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16/941,522	07/28/2020	Nicholas Mozzicato	- SMTX-001-T1-CON	1050

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EXAMINER	
LUCCHESI, NICHOLAS D	

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11/22/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

srlpatents@aol.com

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Applicant-Initiated Interview Summary	**Application No.** 16/941,522	**Applicant(s)** Mozzicato et al.		
	Examiner NICHOLAS D LUCCHESI	**Art Unit** 3772	**AIA (First Inventor to File) Status** Yes	**Page** 1 of 2

All Participants (applicant, applicants representative, PTO personnel)	**Title**	**Type**
NICHOLAS D LUCCHESI	Primary Examiner	Telephonic
Steven Lazar	Attorney	
Dan Burnham	Attorney	

Date of Interview: 15 November 2023

Issues Discussed:

35 U.S.C. 112

The outstanding 112 rejections from the previous office action were discussed. Applicant presented a proposed response (attached). Examiner indicated that the response would be given consideration upon a formal filing. No agreement was reached.

Drawings

The outstanding drawing objections from the previous office action were discussed. Applicant presented a proposed response (attached), which will be given consideration upon a formal filing. No agreement was reached.

Other

Applicant also presented materials related to Post Grant Review of U.S. Patent No. 11660175 and indicated that such materials would be filed in an Information Disclosure Statement. Examiner indicated that the materials would be considered upon review of the IDS prior to the issuance of the next office action.

☑ Attachment

/NICHOLAS D LUCCHESI/ Primary Examiner, Art Unit 3772	

Applicant is reminded that a complete written statement as to the substance of the interview must be made of record in the application file. It is the applicants responsibility to provide the written statement, unless the interview was initiated by the Examiner and the Examiner has indicated that a written summary will be provided. See MPEP 713.04
Please further see:
MPEP 713.04
Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews, paragraph (b)
37 CFR § 1.2 Business to be transacted in writing

Applicant recordation instructions: The formal written reply to the last Office action must include the substance of the interview. (See MPEP section 713.04). If a reply to the last Office action has already been filed, applicant is given a non-extendable period of the longer of one month or thirty days from this interview date, or the mailing date of this interview summary form, whichever is later, to file a statement of the substance of the interview.

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Applicant-Initiated Interview Summary	Application No. 16/941,522	Applicant(s) Mozzicato et al.		
	Examiner NICHOLAS D LUCCHESI	Art Unit 3772	AIA (First Inventor to File) Status Yes	Page 2 of 2

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	*16/941,522*
Confirmation No.	:	*1050*
Inventor	:	*Nicholas Mozzicato*
Applicant	:	*Solmetex LLC*
Filed	:	*July 28, 2020*
Title	:	*Detachable Recycling Container*
TC/A.U.	:	*3772*
Examiner	:	*Nicholas D. Lucchesi*
Docket No.	:	*SMTX-001-T1-CON*
Customer No.	:	*80709*

Commissioner for Patents – via EFS
P.O. Box 1450
Alexandria, Virginia 22313-1450

PROPOSED RESPONSE TO NON-FINAL OFFICE ACTION DATED SEPTEMBER 13, 2023

Dear Commissioner:

The Applicant respectfully requests that this Response to the Non-Final Office Action be entered into the record of the above-captioned patent application.

The Applicant's **Amendments to the Specification** are presented on page 2 of this paper.

The Applicant's **Amendments to the Drawings** are presented on page 5 of this paper.

The Applicant's **Listing of Claims** is presented on page 8 of this paper.

The Applicant's **Remarks** begin on page 13 of this paper.

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AMENDMENT TO SPECIFICATION:

Please amend the specification as follows. A Marked-Up version of the specification and a Clean version of the specification are attached that take into account the amendments below:

- Please amend paragraph [0049] that defines reference numeral "9" to include the word "portion" after "top", as follows:

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--[0049] 9-Recycling Container Top Portion--

- Please delete paragraphs [0074] to [0081] to take into account the deletions of the figures noted below.

- Please amend paragraph [0089] to specifically mention the container top portion, the container inlet conduit, the main body, and the interior volume of the detachable recycling container, as follows:

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--[0089] The air-water separator tank effluent outlet port 14 passes effluent by gravity out of the air-water separator tank 5 and into the detachable recycling container 12 through the recycling container inlet port 15 on the container top portion 9 for target particle separation by sedimentation. After the effluent passes through the inlet port 15 and through the container inlet conduit in the interior volume of the main body of the detachable recycling container 12, solids ~~Solids~~ settle and accumulate in the bottom of the interior volume of the main body of the ~~Recycle~~ detachable recycling container 12. Liquid content of waste flows primarily by gravity, although intermittently assisted by vacuum through Restrictor 11 which slows the flow rate of liquid to assist in sedimentation process and ultimately "clean" effluent discharge through the recycling container outlet port 16 on the container top portion 9.--

- Please amend paragraph [0092] to specifically mention the radially protruding structures of the detachable recycling container, as follows:

I, J

--[0092] The system is provided with a simple back plate 1 for easy dental office placement as well as removable retaining pins 13 that engage radially protruding structures of the detachable recycling container to ensure the recycling container does not detach from the air-water separation tank 5 when there is no vacuum in the system.--

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- Please amend paragraph [0094] to specifically mention the generally cylindrical upper region of the container top portion, as follows:

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--[0094] In one preferred embodiment of the invention designed to minimize recycling costs and waste, the recycling container/sedimentary deposit tank has threads 17 built into the generally cylindrical upper region of the container top portion 9 to enable the addition of a liquid tight top for shipping.--

- Please amend paragraph [0095] to add reference numeral "25" after the word "adapter", as follows:

--[0095] Figure 3 shows a schematic diagram of an adapter 25 according to the invention to enable the use of recycling containers from a variety of sources that are lacking in correctly shaped ports 16 and 15 or otherwise are unable to fit the air-water separator tank 5 according to the invention due to shape differences.—

- Please amend paragraph [0096] to describe the flange structure "22" in a manner consistent with what is illustrated in the figures and to specifically mention the central axis of the main body of the recycling container, as follows:

I, J

--[0096] Figure 4a shows a schematic diagram of the recycling container and cap system (see Figure 5 for more cap 18 detail) according to the present invention. The cap 18 is a two tier shape to allow for a tight grip by both a big and smaller hand in order to achieve a strong seal as required by the invention. An O-ring 21 is provided and fits into an O-ring groove 19 on the recycling container 12 above a flange structure 22 that protrudes radially away from the central axis of the main body of the recycling container 12. The removable retaining pins 13, described above with respect to Figure 2, fit within the region below the flange structure 22. Plugs 20 are used to provide a first leak proof seal for the recycling container 12. These plugs 20 are held in place by the cap 18 when the cap is threaded onto the recycling container as depicted in Figure 5b.

- Please amend paragraph [0097] to remove reference to the deleted figures, to add reference numerals "15", "16" and "24" for the inlet port, outlet port, and keyways, and to specifically mention the circular upper surface of the container top portion, as follows:

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--[0097] ~~Figures~~Figure 6 through Figure 11~~15~~ show several embodiments of irregular keyways 23 on a recycling container. ~~of the present invention, which include the~~ The inlet port 15 and the outlet port 16 are on the circular upper ~~top mating~~ surface of the container top portion, and the irregular keyways 23 are cast into the outer top mating surface for mating with a corresponding keying structure 26 (See FIG. 11B) associated with the air-water separation tank.--

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AMENDMENT TO DRAWINGS:

Please make the following amendments to the drawings. The Applicant has submitted a clean Replacement Drawing Set that takes into account these changes:

- In FIGURE 1, please elongate the reference line for container top portion 9 so that the reference line extends further into the container top portion 9.

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- In FIGURE 2, please change the reference line for the pin 13 from an arrowed lead line to a straight lead line that touches the pin 13.

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- In FIGURES 3A and 3B, please add reference numeral "25" to identify the adapter 25.

- In FIGURE 4A, please add reference numerals "15", "16", and "22" to identify the container inlet port 15, container outlet port 16, and the flange structure 22, respectively.

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- In FIGURE 4B, please add reference numerals "12", "15", "16", "18", "19", "20", "21" and "22" to identify the container 12, the container inlet port 15, the container outlet port 16, the cap 18, the O-ring groove 19, the plugs 20, the O-ring 21, and the flange structure 22, respectively.

D, F

- In FIGURE 4B, please add reference numeral "9" to identify the container top portion 9.

- In FIGURE 5A, please change reference numeral "17" to reference numeral "18" to properly identify the cap 18.

- In FIGURE 5B, please add reference numeral "9" to identify the container top portion 9.

- Please delete FIGURES 6A, 6B, 7A, 7B, 8A, 8B, 9A, and 9B.

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- In FIGURE 10A, please change the figure number to FIGURE 6A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 10B, please change the figure number to FIGURE 6B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 11A, please change the figure number to FIGURE 7A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 11B, please change the figure number to FIGURE 7B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 12A, please change the figure number to FIGURE 8A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 12B, please change the figure number to FIGURE 8B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 13A, please change the figure number to FIGURE 9A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 13B, please change the figure number to FIGURE 9B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

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- In FIGURE 14A, please change the figure number to FIGURE 10A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 14B, please change the figure number to FIGURE 10B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 15A, please change the figure number to FIGURE 11A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 15B, please change the figure number to FIGURE 11B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, one of the keyways 23, and the corresponding keying structure 26 associated with the air-water separation tank 5, respectively.

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LISTING OF CLAIMS:

This listing of claims will replace all prior versions, and listings, of the claims in the application.

1-40. (Canceled)

41. (Previously Presented) A detachable dental-amalgam container for use with a dental amalgam separation system, the dental amalgam separation system having a vacuum source that applies a pressure within the dental amalgam separation system to cause movement of dental amalgam effluent within the detachable dental-amalgam container, the dental amalgam separation system having at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having an interior volume for receiving the dental amalgam effluent from the dental amalgam separation system;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having a circular upper surface from which a container inlet port and a container outlet port extend away from the main body, the container inlet port being positioned nearer to a periphery of the circular upper surface than the container outlet port, the container inlet port for receiving the dental amalgam effluent from the dental amalgam separation system, the container top portion further including at least one radially protruding structure located below the generally cylindrical upper region, the at least one radially protruding structure for engaging the at least one retaining pin of the dental amalgam separation system to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system when the pressure is released from the vacuum source, the at least one radially protruding structure being located radially outward relative to the periphery of the circular upper surface.

42. (Currently Amended) The detachable dental-amalgam container of claim 41, further including a container inlet conduit extending downwardly from the container top portion and into the interior volume, the container inlet conduit being fluidically coupled to the container inlet

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port, the container inlet conduit and the container inlet port for transferring the dental amalgam effluent from the dental amalgam separation system to the interior volume of the main body.

43. (Previously Presented) The detachable dental-amalgam container of claim 41, wherein the inlet port and the outlet port are of the same height.

44. (Previously Presented) The detachable dental-amalgam container of claim 41, wherein the container top portion has a maximum outer dimension that is greater than a maximum outer diameter of the main body.

45. (Previously Presented) The detachable dental-amalgam container of claim 41, further including a pair of plugs configured to seal a container inlet port and a container outlet port of a filled detachable dental-amalgam container.

46. (Previously Presented) The detachable dental-amalgam container of claim 45, further including a cap configured to retain at least one of the plugs on the filled detachable dental-amalgam container.

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47. (Currently Amended) The detachable dental-amalgam container of claim 46, wherein the cap mates with threads on the generally cylindrical upper region to hold the pair of plugs in placehas an inside surface with a first circular wall and a second circular wall, the first circular wall placed so as to engage a first one of the pair of plugs on the container inlet port and the second circular wall placed so as to engage a second one of the pair of plugs on the container outlet port.

48. (Previously Presented) The detachable dental-amalgam container of claim 41, wherein the at least one radially protruding structure defines a maximum outer dimension for the container top portion.

49. (Previously Presented) The detachable dental-amalgam container of claim 41, wherein the generally cylindrical upper region includes external threads.

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50. (Currently Amended) The detachable dental-amalgam container of claim 41, wherein the at least one radially protruding structure includes a flange structure extending in a direction away from the generally cylindrical upper region.

51. (Currently Amended) The detachable dental-amalgam container of claim 50, wherein the flange structure extends entirely around the container top portion.

52. (Currently Amended) The detachable dental-amalgam container of claim 50, wherein the flange structure includes a curved outer surface.

53. (Currently Amended) A detachable dental-amalgam container for use with a dental amalgam separation system, the dental amalgam separation system having a tank that holds dental amalgam effluent and at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having an interior volume for receiving the dental amalgam effluent from the tank of the dental amalgam separation system;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having an upper surface from which a container inlet port and a container outlet port extend away from the main body, the container inlet port being positioned nearer to a periphery of the upper surface than the container outlet port, each of the container inlet port and the container outlet port ~~including an external o ring at upper portions thereof that~~ is configured to help provide a seal between the detachable dental-amalgam container and the dental amalgam separation system, the container top portion further including at least one radially protruding structure located below the generally cylindrical upper region, the at least one retaining pin of the dental amalgam separation system adapted to be received below the at least one radially protruding structure ~~defining a pin receiving region therebelow for receiving the at least one retaining pin of the dental amalgam separation system~~ to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system, the at least

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one radially protruding structure protrudes radially outward of the container top portion such that it is located outward from the periphery of the upper surface;

a container inlet conduit extending downwardly from the container top portion and into the interior volume, the container inlet conduit being coupled to the container inlet port, the container inlet conduit and the container inlet port for transferring the dental amalgam effluent from the tank of the dental amalgam separation system to the interior volume of the main body; and

wherein the container outlet port is for being coupled to a system outlet port of the dental amalgam separation system such that the fluid from the dental amalgam effluent is moved from the interior volume of main body, through the container outlet port, and into the system outlet.

54. (Previously Presented) The detachable dental-amalgam container of claim 53, further including a pair of plugs configured to seal a container inlet port and a container outlet port of a filled detachable dental-amalgam container, and a cap that retains at least one of the plugs on the filled detachable dental-amalgam container.

55. (Currently Amended) The detachable dental-amalgam container of claim 53, wherein the at least one radially protruding structure includes a flange structure extending away from a lower portion of the generally cylindrical upper region.

56. (Currently Amended) The detachable dental-amalgam container of claim 55, wherein the flange structure extends entirely around the container top portion.

57. (Currently Amended) The detachable dental-amalgam container of claim 55, wherein the flange structure includes a curved outer surface.

58. (Previously Presented) The detachable dental-amalgam container of claim 53, wherein the generally cylindrical upper region includes external threads.

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59. (Previously Presented) The detachable dental-amalgam container of claim 53, further including a restrictor located within the interior volume of the main body and fluidically coupled to the container outlet port, the restrictor configured to remove fine particles from the dental amalgam effluent so that the fine particles are not discharged from the container outlet port.

60. (Previously Presented) A detachable dental-amalgam container for use with a dental amalgam separation system, the dental amalgam separation system having a tank for receiving the dental amalgam effluent and at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having an interior volume for receiving the dental amalgam effluent from the tank of the dental amalgam separation system;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having a circular upper surface from which a container inlet port and a container outlet port extend away from the main body, the container inlet port being positioned nearer to a periphery of the circular upper surface than the container outlet port, the container inlet port for receiving the dental amalgam effluent from the tank of the dental amalgam separation system, the container top portion further including at least one radially protruding structure located below the generally cylindrical upper region, the at least one radially protruding structure being located radially outward relative to the periphery of the circular upper surface, the at least one radially protruding structure for being positioned above the at least one retaining pin of the dental amalgam separation system to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system.

61. (Previously Presented) The detachable dental-amalgam container of claim 60, further including a restrictor located within the interior volume of the main body and fluidically coupled to the container outlet port, the restrictor configured to remove fine particles from the dental amalgam effluent so that the fine particles are not discharged from the container outlet port.

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REMARKS

Claims 41-61 remain in the application for further prosecution. Claims 42, 47, 50–53, and 55–57 are presently being amended. No new matter is being added.

I. Changes Made to Drawings and Specification

For consistency, Applicant is now making the same drawing and specification changes that were made in Office Action Responses dated February 7, 2023 and March 22, 2023 in the child application, Patent Application No. 17/965,556, now granted as U.S. Patent No. 11,660,175. The only differences from the parent application are the corresponding keying structure 26, which was added to new FIG. 11B at the request of the Examiner and correspondingly explained in the specification at [0097].

a. Drawing Changes

The Applicant respectfully suggests that the initial drawings illustrated the features in the pending claims. The Applicant is now submitting a Replacement Drawing Set that makes the following changes:

- In FIGURE 1, the reference line for the container top portion 9 was elongated so that the reference lines extends further into the container top portion 9.
- In FIGURE 2, the reference line for the pin 13 was changed from an arrowed lead line to a straight lead line that touches vertical segment of the pin 13.
- FIGURES 3A and 3B previously had no reference numerals. As requested by the Examiner, reference numeral “25” has now been added to identify the adapter 25.
- In FIGURE 4A, reference numerals “15”, “16”, and “22” were added to identify the container inlet port 15, container outlet port 16, and the flange structure 22, respectively.
- FIGURE 4B previously had no reference numerals. As requested by the Examiner, reference numerals “9,” “12”, “15”, “16”, “18”, “19”, “20”, “21” and “22” have now been added to identify the container top portion 9, container 12, the container inlet port 15, the container outlet port 16, the cap 18, the O-ring groove 19, the plugs 20, the O-ring 21, and the flange structure 22, respectively.

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- In FIGURE 5A, reference numeral "17" was changed to reference numeral "18" to properly identify the cap 18.
- In FIGURE 5B, reference numeral "9" was added to identify the container top portion 9.
- FIGURES 6A, 6B, 7A, 7B, 8A, 8B, 9A, and 9B have now been deleted, to be consistent with the parent application.
- Due to the former FIGURES 6-9 being deleted, FIGURES 10A, 10B, 11A, 11B, 12A, 12B, 13A, 13B, 14A, 14B, 15A, and 15B have now been renumbered. Further, these figures previously had no reference numerals. As requested by the Examiner, in each of these figures, reference numerals "15", "16", and "23" have been added to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.
- In FIGURE 11B, the "corresponding keying structure" was added and identified with reference numeral "26" as requested by the Examiner.

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end

Within these changes to the drawings, the only new reference numerals being added are the flange structure 22, the keyways 23, the adapter 25, and the corresponding keying structure 26. Because the original drawings and specification previously disclosed these features, no new matter has been added by these drawing changes. Furthermore, the amendments to the specification to account for these drawing changes are also consistent with the originally filed drawings and specification and, therefore, no new matter has been added by these amendments to the specification.

b. Specification Changes

In light of the changes to the drawings noted above, and for purposes of making the specification consistent with the parent application, the following changes have been made to the specification. The only difference from the parent application is the corresponding keying structure 26 which was added to new FIG. 11B at the request of the Examiner and correspondingly explained in the specification at [0097].

- The "main body" and the "interior volume": The detachable recycling container 12 has a main body with an interior volume for receiving the effluent, as shown throughout the

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drawings, such as FIG. 1. Paragraph [0089] has been amended to specifically use the term "main body" and "interior volume", which is supported by the original specification and drawings.

- The "central axis": The "central axis" of the main body of the recycling container 12 is shown in FIG. 4A. Paragraph [0096] has been amended accordingly in a manner that is supported by the original specification and drawings.
- The "container top portion": The "container top" is mentioned in Paragraph [0049] as being associated with reference numeral 9, which is shown in FIG. 1. For clarity Paragraph [0049] has been amended to include the word "portion" after "top." For clarity, FIGS. 4B and 5B have now been amended to include reference numeral 9 to refer to the container top portion. Paragraphs [0089] and [0094] have been amended to specifically use the term "container top portion", which is supported by the original specification and drawings.

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- The "cylindrical upper region" and the "circular upper surface": The cylindrical upper region of the container top portion 9 that has the circular upper surface is shown throughout the figures. For example, as shown in FIGS. 1 and 4A, the generally cylindrical upper region is where the threads 17 of the container are located. Paragraph [0094] has been amended to specifically use the term "generally cylindrical upper region." Paragraph [0097] describes the inlet port 15 and the outlet port 16 in FIGS. 6-11 and has been amended to refer to the circular upper surface of the container top portion. These amendments are supported by the original specification and drawings.
- The "radially protruding structures" and the "flange structure": Paragraph [0092] has been amended to specifically use the term "radially protruding structures" that can be engaged by the removable retaining pins 13. The flange structure 22 illustrated in FIGS. 4A and 4B is an example of such a radially protruding structure. Paragraph [0096] has been amended to specifically use the term "flange structure" that protrudes radially away from the central axis of the main body of the recycling container. These amendments are supported by the original specification and drawings.

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- The "container inlet conduit": As shown in FIG. 1, a container inlet conduit extends downwardly directly below the container inlet port 15 and into the interior volume of the main body of the detachable recycling container 12. Paragraph [0089] has been amended to

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describe this configuration in a manner that is supported by the original specification and drawings.

- The "corresponding keying structure": As shown in FIG. 11B, the corresponding keying structure mates with the irregular keyways cast into the outer top mating surface of the container top portion. Paragraph [0097] has been amended to describe the corresponding keying structure 26 that was added to FIG. 11B at the request of the Examiner. The description of the keying structure in paragraph [0097] is consistent with the description of the keying system that is described in paragraph [0032] of the original specification.

The Applicant appreciates the Examiner's careful review of the claims and believes that these changes to the specification should obviate the specification objections. The Applicant further notes that 37 CFR §1.75(d)(1) and MPEP §608.01(o) indicate the terms and phrases used in the claims should find support or antecedent basis in the description. As noted above, the Applicant believes a skilled artisan would understand the claim elements subject to these objections are clearly supported by the originally filed specification and drawings. As such, no new matter has been added. *See also. Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1352 (Fed. Cir. 2010) (en banc) ("the description requirement does not demand any particular form of disclosure, or that the specification recite the claimed invention *in haec verba*").

II. Section 112 Rejections

Claims 41–61 have been rejected under 35 U.S.C. §112(a) as allegedly failing to comply with the written description requirement. For reasons unrelated to patentability and to advance prosecution, the claims and the specification have been amended to clarify the language used in the claims as suggested by the Examiner. As such, the Applicant respectfully suggests that the present application describes the claimed subject matter in a way that would permit the skilled artisan to make and use the invention.

Consequently, the Applicant believes that all of the pending claims meet the requirements of 35 U.S.C. §112.

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III. Double Patenting

Claims 41–61 were rejected on the ground of nonstatutory double patenting as allegedly being unpatentable over claims 1–22 of U.S. Patent No. 11,660,175. While Applicant respectfully disagrees, for reasons unrelated to patentability and to advance prosecution, a terminal disclaimer in compliance with 37 C.F.R. § 1.321 is submitted herewith for overcoming the double patenting rejection. The submission of this terminal disclaimer should not be construed as an admission to the merits of the obviousness-type double-patenting rejections pursuant to *Quad Environ. Tech. Corp. v. Union Sanitary District*, 946 F.2d 870 (Fed. Cir. 1991). Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

IV. Conclusion

Applicant submits that the claims are in a condition for allowance and action toward that end is earnestly solicited. If there are any matters which may be resolved or clarified through a telephone interview, the Examiner is respectfully requested to contact Applicant's undersigned attorney at the number indicated.

It is believed that no fees are due; however, should any fees be required (except for payment of the issue fee), the Commissioner is requested to contact the undersigned attorney for Applicant.

Respectfully submitted,

Date:

By: /Steven R. Lazar/
Steven R. Lazar
Attorneys for Applicant
Registration No. 32,618

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AKE DENTAL AMALGAM SEPARATION AND RECYCLING SYSTEM

RELATED APPLICATIONS

[1] This patent application claims priority from provisional patent application serial number 62/414,712, filed on October 29, 2016; and provisional patent application serial number 62/406,990, filed on October 12, 2016. This application further claims priority from patent application serial number 29/667,212, filed October 19, 2018, which is a continuation of serial number 29/585,659, filed on November 28, 2016, now patent number D835,778. This patent application further claims priority from patent application serial number 29/585,674, filed on November 28, 2016. This patent application further claims priority from patent application serial number 29/672,887, filed on December 10, 2018, which is a continuation of patent application serial number 29/585,668, filed on November 28, 2016, now patent number D835,779. This patent application further claims priority from patent application serial number 29/577,701, filed on September 14, 2016. This patent application further claims priority from patent application serial number 29/567,544, filed on June 9, 2016. This patent application further claims priority from patent application serial number 29/671,943, filed on November 30, 2018, which is a continuation of patent application serial number 29/565,622, filed on May 23, 2016, now issued patent D835,264.

FIELD OF THE INVENTION

[2] This invention relates to systems and apparatus suitable to remove particles from effluent waste, and particularly, to remove amalgam and other metallic particles and other abrasive solids from dental office suction effluent. The system also comprises a self contained recycling container to facilitate customer regulatory compliance and environmental safeguards.

BACKGROUND OF THE INVENTION

[3] Dental amalgam is a dental filling material used to fill cavities caused by tooth decay. It has been used for more than 150 years in hundreds of millions of patients around the world.

[4] Dental amalgam is a mixture of metals, consisting of liquid (elemental) mercury and a powdered alloy composed of silver, tin, and copper. Approximately 50% of dental amalgam is

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elemental mercury by weight. The chemical properties of elemental mercury allow it to react with and bind together the silver/copper/tin alloy particles to form an amalgam. See http://www.fda.gov/MedicalDevices/ProductsandMedical_Procedures/DentalProducts/DentalAmalgam/ucm171094.htm, accessed September 9, 2016.

[5] Amalgam is used less often than in the past, mostly because tooth-colored materials now can be used. However, the newer materials can't be used for all dental situations, amalgam is less costly than newer materials and it lasts longer, especially in teeth that undergo a lot of pressure and wear from chewing.

[6] Better dental health overall coupled with increased demand for more modern alternatives such as resin composite fillings (which match the tooth color), as well as public concern about the mercury content of dental amalgam, have resulted in a steady decline in dental amalgam use in developed countries, though overall amalgam use continues to rise worldwide. Stein, PS; Sullivan, J; Haubenreich, JE; Osborne, PB (2005). "Composite resin in medicine and dentistry". Journal of long-term effects of medical implants. 15 (6): 641–54. doi:10.1615/jlongtermeffmedimplants. v15.i6.70. PMID 16393132.

[7] Although amalgams are less frequently used in developed countries for new dental fillings than in the past, amalgams continue to make up a portion of the particle component of dental office effluent mainly because of the fact that old fillings made of amalgams are drilled out and removed in the effluent waste when new fillings are effected to replace the old. Further, as noted above, even under current dental practice, an amalgam is preferred for some tooth filling situations.

[8] Because mercury is a poison that can accumulate in living tissues and can pose a health hazard to species in a food chain exposed to mercury-containing compounds, and since humans are inevitably at the end of the food chain, it follows that effluent containing amalgams can pose a health hazard to the community at large. Also, certain metals such as silver are commercially valuable if recovered in quantity. For those reasons, it is desirable to devise systems, apparatus and processes for removing amalgams from dental office effluent and efficiently recycling those amalgams.

[9] In addition to removing amalgams, other matter disposed into dental office suction effluent includes aluminum oxides used in air abrasion treatments and other solid waste

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material. These solid materials tend to wear out or damage vacuum pumps and other equipment downstream of the dental chair suction apparatus, and also constitute effluent water contaminants. Therefore, it is desirable for the apparatus to remove solid abrasive material and other particulate waste from the dental office suction effluent.

[10] The World Health Organization also points out that amalgam separators, installed in the waste water lines of many dental offices, dramatically decrease the release of mercury into the public sewer system. However, critics say that the separators are still not mandatory in some states of the United States. "Purchasing, installing and operating dental amalgam separators: Practical issues". The Journal of the American Dental Association. 134 (8): 1054–65. doi:10.14219/jada.archive.2003.0319. PMID 12956345. Recently, the EPA has enacted nation-wide regulations requiring amalgam separators in dental offices.

[11] Previously known apparatus for removing amalgam particles from dental office suction effluent are known to include a collecting tank for collecting a day's accumulation of suction effluent from one or more sources of such waste. The waste is sucked from the dental chair suction apparatus and into the collecting tank by a vacuum pump. When the vacuum pump is turned off, an outlet valve is opened and the accumulated waste is deposited into a separation device intended to separate metal particles from the effluent liquid. Flow into the separation device is induced by the head of fluid in the collecting tank. Particles passing through the separation device are separated from the waste by gravity and settle to the bottom of the separation device. The flow rate is dependent on the head inside the collecting tank; as the head diminishes, the flow rate also diminishes. The changes in flow rate are undesirable because the particle separation rate is affected, and the system becomes prone to plugging when the flow rate decreases. Also, since the waste can be deposited only when the vacuum pump is off, waste is usually moved to the separation device at the end of the day. As a result, the collecting tank and separation device tend to be undesirably large and the whole process is time consuming.

[12] Another known apparatus is a centrifuge type system that separates heavier metal particles from effluent liquid by collecting the particles at the peripheral wall of the centrifuge. This apparatus does not effectively separate lighter particles, and is expensive to purchase and operate due to the complexity of its mechanical parts.

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[13] Yet another known apparatus uses a dedicated mechanical pump to suction waste liquids through a separator device. Again, a dedicated pump can be expensive to purchase and to maintain, and can be undesirably space-consuming.

[14] Such known systems can become quite complex, unwieldy and expensive, as for example that disclosed in U.S. Pat. No. 5,885,076 granted 23 Mar. 1999. It teaches the use of sedimentation, co-precipitation and filtration in an expensive complicated apparatus that is probably economical, if at all, only for relatively large installations such as a military base dental complex.

[15] U.S. Pat. No. 6,692,636 and U.S. Pat. No. 6,596,754 are patents that disclose systems for removing amalgam from dental office suction effluent.

[16] After collecting the amalgam and other solid waste the dentist is left with the problem of what to do with the waste. Either the dentist has to deal with his own hazardous waste or he can send his collected material to a recycler. In either case, the "collection container" needs to be disposable and easily replaceable.

[17] Existing recycling programs generally require the provision of bulky shipping materials and the delivery of those materials to the dentist for every full container. If such materials are not provided and the materials are not properly recycled a large part of the benefit of collecting the amalgam waste can be lost. It is important that the waste is recycled under federal guidelines in order to make sure the full benefits of amalgam separation are achieved.

[18] Additionally, containers for collection, such as dental amalgam recycling systems, can be compromised by incorrect installation or misalignment, which can cause O-rings to deform and/or seal irregularly, and result in leakage.

SUMMARY OF THE INVENTION

[19] The present invention overcomes many of the shortcomings of the prior technology and achieves further advantages that will be apparent after reviewing the following detailed description.

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[20] In one aspect, the invention comprises a dental amalgam recycling system for recycling particles from a dental liquid effluent drawn from a suctioning device. In certain embodiments, the dental amalgam recycling system of the invention comprises:

[21] (a) an air-water separator tank for receiving said effluent, said air-water separator tank having an air-water separator tank inlet in fluid communication with said suctioning device, an air-water separator tank liquid effluent outlet and an air-water separator tank air outlet;

[22] (b) a detachable recycling container, said recycling container acting primarily under the influence of gravity to cause settlement of said particles; said recycling container having a recycling container effluent inlet port connected to said air-water separator tank liquid effluent outlet and said recycling container further having an effluent outlet port;

[23] (c) wherein the air-water separator tank also includes an internal suction conduit;

[24] (d) wherein the recycling container comprises threads;

[25] (e) wherein the recycling container effluent inlet port and the recycling container outlet port are not the same height.

[26] In certain embodiments, the dental amalgam recycling system further comprises (f) a threaded shipping cap, wherein the threads of the shipping cap and the threads of the recycling container are complementary such that, when the shipping cap is fitted in place, the shipping cap forms a tight seal with said recycling container.

[27] While in use, the dental amalgam recycling system is functionally associated with a vacuum pump having a vacuum pump inlet. The vacuum pump is typically a pre-existing part of the dental office facility. In particular embodiments, the dental amalgam recycling system is physically connected with a vacuum pump via a suction conduit in the air-water separator. In certain preferred embodiments, the suction conduit is an internal suction conduit within the air-water separator.

[28] In certain embodiments, the dental amalgam recycling system of the invention further comprise a first plug for said recycling container inlet port and a second plug for said recycling container effluent outlet port. Said first and second plugs may be held tightly in place by said threaded shipping cap when said shipping cap is fitted in place.

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[29] In certain embodiments, the dental amalgam recycling system of the invention further comprise an O-ring that provides an air and effluent tight seal when said shipping cap is fitted in place.

[30] In certain embodiments, the invention comprises a container, useful as a dental amalgam recycling container, comprising threads for attachment of a shipping cap. In certain embodiments, the dental amalgam recycling container further comprises two plugs held in place by said shipping cap and an O-ring fitted in an O-ring groove to prevent leaks. The dental amalgam recycling containers of the present invention may further comprise a two tier cap that enables people with hands of different sizes to grip the cap and tighten to achieve a very tight seal.

[31] In certain embodiments, the invention comprises an adapter for an air-water separator tank, wherein the adapter enables a recycling container without compatible effluent ports to attach to an air-water separator tank. Said air-water separator tank may comprise, for example, a component of a dental amalgam recycling system, as described above. In certain embodiments, the adapter may comprise threads. In alternative embodiments, the adaptor may be without threads.

[32] As described above, the potential for leakage exists in a collection canister such as a recycling container used in the dental amalgam recycling systems described herein. Such leakage may occur, for example, due to incorrect installation, or due to misalignment of a container and its intended mating partner, such as the air-water separation tank or its intended cap, such as a threaded shipping cap, which may cause O-rings to deform and/or seal irregularly. In order to address this problem and/or reduce the potential for leakage, a collection canister, such as a recycling container used in a dental amalgam recycling system, may have one or more irregular 'keyways' cast into its outside top mating surface, and the intended mating partner, such as the air-water separation tank, or the shipping cap, may have one or more corresponding 'key(s)' be cast into its mating surface, such that the key(s) and keyway(s) must be aligned in order for the collection canister (e.g., the recycling container) and its mating partner (e.g., the air-water separation tank; or the shipping cap) to mate properly. This key/keyway system can help ensure even pressure across the entire circumference of the O-ring surface on each port. Similarly, such key(s) and keyway(s) may be used to ensure proper

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replacement of the container and/or the air-water separation tank, such that incorrect replacement can be avoided or minimized.

BRIEF DESCRIPTION OF THE DRAWINGS

[33] FIG. 1 is a schematic front view of an embodiment of particle removal and recycling apparatus according to the invention, for particular use in a dental office.

[34] FIG. 2 is a schematic side view of an embodiment of particle removal and recycling apparatus according to the invention, for particular use in a dental office.

[35] FIG. 3a is a schematic view of an embodiment of a universal adapter for fitting various different sized recycling containers to the air-water separator of the present invention.

[36] FIG. 3b is a schematic view of an alternative embodiment of a universal adapter for fitting various different sized recycling containers to the air-water separator of the present invention.

[37] FIG. 4a is a schematic view of an embodiment of a recycling container and cap system of the invention.

[38] Fig. 4b is a schematic perspective depiction of an embodiment of a recycling container and cap system of the invention.

[39] FIG. 5a is a schematic inside view of an embodiment of a recycling cap for the recycling containers of the invention.

[40] Fig. 5b is a schematic depiction of a recycling cap according to the invention fitting on a partial view of a recycling container according to the invention.

[41] 1-Backplate

[42] 2-Waste Inlet (from dental practice)

[43] 3-Air/water Separator Top

[44] 4-Top Support Bracket

[45] 5-Air/Water Separation Tank

[46] 6-Suction tube

[47] 7-Air/Water Separator Base

[48] 8-0utlet Tube (to vacuum system)

[49] 9-Recycling Container Top Portion

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[50] 10-Lower Support Bracket

[51] 11-Restrictor

[52] 12-Detachable Recycling Container

[53] 13-Retaining Pins (2)

[54] 14- air-water separator tank effluent outlet port

[55] 15- recycling container inlet port

[56] 16- recycling container outlet port

[57] 17- recycling container threads

[58] 18- two tier recycling cap

[59] 19- O-ring groove

[60] 20- cap plugs

[61] 21- O-ring

[62] Figure 6A is a schematic view of a first embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[63] Figure 6B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[64] Figure 7A is a schematic view of a second embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[65] Figure 7B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[66] Figure 8A is a schematic view of a third embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[67] Figure 8B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[68] Figure 9A is a schematic view of a fourth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[69] Figure 9B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[70] Figure 10A is a schematic view of a fourth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

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[71] Figure 10B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[72] Figure 11A is a schematic view of a fifth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[73] Figure 11B is a schematic view of the same embodiment, viewing the top of the container from directly above.

~~[74] Figure 12A is a schematic view of a sixth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.~~

~~[75] Figure 12B is a schematic view of the same embodiment, viewing the top of the container from directly above.~~

~~[76] Figure 13A is a schematic view of a seventh embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.~~

~~[77] Figure 13B is a schematic view of the same embodiment, viewing the top of the container from directly above.~~

~~[78] Figure 14A is a schematic view of a eighth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.~~

~~[79] Figure 14B is a schematic view of the same embodiment, viewing the top of the container from directly above.~~

~~[80] Figure 15A is a schematic view of a ninth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.~~

~~[81] Figure 15B is a schematic view of the same embodiment, viewing the top of the container from directly above.~~

DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

[82] According to one aspect of the instant invention, an apparatus is provided for removing and recycling metal-containing particles and other waste particles from effluent, particularly effluent from a dental office. While herein the term “metal particles” may frequently be employed, it is contemplated that the apparatus is capable of separating other solid particles from effluent liquid.

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[83] According to one aspect of the invention, an apparatus for removing metal particles and other solid particles from liquid suction effluent can be installed in a dental office using a pre-existing suction/vacuum pump system. The apparatus may share a common vacuum pump with conventional dental chair suction apparatus, without interrupting the use of suction equipment at the dental chairs.

[84] Removal of solid particles from liquid suction effluent is effected by sedimentation.

[85] In accordance with a one embodiment of the invention, the dental office suction effluent is passed from dental chair suction equipment outlets to an air water separator tank via a suitable inlet port for the tank. The air-water separator tank in turn passes effluent into a sedimentary deposit tank, closed on all sides when in use and preferably readily detachable for emptying or replacement.

[86] In certain aspects of the instant invention the sedimentary deposit tank has a secondary function as a recycling container. In another aspect of the invention this recycling container can have features built in to make recycling easier and to reduce the amount of packaging and waste in the recycling system.

[87] In another embodiment of the invention designed to minimize the space required to install the amalgam recycling system the air-water suction tube is internalized – within the air-water separator tank.

[88] Figure 1 and Figure 2 shows two views of the separation apparatus according to the present invention in detail. Effluent from the dental chairs and a quantity of air are sucked through a suction apparatus exhaust conduit, through an air-water separator tank inlet 2, and thence into an air-water separator tank 5. The liquid effluent passes out of the air-water separator tank 5 via air-water separator tank outlet port 14, while air passes downstream via the air suction tube 6 while maintaining constant vacuum upstream of amalgam separator.

[89] The air-water separator tank effluent outlet port 14 passes effluent by gravity out of the air-water separator tank 5 and into the detachable recycling container 12 through the recycling container inlet port 15 on the container top portion 9 for target particle separation by sedimentation. After the effluent passes through the inlet port 15 and through the container inlet conduit in the interior volume of the main body of the detachable recycling container 12, solids ~~Solids~~ settle and accumulate in the bottom of the interior volume of the main body of the

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~~Recycle~~ detachable recycling container 12. Liquid content of waste flows primarily by gravity, although intermittently assisted by vacuum through Restrictor 11 which slows the flow rate of liquid to assist in sedimentation process and ultimately "clean" effluent discharge through the recycling container outlet port 16 on the container top portion 9.

[90] Outlet ports 16 and inlet port 15 can be a variety of shapes and sizes, square, oval (as depicted), round or even more unusual shapes like a star. Preferred ports are those that provide a tight seal, allow for easy removal, and do not break. Oval or round are preferred embodiments. Round are most preferred.

[91] A vacuum at the outlet tube 8 is generated when the vacuum pump is operating, thereby sucking air out of the air-water separator tank 5 via suction tube 6 while maintaining vacuum upstream of amalgam separator apparatus. Effluent from the recycling container 12 passes through the restrictor 11 where remaining non-settable fine particles are removed from the effluent and into the recycling container outlet port 16 to be discharged from the apparatus via common outlet tube 8. Matter sucked by the vacuum pump, generally free of removed solids, is discharged via vacuum pump into a municipal drain of the public sewage system.

[92] The system is provided with a simple back plate 1 for easy dental office placement as well as removable retaining pins 13 that engage radially protruding structures of the recycling container to ensure the recycling container does not detach from the air-water separation tank 5 when there is no vacuum in the system.

[93] In certain embodiments, the recycling container ports 16 and 15 may be different heights in order to aid in alignment of the detachable recycling container 12 in the air-water separator base 7. In a preferred embodiment, the outlet port 16 engages before the inlet port 15 while during removal the inlet port 15 disengages first. This causes a small volume of fluid to be pulled out of the collection container back into air-water separator tank 5 creating head space and eliminating upward force of vacuum which eases removal of recycle container 12 by operator. Existing devices require rocking, wiggling or applying extensive down force for removal of recycle container 12.

[94] In one preferred embodiment of the invention designed to minimize recycling costs and waste, the recycling container/sedimentary deposit tank has threads 17 built into the

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generally cylindrical upper region of the container top portion 9 to enable the addition of a liquid tight top for shipping.

[95] **Figure 3** shows a schematic diagram of an adapter **25** according to the invention to enable the use of recycling containers from a variety of sources that are lacking in correctly shaped ports **16** and **15** or otherwise are unable to fit the air-water separator tank **5** according to the invention due to shape differences.

[96] **Figure 4a** shows a schematic diagram of the recycling container and cap system (see **Figure 5** for more cap **18** detail) according to the present invention. The cap **18** is a two tier shape to allow for a tight grip by both a big and smaller hand in order to achieve a strong seal as required by the invention. An O-ring **21** is provided and fits into an O-ring groove **19** on the recycling container **12** above a flange structure **22** that protrudes radially away from the central axis of the main body of the recycling container **12**. The removable retaining pins **13,** described above with respect to Figure 2, fit within the region below the flange structure **22.** Plugs **20** are used to provide a first leak proof seal for the recycling container **12.** These plugs **20** are held in place by the cap **18** when the cap is threaded onto the recycling container as depicted in **Figure 5b**.

[97] ~~Figures~~**Figure 6** through **Figure 11~~15~~** show several embodiments of irregular keyways **23** on a recycling container. ~~of the present invention, which include the~~ The inlet port **15** and the outlet port **16** are on the circular upper ~~top mating~~ surface of the container top portion, and the irregular keyways **23** are cast into the outer top mating surface for mating with a corresponding keying structure 26 (See FIG. 11B) associated with the air-water separation tank.

[98] Generally, under present practice, the dental staff will not be able to remove deposited sediment from the recycle container nor remove accumulated particle residues from the restrictor unit themselves. Thus, it is desirable that such removal be done by a competent effluent residue processing facility. Therefore, under present practice, it is expected to be preferred that the recycling container with its enclosed restrictor unit be removed when full, or periodically replaced by fresh tanks from time to time as required. The spent tank with an accumulation of metallic and other particles can then be sent to a processing facility for proper

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disposal of the targeted metallic particles, such as mercury, and recovery of precious metals such as silver.

[99] Although the sedimentary deposit process is effective to remove a satisfactorily high proportion of the target particles desired to be removed from the effluent, the recycling container desirably includes an outlet restrictor right in the chamber to catch any floating materials as well as any other materials that did not settle out.

[100] If the recycle container is not changed as required or filled beyond normal capacity, waste liquid from dental practice may back up into air water separator tank. Should this occur, effluent overflows through the air suction tube and into the outlet port and is discharged into the vacuum pump draw line and thence eventually into the municipal drain. However, it is desirable that the system should operate in such a manner as to avoid having the air-water separator tank become completely full, since effluent exiting through the air outlet port will contain particles that will not be separated by the separator. If, however, such a by-pass condition occurs at no time will the suction generated by the vacuum pump be lost or interrupted at the dental office.

[101] In a further embodiment of the invention oriented towards large-scale institutional applications, in which many dental chairs or other sources of effluent are connected to the same suction and drain services, several parallel-connected recycling containers and associated apparatus, each such composite apparatus including a air-water separator tank and preferably one, or alternatively two attached recycling containers, may be operated in parallel to provide sufficient treatment capacity for large effluent volumes.

[102] All publications, web-sites, patents and patent applications cited in the specification are hereby incorporated herein by reference in their entirety for the disclosure for which they are cited.

[103] Having read the above specification, other alternatives and variants of the above described methods and apparatus suitable for practicing the methods will occur to those skilled in the technology. Such alternatives, modifications and variants fall within the scope of the present invention.

[104] The invention as described above also includes the following non-limiting claims, which describe particular embodiments of the invention.

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AKE DENTAL AMALGAM SEPARATION AND RECYCLING SYSTEM

RELATED APPLICATIONS

[1] This patent application claims priority from provisional patent application serial number 62/414,712, filed on October 29, 2016; and provisional patent application serial number 62/406,990, filed on October 12, 2016. This application further claims priority from patent application serial number 29/667,212, filed October 19, 2018, which is a continuation of serial number 29/585,659, filed on November 28, 2016, now patent number D835,778. This patent application further claims priority from patent application serial number 29/585,674, filed on November 28, 2016. This patent application further claims priority from patent application serial number 29/672,887, filed on December 10, 2018, which is a continuation of patent application serial number 29/585,668, filed on November 28, 2016, now patent number D835,779. This patent application further claims priority from patent application serial number 29/577,701, filed on September 14, 2016. This patent application further claims priority from patent application serial number 29/567,544, filed on June 9, 2016. This patent application further claims priority from patent application serial number 29/671,943, filed on November 30, 2018, which is a continuation of patent application serial number 29/565,622, filed on May 23, 2016, now issued patent D835,264.

FIELD OF THE INVENTION

[2] This invention relates to systems and apparatus suitable to remove particles from effluent waste, and particularly, to remove amalgam and other metallic particles and other abrasive solids from dental office suction effluent. The system also comprises a self contained recycling container to facilitate customer regulatory compliance and environmental safeguards.

BACKGROUND OF THE INVENTION

[3] Dental amalgam is a dental filling material used to fill cavities caused by tooth decay. It has been used for more than 150 years in hundreds of millions of patients around the world.

[4] Dental amalgam is a mixture of metals, consisting of liquid (elemental) mercury and a powdered alloy composed of silver, tin, and copper. Approximately 50% of dental amalgam is

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elemental mercury by weight. The chemical properties of elemental mercury allow it to react with and bind together the silver/copper/tin alloy particles to form an amalgam. See http://www.fda.gov/MedicalDevices/ProductsandMedical_Procedures/DentalProducts/DentalAmalgam/ucm171094.htm, accessed September 9, 2016.

[5] Amalgam is used less often than in the past, mostly because tooth-colored materials now can be used. However, the newer materials can't be used for all dental situations, amalgam is less costly than newer materials and it lasts longer, especially in teeth that undergo a lot of pressure and wear from chewing.

[6] Better dental health overall coupled with increased demand for more modern alternatives such as resin composite fillings (which match the tooth color), as well as public concern about the mercury content of dental amalgam, have resulted in a steady decline in dental amalgam use in developed countries, though overall amalgam use continues to rise worldwide. Stein, PS; Sullivan, J; Haubenreich, JE; Osborne, PB (2005). "Composite resin in medicine and dentistry". Journal of long-term effects of medical implants. 15 (6): 641–54. doi:10.1615/jlongtermeffmedimplants. v15.i6.70. PMID 16393132.

[7] Although amalgams are less frequently used in developed countries for new dental fillings than in the past, amalgams continue to make up a portion of the particle component of dental office effluent mainly because of the fact that old fillings made of amalgams are drilled out and removed in the effluent waste when new fillings are effected to replace the old. Further, as noted above, even under current dental practice, an amalgam is preferred for some tooth filling situations.

[8] Because mercury is a poison that can accumulate in living tissues and can pose a health hazard to species in a food chain exposed to mercury-containing compounds, and since humans are inevitably at the end of the food chain, it follows that effluent containing amalgams can pose a health hazard to the community at large. Also, certain metals such as silver are commercially valuable if recovered in quantity. For those reasons, it is desirable to devise systems, apparatus and processes for removing amalgams from dental office effluent and efficiently recycling those amalgams.

[9] In addition to removing amalgams, other matter disposed into dental office suction effluent includes aluminum oxides used in air abrasion treatments and other solid waste

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material. These solid materials tend to wear out or damage vacuum pumps and other equipment downstream of the dental chair suction apparatus, and also constitute effluent water contaminants. Therefore, it is desirable for the apparatus to remove solid abrasive material and other particulate waste from the dental office suction effluent.

[10] The World Health Organization also points out that amalgam separators, installed in the waste water lines of many dental offices, dramatically decrease the release of mercury into the public sewer system. However, critics say that the separators are still not mandatory in some states of the United States. "Purchasing, installing and operating dental amalgam separators: Practical issues". The Journal of the American Dental Association. 134 (8): 1054–65. doi:10.14219/jada.archive.2003.0319. PMID 12956345. Recently, the EPA has enacted nation-wide regulations requiring amalgam separators in dental offices.

[11] Previously known apparatus for removing amalgam particles from dental office suction effluent are known to include a collecting tank for collecting a day's accumulation of suction effluent from one or more sources of such waste. The waste is sucked from the dental chair suction apparatus and into the collecting tank by a vacuum pump. When the vacuum pump is turned off, an outlet valve is opened and the accumulated waste is deposited into a separation device intended to separate metal particles from the effluent liquid. Flow into the separation device is induced by the head of fluid in the collecting tank. Particles passing through the separation device are separated from the waste by gravity and settle to the bottom of the separation device. The flow rate is dependent on the head inside the collecting tank; as the head diminishes, the flow rate also diminishes. The changes in flow rate are undesirable because the particle separation rate is affected, and the system becomes prone to plugging when the flow rate decreases. Also, since the waste can be deposited only when the vacuum pump is off, waste is usually moved to the separation device at the end of the day. As a result, the collecting tank and separation device tend to be undesirably large and the whole process is time consuming.

[12] Another known apparatus is a centrifuge type system that separates heavier metal particles from effluent liquid by collecting the particles at the peripheral wall of the centrifuge. This apparatus does not effectively separate lighter particles, and is expensive to purchase and operate due to the complexity of its mechanical parts.

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[13] Yet another known apparatus uses a dedicated mechanical pump to suction waste liquids through a separator device. Again, a dedicated pump can be expensive to purchase and to maintain, and can be undesirably space-consuming.

[14] Such known systems can become quite complex, unwieldy and expensive, as for example that disclosed in U.S. Pat. No. 5,885,076 granted 23 Mar. 1999. It teaches the use of sedimentation, co-precipitation and filtration in an expensive complicated apparatus that is probably economical, if at all, only for relatively large installations such as a military base dental complex.

[15] U.S. Pat. No. 6,692,636 and U.S. Pat. No. 6,596,754 are patents that disclose systems for removing amalgam from dental office suction effluent.

[16] After collecting the amalgam and other solid waste the dentist is left with the problem of what to do with the waste. Either the dentist has to deal with his own hazardous waste or he can send his collected material to a recycler. In either case, the "collection container" needs to be disposable and easily replaceable.

[17] Existing recycling programs generally require the provision of bulky shipping materials and the delivery of those materials to the dentist for every full container. If such materials are not provided and the materials are not properly recycled a large part of the benefit of collecting the amalgam waste can be lost. It is important that the waste is recycled under federal guidelines in order to make sure the full benefits of amalgam separation are achieved.

[18] Additionally, containers for collection, such as dental amalgam recycling systems, can be compromised by incorrect installation or misalignment, which can cause O-rings to deform and/or seal irregularly, and result in leakage.

SUMMARY OF THE INVENTION

[19] The present invention overcomes many of the shortcomings of the prior technology and achieves further advantages that will be apparent after reviewing the following detailed description.

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[20] In one aspect, the invention comprises a dental amalgam recycling system for recycling particles from a dental liquid effluent drawn from a suctioning device. In certain embodiments, the dental amalgam recycling system of the invention comprises:

[21] (a) an air-water separator tank for receiving said effluent, said air-water separator tank having an air-water separator tank inlet in fluid communication with said suctioning device, an air-water separator tank liquid effluent outlet and an air-water separator tank air outlet;

[22] (b) a detachable recycling container, said recycling container acting primarily under the influence of gravity to cause settlement of said particles; said recycling container having a recycling container effluent inlet port connected to said air-water separator tank liquid effluent outlet and said recycling container further having an effluent outlet port;

[23] (c) wherein the air-water separator tank also includes an internal suction conduit;

[24] (d) wherein the recycling container comprises threads;

[25] (e) wherein the recycling container effluent inlet port and the recycling container outlet port are not the same height.

[26] In certain embodiments, the dental amalgam recycling system further comprises (f) a threaded shipping cap, wherein the threads of the shipping cap and the threads of the recycling container are complementary such that, when the shipping cap is fitted in place, the shipping cap forms a tight seal with said recycling container.

[27] While in use, the dental amalgam recycling system is functionally associated with a vacuum pump having a vacuum pump inlet. The vacuum pump is typically a pre-existing part of the dental office facility. In particular embodiments, the dental amalgam recycling system is physically connected with a vacuum pump via a suction conduit in the air-water separator. In certain preferred embodiments, the suction conduit is an internal suction conduit within the air-water separator.

[28] In certain embodiments, the dental amalgam recycling system of the invention further comprise a first plug for said recycling container inlet port and a second plug for said recycling container effluent outlet port. Said first and second plugs may be held tightly in place by said threaded shipping cap when said shipping cap is fitted in place.

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[29] In certain embodiments, the dental amalgam recycling system of the invention further comprise an O-ring that provides an air and effluent tight seal when said shipping cap is fitted in place.

[30] In certain embodiments, the invention comprises a container, useful as a dental amalgam recycling container, comprising threads for attachment of a shipping cap. In certain embodiments, the dental amalgam recycling container further comprises two plugs held in place by said shipping cap and an O-ring fitted in an O-ring groove to prevent leaks. The dental amalgam recycling containers of the present invention may further comprise a two tier cap that enables people with hands of different sizes to grip the cap and tighten to achieve a very tight seal.

[31] In certain embodiments, the invention comprises an adapter for an air-water separator tank, wherein the adapter enables a recycling container without compatible effluent ports to attach to an air-water separator tank. Said air-water separator tank may comprise, for example, a component of a dental amalgam recycling system, as described above. In certain embodiments, the adapter may comprise threads. In alternative embodiments, the adaptor may be without threads.

[32] As described above, the potential for leakage exists in a collection canister such as a recycling container used in the dental amalgam recycling systems described herein. Such leakage may occur, for example, due to incorrect installation, or due to misalignment of a container and its intended mating partner, such as the air-water separation tank or its intended cap, such as a threaded shipping cap, which may cause O-rings to deform and/or seal irregularly. In order to address this problem and/or reduce the potential for leakage, a collection canister, such as a recycling container used in a dental amalgam recycling system, may have one or more irregular 'keyways' cast into its outside top mating surface, and the intended mating partner, such as the air-water separation tank, or the shipping cap, may have one or more corresponding 'key(s)' be cast into its mating surface, such that the key(s) and keyway(s) must be aligned in order for the collection canister (e.g., the recycling container) and its mating partner (e.g., the air-water separation tank; or the shipping cap) to mate properly. This key/keyway system can help ensure even pressure across the entire circumference of the O-ring surface on each port. Similarly, such key(s) and keyway(s) may be used to ensure proper

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replacement of the container and/or the air-water separation tank, such that incorrect replacement can be avoided or minimized.

BRIEF DESCRIPTION OF THE DRAWINGS

[33] FIG. 1 is a schematic front view of an embodiment of particle removal and recycling apparatus according to the invention, for particular use in a dental office.

[34] FIG. 2 is a schematic side view of an embodiment of particle removal and recycling apparatus according to the invention, for particular use in a dental office.

[35] FIG. 3a is a schematic view of an embodiment of a universal adapter for fitting various different sized recycling containers to the air-water separator of the present invention.

[36] FIG. 3b is a schematic view of an alternative embodiment of a universal adapter for fitting various different sized recycling containers to the air-water separator of the present invention.

[37] FIG. 4a is a schematic view of an embodiment of a recycling container and cap system of the invention.

[38] Fig. 4b is a schematic perspective depiction of an embodiment of a recycling container and cap system of the invention.

[39] FIG. 5a is a schematic inside view of an embodiment of a recycling cap for the recycling containers of the invention.

[40] Fig. 5b is a schematic depiction of a recycling cap according to the invention fitting on a partial view of a recycling container according to the invention.

[41] 1-Backplate

[42] 2-Waste Inlet (from dental practice)

[43] 3-Air/water Separator Top

[44] 4-Top Support Bracket

[45] 5-Air/Water Separation Tank

[46] 6-Suction tube

[47] 7-Air/Water Separator Base

[48] 8-0utlet Tube (to vacuum system)

[49] 9-Recycling Container Top Portion

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[50] 10-Lower Support Bracket

[51] 11-Restrictor

[52] 12-Detachable Recycling Container

[53] 13-Retaining Pins (2)

[54] 14- air-water separator tank effluent outlet port

[55] 15- recycling container inlet port

[56] 16- recycling container outlet port

[57] 17- recycling container threads

[58] 18- two tier recycling cap

[59] 19- O-ring groove

[60] 20- cap plugs

[61] 21- O-ring

[62] Figure 6A is a schematic view of a first embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[63] Figure 6B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[64] Figure 7A is a schematic view of a second embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[65] Figure 7B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[66] Figure 8A is a schematic view of a third embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[67] Figure 8B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[68] Figure 9A is a schematic view of a fourth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[69] Figure 9B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[70] Figure 10A is a schematic view of a fourth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

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[71] Figure 10B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[72] Figure 11A is a schematic view of a fifth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[73] Figure 11B is a schematic view of the same embodiment, viewing the top of the container from directly above.

DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

[74] According to one aspect of the instant invention, an apparatus is provided for removing and recycling metal-containing particles and other waste particles from effluent, particularly effluent from a dental office. While herein the term "metal particles" may frequently be employed, it is contemplated that the apparatus is capable of separating other solid particles from effluent liquid.

[75] According to one aspect of the invention, an apparatus for removing metal particles and other solid particles from liquid suction effluent can be installed in a dental office using a pre-existing suction/vacuum pump system. The apparatus may share a common vacuum pump with conventional dental chair suction apparatus, without interrupting the use of suction equipment at the dental chairs.

[76] Removal of solid particles from liquid suction effluent is effected by sedimentation.

[77] In accordance with a one embodiment of the invention, the dental office suction effluent is passed from dental chair suction equipment outlets to an air water separator tank via a suitable inlet port for the tank. The air-water separator tank in turn passes effluent into a sedimentary deposit tank, closed on all sides when in use and preferably readily detachable for emptying or replacement.

[78] In certain aspects of the instant invention the sedimentary deposit tank has a secondary function as a recycling container. In another aspect of the invention this recycling container can have features built in to make recycling easier and to reduce the amount of packaging and waste in the recycling system.

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[79] In another embodiment of the invention designed to minimize the space required to install the amalgam recycling system the air-water suction tube is internalized – within the air-water separator tank.

[80] Figure 1 and Figure 2 shows two views of the separation apparatus according to the present invention in detail. Effluent from the dental chairs and a quantity of air are sucked through a suction apparatus exhaust conduit, through an air-water separator tank inlet 2, and thence into an air-water separator tank 5. The liquid effluent passes out of the air-water separator tank 5 via air-water separator tank outlet port 14, while air passes downstream via the air suction tube 6 while maintaining constant vacuum upstream of amalgam separator.

[81] The air-water separator tank effluent outlet port 14 passes effluent by gravity out of the air-water separator tank 5 and into the detachable recycling container 12 through the recycling container inlet port 15 on the container top portion 9 for target particle separation by sedimentation. After the effluent passes through the inlet port 15 and through the container inlet conduit in the interior volume of the main body of the detachable recycling container 12, solids settle and accumulate in the bottom of the interior volume of the main body of the detachable recycling container 12. Liquid content of waste flows primarily by gravity, although intermittently assisted by vacuum through Restrictor 11 which slows the flow rate of liquid to assist in sedimentation process and ultimately "clean" effluent discharge through the recycling container outlet port 16 on the container top portion 9.

[82] Outlet ports 16 and inlet port 15 can be a variety of shapes and sizes, square, oval (as depicted), round or even more unusual shapes like a star. Preferred ports are those that provide a tight seal, allow for easy removal, and do not break. Oval or round are preferred embodiments. Round are most preferred.

[83] A vacuum at the outlet tube 8 is generated when the vacuum pump is operating, thereby sucking air out of the air-water separator tank 5 via suction tube 6 while maintaining vacuum upstream of amalgam separator apparatus. Effluent from the recycling container 12 passes through the restrictor 11 where remaining non-settable fine particles are removed from the effluent and into the recycling container outlet port 16 to be discharged from the apparatus via common outlet tube 8. Matter sucked by the vacuum pump, generally free of removed solids, is discharged via vacuum pump into a municipal drain of the public sewage system.

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[84] The system is provided with a simple back plate 1 for easy dental office placement as well as removable retaining pins 13 that engage radially protruding structures of the recycling container to ensure the recycling container does not detach from the air-water separation tank 5 when there is no vacuum in the system.

[85] In certain embodiments, the recycling container ports 16 and 15 may be different heights in order to aid in alignment of the detachable recycling container 12 in the air-water separator base 7. In a preferred embodiment, the outlet port 16 engages before the inlet port 15 while during removal the inlet port 15 disengages first. This causes a small volume of fluid to be pulled out of the collection container back into air-water separator tank 5 creating head space and eliminating upward force of vacuum which eases removal of recycle container 12 by operator. Existing devices require rocking, wiggling or applying extensive down force for removal of recycle container 12.

[86] In one preferred embodiment of the invention designed to minimize recycling costs and waste, the recycling container/sedimentary deposit tank has threads 17 built into the generally cylindrical upper region of the container top portion 9 to enable the addition of a liquid tight top for shipping.

[87] **Figure 3** shows a schematic diagram of an adapter **25** according to the invention to enable the use of recycling containers from a variety of sources that are lacking in correctly shaped ports **16** and **15** or otherwise are unable to fit the air-water separator tank **5** according to the invention due to shape differences.

[88] **Figure 4a** shows a schematic diagram of the recycling container and cap system (see **Figure 5** for more cap **18** detail) according to the present invention. The cap **18** is a two tier shape to allow for a tight grip by both a big and smaller hand in order to achieve a strong seal as required by the invention. An O-ring **21** is provided and fits into an O-ring groove **19** on the recycling container **12** above a flange structure **22** that protrudes radially away from the central axis of the main body of the recycling container **12**. The removable retaining pins **13,** described above with respect to Figure 2, fit within the region below the flange structure **22.** Plugs **20** are used to provide a first leak proof seal for the recycling container **12.** These plugs **20** are held in place by the cap **18** when the cap is threaded onto the recycling container as depicted in **Figure 5b**.

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[89] **Figure 6** through **Figure 11** show several embodiments of irregular keyways **23** on a recycling container. The inlet port **15** and the outlet port **16** are on the circular upper surface of the container top portion, and the irregular keyways **23** are cast into the outer top mating surface for mating with a corresponding keying structure 26 (See FIG. 11B) associated with the air-water separation tank.

[90] Generally, under present practice, the dental staff will not be able to remove deposited sediment from the recycle container nor remove accumulated particle residues from the restrictor unit themselves. Thus, it is desirable that such removal be done by a competent effluent residue processing facility. Therefore, under present practice, it is expected to be preferred that the recycling container with its enclosed restrictor unit be removed when full, or periodically replaced by fresh tanks from time to time as required. The spent tank with an accumulation of metallic and other particles can then be sent to a processing facility for proper disposal of the targeted metallic particles, such as mercury, and recovery of precious metals such as silver.

[91] Although the sedimentary deposit process is effective to remove a satisfactorily high proportion of the target particles desired to be removed from the effluent, the recycling container desirably includes an outlet restrictor right in the chamber to catch any floating materials as well as any other materials that did not settle out.

[92] If the recycle container is not changed as required or filled beyond normal capacity, waste liquid from dental practice may back up into air water separator tank. Should this occur, effluent overflows through the air suction tube and into the outlet port and is discharged into the vacuum pump draw line and thence eventually into the municipal drain. However, it is desirable that the system should operate in such a manner as to avoid having the air-water separator tank become completely full, since effluent exiting through the air outlet port will contain particles that will not be separated by the separator. If, however, such a by-pass condition occurs at no time will the suction generated by the vacuum pump be lost or interrupted at the dental office.

[93] In a further embodiment of the invention oriented towards large-scale institutional applications, in which many dental chairs or other sources of effluent are connected to the same suction and drain services, several parallel-connected recycling containers and associated

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apparatus, each such composite apparatus including a air-water separator tank and preferably one, or alternatively two attached recycling containers, may be operated in parallel to provide sufficient treatment capacity for large effluent volumes.

[94] All publications, web-sites, patents and patent applications cited in the specification are hereby incorporated herein by reference in their entirety for the disclosure for which they are cited.

[95] Having read the above specification, other alternatives and variants of the above described methods and apparatus suitable for practicing the methods will occur to those skilled in the technology. Such alternatives, modifications and variants fall within the scope of the present invention.

[96] The invention as described above also includes the following non-limiting claims, which describe particular embodiments of the invention.

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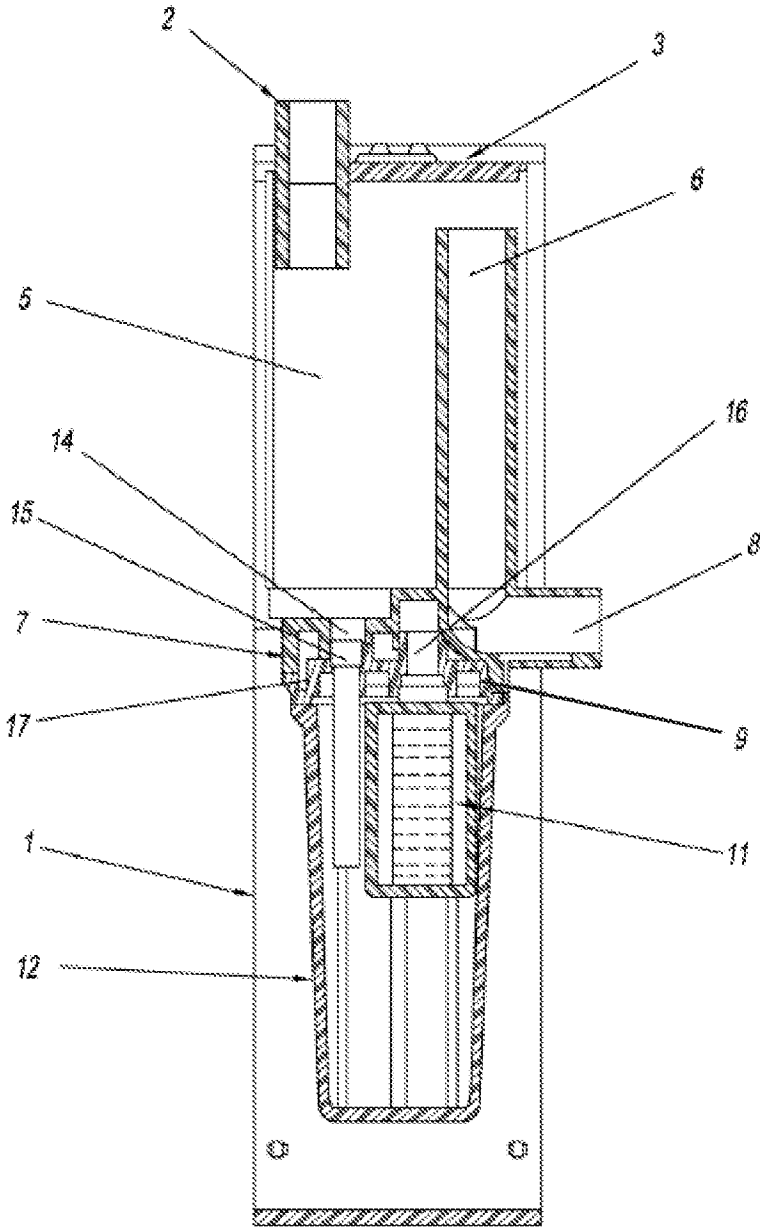


FIG. 1

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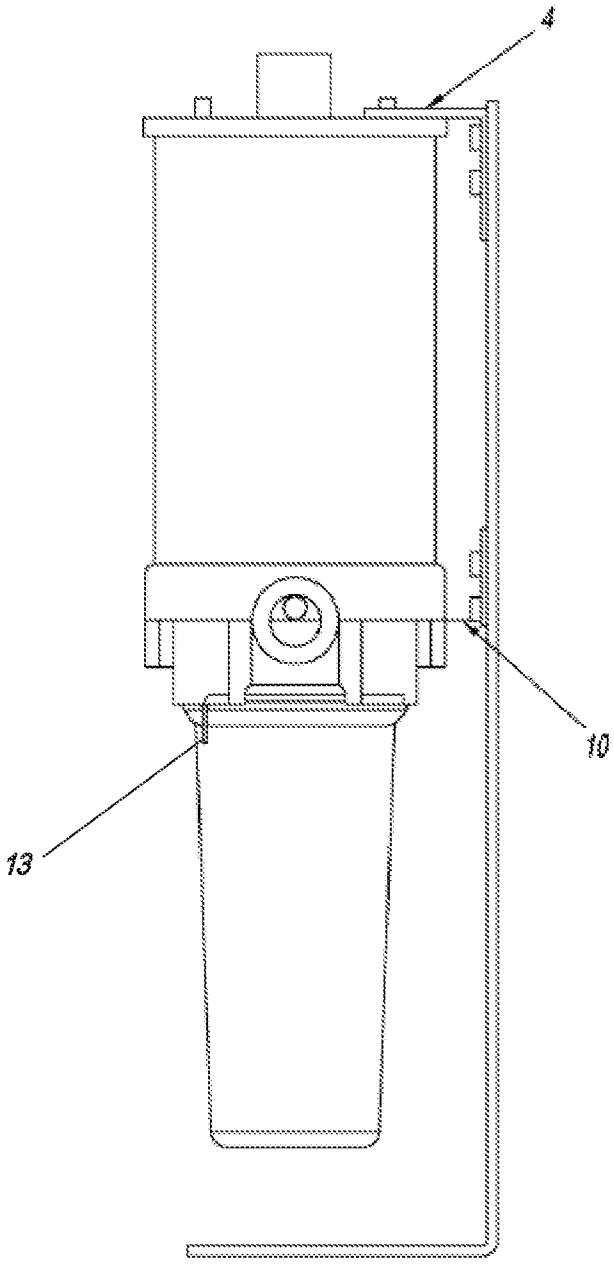


FIG. 2

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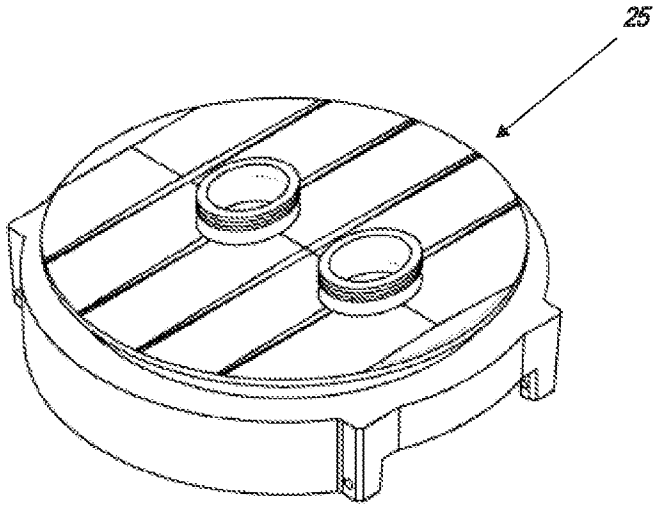


FIG. 3A

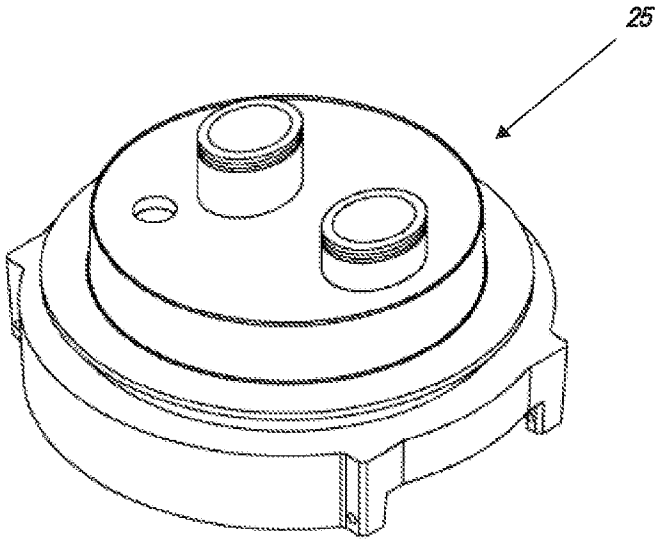


FIG. 3B

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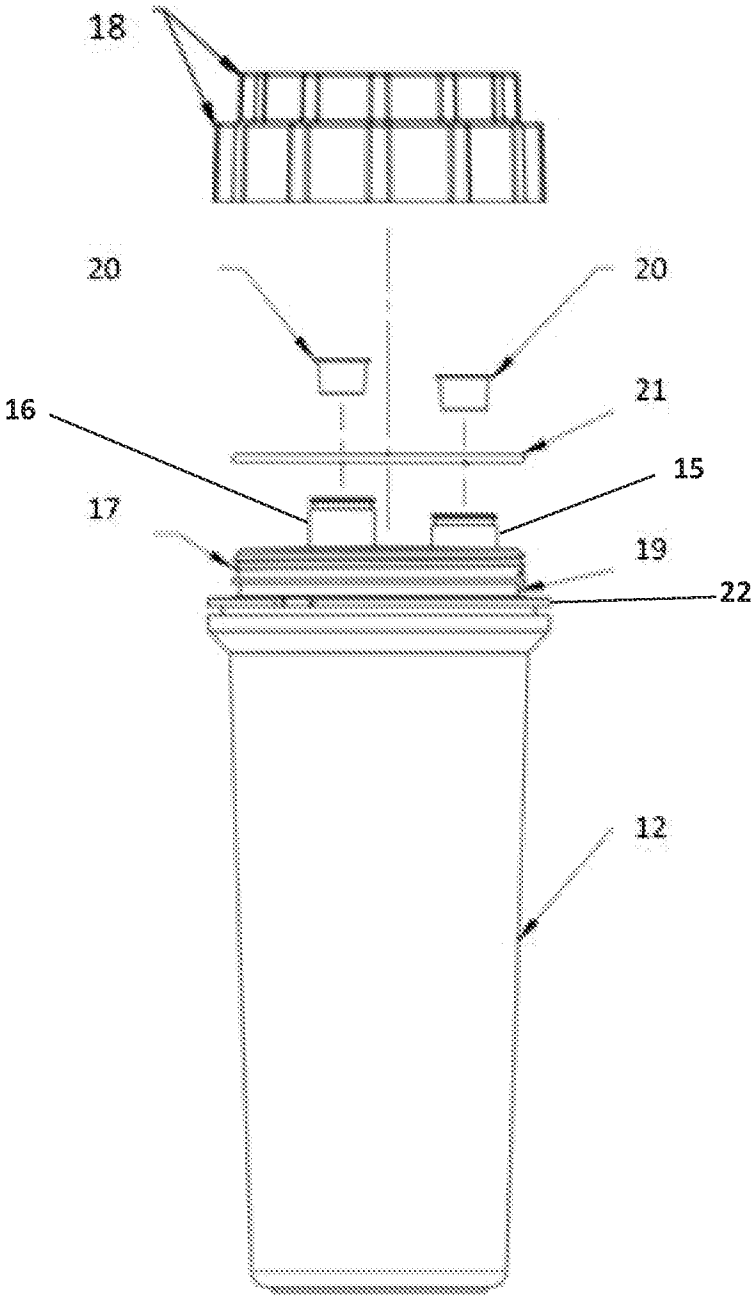


FIG. 4A

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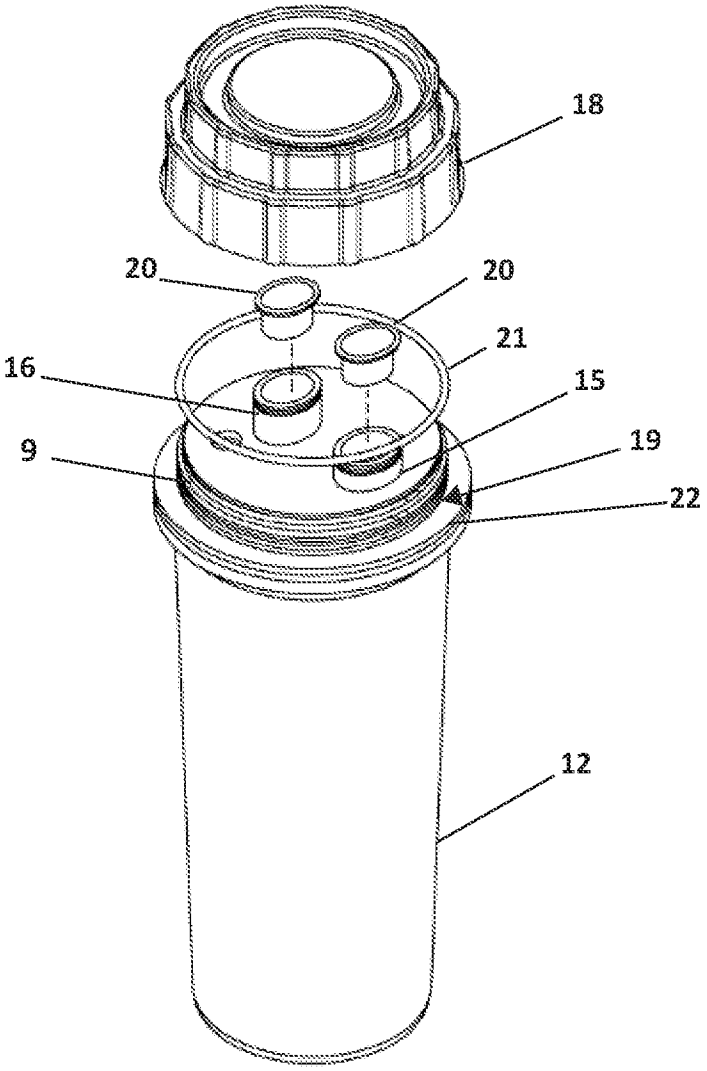


FIG. 4B

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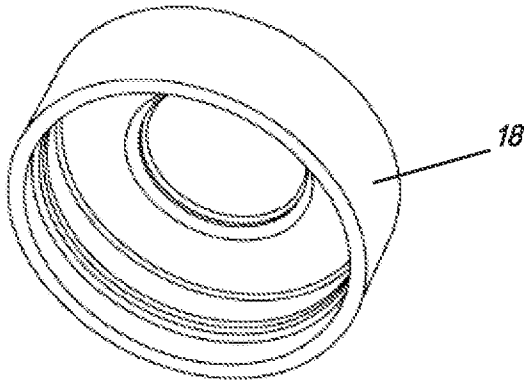


FIG. 5A

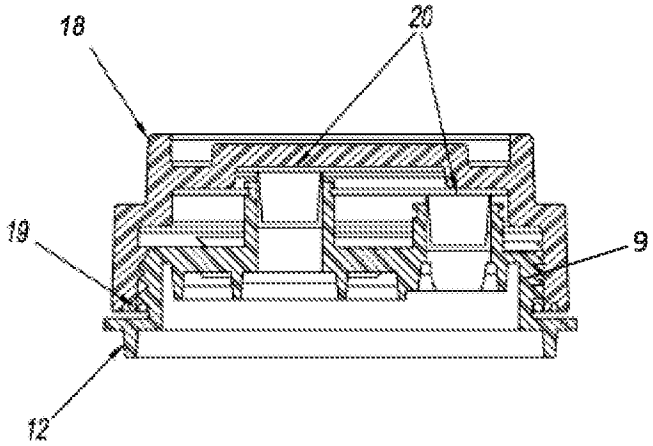


FIG. 5B

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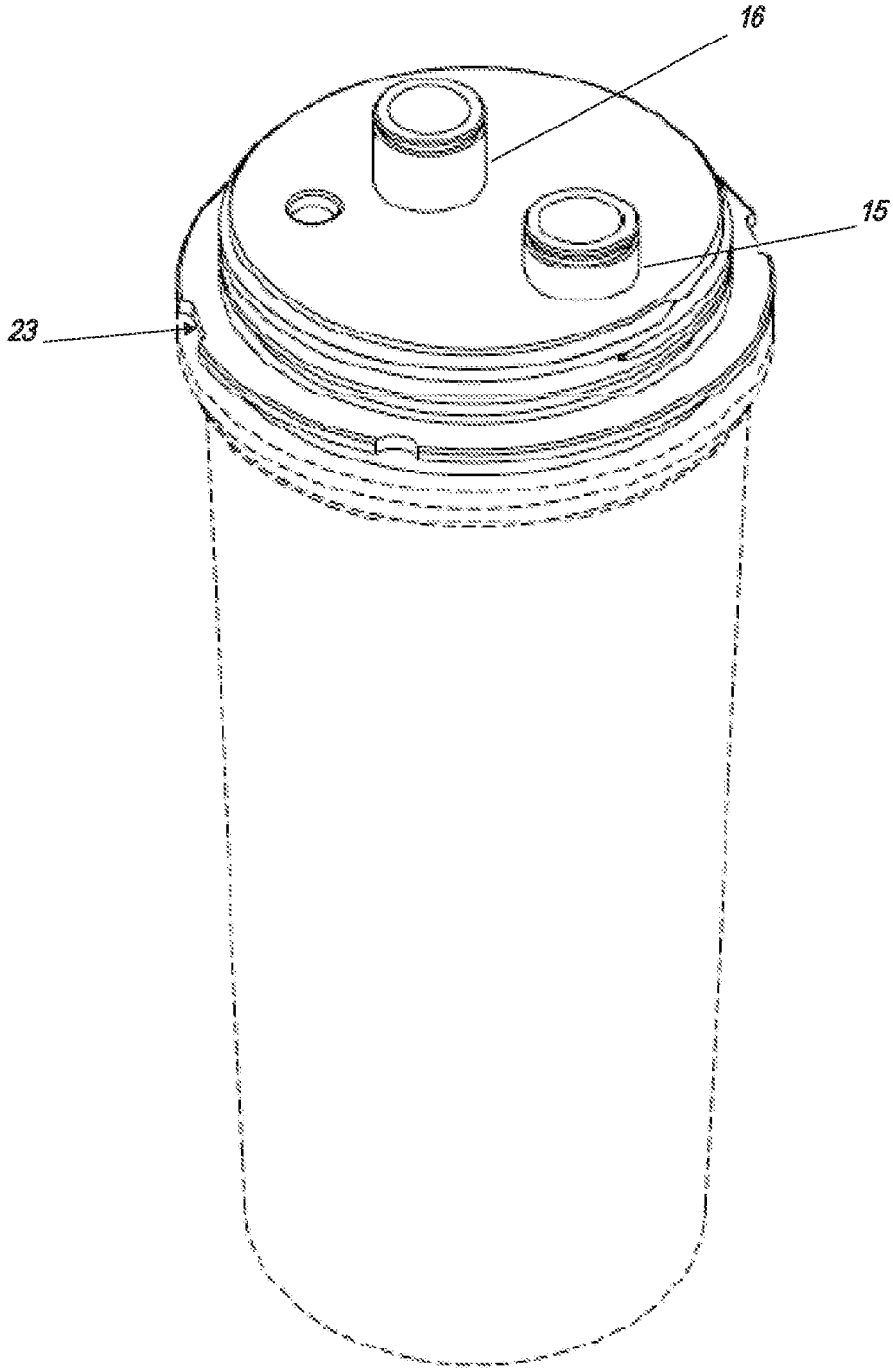


FIGURE 6A

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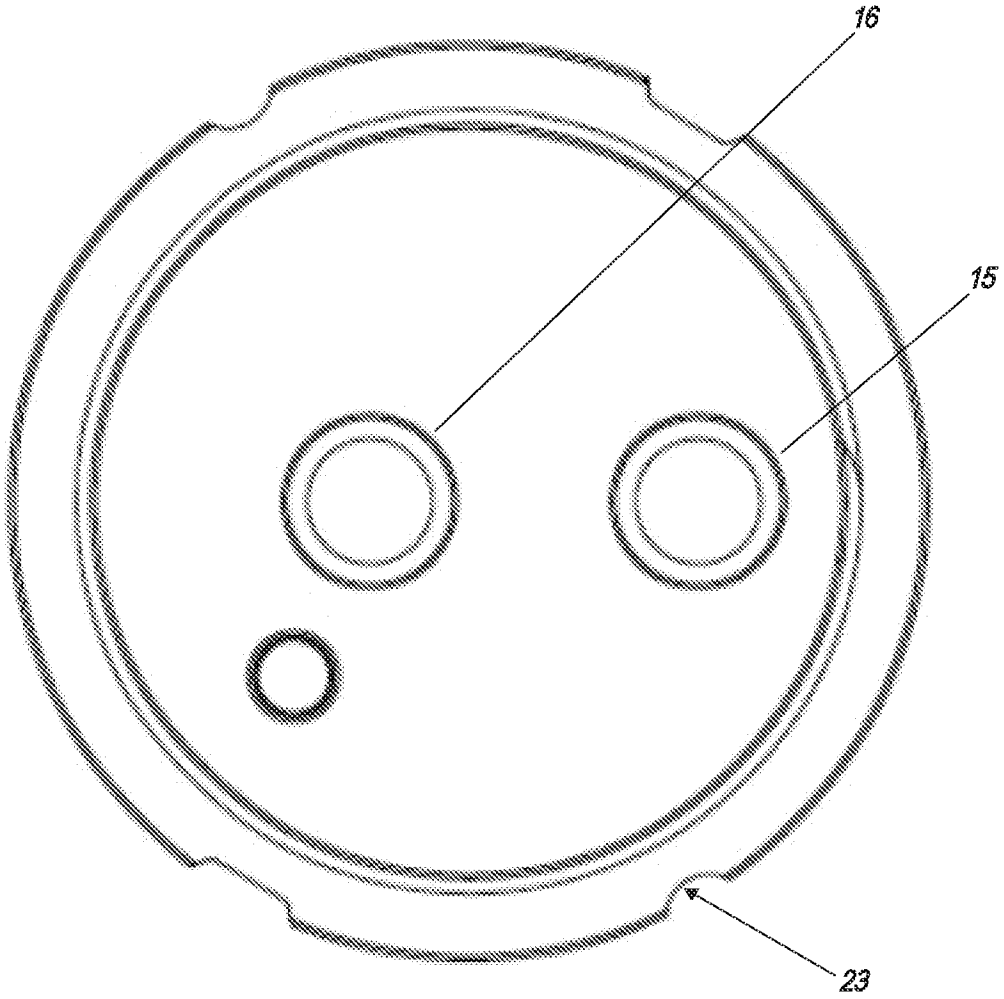


FIGURE 6B

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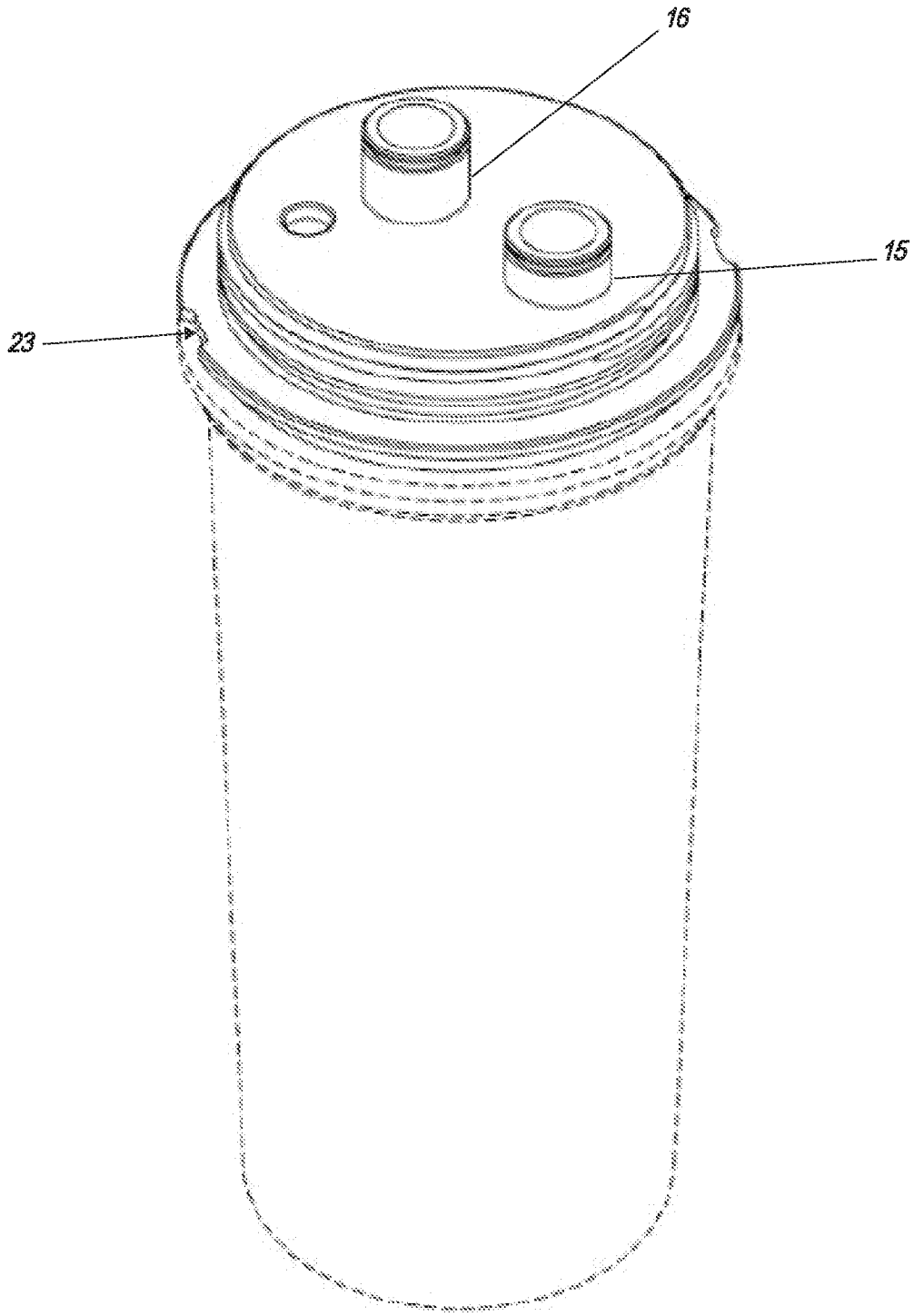


FIGURE 7A

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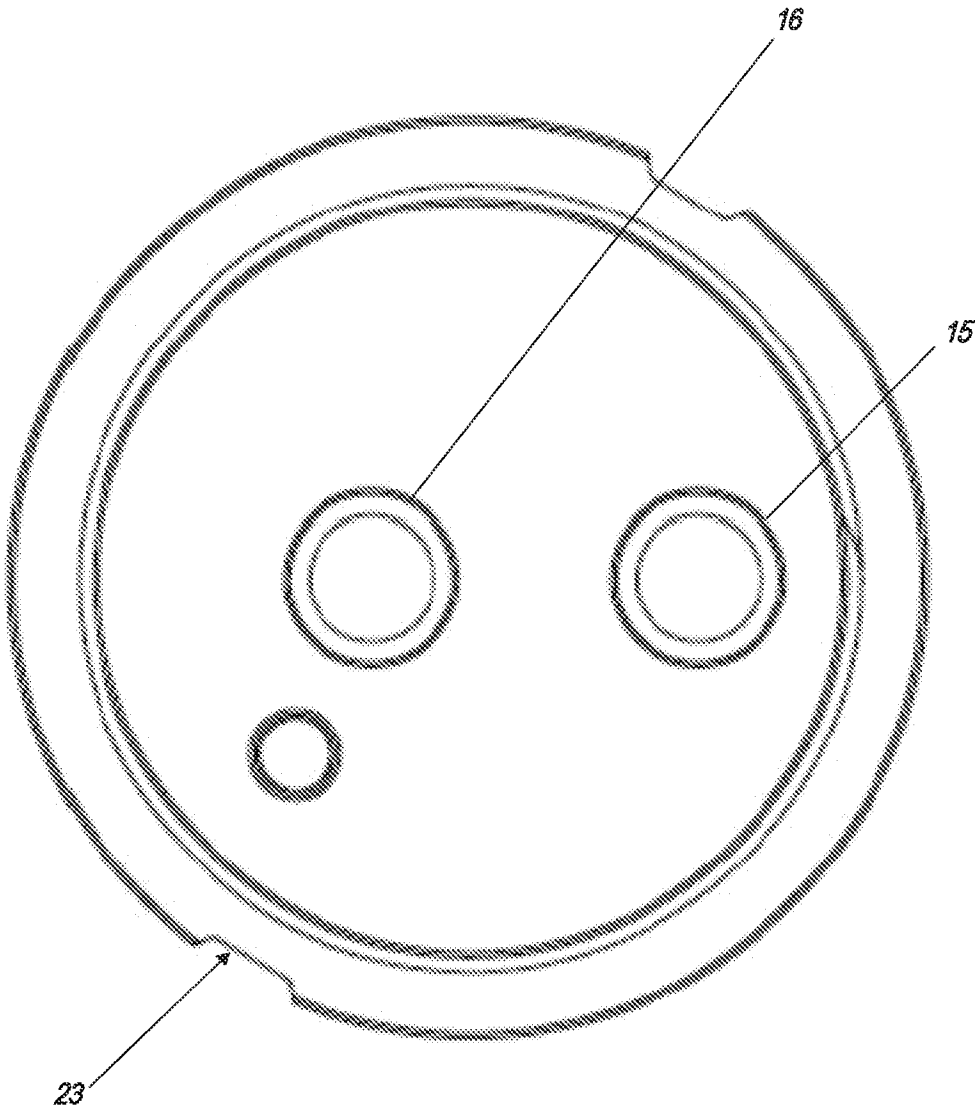


FIGURE 7B

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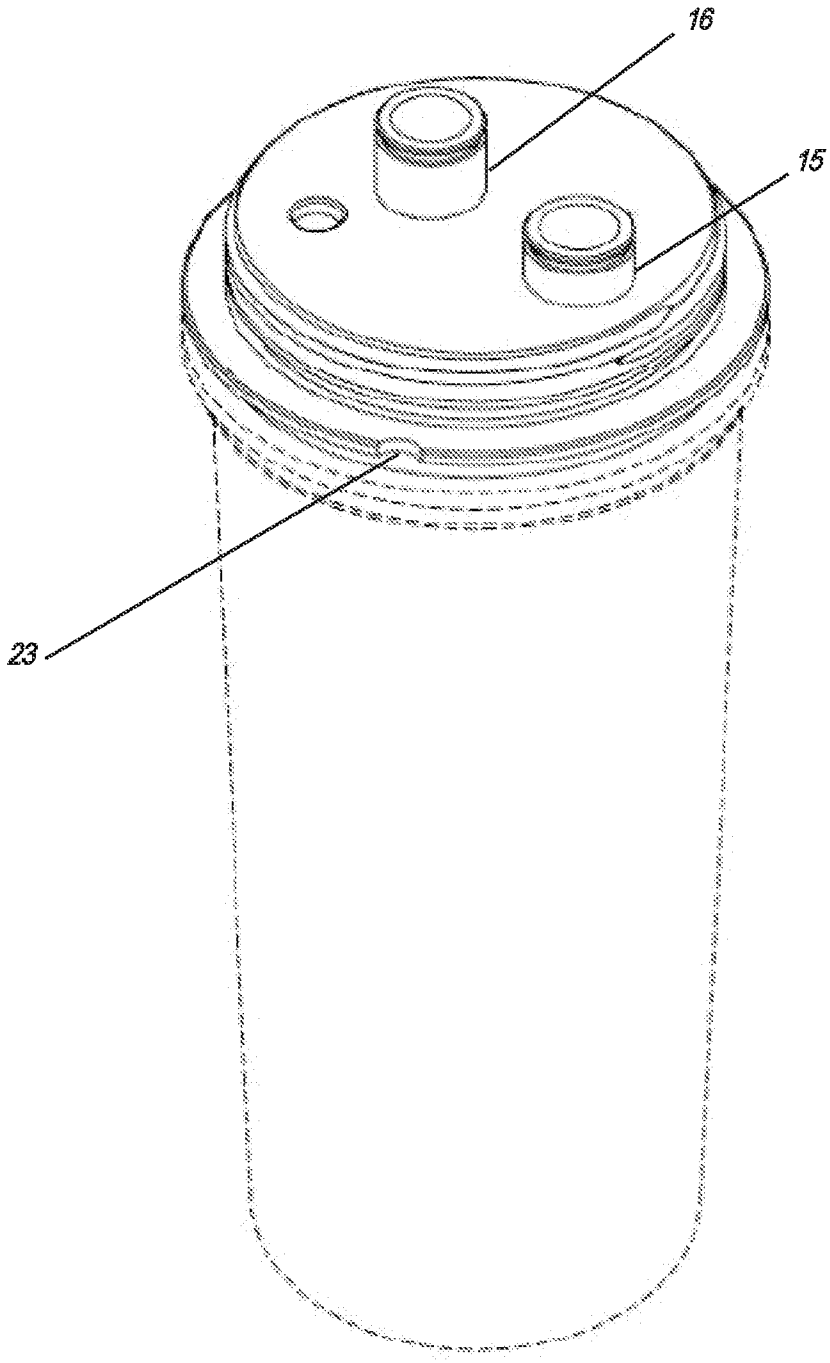


FIGURE 8A

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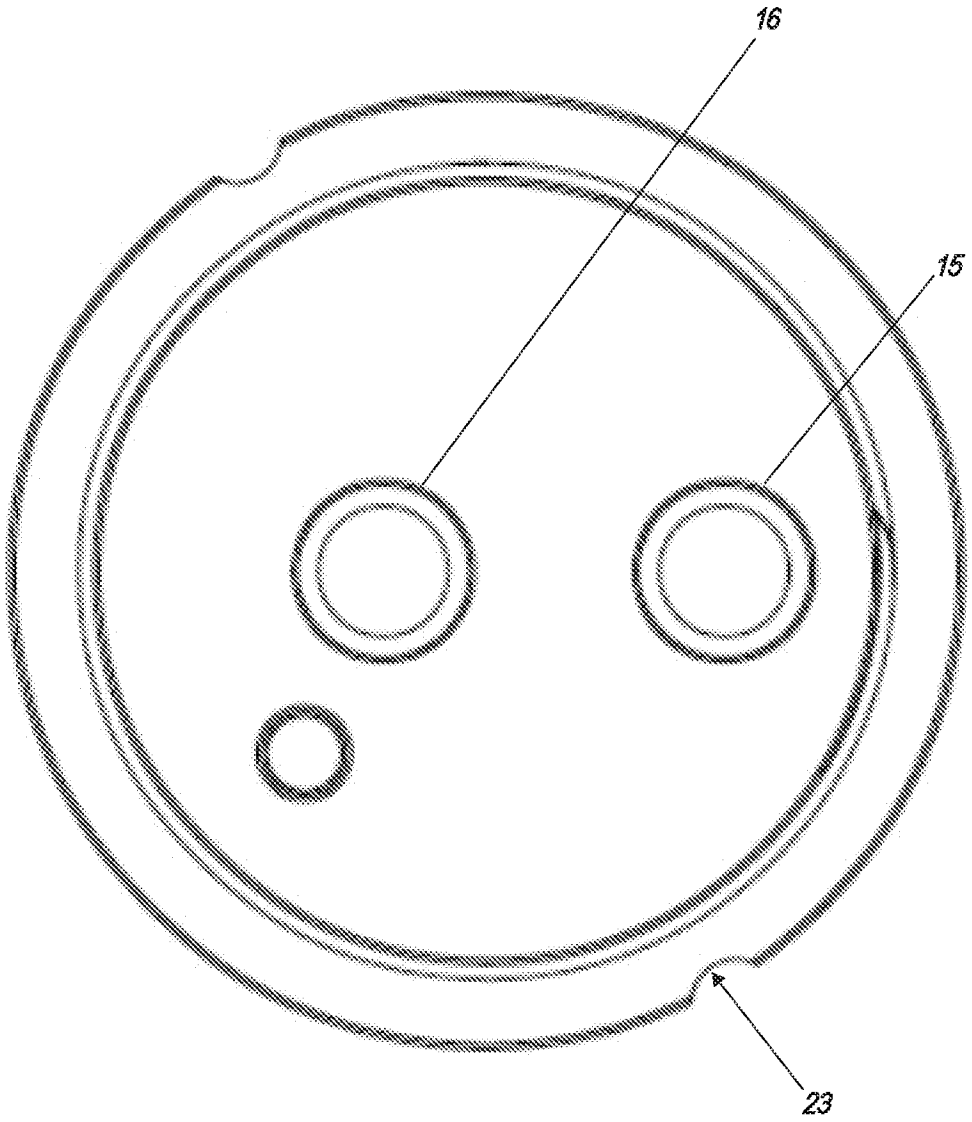


FIGURE 8B

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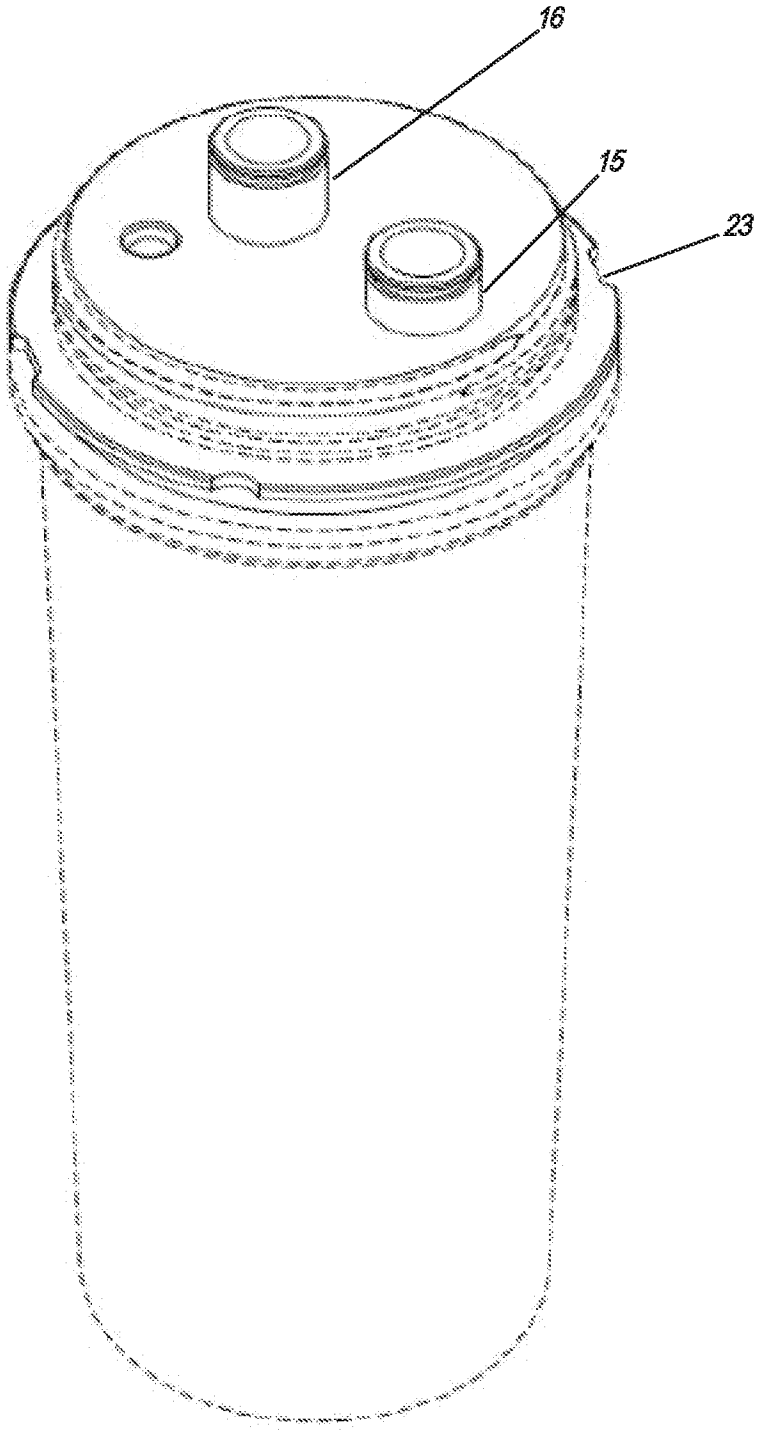


FIGURE 9A

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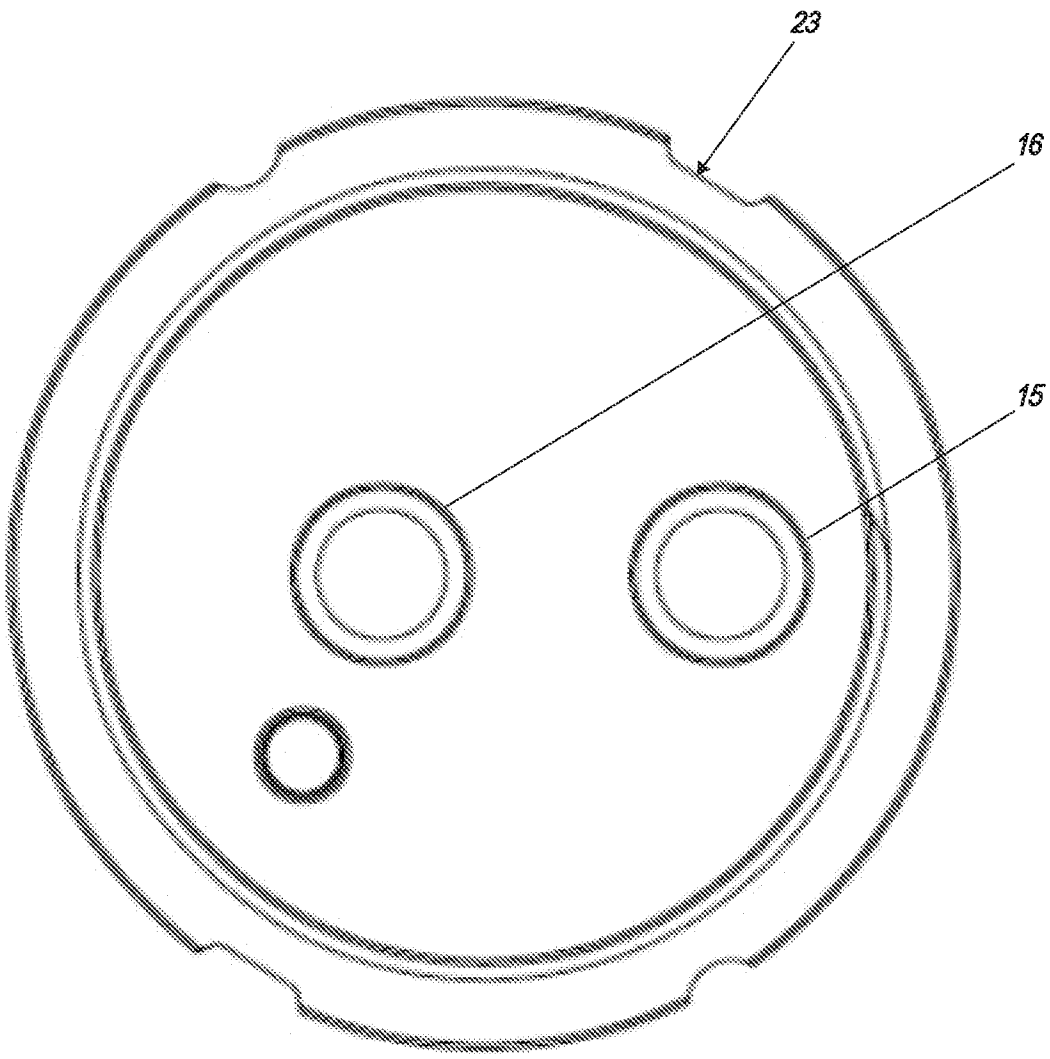


FIGURE 9B

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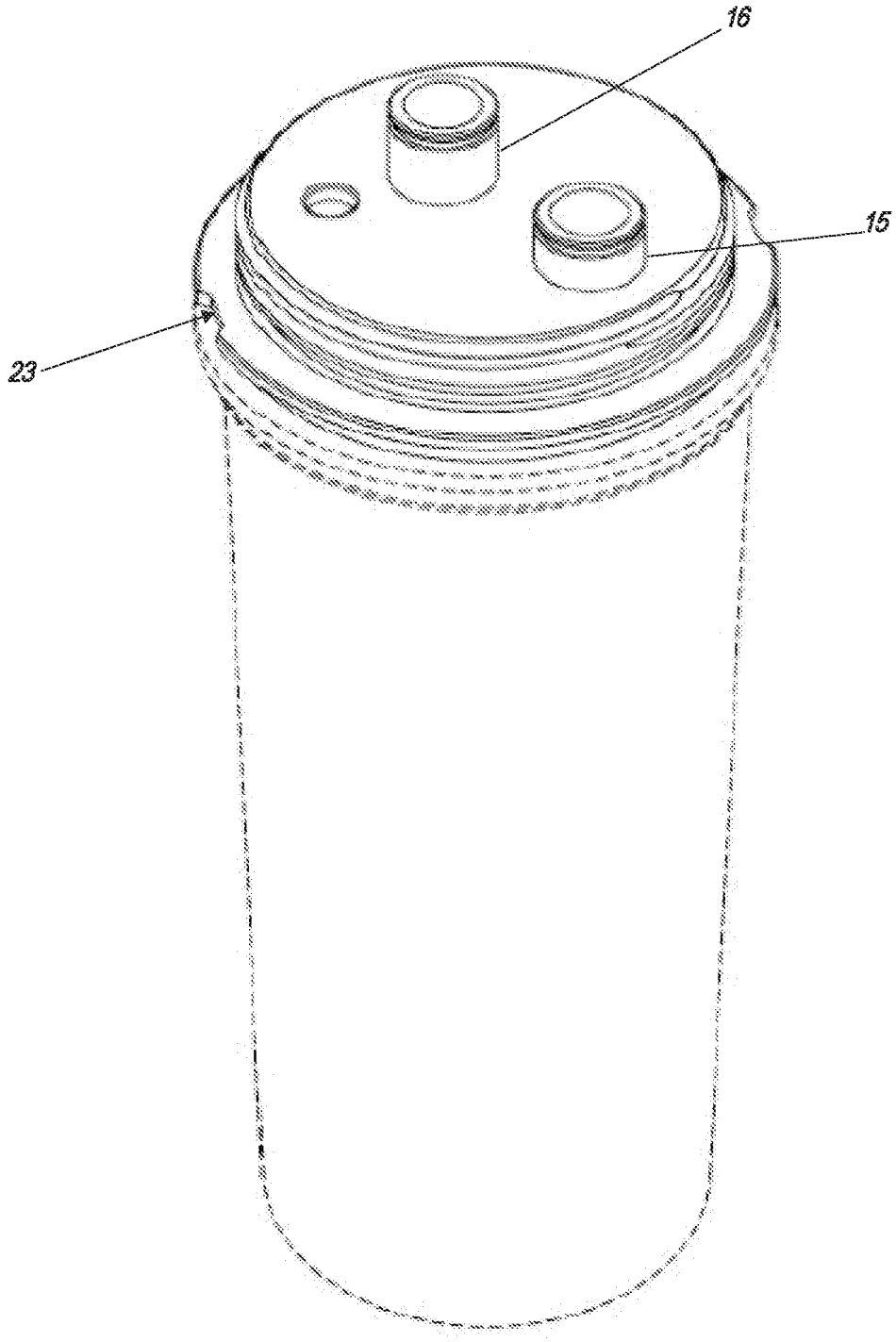


FIGURE 10A

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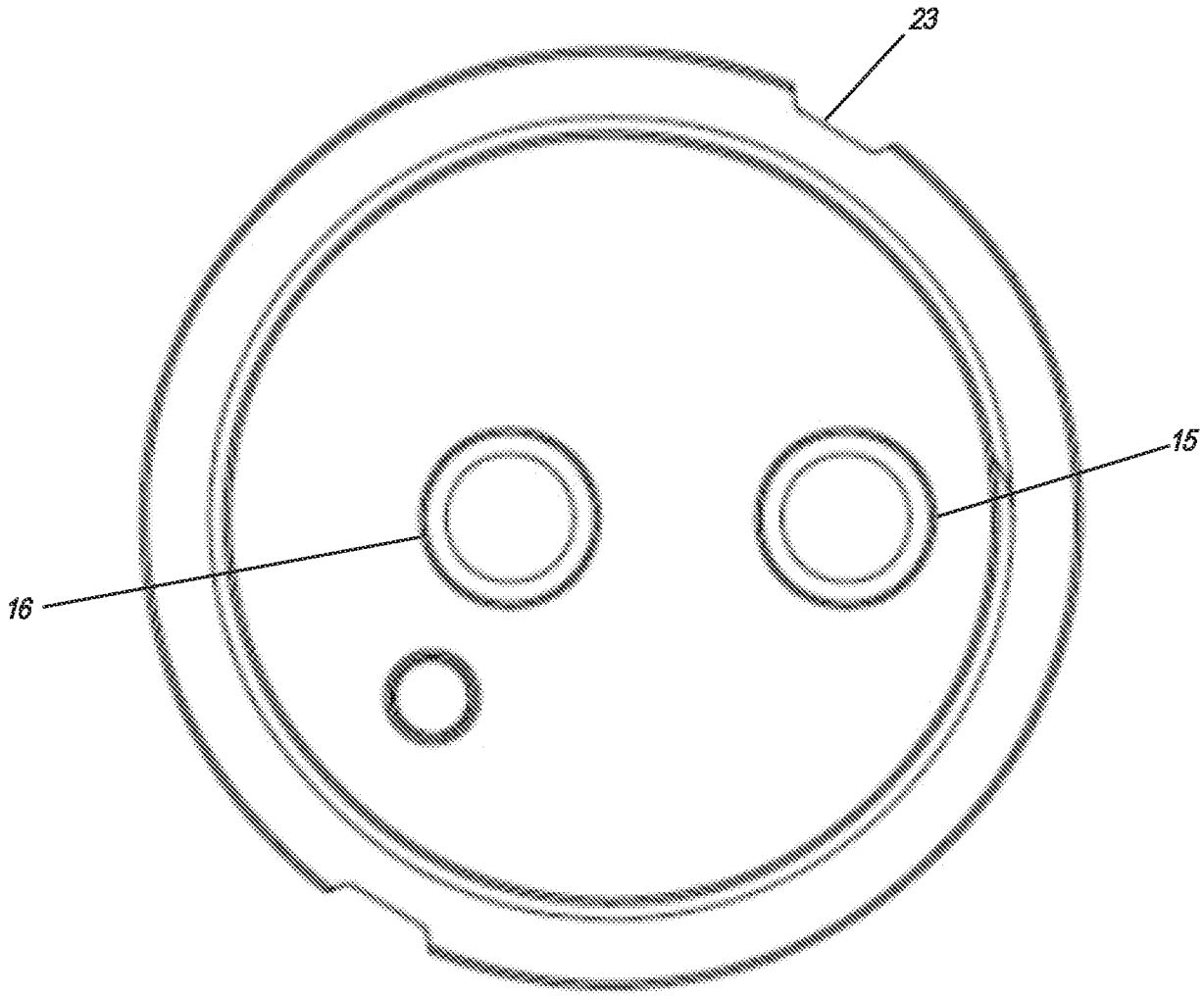


FIGURE 10B

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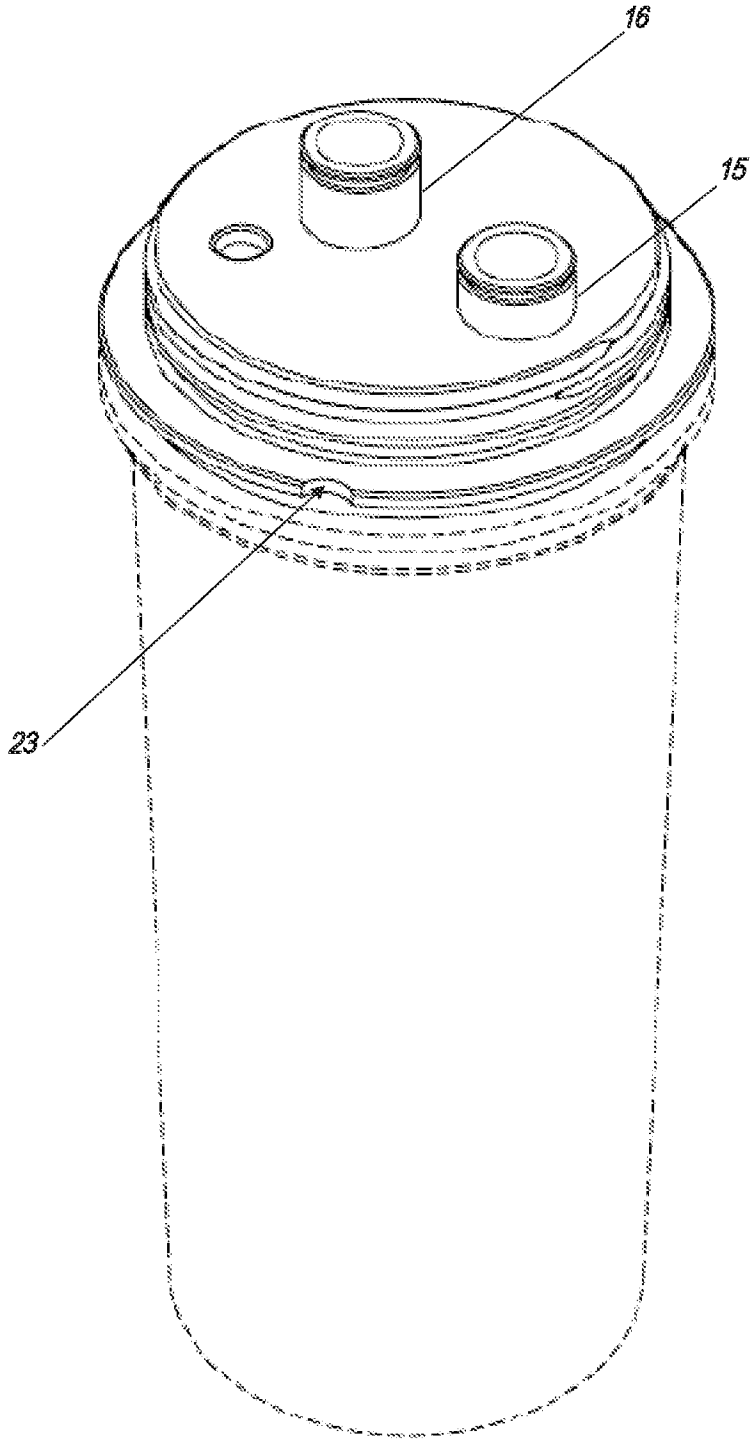


FIGURE 11A

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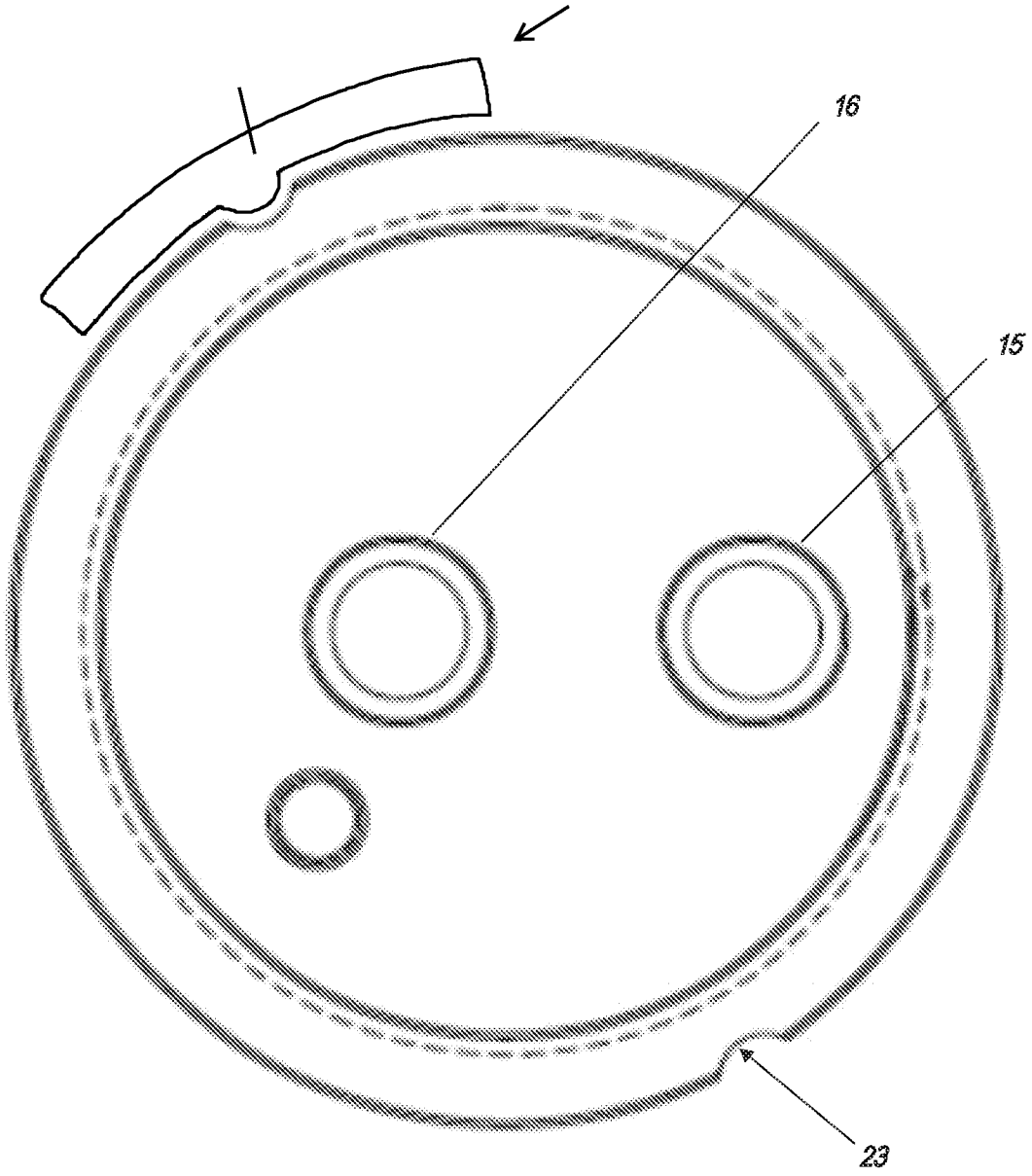


FIGURE 11B

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UNITED STATES
PATENT AND TRADEMARK OFFICE

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/16/2023 12:31:26 PM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63276482	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
Response-OA-9-13-2023-16941522-11-16-2023.pdf	20	Amendment/Request for Reconsideration-After Non-Final Rejection	189 KB
MARKED-UP-SPECIFICATION-App_No_16941522-Response-Nov-16-2023.pdf	13	Specification	115 KB
CLEAN-SPECIFICATION-App_No_16941522-Response-Nov-16-2023.pdf	13	Specification	111 KB
Replacement-Sheets-16941522-Response_OA-	18	Drawings-only black and white line drawings	823 KB

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Nov162023.pdf

Warning: The attached file contains comments or annotations. Comments are not recommended and may cause processing problems with the document.

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
Response-OA-9-13-2023-16941522-11-16-2023.pdf	E7F754D7AD36610D6EFF29341E0A9502C26D4DBEBADF4DBF552DB8EA39BEA9BF6B35B7C7FD41F581AE2EFB11ACD1574C4C5D8AE63A68BD2552D9B9EA5E9729C5
MARKED-UP-SPECIFICATION-App_No_16941522-Response-Nov-16-2023.pdf	B28A93CABC5DF1C620A7623ADC6D261C09A9989259807A14BD9AB71894B12DD0ABFB2EEFB34467FFD1311758FE0AC76875CEA213B3B5731764FF00D4D656839F
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Replacement-Sheets-16941522-Response_OA-Nov162023.pdf	CBDFB9F4742B16EBBBB29F5AC0191F1F08E937065B8DD888F4217D2DC6F192C3722CC1230DE9D004D613C608CCE2F6BC0FAEC03A9BEA8CEA522AD3794D3CF7C4

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the

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International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	:	*16/941,522*
Confirmation No.	:	*1050*
Inventor	:	*Nicholas Mozzicato*
Applicant	:	*Solmetex LLC*
Filed	:	*July 28, 2020*
Title	:	*Detachable Recycling Container*
TC/A.U.	:	*3772*
Examiner	:	*Nicholas D. Lucchesi*
Docket No.	:	*SMTX-001-T1-CON*
Customer No.	:	*80709*

Commissioner for Patents – via EFS
P.O. Box 1450
Alexandria, Virginia 22313-1450

RESPONSE TO NON-FINAL OFFICE ACTION
DATED SEPTEMBER 13, 2023

Dear Commissioner:

The Applicant respectfully requests that this Response to the Non-Final Office Action be entered into the record of the above-captioned patent application.

The Applicant's **Amendments to the Specification** are presented on page 2 of this paper.

The Applicant's **Amendments to the Drawings** are presented on page 5 of this paper.

The Applicant's **Listing of Claims** is presented on page 8 of this paper.

The Applicant's **Remarks** begin on page 14 of this paper.

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AMENDMENT TO SPECIFICATION:

Please amend the specification as follows. A Marked-Up version of the specification and a Clean version of the specification are attached that take into account the amendments below:

- Please amend paragraph [0049] that defines reference numeral "9" to include the word "portion" after "top", as follows:

  --[0049] 9-Recycling Container Top Portion--

- Please delete paragraphs [0074] to [0081] to take into account the deletions of the figures noted below.

- Please amend paragraph [0089] to specifically mention the container top portion, the container inlet conduit, the main body, and the interior volume of the detachable recycling container, as follows:

  --[0089] The air-water separator tank effluent outlet port 14 passes effluent by gravity out of the air-water separator tank 5 and into the detachable recycling container 12 through the recycling container inlet port 15 on the container top portion 9 for target particle separation by sedimentation. After the effluent passes through the inlet port 15 and through the container inlet conduit in the interior volume of the main body of the detachable recycling container 12, solids ~~Solids~~ settle and accumulate in the bottom of the interior volume of the main body of the ~~Recycle~~ detachable recycling container 12. Liquid content of waste flows primarily by gravity, although intermittently assisted by vacuum through Restrictor 11 which slows the flow rate of liquid to assist in sedimentation process and ultimately "clean" effluent discharge through the recycling container outlet port 16 on the container top portion 9.--

- Please amend paragraph [0092] to specifically mention the radially protruding structures of the detachable recycling container, as follows:

  --[0092] The system is provided with a simple back plate 1 for easy dental office placement as well as removable retaining pins 13 that engage radially protruding structures of the detachable recycling container to ensure the recycling container does not detach from the air-water separation tank 5 when there is no vacuum in the system.--

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- Please amend paragraph [0094] to specifically mention the generally cylindrical upper region of the container top portion, as follows:

  --[0094] In one preferred embodiment of the invention designed to minimize recycling costs and waste, the recycling container/sedimentary deposit tank has threads 17 built into the generally cylindrical upper region of the container top portion 9 to enable the addition of a liquid tight top for shipping.--

- Please amend paragraph [0095] to add reference numeral "25" after the word "adapter", as follows:

  --[0095] Figure 3 shows a schematic diagram of an adapter 25 according to the invention to enable the use of recycling containers from a variety of sources that are lacking in correctly shaped ports 16 and 15 or otherwise are unable to fit the air-water separator tank 5 according to the invention due to shape differences.—

- Please amend paragraph [0096] to describe the flange structure "22" in a manner consistent with what is illustrated in the figures and to specifically mention the central axis of the main body of the recycling container, as follows:

  --[0096] Figure 4a shows a schematic diagram of the recycling container and cap system (see Figure 5 for more cap 18 detail) according to the present invention. The cap 18 is a two tier shape to allow for a tight grip by both a big and smaller hand in order to achieve a strong seal as required by the invention. An O-ring 21 is provided and fits into an O-ring groove 19 on the recycling container 12 above a flange structure 22 that protrudes radially away from the central axis of the main body of the recycling container 12. The removable retaining pins 13, described above with respect to Figure 2, fit within the region below the flange structure 22. Plugs 20 are used to provide a first leak proof seal for the recycling container 12. These plugs 20 are held in place by the cap 18 when the cap is threaded onto the recycling container as depicted in Figure 5b.

- Please amend paragraph [0097] to remove reference to the deleted figures, to add reference numerals "15", "16", and "23" for the inlet port, outlet port, and keyways relative to the circular upper surface of the container top portion, respectively. Further, please amend

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paragraph [0097] to mention the corresponding keying structure 26, which was requested to be added to the drawings by the Examiner at page 4 of the Office Action dated September 13, 2023 in related U.S. Serial No. 18/135,341, as follows:

--[0097] ~~Figures~~ Figure 6 through Figure 11~~15~~ show several embodiments of irregular keyways 23 on a recycling container. ~~of the present invention, which include the~~ The inlet port 15 and the outlet port 16 are on the circular upper ~~top mating~~ surface of the container top portion, and the irregular keyways 23 are cast into the outer top mating surface for mating with a corresponding keying structure 26 (See FIG. 11B) associated with the air-water separation tank.--

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AMENDMENT TO DRAWINGS:

Please make the following amendments to the drawings. The Applicant has submitted a clean Replacement Drawing Set that takes into account these changes:

- In FIGURE 1, please elongate the reference line for container top portion 9 so that the reference line extends further into the container top portion 9.

- In FIGURE 2, please change the reference line for the pin 13 from an arrowed lead line to a straight lead line that touches the pin 13.

- In FIGURES 3A and 3B, please add reference numeral "25" to identify the adapter 25.

- In FIGURE 4A, please add reference numerals "15", "16", and "22" to identify the container inlet port 15, container outlet port 16, and the flange structure 22, respectively.

- In FIGURE 4B, please add reference numerals "12", "15", "16", "18", "19", "20", "21" and "22" to identify the container 12, the container inlet port 15, the container outlet port 16, the cap 18, the O-ring groove 19, the plugs 20, the O-ring 21, and the flange structure 22, respectively.

- In FIGURE 4B, please add reference numeral "9" to identify the container top portion 9.

- In FIGURE 5A, please change reference numeral "17" to reference numeral "18" to properly identify the cap 18.

- In FIGURE 5B, please add reference numeral "9" to identify the container top portion 9.

- Please delete FIGURES 6A, 6B, 7A, 7B, 8A, 8B, 9A, and 9B.

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- In FIGURE 10A, please change the figure number to FIGURE 6A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 10B, please change the figure number to FIGURE 6B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 11A, please change the figure number to FIGURE 7A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 11B, please change the figure number to FIGURE 7B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 12A, please change the figure number to FIGURE 8A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 12B, please change the figure number to FIGURE 8B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 13A, please change the figure number to FIGURE 9A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

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- In FIGURE 13B, please change the figure number to FIGURE 9B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 14A, please change the figure number to FIGURE 10A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 14B, please change the figure number to FIGURE 10B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 15A, please change the figure number to FIGURE 11A (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

- In FIGURE 15B, please change the figure number to FIGURE 11B (due to former FIGS. 6-9 being deleted) and add reference numerals "15", "16", and "23" to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively. Further, for consistency, please add the reference numeral "26" to identify the corresponding keying structure 26 associated with the air-water separation tank 5, which was requested by the Examiner at page 4 of the Office Action for Serial No. 18/135,341, dated September 13, 2023.

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LISTING OF CLAIMS:

This listing of claims will replace all prior versions, and listings, of the claims in the application.

1-40. (Canceled)

41. (Previously Presented) A detachable dental-amalgam container for use with a dental amalgam separation system, the dental amalgam separation system having a vacuum source that applies a pressure within the dental amalgam separation system to cause movement of dental amalgam effluent within the detachable dental-amalgam container, the dental amalgam separation system having at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having an interior volume for receiving the dental amalgam effluent from the dental amalgam separation system;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having a circular upper surface from which a container inlet port and a container outlet port extend away from the main body, the container inlet port being positioned nearer to a periphery of the circular upper surface than the container outlet port, the container inlet port for receiving the dental amalgam effluent from the dental amalgam separation system, the container top portion further including at least one radially protruding structure located below the generally cylindrical upper region, the at least one radially protruding structure for engaging the at least one retaining pin of the dental amalgam separation system to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system when the pressure is released from the vacuum source, the at least one radially protruding structure being located radially outward relative to the periphery of the circular upper surface.

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42. (Currently Amended) The detachable dental-amalgam container of claim 41, further including a container inlet conduit extending downwardly from the container top portion and into the interior volume, the container inlet conduit being fluidically coupled to the container inlet port, the container inlet conduit and the container inlet port for transferring the dental amalgam effluent from the dental amalgam separation system to the interior volume of the main body.

43. (Previously Presented) The detachable dental-amalgam container of claim 41, wherein the inlet port and the outlet port are of the same height.

44. (Previously Presented) The detachable dental-amalgam container of claim 41, wherein the container top portion has a maximum outer dimension that is greater than a maximum outer diameter of the main body.

45. (Previously Presented) The detachable dental-amalgam container of claim 41, further including a pair of plugs configured to seal a container inlet port and a container outlet port of a filled detachable dental-amalgam container.

46. (Previously Presented) The detachable dental-amalgam container of claim 45, further including a cap configured to retain at least one of the plugs on the filled detachable dental-amalgam container.

47. (Currently Amended) The detachable dental-amalgam container of claim 46, wherein the cap mates with threads on the generally cylindrical upper region to hold the pair of plugs in place ~~has an inside surface with a first circular wall and a second circular wall, the first circular wall placed so as to engage a first one of the pair of plugs on the container inlet port and the second circular wall placed so as to engage a second one of the pair of plugs on the container outlet port~~.

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48. (Previously Presented) The detachable dental-amalgam container of claim 41, wherein the at least one radially protruding structure defines a maximum outer dimension for the container top portion.

49. (Previously Presented) The detachable dental-amalgam container of claim 41, wherein the generally cylindrical upper region includes external threads.

50. (Currently Amended) The detachable dental-amalgam container of claim 41, wherein the at least one radially protruding structure includes a flange structure extending in a direction away from the generally cylindrical upper region.

51. (Currently Amended) The detachable dental-amalgam container of claim 50, wherein the flange structure extends entirely around the container top portion.

52. (Currently Amended) The detachable dental-amalgam container of claim 50, wherein the flange structure includes a curved outer surface.

53. (Currently Amended) A detachable dental-amalgam container for use with a dental amalgam separation system, the dental amalgam separation system having a tank that holds dental amalgam effluent and at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having an interior volume for receiving the dental amalgam effluent from the tank of the dental amalgam separation system;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having an upper surface from which a container inlet port and a container outlet port extend away from the main body, the container inlet port being positioned nearer to a periphery of the upper surface than the container outlet port, each of the container inlet port and the container outlet port ~~including an external o-ring at upper portions thereof that~~ is configured to help provide a seal between the detachable dental-amalgam container and the dental

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amalgam separation system, the container top portion further including at least one radially protruding structure located below the generally cylindrical upper region, the at least one retaining pin of the dental amalgam separation system adapted to be received below the at least one radially protruding structure ~~defining a pin-receiving region therebelow for receiving the at least one retaining pin of the dental amalgam separation system~~ to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system, the at least one radially protruding structure protrudes radially outward of the container top portion such that it is located outward from the periphery of the upper surface;

a container inlet conduit extending downwardly from the container top portion and into the interior volume, the container inlet conduit being coupled to the container inlet port, the container inlet conduit and the container inlet port for transferring the dental amalgam effluent from the tank of the dental amalgam separation system to the interior volume of the main body; and

wherein the container outlet port is for being coupled to a system outlet port of the dental amalgam separation system such that the fluid from the dental amalgam effluent is moved from the interior volume of main body, through the container outlet port, and into the system outlet.

54. (Previously Presented) The detachable dental-amalgam container of claim 53, further including a pair of plugs configured to seal a container inlet port and a container outlet port of a filled detachable dental-amalgam container, and a cap that retains at least one of the plugs on the filled detachable dental-amalgam container.

55. (Currently Amended) The detachable dental-amalgam container of claim 53, wherein the at least one radially protruding structure includes a flange structure extending away from a lower portion of the generally cylindrical upper region.

56. (Currently Amended) The detachable dental-amalgam container of claim 55, wherein the flange structure extends entirely around the container top portion.

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57. (Currently Amended) The detachable dental-amalgam container of claim 55, wherein the flange structure includes a curved outer surface.

58. (Previously Presented) The detachable dental-amalgam container of claim 53, wherein the generally cylindrical upper region includes external threads.

59. (Previously Presented) The detachable dental-amalgam container of claim 53, further including a restrictor located within the interior volume of the main body and fluidically coupled to the container outlet port, the restrictor configured to remove fine particles from the dental amalgam effluent so that the fine particles are not discharged from the container outlet port.

60. (Previously Presented) A detachable dental-amalgam container for use with a dental amalgam separation system, the dental amalgam separation system having a tank for receiving the dental amalgam effluent and at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having an interior volume for receiving the dental amalgam effluent from the tank of the dental amalgam separation system;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having a circular upper surface from which a container inlet port and a container outlet port extend away from the main body, the container inlet port being positioned nearer to a periphery of the circular upper surface than the container outlet port, the container inlet port for receiving the dental amalgam effluent from the tank of the dental amalgam separation system, the container top portion further including at least one radially protruding structure located below the generally cylindrical upper region, the at least one radially protruding structure being located radially outward relative to the periphery of the circular upper surface, the at least one radially protruding structure for being positioned above the at least one retaining pin of the dental amalgam separation

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system to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system.

61. (Previously Presented) The detachable dental-amalgam container of claim 60, further including a restrictor located within the interior volume of the main body and fluidically coupled to the container outlet port, the restrictor configured to remove fine particles from the dental amalgam effluent so that the fine particles are not discharged from the container outlet port.

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REMARKS

Claims 41-61 remain in the application for further prosecution. Claims 42, 47, 50–53, and 55–57 are presently being amended. No new matter is being added.

I. Examiner Interview on November 15, 2023

Applicant appreciates the Examiner's time and effort in conducting the Interview on November 15, 2023 for the current application and related Serial No. 18/135,341, which also has an outstanding Office Action. During the Interview, the drawing / specification objections and rejections under 35 U.S.C. §112 from the current Office Action were discussed. Further, the materials from the Post-Grant Review on related U.S. Patent No. 11,660,175 submitted in the recently filed Information Disclosure Statements were discussed. Specifically, the Interview included a discussion of Petitioner DRNA's positions in the Post-Grant Review regarding (i) the effective filing date of the '175 Patent relative to Grounds 1-4, and (ii) the prior art teachings of Liu and Liu/Boyd in Grounds 5-6. No final decision regarding the patentability of the pending claims was reached during the Interview.

In addition to the amendments in this Response, the Applicant now submits a Replacement Drawing Set, a Marked-Up Specification, and a Clean Specification as discussed with the Examiner.

II. Changes Made to the Drawings and the Specification

As discussed during the Interview, for purposes of consistency, Applicant is now making the same drawing and specification changes that were made in Office Action Responses dated February 7, 2023 and March 22, 2023 in the related application, Patent Application No. 17/965,556, now granted as U.S. Patent No. 11,660,175. The only difference is the change related to the corresponding keying structure 26 (which was added to replacement drawing FIG. 11B at the request of the Examiner in related Serial No. 18/135,341) and the corresponding explanation in the specification at paragraph [0097]. No new matter has been added by the Replacement Drawing Set or the Marked-Up Specification.

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a. Drawing Changes

The Applicant respectfully suggests that the initial drawings illustrated the features in the pending claims. The Applicant is now submitting a Replacement Drawing Set that makes the following changes:

- In FIGURE 1, the reference line for the container top portion 9 was elongated so that the reference lines extends further into the container top portion 9.
- In FIGURE 2, the reference line for the pin 13 was changed from an arrowed lead line to a straight lead line that touches vertical segment of the pin 13.
- FIGURES 3A and 3B previously had no reference numerals. As requested by the Examiner, reference numeral "25" has now been added to identify the adapter 25.
- In FIGURE 4A, reference numerals "15", "16", and "22" were added to identify the container inlet port 15, container outlet port 16, and the flange structure 22, respectively.
- FIGURE 4B previously had no reference numerals. As requested by the Examiner, reference numerals "9," "12", "15", "16", "18", "19", "20", "21" and "22" have now been added to identify the container top portion 9, container 12, the container inlet port 15, the container outlet port 16, the cap 18, the O-ring groove 19, the plugs 20, the O-ring 21, and the flange structure 22, respectively.
- In FIGURE 5A, reference numeral "17" was changed to reference numeral "18" to properly identify the cap 18.
- In FIGURE 5B, reference numeral "9" was added to identify the container top portion 9.
- FIGURES 6A, 6B, 7A, 7B, 8A, 8B, 9A, and 9B have now been deleted as they were in the related application Serial No. 17/965,556.
- Due to the former FIGURES 6-9 being deleted, FIGURES 10A, 10B, 11A, 11B, 12A, 12B, 13A, 13B, 14A, 14B, 15A, and 15B have now been renumbered. Further, these figures previously had no reference numerals. As requested by the Examiner, in each of these figures, reference numerals "15", "16", and "23" have been added to identify the container inlet port 15, the container outlet port 16, and one of the keyways 23, respectively.

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- Additionally, in FIGURE 11B, the "corresponding keying structure" was added and identified with reference numeral "26" as requested by the Examiner in related Serial No. 18/135,341.

Within these changes to the drawings, the only new reference numerals being added are the flange structure 22, the keyways 23, the adapter 25, and the corresponding keying structure 26. Because the original drawings and specification previously disclosed these features, no new matter has been added by these drawing changes. Furthermore, the amendments to the specification to account for these drawing changes are also consistent with the originally filed drawings and specification and, therefore, no new matter has been added by these amendments to the specification.

Regarding the specific drawing objection to claim 53 related to the "external O-ring" on page 2 of the Office Action, the Applicant has amended claim 53 to remove reference to the "external O-ring" to obviate the drawing objection. Support for the sealing function of the inlet port and outlet port in amended claim 53 can be found in Paragraph [0090] of the specification.

Regarding the specific drawing objection to claim 47 related to the "first circular wall" and "second circular wall" of the cap 18 on page 2 of the Office Action, the Applicant has amended claim 47 to remove reference to these first and second wall features. Support for amended claim 47 can be found in Paragraph [0096] of the specification.

b. Specification Changes

In light of the changes to the drawings noted above, and for purposes of making the specification consistent with the related application, Serial No. 17/965,556, the following changes have been made to the specification. The only difference is the corresponding keying structure 26, which was added to replacement drawing FIG. 11B and explained in the specification at paragraph [0097] at the request of the Examiner in the current Office Action for Serial No. 18/135,341.

As mentioned to the Examiner in the Interview, the following explanations for the specification changes are consistent with the explanations provided in the Office Action Responses dated February 7, 2023 and March 22, 2023 in the related application, Patent Application No. 17/965,556, now granted as U.S. Patent No. 11,660,175.

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- The "main body" and the "interior volume": The detachable recycling container 12 has a main body with an interior volume for receiving the effluent, as shown throughout the drawings, such as FIG. 1. Paragraph [0089] has been amended to specifically use the term "main body" and "interior volume", which is supported by the original specification and drawings.
- The "central axis": The "central axis" of the main body of the recycling container 12 is shown in FIG. 4A. Paragraph [0096] has been amended accordingly in a manner that is supported by the original specification and drawings.
- The "container top portion": The "container top" is mentioned in Paragraph [0049] as being associated with reference numeral 9, which is shown in FIG. 1. For clarity Paragraph [0049] has been amended to include the word "portion" after "top." For clarity, FIGS. 4B and 5B have now been amended to include reference numeral 9 to refer to the container top portion. Paragraphs [0089] and [0094] have been amended to specifically use the term "container top portion", which is supported by the original specification and drawings.
- The "cylindrical upper region" and the "circular upper surface": The cylindrical upper region of the container top portion 9 that has the circular upper surface is shown throughout the figures. For example, as shown in FIGS. 1 and 4A, the generally cylindrical upper region is where the threads 17 of the container are located. Paragraph [0094] has been amended to specifically use the term "generally cylindrical upper region." Paragraph [0097] describes the inlet port 15 and the outlet port 16 in FIGS. 6-11 and has been amended to refer to the circular upper surface of the container top portion. These amendments are supported by the original specification and drawings.
- The "radially protruding structures" and the "flange structure": Paragraph [0092] has been amended to specifically use the term "radially protruding structures" that can be engaged by the removable retaining pins 13. The flange structure 22 illustrated in FIGS. 4A and 4B is an example of such a radially protruding structure. Paragraph [0096] has been amended to specifically use the term "flange structure" that protrudes radially away from the central axis of the main body of the recycling container. These amendments are supported by the original specification and drawings.

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- The "container inlet conduit": As shown in FIG. 1, a container inlet conduit extends downwardly directly below the container inlet port 15 and into the interior volume of the main body of the detachable recycling container 12. Paragraph [0089] has been amended to describe this configuration in a manner that is supported by the original specification and drawings.
- The "corresponding keying structure": As shown in FIG. 11B, the corresponding keying structure mates with the irregular keyways cast into the outer top mating surface of the container top portion. Paragraph [0097] has been amended to describe the corresponding keying structure 26 that was added to FIG. 11B. The description of the keying structure in paragraph [0097] is consistent with the description of the keying system that is described in paragraph [0032] of the original specification. This change was not made in the related application, Patent Application No. 17/965,556, now granted as U.S. Patent No. 11,660,175.

The Applicant appreciates the Examiner's careful review of the claims and believes that these changes to the specification and drawings should obviate the objections in the Office Action. The Applicant further notes that 37 CFR §1.75(d)(1) and MPEP §608.01(o) indicate the terms and phrases used in the claims should find support or antecedent basis in the description. As noted above, the Applicant believes a skilled artisan would understand the claim elements subject to these objections are clearly supported by the originally filed specification and drawings. As such, no new matter has been added. *See also Ariad Pharmaceuticals, Inc. v. Eli Lilly and Co.*, 598 F.3d 1336, 1352 (Fed. Cir. 2010) (en banc) ("the description requirement does not demand any particular form of disclosure, or that the specification recite the claimed invention *in haec verba*"). No new matter has been added by the changes to the drawings or the specification.

III. Section 112 Rejections

Claims 41–61 have been rejected under 35 U.S.C. §112(a) as allegedly failing to comply with the written description requirement. For reasons unrelated to patentability and to advance prosecution, the claims, drawings, and specification have been amended to obviate any problems with 35 U.S.C. §112. As noted above, no new matter has been added by the changes to the

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drawings or the specification. As such, the Applicant respectfully suggests that the present application describes the claimed subject matter in a way that would permit the skilled artisan to make and use the invention.

Regarding the specific question related to the "universal adapter" in FIGS. 3A and 3B on page 4 of the Office Action, as discussed in the Interview, the universal adapter is not the same as the "container top portion 9." The universal adapter, which has a specific function described in Paragraph [0095], is not being claimed in the present application.

Regarding the specific question related to the "flange structure" having a "curved surface" on page 4 of the Office Action, as discussed in the Interview, the flange structure 22 illustrated in FIGS. 4A and 4B is a radially protruding structure and has a circular outer periphery (as best seen in FIG. 4B). Hence, the flange structure has a "curved outer surface" as set forth in dependent claims 50 and 57.

Regarding the specific question related to how "the at least one retaining pin" engages with the radially protruding structure or flange on pages 4-5 of the Office Action, as discussed in the Interview, the only possible mating location for the retaining pin 13 is in the groove below the radially protruding flange 22 illustrated in FIGS. 4A and 4B.

Consequently, the Applicant believes that all of the pending claims meet the requirements of 35 U.S.C. §112.

IV. Double Patenting

Claims 41–61 were rejected on the ground of nonstatutory double patenting as allegedly being unpatentable over claims 1–22 of U.S. Patent No. 11,660,175. While Applicant respectfully disagrees, for reasons unrelated to patentability and to advance prosecution, a terminal disclaimer in compliance with 37 C.F.R. § 1.321 is submitted herewith for overcoming the double patenting rejection. The submission of this terminal disclaimer should not be construed as an admission to the merits of the obviousness-type double-patenting rejections pursuant to *Quad Environ. Tech. Corp. v. Union Sanitary District*, 946 F.2d 870 (Fed. Cir. 1991). Accordingly, reconsideration and withdrawal of the rejection is respectfully requested.

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V. Conclusion

Applicant submits that the claims are in a condition for allowance and action toward that end is earnestly solicited. If there are any matters which may be resolved or clarified through a telephone interview, the Examiner is respectfully requested to contact Applicant's undersigned attorney at the number indicated.

It is believed that no fees are due; however, should any fees be required (except for payment of the issue fee), the Commissioner is requested to contact the undersigned attorney for Applicant.

Respectfully submitted,

Date: November 16, 2023

By: /Steven R. Lazar/
Steven R. Lazar
Attorneys for Applicant
Registration No. 32,618

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PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/941,522	Filing Date 07/28/2020	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	11/16/2023	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 21	Minus	** 21	= 0		x $40 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $192 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/ZURIASHWORK ZENEBE/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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List of References **THIRD INFORMATION DISCLOSURE STATEMENT** Page 1 of 1	Atty. Docket No. SMTX-001-T1-CON	Application No.: 16/941,522
	Applicant(s): Solmetex LLC	
	Filing Date: July 28, 2020	Art Unit: 3772

U.S. PATENTS				
Examiner Initial	**Cite No.**	**Patent Number**	**Issue Date**	**First Named Inventor**
	A1			

U.S. PATENT APPLICATION PUBLICATIONS				
Examiner Initial	**Cite No.**	**Patent Application Publication Number**	**Publication Date**	**First Named Inventor**
	B1			

FOREIGN PATENT DOCUMENTS					
Examiner Initial	**Cite No.**	**Foreign Document Number**	**Publication Date**	**Country**	**Translation**
	C1				

OTHER DOCUMENTS (including publisher, author (if any), title, relevant pages, date, and place of publication)		
Examiner Initial	**Cite No.**	**Document Information**
	D1	Complaint filed in *Solmetex, LLC v. Dental Recycling North America, Inc.,* Civil Action No. 1:23-cv-00602-UNA, D.I. 1; dated June 1, 2023 (58 pages)
	D2	Defendant's Answer, Defenses, and Counterclaims to Solmetex, LLC's Complaint, filed in *Solmetex, LLC v. Dental Recycling North America, Inc.,* Civil Action No. 1:23-cv-00602-UNA, D.I. 18; dated November 1, 2023 (40 pages)

EXAMINER:	**DATE CONSIDERED:**

EXAMINER: INITIAL IF REFERENCE CONSIDERED, WHETHER OR NOT CITATION IS IN CONFORMANCE WITH MPEP609; DRAW LINE THROUGH CITATION IF NOT IN CONFORMANCE AND NOT CONSIDERED. INCLUDE COPY OF THIS FORM WITH NEXT COMMUNICATION TO APPLICANT.

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UNITED STATES
PATENT AND TRADEMARK OFFICE

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ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	11/14/2023 05:08:43 PM Z ET	- SMTX-001-T1-CON

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63248005	AUTHORIZED BY	-
CUSTOMER #	80709	FILING DATE	07/28/2020
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Nicholas Mozzicato

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 2421	E2023ADH10249821	Steven Lazar

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
2806	SUBMISSION OF AN INFORMATION DISCLOSURE STATEMENT	104.00	1	104.00
			TOTAL AMOUNT:	$104.00

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

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DRNA v. Solmetex - PGR2023-00555

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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DRNA v. Solmetex - PGR2023-00555

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Solmetex LLC	Customer No.: 80709
Application No.: 16/941,522	Confirmation No.: 1050
Filed: July 28, 2020	Art Unit: 3772
Docket No.: SMTX-001-T1-CON	Examiner: Lucchesi, Nicholas D.

Title: DETACHABLE RECYCLING CONTAINER

THIRD INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. §§ 1.97 and 1.98

Commissioner for Patents – via EFS
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56, it is respectfully requested that this Information Disclosure Statement be entered and the references listed on the attached List of References be considered by the Examiner and made of record.

In accordance with 37 C.F.R. § 1.98(a)(2)(ii), copies of the U.S. Patents and/or U.S. Patent Application Publications on the attached List of References are not being submitted.

The information contained in this Information Disclosure Statement was identified in *Solmetex, LLC v. Dental Recycling North America, Inc.*, Civil Action No. 1:23-cv-00602-MN, filed in the District Court of Delaware on June 1, 2023. Applicant invites the Examiner or any other appropriate USPTO official to contact the attorney of record below with any questions and/or requests regarding this notice.

In accordance with 37 C.F.R. §§ 1.97(g) and (h), this Information Disclosure Statement is not to be construed as a representation that a search has been made, and is not to be construed to be an admission that the information disclosed is, or is considered to be, prior art with respect to the present application or material to patentability as defined in 37 C.F.R. § 1.56.

This Information Disclosure Statement is being filed after the mailing of a first office action on the merits, but before the mailing of a final office action or notice of allowance. Accordingly, pursuant to 37 C.F.R. § 1.97(c), Applicant is concurrently submitting

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the $104.00 Information Disclosure Statement fee set forth in 37 C.F.R. § 1.17(p). No additional fees are believed to be due in connection with the filing of this Information Disclosure Statement. However, should any additional fees be deemed necessary (except payment of the issue fee), the Director is urged to contact the below-signed representative of the Applicant.

Respectfully submitted,

Date: November XX, 2023

By: /Steven R. Lazar/
Steven R. Lazar
Attorney for Applicant
Registration No. 32,618
617-966-2374

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DRNA v. Solmetex - PGR2023-00555

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/14/2023 05:08:43 PM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63248005	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
SMTX-01-T1-CON-Third_IDS_Transmittal_Letter_16941522.pdf	2	Transmittal Letter	76 KB
Third_IDS_List_of_References_16941522.pdf	1	Information Disclosure Statement (IDS) Form (SB08)	89 KB
Warning: This is not a USPTO supplied IDS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.			
D1_Complaint.pdf	58	Non Patent Literature	6313 KB
D2_Answer.pdf	40	Non Patent Literature	9566 KB

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DRNA v. Solmetex - PGR2023-00555

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
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New Applications Under 35 U.S.C. 111

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 06:27:14 PM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63163405	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D4-Motion_to_Dismiss_Exhibit_2_6.pdf	41	Non Patent Literature	3304 KB
D4-Motion_to_Dismiss_Exhibit_2_7.pdf	45	Non Patent Literature	2038 KB
D4-Motion_to_Dismiss_Exhibit_2_11.pdf	43	Non Patent Literature	2598 KB

Digest

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

DOCUMENT	MESSAGE DIGEST(SHA-512)
D4-Motion_to_Dismiss_Exhibit_2_6.pdf	F9C0159E227E9AE56C51FA2CAC07168CBCE5AC38948D66804E672866F500B7A29D0B7D166C40020839424FA26061F4B64D840C3F934453B5238C5C896B1A297F
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 12:20:07 PM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63163039	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 2

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D4-Motion_to_Dismiss_Exhibit_2_4.pdf	39	Non Patent Literature	2764 KB
D4-Motion_to_Dismiss_Exhibit_2_5.pdf	27	Non Patent Literature	2000 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

D4-Motion_to_Dismiss_Exhibit_2_4.pdf	2B224D7D115BFE20993CA57EF90448CEFC91F16FC0D56D35BF25BF5D73CFDC91C8B9F15C5850E3A44E90E4F5CADAC1D0C3B1B4282CB6641CBE3B8654BA3B7BD7
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 12:06:38 PM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63163033	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D4-Motion_to_Dismiss_Exhibit_2_2-pt1.pdf	23	Non Patent Literature	1716 KB
D4-Motion_to_Dismiss_Exhibit_2_2-pt2.pdf	23	Non Patent Literature	1604 KB
D4-Motion_to_Dismiss_Exhibit_2_3.pdf	42	Non Patent Literature	2879 KB

Digest

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 11:46:51 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63163018	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D41-Ex1035_Memorandum_Order.pdf	4	Non Patent Literature	153 KB
D40-Ex1034_Memorandum_Order.pdf	4	Non Patent Literature	3036 KB
D42-Ex1036_Memorandum_Order.pdf	5	Non Patent Literature	259 KB
D43-Ex1037_Federal_Court_Management_Statistics.pdf	4	Non Patent Literature	679 KB

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D44-District_of_Delaware_Order_Denying_DRNA_Motion_to_Dismiss.pdf	2	Non Patent Literature	128 KB
D45-Opposition_to_Motion_to_Dismiss.pdf	27	Non Patent Literature	10777 KB

Digest

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 11:44:30 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63163017	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D34-Ex1028_Solmetex_Contact_Us.pdf	6	Non Patent Literature	723 KB
D35-Ex1029_US10918982.pdf	22	Non Patent Literature	1906 KB
D36-Ex1030_US8007669.pdf	8	Non Patent Literature	441 KB
D37-Ex1031_US3615016.pdf	8	Non Patent Literature	709 KB
D38-Ex1032_DE3737002C1.pdf	18	Non Patent Literature	5753 KB

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D39-Ex1033_CN107417069A.pdf	15	Non Patent Literature	3439 KB

Digest

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US010918982B1

(12) **United States Patent**
Sutton

(10) **Patent No.: US 10,918,982 B1**
(45) **Date of Patent: Feb. 16, 2021**

(54) **MANUALLY DETACHABLE ENCLOSURE FOR REPLACEABLE FILTER ELEMENTS AND THE LIKE**

(71) Applicant: **Jepson Sutton**, Phoenix, AZ (US)

(72) Inventor: **Jepson Sutton**, Phoenix, AZ (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 20 days.

(21) Appl. No.: **16/160,983**

(22) Filed: **Oct. 15, 2018**

(51) **Int. Cl.**
B01D 35/30 (2006.01)

(52) **U.S. Cl.**
CPC ***B01D 35/30*** (2013.01); *B01D 2201/302* (2013.01); *B01D 2201/304* (2013.01); *B01D 2201/305* (2013.01); *B01D 2201/306* (2013.01); *B01D 2201/307* (2013.01)

(58) **Field of Classification Search**
CPC B01D 35/30; B01D 2201/304; B01D 2201/306; B01D 2201/305; B01D 2201/302; B01D 2201/307
USPC 210/450, 440–445, 455, 282; D23/207, D23/209, 365
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2012/0318725 A1* 12/2012 Tseng B01D 35/30 210/232

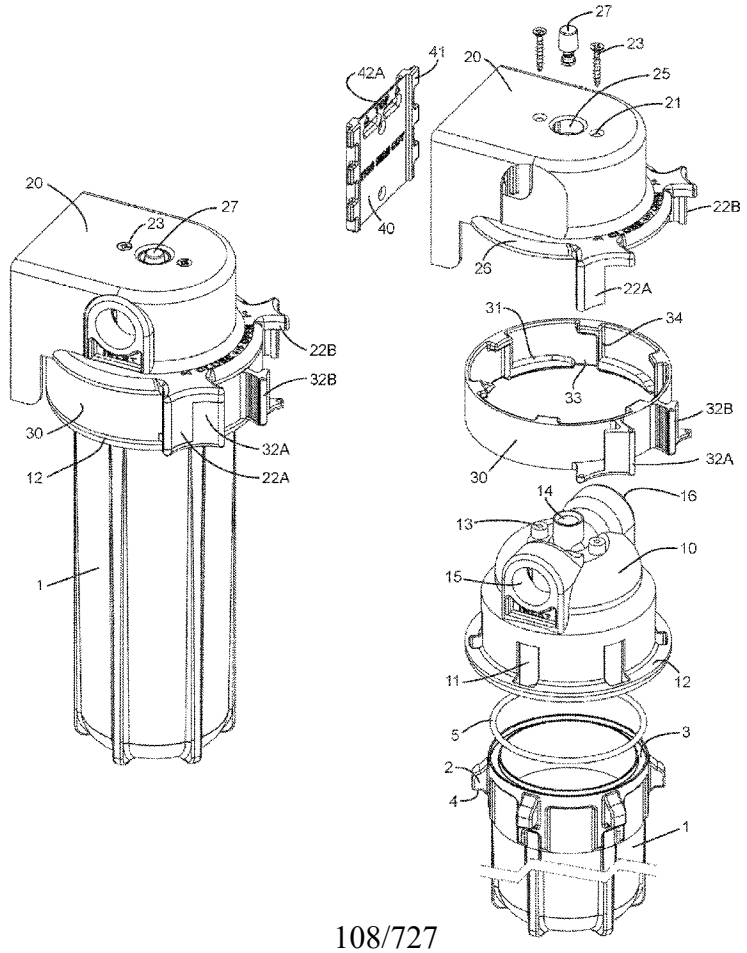
* cited by examiner

Primary Examiner — Madeline Gonzalez

(57) **ABSTRACT**

An apparatus and method for using a detachable sealed enclosure for containing and quickly accessing filter elements and the like without the use of tools and without the possibility of initial or subsequent over tightening. A first set of paired protrusions receive lateral pinch forces which draw the enclosure into a sealed connection with a lid while selectively compressing a seal between these components. A second set of paired protrusions receive lateral pinch forces which release the sealed connection, providing access to the enclosure content.

19 Claims, 13 Drawing Sheets



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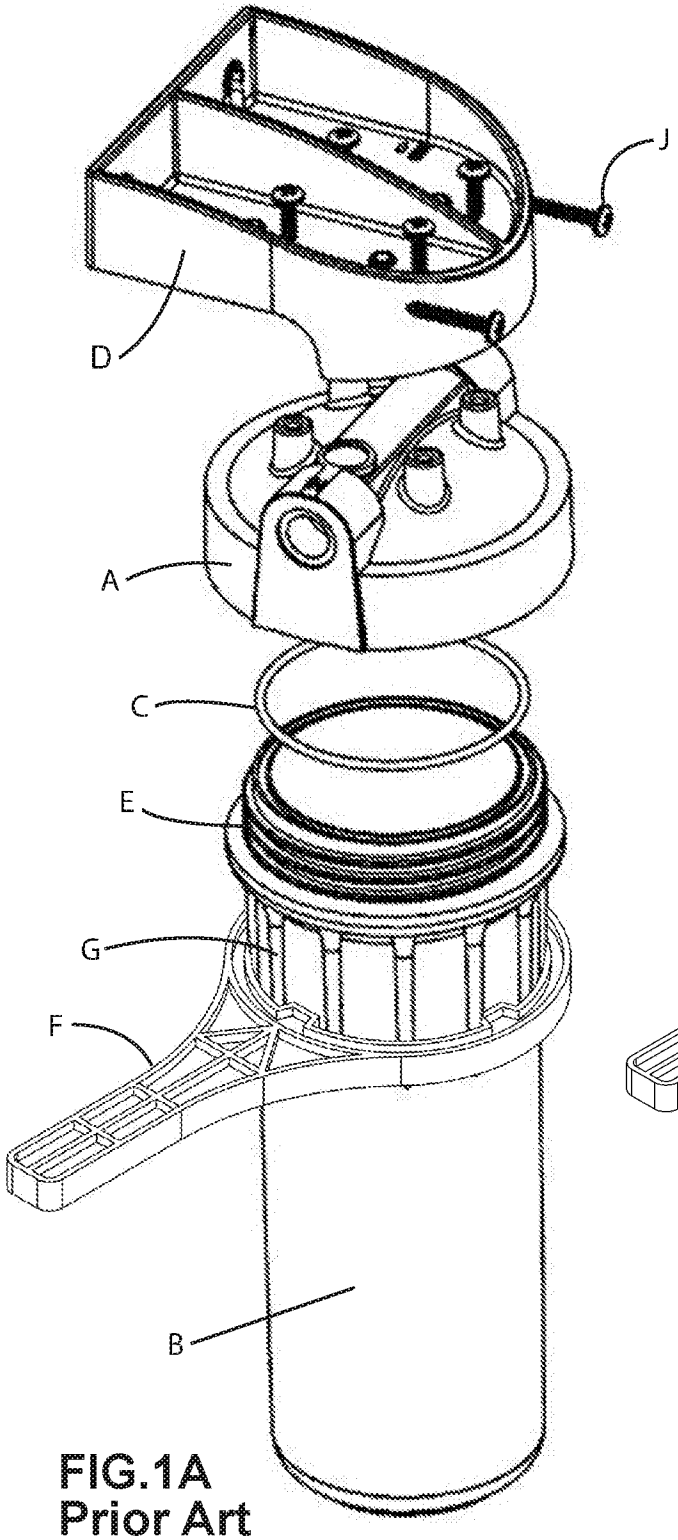


FIG.1A
Prior Art

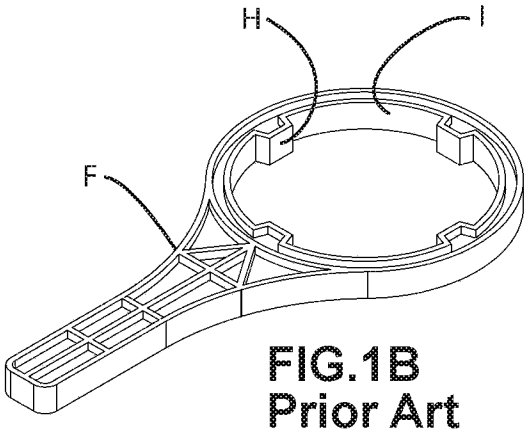


FIG.1B
Prior Art

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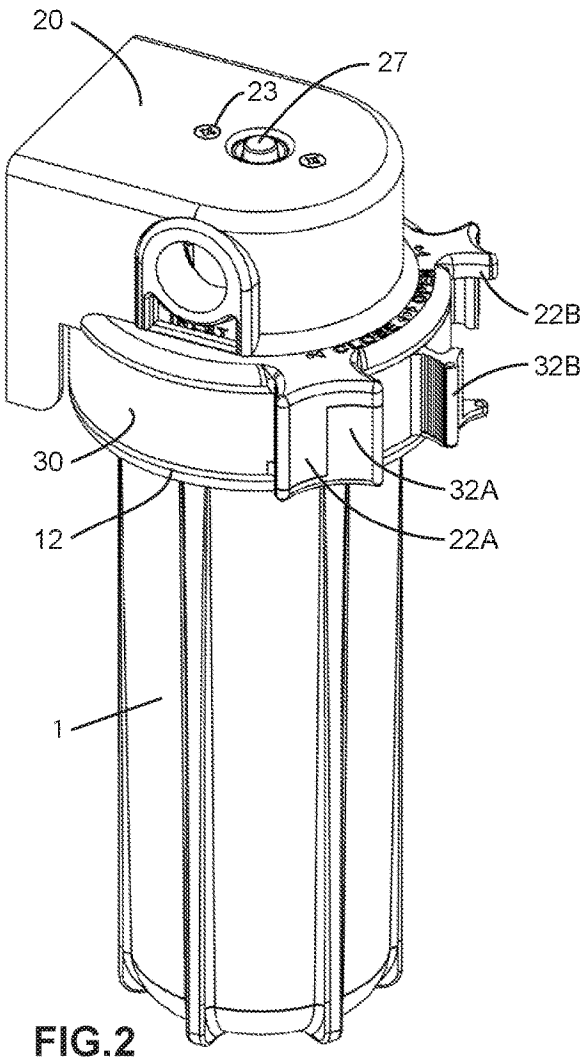


FIG.2

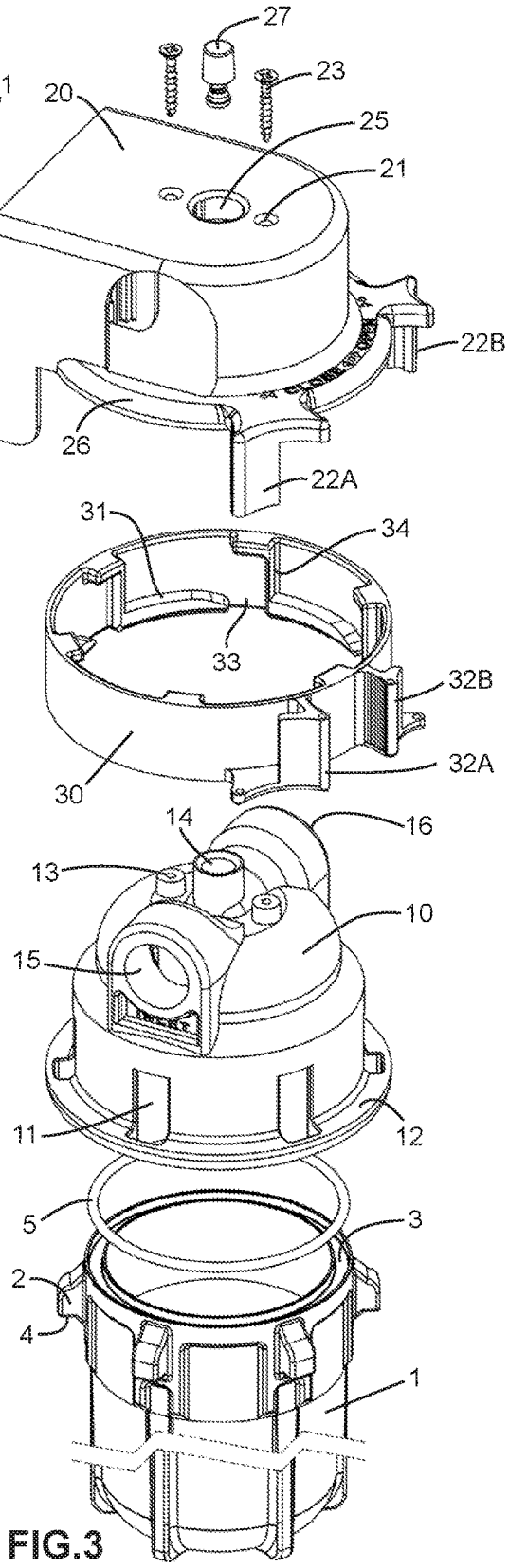


FIG.3

PGR2023-00555 - Ex. 1029
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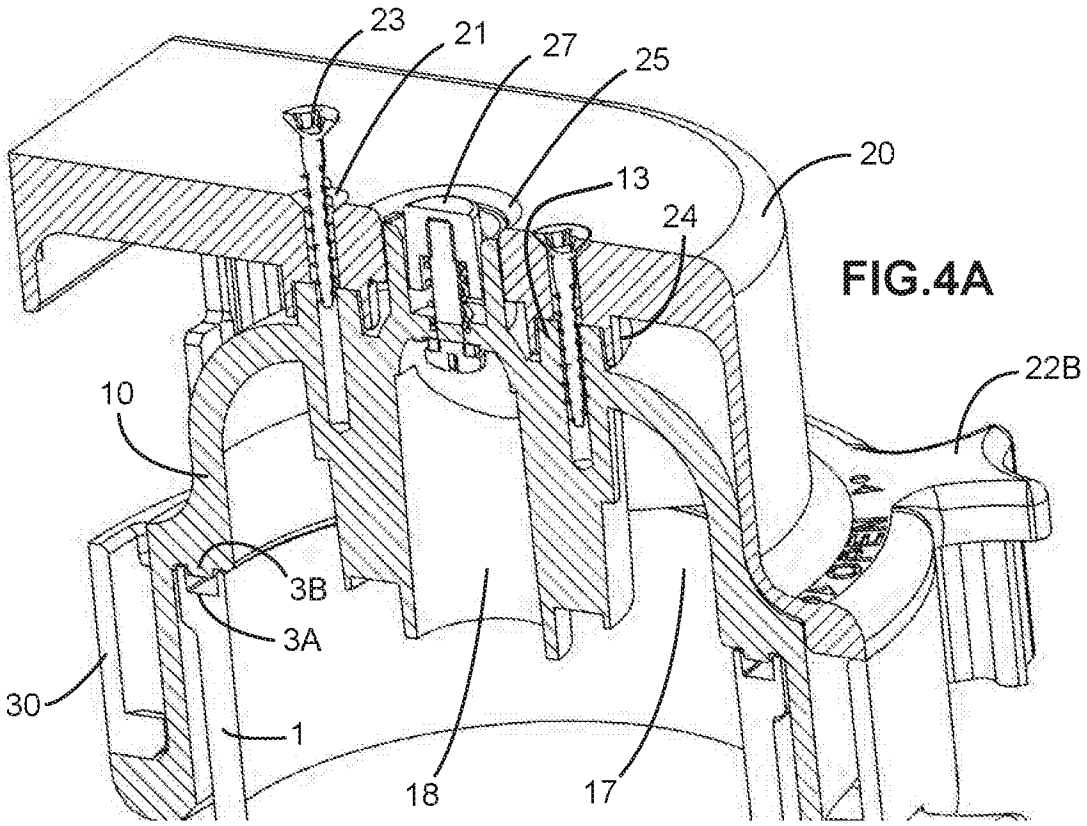


FIG.4A

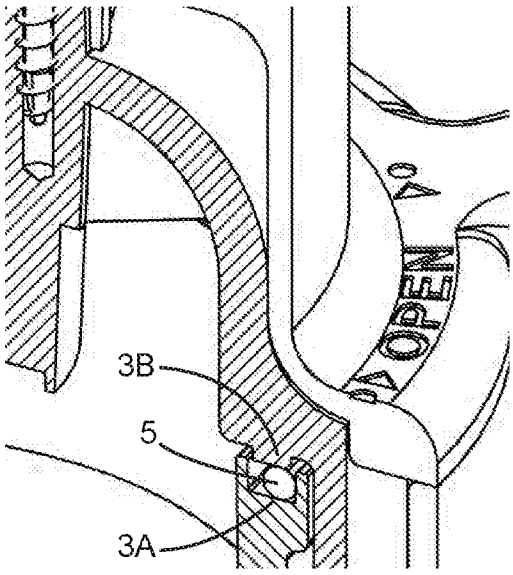


FIG.4B

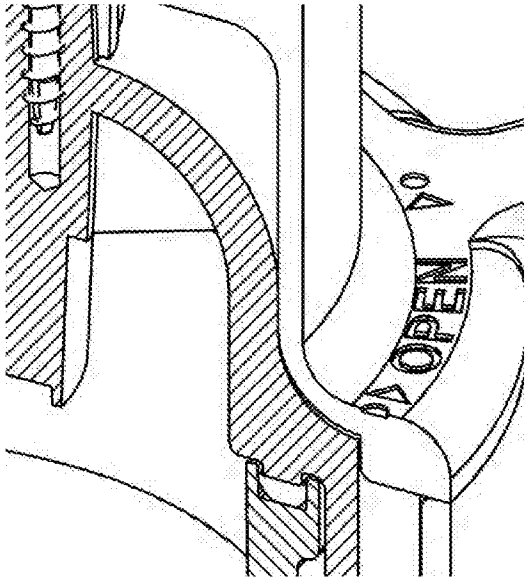


FIG.4C

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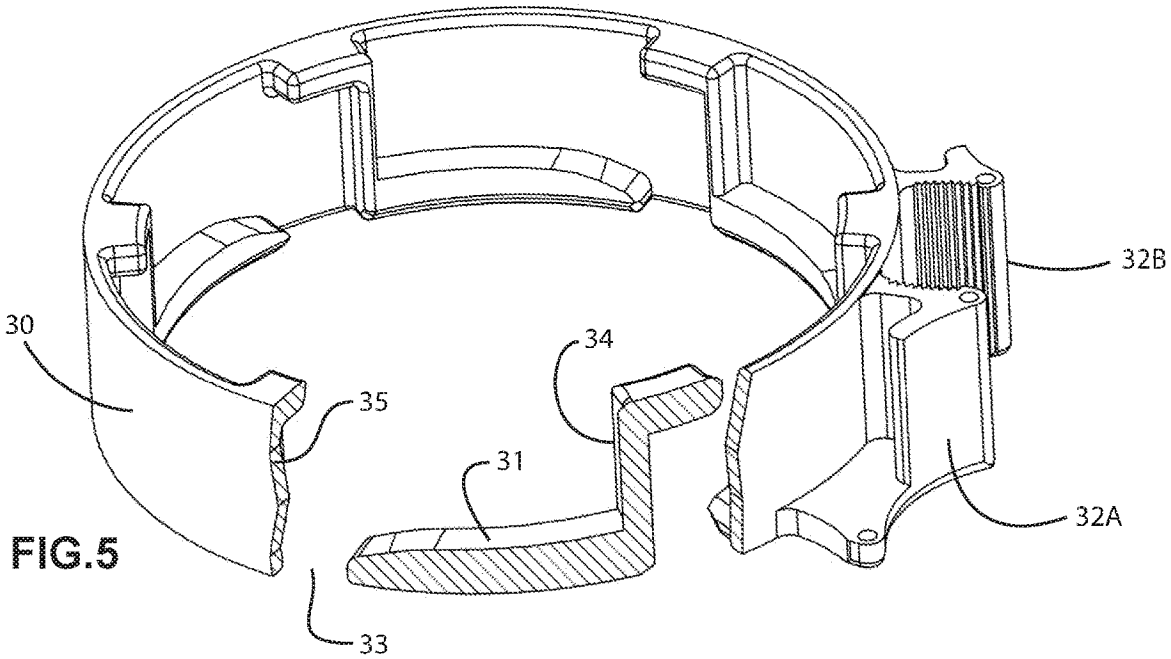


FIG.5

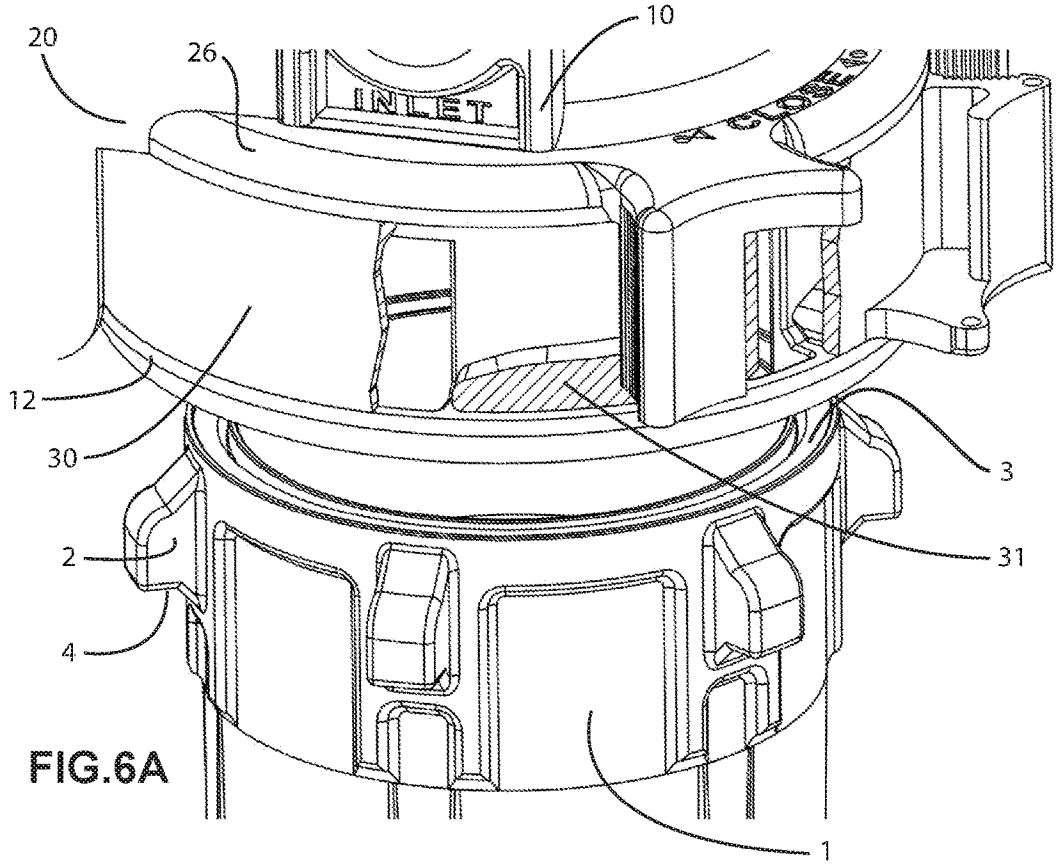


FIG.6A

PGR2023-00555 - Ex. 1029
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FIG.6B

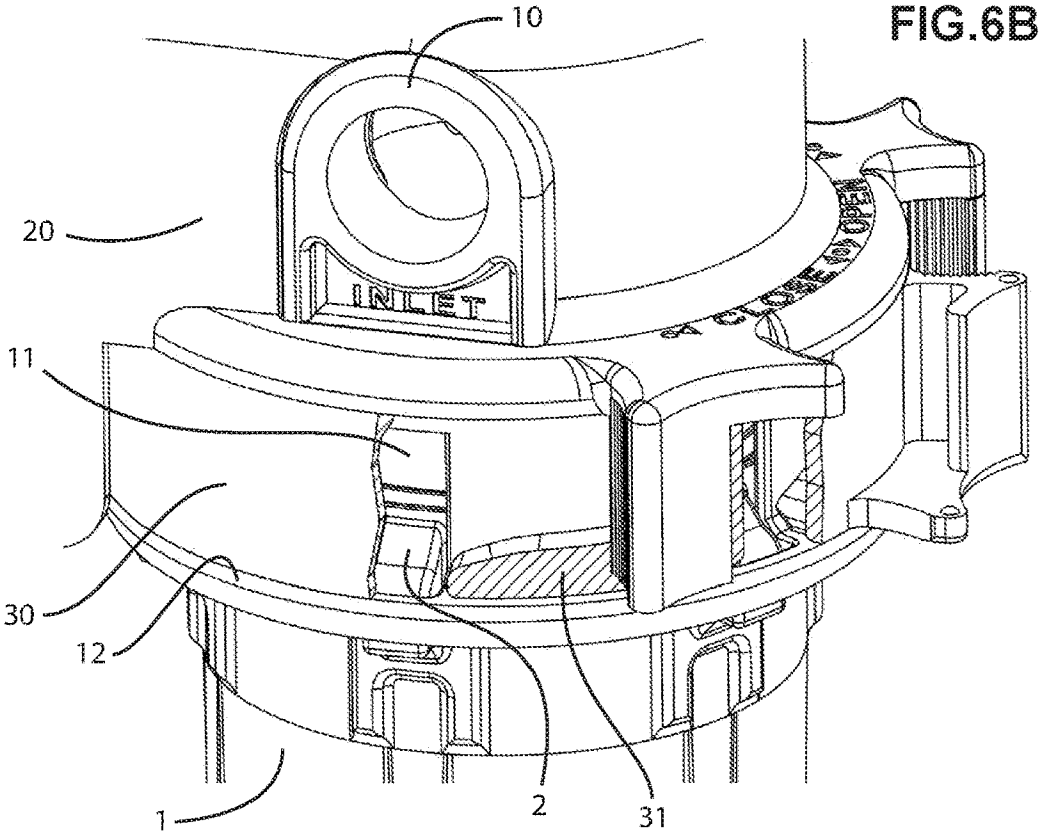
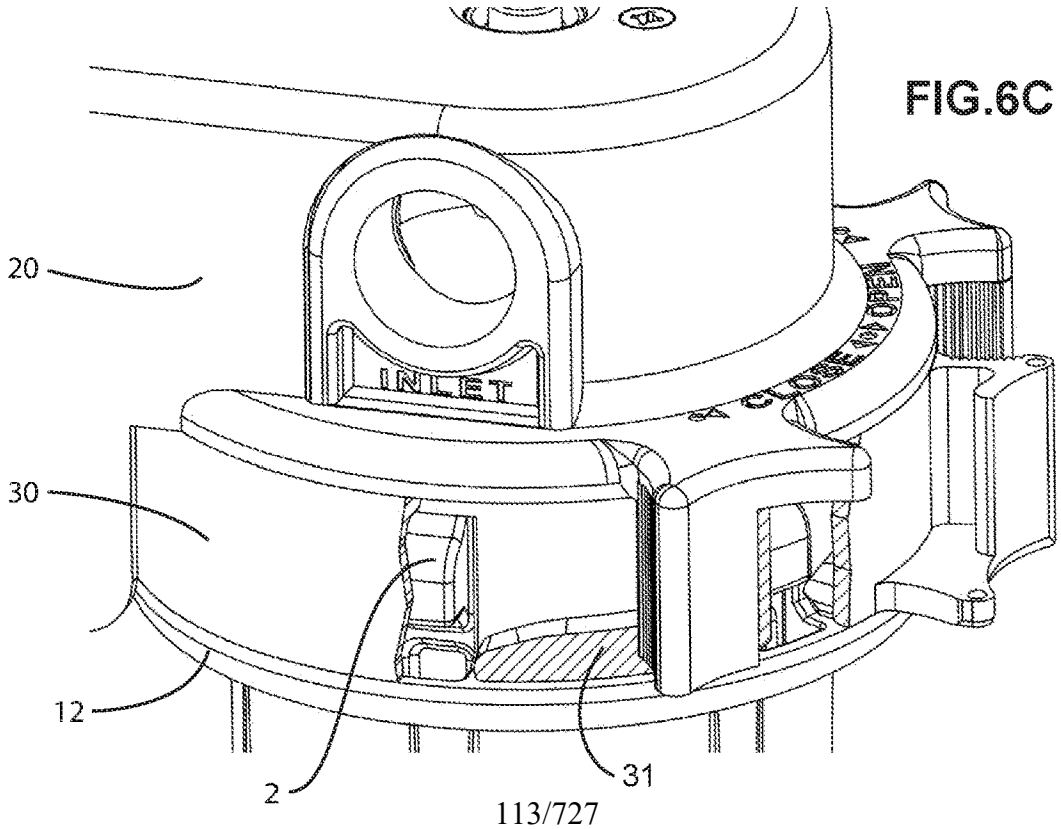


FIG.6C



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DRNA v. Solmetex - PGR2023-00555
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FIG.6D

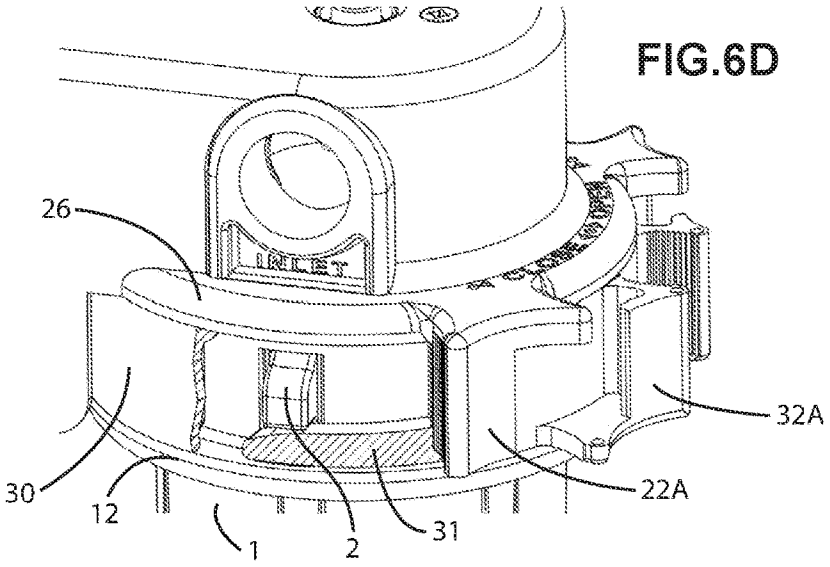


FIG.6E

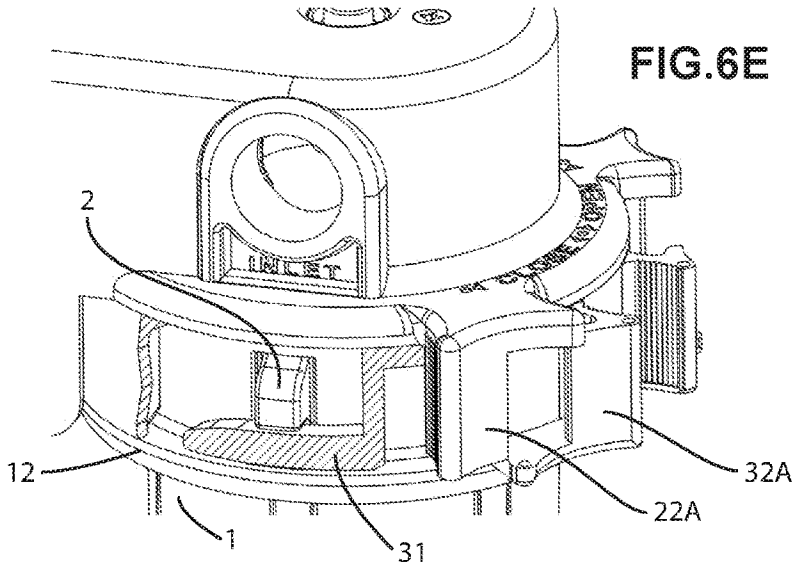
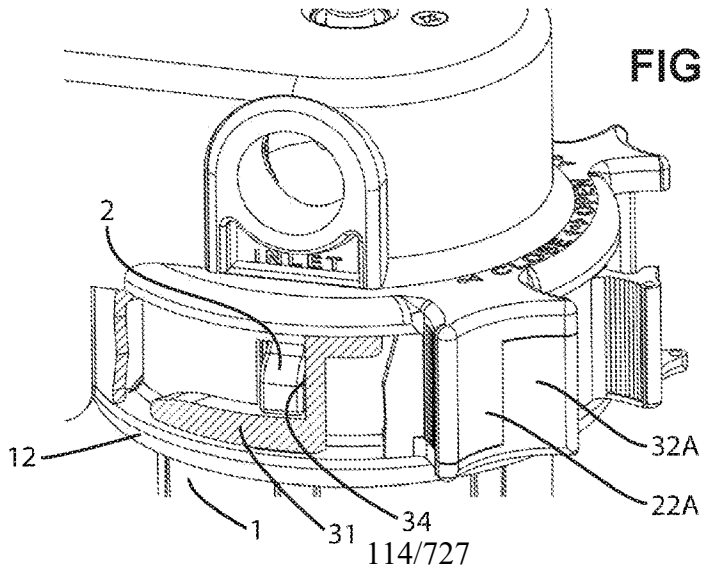


FIG.6F



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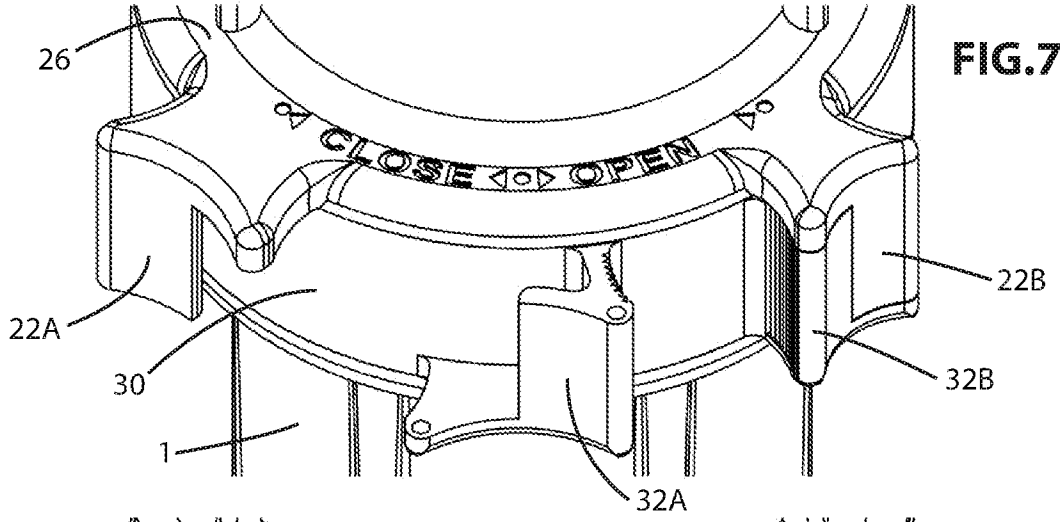


FIG.7A

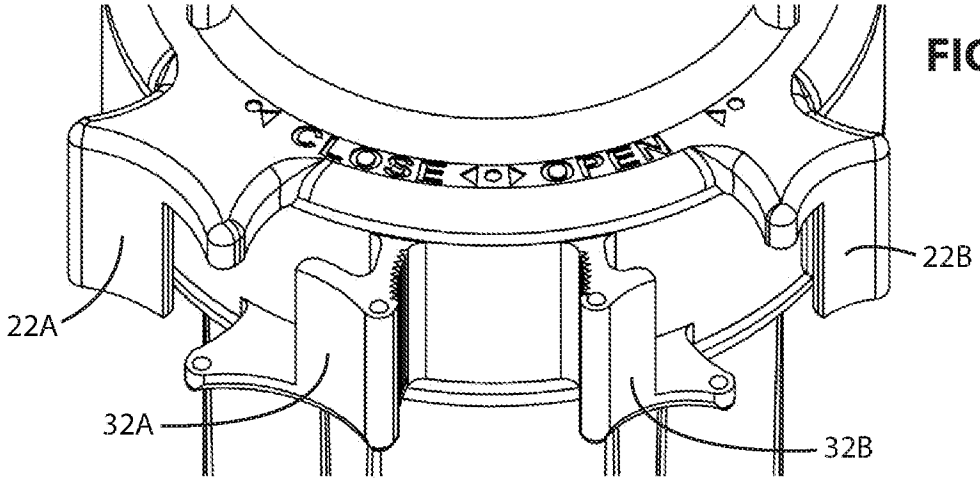


FIG.7B

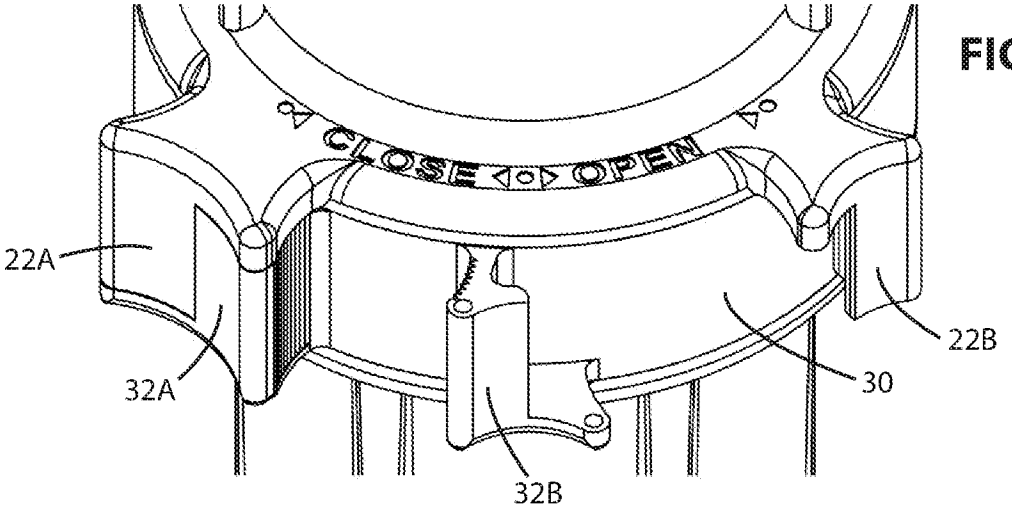


FIG.7C

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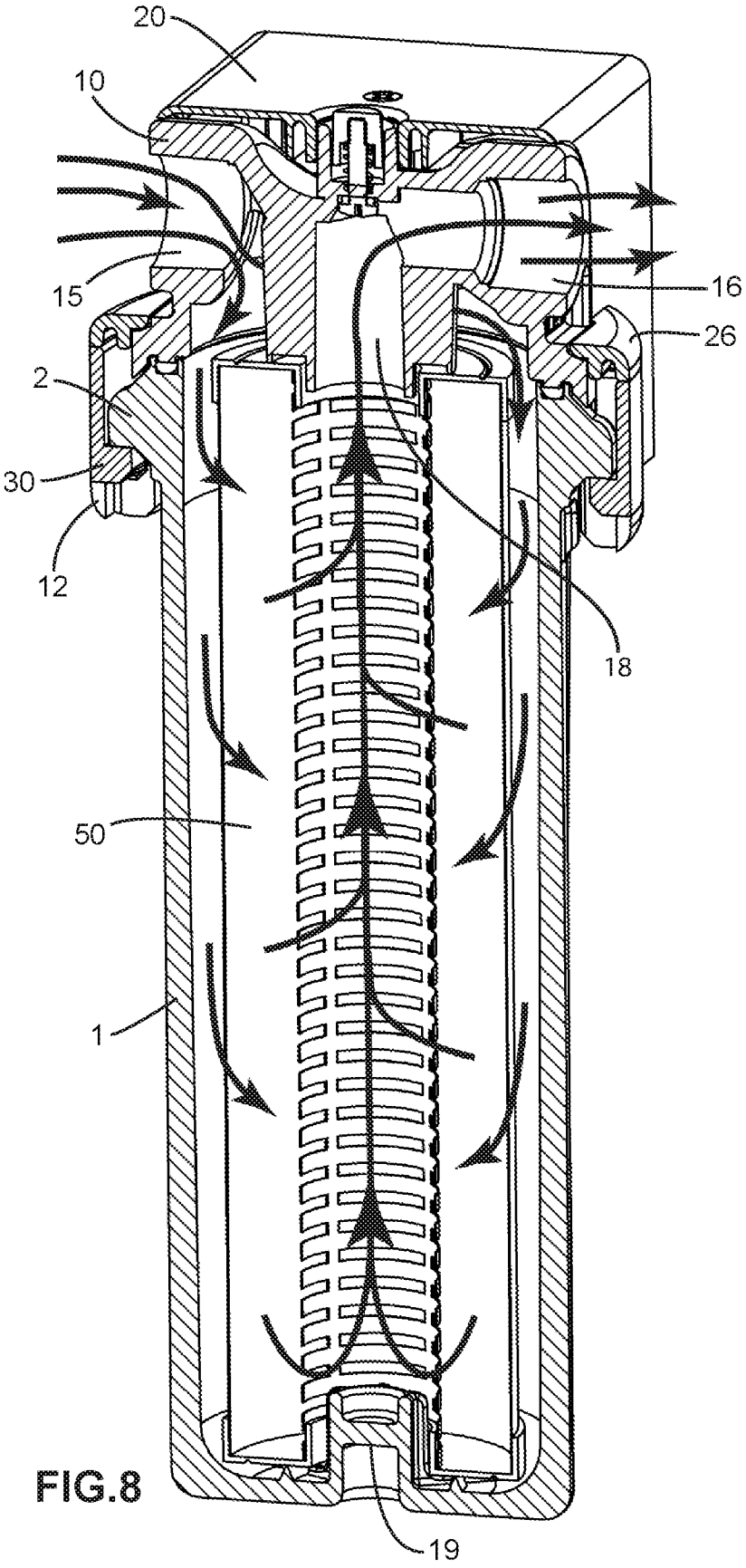


FIG.8

PGR2023-00555 - Ex. 1029
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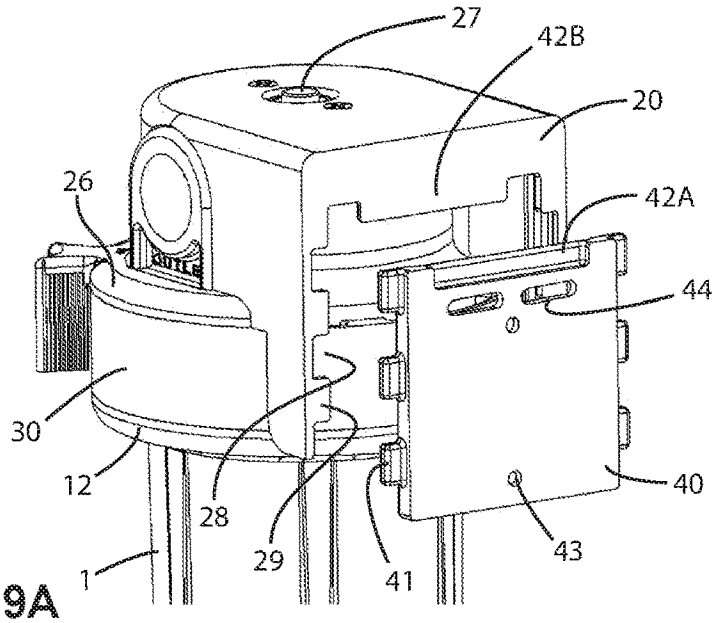


FIG.9A

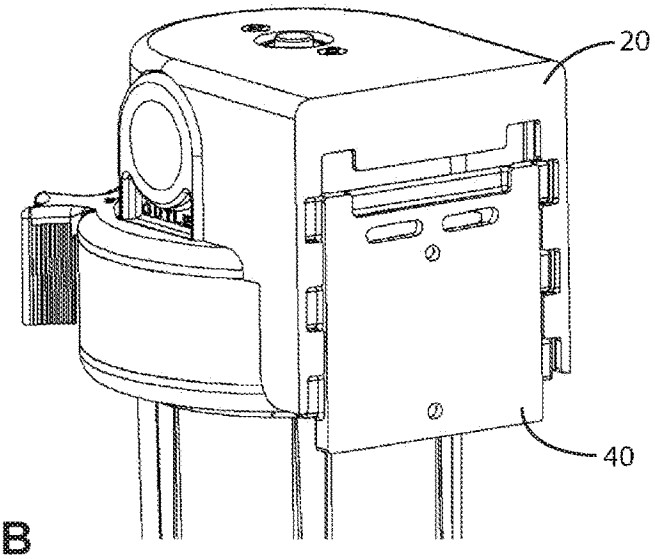


FIG.9B

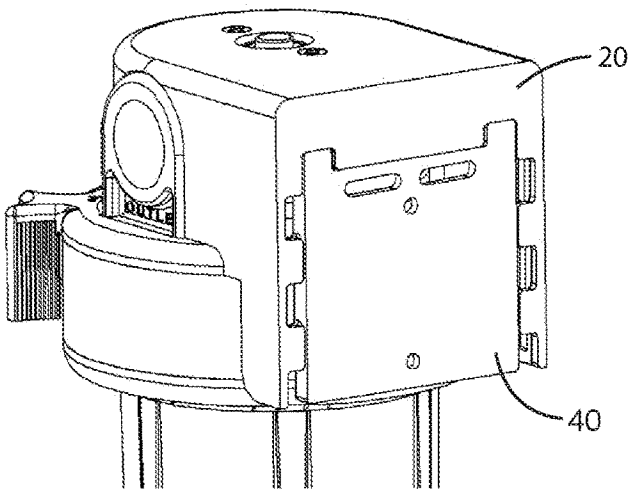


FIG.9C

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FIG.10A

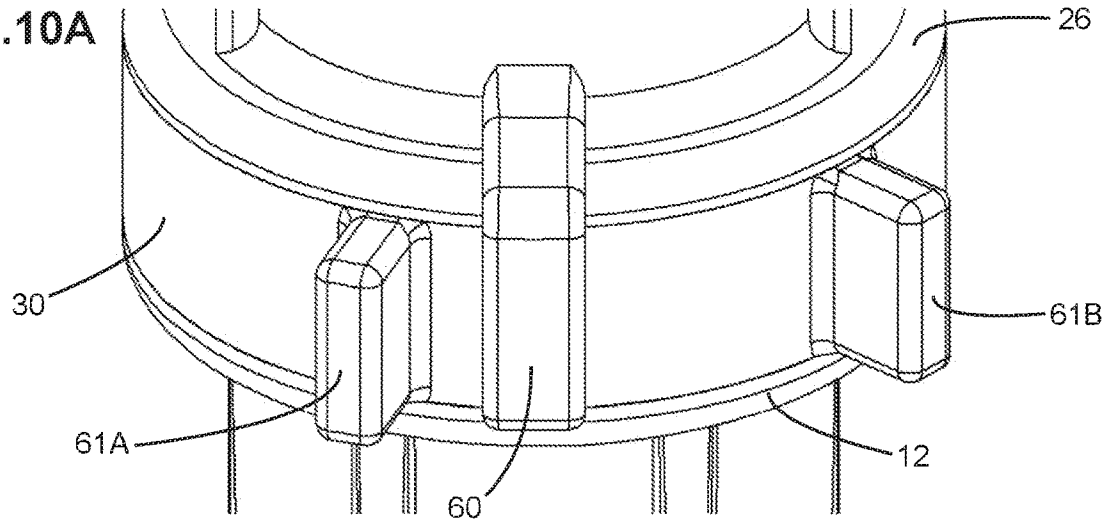


FIG.10B

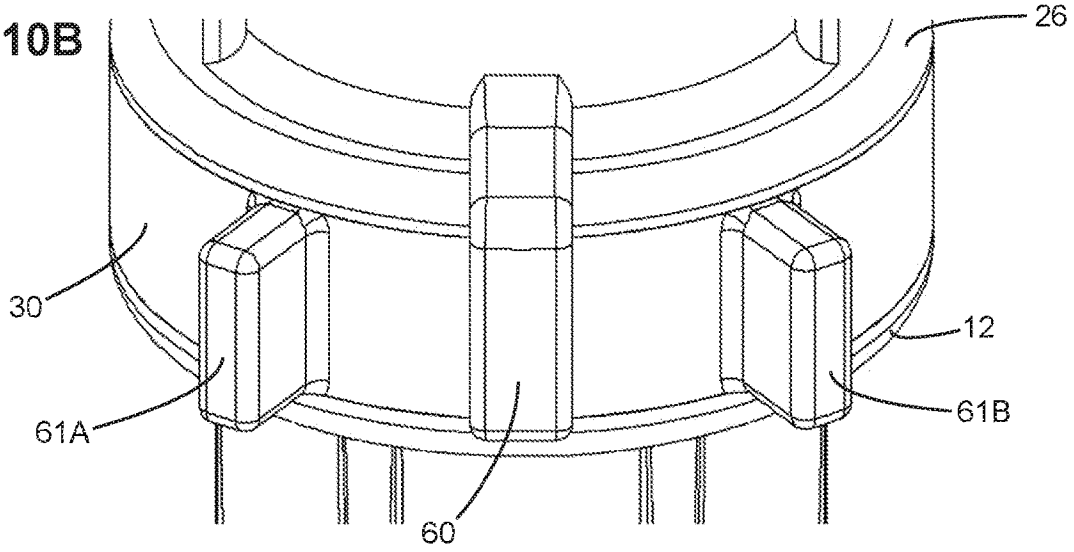
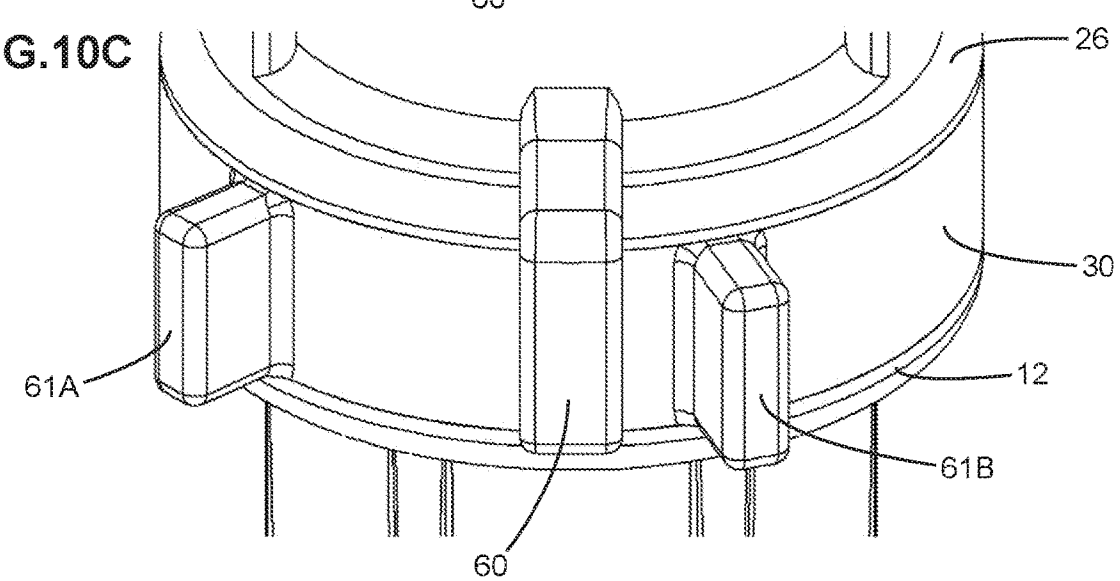


FIG.10C



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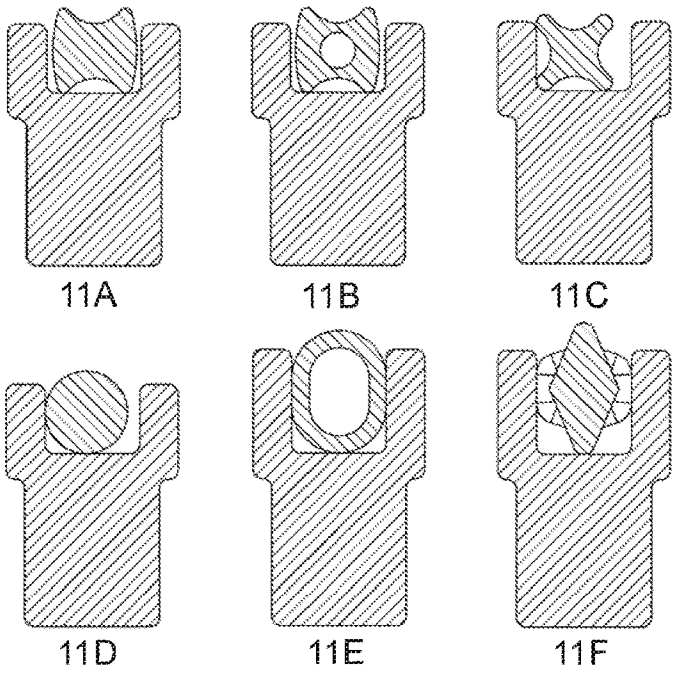


FIG.11

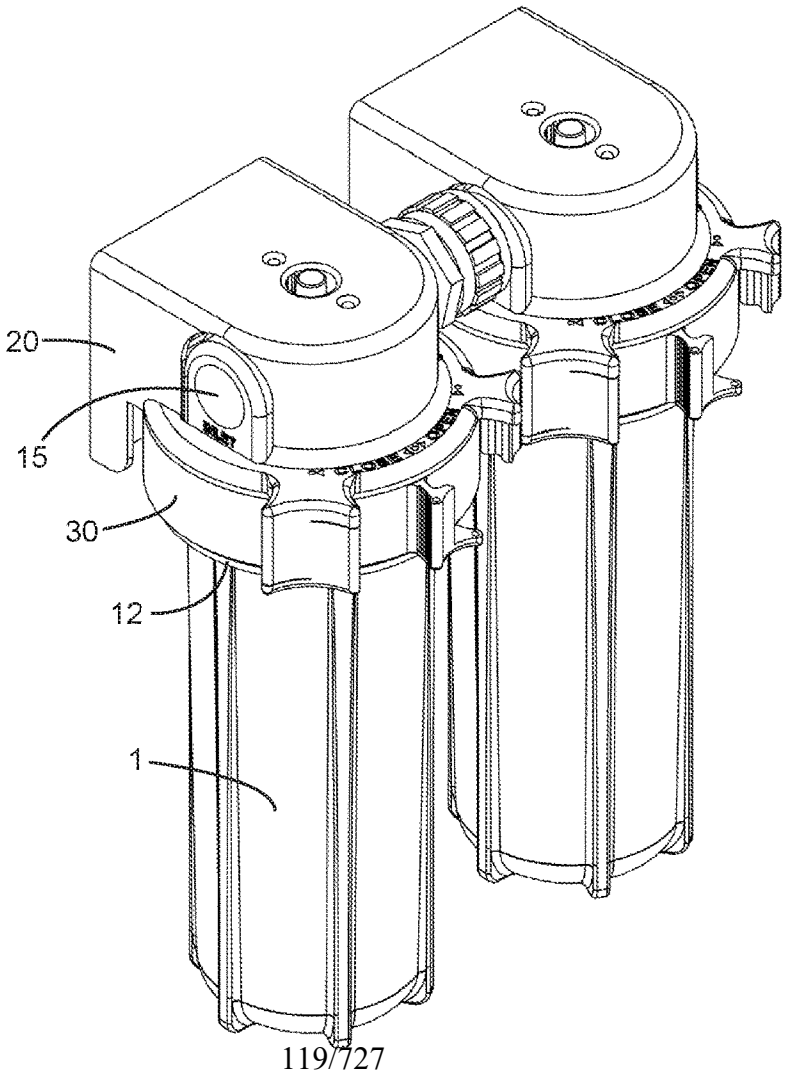
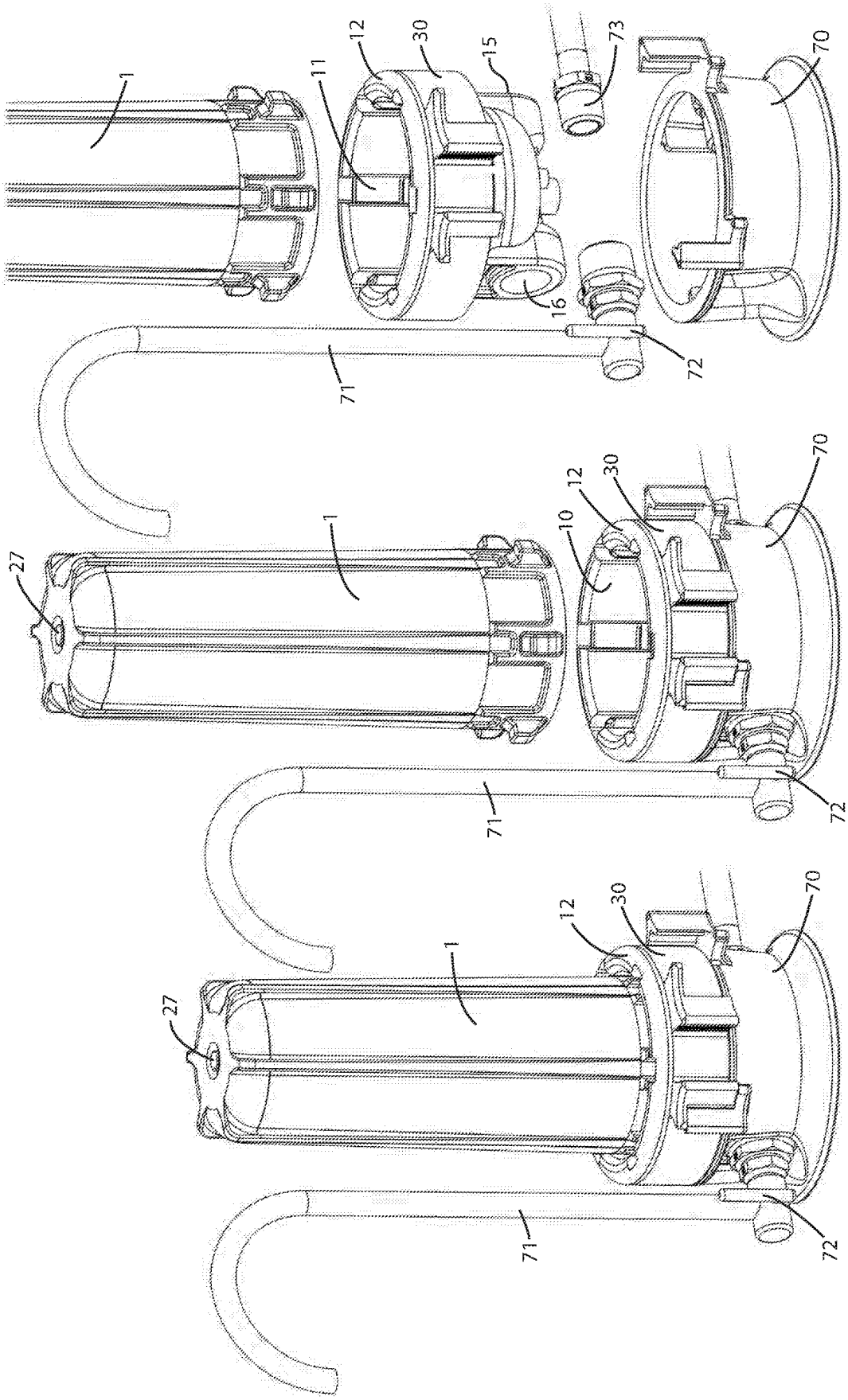


FIG.12



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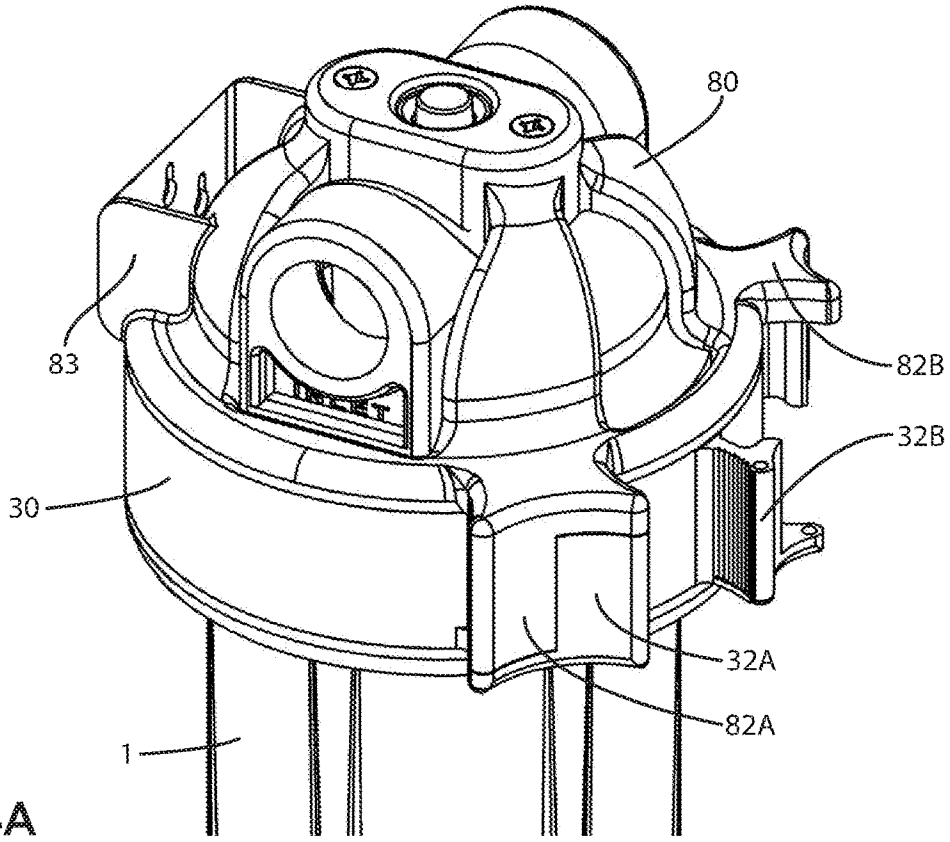


FIG.14A

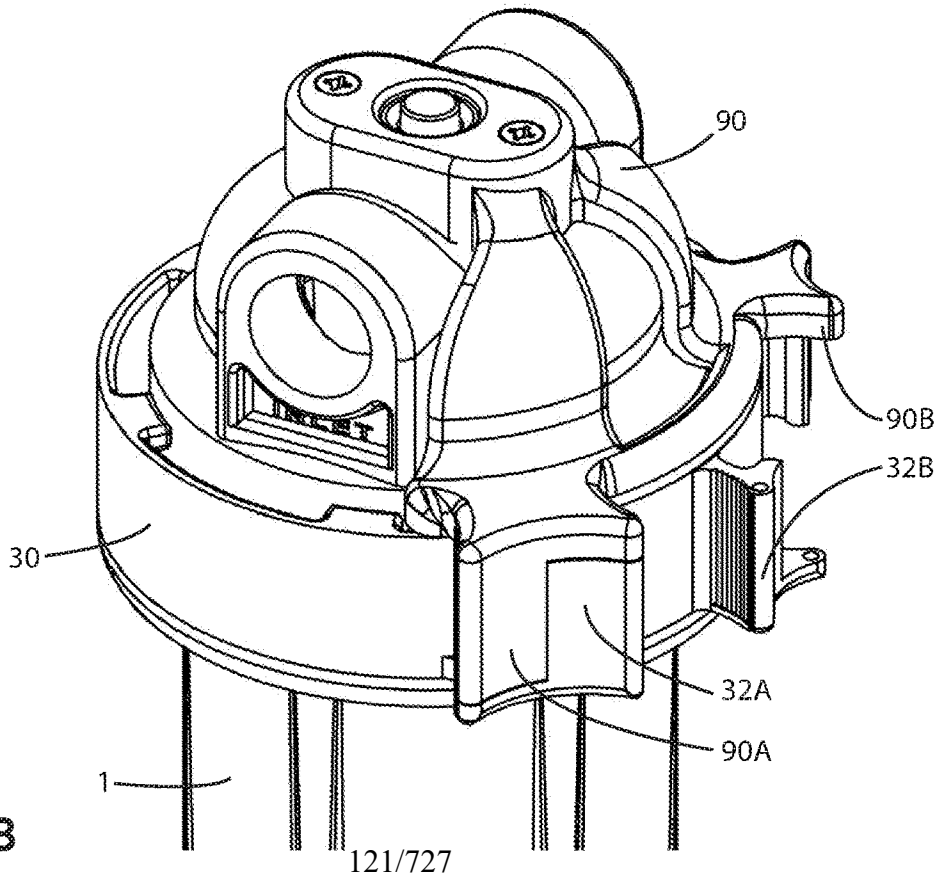


FIG.14B

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MANUALLY DETACHABLE ENCLOSURE FOR REPLACEABLE FILTER ELEMENTS AND THE LIKE

I. BACKGROUND

A. RELATED APPLICATION

This application is related to co-pending application entitled "Quick Change Filter Housing" that was filed Jun. 3, 2017 and assigned Ser. No. 29/606,366 (now U.S. Pat. No. D832,394, issued Oct. 30, 2018). The disclosure in application Ser. No. 29/606,366 as filed on Jun. 3, 2017 is incorporated herein by reference.

B. FIELD OF INVENTION

The invention described in the present application relates to a detachable enclosure that in one preferred embodiment is used to contain and support a replaceable filter within a directed flow of water to be filtered prior to use; more particularly, the present invention relates to a container having manually detachable sections that allow for the quick removal and replacement of an enclosed filter element without the use of tools.

C. PRIOR ART FILTER CONTAINERS AND ASSEMBLY/DISASSEMBLY MECHANISMS

There are tens of thousands of patents describing various forms of enclosures, containers and housings adapted to receive filter elements used to treat different fluids, in different applications and under different operating conditions. For example there are over 2600 patents just in U.S. Class 210 (the primary class for patents directed to water treatment apparatus) subclass 232 (the subclass for patents related to the means to secure parts of a water treatment apparatus in operative relation or to aid in assembling or disassembling the apparatus). While the container of the present invention may find many applications, including in the filtration, containment or treatment of various fluids, the preferred embodiment of the described herein is for the containment and support of a replaceable filter element within a flow of water and more particularly, a container that can be opened and closed without the use of tools and can be installed for use on a vertical or horizontal surface.

Containers for replaceable water filters are designed for in-line use, with an inlet to receive incoming water under pressure and an outlet to convey filtered water to a faucet or other point of use. When installed, the filter container may be physically supported in a number of ways, including: (a) by connection to an adjacent wall or other existing structure (e.g., prior art FIG. **1**A); or, (b) by connection in series or to a shared manifold or to other system components (e.g., U.S. Pat. No. 10,040,005); or, (c) by placement on a countertop or other horizontal surface (e.g., U.S. Pat. No. 8,561,809).

As shown in prior art FIG. **1**A, most enclosures used as containers for replaceable filter element consist of three basic components: The first basic component is a lid and distribution structure (A) for receiving and directing the flow of incoming water through the filter element and then from the filter element out of the housing to a point of use. The second basic component is an enclosure (B) for retaining the filter element in functional relation to the flow pattern produced by the lid and distribution structure A. The third basic component is a seal (C) between the lid (A) and the enclosure (B) to prevent leakage from the housing after assembly and during use. Filter housings also typically include some mounting structure such as the wall mount (D) shown in FIG. **1**A. Other prior art filter housings are designed to stand on a base supported by a flat surface (e.g. U.S. Pat. Nos. 8,561,809 and 9,636,612).

The vast majority of commercially available filter housings—as exemplified in the prior art FIG. **1**A—are generally cylindrical in form and the lid or distribution structure (A) is detachably connected to the enclosure structure (B) by mating threads (E) along edges or surfaces where the two structures are joined. An o-ring seal (C) is typically placed between the two structures (A, B) and this seal (C) is compressed as the threaded connection between the two components is tightened. When sufficiently compressed, the seal (C) resiliently fills the gap between the two solid components and resists leakage from the container under conditions of intermediate internal pressure and pulsing.

Other prior art filter housings have an internally threaded collar that is rotationally retained by a circumferential flange extending from one of the basic components (A or B) and this treaded collar is detachably connected to exterior threads on the other component (e.g., U.S. Pat. Nos. 6,635, 175 and 4,935,134). Turning the threaded collar draws the two components into tight connection while compressing an o-ring or other seal between them. Still other enclosures include covers, bases, lids or other detachable components that are joined by integral or collar-mounted, bayonet-type mechanisms consisting of short thread-like segments that allow the connection between the two components to be quickly engaged and disengaged (e.g., U.S. Pat. Nos. 8,561, 809, 6,001,249, 5,394,601 and 8,246,055).

D. PRIOR ART PROBLEMS

In practice, the opening and closing of prior art filter housings of the type shown in FIG. **1**A has required the use of a special wrench (F). One of many different wrench configurations is shown separately in FIG. **1**B and is shown in FIG. **1**A engaged with the protrusions (G) spaced around the side of enclosure (B). An image search on the phrase "water filter wrench" produces hundreds of different configurations with different engagement protrusions (H) or recesses (I) and many different inside diameters for use with an equally wide range of prior art housings (e.g., U.S. Pat. No. D 644,897). Wrenches of this type have been required to tighten, but more importantly, to loosen the threaded connection (E) between the detachable enclosure structure (B) and the cover structure (A). Consumers often complain about losing or breaking plastic filter wrenches, which are used only infrequently when changing a filter.

Depending on their physical size and strength, users will tighten the threaded connection (E), either by hand of by use of a wrench (F) of the type shown in FIGS. **1**A and **1**B. To be confident that the o-ring is sufficiently compressed to avoid leakage, users often over tighten the treaded connection (E). Even when over tightening does not occur during installation, pulse tightening frequently occurs over time. This pulse tightening is caused by hydraulic transients (water hammer) in the form of pressure spikes that vary in amplitude and occur with different frequency in different water systems depending on pipe diameter and length, system pressure, flow velocity and rigidity of the system components.

Water hammer occurs when water flow is suddenly disrupted by, for example, valves being closed quickly or by pumps being turned off. When water hammer pulses are transmitted through a system, filter housings will expand

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and contract in proportion to the amplitude and duration of the pressure spike. When a prior art filter housing of the type shown in FIG. **1**A is subjected to a pulse of this kind, the component volumes on either side of the treaded connection (E) expand. At the end of the pulse, the component volumes will contract; causing the threaded connection (E) to incrementally tighten. Depending on the water system involved, the filter housing may be exposed to little or no water hammer; or water hammer may be a frequent occurrence, subjecting the housing to hundreds or thousands of pulses each month. Pulse tightening of the threaded connection (E) will make it harder to loosen and remove the enclosure (B). The torque required to remove the enclosure (B) will be higher than the torque used to initially tighten the enclosure against leakage. Wrenches of the type shown in FIG. **1**B are employed for this purpose, making the process of changing a filter element more much more difficult and cumbersome.

In cases where the threaded connection (E) is over tightened during installation or has incrementally tightened over time due to water hammer, it may be necessary to apply substantial force to the wrench (F) in order to rotate the enclosure (B) in relation to the fixed lid or distribution structure (A). This twisting force can caused the wall mount (D) to loosen, separate or detach from the wall to which it is connected by screws (J), nails or other fasteners.

The threaded connection (E) that characterizes most prior art commercial housings, has an additional disadvantage: when the connection is tightened there is circumferential displacement between the enclosure B and the lid A which subjects the o-ring seal C to significant shear forces from one side of the seal to the other, resulting in unpredictable cross sectional distortions and residual elastic energy in the seal itself.

E. OBJECTS OF THE INVENTION

One object of the present invention is to provide a detachable enclosure to contain a periodically accessed item such as a replaceable filter element, the enclosure comprising structures that can be quickly and easily attached and detached in sealed relation without the use of tools and without initial or subsequent over tightening.

Another object of the invention is to provide such an enclosure in which the seal between the detachable components is achieved solely through axial compression without imposing material circumferential shear forces or displacement.

Another object of the invention is to provide such an enclosure that is capable of easy and precise mounting on a wall while also being adapted for free standing support on a horizontal surface such as a countertop.

A further object of the invention is to provide an enclosure specifically adapted for containing and supporting a replaceable filter within a contained and directed flow of a fluid such as water.

F. SUMMARY OF THE INVENTION

In one embodiment, the present invention is for a resealable enclosure particularly adapted to receive a filter element and to support that filter element within a contained flow of water directed into and through the filter by a lid that includes a water distributor connected to a mounting structure. The lid detachably connects to the enclosure while acting to compress a seal located in opposing seats on the connected elements. In operation, a plurality of pins on the enclosure is engaged within a corresponding plurality of slots on the lid. A plurality of wedges on a separator is advanced between corresponding pins on the enclosure and a flange on the lid to force the pins away from the flange thereby compressing the seal to substantially prevent leakage from the enclosure. The mounting structure and the separator include paired protrusions that are configured to be manually engaged by a user and to receive lateral pinch forces (a) to draw a first paring of the protrusions together and to thereby compress the seal to a predetermined extent and (b) to draw a second pairing of the protrusions together and to thereby release the seal from compression and allow disengagement of the lid from the enclosure to allow replacement of the filter contained within the enclosure.

G. DESCRIPTION OF THE DRAWINGS

FIG. **1**A is an exploded perspective view of a prior art enclosure for a replaceable inline filter, including a wall mount and a wrench for use in loosening and removal of the enclosure to allow filter replacement. FIG. **1**B is a perspective view of the prior art wrench that is shown engaged with the filter housing in prior art FIG. **1**A.

FIG. **2** is an assembled perspective view of one embodiment of the present invention in the form of filter container or housing having an enclosure that is quickly and easily detachable from a lid and fluid distributor through application of manual pinching forces between paired protrusions.

FIG. **3** is an exploded perspective view of the container embodiment shown in FIG. **2**.

FIG. **4**A is close up sectional view of the upper portions of the filter enclosure shown in FIGS. **2** and **3**, with the mounting structure secured to the lid and distribution structure with the seal omitted for clarity.

FIG. **4**B is a closer view of the seats in FIG. **4**A (no seal shown) with the lid and enclosure engaged to the point that the o-ring seal is in initial contact with the opposing seats on the lid and the enclosure.

FIG. **4**C is the view of FIG. **4**B with the lid and enclosures fully engaged and the o-ring compressed to a predetermined extent between the opposing seats.

FIG. **5** is a perspective view of the collar or separator shown in FIG. **2** with a portion of the outer wall cut away to show the location of a representative wedge and the corresponding stop.

FIG. **6**A is a perspective view of the upper portion of the embodiment shown in FIGS. **2** and **3** modified to incorporate the cutaway version of the separator shown in FIG. **5** to allow visualization of the spatial relation between one of the pins on the enclosure and the exposed wedge on the inner surface of the separator. In FIG. **6**A the lid and enclosure are axially aligned for engagement.

FIG. **6**B is the view of FIG. **6**A showing the lid partially engaged over the open end of the enclosure partially, with the exposed pin on the enclosure extending partially into the corresponding slot on the lid.

FIG. **6**C is the view of FIG. **6**B showing the lid fully engaged over the open end of the enclosure, with the exposed pin located fully within the corresponding slot on the lid.

FIG. **6**D is the view of FIG. **6**C with the exposed wedge advanced to an initial position between the exposed pin on the enclosure and the flange on the lid.

FIG. **6**E is the view of FIG. **6**D with the exposed wedge advanced to an intermediate position separating the exposed pin on the enclosure and the bearing surface of the flange on the lid.

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FIG. **6**F is the view of FIG. **6**E with the exposed wedge advanced to a maximum extent between the pin and the flange and against the stop that limits further advancement.

FIG. **7**A is a detailed view of the embodiment of FIG. **2** with the paired protrusions from the mounting structure and from the separator shown in the fully open position depicted by the wedge location shown in FIG. **6**C.

FIG. **7**B is a detailed view of FIG. **7**A with the paired protrusions in their intermediate positions depicted by the wedge location in FIG. **6**E.

FIG. **7**C is a detailed view of FIG. **7**B with the paired protrusions in their fully closed position depicted by the wedge location in FIG. **6**F.

FIG. **8** is a sectional view of the embodiment shown in FIG. **2** taken through a plane through center of the inlet and outlet ports and showing the directed flow of liquid into and through a filter element supported within the enclosure.

FIG. **9**A is a detailed perspective view of the back side of the embodiment shown in FIGS. **2** and **3** with a wall bracket in aligned proximity to a slotted aperture through the back of the mounting structure.

FIG. **9**B shows the view of FIG. **9**A with the wall bracket initially engaged within corresponding slots along the edges of the aperture through the back side of the mounting structure.

FIG. **9**C shows the view of FIG. **9**B with the mounting structure lowered into full locked engagement with the wall bracket.

FIG. **10**A is a modified detailed view of the embodiment shown in FIGS. **2** and **7** with the mounting structure having only one protrusion for receiving lateral pinch forces in selective opposition to the two protrusions extending from the separator. In FIG. **10**A, the closest paired protrusions are shown in the fully open position depicted by the location of the wedge in FIG. **6**C.

FIG. **10**B is the view of FIG. **10**A with the protrusions shown in their intermediate positions depicted by the wedge location in FIG. **6**E.

FIG. **10**C is the view of FIG. **10**B with the protrusions shown in their fully closed positions as depicted by the location of the wedge in FIG. **6**F.

FIGS. **11**A through **11**F generally illustrate alternative seals for placement between the opposing seats on the enclosure and on the lid.

FIG. **12** is a perspective view of two filter housings of the type shown in FIG. **2** connected in series for use in a multi-stage treatment system.

FIG. **13**A is a perspective view of a countertop version of the filter housing illustrated in FIGS. **2** through **8** in which the mounting structure is configured as a base to receive the same components otherwise shown in FIG. **3**.

FIG. **13**B is the view of FIG. **13**A with the enclosure disconnected and axially separated from the lid which is connected to the base mounting structure.

FIG. **13**C is the view of FIG. **13**B with the lid and separator disconnected from the base mount for better viewing of their interrelationship.

FIG. **14**A is a detailed perspective view of the filter housing of FIGS. **2** through **8** with a modified mounting structure that does not substantially cover the lid/distributor but instead provides a minimal structure for firmly interconnecting the lid to the two pinch tabs and an integral wall bracket.

FIG. **14**B is the view of FIG. **14**A, without an integral wall bracket, for applications in which the filter housing does not require support or where the housing is supported by structural fluid connection to other fixed system components.

II. DETAILED DESCRIPTION

FIG. **2** is an assembled perspective view of one of the more useful and complex embodiments of the invention, namely a replaceable filter housing which is capable of being quickly opened and closed manually without the use of special tools and without the possibility of over tightening. FIG. **3** shows an exploded perspective view of the housing of FIG. **2**, without an enclosed replaceable filter. FIG. **8** shows a sectional view of the FIG. **2** housing with an enclosed filter element **50**. The housing shown in FIGS. **2** and **3** includes the following basic components:

An enclosure **1**, which includes six radial pins **2** extending from the open end of the enclosure **1**. The enclosure **1** also includes a recessed seat **3**A designed to receive a seal **5**.

A closure or lid **10** (best shown in FIG. **3**) includes six slots **11** which are configured to receive the six corresponding pins **2** when the lid **10** is engaged over the open end of the enclosure **1**. The lid **10** also includes a load bearing circumferential flange **12**. As best shown in FIG. **8**, the lid **10** incorporates internal channels for distributing the flow of water received under pressure at the inlet **15** and directing the flow around and through an enclosed filter element **50** and through the outlet **16** to a point requiring filtered water. The arrows in FIG. **8** generally indicate the pattern flow through the filter housing.

A mount structure **20** is connected to the lid **10** by screws **23** that extend through a pair of holes **21** and are threaded into a corresponding pair of bosses **13** that extend from the outer surface of lid **10**. The bosses **13** constrained in corresponding bores **24** (best shown in FIG. **4**A) on the inside of the mount **20**. An optional pressure relief valve **27** may be incorporated by drilling out and tapping an otherwise closed aperture **25** at the center of the lid **10**. When installed, the contact button on valve **27** extends through the aperture **25** at the center of the mount **20**.

As best shown in the sectional view of FIG. **4**A, when the mount **20** is fully engaged on the lid **10**, the holes **21** are aligned with corresponding holes in bosses **13** on lid **10** and the bosses **13** extend into two shallow sleeves **24** extending from the inner surface of the mount **20**. When the bosses **13** are within the sleeves **24**, the lid **1** cannot rotate with respect to the mount **20**. Because the holes **21**, bosses **13** and sleeves **24** are symmetrical about the center axis of the enclosure, the mount **20** can be connected to the lid **10** in two diametrically opposite orientations with respect to the inlet and outlet ports **15** and **16**. This allows installation of the filter housing with the inlet **15** oriented toward the pressurized source of water, thus simplifying the plumbing connection to the inlet **15**. As seen in FIGS. **2** and **3**, the mount **20** also includes two radial protrusions or finger tabs **22**A and **22**B that, as described below, are manually engaged by the user in opening or closing the filter housing.

A separator or collar **30** includes six low-angle wedges **31** each of which spatially corresponds to one of the six pins **2** on the enclosure **1**. At the leading edge of each of the six wedges **31** is a recess **33** that allows a corresponding pin **2** to pass through as the collar **30** is axially engaged over the open end of the enclosure **1**. At the end of each of the six wedges **31** is a stop **34** that limits the extent that each wedge **31** can be advanced in relation to the corresponding pin **2**. When the housing of FIGS. **2** and **3** is assembled, the collar **30** rotates around the outer perimeter of the lid **10** and rides on the flange **12**.

As shown in FIGS. **2** and **3**, the collar **30** includes two radial protrusions or finger tabs **32**A and **32**B that are manually engaged in opposition to the paired tabs **22**A and

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22B on the mount structure **20** to cause clockwise or counterclockwise rotation of the collar **30** in relation to the mount **20** and the connected lid **10**. Rotation of the collar **30** in one direction advances the wedges **31** into engagement between the flange **12** on the lid **10** and the load bearing surface **4** of the pins **2** on the enclosure **1**. Rotation in the opposite direction withdraws the wedges **31** from between the pins **2** and the flange **12**. As further described below, FIGS. **7**A through **7**C provide close up perspective views of the two paired sets of tabs (**22**A-**32**A and **22**B-**32**B) which are pinched together to either close or to open the filter housing of FIGS. **2** and **3**.

FIG. **5** is a perspective view of the collar **30** with a section of the outer wall **35** partially cut away to show the position of one of the wedges **31** in relation to the other elements of the collar **30**, including the recess **33** and the stop **34**. This cutaway version of the collar **30** is incorporated in FIGS. **6**A through **6**F to allow better visualization of the process by which the collar **30** is rotated to advance or withdraw the wedges **31** between the flange **12** on the lid **10** and the lower bearing surface **4** the pins **2** on the enclosure **1**. FIGS. **6**A through **6**F show the lid **10** assembled with, and essentially covered by, the mount **20**. The collar **30** is axially retained for rotation between the flange **12** on lid **10** and the circular skirt **26** on mount **20**. FIGS. **6**A through **6**F show progressive steps by which the enclosure **1** is engaged with and locked onto the lid **10**.

Referring to FIG. **6**A, the lid **10** and the attached mount **20** are aligned with the open end of enclosure **1** for axial engagement. The pins **2** with their load bearing surfaces **4** are aligned with their corresponding slots **11** on the lid **10**. One of the wedges **31** is visible through the cutaway portion of collar **30**. For clarity, seat **3**A is shown without the seal **5** (FIGS. **3** and **4**B), which would be retained in the seat **3**A when the enclosure **1** is connected to the lid **10**.

In FIG. **6**B the enclosure **1** is shown as partially engaged with the lid **10**. In the cutaway portion of the collar **30** it can be seen that the pins **2** have partially entered the slots **11** on the lid **10** while also within the recesses **33** on the inside surface of collar **30**. In this view the pins **2** are adjacent to the leading edge of the wedges **31**. At this point, the lid **10** is in its fully open or unlocked position. As shown in FIG. **7**A with the tabs **22**B and **32**B fully engaged with one another and cannot be further advanced in the open direction. At the same time, FIG. **7**A shows the paired tabs **22**A and **32**A as being separated to a maximum extent and ready to receive manual pinch forces to advance the collar **30** and the wedges **31** into position between the flange **12** on the lid **1** and the load bearing surfaces **4** on pins **2**.

Referring to FIG. **6**C, the enclosure **1** is shown as having moved upward into full axial engagement with the lid **10**. The pins **2** are fully within both the slots **11** and the recesses **33**. At this point, the leading edge of the representative wedge **31** is: (a) level with or below the load bearing surface **4** of the corresponding pin **2** and (b) aligned for advancement between the load bearing surface **4** of pin **2** and the upper bearing surface of the flange **12** on lid **10**. The paired tabs **22**B and **32**B remain in full contact while tabs **22**A and **22**B remain fully apart, as shown in FIG. **7**A. As the collar **30** is rotated, each wedge **31** is advanced between the corresponding pin **2** and the flange **12**. The advancing wedges **31** forcibly separate the pins **2** and the flange **12**, resulting in the enclosure **1** being drawn into tight engagement with the lid **10** and seal **5** being compressed between the seat **3**A on at the open end of the enclosure **1** and an extended seating surface **3**B on the inside of the lid **10**, as best shown in FIGS. **4**B and **4**C. In FIG. **4**A, the seal has been omitted to provide a better view of the opposing seats **3**A and **3**B.

The configuration of opposing seating surfaces **3**A and **3**B will vary depending upon the shape and characteristics of the seal **5**, the operating conditions under which the enclosure **1** is used and the dimensional relationship between the pins **2**, the wedges **31** and the flange **12**. As shown, the seat **3**A has the standard configuration for accepting and retaining an o-ring subjected to internal pressure. The seat **3**B on the lid **10** is a stepped configuration that extends into the upper portion of the seal **5** when the o-ring is under full compression. This configuration exposes the seal **5** of contact with the edges of the extended seat **3**B which may provide secondary sealing lines depending upon the extent to which the o-ring is compressed. Depending on the design pressures, materials used, and degree of seal deformation required, the extended seat **3**B could be converted to nothing more than a flat surface on the underside of the lid **10** and the seat **3**A on the enclosure **1** could have a different depth and/or width depending on the shape of the seal **5**. See, for example, the alternative forms of seals shown and discussed in relation to FIGS. **11**A through **11**F.

FIG. **6**D shows the collar **30** having been rotated to advance wedge **31** into an initial engagement position under pin **2**. Rotation of the collar **30** is accomplished when the user manually applies a linear pinch force between the paired tabs **22**A and **32**A. As the tabs **22**A and **32**A move closer to one another in response to this pinch force, the collar **30** rotates and the wedges **31** advance between the pins **2** and the flange **12**. In preferred embodiments, when the pins **2** are in their initial engagement position with wedges **31** as shown in FIG. **6**D, the seal **5** is in uncompressed contact with both of the opposing seats; namely, seat **3**A on the enclosure **1** and seat **3**B on the inside of the lid **10**. FIG. **4**B shows the relative positions of the seats **3**A and **3**B and the seal **5** when the collar **30** and the wedges **31** are initially engaged as shown in FIG. **6**D.

FIG. **6**E shows the collar **30** having been further rotated to advance the wedge **31** to an intermediate position where the pin **2** is approximately half the way up the wedge **31**. This further rotation of the collar **31** has been caused by application of a further pinch force between the paired tabs **22**A and **32**A which have moved proportionately closer while paired tabs **22**B and **32**B have moved proportionately further apart. FIG. **7**B shows the relative positions of the paired tabs when the wedges **31** are partially advanced in relation to the pins **2** as shown in FIG. **6**E. As the wedges **31** further separate the pins **2** from the flange **12**, the seal **5** is compressed and forms an increasingly improved seal between the opposing seats **3**A and **3**B on the enclosure **1** and the lid **10**, respectively. Compare FIGS. **4**B and **4**C.

FIG. **6**F shows the collar **30** having been rotated to advance wedges **31** into engagement with the stops **34**. At this point the wedges **31** separate the pins **2** and the flange **12** by an amount that produces a predetermined crush of the seal **5** between the opposing seats **3**A and **3**B on the enclosure **1** and the lid **10** respectively. This condition is shown in the detail view of FIG. **4**C. Further advancement of the wedge **31** and over compression of the seal **5** is prevented by the stop **34** coming into contact with the pin **2**. In the fully closed position shown in FIG. **6**F, the paired tabs **22**A and **32**A overlap in a contiguous configuration that provides a visual indication that the enclosure **1** is fully locked onto lid **10**. This condition is best shown in FIG. **7**C, which also shows paired tabs **22**B and **32**B fully separated and ready to receive lateral pinch forces that will cause the

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collar **30** to rotate in the opposite direction and withdraw the wedges **31** from between the pins **2** and the flange **12**, allowing the enclosure **1** to be released and separated from the lid **10**. Viewing FIGS. **6**A through **6**F in reverse order serves to illustrate the opening of the connection between the enclosure **1** and the lid **10**.

It is well known that the axial compressive force that can be applied to the seal **5** will be a multiple of the force required to advance the wedges **31** through rotation of the collar **30** and that the force multiplier of the wedges **31** is inversely proportional to the angle of the wedges **31**. In the absence of friction, the force multiplier is equal to the length of the wedges **31** divided by the height or axial lift of the wedges **31**. The theoretical force multiplier provided by the low-angle wedges **31** is reduced (a) by friction between the wedges **31** and the pins **2** and (b) by friction between the collar **30** and the flange **12**. While these friction forces are independent of the area of contact between the contacting surfaces, the coefficient of friction is primarily dependent on the materials that are in frictional contact and the relative smoothness of these contacting surfaces.

In the latest tested prototypes of the present invention, ABS (Acrylonitrile Butadiene Styrene) was used to fabricate all of the components. This is not an ideal material selection because, to minimize contact friction, the material used for the collar **30** should be different from the material used for the contacted surfaces, namely the flange **12** on the lid **10** and the pins **2** on the enclosure **1**. In future prototypes and in commercial applications it is expected that the enclosure **1** and the lid **10** will be produced from polypropylene or glass filled polypropylene. It is likewise expected that the collar **30** will be manufactured from Delrin® (acetal, polyoxymethylene or POM) or from Delrin® AF (Delrin® with PTFE fibers). The frictional interaction of these materials, coupled with smooth sliding surfaces resulting from the use of selectively polished molds are expected to further lower the static and dynamic frictional forces between the collar **30** and the bearing surfaces of the pins **2** and the flange **12**.

In the fields of physical therapy and ergonomics there have been many studies directed to the strength of human hands for people of different sizes, genders, ages and occupations. These studies have measured different forms of manual strength including, for example, different forms of grip and pinch strength. In the case of pinch strength, studies have quantified performance based on different placements of fingers in opposition to the thumb. The literature generally uses the term "lateral pinch" to describe the force applied between the thumb-side of the index finger in opposition to the pad of the thumb. FIGS. **7**A through **7**C show the paired tabs **22**A and **32**A (for closing) and the paired tabs **22**B and **32**B (for opening). These tabs are generally configured to accommodate lateral pinch forces when engaged by the human hand. These paired sets of tabs have bearing surfaces (a) that are curved to provide greater contact area with distributed force, (b) that are roughened to resist slippage and (c) that are circumferentially spaced apart within a range of maximum and minimum distances associated with optimal pinch strength as a function of pinch distance for average persons.

The seal **5** used in the latest tested prototypes of the filter housing shown in FIGS. **2** though **8** has been a buna-n rubber o-ring having a cross-sectional diameter of 0.139 inches and a circumferential diameter of approximately 3.59 inches (AS-568 NO-237). The hardness of these o-rings has been from 40 and 70 durometer (Shore A) with the preferred hardness being about 40 durometer. FIG. **11**D shows a cross sectional view of a typical o-ring in a seat configured for internal pressure to the right of the o-ring shown.

For the nominal operating pressure of 100 psi associated with the filter housing of FIGS. **1** through **8**, it is expected that equal or better results can be achieved when seal **5** is of a different material and/or configuration. Alternative seals may require slight modification of the seat **3**A on enclosure **1** and/or seat **3**B on lid **10**. For example, a low hardness diamond seal of the type available from Parker Seals is expected to provide optimal performance from the perspectives of sealing capacity, pulse response, seal retention, and ease of compression. FIG. **11**F includes a sectional view of a diamond seal fitted in an appropriately scaled seat.

Other seal configurations such as those shown in FIG. **11** are expected to provide equal or better overall performance as compared to the o-ring, depending on the pressures and operating conditions associated with use of the enclosure **1**. These alternate seal configurations include an X-shaped (or quad seal) shown in FIG. **11**C and the H-shaped seal shown in FIG. **11**A. Different forms of hollow seals are of particular interest in low and intermediate pressure applications and in applications involving lower pinch forces. FIG. **11**E shows a cross sectional view of an annular seal retained in a narrower seat and FIG. **11**B shows a hollow H-seal suitable for lower pressure applications and those involving limited compression of the seal.

FIG. **8** is a sectional view of the filter housing shown and discussed in relation to FIGS. **2** through **7**. The sectional view is taken through the center of the inlet **15** and the outlet **16** and shows the various components in assembled and fully engaged relation to one another. The following key elements of the invention are shown in FIG. **8**: the enclosure **1**, the lid **10**, the mount **20**, the collar or separator **30**, the pins **2**, and the skirt **26** that retains the collar **30** for rotation on the flange **12**. FIG. **8** also shows the assembled relation of these components to a standard filter element **50** and includes arrows indicating the pattern of flow: through the inlet **15**, around and through the inlet cavity **17** in lid **10**, into the enclosure **1** and around the outer surface of the filter element **50** where pressure forces the flow through sides of the filter into its hollow central core and from there through the central cavity **18** to the outlet **16**.

While the container of FIGS. **2** through **8** has been described as receiving pressurized flow into inlet **15**, the device will work equally well when the inlet **15** is connected to an unpressurized source and drawn through the lid **10** and enclosure **1** by a suction pump connected to outlet port **16**. In this case the housing would be operating under vacuum rather than pressure and the seal **5** would be subjected to the same amount of initial deformation.

FIGS. **9**A through **9**C show the manner in which the mount **20** is connected to the wall bracket **40**. Referring to FIG. **9**A, the wall bracket **40** includes three connection tabs **41** extending from each side. These connection tabs **41** are half the thickness of the mounting bracket **40**. There is a wide recessed portion **42**A along the upper edge of the bracket **40** that is also half the thickness of the bracket. The back side of the mount **20** includes a large aperture that generally corresponds to the outline of the wall bracket **40** with cutouts **28** that spatially correspond to the tabs **41** on the wall bracket **40**. The back side of the mount also includes a wide tab **42**B that corresponds to the recess **42**A on the wall bracket **40**. The material thickness of the wide tab **42**B and the areas adjacent to the cutouts **28** is approximately half the thickness of the wall bracket **40**. The bracket **40** also includes two holes **43** and two slots **44** to facilitate its

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connection to a wall or other support structure before installation of the filter housing.

As shown in FIG. **9**B, the aperture in the mount **20** is initially aligned with and placed over the wall bracket **40** with the tabs **41** located in the corresponding apertures **28**. At this point, the wall bracket **40** is essentially coplanar with the back of the mount **20**. During installation, the mount **20** is displaced downward along the axis of the housing and the tabs **41** slide into recesses of reduced cross section along the back wall of the mount **20** while the wide tab **42**B slides into and over the recessed area **42**A, thereby detachably connecting the mount **20** to the wall bracket **40** as shown in FIG. **9**C. The weight of the filter housing and friction between the tabs and recessed areas holds the housing firmly in place. Twisting and turning forces on the wall bracket **40** are minimal because the enclosure **1** is connected to and disconnected from the lid **10** with zero net torque resulting from the application of equal and opposite forces between the paired tabs (**22**A-**32**A and **22**B-**32**B).

FIGS. **10**A through **100** show an alternative arrangement of pinch tabs for use in rotating the collar **30** and moving the wedges **31** between their open and closed positions. As shown in FIG. **10**A, the mount **20** includes a single protrusion or tab **60** that extends radially outward from the mount **20** and over the collar **30**. The collar **30** has two spaced-apart protrusions or tabs **61**A and **61**B. FIG. **10**A shows the paired tabs **60** and **61**A after having been pinched together to their fully open position which corresponds to the wedges **31** being fully disengaged between the pins **2** and the flange **12** (as shown in FIG. **6**B).

FIG. **10**B shows the tabs **61**A and **61**B about equal distant from the single tab **60**. This position corresponds to the wedges **31** being engaged about half way between the pins **2** and the flange **12** (as shown in FIG. **6**E). FIG. **10**C shows the paired tabs **60** and **61**B in their closest fully closed position corresponding to wedges **31** being fully engaged from under the pins **2** (as shown in FIG. **6**F). A further alternative arrangement of the pinch tabs would place a single tab on the collar **30** and two spaced-apart tabs on the mount **20**.

As shown and further discussed in relation to FIGS. **13** and **14**, the mount **20** shown in FIGS. **2** through **8** may assume many different forms in connecting the tabs (**22**A and **22**B) to the lid **10**. In the simplest embodiment shown in FIG. **10**, the tab **60** may be connected to the lid **10** by means of any form of axial joint that resists circumferential pinch forces. For example the lid **10** could be molded with a square pin extending upward from its surface above the slots and the tab **60** could be separately molded with a corresponding square hole in the bottom. The tab **60** would thus include an integral mount and would be connected to the lid **10** by sliding the square hole in the tab **60** down onto the square pin extending from the lid. The square pin in the square hole would prevent rotation from application of opposing forces between the tab **60** when pared with the other tabs **61**A and **61**B on the collar **30**. Other alternative forms of mounts are shown in FIG. **13** (mount **70**), FIG. **14**A (mount **80**) and FIG. **14**B (mount **90**).

In many applications it is necessary to process fluid through different kinds of filters to remove different materials. In such multi-stage applications a series of two or more filter housings containing different filter elements are connected in series. Serial connection means that the outlet from a first housing is connected to the inlet of a second housing. The housing of the present invention is particularly useful in multi-stage filter applications as shown in FIG. **12**. In the illustrated example the pinch tabs extend from the same side of both filter housings; however, as discussed in relation to FIG. **4**A, the mount **20** on one of the adjacent housings can be easily disconnected from the corresponding lid **10**, rotated 180 degrees and reconnected to the lid. This will serve to relocate the pinch tabs on alternating sides of serially connected housings.

The filter housing of FIGS. **2** through **8** was designed to accommodate standard 10 inch filter elements; however, the enclosure **1** could be made longer to accommodate standard 20 inch filters without modification of the remaining components. The advantage of a larger filter is greater filtration capacity and less frequent filter changes for any given application and volume of treated flow. In cases where a greater volume or rate of flow must be accommodated, two or more filter housings of the type shown in FIGS. **2** through **8** can be connected in parallel. Parallel connection means that the inlets of two or more housings are connected to the same source of pressurized fluid and the outlets from these housings are connected in fluid communication with a common point of use.

Many consumers seek to install drinking water filtration systems in their homes but find it difficult to access existing plumbing or to find sufficient under-counter space to accommodate or provide ready access to a filter housing. In these cases countertop filter housings provide a workable option. FIGS. **13**A through **13**C show the filter housing of FIGS. **2** through **8** that has been modified by replacing the mount **20** and wall bracket **40** with a counter mount **70** and doing so without changing any of the other components. The counter mount **70** is inexpensive, easily manufactured and suitable for supporting the FIG. **2** filter housing in an inverted position on a horizontal surface. The counter mount **70** has a relatively large diameter base to provide stability. The counter mount **70** attaches to the distributor/lid **10** in exactly the same way that the mount **20** is connected (as shown in FIG. **4**A), using the same combination of holes **21**, screws **23**, bosses **13** and bores **24**. As shown in FIGS. **13**A and **13**B, the enclosure **1** may include an optional pressure relief valve **27**. This optional valve is the same as valve **27** shown in FIGS. **1**, **2** and **8**, except that it would be incorporated by drilling out an otherwise closed aperture **19** at the closed end of enclosure **1** (see FIG. **8**). The countertop version of the present invention would be installed with a faucet **71** controlled by a valve **72** connected to the outlet **16** from the distributor/lid **20**. Typically, a small diameter tube from the source of pressurized water would be connected through an adaptor **73** to the inlet **15** on the distributor/lid **20**.

FIGS. **14**A and **14**B illustrate two alternate embodiments of the filter housing described in relation to FIGS. **2** through **8** in which the mount **20** is replaced by a mount that is simpler, more compact and uses less material, while all other elements of the FIG. **2** housing remain the same. The mount **80** of FIG. **14**A includes only the structural elements required to support the two protruding tabs **82**A and **82**B together with the simple integrated wall bracket **83**. The mount **90** of FIG. **14**B is the same as mount **80**, except that it does include a wall bracket. These alternative embodiments are particularly useful in applications where filter housings are connected in serial and/or parallel clusters for high flow and/or in technically complex multi-phase filtration systems, where concurrent filter changes can be very rapidly accomplished without the use of tools and with minimum down time for the filtration system.

The container of the present invention has been shown and described in the form of a quickly detachable enclosure for the sealed containment of a replaceable filter element in the directed flow of a fluid, while the basic elements of the

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invention may be incorporated into other forms of sealed containers requiring periodic manual detachment or disassembly without the use of tools.

The subject matter of the present invention is defined by the following claims.

The invention claimed is:

1. A detachably sealed container for receiving and supporting a replaceable filter element within a fluid flow, comprising in combination:

(a) a lid structure including a distributor for receiving incoming fluid and directing the flow thereof for filtration and use, said lid including

(i) a plurality of slots for receiving a corresponding plurality of pins,

(ii) a flange for receiving compressive forces transmitted in opposition to said pins,

(iii) a first seat for engaging a seal and for compressing said seal in response to axial forces transmitted between said pins and said flange;

(b) a mounting structure connected to said lid, said mounting structure including at least one protrusion for receiving forces in opposition to substantially equal forces applied to a functionally paired protrusion on a displaceable separator;

(c) an enclosure having an open end and being adapted to receive and support a removable filter element, said enclosure including

(i) a plurality of pins corresponding to and oriented for engagement within the corresponding plurality of slots on said lid,

(ii) a second seat around the open end of the enclosure for compressing said seal in opposition to said first seat, said second seat corresponding to said first seat;

(iii) means cooperating with said distributor for receiving and directing the flow of said incoming fluid through a filter when fitted within said enclosure; and,

(d) said displaceable separator including

(i) at least one radial protrusion functionally paired with the at least one protrusion on said mounting structure, said paired protrusions adapted to receive opposing forces to displace said separator in a first direction relative to said mounting structure,

(ii) at least another radial protrusion functionally paired with at least another protrusion on said mounting structure, said paired protrusions adapted to receive opposing forces to displace said separator in a second direction relative to said mounting structure,

(iii) a plurality of wedges having substantially the same predetermined height, angle and length and being configured for selective engagement between corresponding pins on said enclosure and the flange on said lid when said pins are substantially within the corresponding slots on said lid; and,

(e) said seal is a deformable seal engaged between said first and second seats;

whereby (i) said seal is compressed when the seats are drawn together as the wedges are advanced between the pins and the flange in response to displacement of said separator in said first direction and (ii) said seal is released when the seats are allowed to disengage as the wedges are withdrawn from between the pins and the flange in response to displacement of said separator in said second direction.

2. The container of claim **1** wherein the opposing force on each pair of protrusions required for producing a substantial seal against fluid leakage between said seats is less than the lateral pinching force produced by the dominant hand of an average human user of the container.

3. The container of claim **1** wherein the opposing force on each pair of protrusions required for producing a substantial seal against fluid leakage between said seats is less than about 26 pounds and wherein the compressibility of said seal is less than or equal to the compressibility of a rubber O-ring having a Shore A hardness of between about 30 and 50 durometer.

4. The container of claim **3** wherein the opposing force on each pair of protrusions required to provide a substantial seal between the seats is less than about 20 pounds.

5. The container of claim **3** wherein the opposing force on each pair of protrusions required to provide a substantial seal is less than about 20 pounds and the seal has a cross sectional configuration selected from the group of shapes including circular, diamond-shaped, quad-shaped, hollow or annular.

6. The container of claim **1** wherein the mounting structure is adapted for connection to the distributor in at least two predetermined orientations.

7. The container of claim **2** wherein the mounting structure further includes a bracket to secure the container to a stationary surface.

8. The container of claim **2** wherein the mounting structure further includes a base for supporting the container on a generally horizontal surface.

9. The container of claim **2** wherein engagement of the wedges between the pins and the flange is mechanically limited at a point where the seal has been compressed to a predetermined extent.

10. The container of claim **2** wherein the distributor further includes means for separately receiving and conveying the flow of filtered fluid from the enclosure for use outside the container.

11. A method for using the container of claim **1**, including the steps of:

(a) connecting the distributor in fluid communication between a pressurized source of fluid and a point requiring filtered fluid;

(b) installing a replaceable filter within the enclosure;

(c) engaging the pins on the enclosure within the corresponding slots on the lid with the seal between said first and second seats;

(d) applying manual force between at least one set of paired protrusions on said mounting structure and said displaceable separator to advance the wedges on said separator between the pins on said enclosure and the flange on said lid to bring the first and second seats into closer proximity; and

(e) further advancing the wedges until the seal has been compressed between the first and second seats by the amount required to achieve the desired seal against substantial leakage between said first and second seats of the container.

12. The method of claim **11** including the further steps of:

(f) applying manual force between at least one other set of paired protrusions on said mounting structure and said displaceable separator to withdraw the wedges from between the pins and the flange; and,

(g) disengaging and separating the pins on the enclosure from the slots on the lid to provide access to the replaceable filter element within the enclosure.

13. The method of claim **12**, including the further steps of:

(h) removing and replacing the filter element within the enclosure; and,

(i) repeating the steps (b) through (e).

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14. A detachably sealed container comprising in combination:

(a) a lid structure including

(i) a plurality of slots for receiving a corresponding plurality of pins,

(ii) a flange for receiving compressive forces in opposition to said pins,

(iii) a first seat for engaging a seal and for compressing said seal in response to forces transmitted between said pins to said flange;

(b) a mounting structure connected to said lid, said mounting structure including at least one protrusion for receiving pinch forces in opposition to substantially equal pinch forces applied to a functionally paired protrusion on a displaceable separator;

(c) an enclosure having an open end and including

(i) a plurality of pins corresponding to and oriented for engagement within the corresponding plurality of slots on said lid,

(ii) a second seat around the open end of the enclosure for compressing said seal in opposition to said first seat, said second seat corresponding to said first seat;

(d) said displaceable separator including

(i) at least one protrusion functionally paired with the at least one protrusion on said mounting structure, said paired protrusions adapted to receive opposing forces to displace said separator in a first direction relative to said mounting structure,

(ii) at least another radial protrusion functionally paired with at least another protrusion on said mounting structure, said paired protrusions adapted to receive opposing forces to displace said separator in a second direction relative to said mounting structure,

(iii) a plurality of wedges having substantially the same predetermined rise, angle and length and being configured for selective engagement between corresponding pins on said enclosure and the flange on said lid when said pins are substantially within the corresponding slots on said lid; and,

(e) said seal is a deformable seal engaged between said first and second seats;

whereby (i) said seal is compressed when the seats are drawn together as the wedges are advanced between the pins and the flange in response to displacement of said separator in said first direction and (ii) said seal is released when the seats are allowed to disengage as the wedges are withdrawn from between the pins and the flange in response to displacement of said separator in said second direction.

15. The container of claim 14 wherein the opposing force required for producing a substantial seal against fluid leakage between said seats is less than the lateral pinching force produced by the dominant hand of an average human user of the container.

16. The container of claim 14 wherein the opposing force required for producing a substantial seal against fluid leakage between said seats is less than about 26 pounds and wherein the compressibility of said seal is less than or equal to the compressibility of a rubber O-ring having a Shore A hardness of between about 30 and 50 durometer.

17. The container of claim 16 wherein the opposing force required to provide a substantial seal is less than about 22 pounds.

18. The container of claim 17 wherein the seal has a cross sectional configuration selected from the group of shapes including circular, diamond-shaped, quad-shaped, hollow or annular.

19. The container of claim 14 wherein advancement of the wedges between the pins and the flange is mechanically limited to a point where the seal has been compressed to a predetermined extent.

* * * * *

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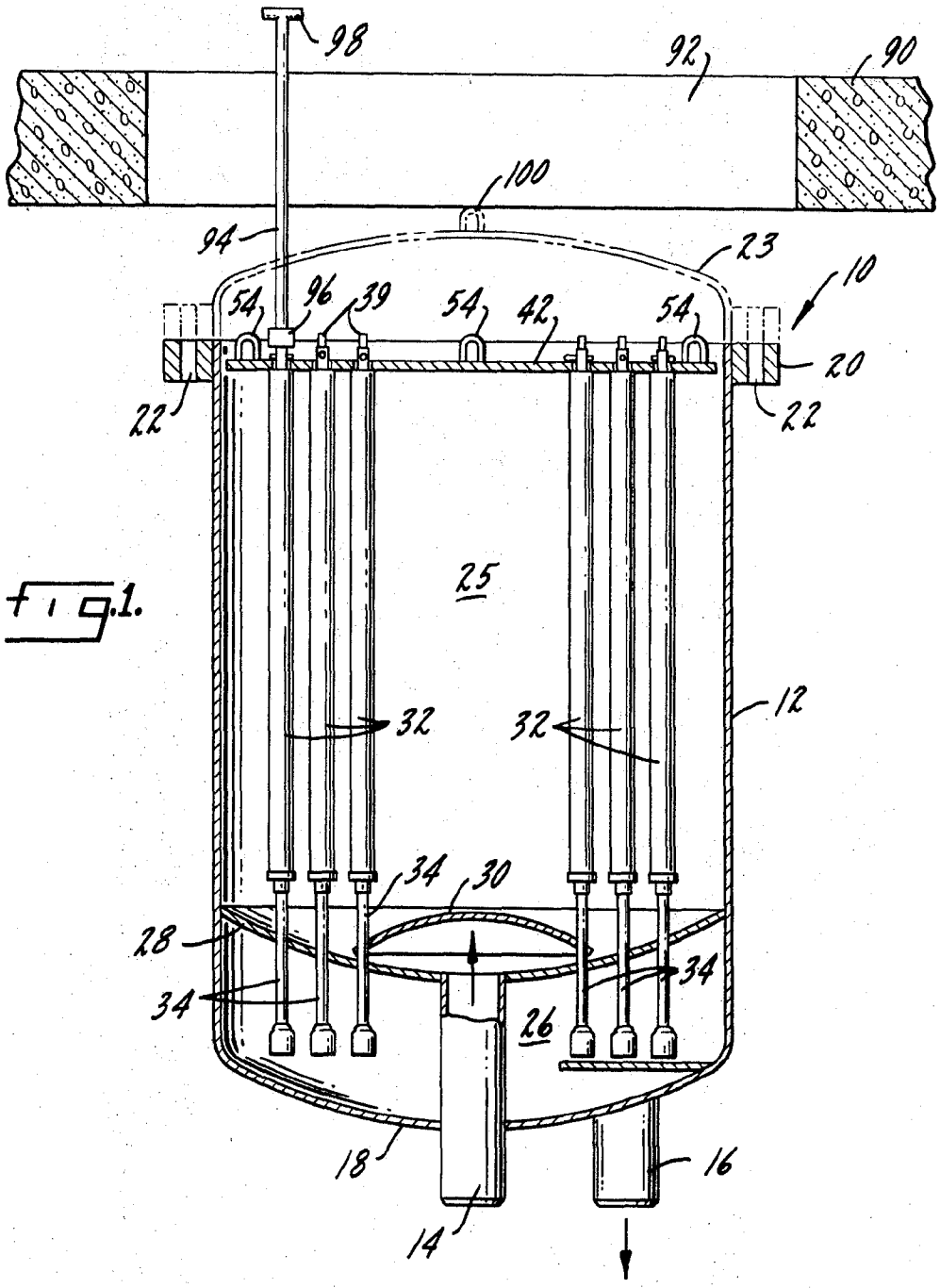


fig. 1.

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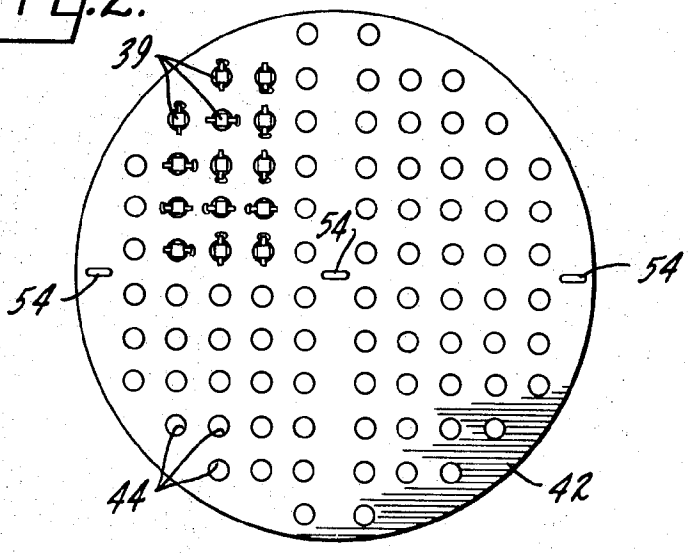
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Fig. 2.



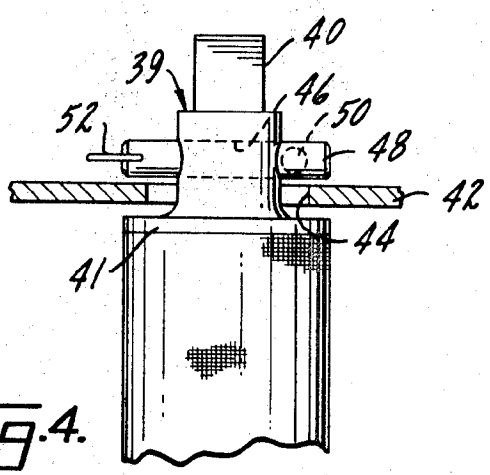


Fig. 4.

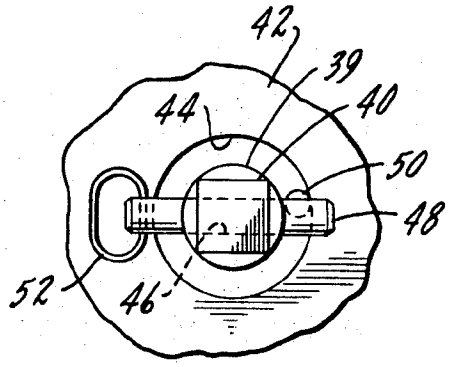
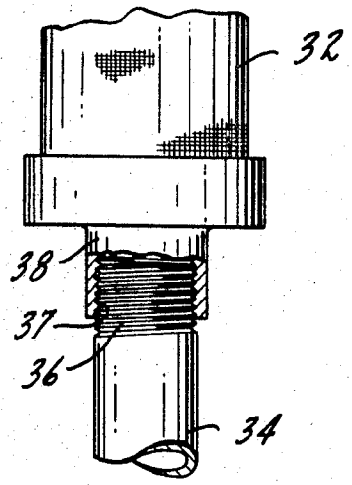


Fig. 3.



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Fig. 5.

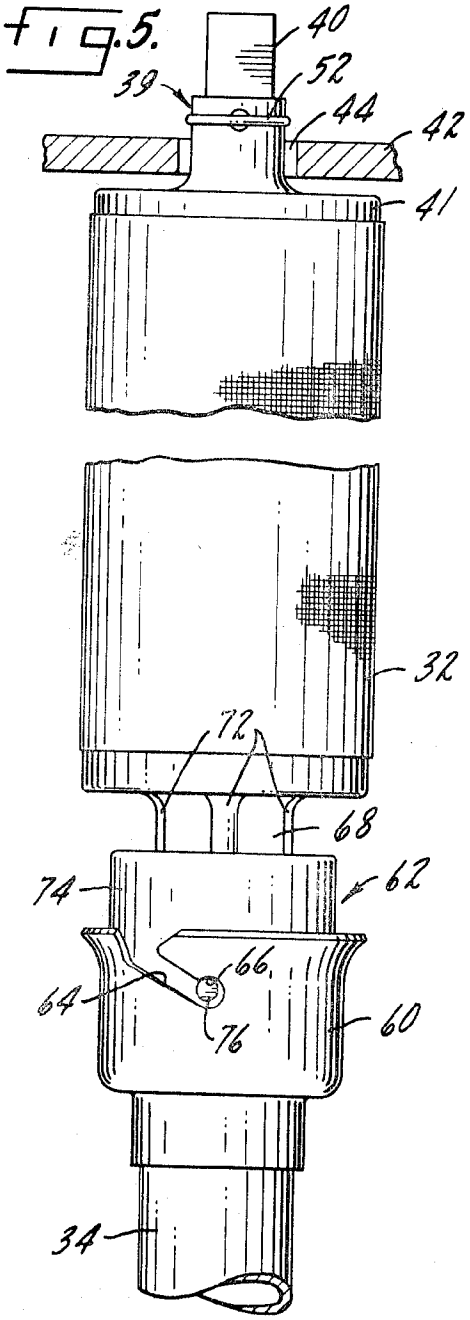
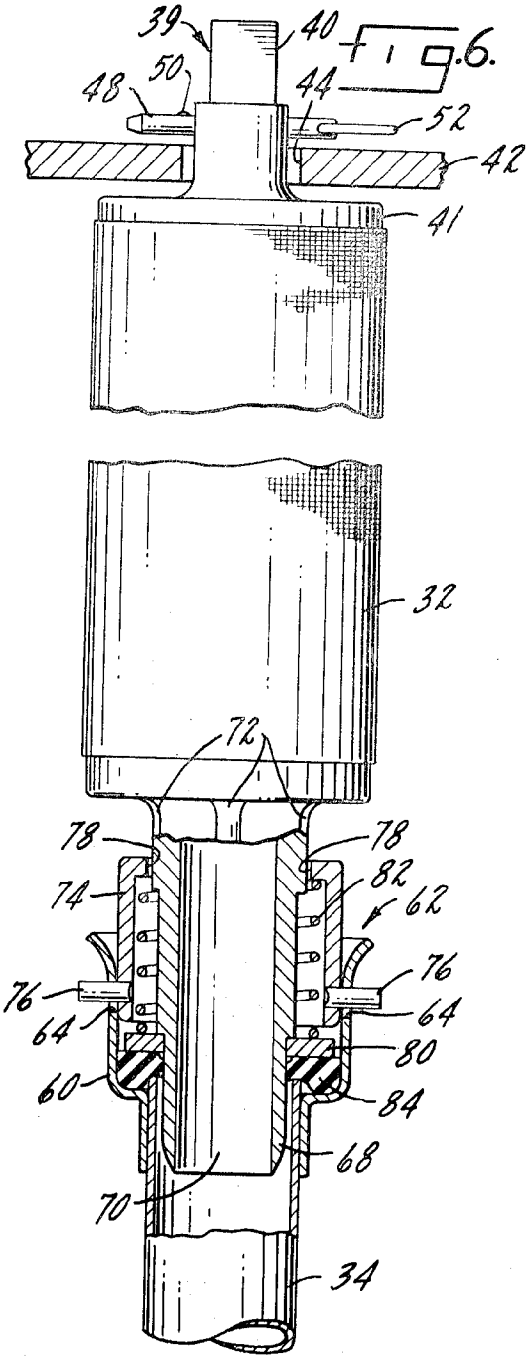


Fig. 6.



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United States Patent Office 3,615,016 Patented Oct. 26, 1971

3,615,016

FILTER TANK HAVING REPLACEABLE FILTER CARTRIDGES

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Int. Cl. B01d 25/02
U.S. Cl. 210—232 17 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus enabling remote removal of a plurality of annular filter cartridges from a tank includes a wrenching portion on top of each cartridge, enabling it to be easily turned and unseated by an operator outside the tank. A cartridge locating plate having a plurality of apertures is positioned to fit over the wrenching portions, while permitting them to be rotated. Each wrenching portion includes release means which prevent the cartridge from dropping from the plate, so that the plate and cartridges may be lifted together and removed from the tank. The release means permit the easy removal of the cartridges from the plate after removal from the tank. The filter cartridges may be screw-mounted on the seat means, or novel mounting means may be employed. These novel mounting means include a cartridge receiver on top of the seat means, and having a cam slot, together with upwardly biased cam follower means on the bottom of the filter cartridge.

The present invention relates to an improved apparatus enabling the remote removal of a plurality of annular filter cartridges from a tank, and to improved cartridge mounting means adapted for use therein.

Filter tanks having replaceable filter cartridges are well known in the art. An exemplary filter tank with filter cartridges is described in U.S. Pat. No. 3,279,608 to Sorient et al., issued Oct. 18, 1966, and assigned to the assignee of the present application. When the filter cartridges are removed or installed, personnel must ordinarily reach into the tank in order to handle them. This usually is not hazardous, but when the apparatus is used to filter liquids containing toxic and/or radioactive substances it is dangerous for personnel to enter the tank or to be in close proximity to the filter cartridges. In such instances, the personnel must have means for removing the exhausted cartridges from a position outside the tank. In the case of radioactive substances, removal is preferably carried out from a position that it not dangerously close to the tank, and, where the radiation level is high, removal should be performed from behind a suitable shield.

While apparatus have been developed for the remote removal of cartridges from a filter tank, they are often cumbersome and expensive. In addition, many such apparatus have required the use of highly specialized tools which are not readily available.

Generally, the present invention relates to improvements in a filter tank of the type having first and second end portions, an internal plate mounted in the second end portion, a plurality of annular cartridge seat means having first and second ends and supported by the internal plate, and a plurality of replaceable annular filter cartridges, also having first and second ends. In the present invention, the tank is provided with a fully removable head on the first end portion, and the filter cartridges each have a wrenching projection fixedly mounted on the first end, projecting axially therefrom. A cartridge locating plate is positioned over the wrenching projections. The locating plate has apertures which are adapted to permit rotation of the wrenching projections. The wrenching projections have

release means which are engageable to prevent the filter cartridges from dropping from the locating plate when it is lifted, thus enabling the removal of all of the cartridges at once when the locating plate is removed. The second end of each filter cartridge and the first end of the seat means carry cooperating mounting means for attaching the cartridges to the seat means when they are rotated in one direction, and for disengaging the cartridges from the seat means when they are rotated in the opposite direction. In a simple form mounting means may comprise a simple tube with screws threads mounted on the end of each filter cartridge and cooperating screw threads on the first end of each seat means.

The present invention also provides novel mounting means which enable the filter cartridges to be securely mounted with only a relatively small amount of turning in one direction, and to be disengaged with a similarly small turn in the opposite direction. Generally, these mounting means comprise a receiver on the first end of each seat means, the receiver having a cam slot which is open at the end and angled toward the mounting means. Each filter cartridge carries a mounting assembly which is engageable with the cartridge receiver. The mounting assembly comprises a tube fixedly mounted on the end of the cartridge, substantially coaxially therewith. The tube carries a sleeve slidably mounted on it, and means are provided to prevent rotational movement of the sleeve relative to the cartridge. The sleeve has a cam follower pin which projects outwardly from its side and is adapted to follow the aforementioned cam slot when the sleeve and cartridge are rotated. Resilient means are also provided which bias the sleeve toward the cartridge and away from the seat means. It can therefore be seen that, after the cam it guided into the cam slot, when the cartridge is rotated the sleeve will be forced toward the seat means, thus engaging the cartridge.

While the above-described mounting means are particularly adapted for use with the remote removal means of the present invention, they are also useful in facilitating the installation and removal of cartridges where it is permissible for personnel to closely approach or even enter the filter tank.

The invention, both as to its organization and method of operation, taken together with the objects and advantages thereof, will be best understood by reference to the following detailed description, taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a simplified cross-sectional view of a filtering device embodying the features of the present invention;

FIG. 2 is a plan view of the locating plate and filter cartridges of the present invention;

FIG. 3 is a fragmentary plan view of a single filter cartridge mounted in the apparatus;

FIG. 4 is an elevation view of a single filter cartridge and seat means, illustrating the manner in which the filter cartridge may be screw-mounted on the seat beams;

FIG. 5 is an elevation view of a single filter cartridge and seat means, illustrating the novel mounting means of the present invention; and

FIG. 6 is an elevation view similar to FIG. 5, partially in section to illustrate the interior details of the cartridge mounting means.

Referring to the drawings, and more particularly to FIG. 1, a filtering device embodying the features of the present invention is generally indicated by reference numeral **10**. The filtering device **10** is adapted to receive an influent stream, filter the influent stream, and discharge the filtrate or effluent stream. To these ends, the filtering device comprises a filter tank **12** having an inlet or influent line **14** and an outlet or filtrate line **16**. The filter tank **12** is a generally cylindrical vessel made of steel or the like and having an outwardly convex bottom **18**. The

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top of the tank 12 carries an external mounting ring 20 having bolt receiving apertures 22. During operation, the tank 12 is closed by a fully removable head 23, shown by phantom lines, mounted to the mounting ring 20 by bolts (now shown) penetrating the bolt receiving apertures 22 and aligned apertures in the head 23.

The tank 12 is divided into an influent zone 25 and a filtrate zone 26 by a downwardly convex tube sheet plate 28 suitably secured to the interior of the tank 12 by welding or the like. The inlet line 14 extends through the bottom 18 of the tank 12 and communicates with the influent zone 25 so that all of the influent stream is passed directly to the influent zone 25. The inlet pipe 14 is attached to the tube sheet plate 28 by welding or the like. In this manner, direct communication between the influent zone 25 and the filtrate zone 26 is precluded.

The influent stream from the inlet line 14 is dispersed as it enters the influent zone 25 by a distributor plate 30 having an upwardly convex configuration. The distributor plate 30 is mounted within the influent zone 25 in alignment with the inlet pipe 14 by suitable means, not shown in the drawings. As the influent stream enters the influent zone 25 it strikes the distributor plate 30 and is distributed radially outwardly of the distributor plate 30. In this manner, the influent stream is distributed substantially uniformly over the influent zone 25.

Mounted within the influent zone 25 are a plurality of filter cartridges 32 through which the influent stream must pass before entering the filtrate zone 26 and being discharged from the filter tank 12 through the outlet line 16. The filter cartridges 32 are annular-shaped filter elements. In the embodiment shown, they are perforated stainless steel elements covered with a layer of coarse screen and overlaid with a layer of fine screen. As is well known in the art, similar elements may be employed wherein nylon or other natural or synthetic fibers are substituted for the screen in the embodiment shown. Each of the filter cartridges 32 is mounted within the tank 12 by means hereinafter described. For simplicity, only six such cartridges 32 are shown in FIG. 1. As those skilled in the art will appreciate, the tank 12 will normally contain a much larger number of cartridges 32. As indicated in FIG. 2, these cartridges are spaced throughout most of the interior of the tank 12.

The tube sheet plate 28 has attached thereto cartridge seat means 34 for each filter cartridge 32 in the tank 12. Each of the cartridge seat means comprises an annular pipe made of steel or the like which extends through a hole in the tube sheet plate 28 and is attached thereto by welding or other suitable means. Each cartridge seat means 34 is substantially parallel to the longitudinal axis of the filter tank 12 and provides communication between the influent zone 25 and the filtrate zone 26.

As shown in FIG. 4, the simple mounting means which is adapted for use in the present invention comprises screw threads 36 on the upper end of the cartridge seat means 34. These screw threads 36 engage internal threads 37 in a mounting tube 38 mounted on the bottom of each filter cartridge 32, so that a tight fit is formed when the cartridges 32 are mounted on the seat means 34.

As shown in FIGS. 1–4, each of the filter cartridges 32 has a wrenching projection 39 on its upper end. These wrenching projections 39 are axially aligned with the remainder of the filter cartridges 32, and have a maximum diameter smaller than the diameter of the top of the filter cartridge body. As shown in the drawings, the top portions of these wrenching projections 39 have wrench flats 40 forming a square cross-sectional configuration. Of course, any configuration is suitable so long as it enables the wrenching projections 39 to be turned with a wrench. As shown is FIG. 4, the wrenching projections 39 are affixed to the top of caps 41, and the caps are mounted at the tops of the cartridges 32 by welding or the like.

When the filter cartridges 32 are mounted in the tank 12, their upper ends are properly located by a locating

plate 42. As shown most clearly in FIG. 2, the locating plate 42 is a circular plate, having a diameter slightly smaller than the internal diameter diameter of the filter tank 12, and having a plurality of spaced apertures 44 corresponding to the positions of the filter cartridges 32. The apertures 44 are preferably circular, and are large enough to permit the rotation of the wrenching projections 39. These apertures 44 are of a size intermediate between the maximum diameter of the wrenching projections 39 and the top of the main portion of the filter cartridge 32 so that the locating plate may normally rest upon the filter cartridges 32 as shown in FIG. 1.

As best shown in FIGS. 3 and 4, each of the wrenching projections 39 includes release means which prevent the filter cartridge 32 from dropping from the locating plate 42 when the plate 42 is lifted. In the preferred embodiment, these release means include a transverse aperture 46 which fully penetrates each wrenching projection 39 in a direction transverse to the axis of the filter cartridge 32. The transverse apertures 46 each receive a quick release pin 48 having a partially recessed, spring-biased ball 50 mounted adjacent to one end and a gripping loop 52 at the opposite end. The spring-biased ball normally retains the quick release pin 48 properly located in the transverse aperture 46. As shown in FIGS. 3 and 4, the quick release pin 48 has a length greater than the diameter of the spaced apertures 44 in the locating plate 42. This insures that the cartridges 32 will not fall from the plate 42 when the plate 42 is lifted.

As shown in FIGS. 1 and 2, the locating plate 42 includes means for gripping and lifting it from the tank 12. In the embodiment shown, these gripping means comprise three lifting lugs 54 mounted on top of the locating plate 42 by welding or the like. These lugs 54 may be easily engaged by a suitable hook-shaped tool (not shown) to remove the locating plate 42 and cartridges 32 from the tank 12, as hereinafter described.

Referring to FIGS. 5 and 6, there are illustrated improved mounting means which permit the rapid and secure mounting of filter cartridges 32 on seat means 34. These mounting means are made up of two cooperating sections, a cartridge receiver 60 affixed to the top end of the cartridge seat means 34 and a cartridge mounting assembly affixed to the bottom end of the filter cartridge 32, generally indicated by reference numeral 62. The mounting assembly 62 is engageable with the cartridge receiver 60, as hereinafter described. In the preferred embodiment, the cartridge receiver 60 forms a shield, which is annular in shape, flared outwardly at the top. The cartridge receiver 60 is secured to the top of the seat means 34 by screw threads, welding, or the like. As shown in FIG. 5, the cartridge receiver has a cam slot 64 which is open at the top end of the receiver 60, and is angled downwardly toward the mounting means. The end of the cam slot 64 preferably includes a retention portion 66 which is angled upwardly, away from the mounting means 34. The retention portion 66 serves to retain the cartridge 32 mounted on the seat means 34, although its angle is not so sharp as to prevent disengagement of the cartridge receiver 60 and mounting assembly 62 as hereinafter described.

In the preferred embodiment, a pair of identical, oppositely disposed cam slots 64 is employed. These slots 64 are shown in section in FIG. 6, which illustrates the mounting means and filter cartridge 32 rotated 90° as compared to FIG. 5.

Referring to FIG. 6, the mounting assembly 62 includes a tube 68 fixedly mounted to the bottom of the cartridge 32, and axially aligned therewith. The tube 68 has a central conduit 70 which communicates with the interior of the filter cartridge 32. The exterior of the tube 68 carries a plurality of splines 72. A sleeve 74 having a cam follower pin 76 is slidably mounted on the tube. In the preferred embodiment, where a pair of cam slots 64 is employed, the sleeve 74 has a pair of

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aligned, oppositely disposed cam follower pins 76, as shown in FIG. 6. The sleeve 74 carries slots 78 which fit over the splines 72 to prevent the rotational movement of the sleeve 74 relative to the cartridge 32 and tube 68, while permitting longitudinal sliding movement thereof.

In the preferred embodiment, a spring retainer ring 80 is fixedly mounted on the tube 68 by welding or the like. The spring retainer ring 80 is positioned so that the sleeve 74 is slidable between the cartridge 32 and the spring retainer ring 80. A helical spring 82 is positioned between the sleeve 74 and the tube 68. The spring 82 abuts the spring retainer ring 80, and biases the sleeve 74 in an upward direction away from the spring retainer and toward the top of the cartridge. The underside of the spring retainer ring 80, opposite the spring 82, carries a gasket 84 of rubber, nylon, or the like, which forms a seal with the top of the seat means 34 when the mounting assembly 62 engages the cartridge receiver 60.

To mount the cartridge 32 on the seat means 34 with the mounting means illustrated in FIGS. 5 and 6, it is simply necessary that the cartridges 32 be positioned so that the cam follower pins rest on top of the cartridge receivers 60. Each cartridge 32 is then mounted by rotating the wrenching projection 39 slowly in a given direction (counter-clockwise in the embodiment shown) until the cam follower pins drop into the cam slots 64. As rotation of the cartridge 32 is continued, the cam follower pins 76 will follow the cam slots 64 in a downward direction, moving the sleeve 74 downward, and compressing the spring 82. When the cam follower pins 76 reach the retention portions 66 of the cam slots 64, further rotation of the cartridge 32 will not be permitted, and the cartridge will then be properly mounted.

It will be appreciated that a particular advantage of this mounting means is that it is not necessary to be careful about properly starting screw threads. Instead, the mounting assembly 62 will locate itself and permit a secure mounting in a minimum of time. For this reason, the cartridge receiver 60 and mounting assembly 62 of the present invention are well adapted to any apparatus wherein it is desired to mount filter cartridges on seat means, but is particularly adapted to the filter tank illustrated in the present invention, where rapid handling of cartridges is especially important.

To remove a cartridge 32 from the tank 12, the reverse of the above-described procedure is employed. That is, the cartridge 32 is simply rotated in the opposite direction (clockwise, in the embodiment shown) so that the cam follower pins 76 disengage themselves from the retention portions 66 of the cam slots 64, and follow the cam slots 64 in an upward direction away from the seat means 34, eventually disengaging the cartridge 32 from the seat means 34 when the cam follower pins 76 reach the ends of the slots 64.

The apparatus shown in the drawings is designed to be suitable for use in filtering liquids containing radioactive materials. To this end, as shown in FIG. 1, a radiation shield 90, of concrete or the like, is located above the tank 12. The radiation shield 90 has an aperture 92 which permits the removal of the tank head 23 and subsequent removal of the cartridges 32. FIG. 1 also shows a suitable wrench 94 fitted over one of the wrenching projections for unseating a cartridge 32. The wrench 94 has a socket portion 96 on one end and a handle 98 on the opposite end.

In normal operation, a pre-coat layer of filter medium, for example finely divided ion exchange resin particles in the range of about 60–400 mesh, will be deposited on the outside surfaces of the filter cartridges 32. A suitable pre-coating procedure is described in U.S. Pat. Nos. 3,377,270, issued Apr. 9, 1968 and 3,373,104, issued Mar. 12, 1968, both of which are assigned to the assignee of this application. A stream of liquid to be filtered, such as condensate water from a nuclear power plant, is fed into the apparatus 10 through the inlet line 14. The liquid is distributed by the distributor plate 30 as it enters the influent zone 25. The liquid then enters the filter cartridge 32, where it is filtered, exiting from the bottom of the cartridge seat means 34 into the filtrate zone 26. The filtered liquid then leaves the tank 12 through the outlet line 16.

Periodically, the apparatus may be backwashed to clean the filters. Suitable procedures are described in U.S. Pat. No. 3,373,104 to Ryan, issued Mar. 12, 1968, and in copending application Ser. No. 768,580, filed Aug. 30, 1968, both of which are assigned to the assignee of this application. After a time, it becomes necessary to remove and replace the filter cartridges 32.

In carrying out the removal process in accordance with the present invention, the tank 12 is drained of all liquid, and the head 23 is removed and withdrawn through the opening 92 in the radiation shield 90. This may be easily accomplished by engaging a suitable lifting lug 100 on top of the removable head 23.

After the head 23 has been removed, each of the cartridges 32 is unseated. This is accomplished by fitting the wrench 94 over the wrenching portion 39 of each filter cartridge 32 and turning it to fully unseat it. Where the filter cartridges are screw-mounted as illustrated in FIG. 4, a number of turns will be required to fully unseat each cartridge. On the other hand, where the improved mounting means shown in FIGS. 5 and 6 is employed, each cartridge may generally be unseated with less than a full turn. Where many cartridges are involved, this will very substantially reduce the time required to perform the unseating procedure. Where the filter tank is very large, it may be necessary to place a temporary catwalk (not shown) across the radiation shield 90 in order that an operator may unseat the cartridges 32 near the center of the tank. Although the operator is not protected by the radiation shield 90 during this operation, he is nevertheless relatively distant from the cartridges 32, and any hazard is therefore minimized. Of course, if radiation levels are high, the operation can be performed by remote control.

After all of the cartridges 32 have been unseated, the lifting lugs 54 on the locating plate 42 are engaged by a suitable gripping device (not shown), and the locating plate 42 and cartridges 32 are all lifted from the tank. This operation may also be accomplished from a position remote from the tank 12, as, for example, by utilizing a motorized winch to lift the plate 42 and cartridges 32.

If radiation levels are too high for personnel to safely approach the cartridges 32, the plate 42 and cartridges 32 are transferred to a decontamination station prior to removal from the plate. In most cases, such decontamination will not be necessary, since only a brief exposure to the cartridges 32 is required to remove them from the plate 42. In removing the cartridges 32 from the plate 42, the quick release pins 48 are simply pulled from the wrenching projections 39 by grasping the gripping loops 52 and pulling the pins 48 out of the transverse apertures 46 in the wrenching projections 39.

Since the radiation levels will be very low, an operator may enter the tank 12 and individually reinstall each of the elements 32. Again, when the elements are screw-mounted, each must be screwed into place, while when the improved mounting means described herein are employed, each cartridge may be rapidly mounted as described. Subsequently, the locating plate 42 is placed on top of the cartridges 32, and the quick release pins 48 are inserted. After the removable head 23 has been attached to the tank 12, the apparatus is again ready for operation.

Obviously, many modifications and variations of the present invention as hereinbefore set forth will occur to those skilled in the art, and it is intended to cover in the appended claims all such modifications and variations as fall within the true spirit and scope of the invention.

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We claim:

1. In a filter tank of the type having first and second end portions, an internal plate mounted in said second end portion, a plurality of annular cartridge seat means having first and second ends, said seat means supported by said plate, said first ends of said seat means spaced from aid plate toward aid first end portion of said tank, and a plurality of replaceable annular filter cartridges having first and second ends, the improvement comprising: a fully removable head on said first end portion of said tank; wrenching projections fixedly mounted on said first ends of said filter cartridges and projecting axially therefrom; a cartridge locating plate having a plurality of apertures positioned to fit over said wrenching projections and adapted to permit rotation of said wrenching projections; release means in said wrenching projections, said release means being engageable to prevent said filter cartridges from dropping from said locating plate when said plate is lifted; and cooperating cartridge mounting means on said first end of said seat means and said second end of said filter cartridge, said mounting means adapted for attachment of said cartridges to said seat means when said cartridges are rotated in one direction and to disengage said cartridges from said seat means when said cartridges are rotated in the opposite direction.

2. The apparatus as defined in claim 1 wherein said cartridge mounting means comprise screw threads on said second ends of said filter cartridges and cooperating screw threads on said first ends of said mounting means.

3. The apparatus as defined in claim 2 further including a radiation shield located above said filter tank, said shield having an aperture large enough to permit the simultaneous removal of said locating plate and said cartridges from said tank.

4. The apparatus as defined in claim 2 wherein said wrenching projections each have a transverse aperture, and wherein said release means comprise pins adapted to penetrate said apertures.

5. The apparatus as defined in claim 4 wherein said pins each have a gripping loop on one end.

6. The apparatus as defined in claim 1 wherein said cartridge mounting means comprise cartridge receivers having first and second ends, said second ends of said cartridge receivers mounted on said first ends of said seat means, and said cartridge receivers each having a cam slot open at said first end of said cartridge receiver and angled toward said mounting means; and a mounting assembly on said second end of said filter cartridge and engageable with said cartridge receiver, said assembly comprising a tube fixedly mounted on said cartridge and coaxially aligned therewith; a sleeve slidably mounted on said tube; means for preventing rotational movement of said sleeve relative to said cartridge; a cam follower pin projecting outwardly from the side of said sleeve, said pin adapted to follow said cam slot when said sleeve and said cartridge are rotated; and resilient means biasing said sleeve toward said first end of said cartridge.

7. The apparatus as defined in claim 6 wherein said cam slot includes a retention portion angled away from said mounting means.

8. The apparatus as defined in claim 7 wherein said mounting assembly further includes a spring retainer ring fixedly mounted on said tube and positioned so that said sleeve is slidable betweed said retainer ring and said cartridge, and wherein said resilient means comprises a helical spring positioned between said sleeve and said tube and abutting said spring retainer ring.

9. The apparatus as defined in claim 8 wherein said cartridge receiver is annular in shape and flared outwardly at said first end.

10. The apparatus as defined in claim 9 further including a gasket mounted on said spring retainer ring opposite said spring, said gasket adapted to form a seal with said seat means when said mounting assembly engages said cartridge receiver.

11. In a filter tank having first and second end portions, an internal plate mounted in said second end portion, annular cartridge seat means having first and second ends, said seat means supported in said tank by said plate, said first ends of said seat means spaced from said plate toward said first end portion of said tank, and a replaceable annular filter cartridge having first and second ends, means mounting said cartridge coaxially on said first end of said seat means, the improvement comprising:

a cartridge receiver having first and second ends, said second end of said cartridge receiver mounted on said first end of said seat means, and said receiver having a cam slot open at said first end of said receiver and angled toward said mounting means; and

a mounting assembly engageable with said cartridge receiver on said second end of said filter cartridge, said assembly comprising a tube fixedly mounted on said cartridge coaxially therewith; a sleeve slidably mounted on said tube; means for preventing rotational movement of said sleeve relative to said cartridge; a cam follower pin projecting outwardly from the side of said sleeve, said pin adapted to follow said cam slot when said sleeve and said cartridge are rotated; and resilient means normally biasing said sleeve toward said first end of said cartridge.

12. The apparatus as defined in claim 11 wherein said cam slot includes a retention portion angled away from said mounting means.

13. The apparatus as defined in claim 12 wherein said mounting assembly further includes a spring retainer ring fixedly mounted on said tube, and positioned so that said sleeve is slidable between said retainer ring and said cartridge, and wherein said resilient means comprises a helical spring positioned between said sleeve and said tube and abutting said spring retainer ring.

14. The apparatus as defined in claim 13 wherein said cartridge receiver is annular in shape and flared outwardly at said first end.

15. The apparatus as defined in claim 14 further including a gasket mounted on said spring retainer ring opposite said spring, said gasket adapted to form a seal with said seat means when said mounting assembly engages said cartridge receiver.

16. In a filter tank having first and second end portions, an internal plate mounted in said second end portion, annular cartridge seat means having first and second ends, said seat means supported in said tank by said plate, said first ends of said seat means spaced from said plate toward said first end portion of said tank, and a replaceable annular filter cartridge having first and second ends, means mounting said cartridge coaxially on said first end of said seat means, the improvement comprising:

an annular cartridge receiver having first and second ends, said second end of said cartridge receiver shield mounted on said first end of said seat means, and said cartridge receiver having a pair of identical, oppositely disposed cam slots, said slots being open at said first end of said receiver and angled toward said mounting means, and including a retention portion angled away from said mounting means; and

a mounting assembly engageable with said cartridge receiver shield on said second end of said cartridge, said assembly comprising a tube fixedly mounted on said cartridge coaxially therewith; a spring retainer ring fixedly mounted on said tube; a sleeve slidably mounted on said tube between said spring retainer ring and said cartridge; means for preventing rotational movement of said sleeve relative to said cartridge; a pair of aligned, oppositely disposed cam follower pins projecting outwardly from the side of said sleeve, said pins adapted to follow said cam slots when said sleeve and said cartridge are rotated; a helical spring positioned between said sleeve and said tube, said spring abutting said spring retainer ring and

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biasing said sleeve away from said spring retainer ring and toward said first end of said cartridge; and a gasket mounted on said spring retainer ring opposite said spring, said gasket adapted to form a seal with said first end of said seat means when said mounting assembly engages said cartridge receiver shield.

17. The apparatus as defined in claim 16 wherein said first end of said filter cartridge includes a wrenching projection fixedly mounted thereon.

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SAMIH N. ZAHARNA, Primary Examiner

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210—323

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DEUTSCHES PATENTAMT

(12) **Patentschrift**

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B 04 B 9/00
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C 02 F 1/38

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(56) Für die Beurteilung der Patentfähigkeit in Betracht gezogene Druckschriften:

DE 35 42 115 A1

(54) Vorrichtung zum Abscheiden feiner Feststoffpartikel aus Abwasser

Bei einer insbesondere zur Amalgamabscheidung aus Abwässern, wie sie in Zahnarztpraxen anfallen, bestimmten Zentrifugenvorrichtung ist zur Verbesserung der Füllstandserfassung des der Zentrifuge (11) nachgeschalteten Sammelbehälters (36), zur besseren Ausnutzung des Behältervolumens und zur Erzielung einer geringen Restfeuchte der abgeschiedenen Feststoffe bei gleichzeitiger Eliminierung von zwischen Sammelbehälter (36) und Zentrifuge (11) wirksamen Rückpumpeinrichtungen vorgesehen, daß der Sammelbehälter (36) lösbar an der Zentrifugentrommel (26) angebracht ist und mit der Zentrifuge (11) zusammen rotiert, wobei Maßnahmen zur Absperrung des Reinwasserraums gegenüber der Zentrifugentrommel (26) vorgesehen sind. Es wird auch ein Transportbehälter (21) vorgeschlagen, der gemeinsam mit dem Sammelbehälter (36) von der Vorrichtung abnehmbar und bei darin befindlichem Sammelbehälter durch einen Deckel (52) verschließbar ist, der bei Nichtgebrauch lösbar am Transportbehälter (21) befestigt ist.

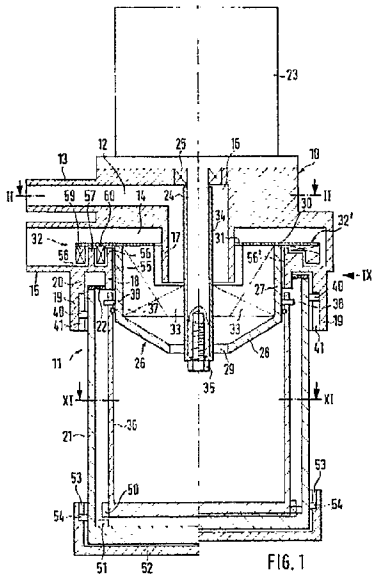


FIG. 1

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Patentansprüche

1. Vorrichtung zum Abscheiden feiner Feststoffpartikel aus Abwasser, insbesondere Amalgampartikel aus dem Abwasser einer Zahnarztpraxis, mit einer von einem Gehäuse umschlossenen Zentrifugentrommel, bestehend aus einer Trommelumfangswand, einem damit verbundenen trommelauswärts vorspringenden konischen Trommelboden, der eine zentrale Durchtrittsöffnung aufweist, und einem vom freien Ende der Trommelumfangswand getragenen, radial nach innen weisenden ringförmigen Sperrflansch, der eine Überlauföffnung begrenzt, durch die hindurch das Innere der Zentrifugentrommel mit einem im Gehäuse befindlichen Auslaßraum für Reinwasser in Verbindung steht,
einer die Zentrifugentrommel tragenden Antriebswelle eines mit dem Gehäuse verbundenen Motors,
einem die Antriebswelle konzentrisch und in radialem Abstand umgebenden, gehäusefesten Einleitrohr, welches die Überlauföffnung unter Radialspiel durchsetzt und mit einem im Gehäuse befindlichen Einlaßkanal für Abwasser sowie mit dem Inneren der Zentrifugentrommel in Verbindung steht, und
einem abnehmbar angebrachten Sammelbehälter für die abgeschiedenen Feststoffpartikel, der durch die Durchtrittsöffnung hindurch mit dem Inneren der Zentrifugentrommel in Verbindung steht,
dadurch gekennzeichnet,
daß der Sammelbehälter (36) lösbar und abgedichtet mit der Zentrifugentrommel (26) drehfest verbunden ist, und
daß bei Zentrifugenbetrieb und -stillstand wirksame Sperrmittel (32, 32′, 32″) vorgesehen sind, durch welche der an den Außenumfang der Trommelumfangswand (27) angrenzende Gehäuseraum (55) gegenüber dem Auslaßraum (14) für Reinwasser abgesperrt ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Sammelbehälter (36) innerhalb eines Transportbehälters (21) angeordnet ist, der den Sammelbehälter (36), außer bei dessen Auswechslung, berührungsfrei umgibt und mit seiner Öffnung abgedichtet und abnehmbar am Gehäuse (10) befestigt ist.

3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Zentrifugentrommel (26) und der Sammelbehälter (36) durch einen Bajonettverschluß (Bajonettstifte 38, Bajonettkulisse 39) miteinander verbunden sind, zu dessen Entriegelung der Sammelbehälter (36) anzuheben und anschließend zu drehen ist.

4. Vorrichtung nach einem der Ansprüche 2 oder 3, dadurch gekennzeichnet, daß der Transportbehälter (21) mittels eines Bajonettverschlusses (Bajonettstifte 40, Bajonettkulisse 41) am Gehäuse (10) befestigt ist, der gemeinsam mit dem die Zentrifugentrommel (26) mit dem Sammelbehälter (36) verbindenden Bajonettverschluß (Bajonettstifte 38, Bajonettkulisse 39) durch Anheben und anschließendes Drehen entriegelbar ist, wobei Transportbehälter (21) und Sammelbehälter (36) nach dem Anheben des Transportbehälters (21) miteinander drehfest im Eingriff sind.

5. Vorrichtung nach einem der Ansprüche 2 bis 4, dadurch gekennzeichnet, daß der Bajonettverschluß (Bajonettstifte 40, Bajonettkulisse 41) des

Transportbehälters (21) mit einer Rastung (Rastvertiefungen 42) versehen ist, die aufzuheben ist, bevor der Transportbehälter (21) in seine ein Anheben erlaubende Position drehbar ist.

6. Vorrichtung nach einem der Ansprüche 2 bis 5, dadurch gekennzeichnet, daß der Transportbehälter (21) mit darin befindlichem Sammelbehälter (36) durch einen Deckel (52) verschließbar ist, der an seinem Rand Bajonettelemente (Bajonettkulisse 53) aufweist, die mit den am Transportbehälter angebrachten Bajonettelementen (Bajonettstifte 40) des zugehörigen Bajonettverschlusses eingreifen, und der bei Nichtgebrauch außen am Boden des Transportbehälters (21) anbringbar ist, wobei seine Bajonettelemente (Bajonettkulisse 53) mit entsprechenden in der Nähe des Bodens am Transportbehälter (21) angebrachten Bajonettelementen (Bajonettstifte 54) im Eingriff sind.

7. Vorrichtung nach den Ansprüchen 2 bis 6, dadurch gekennzeichnet, daß an der Öffnung des Transportbehälters (21) eine Dichtung (Lippendichtung 22) angebracht ist, die bei Anbringung des Transportbehälters (21) am Gehäuse (10) einer Abdichtfläche des Gehäuses (10) und bei Anbringung des Deckels (52) am Transportbehälter (21) dem Deckel (52) anliegt.

8. Vorrichtung nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß die Sperrmittel (32, 32′, 32″) aus mindestens einer mit der Zentrifugentrommel (26) konzentrischen geschlossenen Ringwand (56), die von der Bodenfläche (58) des Auslaßraumes (14) für Reinwasser nach oben vorspringt, und mindestens einem ebenfalls mit der Zentrifugentrommel (26) konzentrischen Kranz von radial gerichteten, der Ringwand (56) mit engem Spalt benachbarten Schaufeln (60) bestehen, daß sich der Sperrflansch (30) von der Trommelumfangswand (27) auch radial nach außen über die mindestens eine Ringwand (56) hinweg erstreckt, und daß die Schaufeln (60) nach unten vorspringend am Sperrflansch (30) angebracht sind.

9. Vorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß zwei Ringwände (56, 57) und zwei damit eingreifende Kränze von Schaufeln (60, 59) vorgesehen sind.

10. Vorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß eine radial nach außen abgestufte Ringwand (56′) vorgesehen ist, der entsprechend stufenförmige Schaufeln (61) zugeordnet sind.

11. Vorrichtung nach einem der Ansprüche 8 bis 10, dadurch gekennzeichnet, daß die Schaufeln (62) bis an die Trommelumfangswand (27) heranreichen.

12. Vorrichtung nach einem der Ansprüche 1 bis 11, dadurch gekennzeichnet, daß am Sammelbehälter (36) mindestens zwei paarweise gegenüberliegende, nach innen gerichtete und abmessungsgleiche Einbuchtungen (64) od. dgl. aus lichtdurchlässigem Material vorgesehen sind, daß ggf. der Transportbehälter (21) mindestens an zwei entsprechend gegenüberliegenden Stellen lichtdurchlässig ausgebildet ist, und daß am Zentrifugenrahmen (67) eine Lichtschranke (IR-Lichtquelle 65, IR-Detektor 66) zur Füllstandserfassung befestigt ist, deren optische Achse auf die Einbuchtungen (64) ausgerichtet ist.

13. Vorrichtung nach einem der Ansprüche 1 bis 11, dadurch gekennzeichnet, daß zur Erfassung des Füllstandes des Sammelbehälters (36) das Anlaufdrehmoment des Motors (Elektromotor 23) gemes-

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sen wird.

14. Vorrichtung nach einem der Ansprüche 1 bis 13, dadurch gekennzeichnet, daß der Innenradius des Sammelbehälters (36) größer ist als der Innenradius der Trommelumfangswand (27).

Beschreibung

Die Erfindung betrifft eine Vorrichtung zum Abscheiden feiner Feststoffpartikel aus Abwasser, insbesondere Amalgampartikel aus dem Abwasser einer Zahnarztpraxis, entsprechend dem Oberbegriff des Patentanspruches 1.

Bei einer derartigen bekannten Vorrichtung (DE-OS 35 42 115, Fig. 7) ist der Sammelbehälter für die Feststoffpartikel an das Gehäuse angeschlossen, so daß er bei Stillstand der Zentrifugentrommel durch die zentrale Durchtrittsöffnung im Trommelboden hindurch mit abgeschiedenen Feststoffpartikeln von der Behältermitte ausgehend befüllt wird. Daraus kann eine ungünstige Ausnutzung des im Sammelbehälter vorhandenen Aufnahmevolumens resultieren. Darüber hinaus ist bei der bekannten Vorrichtung am unteren Ende der Zentrifugennabe das in den Sammelbehälter gelangende Wasser bei Inbetriebsetzung der Zentrifuge wieder in die Zentrifugentrommel zurückzupumpen. Außerdem kann bei der bekannten Vorrichtung die für den rechtzeitigen Wechsel des Sammelbehälters erforderliche Füllstandserfassung Schwierigkeiten bereiten, weil für eine zuverlässige Erfassung eine ausreichende Sedimentation der Feststoffpartikel im Sammelbehälter erforderlich ist.

Der Erfindung liegt die Aufgabe zugrunde, eine Vorrichtung entsprechend dem Oberbegriff des Patentanspruches 1 bereitzustellen, bei welcher die Ausnutzung des vorhandenen Aufnahmevolumens des Sammelbehälters und die Füllstandserfassung bei gleichzeitigem Verzicht auf besondere Vorkehrungen zum Zurückpumpen des Wassers aus dem Sammelbehälter verbessert werden.

Diese Aufgabe wird durch das Zusammenwirken der Merkmale des Oberbegriffs des Patentanspruches 1 mit den Merkmalen des kennzeichnenden Teils des Patentanspruchs 1 gelöst.

Vorteilhafte Ausgestaltungen sind in den Unteransprüchen angegeben.

Somit nimmt der Sammelbehälter an der Rotation der Zentrifugentrommel teil, so daß auch die abgeschiedenen und bei Stillstand der Zentrifugentrommel unter Schwerkrafteinfluß in den Sammelbehälter gelangten Feststoffpartikel und auch das im Behälter befindliche Wasser unter Zentrifugalkrafteinwirkung stehen. Die abgeschiedenen Feststoffpartikel bauen sich daher ringförmig und bei fortschreitender Betriebsdauer mit zunehmender Schichtdicke an der Innenwand des mitrotierenden Sammelbehälters auf, während das in den Sammelbehälter gelangende Wasser ebenfalls einen innen befindlichen Ring bildet, dessen Schichtdicke durch den Durchmesser der zentralen Durchtrittsöffnung im Trommelboden begrenzt ist. Überschüssiges Wasser wird unter dem Einfluß der Zentrifugalwirkung ohne zusätzliche Pumpeinrichtungen od. dgl. nach oben durch die Durchtrittsöffnung hindurch in die Zentrifugentrommel verdrängt. Auf diese Weise wird ein definierter Schichtaufbau der abgeschiedenen Feststoffpartikel im Sammelbehälter und damit eine günstige Ausnutzung seines Aufnahmevolumens erreicht. Der definierte Schichtaufbau erleichtert auch eine genaue Füllstandserfassung wesentlich. Darüber hinaus ist die in dem Sammelbehälter abgeschiedene Feststoffpartikelschicht besonders verdichtet, wodurch das Sediment eine geringe Restfeuchte aufweist, die eine Wiederaufarbeitung der abgeschiedenen Feststoffe erleichtert. Die Sperrmittel sorgen sowohl im Zentrifugenbetrieb als auch bei Zentrifugenstillstand dafür, daß Reinwasser aus dem Auslaßraum nicht zur Außenseite der Zentrifugentrommel gelangen kann.

Durch die Merkmale des Patentanspruchs 2 wird vorteilhaft erreicht, daß der mitrotierende Sammelbehälter durch den an der Rotation nicht teilnehmenden Transportbehälter nach außen abgedeckt und nach dem Auswechseln mit seinem Inhalt für den Transport zu einer Entsorgungseinrichtung sicher untergebracht ist. Die Abdichtung zwischen Gehäuse und Transportbehälter stellt sicher, daß etwaiges trotz der Sperrmittel in den Gehäuseraum an der Trommelaußenwand übertretendes Reinwasser nicht aus der Vorrichtung nach außen gelangen kann.

Zur Herbeiführung einer lösbaren Verbindung zwischen Sammelbehälter und Zentrifugentrommel könnten diese Teile zwar miteinander verschraubt sein, indes wird vorteilhaft die im Patentanspruch 3 angegebene Ausgestaltung verwendet. Diese eröffnet auch zusammen mit den Merkmalen des Patentanspruches 4 die vorteilhafte Möglichkeit, den Sammelbehälter und den Transportbehälter gleichzeitig und gemeinsam von der Vorrichtung zu lösen. Zu diesem Zweck ist lediglich der Transportbehälter anzuheben und zu drehen, wobei infolge des beim Anheben eintretenden Eingriffs zwischen Transportbehälter und Sammelbehälter die Bajonettverschlüsse beider Behälter gelöst werden, so daß beide Behälter gemeinsam zur Aufhebung des Eingriffs mit dem Gehäuse bzw. der Zentrifugentrommel nach unten abgezogen werden können.

Durch die Maßnahme des Patentanspruches 5 wird sichergestellt, daß der Transportbehälter nicht unabsichtlich in seine ein Anheben ermöglichende Position gebracht werden kann. Die vorgesehene Rastung fixiert den Transportbehälter in definierter Lage am Gehäuse.

Im Patentanspruch 6 ist eine besonders günstige Anordnung eines Deckels für das Verschließen des Transportbehälters mit darin befindlichem Sammelbehälter angegeben, die auch eine zweckmäßige Aufbewahrung des Deckels bei Nichtgebrauch einschließt.

Die Merkmale des Patentanspruches 7 beziehen sich auf eine zweckmäßige Anbringung einer Dichtung am Sammelbehälter, die sowohl zur Abdichtung des Sammelbehälters gegenüber dem Gehäuse als auch gegenüber dem aufgesetzten Deckel geeignet ist.

Die Sperrmittel, welche den das Reinwasser führenden Auslaßraum gegenüber dem an die Trommelumfangswand angrenzenden Gehäuseraum und damit auch gegenüber dem Spaltraum zwischen dem Sammelbehälter und dem Transportbehälter absperren, sind gemäß dem Patentanspruch 8 ausgebildet. Während die Schaufeln bei Rotation der Zentrifugentrommel, an der sie wegen ihrer Anbringung an dem Sperrflansch mit derselben Winkelgeschwindigkeit teilnehmen, das aus der Überlauföffnung austretende Reinwasser radial auswärts fördern und damit eine wirksame dynamische Abdichtung vorsehen, wirkt die Ringwand bei stillstehender Zentrifugentrommel als Sperrwand innerhalb des Auslaßraumes und verhindert einen Reinwasserrückfluß, auch wenn in dem Auslaßraum ein erheblicher Wasserpegel anstehen sollte.

Zweckmäßige Ausführungsformen der vorstehend erläuterten Sperrmittel gehen aus den Patentansprü-

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chen 9 bis 11 hervor.

Die vorteilhafte Möglichkeit einer exakten Füllstandserfassung des Sammelbehälters wird durch die Merkmale des Patentanspruchs 12 realisiert. Hierbei ist die Tiefe der Einbuchtungen bemessend für den zugelassenen Füllstand im Sammelbehälter, d. h. die zugelassene Schichtdicke der ausgeschiedenen und unter Zentrifugalkrafteinwirkung an der Wand des Sammelbehälters abgelagerten Feststoffpartikel. Sobald die Schichtdicke so groß geworden ist, daß die gegenüberliegenden Flächen der Einbuchtungen von Feststoffpartikeln bedeckt werden, wird mit Hilfe der Lichtschranke ein optisches und/oder akustisches Signal ausgelöst, das den erforderlichen Wechsel des Sammelbehälters anzeigt.

Anstelle der oder zusätzlich zu der vorstehend angegebenen Füllstandserfassung durch Sensor kann auch die durch den mitrotierenden Sammelbehälter ermöglichte Auswertung des Motoranlaufdrehmoments gemäß Patentanspruch 13 zur Erfassung des Füllstandes des Sammelbehälters herangezogen werden.

Durch die im Patentanspruch 14 angegebene Radienausführung erfolgt wegen der vergleichsweise größeren Umfangsgeschwindigkeit an der Sammelbehälterwand und der dadurch eintretenden größeren Zentrifugaleinwirkung auf die abgeschiedenen Feststoffe eine noch günstigere Verdichtung des Sediments.

Ausführungsbeispiele der Erfindung sind in zum Teil schematischer Darstellungsweise in der Zeichnung dargestellt und werden nachstehend näher erläutert. Darin zeigt

Fig. 1 einen vertikalen Schnitt durch die Vorrichtung zum Abscheiden feiner Amalgampartikel aus dem in einer Zahnarztpraxis anfallenden Abwasser,

Fig. 2 den abgebrochen dargestellten Querschnitt durch das Gehäuse der Vorrichtung entsprechend der Linie II-II in **Fig.** 1,

Fig. 3 einen abgebrochenen vertikalen Schnitt durch die Zentrifugentrommel,

Fig. 4 die abgebrochen dargestellte Draufsicht auf die Zentrifugentrommel gemäß **Fig.** 3,

Fig. 5—7 abgebrochene Vertikalschnitte durch unterschiedliche Ausführungsvarianten für die Sperrmittel,

Fig. 8 den abgebrochen dargestellten Schnitt durch eine der Ausführungsvarianten entsprechend der Linie VIII-VIII in **Fig.** 5,

Fig. 9 die abgebrochene Ansicht einer Gehäuseeinzelheit entsprechend dem Pfeil IX in **Fig.** 1,

Fig. 10 eine abgebrochene Seitenansicht des oberen Bereichs des Sammelbehälters mit einer Bajonettkulisse,

Fig. 11 den Querschnitt durch den Sammelbehälter und den Transportbehälter entsprechend der Linie XI-XI in **Fig.** 1,

Fig. 12 den abgebrochenen Vertikalschnitt durch den Sammelbehälter entsprechend der Linie XII-XII in **Fig.** 11,

Fig. 13 die abgebrochene Seitenansicht des Sammelbehälters entsprechend dem Pfeil XIII in **Fig.** 12 und

Fig. 14 einen der **Fig.** 12 ähnlichen Vertikalschnitt durch eine Ausführungsvariante des Sammelbehälters.

Die in **Fig.** 1 gezeigte Vorrichtung zum Abscheiden von Amalgampartikeln aus dem in einer Zahnarztpraxis anfallenden Abwasser ist links und rechts der Vorrichtungsmittelachse auf noch zu beschreibende Weise teilweise unterschiedlich ausgebildet und teilweise in unterschiedlichen Positionen befindlich dargestellt. Das Gehäuse der Vorrichtung ist insgesamt mit der Bezugszahl **10** bezeichnet, während die Zentrifuge in ihrer Gesamtheit die Bezugszahl **11** trägt.

An einen im Gehäuse **10** quer zur Vorrichtungsmittelachse verlaufenden Einlaßkanal **12** ist ein Einlaßstutzen **13** angeschlossen. Unterhalb des Einlaßkanals **12** befindet sich ein ringförmiger Auslaßraum **14** für aus der Zentrifuge **11** austretendes Reinwasser, an welchen ein Auslaßstutzen **15** angeschlossen ist. Wie **Fig.** 2 verdeutlicht, mündet der Einlaßkanal **12** tangential in eine mit der Vorrichtungsmittelachse konzentrische Einleitkammer **16** ein, an die sich ein nach unten gerichtetes Einleitrohr **17** anschließt. Das Einleitrohr **17** stellt die innere Begrenzung des ringförmigen Auslaßraums **14** dar und reicht in eine die Zentrifuge **11** im wesentlichen umschließende mit der Vorrichtungsmittelachse konzentrische Mantelwand **18** des Gehäuses **10** hinein.

Mit radialem Abstand zu der zylindrischen Mantelwand **18** ist am Gehäuse eine noch weiter nach unten vorspringende äußere Ringwand **19** vorgesehen, die einen ringförmigen nach unten geöffneten Aufnahmeraum **20** außen begrenzt, dessen innere Begrenzung von der Mantelwand **18** gebildet ist. In den Aufnahmeraum **20** reicht das obere Ende eines auf noch zu beschreibende Weise abnehmbar am Gehäuse **10** befestigten Transportbehälters **21** hinein. Der Transportbehälter **21** weist die Form eines Zylinderbechers auf und trägt an seinem Öffnungsrand eine Lippendichtung **22**, welche der zylindrischen Außenfläche der Mantelwand **18** dicht aber höhenverschiebbar anliegt, wie ein Vergleich der linken und rechten Darstellungshälfte der **Fig.** 1 zeigt.

Ein Elektromotor **23** ist oben auf das Gehäuse **10** so aufgeflanscht, daß seine Hauptachse mit der Vorrichtungsmittelachse fluchtet. Die Antriebswelle **24** des Elektromotors **23** reicht durch eine Gehäuseabdichtung **25** hindurch und endet unterhalb des Einleitrohres **17**. Die Antriebswelle **24** trägt auf die nachstehend beschriebene Weise eine drehfest an ihr angebrachte insgesamt mit der Bezugszahl **26** bezeichnete Zentrifugentrommel.

Die Zentrifugentrommel **26** weist eine zylindrische Trommelumfangswand **27** und einen unten daran anschließenden konischen Trommelboden **28** auf, der an einer zentralen Durchtrittsöffnung **29** endet. Die Durchtrittsöffnung **29** ist kreisförmig ausgebildet und konzentrisch mit der Vorrichtungsmittelachse angeordnet. Am freien Ende der Trommelumfangswand **27** und damit fest und abgedichtet, beispielsweise einteilig verbunden ist ein kreisringförmiger Sperrflansch **30** angeordnet, der innen eine ebenfalls kreisringförmige Überlauföffnung **31** begrenzt. Die Außenfläche des Einleitrohres **17** bildet die innere Begrenzung der Überlauföffnung **31**. Der Sperrflansch **30** erstreckt sich von der Trommelumfangswand **27** auch radial nach außen um die Anordnung von noch näher zu erläuternden Sperrmitteln zu ermöglichen, die in **Fig.** 1 in der linken und rechten Darstellungshälfte unterschiedlich ausgebildet gezeigt sind und dort insgesamt die Bezugszahlen **32** bzw. **32'** tragen. Die Zentrifugentrommel **26** ist über eine Mehrzahl von radial gerichteten speichenartig angeordneten Leitflügeln **33** starr mit einer Nabenhülse **34** verbunden, welche auf die Antriebswelle **24** aufgeschoben und daran durch eine Schraube **35** befestigt ist, so daß die Zentrifugentrommel **26** und alle starr mit ihr verbundenen Teile drehfest von der Antriebswelle **24** getragen sind. Die Leitflügel **33** erstrecken sich zwischen der Innenfläche der Trommelumfangswand **27** und der Nabenhülse, wie aus den **Fig.** 1, 3 und 4 hervorgeht. Im gezeigten Beispiel sind die Leitflügel L-förmig ausgebildet und enden mit der Innenfläche ihres [illegible]

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Lappens an der Kante der Überlauföffnung **31**. Ihr horizontal ausgerichteter Lappen befindet sich dicht unterhalb des Öffnungsrandes des Einleitrohres **17**.

Ein zylinderbecherförmiger Sammelbehälter **36** ist drehfest und über einen Dichtungsring **37** abgedichtet mit dem unteren Ende der Zentrifugentrommel **26** lösbar verbunden. Zur lösbaren und drehfesten Verbindung sind am Umfang verteilt mehrere beispielsweise vier Bajonettverschlüsse vorgesehen, von denen zwei an der Trommelumfangswand **27** befestigte Bajonettstifte **38** aus **Fig.** 1 entnehmbar sind. Die Bajonettstifte **38** wirken jeweils mit im Randbereich des Sammelbehälters **36** angeordneten Bajonettkulissen **39** zusammen, von denen eine aus **Fig.** 10 entnehmbar ist. Die Verbindung des Sammelbehälters **36** mit der Zentrifugentrommel erfolgt so, daß die Bajonettkulissen mit ihrem nach oben geöffneten Kulissenschlitz auf die Bajonettstifte **38** aufgeschoben werden, bis die Bajonettstifte den horizontalen Bereich der Bajonettkulissen erreichen. Durch eine Linksdrehung des Sammelbehälters **36** wird sodann der Bajonettverschluß verriegelt, bis die Bajonettstifte **38** in die kürzeren vertikal gerichteten und oben geschlossenen Kulissenabschnitte eintreten können. Nach geringfügiger Abwärtsbewegung des Sammelbehälters **36** ist dieser drehfest mit der Zentrifugentrommel **26** verbunden.

Die linke Darstellungshälfte in **Fig.** 1 zeigt den Sammelbehälter **36** und den ihn allseits berührungsfrei umgebenden Transportbehälter **21** in der Betriebsposition der Zentrifuge. Die rechte Hälfte der **Fig.** 1 veranschaulicht dagegen die Relativlage des Transportbehälters **21** und des Sammelbehälters **36** bei dem noch zu beschreibenden Vorgang der gemeinsamen Entriegelung der beiden Behälter von der Vorrichtung. Hierbei ist der Transportbehälter **21** angehoben dargestellt.

Der Transportbehälter **21** ist ebenfalls durch einen Bajonettverschluß mit dem Gehäuse **10** lösbar verbunden. Zu diesem Zweck sind im gezeigten Beispiel am Umfang des Transportbehälters **21** verteilt mehrere Bajonettstifte **40** befestigt, die in Bajonettkulissen **41** eingreifen, welche in der Ringwand **19** angeordnet sind. Die Bajonettkulissen **41** haben die aus **Fig.** 9 ersichtliche Konfiguration. Bei der Anbringung des Transportbehälters **21** am Gehäuse **10** treten die Bajonettstifte **40** zunächst in die nach unten geöffneten kürzeren Kulissenabschnitte ein, von denen einer auf der linken Seite der **Fig.** 9 dargestellt ist. Nunmehr wird der Transportbehälter **21** angehoben, bis die Bajonettstifte **40** den längeren der beiden waagerechten Kulissenabschnitte erreicht. Bei Rechtsdrehung des Transportbehälters **21** bewegen sich die Bajonettstifte **40** in diesem waagerechten Kulissenabschnitt, bis sie Rastvertiefungen **42** erreichen, von denen eine in **Fig.** 9 dargestellt ist. In dieser Lage wird der Transportbehälter **21** an dem Gehäuse **10** durch die in die Rastvertiefungen **42** eingreifenden Bajonettstifte **40**, die zusammen mit den Rastvertiefungen **42** eine Verdrehrastung bilden, fixiert. Die Verdrehrastung läßt sich durch geringfügiges Anheben und Drehen des Transportbehälters **21** aufheben.

Um den Transportbehälter **21** und den Sammelbehälter **36** gemeinsam von dem Gehäuse **10** lösen zu können ist es erforderlich, daß beide Behälter drehfest miteinander in Eingriff zu bringen sind. Zu diesem Zweck ist am Sammelbehälter **36** mindestens ein Anschlag **50** vorgesehen, dem mindestens ein Gegenanschlag **51** im Transportbehälter **21** zugeordnet ist. Beim Anheben des Transportbehälters **21** in die in der rechten Hälfte der **Fig.** 1 gezeigte Position greifen Anschlag **50** und Gegenanschlag **51** so ineinander, daß bei Rechtsdrehung der beiden Behälter ein gemeinsames Lösen von den jeweiligen Bajonettverschlüssen ermöglicht wird.

Sollen die beiden Behälter abgenommen werden, so wird zunächst der Transportbehälter **21** durch Rechtsdrehung aus seiner Verdrehrastposition bewegt. Hierbei rasten die Bajonettstifte **40** aus den zugehörigen Rastvertiefungen **42** der Bajonettkulissen **41** aus. Die Rechtsdrehung des Transportbehälters **21** wird fortgesetzt, bis die Bajonettstifte **40** den mittleren vertikal gerichteten kurzen Kulissenabschnitten gegenüberstehen, welche die beiden horizontal ausgerichteten Kulissenabschnitte der Bajonettkulissen **41** miteinander verbinden. Nunmehr wird der Transportbehälter **21** angehoben, wobei die Bajonettstifte **40** sich in den zugeordneten kurzen Kulissenabschnitten aufwärts bewegen. Hierbei gelangen Anschlag **50** und Gegenanschlag **51** in Eingriff. In der letzten Phase der Aufwärtsbewegung wird der Sammelbehälter **36** in Aufwärtsrichtung mitgenommen, wobei seine Bajonettkulissen **39** relativ zu den feststehenden Bajonettstiften **38** der Zentrifugentrommel **26** nach oben verlagert werden. Am Ende der Aufwärtsbewegung der beiden Behälter **21** und **36** stehen die jeweils zugeordneten Bajonettstifte **40** und **38** waagerecht ausgerichteten Kulissenabschnitten gegenüber. Bei fortgesetzter Rechtsdrehung des Transportbehälters **21** und des damit drehfest gekuppelten Sammelbehälters **36** gelangen die Bajonettstifte **38** und **40** schließlich in die nach oben bzw. nach unten geöffneten vertikalen Kulissenabschnitte, wodurch beide Behälter gemeinsam nach unten abgezogen werden können.

Zum Verschließen des Transportbehälters **21** ist ein Deckel **52** vorgesehen, der an seinem Rand Bajonettkulissen **53** aufweist, die so ausgebildet sind, daß sie mit den Bajonettstiften **40** eingreifen können. Die Eingriffssituation ist dabei so gestaltet, daß sich der aufgesetzte und verriegelte Deckel **52** dicht auf die Lippendichtung **22** aufsetzt. Zur Aufbewahrung des Deckels **52** am Transportbehälter **21** bei Nichtgebrauch des Deckels sind in der Nähe des Bodens außen am Transportbehälter Bajonettstifte **54** angebracht, welche mit den Bajonettkulissen **53** zusammenwirken.

Zur Erläuterung der Sperrmittel, mit deren Hilfe verhindert wird, daß Reinwasser aus dem Auslaßraum **14** in den an den Gehäuseumfang der Trommelumfangswand **27** angrenzenden und mit der Bezugszahl **55** bezeichneten spaltförmigen Gehäuseraum eindringen kann, wird nunmehr auf **Fig.** 1 in Verbindung mit den **Fig.** 5 bis 8 Bezug genommen. Der spaltförmige Gehäuseraum **55** kommuniziert mit dem Spaltraum zwischen dem Transportbehälter **21** und dem Sammelbehälter **36**. Zum Zwecke der Absperrung ist bei allen Ausführungsbeispielen vorgesehen, daß die Mantelwand **18** mit den zylindrischen Innenflächen fluchtend an eine geschlossene Ringwand **56** bzw. **56'** anschließt, die nach oben in den Auslaßraum **14** bis dicht unter den Sperrflansch **30** der Zentrifugentrommel **26** vorspringt. In der linken Hälfte der Darstellung gemäß **Fig.** 1 und in den Ausführungsbeispielen gemäß der **Fig.** 5, 7 und 8 ist zusätzlich zu der Ringwand **56** eine weitere Ringwand **57** mit radialem Abstand zur Ringwand **56** vorgesehen. Die Ringwand **57** springt aus der Bodenfläche **58** des Auslaßraums **14** nach oben vor und endet ebenfalls dicht unterhalb des Sperrflansches **30**. Die in der rechten Hälfte der **Fig.** 1 dargestellte Ringwand **56'** ist ebenso wie das in **Fig.** 6 angegebene Ausführungsbeispiel als sich nach außen abstufende Ringwand ausgebildet.

An dem Sperrflansch **30** ist mindestens ein Kranz von

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radial gerichteten sich nach unten erstreckenden Schaufeln befestigt. Bei dem Ausführungsbeispiel entsprechend der linken Hälfte der **Fig.** 1, das dem Ausführungsbeispiel entsprechend **Fig.** 5 sehr ähnlich ist, sind zwei Kränze mit Schaufeln **59** und **60** bzw. **60'** vorgesehen. Beim Ausführungsbeispiel gemäß der rechten Darstellungshälfte der **Fig.** 1 entsprechend dem Ausführungsbeispiel gemäß **Fig.** 6 ist nur ein Kranz mit Schaufeln **61** am Sperrflansch **30** befestigt, hierbei sind die Schaufeln **61** der Ringwand **56'** entsprechend abgestuft ausgebildet. Beim Ausführungsbeispiel nach **Fig.** 7 sind prinzipiell zwei Kränze mit Schaufeln vorhanden, die Schaufeln springen jedoch einteilig aus einem Schaufelquerteil nach unten hervor, welches bis an die Trommelumfangswand **27** heranreicht. Die Schaufeln gemäß **Fig.** 7 sind insgesamt mit der Bezugszahl **62** bezeichnet. Die Ringwände **56, 56'** und **57** und die Schaufeln **59** bis **62** sind jeweils relativ zueinander so angeordnet, daß zwischen ihnen enge Spalträume vorhanden sind.

Die Ringwände **56, 56'** und **57** sorgen dafür, daß bei stillstehender Zentrifuge noch im Auslaßraum **14** anstehendes Wasser nicht in den Gehäuseraum **55** bzw. zwischen die Wandungen der beiden Behälter **21** und **36** gelangen kann. Im Betrieb der Zentrifuge bilden die Schaufeln **59** bis **62** eine dynamische Abdichtung, weil sie dafür sorgen, daß das aus der Zentrifuge austretende Reinwasser von der Zentrifugentrommel **26** radial auswärts transportiert wird.

Aus **Fig.** 7 ist ersichtlich, daß die Trommelumfangswand **27** innen mit einer Verschleißschutzschicht **63** versehen sein kann.

In den **Fig.** 11 bis 14 ist dargestellt, wie zur Erfassung des Füllstandes des Sammelbehälters **36** eine Infrarotlichtschranke angeordnet werden kann. Zu diesem Zweck ist der Sammelbehälter **36** mit zwei diametral gegenüberliegenden radial nach innen gerichteten und abmessungsgleichen Einbuchtungen **64** versehen. In der in **Fig.** 11 gezeichneten Lage der Teile stehen der einen Einbuchtung **64** eine IR-Lichtquelle **65** und der anderen Einbuchtung **64** ein IR-Detektor **66** gegenüber. Lichtquelle **65** und Detektor **66** sind in geeigneter Weise am Zentrifugenrahmen **67** ortsfest angebracht. Ihre gemeinsame optische Achse ist auf die Einbuchtungen **64** ausgerichtet, d. h. schneidet die Vorrichtungsmittelachse. Der Sammelbehälter **36** und der Transportbehälter **21** können insgesamt aus für Infrarotlicht durchlässigem Material hergestellt sein. Es reicht allerdings aus, wenn die sich gegenüberliegenden Flächen der Einbuchtungen **64** des Sammelbehälters **36** und die der Lichtquelle **65** und dem Detektor **66** gegenüberliegenden Wandbereiche des Transportbehälters **21** für IR-Licht durchlässig sind.

Die Füllstandserfassung kann auch durch Messung des Anlaufdrehmoments des Motors **23** erfolgen, weil das Anlaufdrehmoment abhängig ist von der Masse der im Sammelbehälter **36** befindlichen Feststoffpartikel. Der Verlauf des Drehmoments beim Anlaufen des Motors **23** kann durch geeignete elektronische Mittel überwacht werden, wobei bei Überschreiten eines Grenzwerts ein optisches und/oder akustisches Signal ausgelöst werden kann, welches zur Anzeige bringt, daß der Sammelbehälter den maximalen Füllstand erreicht hat.

Die Arbeitsweise der erfindungsgemäßen Vorrichtung ist wie folgt:

Das durch Einlaßstutzen **13**, den Einlaßkanal **12** und das Einleitrohr **17** in das Innere der Zentrifuge **11** gelangende mit Feststoffen beladene Abwasser aus zahnärztlicher Praxis wird von den Leitflügeln **33** aufgenommen und an den Leitflügeln **33** entlang zur Innenfläche der Trommelumfangswand **27** transportiert. Hierbei lagern sich, wie bei derartigen Zentrifugen üblich, die Feststoffe an der Trommelumfangswand ab, während das Wasser aufgrund seiner geringeren Dichte bezüglich der Rotationsachse weiter innen verbleibt. Die ringförmige Wasserschicht baut sich soweit nach innen auf, bis sie den Außendurchmesser der Überlauföffnung **31** erreicht. Von Feststoffpartikeln befreites Reinwasser tritt dann fortlaufend durch die Überlauföffnung **31** in den Auslaßraum **14** ein und wird von dem mit der Zentrifugentrommel **26** rotierenden Sperrflansch **30** nach außen abgeleitet. Hierbei sorgen die Sperrmittel **32** bzw. **32'** bzw. **32''** für eine dynamische Abdichtung des Reinwasserraums gegenüber dem Gehäuseraum **55**.

Wird die Zentrifuge abgestellt, so gleiten die abgeschiedenen Feststoffe an der Trommelumfangswand **27** unter Schwerkrafteinfluß nach unten und setzen ihren Gleitweg auf der konischen Innenfläche des Trommelbodens **28** fort, bis sie durch die Durchtrittsöffnung **29** hindurch in den Sammelbehälter **36** gelangen. Die in den Sammelbehälter **36** abgegebenen ausgeschiedenen Feststoffe und das in den Sammelbehälter **36** gelangende Wasser bilden im Zentrifugenbetrieb zwei separierte Schichten, wobei selbstverständlich die Feststoffe an der Wand des Sammelbehälters **36** abgelagert werden, während sich der Wasserring nach einwärts zum Rotationszentrum hin aufbaut, bis überschüssiges Wasser durch die Durchtrittsöffnung **29** hindurch wieder in die Zentrifugentrommel **26** gelangen kann, von wo es durch die Überlauföffnung **31** hindurch als Reinwasser auf die beschriebene Weise in den Auslaßraum **14** geleitet wird. Erreicht die im Sammelbehälter **36** abgelagerte Feststoffschicht, die nur noch eine geringe Restfeuchte aufweist, eine Dicke, welche die Radialabmessungen der Einbuchtungen **64** übersteigt, so kann das von der Lichtquelle **65** emittierte Licht nicht mehr vom Detektor **66** empfangen werden, wodurch Signalauslösung erfolgt.

Bei dem Lösen der beiden Bajonettverschlüsse der Behälter **21** und **36** ist selbstverständlich dafür Sorge zu tragen, daß die Zentrifugentrommel **26** und damit ihre Bajonettstifte **38** ortsfest gehalten werden, damit Relativverdrehungen der Behälter gegenüber den Bajonettstiften **38** möglich sind. Dies kann durch geeignete auf die Zentrifugentrommel **26** einwirkende mechanische Drehsperrmittel erfolgen, aber auch durch eine elektrische Bremsung des Elektromotors **23**.

Die für die Lichtschranke benötigten Einbuchtungen **64** müssen nicht die aus den **Fig.** 11 bis 13 ersichtliche Form aufweisen. Es reicht völlig aus, wenn Einbuchtungen **64'** entsprechend dem in **Fig.** 14 gezeigten Ausführungsbeispiel nach Art von Zylinderhülsen ausgebildet und in die Wandfläche des Sammelbehälters **36** diametral gegenüberliegend eingelassen sind. Auch in diesem Fall müssen die sich gegenüberliegenden Stirnflächen der Einbuchtungen **64'** aus einem für Infrarotlicht durchlässigen Werkstoff bestehen.

Hierzu 5 Blatt Zeichnungen

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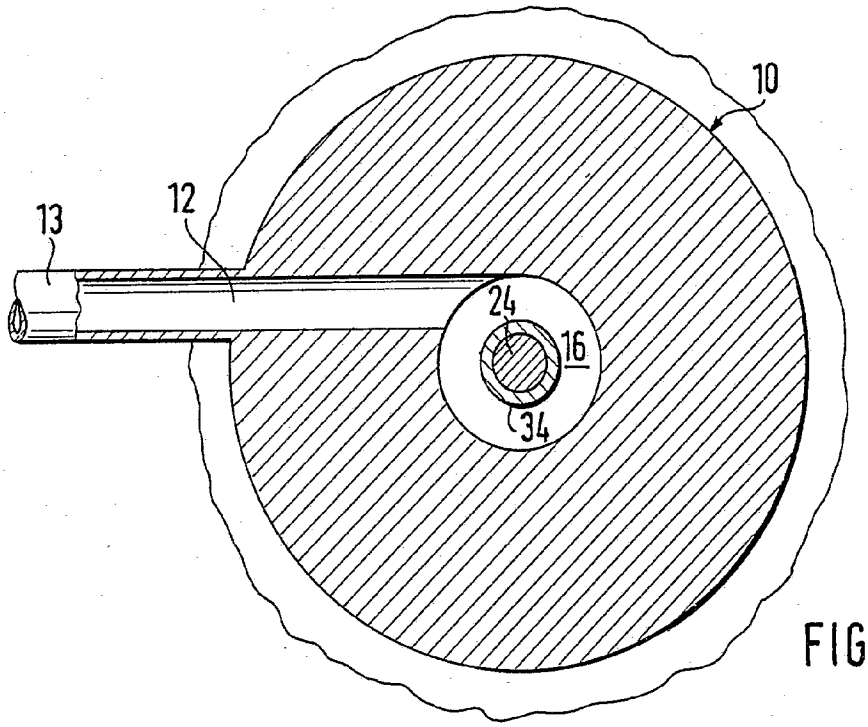


FIG. 2

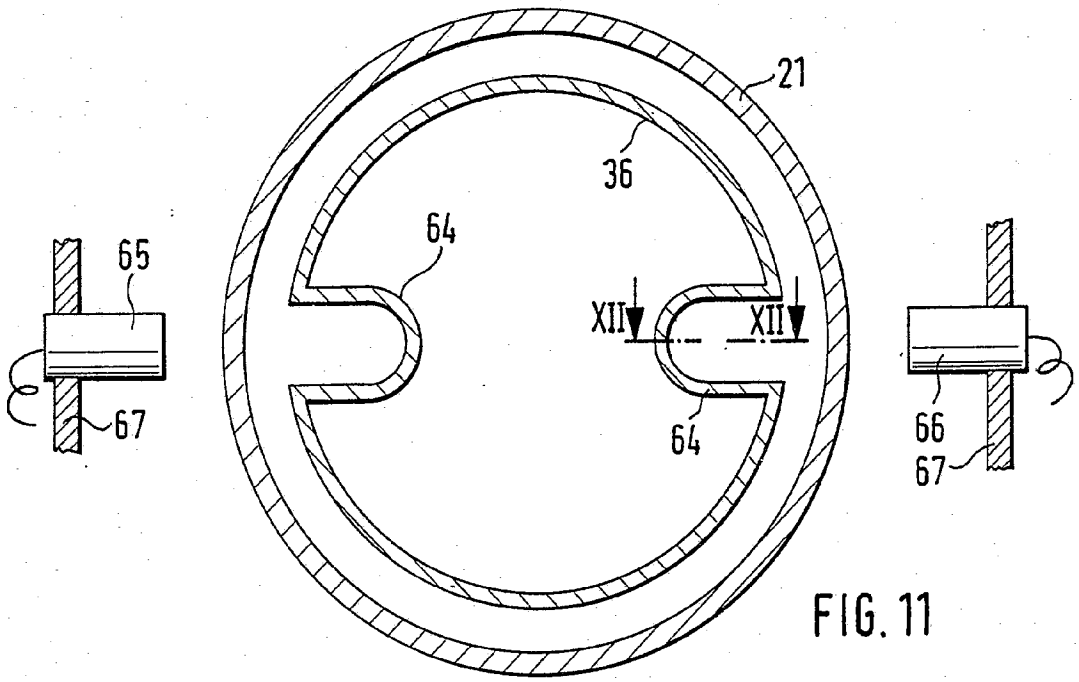


FIG. 11

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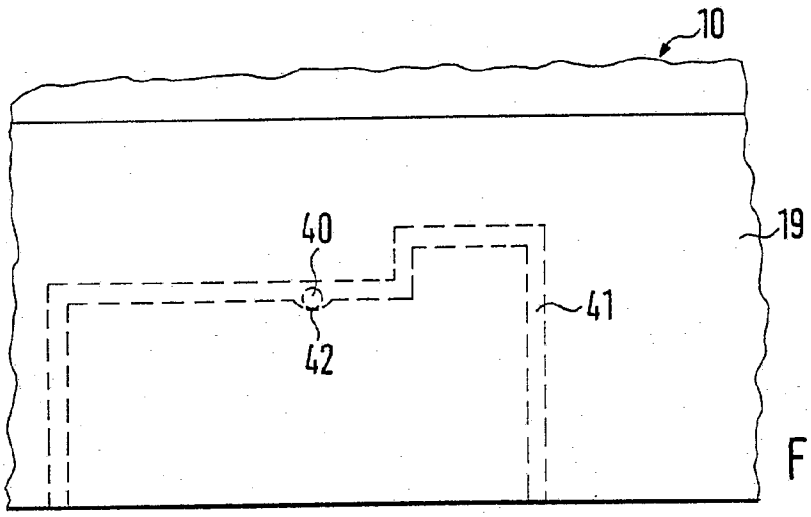


FIG. 9

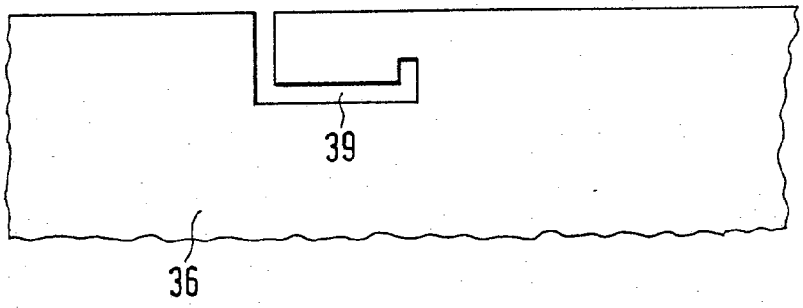


FIG. 10

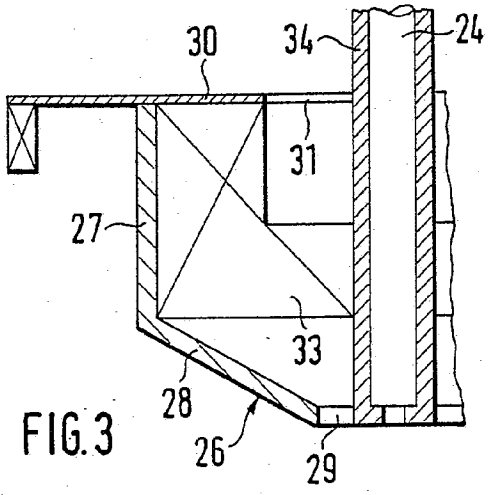


FIG. 3

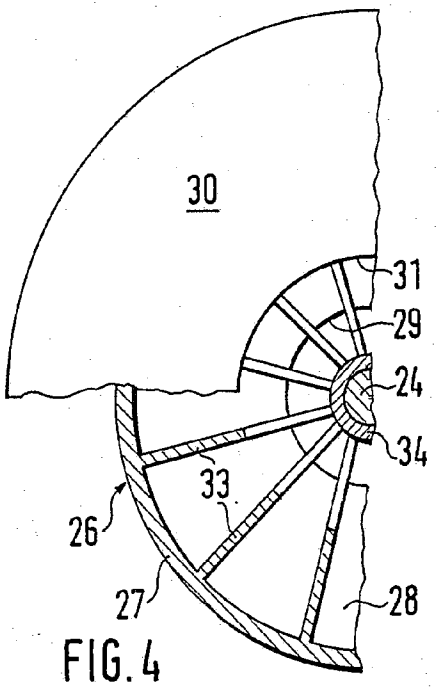


FIG. 4

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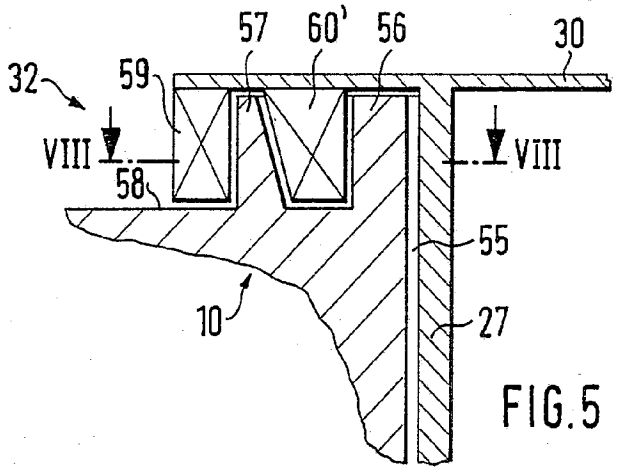


FIG.5

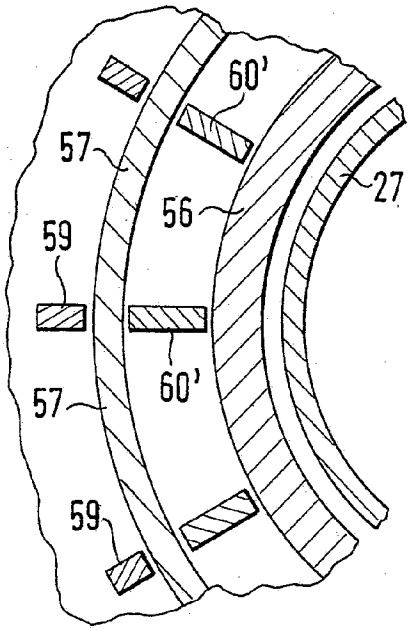


FIG.8

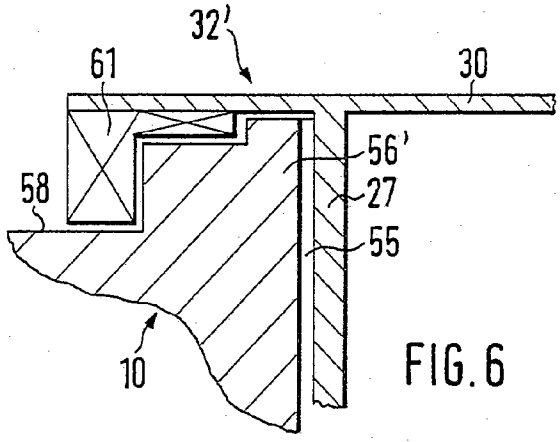


FIG.6

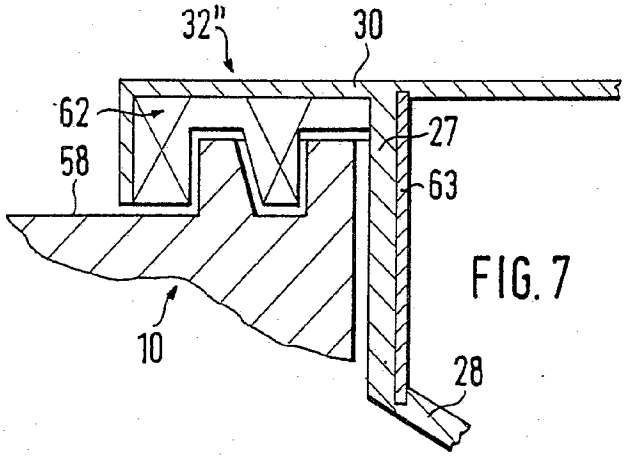


FIG.7

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FIG. 12

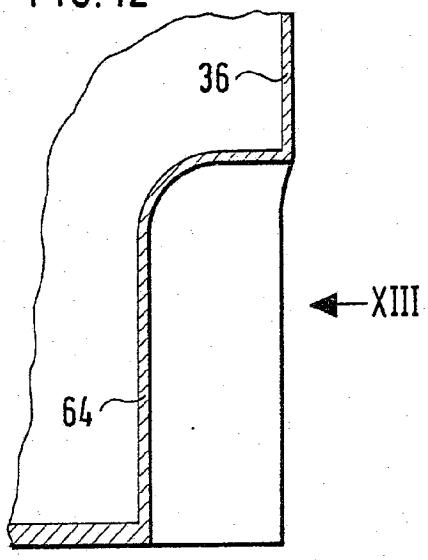


FIG. 13

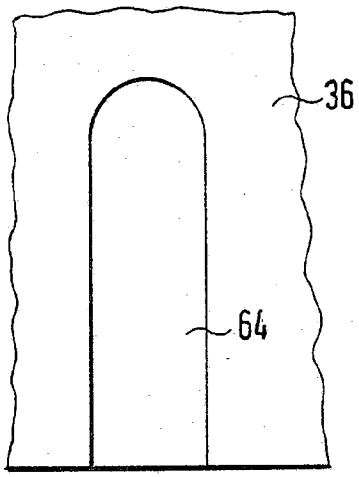
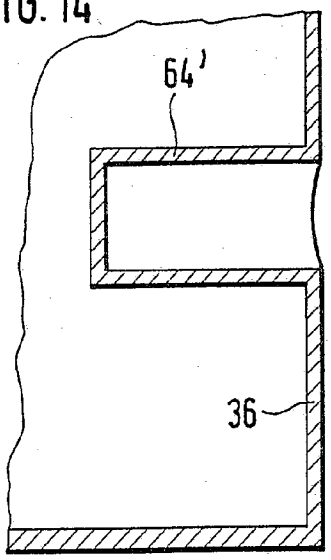


FIG. 14



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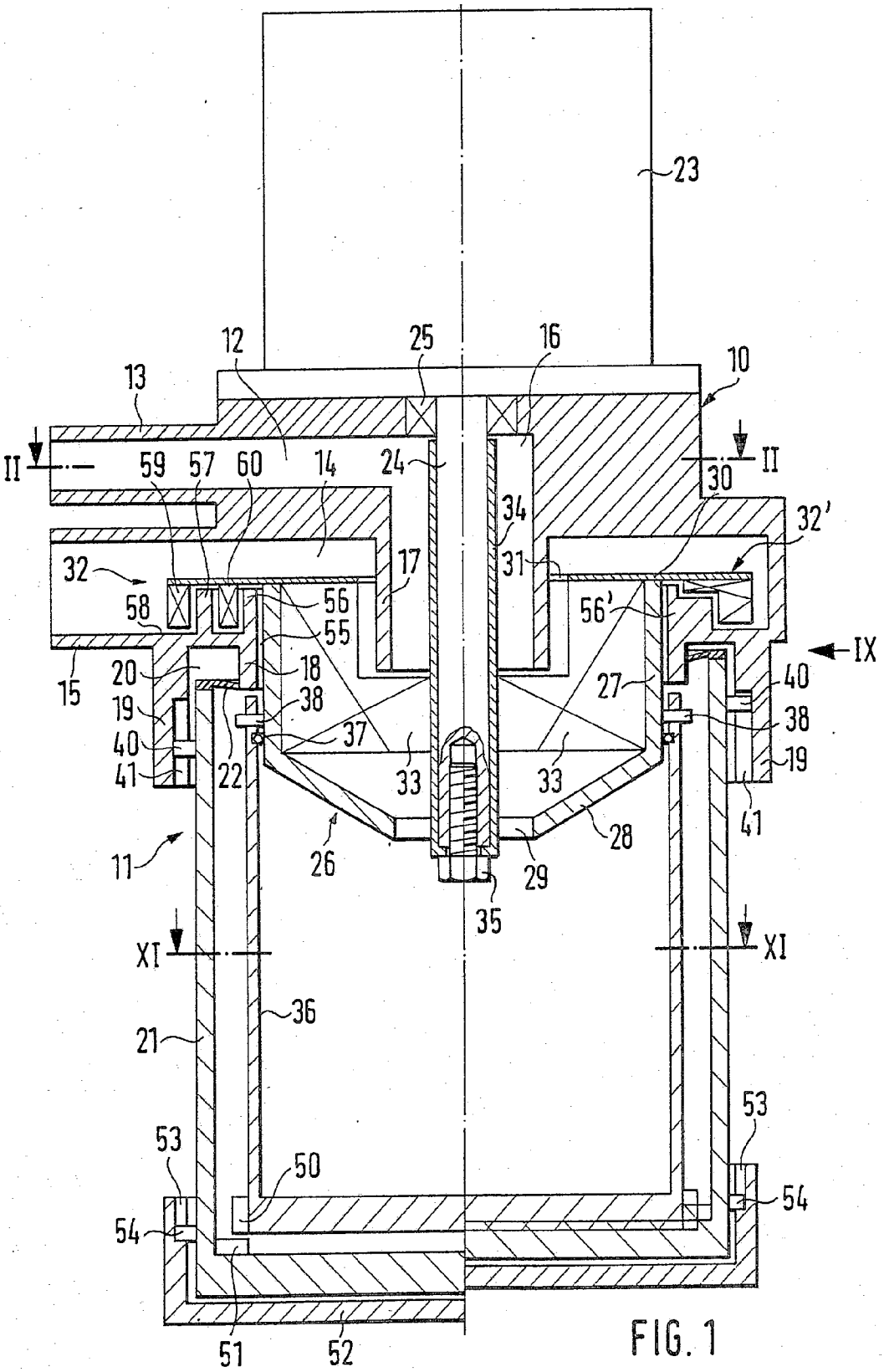


FIG. 1

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Patents DE3737002

Device for precipitating fine particles of solids from waste water

Abstract

In a centrifuge device intended in particular for precipitating amalgam from waste water such as occurs in dental practices, in order to improve the detection of the level to which the collecting container (36) which is connected downstream of the centrifuge (11) is filled, in order to utilise better the volume of the container and in order to achieve a low degree of residual dampness of the precipitated solids whilst simultaneously eliminating feedback pump devices which act between collecting container (36) and centrifuge (11), there is provision for the collecting container (36) to be detachably attached to the centrifuge drum (26) and to rotate together with the centrifuge (11), measures being provided for blocking off the pure water space with respect to the centrifuge drum (26). A transport container (21) is also proposed which can be taken off the device together with the collecting container (36) and can be closed off by a lid (52) when the collecting container is located in it, the said lid being detachably mounted on the transport container (21) when not in use.
<IMAGE>

Classifications

B04B11/043 Load indication with or without control arrangements

View 2 more classifications

DE3737002C1
Germany

Find Prior Art Similar

Other languages: German

Inventor: Ernst Dipl-Ing Becker, Manfred Prof Dr Dipl-In Pausch, Horst Panzer

Current Assignee : EMDA DENTAL-SYSTEME GMBH, 6050 OFFENBACH, DE

Worldwide applications

1987 DE

Application DE3737002A events

1987-10-31 Application filed by EMDA

1987-10-31 Priority to DE3737002A

1989-01-26 Application granted

1989-01-26 Publication of DE3737002C1

Status Expired

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Info: Patent citations (1), Cited by (7), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, DPMA, Discuss

Claims (14)

Hide Dependent translated from German

1. Device for separating fine solid particles from waste water, in particular amalgam particles from the waste water of a dental practice, with:
a centrifuge drum enclosed by a housing, consisting of a drum circumferential wall, an associated projecting drum outwardly projecting conical drum bottom, which has a central passage opening, and a radially inwardly directed annular locking flange carried by the free end of the drum circumferential wall, which delimits an overflow opening which communicates through the inside of the centrifuge drum with an outlet space for pure water located in the housing,
a drive shaft carrying the centrifuge drum of a motor connected to the housing,
a concentrically and at a radial distance surrounding the housing-fixed inlet tube, which passes through the overflow opening with radial play and is connected to an inlet channel for waste water and the interior of the centrifuge drum, and
a detachably attached collecting container for the separated solid particles, which is connected to the inside of the centrifuge drum through the passage opening,
characterized,
that the collecting container (36) is detachably and sealed with the centrifuge drum (26) rotatably connected, and
that when centrifuge operation and standstill effective locking means (32, 32 ', 32") are provided, through which the adjacent to the outer circumference of the drum peripheral wall (27) de housing space (55) is blocked off from the outlet space (14) for pure water. 2. Apparatus according to claim 1, characterized in that the collecting container (36) within a Transportbe container (21) is arranged which, except for its replacement, surrounds the collecting container (36) without contact and sealed with its opening and removable on the housing (10) is attached. 3. Apparatus according to claim 1 or 2, characterized in that the centrifuge drum (26) and the collecting container (36) are connected by a bayonet lock (bayonet pins 38 , bayonet link 39) with each other, for unlocking the collecting container (36) is to be lifted and then turned. 4. Device according to one of claims 2 or 3, characterized in that the transport container (21) by means of a bayonet lock (bayonet pins 40 , bayonet link 41) on the housing (10) is attached, which together with the centrifuge drum (26) with the Collecting container (36) connecting bayonet lock (bayonet pins 38 , bayonet link 39) can be unlocked by lifting and then turning, where in the transport container (21) and the collecting container (36) after lifting the transport container (21) are rotatably engaged with one another. 5. Device according to one of claims 2 to 4, characterized in that the bayonet lock (bayonet pins 40 , bayonet link 41) of the transport container (21) is provided with a detent (locking recesses 42) which is to be canceled before the transport container (21st) can be rotated into its position allowing lifting. 6. Device according to one of claims 2 to 5, characterized in that the transport container (21) with the collecting container (36) therein can be closed by a cover (52) which has bayonet elements (bayonet link 53) on its edge, which with engage the bayonet elements (bayonet pins 40) of the associated bayonet catch attached to the transport container, and which can be attached to the outside of the bottom of the transport container (21) when not in use, with its bayonet elements (bayonet link 53) being attached to the transport container (21) in the vicinity of the base Bayonet elements (bayonet pins 54) are engaged. 7. Device according to claims 2 to 6, characterized in that at the opening of the transport container (21) a seal (lip seal 22) is attached, which is attached to the housing (10) of a sealing surface of the housing when the transport container (21) is attached (10) and when attaching the lid (52) to the transport container (21) the lid (52) abuts. 8. Device according to one of claims 1 to 7, characterized in that the locking means (32, 32 ', 32") from at least one with the centrifuge drum (26) concentric closed annular wall (56) by the bottom surface (58) of the outlet space (14) for pure water protrudes upwards, and at least one ring of radially directed flanges (60) which are also concentric with the centrifuge drum (26) and which are adjacent to the ring wall (56) with a narrow gap, axial such that the locking flange (30) extends radially outward from the drum

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peripheral wall (27) over the at least one ring wall (56), and that the blades (60) are attached to the locking flange (38) so as to project downwards. 9. The device according to claim 8, characterized in that two ring walls (56, 57) and two intermeshing rings of blades (60, 59) are provided. 10. The device according to claim 8, characterized in that a radially outwardly stepped annular wall (56 ') is provided, which are arranged according to step-shaped blades (61). 11. The device according to one of claims 8 to 10, characterized in that the blades (62) reach up to the drum peripheral wall (27). 12. The device according to one of claims 1 to 11, characterized in that on the collecting container (36) at least two opposite, inwardly directed and dimensionally identical indentations (64) or the like. Of translucent material are provided that, if necessary, the Trans port container (21) is designed to be translucent at least at two corresponding opposite points, and that on the centrifuge frame (67) a light barrier (IR light source 65 , IR detector 66) for level detection is attached, the optical axis on the indentations (64) out is aimed. 13. The device according to one of claims 1 to 11, characterized in that the starting torque of the motor (electric motor 23) is measured to detect the fill level of the collecting container (36). 14. Device according to one of claims 1 to 13, characterized in that the inner radius of the collecting container age (36) is greater than the inner radius of the drum circumference wall (27).

Description

translated from German

The invention relates to a device for separating fine solid particles from waste water, in particular Amalgam particles from the wastewater of a dental practice, according to the preamble of claim 1.

In such a known device (DE-OS 35 42 115, Fig. 7) is the collection container for the solid particles the housing connected so that when the Centrifuge drum through the central opening in the bottom of the drum with separated solid particles filling from the middle of the container. Out of it can be an unfavorable use of the in the collection container existing recording volume result. In addition, at known device at the lower end of the centrifuge hub that in the collection water entering the centrifuge pump back into the centrifuge drum. Besides, can in the known device for the right early change of the container required filling status registration cause difficulties because of a reliable Capture adequate sedimentation of the solid particles in the collection container is required.

The invention has for its object a device ready according to the preamble of claim 1 to deliver, in which the utilization of the existing On volume of the collecting container and the level detection with the simultaneous waiver of special precautions for Pumping back the water from the reservoir improved will.

This task is accomplished through the interaction of Features of the preamble of claim 1 with the Features of the characterizing part of patent claim 1 solved.

Advantageous configurations are in the sub claims specified.

Thus the Part of the container in the rotation of the centrifuge drum, so that the separated and at a standstill the centri Joint drum under the influence of gravity in the collecting container reached solid particles and also that in the container water under centrifugal force. The off therefore separated solid particles build up in a ring and with increasing shifts with increasing shifts thickness on the inner wall of the rotating container, while the water entering the storage tank also forms an inner ring, the layer thickness by the diameter of the central opening in the Drum bottom is limited. Excess water gets under the influence of centrifugal action without additional pumps Directions or the like. Up through the passage opening displaced into the centrifuge drum. In this way becomes a defined layer structure of the deposited feast particles of matter in the collection container and thus a cheap off use of its recording volume achieved. The defined one Layer structure also facilitates precise level detection essential. In addition, that is in the collection container separated solid particle layer particularly compacted where has a low residual moisture due to the sediment Reprocessing the separated solids is easier. The locking means ensure both in the centrifuge operation as well in the case of a centrifuge standstill for pure water from the end do not leave the outside of the centrifuge bowl can be long.

The features of claim 2 are advantageous achieved that the rotating container through the transport containers not participating in the rotation covered on the outside and after replacing it with its in stop safe for transport to a disposal facility is housed. The seal between the housing and Transport container ensures that despite the Locking agent in the housing space on the outer drum wall Excess water does not come out of the device can get outside.

To create a detachable connection between collection Container and centrifuge drum could be these parts screwed to the other, but the one in the Claim 3 design used. These also opens together with the features of the claim 4 the advantageous way of collecting the container and the Transport containers simultaneously and together from the front direction to solve. For this purpose, only the transport lifting and rotating the container, due to the Lifting engaging between the transport container and collecting container the bayonet locks of both containers be solved so that both containers together for Aufhe exercise of the engagement with the housing or the centrifuges drum can be pulled down.

By the measure of claim 5 is secure represents that the transport container is not accidentally in be brought into its position enabling lifting can. The provided detent fixes the transport container in a defined position on the housing.

In claim 6 is a particularly favorable arrangement a lid for closing the transport container indicated with the collecting container in it, which also appropriate storage of the lid when not in use includes.

The features of claim 7 relate to a expedient attachment of a seal on the collecting container, the both for sealing the collecting container against the Ge is suitable as well as compared to the attached lid.

The blocking means, which the outlet space leading the pure water opposite the housing adjacent to the drum peripheral wall space and thus also opposite the gap between the sam Shut off the mel container and the transport container in accordance with the Claim 8 trained. While the blades at Rota tion of the centrifuge drum to which they are attached part of the locking flange with the same angular velocity take the pure water emerging from the overflow opening promote radially outward and thus an effective dynamic Provide sealing, the ring wall acts when the ring is stationary Centrifuge drum as barrier wall within the outlet space and prevents a pure water reflux, even if in the Outlet space should have a significant water level.

Appropriate embodiments of those explained above Locking agents are evident from claims 9 to 11.

The advantageous option an exact fill level detection of the collecting container by the characteristics of the Claim 12 realized. Here the depth is the on Bookings dimensioned for the permitted fill level in the group container, d. H the approved layer thickness of the deposited and with centrifugal force on the wall of the collector container-deposited solid particles. Once the shift thickness has become so large that the opposite faces the indentations are covered with solid particles, becomes an optical and / or acoustic signal triggered the necessary change of the collection container.

Instead of or in addition to that given above Level detection by sensor can also through the rotating container enables evaluation of the motor starting torque according to Claim 13 for detecting the level of the collection container can be used.

By the radius design specified in claim 14 takes place because of the comparatively larger circumferential speed speed on the collecting container wall and the resulting greater centrifugal action on the separated solid substances an even more favorable compaction of the sediment.

Embodiments of the invention are in part mathematical representation in the Drawing shown, which are below explained in more detail. It shows

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Figure is a vertical section water. 1 by the apparatus for depositing fine amalgam particles from the resulting in a dental office Ab,

Fig. 2 shows the cross-section shown broken through the housing of the device according to the line II-II in Fig. 1,

3 shows drum. A broken vertical section through the centrifuge,

Fig. 4 is a plan view of the centrifuge shown aborted drum according to Fig. 3,

Fig. 5-7 broken vertical sections through different from design variants for the blocking means,

Fig. 8 shows the aborted illustrated section through one of the off design variants according to the line VIII-VIII in Fig. 5,

Fig. 9, the cut-away view of a detail of the housing according to the arrow IX in Fig. 1,

Figure is a fragmentary side view of the upper region of the collecting container backdrop. 10 with a bayonet,

Fig. 11 shows the cross-section container through the collection and transport container according to the line XI-XI in Fig. 1,

Fig. 12 the broken vertical section through the collection line XII-XII accordingly in Fig. 11,

Fig. 13 is the broken side view of the collecting container according to the arrow XIII in Fig. 12 and

Fig. 14 a similar to Fig. 12 vertical section through an embodiment variant of the collecting container.

The device shown in FIG. 1 for separating amalgam particles from the wastewater accumulating in a dentist's office is designed differently on the left and right of the device center axis in a manner still to be described and partly shown in different positions. The housing of the device is generally designated by the reference number 10 , while the centrifuge as a whole bears the reference number 11 .

At an in the housing 10 transverse to the device center axis inlet channel 12 , an inlet port 13 is closed. Below the inlet channel 12 there is an annular outlet space 14 for pure water emerging from the centrifuge 11 , to which an outlet connection 15 is connected. As illustrated in FIG. 2, the inlet channel 12 opens tangentially into an inlet chamber 16 which is concentric with the device means axis and to which a downwardly directed inlet pipe 17 connects. The inlet tube 17 represents the inner boundary of the annular outlet space 14 and extends into a jacket wall 18 of the housing 10 which essentially concentrically surrounds the centrifuge 11 and is concentric with the device center axis.

At a radial distance from the cylindrical jacket wall 18 , an even further downwardly projecting outer ring wall 19 is provided on the housing, which externally delimits an annular, downwardly open receiving space 20 , the inner boundary of which is formed by the jacket wall 18 . The upper end of a transport container 21 , which is detachably fastened to the housing 10 in a manner to be described, extends into the receiving space 20 . The transport container 21 has the shape of a cylinder cup and carries at its opening edge a lip seal 22 which bears tightly against the cylindrical outer surface of the jacket wall 18, but is displaceable in height, as a comparison of the left and right half of FIG. 1 shows.

An electric motor 23 is flanged up on the housing 10 so that its main axis is aligned with the device means axis. The drive shaft 24 of the electric motor 23 extends through a housing seal 25 and ends below the inlet pipe 17 . In the manner described below, the drive shaft 24 carries a centrifuge drum, which is attached to it in a rotationally fixed manner and is designated overall by the reference number 26 .

The centrifuge drum 26 has a cylindrical drum peripheral wall 27 and a conical drum bottom 28 adjoining it at the bottom, which ends at a central passage opening 29 . The passage opening 29 is circular and is arranged concentrically with the device means axis. At the free end of the peripheral drum wall 27 and thus firmly and sealed, for example connected in one piece, an annular locking flange 30 is angeord net, which also defines an annular overflow opening 31 inside. The outer surface of the inlet pipe 17 forms the inner boundary of the overflow opening 31 . The locking flange 30 extends from the drum circumference wall 27 also radially outward to enable the arrangement of locking means to be explained in more detail, which are shown differently in Fig. 1 in the left and right half of the illustration and there overall the reference numbers 32 and 32nd ' Wear. The centrifuge drum 26 is rigidly connected via a plurality of radially directed spokes 33 arranged with a hub sleeve 34 , which is pushed onto the drive shaft 24 and fastened to it by a screw 35 , so that the centrifuge drum 26 and all rigidly connected to it Parts are rotatably supported by the drive shaft 24 . The guide vanes 33 extend between the inner surface of the drum peripheral wall 27 and the hub sleeve, as is shown in FIGS . 1, 3 and 4. In the example shown, the guide vanes are L-shaped and end with the inner surface of their vertically upward-facing tab at the edge of the overflow opening 31 . Your horizontally aligned tab is located just below the opening edge of the inlet tube 17th

A cylinder-cup-shaped collecting container 36 is non-rotatably and sealed via a sealing ring 37 with the lower end of the centrifuge drum 26 releasably connected. For detachable and non-rotatable connection, several, for example, four bayonet closures are provided distributed around the circumference, of which two bayonet pins 38 fastened to the drum peripheral wall 27 can be removed from FIG. 1. The bayonet pins 38 each interact with bayonet sets 39 arranged in the edge region of the collecting container 36 , one of which can be seen in FIG. 10. The connection of the collecting container 36 to the centrifuge drum is carried out in such a way that the bayonet links are pushed onto the bayonet pins 38 with their link slot open upwards until the bayonet pins reach the horizontal region of the bayonet links. By turning the collecting container 36 to the left , the bayonet catch is then locked until the bayonet pins 38 can enter the shorter, vertically oriented and closed top sections. After a slight downward movement of the collecting container 36 , it is connected in a rotationally fixed manner to the centrifuge drum 26 .

The left half of the illustration in FIG. 1 shows the collecting container 36 and the transport container 21 surrounding it on all sides without contact in the operating position of the centrifuge. The right half of FIG. 1, on the other hand, illustrates the relative position of the transport container 21 and the collecting container 36 in the process of the common unlocking of the two containers from the device which is yet to be described. Here, the transport container 21 is shown raised.

The transport container 21 is also releasably connected to the housing 10 by a bayonet lock. For this purpose, in the example shown, a plurality of bayonet pins 40 are attached to the circumference of the transport container 21 , which engage in bayonet links 41 , which are arranged in the annular wall 19 . The bayonet scenes 41 have the configuration shown in FIG. 9. When the transport container 21 is attached to the housing 10 , the bayonet pins 40 first enter the shorter link sections which are open at the bottom and one of which is shown on the left-hand side of FIG. 9. Now the Transportbe container 21 is raised until the bayonet pins 40 reaches the longer of the two horizontal sections. When the transport container 21 is turned clockwise, the bayonet pins 40 move in this horizontal link section until they reach locking recesses 42 , one of which is shown in FIG. 9. In this position, the transport container 21 is fixed to the housing 10 by the bayonet pins 40 engaging in the latching recesses 42 , which together with the latching recesses 42 form a twisting detent. The twist lock can be canceled by slightly lifting and rotating the transport container 21 .

In order to solve the transport container 21 and the collecting container 36 together sam from the housing 10 , it is necessary that both containers are rotatably engaged with each other. For this purpose, at least one stop 50 is provided on the collecting container 36 , which is assigned at least one counter stroke 51 in the transport container 21 . When lifting the transport container 21 into the position shown in the right half of FIG. 1, stop 50 and counter stop 51 in such a way that the two containers are turned to the right, a joint release from the respective bayonet is made possible.

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If the two containers are to be removed, the transport container 21 is first moved from its twist-lock position by turning to the right. The bayonet pins 40 snap out of the associated locking recesses 42 in the bayonet link 41 . The right rotation of the transport container 21 is continued until the bayonet pins 40 face the middle vertically directed short link sections, which bind the two horizontally aligned link sections of the bayonet link 41 together. Now the transport container 21 is raised, the bayonet pins 40 moving upwards in the associated short link sections. Here stop 50 and counter stroke 51 come into engagement. In the last phase of the upward movement, the collecting container 36 is taken along in the upward direction, its bayonet link 39 pins relative to the fixed bayonet 38 of the centrifuge drum 26 being stored upwards. At the end of the upward movement of the case with the containers 21 and 36 , the respectively assigned bayonet pins 40 and 38 face horizontally aligned backdrop sections. With continued clockwise rotation of the Transportbehäl age 21 and the rotatably coupled collecting container 36 , the bayonet pins 38 and 40 finally get into the up and down open vertical link sections, whereby both containers can be pulled down together.

To close the transport container 21 , a cover 52 is provided which has bayonet links 53 on its edge, which are designed such that they can engage with the bayonet pins 40 . The engagement situation is designed so that the attached and locked cover 52 sits tightly on the lip seal 22 . To store the lid 52 on the transport container 21 when the lid is not in use, bayonet pins 54 are attached to the outside of the transport container near the bottom, which cooperate with the bayonet backdrops 53 .

To explain the locking means with the help of which pure water from the outlet space 14 can penetrate into the circumferential wall 27 adjacent to the housing periphery of the drum and designated by the reference number 55 , the gap-shaped housing space will now be referred to FIG. 1 in conjunction with FIGS 5 taken through 8.. The column-shaped Ge housing space 55 communicates with the gap between the transport container 21 and the container 36 . For the purpose of isolation, it is provided in all embodiments that the jacket wall 18 in alignment with the cylindrical inner surfaces adjoins a closed annular wall 56 or 56 ' which protrudes upwards into the outlet space 14 to just below the locking flange 30 of the centrifugal drum 26 . In the left half of the Dar position shown in FIG. 1 and in the Ausführungsbei play according to FIGS. 5, 7 and 8, in addition to the ring wall 56, another ring wall 57 is provided with ra dialem distance to the ring wall 56 . The ring wall 57 jumps from the bottom surface 58 of the outlet space 14 upwards and also ends just below the locking flange 30th The Darge presented in the right half of Fig. 1 annular wall 56 ' is formed as well as the embodiment shown in Fig. 6 as an outwardly graduated ring wall.

At least one ring of radially directed downwardly extending blades is attached to the locking flange 30 . In the embodiment corresponding to the left half of FIG. 1, which is very similar to the embodiment shown in FIG. 5, two rings with blades 59 and 60 and 60 'are provided. In the embodiment according to the right half of FIG. 1 corresponding to the embodiment of FIG. 6, only one ring with blades 61 is attached to the locking flange 30 , here the blades 61 of the ring wall 56 'are correspondingly graduated. In the exemplary embodiment according to FIG. 7 there are in principle two rings with blades, but the blades protrude downwards in one piece from a blade cross part which extends up to the drum peripheral wall 27 . The blades according to FIG. 7 are designated overall by the reference number 62 . The ring walls 56, 56 ' and 57 and the blades 59 to 62 are each arranged relative to one another so that narrow gap spaces are present between them.

The ring walls 56, 56 ' and 57 ensure that when the centrifuge is still still in the outlet space 14 water present cannot get into the housing space 55 or between the walls of the two containers 21 and 36 . During operation of the centrifuge, the blades 59 to 62 form a dynamic seal because they ensure that the pure water emerging from the centrifuge is transported radially outward by the centrifuge drum 26 .

From Fig. 7 it can be seen that the drum peripheral wall 27 may be provided with a wear protection layer 63 on the inside.

In Figs. 11 to 14 is shown as an infrared light sensor for detecting the filling level of the collecting container 36 can be placed. For this purpose, the collecting container 36 is provided with two diametrically opposite, radially inwardly directed and dimensionally identical indentations 64 . In the position of the parts shown in FIG. 11, the one indentation 64 is opposed by an IR light source 65 and the other indentation 64 by an IR detector 66 . Light source 65 and detector 66 are suitably fixedly attached to centrifuge frame 67 . Their common optical axis is directed towards the indentations 64 , ie intersects the device center axis. The collection container 36 and the transport container 21 can be made from a material permeable to infrared light. However, it is sufficient if the opposing surfaces of the indentations 64 of the collecting container 36 and the wall regions of the transport container 21 opposite the light source 65 and the detector 66 are transparent to IR light.

The level detection can also be done by measuring the starting torque of the motor 23 , because the starting torque is dependent on the mass of the solid particles in the collecting container 36 . The course of the torque when starting the motor 23 can be monitored by suitable electronic means, an optical and / or acoustic signal can be triggered when a limit value is exceeded, which indicates that the collecting container has reached the maximum level.

The operation of the device according to the invention is as follows:

The waste water from dental practice, loaded with solids, coming through the inlet connection 13 , the inlet channel 12 and the inlet pipe 17 into the interior of the centrifuge 11 is taken up by the guide vanes 33 and is transported along the guide vanes 33 to the inner surface of the drum circumferential wall 27 . Here, as is customary in centrifuges of this type, the solids on the peripheral wall of the drum, while the water remains further inward due to its lower density with respect to the axis of rotation. The annular water layer builds up to the inside until it reaches the outer diameter of the overflow opening 31 . Pure water freed from solid particles then continuously enters through the overflow opening 31 into the outlet space 14 and is discharged from the blocking flange 30 rotating with the centrifuge drum 26 to the outside. Here, the locking means 32 and 32 ' and 32" provide a dynamic seal of the clean water space against the housing space 55th

If the centrifuge is turned off, the separated solids slide on the drum peripheral wall 27 under the influence of gravity and continue their glide path on the conical inner surface of the drum base 28 until they pass through the passage opening 29 into the container 36 . The discharged solids discharged into the collecting container 36 and the water entering the collecting container 36 form two separate layers in centrifuge operation, whereby of course the solid substances are deposited on the wall of the collecting container 36 while the water ring builds up towards the center of rotation until Excess water can pass through the opening 29 through into the Centrifugemrom mel 26 , from where it is passed through the overflow opening 31 as pure water in the manner described in the outlet space 14 . If the solid layer deposited in the collecting container 36 , which has only a small residual moisture, reaches a thickness which exceeds the radial dimensions of the indentations 64 , the light emitted by the light source 65 can no longer be received by the detector 66 , which triggers the signal.

When loosening the two bayonet locks of the loading containers 21 and 36 it is of course to be ensured that the centrifuge drum 26 and thus its bayonet pins 38 are held stationary so that relative rotations of the container relative to the bayonet pins 38 are possible. This can be followed by suitable mechanical rotary locking means acting on the centrifuge drum 26 , but also by electrical braking of the electric motor 23rd

The indentations 64 required for the light barrier do not have to have the shape shown in FIGS. 11 to 13. It is entirely sufficient if indentations 64 'are formed accordingly to the embodiment shown in FIG. 14 in the manner of cylinder sleeves and are diametrically opposite in the wall surface of the collecting container 36 . In this case, too, the opposite end faces of the indentations 64 'must consist of a material which is permeable to infrared light.

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Publication number	Priority date	Publication date	Assignee	Title
DE3542115A1 *	1985-11-28	1987-06-04	Duerr Dental Gmbh & Co Kg	HOOD-COVERED CENTRIFUGE FOR SEPARATING FINE SOLID PARTICLES FROM WASTEWATER

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Family To Family Citations

* Cited by examiner, † Cited by third party

Cited By (7)

Publication number	Priority date	Publication date	Assignee	Title
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EP0524455A1 *	1991-07-03	1993-01-27	Dürr-Dental GmbH & Co. KG	Centrifuge
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AT399453B *	1993-02-18	1995-05-26	Trawoeger Werner	Method for separating transporting suction air from a transported, flowable medium, and separator for carrying out the method
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Family To Family Citations				

* Cited by examiner, † Cited by third party, ‡ Family to family citation

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DE3608664A1	1987-09-17	FULL-COAT CENTRIFUGE
DE3737002C1	1989-01-26	Device for precipitating fine particles of solids from waste water
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DE3126630A1	1983-01-20	CENTRIFUG BASKET
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DE4136464A1	1993-05-13	DEVICE FOR SEPARATING AND PROVIDING CROWN CORKS OR THE LIKE LOCK
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DE1626280		

Priority And Related Applications

Priority Applications (8)

Application	Priority date	Filing date	Title
DE3737002A	1987-10-31	1987-10-31	Device for precipitating fine particles of solids from waste water
CH3772/88A	1987-10-31	1988-10-10	
NL8802561A	1987-10-31	1988-10-18	Device for separating fine solid particles from wastewater.
AT0259688A	1987-10-31	1988-10-20	DEVICE FOR SEPARATING FINE SOLID PARTICLES FROM WASTEWATER
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IT2246588A	1987-10-31	1988-10-28	DEVICE FOR SEPARATION OF FINE SOLID PARTICLES FROM WASTE WATER
US07/265,391	1987-10-31	1988-10-31	Apparatus for separating fine solid particles from waste water

Applications Claiming Priority (1)

Application	Filing date	Title
DE3737002A	1987-10-31	Device for precipitating fine particles of solids from waste water

Legal Events

Date	Code	Title	Description
1989-01-26	B100	Publication of the examined application without publication of unexamined application	
1989-01-26	D1	Grant (no unexamined application published) patent law 81	
1989-07-20	8364	No opposition during term of opposition	
1991-01-31	8327	Change in the person/name/address of the patent owner	**Owner name:** EMDA DENTAL-SYSTEME GMBH, 6050 OFFENBACH, DE
1993-10-07	8339	Ceased/non-payment of the annual fee	
1995-04-13	8370	Indication of lapse of patent is to be deleted	
1995-08-03	8327	Change in the person/name/address of the patent owner	**Owner name:** LIMBURGER DENTAL DEPOT GMBH, 65549 LIMBURG, DE
1999-08-05	8327	Change in the person/name/address of the patent owner	**Owner name:** DUERR DENTAL BELGIUM BVBA, HEVER, BE
1999-08-05	8328	Change in the person/name/address of the agent	**Free format text:** U. OSTERTAG UND KOLLEGEN, 70597 STUTTGART
2004-08-26	8339	Ceased/non-payment of the annual fee	

Concepts

machine-extracted

Download Filter table

Name	Image	Sections	Count	Query match
solid		title,claims,abstract,description	23	17.000
wastewater		title,claims,abstract,description	9	9.000

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precipitating	title,abstract	2	0.000
fine particle	title	1	0.000
water	claims,abstract,description	28	0.000
detection method	claims,abstract,description	7	0.000
Amalgam	claims,abstract,description	5	0.000
particle	claims,description	18	0.000
peripheral	claims,description	12	0.000
optical	claims,description	4	0.000
sealing	claims,description	4	0.000
Lip	claims,description	3	0.000
corresponding	claims,description	3	0.000
material	claims,description	3	0.000
transport	claims	13	0.000
blocking	abstract,description	4	0.000

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 11:42:07 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63163015	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 7

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D27-Ex1021-Solmetex_Opposition_to_Motion_to_Dismiss.pdf	27	Non Patent Literature	4003 KB
D28-Ex1022_DRNA_Reply_for_Motion_to_Dismiss.pdf	16	Non Patent Literature	405 KB
D29-Ex1023_DRNA_Website_Cartridge-2.pdf	5	Non Patent Literature	1750 KB
D30-Ex1024-DRNA_Contact_Us_webpage.pdf	3	Non Patent Literature	466 KB

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D31-Ex1025_Solmetex_NXT_Amalgam_Separators.pdf	11	Non Patent Literature	3795 KB
D32-Ex1026_Solmetex_Installation-Operations_Manual.pdf	8	Non Patent Literature	3916 KB
D33-Ex1027_Solmetex_NXT_Change_Collection.pdf	2	Non Patent Literature	1263 KB

Digest

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Operations_Manual.pdf	A16DE9FB25AF6F838FC95858E3D35B
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16/941,522	**11/05/2023 11:39:28 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63163002	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 5

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D22-Ex1016-Amalsed_Silver_Operations_Manual.pdf	20	Non Patent Literature	2346 KB
D23-Ex1017_Tech_West_Eco-Star.pdf	20	Non Patent Literature	1014 KB
D24-Ex1018_Solmetex_History.pdf	5	Non Patent Literature	2041 KB
D25-Ex1019_Solmetex_FAQs.pdf	8	Non Patent Literature	2213 KB

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D26-Ex1020_DRNA_Brief_re_Motion_to_Dismiss.pdf	26	Non Patent Literature	1846 KB

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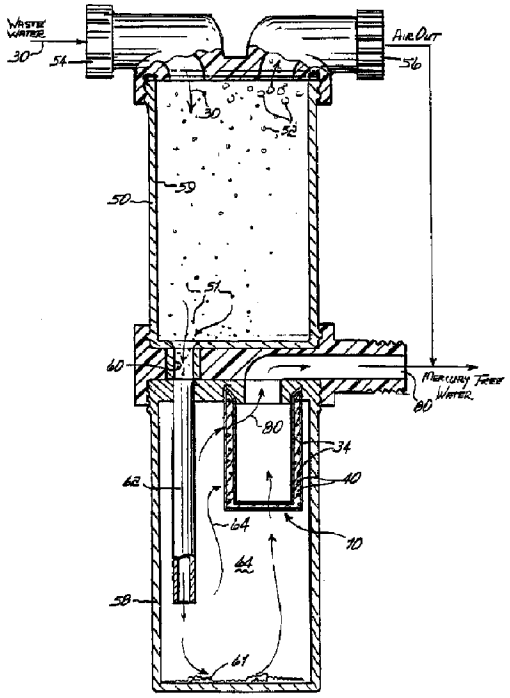
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SCHERER, JONATHAN E. (US).

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(54) DISPOSITIF ET PROCEDE DE TRAITEMENT DE FLUX DE DECHETS D'ORIGINE DENTAIRE
(54) DEVICE AND METHOD FOR TREATING DENTAL WASTE STREAMS

(57)

A device and method for safe, efficient and easy decontamination of waste streams, particularly dental waste streams. The contaminated stream (30), which may contain toxic metals such as mercury, contacts the inventive unit (31, 70) that both physically and chemically filters contaminants in a single stage. The unit (31, 70) contains a contaminant binding resin (34) and a mechanical filter (14), which removes both soluble and insoluble forms of the contaminant. The device and method reduce contaminants to levels which meet regulatory agency requirements for toxic metals. The device and method also allow safe handling and transport of the contaminated unit (31, 70).



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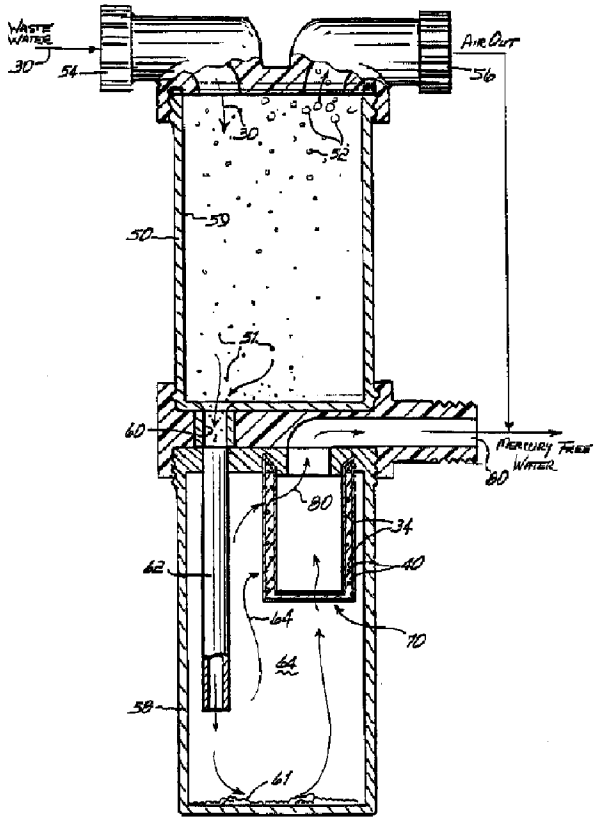
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(54) Titre : DISPOSITIF ET PROCEDE DE TRAITEMENT DE FLUX DE DECHETS D'ORIGINE DENTAIRE
(54) Title: DEVICE AND METHOD FOR TREATING DENTAL WASTE STREAMS



(57) Abrégé/Abstract:
A device and method for safe, efficient and easy decontamination of waste streams, particularly dental waste streams. The contaminated stream (30), which may contain toxic metals such as mercury, contacts the inventive unit (31, 70) that both

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DRNA v. Solmetex - PGR2023-00555
Page 2 of 26

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(57) Abrégé(suite)/Abstract(continued):
physically and chemically filters contaminants in a single stage. The unit (31, 70) contains a contaminant binding resin (34) and a mechanical filter (14), which removes both soluble and insoluble forms of the contaminant. The device and method reduce contaminants to levels which meet regulatory agency requirements for toxic metals. The device and method also allow safe handling and transport of the contaminated unit (31, 70).

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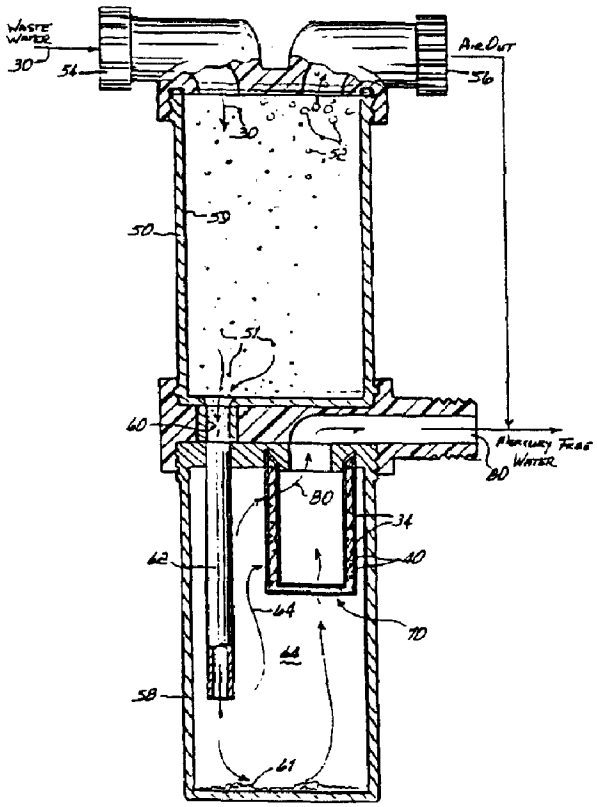
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[Continued on next page]

(54) Title: DEVICE AND METHOD FOR TREATING DENTAL WASTE STREAMS



(57) Abstract: A device and method for safe, efficient and easy decontamination of waste streams, particularly dental waste streams. The contaminated stream (30), which may contain toxic metals such as mercury, contacts the inventive unit (31, 70) that both physically and chemically filters contaminants in a single stage. The unit (31, 70) contains a contaminant binding resin (34) and a mechanical filter (14), which removes both soluble and insoluble forms of the contaminant. The device and method reduce contaminants to levels which meet regulatory agency requirements for toxic metals. The device and method also allow safe handling and transport of the contaminated unit (31, 70).

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DEVICE AND METHOD FOR TREATING DENTAL WASTE STREAMS

This application claims priority from co-pending U.S. provisional application Serial No. 60/162,031, filed October 28, 1999.

Field of the Invention

The invention is a method and device for the removal of debris and contaminants from dental waste streams.

Background

Aqueous dental waste streams contain dental amalgam, saliva, blood, cellular tissue and pieces of dental appliances as part of a waste water slurry. Dental amalgam, which generally is a mixture of silver (34.5%), mercury (42.5%) and other metals (notably copper (8.0%), tin (15.0%) and zinc), is a common dental restorative material for use in the repair of teeth. Pieces of amalgam are suctioned by the dentist from the patient's mouth and enter the waste stream from the dental operatory.

Current methods to capture these particles employ amalgam traps. The traps, usually 40 mesh mechanical filters, physically trap and collect only the larger amalgam particles. The traps also do not remove any of the soluble metal ions that may leach out from the amalgam as part of the

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usual dental operations, nor do they remove amalgam particles or other particles that are small enough to pass through the filter.

Since the traps are changed or cleaned only periodically, typically biweekly or monthly, trapped amalgam particles remain in the waste stream for extended periods of time. Hence, some metallic components of the amalgam, such as mercury, become water soluble and thereby enter the environment. This process is greatly accelerated by oxidizing disinfectants used to clean the dental operatory.

Mercury is classified as a toxic material by the Environmental Protection Agency. Discharge of mercury into the environment is regulated by governmental agencies. It has been estimated that dental operatories annually contribute over 30 million gallons of mercury-contaminated water through their waste streams into the environment. Current technologies are unable to capture the toxic portion of dental waste, including the soluble form of mercury as well as other solubilized amalgam metals, before it is discharged via waste lines into the environment. In fact, recent studies have shown that dental facilities contribute between 10 and 25% of the mercury that enters local publicly owned treatment works, many of which are struggling to meet mercury discharge requirements.

Previous methods for removing dissolved metal ions, more particularly for removing dissolved mercury ions from aqueous waste streams, include numerous electrolytic methods, chemical precipitation and filtration methods, vaporization and condensation methods, and related methods and associated devices. All of these approaches may work well on a relatively

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large industrial scale. However, these methods are too cumbersome, too expensive, and are not readily adaptable to a dental waste stream from a typical dental operatory, which is generally small and may include one or more dentists (and dental chairs) and technicians.

Devices previously disclosed, such as in U.S. Pat. No. 5,795,159, relate to the removal of particulate matter and insoluble metals, including mercury, from dental waste streams, but do not address the soluble portion of these materials. A device and method for the removal of both insoluble and soluble metals from dental waste streams is disclosed in U.S. Patent. No. 5,885,076; however, it is not readily incorporated into existing dental operatories and facilities because of its complexity. The devices described above, as well as other devices disclosed in the prior art, do not remove both soluble and insoluble contaminants, or require spatially separated steps and/or components that are connected with conduits to remove both soluble and insoluble contaminants.

Thus, a device and method that can be easily incorporated into existing systems for removing waste stream contaminants, such as metal ions found in dental operatory waste, is needed.

Summary of the Invention

While the invention has numerous applications, it is particularly described herein for use in efficiently and effectively removing contaminants from dental waste resulting from procedures conducted on patients in dental offices.

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The invention provides a single stage unit which provides a dual effect: it removes both soluble and insoluble contaminants from dental waste streams. This is an advantage over existing systems which either do not provide the dual effect, or require two stages to achieve the dual effect.

In particular, the invention contemplates the combination of chemical and mechanical purification of a waste stream in a single stage. Waste is introduced directly for mechanical and chemical purification without passing through any intermediary conduits, passageways, or other connections. In this way, a two-part purification can be carried out in a single stage device that is easily incorporated into an existing waste line without interconnections of plural devices.

Structurally, a screen mechanically retains particulates and/or insoluble contaminants from the waste stream, and a closely adjacent resin chemically retains soluble contaminants from the waste stream. In various embodiments, the invention incorporates an air/water separation chamber, a sedimentation chamber, and introduction of a sanitizing or disinfecting agent.

In use, the invention is readily connected to an existing waste stream to remove dental debris and contaminants, including both insoluble and soluble ions such as mercury, silver, copper, and related dental amalgam metals. The invention is sufficiently compact to fit in a dental office's mechanical closet, and does not interfere with operation of the dental vacuum system. The invention provides dentists with a cost-effective, single waste removal device that ensures the permanent capture of both particulate and solubilized metals, such as mercury as well as other contaminants, from dental

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waste streams. No additional expensive mechanical or filtration equipment is required, nor is an additional motive force of a pump. No additional plumbing is required, since the unit may simply be spliced into an existing vacuum line. The apparatus and materials of construction are robust to vacuum pressure, oxidants, and other sanitizing agents.

Furthermore, the resin incorporated or contained in the inventive device is not regenerated; therefore, no regeneration chemicals are required, nor is there creation of hazardous liquid waste from regeneration. The apparatus allows dentists to continue to use amalgam in their practice, while greatly lowering the risk of contaminating the environment with mercury and other dissolved metals contained in the amalgam. Used devices, or portions thereof, can be retorted, thus permitting recovery of mercury that, otherwise, would be released into the environment.

The invention thus lowers toxic metal ion concentrations in dental waste streams. By combining the actions of air/water separation, sedimentation, mechanical filtration and/or chemical filtration, the invention achieves lower effluent concentration of metals than amalgam traps alone.

Other aspects and advantages of the invention will be apparent in view of the following drawings, detailed description, and examples.

Brief Description of the Figures

FIG. 1 is an exploded view of a trap apparatus currently used in dental practice.

FIG. 2 is as axial cross sectional view of an assembled trap apparatus shown in FIG. 1

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FIG. 3 is a perspective view of a screen containing a contaminant binding resin as in FIG. 1.

FIG. 4 is a front view partially in cross section of an alternative filter comprising a porous molded cup containing a contaminant binding resin.

FIG. 5 is a schematic cross sectional view of an alternative embodiment of the inventive device.

FIG. 6 is another alternative embodiment of the invention.

Detailed Description

In one embodiment, the inventive device is designed to fit into an apparatus that is used currently in dental practices to trap contaminants. Contaminants include, but are not limited to, amalgam components, biological contaminants, particulates, organic contaminants, etc. The device is intended to be used upstream of the vacuum pump, that is, on the vacuum side of the pump in the vacuum line in a dental office. The device either augments or replaces the mesh screen component of currently used devices.

With reference to FIGS. 1 and 2, a dental waste stream 30 flows in the direction of the arrows through trap 31. The waste 30 flows into the trap 31 through an opening 26 on the side of a trap head 22, then is directed downward through an opening 24 in the center of the head 22, through a mesh screen 14, radially outward and upward to the head 22 and out through opening 28 of the head 22.

The screen 14 is located within a container 10. A gasket 18 is used between the head 22 and container 10. The trap head 22 has a fitting with a threaded connector 24 to the container 10, and threaded openings 26,

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28 for fittings to provide a means of delivering the waste stream 30 to and from the trap 31. A threaded cap 39 (shown in phantom in FIG. 1) for container 10 is capable of hermetically sealing the container 10 once it has been used and contains trapped contaminants such as amalgam. After use and when the trap 31 is to be removed, the container 10 is detached and the head 22 is replaced with the cap 39. The hermetically sealed used container 10 can then be safely transported and delivered to an appropriate recovery or disposal facility.

With reference to FIG. 3, a cylindrical mesh screen 14 as contained in a standard trap is modified to include a contaminant binding resin 34. The resin 34 is a metal binding resin, particularly a mercury absorbing resin, one suitable example of which is Keyle:X® resin, manufactured by and available from SolmeteX (Billerica, MA). Other mercury absorbing resins, however, may be used, for example, Duolite GT-73 (Rohm and Haas, Philadelphia, PA), Ionac SR-4 (Sybron, Birmingham, PA), S-930 (Purolite, Bala Cynwyd, PA), Mersorb (ALCOA, Pittsburgh, PA), and Lewatit TP 214 (Bayer AG Leverkusen, Pittsburgh, PA). The particular resin does not form part of the inventive system and method.

The resin 34 may be contained in a device, such as a rectangular pleated flexible polypropylene mesh bag 32, that is wrapped around the screen 14 (FIG. 2). Alternatively, the bag 32 a resin-containing device, may be sized to fit within the container 10 of the trap 31. In this embodiment, the screen 14 is rendered unnecessary by incorporating or imbedding the contaminant binding resin 34 directly into a molded, porous (foam-like or related) cup 36

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that is sized and shaped to fit into the container 10 of the trap 31, as shown in FIG. 4. The cup 36 contains about 80 grams of resin 34 and fits in the trap 31.

The trap 31 may be porous or permeable, and may be disposable or reusable. The trap 31 containing the contaminant binding resin 34 in any embodiment may also contain a powder, fiber, glass or a related substrate designed or selected for the removal of soluble and insoluble contaminants, such as mercury, from dental waste streams. The trap 31 may also contain a sanitizing or oxidizing material 40, such as an iodated resin.

In yet another embodiment of the invention, and with reference to FIG. 5, a separate three phase contaminant-removing system is disclosed. In this embodiment, the waste flow 30 initially enters an air/liquid separation chamber 50 via inlet port 54. The air/liquid separator chamber 50 is of sufficient volume to slow down the flow of air 52 in waste flow 30 enough to allow the entrained solids and liquids 51 to drop to the bottom of the chamber 50. Air is removed through a port 56 at the top of the air/liquid separation chamber 50. This allows the liquid waste flow 30 to pass into a settlement chamber 58 for contaminant removal with no interruption to a dental vacuum system. Liquid waste flow 30 continues through an opening 60 in the bottom of the air/liquid separation chamber 50. The air/liquid separation chamber 50 may be coated with a hydrophobic or oleophobic material 59 to minimize foaming and bubble formation in the waste flow 30.

The settlement chamber 58 is located below, preferably directly below, the air/liquid separation chamber 50. It is sufficiently large to allow

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enough residence time for the particulate matter 61 in the waste flow 30 to settle to the bottom of the chamber 58. The waste flow 30 enters the settlement chamber 54 via a tube 62 extending from the air/liquid separation chamber 50 to about two-thirds of the way into the settlement chamber 58. This allows the path of the waste flow 30 to be in an upflow mode as liquid accumulates. The heavier solids and particulate matter 61 settle to the bottom of the chamber 54, while the clarified liquid 64 rises toward the top of the chamber 54.

The clarified liquid 64, free of large particulates and sedimenting material but still containing soluble contaminants and smaller particulates, then flows through a contaminant binding resin 34. The resin 34 is contained in a molded insert or cup 78 located near the top of the chamber 54. The interstitial spaces of the porous molded resin insert or cup 78 may be small enough to perform mechanical filtration on the remaining particulate. The treated liquid, now containing reduced levels of contaminants, then exits through a line 80 for recombination with the air stream. The port 56 in the air/liquid separation chamber 50 through which air was removed is connected to line 80.

The contaminant binding resin 34 contained in an insert 70 that is positioned to permit the liquid 62 to either flow over or percolate through the resin 34 before exiting from the settlement chamber 54. The insert 70 may be porous or permeable, and may be disposable or reusable. The insert 70 contains one or more contaminant binding resins 34, as previously described, and may also contain powder, fiber, glass or a related substrate

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designed or selected for the removal of soluble and insoluble contaminants, such as mercury, from dental waste streams 30. The insert 70 may also contain a carbon based adsorbent or related material. The insert 70 may also contain a sanitizing or oxidizing material, such as an iodated resin 40. The iodated resin 40 provides microbial control for increased safety and convenience to the dental worker, while also ensuring the appropriate speciation of the dissolved mercury or other metals for optimal metal binding.

The insert 70 entraps particulate matter and acts as a mechanical filter. One embodiment of the insert 70 incorporates an inert binder such as high density polyethylene to form the metal binding resin 34 into a rigid porous insert 72. Another embodiment of the insert 70 incorporates a porous container or vehicle, which may be, for example, a heat sealed flexible screen pouch 74 that is filled with a metal binding resin 34, as shown in FIG. 6.

The trap 31 or insert 70 or sedimentation cartridge 54 may be sent to an approved retort/recovery facility when the binding capacity of the resin is exhausted, or at defined or periodic times. The sedimentation chamber 58 is easily detached, for example, by threads, pins and a gasket system, from the air/liquid separation chamber 50 and from inflow and outflow lines. The entire cartridge, containing contaminant-laden solids and soluble contaminants bound to the adsorbent resin 34, is sent for retorting.

An advantage of the present invention is that the waste stream 30 need not pass through a packed resin bed for effective metal removal. Rather, the waste stream 30 passing over the resin 34 via percolation, with resin 34 in a container 32 surrounding a screen 14, in a porous cup 36, or in

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an insert 70, results in sufficient contact with the resin to permit binding of the contaminants.

Table 1 shows the test results of a typical dental waste stream 30 before and after treatment with one embodiment of the present invention containing the Keyle:X® resin.

TABLE 1

Sample Date	Influent to System Total Hg (ppm)	Effluent from System Total Hg (ppm)	Mercury Removal (%)
Day 1	4,290.0	106.0	97.5%
Day 2	1,190.0	5.3	99.6%
Day 3	585.0	1.0	99.8%
Day 4	1,570.0	25.5	98.4%
Day 5	6,130.0	69.0	98.9%
Day 6	20,500.0	17.2	99.9%
Day 7	2,720.0	12.8	99.5%
Average	5,283.6	33.8	99.1%

As shown by the levels of mercury remaining in dental waste after treatment with a separator containing the inventive trap, the inventive trap is effective in reducing total mercury concentrations by about two orders of magnitude.

Table 2 shows the test results of a soluble mercury stream with concentrations before and after treatment with the cup embodiment of the invention.

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TABLE 2

	Porous Cup #1	Porous Cup #2	Porous Cup #1	Porous Cup #2
Flow Rate	150 ml/min	150 ml/min	50 ml/min	50 ml/min
Influent (ppb)	154	170	152	254
Effluent Sample 1 (ppb)	1.0	1.3	0.7	2.2
Effluent Sample 2 (ppb)	1.5	2.0	0.7	2.1
Effluent Sample 3 (ppb)	1.6	2.2	0.7	2.2
Effluent Sample 4 (ppb)	1.9	3.2	0.5	1.7
Effluent Sample 5 (ppb)	2.3	3.8	0.6	2.9
Effluent Sample 6 (ppb)	1.7	2.5	0.6	2.1

As shown by comparison of mercury levels in the influent and effluent, the inventive device is effective in removing mercury concentrations down to the part per billion level, and reducing soluble mercury concentrations on the order of two orders of magnitude.

It should be understood that the embodiments of the present invention shown and described in the specification are only preferred embodiments of the inventor who is skilled in the art and are not limiting in any way. Therefore, various changes, modifications or alterations to these embodiments may be made or resorted to without departing from the spirit of the invention and the scope of the following claims.

What is claimed is:

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1. A method for removing at least one contaminant from a contaminated dental stream comprising contacting said contaminated stream with a combined physical and chemical filtration unit under conditions sufficient to remove said contaminant from said stream to yield a decontaminated waste stream.

2. The method of claim 1 including connecting said unit in-line with an existing contaminated stream.

3. The method of claim 1 comprising contacting a stream contaminated with a metal.

4. The method of claim 3 wherein said metal is selected from the group consisting of mercury, tin, silver, copper, and combinations thereof.

5. The method of claim 1 wherein said physical filtration removes an insoluble contaminant in said stream and said chemical filtration removes a soluble contaminant in said stream.

6. The method of claim 1 including directing said contaminated stream into a chamber for separating air before contacting said stream with said unit.

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7. A method for decreasing a concentration of least one contaminant present in soluble and insoluble forms in a waste stream comprising exposing said stream to a filtering unit wherein said insoluble form of said contaminant is physically retained by said filtering unit and said soluble form of said contaminant is chemically retained by said filtering unit under conditions wherein contact of said waste stream with said filtering unit decreases said contaminant concentration.

8. The method of claim 7 including contacting a stream containing dental waste.

9. The method of claim 8 including contacting a stream containing dental amalgam.

10. The method of claim 8 including percolating said stream through said filtering unit.

11. The method of claim 8 including flowing said stream over said filtering unit.

12. The method of claim 8 including decreasing said contaminant concentration so that said stream contains less than 10 ppb of said contaminants.

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13. A method for treating contaminants from a dental stream comprising

exposing said stream to a unit containing at least one contaminant binding resin and a mechanical filter in line with said stream under conditions sufficient to decrease a concentration of said contaminants in said stream,

removing said unit from said contaminated stream, and

confining said contaminated resin and filter in said unit.

14. The method of claim 13 including exposing said stream to said unit a plurality of times before removing and confining said unit.

15. The method of claim 13 further comprising retorting said removed unit.

16. The method of claim 13 including exposing said stream containing at least one metal contaminant.

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17. A method for removing at least one contaminant from a contaminated dental comprising

directing said contaminated stream into a first deaeration chamber to form a deaerated stream and thereafter to an adjacent sedimentation chamber to form a clarified stream, and

contacting said deaerated clarified stream with a unit contained in said sedimentation chamber, said unit containing at least one contaminant binding resin and a filter to form a decontaminated stream.

18. The method of claim 17 wherein said deaerated clarified stream percolates through said resin.

19. The method of claim 17 wherein said deaerated clarified stream flows over said resin.

20. The method of claim 17 further comprising aerating said decontaminated stream.

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21. An apparatus capable of sequestering at least one contaminant from a contaminated dental stream comprising a unit containing at least one contaminant binding resin and a filter, said unit insertable in-line with said contaminated stream to contact said stream and thereby sequester said contaminant.

22. The apparatus of claim 21 wherein said unit is located in a chamber for sedimenting said contaminant before contacting said stream with said resin and filter.

23. The apparatus of claim 21 wherein said filter is a molded porous cup.

24. The apparatus of claim 21 wherein said resin is a metal binding resin.

25. The apparatus of claim 21 further comprising a sanitizing material.

26. The apparatus of claim 21 further comprising an oxidizing material.

27. The apparatus of claim 21 wherein said resin is iodinated.

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28. The apparatus of claim 21 including a deaerating chamber disposed upstream of said resin and said filter.

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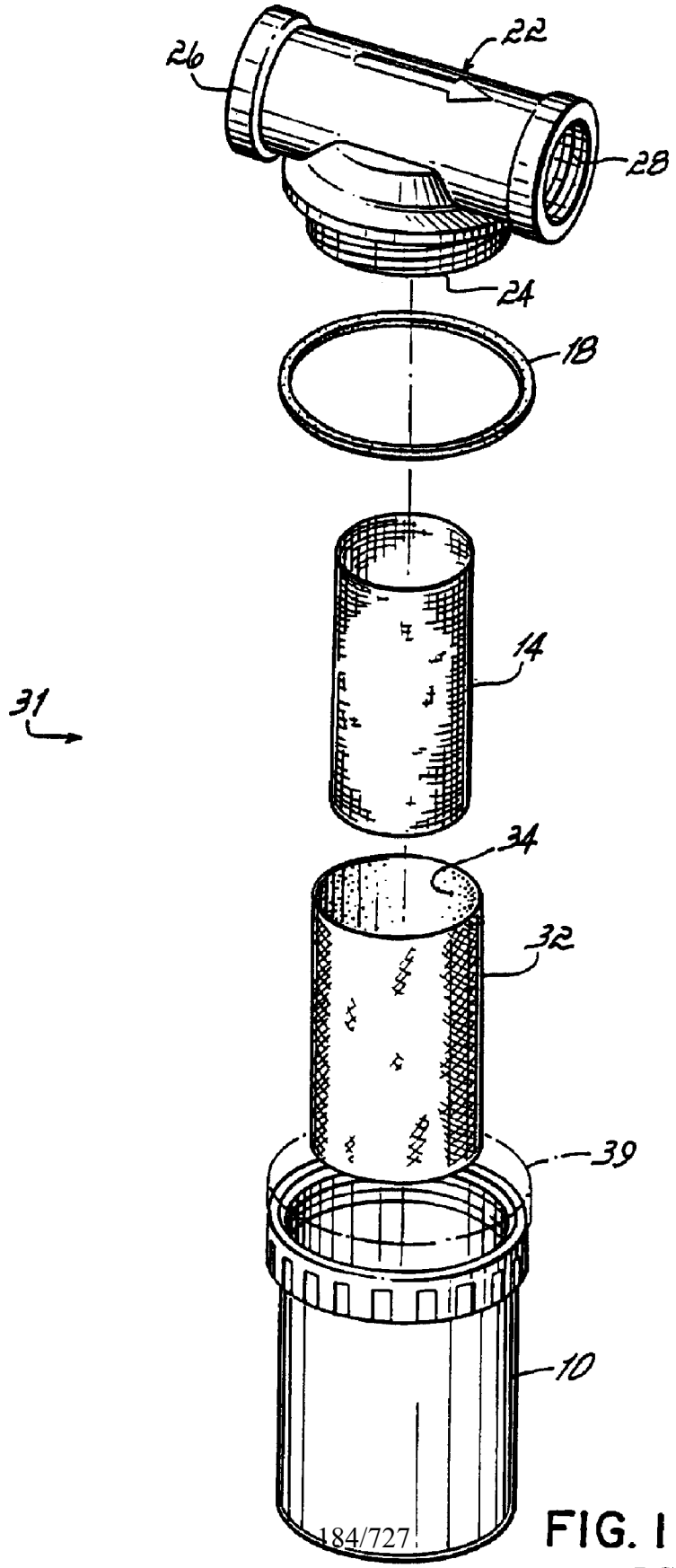


FIG. 1

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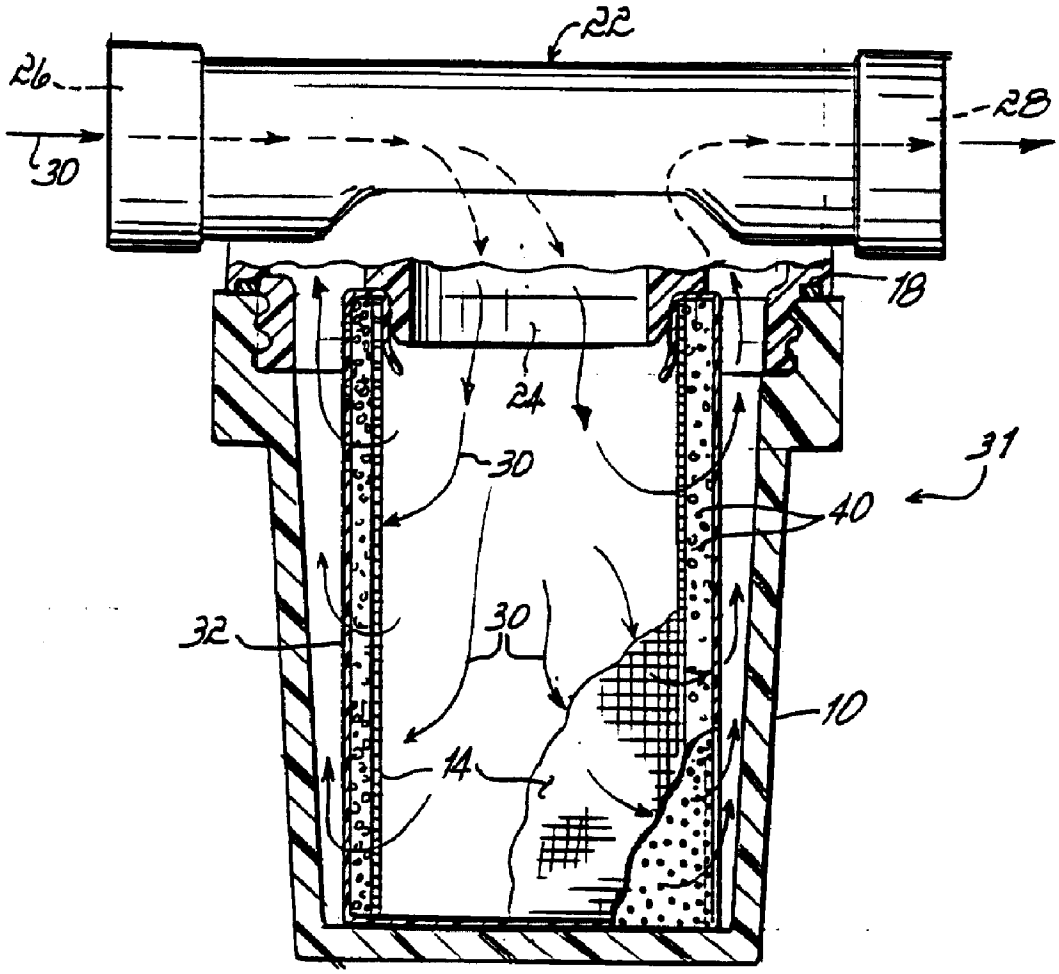


Fig. 2

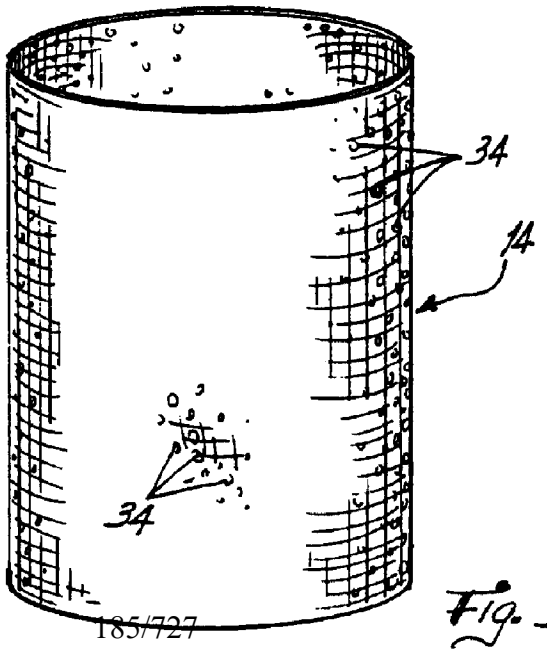


Fig. 3

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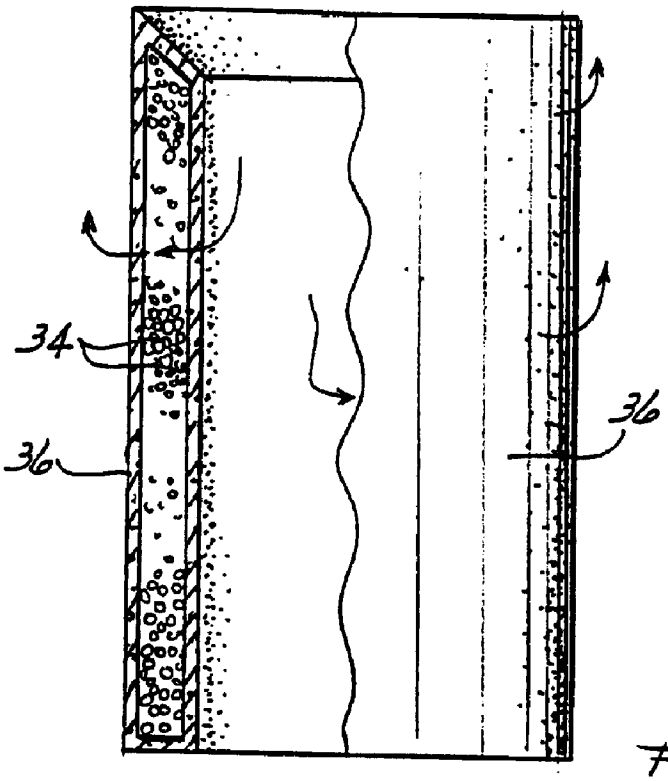


Fig. 4

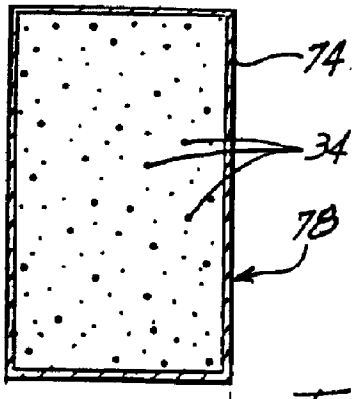
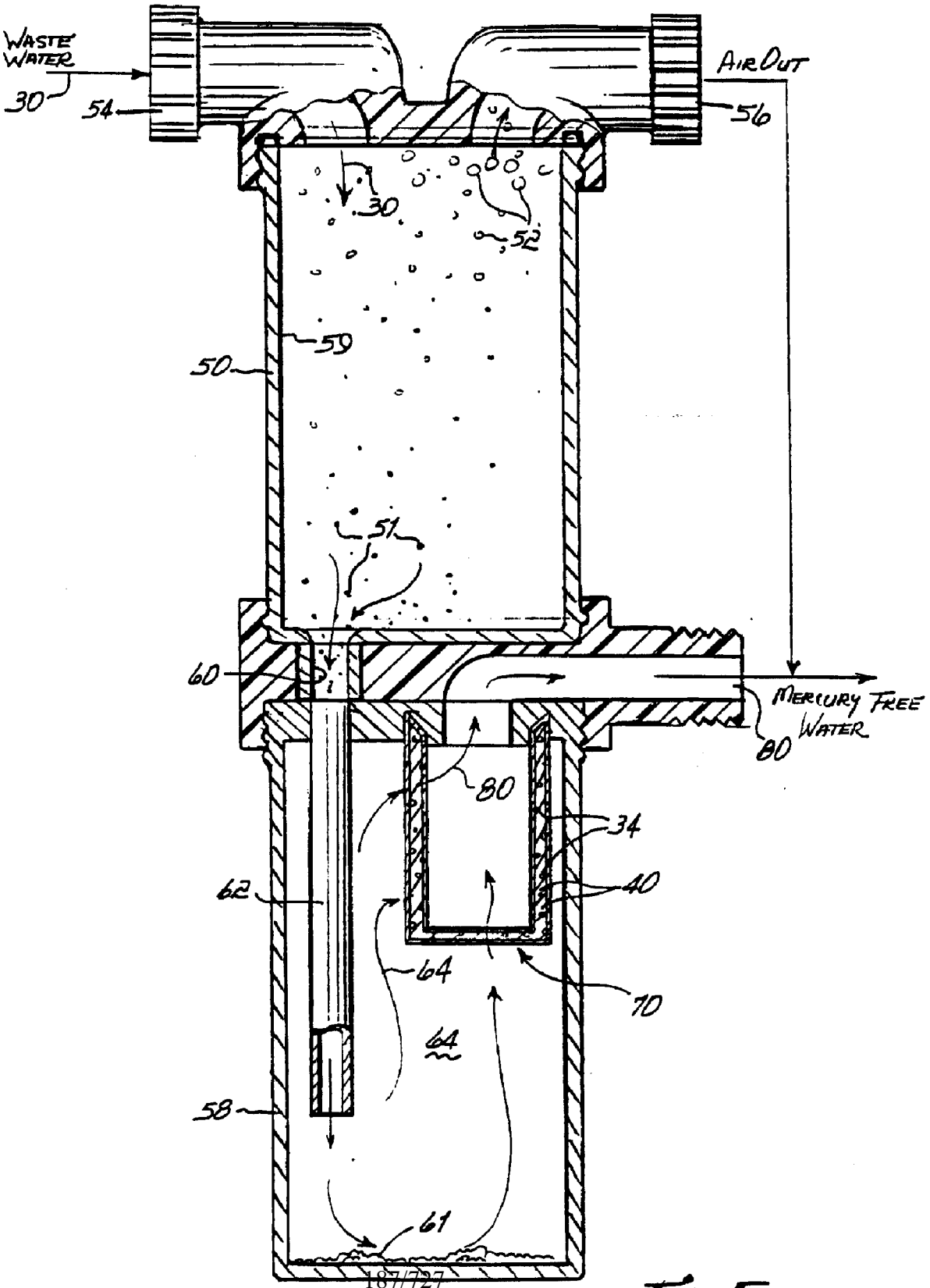


Fig. 6

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WASTE WATER
30
54
AIR OUT
56
30
52
59
50
51
60
MERCURY FREE WATER
80
80
34
40
62
64
70
64
58
61

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Fig. 5

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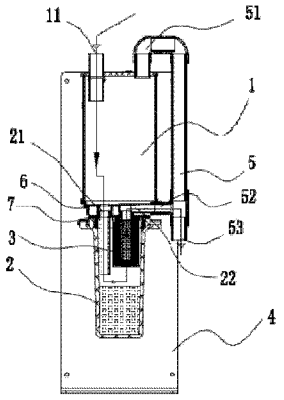
权利要求书 1 页 说明书 3 页 附图 3 页

(54)发明名称

重金属分离装置

(57)摘要

本发明揭示了一种重金属分离装置，其包括积污桶、重金属收集瓶和固体过滤器，所述积污桶上设有与口腔治疗机相连接的污水进水口，所述重金属收集瓶上设有与所述积污桶的底部相连通的污水入口和与负压抽吸机相连通的污水排水口；所述固体过滤器设于重金属收集瓶内，由过滤网层和沙层组成，用于将污水中的重金属过滤在所述重金属收集瓶内，并将过滤后的污水由负压抽吸机抽吸排放。本发明具有产品体积小、安装方便；适用于口腔医院和个体私人口腔诊所，使得口腔治疗时产生的污水中的重金属含量得到有效的减少，起到环保的作用。



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1. 一种重金属分离装置，其特征在于：包括积污桶、重金属收集瓶和固体过滤器，所述积污桶上设有与口腔治疗机相连接的污水进水口，所述重金属收集瓶上设有与所述积污桶的底部相连通的污水入口和与负压抽吸机相连通的污水排水口；所述固体过滤器设于重金属收集瓶内，用于将污水中的重金属过滤在所述重金属收集瓶内，并将过滤后的污水由负压抽吸机抽吸排放。

2. 根据权利要求 1 所述的重金属分离装置，其特征在于：所述固体过滤器由过滤网层和夹设于过滤网层间的沙层组成。

3. 根据权利要求 2 所述的重金属分离装置，其特征在于：所述沙层包括海沙，锰沙或海沙和锰沙的混合层。

4. 根据权利要求 3 所述的重金属分离装置，其特征在于：所述沙层由海沙和锰沙以重量比为 80％的海沙和 20％的锰沙混合而成。

5. 根据权利要求 1 所述的重金属分离装置，其特征在于：所述污水排水口通过抽吸管道与所述负压抽吸机相连接，所述抽吸管道还与所述积污桶的上端相连通。

6. 根据权利要求 1 所述的重金属分离装置，其特征在于：所述固体过滤器粘接于所述重金属收集瓶上。

7. 根据权利要求 1 所述的重金属分离装置，其特征在于：所述装置还包括一安装支架，所述积污桶固定于所述安装支架上。

8. 根据权利要求 1 所述的重金属分离装置，其特征在于：所述重金属收集瓶和所述积污桶间通过密封连接件相密封连接。

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重金属分离装置

技术领域

[0001] 本发明涉及重金属过滤沉淀分离技术，尤其涉及用于口腔治疗中分离重金属的重金属分离装置。

背景技术

[0002] 目前，环境保护问题已经引起了全世界的普遍重视，污水对环境的污染已经成为一个全球性的问题，最近几年来人类的目光逐渐从工厂废料，废水对环境的污染转移到包括一些医疗机构和家庭废弃物的污染上来。近年来由于口腔医学的发展，口腔治疗中产生的各种污染引起人们的关注及危害，尤其是口腔治疗中使用的银汞合金粉，以及包括其它重金属材料，这些重金属在治疗过程中会有一些随污水一起被排放掉，在常年的积累下随污水排放的重金属会引起对环境的污染。而对于这些重金属造成的污染，目前尚未有很好的方式来解决这一问题。

发明内容

[0003] 本发明的目的在于克服现有技术的缺陷，提供一种重金属分离装置，其用于收集口腔治疗过程中产生的重金属，以减少重金属对环境污染。

[0004] 为实现上述目的，本发明提出如下技术方案：一种重金属分离装置，包括积污桶、重金属收集瓶和固体过滤器，所述积污桶上设有与口腔治疗机相连接的污水进水口，所述重金属收集瓶上设有与所述积污桶的底部相连通的污水入口和与负压抽吸机相连通的污水排水口；所述固体过滤器设于重金属收集瓶内，用于将污水中的重金属过滤在所述重金属收集瓶内，并将过滤后的污水由负压抽吸机抽吸排放。

[0005] 其中，所述固体过滤器由过滤网层和夹设于过滤网层间的沙层组成。

[0006] 所述沙层包括海沙，锰沙或海沙和锰沙混合层。

[0007] 所述沙层由海沙和锰沙以重量比为 80％的海沙和 20％的锰沙混合而成。

[0008] 所述污水排水口通过抽吸管道与所述负压抽吸机相连接，所述抽吸管道还与所述积污桶的上端相连通。

[0009] 所述固体过滤器粘接于所述重金属收集瓶上。

[0010] 所述装置还包括一安装支架，所述积污桶固定于所述安装支架上。

[0011] 所述重金属收集瓶和所述积污桶间通过密封连接件相密封连接。

[0012] 与现有技术相比，本发明所揭示重金属分离装置，其具有产品体积小、安装方便；银汞分离率达到 99％；方便重金属回收和处理，使得重金属得到了有效收集；适用于口腔医院和个体私人口腔诊所，能拖一至 20 台牙科治疗机同时使用；使得口腔治疗时产生的废水重金属含量减少，对环境保护产生很大效果，保护了环境。

附图说明

[0013] 图 1 是本发明重金属分离装置的立体示意图；

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[0014] 图 2 是本发明重金属分离装置的剖视示意图；

[0015] 图 3 是本发明固体过滤器安装于重金属收集瓶上的示意图（包括了第一密封连接件）。

具体实施方式

[0016] 下面将结合本发明的附图，对本发明实施例的技术方案进行清楚、完整的描述。

[0017] 结合图 1、图 2 所示，本发明所揭示的重金属分离装置，其包括积污桶 1、重金属收集瓶 2，固体过滤器 3 及安装支架 4，所述积污桶 1 固定于安装支架 4 上，积污桶 1 上设有与口腔治疗机（图未示）相连接的污水进水口 11，积污桶 1 用于将口腔治疗过程中产生的污水和负压气体进行有效的水气分离。

[0018] 所述重金属收集瓶 2 置于所述积污桶 1 的下部，其与积污桶 1 间通过第一密封连接件 6，第二密封连接件 7 以接口的方式相密封连接，并通过卡扣件相卡紧。具体来说，重金属收集瓶 2 上端具有与积污桶 1 底部相连通的污水入口 21 和与负压抽吸机连接的污水排水口 22，重金属收集瓶 2 用于将口腔治疗过程中产生的重金属如银、汞、铜、锡、锌进行有效收集。

[0019] 结合图 3 示，所述固体过滤器 3 设于所述重金属收集瓶 2 的内部，且固体过滤器 3 和重金属收集瓶 3 胶粘于一起，用于将口腔治疗过程中产生的污水中含有的重金属如银、汞、铜、锡、锌等进行有效的过滤、沉淀。固体过滤器 3 整体上中空呈圆柱状，由过滤网层 31 和沙层 32 组成，更具体来说，固体过滤器 3 包括两层过滤网层 31、33 和设于两层过滤网层 31、33 中间的沙层 32，所述沙层 32 由海沙，锰沙或者海沙和锰沙以一定比例相混合而成，且以海沙占 80％，锰沙占 20％的比例混合而成的沙层为优选。海沙和锰沙的沙粒大小为 1.5 ～ 2 毫米，过滤网的间隙为 0.5 ～ 1 毫米为优选。这样的固体过滤器能够有效地过滤污水中的重金属。

[0020] 此外，所述重金属收集瓶 2 的污水排水口 22 通过抽吸管道 5 与负压抽吸机（图未示）相连接，所述抽吸管道 5 具有与积污桶 1 上部相连通的第一连接口 51，与重金属收集瓶 2 的污水排水口 22 相连接的第二连接口 52，以及与负压抽吸机相连接的第三连接口 53，积污桶 1 中的污水通过负压抽吸机的抽取后沿图 2 中 H 线的箭头方向排放至外界的污水道中。

[0021] 工作时，积污桶 1 的污水进水口 11 连接牙科治疗机的痰盂下水、强吸唾器和弱吸唾器等的接口。所述抽吸管道 5 的第三连接口 53 与负压抽吸机连接好，当医师为患者治疗时，使用痰盂、强吸唾器或弱吸唾器，此时牙科治疗机会给负压抽吸机一个信号，负压抽吸机开始工作，负压抽吸机将患者治疗时产生的污水抽吸到积污桶 1 中，此时积污桶 1 将水和气分离，水通过负压抽吸和水自身的重量流入重金属收积瓶 2。重金属收积瓶 2 中的污水通过固体过滤器 3 后抽吸到负压抽吸机，其中重金属被固体过滤器 3 所过滤，并经过沉淀后保存到重金属收积瓶中，过滤后的污水通过负压抽吸机排放到国家规定的污水道中。

[0022] 使用一段时间后，当重金属收集瓶 2 中收集的重金属达到一定的高度后，则将重金属收集瓶从积污桶的下端拿开，更换上新的重金属收集瓶（连通粘接好的新的固体过滤器）后继续使用。

[0023] 本发明实施例所述的重金属分离装置，产品体积小、重金属收集瓶的安装更换方

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便；银汞分离率达到 99%，分离具体数据为：1%铜，20%银，25%锡，53%汞；重金属得到了有效收集，方便重金属回收和处理；适用于口腔医院和个体私人口腔诊所，能拖一至 20 台牙科治疗机同时使用；使得口腔治疗时产生的废水重金属含量减少，对环境保护产生很大效果，保护了环境。

[0024] 本发明的技术内容及技术特征已揭示如上，然而熟悉本领域的技术人员仍可能基于本发明的教示及揭示而作种种不背离本发明精神的替换及修饰，因此，本发明保护范围应不限于实施例所揭示的内容，而应包括各种不背离本发明的替换及修饰，并为本专利申请权利要求所涵盖。

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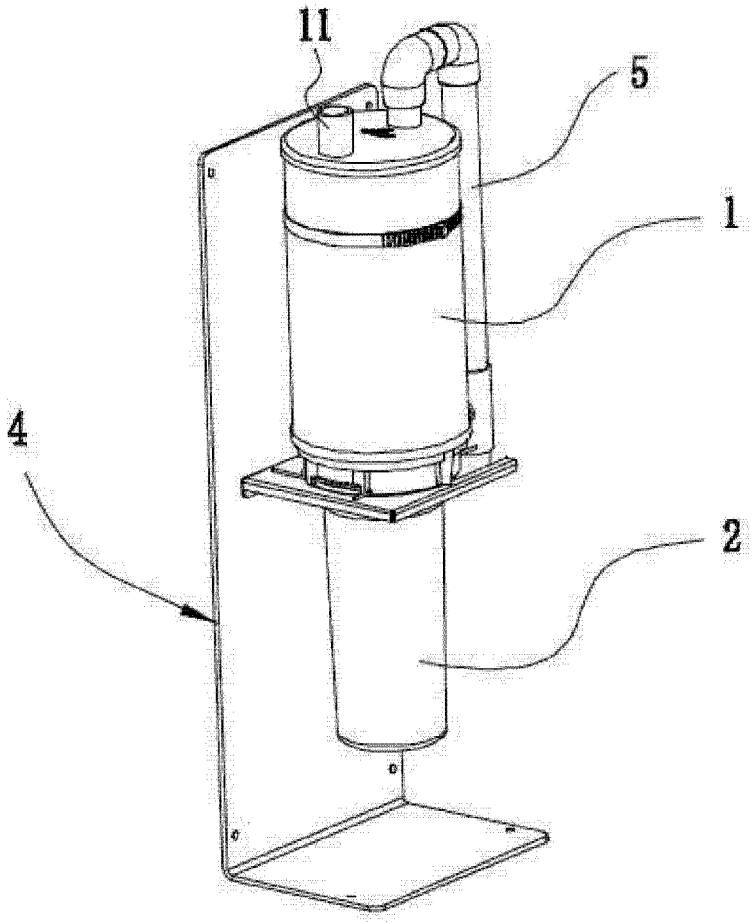


图 1

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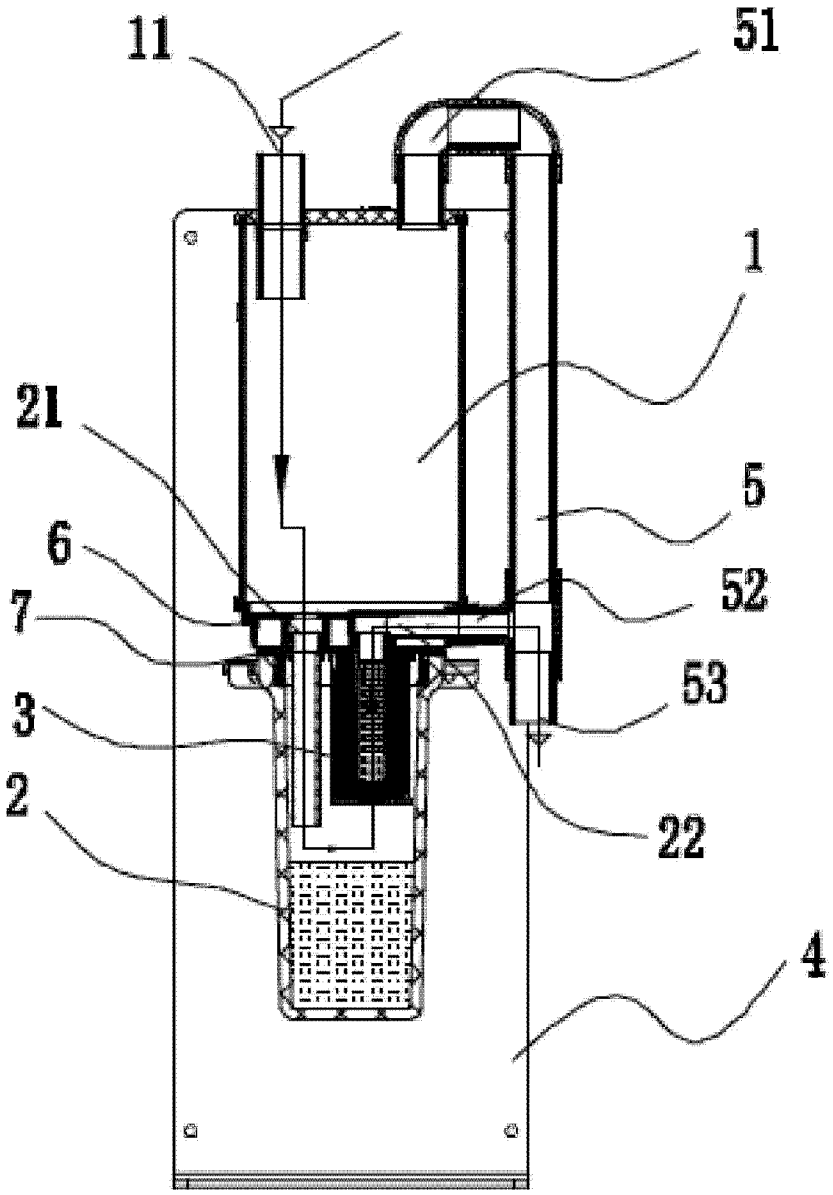


图 2

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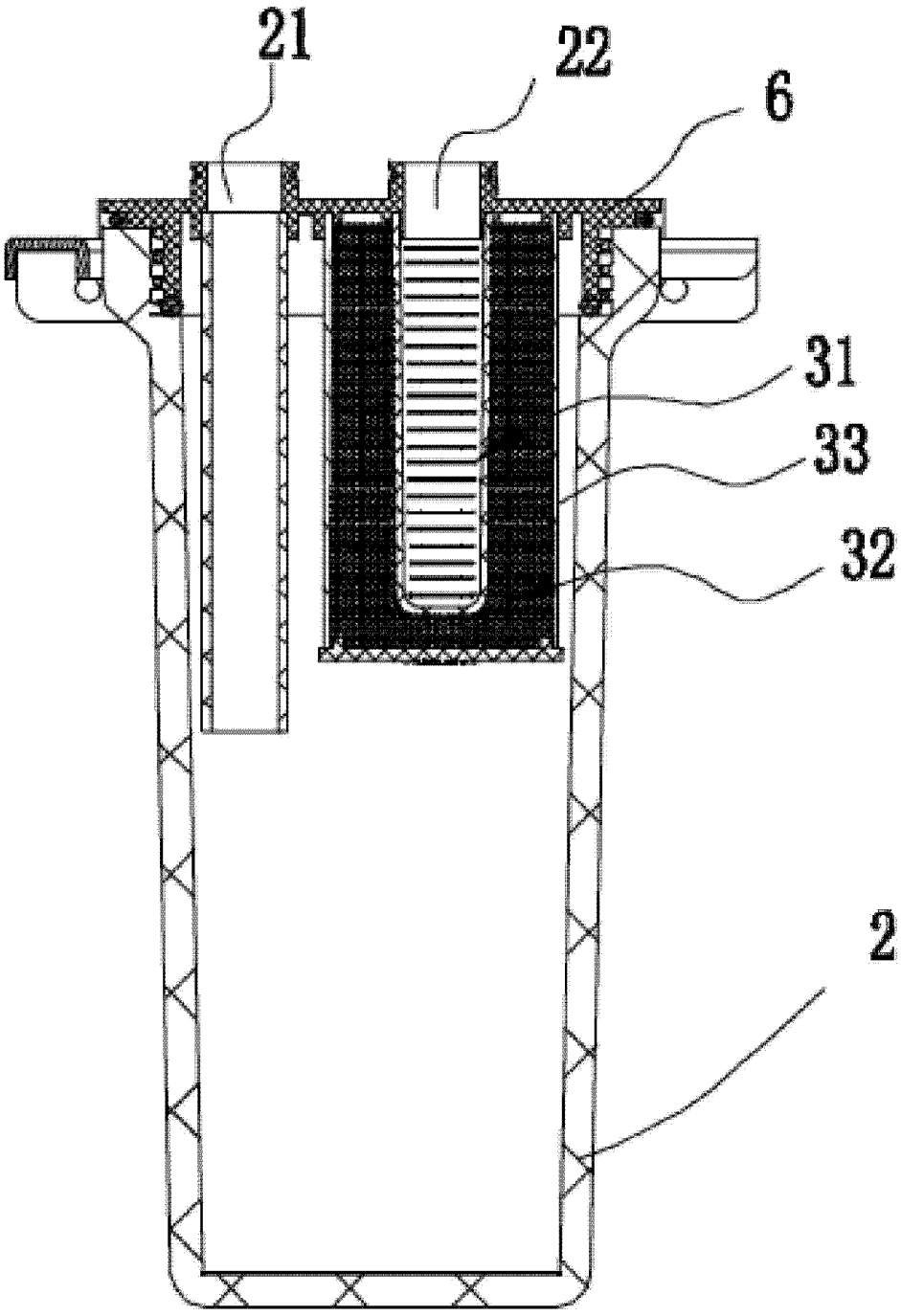


图 3

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Solmetex Exo 2002
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(19) China National Intellectual Property Administration

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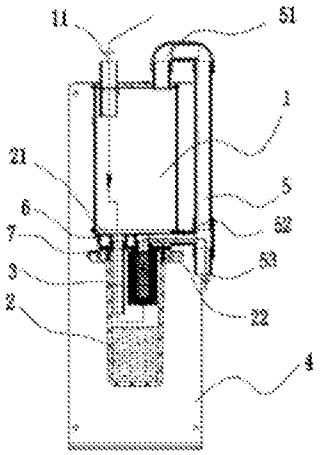
1 page of Claims, 3 pages of Specifications,
3 pages of Drawings

(54) **Title of invention**

Heavy metal separation device

(57) **Abstract**

The invention discloses a heavy metal separation device, which comprises a waste collecting tank, a heavy metal receiving bottle, and a solid filter. The waste collecting tank is provided with a sewage water inlet connected to an oral treatment machine, and the heavy metal receiving bottle is provided with a sewage inlet connected to the bottom of the waste collecting tank and a sewage discharge port connected with a negative pressure suction machine: the solid filter is arranged in the heavy metal receiving bottle and is composed of a filter mesh layer and a sand layer, and is used for filtering heavy metals in the sewage into the heavy metal receiving bottle, and the filtered sewage is sucked and discharged by a negative pressure suction machine. The invention has the advantages of small product size and convenient installation: it is suitable for stomatological hospitals and individual private dental clinics, so that the content of heavy metals in sewage generated during oral treatment can be effectively reduced, thereby playing an environmental protection role.



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1. The invention discloses a heavy metal separation device, which comprises a waste collecting tank, a heavy metal receiving bottle, and a solid filter. The waste collecting tank is provided with a sewage water inlet connected to an oral treatment machine, and the heavy metal receiving bottle is provided with a sewage inlet connected to the bottom of the waste collecting tank and a sewage discharge port connected with a negative pressure suction machine: the solid filter is arranged in the heavy metal receiving bottle and is used for filtering heavy metals in the sewage into the heavy metal receiving bottle, and the filtered sewage is sucked and discharged by a negative pressure suction machine.

2. The heavy metal separation device according to Claim 1 is characterized by: the solid filter is composed of a filter layer and a sand layer sandwiched between the filter layers.

3. The heavy metal separation device according to Claim 2 is characterized by: the sand layer comprises sea sand, manganese sand or a mixed layer of sea sand and manganese sand.

4. The heavy metal separation device according to Claim 3 is characterized by: the sand layer is formed by mixing sea sand and manganese sand with a weight ratio of 80% sea sand and 20% manganese sand.

5. The heavy metal separation device according to Claim 1 is characterized by: the sewage outlet is connected to the negative pressure suction machine through a suction pipe, and the suction pipe is also connected to the upper end of the waste collecting tank.

6. The heavy metal separation device according to Claim 1 is characterized by: the solid filter is bonded to the heavy metal receiving bottle.

7. The heavy metal separation device according to Claim 1 is characterized by: the device further comprises a mounting bracket, and the waste collecting tank is fixed on the mounting bracket.

8. The heavy metal separation device according to Claim 1 is characterized by: the heavy metal receiving bottle and the waste collecting tank are sealed and connected by a sealed connector.

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Heavy Metal Separation Device

Technical areas

[0001] The invention relates to heavy metal filtration and deposition separation technology, in particular to a heavy metal separation device used for separating heavy metals in dental treatment.

Background technique

[002] At present, environmental protection problem has caused the general attention of the whole world, and the pollution of sewage to environment has become a global problem. In recent years, the attention has gradually shifted from the environmental pollution caused by factory waste and wastewater to the pollution, including some medical institutions and household waste. In recent years, due to the development of stomatology, various pollutions produced in oral treatment have attracted people's attention, especially the amalgam powder used in oral treatment, as well as other heavy metal materials. Some of these heavy metals will be discharged with sewage during the treatment process. The heavy metals discharged with sewage will cause environmental pollution after years of accumulation. As for the pollution caused by these heavy metals, there is no good way to solve this problem.

Contents of the invention

[0003] The purpose of the present invention is to overcome the defective of prior art, and provide a heavy metal separation device, which is used for collecting heavy metals generated during oral treatment, so as to reduce environmental pollution caused by heavy metals.

[0004] In order to achieve the above object, the present invention proposes the following technical solution: a heavy metal separation device, which comprises a waste collecting tank, a heavy metal receiving bottle, and a solid filter. The waste collecting tank is provided with a sewage water inlet connected to an oral treatment machine, and the heavy metal receiving bottle is provided with a sewage inlet connected to the bottom of the waste collecting tank and a sewage discharge port connected with a negative pressure suction machine: the solid filter is arranged in the heavy metal receiving bottle and is used for filtering heavy metals in the sewage into the heavy metal receiving bottle, and the filtered sewage is sucked and discharged by a negative pressure suction machine.

[0005] Wherein, the solid filter is composed of a mesh layer and a sand layer sandwiched between the filter mesh layers.

[0006] The sand layer includes sea sand, manganese sand or a mixed layer of sea sand and manganese sand.

[0007] The sand layer is formed by mixing sea sand and manganese sand with a weight ratio of 80% sea sand and 20% manganese sand.

[0008] The sewage outlet is connected to the negative pressure pump through a suction pipe, and the suction pipe is also connected to the upper end of the waste collecting tank.

[0009] The solid filter is bonded to the heavy metal receiving bottle.

[0010] The device also includes a mounting bracket on which the waste collecting tank is fixed.

[0011] The heavy metal receiving bottle and the waste collecting tank are sealed and connected by a sealed connector.

[0012] Compared with the prior art, the heavy metal separation device disclosed in the present invention has the advantages of small product size and convenient installation; the amalgam separation rate reaches 99%; it is convenient for the recovery and treatment of heavy metals, so that the heavy metals are effectively collected; it is suitable for stomatological hospitals and individual private dental clinics, and can be used at the same time with one to 20 dental treatment machines: the waste water produced during oral treatment has less heavy metal content, which has a great effect on environmental protection and protects the environment.

Description of drawings

[0013] Fig. 1 is the perspective view of heavy metal separation device of the present invention:

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[0014] Fig. 2 is the schematic sectional view of heavy metal separation device of the present invention:

[0015] Fig. 3 is a schematic diagram of the solid filter of the present invention installed on the heavy metal receiving bottle (including the first sealed connector).

Specific implementation methods

[0016] The following will clearly and completely describe the technical solutions of the embodiments of the present invention in conjunction with the accompanying drawings of the present invention.

[0017] As shown in FIG. 1 and FIG. 2 , the heavy metal separation device disclosed by the present invention includes a waste collecting tank 1, a heavy metal receiving bottle 2, a solid filter 3 and a mounting bracket 4. The waste collecting tank 1 is fixed on the mounting bracket 4. The waste collecting tank 1 is provided with a sewage water inlet 11 connected to a dental treatment machine (not shown in the figure). The waste collecting tank 1 is used to effectively separate water and gas from sewage and negative pressure gas generated during oral treatment.

[0018] The heavy metal receiving bottle 2 is placed at the lower part of the waste collecting tank 1 and is connected with the waste collecting tank 1 through the first sealed connector 6 and the second sealed connector 7 in the form of an interface and is fastened by a buckle. Specifically, the upper end of the heavy metal receiving bottle 2 has a sewage inlet 21 connected to the bottom of the waste collecting tank 1 and the sewage discharge port 22 connected to a negative pressure suction machine, and the heavy metal receiving bottle 2 is used to effectively collect heavy metals such as silver, mercury, copper, tin, and zinc produced during oral treatment.

[0019] As shown in FIG. 3 , the solid filter 3 is arranged inside the heavy metal receiving bottle 2 , and the solid filter 3 and the heavy metal receiving bottle 3 are glued together for effective filtration and deposition of heavy metals, such as silver, mercury, copper, tin, zinc, etc. contained in the sewage generated during oral treatment. The solid filter 3 is hollow and cylindrical as a whole and is composed of a filter layer 31 and a sand layer 32. More specifically, the solid filter 3 includes two filter layers 31, 33 and a sand layer 32 located between the two filter layers 31 and 33. The sand layer 32 is formed by mixing sea sand, manganese sand or a certain proportion of sea sand and manganese sand, and the sand layer is preferably mixed with 80% of sea sand and 20% of manganese sand. The sand grain size of sea sand and manganese sand is preferably 1.5-2 mm, and the gap of the filter screen is 0.5-1 mm. Such a solid filter can effectively filter heavy metals in sewage.

[0020] In addition, the sewage discharge port 22 of the heavy metal receiving bottle 2 is connected to a negative pressure suction machine (not shown) through a suction pipe 5, The suction pipe 5 has a first connection port 51 connected to the upper part of the waste collecting tank 1, a second connection port 52 connected to the sewage discharge port 22 of the heavy metal receiving bottle 2, and a third connection port 53 connected to the negative pressure suction machine. After being sucked by the negative pressure suction machine, the sewage in the waste collecting tank 1 is discharged into the external sewage channel along the arrow direction of the H line in FIG. 2

[0021] During operation, the sewage water inlet 11 of the waste collecting tank 1 is connected to the interface of the spittoon drain of the dental treatment machine, the strong saliva suction device and the weak saliva suction device. The third connection port 53 of the suction pipeline 5 is connected to the negative pressure suction machine. When the doctor treats the patient, he or she uses a spittoon, a strong saliva suction device or a weak saliva suction device. At this time, the dental treatment machine would send a signal to the negative pressure suction machine, and the negative pressure suction machine starts to work. The negative pressure suction machine sucks the sewage generated during the treatment of the patient into the waste collecting tank 1. At this time, the waste collecting tank 1 separates water and gas, and the water flows into the heavy metal storage bottle 2 through the negative pressure suction and the weight of the water itself. The sewage passes through the solid filter 3 and then is sucked into the negative pressure suction machine, in which the heavy metals are filtered by the solid filter 3, and are stored in the heavy metal storage bottle after precipitation, and the filtered sewage is discharged into the national sewage channel through the negative pressure suction machine.

[0022] After using for a period of time, when the heavy metals collected in the heavy metal receiving bottle 2 reach a certain height, the heavy metal receiving bottle is removed from the lower end of the waste collecting tank, and a new heavy metal receiving bottle (connected with a bonded new solid filter) is replaced before continued use.

[0023] The heavy metal separation device described in the embodiment of the present invention is small in size, and the heavy metal receiving bottle is easy to install and replace:

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The amalgam separation rate reaches 99%, and the specific separation data are: 1% of copper, 20% of silver, 25% of tin, 53% of mercury; heavy metals have been effectively collected, which is convenient for heavy metal recycling and processing: it is suitable for dental hospitals and individual private dental clinics, and can be used at the same time with one to 20 dental treatment machines: it reduces the heavy metal content of wastewater generated during dental treatment, which has a great effect on environmental protection and protect the environment.

[0024] The technical content and technical features of the present invention are disclosed above. However, those skilled in the art may still make various replacements and modifications based on the teachings and disclosures of the present invention without departing from the spirit of the present invention. Therefore, the scope of protection of the present invention should not be limited to the content disclosed in the embodiments but should include various replacements and modifications that do not deviate from the present invention and are covered by the claims of this patent application.

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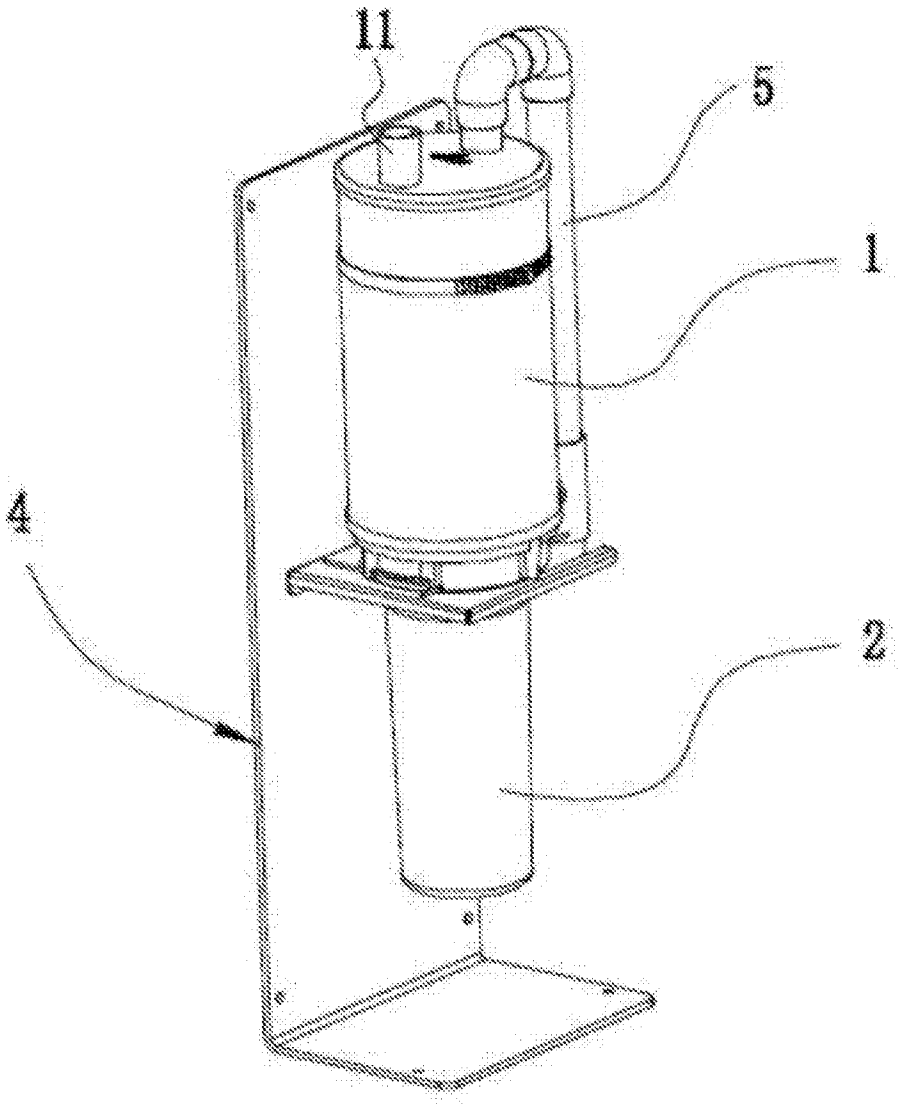


Fig. 1

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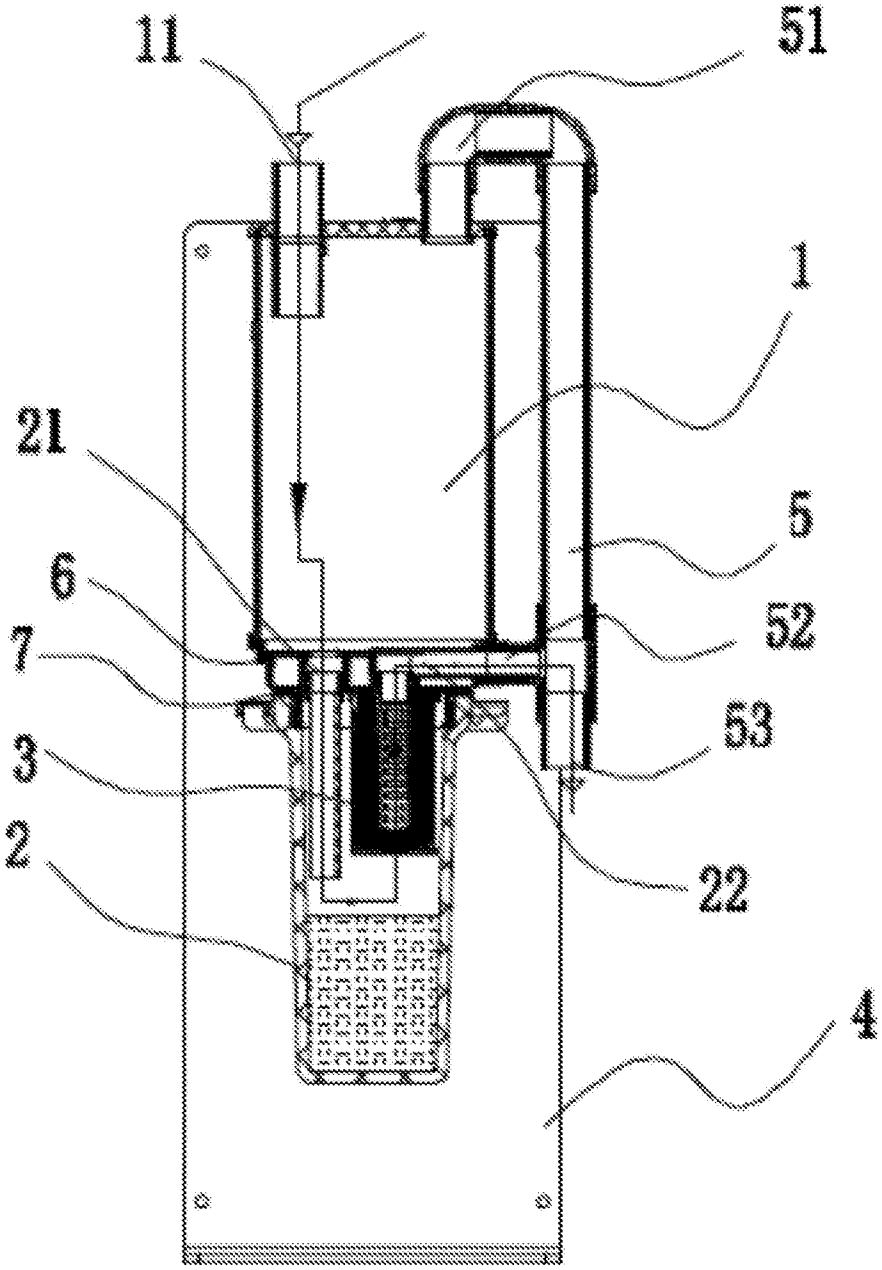


Fig. 2

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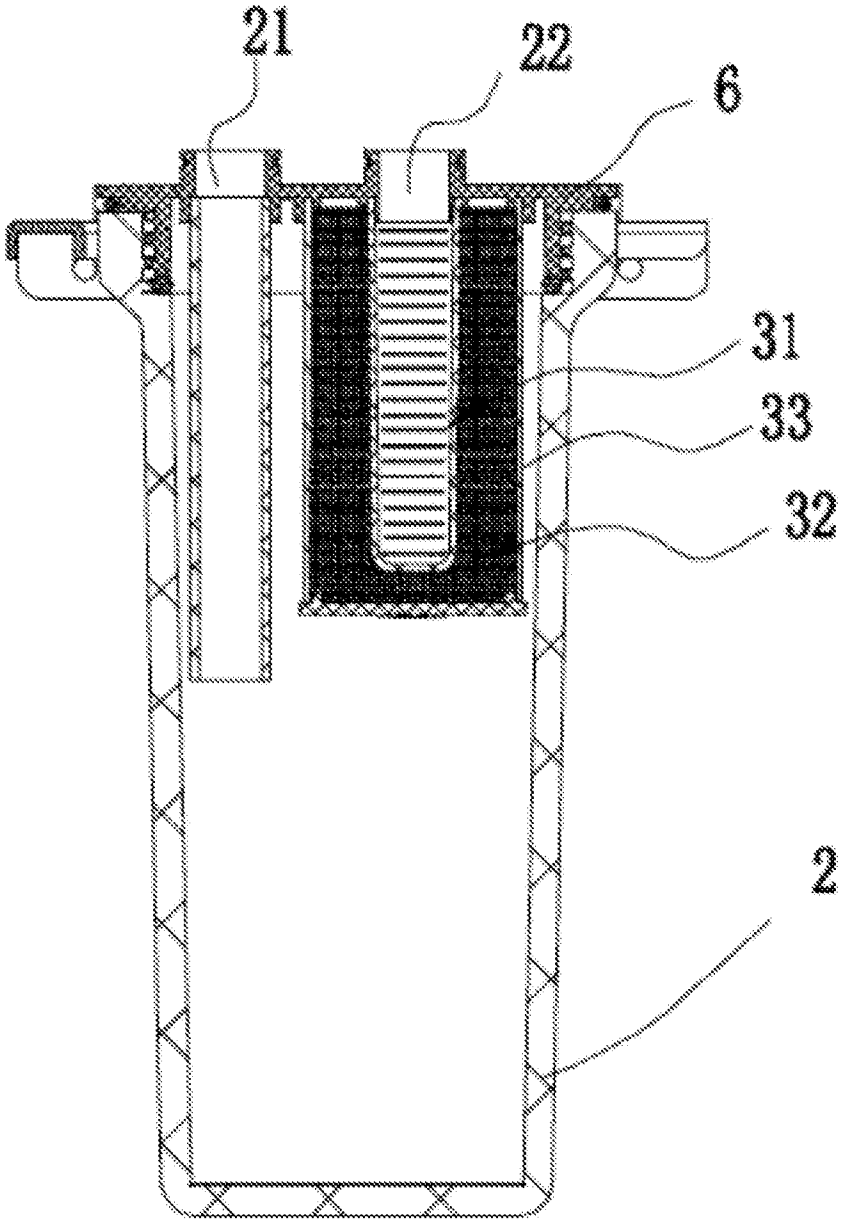


Fig. 3

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TRANSPERFECT

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APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 11:28:34 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63162997	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 5

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D18-Ex1011_CA2356902A1.pdf	26	Non Patent Literature	1619 KB
D17-Ex1010_CN102989232A.pdf	17	Non Patent Literature	9922 KB
D19-Ex1013_Exhibit-B.pdf	9	Non Patent Literature	4510 KB
D20-Ex1014_US20210106412.pdf	32	Non Patent Literature	1167 KB
D21-Ex1015_Amalgam_Separator_Report.pdf	22	Non Patent Literature	5536 KB

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Digest

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If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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US 20210106412A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2021/0106412 A1**

Mozzicato et al. (43) **Pub. Date: Apr. 15, 2021**

(54) **DETACHABLE RECYCLING CONTAINER**

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(21) Appl. No.: **16/941,522**

(22) Filed: **Jul. 28, 2020**

Related U.S. Application Data

(63) Continuation-in-part of application No. 16/033,823, filed on Jul. 12, 2018, now Pat. No. 10,779,923, which is a continuation-in-part of application No. 15/703,823, filed on Sep. 13, 2017, now Pat. No. 10,592,508.

Publication Classification

(51) **Int. Cl.**

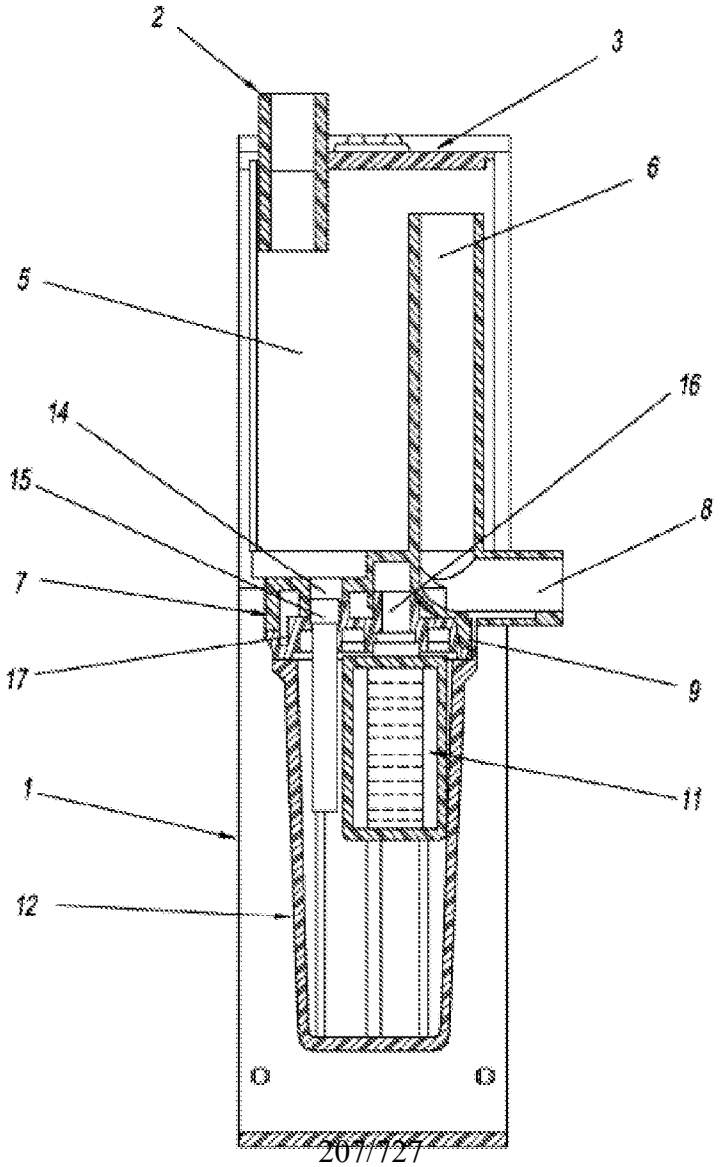
A61C 17/06	(2006.01)
B65D 43/02	(2006.01)
B01D 21/24	(2006.01)

(52) **U.S. Cl.**

CPC ***A61C 17/065*** (2019.05); ***B65D 43/0231*** (2013.01); *A61M 1/0001* (2013.01); *B65D 2543/00092* (2013.01); ***B01D 21/2444*** (2013.01)

(57) **ABSTRACT**

The present invention provides dental amalgam recycling systems, useful for recycling particles from a dental liquid effluent drawn, for example, from a suctioning device.



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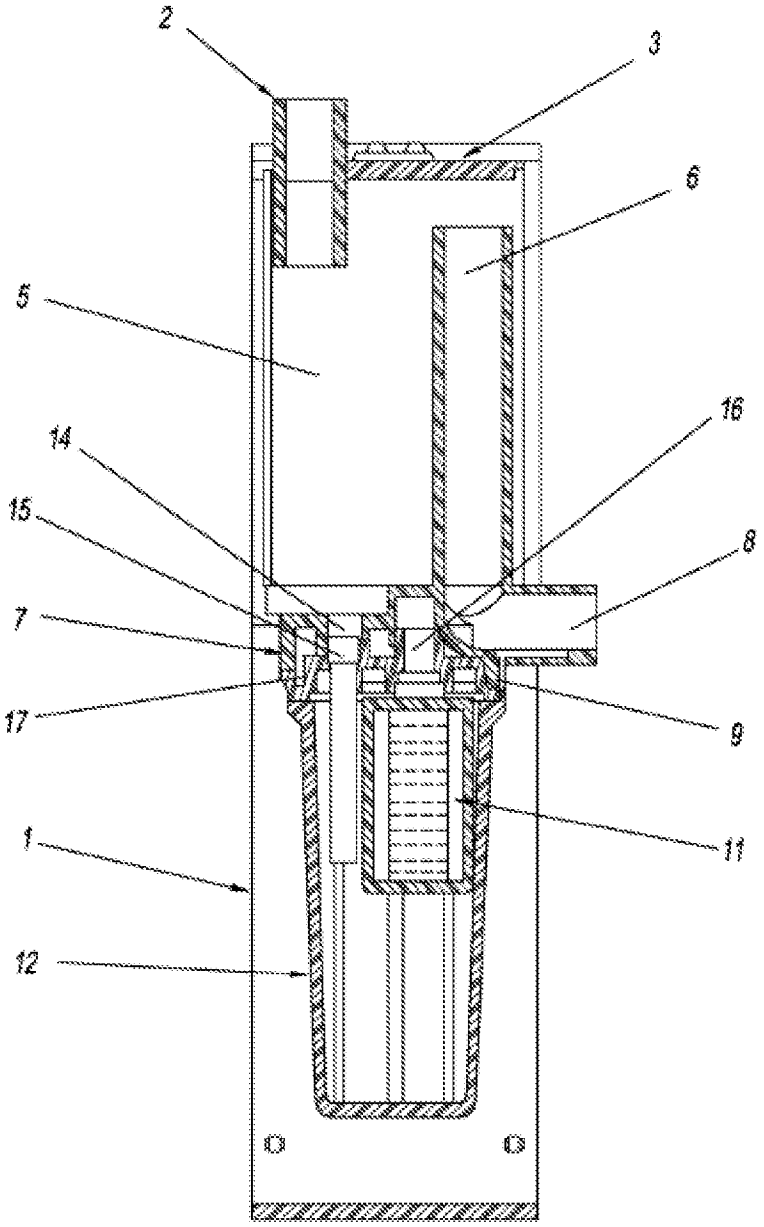


FIGURE 1

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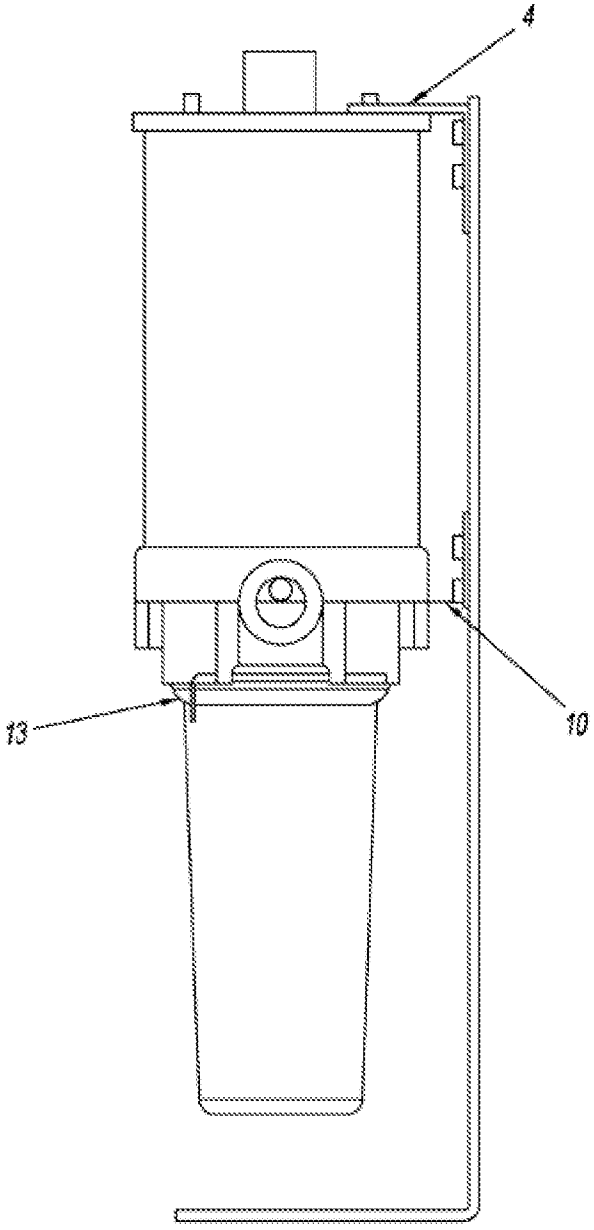


FIGURE 2

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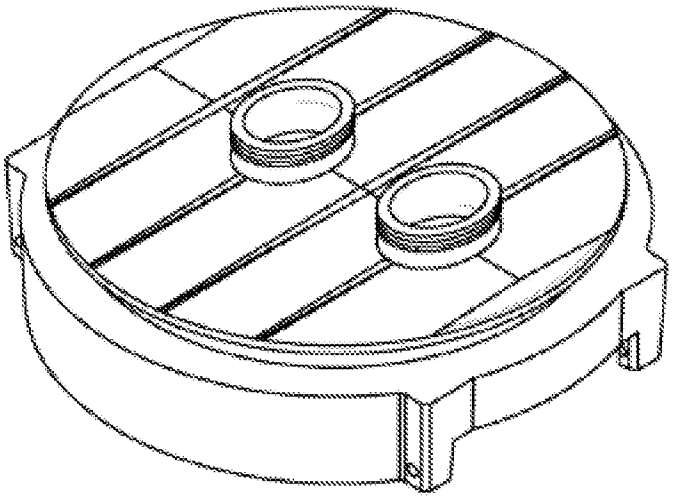


FIGURE 3A

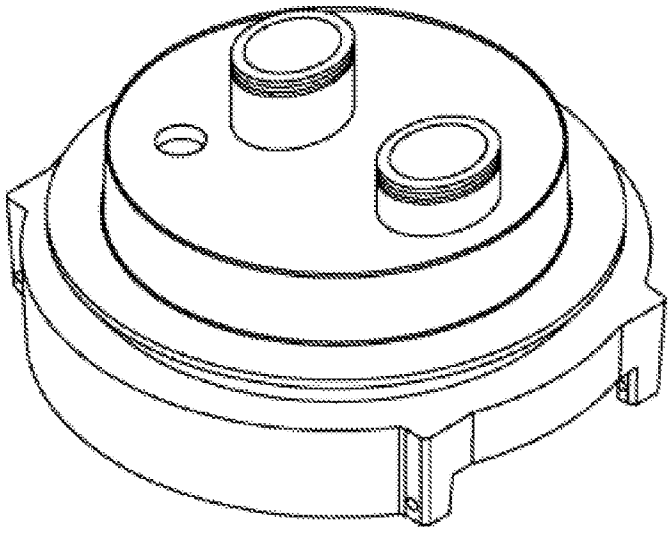


FIGURE 3B

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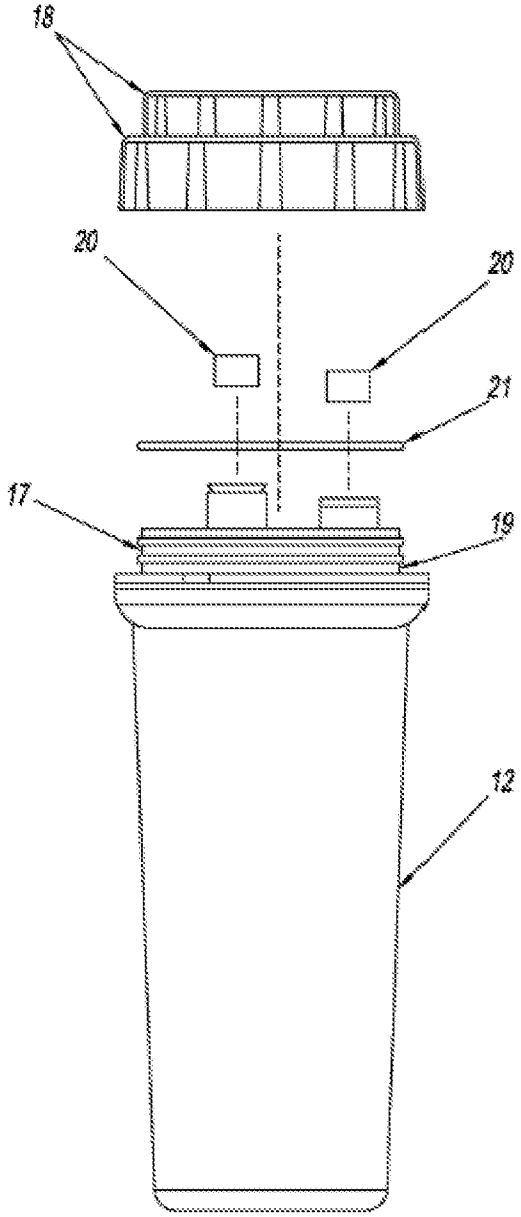


FIGURE 4A

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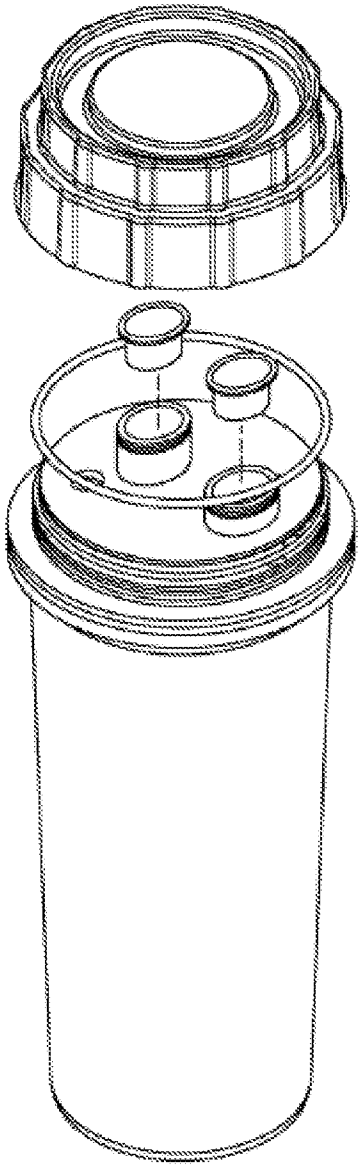


FIGURE 4B

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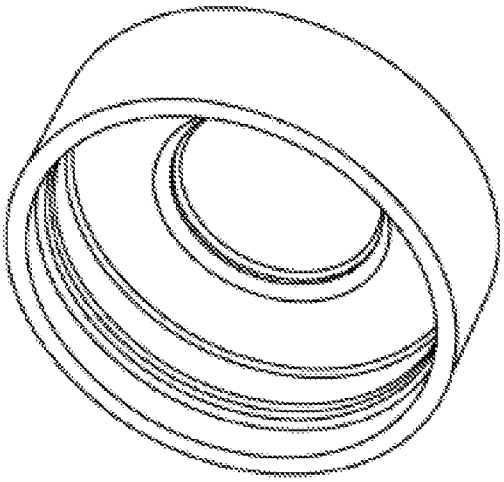


FIGURE 5A

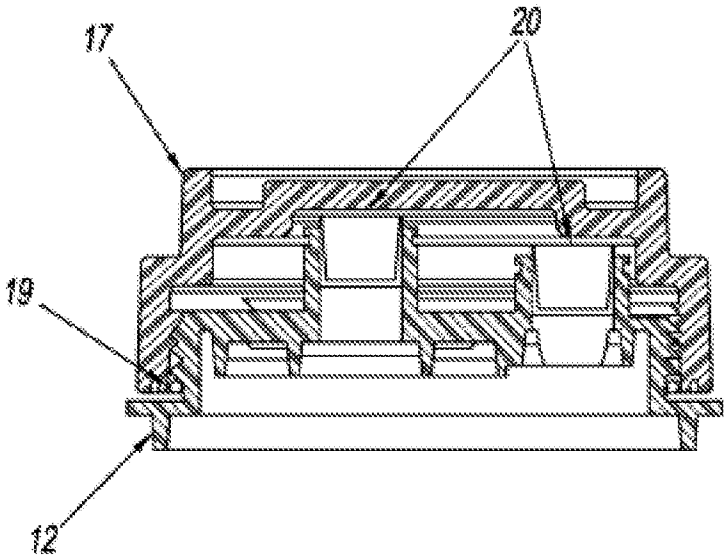


FIGURE 5B

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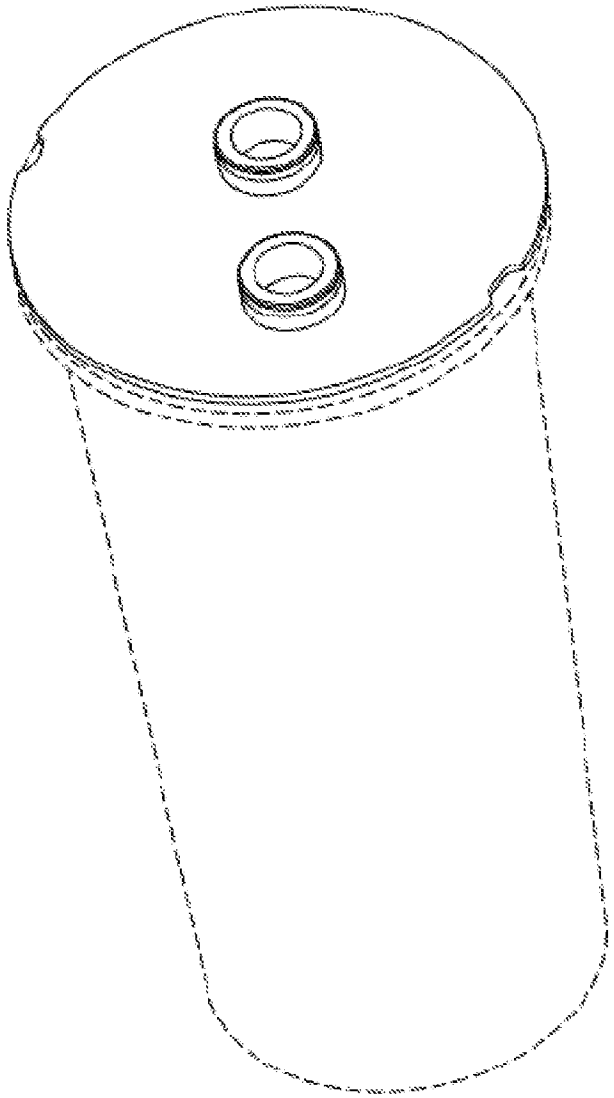


FIGURE 6A

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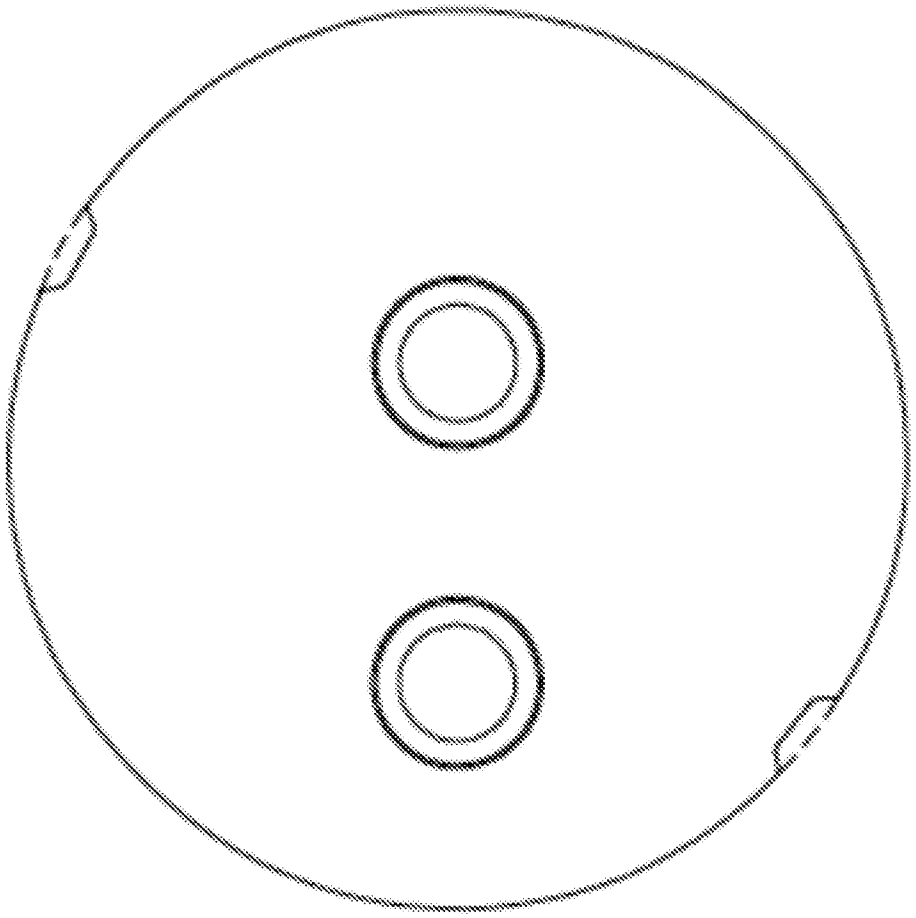


FIGURE 6B

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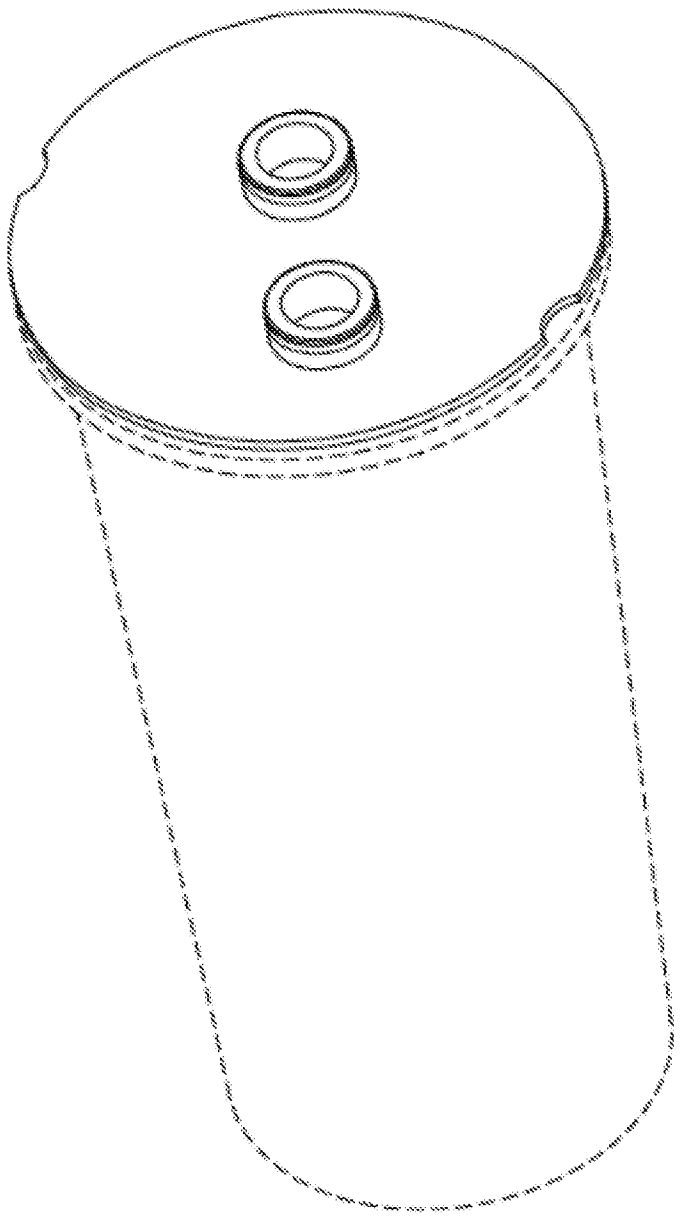


FIGURE 7A

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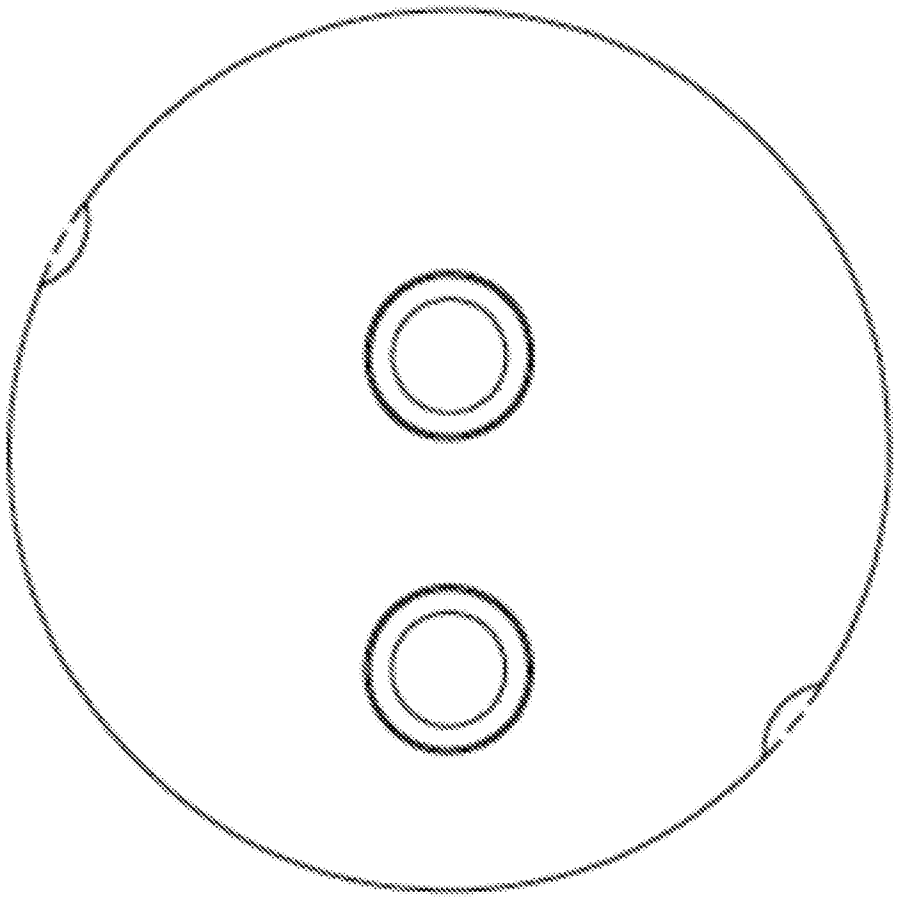


FIGURE 7B

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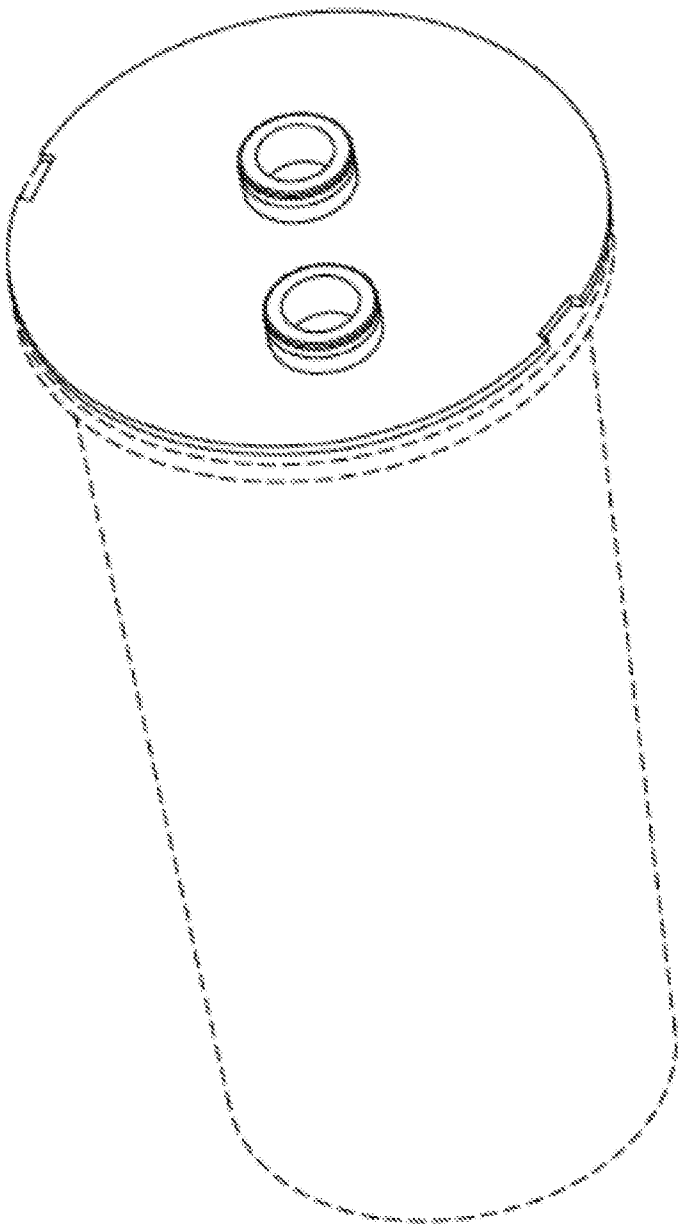


FIGURE 8A

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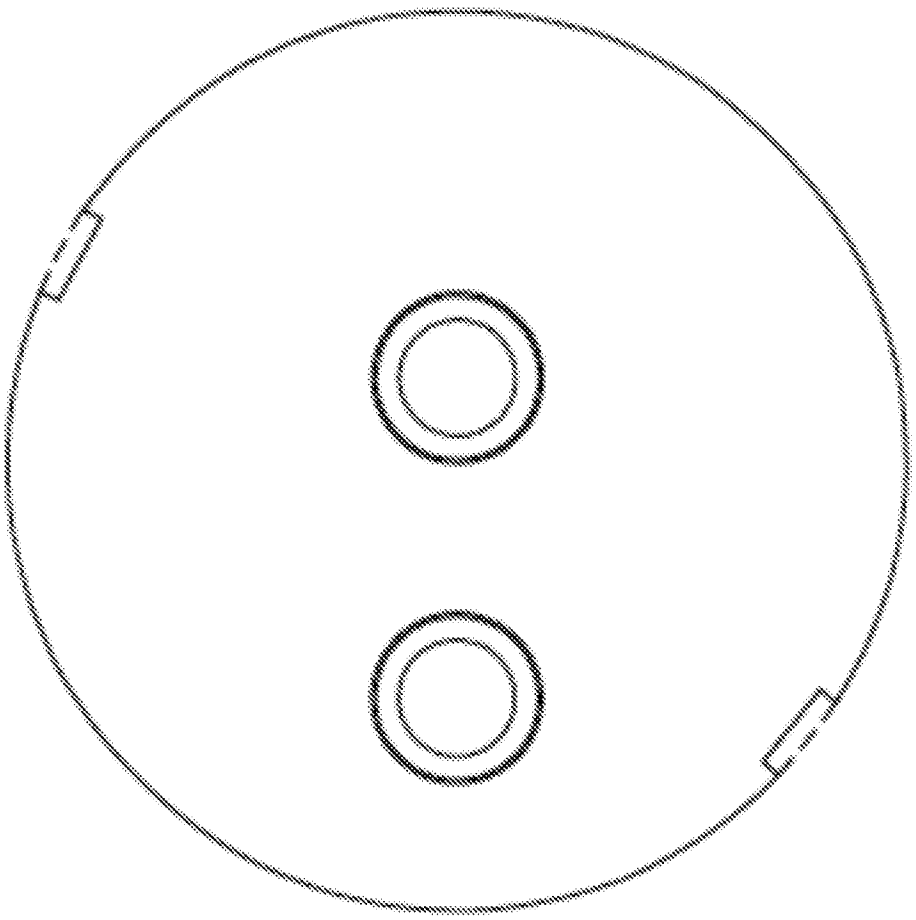


FIGURE 8B

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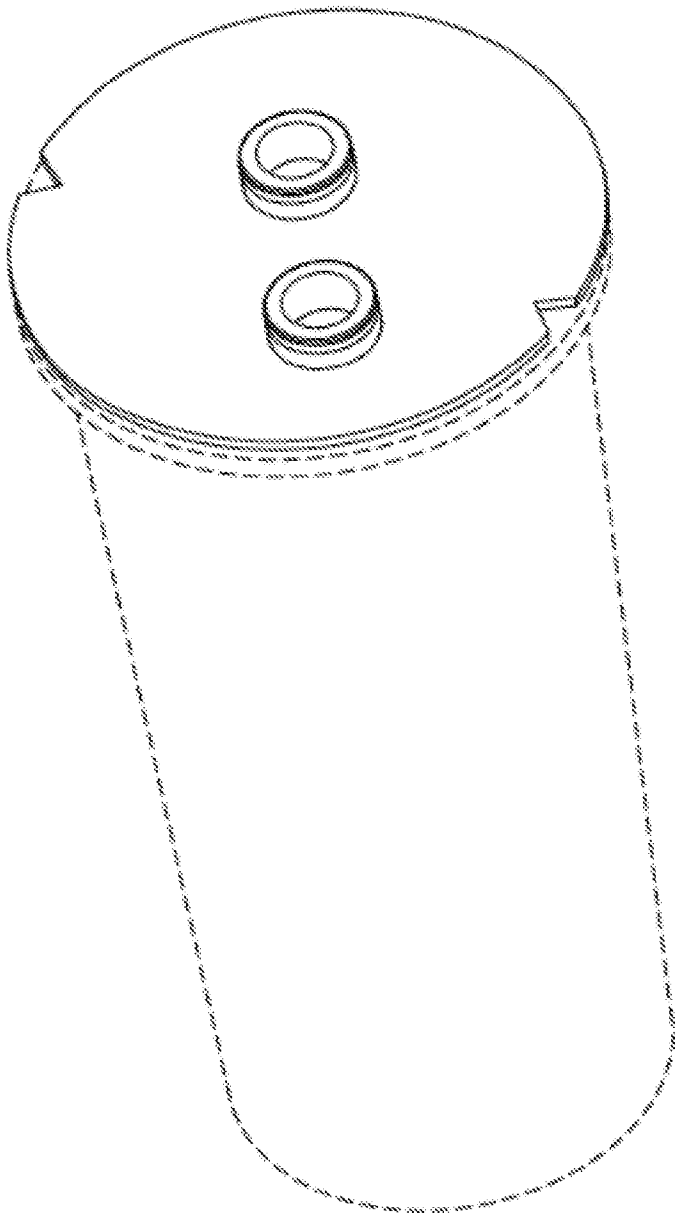


FIGURE 9A

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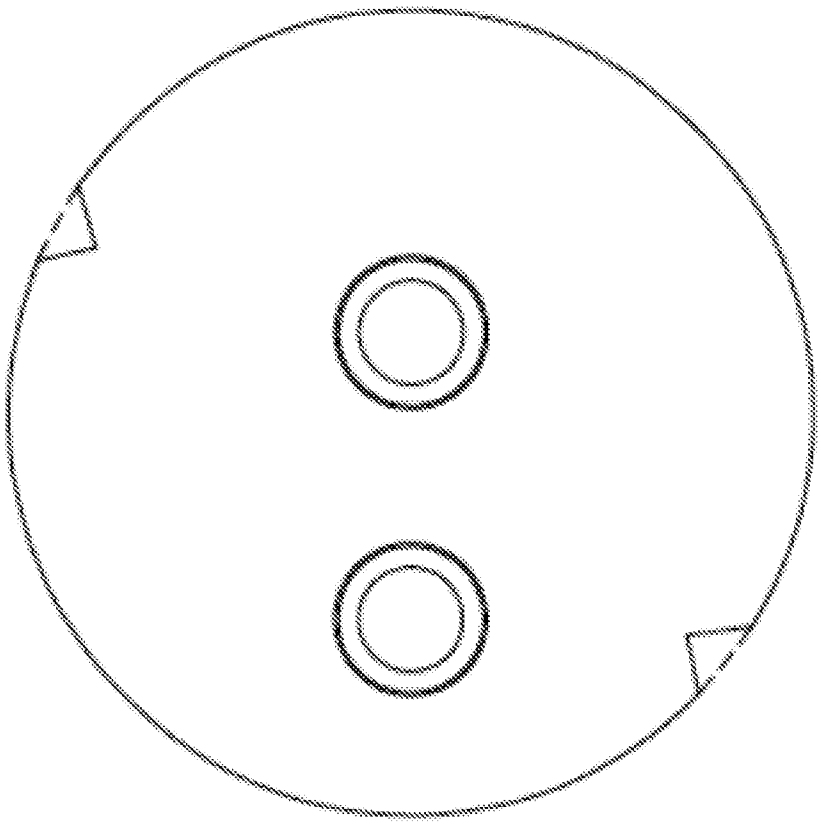


FIGURE 9B

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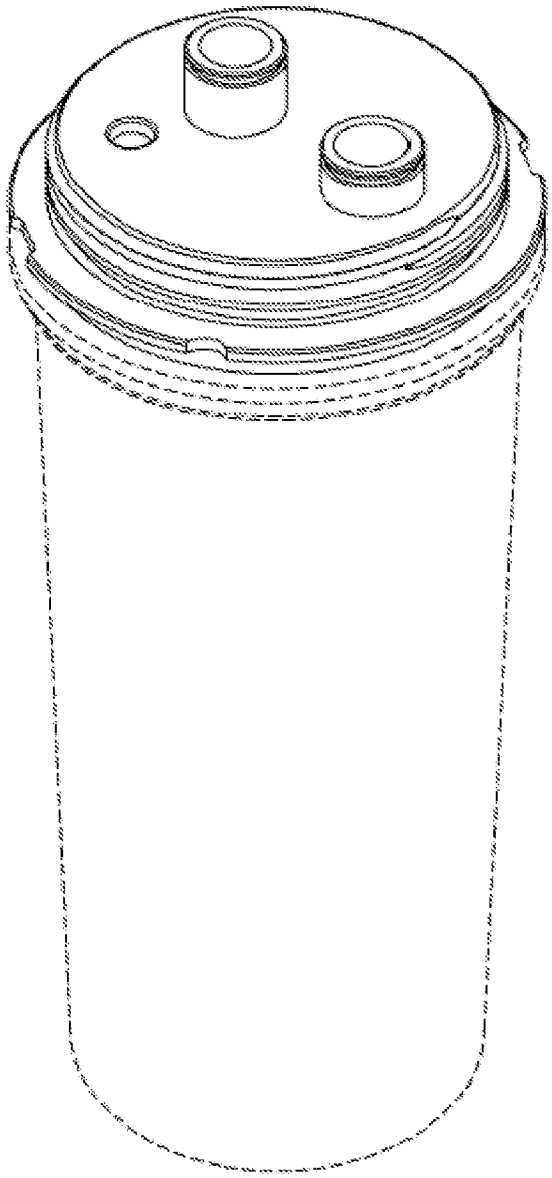


FIGURE 10A

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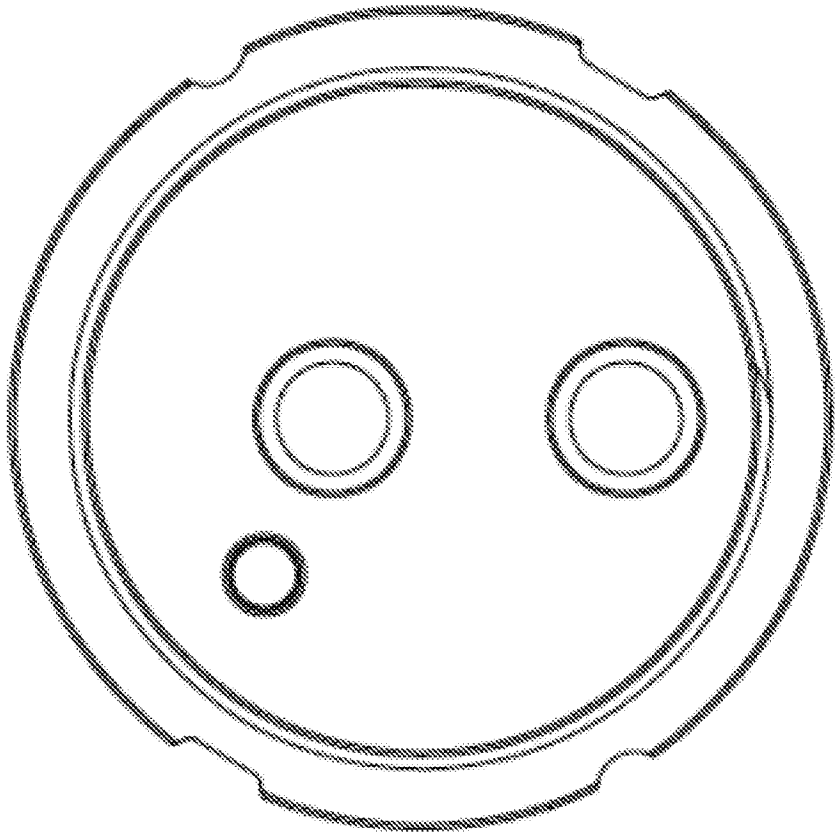


FIGURE 10B

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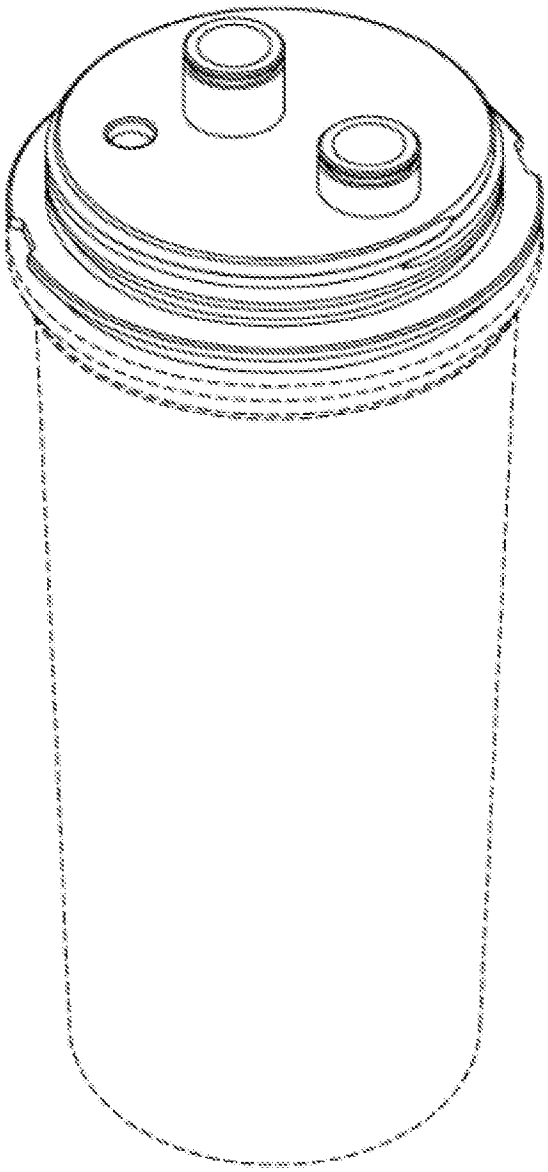


FIGURE 11A

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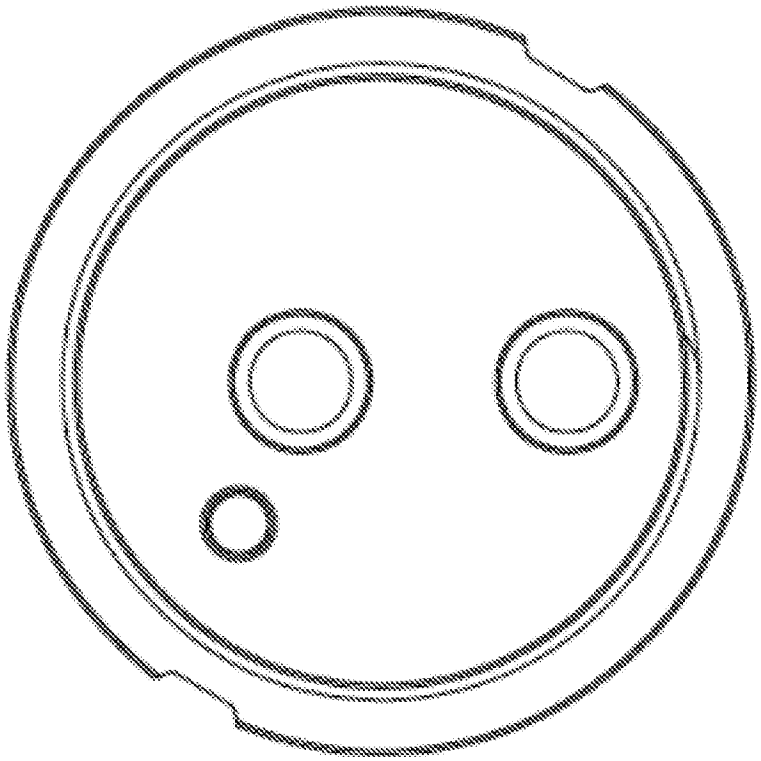


FIGURE 11B

Solmetex Ex. 1004
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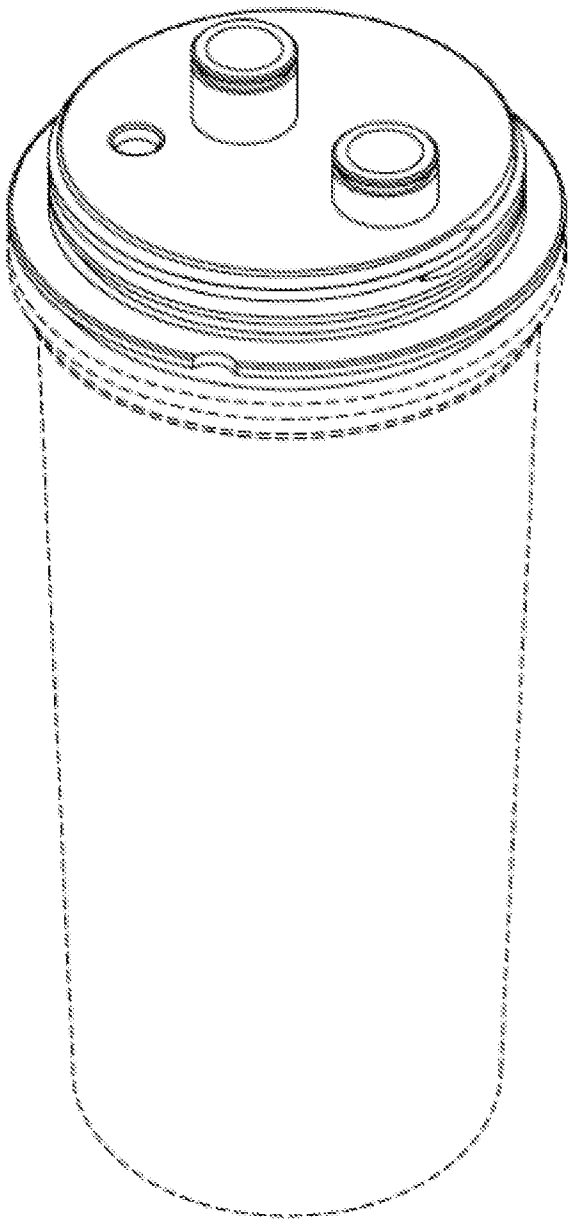


FIGURE 12A

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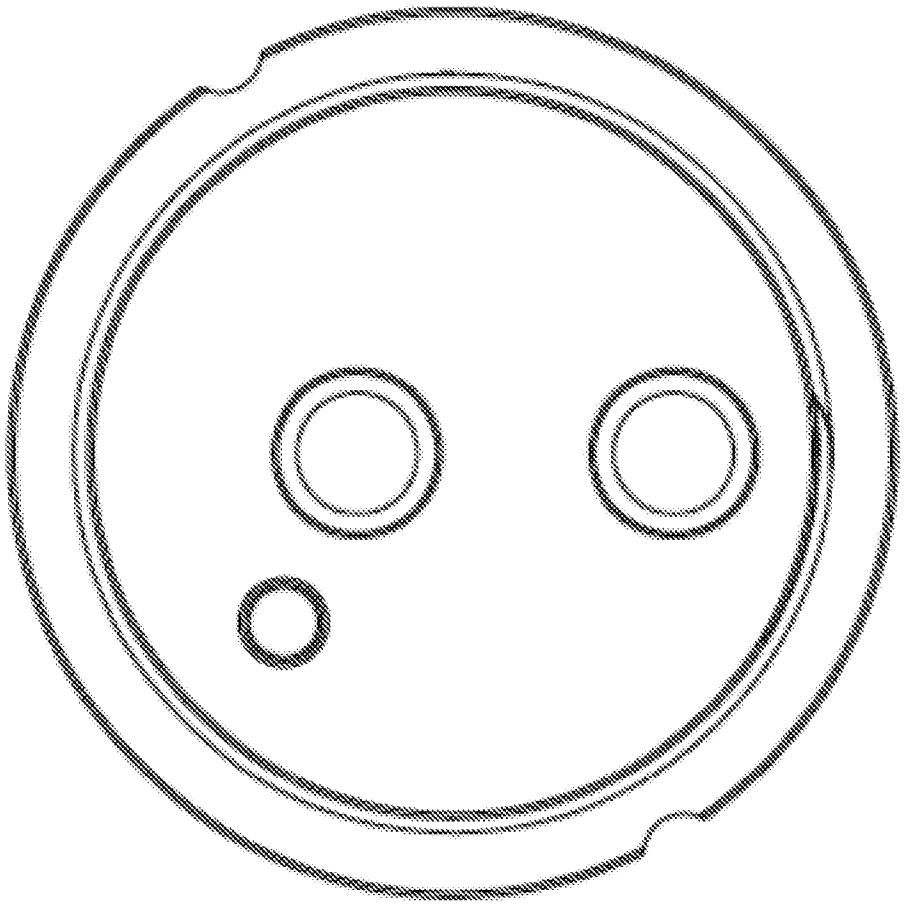


FIGURE 12B

PGR2023-00555 - Ex. 1014
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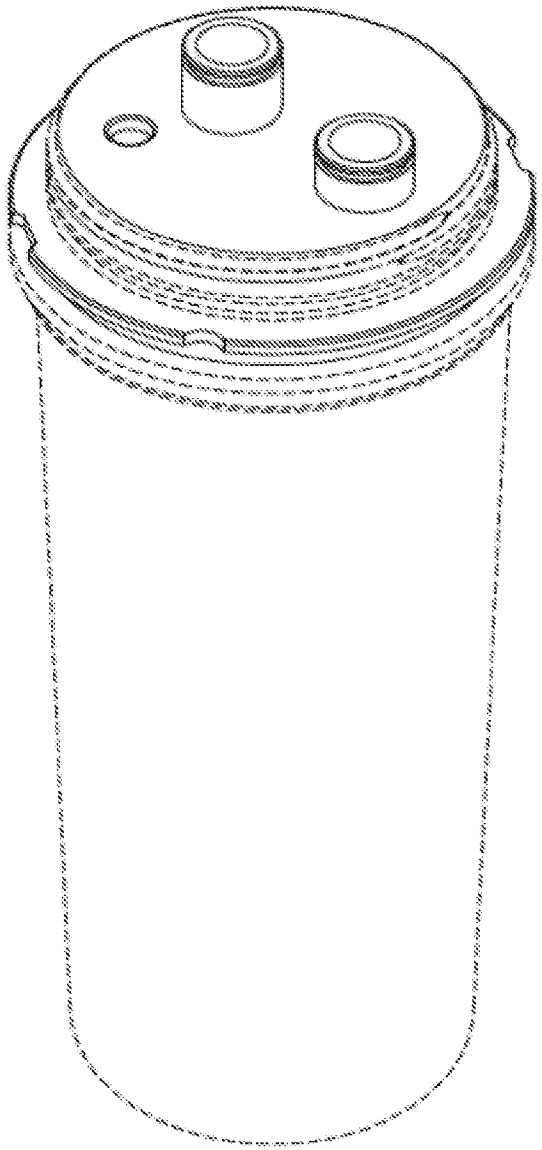


FIGURE 13A

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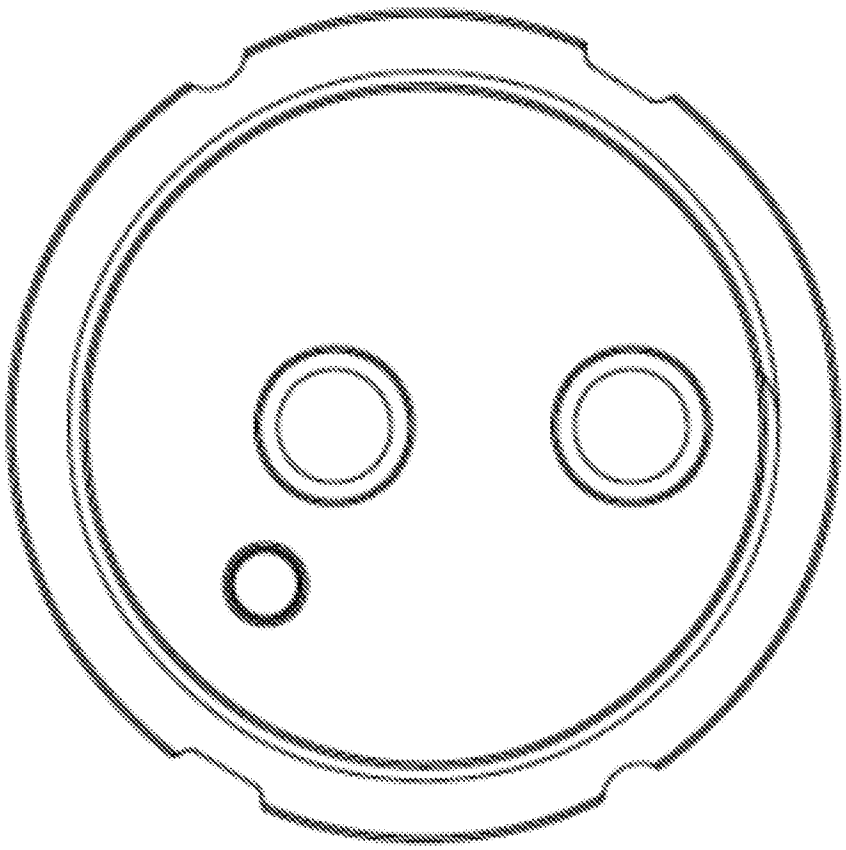


FIGURE 13B

Solmetex Ex. 1002
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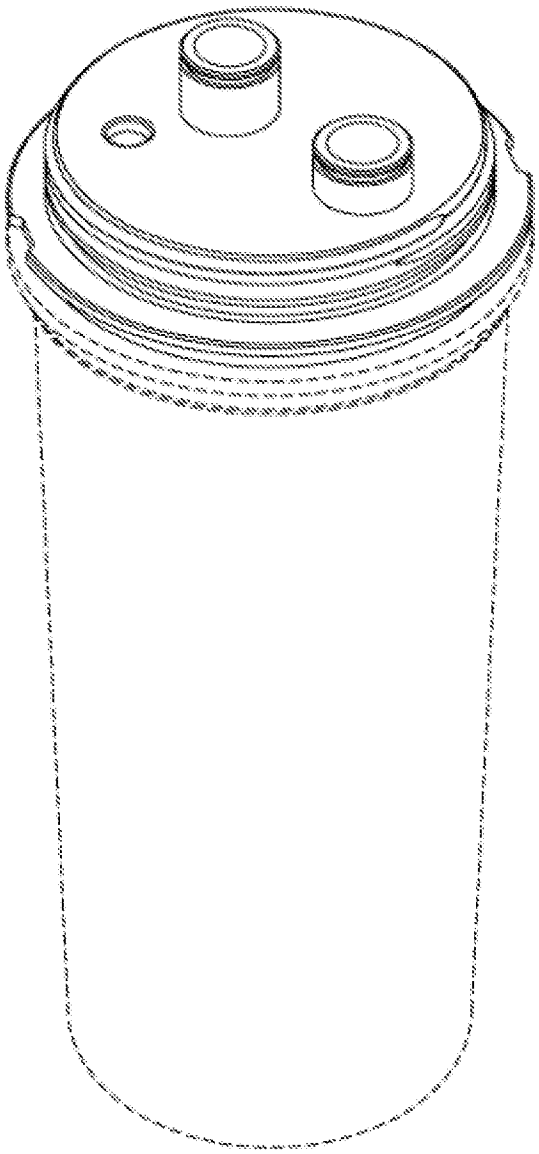


FIGURE 14A

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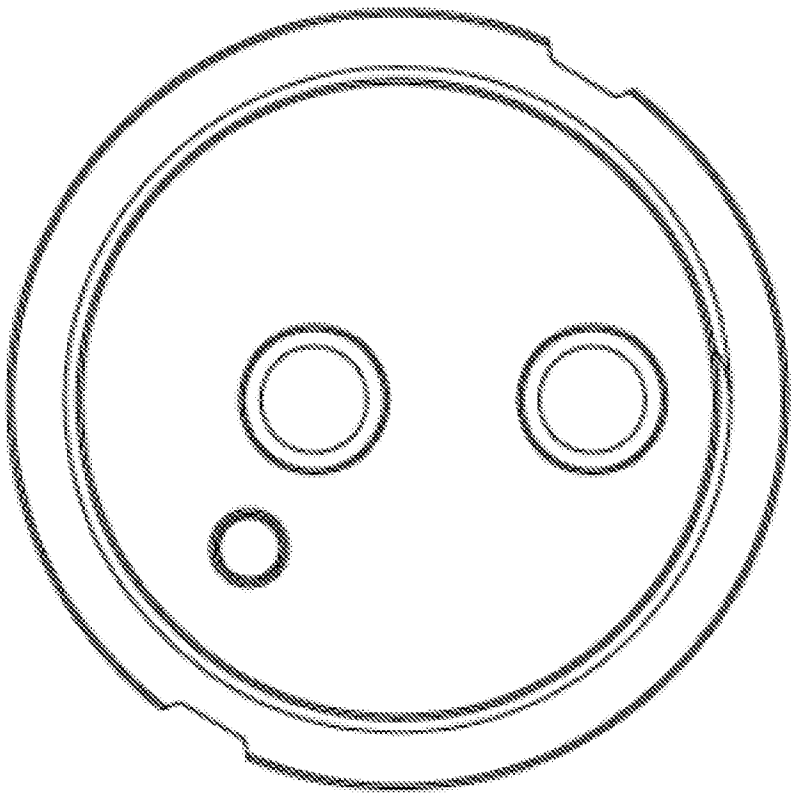


FIGURE 14B

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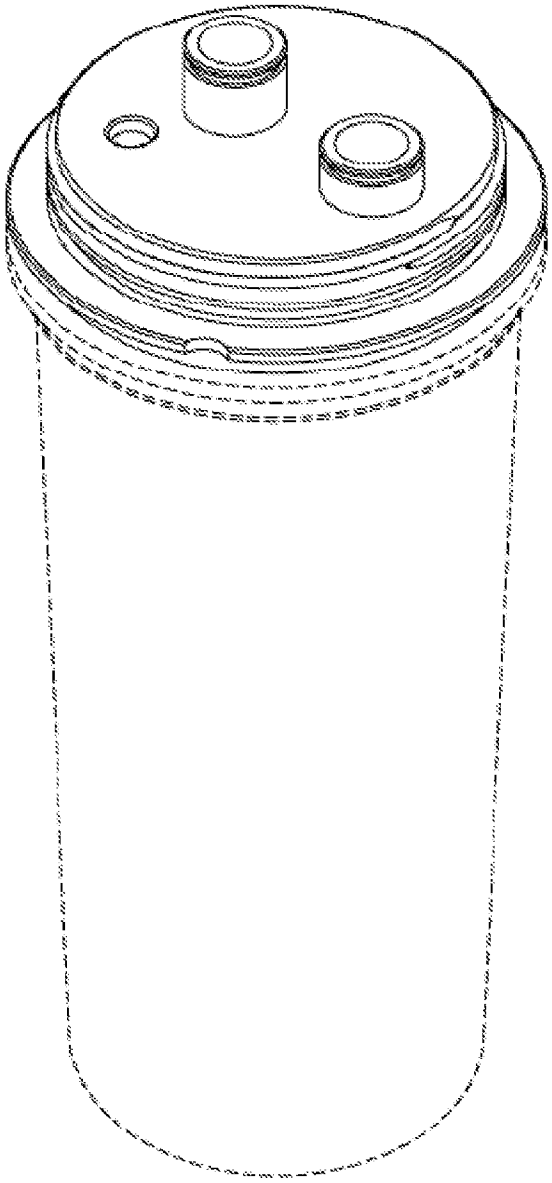


FIGURE 15A

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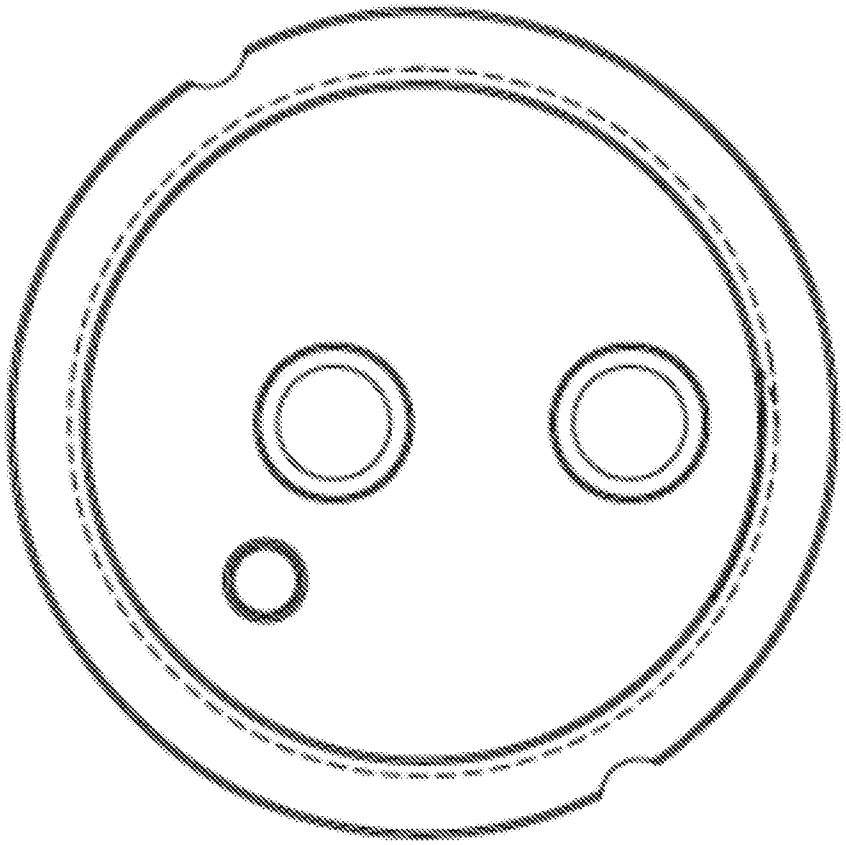


FIGURE 15B

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DETACHABLE RECYCLING CONTAINER

RELATED APPLICATIONS

[0001] This patent application claims priority from provisional patent application Ser. No. 62/414,712, filed on Oct. 29, 2016; and provisional patent application Ser. No. 62/406,990, filed on Oct. 12, 2016. This application further claims priority from patent application Ser. No. 29/667,212, filed Oct. 19, 2018, which is a continuation of Ser. No. 29/585,659, filed on Nov. 28, 2016, now patent number D835,778. This patent application further claims priority from patent application Ser. No. 29/585,674, filed on Nov. 28, 2016. This patent application further claims priority from patent application Ser. No. 29/672,887, filed on Dec. 10, 2018, which is a continuation of patent application Ser. No. 29/585,668, filed on Nov. 28, 2016, now patent number D835,779. This patent application further claims priority from patent application Ser. No. 29/577,701, filed on Sep. 14, 2016. This patent application further claims priority from patent application Ser. No. 29/567,544, filed on Jun. 9, 2016. This patent application further claims priority from patent application Ser. No. 29/671,943, filed on Nov. 30, 2018, which is a continuation of patent application Ser. No. 29/565,622, filed on May 23, 2016, now issued U.S. Pat. No. D835,264.

FIELD OF THE INVENTION

[0002] This invention relates to systems and apparatus suitable to remove particles from effluent waste, and particularly, to remove amalgam and other metallic particles and other abrasive solids from dental office suction effluent. The system also comprises a self contained recycling container to facilitate customer regulatory compliance and environmental safeguards.

BACKGROUND OF THE INVENTION

[0003] Dental amalgam is a dental filling material used to fill cavities caused by tooth decay. It has been used for more than 150 years in hundreds of millions of patients around the world.

[0004] Dental amalgam is a mixture of metals, consisting of liquid (elemental) mercury and a powdered alloy composed of silver, tin, and copper. Approximately 50% of dental amalgam is elemental mercury by weight. The chemical properties of elemental mercury allow it to react with and bind together the silver/copper/tin alloy particles to form an amalgam. See http://www.fda.gov/MedicalDevices/ProductsandMedical Procedures/DentalProducts/DentalAmalgam/ucm171094.htm, accessed Sep. 9, 2016.

[0005] Amalgam is used less often than in the past, mostly because tooth-colored materials now can be used. However, the newer materials can't be used for all dental situations, amalgam is less costly than newer materials and it lasts longer, especially in teeth that undergo a lot of pressure and wear from chewing.

[0006] Better dental health overall coupled with increased demand for more modern alternatives such as resin composite fillings (which match the tooth color), as well as public concern about the mercury content of dental amalgam, have resulted in a steady decline in dental amalgam use in developed countries, though overall amalgam use continues to rise worldwide. Stein, P S; Sullivan, J; Haubenreich, J E; Osborne, P B (2005). "Composite resin in medicine and dentistry". Journal of long-term effects of medical implants, 15 (6):641-54, doi:10.1615/jlongtermeffmedimplants. v15.i6.70. PMID 16393132.

[0007] Although amalgams are less frequently used in developed countries for new dental fillings than in the past, amalgams continue to make up a portion of the particle component of dental office effluent mainly because of the fact that old fillings made of amalgams are drilled out and removed in the effluent waste when new fillings are effected to replace the old. Further, as noted above, even under current dental practice, an amalgam is preferred for some tooth filling situations.

[0008] Because mercury is a poison that can accumulate in living tissues and can pose a health hazard to species in a food chain exposed to mercury-containing compounds, and since humans are inevitably at the end of the food chain, it follows that effluent containing amalgams can pose a health hazard to the community at large. Also, certain metals such as silver are commercially valuable if recovered in quantity. For those reasons, it is desirable to devise systems, apparatus and processes for removing amalgams from dental office effluent and efficiently recycling those amalgams.

[0009] In addition to removing amalgams, other matter disposed into dental office suction effluent includes aluminum oxides used in air abrasion treatments and other solid waste material. These solid materials tend to wear out or damage vacuum pumps and other equipment downstream of the dental chair suction apparatus, and also constitute effluent water contaminants. Therefore, it is desirable for the apparatus to remove solid abrasive material and other particulate waste from the dental office suction effluent.

[0010] The World Health Organization also points out that amalgam separators, installed in the waste water lines of many dental offices, dramatically decrease the release of mercury into the public sewer system. However, critics say that the separators are still not mandatory in some states of the United States. "Purchasing, installing and operating dental amalgam separators: Practical issues". The Journal of the American Dental Association. 134 (8):1054-65. doi:10.14219/jada.archive.2003.0319. PMID 12956345. Recently, the EPA has enacted nation-wide regulations requiring amalgam separators in dental offices.

[0011] Previously known apparatus for removing amalgam particles from dental office suction effluent are known to include a collecting tank for collecting a day's accumulation of suction effluent from one or more sources of such waste. The waste is sucked from the dental chair suction apparatus and into the collecting tank by a vacuum pump. When the vacuum pump is turned off, an outlet valve is opened and the accumulated waste is deposited into a separation device intended to separate metal particles from the effluent liquid. Flow into the separation device is induced by the head of fluid in the collecting tank. Particles passing through the separation device are separated from the waste by gravity and settle to the bottom of the separation device. The flow rate is dependent on the head inside the collecting tank; as the head diminishes, the flow rate also diminishes. The changes in flow rate are undesirable because the particle separation rate is affected, and the system becomes prone to plugging when the flow rate decreases. Also, since the waste can be deposited only when the vacuum pump is off, waste is usually moved to the separation device at the end of the

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day. As a result, the collecting tank and separation device tend to be undesirably large and the whole process is time consuming.

[0012] Another known apparatus is a centrifuge type system that separates heavier metal particles from effluent liquid by collecting the particles at the peripheral wall of the centrifuge. This apparatus does not effectively separate lighter particles, and is expensive to purchase and operate due to the complexity of its mechanical parts.

[0013] Yet another known apparatus uses a dedicated mechanical pump to suction waste liquids through a separator device. Again, a dedicated pump can be expensive to purchase and to maintain, and can be undesirably space-consuming.

[0014] Such known systems can become quite complex, unwieldy and expensive, as for example that disclosed in U.S. Pat. No. 5,885,076 granted 23 Mar. 1999. It teaches the use of sedimentation, co-precipitation and filtration in an expensive complicated apparatus that is probably economical, if at all, only for relatively large installations such as a military base dental complex.

[0015] U.S. Pat. Nos. 6,692,636 and 6,596,754 are patents that disclose systems for removing amalgam from dental office suction effluent.

[0016] After collecting the amalgam and other solid waste the dentist is left with the problem of what to do with the waste. Either the dentist has to deal with his own hazardous waste or he can send his collected material to a recycler. In either case, the "collection container" needs to be disposable and easily replaceable.

[0017] Existing recycling programs generally require the provision of bulky shipping materials and the delivery of those materials to the dentist for every full container. If such materials are not provided and the materials are not properly recycled a large part of the benefit of collecting the amalgam waste can be lost. It is important that the waste is recycled under federal guidelines in order to make sure the full benefits of amalgam separation are achieved.

[0018] Additionally, containers for collection, such as dental amalgam recycling systems, can be compromised by incorrect installation or misalignment, which can cause O-rings to deform and/or seal irregularly, and result in leakage.

SUMMARY OF THE INVENTION

[0019] The present invention overcomes many of the shortcomings of the prior technology and achieves further advantages that will be apparent after reviewing the following detailed description.

[0020] In one aspect, the invention comprises a dental amalgam recycling system for recycling particles from a dental liquid effluent drawn from a suctioning device. In certain embodiments, the dental amalgam recycling system of the invention comprises:

[0021] (a) an air-water separator tank for receiving said effluent, said air-water separator tank having an air-water separator tank inlet in fluid communication with said suctioning device, an air-water separator tank liquid effluent outlet and an air-water separator tank air outlet;

[0022] (b) a detachable recycling container, said recycling container acting primarily under the influence of gravity to cause settlement of said particles; said recycling container having a recycling container effluent inlet port connected to said air-water separator tank liquid effluent outlet and said recycling container further having an effluent outlet port;

[0023] (c) wherein the air-water separator tank also includes an internal suction conduit;

[0024] (d) wherein the recycling container comprises threads;

[0025] (e) wherein the recycling container effluent inlet port and the recycling container outlet port are not the same height.

[0026] In certain embodiments, the dental amalgam recycling system further comprises (f) a threaded shipping cap, wherein the threads of the shipping cap and the threads of the recycling container are complementary such that, when the shipping cap is fitted in place, the shipping cap forms a tight seal with said recycling container.

[0027] While in use, the dental amalgam recycling system is functionally associated with a vacuum pump having a vacuum pump inlet. The vacuum pump is typically a pre-existing part of the dental office facility. In particular embodiments, the dental amalgam recycling system is physically connected with a vacuum pump via a suction conduit in the air-water separator. In certain preferred embodiments, the suction conduit is an internal suction conduit within the air-water separator.

[0028] In certain embodiments, the dental amalgam recycling system of the invention further comprise a first plug for said recycling container inlet port and a second plug for said recycling container effluent outlet port. Said first and second plugs may be held tightly in place by said threaded shipping cap when said shipping cap is fitted in place.

[0029] In certain embodiments, the dental amalgam recycling system of the invention further comprise an O-ring that provides an air and effluent tight seal when said shipping cap is fitted in place.

[0030] In certain embodiments, the invention comprises a container, useful as a dental amalgam recycling container, comprising threads for attachment of a shipping cap. In certain embodiments, the dental amalgam recycling container further comprises two plugs held in place by said shipping cap and an O-ring fitted in an O-ring groove to prevent leaks. The dental amalgam recycling containers of the present invention may further comprise a two tier cap that enables people with hands of different sizes to grip the cap and tighten to achieve a very tight seal.

[0031] In certain embodiments, the invention comprises an adapter for an air-water separator tank, wherein the adapter enables a recycling container without compatible effluent ports to attach to an air-water separator tank. Said air-water separator tank may comprise, for example, a component of a dental amalgam recycling system, as described above. In certain embodiments, the adapter may comprise threads. In alternative embodiments, the adaptor may be without threads.

[0032] As described above, the potential for leakage exists in a collection canister such as a recycling container used in the dental amalgam recycling systems described herein. Such leakage may occur, for example, due to incorrect installation, or due to misalignment of a container and its intended mating partner, such as the air-water separation tank or its intended cap, such as a threaded shipping cap, which may cause O-rings to deform and/or seal irregularly. In order to address this problem and/or reduce the potential for leakage, a collection canister, such as a recycling container used in a dental amalgam recycling system, may have

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one or more irregular 'keyways' cast into its outside top mating surface, and the intended mating partner, such as the air-water separation tank, or the shipping cap, may have one or more corresponding 'key(s)' be cast into its mating surface, such that the key(s) and keyway(s) must be aligned in order for the collection canister (e.g., the recycling container) and its mating partner (e.g., the air-water separation tank; or the shipping cap) to mate properly. This key/keyway system can help ensure even pressure across the entire circumference of the O-ring surface on each port. Similarly, such key(s) and keyway(s) may be used to ensure proper replacement of the container and/or the air-water separation tank, such that incorrect replacement can be avoided or minimized.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] FIG. **1** is a schematic front view of an embodiment of particle removal and recycling apparatus according to the invention, for particular use in a dental office.

[0034] FIG. **2** is a schematic side view of an embodiment of particle removal and recycling apparatus according to the invention, for particular use in a dental office.

[0035] FIG. **3** *a* is a schematic view of an embodiment of a universal adapter for fitting various different sized recycling containers to the air-water separator of the present invention.

[0036] FIG. **3** *b* is a schematic view of an alternative embodiment of a universal adapter for fitting various different sized recycling containers to the air-water separator of the present invention.

[0037] FIG. **4** *a* is a schematic view of an embodiment of a recycling container and cap system of the invention.

[0038] FIG. **4** *b* is a schematic perspective depiction of an embodiment of a recycling container and cap system of the invention.

[0039] FIG. **5** *a* is a schematic inside view of an embodiment of a recycling cap for the recycling containers of the invention.

[0040] FIG. **5** *b* is a schematic depiction of a recycling cap according to the invention fitting on a partial view of a recycling container according to the invention.

[0041] **1**—Backplate

[0042] **2**—Waste Inlet (from dental practice)

[0043] **3**—Air/water Separator Top

[0044] **4**—Top Support Bracket

[0045] **5**—Air/Water Separation Tank

[0046] **6**—Suction tube

[0047] **7**—Air/Water Separator Base

[0048] **8**—Outlet Tube (to vacuum system)

[0049] **9**—Recycling Container Top

[0050] **10**—Lower Support Bracket

[0051] **11**—Restrictor

[0052] **12**—Detachable Recycling Container

[0053] **13**—Retaining Pins (**2**)

[0054] **14**—air-water separator tank effluent outlet port

[0055] **15**—recycling container inlet port

[0056] **16**—recycling container outlet port

[0057] **17**—recycling container threads

[0058] **18**—two tier recycling cap

[0059] **19**—O-ring groove

[0060] **20**—cap plugs

[0061] **21**—O-ring

[0062] FIG. **6**A is a schematic view of a first embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0063] FIG. **68** is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0064] FIG. **7**A is a schematic view of a second embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0065] FIG. **78** is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0066] FIG. **8**A is a schematic view of a third embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0067] FIG. **88** is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0068] FIG. **9**A is a schematic view of a fourth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0069] FIG. **98** is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0070] FIG. **10**A is a schematic view of a fourth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0071] FIG. **10**B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0072] FIG. **11**A is a schematic view of a fifth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0073] FIG. **11**B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0074] FIG. **12**A is a schematic view of a sixth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0075] FIG. **12**B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0076] FIG. **13**A is a schematic view of a seventh embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0077] FIG. **138** is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0078] FIG. **14**A is a schematic view of a eighth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0079] FIG. **14**B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0080] FIG. **15**A is a schematic view of a ninth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0081] FIG. **15**B is a schematic view of the same embodiment, viewing the top of the container from directly above.

DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

[0082] According to one aspect of the instant invention, an apparatus is provided for removing and recycling metal-containing particles and other waste particles from effluent, particularly effluent from a dental office. While herein the term "metal particles" may frequently be employed, it is contemplated that the apparatus is capable of separating other solid particles from effluent liquid.

[0083] According to one aspect of the invention, an apparatus for removing metal particles and other solid particles from liquid suction effluent can be installed in a dental office using a pre-existing suction/vacuum pump system. The

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apparatus may share a common vacuum pump with conventional dental chair suction apparatus, without interrupting the use of suction equipment at the dental chairs.

[0084] Removal of solid particles from liquid suction effluent is effected by sedimentation.

[0085] In accordance with a one embodiment of the invention, the dental office suction effluent is passed from dental chair suction equipment outlets to an air water separator tank via a suitable inlet port for the tank. The air-water separator tank in turn passes effluent into a sedimentary deposit tank, closed on all sides when in use and preferably readily detachable for emptying or replacement.

[0086] In certain aspects of the instant invention the sedimentary deposit tank has a secondary function as a recycling container. In another aspect of the invention this recycling container can have features built in to make recycling easier and to reduce the amount of packaging and waste in the recycling system.

[0087] In another embodiment of the invention designed to minimize the space required to install the amalgam recycling system the air-water suction tube is internalized—within the air-water separator tank.

[0088] FIG. **1** and FIG. **2** shows two views of the separation apparatus according to the present invention in detail. Effluent from the dental chairs and a quantity of air are sucked through a suction apparatus exhaust conduit, through an air-water separator tank inlet **2**, and thence into an air-water separator tank **5**. The liquid effluent passes out of the air-water separator tank **5** via air-water separator tank outlet port **14**, while air passes downstream via the air suction tube **6** while maintaining constant vacuum upstream of amalgam separator.

[0089] The air-water separator tank effluent outlet port **14** passes effluent by gravity out of the air-water separator tank **5** and into the detachable recycling container **12** through the recycling container inlet port **15** for target particle separation by sedimentation. Solids settle and accumulate in the bottom of Recycle container **12**. Liquid content of waste flows primarily by gravity, although intermittently assisted by vacuum through Restrictor **11** which slows the flow rate of liquid to assist in sedimentation process and ultimately "clean" effluent discharge through the recycling container outlet port **16**.

[0090] Outlet ports **16** and inlet port **15** can be a variety of shapes and sizes, square, oval (as depicted), round or even more unusual shapes like a star. Preferred ports are those that provide a tight seal, allow for easy removal, and do not break. Oval or round are preferred embodiments. Round are most preferred.

[0091] A vacuum at the outlet tube **8** is generated when the vacuum pump is operating, thereby sucking air out of the air-water separator tank **5** via suction tube **6** while maintaining vacuum upstream of amalgam separator apparatus. Effluent from the recycling container **12** passes through the restrictor **11** where remaining non-settable fine particles are removed from the effluent and into the recycling container outlet port **16** to be discharged from the apparatus via common outlet tube **8**. Matter sucked by the vacuum pump, generally free of removed solids, is discharged via vacuum pump into a municipal drain of the public sewage system.

[0092] The system is provided with a simple back plate **1** for easy dental office placement as well as removable retaining pins **13** to ensure the recycling container does not detach from the air-water separation tank **5** when there is no vacuum in the system.

[0093] In certain embodiments, the recycling container ports **16** and **15** may be different heights in order to aid in alignment of the detachable recycling container **12** in the air-water separator base **7**. In a preferred embodiment, the outlet port **16** engages before the inlet port **15** while during removal the inlet port **15** disengages first. This causes a small volume of fluid to be pulled out of the collection container back into air-water separator tank **5** creating head space and eliminating upward force of vacuum which eases removal of recycle container **12** by operator. Existing devices require rocking, wiggling or applying extensive down force for removal of recycle container **12**.

[0094] In one preferred embodiment of the invention designed to minimize recycling costs and waste, the recycling container/sedimentary deposit tank has threads **17** built into the container to enable the addition of a liquid tight top for shipping.

[0095] FIG. **3** shows a schematic diagram of an adapter according to the invention to enable the use of recycling containers from a variety of sources that are lacking in correctly shaped ports **16** and **15** or otherwise are unable to fit the air-water separator tank **5** according to the invention due to shape differences.

[0096] FIG. **4** *a* shows a schematic diagram of the recycling container and cap system (see FIG. **5** for more cap **18** detail) according to the present invention. The cap **18** is a two tier shape to allow for a tight grip by both a big and smaller hand in order to achieve a strong seal as required by the invention. An O-ring **21** is provided and fits into an O-ring groove on the recycling container **12**. Plugs **20** are used to provide a first leak proof seal for the recycling container **12**. These plugs **20** are held in place by the cap **18** when the cap is threaded onto the recycling container as depicted in FIG. **5***b*.

[0097] FIG. **6** through FIG. **15** show several embodiments of a recycling container of the present invention, which include the inlet port and outlet port on the top mating surface, and irregular keyways cast into the outer top mating surface.

[0098] Generally, under present practice, the dental staff will not be able to remove deposited sediment from the recycle container nor remove accumulated particle residues from the restrictor unit themselves. Thus, it is desirable that such removal be done by a competent effluent residue processing facility. Therefore, under present practice, it is expected to be preferred that the recycling container with its enclosed restrictor unit be removed when full, or periodically replaced by fresh tanks from time to time as required. The spent tank with an accumulation of metallic and other particles can then be sent to a processing facility for proper disposal of the targeted metallic particles, such as mercury, and recovery of precious metals such as silver.

[0099] Although the sedimentary deposit process is effective to remove a satisfactorily high proportion of the target particles desired to be removed from the effluent, the recycling container desirably includes an outlet restrictor right in the chamber to catch any floating materials as well as any other materials that did not settle out.

[0100] If the recycle container is not changed as required or filled beyond normal capacity, waste liquid from dental practice may back up into air water separator tank. Should

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this occur, effluent overflows through the air suction tube and into the outlet port and is discharged into the vacuum pump draw line and thence eventually into the municipal drain. However, it is desirable that the system should operate in such a manner as to avoid having the air-water separator tank become completely full, since effluent exiting through the air outlet port will contain particles that will not be separated by the separator, if, however, such a by-pass condition occurs at no time will the suction generated by the vacuum pump be lost or interrupted at the dental office.

[0101] In a further embodiment of the invention oriented towards large-scale institutional applications, in which many dental chairs or other sources of effluent are connected to the same suction and drain services, several parallel-connected recycling containers and associated apparatus, each such composite apparatus including a air-water separator tank and preferably one, or alternatively two attached recycling containers, may be operated in parallel to provide sufficient treatment capacity for large effluent volumes.

[0102] All publications, web-sites, patents and patent applications cited in the specification are hereby incorporated herein by reference in their entirety for the disclosure for which they are cited.

[0103] Having read the above specification, other alternatives and variants of the above described methods and apparatus suitable for practicing the methods will occur to those skilled in the technology. Such alternatives, modifications and variants fall within the scope of the present invention.

[0104] The invention as described above also includes the following non-limiting claims, which describe particular embodiments of the invention.

1-12. (canceled)

13. A detachable container suitable for mating securely with a corresponding air-water separation tank having one or more keys; said detachable container having an outside top mating surface, said top mating surface having an outside perimeter, said detachable container further comprising an inlet port and an outlet port projecting upward from the top mating surface; said detachable container further comprising one or more corresponding keyways cast into said outside perimeter of said top mating surface; such that, when said one or more corresponding keyways of the detachable container are aligned with the one or more keys of the air-water separation tank, said detachable container is capable of mating securely with said air-water separation tank.

14. The detachable container of claim **13**, wherein said inlet port and said outlet port are of the same height.

15. The detachable container of claim **13**, wherein, when said detachable container is mated securely with a corresponding air-water separation tank, said inlet port is securely connected to a liquid effluent outlet from the corresponding air-water separation tank, and said outlet port is securely connected to an outlet tube.

16. The detachable container of claim **13**, further comprising a cap for covering the outside top mating surface and having an inside surface with a first circular wall and a second circular wall, the first circular wall placed so as to engage an upper surface of the inlet port and the second circular wall placed so as to engage an upper surface of the outlet port; wherein said cap prevents spillage or leaking during storage or shipping of the detachable container.

17. A detachable container comprising one or more container keyways suitable for attachment with a dental amalgam separation system comprising one or more corresponding keys,

said detachable container having an outside top mating surface comprising a container effluent inlet port and a container effluent outlet port projecting upward from the outside top mating surface; and wherein said detachable container further comprises one or more container keyways cast into the outside perimeter of said top mating surface;

wherein, upon alignment of the one or more container keyways with one or more corresponding keys present on the dental amalgam separation system, the detachable container will detachably engage with the dental amalgam separation system, allowing for a leak-proof detachable connection.

18. The detachable container of claim **17**, wherein said container effluent inlet port and said container effluent outlet port are of the same height.

19. The detachable container of claim **17**, wherein, when said detachable container is mated securely with a corresponding air-water separation tank, said container effluent inlet port is securely connected to a effluent outlet from the corresponding air-water separation tank, and said container effluent outlet port is securely connected to an outlet tube.

20. The detachable container of claim **17**, further comprising a cap for covering the outside top mating surface and having an inside surface with a first circular wall and a second circular wall, the first circular wall placed so as to engage an upper surface of the inlet port and the second circular wall placed so as to engage an upper surface of the outlet port; wherein said cap prevents spillage or leaking during storage or shipping of the detachable container.

* * * * *

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APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 11:21:24 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63162988	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D12-EX1005_PGR.pdf	33	Non Patent Literature	9187 KB
D14-Ex1007_NXT_Container_Pictures.pdf	26	Non Patent Literature	4963 KB
D15-Ex1008_NXT_Container_Recycling_Procedure.pdf	8	Non Patent Literature	23065 KB
D16-Ex1009-NXT_Container_Shipping_Information.pdf	1	Non Patent Literature	8523 KB

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Digest

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D15-Ex1008_NXT_Container_Recycling_Procedure.pdf	505740CF51E42031802FC699C00BBC5255538E4ADA69815D9BCEF495C26EEB7ABD09C4348337F81D2A37F0E41D411F4BF10D50C209A02D402DB69FF87BF9CEE5
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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
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Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63162980	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D10-Ex1003_Janet_Declaration_20.pdf	12	Non Patent Literature	9600 KB
D13-Ex1006_Cartridge_2_Installation_Instructions.pdf	2	Non Patent Literature	5621 KB
D10-Ex1003_Janet_Declaration_19.pdf	20	Non Patent Literature	21638 KB
D11-Ex1004_MOREIRA_Declaration_PGR11660175.pdf	12	Non Patent Literature	19881 KB

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APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
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Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63162971	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

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D10-Ex1003_Janet_Declaration_15.pdf	12	Non Patent Literature	11670 KB
D10-Ex1003_Janet_Declaration_16.pdf	21	Non Patent Literature	22207 KB
D10-Ex1003_Janet_Declaration_17.pdf	18	Non Patent Literature	20694 KB
D10-Ex1003_Janet_Declaration_18.pdf	12	Non Patent Literature	18662 KB

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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

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DRNA v. Solmetex - PGR2023-00555

UNITED STATES
PATENT AND TRADEMARK OFFICE

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 11:02:39 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63162967	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D10-Ex1003_Janet_Declaration_11.pdf	10	Non Patent Literature	10772 KB
D10-Ex1003_Janet_Declaration_13.pdf	20	Non Patent Literature	22752 KB
D10-Ex1003_Janet_Declaration_14.pdf	20	Non Patent Literature	23544 KB
D10-Ex1003_Janet_Declaration_12.pdf	15	Non Patent Literature	18385 KB

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
D10-Ex1003_Janet_Declaration_11.pdf	B9A601B7B35A8052E9D01B6FAC4C105AB6AFD53034FC6AC8228BBF3482432F66299679635CF32596D3AE30281BF9B05737984F2692A46261C06201A7223BD3C0
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D10-Ex1003_Janet_Declaration_12.pdf	143B55BF115F554C3B5E0EE3DED28815372A22CBC501C79F2B35AC1DC1C65592554C50F3A5E758A8D9306D1282745EE4EC9F7732F174D037087952B6B3258C2D

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New Applications Under 35 U.S.C. 111

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 10:57:54 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63162965	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D10-Ex1003_Janet_Declaration_7.pdf	10	Non Patent Literature	11256 KB
D10-Ex1003_Janet_Declaration_8.pdf	10	Non Patent Literature	10271 KB
D10-Ex1003_Janet_Declaration_10.pdf	10	Non Patent Literature	10951 KB
D10-Ex1003_Janet_Declaration_9.pdf	10	Non Patent Literature	11920 KB

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DRNA v. Solmetex - PGR2023-00555

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
D10-Ex1003_Janet_Declaration_7.pdf	77CAC45C10DB7B31A4EDDBE4020AFEC40DE6975EB1B25B78372D6BF962FDE4158C507702F7B889A435A39259611D23031C0C9585295EF8E3DD6A2B840AD98F39
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DRNA v. Solmetex - PGR2023-00555

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 10:53:47 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63162958	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 5

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D10-Ex1003_Janet_Declaration_2.pdf	10	Non Patent Literature	15287 KB
D10-Ex1003_Janet_Declaration_4.pdf	10	Non Patent Literature	13294 KB
D10-Ex1003_Janet_Declaration_5.pdf	10	Non Patent Literature	13340 KB
D10-Ex1003_Janet_Declaration_3.pdf	10	Non Patent Literature	15991 KB

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D10-Ex1003_Janet_Declaration_6.pdf	10	Non Patent Literature	12812 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
D10-Ex1003_Janet_Declaration_2.pdf	91C2D25E4AD8B98F62E106CF73E55C23829A4EA89EBEE0309D813ACDB3C4FF68FB7D0A59D5D569EC1F38C00A420E08DDD59CE65F520DCC58275AFE28C4BBA844
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D10-Ex1003_Janet_Declaration_6.pdf	44FDAFEBC2B80183871285B8C040FB6F6C602A469FC10E9B3F52F8BE5DF4ED6DC1CA24D0653862E994860E31E1DEFD213A741463BB66A7F935BF7C25DA1CFBAA

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DRNA v. Solmetex - PGR2023-00555

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Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 10:48:42 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63162951	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D7-Petition_for_Post_Grant_Review_8.pdf	28	Non Patent Literature	5512 KB
D8-Ex1001-US11660175.pdf	26	Non Patent Literature	1329 KB
D9-Ex1002_File_History_11660175.pdf	346	Non Patent Literature	13796 KB
D10-Ex1003_Janet_Declaration_1.pdf	10	Non Patent Literature	13994 KB

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
D7-Petition_for_Post_Grant_Review_8.pdf	50F677BA207B7FF1B8E8FF11759DB23D02747DD2D7DAE16486C98591E7CDD42F05B09CC8D7B0E860E462522D6F4B5D135703C7D61960C83D9C4ABD01835E5760
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D9-Ex1002_File_History_11660175.pdf	2945E88A8849F7D927158339A4B6AD49E909B952BD065647C3B47A55454AD77122A5FD833AE3E4E86893F668D2B49B28987559176ED15F802ADB7A94EAD31552
D10-Ex1003_Janet_Declaration_1.pdf	5D3033DDB3D15127B75EAD8F861728797FE90E89B493928606E9B5F36CA38410A20828F9C790909C90CE7B33A38227C4CC54B7EE058CAA5ECDD54C19560E7F98

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DRNA v. Solmetex - PGR2023-00555

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 10:40:05 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63162950	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D7-Petition_for_Post_Grant_Review_4.pdf	25	Non Patent Literature	6771 KB
D7-Petition_for_Post_Grant_Review_5.pdf	22	Non Patent Literature	5744 KB
D7-Petition_for_Post_Grant_Review_6.pdf	12	Non Patent Literature	3615 KB
D7-Petition_for_Post_Grant_Review_7.pdf	25	Non Patent Literature	6986 KB

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
D7-Petition_for_Post_Grant_Review_4.pdf	4108E5D8A43887B8F732B929BF43AB8B06C5438F42459B2129E93AEA7E57EE013321DF3BCB3DDCF28F97221980B4CE5FE05E99BF95969582BC58A6111C79F12F
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D7-Petition_for_Post_Grant_Review_7.pdf	AAE51AB1DE90C5F2BC60A4B3D2194EC1FC8C3605B440F5AA002BCAFB897A39319D550523361FEE69860530B346066CD782CF29A24F263FD117C616E84DD2AE52

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DRNA v. Solmetex - PGR2023-00555

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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 10:35:31 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63162944	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 5

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D5-Cartridge_2-Compatible_with_Solmetex_NXT_Hg5_ONLY.pdf	6	Non Patent Literature	1755 KB
D6-Vimeo_Replacing_Your_Amalgam_Separator_Cartridge.pdf	2	Non Patent Literature	414 KB
D7-Petition_for_Post_Grant_Review_1.pdf	28	Non Patent Literature	6283 KB
D7-Petition_for_Post_Grant_Revi	28	Non Patent Literature	7167 KB

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

ew_2.pdf			
D7-Petition_for_Post_Grant_Review_3.pdf	28	Non Patent Literature	7700 KB

Digest

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D6-Vimeo_Replacing_Your_Amalgam_Separator_ Cartridge.pdf	74F14EE53F7D7B30F7341DD94B2FA2382D26AD3281620E197A6B45986387C7CA36C877D020E299D614EDD0EF9CBF175763F867FBCA9C8CF05C76CF276C6F9D2D
D7-Petition_for_Post_Grant_Review_1.pdf	48534923C02CEFF0FB99F2139F301C6B0AF47BB47BC07D22E366040B933D0A4646D774DF65BB1A277BE32AF8365A1999FD29EABD981A27D12401D696E1511532
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D7-Petition_for_Post_Grant_Review_3.pdf	338A5CFFBFA5638D521AEC730700F1DDC29DE3F43AED4D3925ADAB889CCB843DDFA10ACEBC482973DB6A6CE72419FCCB4DCB31AB0D5C63DEF590586D7C62C8D3

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Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

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PATENT AND TRADEMARK OFFICE

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Alexandria, VA 22313 - 1450
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ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
16/941,522	**11/05/2023 10:29:25 AM Z ET**	**- SMTX-001-T1-CON**

Title of Invention

Detachable Recycling Container

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	1050	FILED BY	Steven Lazar
PATENT CENTER #	63162937	FILING DATE	07/28/2020
CUSTOMER #	80709	FIRST NAMED INVENTOR	Nicholas Mozzicato
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	-

Documents

TOTAL DOCUMENTS: 4

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
D4-Motion_to_Dismiss_Exhibit_2_5.pdf	27	Non Patent Literature	24384 KB
D4-Motion_to_Dismiss_Exhibit_2_8.pdf	13	Non Patent Literature	14106 KB
D4-Motion_to_Dismiss_Exhibit_2_9.pdf	10	Non Patent Literature	12151 KB
D4-Motion_to_Dismiss_Exhibit_2_10.pdf	18	Non Patent Literature	19459 KB

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
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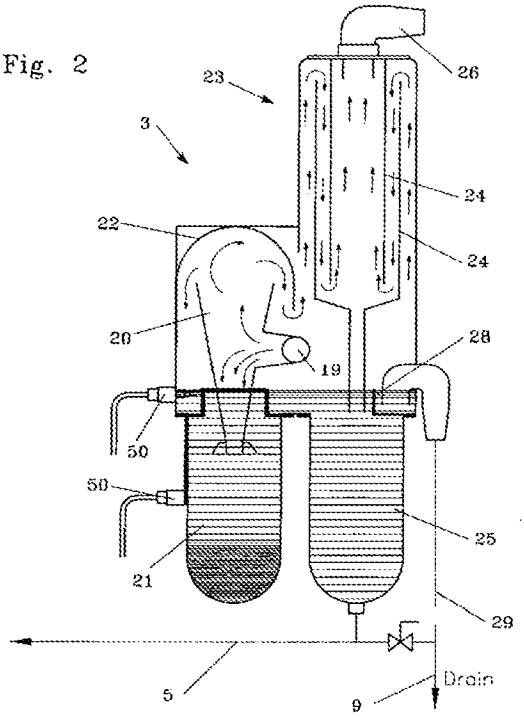
(54) Surgical draining apparatus, in particular for a dental surgery

(57) The invention relates to a surgical suction unit in particular for dental surgeries, comprising:

- a liquid-ring suction pump (2);
- an input unit (1), upstream of said pump (2), connected to the various points of use;
- a separator unit (3), downstream of said pump (2), which said separator unit comprises first means (20) designed to separate the solid and liquid particles from the fluids received from the pump, and second means (23) designed to separate the remaining liquids from the air;
- a first tank (21) designed to collect said solid and liquid parts;
- a second tank (25) designed to collect said liquids; and
- means (5) designed to place said second tank in communication with the pump inlet.

The unit according to the invention combines the advantages of known liquid-ring systems (high negative pressure values achievable, ability to discharge aspirated fluids continuously), but is not subject to their limitations, especially high water consumption.

Fig. 2



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Description

[0001] This invention relates to a surgical suction unit designed in particular, but not solely, for use in dental surgeries, which said unit comprises a liquid-ring suction pump associated with a liquid recirculation unit, the latter unit being fitted with a heat exchanger designed to cool the liquid returned into circulation, systems for collection of heavy metal amalgam particles, and a tank designed to collect liquids for recirculation in the pump.

[0002] The unit according to the invention combines the advantages of known liquid-ring systems (high negative pressure values achievable, ability to discharge aspirated fluids continuously), but is not subject to their limitations, especially high water consumption.

[0003] Units designed to aspirate and remove "surgical" fluids and liquids are used in numerous medical applications, and in particular in dental surgeries.

[0004] Units in which a suction pump is connected via pipes to cannulae or other suction devices used at the point of operation are known for this purpose.

[0005] The known systems are substantially divided into three main categories: liquid-ring units, air-ring units and wet-ring units.

[0006] "Liquid-ring" systems involve the use of a centrifugal pump with an impeller immersed in a ring of liquid. An air/liquid separator is located at the pump outlet.

[0007] A unit of this kind is described, for example, in German patent DE 3101954.

[0008] Liquid-ring units offer the advantage that a high negative pressure value can be achieved by the pump which, by creating a high suction speed in the suction cannulae, keeps the operating area and all conveyor pipes clean, even in the presence of large spillages.

[0009] Another advantage is their ability to discharge the aspirated fluids continuously, said fluids being discharged non-stop at positive pressure into the air/liquid separator.

[0010] However, liquid-ring units present the drawback of requiring very high water consumption to maintain the liquid ring around the impeller, and this problem is liable to become increasingly serious in future.

[0011] "Air-ring" systems, which have represented the alternative to the liquid-ring system for decades, comprise a centrifugal air-ring pump to generate the vacuum, and an air/liquid separator installed between the suction points in the operating area and the pump.

[0012] The separator, which operates in the part of the circuit in negative pressure, accumulates the aspirated fluids up to a maximum capacity level, after which it must be discharged, and the pump has to be shut down.

[0013] The system consequently presents the considerable drawback of noncontinuous operation, as well as slow air suction, which constitutes an intrinsic limitation of air-ring pumps.

[0014] A further limitation is the need for regular maintenance of the separator vessel, which requires frequent manual cleaning, with the risk of microbiological contamination of the operators.

[0015] The "wet-ring" system, which constitutes a development on air-ring devices, involves the use of a centrifugal air-ring pump combined with a motor-driven centrifugal separator of the liquids conveyed by the current.

[0016] The "wet-ring" system involves the use of a centrifugal air-ring pump combined with a motor-driven centrifugal separator which separates the liquids conveyed by the vacuum current and the solid particles of amalgam, consisting of heavy metals such as mercury, tin, silver, copper, zinc, palladium, indium, etc..

[0017] Some of these units include separate motors for the pump and the liquid and amalgam separator, involving increased costs, energy consumption, size and noise levels.

[0018] In other cases, a single motor is installed.

[0019] However, the problem of low head of air-ring pumps still remains in this version: this means a low transport speed of the fluids in the pipes, stagnation and undrained deposits in the ducts, which requires the suction unit to be over-dimensioned and makes it more complicated to manufacture the vacuum pipes. Moreover, considerable infiltrations of moisture take place, especially in the parts constituting the air-ring pump, leading to problems of condensation, microbiological pollution and chemical aggression in a part of the unit which cannot be washed or sanitised unless it is dismantled.

[0020] A liquid-ring system has also been proposed wherein the pump is connected to a tank which separates the air from the circulating fluids by means of a pipe that recirculates the accumulated liquid.

[0021] However, this system presents the drawback of overheating the liquid, which is continually recirculated by the pump until it reaches such a temperature as to considerably reduce the performance of the pump and the entire system, thus forcing the designer to over-dimension all the components of the installation.

[0022] A further limitation of this system is that the amalgams are separated in decantation vessels located in the suction section upstream of the pump, and this system is unable to retain the smaller particles that travel at high speed, which are deposited in the liquid collection tank and conveyed from there to the outlet filter, which is thus often clogged, so that periodic maintenance of the system is required.

[0023] These drawbacks and limitations are overcome by a surgical suction unit according to the characterising part of the annexed claims.

[0024] The invention will now be described in detail, by way of example but not of limitation, by reference to the annexed figures, wherein:

- figure 1 is a simplified diagram of the suction unit according to the invention;
- figure 2 shows separation devices located at the pump outlet, in cross-section;
- figure 2a shows a variation on the devices illustrated in figure 2;

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- figures 3a to 3d schematically illustrate different embodiments of the devices which input the fluids into the pump;
- figure 4 is a view of a unit according to the invention.

[0025] The apparatus according to the invention (see figure 1) substantially consists of three units: an input unit shown as 1, a liquid-ring pump 2 which circulates the fluids, and a unit indicated as 3, which separates the amalgams and liquids from the air.

[0026] The separation unit also comprises a liquid collection tank 4, connected to pump inlet 7 via a pipe 5, to which a heat exchanger 6 is fitted.

[0027] The surgical fluids, air and liquids from the various uses are conveyed from there, through pipes 8, to input unit 1, then to pump 2, and from there to separation unit 3.

[0028] The liquids are then recirculated after suitable cooling, and the surplus is discharged through outlet pipe 9.

[0029] Input unit 1 and separator unit 3 will now be described in more detail.

[0030] Input unit 1 (see figure 3a) comprises a connector 10 connected to pipes which lead to the various points of use, a filter 11 designed to separate the coarser solid parts, and a pipe 12 downstream of the filter, which leads to pump inlet 7.

[0031] Pipe 12 is connected to a well 14 for input of environmental air. Well 14 also leads to a pipe 15 connected to the water network, to which a solenoid valve 16 or the like is fitted, allowing a certain quantity of top-up water to be introduced into the well when necessary if the unit is emptied for maintenance purposes. This solution creates a physical separation between the water network and the device, in order to eliminate all risk of bacterial contamination of the water network.

[0032] A valve of known type 13 is fitted to the connector that leads from well 14 to pump inlet pipe 12, enabling the vacuum in suction pipes 10 leading to the point of use to be regulated.

[0033] Separator unit 3, illustrated in detail in figure 2, is installed downstream of the pump.

[0034] Number 19 indicates the pipe leading from the outlet of pump 2, from which water mixed with air and the particles aspirated at the various points of use arrives.

[0035] Pipe 19 leads to a separator device 20 consisting, for example, of a cyclone or other similar device of known type in which the heavier parts, especially amalgams, are separated after a reduction in the speed of the fluids conveyed from the pump; said parts then drop downwards and are collected on the bottom of a removable tank 21, located below cyclone 20. When tank 21 is full, the accumulated liquids spill over the overfall that separates it from the next tank 25 and flow into that tank, while the heavier parts are deposited on the bottom of tank 21. The air and the lighter parts exit from the upper part of the cyclone, guided by a shaped partition or wall 22, and are conveyed to a second separator shown as 23. This separator is constituted by a set of concentric tubular elements 24 that force the air to perform a series of sudden reversals of the direction of motion, as shown by the arrows in figure 2. These sudden reversals of motion aid the separation of the liquids into aerosols, which collect in a second tank 25, also removable, located under separator 23.

[0036] The air exits from separator 23 through an outlet pipe 26 leading to the exterior; a bacterial filter 27 can be fitted to said pipe if the air is to be recirculated into the premises.

[0037] The filter is shown in figure 2a, which illustrates a separator complex similar to the previous one but fitted with said filter.

[0038] Tank 25, in which liquids from which the solid particles have been almost entirely removed collect, is fitted with an overfall 28 from which the liquid in the upper part of the tank is conveyed to an outlet pipe 29. Sensors 50 of known type detect the level of the solid parts in tank 21 and of the liquids in tanks 21 and 25.

[0039] Recirculation pipe 5, leading to the pump inlet, is connected to a connection 30 in the bottom of tank 25.

[0040] The system operates as follows.

[0041] When pump 2 is switched on, a strong negative pressure is created in pipe 12, as a result of which air is aspirated through pipes 10 leading to the points of use, which said air draws surgical liquids and the various solid particles with it.

[0042] This mixture of fluids and solids is conveyed to the pump, from which it is conveyed to the set of separation units 3.

[0043] By suitably regulating valve 13, suction pipe 12 leading to pump inlet 7 can be placed in communication with well 14 through which environmental air is aspirated, thus allowing the vacuum created by suction in pipes 10 to be regulated as required.

[0044] The necessary amount of water can be introduced into the well when the liquids in the unit need to be topped up; said water flows down into the well and is also aspirated by the pump.

[0045] The configuration illustrated allows physical separation between the water network and the unit, so as to eliminate all risk of countercurrent bacterial migration and prevent contamination of said network.

[0046] Alternatively, as shown in figures 3b, 3c and 3d, a tank of sanitising liquid 6 could be connected to pipe 12 and the pump inlet.

[0047] Sanitising liquid tank 6 can be screwed directly to the body of input unit 1 as illustrated in figure 3b, or may be constituted by a separate can which is always connected to the input unit via suitable pipes fitted with valve devices of known type as illustrated in figure 3d; alternatively, it can be conveyed to the point of input of water from the network, as illustrated in figure 3c.

[0048] In the last two cases a filter, shown as no. 40, can be fitted to the inlet of environmental air suction well 14.

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[0049] The fluids and solid particles aspirated by the pump are then expelled under positive pressure and conveyed to separator unit 3, through pipe 19 (fig. 2).

[0050] Here, the fluids enter cyclone 20, in which their flow rate suddenly slows; the heavier solid parts, especially amalgams of heavy metals, then spill downwards and collect on the bottom of removable tank 21.

[0051] Alternatively, a motor-driven cyclone of known type could be installed instead of cyclone 20; in this case the complex will be configured differently.

[0052] The air, with part of the nebulised liquids, is deviated by wall 22, and conveyed to separator device 23. Here, the abrupt reversals of the direction of motion and variations in speed undergone by the fluid current in order to pass into the cavity between the various tubular elements 24 leads to detachment of the residues, which fall to the bottom and collect in collection tank 25.

[0053] The air, free of liquids and solid particles, can then be conveyed to the exterior through pipe 26, or returned into the premises after being passed through filter 27.

[0054] The liquids arriving from the overfall of tank 21, with the finer solid particles, collect in tank 25, where they are drawn through connector 30 and conveyed along recirculation pipe 5.

[0055] Next, the liquids are cooled in heat exchanger 6, sent back to the inlet of the pump 7, and returned into circulation.

[0056] Any surplus liquid spills over overfall 28 and can be discharged along pipe 29.

[0057] The system described offers numerous advantages compared with the currently known systems.

[0058] The use of a liquid-ring pump as vacuum generator allows high vacuum values to be obtained, with a suitable transport speed of the fluids aspirated through the suction pipes leading from the cannulae; it ensures that all the aspirated fluids pass through the pump, with the advantage of safe transport through a single pipe which can be washed and sanitised without being dismantled, while the discharge of liquids under positive pressure downstream of the pump facilitates their separation and discharge. The characteristics of the input unit ensure effective protection of the water network against contamination because either there is no connection between the two circuits, so transmigration of pollutant microbial colonies in countercurrent is impossible, or the sanitising liquid keeps the pressurised running water input connection sterile.

[0059] The fact that liquids are recovered and recirculated after separation aids aggregation of the microparticles not removed during earlier stages and the formation of larger, heavier precipitates which escape the Brownian motion of suspensions, and are deposited sooner or later in collection tank 21.

[0060] The fact that a heat exchanger cools the liquid returned into circulation maintains constant pump efficiency, and prevents the formation of internal scaling due to precipitation of the salts in the circulating liquids.

[0061] Improvements in the most significant aspects of sanitary applications are thus achieved at the same time, namely:

- no water consumption for continuous operation;
- a high level of hygiene without maintenance;
- recovery of heavy metals;
- high performance and constant efficiency in continuous service;
- energy saving;
- low noise levels;
- a highly reliable system which is simple to manufacture.

[0062] An expert in the field could devise various modifications and variations, all of which should be deemed to fall within the ambit of this invention.

Claims

1. Surgical suction unit, in particular for dental surgeries, of the type comprising a liquid-ring suction pump (2), means (1) designed to connect the input of said pump with the various points of use, and means (3) designed to separate the liquids and solids aspirated by said pump from the air, said unit being **characterised in that** said separation devices (3) are located downstream of pump (2).

2. Surgical suction unit as claimed in claim 1, **characterised in that** it includes:

   - a liquid-ring suction pump (2);
   - an input unit (1), upstream of said pump (2), connected to the various points of use;
   - a separator unit (3), downstream of said pump (2), which said separator unit comprises first means (20) designed to separate the solid and liquid particles from the fluids received from the pump, and second means (23) designed to separate the remaining liquids from the air; .
   - a first tank (21) designed to collect said solid and liquid parts;
   - a second tank (25) designed to collect said liquids; and
   - means (5) designed to place said second tank in communication with the pump inlet.

3. Surgical suction unit as claimed in claim 2, **characterised in that** an overfall is created between said first and second tanks (21, 25) which allows the liquid present in said first tank to flow into the adjacent tank.

4. Surgical suction unit as claimed in claim 3, **characterised in that** means (6) are installed along the route (5) that connects said liquid and particle col-

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lection tank (25) with the inlet of pump (2) to cool said liquid.

5. Surgical suction unit as claimed in claim 1, **characterised in that** said separation means (3) comprise first devices (20) designed to separate the solids and liquids from the air flow and second devices (23) designed to separate the liquids into aerosols, which said first and second devices are arranged in series.

6. Surgical suction unit as claimed in claim 5, **characterised in that** said separator (23) which separates the liquids in aerosol form from the expelled air comprises a plurality of concentric pipes (24) with different cross-sectional shapes, designed to impose abrupt reversals and variations of motion on the air flow for the purpose of recovering the condensed liquids.

7. Surgical suction unit as claimed in claim 5 or 6, **characterised in that** it includes tanks (21, 25) for collection of the solids and liquids associated with said first and second separation devices (20, 23) respectively, which said tanks are connected by an overfall.

8. Surgical suction unit as claimed in each of the preceding claims, **characterised in that** it includes an inlet unit (1) for the fluids aspirated by the pump, which is fitted with a well (14) communicating with pipe (12) that conveys the aspirated fluids to the pump, means (15, 16) designed to pour water from the water network into said well being fitted.

9. Surgical suction unit as claimed in claim 8, **characterised in that** it includes adjustable valve means (13) designed to place said well (14) in communication with said aspirated fluid supply pipe (12) to regulate the degree of vacuum in the pipes.

10. Surgical suction unit as claimed in each of the preceding claims, **characterised in that** it includes a tank of sanitising liquid (6) connected to the inlet pipe leading to pump (2).

11. Surgical suction unit as claimed in each of the preceding claims, **characterised in that** it includes, at the outlet of said pump (2), means (20) designed to slow the speed of the fluids conveyed by the pump to allow separation of the liquids and heavy parts, and means (23), downstream of the preceding ones, designed to separate the liquids in aerosol form from the airflow, each of which separator means is associated with the corresponding collection tank (21, 25), which said tanks are arranged in series and connected by an overfall, a pipe (5) designed to draw liquid from the bottom of said second tank (25) and convey it to the inlet of pump (2) being fitted.

12. Surgical suction unit as claimed in claim 10, **characterised in that** means (6) designed to cool the liquid conveyed to pump (2) are fitted on said pipe (5).

13. Surgical suction unit as claimed in claim 11, **characterised in that** said tanks (21, 25) are removable.

14. Surgical suction unit as claimed in claim 12, **characterised in that** it includes level gauges (50) for the solid parts in tank (21) and the liquids in tank (25).

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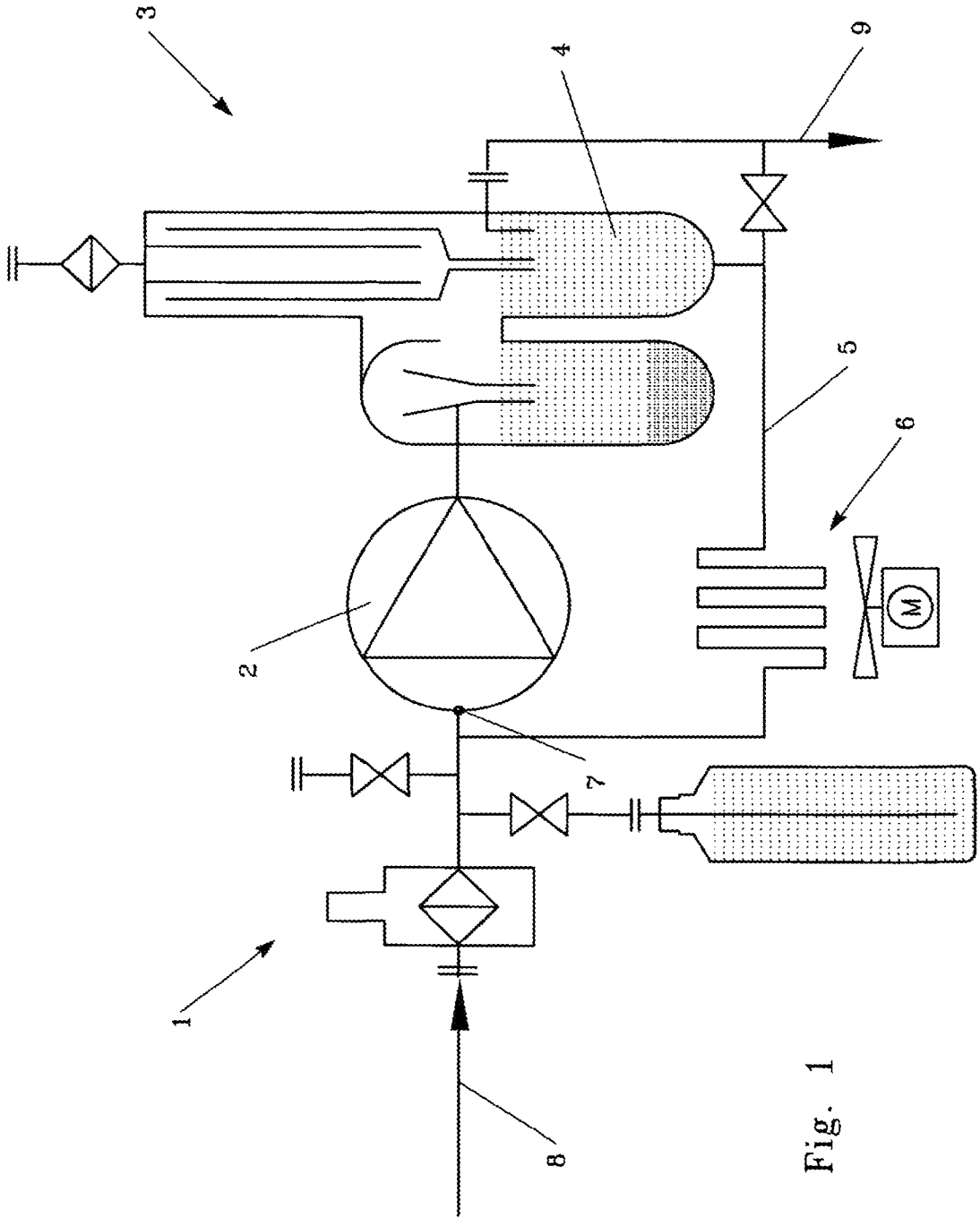
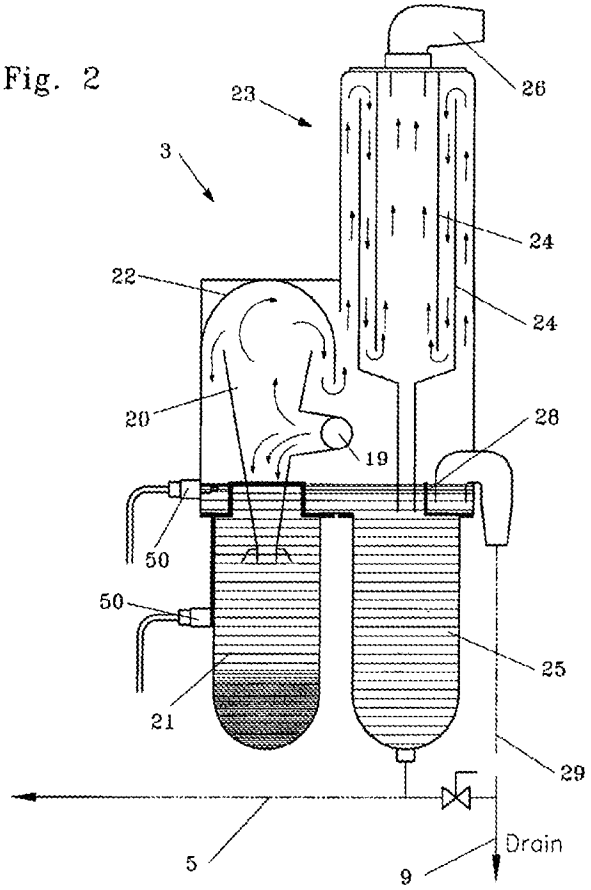


Fig. 1

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Fig. 2



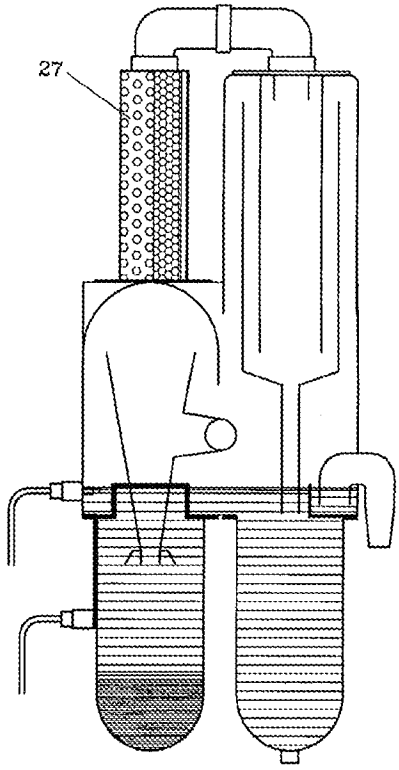


Fig. 2a

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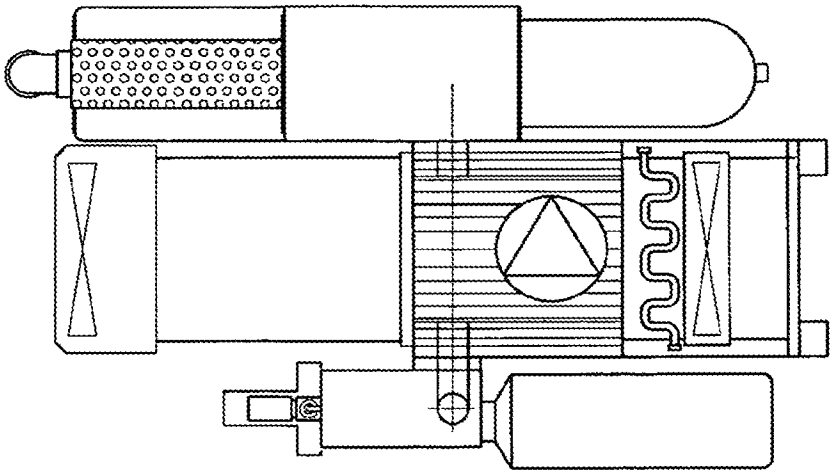


Fig. 4

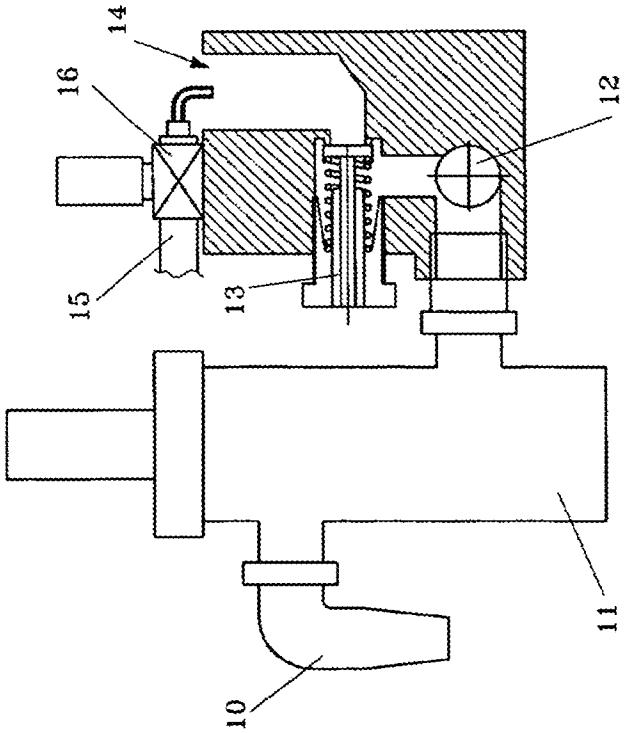


Fig. 3a

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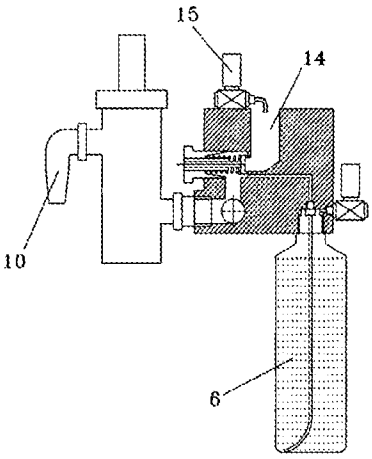


Fig. 3b

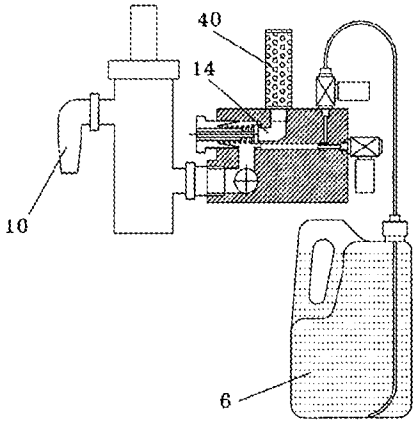


Fig. 3d

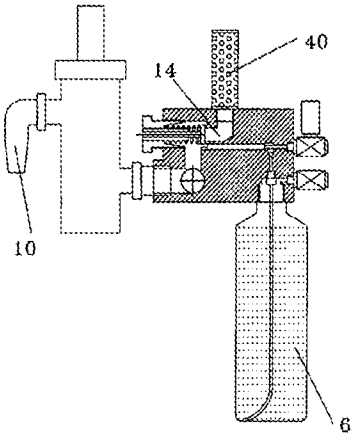


Fig. 3c

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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 01 0773

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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Y	US 5 577 910 A (HOLLAND) 26 November 1996 (1996-11-26) * column 7, line 64 - column 8, line 35 * * column 9, line 60 - column 10, line 3 * * column 10, line 37 - line 43 * * claim 5; figures 1,2 *	1-14	
Y	DE 43 28 990 A (ANWEILER ET AL.) 16 February 1995 (1995-02-16) * column 2, line 31 - line 37; figure *	3	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	2 September 2003	Raybould, B

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 03 01 0773

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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(33) Priority Country: DK

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(74) Agent: BUDDE, SCHOU & CO.; 4, H.C. Andersens Boulevard, DK-1553 Copenhagen V (DK).

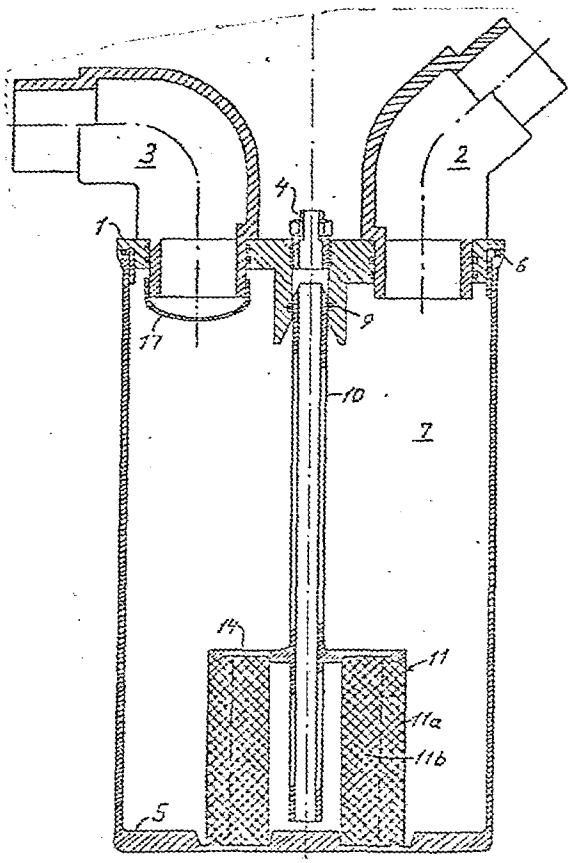
(81) Designated States: AT, BE (European patent), CH, DE, DE (Auxiliary utility model), FI, FR (European patent), GB, LU, NL, NO, SE.

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(54) Title: A DEVICE FOR SEPARATING WASTE PRODUCTS FROM A FLOW OF LIQUID AND GAS

(57) Abstract

The apparatus, which is designed for collection of mercury waste products and other waste products which are sucked from a rinse basin or by a mouth suction device at a dental clinic, has a head (1) which is stationary at the dentist's chair, and which through connections (2, 3, 4) and appertaining hoses are connected permanently to the rinse basin, a suction source, and an injector or suction pump respectively which, from the bottom of a tank (7) under the head (1), can suck filtered water to a sewer. Impurities are separated from the air current under its strong change of direciton and possibly by passage through a sieve (17) or a filter. At the bottom of the tank there is a filter cartridge (11) separating waste products from the liquid which from the outside of the cartridge is drawn through it and up through a suction tube (10). The apparatus can be used with different kinds of filter cartridges (11) and with screens (17) selected as required or filter cartridges at the connection (3) and possibly also at the connection (2). It ensures effective separation of cleaned air, liquid, andimpurities and allows active suction of cleaned liquid by the use of a small liquid tank placed close to the source of pollution.



* (Referred to in PCT Gazette No. 24/1983, Section II)

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Exhibit 1

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

US011660175B2

(12) **United States Patent**
Mozzicato et al.

(10) **Patent No.: US 11,660,175 B2**
(45) **Date of Patent: May 30, 2023**

(54) **DETACHABLE RECYCLING CONTAINER**

(71) Applicant: **Solmetex LLC**, Northborough, MA (US)

(72) Inventors: **Nicholas Mozzicato**, Acton, MA (US); **Richard Goulston**, Stuart, FL (US); **Robin Schofield**, Lancaster, MA (US); **Michael Toole**, Norton, MA (US)

(73) Assignee: **Solmetex, LLC**, Northborough, MA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **17/965,556**

(22) Filed: **Oct. 13, 2022**

(65) **Prior Publication Data**

US 2023/0038660 A1 Feb. 9, 2023

Related U.S. Application Data

(63) Continuation of application No. 16/941,522, filed on Jul. 28, 2020, which is a continuation-in-part of application No. 16/033,823, filed on Jul. 12, 2018, now Pat. No. 10,779,923, which is a continuation-in-part of application No. 15/730,828, filed on Oct. 12, 2017, now Pat. No. 10,646,313, and a continuation of application No. 29/585,674, filed on Nov. 28, 2016, now Pat. No. Des. 840,534, and a continuation of application No. 29/585,668, filed on Nov. 28, 2016, now Pat. No. Des. 835,779, and a continuation of application No. 29/585,659, filed on Nov. 28, 2016, now Pat. No. Des. 835,778, and a (Continued)

(51) **Int. Cl.**

A61C 17/06	(2006.01)
B65D 43/02	(2006.01)
B01D 21/24	(2006.01)
A61M 1/00	(2006.01)

(52) **U.S. Cl.**
CPC ***A61C 17/065*** (2019.05); ***A61M 1/64*** (2021.05); ***B01D 21/2444*** (2013.01); ***B65D 43/0231*** (2013.01); *B65D 2543/00092* (2013.01)

(58) **Field of Classification Search**
CPC A61C 17/065; A61M 1/64; B01D 21/2444; B65D 43/0231; B65D 2543/00092
See application file for complete search history.

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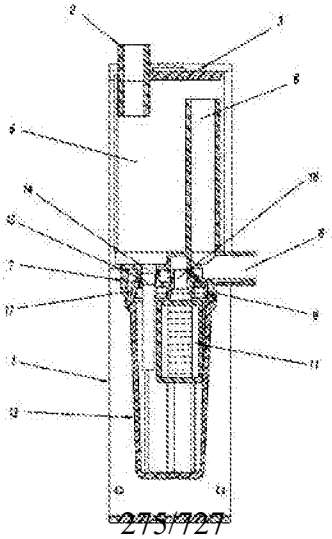
"International Standard ISO 11143: Dentistry—Amalgam separators"; Second edition; ISO Copyright Office, Switzerland; Jul. 1, 2008; (32 pages).
(Continued)

Primary Examiner — Nicholas D Lucchesi

(57) **ABSTRACT**

The present invention provides dental amalgam recycling systems, useful for recycling particles from a dental liquid effluent drawn, for example, from a suctioning device.

22 Claims, 18 Drawing Sheets



Related U.S. Application Data

continuation of application No. 29/577,701, filed on Sep. 14, 2016, now Pat. No. Des. 848,612, and a continuation of application No. 29/567,544, filed on Jun. 9, 2016, now Pat. No. Des. 840,533, and a continuation of application No. 29/565,622, filed on May 23, 2016, now Pat. No. Des. 835,264.

(60) Provisional application No. 62/414,712, filed on Oct. 29, 2016, provisional application No. 62/406,990, filed on Oct. 12, 2016.

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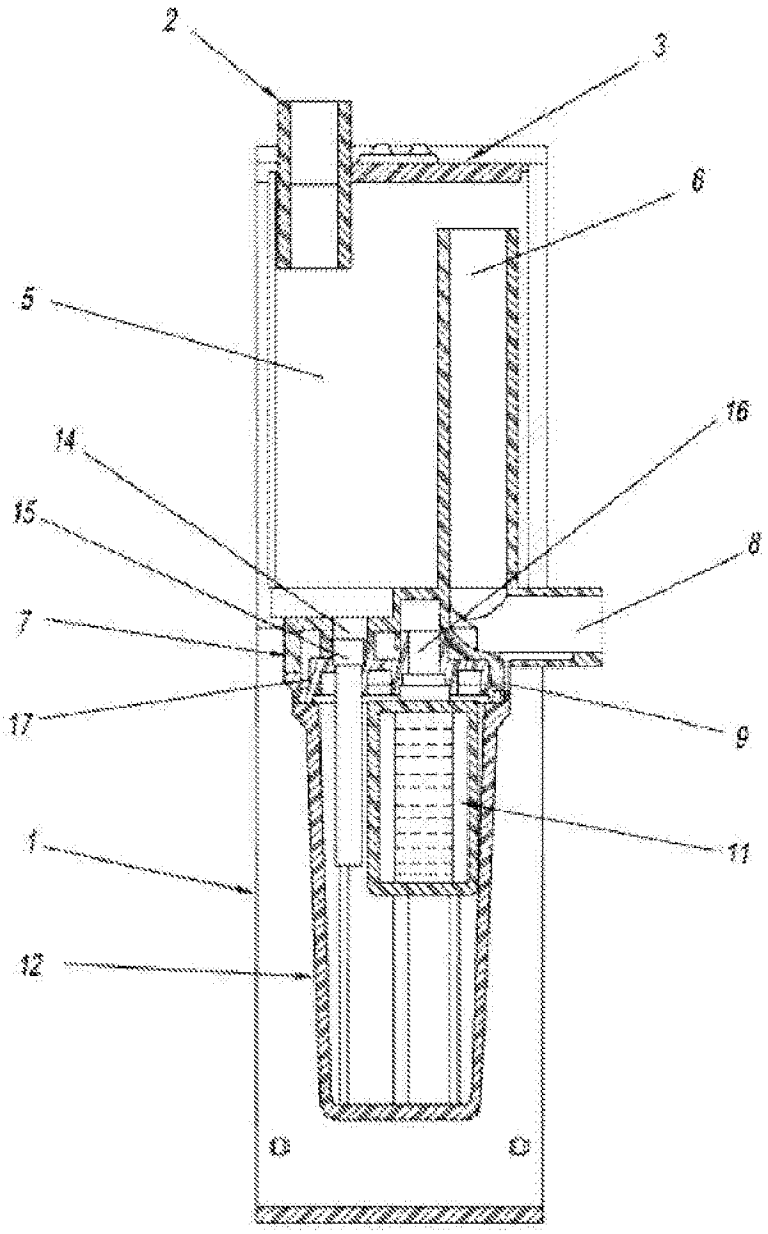


FIG. 1

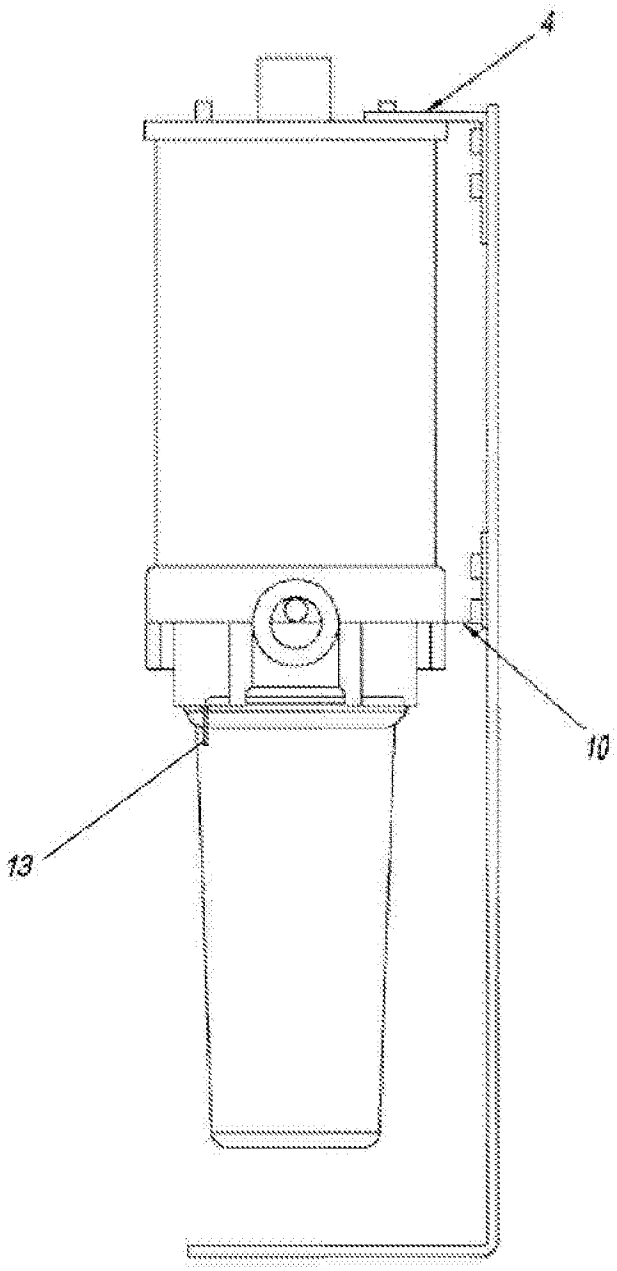


FIG. 2

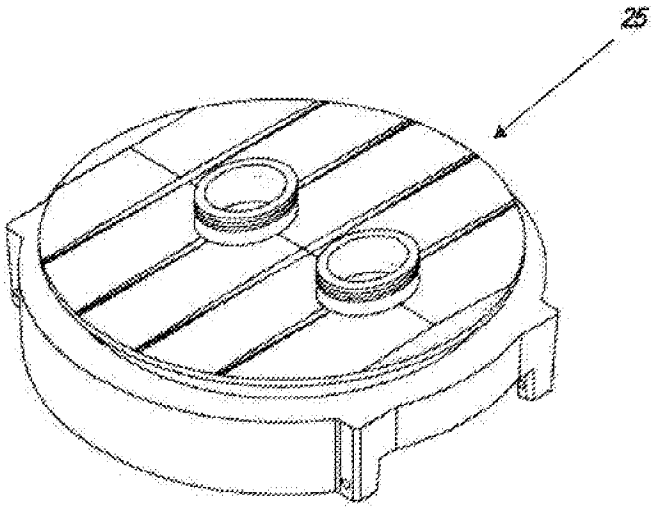


FIG. 3A

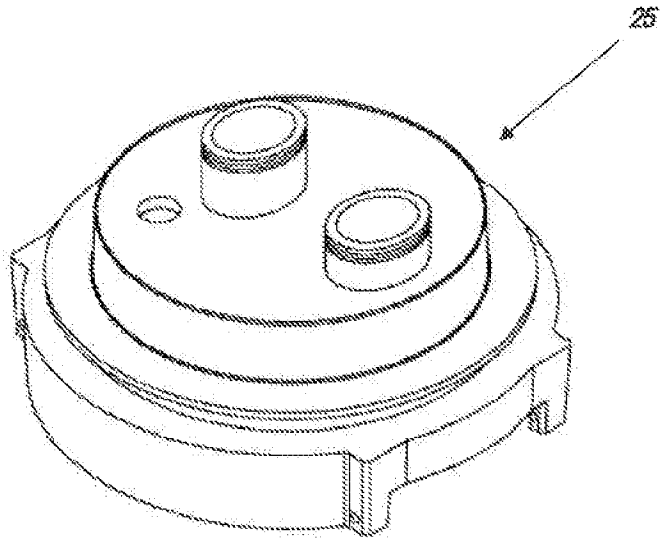


FIG. 3B

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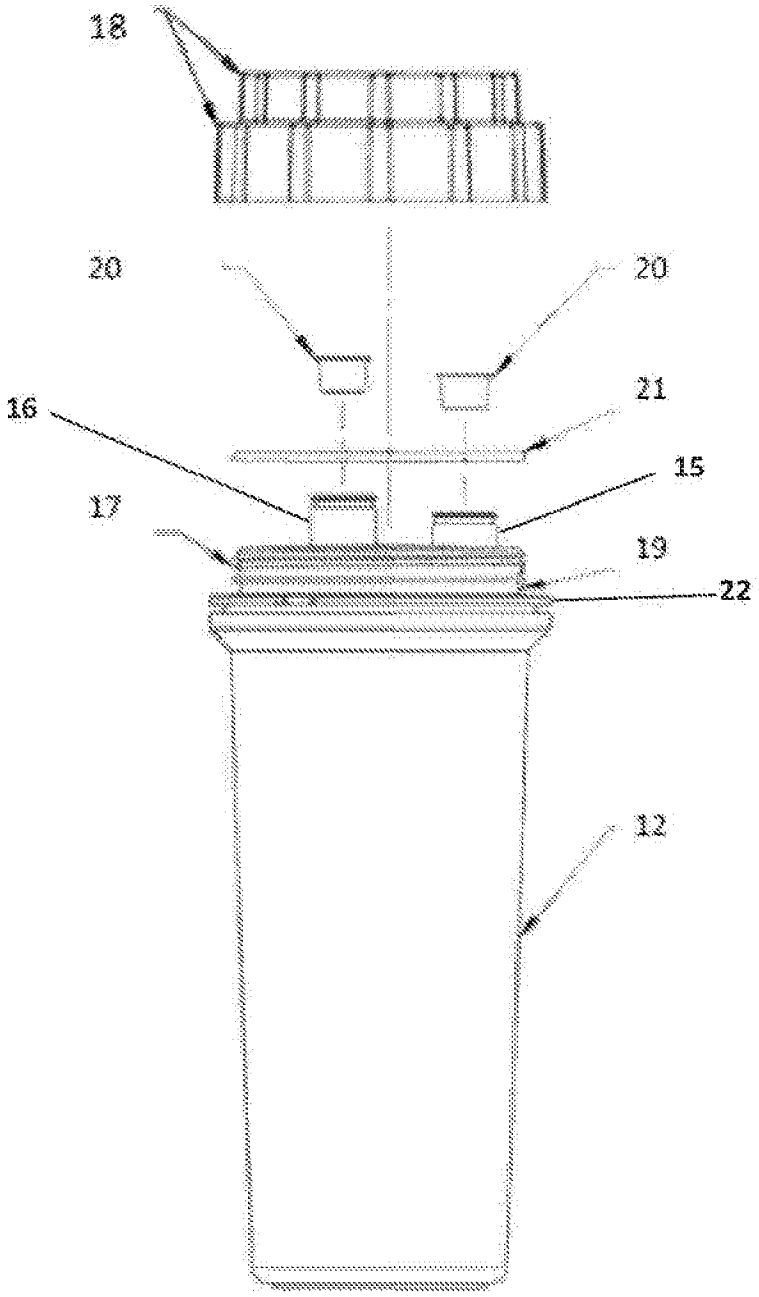


FIG. 4A

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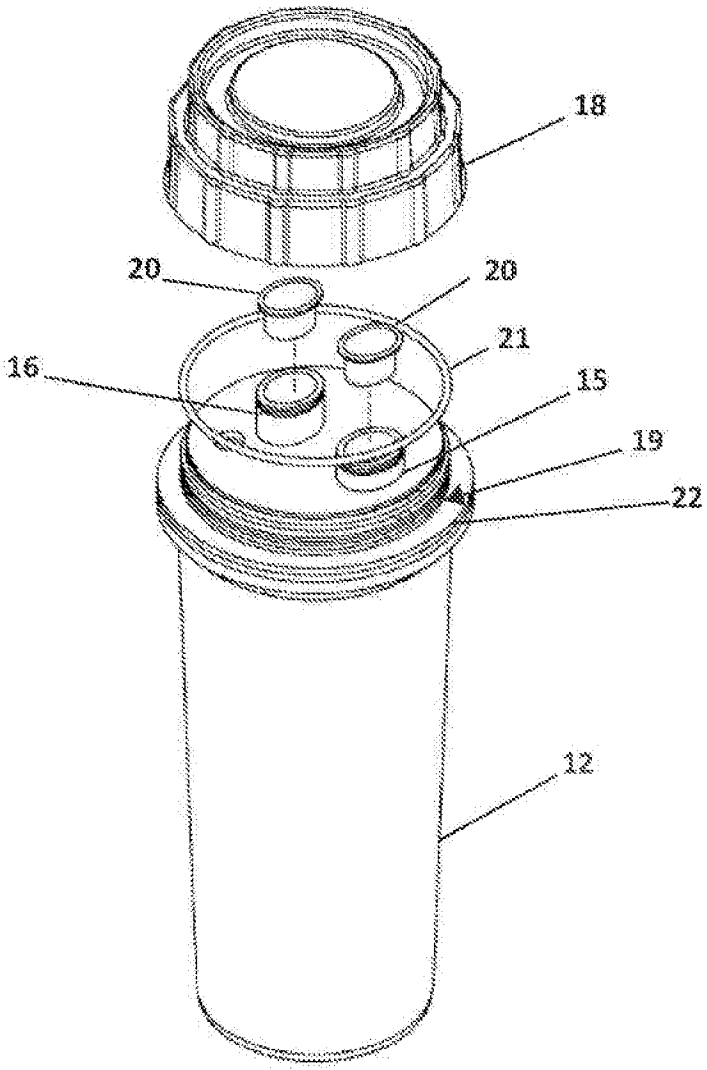


FIG. 4B

Solmetex Ex. 2002
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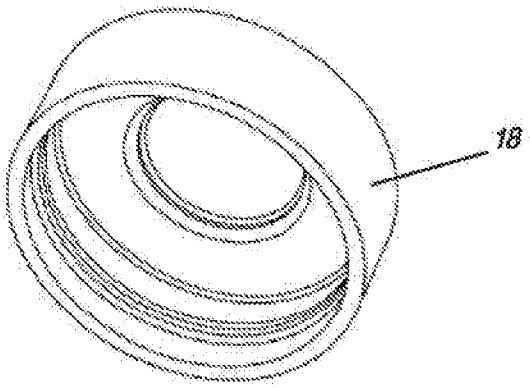


FIG. 5A

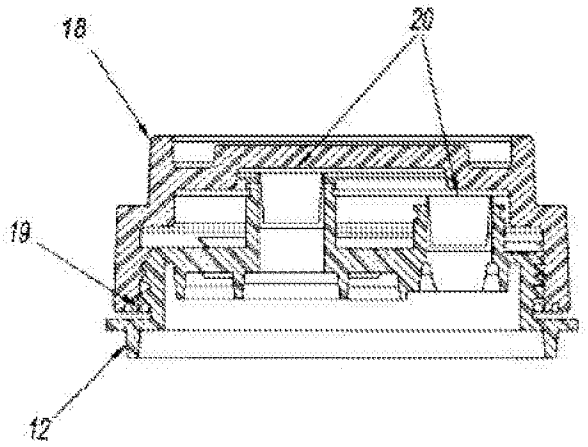


FIG. 5B

Solmetex Ex. 2002
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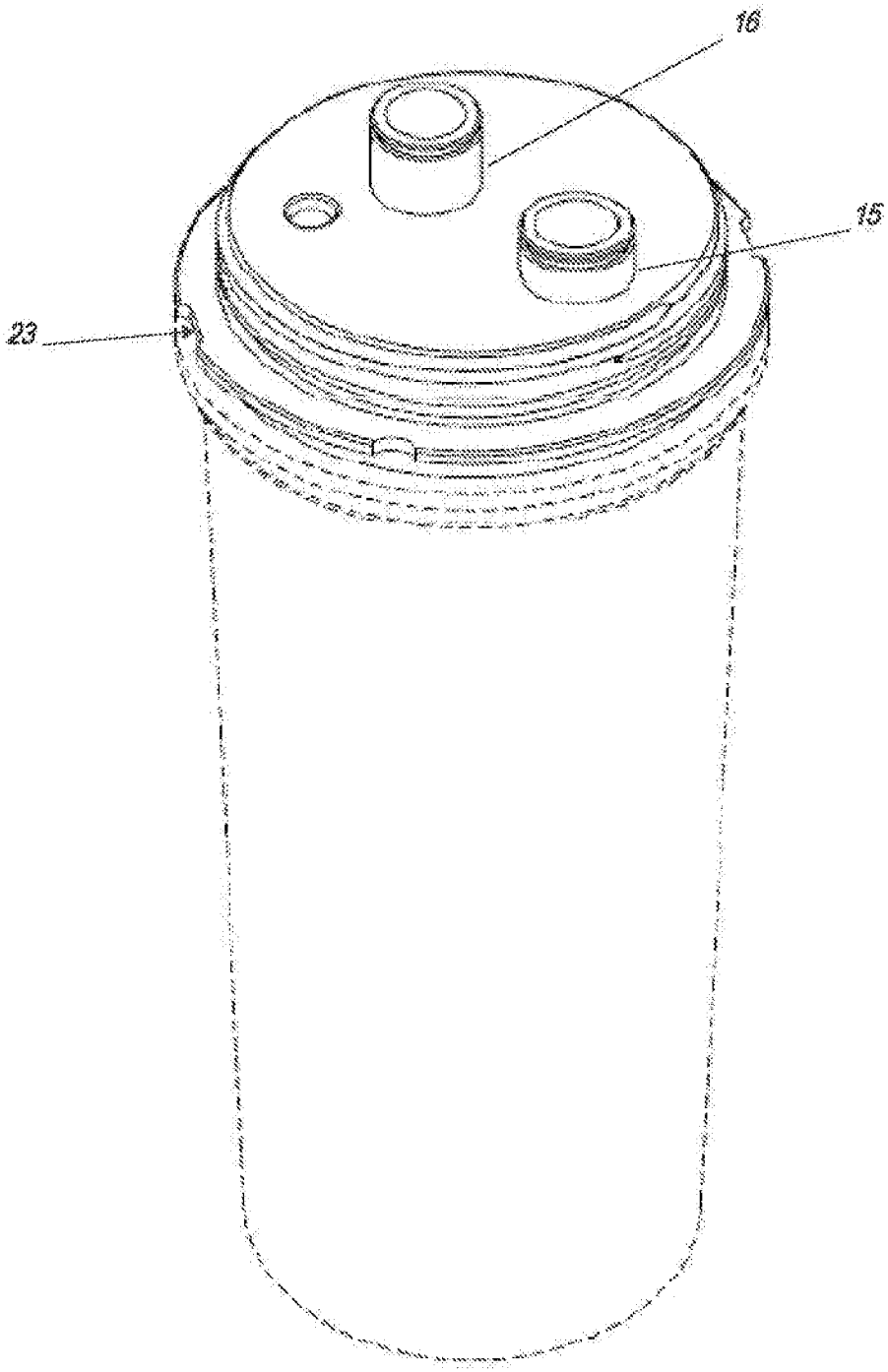


FIGURE 6A

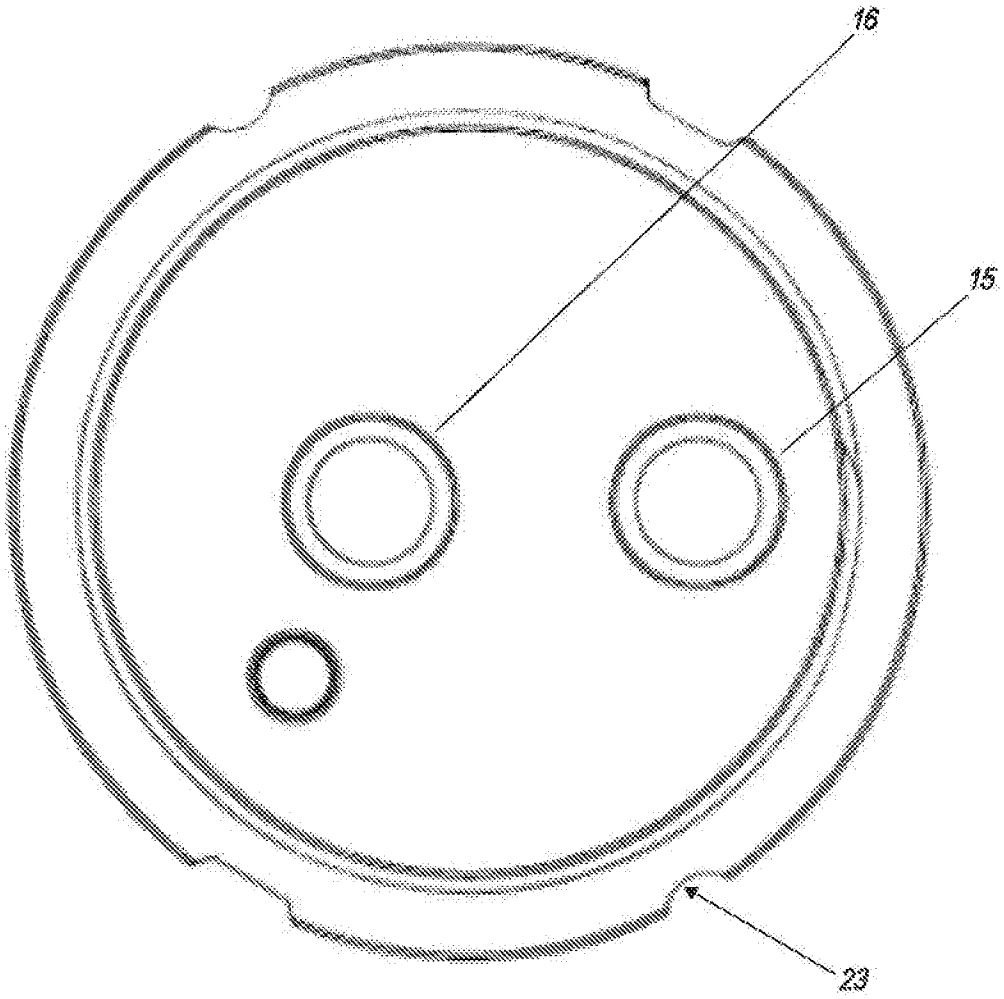


FIGURE 6B

Solmetex Ex. 2002
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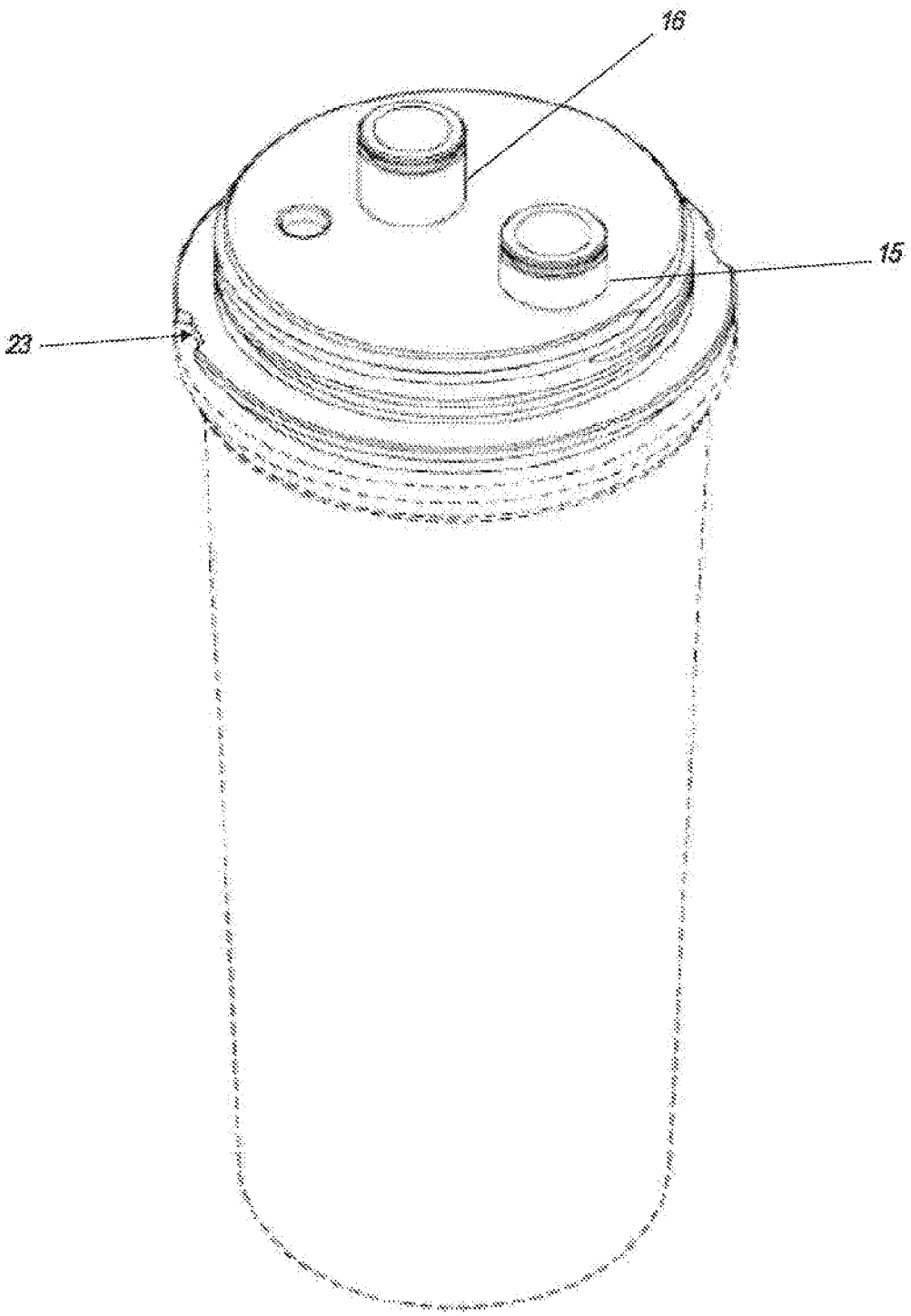


FIGURE 7A

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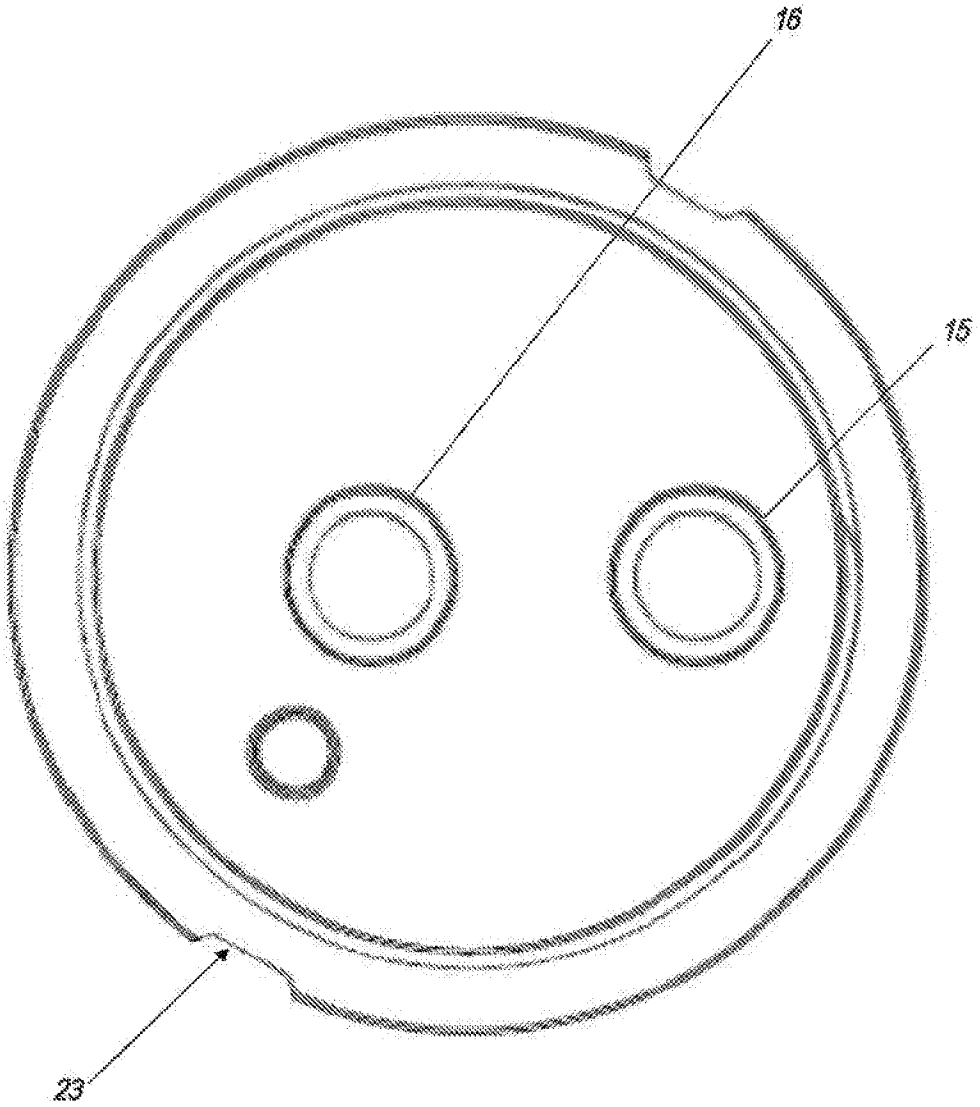


FIGURE 7B

Solmetex Ex. 2002
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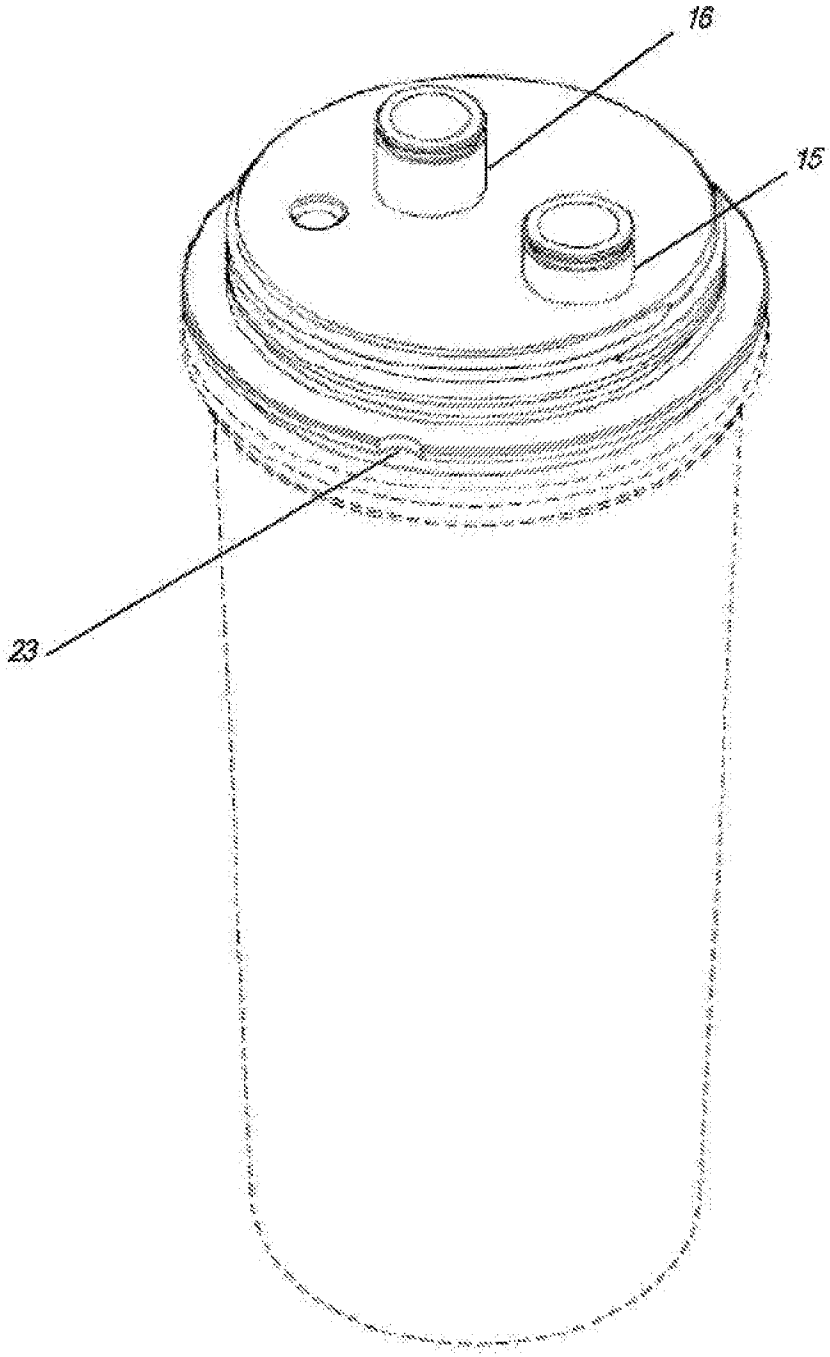


FIGURE 8A

Solmetex Ex. 2002
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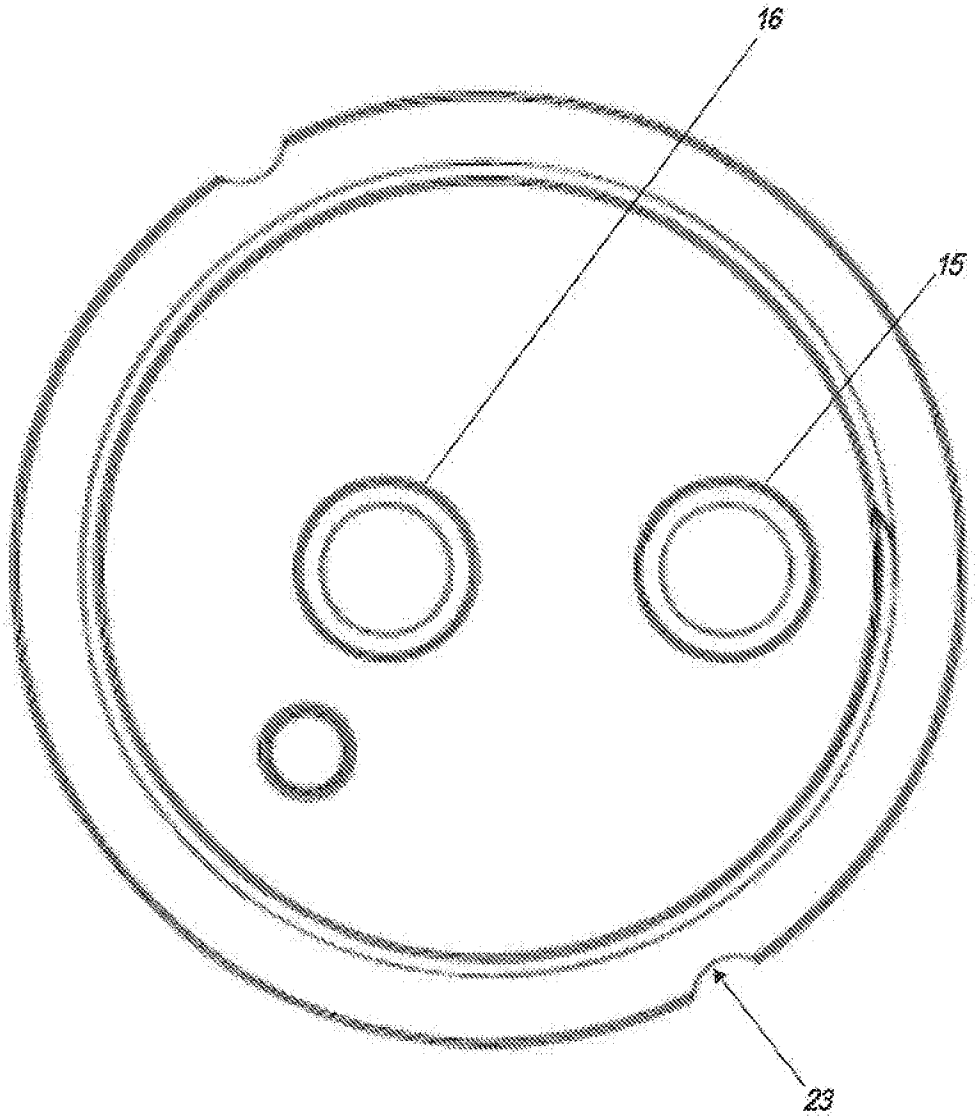


FIGURE 8B

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

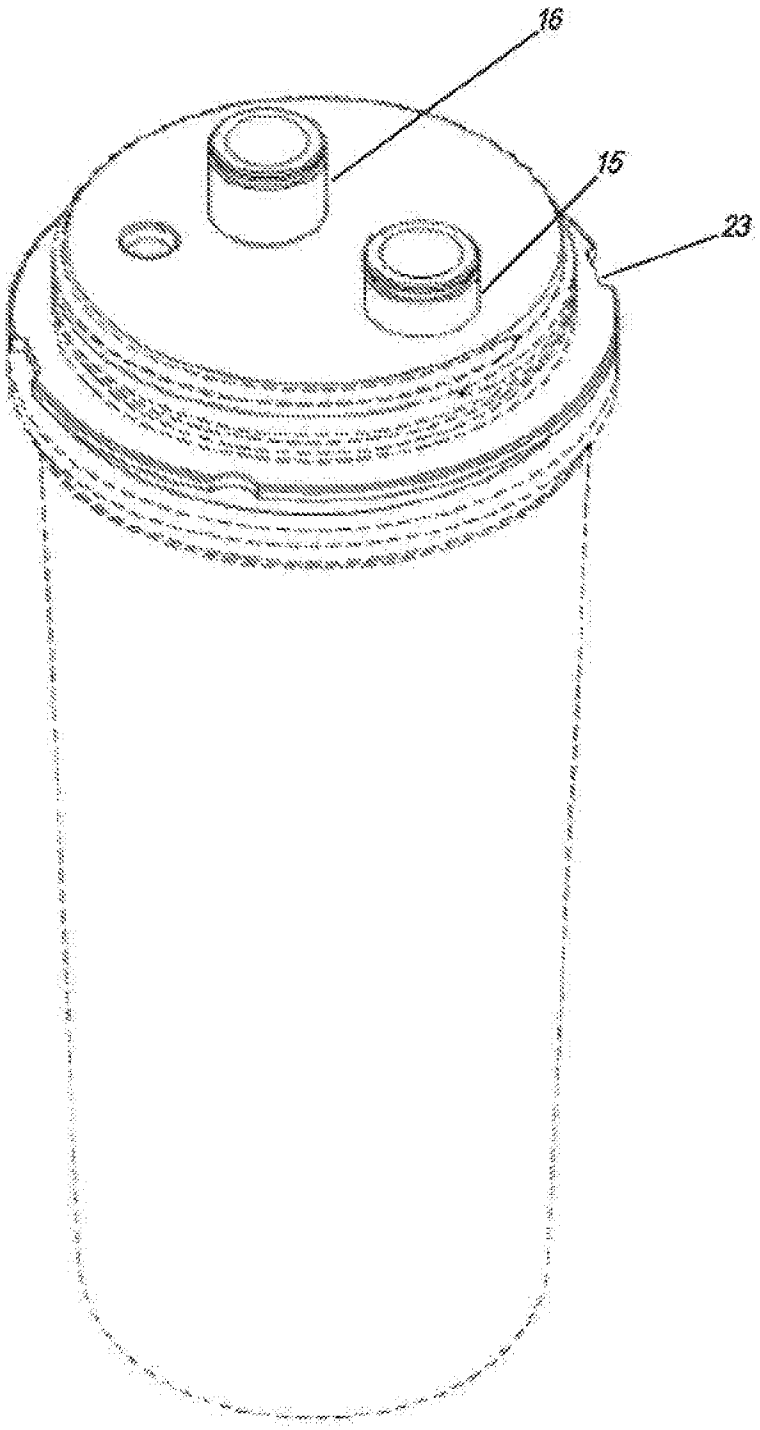


FIGURE 9A

Solmetex Ex. 2002
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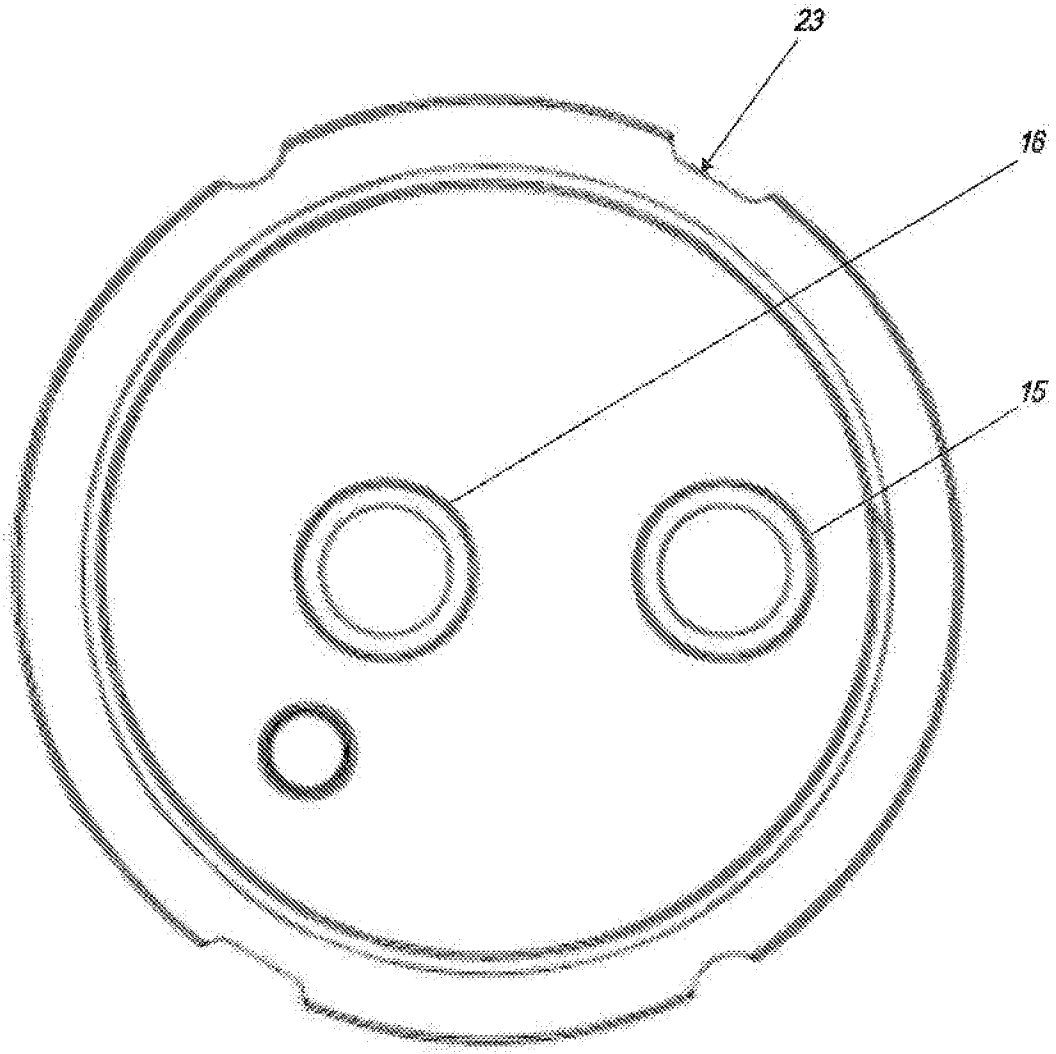


FIGURE 9B

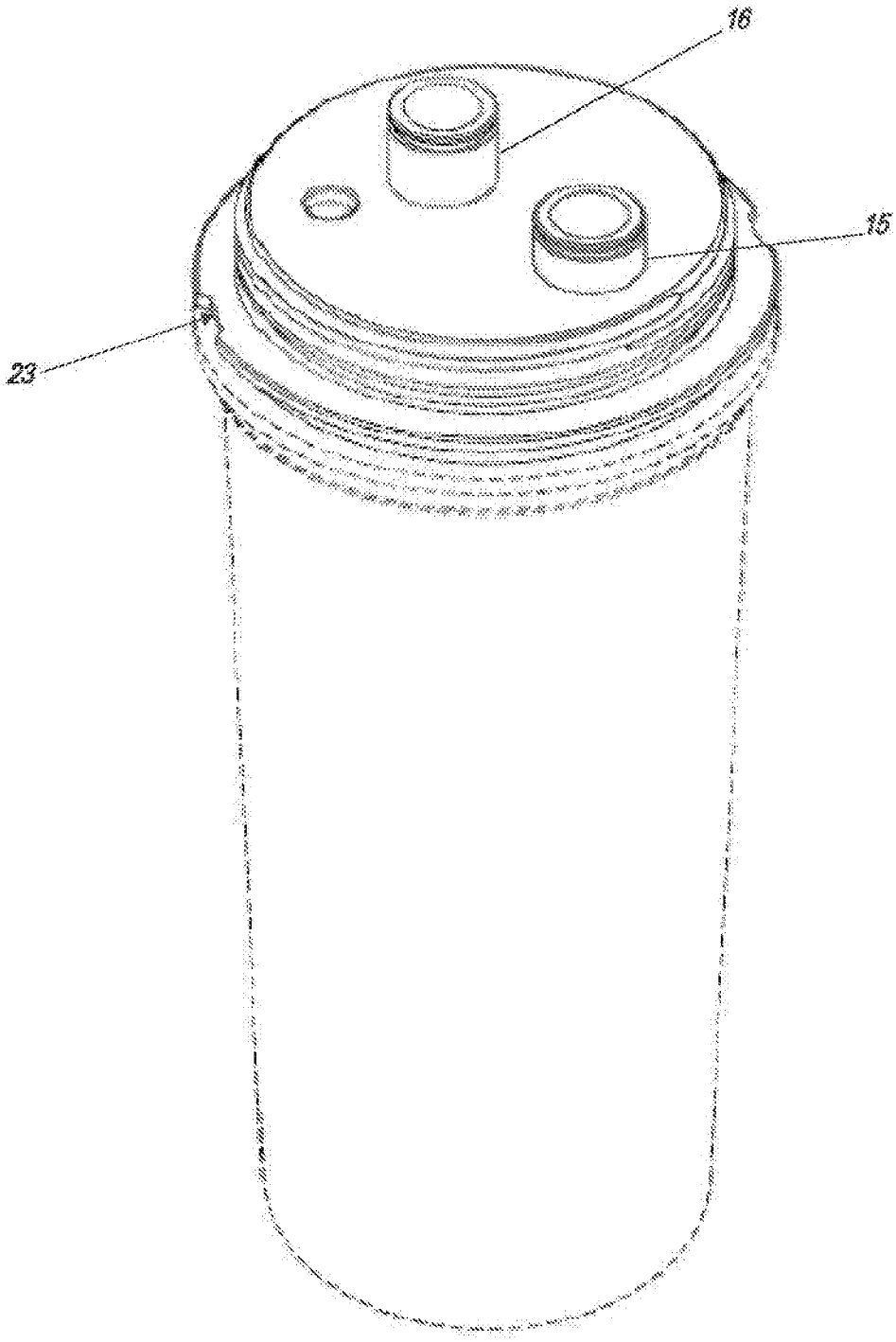


FIGURE 10A

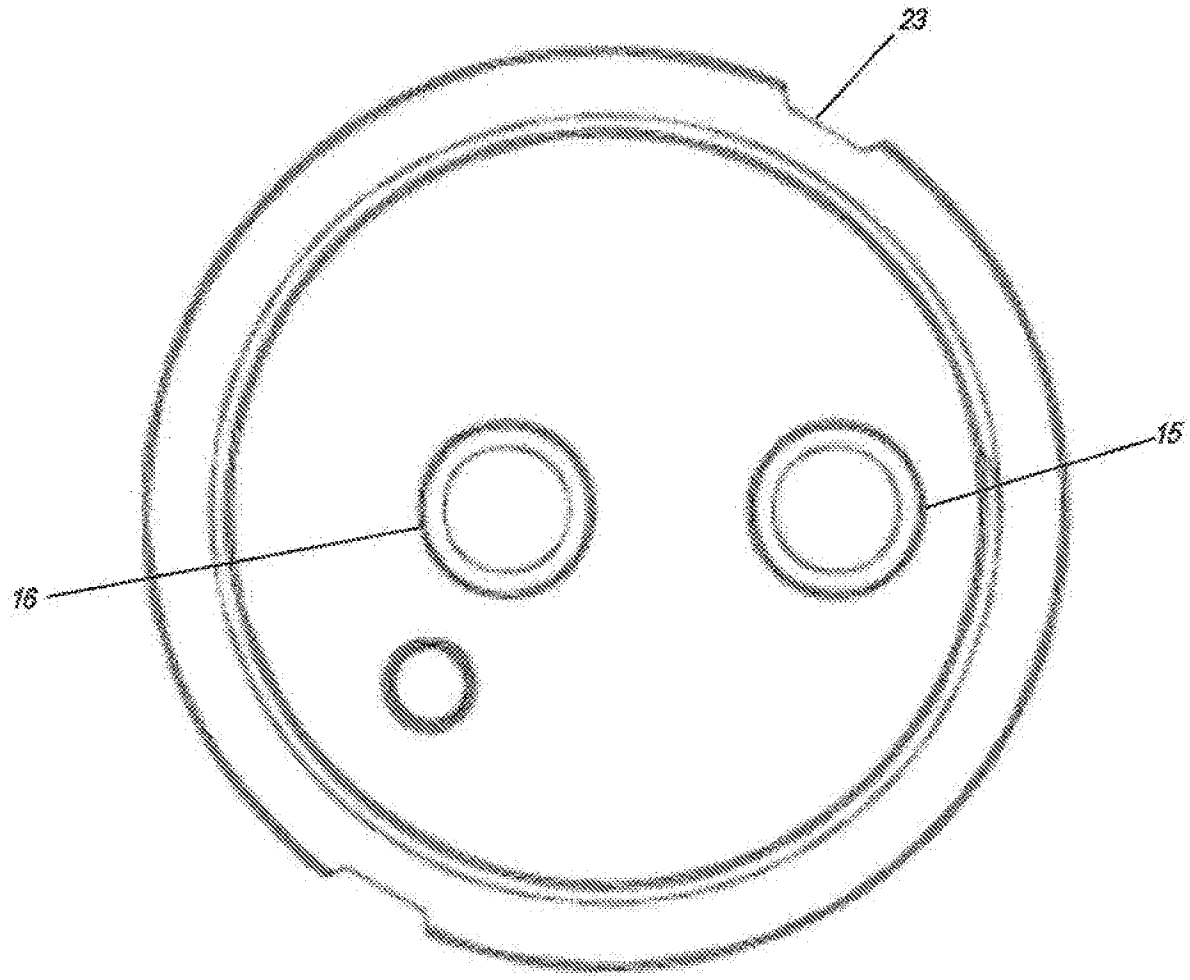


FIGURE 10B

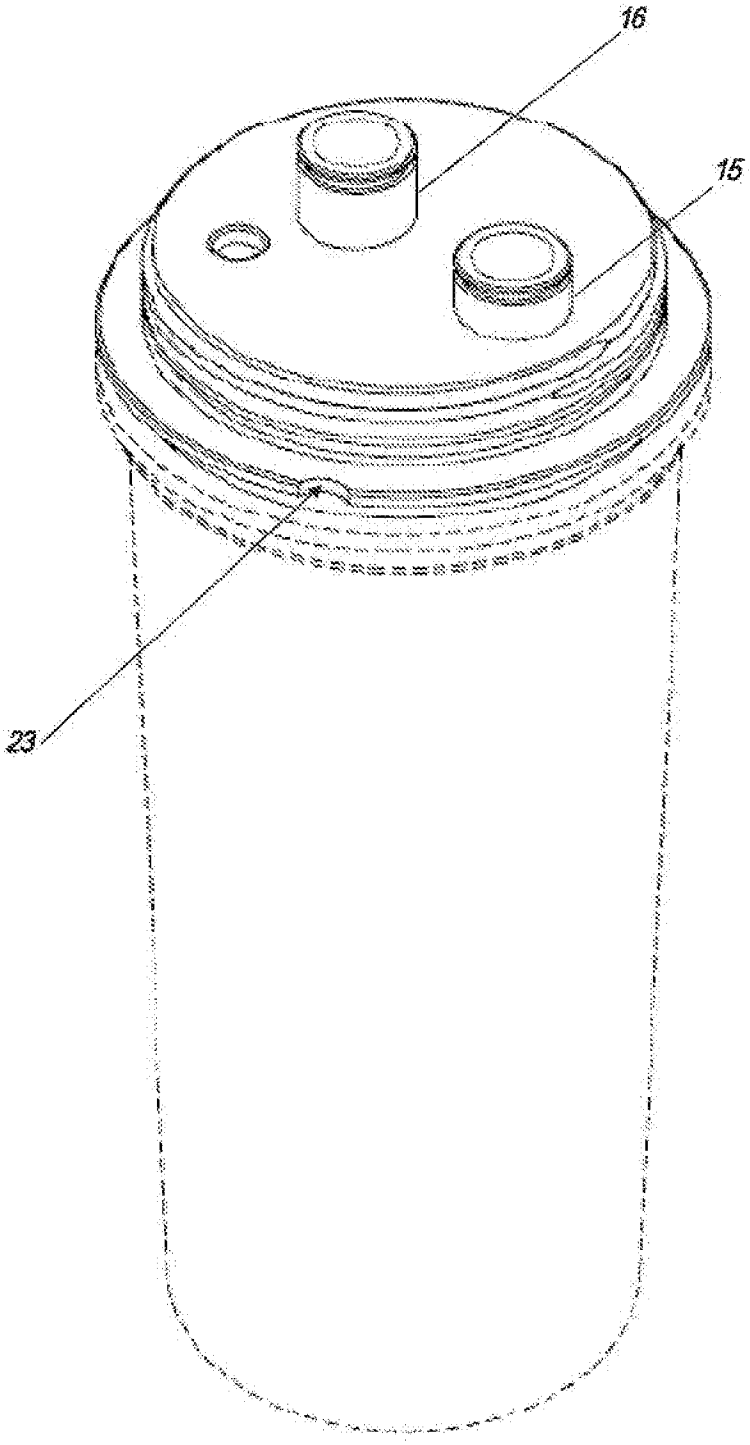


FIGURE 11A

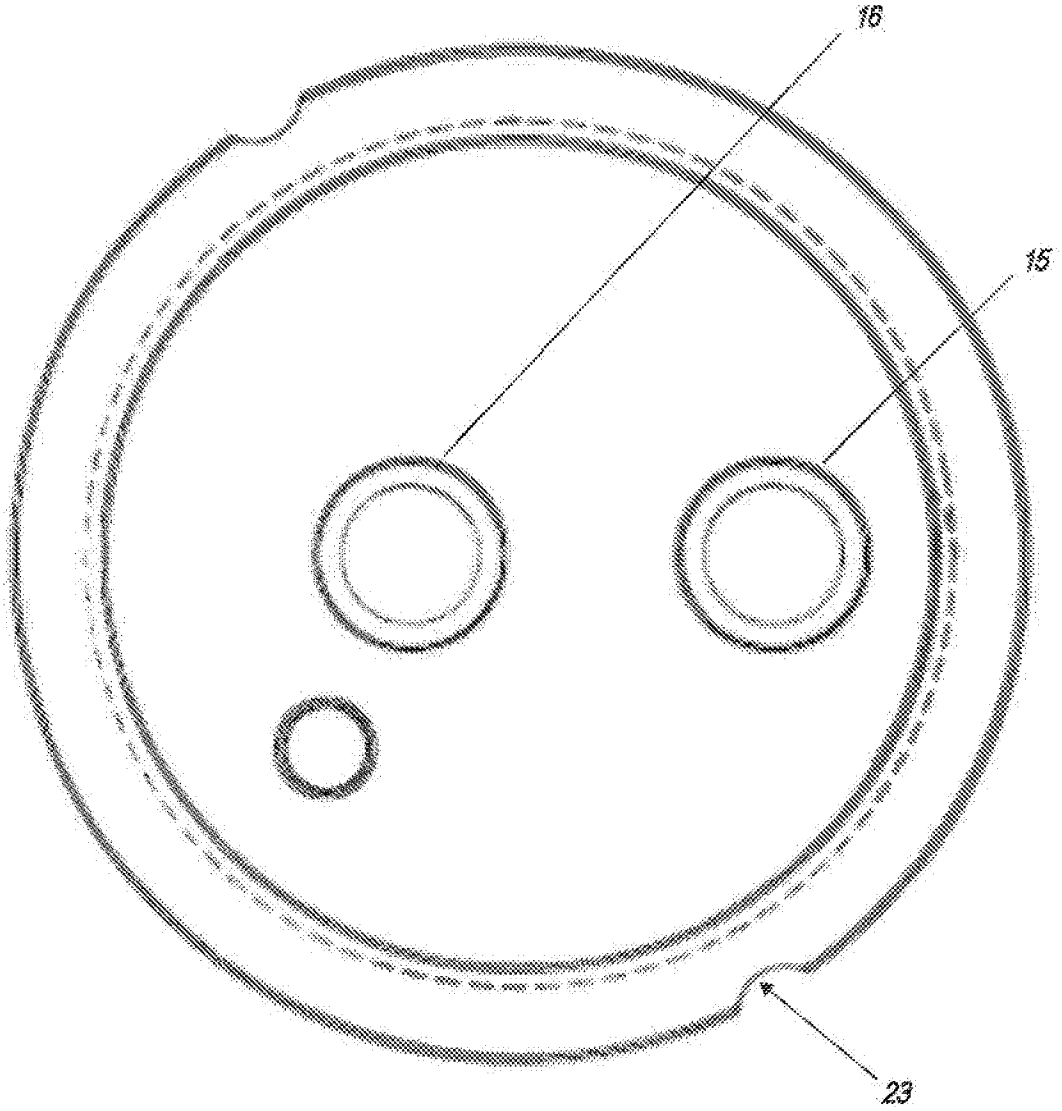


FIGURE 11B

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

DETACHABLE RECYCLING CONTAINER

RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 16/941,522, filed Jul. 28, 2020, which is a continuation-in-part of U.S. application Ser. No. 16/033,823, filed Jul. 12, 2018, now issued as U.S. Pat. No. 10,779,923, which is a continuation-in-part of U.S. application Ser. No. 15/730,828, filed Oct. 12, 2017, now issued as U.S. Pat. No. 10,646,313, which claims the benefit of and priority to provisional patent application Ser. No. 62/414,712, filed on Oct. 29, 2016, and provisional patent application Ser. No. 62/406,990, filed on Oct. 12, 2016. This patent application further claims priority from patent application Ser. No. 29/585,674, filed on Nov. 28, 2016, now issued as U.S. Pat. No. D840,534. This patent application further claims priority from patent application Ser. No. 29/585,668, filed on Nov. 28, 2016, now issued as U.S. Pat. No. D835,779. This application further claims priority to patent application Ser. No. 29/585,659, filed on Nov. 28, 2016, now issued as U.S. Pat. No. D835,778. This patent application further claims priority from patent application Ser. No. 29/577,701, filed on Sep. 14, 2016, now issued as U.S. Pat. No. D848,612. This patent application further claims priority from patent application Ser. No. 29/567,544, filed on Jun. 9, 2016, now issued as U.S. Pat. No. D840,533. This patent application further claims priority from patent application Ser. No. 29/565,622, filed on May 23, 2016, now issued as U.S. Pat. No. D835,264.

FIELD OF THE INVENTION

This invention relates to systems and apparatus suitable to remove particles from effluent waste, and particularly, to remove amalgam and other metallic particles and other abrasive solids from dental office suction effluent. The system also comprises a self contained recycling container to facilitate customer regulatory compliance and environmental safeguards.

BACKGROUND OF THE INVENTION

Dental amalgam is a dental filling material used to fill cavities caused by tooth decay. It has been used for more than 150 years in hundreds of millions of patients around the world.

Dental amalgam is a mixture of metals, consisting of liquid (elemental) mercury and a powdered alloy composed of silver, tin, and copper. Approximately 50% of dental amalgam is elemental mercury by weight. The chemical properties of elemental mercury allow it to react with and bind together the silver/copper/tin alloy particles to form an amalgam. See http://www.fda.gov/Medica/Devices/ProductsandMedical_Procedures/DentalProducts/DentalAmalgam/ucm171094.htm, accessed Sep. 9, 2016.

Amalgam is used less often than in the past, mostly because tooth-colored materials now can be used. However, the newer materials can't be used for all dental situations, amalgam is less costly than newer materials and it lasts longer, especially in teeth that undergo a lot of pressure and wear from chewing.

Better dental health overall coupled with increased demand for more modern alternatives such as resin composite fillings (which match the tooth color), as well as public concern about the mercury content of dental amalgam, have resulted in a steady decline in dental amalgam use in developed countries, though overall amalgam use continues to rise worldwide. Stein, P S; Sullivan, J; Haubenreich, J E; Osborne, P B (2005). "Composite resin in medicine and dentistry". Journal of long-term effects of medical implants. 15 (6): 641-54. doi:10.1615/jlongtermeffmedimplants.v15.i6.70. PMID 16393132.

Although amalgams are less frequently used in developed countries for new dental fillings than in the past, amalgams continue to make up a portion of the particle component of dental office effluent mainly because of the fact that old fillings made of amalgams are drilled out and removed in the effluent waste when new fillings are effected to replace the old. Further, as noted above even under current dental practice, an amalgam is preferred for some tooth filling situations.

Because mercury is a poison that can accumulate in living tissues and can pose a health hazard to species in a food chain exposed to mercury-containing compounds, and since humans are inevitably at the end of the food chain, it follows that effluent containing amalgams can pose a health hazard to the community at large. Also, certain metals such as silver are commercially valuable if recovered in quantity. For those reasons, it is desirable to devise systems, apparatus and processes for removing amalgams from dental office effluent and efficiently recycling those amalgams.

In addition to removing amalgams, other matter disposed into dental office suction effluent includes aluminum oxides used in air abrasion treatments and other solid waste material. These solid materials tend to wear out or damage vacuum pumps and other equipment downstream of the dental chair suction apparatus, and also constitute effluent water contaminants. Therefore, it is desirable for the apparatus to remove solid abrasive material and other particulate waste from the dental office suction effluent.

The World Health Organization also points out that amalgam separators, installed in the waste water lines of many dental offices, dramatically decrease the release of mercury into the public sewer system. However, critics say that the separators are still not mandatory in some states of the United States. "Purchasing, installing and operating dental amalgam separators: Practical issues". The Journal of the American Dental Association. 134 (8): 1054-65. doi:10.14219/jada.archive.2003.0319. PMID 12956345. Recently, the EPA has enacted nation-wide regulations requiring amalgam separators in dental offices.

Previously known apparatus for removing amalgam particles from dental office suction effluent are known to include a collecting tank for collecting a days accumulation of suction effluent from one or more sources of such waste. The waste is sucked from the dental chair suction apparatus and into the collecting tank by a vacuum pump. When the vacuum pump is turned off, an outlet valve is opened and the accumulated waste is deposited into a separation device intended to separate metal particles from the effluent liquid. Flow into the separation device is induced by the head of fluid in the collecting tank. Particles passing through the separation device are separated from the waste by gravity and settle to the bottom of the separation device. The flow rate is dependent on the head inside the collecting tank; as the head diminishes, the flow rate also diminishes. The changes in flow rate are undesirable because the particle separation rate is affected, and the system becomes prone to plugging when the flow rate decreases. Also, since the waste can be deposited only when the vacuum pump is off, waste is usually moved to the separation device at the end of the

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day. As a result, the collecting tank and separation device tend to be undesirably large and the whole process is time consuming.

Another known apparatus is a centrifuge type system that separates heavier metal particles from effluent liquid by collecting the particles at the peripheral wall of the centrifuge. This apparatus does not effectively separate lighter particles, and is expensive to purchase and operate due to the complexity of its mechanical parts.

Yet another known apparatus uses a dedicated mechanical pump to suction waste liquids through a separator device. Again, a dedicated pump can be expensive to purchase and to maintain, and can be undesirably space-consuming.

Such known systems can become quite complex, unwieldy and expensive, as for example that disclosed in U.S. Pat. No. 5,885,076 granted 23 Mar. 1999. It teaches the use of sedimentation, co-precipitation and filtration in an expensive complicated apparatus that is probably economical, if at all, only for relatively large installations such as a military base dental complex.

U.S. Pat. Nos. 6,692,636 and 6,596,754 are patents that disclose systems for removing amalgam from dental office suction effluent.

After collecting the amalgam and other solid waste the dentist is left with the problem of what to do with the waste. Either the dentist has to deal with his own hazardous waste or he can send his collected material to a recycler. In either case, the "collection container" needs to be disposable and easily replaceable.

Existing recycling programs generally require the provision of bulky shipping materials and the delivery of those materials to the dentist for every full container. If such materials are not provided and the materials are not properly recycled a large part of the benefit of collecting the amalgam waste can be lost. It is important that the waste is recycled under federal guidelines in order to make sure the full benefits of amalgam separation are achieved.

Additionally, containers for collection, such as dental amalgam recycling systems, can be compromised by incorrect installation or misalignment, which can cause O-rings to deform and/or seal irregularly, and result in leakage.

SUMMARY OF THE INVENTION

The present invention overcomes many of the shortcomings of the prior technology and achieves further advantages that will be apparent after reviewing the following detailed description.

In one aspect, the invention comprises a dental amalgam recycling system for recycling particles from a dental liquid effluent drawn from a suctioning device. In certain embodiments, the dental amalgam recycling system of the invention comprises:

(a) an air-water separator tank for receiving said effluent, said air-water separator tank having an air-water separator tank inlet in fluid communication with said suctioning device, an air-water separator tank liquid effluent outlet and an air-water separator tank air outlet;

(b) a detachable recycling container, said recycling container acting primarily under the influence of gravity to cause settlement of said particles; said recycling container having a recycling container effluent inlet port connected to said air-water separator tank liquid effluent outlet and said recycling container further having an effluent outlet port;

(c) wherein the air-water separator tank also includes an internal suction conduit;

(d) wherein the recycling container comprises threads;

(e) wherein the recycling container effluent inlet port and the recycling container outlet port are not the same height.

In certain embodiments, the dental amalgam recycling system further comprises (f) a threaded shipping cap, wherein the threads of the shipping cap and the threads of the recycling container are complementary such that, when the shipping cap is fitted in place, the shipping cap forms a tight seal with said recycling container.

While in use, the dental amalgam recycling system is functionally associated with a vacuum pump having a vacuum pump inlet. The vacuum pump is typically a pre-existing part of the dental office facility. In particular embodiments, the dental amalgam recycling system is physically connected with a vacuum pump via a suction conduit in the air-water separator. In certain preferred embodiments, the suction conduit is an internal suction conduit within the air-water separator.

In certain embodiments, the dental amalgam recycling system of the invention further comprise a first plug for said recycling container inlet port and a second plug for said recycling container effluent outlet port. Said first and second plugs may be held tightly in place by said threaded shipping cap when said shipping cap is fitted in place.

In certain embodiments, the dental amalgam recycling system of the invention further comprise an O-ring that provides an air and effluent tight seal when said shipping cap is fitted in place.

In certain embodiments, the invention comprises a container, useful as a dental amalgam recycling container, comprising threads for attachment of a shipping cap. In certain embodiments, the dental amalgam recycling container further comprises two plugs held in place by said shipping cap and an O-ring fitted in an O-ring groove to prevent leaks. The dental amalgam recycling containers of the present invention may further comprise a two tier cap that enables people with hands of different sizes to grip the cap and tighten to achieve a very tight seal.

In certain embodiments, the invention comprises an adapter for an air-water separator tank, wherein the adapter enables a recycling container without compatible effluent ports to attach to an air-water separator tank. Said air-water separator tank may comprise, for example, a component of a dental amalgam recycling system, as described above. In certain embodiments, the adapter may comprise threads. In alternative embodiments, the adaptor may be without threads.

As described above, the potential for leakage exists in a collection canister such as a recycling container used in the dental amalgam recycling systems described herein. Such leakage may occur, for example, due to incorrect installation, or due to misalignment of a container and its intended mating partner, such as the air-water separation tank or its intended cap, such as a threaded shipping cap, which may cause O-rings to deform and/or seal irregularly. In order to address this problem and/or reduce the potential for leakage, a collection canister, such as a recycling container used in a dental amalgam recycling system, may have one or more irregular 'keyways' cast into its outside top mating surface, and the intended mating partner, such as the air-water separation tank, or the shipping cap, may have one or more corresponding 'key(s)' be cast into its mating surface, such that the key(s) and keyway(s) must be aligned in order for the collection canister (e.g., the recycling container) and its mating partner (e.g., the air-water separation tank; or the shipping cap) to mate properly. This key/keyway system can help ensure even pressure across the entire circumference of the O-ring surface on each port. Similarly, such key(s) and

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keyway(s) may be used to ensure proper replacement of the container and/or the air-water separation tank, such that incorrect replacement can be avoided or minimized.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic front view of an embodiment of particle removal and recycling apparatus according to the invention, for particular use in a dental office.

FIG. **2** is a schematic side view of an embodiment of particle removal and recycling apparatus according to the invention, for particular use in a dental office.

FIG. **3***a* is a schematic view of an embodiment of a universal adapter for fitting various different sized recycling containers to the air-water separator of the present invention.

FIG. **3***b* is a schematic view of an alternative embodiment of a universal adapter for fitting various different sized recycling containers to the air-water separator of the present invention.

FIG. **4***a* is a schematic view of an embodiment of a recycling container and cap system of the invention.

FIG. **4***b* is a schematic perspective depiction of an embodiment of a recycling container and cap system of the invention.

FIG. **5***a* is a schematic inside view of an embodiment of a recycling cap for the recycling containers of the invention.

FIG. **5***b* is a schematic depiction of a recycling cap according to the invention fitting on a partial view of a recycling container according to the invention.

1—Backplate
2—Waste Inlet (from dental practice)
3—Air/water Separator Top
4—Top Support Bracket
5—Air/Water Separation Tank
6—Suction tube
7—Air/Water Separator Base
8—Outlet Tube (to vacuum system)
9—Recycling Container Top Portion
10—Lower Support Bracket
11—Restrictor
12—Detachable Recycling Container
13—Retaining Pins (2)
14—air-water separator tank effluent outlet port
15—recycling container inlet port
16—recycling container outlet port
17—recycling container threads
18—two tier recycling cap
19—O-ring groove
20—cap plugs
21—O-ring

FIG. **6**A is a schematic view of a first embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

FIG. **6**B is a schematic view of the same embodiment, viewing the top of the container from directly above.

FIG. **7**A is a schematic view of a second embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

FIG. **7**B is a schematic view of the same embodiment, viewing the top of the container from directly above.

FIG. **8**A is a schematic view of a third embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

FIG. **8**B is a schematic view of the same embodiment, viewing the top of the container from directly above.

FIG. **9**A is a schematic view of a fourth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

FIG. **9**B is a schematic view of the same embodiment, viewing the top of the container from directly above.

FIG. **10**A is a schematic view of a fourth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

FIG. **10**B is a schematic view of the same embodiment, viewing the top of the container from directly above.

FIG. **11**A is a schematic view of a fifth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

FIG. **11**B is a schematic view of the same embodiment, viewing the top of the container from directly above.

DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

According to one aspect of the instant invention, an apparatus is provided for removing and recycling metal-containing particles and other waste particles from effluent, particularly effluent from a dental office. While herein the term "metal particles" may frequently be employed, it is contemplated that the apparatus is capable of separating other solid particles from effluent liquid.

According to one aspect of the invention, an apparatus for removing metal particles and other solid particles from liquid suction effluent can be installed in a dental office using a pre-existing suction/vacuum pump system. The apparatus may share a common vacuum pump with conventional dental chair suction apparatus, without interrupting the use of suction equipment at the dental chairs.

Removal of solid particles from liquid suction effluent is effected by sedimentation.

In accordance with a one embodiment of the invention, the dental office suction effluent is passed from dental chair suction equipment outlets to an air water separator tank via a suitable inlet port for the tank. The air-water separator tank in turn passes effluent into a sedimentary deposit tank, closed on all sides when in use and preferably readily detachable for emptying or replacement.

In certain aspects of the instant invention the sedimentary deposit tank has a secondary function as a recycling container. In another aspect of the invention this recycling container can have features built in to make recycling easier and to reduce the amount of packaging and waste in the recycling system.

In another embodiment of the invention designed to minimize the space required to install the amalgam recycling system the air-water suction tube is internalized—within the air-water separator tank.

FIG. **1** and FIG. **2** shows two views of the separation apparatus according to the present invention in detail. Effluent from the dental chairs and a quantity of air are sucked through a suction apparatus exhaust conduit, through an air-water separator tank inlet **2**, and thence into an air-water separator tank **5**. The liquid effluent passes out of the air-water separator tank **5** via air-water separator tank outlet port **14**, while air passes downstream via the air suction tube **6** while maintaining constant vacuum upstream of amalgam separator.

The air-water separator tank effluent outlet port **14** passes effluent by gravity out of the air-water separator tank **5** and into the detachable recycling container **12** through the recycling container inlet port **15** on the container top portion for target particle separation by sedimentation. After the

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effluent passes through the inlet port **15** and through the container inlet conduit in the interior volume of the main body of the detachable recycling container **12**, solids settle and accumulate in the bottom of the interior volume of the main body of the detachable recycling container **12**. Liquid content of waste flows primarily by gravity, although intermittently assisted by vacuum through Restrictor **11** which slows the flow rate of liquid to assist in sedimentation process and ultimately "clean" effluent discharge through the recycling container outlet port **16** on the container top portion **9**.

Outlet ports **16** and inlet port **15** can be a variety of shapes and sizes, square, oval (as depicted), round or even more unusual shapes like a star. Preferred ports are those that provide a tight seal, allow for easy removal, and do not break. Oval or round are preferred embodiments. Round are most preferred.

A vacuum at the outlet tube **8** is generated when the vacuum pump is operating, thereby sucking air out of the air-water separator tank **5** via suction tube **6** while maintaining vacuum upstream of amalgam separator apparatus. Effluent from the recycling container **12** passes through the restrictor **11** where remaining non-settable fine particles are removed from the effluent and into the recycling container outlet port **16** to be discharged from the apparatus via common outlet tube **8**. Matter sucked by the vacuum pump, generally free of removed solids, is discharged via vacuum pump into a municipal drain of the public sewage system.

The system is provided with a simple back plate **1** for easy dental office placement as well as removable retaining pins **13** that engage radially protruding structures of the recycling container to ensure the recycling container does not detach from the air-water separation tank **5** when there is no vacuum in the system.

In certain embodiments, the recycling container ports **16** and **15** may be different heights in order to aid in alignment of the detachable recycling container **12** in the air-water separator base **7**. In a preferred embodiment, the outlet port **16** engages before the inlet port **15** while during removal the inlet port **15** disengages first. This causes a small volume of fluid to be pulled out of the collection container back into air-water separator tank **5** creating head space and eliminating upward force of vacuum which eases removal of recycle container **12** by operator. Existing devices require rocking, wiggling or applying extensive down force for removal of recycle container **12**.

In one preferred embodiment of the invention designed to minimize recycling costs and waste, the recycling container/sedimentary deposit tank has threads **17** built into the generally cylindrical upper region of the container top portion **9** to enable the addition of a liquid tight top for shipping.

FIG. **3** shows a schematic diagram of an adapter **25** according to the invention to enable the use of recycling containers from a variety of sources that are lacking in correctly shaped ports **16** and **15** or otherwise are unable to fit the air-water separator tank **5** according to the invention due to shape differences.

FIG. **4***a* shows a schematic diagram of the recycling container and cap system (see FIG. **5** for more cap **18** detail) according to the present invention. The cap **18** is a two tier shape to allow for a tight grip by both a big and smaller hand in order to achieve a strong seal as required by the invention. An O-ring **21** is provided and fits into an O-ring groove **19** on the recycling container **12** above a flange structure **22** that protrudes radially away from the central axis of the main body of the recycling container **12**. The removable retaining pins **13**, described above with respect to FIG. **2**, fit within the region below the flange structure **22**. Plugs **20** are used to provide a first leak proof seal for the recycling container **12**. These plugs **20** are held in place by the cap **18** when the cap is threaded onto the recycling container as depicted in FIG. **513**.

FIG. **6** through FIG. **11** show several embodiments of irregular keyways **23** on a recycling container. The inlet port **15** and the outlet port **16** are on the circular upper surface of the container top portion, and the irregular keyways **23** are cast into the outer top mating surface.

Generally, under present practice, the dental staff will not be able to remove deposited sediment from the recycle container nor remove accumulated particle residues from the restrictor unit themselves. Thus, it is desirable that such removal be done by a competent effluent residue processing facility. Therefore, under present practice, it is expected to be preferred that the recycling container with its enclosed restrictor unit be removed when full, or periodically replaced by fresh tanks from time to time as required. The spent tank with an accumulation of metallic and other particles can then be sent to a processing facility for proper disposal of the targeted metallic particles, such as mercury, and recovery of precious metals such as silver.

Although the sedimentary deposit process is effective to remove a satisfactorily high proportion of the target particles desired to be removed from the effluent, the recycling container desirably includes an outlet restrictor right in the chamber to catch any floating materials as well as any other materials that did not settle out.

If the recycle container is not changed as required or filled beyond normal capacity, waste liquid from dental practice may back up into air water separator tank. Should this occur, effluent overflows through the air suction tube and into the outlet port and is discharged into the vacuum pump draw line and thence eventually into the municipal drain. However, it is desirable that the system should operate in such a manner as to avoid having the air-water separator tank become completely full, since effluent exiting through the air outlet port will contain particles that will not be separated by the separator. If, however, such a by-pass condition occurs at no time will the suction generated by the vacuum pump be lost or interrupted at the dental office.

In a further embodiment of the invention oriented towards large-scale institutional applications, in which many dental chairs or other sources of effluent are connected to the same suction and drain services, several parallel-connected recycling containers and associated apparatus, each such composite apparatus including a air-water separator tank and preferably one, or alternatively two attached recycling containers, may be operated in parallel to provide sufficient treatment capacity for large effluent volumes.

All publications, web-sites, patents and patent applications cited in the specification are hereby incorporated herein by reference in their entirety for the disclosure for which they are cited.

Having read the above specification, other alternatives and variants of the above described methods and apparatus suitable for practicing the methods will occur to those skilled in the technology. Such alternatives, modifications and variants fall within the scope of the present invention.

The invention as described above also includes the following non-limiting claims, which describe particular embodiments of the invention.

The invention claimed is:

1. A detachable dental-amalgam container for use with a dental amalgam separation system, the dental amalgam

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separation system having a system inlet for receiving dental amalgam effluent, an air-water separation tank for holding the dental amalgam effluent received from the system inlet, a system outlet, a vacuum source acting on the system outlet for moving fluid from the dental amalgam effluent toward the system outlet, and at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having a central axis and an interior volume for receiving the dental amalgam effluent from the air-water separation tank;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having a circular upper surface from which a container inlet port and a container outlet port extend away from the main body, the container outlet port being positioned nearer to the central axis of the main body than the container inlet port, the container inlet port being positioned nearer to a periphery of the circular upper surface than the container outlet port, the container top portion further including at least one radially protruding structure located below the generally cylindrical upper region, the at least one radially protruding structure for engaging the at least one retaining pin of the dental amalgam separation system to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system when there is no pressure being applied from the vacuum source, the at least one radially protruding structure being located radially outward relative to the periphery of the circular upper surface;

a container inlet conduit extending downwardly from the container top portion and into the interior volume, the container inlet conduit being coupled to the container inlet port, the container inlet conduit and the container inlet port for transferring the dental amalgam effluent from the air-water separation tank to the interior volume of the main body; and

a restrictor located within the interior volume of the main body and fluidically coupled to the container outlet port, the restrictor configured to remove fine particles from the dental amalgam effluent as fluid from the dental amalgam effluent is moved toward the container outlet port due to the vacuum source.

2. The detachable dental-amalgam container of claim **1**, wherein the container inlet port and the container outlet port extend above the circular upper surface by the same height.

3. The detachable dental-amalgam container of claim **1**, further including a pair of plugs configured to seal a container inlet port and a container outlet port of a filled detachable dental-amalgam container.

4. The detachable dental-amalgam container of claim **3**, further including a cap configured to retain at least one of the plugs on the filled detachable dental-amalgam container.

5. The detachable dental-amalgam container of claim **4**, wherein the cap has an inside surface with a first circular wall and a second circular wall, the first circular wall placed so as to engage a first one of the pair of plugs on the container inlet port and the second circular wall placed so as to engage a second one of the pair of plugs on the container outlet port.

6. The detachable dental-amalgam container of claim **1**, wherein the container top portion has a maximum outer dimension that is greater than a maximum outer diameter of the main body.

7. The detachable dental-amalgam container of claim **1**, wherein the container outlet port is configured for fluidic coupling to the system outlet of the dental amalgam separation system that transfers fluid from the dental amalgam effluent to a municipal water disposal system.

8. The detachable dental-amalgam container of claim **1**, wherein the at least one radially protruding structure includes a flange extending in a direction away from the generally cylindrical upper region.

9. The detachable dental-amalgam container of claim **8**, wherein the flange extends entirely around the container top portion.

10. The detachable dental-amalgam container of claim **1**, wherein the container top portion further comprises a keying feature for mating with a corresponding keying feature on the dental amalgam separation system, the keying feature being located below the generally cylindrical upper region and being outside the periphery of the circular upper surface, the detachable dental-amalgam container is capable of mating securely with the dental amalgam separation system when the keying feature and the corresponding keying feature on the dental amalgam separation system are mated.

11. The detachable dental-amalgam container of claim **10**, wherein the keying feature includes a recess formed in an outermost periphery of the container top portion.

12. A detachable dental-amalgam container for use with a dental amalgam separation system, the dental amalgam separation system having a system inlet for receiving dental amalgam effluent, an air-water separation tank for holding the dental amalgam effluent received from the system inlet, a system outlet, a vacuum source for moving fluid from the dental amalgam effluent through the system outlet, and at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having a central axis and an interior volume for receiving the dental amalgam effluent from the air-water separation tank;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having an upper surface from which a container inlet port and a container outlet port extend away from the main body, the container outlet port being positioned nearer to the central axis of the main body than the container inlet port, the container inlet port being positioned nearer to a periphery of the upper surface than the container outlet port, the container inlet port and the container outlet port both including an external O-ring at upper portions thereof that are configured to help provide a seal between the detachable dental-amalgam container and the dental amalgam separation system while the vacuum source acts upon the dental amalgam separation system to move fluid from the dental amalgam effluent toward the system outlet, the container top portion further including at least one radially protruding structure located below the generally cylindrical upper region, the at least one radially protruding structure defining a pin-receiving region therebelow for receiving the at least one retaining pin of the dental amalgam separation system to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system, the at least one radially protruding structure is located radially outward from the periphery of the upper surface;

a container inlet conduit extending downwardly from the container top portion and into the interior volume, the

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container inlet conduit being coupled to the container inlet port, the container inlet conduit and the container inlet port for transferring the dental amalgam effluent from the air-water separation tank to the interior volume of the main body; and

wherein the container outlet port is for being coupled to the system outlet port such that the fluid from the dental amalgam effluent is moved from the interior volume of main body, through the container outlet port, and into the system outlet due to the vacuum source acting upon the dental amalgam separation system.

13. The detachable dental-amalgam container of claim **12**, further including a pair of plugs configured to seal a container inlet port and a container outlet port of a filled detachable dental-amalgam container, and a cap that retains at least one of the plugs on the filled detachable dental-amalgam container.

14. The detachable dental-amalgam container of claim **13**, wherein the cap has internal threads that threadably mate with corresponding threads on the generally cylindrical upper region of the container top portion to retain the pair of plugs on the detachable dental-amalgam container.

15. The detachable dental-amalgam container of claim **12**, wherein the at least one radially protruding structure includes a flange extending away from the generally cylindrical upper region.

16. The detachable dental-amalgam container of claim **15**, wherein the flange extends entirely around the container top portion.

17. The detachable dental-amalgam container of claim **15**, wherein the flange includes a curved outer surface.

18. A detachable container for use with a dental amalgam separation system, the dental amalgam separation system having a system inlet for receiving dental amalgam effluent, a system outlet, a vacuum source for moving fluid from the dental amalgam effluent toward the system outlet, and at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having a central axis and an interior volume for receiving the dental amalgam effluent from the dental amalgam separation system;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having a circular upper surface from which a container inlet port and a container outlet port extend away from the main body, the container outlet port being positioned nearer to the central axis of the main body than the container inlet port, the container inlet port being positioned nearer to a periphery of the circular upper surface than the container outlet port, the container top portion further including at least one radially protruding structure located below the upper generally cylindrical region, the at least one radially protruding structure having a lower surface under which the at least one retaining pin of the dental amalgam separation system is received to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system, the at least one radially protruding structure is located radially outward relative to the periphery of the circular upper surface; and

wherein the container inlet port is configured to transfer the dental amalgam effluent that is received by the system inlet into the interior volume of the main body; and

wherein the container outlet port is configured to be coupled to the system outlet port such that fluid from the dental amalgam effluent is moved from the interior volume of main body, through the container outlet port, and into the system outlet due to the vacuum source acting on the dental amalgam separation system.

19. The detachable dental-amalgam container of claim **18**, wherein the container top portion further comprises a keying feature for mating with a corresponding keying feature on the dental amalgam separation system, the keying feature being located below the generally cylindrical upper region, the detachable dental-amalgam container is capable of mating securely with the dental amalgam separation system when the keying feature and the corresponding keying feature on the dental amalgam separation system are mated.

20. The detachable dental-amalgam container of claim **18**, wherein the at least one radially protruding structure includes a flange extending away from the generally cylindrical upper region, the flange includes a curved outer surface.

21. The detachable dental-amalgam container of claim **20**, wherein the flange extends entirely around the container top portion.

22. The detachable dental-amalgam container of claim **20**, further including a pair of plugs configured to seal a container inlet port and a container outlet port of a filled detachable dental-amalgam container, and a cap configured to retain at least one of the plugs on the filled detachable dental-amalgam container.

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Electronic Acknowledgement Receipt

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Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	D2-DRNA_Opening_Brief_for_MTD.pdf	1879394 7dcd5a2ed5209818cf0def8d336b58dd01843092	no	26

Warnings:

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Information:					
2	Non Patent Literature	D3-Motion_to_Dismiss_Exhibit_1.pdf	7349823 94981a22163e777900f9fda75d84589fb9e1ffd9	no	27
Warnings:					
Information:					
			Total Files Size (in bytes):	9229217	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Solmetex LLC	Customer No.: 80709
Application No.: 16/941,522	Confirmation No.: 1050
Filed: July 28, 2020	Art Unit: 3772
Docket No.: SMTX-001-T1-CON	Examiner: Lucchesi, Nicholas D.

Title: DETACHABLE RECYCLING CONTAINER

SECOND INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. §§ 1.97 and 1.98

Commissioner for Patents – via EFS
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56, it is respectfully requested that this Information Disclosure Statement be entered and the references listed on the attached List of References be considered by the Examiner and made of record.

In accordance with 37 C.F.R. § 1.98(a)(2)(ii), copies of the U.S. Patents and/or U.S. Patent Application Publications on the attached List of References are not being submitted.

In accordance with MPEP § 2001.06(c), Applicant would like to make the Examiner aware of the following litigation involving patent(s) related to the present application, *i.e.*, U.S. Patent No. 11,660,175: *Solmetex, LLC v. Dental Recycling North America, Inc.,* Civil Action No. 1:23-cv-00602-MN, filed in the District Court of Delaware on June 1, 2023. Applicant would also like to make the Examiner aware of the following Patent Trial and Appeal Board (PTAB) proceedings involving U.S. Patent No. 11,660,175: *Dental Recycling North America, Inc. v. Solmetex, LLC*, Case No. PGR2023-00055, filed on September 29, 2023. Applicant invites the Examiner or any other appropriate USPTO official to contact the attorney of record below with any questions and/or requests regarding this notice.

In accordance with 37 C.F.R. §§ 1.97(g) and (h), this Information Disclosure Statement is not to be construed as a representation that a search has been made, and is not to be construed to

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

be an admission that the information disclosed is, or is considered to be, prior art with respect to the present application or material to patentability as defined in 37 C.F.R. § 1.56.

This Information Disclosure Statement is being filed after the mailing of a first office action on the merits, but before the mailing of a final office action or notice of allowance. Accordingly, pursuant to 37 C.F.R. § 1.97(c), Applicant is concurrently submitting the $104.00 Information Disclosure Statement fee set forth in 37 C.F.R. § 1.17(p). No additional fees are believed to be due in connection with the filing of this Information Disclosure Statement. However, should any additional fees be deemed necessary (except payment of the issue fee), the Director is urged to contact the below-signed representative of the Applicant.

Respectfully submitted,

Date: October 31, 2023

By: /Steven R. Lazar/
Steven R. Lazar
Attorney for Applicant
Registration No. 32,618
617-966-2374

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

List of References **SECOND INFORMATION DISCLOSURE STATEMENT** Page 1 of 4	Atty. Docket No. SMTX-001-T1-CON	Application No.: 16/941,522
	Applicant(s): Solmetex LLC	
	Filing Date: July 28, 2020	Art Unit: 3772

U.S. PATENTS				
Examiner Initial	**Cite No.**	**Patent Number**	**Issue Date**	**First Named Inventor**
	A1			

U.S. PATENT APPLICATION PUBLICATIONS				
Examiner Initial	**Cite No.**	**Patent Application Publication Number**	**Publication Date**	**First Named Inventor**
	B1			

FOREIGN PATENT DOCUMENTS					
Examiner Initial	**Cite No.**	**Foreign Document Number**	**Publication Date**	**Country**	**Translation**
	C1				

OTHER DOCUMENTS (including publisher, author (if any), title, relevant pages, date, and place of publication)		
Examiner Initial	**Cite No.**	**Document Information**
	D1	Defendant DRNA's Motion to Dismiss in *Solmetex, LLC v. Dental Recycling North America, Inc.,* Civil Action No. 1:23-cv-00602-MN, D.I. 10; August 7, 2023 (2 pages)
	D2	Defendant DRNA's Opening Brief in Support of its Motion to Dismiss in *Solmetex, LLC v. Dental Recycling North America, Inc.,* Civil Action No. 1:23-cv-00602-MN, D.I. 12-1 (26 pages)
	D3	U.S. Patent No. 11,660,175; Ex. 1 to Defendant DRNA's Opening Brief in Support of its Motion to Dismiss in *Solmetex, LLC v. Dental Recycling North America, Inc.,* Civil Action No. 1:23-cv-00602-MN, D.I. 12-1 (27 pages)
	D4	Excerpts of the File History for U.S. Patent No. 11,660,175; Ex. 2 to Defendant DRNA's Opening Brief in Support of its Motion to Dismiss in *Solmetex, LLC v. Dental Recycling North America, Inc.,* Civil Action No. 1:23-cv-00602-MN, D.I. 12-2 (347 pages)
	D5	"Cartridge 2 – Compatible with Solmetex® NXT Hg5®** Only"; Ex. 3 to Defendant DRNA's Opening Brief in Support of its Motion to Dismiss in *Solmetex, LLC v. Dental Recycling North America, Inc.,* Civil Action No. 1:23-cv-00602-MN, D.I. 12-3; retrieved from https://drna.com/products/Cartridge-2-Compatible-with-Solmetex-r-NXT-Hg5-r-**-ONLY-p4549946180 on October 10, 2023 (6 pages)
	D6	https://vimeo.com/509905162, "Replacing Your Amalgam Separator Cartridge with DRNA's Generic Cartridge", included on https://drna.com/products/Cartridge-2-Compatible-with-Solmetex-r-NXT-Hg5-r-**-ONLY-p4549946180; Ex. 4 to Defendant DRNA's Opening Brief in Support of its Motion to Dismiss in *Solmetex, LLC v. Dental Recycling North America, Inc.,* Civil Action No. 1:23-cv-00602-MN, D.I. 12-4; retrieved on October 10, 2023 (2 pages)

EXAMINER:	**DATE CONSIDERED:**

EXAMINER: INITIAL IF REFERENCE CONSIDERED, WHETHER OR NOT CITATION IS IN CONFORMANCE WITH MPEP609; DRAW LINE THROUGH CITATION IF NOT IN CONFORMANCE AND NOT CONSIDERED. INCLUDE COPY OF THIS FORM WITH NEXT COMMUNICATION TO APPLICANT.

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DRNA v. Solmetex - PGR2023-00555

OTHER DOCUMENTS (including publisher, author (if any), title, relevant pages, date, and place of publication)

Examiner Initial	Cite No.	Document Information
	D7	Petition for Post Grant Review of U.S. Patent No. 11,660,175 in Case No. PGR2023-00055 (196 pages)
	D8	Ex. 1001 to Petition in Case No. PGR2023-00055, U.S. Patent No. 11,660,175 B2 to Mozzicato (26 pages)
	D9	Ex. 1002 to Petition in Case No. PGR2023-00055, File History of U.S. Patent No. 11,660,175 to Mozzicato (346 pages)
	D10	Ex. 1003 to Petition in Case No. PGR2023-00055, Declaration of Dr. Jason Janet in Support of the Petition for Post Grant Review of U.S. Patent No. 11,660,175, dated September 29, 2023 (12 pages)
	D11	Ex. 1004 to Petition in Case No. PGR2023-00055, Declaration of Darwin Moreira in Support of the Petition for Post Grant Review of U.S. Patent No. 11,660,175, dated September 29, 2023 (12 pages)
	D12	Ex. 1005 to Petition in Case No. PGR2023-00055, Photos of DRNA Generic Cartridge 2 and corresponding components (2 pages)
	D13	Ex. 1006 to Petition in Case No. PGR2023-00055, "Cartridge 2 Installation Instructions" (2 pages)
	D14	Ex. 1007 to Petition in Case No. PGR2023-00055, Photos of Solmetex NXT Hg5 Collection Container and corresponding components (26 pages)
	D15	Ex. 1008 to Petition in Case No. PGR2023-00055, Solmetex NXT Hg5 Collection Container Replacement & Recycling Procedure (8 pages)
	D16	Ex. 1009 to Petition in Case No. PGR2023-00055, Solmetex NXT Hg5 Collection Container Shipping and Recycling Information (1 page)
	D17	Ex. 1010 to Petition in Case No. PGR2023-00055, CN 102989232 A to Liu et al. ("Liu") and Certified English Translation Thereof (17 pages)
	D18	Ex. 1011 to Petition in Case No. PGR2023-00055, CA 2356902 A1 to Boyd ("Boyd") (26 pages)
	D19	Ex. 1013 to Petition in Case No. PGR2023-00055, "Solmetex NXT-Hg5 Amalgam Separator Installation and Operations Manual," Exhibit B to Complaint filed in *Solmetex, LLC v. Dental Recycling North America, Inc.,* Civil Action No. 1:23-cv-00602-UNA, D.I. 1, Ex. B; June 1, 2023 (9 pages)
	D20	Ex. 1014 to Petition in Case No. PGR2023-00055, U.S. Patent Publication No. 2021/0106412 A1, published April 15, 2021, which is the published application of App. No. 16/941,522 (32 pages)
	D21	Ex. 1015 to Petition in Case No. PGR2023-00055, Vermont Dental Amalgam Separator Pilot Project; Vermont Department of Environmental Conservation; August 2004 (22 pages)
	D22	Ex. 1016 to Petition in Case No. PGR2023-00055, Medentex, "Amalsed Silver Powered by Apavia - Installation & Operating Manual"; publication date not available (20 pages)
	D23	Ex. 1017 to Petition in Case No. PGR2023-00055, Tech West Eco-Star Retail Price Index, revised 5/18 (20 pages)
	D24	Ex. 1018 to Petition in Case No. PGR2023-00055, "Solmetex History Into Amalgam & Mercury Removal & Recycling Productions"; retrieved from https://solmetex.com/history/; September 19, 2023 (5 pages)

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EXAMINER: INITIAL IF REFERENCE CONSIDERED, WHETHER OR NOT CITATION IS IN CONFORMANCE WITH MPEP609; DRAW LINE THROUGH CITATION IF NOT IN CONFORMANCE AND NOT CONSIDERED. INCLUDE COPY OF THIS FORM WITH NEXT COMMUNICATION TO APPLICANT.

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DRNA v. Solmetex - PGR2023-00555

OTHER DOCUMENTS (including publisher, author (if any), title, relevant pages, date, and place of publication)

Examiner Initial	Cite No.	Document Information
	D25	Ex. 1019 to Petition in Case No. PGR2023-00055, "Solmetex NXT Hg5 Series Amalgam Separator FAQs"; retrieved from https://solmetex.com/faqs-nxt/; September 19, 2023 (8 pages)
	D26	Ex. 1020 to Petition in Case No. PGR2023-00055, Defendant DRNA's Opening Brief in Support of its Motion to Dismiss in *Solmetex, LLC v. Dental Recycling North America, Inc.*, Civil Action No. 1:23-cv-00602-MN, D.I. 11; August 7, 2023 (26 pages)
	D27	Ex. 1021 to Petition in Case No. PGR2023-00055, Plaintiff Solmetex, LLC's Opposition to Defendant Dental Recycling North America, Inc.'s Rule 12(b)(6) Motion to Dismiss for Failure to State a Claim in in *Solmetex, LLC v. Dental Recycling North America, Inc.*, Civil Action No. 1:23-cv-00602-MN, Civil Action No. 1:23-00602-MN, D.I. 14; August 21, 2023 (27 pages)
	D28	Ex. 1022 to Petition in Case No. PGR2023-00055, Defendant DRNA's Reply in Support of its Motion to Dismiss in in *Solmetex, LLC v. Dental Recycling North America, Inc.*, Civil Action No. 1:23-cv-00602-MN, Civil Action No. 1:23-00602-MN, D.I. 15; August 28, 2023 (16 pages)
	D29	Ex. 1023 to Petition in Case No. PGR2023-00055, "DRNA Website on Cartridge 2"; retrieved from https://drna.com/products/Generic-Amalgam-Separator-Cartridges-c130409018; September 19, 2023 (5 pages)
	D30	Ex. 1024 to Petition in Case No. PGR2023-00055, "DRNA Contact Us Webpage"; retrieved from https://drna.com/contact/; September 19, 2023 (3 pages)
	D31	Ex. 1025 to Petition in Case No. PGR2023-00055, "Solmetex NXT Hg5 Series of Amalgam Separators"; retrieved from https://solmetex.com/hg5-series-products/#hg5; September 19, 2023 (11 pages)
	D32	Ex. 1026 to Petition in Case No. PGR2023-00055, "NXT Separator Installation and Operations Manual"; retrieved from https://solmetex.com/wp-content/uploads/2021/11/NXT-Hg5-Install-Ops-Manual-11.2021_FINAL.pdf; publication date not available (8 pages)
	D33	Ex. 1027 to Petition in Case No. PGR2023-00055, "Solmetex NXT Collection Container Change-Out video"; retrieved from https://www.youtube.com/watch?v=WFAFnBGZHIw; September 19, 2023 (2 pages)
	D34	Ex. 1028 to Petition in Case No. PGR2023-00055, "Solmetex Contact Us Webpage"; retrieved from https://solmetex.com/contact-us/; September 19, 2023 (6 pages)
	D35	Ex. 1029 to Petition in Case No. PGR2023-00055, U.S. Patent No. 10,918,982 to Sutton (22 pages)
	D36	Ex. 1030 to Petition in Case No. PGR2023-00055, U.S. Patent No. 8,007,669 to Chernoff (8 pages)
	D37	Ex. 1031 to Petition in Case No. PGR2023-00055, U.S. Patent No. 3,615,016 to Soriente (8 pages)
	D38	Ex. 1032 to Petition in Case No. PGR2023-00055, German Patent No. DE 3737002 C1 to Becker (18 pages)
	D39	Ex. 1033 to Petition in Case No. PGR2023-00055, Chinese Patent Publication No. 107417069 A (15 pages)

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DRNA v. Solmetex - PGR2023-00555

OTHER DOCUMENTS (including publisher, author (if any), title, relevant pages, date, and place of publication)		
Examiner Initial	**Cite No.**	**Document Information**
	D40	Ex. 1034 to Petition in Case No. PGR2023-00055, Memorandum Order in *Personal Genomics Taiwan, Inc. v. Pacific Biosciences of California, Inc.*, Civil Action No. 19-1810-GBW-MPT (D. Del. Sep. 15, 2022) (4 pages)
	D41	Ex. 1035 to Petition in Case No. PGR2023-00055, Memorandum Order in *WSOU Investments, LLC d/b/a Brazos Licensing and Development v. NetGear, Inc.*, Civil Action Nos. 21-1117-MN-CJB and 21-1120-MN-CJB 9 (D. Del. Nov. 30, 2022) (4 pages)
	D42	Ex. 1036 to Petition in Case No. PGR2023-00055, Memorandum Order in *Consumeron, LLC v. MapleBear Inc. d/b/a Instacart*, Civil Action No. 21-1147-GBW-MPT (D. Del. May 12, 2023) (5 pages)
	D43	Ex. 1037 to Petition in Case No. PGR2023-00055, Federal Court Management Statistics – Comparison Within Circuit, retrieved from https://www.uscourts.gov/statistics/table/na/federal-court-management-statistics/2022/03/31-3; March 31, 2022 (4 pages)
	D44	Order from District of Delaware Denying DRNA's Motion to Dismiss in Case No. 23-602 (MN) (D. Del. Oct. 18, 2023) (2 pages)
	D45	Plaintiff Solmetex, LLC's Opposition to Defendant Dental Recycling North America, Inc.'s Rule 12(B)(6) Motion to Dismiss For Failure to State a Claim in Case No. 23-602 (MN) D.14 (27 pages)

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DRNA v. Solmetex - PGR2023-00555

Electronic Patent Application Fee Transmittal

Application Number:	16941522
Filing Date:	28-Jul-2020
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Filer:	Steven R. Lazar
Attorney Docket Number:	- SMTX-001-T1-CON

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

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DRNA v. Solmetex - PGR2023-00555

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	104	104
		Total in USD ($)		**104**

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Electronic Acknowledgement Receipt

EFS ID:	48799061
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	- SMTX-001-T1-CON
Receipt Date:	05-NOV-2023
Filing Date:	28-JUL-2020
Time Stamp:	10:08:29
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$104
RAM confirmation Number	E2023A5A10069401
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	Second_IDS_Transmittal_Letter_16941522.pdf	77722 671a65c9b22014d49f7680bb238a3f9db2d04760	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
2	Information Disclosure Statement (IDS) Form (SB08)	10-31-2023-Second_IDS_List_of_References_16941522.pdf	151063 1a0bf3ac7e0a3ae02db476f3812755c9d5d7f015	no	4
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	D1-DRNA_Motion_to_Dismiss.pdf	154971 6453cd0cd35a7559844e6d9d77e0e42e50294fcf	no	2
Warnings:					
Information:					
4	Non Patent Literature	D4-Motion_to_Dismiss_Exhibit_2_1.pdf	22263613 6981a5808fe55e75da625877123cc8205a68f03c	no	23
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	37892 4654775970ba59ef3bb67b18ba5b203a522bdefe	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	22685261		

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DRNA v. Solmetex - PGR2023-00555

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National Stage of an International Application under 35 U.S.C. 371

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/941,522	07/28/2020	Mozzicato, Nicholas	- SMTX-001-T1-CON

CONFIRMATION NO. 1050

80709
Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

PUB REQUEST ACCEPTANCE LETTER

OC000000138228861

Date Mailed: 09/28/2023

NOTICE OF ACCEPTANCE OF PUBLICATION REQUEST

The request for voluntary publication, amended publication, early publication, redacted publication, republication, corrected publication or revised publication has been received for this application. The request, including payment of any necessary fee(s), is in compliance with 37 CFR 1.215, 1.217, 1.219 or 1.221.

The projected publication date is 01/04/2024.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/npfarmer/

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DRNA v. Solmetex - PGR2023-00555

UNITED STATES PATENT AND TRADEMARK OFFICE

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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/941,522	07/28/2020	Nicholas Mozzicato	- SMTX-001-T1-CON

CONFIRMATION NO. 1050

80709
Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

PUB REQUEST ACCEPTANCE LETTER

OC000000062540360

Date Mailed: 09/28/2023

NOTICE OF ACCEPTANCE OF PUBLICATION REQUEST

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/npfarmer/

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DRNA v. Solmetex - PGR2023-00555

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www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/941,522	07/28/2020	Nicholas Mozzicato	- SMTX-001-T1-CON	1050

80709 7590 09/22/2023

Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

EXAMINER	
LUCCHESI, NICHOLAS D	

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
09/22/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

srlpatents@aol.com

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

In re Application of	:	
Mozzicato, et al.	:	
Application No. 16/941,522	:	DECISION ON PETITION
Filed: July 28, 2020	:	UNDER 37 CFR 1.78(c) and (e)
Attorney Docket No. - SMTX-001-T1-CON	:	

This is a decision on the "Second Renewed Petition to Amend ADS and Petition for Corrected Filing Receipt", filed on September 6, 2023, that is being treated as a renewed petition under 37 CFR 1.78(c) and (e) to accept an unintentionally delayed claim for the benefit of the prior-filed non-provisional and provisional applications set forth in the corrected Application Data Sheet filed on September 6, 2023.

The petition under 37 CFR 1.78(e) is **GRANTED**.

The petition under 37 CFR 1.78(c) is also **GRANTED**.

TREATMENT UNDER 37 CFR 1.78(e)

A petition for acceptance of a benefit claim under 37 CFR 1.78 is only applicable to those applications filed on, or after, November 29, 2000. Further, the petition is appropriate only after the expiration of the period specified in 37 CFR 1.78(d). In addition, the petition under 37 CFR 1.78(e) must be accompanied by:

1. the reference required by 35 U.S.C § 120 and paragraph (d)(2) to the prior-filed application, unless previously submitted;

2. the petition fee set forth in § 1.17(m), and

3. a statement that the entire delay between the date the claim was due under 37 CFR 1.78(d)(3) and the date the benefit claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional.

The instant nonprovisional application was filed after November 29, 2000, and the claim herein for the benefit of priority to the prior-filed applications is submitted after the expiration of the period specified in 37 CFR 1.78(d). Accordingly, having found that the instant petition for acceptance of an unintentionally delayed claim for benefit under 35 U.S.C. § 120 to the prior-filed non-provisional applications satisfies the conditions of 37 CFR 1.78(e), the petition is granted.

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In re Application No. 16/941,522

TREATMENT UNDER 37 CFR 1.78(c)

A petition for acceptance of a benefit claim under 37 CFR 1.78(c) is only applicable to those applications filed on, or after, November 29, 2000. Further, the petition is appropriate only after the expiration of the period specified in 37 CFR 1.78(a)(4). In addition, the petition under 37 CFR 1.78(c) must be accompanied by:

1. the reference required by 35 USC 119(e) and paragraph (a)(3) of this section to the prior-filed provisional application, unless previously submitted.

2. the petition set forth in 1.17(m), and

3. a statement that the entire delay between the date the claim was due under paragraph (a)(4) of this section and the date the claim was filed was unintentional.

The instant non-provisional application was filed after November 29, 2000, and the claim herein for the benefit of the prior-filed provisional applications is submitted after the expiration of the period specified in 37 CFR 1.78(a). Accordingly, having found that the instant petition for acceptance of an unintentionally delayed claim for benefit under 35 U.S.C. § 119 to the prior-filed provisional applications satisfies the conditions of 37 CFR 1.78(c) the petition is granted.

Petitioner is advised that this decision grants the petition to accept the unintentionally delayed domestic benefit claim to the prior filed application(s) because the petition requirements of 37 CFR 1.78 (c) and (e) and the formal requirements for claiming domestic benefit (see MPEP 211.01 et. seq.) have been met. This acceptance should not be construed as meaning that this application is entitled to the benefit of the prior-filed application(s). Whether a claimed invention in a nonprovisional application is entitled to the benefit of the filing date of a prior-filed application on the basis of the disclosure thereof is determined during examination if it becomes necessary to do so (e.g., intervening reference and interference proceeding). See MPEP 211.05.

A corrected Filing Receipt, which includes the correction to the benefit claims to the prior-filed applications will be made of record.

The application is directed to Technology Center 3700 for further processing.

Questions specific to this decision may be directed to Kenya A. McLaughlin, Attorney Advisor, at (571) 272-3222. Questions regarding the further processing of the application must be directed to Technology Center Group 3700 at (571) 272-3700.

/KENYA A THORNTON MCLAUGHLIN/
Attorney Advisor, OPET

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/941,522	07/28/2020	3772	950	- SMTX-001-T1-CON	8	2

CONFIRMATION NO. 1050

REPLACEMENT FILING RECEIPT

80709
Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

OC00000062235454

Date Mailed: 09/22/2023

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Nicholas Mozzicato, Acton, MA;
Richard Goulston, Stuart, FL;
Robin Schofield, Lancaster, MA;
Michael Toole, Norton, MA;

Applicant(s)

Solmetex LLC, Northborough, MA;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CIP of 16/033,823 07/12/2018 PAT 10,779,923
which is a CIP of 15/730,828 10/12/2017 PAT 10,646,313
which claims benefit of 62/414,712 10/29/2016
and claims benefit of 62/406,990 10/12/2016

Foreign Applications for which priority is claimed (You may be eligible to benefit from the Patent Prosecution Highway program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

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Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 08/05/2020
The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/941,522**
Projected Publication Date: 04/15/2021
Non-Publication Request: No
Early Publication Request: No
**** SMALL ENTITY ****
Title

Detachable Recycling Container

Preliminary Class

433

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative,

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this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/941,522	07/28/2020	Nicholas Mozzicato	- SMTX-001-T1-CON	1050

80709 7590 09/13/2023

Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

EXAMINER	
LUCCHESI, NICHOLAS D	

ART UNIT	PAPER NUMBER
3772	

NOTIFICATION DATE	DELIVERY MODE
09/13/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

srlpatents@aol.com

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Office Action Summary	Application No. 16/941,522	Applicant(s) Mozzicato et al.	
	Examiner NICHOLAS D LUCCHESI	Art Unit 3772	AIA (FITF) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 7/28/20.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 41-61 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 41-61 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☑ The drawing(s) filed on 7/28/20 is/are: a)☐ accepted or b)☑ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☑ Notice of References Cited (PTO-892)

2) ☑ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

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DETAILED ACTION

Notice of Pre-AIA or AIA Status

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims.

The "external o-ring" at the upper portions of the inlet port and outlet port (claim 53), as well as the "inside surface with a first circular wall and a second circular wall, the first circular wall placed so as to engage a first one of the pair of plugs on the container inlet port and the second circular wall placed so as to engage a second one of the pair of plugs on the container outlet port" (claim 47) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

It is also noted that while reference numeral 13 appears to point to the "at least one retaining pin" as recited in the claims, it is not entirely clear from figure 2 as to the details of the pin. Correction is required.

The drawings are objected to because certain recited elements of the claims are not identified with reference numerals in the drawings. These elements include the "at least one radially protruding structure (claims 41,48,50,53,55,60), "pin-receiving region" (claim 53) and the "flange" (claims 50-52,55-57). Correction is required.

The drawings are objected to because figures 3A,3B,4A,4B,5B,6A,6B,7A,7B,8A,8B,9A,9B,10A,10B,11A,11B,12A,12B,13A,13B,14A,14B,15A,15B do not contain any reference numerals that refer to elements in these figures, described in the specification. Correction is required.

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Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by

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the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112(a):

> (a) IN GENERAL.—The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

The following is a quotation of the first paragraph of pre-AIA 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 41-61 are rejected under 35 U.S.C. 112(a) or 35 U.S.C. 112 (pre-AIA), first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor or a joint inventor, or for applications subject to pre-AIA 35 U.S.C. 112, the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 41,53,60 recite a "container top portion". The specification and claims as originally filed, do not provide an adequate description of the "container top portion", and whether or not this is the "universal adaptor" in Figures 3A and 3B. There is no description of the "universal adaptor" in the specification, except for reference to the drawings. Similarly, there is no description of "at least one radially protruding structure" and whether or not this refers to the "flange". There is no description of a "flange", or the "flange" having a "curved surface", in the specification as originally filed. Further,

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there is no description in the specification how the "at least one retaining pin" engages with the "at least one radially protruding structure" nor the "flange". This is a new matter rejection.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP § 2146 *et seq.* for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The filing of a terminal disclaimer by itself is not a complete reply to a nonstatutory double patenting (NSDP) rejection. A complete reply requires that the terminal disclaimer be accompanied by a

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reply requesting reconsideration of the prior Office action. Even where the NSDP rejection is provisional the reply must be complete. See MPEP § 804, subsection I.B.1. For a reply to a non-final Office action, see 37 CFR 1.111(a). For a reply to final Office action, see 37 CFR 1.113(c). A request for reconsideration while not provided for in 37 CFR 1.113(c) may be filed after final for consideration. See MPEP §§ 706.07(e) and 714.13.

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The actual filing date of the application in which the form is filed determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/apply/applying-online/eterminal-disclaimer.

Claims 41-61 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-22 of U.S. Patent No. 11660175. Although the claims at issue are not identical, they are not patentably distinct from each other because the claims of the instant application are broader than the claims of the above identified patent. Thus, the claims of the patent "anticipate" the claims of the instant application.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICHOLAS D LUCCHESI whose telephone number is (571)272-4977. The examiner can normally be reached M-F 800-430.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacqueline Johanas can be reached on 571-270-5085. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/NICHOLAS D LUCCHESI/
Primary Examiner, Art Unit 3772

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Notice of References Cited	Application/Control No. 16/941,522	Applicant(s)/Patent Under Reexamination Mozzicato et al.	
	Examiner NICHOLAS D LUCCHESI	Art Unit 3772	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-20130199975-A1	08-2013	Stone; Mark E.	A61C17/065	210/136
*	B	US-20060093990-A1	05-2006	Stone; Mark E.	A61C17/06	433/92
*	C	US-20050282107-A1	12-2005	Stone, Mark E.	A61C17/065	433/92
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	L					
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FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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DRNA v. Solmetex - PGR2023-00555

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	16/941,522	Mozzicato et al.
	Examiner	Art Unit
	NICHOLAS D LUCCHESI	3772

CPC - Searched*		
Symbol	Date	Examiner
A61C 17/065; A61M 1/64; B65D 43/0231, 2543/00092; B01D 21/2444	09/07/2023	NL

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Assignee search; Inventor search	09/07/2023	NL

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

/NICHOLAS D LUCCHESI/
Primary Examiner, Art Unit 3772

332/727

List of References **FIRST INFORMATION DISCLOSURE STATEMENT** Page 1 of 5	Atty. Docket No. SMTX-001-T1-Con	Application No.: 16/941,522
	Applicant(s): Solmetex LLC	
	Filing Date: July 28, 2020	Art Unit: Central, Docket

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Examiner Initial	**Cite No.**	**Patent Number**	**Issue Date**	**First Named Inventor**
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EXAMINER: /NICHOLAS D LUCCHESI/	**DATE CONSIDERED:** 09/07/2023

EXAMINER: INITIAL IF REFERENCE CONSIDERED, WHETHER OR NOT CITATION IS IN CONFORMANCE WITH MPEP609; DRAW LINE THROUGH CITATION IF NOT IN CONFORMANCE AND NOT CONSIDERED. INCLUDE COPY OF THIS FORM WITH NEXT COMMUNICATION TO APPLICANT.

Solmetex Ex. 2002
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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /N.D.L./

List of References **FIRST INFORMATION DISCLOSURE STATEMENT** Page 2 of 5	Atty. Docket No. SMTX-001-T1-Con	Application No.: 16/941,522
	Applicant(s): Solmetex LLC	
	Filing Date: July 28, 2020	Art Unit: Central, Docket

U.S. PATENTS				
Examiner Initial	**Cite No.**	**Patent Number**	**Issue Date**	**First Named Inventor**
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EXAMINER: /NICHOLAS D LUCCHESI/	**DATE CONSIDERED:** 09/07/2023

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Solmetex Ex. 2002
DRNA v. Solmetex, PGR2023-00555

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List of References **FIRST INFORMATION DISCLOSURE STATEMENT** Page 3 of 5	Atty. Docket No. SMTX-001-T1-Con	Application No.: 16/941,522
	Applicant(s): Solmetex LLC	
	Filing Date: July 28, 2020	Art Unit: Central, Docket

U.S. PATENTS				
Examiner Initial	**Cite No.**	**Patent Number**	**Issue Date**	**First Named Inventor**
	A57	6,592,754 B2	07/15/2003	Chilibeck
	A58	6,592,769 B2	07/15/2003	Erickson
	A59	6,638,066 B2	10/28/2003	Hubner
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List of References **FIRST INFORMATION DISCLOSURE STATEMENT** Page 4 of 5	Atty. Docket No. SMTX-001-T1-Con	Application No.: 16/941,522
	Applicant(s): Solmetex LLC	
	Filing Date: July 28, 2020	Art Unit: Central, Docket

U.S. PATENTS				
Examiner Initial	**Cite No.**	**Patent Number**	**Issue Date**	**First Named Inventor**
	A85	D705,059 S	05/20/2014	Hutchinson
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	A87	D727,149 S	04/21/2015	Humm
	A88	D750,962 S	03/08/2016	Liu
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	A90	D835,264 S	12/04/2018	Mozzicato
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Examiner Initial	**Cite No.**	**Patent Application Publication Number**	**Publication Date**	**First Named Inventor**
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	B3	2003/0003417 A1	01/02/2003	Hubner
	B4	2004/0259052 A1	12/23/2004	Hubner
	B5	2005/0016913 A1	01/27/2005	Giesel
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EXAMINER: /NICHOLAS D LUCCHESI/	**DATE CONSIDERED:** 09/07/2023

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List of References **FIRST INFORMATION DISCLOSURE STATEMENT** Page 5 of 5	Atty. Docket No. SMTX-001-T1-Con	Application No.: 16/941,522
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	Filing Date: July 28, 2020	Art Unit: Central, Docket

U.S. PATENT APPLICATION PUBLICATIONS				
Examiner Initial	**Cite No.**	**Patent Application Publication Number**	**Publication Date**	**First Named Inventor**
	B11	2022/0211476 A1	07/07/2022	Stolarik

FOREIGN PATENT DOCUMENTS					
Examiner Initial	**Cite No.**	**Foreign Document Number**	**Publication Date**	**Country**	**Translation**
	C1	CA 2442513 A1	03/23/2005	CA	N/A
	C2	EP 1366728 A1	12/03/2003	EP	N/A
	C3	WO 1983/002720 A1	08/18/1983	PCT	N/A
	C4	WO 1994/016643 A1	08/04/1994	PCT	English abstract only
	C5	WO 2018/006106 A1	01/11/2018	PCT	N/A

OTHER DOCUMENTS (including publisher, author (if any), title, relevant pages, date, and place of publication)		
Examiner Initial	**Cite No.**	**Document Information**
	D1	"International Standard ISO 11143: Dentistry – Amalgam separators"; Second edition; ISO Copyright Office, Switzerland; 2008/07/01; (32 pages)
	D2	Solmetex; "Solmetex Hg5 Amalgam Separator, Type 2 – Maximum Flow = 1000 ml/min: Installation and Maintenance Instructions"; Northborough, Massachusetts; Revised April 27, 2012 (8 pages)
	D3	ASME USAS B17-1; "Keys and Keys Seals": American Society of Mechanical Engineers; USA Standard, 1967 (Reaffirmed 2013)

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Solmetex Ex. 2002
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ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /N.D.L./

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	11	((("Solmetex") near3 ("LLC"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/01/13 11:10 PM
L2	20	((("MOZZICATO") near3 ("Nicholas")) OR (("GOULSTON") near3 ("Richard")) OR (("SCHOFIELD") near3 ("Robin")) OR (("TOOLE") near3 ("Michael"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/01/13 11:22 PM
L3	209	A61C17/065.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/01/13 11:23 PM
L4	153	A61M1/64.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/01/13 11:24 PM
L5	1014	B01D21/2444.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/01/13 11:24 PM
L6	0	B01D43/0231.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/01/13 11:24 PM
L7	669	B65D43/0231.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/01/13 11:24 PM
L8	4544	B65D2543/00092.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/01/13 11:25 PM
L9	6164	L3 OR L4 OR L5 OR L7 OR L8	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/01/13 11:25 PM
L10	73	L9 AND dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/01/13 11:26 PM
L11	226	dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/01/13 11:31 PM
L12	39	L11 AND pin	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/01/13 11:32 PM
L13	45	L11 AND flange	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/01/13 11:32 PM
L14	14	((("Solmetex") near3 ("LLC"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/03/08 02:57 PM
L15	21	((("MOZZICATO") near3 ("Nicholas")) OR (("GOULSTON") near3 ("Richard")) OR (("SCHOFIELD") near3 ("Robin")) OR (("TOOLE") near3 ("Michael"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/03/08 02:57 PM
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L17	158	A61M1/64.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/03/08 02:57 PM

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L21	4580	B65D2543/00092.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/03/08 02:57 PM
L22	6222	L3 OR L4 OR L5 OR L7 OR L8	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/03/08 02:57 PM
L23	75	L9 AND dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/03/08 02:57 PM
L24	229	dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/03/08 02:57 PM
L25	40	L11 AND pin	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/03/08 02:57 PM
L26	46	L11 AND flange	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/03/08 02:57 PM
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L36	76	L9 AND dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/04/07 06:22 PM
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L38	40	L11 AND pin	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/04/07 06:22 PM
L39	46	L11 AND flange	(US-PGPUB; USPAT;	OR	ON	ON	2023/04/07

			EPO; JPO)				06:22 PM
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L50	230	dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/04/07 06:22 PM
L51	40	L11 AND pin	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/04/07 06:22 PM
L52	46	L11 AND flange	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/04/07 06:22 PM
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L58	0	B01D43/0231.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM

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L63	234	dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L64	42	L11 AND pin	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L65	48	L11 AND flange	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L66	18	((("Solmetex") near3 ("LLC"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/09/07 09:07 AM
L67	24	((("MOZZICATO") near3 ("Nicholas")) OR (("GOULSTON") near3 ("Richard")) OR (("SCHOFIELD") near3 ("Robin")) OR (("TOOLE") near3 ("Michael"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/09/07 09:07 AM
L68	218	A61C17/065.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L69	163	A61M1/64.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L70	1045	B01D21/2444.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L71	0	B01D43/0231.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L72	705	B65D43/0231.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L73	4657	B65D2543/00092.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L74	6337	L3 OR L4 OR L5 OR L7 OR L8	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L75	78	L9 AND dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L76	234	dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L77	42	L11 AND pin	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L78	48	L11 AND flange	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L79	18	((("Solmetex") near3 ("LLC"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/09/07 09:07 AM
L80	24	((("MOZZICATO")	(US-PGPUB; USPAT;	OR	ON	ON	2023/09/07

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		near3 ("Nicholas")) OR (("GOULSTON") near3 ("Richard")) OR (("SCHOFIELD") near3 ("Robin")) OR (("TOOLE") near3 ("Michael"))).INV.	USOCR; EPO; JPO; DERWENT)				09:07 AM
L81	218	A61C17/065.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L82	163	A61M1/64.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L83	1045	B01D21/2444.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L84	0	B01D43/0231.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L85	705	B65D43/0231.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L86	4657	B65D2543/00092.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L87	6337	L3 OR L4 OR L5 OR L7 OR L8	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L88	78	L9 AND dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L89	234	dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L90	42	L11 AND pin	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L91	48	L11 AND flange	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L92	18	((("Solmetex") near3 ("LLC"))).AS,AANM.	(USPAT)	OR	ON	ON	2023/09/07 09:07 AM
L93	24	((("MOZZICATO") near3 ("Nicholas")) OR (("GOULSTON") near3 ("Richard")) OR (("SCHOFIELD") near3 ("Robin")) OR (("TOOLE") near3 ("Michael"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2023/09/07 09:07 AM
L94	218	A61C17/065.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L95	163	A61M1/64.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L96	1045	B01D21/2444.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L97	0	B01D43/0231.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L98	705	B65D43/0231.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L99	4657	B65D2543/00092.cpc.	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM

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L100	6337	L3 OR L4 OR L5 OR L7 OR L8	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L101	78	L9 AND dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L102	234	dental AND amalgam AND separator	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L103	42	L11 AND pin	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L104	48	L11 AND flange	(US-PGPUB; USPAT; EPO; JPO)	OR	ON	ON	2023/09/07 09:07 AM
L105	107	("0054414"|"1032879"|"10342647"|"10646313"|"10779923"|"11278382"|"2467547"|"3665682"|"3870486"|"3988134"|"4083705"|"4097381"|"4226054"|"4326952"|"4385891"|"4599170"|"4753632"|"4761235"|"4911315"|"4934545"|"4951845"|"4957621"|"5018971"|"5114578"|"5125522"|"5330641"|"5343592"|"5421996"|"5484282"|"5509551"|"5613851"|"5730322"|"5741134"|"5743735"|"5795159"|"5797742"|"5873494"|"5958113"|"6083307"|"6149812"|"6409803"|"6521131"|"6592754"|"6592769"|"6638066"|"6660160"|"6692636"|"6790038"|"6797178"|"6946069"|"7063793"|"7080425"|"7131839"|"7156214"|"7166214"|"7182599"|"7306460"|"7422615"|"7604674"|"7753976"|"7767079"|"8393898"|"8636837"|"8692636"|"9332969"|"D024111"|"D189743"|"D286268"|"D288528"|"D288529"|"D306266"|"D306649"|"D341085"|"D349647"|"D359236"|"D372426"|"D374481"|"D384280"|"D423354"|"D428768"|"D431158"|"D433275"|"D435194"|"D503097"|"D503110"|"D522359"|"D536247"|"D574237"|"D630094"|"D705059"|"D706135"|"D727149"|"D750962"|"D835264"|	(US-PGPUB; USPAT; USOCR; EPO; JPO)	OR	ON	ON	2023/09/07 09:52 AM

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		D835778"|"D835779"|" D840533"|"D840534"|" D848612").PN.					

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	6093	L3 OR L4 OR L5 OR L7 OR L8	(US-PGPUB; USPAT)	OR	ON	ON	2023/04/07 06:30 PM

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: TBA
MOZZICATTO	)	
	:	Group Art Unit TBA
Application No.: 16/941,522	)	
	:	Confirmation No. 1050
Filed: July 12, 2018	)	
	:	
For: DETACHABLE CONTAINER	)	
	:	

Mail Stop: PETITIONS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SECOND RENEWED PETITION TO AMEND ADS AND PETITION FOR CORRECTED FILING RECEIPT

Sir:

This Second Renewed Petition is made in response to the Decision On Petition, mailed on July 6, 2023 ("Decision"), which dismissed Applicant's Renewed to Amend ADS and Petition for Corrected Filing Receipt", filed on June 6, 2023 ("Renewed Petition").

As advised in said Decision, this Second Renewed Petition is made as a Petition under 37 C.F.R. 1.78(c) and (e) to accept an unintentionally delayed claim for the benefit of priority to the prior filed applications set forth in the corrected Application Data Sheet filed on December 15, 2022. Applicant's representative thanks the OPET Attorney Advisor for her careful review of Applicant's Original Petition and for the helpful guidance with respect thereto in telephone conversations regarding the substance of the Decision on Petition and Applicant's appropriate remedy.

In support of the Renewed Petition, Applicant provided a detailed explanation of (i) the unintentional transposition of digits in the Application Data Sheet filed on July 28, 2020, (ii) the preparation and filing of Applicant's Original Petition,

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which was dismissed in the Decision on Petition mailed on March 6, 2023, and (iii) Applicant's actions taken in response to the Decision on Petition, leading up to the preparation and filing of this Renewed Petition.

Applicant further submits herewith a Corrected Application Data Sheet, in Marked-Up format to show deletions with brackets and cross-out (e.g.: "[~~brackets and cross out~~]") and showing new corrected information as underlined (e.g.:" underlined") to indicate the requested changes. For the Examiner's convenience, Applicant also includes a fresh Substitute Application Data Sheet with the corrected information.

With submission herewith of the corrected Application Data Sheet, and the Statement in Support of Petition which follows, Applicant submits this RENEWED PETITION to accept an unintentionally delayed claim for the benefit of domestic priority, as set forth in the Corrected Application Data Sheet should be GRANTED.

Applicant acknowledges the statement in the Decision on Petition that this Renewed Petition is not required to be accompanied by a required Petition Fee under 37 C.F.R. §1.17(m).

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STATEMENT IN SUPPORT OF PETITION TO ACCEPT UNINTENTIONALLY DELAYED CLAIM FOR PRIORITY UNDER 37 C.F.R. §1.78(c) and (e)

1. Applicant files this Second Renewed Petition to Amend the ADS and for a Corrected Filing Receipt, and to accept an unintentionally delayed claim for priority under 37 C.F.R. §1.78(c) and (e) in response to the Decision on Petition Under 37 C.F.R. §1.78(c) and (e), mailed on July 6, 2023.

2. Applicant repeats below the relevant statements made in Applicant's original "Petition to Accept Unintentionally Delayed Claim For Priority Under 37 C.F.R. §1.55 and For Corrected Filing Receipt", filed on December 15, 2022, and Applicant's "Renewed Petition to Amend ADS and Petition for Corrected Filing Receipt", filed on June 6, 2023, which was treated as a Petition under 37 C.F.R. §1.78(c) and (e) to accept an unintentionally delayed claim for the benefit of the prior-filed applications set forth in the corrected Application Data Sheet filed on June 6, 2023.

3. Applicant filed the present patent application, serial number 16941522, on **July 28, 2020** with an application data sheet (ADS) that inadvertently contained a reference to a priority application with the erroneous serial number *(15703823)(sic),* in which digits were inadvertently transposed from the correct serial number **15730828**. This petition seeks to correct that inadvertent error. Correction of the error does not amount to the addition of new information, as the correct serial number was contained in the ADS originally filed at other locations, and the correct priority patent number was also listed on the ADS.

4. There are two utility applications to which Serial Number 16/941522 claims priority. In the application ADS filed on July 28, 2020, the first utility application is accurately noted for the claim of priority as Serial Number **16/033823**, filed July 12, 2018, which was pending at the time (and later issued as US Patent **10779923** on September 22, 2020):

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation in part of	16033823	2018-07-12

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5. However, in the next entry, the ADS filed July 28, 2020, erroneously noted that Serial Number 16033823 claimed priority from Serial Number *15703823 (sic)*, filed October 12, 2017 (which contained the inadvertent transpositions of the actual serial number **157308<u>28</u>*) and*** Patent Number **10646313** (which is correct**)**:

Prior Application Status			Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
	Claims benefit of provisional	16033823	2018-07-12		
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	Continuation in part of	15703823	2017-10-12	10646313	
Prior Application Status	Pending		Remove		

6. In other words, the original ADS **<u>correctly</u>** listed the grandparent patent -- US Patent **10646313 --** but **<u>incorrectly</u>** listed the corresponding patent application number as *Serial Number 15703823 (sic),* whereas the correct application number for US Patent 10646313 is Serial No. **<u>15730828</u>**.

7. On December 7, 2020, Applicant submitted a corrected ADS to add the information that application **16033823** had issued as Patent Number **10779923**. However, Applicant did not realize at that time that the originally filed ADS contained the inadvertent errors to the application number noted above.

8. Applicant notes that the USPTO updated filing receipt mailed on January 5, 2021, changed Applicant's submitted information. After noting that Applicant's data was not consistent with USPTO records, the correctly listed Patent Number **10646313** was replaced with the erroneous Patent Number *10592508.* Applicant believes the incorrect Patent Number was entered by USPTO personnel in order to correspond with the erroneous serial number *15703823 (sic)*. The title, subject matter and applicant names of Patent Number *10592508* and Serial Number *15703823* have no similarity to the subject matter and applicant names of the present invention. Applicant submits that the USPTO could analogously have entered the correct serial number **15730828**, in order to correspond with the *correctly* listed Patent Number **10646313** on the ADS, the title, subject matter and

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applicant names of which match the title, subject matter and applicant names of the present invention.

9. On September 16, 2022, Applicant filed a preliminary amendment in the present application 16941522. Shortly thereafter, the above-noted erroneous transposition of digits in the serial number of Serial Number **15730828** was identified.

10. On October 12, 2022, Applicant filed a further updated ADS seeking to correct the erroneous serial number *15703823 (sic)*. However, this request was denied in the USPTO's Response to Request for Corrected Filing Receipt, mailed on October 14, 2022, as the request was considered to constitute a 'priority or continuity claim' which was not entered 'because it was not filed during the required time period.' The USPTO Response on October 14, 2022 advised the Applicant to file this petition to accept an unintentionally delayed claim for priority.

11. On December 15, 2022, Applicant filed a Petition to Accept Unintentionally Delayed Claim For Priority Under 37 C.F.R. §1.55 ("Original Petition").

12. On March 6, 2023, the Patent Office, Petitions Branch, mailed a Decision on Petition, in which Applicant's Original Petition was dismissed.

13. Applicant's undersigned Attorney diligently reviewed the Decision on Petition that dismissed Applicant's Original Petition, in order to understand the basis for the dismissal and to understand the appropriate response to said Decision.

14. The Decision on Petition identified several grounds for dismissal of the Original Petition at pages 1-2 of the Decision:

a) the Decision on Petition Stated:

> "The application data sheet must include the section headings listed in paragraph (b) of [37 CFR1.76] for each section included in the application data sheet, and must identify the information that is being changed, with underlining for insertions, and strike-through or brackets for text removed..."

b) the Decision on Petition Stated:

> **"In general, the identification of the information being changed should be made relative to the most recent filing receipt."**

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c) the Decision on Petition stated:

> "A review of the application file history reveals that the application, as filed on July 28, 2020, was accompanied by an ADS setting forth domestic benefit claims under 37 CFR 1.78, that were incorrectly listed. Some of the benefit claims were entered, however, and memorialized on the Filing Receipt mailed on August 6, 2020. Applicant failed to timely file a corrected ADS that was in compliance with 37 CFR 1.76(c) and that set forth domestic benefit claims that could be entered. See 37 CFR 1.78(a)(4) and 37 CFR 1.78(d)(3)."

and further noted that:

> "All of the new domestic benefit claims, which are domestic benefit claims that are not listed on the last filing receipt mailed on January 5, 2021, were not underlined but were required to be so. The petition under 37 CFR 1.78 cannot be granted at this juncture as the corrected ADS filed on December 15, 2022 is not in compliance with 37 CFR 1.76(c)(2) as to the inclusion of the new domestic benefit information. Any renewed petition under 37 CFR 1.78(c) and (e) that may be filed must be accomplished by a corrected ADS that is compliant with 37 CFR 1.76(c)(2), specifically that reflects underlining and strike-throughs of all data that is being added and removed relative to this last filing receipt."

15. With respect to grounds (a) through (c) above, Applicant's undersigned Attorney realized that the ADS submitted with Applicant's Original Petition was inadvertently marked up relative to the ADS filed on July 28, 2020, with Applicant's original filing of the present application, rather than the corrected ADS filed on December 7, 2020, which was more recent. Applicant's undersigned Attorney inadvertently concluded that the above grounds could be addressed by preparing a fresh ADS in which all of the new information in the corrected ADS of December 15, 2022, was marked-up relative to the more recent ADS that was filed on December 7, 2020, rather than the earlier filed ADS of July 28, 2020, and began preparing Applicant's Renewed Petition based upon this erroneous understanding.

16. However, in the process of drafting Applicant's response to the Decision on Petition, Applicant's undersigned Attorney realized that, the response prepared to address grounds (a) through (c) above seemed to be contradicted by further statements in Decision on Petition on page 4 with respect to the priority claims set forth in Application No. 15/730,828:

> "…the corrected ADS filed on December 15, 2022, asserts a claim of domestic benefit to Application No. 15/730,828, and through Application No. 15/730,828, asserts benefit claims to several provisional and design applications. A review of the application file record for Application No. 15/730,828, reveals that Application No. 15/730,828, only asserts a benefit claim to provisional Application Nos. 62/414,712, and 62/406,990, however."

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17. Thus, in May 2023, Applicant's undersigned Attorney realized that he had inadvertently misinterpreted the Decision on Petition from March 2023 and that his original understanding was either incorrect or not fully correct.

18. Following this realization, in May 2023, Applicant's undersigned Attorney called the Petitions Branch in order to clarify the import of the Decision, and left a message with the OPET Attorney Advisor whose name appeared under the Decision on Petition.

19. The OPET Attorney Advisor promptly returned Applicant's call the next day and provided helpful guidance in understanding the import of the Decision on Petition's statements with respect to the priority claims set forth in Application No. 15/730,828.

20. Subsequent to the telephone discussion with the OPET Attorney Advisor, Applicant's undersigned Attorney, diligently revised his earlier draft response to the Decision on Petition, which was now understood not to fully address all of the matters raised in the Decision on Petition. Applicant diligently prepared this Renewed Petition, which addresses all of the matters raised in the Decision on Petition, and seeks the appropriate remedy.

21. As a result of the telephone discussion described above, Applicant's undersigned Attorney more deeply reviewed the file history of Application No. 15/730,828. To simplify this current priority claim issue, Applicant has chosen to remove the priority claim of the earlier filed design patent applications, as those priority claims to the earlier filed design patent applications are unnecessary in the present patent application.

22. Thus, the corrected ADS submitted with the first Renewed Petition cancels the domestic benefit claims made through Application No. 15/730,828 to several design applications such that the corrected ADS is now more consistent with the most recent Filing Receipt dated January 5, 2021. As explained above, the original transposition of the digits in the earlier ADS for Application No. 15/730,828 was an unintentional mistake.

23. In the Decision mailed on July 6, 2023, it was further clarified that Section 601.05(a)(II) of the *Manual of Patent Examining Procedure* (MPEP) provides: "**In**

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general, the identification of the information being changed (*i.e., in the ADS*) should be made relative to the most recent filing receipt."

24. Accordingly, Applicant submits herewith a Corrected ADS, in both marked-up and in clean form, in which the changes are indicated relative to the Updated Filing Receipt, which was mailed on January 5, 2021, which is the most recent filing receipt mailed in the present application.

25. Applicant gratefully acknowledges the guidance of the Decision in clarifying the appropriate response and requirements for the present Second Renewed Petition.

26. Applicant hereby states that the entire delay between the date the claim was due under 37 CFR 1.78(a)(4) and (d)(3) and the date the benefit claim was filed, up to and including the filing of this Second Renewed Petition, was unintentional.

27. Applicant claims small entity status under 37 C.F.R. §1.27.

CONCLUSION

For the reasons stated above, with submission of the corrected Application Data Sheet in Marked-up and Clean forms, Applicant submits this RENEWED PETITION should be GRANTED, and the USPTO should accept the unintentionally delayed claims for benefit of domestic priority, as set forth in the Corrected Application Data Sheet.

No fees are believed due with this submission. However, if any fees are due, the Commissioner is requested to contact the undersigned Attorney for Applicants.

/Steven R. Lazar/
Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

September 6, 2023

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PTO/SB/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Mazzicato	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

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Address 2	

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Postal Code	01720	Country	US

Inventor 2 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Goulston	

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Postal Code	34994	Country	US

Inventor 3 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

EFS-Web 3.2.12

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PTO/SB/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

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Address 2			
City	Lancaster	State/Province	MA
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Inventor 4 Remove

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Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Toole	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

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Mailing Address of Inventor:

Address 1	184 Newcomb Street, D		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country	US

All Inventors Must Be Listed - Additional Inventor information blocks may be generated within this form by selecting the Add button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence Information of this application.

Customer Number	30709		
Email Address	sripatents@aol.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SMTX-001-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	26	Suggested Figure for Publication (if any)	6A

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DRNA v. Solmetex - PGR2023-00555

PTO/SB/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative Information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	80709		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Patented	Remove			
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation in part of	16033623	2018-07-12	10779623	2020-09-22

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Solmetex Ex. 2002
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PTO/SB/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	Continuation in part of	15730828	2017-10-12	10646313	
Prior Application Status	Pending				Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Claims benefit of provisional	62414712	2016-10-29		
Prior Application Status					Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Claims benefit of provisional	62406990	2016-10-12		
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.					Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[1] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[2]	Filing Date (YYYY-MM-DD)	Access Code[3] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the Add button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant must opt-out of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is ONLY reviewed and processed with the INITIAL filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant DOES NOT authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant DOES NOT authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

○ Assignee ○ Legal Representative under 35 U.S.C. 117 ○ Joint Inventor

◉ Person to whom the inventor is obligated to assign ○ Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	50 Bearfoot Road		
Address 2			
City	Northborough	State/Province	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SNTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		State/Province	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet must be signed by a patent practitioner if one or more of the applicants is a juristic entity (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, all joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of all joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	2023-08-08
First Name	Steven	Last Name	Lazar	Registration Number	32618

Additional Signature may be generated within this form by selecting the Add button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Solmetex Ex. 2002
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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-031-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Mozzicato	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Acton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	19 Preston Way		
Address 2			
City	Acton	State/Province	MA
Postal Code	01720	Country	US

Inventor 2 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Goulston	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Stuart	State/Province	FL	Country of Residence	US

Mailing Address of Inventor:

Address 1	1928 NW Palmetto Terrace		
Address 2			
City	Stuart	State/Province	FL
Postal Code	34994	Country	US

Inventor 3 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

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Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SNTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	154 Old Country Road		
Address 2			
City	Lancaster	State/Province	MA
Postal Code	01523	Country i	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Toole	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Norton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	184 Newsomb Street, B		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country i	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence Information of this application.

Customer Number	86789		
Email Address	ip@patents@aol.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SNTX-001-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	26	Suggested Figure for Publication (if any)	6A

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Filing By Reference:

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For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	65709		

Domestic Benefit/National Stage Information:

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When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status: Patented — Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation in part of	16033823	2018-07-12	10779923	2020-09-22

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
~~16933823~~	~~Continuation in part of~~	~~15792622~~	~~2017-09-13~~	~~10593592~~	~~2020-03-17~~

Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16933823	Continuation in part of	15730828	2017-10-12	10645313	2020-05-12

Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62414712	2016-10-29

Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62406958	2016-10-12

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[1] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[2]	Filing Date (YYYY-MM-DD)	Access Code[3] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the Add button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/SB/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. **Priority Document Exchange (PDX)** - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. **Search Results from U.S. Application to EPO** - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

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EFS Web 2.2.12

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

○ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
◉ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

*

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	50 Bearfoot Road		
Address 2			
City	Northborough	State/Province	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

EFS Web 2.2.12

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	Application Number	
Title of Invention	Detachable Recycling Container	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		State/Province	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet must be signed by a patent practitioner if one or more of the applicants is a juristic entity (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, all joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of all joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	~~2023-08-08~~ 2023-08-08
First Name	Steven	Last Name	Lazar	Registration Number	32618

Additional Signature may be generated within this form by selecting the Add button. Add

EFS Web 2.2.12

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

EFS Web 2.2.12

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Mozzicato	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Acton	MA	US

Mailing Address of Inventor:

Address 1	19 Preston Way
Address 2	

City	State/Province	Postal Code	Country
Acton	MA	01720	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Goulston	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Stuart	FL	US

Mailing Address of Inventor:

Address 1	1928 NW Palmetto Terrace
Address 2	

City	State/Province	Postal Code	Country
Stuart	FL	34994	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
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Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	164 Old Country Road		
Address 2			
City	Lancaster	State/Province	MA
Postal Code	01523	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Toole	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Norton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	104 Newcomb Streed, D		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	30709		
Email Address	srlpatents@aol.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SMTX-001-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	26	Suggested Figure for Publication (if any)	6A

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Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	30709		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status: Patented — Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation in part of	16033823	2018-07-12	10779923	2020-09-22

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Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	Continuation in part of	15730828	2017-10-12	10646313	2020-05-12

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62414712	2016-10-29

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62406990	2016-10-12

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

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Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
● Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	60 Bearfoot Road		
Address 2			
City	Northborough	**State/Province**	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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	Application Number	
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Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	2023-09-06
First Name	Steven	Last Name	Lazar	Registration Number	32618

Additional Signature may be generated within this form by selecting the Add button. Add

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PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

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5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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Electronic Acknowledgement Receipt

EFS ID:	48547496
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	- SMTX-001-T1-CON
Receipt Date:	06-SEP-2023
Filing Date:	28-JUL-2020
Time Stamp:	16:47:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition for review by the Office of Petitions	1-Solmetex-001-T1-CON-Second-Renewed-Petition-9-6-2023.pdf	200578 cc8082deef976a018440394f3fdd7513822dcb31	no	8

Warnings:

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Information:					
2	Application Data Sheet	2-SMTX-001-T1-CON-CORRECTED-CLEAN-ADS-08-8-2023.pdf	556280 3f2eb9a2b9ec61fd5a18d87927ad000bb565ca89	no	9
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
3	Application Data Sheet	3-SMTX-001-T1-CON-CORRECTED-MARKED-UP-ADS-08-8-2023.pdf	716645 9b4c10f650cbfa561f203b881d9fa554ed21b476	no	10
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
4	Application Data Sheet	4-SMTX-001-T1-CON-FRESH-ADS-09-06-2023.pdf	1823655 0f1cdbb9bcd5c264077ba2a78b334e6809e14f3d	no	9
Warnings:					
Information:					
			Total Files Size (in bytes):	3297158	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/941,522	07/28/2020	Nicholas Mozzicato	SMTX-001-T1-CON	1050

80709 7590 07/06/2023

Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

EXAMINER	
CENTRAL, DOCKET	

ART UNIT	PAPER NUMBER
OPAP	

NOTIFICATION DATE	DELIVERY MODE
07/06/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

srlpatents@aol.com

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UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

In re Application of	:	
Mozzicato, et al.	:	
Application No. 16/941,522	:	DECISION ON PETITION
Filed: July 28, 2020	:	UNDER 37 CFR 1.78(c) and (e)
Attorney Docket No. SMTX-001-T1-CON	:	

This is a decision on the "Renewed Petition to Amend ADS and Petition for Corrected Filing Receipt", filed June 6, 2023, which is being treated as a petition under 37 CFR 1.78(c) and (e) to accept an unintentionally delayed claim for the benefit of the prior-filed applications set forth in the corrected Application Data Sheet filed on June 6, 2023.

The petition is DISMISSED.

A petition for acceptance of a claim for late priority under 37 CFR 1.78(c) and (e) is only applicable to those applications filed on, or after, November 29, 2000. Further, the petition is appropriate only after the expiration of the period specified in 37 CFR 1.78(d). In addition, the petition under 37 CFR 1.78(c) and (e) must be accompanied by:

1. the references required by 35 U.S.C. § 119 and 35 U.S.C § 120 and paragraph (d)(2) to the prior-filed application, unless previously submitted;

2. the petition fee set forth in § 1.17(m), and

3. a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(4) and (d)(3) and the date the benefit claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional.

The instant nonprovisional application was filed after November 29, 2000, and the claim herein for the benefit of priority to the prior-filed application is submitted after the expiration of the period specified in 37 CFR 1.78(d).

The petition does not, however, comply with items (1) above.

As to Item (1), 37 CFR 1.78 requires that any nonprovisional application claiming the benefit of one or more prior-filed copending nonprovisional applications or provisional applications must contain or be amended to contain references to each such prior-filed application, identifying it by application number (consisting of the series code and serial number) and indicating the relationship of the applications. If the later filed application is a non-provisional application, the reference required by this paragraph must be

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included in an application data sheet (ADS).[1] The instant petition was accompanied by a corrected ADS. As to the ADS, it is noted that 37 CFR 1.76(c)(2), states:

> (2) An application data sheet providing corrected or updated information may include all of the sections listed in paragraph (b) of this section or only those sections containing changed or updated information. The application data sheet must include the section headings listed in paragraph (b) of this section for each section included in the application data sheet, and must identify the information that is being changed, with underlining for insertions, and strike-through or brackets for text removed, except that identification of information being changed is not required for an application data sheet included with an initial submission under 35 U.S.C. 371 .

It is further noted that Section 601.05(a)(II) of the *Manual of Patent Examining Procedure* (MPEP) provides, in pertinent part, that:

> 37 CFR 1.76(c) provides the procedure for correcting and updating not only an application data sheet (ADS), but also information otherwise of record (e.g., information provided on the most recent filing receipt). **Any ADS filed after the filing date of the application is considered a corrected (or updated) ADS even if an ADS was not previously submitted. Such a corrected ADS must identify the information that is being changed with underlining for insertions and strike-through or brackets for text removed,** except that identification of information being changed is not required for an ADS included with an initial submission under 35 U.S.C. 371. **In general, the identification of the information being changed should be made relative to the most recent filing receipt.**

A review of the application file history reveals that the application, as filed on July 28, 2020, was accompanied by an ADS setting forth domestic benefit claims under 37 CFR 1.78, that were incorrectly listed. Some of the benefit claims were entered, however, and memorialized on the Filing Receipt mailed on August 6, 2020. Applicant failed to timely file a corrected ADS that was in compliance with 37 CFR 1.76(c) and that set forth domestic benefit claims that could be entered. See 37 CFR 1.78(a)(4) and 37 CFR 1.78(d)(3).

It is noted that, pursuant to 37 CFR 1.78, for all application filed after September 16, 2012, a domestic benefit claim must be set forth in an ADS. All of the new domestic benefit claims, which are domestic benefit claims that are not listed on the last filing receipt mailed on January 5, 2021, were not underlined, but were required to be so. The petition under 37 CFR 1.78 cannot be granted at this juncture as the corrected ADS filed on June 6, 2023, is not in compliance with 37 CFR 1.76(c)(2) as to the deletion and inclusion of the new domestic benefit information.

The current domestic benefit data of record is reflected as:

16941522 filed 07/28/2020 is a Continuation in Part of 16033823 , filed 07/12/2018 ,now U.S. Patent # 10779923

[1] Any petition under 37 CFR 1.78 must be accompanied by a corrected ADS in compliance with 37 CFR 1.76(c) (for applications filed on or after September 16, 2012), or by an amendment to the specification or a supplemental ADS in compliance with pre-AIA 37 CFR 1.76(c) (for applications filed prior to September 16, 2012) unless the proper reference was previously submitted. See MPEP 211.02(a).

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16033823 is a Continuation in Part of 15703823 , filed 09/13/2017 ,now U.S. Patent # 10592508

Applicant now seeks to assert that Application No. 16/033,823 is a continuation in part of Application No. 15/730,828, which claims the benefit of provisional Applications Nos. 62/414,712 and 62/406,990. The corrected ADS must:

1) **strike through the present** claim "16/033,823 is a continuation in part of 15/703,823"
2) **present and underline** the claim "16/033,823 is a continuation in part of 15/730,828"
3) **present and underline** "15/730,828 claims the benefit of 62/414,712"
4) **present and underline** "15/730,828 claims the benefit of 62/406,990"

Any renewed petition under 37 CFR 1.78(c) and (e) that may be filed must be accompanied by a corrected ADS that is compliant with 37 CFR 1.76(c)(2), specifically that reflects underlining and strike-throughs of all data that is being added and removed relative to the last filing receipt.

The renewed petition is not required to be accompanied by a petition fee under 37 CFR 1.17(m).

Further correspondence with respect to this matter should be addressed as follows:

By mail:	Mail Stop PETITIONS Commissioner for Patents Post Office Box 1450 Alexandria, VA 22313-1450
By fax:	(571) 273-8300 ATTN: Office of Petitions
By Internet	EFS-Web or Patent Center

Questions specific to this decision may be directed to the undersigned at (571) 272-3222.

/KENYA A THORNTON MCLAUGHLIN/
Attorney Advisor, OPET

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: TBA
MOZZICATTO	)	
	:	Group Art Unit TBA
Application No.: 16/941,522	)	
	:	Confirmation No. 1050
Filed: July 12, 2018	)	
	:	
For: DETACHABLE CONTAINER	)	
	:	

Mail Stop: PETITIONS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RENEWED PETITION TO AMEND ADS AND PETITION FOR CORRECTED FILING RECEIPT

Sir:

This Renewed Petition is made in response to the Decision On Petition, mailed on March 6, 2023, which dismissed Applicant's Petition to Accept Unintentionally Delayed Claim For Priority Under 37 C.F.R. §1.55 ("Original Petition"), filed on December 15, 2022.

As advised by the USPTO Office of Petitions Attorney Advisor in said Decision, this Renewed Petition is made as a Petition under 37 C.F.R. 1.78(c) and (e) to accept an unintentionally delayed claim for the benefit of priority to the prior filed applications set forth in the corrected Application Data Sheet filed on December 15, 2022. Applicant's representative thanks the OPET Attorney Advisor for her careful review of Applicant's Original Petition and for the helpful suggestion with respect thereto in telephone conversations regarding the substance of the Decision on Petition and Applicant's appropriate remedy.

In support of the Renewed Petition, Applicant provides the following remarks explaining (i) the unintentional transposition of digits in the Application Data

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Sheet filed on July 28, 2020, (ii) the preparation and filing of Applicant's Original Petition, which was dismissed in the Decision on Petition mailed on March 6, 2023, and (iii) Applicant's actions taken in response to the Decision on Petition, leading up to the preparation and filing of this Renewed Petition.

Applicant further submits herewith a Corrected Application Data Sheet, in Marked-Up format to show deletions with brackets and cross-out (e.g.: "[~~brackets and cross out~~]") and showing new corrected information as underlined (e.g.:" underlined") to indicate the requested changes. For the Examiner's convenience, Applicant also includes a fresh Substitute Application Data Sheet with the corrected information.

With submission herewith of the corrected Application Data Sheet, and the Statement in Support of Petition which follows, Applicant submits this RENEWED PETITION to accept an unintentionally delayed claim for the benefit of domestic priority, as set forth in the Corrected Application Data Sheet should be GRANTED.

Applicant acknowledges the statement in the Decision on Petition that this Renewed Petition is not required to be accompanied by a required Petition Fee under 37 C.F.R. §1.17(m).

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STATEMENT IN SUPPORT OF PETITION TO ACCEPT UNINTENTIONALLY DELAYED CLAIM FOR PRIORITY UNDER 37 C.F.R. §1.78(c) and (e)

1. Applicant files this Renewed Petition to Accept Unintentionally Delayed Claim For Priority Under 37 C.F.R. §1.78(c) and (e) in response to the USPTO Response to Request for Corrected Filing Receipt, mailed on October 14, 2022, and the USPTO's Decision on Petition, mailed on March 6, 2023, which dismissed Applicant's Original Petition filed on December 15, 2022.

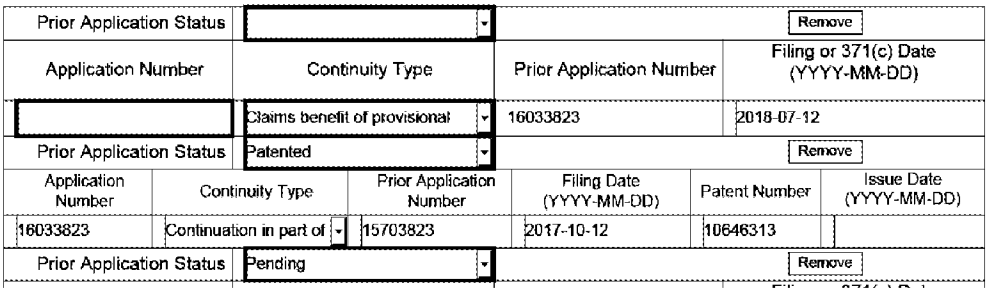
2. Applicant filed the present patent application, serial number 16941522, on **July 28, 2020** with an application data sheet (ADS) that inadvertently contained a reference to a priority application with the erroneous serial number *(15703823)(sic),* in which digits were inadvertently transposed from the correct serial number **15730828**. This petition seeks to correct that inadvertent error. Correction of the error does not amount to the addition of new information, as the correct serial number was contained in the ADS originally filed at other locations, and the correct priority patent number was also listed on the ADS.

3. There are two utility applications to which Serial Number 16/941522 claims priority. In the application ADS filed on July 28, 2020, the first utility application is accurately noted for the claim of priority as Serial Number **16/033823**, filed July 12, 2018, which was pending at the time (and later issued as US Patent **10779923** on September 22, 2020):

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation in part of	16033823	2018-07-12

4. However, in the next entry, the ADS filed July 28, 2020, erroneously noted that Serial Number 16033823 claimed priority from Serial Number *15703823 (sic)*, filed October 12, 2017 (which contained the inadvertent transpositions of the actual serial number **15730828*) and*** Patent Number **10646313** (which is correct**)**:

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Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Claims benefit of provisional	16033823	2018-07-12
Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	Continuation in part of	15703823	2017-10-12	10646313	

Prior Application Status	Pending	Remove

5. In other words, the original ADS **correctly** listed the grandparent patent -- US Patent **10646313 --** but **incorrectly** listed the corresponding patent application number as *Serial Number 15703823 (sic),* whereas the correct application number for US Patent 10646313 is Serial No. **15730828**.

6. On December 7, 2020, Applicant submitted a corrected ADS to add the information that application **16033823** had issued as Patent Number **10779923**. However, Applicant did not realize at that time that the originally filed ADS contained the inadvertent errors to the application number noted above.

7. Applicant notes that the USPTO updated filing receipt mailed on January 5, 2021, changed Applicant's submitted information. After noting that Applicant's data was not consistent with USPTO records, the correctly listed Patent Number **10646313** was replaced with the erroneous Patent Number *10592508.* Applicant believes the incorrect Patent Number was entered by USPTO personnel in order to correspond with the erroneous serial number *15703823 (sic)*. The title, subject matter and applicant names of Patent Number *10592508* and Serial Number *15703823* have no similarity to the subject matter and applicant names of the present invention. Applicant submits that the USPTO could analogously have entered the correct serial number **15730828**, in order to correspond with the *correctly* listed Patent Number **10646313** on the ADS, the title, subject matter and applicant names of which match the title, subject matter and applicant names of the present invention.

8. On September 16, 2022, Applicant filed a preliminary amendment in the present application 16941522. Shortly thereafter, the above-noted erroneous transposition of digits in the serial number of Serial Number **15730828** was identified.

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9. On October 12, 2022, Applicant filed a further updated ADS seeking to correct the erroneous serial number *15703823 (sic)*. However, this request was denied in the USPTO's Response to Request for Corrected Filing Receipt, mailed on October 14, 2022, as the request was considered to constitute a 'priority or continuity claim' which was not entered 'because it was not filed during the required time period.' The USPTO Response on October 14, 2022 advised the Applicant to file this petition to accept an unintentionally delayed claim for priority.

10. On December 15, 2022, Applicant filed a Petition to Accept Unintentionally Delayed Claim For Priority Under 37 C.F.R. §1.55 ("Original Petition").

11. On March 6, 2023, the Patent Office, Petitions Branch, mailed a Decision on Petition, in which Applicant's Original Petition was dismissed.

12. Applicant's undersigned Attorney diligently reviewed the Decision on Petition that dismissed Applicant's Original Petition, in order to understand the basis for the dismissal and to understand the appropriate response to said Decision.

13. The Decision on Petition identified several grounds for dismissal of the Original Petition at pages 1-2 of the Decision:

a) the Decision on Petition Stated:

> "The application data sheet must include the section headings listed in paragraph (b) of [37 CFR1.76] for each section included in the application data sheet, and must identify the information that is being changed, with underlining for insertions, and strike-through or brackets for text removed…"

b) the Decision on Petition Stated:

> **"In general, the identification of the information being changed should be made relative to the most recent filing receipt."**

c) the Decision on Petition stated:

> "A review of the application file history reveals that the application, as filed on July 28, 2020, was accompanied by an ADS setting forth domestic benefit claims under 37 CFR 1.78, that were incorrectly listed. Some of the benefit claims were entered, however, and memorialized on the Filing Receipt mailed on August 6, 2020. Applicant failed to timely file a corrected ADS that was in compliance with 37 CFR 1.76(c) and that set forth domestic benefit claims that could be entered. See 37 CFR 1.78(a)(4) and 37 CFR 1.78(d)(3)."

and further noted that:

> "All of the new domestic benefit claims, which are domestic benefit claims that are not listed on the last filing receipt mailed on January 5, 2021, were not underlined but were required to

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> be so. The petition under 37 CFR 1.78 cannot be granted at this juncture as the corrected ADS filed on December 15, 2022 is not in compliance with 37 CFR 1.76(c)(2) as to the inclusion of the new domestic benefit information. Any renewed petition under 37 CFR 1.78(c) and (e) that may be filed must be accomplished by a corrected ADS that is compliant with 37 CFR 1.76(c)(2), specifically that reflects underlining and strike-throughs of all data that is being added and removed relative to this last filing receipt."

14. With respect to grounds (a) through (c) above, Applicant's undersigned Attorney realized that the ADS submitted with Applicant's Original Petition was inadvertently marked up relative to the ADS filed on July 28, 2020, with Applicant's original filing of the present application, rather than the corrected ADS filed on December 7, 2020, which was more recent. Applicant's undersigned Attorney inadvertently concluded that the above grounds could be addressed by preparing a fresh ADS in which all of the new information in the corrected ADS of December 15, 2022, was marked-up relative to the more recent ADS that was filed on December 7, 2020, rather than the earlier filed ADS of July 28, 2020, and began preparing Applicant's Renewed Petition based upon this erroneous understanding.

15. However, in the process of drafting Applicant's response to the Decision on Petition, Applicant's undersigned Attorney realized that, the response prepared to address grounds (a) through (c) above seemed to be contradicted by further statements in Decision on Petition on page 4 with respect to the priority claims set forth in Application No. 15/730,828:

> "…the corrected ADS filed on December 15, 2022, asserts a claim of domestic benefit to Application No. 15/730,828, and through Application No. 15/730,828, asserts benefit claims to several provisional and design applications. A review of the application file record for Application No. 15/730,828, reveals that Application No. 15/730,828, only asserts a benefit claim to provisional Application Nos. 62/414,712, and 62/406,990, however."

16. Thus, in May 2023, Applicant's undersigned Attorney realized that he had inadvertently misinterpreted the Decision on Petition from March 2023 and that his original understanding was either incorrect or not fully correct.

17. Following this realization, in May 2023, Applicant's undersigned Attorney called the Petitions Branch in order to clarify the import of the Decision, and left a message with the OPET Attorney Advisor whose name appeared under the Decision on Petition.

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18. The OPET Attorney Advisor promptly returned Applicant's call the next day and provided helpful guidance in understanding the import of the Decision on Petition's statements with respect to the priority claims set forth in Application No. 15/730,828.

19. Subsequent to the telephone discussion with the OPET Attorney Advisor, Applicant's undersigned Attorney, diligently revised his earlier draft response to the Decision on Petition, which was now understood not to fully address all of the matters raised in the Decision on Petition. Applicant diligently prepared this Renewed Petition, which addresses all of the matters raised in the Decision on Petition, and seeks the appropriate remedy.

20. As a result of the telephone discussion described above, Applicant's undersigned Attorney more deeply reviewed the file history of Application No. 15/730,828. To simplify this current priority claim issue, Applicant has chosen to remove the priority claim of the earlier filed design patent applications, as those priority claims to the earlier filed design patent applications are unnecessary in the present patent application.

21. Thus, the corrected ADS submitted with this Renewed Petition cancels the domestic benefit claims made through Application No. 15/730,828 to several design applications such that the corrected ADS is now more consistent with the most recent Filing Receipt dated January 5, 2021. As explained above, the original transposition of the digits in the earlier ADS for Application No. 15/730,828 was an unintentional mistake.

22. Accordingly, it is submitted that this Renewed Petition fully satisfies the requirements of 37 CFR 1.76(c) and (e) and should be granted.

23. Applicant gratefully acknowledges the assistance of the USPTO OPET Attorney Advisor in clarifying the defects found in Applicant's Original Petition filed on December 15, 2022, and further clarifying Applicant's understanding of the requirements for the present Renewed Petition.

24. Applicant hereby states that the entire delay between the date the claim was due under 37 CFR 1.78(a)(4) and (d)(3) and the date the benefit claim was filed, up to and including the filing of this Renewed Petition, was unintentional.

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25. Applicant claims small entity status under 37 C.F.R. §1.27.

CONCLUSION

For the reasons stated above, with submission of the corrected Application Data Sheet in Marked-up and Clean forms, Applicant submits this RENEWED PETITION should be GRANTED, and the USPTO should accept the unintentionally delayed claims for benefit of domestic priority, as set forth in the Corrected Application Data Sheet.

No fees are believed due with this submission. However, if any fees are due, the Commissioner is requested to contact the undersigned Attorney for Applicants.

/Steven R. Lazar/
Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

June 5, 2023

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-301-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Mazzicalo	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Acton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	19 Preston Way		
Address 2			
City	Acton	State/Province	MA
Postal Code	01720	Country	US

Inventor 2 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Goulston	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Stuart	State/Province	FL	Country of Residence	US

Mailing Address of Inventor:

Address 1	1928 NW Palmetto Terrace		
Address 2			
City	Stuart	State/Province	FL
Postal Code	34994	Country	US

Inventor 3 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

Privacy Act Statement

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-S01-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	164 Old Country Road		
Address 2			
City	Lancaster	State/Province	MA
Postal Code	01523	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Tosie	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Norton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	164 Newcomb Street, D		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence information of this application.

Customer Number	60709		
Email Address	sripatents@scl.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SMTX-S01-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	25	Suggested Figure for Publication (if any)	5A

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-S01-F1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative Information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	60709		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status: Patented — Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation of	16933923	2018-07-12	10779923	2020-09-22

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-301-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	Continuation in part of	15730828	2017-10-12	10646313	
Prior Application Status	Pending			Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Claims benefit of provisional	63414712	2016-10-29		
Prior Application Status				Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Claims benefit of provisional	63406990	2016-10-12		
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button.				Add	

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country	Filing Date (YYYY-MM-DD)	Access Code (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the Add button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-S01-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant must opt-out of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is ONLY reviewed and processed with the INITIAL filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant DOES NOT authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant DOES NOT authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-301-F1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

○ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
◉ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	60 Bearfoot Road		
Address 2			
City	Northborough	State/Province	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-301-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee Including Non-Applicant Assignee:

Address 1			
Address 2			
City		State/Province	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet must be signed by a patent practitioner if one or more of the applicants is a juristic entity (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, all joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of all joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	2023-06-05
First Name	Steven	Last Name	Lazar	Registration Number	32618

Additional Signature may be generated within this form by selecting the Add button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-301-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 3(a)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

[illegible]

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

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Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Mosticchio	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Acton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	19 Preston Way		
Address 2			
City	Acton	State/Province	MA
Postal Code	01720	Country	US

Inventor 2 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Goulston	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Stuart	State/Province	FL	Country of Residence	US

Mailing Address of Inventor:

Address 1	1923 Nw Palmetto Terrace		
Address 2			
City	Stuart	State/Province	FL
Postal Code	34994	Country	US

Inventor 3 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	154 Old Country Road		
Address 2			
City	Lancaster	State/Province	MA
Postal Code	01523	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Toole	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Norton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	104 Newcomb Street, 3B		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence information of this application.

Customer Number	82705		
Email Address	sr@stents@aol.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SMTX-001-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	38	Suggested Figure for Publication (if any)	6A

PTO/SB/14 (11-15)

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/SB/14 (11-18)
Approved for use through 06/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	85705		

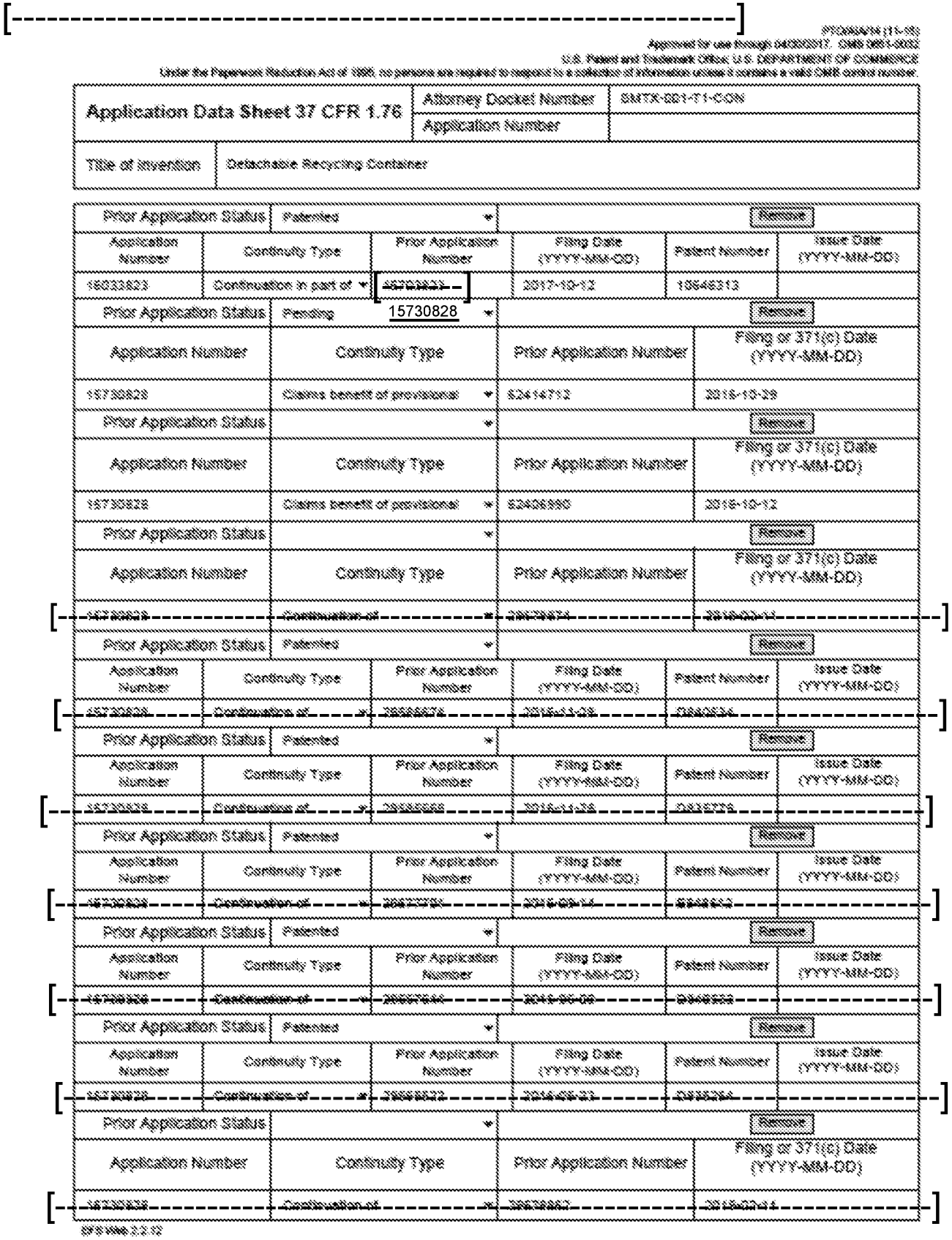
Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status: Patented — Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	~~Continuation-in-part-of~~ continuation	15033823	2018-07-12	10779823	2020-09-22

SPTO/SB/14 (11-18)



PTO/SB/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-11-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033633	Continuation in part of	[redacted]	2017-10-13	10646313	

Prior Application Status	Pending	15730828	Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)	
15730828	Claims benefit of provisional	62414713	2016-10-29	

Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62406990	2016-10-12

Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
[redacted]	[redacted]	[redacted]	[redacted]

Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	

Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	

Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	

Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	

Prior Application Status		Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
[redacted]	[redacted]	[redacted]	[redacted]

SB/14(11-15)v2.2.0

PTO/AIA/14 (11-18)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[1] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[2]	Filing Date (YYYY-MM-DD)	Access Code[3] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the Add button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

PTO/AIA/14 (11-18)
Approved for use through 01/31/2021. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant must opt-out of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is ONLY reviewed and processed with the INITIAL filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant DOES NOT authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant DOES NOT authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

EFS Web 2.2.10

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

○ Assignee ○ Legal Representative under 35 U.S.C. 117 ○ Joint Inventor

◉ Person to whom the inventor is obligated to assign. ○ Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	68 Bearfoot Road		
Address 2			
City	Northborough	State/Province	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (11-18)
Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee Including Non-Applicant Assignee:

Address 1			
Address 2			
City		State/Province	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet must be signed by a patent practitioner if one or more of the applicants is a juristic entity (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, all joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of all joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

2023-06-05

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	[2023-06-05]
First Name	Steven	Last Name	Lazar	Registration Number	32618

Additional Signature may be generated within this form by selecting the Add button. Add

EFS Web 2.2.10

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/SB/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Effective 1.2.18

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Mozzicato	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Acton	MA	US

Mailing Address of Inventor:

Address 1	19 Preston Way
Address 2	
City	Acton
State/Province	MA
Postal Code	01720
Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Goulston	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Stuart	FL	US

Mailing Address of Inventor:

Address 1	1928 NW Palmetto Terrace
Address 2	
City	Stuart
State/Province	FL
Postal Code	34994
Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

Solmetex Ex. 2002

DRNA v. Solmetex - PGR2023-00555

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	164 Old Country Road		
Address 2			
City	Lancaster	State/Province	MA
Postal Code	01523	Country	US

Inventor 4 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Toole	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Norton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	104 Newcomb Streed, D		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. — Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	30709		
Email Address	srlpatents@aol.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SMTX-001-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	26	Suggested Figure for Publication (if any)	6A

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Title of Invention	Detachable Recycling Container	

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Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	30709		

Domestic Benefit/National Stage Information:

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When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status: Patented — Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation of	16033823	2018-07-12	10779923	2020-09-22

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
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Title of Invention	Detachable Recycling Container	

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	Continuation in part of	15730828	2017-10-12	10646313	

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62414712	2016-10-29

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
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Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

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Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
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Title of Invention	Detachable Recycling Container	

Authorization or Opt-Out of Authorization to Permit Access:

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Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
● Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	50 Bearfoot Road		
Address 2			
City	Northborough	**State/Province**	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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DRNA v. Solmetex - PGR2023-00555

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	2023-06-05
First Name	Steven	Last Name	Lazar	Registration Number	32618

Additional Signature may be generated within this form by selecting the Add button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Electronic Patent Application Fee Transmittal

Application Number:	16941522
Filing Date:	28-Jul-2020
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Filer:	Steven R. Lazar
Attorney Docket Number:	SMTX-001-T1-CON

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	2202	1	40	40
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**40**

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Electronic Acknowledgement Receipt

EFS ID:	48108121
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	06-JUN-2023
Filing Date:	28-JUL-2020
Time Stamp:	13:19:43
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$40
RAM confirmation Number	E202366D21487871
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

424/727

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		1-SMTX-T1-Con-THIRD_PRELIM_AMEND_6-5-2023.pdf	86096 e1344398e57746463bdaa2b46eb348fa7aa602db	yes	8

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Preliminary Amendment	1	1
Claims	2	7
Applicant Arguments/Remarks Made in an Amendment	8	8

Warnings:					
Information:					
2	Petition for review by the Office of Petitions	2-Solmetex-001-T1-CON-Renewed-Petition-6-5-2023.pdf	192545 7306a95534eb09d7a525a82dd6a7831cfbeee884	no	8
Warnings:					
Information:					
3	Application Data Sheet	3-SMTX-001-T1-CON-ADS-CLEAN-06-05-2023.pdf	528753 95058b64009a130cfa6a6f3ada56f7de765ec767	no	9
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
4	Application Data Sheet	4-SMTX-001-T1-CON-MARKED-UP_ADS-06-05-2023.pdf	694888 e0b25ab167346a462fc887f33688843afc8a712b	no	9
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					

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5	Application Data Sheet	5-SMTX-001-T1-CON-REVISED-ADS-06-05-2023.pdf	1823728 ca3335bb1c85012a1c6679f8046e854096d25cf4	no	9
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	37726 92f6cf06bd696de17d112ef4e6036f29144e6207	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	3363736		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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DRNA v. Solmetex - PGR2023-00555

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: TBA
MOZZICATTO	)	
	:	Group Art Unit TBA
Serial No.: 16/941,522	)	
	:	Confirmation No. 1050
Filed: July 28, 2020	)	
	:	
For: DETACHABLE RECYCLING CONTAINER	)	
	:	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

THIRD PRELIMINARY AMENDMENT

Sir:

Prior to Examination of the present Application, Applicants present the following preliminary amendment to the claims:

1. Claims begin on Page 2.
2. Remarks begin on page 8.
3. Applicant claims small entity status under 37 C.F.R. §1.27.

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CLAIMS:

Please Amend the Claims As Follows:

Claims 1 through 40 (Canceled).

41. (New) A detachable dental-amalgam container for use with a dental amalgam separation system, the dental amalgam separation system having a vacuum source that applies a pressure within the dental amalgam separation system to cause movement of dental amalgam effluent within the detachable dental-amalgam container, the dental amalgam separation system having at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having an interior volume for receiving the dental amalgam effluent from the dental amalgam separation system;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having a circular upper surface from which a container inlet port and a container outlet port extend away from the main body, the container inlet port being positioned nearer to a periphery of the circular upper surface than the container outlet port, the container inlet port for receiving the dental amalgam effluent from the dental amalgam separation system, the container top portion further including at least one radially protruding structure located below the generally cylindrical upper region, the at least one radially protruding structure for engaging the at least one retaining pin of the dental amalgam separation system to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system when the pressure is released from the vacuum source, the at least one radially protruding structure being located radially outward relative to the periphery of the circular upper surface.

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42. (New) The detachable dental-amalgam container of claim 41, further including a container inlet conduit extending downwardly from the container top portion and into the interior volume, the container inlet conduit being fluidically coupled to the container inlet port, the container inlet conduit and the container inlet port for transferring the dental amalgam effluent from the dental amalgam separation system to the interior volume of the main body

43. (New) The detachable dental-amalgam container of claim 41, wherein the inlet port and the outlet port are of the same height.

44. (New) The detachable dental-amalgam container of claim 41, wherein the container top portion has a maximum outer dimension that is greater than a maximum outer diameter of the main body.

45. (New) The detachable dental-amalgam container of claim 41, further including a pair of plugs configured to seal a container inlet port and a container outlet port of a filled detachable dental-amalgam container.

46. (New) The detachable dental-amalgam container of claim 45, further including a cap configured to retain at least one of the plugs on the filled detachable dental-amalgam container.

47. (New) The detachable dental-amalgam container of claim 46, wherein the cap has an inside surface with a first circular wall and a second circular wall, the first circular wall placed so as to engage a first one of the pair of plugs on the container inlet port and the second circular wall placed so as to engage a second one of the pair of plugs on the container outlet port.

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48. (New) The detachable dental-amalgam container of claim 41, wherein the at least one radially protruding structure defines a maximum outer dimension for the container top portion.

49. (New) The detachable dental-amalgam container of claim 41, wherein the generally cylindrical upper region includes external threads.

50. (New) The detachable dental-amalgam container of claim 41, wherein the at least one radially protruding structure includes a flange extending in a direction away from the generally cylindrical upper region.

51. (New) The detachable dental-amalgam container of claim 50, wherein the flange extends entirely around the container top portion.

52. (New) The detachable dental-amalgam container of claim 50, wherein the flange includes a curved outer surface.

53. (New) A detachable dental-amalgam container for use with a dental amalgam separation system, the dental amalgam separation system having a tank that holds dental amalgam effluent and at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having an interior volume for receiving the dental amalgam effluent from the tank of the dental amalgam separation system;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having an upper surface from which a container inlet port and a container outlet port extend away from the main body, the container inlet port being positioned nearer to a periphery of the upper surface than the container outlet port, each of the container inlet port and the container outlet port including an external O-ring at upper portions thereof that is configured to help provide a seal between

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the detachable dental-amalgam container and the dental amalgam separation system, the container top portion further including at least one radially protruding structure located below the generally cylindrical upper region, the at least one radially protruding structure defining a pin-receiving region therebelow for receiving the at least one retaining pin of the dental amalgam separation system to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system, the at least one radially protruding structure protrudes radially outward of the container top portion such that it is located outward from the periphery of the upper surface;

a container inlet conduit extending downwardly from the container top portion and into the interior volume, the container inlet conduit being coupled to the container inlet port, the container inlet conduit and the container inlet port for transferring the dental amalgam effluent from the tank of the dental amalgam separation system to the interior volume of the main body; and

wherein the container outlet port is for being coupled to a system outlet port of the dental amalgam separation system such that the fluid from the dental amalgam effluent is moved from the interior volume of main body, through the container outlet port, and into the system outlet.

54. (New) The detachable dental-amalgam container of claim 53, further including a pair of plugs configured to seal a container inlet port and a container outlet port of a filled detachable dental-amalgam container, and a cap that retains at least one of the plugs on the filled detachable dental-amalgam container.

55. (New) The detachable dental-amalgam container of claim 53, wherein the at least one radially protruding structure includes a flange extending away from a lower portion of the generally cylindrical upper region.

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56. (New) The detachable dental-amalgam container of claim 55, wherein the flange extends entirely around the container top portion.

57. (New) The detachable dental-amalgam container of claim 55, wherein the flange includes a curved outer surface.

58. (New) The detachable dental-amalgam container of claim 53, wherein the generally cylindrical upper region includes external threads.

59. (New) The detachable dental-amalgam container of claim 53, further including a restrictor located within the interior volume of the main body and fluidically coupled to the container outlet port, the restrictor configured to remove fine particles from the dental amalgam effluent so that the fine particles are not discharged from the container outlet port.

60. (New) A detachable dental-amalgam container for use with a dental amalgam separation system, the dental amalgam separation system having a tank for receiving the dental amalgam effluent and at least one retaining pin for use with the detachable dental-amalgam container, the detachable dental-amalgam container comprising:

a main body having an interior volume for receiving the dental amalgam effluent from the tank of the dental amalgam separation system;

a container top portion located at a top of the main body, the container top portion including a generally cylindrical upper region having a circular upper surface from which a container inlet port and a container outlet port extend away from the main body, the container inlet port being positioned nearer to a periphery of the circular upper surface than the container outlet port, the container inlet port for receiving the dental amalgam effluent from the tank of the dental amalgam separation system, the container top portion further including at least one radially protruding structure located below the generally cylindrical upper region, the at least one radially protruding

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structure being located radially outward relative to the periphery of the circular upper surface, the at least one radially protruding structure for being positioned above the at least one retaining pin of the dental amalgam separation system to ensure the detachable dental-amalgam container does not become detached from the dental amalgam separation system.

61. (New) The detachable dental-amalgam container of claim 60, further including a restrictor located within the interior volume of the main body and fluidically coupled to the container outlet port, the restrictor configured to remove fine particles from the dental amalgam effluent so that the fine particles are not discharged from the container outlet port.

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REMARKS

The pending claims are claims 41-61. Claims 1-20 have previously been canceled. Claims 21-40 have been canceled in this Third Preliminary Amendment.

CONCLUSION

Applicant hereby claims small entity status under 37 CFR §1.27. Applicant submits herewith the fee for one total claim in excess of 20 (i.e., 21 claims). No other fees are believed due with this submission. If any additional fees are due, the Examiner is requested to contact Applicants' undersigned representative. Applicant's undersigned representative may be reached by telephone at 617-966-2374. All correspondence should continue to be directed to the listed address.

Respectfully submitted,

/Steven R. Lazar/
Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

SRL Patents
234 Broadway
Arlington, MA 02474
June 5, 2023

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PTO/SB/06 (09-11)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/941,522	Filing Date 07/28/2020	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	06/06/2023	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 21	Minus	** 20	= 1		x $40 =	40
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $192 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	40

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/VENESSA JONES/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
16/941,522	07/28/2020	Nicholas Mozzicato	SMTX-001-T1-CON	1050

80709 7590 03/06/2023

Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

EXAMINER	
CENTRAL, DOCKET	

ART UNIT	PAPER NUMBER
OPAP	

NOTIFICATION DATE	DELIVERY MODE
03/06/2023	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

srlpatents@aol.com

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UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
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In re Application of	:	
Mozzicato, et al.	:	
Application No. 16/941,522	:	DECISION ON PETITION
Filed: July 28, 2020	:	UNDER 37 CFR 1.78(c) and (e)
Attorney Docket No. SMTX-001-T1-CON	:	

This is a decision on the "Petition to Accept Unintentionally Delayed Claim for Priority under 37 CFR 1.55 and Corrected Filing Receipt", filed December 15, 2022, which is being treated as a petition under 37 CFR 1.78(c) and (e) to accept an unintentionally delayed claim for the benefit of priority to the prior-filed applications set forth in the corrected Application Data Sheet filed on December 15, 2022.

The petition is DISMISSED.

A petition for acceptance of a claim for late priority under 37 CFR 1.78(c) and (e) is only applicable to those applications filed on, or after, November 29, 2000. Further, the petition is appropriate only after the expiration of the period specified in 37 CFR 1.78(d). In addition, the petition under 37 CFR 1.78(c) and (e) must be accompanied by:

1. the references required by 35 U.S.C. § 119 and 35 U.S.C § 120 and paragraph (d)(2) to the prior-filed application, unless previously submitted;

2. the petition fee set forth in § 1.17(m), and

3. a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(4) and (d)(3) and the date the benefit claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional.

The instant nonprovisional application was filed after November 29, 2000, and the claim herein for the benefit of priority to the prior-filed application is submitted after the expiration of the period specified in 37 CFR 1.78(d).

The petition does not, however, comply with items (1) and (3) above.

As to Item (1), 37 CFR 1.78 requires that any nonprovisional application claiming the benefit of one or more prior-filed copending nonprovisional applications or provisional applications must contain or be amended to contain references to each such prior-filed application, identifying it by application number (consisting of the series code and serial number) and indicating the relationship of the applications. If the later filed application is a non-provisional application, the reference required by this paragraph must be

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included in an application data sheet (ADS).[1] The instant petition was accompanied by a corrected ADS. As to the ADS, it is noted that 37 CFR 1.76(c)(2), states:

> (2) An application data sheet providing corrected or updated information may include all of the sections listed in paragraph (b) of this section or only those sections containing changed or updated information. The application data sheet must include the section headings listed in paragraph (b) of this section for each section included in the application data sheet, and must identify the information that is being changed, with underlining for insertions, and strike-through or brackets for text removed, except that identification of information being changed is not required for an application data sheet included with an initial submission under 35 U.S.C. 371 .

It is further noted that Section 601.05(a)(II) of the *Manual of Patent Examining Procedure* (MPEP) provides, in pertinent part, that:

> 37 CFR 1.76(c) provides the procedure for correcting and updating not only an application data sheet (ADS), but also information otherwise of record (e.g., information provided on the most recent filing receipt). **Any ADS filed after the filing date of the application is considered a corrected (or updated) ADS even if an ADS was not previously submitted. Such a corrected ADS must identify the information that is being changed with underlining for insertions and strike-through or brackets for text removed,** except that identification of information being changed is not required for an ADS included with an initial submission under 35 U.S.C. 371. **In general, the identification of the information being changed should be made relative to the most recent filing receipt.**

A review of the application file history reveals that the application, as filed on July 28, 2020, was accompanied by an ADS setting forth domestic benefit claims under 37 CFR 1.78, that were incorrectly listed. Some of the benefit claims were entered, however, and memorialized on the Filing Receipt mailed on August 6, 2020. Applicant failed to timely file a corrected ADS that was in compliance with 37 CFR 1.76(c) and that set forth domestic benefit claims that could be entered. See 37 CFR 1.78(a)(4) and 37 CFR 1.78(d)(3).

It is noted that, pursuant to 37 CFR 1.78, for all application filed after September 16, 2012, a domestic benefit claim must be set forth in an ADS. All of the new domestic benefit claims, which are domestic benefit claims that are not listed on the last filing receipt mailed on January 5, 2021, were not underlined, but were required to be so. The petition under 37 CFR 1.78 cannot be granted at this juncture as the corrected ADS filed on December 15, 2022, is not in compliance with 37 CFR 1.76(c)(2) as to the inclusion of the new domestic benefit information. Any renewed petition under 37 CFR 1.78(c) and (e) that may be filed must be accompanied by a corrected ADS that is compliant with 37 CFR 1.76(c)(2), specifically that reflects underlining and strike-throughs of all data that is being added and removed relative to the last filing receipt.

[1] Any petition under 37 CFR 1.78 must be accompanied by a corrected ADS in compliance with 37 CFR 1.76(c) (for applications filed on or after September 16, 2012), or by an amendment to the specification or a supplemental ADS in compliance with pre-AIA 37 CFR 1.76(c) (for applications filed prior to September 16, 2012) unless the proper reference was previously submitted. See MPEP 211.02(a).

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Before the petition under 37 CFR § 1.78 can be granted, a renewed petition under 37 CFR § 1.78(c) and (e) and a supplemental Application Data Sheet that complies with 37 CFR 1.76 and 37 CFR 1.78 is required.

Further, as a to item (3), it is noted that the corrected ADS filed on December 15, 2022, asserts a claim of domestic benefit to Application No. 15/730,828, and through Application No. 15/730,828, asserts benefit claims to several provisional and design applications. A review of the application file record for Application No. 15/730,828, reveals that Application No. 15/730,828, only asserts a benefit claim to provisional Application Nos. 62/414,712, and 62/406,990, however.

It is noted that MPEP § 211.01(b)(II)states, *in pertinent part*:

> Sometimes a pending application is one of a series of applications wherein the pending application is not copending with the first filed application but is copending with an intermediate application entitled to the benefit of the filing date of the first application. If applicant wishes that the pending application have the benefit of the filing date of the first filed application, applicant must, besides making reference to the intermediate application, also make reference to the first application. See *Sticker Indus. Supply Corp. v. Blaw-Knox Co.*, 405 F.2d 90, 160 USPQ 177 (7th Cir. 1968) and *Hovlid v. Asari*, 305 F.2d 747, 134 USPQ 162 (9th Cir. 1962). The reference to the prior applications must identify all of the prior applications and indicate the relationship (i.e., continuation, divisional, or continuation-in-part) between each nonprovisional application in order to establish copendency throughout the entire chain of prior applications. **Appropriate references must be made in each intermediate application in the chain of prior applications** (emphasis included). See MPEP § 211.02 for guidance regarding properly referencing prior applications.

If applicant wishes to claim the benefit of the several design application through Application No. 15/730,828, that are listed in the corrected ADS filed on December 15, 2022, applicant may consider:

1) filing a grantable petition under 37 CFR 1.78(e) and corrected ADS in application number 15/730,828, that adds the domestic benefit claims to the design applications and

2) once the aforementioned has occurred, file a renewed petition under 37 CFR 1.78(c) and (e) in the present application.

Petitioner will note that the aforementioned should not be interpreted either as an assurance that any such petition filed in Application No. 15/730,828, would be deemed grantable, or an advisement that Petitioner should file such a petition. It is noted, however, that the benefit claims set forth in the corrected ADS filed on December 15, 2022, cannot be entered without correction of the domestic benefit claims in application number Application No. 15/730,828.

As to item (3), a grantable petition under 37 CFR 1.78(c) and (e) requires a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(4) and (d)(3) and the date the benefit claim was filed was unintentional. The petition lacks this statement or statement that can be construed as such. The renewed petition under 37 CFR 1.78(c) and (e) is required to include a statement that entire delay between the date the claim was due under 37 CFR 1.78(a)(4) and (d)(3) and the date the benefit claim was filed was unintentional.

It is noted that applicant has made a "conditional" request for refund of the petition under 37 CFR 1.17(m). A review of the ADS filed July 28, 2020, did not reveal that the entirety of the domestic benefit

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data the applicant set forth on the ADS could be entered, and the record does not demonstrate that the applicant made a proper claim under 37 CFR 1.78 within the periods prescribed by 37 CFR 1.78(a)(4) and (d)(3). Since applicant failed to properly assert the domestic benefit claims within the prescribed period, a petition under 37 CFR 1.78(c) and (e) is required and, thus, payment of the fee under 37 CFR 1.17(m). Applicant's request for refund of the petition is dismissed; no refund of the petition fee under 37 CFR 1.17(m) is forthcoming.

The renewed petition is not required to be accompanied by a petition fee under 37 CFR 1.17(m).

Further correspondence with respect to this matter should be addressed as follows:

By mail:	Mail Stop PETITIONS Commissioner for Patents Post Office Box 1450 Alexandria, VA 22313-1450
By fax:	(571) 273-8300 ATTN: Office of Petitions
By Internet	EFS-Web or Patent Center

Any questions specific to this decision may be directed to the undersigned at (571) 272-3222.

/KENYA A THORNTON MCLAUGHLIN/
Attorney Advisor, OPET

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: TBA
MOZZICATTO	)	
	:	Group Art Unit TBA
Application No.: 16/941,522	)	
	:	Confirmation No. 1050
Filed: July 12, 2018	)	
	:	
For: DETACHABLE CONTAINER	)	
	:	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PETITION TO ACCEPT UNINTENTIONALLY DELAYED CLAIM FOR PRIORITY UNDER 37 CFR §1.55 AND FOR CORRECTED FILING RECEIPT

Sir:

In response to the USPTO's Response to Request for Corrected Filing Receipt, mailed on October 14, 2022, Applicant responds as follows:

Applicant submits this Petition to Accept Unintentionally Delayed Claim For Priority Under 37 C.F.R. §1.55. Applicant provides remarks explaining the unintentional transposition of digits in the Application Data Sheet filed on July 28, 2020 and why the unintentional error should be deemed readily correctable.

Applicant further submits herewith a Corrected Application Data Sheet, in Marked-Up format to show deletions with brackets and cross-out (e.g.: " [~~brackets and cross out~~] " and showing new corrected information as underlined (e.g.: " underlined ") to indicate the requested changes. For the Examiner's convenience, Applicant also includes a fresh Substitute Application Data Sheet with the corrected information.

Applicant submits herewith the required Petition Fee under 37 C.F.R. §1.17(m). Applicant conditionally requests that the Petition Fee be refunded to Applicant should it be deemed that the information in the ADS was correctable because the errors were apparent on their face and that this Petition should not be required.

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PETITION TO ACCEPT UNINTENTIONALLY DELAYED
CLAIM FOR PRIORITY UNDER 37 C.F.R. §1.55

1. Applicant files this Petition to Accept Unintentionally Delayed Claim For Priority Under 37 C.F.R. §1.55 in response to the suggestion of the Office made in its Response to Request for Correct Filing Receipt, mailed on October 14, 2022.

2. Applicant filed the present patent application, serial number 16941522, on **July 28, 2020** with an application data sheet (ADS) that inadvertently contained a reference to a priority application with the erroneous serial number *(15703823)(sic),* in which digits were inadvertently transposed from the correct serial number **15730828**. This petition seeks to correct that inadvertent error. Correction of the error does not amount to the addition of new information, as the correct serial number was contained in the ADS originally filed at other locations, and the correct priority patent number was also listed on the ADS.

3. There are two utility applications to which Serial Number 16/941522 claims priority. In the application ADS filed on July 28, 2020, the first utility application is accurately noted for the claim of priority as Serial Number **16/033823**, filed July 12, 2018, which was pending at the time (and later issued as US Patent **10779923** on September 22, 2020):

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation in part of	16033823	2018-07-12

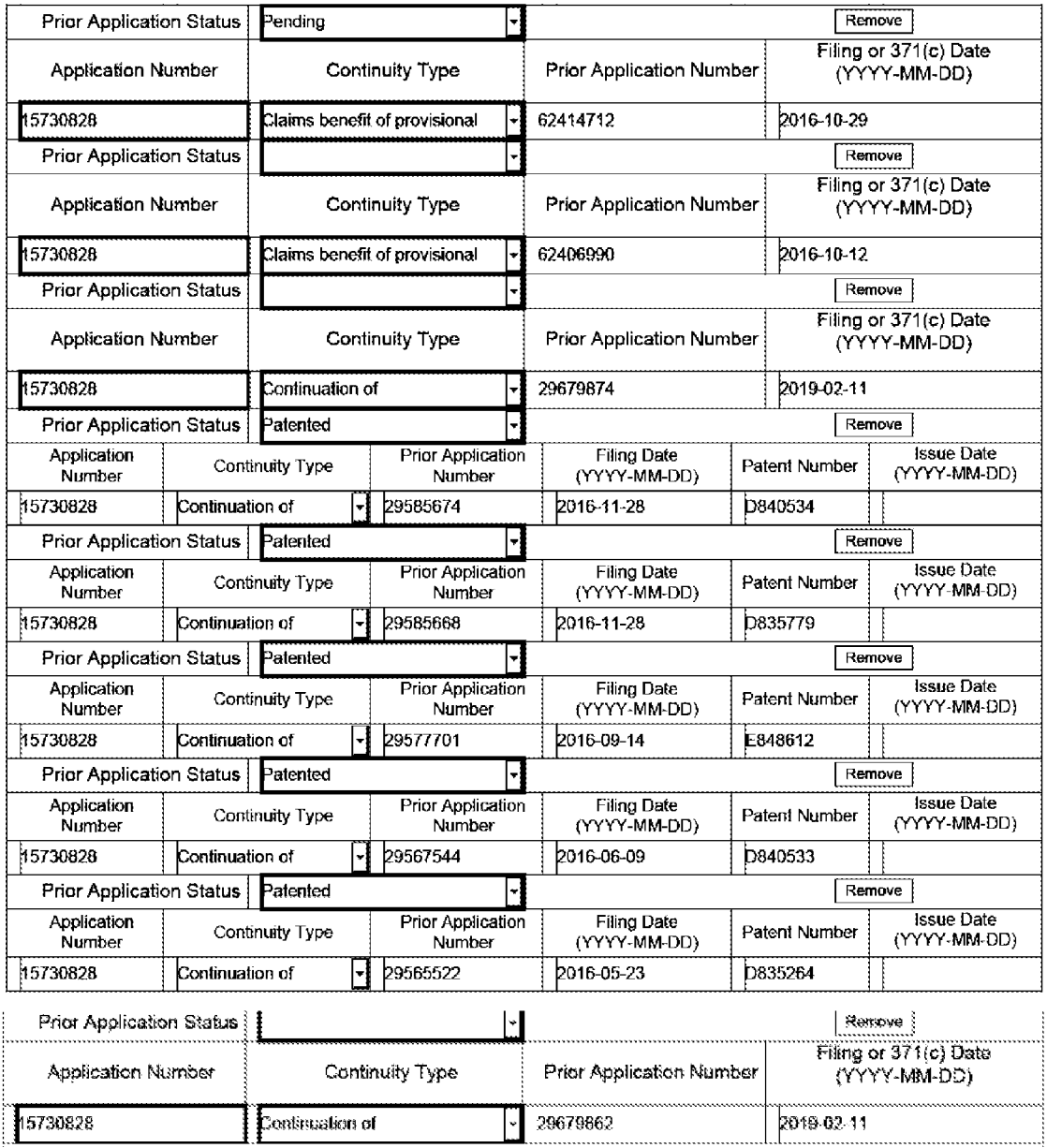
4. However, in the next entry, the ADS filed July 28, 2020, erroneously noted that Serial Number 16033823 claimed priority from Serial Number *15703823 (sic)*, filed October 12, 2017 (which contained the inadvertent transpositions of the actual serial number **1573082*8)* *and*** Patent Number **10646313** (which is correct**)**:

Prior Application Status					Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
	Claims benefit of provisional	16033823	2018-07-12		
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	Continuation in part of	15703823	2017-10-12	10646313	
Prior Application Status	Pending				Remove

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5. In other words, the original ADS **correctly** listed the grandparent patent -- US Patent **10646313 ---** but **incorrectly** listed the corresponding patent application number as *Serial Number 15703823 (sic), when the correct application number for US Patent 10646313 is Serial No.* **15730828**.

6. Further, when showing how the claim of priority relates back to the earlier two provisional applications and the seven design patents, the ADS correctly listed *Serial No.* **15730828** in those nine entries:



Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62414712	2016-10-29
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62406990	2016-10-12
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Continuation of	29679874	2019-02-11
Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29585674	2016-11-28	D840534	
Prior Application Status	Patented				Remove
15730828	Continuation of	29585668	2016-11-28	D835779	
Prior Application Status	Patented				Remove
15730828	Continuation of	29577701	2016-09-14	E848612	
Prior Application Status	Patented				Remove
15730828	Continuation of	29567544	2016-06-09	D840533	
Prior Application Status	Patented				Remove
15730828	Continuation of	29565522	2016-05-23	D835264	

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Continuation of	29679862	2019-02-11

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7. In other words, the ADS correctly listed *Serial No.* **15730828** nine times, but incorrectly transposed the numbers of *Serial No.* **15730828** a single time (but when doing so, still listed the correct patent number as *Patent No.* **10646313**).

8. On December 7, 2020, Applicant submitted a corrected ADS to add the information that application **16033823** had issued as Patent Number **10779923**. However, Applicant did not realize at that time that the originally filed ADS contained the inadvertent error to the application number noted above.

9. Applicant notes that the USPTO updated filing receipt mailed on January 5, 2021, changed Applicant's submitted information. After noting that Applicant's data was not consistent with USPTO records, the correctly listed Patent Number **10646313** was replaced with the erroneous Patent Number *10592508*. Applicant believes the incorrect Patent Number was entered by USPTO personnel in order to correspond with the erroneous serial number *15703823 (sic)*. Analogously, Applicant submits that the USPTO could more properly have entered the correct serial number **15730828**, in order to correspond with the correctly listed Patent Number **10646313** on the ADS. The subject matter and applicant names of Patent Number 10592508 and Serial Number 15703823 have no similarity to the subject matter and applicant names of the present invention.

10. On September 16, 2022, Applicant filed a preliminary amendment in the present application 16941522. Shortly thereafter, the above-noted erroneous transposition of digits in the serial number of Serial Number **15730828** was identified.

11. On October 12, 2022, Applicant filed a further updated ADS seeking to correct the erroneous serial number *15703823 (sic)*. However, this request was denied in the USPTO's Response to Request for Corrected Filing Receipt, mailed on October 14, 2022, as the request was considered to constitute a 'priority or continuity claim' which was not entered 'because it was not filed during the required time period.' The USPTO Response on October 14, 2022 advised the Applicant to file this petition to accept an unintentionally delayed claim for priority.

12. Applicant gratefully acknowledges the suggestion of the USPTO made in the October 14, 2022 response. Consistent with said suggestion, Applicant submits the present Petition and requests that the appropriate corrections be made to the ADS and the Filing

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Receipt, to indicate the proper serial number **15730828** and the proper Patent Number 10646313, in accordance with the facts stated above and as presented on the substitute ADS submitted herewith. Additionally, Applicant has corrected the erroneous Patent Number *E848612 (sic)* to the correct Patent Number **D848612,** as being an inadvertent error that would be readily apparent on its face.

13. Applicant hereby states that the entire delay between the date the priority claim was due under 37 C.F.R. §1.55(d) and the date the claim was filed was unintentional.

CONDITIONAL REQUEST FOR REFUND OF PETITION FEE

14. Applicant believes that, under the above facts, the errors in transposition of the digits in the proper serial number **15730828** to the erroneous serial number *15703823 (sic)* and from the correct Patent Number **D848612**, to the erroneous Patent Number *E848612 (sic)* were apparent on their face and should be correctable without the need for this Petition and the associated fee.

15. Accordingly, Applicant respectfully submits that the petition fee paid by Applicant herewith should not be required and should be refunded to Applicant in the event that it is determined that the corrected ADS should have been allowed without the need for this Petition.

16. Applicant claims small entity status under 37 C.F.R. §1.27.

/Steven R. Lazar/
Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

December 14, 2022

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PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Mozzicato	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Acton	MA	US

Mailing Address of Inventor:

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State/Province	MA
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Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Goulston	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

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Stuart	FL	US

Mailing Address of Inventor:

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Address 2	
City	Stuart
State/Province	FL
Postal Code	34994
Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

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PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	164 Old Country Road		
Address 2			
City	Lancaster	State/Province	MA
Postal Code	01523	Country	US

Inventor 4 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Toole	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Norton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	104 Newcomb Streed, D		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	30709		
Email Address	srlpatents@aol.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SMTX-001-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	26	Suggested Figure for Publication (if any)	6A

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PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	30709		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status: [~~Pending~~] Patented — Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	[~~Filing or 371(c) Date (YYYY-MM-DD)~~]	Patent Number	Issue Date (YYYY-MM-DD)
	[~~Continuation-in-part of~~] Continuation of	16033823	2018-07-12	[~~2018-07-12~~]	10777923	2020-09-20

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

[Prior Application Status]			Remove
[Application Number]	[Continuity Type]	[Prior Application Number]	[Filing or 371(c) Date (YYYY-MM-DD)]
	[Claims benefit of provisional]	[46033823]	[2018-07-12]
Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	[Continuation-in-part of] Continuation of	[15703823] 15730828	2017-10-12	10646313	2020-05-12

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62414712	2016-10-29
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62406990	2016-10-12
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Continuation of	29679874	2019-02-11
Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29585674	2016-11-28	D840534	
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29585668	2016-11-28	D835779	
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29577701	2016-09-14	[D848612] D848612	
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29567544	2016-06-09	D840533	
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29565522	2016-05-23	D835264	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Continuation of	29679862	2019-02-11

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
● Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	60 Bearfoot Road		
Address 2			
City	Northborough	**State/Province**	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	~~2020-07-28~~ 2022-12-13
First Name	Steven	Last Name	Lazar	Registration Number	32618

Additional Signature may be generated within this form by selecting the Add button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Moscicato	

Residence Information (Select One): ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Acton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	19 Preston Way		
Address 2			
City	Acton	State/Province	MA
Postal Code	01720	Country	US

Inventor 2 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Goulston	

Residence Information (Select One): ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Stuart	State/Province	FL	Country of Residence	US

Mailing Address of Inventor:

Address 1	1928 NW Palmetto Terrace		
Address 2			
City	Stuart	State/Province	FL
Postal Code	34994	Country	US

Inventor 3 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One): ◉ US Residency ○ Non US Residency ○ Active US Military Service

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	554 Old Country Road		
Address 2			
City	Lancaster	State/Province	MA
Postal Code	01523	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Tasse	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Norton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	104 Newcomb Street, D		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence Information of this application.

Customer Number	80709		
Email Address	smpatents@aol.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SMTX-001-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	36	Suggested Figure for Publication (if any)	5A

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-031-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative Information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	80709		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation of	16023823	2018-07-16	10779933	2020-09-22

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-021-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16203823	Continuation of	15730828	2017-10-12	10646313	2020-05-12
Prior Application Status	Pending			Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Claims benefit of provisional	62414712	2016-10-28		
Prior Application Status				Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Claims benefit of provisional	62406993	2016-10-12		
Prior Application Status				Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Continuation of	29679874	2019-02-11		
Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29589574	2016-11-28	D840834	
Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29589568	2016-11-28	D838779	
Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29577701	2016-09-14	D848612	
Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29567544	2016-06-09	D840833	
Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29566522	2016-06-23	D835264	
Prior Application Status				Remove	
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Continuation of	29679882	2019-02-11		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-031-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[1] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[2]	Filing Date (YYYY-MM-DD)	Access Code[3] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the Add button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Privacy Act Statement

PTO/AIA/14 (11-15)
Approved for use through 09/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-331-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant must opt-out of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is ONLY reviewed and processed with the INITIAL filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant DOES NOT authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant DOES NOT authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

Page 2 of 3

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PTO/AIA/14 (11-18)
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U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

○ Assignee ○ Legal Representative under 35 U.S.C. 117 ○ Joint Inventor

◉ Person to whom the inventor is obligated to assign. ○ Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	60 Seaview Road		
Address 2			
City	Northborough	State/Province	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (21-18)
Approved for use through 09/30/2021. OMB 0651-0035
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee Including Non-Applicant Assignee:

Address 1			
Address 2			
City		State/Province	
Country[i]		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature: Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet must be signed by a patent practitioner if one or more of the applicants is a juristic entity (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, all joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of all joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	2022-12-13
First Name	Steven	Last Name	Lazar	Registration Number	32518

Additional Signature may be generated within this form by selecting the Add button. Add

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/SB/14 (11-15)
Approved for use through 09/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 2168(a)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Electronic Patent Application Fee Transmittal

Application Number:	16941522
Filing Date:	28-Jul-2020
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Filer:	Steven R. Lazar
Attorney Docket Number:	SMTX-001-T1-CON

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
PET. DELAY SUB OR RESTORE PRIORITY-CLAIM	2454	1	1050	1050
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1050**

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Electronic Acknowledgement Receipt

EFS ID:	47220660
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	15-DEC-2022
Filing Date:	28-JUL-2020
Time Stamp:	22:30:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition for review/processing depending on status	1-Solmetex-001-T1-CON-Petition-Claim-Priority.pdf	348817 8e460759f6b02a743a6233f9506a4178bc8c699b	no	5

Warnings:

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Information:					
2	Application Data Sheet	2-CORRECTED_ADS-16941522-MARKED_UP_VERSION.pdf	1184607 b07d2789f5a8b1e5d6cf3d476215d60a61868dbc	no	10
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
3	Application Data Sheet	3-ADS-SUBSTITUTE_SHEETS-16941522-CLEAN_VERSION.pdf	511483 db97bb82c97e18b9c5e6611bd00f7deeea93bc5d	no	10
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
4	Fee Worksheet (SB06)	fee-info.pdf	37975 28cabf618d12bf9d57090e2d65e0d977e45b6af8	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2082882		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Electronic Patent Application Fee Transmittal

Application Number:	16941522
Filing Date:	28-Jul-2020
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Filer:	Steven R. Lazar
Attorney Docket Number:	SMTX-001-T1-CON

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
PET. DELAY SUB OR RESTORE PRIORITY-CLAIM	2454	1	1050	1050
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**1050**

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Electronic Acknowledgement Receipt

EFS ID:	47220689
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	15-DEC-2022
Filing Date:	28-JUL-2020
Time Stamp:	22:44:13
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Fee Worksheet (SB06)	fee-info.pdf	37975 ea28e0d6aacb2d710284e33c1b1af45aa2e34d1f	no	2

Warnings:

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Information:	
Total Files Size (in bytes):	37975

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

UNITED STATES PATENT AND TRADEMARK OFFICE
COMMISSIONER FOR PATENTS
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ALEXANDRIA VA 22313-1451

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POSTEDIGITAL
NNNNN

Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

Courtesy Reminder for
Application Serial No: 16/941,522

Attorney Docket No: SMTX-001-T1-CON
Customer Number: 80709
Date of Electronic Notification: 10/14/2022

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:
srlpatents@aol.com

To view your correspondence online or update your email addresses, please visit us anytime at **https://ppair-my.uspto.gov/pair/PrivatePair.**
If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/941,522	07/28/2020	Nicholas Mozzicato	SMTX-001-T1-CON

CONFIRMATION NO. 1050

IMPROPER CFR REQUEST

80709
Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

OC00000136596165

Date Mailed: 10/14/2022

RESPONSE TO REQUEST FOR CORRECTED FILING RECEIPT

Continuity, Priority Claims, Petitions, and Non-Publication Requests

In response to your request for a corrected Filing Receipt, the Office is unable to comply with your request because:

- The priority or continuity claim has not been entered because it was not filed during the required time period. Applicant may wish to consider filing a petition to accept an unintentionally delayed claim for priority. See 37 CFR 1.55 or 1.78.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ngfissha/

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

CORRECTED ADS FORM

Application Number	16941522
Title of Invention	Detachable Recycling Container

Inventor Information

****If no data is shown, no data has been corrected****

	Data of Record	Updated Data
Order Number		
Name		
Residence Information		
Residency		
City		
State		
Country of Residence		
Mailing Address of Inventor		
Address 1		
Address 2		
City,State/Province, Postal Code		
Country		

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Application Information

	Data of Record	Updated Data
Title of Invention	Detachable Recycling Container	
Attorney Docket Number	SMTX-001-T1-CON	
Entity Type	Small	

Domestic Benefit/National Stage Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121,365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S. C. 119(e) or 120, and 37 CFR 1.78(a).

		Data of Record	Updated Data
	Prior Application Status	patented	
	Application Number	16941522	
	Continuity Type	CIP	
	Prior Application Number	16033823	
	Filing Date (YYYY-MM-DD)	2018-07-12	
	Patent Number	10779923	
	Issue Date (YYYY-MM-DD)	2020-09-22	

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DRNA v. Solmetex - PGR2023-00555

		Data of Record	Updated Data
	Prior Application Status	patented	
	Application Number	16033823	
	Continuity Type	CIP	
	Prior Application Number	15703823	
	Filing Date (YYYY-MM-DD)	2017-09-13	
	Patent Number	10592508	
	Issue Date (YYYY-MM-DD)	2020-03-17	

		Data of Record	Updated Data
	Prior Application Status		pending
	Application Number		15730828
	Continuity Type		CON
	Prior Application Number		29679874
	Filing Date (YYYY-MM-DD)		2019-02-11
	Patent Number		
	Issue Date (YYYY-MM-DD)		

		Data of Record	Updated Data
	Prior Application Status		patented
	Application Number		15730828
	Continuity Type		CON
	Prior Application Number		29585674
	Filing Date (YYYY-MM-DD)		2016-11-28
	Patent Number		D840534
	Issue Date (YYYY-MM-DD)		2019-02-12

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DRNA v. Solmetex - PGR2023-00555

		Data of Record	Updated Data
	Prior Application Status		patented
	Application Number		15730828
	Continuity Type		CON
	Prior Application Number		29585668
	Filing Date (YYYY-MM-DD)		2016-11-28
	Patent Number		D835779
	Issue Date (YYYY-MM-DD)		2018-12-11

		Data of Record	Updated Data
	Prior Application Status		patented
	Application Number		15730828
	Continuity Type		CON
	Prior Application Number		29577701
	Filing Date (YYYY-MM-DD)		2016-09-14
	Patent Number		D848612
	Issue Date (YYYY-MM-DD)		2019-05-14

		Data of Record	Updated Data
	Prior Application Status		patented
	Application Number		15730828
	Continuity Type		CON
	Prior Application Number		29567544
	Filing Date (YYYY-MM-DD)		2016-06-09
	Patent Number		D840533
	Issue Date (YYYY-MM-DD)		2019-02-12

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

		Data of Record	Updated Data
	Prior Application Status		patented
	Application Number		15730828
	Continuity Type		CON
	Prior Application Number		29565522
	Filing Date (YYYY-MM-DD)		2016-05-23
	Patent Number		D835264
	Issue Date (YYYY-MM-DD)		2018-12-04

		Data of Record	Updated Data
	Prior Application Status		pending
	Application Number		15730828
	Continuity Type		CON
	Prior Application Number		29679862
	Filing Date (YYYY-MM-DD)		2019-02-11
	Patent Number		
	Issue Date (YYYY-MM-DD)		

		Data of Record	Updated Data
	Prior Application Status		
	Application Number		
	Continuity Type		
	Prior Application Number		
	Filing Date (YYYY-MM-DD)		
	Patent Number		
	Issue Date (YYYY-MM-DD)		

Foreign Priority Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

		Data of Record	Updated Data
	Application Number		
	Country		
	Filing Date		
	Access Code		

Applicant Information

****If no data is shown, no data has been corrected****
Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

	Data of Record	Updated Data
Applicant Type	PPA	
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is		
Name of the Deceased or Legally Incapacitated Inventor		
Applicant is an Organization	Yes	
Name		
Organization Name	Solmetex LLC	
Address 1		50 Bearfoot Road

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Address 2		
City,State/Province,Postal Code	Northborough MA 01532	
Country	US	
Phone Number		
Fax Number		
Email Address		

Assignee Information including Non-Applicant Assignee Information

****If no data is shown, no data has been corrected****
Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office

	Data of Record	Updated Data
Order		
Applicant is an Organization		
Name		
Organization Name		

Mailing Address

Address 1		
Address 2		
City,State/Province,Postal Code		
Country		
Phone Number		
Fax Number		

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Email Address		

Signature

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/	Registration Number	32618
First Name	Steven R.	Last Name	Lazar

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Mozzicato	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Acton	MA	US

Mailing Address of Inventor:

Address 1	19 Preston Way
Address 2	
City	Acton
State/Province	MA
Postal Code	01720
Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Goulston	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Stuart	FL	US

Mailing Address of Inventor:

Address 1	1928 NW Palmetto Terrace
Address 2	
City	Stuart
State/Province	FL
Postal Code	34994
Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

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DRNA v. Solmetex - PGR2023-00555

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	164 Old Country Road		
Address 2			
City	Lancaster	State/Province	MA
Postal Code	01523	Country	US

Inventor 4 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Toole	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Norton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	104 Newcomb Streed, D		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. — Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	30709		
Email Address	srlpatents@aol.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SMTX-001-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	26	Suggested Figure for Publication (if any)	6A

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	30709		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status: Patented — Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation in part of	16033823	2018-07-12	10779923	2020-09-22

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	Continuation in part of	15730823	2017-10-12	10646313	2020-05-12
Prior Application Status	Pending				Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Claims benefit of provisional	62414712	2016-10-29		
Prior Application Status					Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Claims benefit of provisional	62406990	2016-10-12		
Prior Application Status					Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Continuation of	29679874	2019-02-11		
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29585674	2016-11-28	D840534	
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29585668	2016-11-28	D835779	
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29577701	2016-09-14	E848612	
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29567544	2016-06-09	D840533	
Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29565522	2016-05-23	D835264	
Prior Application Status					Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Continuation of	29679862	2019-02-11		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
● Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	50 Bearfoot Road		
Address 2			
City	Northborough	**State/Province**	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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DRNA v. Solmetex - PGR2023-00555

PTO/AIA/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	2022-10-03
First Name	Steven	Last Name	Lazar	Registration Number	32618

Additional Signature may be generated within this form by selecting the Add button. Add

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Electronic Patent Application Fee Transmittal

Application Number:	16941522
Filing Date:	28-Jul-2020
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Filer:	Steven R. Lazar
Attorney Docket Number:	SMTX-001-T1-CON

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
PROCESSING FEE, EXCEPT PROV. APPLS.	2830	1	70	70
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**70**

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Electronic Acknowledgement Receipt

EFS ID:	46807785
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	12-OCT-2022
Filing Date:	28-JUL-2020
Time Stamp:	20:52:03
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$70
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet to update/ correct info	CorrectedADS.pdf	195389 d99b34bfa421f86f1d927e36857b2503e1007cfd	no	8
Warnings:					
Information:					
2	Application Data Sheet to update/ correct info	SMTX-001-T1-CON-ADS-9-30-2022.pdf	1823959 c20196a88dc42611fe33d5299e077255df7c54cd	no	10
Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	38110 60947ae6a864b5a2ebf1c41ee6533c7b53f2c23e	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	2057458		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Solmetex LLC

Application No.: 16/941,522

Filed: July 28, 2020

Docket No.: 16/941,522

Confirmation No.: 1050

Art Unit: OPAP

Examiner: Central, Docket

Title: DETACHABLE RECYCLING CONTAINER

FIRST INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. §§ 1.97 and 1.98

Commissioner for Patents – via EFS
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In compliance with the duty of disclosure under 37 C.F.R. § 1.56, it is respectfully requested that this Information Disclosure Statement be entered and the references listed on the attached List of References be considered by the Examiner and made of record.

In accordance with 37 C.F.R. § 1.98(a)(2)(ii), copies of the U.S. Patents and/or U.S. Patent Application Publications on the attached List of References are not being submitted.

Applicant would like to make the Examiner aware of the following applications to which this application claims priority: This application is a continuation-in-part of U.S. Patent Application No. 16/033,823, filed July 12, 2018, now issued as U.S. Patent No. 10,779,923, which is a continuation-in-part of U.S. Patent Application No. 15/730,828, filed October 12, 2017, now issued as U.S. Patent No. 10,646,313, which claims the benefit of and priority to U.S. Provisional Patent Application No. 62/414,712, filed October 29, 2016; and U.S. Provisional Patent Application No. 62/406,990, filed October 12, 2016.

This application also claims the benefit of and the priority to the following Design Patents: This application further claims priority to U.S. Patent Application No. 29/667,212, filed October 19, 2018, which is a continuation of U.S. Patent Application No. 29/585,659, filed November 28, 2016, now issued as U.S. Patent No. D835,778. This application further claims priority to U.S. Patent Application No. 29/585,674, filed November 28, 2016, now issued as U.S. Patent No. D840,534. This application further

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claims priority to U.S. Patent Application No. 29/672,887, filed December 10, 2018, which is a continuation of U.S. Patent Application No. 29/585,668, filed November 28, 2016, now issued as U.S. Patent No. D835,779. This application further claims priority to U.S. Patent Application No. 29/577,701, filed September 14, 2016, now issued as U.S. Patent No D848,612. This application further claims priority to U.S. Patent Application No. 29/567,544, filed June 9, 2016, now issued as U.S. Patent No. D840,533. This application further claims priority to U.S. Patent Application No. 29/671,943, filed November 30, 2018, which is a continuation of U.S. Patent Application No. 29/565,622, filed May 23, 2016, now issued as U.S. Patent No. D835,264.

Pursuant to 37 C.F.R. § 1.98(d) and M.P.E.P. § 609.02, copies of foreign patent documents and other documents that were previously cited and submitted in one or more of the parent application(s) in accordance with 37 C.F.R § 1.98(a)-(c) need not be resubmitted in this application. It is the Applicant's belief that all such references on the attached List of References were previously cited and submitted in an Information Disclosure Statement in accordance with 37 C.F.R § 1.98(a)-(c) in one or more of the above referenced U.S. Patent Applications to which this application claims priority under 35 U.S.C. § 120.

In accordance with 37 C.F.R. §§ 1.97(g) and (h), this Information Disclosure Statement is not to be construed as a representation that a search has been made, and is not to be construed to be an admission that the information disclosed is, or is considered to be, prior art with respect to the present application or material to patentability as defined in 37 C.F.R. § 1.56.

This Information Disclosure Statement is being filed prior to the receipt of a first office action on the merits. Accordingly, pursuant to 37 C.F.R. § 1.97(b)(3), no fees are believed to be due in connection with the filing of this Information Disclosure Statement. However, should any fees be deemed necessary (except payment of the issue fee), the Director is urged to contact the below-signed representative of the Applicant.

Respectfully submitted,

Date: September 16, 2022

By: /Steven R. Lazar/
Steven R. Lazar
Attorney for Applicant
Registration No. 32,618
617-966-2374

Solmetex Ex. 2002
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	Applicant(s): Solmetex LLC	
	Filing Date: July 28, 2020	Art Unit: Central, Docket

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C2

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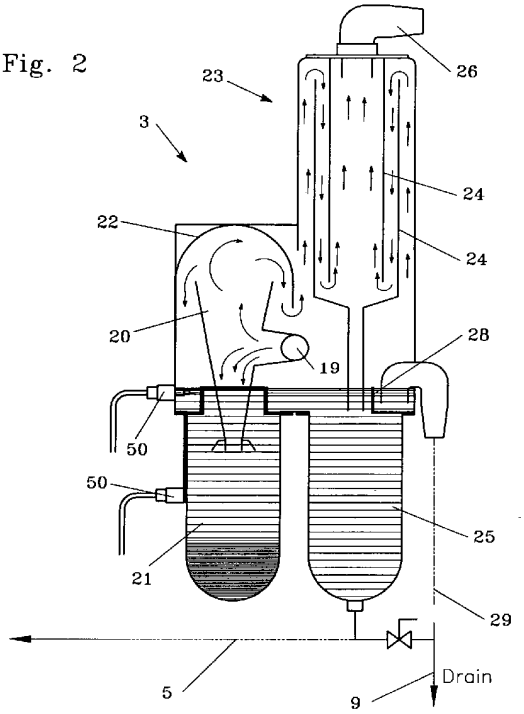
(54) Surgical draining apparatus, in particular for a dental surgery

(57) The invention relates to a surgical suction unit in particular for dental surgeries, comprising:

- a liquid-ring suction pump (2);
- an input unit (1), upstream of said pump (2), connected to the various points of use;
- a separator unit (3), downstream of said pump (2), which said separator unit comprises first means (20) designed to separate the solid and liquid particles from the fluids received from the pump, and second means (23) designed to separate the remaining liquids from the air;
- a first tank (21) designed to collect said solid and liquid parts;
- a second tank (25) designed to collect said liquids; and
- means (5) designed to place said second tank in communication with the pump inlet.

The unit according to the invention combines the advantages of known liquid-ring systems (high negative pressure values achievable, ability to discharge aspirated fluids continuously), but is not subject to their limitations, especially high water consumption.

Fig. 2



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Description

[0001] This invention relates to a surgical suction unit designed in particular, but not solely, for use in dental surgeries, which said unit comprises a liquid-ring suction pump associated with a liquid recirculation unit, the latter unit being fitted with a heat exchanger designed to cool the liquid returned into circulation, systems for collection of heavy metal amalgam particles, and a tank designed to collect liquids for recirculation in the pump.

[0002] The unit according to the invention combines the advantages of known liquid-ring systems (high negative pressure values achievable, ability to discharge aspirated fluids continuously), but is not subject to their limitations, especially high water consumption.

[0003] Units designed to aspirate and remove "surgical" fluids and liquids are used in numerous medical applications, and in particular in dental surgeries.

[0004] Units in which a suction pump is connected via pipes to cannulae or other suction devices used at the point of operation are known for this purpose.

[0005] The known systems are substantially divided into three main categories: liquid-ring units, air-ring units and wet-ring units.

[0006] "Liquid-ring" systems involve the use of a centrifugal pump with an impeller immersed in a ring of liquid. An air/liquid separator is located at the pump outlet.

[0007] A unit of this kind is described, for example, in German patent DE 3101954.

[0008] Liquid-ring units offer the advantage that a high negative pressure value can be achieved by the pump which, by creating a high suction speed in the suction cannulae, keeps the operating area and all conveyor pipes clean, even in the presence of large spillages.

[0009] Another advantage is their ability to discharge the aspirated fluids continuously, said fluids being discharged non-stop at positive pressure into the air/liquid separator.

[0010] However, liquid-ring units present the drawback of requiring very high water consumption to maintain the liquid ring around the impeller, and this problem is liable to become increasingly serious in future.

[0011] "Air-ring" systems, which have represented the alternative to the liquid-ring system for decades, comprise a centrifugal air-ring pump to generate the vacuum, and an air/liquid separator installed between the suction points in the operating area and the pump.

[0012] The separator, which operates in the part of the circuit in negative pressure, accumulates the aspirated fluids up to a maximum capacity level, after which it must be discharged, and the pump has to be shut down.

[0013] The system consequently presents the considerable drawback of noncontinuous operation, as well as slow air suction, which constitutes an intrinsic limitation of air-ring pumps.

[0014] A further limitation is the need for regular maintenance of the separator vessel, which requires frequent manual cleaning, with the risk of microbiological contamination of the operators.

[0015] The "wet-ring" system, which constitutes a development on air-ring devices, involves the use of a centrifugal air-ring pump combined with a motor-driven centrifugal separator of the liquids conveyed by the current.

[0016] The "wet-ring" system involves the use of a centrifugal air-ring pump combined with a motor-driven centrifugal separator which separates the liquids conveyed by the vacuum current and the solid particles of amalgam, consisting of heavy metals such as mercury, tin, silver, copper, zinc, palladium, indium, etc..

[0017] Some of these units include separate motors for the pump and the liquid and amalgam separator, involving increased costs, energy consumption, size and noise levels.

[0018] In other cases, a single motor is installed.

[0019] However, the problem of low head of air-ring pumps still remains in this version; this means a low transport speed of the fluids in the pipes, stagnation and undrained deposits in the ducts, which requires the suction unit to be over-dimensioned and makes it more complicated to manufacture the vacuum pipes. Moreover, considerable infiltrations of moisture take place, especially in the parts constituting the air-ring pump, leading to problems of condensation, microbiological pollution and chemical aggression in a part of the unit which cannot be washed or sanitised unless it is dismantled.

[0020] A liquid-ring system has also been proposed wherein the pump is connected to a tank which separates the air from the circulating fluids by means of a pipe that recirculates the accumulated liquid.

[0021] However, this system presents the drawback of overheating the liquid, which is continually recirculated by the pump until it reaches such a temperature as to considerably reduce the performance of the pump and the entire system, thus forcing the designer to overdimension all the components of the installation.

[0022] A further limitation of this system is that the amalgams are separated in decantation vessels located in the suction section upstream of the pump, and this system is unable to retain the smaller particles that travel at high speed, which are deposited in the liquid collection tank and conveyed from there to the outlet filter, which is thus often clogged, so that periodic maintenance of the system is required.

[0023] These drawbacks and limitations are overcome by a surgical suction unit according to the characterising part of the annexed claims.

[0024] The invention will now be described in detail, by way of example but not of limitation, by reference to the annexed figures, wherein:

- figure 1 is a simplified diagram of the suction unit according to the invention;
- figure 2 shows separation devices located at the pump outlet, in cross-section;
- figure 2a shows a variation on the devices illustrated in figure 2;

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- figures 3a to 3d schematically illustrate different embodiments of the devices which input the fluids into the pump;
- figure 4 is a view of a unit according to the invention.

[0025] The apparatus according to the invention (see figure 1) substantially consists of three units: an input unit shown as 1, a liquid-ring pump 2 which circulates the fluids, and a unit indicated as 3, which separates the amalgams and liquids from the air.

[0026] The separation unit also comprises a liquid collection tank 4, connected to pump inlet 7 via a pipe 5, to which a heat exchanger 6 is fitted.

[0027] The surgical fluids, air and liquids from the various uses are conveyed from there, through pipes 8, to input unit 1, then to pump 2, and from there to separation unit 3.

[0028] The liquids are then recirculated after suitable cooling, and the surplus is discharged through outlet pipe 9.

[0029] Input unit 1 and separator unit 3 will now be described in more detail.

[0030] Input unit 1 (see figure 3a) comprises a connector 10 connected to pipes which lead to the various points of use, a filter 11 designed to separate the coarser solid parts, and a pipe 12 downstream of the filter, which leads to pump inlet 7.

[0031] Pipe 12 is connected to a well 14 for input of environmental air. Well 14 also leads to a pipe 15 connected to the water network, to which a solenoid valve 16 or the like is fitted, allowing a certain quantity of top-up water to be introduced into the well when necessary if the unit is emptied for maintenance purposes. This solution creates a physical separation between the water network and the device, in order to eliminate all risk of bacterial contamination of the water network.

[0032] A valve of known type 13 is fitted to the connector that leads from well 14 to pump inlet pipe 12, enabling the vacuum in suction pipes 10 leading to the point of use to be regulated.

[0033] Separator unit 3, illustrated in detail in figure 2, is installed downstream of the pump.

[0034] Number 19 indicates the pipe leading from the outlet of pump 2, from which water mixed with air and the particles aspirated at the various points of use arrives.

[0035] Pipe 19 leads to a separator device 20 consisting, for example, of a cyclone or other similar device of known type in which the heavier parts, especially amalgams, are separated after a reduction in the speed of the fluids conveyed from the pump; said parts then drop downwards and are collected on the bottom of a removable tank 21, located below cyclone 20. When tank 21 is full, the accumulated liquids spill over the overfall that separates it from the next tank 25 and flow into that tank, while the heavier parts are deposited on the bottom of tank 21. The air and the lighter parts exit from the upper part of the cyclone, guided by a shaped partition or wall 22, and are conveyed to a second separator shown as 23. This separator is constituted by a set of concentric tubular elements 24 that force the air to perform a series of sudden reversals of the direction of motion, as shown by the arrows in figure 2. These sudden reversals of motion aid the separation of the liquids into aerosols, which collect in a second tank 25, also removable, located under separator 23.

[0036] The air exits from separator 23 through an outlet pipe 26 leading to the exterior; a bacterial filter 27 can be fitted to said pipe if the air is to be recirculated into the premises.

[0037] The filter is shown in figure 2a, which illustrates a separator complex similar to the previous one but fitted with said filter.

[0038] Tank 25, in which liquids from which the solid particles have been almost entirely removed collect, is fitted with an overfall 28 from which the liquid in the upper part of the tank is conveyed to an outlet pipe 29. Sensors 50 of known type detect the level of the solid parts in tank 21 and of the liquids in tanks 21 and 25.

[0039] Recirculation pipe 5, leading to the pump inlet, is connected to a connection 30 in the bottom of tank 25.

[0040] The system operates as follows.

[0041] When pump 2 is switched on, a strong negative pressure is created in pipe 12, as a result of which air is aspirated through pipes 10 leading to the points of use, which said air draws surgical liquids and the various solid particles with it.

[0042] This mixture of fluids and solids is conveyed to the pump, from which it is conveyed to the set of separation units 3.

[0043] By suitably regulating valve 13, suction pipe 12 leading to pump inlet 7 can be placed in communication with well 14 through which environmental air is aspirated, thus allowing the vacuum created by suction in pipes 10 to be regulated as required.

[0044] The necessary amount of water can be introduced into the well when the liquids in the unit need to be topped up; said water flows down into the well and is also aspirated by the pump.

[0045] The configuration illustrated allows physical separation between the water network and the unit, so as to eliminate all risk of countercurrent bacterial migration and prevent contamination of said network.

[0046] Alternatively, as shown in figures 3b, 3c and 3d, a tank of sanitising liquid 6 could be connected to pipe 12 and the pump inlet.

[0047] Sanitising liquid tank 6 can be screwed directly to the body of input unit 1 as illustrated in figure 3b, or may be constituted by a separate can which is always connected to the input unit via suitable pipes fitted with valve devices of known type as illustrated in figure 3d; alternatively, it can be conveyed to the point of input of water from the network, as illustrated in figure 3c.

[0048] In the last two cases a filter, shown as no. 40, can be fitted to the inlet of environmental air suction well 14.

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[0049] The fluids and solid particles aspirated by the pump are then expelled under positive pressure and conveyed to separator unit 3, through pipe 19 (fig. 2).

[0050] Here, the fluids enter cyclone 20, in which their flow rate suddenly slows; the heavier solid parts, especially amalgams of heavy metals, then spill downwards and collect on the bottom of removable tank 21.

[0051] Alternatively, a motor-driven cyclone of known type could be installed instead of cyclone 20; in this case the complex will be configured differently.

[0052] The air, with part of the nebulised liquids, is deviated by wall 22, and conveyed to separator device 23. Here, the abrupt reversals of the direction of motion and variations in speed undergone by the fluid current in order to pass into the cavity between the various tubular elements 24 leads to detachment of the residues, which fall to the bottom and collect in collection tank 25.

[0053] The air, free of liquids and solid particles, can then be conveyed to the exterior through pipe 26, or returned into the premises after being passed through filter 27.

[0054] The liquids arriving from the overfall of tank 21, with the finer solid particles, collect in tank 25, where they are drawn through connector 30 and conveyed along recirculation pipe 5.

[0055] Next, the liquids are cooled in heat exchanger 6, sent back to the inlet of the pump 7, and returned into circulation.

[0056] Any surplus liquid spills over overfall 28 and can be discharged along pipe 29.

[0057] The system described offers numerous advantages compared with the currently known systems.

[0058] The use of a liquid-ring pump as vacuum generator allows high vacuum values to be obtained, with a suitable transport speed of the fluids aspirated through the suction pipes leading from the cannulae; it ensures that all the aspirated fluids pass through the pump, with the advantage of safe transport through a single pipe which can be washed and sanitised without being dismantled, while the discharge of liquids under positive pressure downstream of the pump facilitates their separation and discharge. The characteristics of the input unit ensure effective protection of the water network against contamination because either there is no connection between the two circuits, so transmigration of pollutant microbial colonies in countercurrent is impossible, or the sanitising liquid keeps the pressurised running water input connection sterile.

[0059] The fact that liquids are recovered and recirculated after separation aids aggregation of the microparticles not removed during earlier stages and the formation of larger, heavier precipitates which escape the Brownian motion of suspensions, and are deposited sooner or later in collection tank 21.

[0060] The fact that a heat exchanger cools the liquid returned into circulation maintains constant pump efficiency, and prevents the formation of internal scaling due to precipitation of the salts in the circulating liquids.

[0061] Improvements in the most significant aspects of sanitary applications are thus achieved at the same time, namely:

- no water consumption for continuous operation;
- a high level of hygiene without maintenance;
- recovery of heavy metals;
- high performance and constant efficiency in continuous service;
- energy saving;
- low noise levels;
- a highly reliable system which is simple to manufacture.

[0062] An expert in the field could devise various modifications and variations, all of which should be deemed to fall within the ambit of this invention.

Claims

1. Surgical suction unit, in particular for dental surgeries, of the type comprising a liquid-ring suction pump (2), means (1) designed to connect the input of said pump with the various points of use, and means (3) designed to separate the liquids and solids aspirated by said pump from the air, said unit being **characterised in that** said separation devices (3) are located downstream of pump (2).

2. Surgical suction unit as claimed in claim 1, **characterised in that** it includes:

   - a liquid-ring suction pump (2);
   - an input unit (1), upstream of said pump (2), connected to the various points of use;
   - a separator unit (3), downstream of said pump (2), which said separator unit comprises first means (20) designed to separate the solid and liquid particles from the fluids received from the pump, and second means (23) designed to separate the remaining liquids from the air; .
   - a first tank (21) designed to collect said solid and liquid parts;
   - a second tank (25) designed to collect said liquids; and
   - means (5) designed to place said second tank in communication with the pump inlet.

3. Surgical suction unit as claimed in claim 2, **characterised in that** an overfall is created between said first and second tanks (21, 25) which allows the liquid present in said first tank to flow into the adjacent tank.

4. Surgical suction unit as claimed in claim 3, **characterised in that** means (6) are installed along the route (5) that connects said liquid and particle col-

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lection tank (25) with the inlet of pump (2) to cool said liquid.

5. Surgical suction unit as claimed in claim 1, **characterised in that** said separation means (3) comprise first devices (20) designed to separate the solids and liquids from the air flow and second devices (23) designed to separate the liquids into aerosols, which said first and second devices are arranged in series.

6. Surgical suction unit as claimed in claim 5, **characterised in that** said separator (23) which separates the liquids in aerosol form from the expelled air comprises a plurality of concentric pipes (24) with different cross-sectional shapes, designed to impose abrupt reversals and variations of motion on the air flow for the purpose of recovering the condensed liquids.

7. Surgical suction unit as claimed in claim 5 or 6, **characterised in that** it includes tanks (21, 25) for collection of the solids and liquids associated with said first and second separation devices (20, 23) respectively, which said tanks are connected by an overfall.

8. Surgical suction unit as claimed in each of the preceding claims, **characterised in that** it includes an inlet unit (1) for the fluids aspirated by the pump, which is fitted with a well (14) communicating with pipe (12) that conveys the aspirated fluids to the pump, means (15, 16) designed to pour water from the water network into said well being fitted.

9. Surgical suction unit as claimed in claim 8, **characterised in that** it includes adjustable valve means (13) designed to place said well (14) in communication with said aspirated fluid supply pipe (12) to regulate the degree of vacuum in the pipes.

10. Surgical suction unit as claimed in each of the preceding claims, **characterised in that** it includes a tank of sanitising liquid (6) connected to the inlet pipe leading to pump (2).

11. Surgical suction unit as claimed in each of the preceding claims, **characterised in that** it includes, at the outlet of said pump (2), means (20) designed to slow the speed of the fluids conveyed by the pump to allow separation of the liquids and heavy parts, and means (23), downstream of the preceding ones, designed to separate the liquids in aerosol form from the airflow, each of which separator means is associated with the corresponding collection tank (21, 25), which said tanks are arranged in series and connected by an overfall, a pipe (5) designed to draw liquid from the bottom of said second tank (25) and convey it to the inlet of pump (2) being fitted.

12. Surgical suction unit as claimed in claim 10, **characterised in that** means (6) designed to cool the liquid conveyed to pump (2) are fitted on said pipe (5).

13. Surgical suction unit as claimed in claim 11, **characterised in that** said tanks (21, 25) are removable.

14. Surgical suction unit as claimed in claim 12, **characterised in that** it includes level gauges (50) for the solid parts in tank (21) and the liquids in tank (25).

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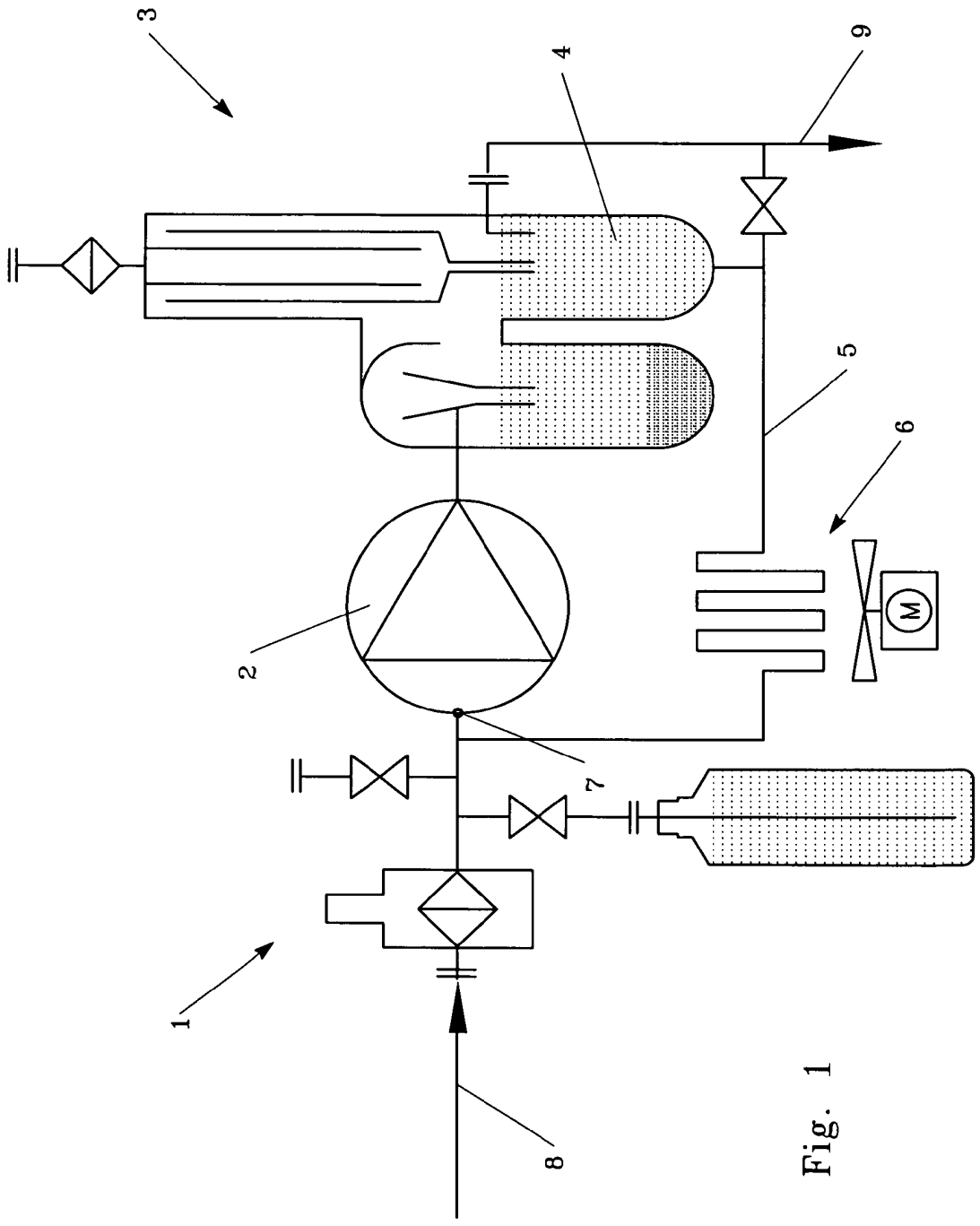


Fig. 1

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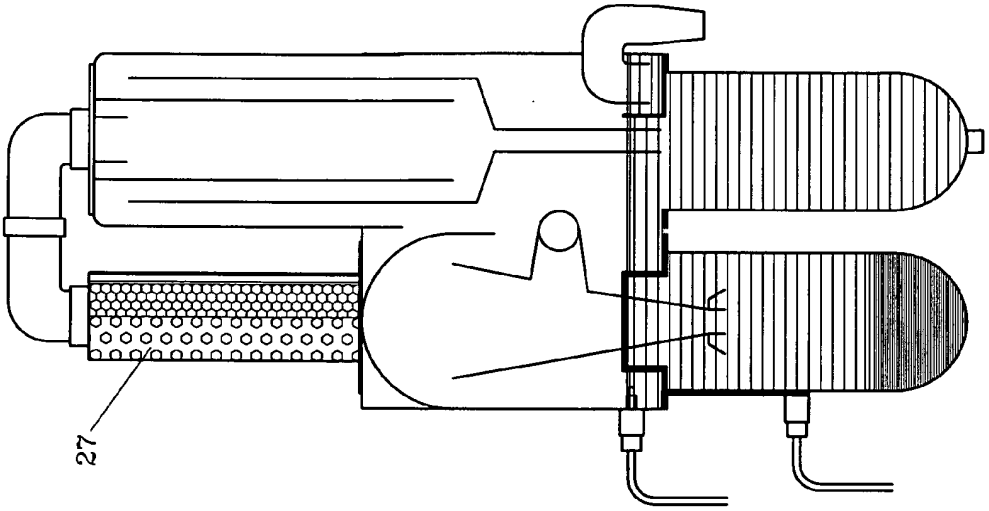


Fig. 2a

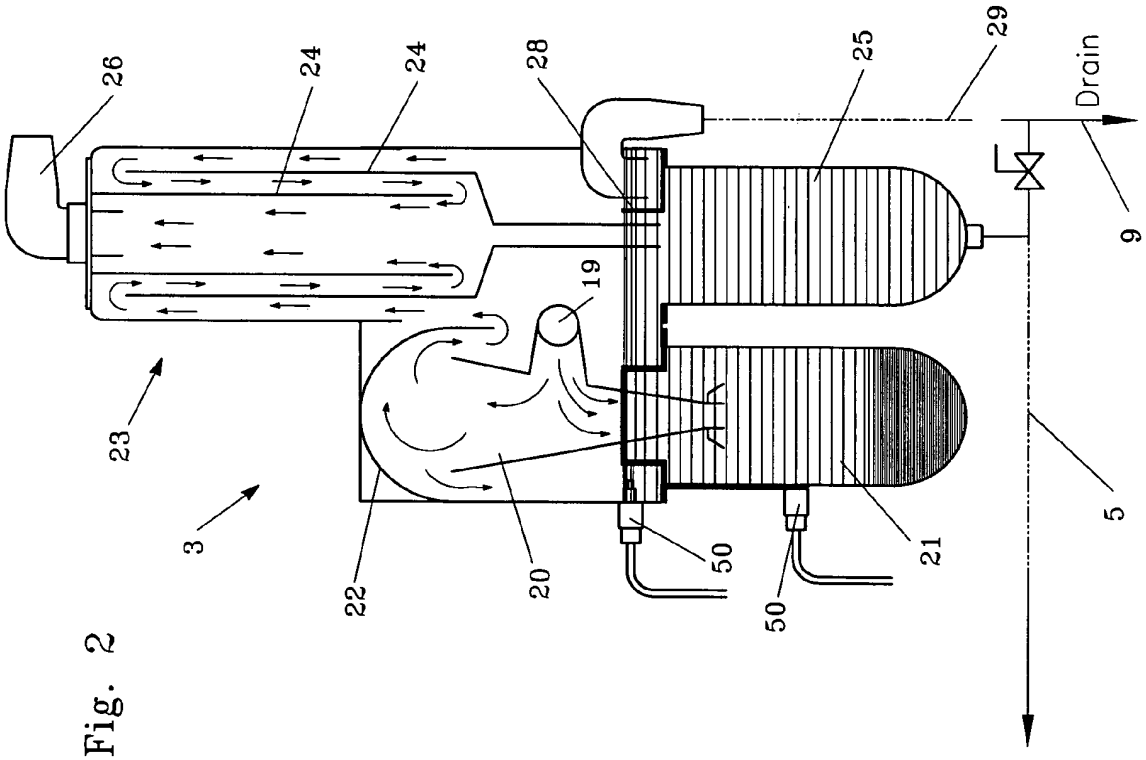


Fig. 2

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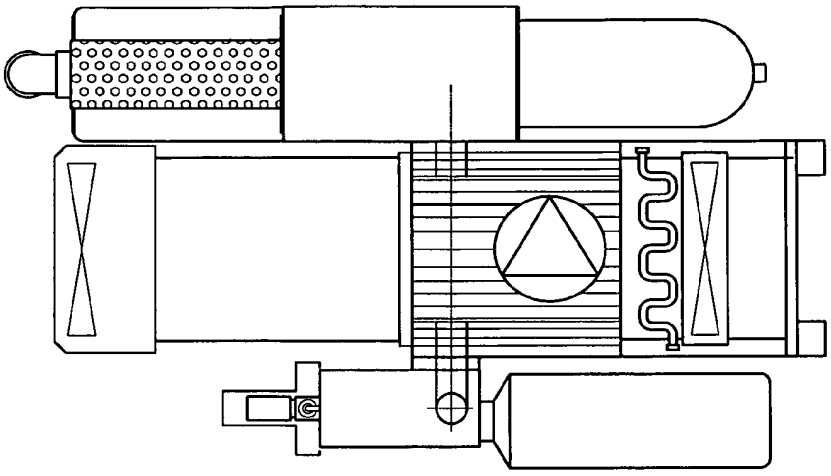


Fig. 4

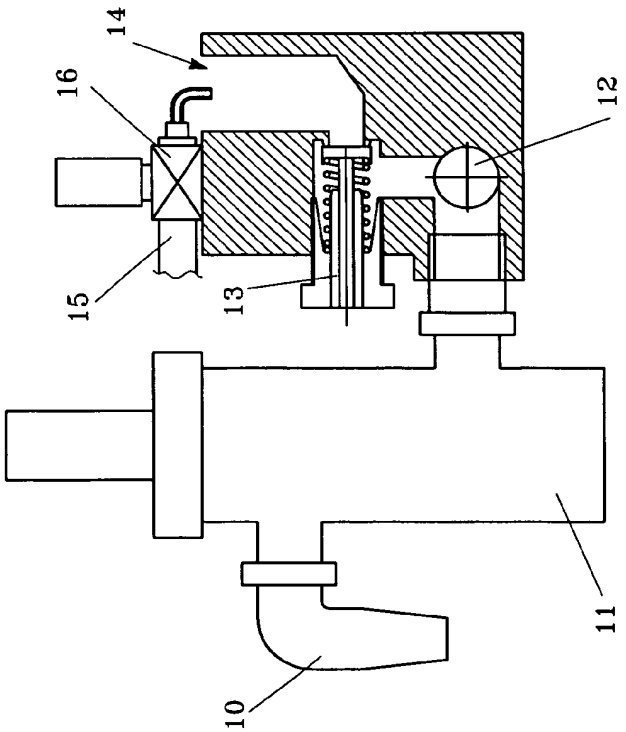


Fig. 3a

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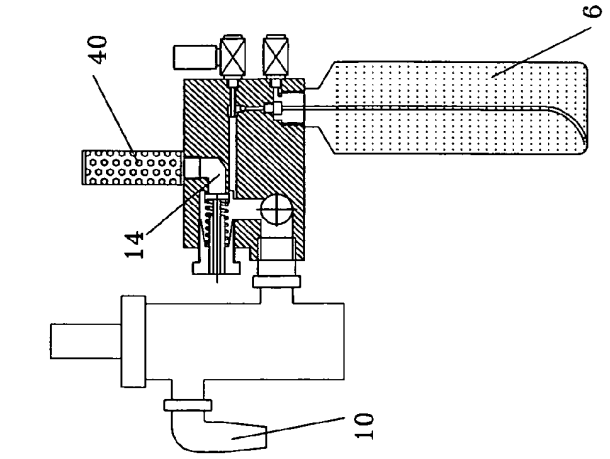


Fig. 3c

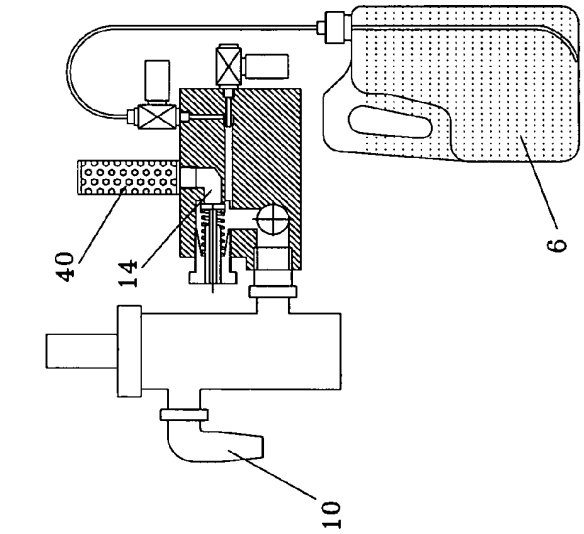


Fig. 3d

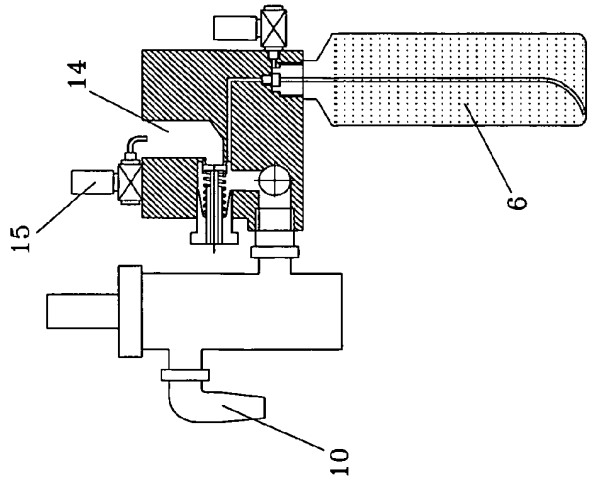


Fig. 3b

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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 01 0773

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	2 September 2003	Raybould, B

CATEGORY OF CITED DOCUMENTS

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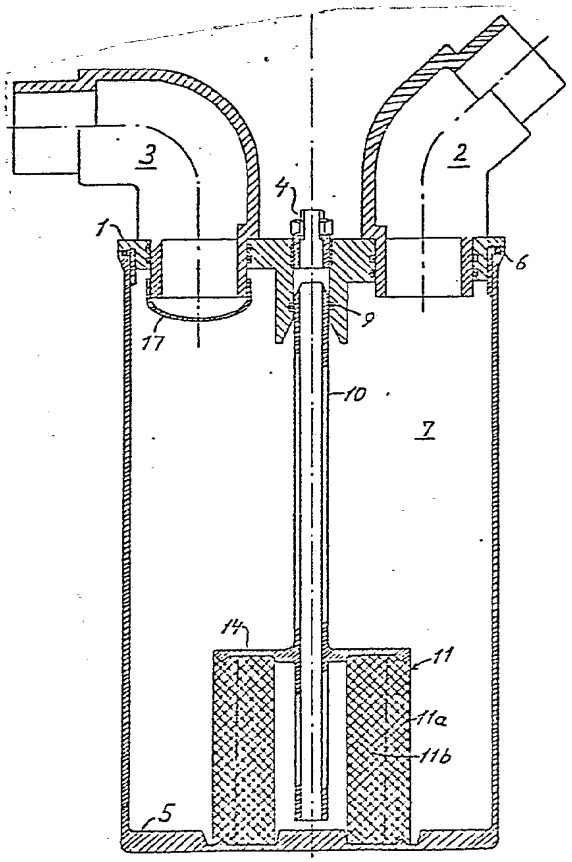
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Published
With international search report.

(54) Title: A DEVICE FOR SEPARATING WASTE PRODUCTS FROM A FLOW OF LIQUID AND GAS

(57) Abstract

The apparatus, which is designed for collection of mercury waste products and other waste products which are sucked from a rinse basin or by a mouth suction device at a dental clinic, has a head (1) which is stationary at the dentist's chair, and which through connections (2, 3, 4) and appertaining hoses are connected permanently to the rinse basin, a suction source, and an injector or suction pump respectively which, from the bottom of a tank (7) under the head (1), can suck filtered water to a sewer. Impurities are separated from the air current under its strong change of direciton and possibly by passage through a sieve (17) or a filter. At the bottom of the tank there is a filter cartridge (11) separating waste products from the liquid which from the outside of the cartridge is drawn through it and up through a suction tube (10). The apparatus can be used with different kinds of filter cartridges (11) and with screens (17) selected as required or filter cartridges at the connection (3) and possibly also at the connection (2). It ensures effective separation of cleaned air, liquid, andimpurities and allows active suction of cleaned liquid by the use of a small liquid tank placed close to the source of pollution.



* (Referred to in PCT Gazette No. 24/1983, Section II)

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A Device for Separating Waste Products from a Flow of Liquid and Gas.

The invention relates to an apparatus for separation of waste products from a flow of liquid and gas, e.g. at dental clinics or photographic establishments, and of the kind which has a tank the inner space of which is connected at its upper end to at least one inlet connection for sucked-in liquid and gas, and to an outlet connection for evacuated gas, while the lower end of the space is connected to a discharge connection for liquid.

Because of the ever growing efforts to avoid pollution of the environment, there is a great need for a simple way of trapping toxic and/or costly waste products carried along in a flow of liquid and gas such as is the case at e.g. dental clinics where liquid and gas are sucked from a rinse basin and/or a mouth suction device into a fixed separation tank, or in some cases into a detachable collecting tank from which the liquid is carried on to a drain after waste products have been separated by sedimentation.

However, cleaning of the apparatuses and collection and dispatch of the waste products are unpleasant and risky work, and endeavours have, therefore, been made to show many different solutions to the related problems.

From the description of DK-PS No. 138,927 a dental apparatus of the said kind is known which, for the purpose of facilitating cleaning work, has a removable liquid collecting tank. Furthermore, the apparatus has a removable sieve for detention of solids in the liquid sucked from the patient's mouth, and this sieve can also be removed and cleaned.

Cleaning of this apparatus as well as of the other known apparatuses where the discharge line is connected to a separation tank is, however, still rather unpleasant work which may involve a certain risk of infection. Besides, these known apparatuses are not built up so that they

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can be arranged in a simple and cheap way for removal of the waste products encountered in every single case and for cleaning of the waste water to the exact extent required in the actual case.

It can be mentioned that apparatuses are also known in which air, liquid, and waste products are sucked through a cyclone where air and liquid are separated whereafter solids in the liquid are deposited in a disposable tank which can be removed and closed with a lid. It is, however, impossible by the use of a cyclone to obtain effective separation of the smallest waste particles, including finely ground amalgam, e.g. sludge from drilling of teeth, and the method is relatively expensive. Furthermore, it is rather difficult to clean the cyclone, and the apparatus is unsuitable in connection with ejector suction devices and rinse fountains of old types.

It is the object of the present invention to show an apparatus of the said kind which, even if it is of a simple design, renders the unpleasant cleaning of separation tanks now required superfluous and which can give a more effective and safe separation and collection of waste products than corresponding known apparatuses, and an apparatus with a great flexibility as regards degree of cleaning and the kind of waste products.

The apparatus according to the invention is characteristic in that inlet connection, outlet connection, and discharge connection for liquid are placed on a common head which has devices for tight-fitting connection to the mouth rim of the tank wall, and in that the interior of a filter cartridge placed in the lower part of the tank space, is connected to the discharge connection for liquid through a suction tube.

In such an apparatus the polluting substances can be removed effectively in the tank, i.e. as close to the pollution source as possible, which is an obvious advantage. Among other things, cleaning of the air line system from suction device to separation tank is made superfluous, and

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gradual reduction of the air suction capacity is thus also avoided. The tank with collected waste products can easily be designed so that it can be removed from the head, sealed, and sent to a regeneration or destruction plant without inconvenience to the personnel. The filter cartridge employed can be adapted to the kind of waste particles and to the degree of cleaning required, and the same applies to a sieve or filter cartridge which can easily be placed in front of the outlet connection where the gas flows away from the tank. This flexibility has the effect that not only is the apparatus suitable for use at dental clinics, but also in other enterprises and for separation of many different substances such as amalgam, mercury, and particles or chips of e.g. silver and gold as well as fine-grained sludge from grinding and drilling processes of many kinds.

A very effective separation between cleaned air, cleaned liquid, and impurities can also according to the invention be obtained by the tank containing an interchangeable sieve placed between the mouth of the head inlet connection for liquid and gas and the outlet connection for gas and which extends towards the tank bottom.

The air is cleaned effectively of impurities, partly during passage through the sieve and partly by the strong deflection of the air flow between the inlet connection and the outlet connection, and the liquid is cleaned effectively both by sedimentation and by filtration through the filter cartridge, whose fraction is not disturbed by air carried along in the liquid.

The screen can, according to the invention, be a tube which is open at both ends and placed under the suction connection of the head. Hence the pressure drop through the sieve is reduced, and it is subjected to a certain self-cleaning effect.

However, the sieve can also, according to the invention, be a bag under the inlet connection of the head so that additional filtration is obtained.

Even if a tubular or a bag-shaped sieve is prefer-

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ed, the tank may, however, also be designed with a sieve wall extending from the head and towards the bottom and separating the inlet connection for liquid and gas from the outlet connection to the vacuum source. It will thus be seen that there are many possible ways of varying the degree of cleaning of both liquid and gas. The tank can in a known way be equipped with level control devices which, e.g. by the use of electrodes, start liquid suction through the discharge connection when the liquid in the tank has reached a certain level. Alternatively, liquid suction can be controlled electrically in connection with the control system for the air suction motor or with a manually operated electric switch.

The necessary seals can easily be provided by O-rings or in a similar way, and the tank can be fixed to the circumference by an axial flange on the head by means of a snap lock mechanism or a threaded section.

According to the invention the tank can form an interchangeable disposable tank which immediately under the head has a cover with openings which are flush with the openings in the head connections, since the discharge connection for liquid is arranged as a tight-fitting releasable connection to the suction tube from the filter cartridge passing through the cover. Such a tank can, without risk of pollution and infection owing to spillage, be removed easily from the permanent head at a dentist's chair.

Normally, it will, however, suffice to use a tank open at the top, since the tank is only open during replacement, and replacement of filter cartridge and sieves will in some cases not be necessary whenever the tank is replaced. Besides, it has appeared that the toxins introduced in the tank during ordinary dental treatment kill bacteria to such an extent that even after lengthy standing the contents of the tank will emit no obnoxious smell which may render replacement work unpleasant.

The invention is explained in greater detail in the following in connection with the drawing where

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Figure 1 shows an axial section through a first embodiment of the tank according to the invention, and

Figure 2 shows an axial section through another embodiment of the tank according to the invention.

Figure 1 shows a preferred simple embodiment of the apparatus according to the invention. The apparatus shown has a head 1 which can be fixed to or at a dentist's chair and which has through-going bores with appertaining connections, viz. one or more inlet connections 2 which via hose connections can be connected to a rinse basin and a mouth suction device, an outlet connection 3 which can be connected to a vacuum source, and a discharge connection 4 which can be connected to an injector or suction pump for suction of filtered water to a sewer or possibly to a collecting tank. The connection 2 can be equipped with branch connections for connection to rinse basin and mouth suction device respectively, or either of these sources of pollution can be connected to a separate connection 2 in the head.

A tank 7 with a closed bottom 5 has a gasket 6 in its mouth rim facing upwards, by means of which gasket it closes tightly against the head 1 to which it is fixed, for example, by a threaded section or a snap lock 8 (Fig. 2) or in another suiable way. For example, the tank can be a cup of elastic material with a rim which can be snapped over a bead on an axial flange of the head 1.

The upper end of a suction tube 10 is fixed to the head under the discharge connection 4 by means of a seal ring 9, and this tube almost reaches the tank bottom where it is surrounded by a filter cartridge 11 which is in close contact with the tank bottom 5. For example, the filter cartridge 11 can be glued to the bottom or fixed to it in some other suitable way as indicated in Figure 2. Tightness can also be obtained with an O-ring 12. The filter cartridge is tightly connected to the suction pipe 10 through a jacket 14.

However, the filter cartridge can also simply be

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closed at the bottom, or it can be ensured in some other way that there is only connection between the outer and inner sides of the cartridge through the filter element. The liquid which flows from the inlet connection 2 to the bottom of the tank, and which from the discharge connection 4 is sucked up through the tube 10, can be cleaned more or less depending on the pores of the filter cartridge 11. As indicated in Figure 1, it can be divided into a coarse filter 11a and an inner filter 11b with finer pores so that clogging up of the filter is delayed which is important since a filter cartridge with a pore size sufficient for obtainment of the filtration fineness yielded by the apparatus according to the invention, is clogged up on the surface very soon unless, like in an embodiment according to the invention, it is surrounded by a cartridge with a larger pore size which provides a certain volume for absorption of the large particles, which thus delay clogging up of the inner cartridge.

The air which enters through connection 2 and is sucked off through connection 3, is cleaned of impurities by the strong deflection in the tank and, if desired, by passage of a sieve 17 or a filter placed under the outlet connection 3. The mesh size of this sieve, or the filter, can also be varied with due regard to the kind of waste products and the degree of cleaning required.

The embodiment of the apparatus according to the invention shown in Figure 2 differs from the embodiment described above by a suspended tubular sieve being mounted in close connection with the lower side of the head 1, which sieve can detain waste products from the liquid-gas mixture entering through inlet connection 2.

To prepare the apparatus for operation, the tank 7 is placed under the stationary head 1 whose connections are connected permanently to a rinse basin, a vacuum suction source, and an injector or suction pump respectively.

During its use, air, mucus, water, and impurities are sucked in through the inlet connection 2. Impurities

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are separated off in the sieve 13 and/or by the strong change in the air direction, before it flows to the suction source through connection 3 while the liquid flows to the bottom of the tank, and waste products such as amalgam waste are filtered off by the filter cartridge 11 before the liquid is drawn up through suction tube 10.

By means of an electrode 16 or a corresponding detection device such as a probe extending into the tank, or by electric control in connection with the air suction motor, it is ensured that the liquid in the tank 7 does not rise above a prefixed level 15 since the liquid suction through the discharge connection 4 is started when the liquid surface has risen to this level. The tank filled with waste is separated from the lid 1 by the snap lock mechanism 8 and is closed with an appertaining tight-fitting lid and sent to a plant where its contents are destroyed and/or recovered. It will be understood that the apparatus with head 1 and filter cartridge 11 and a sieve 17, 13 if any, and an appertaining tank 7 can be made at a relatively low price and can work without replacement for a prolonged period. Furthermore, the apparatus according to the invention is suitable for use in connection with most existing suction apparatuses at dental clinics.

The apparatus according to the invention can be made in many other ways than the one described in the foregoing. For example, as shown in dotted lines in Figure 2, a fixed tight-fitting cover 9 with openings flush with the bores of the head 1 for connections 2, 3, 4 can be placed at the top of the collecting tank 7. In that case the screen 13 and possibly also the suction tube 10 can be fixed to the cover 9 so that they are removed together with the collecting tank.

However, the tank can also be designed with a removable cover 9 and an interchangeable filter 13 placed on it. In either of the embodiments shown the filter cartridge 11 and the jacket 14 can be arranged for replacement on the suction tube 10.

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It can be seen that the invention has produced a cleaning-convenient apparatus of a simple design and usable for safe collection of waste products of many different kinds, including especially the very smallest particles in the waste which it has hitherto been impossible to detain to the same degree. It is thus assumed that at least 98% of liquid-suspended particles of the size 0.3 µ or larger can be caught in the filter cartridge 11, and that 99.95% of particles in the suction air of a size larger than 0.2 µ can be detained in a corresponding filter cartridge 17 in front of the outlet connection 3. The apparatus can easily be arranged individually for the degree of cleaning wanted or required in every single case.

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Patent Claims:

1. An apparatus for separation of waste products from a flow of liquid and gas e.g. at dental clinics or photographic establishments, and of the kind which has a tank (7), the inner space of which is connected at its upper end to at least one inlet connection (2) for sucked-in liquid and gas, and with an outlet connection (3) for evacuated gas, while the lower end of the space is connected to a discharge connection for liquid, c h a r a c t e r i z e d in that the inlet connection (2), the outlet connection (3), and the discharge connection (4) for liquid are placed on a common head (1) with devices (8) for tight-fitting connection with the mouth rim of the tank wall, and in that the interior of a filter cartridge (11) placed in the lower part of the tank space is connected via a suction tube (10) to the discharge connection (4) for liquid.

2. An apparatus as claimed in claim 1, c h a r a c t e r i z e d in that a filter sieve (17) or a filter cartridge is placed under the outlet connection (3) for gas of head (1).

3. An apparatus as claimed in claims 1-2, c h a r a c t e r i z e d in that the filter cartridge (11) is tubular and that the extreme end of the tube wall forms a coarse filter (11a) while the inner part of the wall consists of a material (11b) with finer pores.

4. An apparatus as claimed in each of the preceding claims, c h a r a c t e r i z e d in that the tank (7) contains an interchangeable sieve (13) placed between the mouth of the inlet connection (2) of head (1) for liquid and gas and the outlet connection (3) for gas and which extends towards the bottom of the tank (7).

5. An apparatus as claimed in claim 4, c h a r a c t e r i z e d in that the sieve (13) is a tube which is open at both ends and placed under the inlet connection (2) of head (1).

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6. An apparatus as claimed in claim 4, c h a r a c t e r i z e d in that the sieve (13) is a bag under the inlet connection (2) of head (1).

7. An apparatus as claimed in each of the preceding claims, c h a r a c t e r i z e d in that the collecting tank (7) is fixed to the circumference of an axial flange on head (1) by the use of a snap lock mechanism (8) or a threaded section.

8. An apparatus as claimed in each of the preceding claims, c h a r a c t e r i z e d in that the filter cartridge (11) is interchangeable on the suction tube (10).

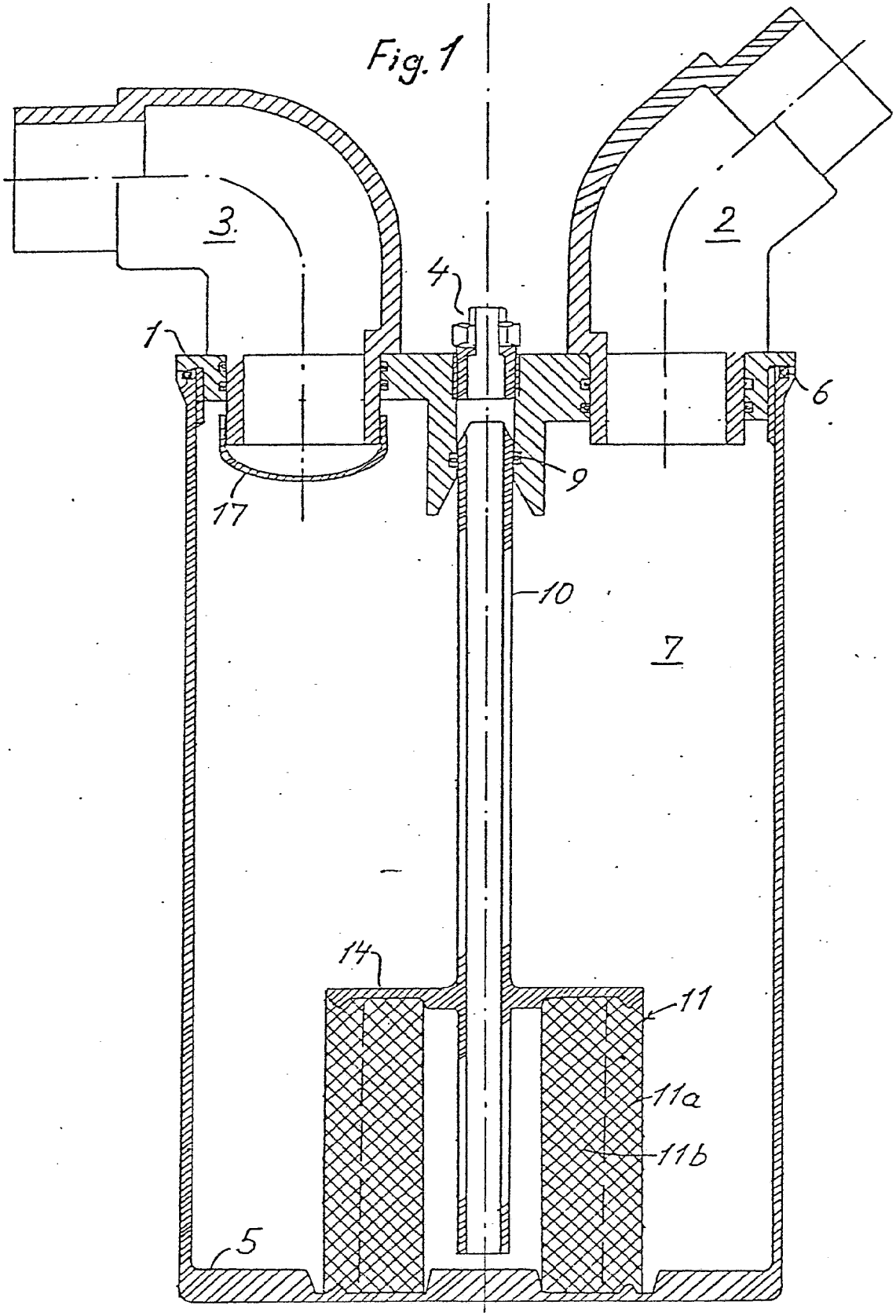
9. An apparatus as claimed in each of the preceding claims, c h a r a c t e r i z e d in that the suction tube (10) from the filter cartridge (11) is releasably connected to head (1).

10. An apparatus as claimed in each of the preceding claims, c h a r a c t e r i z e d in that the tank (7) forms an interchangeable disposable tank which immediately under the head (1) has a cover (9) with openings flush with the openings in the connections (2, 3, 4) of the head and that the discharge connection (4) for liquid is arranged for a tight-fitting releasable connection with the suction tube (10) passing through the cover from the filter cartridge (11).

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Fig. 1



SUBSTITUTE

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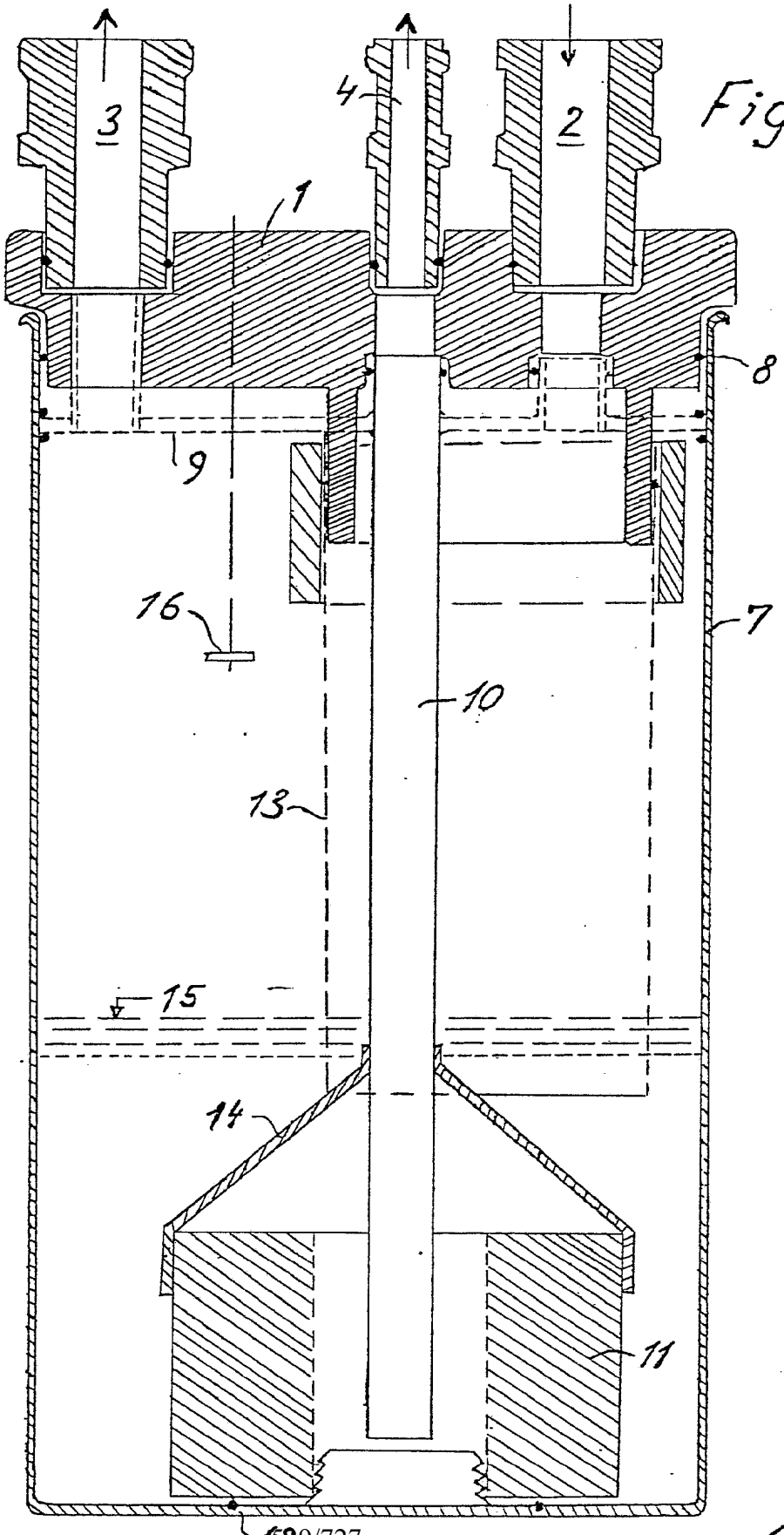


Fig. 2

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INTERNATIONAL SEARCH REPORT

International Application No PCT/DK83/00011

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [2]

According to International Patent Classification (IPC) or to both National Classification and IPC [3]

A 61 C 17/04, B 01 D 35/02, G 03 C 11/24

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC 3	A 61 C 17/04, A 61 M 1/00, B 01 D 27/04,08, G 03 C 11/24, B 01 D 35/02
US Cl	32:33; 210:311, 406, 416, 422-423, 435-438, 459-460

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched [5]

SE, NO, DK, FI classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
Y	DE, B2, 2 459 881 (SIEMENS AG) 24 June 1976 & DK, C, 138 927	
Y	DE, A1, 2 934 915 (LANG) 19 March 1981	
Y	GB, A , 1 299 677 (PENNWALT CORP) 2 August 1971	
Y	US, A , 3 482 313 (STRAM) 9 December 1969	
Y	US, A , 2 997 180 (LOVEDAY) 22 August 1961	
A	SE, B , 333 249 (EASTMAN KODAK COMPANY) 1 July 1968	

* Special categories of cited documents: [15]

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IV. CERTIFICATION

Date of the Actual Completion of the International Search [1]	Date of Mailing of this International Search Report [1]
1983-05-11	1983 -05- 20
International Searching Authority [1]	Signature of Authorized Officer [20]
Swedish Patent Office	530/727 Johan Auby

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Veröffentlicht
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(54) Title: DENTAL TRAP

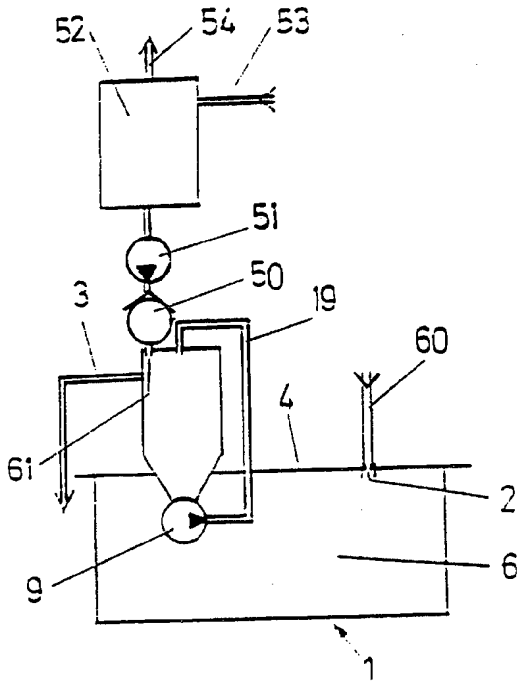
(54) Bezeichnung: ZAHNÄRZTLICHER ABSCHEIDER

(57) Abstract

Solids from two separately supplied (60, 61) mixtures of solids and liquids are collected together in a dental trap with a collecting basin (6) which may be removed from a centrifuge (5). The first mixture is taken from a suction air separator (52) under negative pressure and is brought into the centrifuge (5). The mixture of solids and liquids flows out of a spittoon under the effect of gravity and is directly brought into the collecting basin (6). Residual liquid which accumulates above the solids is conveyed into the centrifuge (5) by means of an arrangement (9, 16, 19) provided with an inlet (61) for the first mixture, an outlet (3) for the separated liquid and a solids discharge (12) that leads into the collecting basin (6).

(57) Zusammenfassung

In einem zahnärztlichen Abscheider mit einem von einer Zentrifuge (5) abnehmbaren Sammelbehälter (6) werden gemeinsam Feststoffe aus zwei getrennt zugeführten (60, 61) Feststoff-Flüssigkeitsgemischen gesammelt. Das erste Gemisch wird aus einer unter Unterdruck stehenden Saugluftabscheideeinrichtung (52) ausgetragen und in die Zentrifuge (5) eingebracht. Das Feststoff-Flüssigkeitsgemisch fließt aus einer Speischale durch Schwerkraft ab und wird unmittelbar in den Sammelbehälter (6) eingebracht. Sich oberhalb der Feststoffe sammelnde Restflüssigkeit wird mittels einer Einrichtung (9, 16, 19) in die Zentrifuge (5) überführt, die einen Einlaß (61) für das erste Gemisch, einen Auslaß (3) für die abgetrennte Flüssigkeit und einen in den Sammelbehälter (6) führenden Feststoffablauf (12) aufweist.



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Codes zur Identifizierung von PCT-Vertragsstaaten auf den Kopfbögen der Schriften, die internationale Anmeldungen gemäss dem PCT veröffentlichen.

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Zahnärztlicher Abscheider

Die Erfindung betrifft einen zahnärztlichen Abscheider mit einem abnehmbaren Sammelbehälter zum gemeinsamen Sammeln von Feststoffen, die aus einem ersten Feststoff-Flüssigkeitsgemisch, das aus einer unter Unterdruck stehenden Saugluftabscheideeinrichtung ausgetragen wird, und aus einem zweiten Feststoff-Flüssigkeitsgemisch abgetrennt werden, das aus einer Speischale durch Schwerkraft abfließt, mit einer Vollmantelzentrifuge, die einen Einlaß für das aus dem Unterdruck auszutragende erste Feststoff-Flüssigkeitsgemisch, einen Auslaß für die abgetrennte Flüssigkeit, und einen Feststoffablauf aufweist, durch den nach jeder Zentrifugierphase unter Schwerkrafteinwirkung Feststoffe mit einem Restflüssigkeitsanteil in den Sammelbehälter abfließen, mit einem Einlaß für das Speischalengemisch und mit einer Einrichtung zur Überführung der sich im Sammelbehälter oberhalb der Feststoffe sammelnden Flüssigkeit zum Einlaß der Zentrifuge.

Ein derartiger Abscheider ist beispielsweise in der EP-A 432 142 beschrieben. Dort sind auf einer gemeinsamen Antriebswelle eine Pumpe und ein Zentrifugenbehälter vorgesehen, wobei das erste Feststoff-Flüssigkeitsgemisch gegen den Saugluftunterdruck in eine zwischen der Pumpe und dem Zentrifugenbehälter ausgebildete Gemischeinlaßkammer eingebracht wird. In die unter Normaldruck stehende Gemischeinlaßkammer mündet auch der Ablauf der Speischale, sodaß also die beiden Gemische vereinigt und durch die Zentrifuge in Flüssigkeit und Feststoffe getrennt werden. Vom Sammelbehälter unter der Zentrifuge wird überstehende Restflüssigkeit, die einen Feststoffanteil enthält, wieder zur Zentrifuge zurückgeführt. Da der Speischalenablauf frei in die Zentrifugenkammer öffnet, werden die Geräusche der

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laufenden Zentrifuge über das in den Raum offene Ablaufrohr durch die Speischale nach außen übertragen. Da die Zentrifuge durch das offene Ablaufrohr Luft ansaugt, werden die gurgelnden Geräusche noch verstärkt und wirken sich störend und belästigend am Arbeitsplatz aus.

Die Erfindung hat es sich nun zur Aufgabe gestellt, bei einem Abscheider der eingangs genannten Art die Geräuschentwicklung zu verringern, und löst dies dadurch, daß der Einlaß für das Speischalengemisch dem Sammelbehälter zugeordnet ist.

Die Zentrifuge ist somit hinsichtlich des ersten Gemisches vor und hinsichtlich des zweiten Gemisches nach dem Sammelbehälter angeordnet, da aus dem ersten Gemisch alle Feststoffe die Zentrifuge passieren und dann in den Sammelbehälter gelangen, während aus dem zweiten Gemisch nur der nicht sedimentierte Teil der Feststoffe in die Zentrifuge befördert wird. Die Geräuschentwicklung ist wesentlich geringer, da über den offenen Speischalenablauf keine Luft angesaugt wird.

In einer ersten Ausführung ist vorgesehen, daß der Abscheider einen mit Durchtrittsöffnungen versehenen Montagegrundkörper aufweist, auf dem das Zentrifugengehäuse angeordnet ist, und an dem der Sammelbehälter nach unten abnehmbar gehalten ist, wobei der Einlaß für das Speischalengemisch im Montagegrundkörper angeordnet ist.

Diese Ausführung erleichtert nicht nur die Montage des Abscheiders insbesondere bei der Nachrüstung bereits bestehender Arbeitsplätze, da die Montagegrundkörper entsprechend den jeweils örtlichen Gegebenheiten ausgebildet sein können, sondern erlaubt es auch, die Dimen-

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sionen, vor allem Länge und Breite des Absetzbehälters unabhängig von den Maßen des Zentrifugengehäuses zu wählen, an die der Absetzbehälter bei direktem Anbau an die Zentrifuge gebunden ist.

Für eine räumlich sehr kompakte Ausführung kann vorgesehen sein, daß sich das Zentrifugengehäuse zum Montagegrundkörper hin verjüngt und der Einlaß für das Speischalengemisch in dem von der Verjüngung des Zentrifugengehäuses ausgesparten Bereich des Montagegrundkörpers vorgesehen ist. Als Einlaß ist bevorzugt ein um eine zum Montagegrundkörper senkrechte Achse schwenkbares Winkelstück für einen in beliebige Richtung verdrehbaren Anschluß im ausgesparten Bereich angeordnet. Eine Pumpe der Überführungseinrichtung für die Restflüssigkeit ist vorzugsweise koaxial unterhalb der Zentrifuge vorgesehen und kann einen eigenen Antriebsmotor aufweisen. Pumpe und Zentrifuge können aber auch von einem gemeinsamen, dazwischenliegenden Antriebsmotor betrieben werden, da bei laufender Pumpe auch die Zentrifuge arbeiten muß.

Nachstehend wird nun die Erfindung an Hand der Figuren der beiliegenden Zeichnungen näher beschrieben, ohne darauf beschränkt zu sein.

Die Fig. 1 zeigt schematisch eine Abscheideeinrichtung zur Trennung von Saugluft, Feststoffen und Flüssigkeit, und die Fig. 2 einen Vertikalschnitt durch einen erfindungsgemäßen Abscheider.

Eine Abscheideeinrichtung besteht aus einer Luftabscheidevorrichtung 52 mit einer Zuflußleitung 53, für ein aus dem Mund eines Patienten abgesaugten ersten Feststoff-Flüssigkeitsgemisch und einer wegführenden Reinluftleitung 54, sowie einem Abscheider 1 zur Tren-

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nung der Feststoffe von der Flüssigkeit. Der Abscheider 1 liegt außerhalb des Unterdrucksystems, d.h. zwischen der Luftabscheidevorrichtung 52 und einem Gemischeinlaß 61 für das erste Feststoff-Flüssigkeitsgemisch ist eine Pumpe 51 und an deren Rückseite ein Rückschlagventil 50 vorgesehen. Der Abscheider 1 setzt sich aus einer Vollmantelzentrifuge 5 und einem unter der Zentrifuge 5 angeordneten Sammelbehälter 6 zur Sedimentation von Feststoffen zusammen. Beide sind an einem Montagegrundkörper 4 angeordnet, der an einem zahnärztlichen Stuhl od.dgl. befestigbar ist, wobei der Sammelbehälter 6, wie aus Fig. 2 näher ersichtlich ist, vom Montagegrundkörper 4 nach unten abnehmbar gehalten ist. Am Sammelbehälter 6 ist ein Einlaß 2 für ein von einer Speischale kommendes, zweites Feststoff-Flüssigkeitsgemisch vorgesehen. Der Einlaß 2 ist daher von der Zentrifuge 5 räumlich getrennt, sodaß die Übertragung von Zentrifugengeräuschen über die Speischalenleitung 60 verringert ist.

Der Montagegrundkörper 4 ist mit Befestigungsbohrungen versehen, die insbesondere an einem eigenen Adapterteil 27 vorgesehen sind. Je nach den gegebenen Einbauverhältnissen sind dann entsprechende Adapterteile 27 vorhanden, mit denen der Montagegrundkörper 4 versehen werden kann. Weitere Durchtrittsöffnungen im Montagegrundkörper 4 sind: eine Öffnung zur Aufnahme des Motors 7 der Zentrifuge 5 und einer Pumpe 9, eine Öffnung zum Einsetzen des Feststoffablaufes 12 der Zentrifuge 5, eine Öffnung zur Durchführung einer nur schematisch gezeigten Verbindungsleitung 19 zwischen der Pumpe 9 und der Zentrifuge 5, Öffnungen für Befestigungsschrauben zur gemeinsamen Fixierung des Zentrifugengehäuses 8 und des Pumpengehäuses 13, sowie der Einlaß 2 für das von der Speischale kommende zweite Feststoff-Flüssigkeitsgemisch 60.

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Das auf dem Montagegrundkörper 4 fixierte Zentrifugengehäuse 8 ist im unteren Teil verjüngt, wobei der Motor 7 zentral angeordnet ist, und enthält darüber zwei ineinander angeordnete Zentrifugenbehälter 28 der Vollmantelzentrifuge 5. In den inneren Zentrifugenbehälter 28 mündet der Einlaß 10 für das von der Pumpe 9 über die Verbindungsleitung 19 aus dem Sammelbehälter 6 hochgeförderte Gemisch und der äußere Zentrifugenbehälter 28 weist eine Übertrittsöffnung 11 auf, über die gereinigte Flüssigkeit in den Flüssigkeitsauslaß 3 gelangt. Feststoffe fließen mit Restflüssigkeit bei Stillstand der Zentrifuge 5 aufgrund der Schwerkraft nach unten und gelangen über den exzentrisch angeordneten Feststoffablauf 12 in den Sammelbehälter 6. In den Einlaß 2 für das Speischalengemisch 60 ist drehbar ein nicht gezeigtes Winkelanschlußstück eingesetzt. Sowohl der Einlaß 2 als auch der Anschluß 16 für die Verbindungsleitung 19 liegen in der durch die Verjüngung des Zentrifugengehäuses 8 bedingten Aussparung 20, also innerhalb des von der Zentrifuge 5 benötigten Raumes, sodaß eine äußerst kompakte, platzsparende Ausführung gegeben ist.

Ein nach unten offene Nut 29 des Montagegrundkörpers 4 dient dem Einschub des Sammelbehälters 6. Dieser ist mittels eines bügelförmigen Verriegelungselementes 70 fixiert, das um eine Achse 75 an der Außenwand der Nut 29 schwenkbar gelagert ist. Das Verriegelungselement 70 weist zwei seitlich außerhalb des Sammelbehälters 6 sich erstreckende Schwenkarme 71 und einen diese verbindenden Quersteg 72 auf. Jedem Schwenkarm 71 ist ein dazu parallel verlaufender Steg 77 zugeordnet, der in der Schließstellung in eine Tasche 68 des Sammelbehälters 6 eingreift. Der Sammelbehälter 6 ist aus lichtdurchlässigem Kunststoff gefertigt und weist an seiner

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zum Quersteg 72 weisenden Wandung eine vorstehende Längsrippe 66 auf. Der Quersteg 72 ist mit parallel zu den Seitenwänden der Längsrippe 66 abstehenden Laschen 73 versehen, an denen eine Sensoreinrichtung 74 ausgebildet ist. Diese umfaßt zumindest eine, im gezeigten Ausführungsbeispiel zwei Lichtschranken, wobei jeder Lichtstrahl die Längsrippe 66 durchdringt und der Messung der Sedimentationshöhe der Feststoffe dient. Die untere Lichtschranke reagiert bei 95 % der maximalen Füllhöhe durch ein Warnsignal, während bei Ansprechen der zweiten, die maximale Füllhöhe anzeigenden oberen Lichtschranke der Abscheider, vorzugsweise die gesamte Absauganlage, außer Betrieb gesetzt wird. Für den Wechsel des Sammelbehälters 6 wird das Verriegelungselement 70 hochgeschwenkt, sodaß die Stege 77 den Sammelbehälter 6 freigeben, der dann nach unten abgenommen werden kann. Die Sensoreinrichtung 74 könnte noch weitere Sensorelemente umfassen, die beispielsweise jene beiden Niveaus der sich über den Feststoffen sammelnden Flüssigkeit erfassen, an denen der Motor 7 ein- und ausgeschaltet wird.

Das Pumpengehäuse 13 ist an der Unterseite des Montagegrundkörpers 4 befestigt, und am hochstehenden Anschluß 16 kann nach der Befestigung von Pumpe 9 und Zentrifuge 5 die Verbindungsleitung 19 montiert werden. Vom Pumpengehäuse 13 nach unten ragt ein zentrales Ansaugrohr 14, das im obersten Teil sich konisch verjüngt, im Mittelteil zylindrisch ausgebildet ist, und im untersten Teil umfangsseitige Durchbrechungen aufweist. Ein Schutzsieb 15 ist zumindest an der Seite des Einlasses 2 des Speischalengemischs los am Ansaugrohr 14 fixiert. Die Pumpe 9 weist ein Flügelrad 17 auf, das eine Nabe 41, von dieser radial abstehende Flügel 42 und einen nach unten in den konischen Teil des Ansaugrohres 14 ragenden Hohlkegelstumpf 18 umfaßt.

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Patentansprüche:

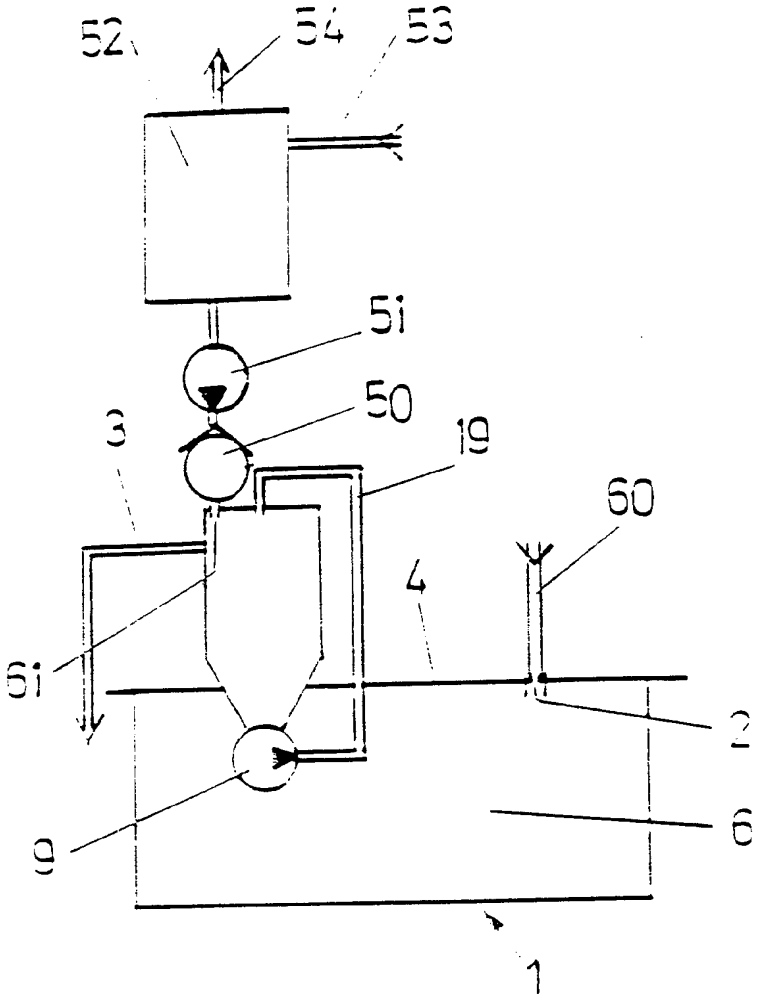
1. Zahnärztlicher Abscheider mit einem abnehmbaren Sammelbehälter (6) zum gemeinsamen Sammeln von Feststoffen, die aus einem ersten Feststoff-Flüssigkeitsgemisch, das aus einer unter Unterdruck stehenden Saugluftabscheideeinrichtung (52) ausgetragen wird, und aus einem zweiten Feststoff-Flüssigkeitsgemisch abgetrennt werden, das aus einer Speischale durch Schwerkraft abfließt, mit einer Vollmantelzentrifuge (5), die einen Einlaß (61) für das aus dem Unterdruck auszutragende erste Feststoff-Flüssigkeitsgemisch, einen Auslaß (3) für die abgetrennte Flüssigkeit, und einen Feststoffablauf (12) aufweist, durch den nach jeder Zentrifugierphase unter Schwerkrafteinwirkung Feststoffe mit einem Restflüssigkeitsanteil in den Sammelbehälter (6) abfließen, mit einem Einlaß (2) für das Speischalengemisch und mit einer Einrichtung (9,16,19) zur Überführung der sich im Sammelbehälter (6) oberhalb der Feststoffe sammelnden Flüssigkeit zum Einlaß (61) der Zentrifuge (5), dadurch gekennzeichnet, daß der Einlaß (2) für das Speischalengemisch dem Sammelbehälter (6) zugeordnet ist.

2. Abscheider nach Anspruch 1, dadurch gekennzeichnet, daß er einen mit Durchtrittsöffnungen versehenen Montagegrundkörper (4) aufweist, auf dem das Zentrifugengehäuse (8) angeordnet ist, und an dem der Sammelbehälter (6) nach unten abnehmbar gehalten ist, wobei der Einlaß (2) für das Speischalengemisch im Montagegrundkörper (4) angeordnet ist.

3. Abscheider nach Anspruch 2, dadurch gekennzeichnet, daß der Einlaß (2) für das Speischalengemisch an einem um eine zum Montagegrundkörper (4) senkrechte Achse schwenkbaren Winkelstück ausgebildet ist.

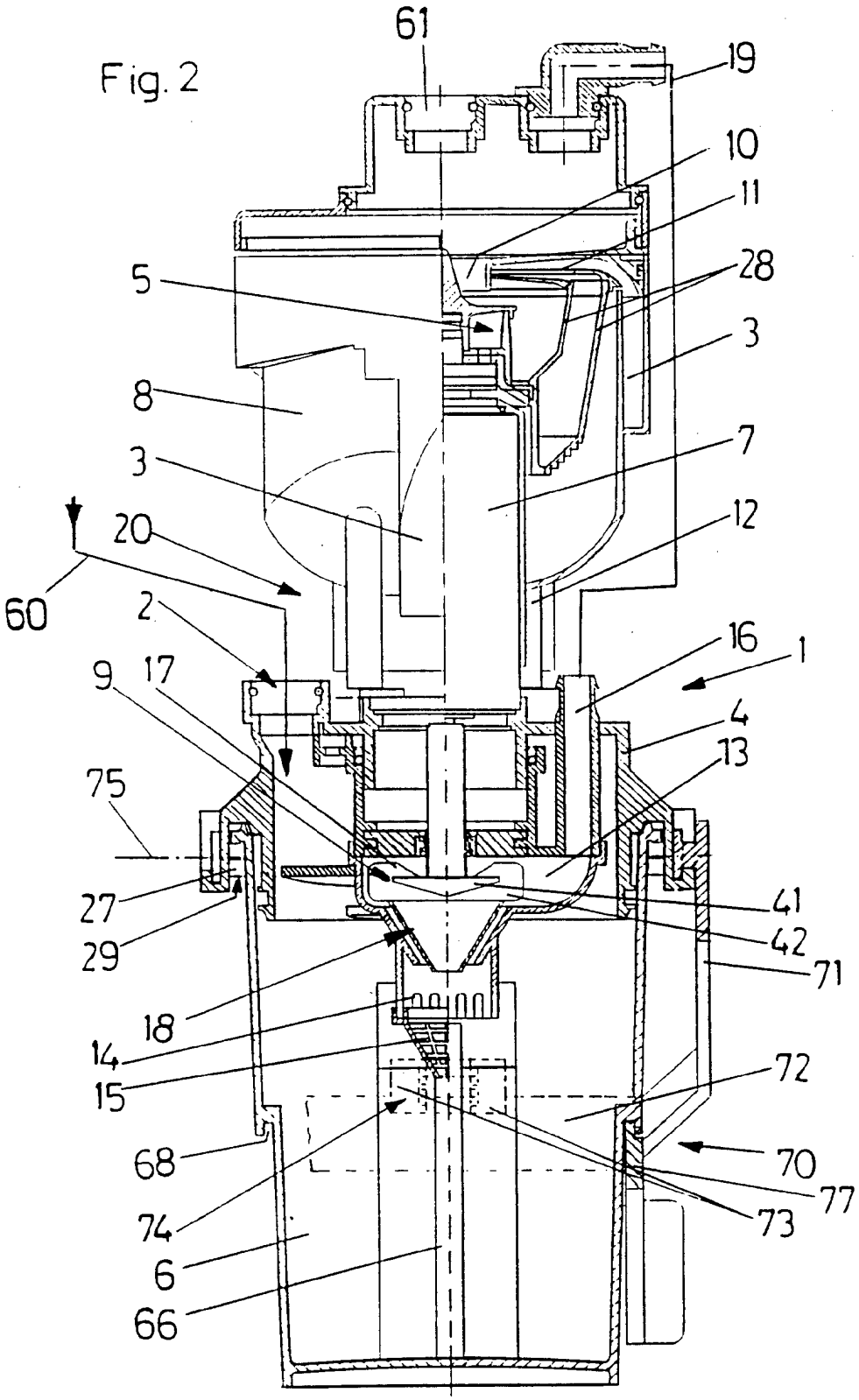
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Fig. 1



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Fig. 2



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INTERNATIONAL SEARCH REPORT

Internat Application No
PCT/AT 93/00199

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 A61C17/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 5 A61C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP,A,0 432 142 (TRAWÖGER) 12 June 1991 cited in the application see abstract; figure 1	1-3
Y	WO,A,92 18062 (TRAWÖGER) 29 October 1992 see the whole document	1-3
A	EP,A,0 400 431 (DÜRR DENTAL) 5 December 1990 see claim 1; figures 1,2,4	1
A	EP,A,0 300 439 (DÜRR DENTAL) 25 January 1989 see abstract; figures 1,2	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 April 1994	22.04.94
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Authorized officer Kousouretas, I

Form PCT/ISA/210 (second sheet) (July 1992)

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DRNA v. Solmetex - PGR2023-00555

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat Application No
PCT/AT 93/00199

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		CA-A- 1293455	24-12-91
		DE-A- 3584636	12-12-91
		DE-U- 8536837	10-12-87
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		DE-D- 3885524	16-12-93

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INTERNATIONALER RECHERCHENBERICHT

Intern ales Aktenzeichen
PCT/AT 93/00199

A. KLASSIFIZIERUNG DES ANMELDUNGSGEGENSTANDES
IPK 5 A61C17/06

Nach der Internationalen Patentklassifikation (IPK) oder nach der nationalen Klassifikation und der IPK

B. RECHERCHIERTE GEBIETE

Recherchierter Mindestprüfstoff (Klassifikationssystem und Klassifikationssymbole)
IPK 5 A61C

Recherchierte aber nicht zum Mindestprüfstoff gehörende Veröffentlichungen, soweit diese unter die recherchierten Gebiete fallen

Während der internationalen Recherche konsultierte elektronische Datenbank (Name der Datenbank und evtl. verwendete Suchbegriffe)

C. ALS WESENTLICH ANGESEHENE UNTERLAGEN

Kategorie*	Bezeichnung der Veröffentlichung, soweit erforderlich unter Angabe der in Betracht kommenden Teile	Betr. Anspruch Nr.
Y	EP,A,0 432 142 (TRAWÖGER) 12. Juni 1991 in der Anmeldung erwähnt siehe Zusammenfassung; Abbildung 1	1-3
Y	WO,A,92 18062 (TRAWÖGER) 29. Oktober 1992 siehe das ganze Dokument	1-3
A	EP,A,0 400 431 (DÜRR DENTAL) 5. Dezember 1990 siehe Anspruch 1; Abbildungen 1,2,4	1
A	EP,A,0 300 439 (DÜRR DENTAL) 25. Januar 1989 siehe Zusammenfassung; Abbildungen 1,2	1

☐ Weitere Veröffentlichungen sind der Fortsetzung von Feld C zu entnehmen

☒ Siehe Anhang Patentfamilie

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Datum des Abschlusses der internationalen Recherche	Absendedatum des internationalen Recherchenberichts
14. April 1994	22.04.94

Name und Postanschrift der Internationale Recherchenbehörde	Bevollmächtigter Bediensteter
Europäisches Patentamt, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Kousouretas, I

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INTERNATIONALER RECHERCHENBERICHT

Angaben zu Veröffentlichungen, die zur selben Patentfamilie gehören

Internat ...s Aktenzeichen
PCT/AT 93/00199

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie		Datum der Veröffentlichung
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		AU-A-	5311886	22-07-86
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		DE-A-	3584636	12-12-91
		DE-U-	8536837	10-12-87
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		EP-A-	0441410	14-08-91
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		EP-A-	0579705	26-01-94
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		DE-D-	59002975	11-11-93
		ES-T-	2045639	16-01-94
EP-A-0300439	25-01-89	DE-A-	3724247	02-02-89
		DE-D-	3885524	16-12-93

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(72) Inventor; and
(71) Applicant: **GHAZARYAN, Artyom** [AM/AM]; St. Movses Khorenatsi Bld. 26, apt. 50, 3126, Gyumri (AM).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*

(54) **Title:** FILTER FOR SUCTION SYSTEM OF DENTAL UNIT

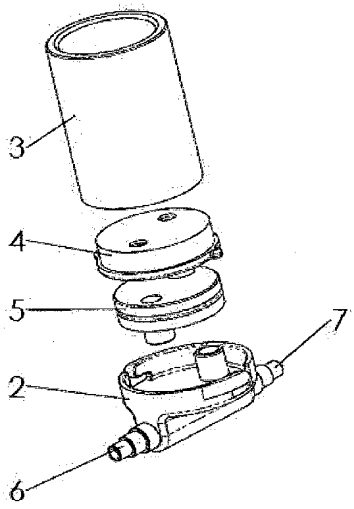


Fig.2

(57) Abstract: The invention relates to the sphere of medical devices, in particular to dental units and can be used in their suction systems. Filter for suction system of dental unit has a connecting module which has inlet and outlet hoses of content moved from suction system, single use filter consisting of the container receiving the content from suction system, rigidly attached covering in it and lock-fixer with a possibility of rotation installed in the covering. On the inner surface of module there is made a pipy projection concatenated with the output of module and a hole concatenated with the input of module, which are provided for attaching the filter to the module. Fixed notches are made on the side face of module. On the inner surface of covering are made inlet and with preventing mesh outlet holes and fixing projections on the outer surface of covering with a possibility of fixation in the fixing notches on side face of connecting module. The lock-fixer of covering has inlet and outlet pipy projections. The safety of filter system servicing is ensured, service time is reduced.

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Filter for suction system of dental unit

Technical field

The invention relates to the sphere of medical devices, in particular to dental units and can be used in their suction systems.

Background art

There are various filters (1-4) which are located in hydro blocks of dental devices or are built in separate suction systems. Those filters have inlet and outlet hoses, a covering to which mesh filter is attached. On that mesh with the help of inlet hose a content solid substance (pieces of tooth, filling, amalgam, blood clot and etc.) moved from suction system is collected which is arising during dental treatment.
The main deficiency of those filters is that at the end of each working day it is necessary to open the covering, remove the mesh filter, empty it, then wash, disinfect and place back. It's unpleasant, dirty, dangerous and time-consuming procedure.
By technicity the filter (5) of dental device suction system is much closer to the invention, which has a connecting module to which is attached the container receiving contents from suction system arising during dental treatment. A filter which has a preventing mesh is placed in the receiving container. The outlet hose is attached to the connecting module, from suction system moved content inlet hose is attached at the bottom of container.
During dental treatment the content of suction system is moved to the receiving container. The solid substance with the help of mesh filter remains in the container.
The deficiency of this filter is also that at the end of each working day it is necessary to disconnect the receiving container with filter from connecting module, empty, then wash, disinfect and again bring to working state.

Disclosure of invention

Object of the invention is to ensure the safety of dental device solid substance filter service and shorten its service time.
Essence of an invention is that in the filter of dental device suction system, which has a connecting module with its outlet hose, inlet hose, mesh filter and receiving container, according to the invention the inlet hose is attached to the input of connecting module, on the inner surface of connecting module there is made a pipy projection concatenated with the output of module and a hole concatenated with the input of module, on the side face of module there are made fixed notches and the filter additionally has a covering rigidly attached to the receiving container and installed in the covering lock-fixer with a possibility of rotation with its inlet and outlet pipy projections, on the outer surface of covering there are made

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projections with a possibility of fixation in the notches of module and on the inner surface of covering are made inlet and outlet holes moreover the mesh filter is placed on the hole of outlet covering.

Description od drawings

Essence of an invention is shown on the graphics depicted on the pictures from 1 to 6 where
on the picture 1 the general view of dental device suction system filter in operation is shown
on the picture 2 – structural diagram of filter
on the picture 3 – connecting module diagram of filter
on the picture 4 – covering diagram of filter
on the picture 5 – lock-fixer diagram installed in the covering with a possibility of rotation
on the picture 6 – view of the container receiving the contents moved from the suction system of filter

Best mode for carrying out the invention

The filter of dental device suction system has a connecting module (1) and a filter which consists of the container (2) receiving the content from suction system, covering (4) and installed in it lock-fixer (5) with a possibility of rotation.
The connecting module (2) is fixed at the hose of dental device hydro block suction system. The connecting module (2) has inlet (6) and outlet (7) hoses of content moved from suction system which may have variable outer diameter 6mm, 8mm, 10mm and it gives them an opportunity to connect both to large and small hoses of suction systems. The inlet (6) hose is attached to the input of connecting module (2), outlet (7) hose to the output.
On the inner surface of connecting module (2) is made a hole (8) concatenated with the input of module and a pipy projection (9) concatenated with the output of module, which are provided for attaching the filter to the module (2).
There are made fixed notches (10) on the side face of connecting module (2) through which the filter is fixed to the module.
The lock-fixer (5) with a possibility of rotation installed in the filter covering (4) has inlet (11) and outlet (12) pipy projections.
Inlet (13) and outlet (14) holes are made on the inner surface of filter covering (4), moreover a preventing mesh (15) is placed on the outlet hole with the help of which the solid substance remains in the container (3).
On the outer surface of covering (4) fixing projections (16) are made with a possibility of fixation in the fixing notches (10) on side face of connecting module (2).

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Filter covering (4) is rigidly attached with glue to the container (3) receiving content from suction system.
The connecting module (2) is designed for multiple use. It is made of polystyrene.
The filter is designed for single use. All parts of filter are made of polypropylene.
The suggested filter operates as follows:
When filter is attached to the connecting module (2), the lock-fixer rotates, the inlet (13) and outlet (14) holes of content moved from suction system of covering are opened and the filter is brought to operating position.
At the end of working day it is necessary to disconnect the filter from connecting module (2), during removal the lock-fixer is rotating closing the inlet (13) and outlet (14) holes of content moved from suction system of covering, whereby the filter is brought to non-operating state, in such a way non dropping of hard substance collected on preventing mesh which is installed on outlet hole of covering and non dropping of content of receiving container is ensured.
It is necessary to throw away the used filter, and new filter is attached to the connecting module (2).
The replacement of used filter with new one takes from 10 up to 20 minutes, thus the servicing of the filter becomes short and most importantly safe as the medical staff does not communicate with the content of filter.

Sources of information

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Applicant A. Ghazaryan

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Claims

Filter for suction system of dental unit, which has connecting module with its outlet hose, inlet hose, mesh filter and receiving container is characterized in that the inlet hose is attached to the input of connecting module, on the inner surface of connecting module there is made a pipy projection concatenated with the output of module and a hole concatenated with the input of module, on the side face of module there are made fixed notches and the filter additionally has a covering rigidly attached to the receiving container and installed in the covering a lock-fixer with a possibility of rotation with its inlet and outlet pipy projections, on the outer surface of covering there are made projections with a possibility of fixation in the notches of module and on the inner surface of covering are made inlet and outlet holes moreover the mesh filter is placed on the hole of outlet covering.

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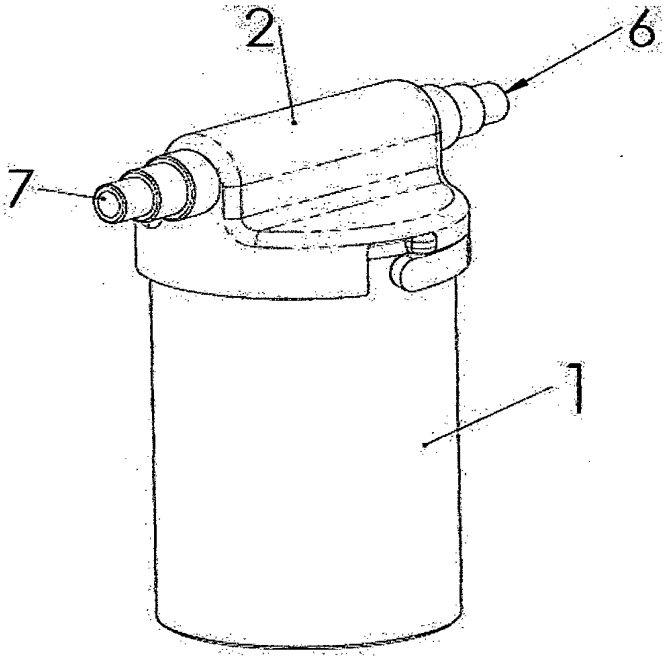


Fig.1

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DRNA v. Solmetex - PGR2023-00555

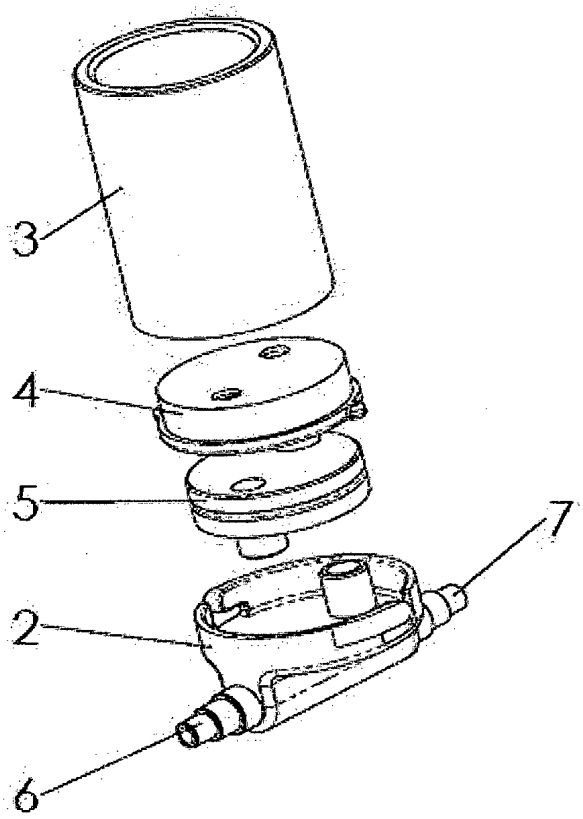


Fig.2

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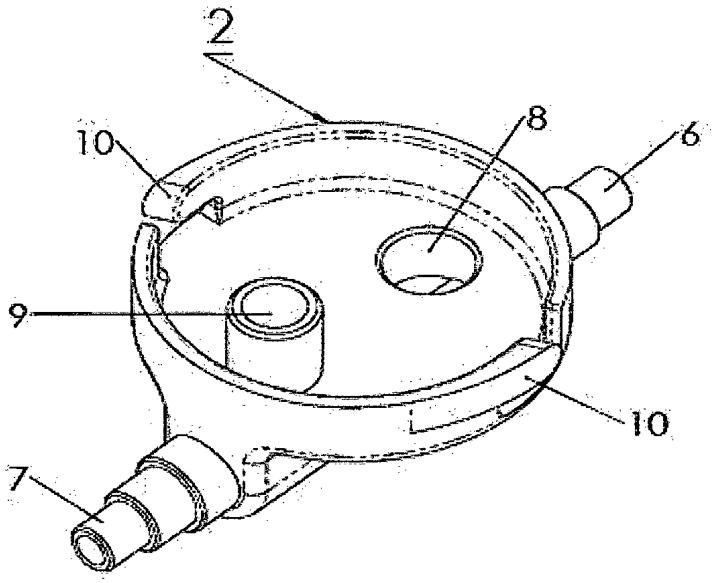


Fig.3

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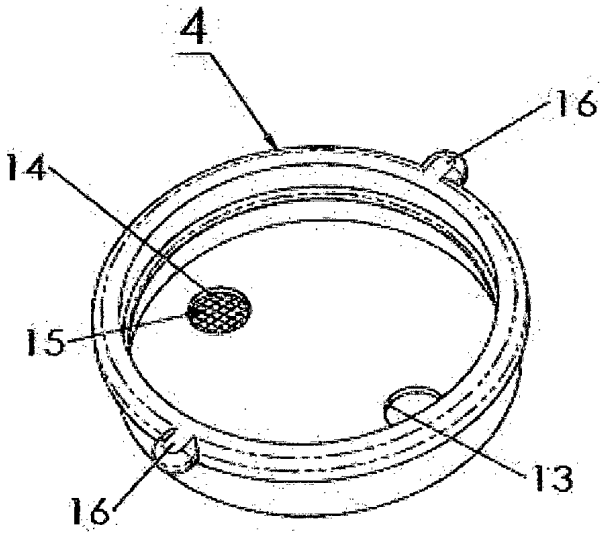


Fig.4

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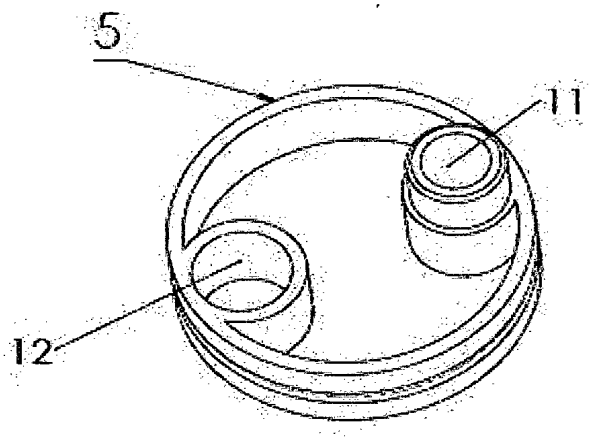


Fig.5

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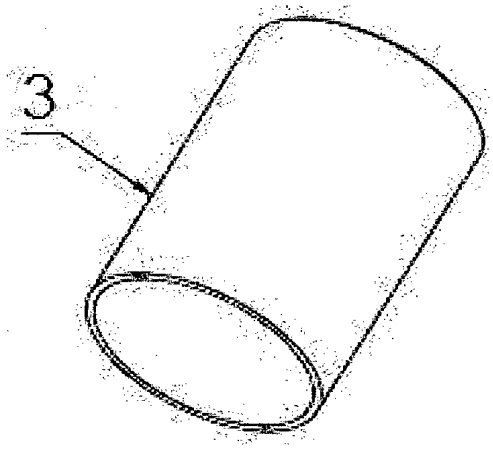


Fig.6

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INTERNATIONAL SEARCH REPORT

International application No
PCT/AM2017/000003

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61C17/06
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61C B01D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data, COMPENDEX, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 700 412 A (MANUEL JOHN L [US]) 20 October 1987 (1987-10-20) column 2, line 8 - column 3, line 41 figures 1-4	1
A	US 5 336 406 A (STANFORD RALPH F [US] ET AL) 9 August 1994 (1994-08-09) column 2, line 45 - column 6, line 44 figures 1-8	1
A	US 3 777 403 A (RITCHIE J) 11 December 1973 (1973-12-11) column 1, line 53 - column 2, line 57 figure 1	1

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 August 2017	21/08/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Pisseloup, Arnaud

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Form PCT/ISA/210 (second sheet) (April 2005)

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INTERNATIONAL SEARCH REPORT

International application No
PCT/AM2017/000003

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 83/02720 A1 (HORN LASSEN HANS; BUCHHORN AKSEL JOHAN) 18 August 1983 (1983-08-18) page 5, line 5 - page 8, line 14 figures 1,2	1
A	KR 101 300 050 B1 (CHOI WOO HYUN [KR]) 29 August 2013 (2013-08-29) paragraphs [0014] - [0030] figures 1-5	1

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Form PCT/ISA/210 (continuation of second sheet) (April 2005)

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/AM2017/000003

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☒ Claims Nos.: 1(partially)
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
see FURTHER INFORMATION sheet PCT/ISA/210

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (April 2005)

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.2

Claims Nos.: 1(partially)

The claim is not clear as to which features belong to the subject-matter of the invention, and in particular the wording "which has connecting module with its outlet hose, inlet hose, mesh filter and receiving container" is such that it is not clear whether the features listed after the conjunction are features that come in addition of the connecting module or they are comprised in the connecting module.

The feature "lock-fixer" has no well recognized meaning, such that the claim is not clear.

Furthermore, from the wording "a lock-fixer with a possibility of rotation with its inlet and outlet pipy projections", it is also unclear which technical features are required for the lock-fixer to rotate, such that it would not be obvious for the skilled person to make the lock-fixer and consequently the claimed invention (Art. 5 PCT).

In addition, the partial absence of articles in front of some technical features, like for instance in the wording "the input of connecting module" or "placed on the hole of outlet covering", is such that it is not clear if they refer to a previously define feature or to an additional new feature.

For all the above mentioned reasons, the subject-matter of claim 1 is not in compliance with the clarity requirement of Article 6 PCT. The non-compliance with the substantive provisions is to such an extent, that the search was performed taking into consideration the non-compliance in determining the extent of the search (PCT Guidelines, 9.19 and 9.24).

The extent of the search was consequently carried out on the basis of the description and figures, such that the filter (assembly) of the claimed subject-matter is resumed only to the following list of technical features:

a filter (assembly) of a dental device suction system comprising:

(i) a fixed connection module having an inlet and outlet ports, a side, an upper and an inner surfaces, and

(ii) a container,

(iii) a filter covering having an inner and outer surfaces, and

(iv) a lock-fixer having an inlet and an oulet pipy projections (note that on figure 5, the outlet 12 consist of a hole and has no pipy projection),

wherein the inner surface of the connection module comprises a hole concatenated with the input port and a pipy projection concatenated with the output port,

wherein the side surface of the connection module comprises fixed notches,

wherein the inner surface of the filter covering comprises an inlet and outlet holes,

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

wherein a preventing mesh is present on the outlet hole,
wherein the
outer surface of the filter covering comprises fixing projections for being inserted in the notches of the connection module.

The applicant's attention is drawn to the fact that claims relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure. If the application proceeds into the regional phase before the EPO, the applicant is reminded that a search may be carried out during examination before the EPO (see EPO Guidelines C-IV, 7.2), should the problems which led to the Article 17(2) declaration be overcome.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/AM2017/000003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4700412 A	20-10-1987	NONE	
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		US 5456830 A	10-10-1995
		US 5486288 A	23-01-1996
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		CH 664702 A5	31-03-1988
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		DK 50582 A	06-08-1983
		EP 0100327 A1	15-02-1984
		FI 832974 A	19-08-1983
		GB 2124923 A	29-02-1984
		NL 8320015 A	01-11-1983
		WO 8302720 A1	18-08-1983
KR 101300050 B1	29-08-2013	NONE	

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(19) Canadian Intellectual Property Office
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(11) CA 2 442 513 (13) A1

(40) 23.03.2005
(43) 23.03.2005

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(21) 2 442 513

(51) Int. Cl.7: A61C 19/00

(22) 23.09.2003

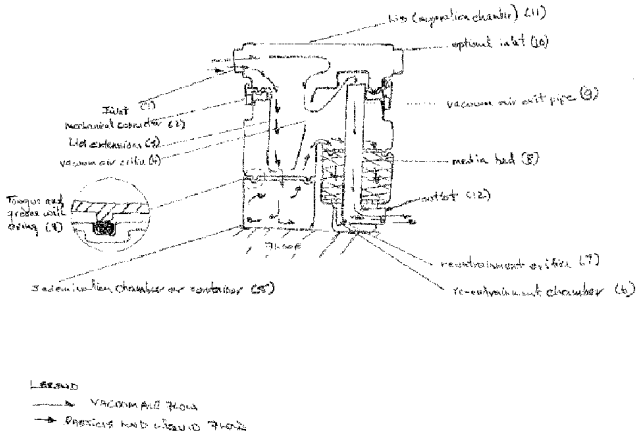
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(54) SEPARATEUR D'AMALGAME
(54) AMALGAM SEPARATOR

(57)

An amalgam separation and collection apparatus for the collecting and separation of amalgam in a dental vacuum waste stream. The apparatus has four primary chambers. The separation chamber is the connection point for the incoming waste flow and once the waste flow has entered the apparatus, the separation chamber allows the division of waste stream into vacuum air and water particle amalgam. The vacuum air is permitted to flow through the unit via vacuum exhaust tube and is unobstructed. The water/amalgam mixture is deposited from the separation chamber into the sedimentation chamber. Separation by sedimentation occurs in this chamber causing the larger amalgam particles to settle to the container base while the cleaner water raises and water falls under gravity into the filtration chamber. The wastewater with trace amalgam passes through a heavy metal removal bed in the filtration chamber. The purified amalgam free water collects in water re-entrainment chamber located of the base of the filtration chamber. The collected water is introduced to the vacuum air via an orifice in the vacuum exhaust tubing. A tube is connected to dental office vacuum pump permitting function. The amalgam waste is retained in two removable chambers namely the sedimentation and filtration chambers.



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An agency of Industry Canada

CA 2442513 A1 2005/03/23

(21) 2 442 513

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(22) Date de dépôt/Filing Date: 2003/09/23

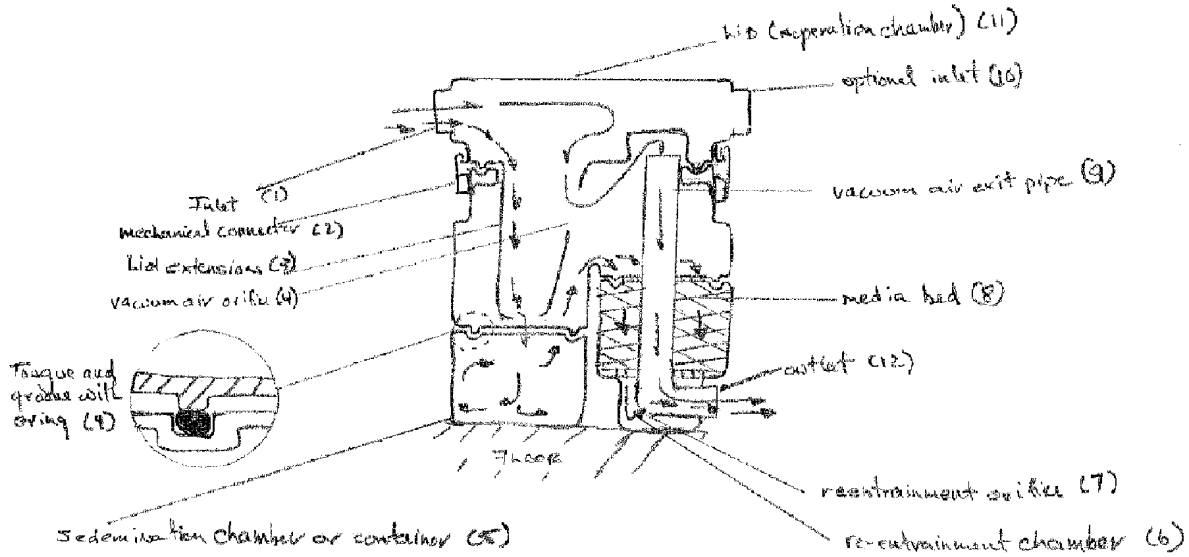
(41) Mise à la disp. pub./Open to Public Insp.: 2005/03/23

(51) Cl.Int.^{7}/Int.Cl.^{7} A61C 19/00

(71) Demandeur/Applicant:
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(72) Inventeur/Inventor:
BARRETT, RICHARD, CA

(54) Titre : SEPARATEUR D'AMALGAME
(54) Title: AMALGAM SEPARATOR



LEGEND
VACUUM AIR FLOW
PARTICLE AND LIQUID FLOW

(57) Abrégé/Abstract:
An amalgam separation and collection apparatus for the collecting and separation of amalgam in a dental vacuum waste stream. The apparatus has four primary chambers. The separation chamber is the connection point for the incoming waste flow and once

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(57) Abrégé(suite)/Abstract(continued):
the waste flow has entered the apparatus, the separation chamber allows the division of waste stream into vacuum air and water particle amalgam. The vacuum air is permitted to flow through the unit via vacuum exhaust tube and is unobstructed. The water/amalgam mixture is deposited from the separation chamber into the sedimentation chamber. Separation by sedimentation occurs in this chamber causing the larger amalgam particles to settle to the container base while the cleaner water raises and water falls under gravity into the filtration chamber. The wastewater with trace amalgam passes through a heavy metal removal bed in the filtration chamber. The purified amalgam free water collects in water re-entrainment chamber located of the base of the filtration chamber. The collected water is introduced to the vacuum air via an orifice in the vacuum exhaust tubing. A tube is connected to dental office vacuum pump permitting function. The amalgam waste is retained in two removable chambers namely the sedimentation and filtration chambers.

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Abstract

An amalgam separation and collection apparatus for the collecting and separation of amalgam in a dental vacuum waste stream. The apparatus has four primary chambers. The separation chamber is the connection point for the incoming waste flow and once the waste flow has entered the apparatus, the separation chamber allows the division of waste stream into vacuum air and water particle amalgam. The vacuum air is permitted to flow through the unit via vacuum exhaust tube and is unobstructed. The water/amalgam mixture is deposited from the separation chamber into the sedimentation chamber. Separation by sedimentation occurs in this chamber causing the larger amalgam particles to settle to the container base while the cleaner water raises and water falls under gravity into the filtration chamber. The wastewater with trace amalgam passes through a heavy metal removal bed in the filtration chamber. The purified amalgam free water collects in water re-entrainment chamber located of the base of the filtration chamber. The collected water is introduced to the vacuum air via an orifice in the vacuum exhaust tubing. A tube is connected to dental office vacuum pump permitting function. The amalgam waste is retained in two removable chambers namely the sedimentation and filtration chambers.

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Description

Technical Field and Background

The present invention is a dental apparatus which is for the collecting of solid material from a vacuum line which is commonly used to remove solid and liquid from a patient's oral cavity during a procedure. The mixture of air, solids and liquid located in the vacuum line contains a high percentage of heavy metals primarily mercury, lead and copper. The untreated disposal of heavy metals offers a possible source of environmental pollution.

Various devices have been attempted to separate amalgam solids from liquid waste stream with limited success. This is primarily due to the difficulties in several areas: 1) removal of dissolved heavy metal such as mercury; 2) difficulty in service thus resulting in costly specialized personnel; 3) difficulty in removal of the amalgam or waste from the separator; 4) difficulty in transportation of waste for the purpose of disposal or recycling; 5) high cost due to material choices for the conventional manufacturing of a device which must withstand vacuum forces; 6) usually there is a large vacuum drop due to the device separation.

The present invention fulfills these needs and provides the related advantages.

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Summary of Invention

The current invention collects solids and purifies liquid while permitting the unobstructed flow of vacuum air through the unit. This function ensures the environment is protected from possible pollution while not obstructing the volume or flow to the vacuum air and thus ensuring acceptable vacuum to ensure the dental procedures is not obstructed.

In preferred embodiment of the present invention the apparatus is a container which has several parts. Each part forms a chamber in which one function of liquid and solid purification occurs. All parts connect to a body to form a complete container or apparatus. The apparatus is connected to the patient from a tube be extending form the oral cavity to the inlet of the apparatus. A second tube connects from the outlet of the apparatus to the vacuum pump as found in a dental office.

The inlet part receives the suspended mixture of particles liquid and air. The mixture is separated within the lid which has a sufficient void capacity to act as a separation chamber. The separation permit's the vacuum to separate and flow via an orifice in the lid to an exit tube. The liquid and particles flow down an extension of the lid and into the sedimentation chamber. The sedimentation chamber is a separate container secured to the body of the apparatus mechanically. The sedimentation chamber has an o-ring and tongue and grove to form a liquid seal. The sedimentation chamber is removable. Particles within the mixture settle in the sedimentation chamber. The lean liquid is located at the upper portion of the container due to the force of gravity on the particles. The cleaner liquid over flows and passes through a media bed located in the filtration container. The filtration container is located a the base of the apparatus and is attached to the body mechanically. The filtration chamber is house in a container and contains an media bed designed for the removal of heavy metals suspended in liquid. The media bed is supported in the container by a support mesh located at the top and base of the media bed. The liquid and suspended metal pass through the media bed under gravity and collect in the re-entrainment chamber. The re-entrainment chamber is an area located in the filtration chamber below the media bed. The outlet of the unit connects the purified liquid to the vacuum pump at the location. Vacuum air and purified water are recombined at this point prior to existing the apparatus.

This is accomplished by means of an orifice located in the exit pipe were it passes through the re-entrainment chamber.

These and other aspects of the invention will become evident upon viewing the attached drawing and reviewing the detailed description.

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Description of Drawing

1. Top view of apparatus with vacuum shown in dotted lines.

2. Side view of apparatus with vacuum shown in dotted lines.

3. Cross sectional view showing internal exit pipe and airing attachment.

Detailed Description of Invention

As previously mentioned, the present invention is an apparatus for the collecting and separating of amalgam solids from a mixture of solids, liquids and air present in a dental vacuum stream.

The present invention is represented in Fig. 1, Fig. 2 and Fig. 3.

Fig. 1 - Top View

A top view of the invention in Fig 1 shows the connection of the dental vacuum tube at patient (4) to the apparatus inlet (1). The connection of the outlet in shadow (5) to the typical dental vacuum pump (3). The mixture streat typically enters through an inlet at the top of the apparatus and exists via an outlet of the bottom or base of the apparatus.

Fig. 2 - Side View

A side view of the invention is represented in Fig 2. The lid (9) also functions as the inlet (1) and liquid, particle and air separation chambers. A mechanical connection (2) and o-ring seal (8) is used to connect the lid (9), sedimentation chamber (3) and filtration chamber (6) to the body (9). The seal is liquid and vacuum tight. The sedimentation chamber (3) and the filtration chamber (6) may be disconnected from the body (7) by releasing the mechanical connection (2). Thus enabling cleaning, recycling, replacement or disposal without specialized staff or equipment. The outlet (2) can be clearly seen and referenced in Fig 1.

Fig. 3 - Cross Section

In the preferred embodiment, the dental mixture enters the invention through the inlet(1) or the optional inlet (10). Both inlet are located in the lid which also functions as a separation chamber (11). In this chamber, the liquid and particles are directed towards the sedimentation zone (5) via an extension of the lid (3). The air is permitted to flow out of the apparatus unobstructed by passing through an orifice in the lid extension (4) thus preventing vacuum pressure reduction and continuing through a vacuum air exit pipe (9) and out the outlet (12).

The liquid and particle is collected in sedimentation zone (5). The heavy

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particles collect at the base of the sedimentation zone due to gravity. The liquid with dissolved heavy metals rises and over flows into the media bed (8). The liquid passes through the media bed assisted by gravity and collects in the re-entrainment chamber (6). The purified water is then re-entrained with the vacuum air via on an orifice (7) located in the vacuum air exit pipe (8). The purified water (air mixture exit's the apparatus via outlet (12) and continues to the vacuum pump.

The apparatus including lid, body, sedimentation chamber and filtration chamber is rotationally moulded thus reducing production cost.

From the foregoing, it will be appreciated that although the embodiment of the invention have been described various modification may be made without deviating from the spirit of the invention. According the invention is only limited by the claims.

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I claim

1. An amalgam collection and separation apparatus used to collect and purify the total mixture of liquid and solid particles found in a dental vacuum stream comprising of:

- a container having a lid which incorporates a chamber to allow separation of liquid and air in the waste stream and has interconnection orifice. A sedimentation chamber which allows the settling of heavy particles in the liquid waste stream. A filtration chamber which incorporates a media bed for the removal of fine and dissolved particles in the liquid waste stream. The filtration chamber also incorporates a water re-entrained area at its base for the reintroduction of purified wastewater to the vacuum air stream.

A body which incorporates a vacuum air exit pipe which permit the flow of vacuum air through the unit and re-entrainment of vacuum air and water prior to exiting the apparatus.

2. The apparatus of claim 1 where the container has a lid portion which houses the inlet, a body portion comprising the mid section, a sedimentation container which mounts to the body at the bottom and a filtration container which also mounts to the body at the bottom and has an outlet connection.

3. Apparatus as in Claim 1 where the containers are manufactured by rotational molding.

4. An apparatus in Claim 1 where the lid is removable.

5. Apparatus as in Claim 1 where the apparatus has no moving internal

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parts.

6. An apparatus in Claim 2 where the lid also function to separate liquid and gas streams through functioning as a separation chamber.

7. An apparatus in Claim 2 where the lid has an extended portion used to direct the liquid and particle waste into the unit bottom containers.

8. An apparatus in Claim 1 where the containers mounted to the body at the bottom are removable.

9 An apparatus as outlined in Claim 1 where one of the containers is used for the collection of large particle waste thus acting as a sedimentation chamber.

10 An apparatus as in Claim 1 where one container is used to hold a media bed thus acting as a filtration chamber.

11 An apparatus in Claim 1 where the media bed is activated carbon.

12. An apparatus as in Claim 8 where the base of the filtration container also functions as a purified water re-entrainment chamber whereby water can be re-introduced to the vacuum stream.

13. The apparatus of Claim 1 further incorporate a tongue and grove housing an o-ring seal which connects the lid sedimentation containers and filtration containers to the body forming a liquid tight seal.

14. The apparatus in Claim 1 where the individual container which function as chambers are connected together using a mechanical device designed to compress the o-ring resulting in a liquid tight seal.

15. A method of collecting and separating a mixture of particles and liquid from a patient under going a dental procedure the method of collection, separation and purification comprising the following steps:

Connection of the a collection apparatus to a vacuum source. The apparatus has an inlet which connects the apparatus to the patient via a tube. The apparatus has five primary parts: 1) lid which functions as a separation chamber; 2) body which houses the vacuum air exit pipe and to which all other components are attached; 3) collection container which function as a sedimentation chamber; 4) a filtration chamber which contains activated carbon and has a liquid containment area at its base.

Solid particles and liquid are drawn from the patient into the separation chamber where vacuum air or gas is separated from liquid and particles.

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Liquid and particles flow down an extended portion of the separation chamber and collects in the sedimentation chamber.

The separated vacuum air flows down the exit pipe and connects to the vacuum pump.

The collected liquid in the sedimentation chamber water falls into the filtration chamber and flows through a media bed. This is performed by gravity.

The purified liquid collects in a re-entrainment zone at the base of the filtration zone.

The purified liquid is re-entrained with the vacuum air via a small orifice located in the exit pipe within the re-entrainment zone.

16. An apparatus as in Claim 2 where separation chamber can one or more inlet connections.

17. The apparatus of Claim 2 has removable sedimentation and filtration chambers.

18. The apparatus in Claim 2 where the removable sedimentation and filtration chambers may act as shipping containers for the purpose of collection, shipping, disposal and/or recycling.

19. The apparatus in Claim 2 where the outlet is located at the bottom of the filtration container.

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FIG 1

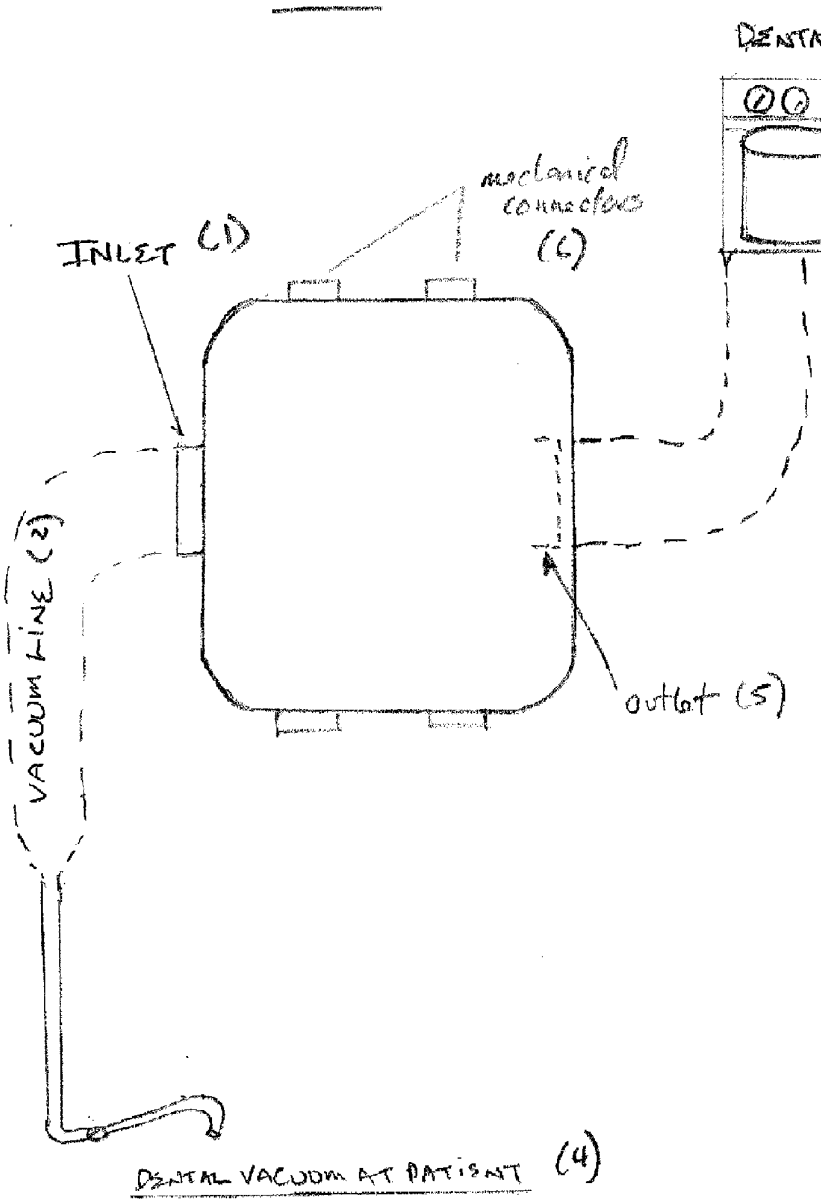
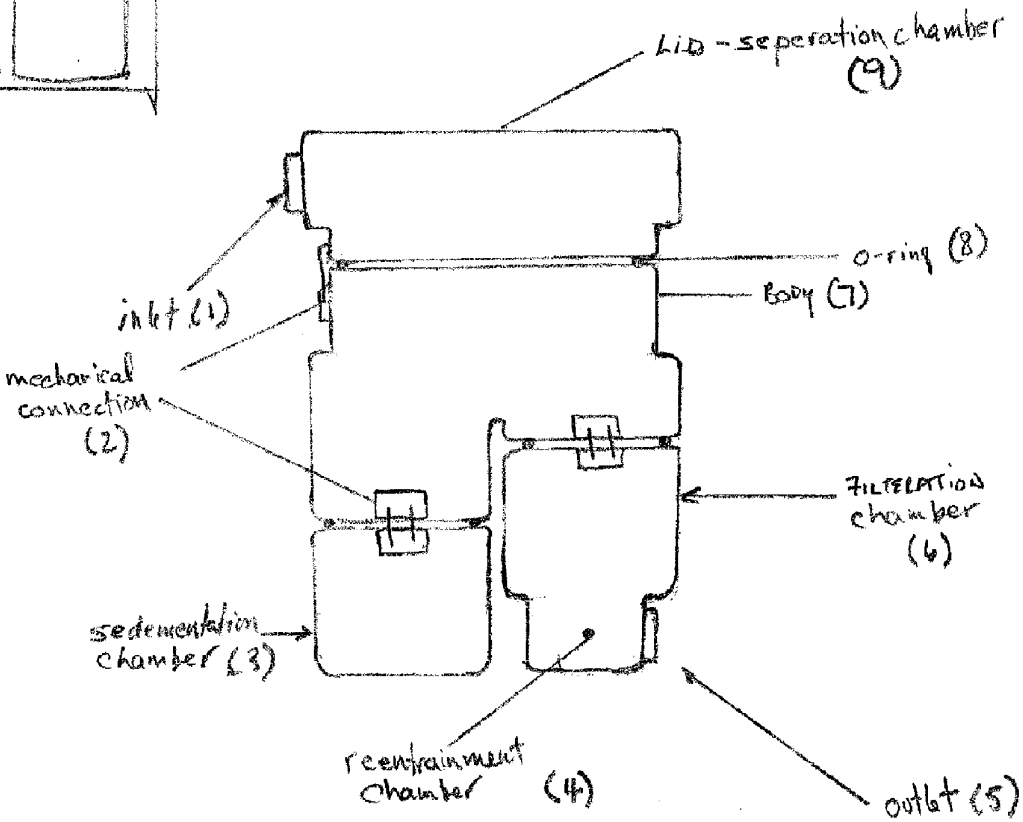


FIG 2

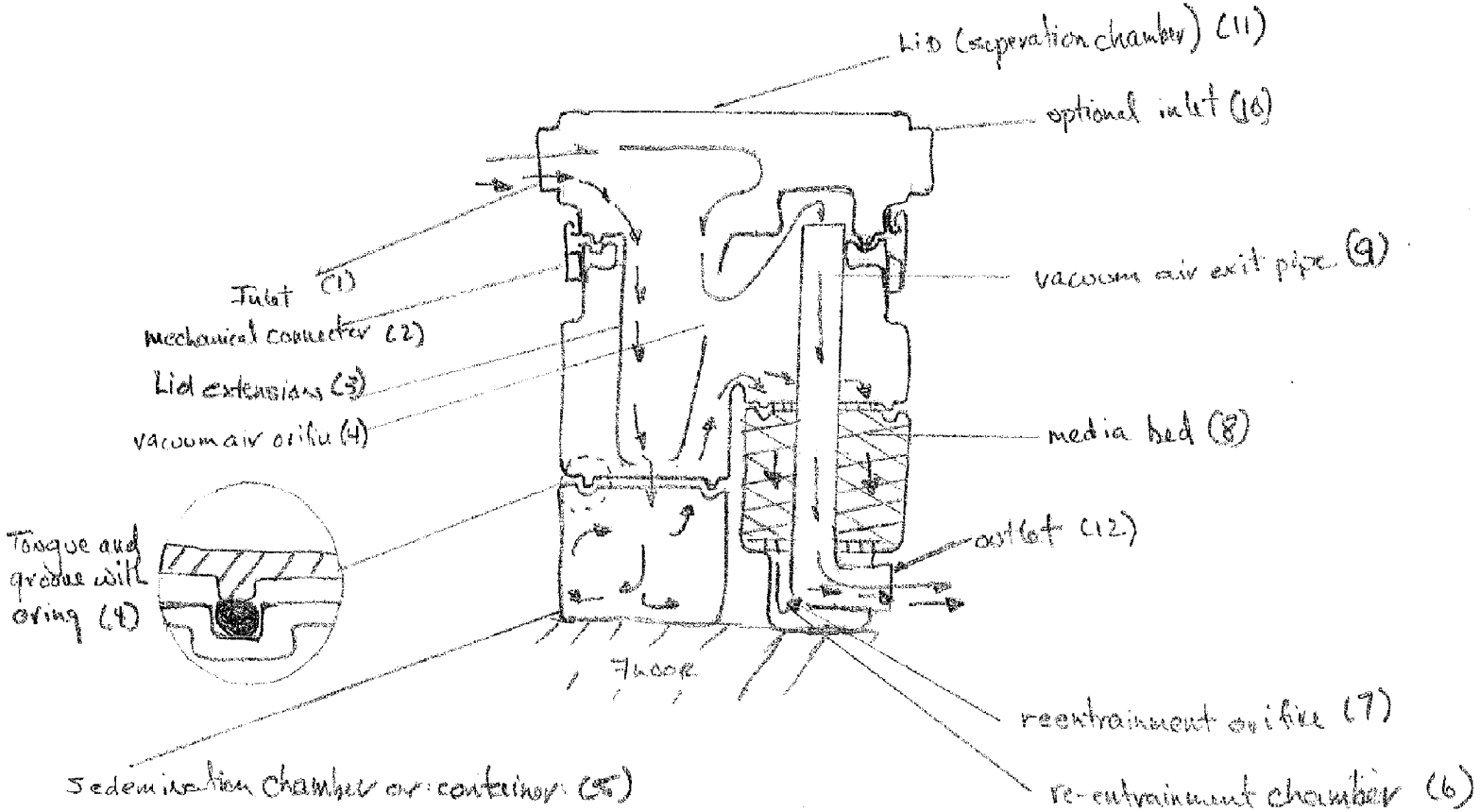


DRAWING

AMALGAM SEPERATOR TOP ½ SIDE VIEW

RICHARD BADGETT

FIG 3



LEGEND

→ VACUUM AIR FLOW

→ PARTICLE AND LIQUID FLOW

Drawing

AMALGAM SEPERATOR CROSS SECTION

RICHARD BARRETT

CA 02442513 2003-09-23

575/727

Solmetex Ex. 2002

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Electronic Acknowledgement Receipt

EFS ID:	46638453
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	16-SEP-2022
Filing Date:	28-JUL-2020
Time Stamp:	23:08:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	SMTX-001-T1-Con_First_IDS_Transmittal_Letter_096568-101.pdf	68360 a4d9dc3c5669d782f2964dbf10b702e9019c3332	no	2

Warnings:

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DRNA v. Solmetex - PGR2023-00555

Information:					
This is not an USPTO supplied IDS fillable form					
2	Information Disclosure Statement (IDS) Form (SB08)	SMTX-001-T1-Con_IDS_List_of_References_096568-101.pdf	164699 dc695b566bfa5fc6de7f0a871d9f7f1b2ffff35f	no	5
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	C2_EP1366728A1.pdf	242722 9fc1a6f6991c58d30c5cea933cc887b52a363b66	no	11
Warnings:					
Information:					
4	Foreign Reference	C3_WO1983002720A1.pdf	802369 6385573ff764fc04629bfd804c092b22faf82fa8	no	15
Warnings:					
Information:					
5	Foreign Reference	C4_WO1994016643A1.pdf	670795 d2c07d2444b23682989b2d7621019cb6dc96922c	no	15
Warnings:					
Information:					
6	Foreign Reference	C5_WO2018006106A1.pdf	537654 8f4c00c156a8485724c49f049fe7fe9061117a61	no	17
Warnings:					
Information:					
7	Foreign Reference	C1_CA2442513A1.pdf	527650 2d1336fc77b9e4fbe5fcc3e684b754459a42a7f5	no	13
Warnings:					
Information:					
8	Non Patent Literature	D3_ASME_B17-1_1967_R2013.pdf 577/727	1293275 dba367469cccafd250200bdd4d24e773a3f239a5	no	18
Warnings:					

Information:					
9	Non Patent Literature	D2_SMTX-Hg5_op_manual_2012.pdf	2437262 4a40f47d310af9c689617c1d154e24a7c2e828c4	no	7
Warnings:					
Information:					
10	Non Patent Literature	D1_ISO11143-2008_std.pdf	1361758 5f45b78a5a779ee5974b4161d3d09de8c8b4cc42	no	32
Warnings:					
Information:					
			Total Files Size (in bytes):	8106544	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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DRNA v. Solmetex - PGR2023-00555

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: TBA
MOZZICATTO	)	
	:	Group Art Unit TBA
Application No.: 16/941,522	)	
	:	Confirmation No. 1050
Filed: July 12, 2018	)	
	:	
For: DETACHABLE CONTAINER	)	
	:	

Commissioner for Patents - EFS
P.O. Box 1450
Alexandria, VA 22313-1450

SECOND PRELIMINARY AMENDMENT

Sir:

The Applicant respectfully requests that this Second Preliminary Amendment be entered prior to the examination of the above-captioned patent application.

The Applicant's **Listing of Claims** is presented on page 2 of this paper.

The Applicant's **Remarks** begin on page 7 of this paper.

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LISTING OF CLAIMS:

This listing of claims will replace all prior versions, and listings, of the claims in the application.

1-20. (Cancelled)

21. (New) A detachable container for use with a dental amalgam separation system that includes an air-water separation tank with a first keying feature of a key system, the detachable dental-amalgam container suitable for mating securely with the air-water separation tank, the detachable dental-amalgam container comprising:

a main body having a central vertical axis and an interior volume configured to receive dental amalgam effluent from the air-water separation tank;

a container top portion attached to a top of the main body, the container top portion including a generally cylindrical upper region having an upper surface with a generally circular periphery, a container inlet port and a container outlet port being located on the upper surface and projecting upwardly away from the main body, the container top portion further comprising a second keying feature for mating with the first keying feature, the second keying feature being located below the generally cylindrical upper region and extending outside the generally circular periphery; and

wherein, when the second keying feature is aligned with the first keying feature of the air-water separation tank, the detachable container is capable of mating securely with the air-water separation tank.

22. (New) The detachable dental-amalgam container of claim 21, wherein the container inlet port and the container outlet port are unaligned with the central vertical axis of the main body, the container inlet port being positioned nearer to a periphery of the circular upper surface than the container outlet port.

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DRNA v. Solmetex - PGR2023-00555

23. (New) The detachable dental-amalgam container of claim 22, wherein the inlet port and the outlet port are of the same height.

24. (New) The detachable dental-amalgam container of claim 23, wherein, when the detachable container is mated securely with the air-water separation tank, the inlet port is securely connected to a liquid dental-amalgam effluent outlet from the air-water separation tank.

25. (New) The detachable dental-amalgam container of claim 21, further including a pair of plugs configured to seal a container inlet port and a container outlet port of a filled detachable dental-amalgam container that the detachable dental-amalgam container is replacing.

26. (New) The detachable dental-amalgam container of claim 25, further including a cap that retains at least one of the plugs on the filled detachable dental-amalgam container.

27. (New) The detachable dental-amalgam container of claim 26, wherein the cap has an inside surface with a first circular wall and a second circular wall, the first circular wall placed so as to engage a first one of the pair of plugs on the container inlet port and the second circular wall placed so as to engage a second one of the pair of plugs on the container outlet port.

28. (New) The detachable dental-amalgam container of claim 21, wherein one of the first and second keying features is a female keying feature and the other of the first and second keying features is a male keying feature configured for mating with the female keying feature.

29. (New) The detachable dental-amalgam container of claim 28, wherein the second keying feature is the female keying feature.

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30. (New) The detachable dental-amalgam container of claim 29, wherein the female keying feature includes a recess formed in an outermost periphery of the container top portion.

31. (New) The detachable dental-amalgam container of claim 30, wherein the first keying feature includes two opposing recesses formed in the outermost periphery of the container top portion.

32. (New) The detachable dental-amalgam container of claim 28, wherein the first keying feature includes two opposing first keying structures, and the second keying feature includes two opposing second keying structures.

33. (New) The detachable dental-amalgam container of claim 21, wherein the container top portion has a maximum outer dimension that is greater than a maximum outer diameter of the main body.

34. (New) The detachable dental-amalgam container of claim 21, wherein the container outlet port is configured for fluidic coupling to a system outlet for the dental amalgam separation system that transfers fluid from the dental amalgam to a municipal water disposal system, and wherein each of the container inlet port and the container outlet port outlet port has an external O-ring at an upper portion thereof, the O-rings configured to help to maintain pressure within the container in response to a suction pressure being applied to the system outlet.

35. (New) The detachable dental-amalgam container of claim 21, further including a container inlet conduit extending downwardly from the container top portion and into the interior volume, the container inlet conduit being coupled to the container inlet port, the container inlet conduit and the container inlet port for transferring the dental amalgam effluent from the air-water separation tank to the interior volume of the main body.

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36. (New) The detachable dental-amalgam container of claim 21, further including a restrictor located within the interior volume of the main body and fluidically coupled to the container outlet port, the restrictor for removing fine particles from the dental amalgam effluent as fluid is discharged from the container outlet port.

37. (New) A detachable container for use with a dental amalgam separation system including an air-water separation tank with a first keying feature of a key system, the detachable container suitable for mating securely with the air-water separation tank, the detachable container comprising:

a main body having a central vertical axis and an interior volume configured to receive dental amalgam effluent from the air-water separation tank;

a container top portion attached to a top of the main body, the container top portion including a generally cylindrical upper region having an upper surface, a container inlet port and a container outlet port being located on the upper surface and projecting upwardly away from the main body, the container inlet port and the container outlet port being unaligned with the central vertical axis of the main body, the container inlet port being positioned nearer to a periphery of the upper surface than the container outlet port, the container top portion further comprising a second keying feature for mating with the first keying structure, the second keying feature being located below the generally cylindrical upper region and extending outside the periphery of the upper surface, and wherein, when the second keying feature is aligned with the first keying feature of the air-water separation tank, the detachable container is capable of mating securely with the air-water separation tank;

a container inlet conduit extending downwardly from the container top portion and into the interior volume, the container inlet conduit being coupled to the container inlet port, the container inlet conduit and the container inlet port for transferring the dental amalgam effluent from the air-water separation tank to the interior volume of the main body; and

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a restrictor located within the interior volume of the main body and fluidically coupled to the container outlet port, the restrictor configured to remove fine particles from the dental amalgam effluent so that the fine particles are not discharged from the container outlet port.

38. (New) The detachable dental-amalgam container of claim 37, wherein one of the first and second keying features is a female keying feature and the other of the first and second keying features is a male keying feature configured for mating with the female keying feature.

39. (New) The detachable dental-amalgam container of claim 38, wherein the second keying feature is the female keying feature.

40. (New) The detachable dental-amalgam container of claim 39, wherein the female keying feature includes a recess formed in an outermost periphery of the container top portion.

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REMARKS

Claims 21-40 remain in the application for further prosecution. Claim 13-20 are presently being cancelled. Claims 1-12 were previously cancelled. Claims 21-40 are presently being added. No new matter is being added.

CONCLUSION

With the filing of this Second Preliminary Amendment, Applicant submits that the claims are in a condition for allowance and action toward that end is earnestly solicited. If there are any matters which may be resolved or clarified through a telephone interview, the Examiner is respectfully requested to contact Applicant's undersigned attorney at the number indicated.

It is believed that no fees are due in connection with this filing; however, should any fees be required, the Examiner is urged to contact Applicant's undersigned attorney at the number indicated.

Accordingly, the Application should be placed into the queue for search and examination. Applicant hereby claims small entity status under 37 CFR §1.27. Applicant's undersigned representative may be reached by telephone at 617-966-2374. All correspondence should continue to be directed to the listed address.

Respectfully submitted,

/Steven R. Lazar/

Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

SRL Patents
234 Broadway
Arlington, MA 02474
September 16, 2022

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DRNA v. Solmetex - PGR2023-00555

Electronic Acknowledgement Receipt

EFS ID:	46630484
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	16-SEP-2022
Filing Date:	28-JUL-2020
Time Stamp:	09:22:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Solmetex-001-T1-CON-Second-PrelimAmend.pdf	89597 c0daf60c74da1b8689bad7532ca191ac0833feb5	yes	7

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DRNA v. Solmetex - PGR2023-00555

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Preliminary Amendment	1	1
	Claims	2	6
	Applicant Arguments/Remarks Made in an Amendment	7	7
Warnings:			
Information:			
	Total Files Size (in bytes):	89597	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

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National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 16/941,522	Filing Date 07/28/2020	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $50 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $230 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	09/16/2022	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0		x $50 =	0
	Independent (37 CFR 1.16(h))	* 2	Minus	*** 3	= 0		x $240 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	SLIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/SHARON M WEST/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/941,522

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	80		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	350		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	400		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	8 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x 240 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	830		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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DRNA v. Solmetex - PGR2023-00555

UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/941,522	07/28/2020	1778	910	SMTX-001-T1-CON	8	2

CONFIRMATION NO. 1050
UPDATED FILING RECEIPT

80709
Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

OC000000122405334

Date Mailed: 01/05/2021

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Nicholas Mozzicato, Acton, MA;
Richard Goulston, Stuart, FL;
Robin Schofield, Lancaster, MA;
Michael Toole, Norton, MA;

Applicant(s)

Solmetex LLC, Northborough, MA

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CIP of 16/033,823 07/12/2018 PAT 10779923
which is a CIP of 15/703,823 09/13/2017 PAT 10592508 *
(*)Data provided by applicant is not consistent with PTO records.

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 08/05/2020

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/941,522**

Projected Publication Date: 04/15/2021

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Detachable Recycling Container

Preliminary Class

210

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

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countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: TBA
MOZZICATTO	)	
	:	Group Art Unit TBA
Application No.: 16/941,522	)	
	:	Confirmation No. 1050
Filed: July 12, 2018	)	
	:	
For: DETACHABLE CONTAINER	)	
	:	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NOTICE TO OF INCOMPLETE REPLY

Sir:

On December 7, 2020, in response to the Notice to File Missing Parts, mailed on August 6, 2020, submitting the executed declaration of the inventors Nicholas Mozzicatto; Robert Schofield, Richard Goulston and Michael Toole; a corrected Application Data Sheet; payment of the small entity surcharge; and a two-month extension of time small entity fee.

However, Applicants inadvertently failed to pay the basic filing, search and examination fees, which were required, hence a Notice of Incomplete Reply was mailed on December 9, 2020. In response thereto, Applicant hereby submits the previously omitted fees, along with a petition for a three-month extension of time and appropriate small entity extension fees (at page 2 hereof) and remarks appearing at page 3 hereof.

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PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. § 1.136

This is a request under the provisions of 37 C.F.R. § 1.136(a) to extend the period for filing a reply to the Notice to File Missing Parts mailed on August 6, 2020, in the above-identified application until from October 5, 2020 until January 5, 2021. The requested extension and fee are as follows: three-month (37 C.F.R. §1.17(a)(3), small entity fee in the amount of $740.00; less the previously paid two-month small entity fee in the amount of $320.00; leaving a balance of **$420.00** being paid herewith.

Applicant claims small entity status under 37 C.F.R. § 1.27.

/Steven R. Lazar/
Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

January 3, 2021

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REMARKS

Applicant submits this response to the Notice of Incomplete Reply, mailed on December 9, 2020. Applicant herewith submits total fees of **$1,250.00**, representing the small entity basic filing fee of $80.00, search fee of $350.00; and examination fee of $400.00, for total fees in the amount of: **$830.00**. Applicant further submits a petition for a three-month extension of time, along with the appropriate small entity fee of $740.00, less the prior paid amount of $320.00, leaving the amount of **$420.00**, in previously unpaid extension fees.

With this submission of the filing, search and examination fees, together with the petition for a three-month extension of time for response, Applicant has now satisfied all of the requirements of the Notice to File Missing Parts, mailed on August 6, 2020, and the Notice of Incomplete Reply, mailed on December 9, 2020. Accordingly, the Application should be placed into the queue for search and examination. Applicant hereby claims small entity status under 37 CFR §1.27. Applicant's undersigned representative may be reached by telephone at 617-966-2374. All correspondence should continue to be directed to the listed address.

Respectfully submitted,

/Steven R. Lazar/

Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

SRL Patents
234 Broadway
Arlington, MA 02474
January 3, 2021

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Electronic Patent Application Fee Transmittal

Application Number:	16941522
Filing Date:	28-Jul-2020
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Filer:	Steven R. Lazar
Attorney Docket Number:	SMTX-001-T1-CON

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	80	80
UTILITY SEARCH FEE	2111	1	350	350
UTILITY EXAMINATION FEE	2311	1	400	400
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $320 paid	2253	1	420	420
Miscellaneous:				
		Total in USD ($)		**1250**

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Electronic Acknowledgement Receipt

EFS ID:	41537452
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	03-JAN-2021
Filing Date:	28-JUL-2020
Time Stamp:	15:29:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1250
RAM confirmation Number	E202113F31516862
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

599/727

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		Solmetex-001-T1-CON-Resp_Incomplete_Reply.pdf	70581 2ec51f654ace0b7890a12ce132f7b7549bc0e2ee	yes	3

Multipart Description/PDF files in .zip description

Document Description	Start	End
Applicant Response to Pre-Exam Formalities Notice	1	1
Extension of Time	2	2
Applicant Response to Pre-Exam Formalities Notice	3	3

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	37406 53639df2e5733eb75b00c846f1141a3aaedc38b2	no	2

Warnings:

Information:

Total Files Size (in bytes):	107987

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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/941,522	07/28/2020	Nicholas Mozzicato	SMTX-001-T1-CON

CONFIRMATION NO. 1050

IMPROPER CFR REQUEST

80709
Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

OC00000121868177

Date Mailed: 12/09/2020

RESPONSE TO REQUEST FOR CORRECTED FILING RECEIPT

Power of Attorney, Claims, Fees, System Limitations, and Miscellaneous

In response to your request for a corrected Filing Receipt, the Office is unable to comply with your request because:

- The ADS submitted on 12/07/2020 was not properly marked up to show the desired changes. For information being changed relative to the information already of record, additions must be shown with underlining, and deletions must be shown with strike-through or brackets. See 37 CFR 1.76(c)(2)

In order to make changes to the information of record, an ADS must be properly signed and properly marked up relative to the current information of record.

Proper signature: The ADS must be signed with a handwritten signature or proper S-signature by:

- A patent practitioner, with the practitioner's registration number accompanying the signature (e.g., immediately below or adjacent to the signature), or
- The applicant, if the applicant is an individual other than the inventor(s) and no power of attorney has been appointed, or
- All of the inventors, if no other applicant has been established and no power of attorney has been appointed.

A proper S-signature consists of only letters and/or Arabic numerals, with appropriate spaces and commas, periods, apostrophes, or hyphens for punctuation contained between a first single forward slash mark before, and a second single forward slash mark after, the S-signature.

Proper markings: The ADS must identify the changes being made with underlining for insertions and strike-through or brackets for text removed. No other markings or indications are acceptable. Where an ADS providing corrected or updated information does not contain all of the sections of the ADS, the entire section in which changes are being made must be included in the ADS. Information of record can generally be found on the latest filing receipt.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ctuazon/

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/941,522

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	80		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	350		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	400		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	8 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x 240 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	830		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/941,522	07/28/2020	Nicholas Mozzicato	SMTX-001-T1-CON

CONFIRMATION NO. 1050

80709
Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

FORMALITIES LETTER

OC000000121868158

Date Mailed: 12/09/2020

NOTICE OF INCOMPLETE REPLY (NONPROVISIONAL)

Filing Date Granted

The U.S. Patent and Trademark Office has received your reply on 12/07/2020 to the NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION (Notice) mailed 08/06/2020 and it has been entered into the application. The reply, however, is not a complete reply for the reason(s) listed below. A complete reply must be timely filed to prevent ABANDONMENT of the above-identified application. Replies should be mailed to: Mail Stop Missing Parts, Commissioner for Patents, P.O.Box 1450, Alexandria VA 22313-1450.

The period for reply continues to run from the date of the Notice mailed 08/06/2020. Applicant must submit all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the appropriate extension fee under the provisions of 37 CFR 1.136(a).

Applicant's reply to the Notice mailed on 08/06/2020 was received in the U.S. Patent and Trademark Office on 12/07/2020, after the expiration of the two month period for reply set forth in the Notice. The application will become abandoned unless applicant obtains an extension of the period for reply, as above. The petition must be accompanied by the appropriate fee as set forth in 37 CFR 1.17 (see the current fees below). The date on which the reply, the petition, and the fee have been filed is the date of the reply and also the date for purposes of determining the period of extension and the corresponding amount of the fee due. The expiration of the time period is determined by the amount of the fee paid. Applicant is advised that extensions may not be granted under 37 CFR 1.136(a) for more than FIVE MONTHS beyond the time period set in the Notice.

Items Required to Avoid Abandonment:

The required items noted below SHOULD be filed along with any items required above.

- The statutory basic filing fee is missing.
- The application search fee was not received.
- The application examination fee was not received.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of the Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

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- $ **80** basic filing fee.
- $ **350** search fee.
- $ **400** examination fee.
- $(**0**) previous unapplied payment amount.
- $ **830** TOTAL FEE BALANCE DUE.

Mail date of Notice: 08/06/2020

Last date that extension may be obtained: (Note: The petition and fee must be received by this date, or include a proper certificate of mailing under 37 CFR 1.8 with a date on or before this date, and extend the time to include this date.) 03/06/2021

Length of Extension of Time	Fee under 37 CFR 1.17(a) effective March 19, 2013		
(response due on or before)	Undiscounted	Small Entity	Micro Entity
Three Months (01/06/2021)	$1480	$740	$370
Four Months (02/06/2021)	$2320	$1160	$580
Five Months (03/06/2021)	$3160	$1580	$790

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ctuazon/

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PTO/SB/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Mosticchio	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Acton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	19 Preston Way		
Address 2			
City	Acton	State/Province	MA
Postal Code	01720	Country	US

Inventor 2 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Gouveia	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Stuart	State/Province	FL	Country of Residence	US

Mailing Address of Inventor:

Address 1	1923 NW Palmetto Terrace		
Address 2			
City	Stuart	State/Province	FL
Postal Code	34994	Country	US

Inventor 3 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

EFS Web 2.2.10

PTO/SB/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	154 Old Country Road		
Address 2			
City	Lancaster	State/Province	MA
Postal Code	01523	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Toole	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Norton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	104 Newcomb Street, 3B		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the Add button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence information of this application.

Customer Number	82705		
Email Address	sr@stents@aol.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SMTX-001-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (If any)	38	Suggested Figure for Publication (If any)	6A

SPS Web 2.2.12

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	85705		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Patented			Remove	
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
	Continuation in part of	15033823	2016-07-12	10779823	2020-09-22

SP3 rev 2.2.0

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-11-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	Continuation in part of	15703823	2017-10-13	10646313	
Prior Application Status	Pending		Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Claims benefit of provisional	62414713	2016-10-29		
Prior Application Status			Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Claims benefit of provisional	62406990	2016-10-12		
Prior Application Status			Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Continuation of	29679874	2019-03-11		
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29565674	2016-11-28	D840534	
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29565668	2016-11-28	D835779	
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29577701	2016-09-14	D848813	
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29567544	2016-06-09	D840533	
Prior Application Status	Patented		Remove		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29565522	2016-05-23	D835264	
Prior Application Status			Remove		
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)		
15730828	Continuation of	29679862	2019-03-11		

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the Add button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[1] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[2]	Filing Date (YYYY-MM-DD)	Access Code[3] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the Add button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant must opt-out of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is ONLY reviewed and processed with the INITIAL filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby grants the USPTO authority to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant DOES NOT authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant DOES NOT authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

○ Assignee ○ Legal Representative under 35 U.S.C. 117 ○ Joint Inventor

◉ Person to whom the inventor is obligated to assign. ○ Person who shows sufficient proprietary interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	68 Bearfoot Road		
Address 2			
City	Northborough	State/Province	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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DRNA v. Solmetex - PGR2023-00555

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	Given Name	Middle Name	Family Name	Suffix

Mailing Address Information For Assignee Including Non-Applicant Assignees:

Address 1			
Address 2			
City		State/Province	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).

This Application Data Sheet must be signed by a patent practitioner if one or more of the applicants is a juristic entity (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, all joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of all joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	2020-12-07
First Name	Steven	Last Name	Lazar	Registration Number	32618

Additional Signature may be generated within this form by selecting the Add button. Add

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Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/SB/14 (11-15)
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Doc Code: ADS

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Mozzicato	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Acton	MA	US

Mailing Address of Inventor:

Address 1	19 Preston Way
Address 2	
City	Acton
State/Province	MA
Postal Code	01720
Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Goulston	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Stuart	FL	US

Mailing Address of Inventor:

Address 1	1928 NW Palmetto Terrace
Address 2	
City	Stuart
State/Province	FL
Postal Code	34994
Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

Solmetex Ex. 2002

DRNA v. Solmetex - PGR2023-00555

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	164 Old Country Road		
Address 2			
City	Lancaster	State/Province	MA
Postal Code	01523	Country	US

Inventor 4 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Toole	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Norton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	104 Newcomb Streed, D		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	30709		
Email Address	srlpatents@aol.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SMTX-001-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	26	Suggested Figure for Publication (if any)	6A

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Filing By Reference:

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For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	30709		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	~~Pending~~		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	~~Continuation-in-part of~~	~~16999928~~	~~2018-07-~~12

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

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Approved for use through 04/30/2017. OMB 0651-0032
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	

Title of Invention	Detachable Recycling Container	Patent Number	Issue Date YYYY-MM-DD

Prior Application Status	Patented	10779923	Remove	2020-09-22

Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Claims benefit of provisional	16033823	2018-07-12

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	Continuation in part of	15703823	2017-10-12	10646313	

Prior Application Status	Pending	Remove

Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62414712	2016-10-29

Prior Application Status		Remove

Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62406990	2016-10-12

Prior Application Status		Remove

Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Continuation of	29679874	2019-02-11

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29585674	2016-11-28	D840534	

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29585668	2016-11-28	D835779	

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29577701	2016-09-14	E848612	

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29567544	2016-06-09	D840533	

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29565522	2016-05-23	D835264	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Continuation of	29679862	2019-02-11

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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DRNA v. Solmetex - PGR2023-00555

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
● Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	60 Bearfoot Road		
Address 2			
City	Northborough	**State/Province**	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	~~2020-07-28~~ 2020-12-07
First Name	Steven	Last Name	Lazar	Registration Number	32618

Additional Signature may be generated within this form by selecting the Add button. Add

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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DRNA v. Solmetex - PGR2023-00555

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Solmetex Ex. 2002

DRNA v. Solmetex - PGR2023-00555

Electronic Acknowledgement Receipt

EFS ID:	41317466
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	07-DEC-2020
Filing Date:	28-JUL-2020
Time Stamp:	20:41:58
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet	SMTX-001-T1-CON-Rev_ADS-12072020-Replacement_Sheets.pdf	517663 c9c13ae0a15ba5503ae2ba6a1327f891ee5e01d5	no	9

Warnings:

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Information:					
This is not an USPTO supplied ADS fillable form					
2	Application Data Sheet	SMTX-001-T1-CON-Mark-Up_ADS-12072020.pdf	595141 05eabec1e07dfa7e46cfade4ee74e83cf6ca9a06	no	10
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
			Total Files Size (in bytes):	1112804	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Electronic Acknowledgement Receipt

EFS ID:	41317324
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	07-DEC-2020
Filing Date:	28-JUL-2020
Time Stamp:	20:16:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	Solmetex-001-T1-CON-Response_to_NTFMP-12072020.pdf	64646 3eb5c2df16264ee284f75f929d0afd2b0c5f2a4e	no	3

Warnings:

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Information:	
Total Files Size (in bytes):	64646

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: TBA
MOZZICATTO	)	
	:	Group Art Unit TBA
Application No.: 16/941,522	)	
	:	Confirmation No. 1050
Filed: July 12, 2018	)	
	:	
For: DETACHABLE CONTAINER	)	
	:	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NOTICE TO FILE MISSING PARTS

Sir:

In response to the Notice to File Missing Parts, mailed on August 6, 2020, Applicant responds as follows:

1. Applicant submits herewith the executed declaration of the inventors Nicholas Mozzicatto; Robert Schofield, Richard Goulston and Michael Toole.
2. Applicant submits the corrected Application Data Sheet, via EFS.
3. Petition for a two-month extension of time along with the appropriate small entity fee.
4. The small entity surcharge.
5. Petition for Extension of Time begins at page 2.
6. Remarks begin on page 3.

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PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. § 1.136

This is a request under the provisions of 37 C.F.R. § 1.136(a) to extend the period for filing a reply to the Notice to File Missing Parts mailed on August 6, 2020, in the above-identified application until from November 5, 2020 until December 7, 2020. The requested extension and fee are as follows: two month (37 C.F.R. §1.17(a)(2), small entity fee in the amount of $320.00.

Applicant claims small entity status under 37 C.F.R. § 1.27.

/Steven R. Lazar/
Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

December 7, 2020

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REMARKS

Applicant submits this response to the Notice to File Missing Parts, which was mailed on August 6, 2020. A petition for a two month extension of time is filed herewith, along with the appropriate small entity fee.

With submission herewith the executed oath or declaration of the inventors, a revised Application Data Sheet, filed via EFS, a petition for a two-month extension of time along with the appropriate small entity fee, and payment of the small entity surcharge, it is believed that all requirements for this provisional patent application have been satisfied. Applicant hereby claims small entity status under 37 CFR §1.27.

Applicant's undersigned representative may be reached by telephone at 617-966-2374. All correspondence should continue to be directed to the listed address.

Respectfully submitted,

/Steven R. Lazar/

Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

SRL Patents
234 Broadway
Arlington, MA 02474
December 7, 2020

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

CORRECTED ADS FORM

Application Number	16941522
Title of Invention	Detachable Recycling Container

Inventor Information

****If no data is shown, no data has been corrected****

	Data of Record	Updated Data
Order Number		
Name		
Residence Information		
Residency		
City		
State		
Country of Residence		
Mailing Address of Inventor		
Address 1		
Address 2		
City,State/Province, Postal Code		
Country		

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Application Information

	Data of Record	Updated Data
Title of Invention	Detachable Recycling Container	
Attorney Docket Number	SMTX-001-T1-CON	
Entity Type	Small	

Domestic Benefit/National Stage Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121,365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S. C. 119(e) or 120, and 37 CFR 1.78(a).

		Data of Record	Updated Data
	Prior Application Status		
	Application Number		
	Continuity Type		
	Prior Application Number		
	Filing Date (YYYY-MM-DD)		
	Patent Number		
	Issue Date (YYYY-MM-DD)		

Foreign Priority Information

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

****If no data is shown, no data has been corrected****

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

		Data of Record	Updated Data
	Application Number		
	Country		
	Filing Date		
	Access Code		

Applicant Information

****If no data is shown, no data has been corrected****
Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

	Data of Record	Updated Data
Applicant Type		
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is		
Name of the Deceased or Legally Incapacitated Inventor		
Applicant is an Organization		
Name		
Organization Name		
Address 1		
Address 2		

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

City,State/Province,Postal Code		
Country		
Phone Number		
Fax Number		
Email Address		

Assignee Information including Non-Applicant Assignee Information

****If no data is shown, no data has been corrected****
Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office

	Data of Record	Updated Data
Order		
Applicant is an Organization		
Name		
Organization Name		

Mailing Address

Address 1		
Address 2		
City,State/Province,Postal Code		
Country		
Phone Number		
Fax Number		
Email Address		

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Signature

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/	Registration Number	32618
First Name	Steven	Last Name	Lazar

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	Detachable Container

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number 16033823

filed on July 12, 2018

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Nick Mozzicato Date (Optional): 6-13-18

Signature: [signature]

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/AIA/01 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

DECLARATION (37 CFR 1.63) FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET (37 CFR 1.76)

Title of Invention	Detachable Container

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number 16033823 filed on July 12, 2018.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WARNING:

Petitioner/applicant is cautioned to avoid submitting personal information in documents filed in a patent application that may contribute to identity theft. Personal information such as social security numbers, bank account numbers, or credit card numbers (other than a check or credit card authorization form PTO-2038 submitted for payment purposes) is never required by the USPTO to support a petition or an application. If this type of personal information is included in documents submitted to the USPTO, petitioners/applicants should consider redacting such personal information from the documents before submitting them to the USPTO. Petitioner/applicant is advised that the record of a patent application is available to the public after publication of the application (unless a non-publication request in compliance with 37 CFR 1.213(a) is made in the application) or issuance of a patent. Furthermore, the record from an abandoned application may also be available to the public if the application is referenced in a published application or an issued patent (see 37 CFR 1.14). Checks and credit card authorization forms PTO-2038 submitted for payment purposes are not retained in the application file and therefore are not publicly available.

LEGAL NAME OF INVENTOR

Inventor: Richard Goulston Date (Optional): _____

Signature: Richard Goulston

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/AIA/01 (06-12)
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Title of Invention	Detachable Container

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This declaration is directed to:

- ☐ The attached application, or
- ☒ United States application or PCT international application number 16033823 filed on July 12, 2018

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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LEGAL NAME OF INVENTOR

Inventor: Robin Schofield Date (Optional): 07/27/2018

Signature: Robin B. Schofield

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 1 minute to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/AIA/01 (05-12)
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Title of Invention	Detachable Container

As the below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

☒ United States application or PCT international application number 16033823

filed on July 12, 2018

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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LEGAL NAME OF INVENTOR

Inventor: Michael Toole Date (Optional): 8/15/18

Signature: Michael Toole

Note: An application data sheet (PTO/SB/14 or equivalent), including naming the entire inventive entity, must accompany this form or must have been previously filed. Use an additional PTO/AIA/01 form for each additional inventor.

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DRNA v. Solmetex - PGR2023-00555

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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
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7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
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Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Electronic Patent Application Fee Transmittal

Application Number:	16941522
Filing Date:	28-Jul-2020
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	
Filer:	Steven R. Lazar
Attorney Docket Number:	SMTX-001-T1-CON

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
PROCESSING FEE, EXCEPT PROV. APPLS.	2830	1	70	70
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**70**

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Electronic Acknowledgement Receipt

EFS ID:	41317177
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	07-DEC-2020
Filing Date:	28-JUL-2020
Time Stamp:	20:07:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$70
RAM confirmation Number	E2020B7K07242388
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet to update/ correct info	CorrectedADS.pdf	63642 e0825dcf9fbc724c71a01a8d1a45390f779704e2	no	5
Warnings:					
Information:					
2	Transmittal Letter	Solmetex-001-T1-CON-Response_to_NTFMP-12072020.pdf	64646 3eb5c2df16264ee284f75f929d0afd2b0c5f2a4e	no	3
Warnings:					
Information:					
3	Oath or Declaration filed	Mozzicato_declaration_signed.pdf	86993 530cc0872026f098d3c2e6ca5513c127273b0d1d	no	1
Warnings:					
Information:					
4	Oath or Declaration filed	Goulston_declaration_signed.pdf	130611 6e567e1d4eea0d9f42fc2565b9e0d9ece01b9d92	no	1
Warnings:					
Information:					
5	Oath or Declaration filed	Schofield_declaration_signed.pdf	163580 6a486c548f63c916a9e80fd0e693d3955302abe2	no	2
Warnings:					
Information:					
6	Oath or Declaration filed	Toole_declaration_signed.pdf	177141 fb996b1c5a21f0d2dd257830a1605b39d9064540	no	2
Warnings:					
Information:					

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

7	Fee Worksheet (SB06)	fee-info.pdf	30545 082aa31f6f04c4424be57c28549802e6b66434a0	no	2

Warnings:	
Information:	
Total Files Size (in bytes):	717158

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: TBA
MOZZICATTO	)	
	:	Group Art Unit TBA
Application No.: 16/941,522	)	
	:	Confirmation No. 1050
Filed: July 12, 2018	)	
	:	
For: DETACHABLE CONTAINER	)	
	:	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NOTICE TO FILE MISSING PARTS

Sir:

In response to the Notice to File Missing Parts, mailed on August 6, 2020, Applicant responds as follows:

1. Applicant submits herewith the executed declaration of the inventors Nicholas Mozzicatto; Robert Schofield, Richard Goulston and Michael Toole.
2. Applicant submits the corrected Application Data Sheet, via EFS.
3. Petition for a two-month extension of time along with the appropriate small entity fee.
4. The small entity surcharge.
5. Petition for Extension of Time begins at page 2.
6. Remarks begin on page 3.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PETITION FOR EXTENSION OF TIME UNDER 37 C.F.R. § 1.136

This is a request under the provisions of 37 C.F.R. § 1.136(a) to extend the period for filing a reply to the Notice to File Missing Parts mailed on August 6, 2020, in the above-identified application until from November 5, 2020 until December 7, 2020. The requested extension and fee are as follows: two month (37 C.F.R. §1.17(a)(2), small entity fee in the amount of $320.00.

Applicant claims small entity status under 37 C.F.R. § 1.27.

/Steven R. Lazar/
Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

December 7, 2020

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

REMARKS

Applicant submits this response to the Notice to File Missing Parts, which was mailed on August 6, 2020. A petition for a two month extension of time is filed herewith, along with the appropriate small entity fee.

With submission herewith the executed oath or declaration of the inventors, a revised Application Data Sheet, filed via EFS, a petition for a two-month extension of time along with the appropriate small entity fee, and payment of the small entity surcharge, it is believed that all requirements for this provisional patent application have been satisfied. Applicant hereby claims small entity status under 37 CFR §1.27.

Applicant's undersigned representative may be reached by telephone at 617-966-2374. All correspondence should continue to be directed to the listed address.

Respectfully submitted,

/Steven R. Lazar/

Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

SRL Patents
234 Broadway
Arlington, MA 02474
December 7, 2020

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: TBA
MOZZICATTO	)	
	:	Group Art Unit TBA
Application No.: 16/033,823	)	
	:	Confirmation No. 9793
Filed: July 12, 2018	)	
	:	
For: DETACHABLE CONTAINER	)	
	:	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE TO NOTICE TO FILE MISSING PARTS

Sir:

In response to the Notice to File Missing Parts, mailed on July 30, 2018

Applicant responds as follows:

1. Applicant submits herewith the executed declaration of the inventors Nicholas Mozzicatto; Robert Schofield, Richard Goulston and Michael Toole

and

2. The small entity surcharge in the amount of $ 80.00.

Remarks begin on page 2.

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

REMARKS

Applicant submits this response to the Notice to File Missing Parts, which was mailed on July 30, 2018.

With submission herewith the executed oath or declaration of the inventors, the and the small entity surcharge of $ 80.00, it is believed that all requirements for this provisional patent application have been satisfied.

Applicant's undersigned representative may be reached by telephone at 617-966-2374. All correspondence should continue to be directed to the listed address.

Respectfully submitted,

/Steven R. Lazar/

Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

SRL Patents
234 Broadway
Arlington, MA 02474
August 21, 2018

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Electronic Patent Application Fee Transmittal

Application Number:	16941522
Filing Date:	28-Jul-2020
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Filer:	Steven R. Lazar
Attorney Docket Number:	SMTX-001-T1-CON

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
LATE FILING FEE FOR OATH OR DECLARATION	2051	1	80	80
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Extension - 2 months with $0 paid	2252	1	320	320
Miscellaneous:				
			Total in USD ($)	**400**

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Electronic Acknowledgement Receipt

EFS ID:	41317285
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	Detachable Recycling Container
First Named Inventor/Applicant Name:	Nicholas Mozzicato
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	07-DEC-2020
Filing Date:	28-JUL-2020
Time Stamp:	20:10:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$400
RAM confirmation Number	E2020B7K11472420
Deposit Account	
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

655/727

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	Solmetex-001-T1-Response_to_NTFMP.pdf	59405 c33a67fc99f0011660072927527 0a54709e0e6d7	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	32422 72248ff984ef4f02d1ba87405a0459d7a7128c0d	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	91827		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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DRNA v. Solmetex - PGR2023-00555

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
16/941,522	07/28/2020	1778	0.00	SMTX-001-T1-CON	8	2

CONFIRMATION NO. 1050

FILING RECEIPT

80709
Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

OC000000118990108*

Date Mailed: 08/06/2020

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Nicholas Mozzicato, Acton, MA;
Richard Goulston, Stuart, FL;
Robin Schofield, Lancaster, MA;
Michael Toole, Norton, MA;

Applicant(s)

Solmetex LLC, Northborough, MA

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CIP of 16/033,823 07/12/2018
which is a CIP of 15/703,823 09/13/2017 PAT 10592508 *
(*)Data provided by applicant is not consistent with PTO records.

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 08/05/2020

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 16/941,522**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

Detachable Recycling Container

Preliminary Class

210

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

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countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/941,522	07/28/2020	Nicholas Mozzicato	SMTX-001-T1-CON

CONFIRMATION NO. 1050

IMPROPER CFR REQUEST

80709
Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

OC00000018991167

Date Mailed: 08/06/2020

RESPONSE TO REQUEST FOR CORRECTED FILING RECEIPT

Continuity, Priority Claims, Petitions, and Non-Publication Requests

In response to your request for a corrected Filing Receipt, the Office is unable to comply with your request because:

- One or more of the benefit claims under 35 U.S.C. § 120 cannot be included on the Filing Receipt since applicant did not specify whether the application is a continuation, divisional or continuation-in-part of the prior application. Applicant must submit a new application data sheet (ADS) that sets forth the relationship, and the ADS must be accompanied by a petition under 37 CFR 1.78 if filed after the time period set forth in 37 CFR 1.78.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/saabdurahman/

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
16/941,522	07/28/2020	Nicholas Mozzicato	SMTX-001-T1-CON

CONFIRMATION NO. 1050

80709
Steven R. Lazar
SRL Patents
234 Broadway
Arlington, MA 02474

FORMALITIES LETTER

OC00000011899010 7

Date Mailed: 08/06/2020

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
- The application search fee must be submitted.
- The application examination fee must be submitted.
- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. Small entity discount is in effect. If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **75** basic filing fee.
- $ **80** surcharge.
- $ **330** search fee.
- $ **380** examination fee.
- $(**0**) previous unapplied payment amount.
- $ **865** TOTAL FEE BALANCE DUE.

Items Required To Avoid Processing Delays:

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's

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oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
  Nicholas Mozzicato
  Richard Goulston
  Robin Schofield
  Michael Toole

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/mteklemichael/

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 16/941,522

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	75		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	330		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	380		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	8 minus 20 =	*	x 50 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x 230 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	785		TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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DRNA v. Solmetex - PGR2023-00555

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: TBA
MOZZICATTO	)	
	:	Group Art Unit TBA
Filed on July 28, 2020;	)	
	:	Confirmation No. TBA
Continuation of Application No.: 16/033,833	)	
	:	
Filed: July 12, 2018	)	
	:	
For: DETACHABLE RECYCLING CONTAINER	)	
	:	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Sir:

Prior to Examination of the present Application, Applicants present the following preliminary amendment to the claims:

1. Claims begin on Page 2.
2. Specification begins on Page 4
3. Remarks begin on page 5.
4. Applicant claims small entity status under 37 C.F.R. §1.27.

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CLAIMS:

Please cancel claims 1 to 12.

Add new claims: 13 to 20.

13. (NEW) A detachable container suitable for mating securely with a corresponding air-water separation tank having one or more keys; said detachable container having an outside top mating surface, said top mating surface having an outside perimeter, said detachable container further comprising an inlet port and an outlet port projecting upward from the top mating surface; said detachable container further comprising one or more corresponding keyways cast into said outside perimeter of said top mating surface; such that, when said one or more corresponding keyways of the detachable container are aligned with the one or more keys of the air-water separation tank, said detachable container is capable of mating securely with said air-water separation tank.

14. (NEW) The detachable container of claim 13, wherein said inlet port and said outlet port are of the same height.

15. (NEW) The detachable container of claim 13, wherein, when said detachable container is mated securely with a corresponding air-water separation tank, said inlet port is securely connected to a liquid effluent outlet from the corresponding air-water separation tank, and said outlet port is securely connected to an outlet tube.

16. (NEW) The detachable container of claim 13, further comprising a cap for covering the outside top mating surface and having an inside surface with a first circular wall and a second circular wall, the first circular wall placed so as to engage an upper surface of the inlet port and the second circular wall placed so as to engage an upper surface of the outlet port; wherein said cap prevents spillage or leaking during storage or shipping of the detachable container.

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17. (NEW) A detachable container comprising one or more container keyways suitable for attachment with a dental amalgam separation system comprising one or more corresponding keys,
said detachable container having an outside top mating surface comprising a container effluent inlet port and a container effluent outlet port projecting upward from the outside top mating surface; and wherein said detachable container further comprises one or more container keyways cast into the outside perimeter of said top mating surface;
wherein, upon alignment of the one or more container keyways with one or more corresponding keys present on the dental amalgam separation system, the detachable container will detachably engage with the dental amalgam separation system, allowing for a leak-proof detachable connection.

18. (NEW) The detachable container of claim 17, wherein said container effluent inlet port and said container effluent outlet port are of the same height.

19. (NEW) The detachable container of claim 17, wherein, when said detachable container is mated securely with a corresponding air-water separation tank, said container effluent inlet port is securely connected to a effluent outlet from the corresponding air-water separation tank, and said container effluent outlet port is securely connected to an outlet tube.

20. (NEW) The detachable container of claim 17, further comprising a cap for covering the outside top mating surface and having an inside surface with a first circular wall and a second circular wall, the first circular wall placed so as to engage an upper surface of the inlet port and the second circular wall placed so as to engage an upper surface of the outlet port; wherein said cap prevents spillage or leaking during storage or shipping of the detachable container.

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IN THE TITLE:

-- DETACHABLE RECYCLING CONTAINER --

IN THE SPECIFICATION

Cancel Paragraph [0001] and replace it with the following Paragraph [0001]:

-- [0001] This patent application is a continuation of application serial number 16/033,823, filed on July 12, 2018, which is a continuation in part of patent application serial number 15/730,828, now issued as US Patent 10,646, 313; which in turn claims priority from provisional patent application serial number 62/414,712, filed on October 29, 2016; and provisional patent application serial number 62/406,990, filed on October 12, 2016. This application further claims priority from patent application serial number 29/679,874, filed February 11, 2019, which claims priority from serial number 29/585,674, filed on November 28, 2016, now US Patent D840,534; serial number 29/585,668, filed on November 28, 2016, now patent number D835,779; serial number 29/577,701, filed on September 14, 2016, now patent number D848,612; serial number 29/567,544, filed on June 9, 2016, now patent number D840,533; and serial number 29/565,522, filed on May 23, 2016, now issued patent D835,264. This application further claims priority from patent application serial number 29/679,862, filed on February 11, 2019, which is a continuation of serial number 29/567,544, filed on June 9, 2016, now patent number D840,533; and serial number 29/565,522, filed on May 23, 2016, now issued patent D835,264. --

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REMARKS

The claims are 13 through 20. Claims 1 to 12 have been canceled. New claims 13 through 20 find support in the original claims, and throughout the specification.

The claims recite a detachable container, suitable for attachment with a dental amalgam separator comprising one or more corresponding keys dental. The detachable container includes a novel combination of features: (1) an effluent inlet port and an effluent outlet port projecting upward from a top mating surface; and (2) one or more keyways cast into the perimeter of said outside top mating surface. The effluent inlet port, effluent outlet port and keyways are designed so that, upon alignment of the one or more container keyways on the top mating surface of the collection container with corresponding keys present on a dental amalgam separation system, the detachable container will detachably engage with the dental amalgam separator, allowing for a secure, leak-proof, detachable connection.

This combination of features provides for the secure engagement of the detachable container to a corresponding dental amalgam separation system in a unique orientation, such that the effluent outlet port of the dental amalgam separation system will securely engage with the effluent inlet port of detachable container and allow the passage of effluent into the detachable container for collection. As described in the specification, the combination of the ports and keyways assists the user in aligning and attaching the container to the corresponding dental amalgam separation system, so that the detachable container can be securely engaged, even if the system is located in an inconvenient location, where it may be difficult to reach or out of sight so that it is difficult to align the container visually.

While the detachable container of the invention is designed for use with a corresponding dental amalgam separation system, the detachable container is an independent apparatus that is capable of being used independently. For example, after the detachable container is used for the collection of effluent, the container can be detached and the inlet and outlet ports sealed, for example with a plug and/or a shipping cap. The sealed container, now filled with effluent, can be appropriately handled --- for example, stored or shipped for recycling or disposal. The original detachable container can be replaced with a second detachable container, which may be new and previously unused, or recycled, and can be attached to

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the dental amalgam system for further collection. In this manner, the detachable container of the invention provides dental offices with a much needed means for efficiently collecting and appropriately disposing of dental amalgam.

Applicant hereby claims small entity status under 37 CFR §1.27. If any additional fees are due, the Examiner is requested to contact Applicants' undersigned representative.

Applicant's undersigned representative may be reached by telephone at 617-966-2374. All correspondence should continue to be directed to the listed address.

Respectfully submitted,

/Steven R. Lazar/

Steven R. Lazar
Attorney for Applicants
Registration No. 32,618

SRL Patents
234 Broadway
Arlington, MA 02474
July 28, 2020

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

PTO/AIA/14 (11-15)
Approved for use through 04/30/2017. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Nicholas		Mozzicato	

Residence Information (Select One) ● US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Acton	MA	US

Mailing Address of Inventor:

Address 1	19 Preston Way
Address 2	
City	Acton
State/Province	MA
Postal Code	01720
Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Richard		Goulston	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

City	State/Province	Country of Residence
Stuart	FL	US

Mailing Address of Inventor:

Address 1	1928 NW Palmetto Terrace
Address 2	
City	Stuart
State/Province	FL
Postal Code	34994
Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Robin		Schofield	

Residence Information (Select One) ◉ US Residency Non US Residency Active US Military Service

Solmetex Ex. 2002

DRNA v. Solmetex - PGR2023-00555

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

City	Lancaster	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	164 Old Country Road		
Address 2			
City	Lancaster	State/Province	MA
Postal Code	01523	Country	US

Inventor 4 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Michael		Toole	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Norton	State/Province	MA	Country of Residence	US

Mailing Address of Inventor:

Address 1	104 Newcomb Streed, D		
Address 2			
City	Norton	State/Province	MA
Postal Code	02766	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	30709		
Email Address	srlpatents@aol.com	Add Email	Remove Email

Application Information:

Title of the Invention	Detachable Recycling Container		
Attorney Docket Number	SMTX-001-T1-CON	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	26	Suggested Figure for Publication (if any)	6A

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	30709		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation in part of	16033823	2018-07-12

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Claims benefit of provisional	16033823	2018-07-12
Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
16033823	Continuation in part of	15703823	2017-10-12	10646313	

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62414712	2016-10-29
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Claims benefit of provisional	62406990	2016-10-12
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Continuation of	29679874	2019-02-11
Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29585674	2016-11-28	D840534	

Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29585668	2016-11-28	D835779	

Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29577701	2016-09-14	E848612	

Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29567544	2016-06-09	D840533	

Prior Application Status	Patented		Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15730828	Continuation of	29565522	2016-05-23	D835264	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
15730828	Continuation of	29679862	2019-02-11
Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.			Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

			Remove
Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)
Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.			Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 — Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
● Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	Solmetex LLC		
Mailing Address Information For Applicant:			
Address 1	60 Bearfoot Road		
Address 2			
City	Northborough	**State/Province**	MA
Country	US	Postal Code	01532
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Steven R. Lazar/			Date (YYYY-MM-DD)	2020-07-28
First Name	Steven	Last Name	Lazar	Registration Number	32618

Additional Signature may be generated within this form by selecting the Add button. Add

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SMTX-001-T1-CON
	Application Number	
Title of Invention	Detachable Recycling Container	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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DRNA v. Solmetex - PGR2023-00555

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	DETACHABLE RECYCLING CONTAINER
First Named Inventor/Applicant Name:	Nick Mozzicatto
Filer:	Steven R. Lazar
Attorney Docket Number:	SMTX-001-T1-CON

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY FILING FEE (ELECTRONIC FILING)	4011	1	75	75
UTILITY SEARCH FEE	2111	1	330	330
UTILITY EXAMINATION FEE	2311	1	380	380
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**785**

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

Electronic Acknowledgement Receipt

EFS ID:	40131704
Application Number:	16941522
International Application Number:	
Confirmation Number:	1050
Title of Invention:	DETACHABLE RECYCLING CONTAINER
First Named Inventor/Applicant Name:	Nick Mozzicatto
Customer Number:	80709
Filer:	Steven R. Lazar
Filer Authorized By:	
Attorney Docket Number:	SMTX-001-T1-CON
Receipt Date:	28-JUL-2020
Filing Date:	
Time Stamp:	23:33:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		SPECIFICATION.pdf	3626616 9193e13aaf60be5624c2b167128b0e440a7c5123	yes	16

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	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Specification		1	13	
	Claims		14	15	
	Abstract		16	16	
Warnings:					
Information:					
2	Drawings-only black and white line drawings	DRAWINGS1-26.pdf	568063 9743fa7bfdbb3bc79445ff54e5d07f1726d9356e	no	26
Warnings:					
Information:					
3		SMTX-0001-PRELIMINARY-AMENDMENT-7-28-2020.pdf	74450 854d72714083fc56ff27a3c32e17e154034ce178	yes	6
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Preliminary Amendment		1	1	
	Claims		2	3	
	Specification		4	4	
	Applicant Arguments/Remarks Made in an Amendment		5	6	
Warnings:					
Information:					
4	Application Data Sheet	SMTX-001-T1-CON-ADS.pdf	1824016 8c80d48dc0939df11a21009e501cbe9f8e4246c7	no	10
Warnings:					
Information:					
5	Fee Worksheet (SB06)	fee-info.pdf	34792 6f1075610586086ab0e06205aaadc7f237f5d425	no	2

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DRNA v. Solmetex - PGR2023-00555

Warnings:	
Information:	
Total Files Size (in bytes):	6127937

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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DENTAL AMALGAM SEPARATION AND RECYCLING SYSTEM

RELATED APPLICATIONS

[001] This patent application claims priority from provisional patent application serial number 62/414,712, filed on October 29, 2016; and provisional patent application serial number 62/406,990, filed on October 12, 2016. This application further claims priority from patent application serial number 29/667,212, filed October 19, 2018, which is a continuation of serial number 29/585,659, filed on November 28, 2016, now patent number D835,778. This patent application further claims priority from patent application serial number 29/585,674, filed on November 28, 2016. This patent application further claims priority from patent application serial number 29/672,887, filed on December 10, 2018, which is a continuation of patent application serial number 29/585,668, filed on November 28, 2016, now patent number D835,779. This patent application further claims priority from patent application serial number 29/577,701, filed on September 14, 2016. This patent application further claims priority from patent application serial number 29/567,544, filed on June 9, 2016. This patent application further claims priority from patent application serial number 29/671,943, filed on November 30, 2018, which is a continuation of patent application serial number 29/565,622, filed on May 23, 2016, now issued patent D835,264.

FIELD OF THE INVENTION

[002] This invention relates to systems and apparatus suitable to remove particles from effluent waste, and particularly, to remove amalgam and other metallic particles and other abrasive solids from dental office suction effluent. The system also comprises a self contained recycling container to facilitate customer regulatory compliance and environmental safeguards.

BACKGROUND OF THE INVENTION

[003] Dental amalgam is a dental filling material used to fill cavities caused by tooth decay. It has been used for more than 150 years in hundreds of millions of patients around the world.

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[004] Dental amalgam is a mixture of metals, consisting of liquid (elemental) mercury and a powdered alloy composed of silver, tin, and copper. Approximately 50% of dental amalgam is elemental mercury by weight. The chemical properties of elemental mercury allow it to react with and bind together the silver/copper/tin alloy particles to form an amalgam. See http://www.fda.gov/MedicalDevices/ProductsandMedical Procedures/DentalProducts/DentalAmalgam/ucm171094.htm, accessed September 9, 2016.

[005] Amalgam is used less often than in the past, mostly because tooth-colored materials now can be used. However, the newer materials can't be used for all dental situations, amalgam is less costly than newer materials and it lasts longer, especially in teeth that undergo a lot of pressure and wear from chewing.

[006] Better dental health overall coupled with increased demand for more modern alternatives such as resin composite fillings (which match the tooth color), as well as public concern about the mercury content of dental amalgam, have resulted in a steady decline in dental amalgam use in developed countries, though overall amalgam use continues to rise worldwide. Stein, PS; Sullivan, J; Haubenreich, JE; Osborne, PB (2005). "Composite resin in medicine and dentistry". Journal of long-term effects of medical implants. 15 (6): 641–54. doi:10.1615/jlongtermeffmedimplants. v15.i6.70. PMID 16393132.

[007] Although amalgams are less frequently used in developed countries for new dental fillings than in the past, amalgams continue to make up a portion of the particle component of dental office effluent mainly because of the fact that old fillings made of amalgams are drilled out and removed in the effluent waste when new fillings are effected to replace the old. Further, as noted above, even under current dental practice, an amalgam is preferred for some tooth filling situations.

[008] Because mercury is a poison that can accumulate in living tissues and can pose a health hazard to species in a food chain exposed to mercury-containing compounds, and since humans are inevitably at the end of the food chain, it follows that effluent containing amalgams can pose a health hazard to the community at large. Also, certain metals such as silver are commercially valuable if recovered in quantity. For those reasons, it is desirable to devise systems, apparatus and processes for removing amalgams from dental office effluent and efficiently recycling those amalgams.

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[009] In addition to removing amalgams, other matter disposed into dental office suction effluent includes aluminum oxides used in air abrasion treatments and other solid waste material. These solid materials tend to wear out or damage vacuum pumps and other equipment downstream of the dental chair suction apparatus, and also constitute effluent water contaminants. Therefore, it is desirable for the apparatus to remove solid abrasive material and other particulate waste from the dental office suction effluent.

[0010] The World Health Organization also points out that amalgam separators, installed in the waste water lines of many dental offices, dramatically decrease the release of mercury into the public sewer system. However, critics say that the separators are still not mandatory in some states of the United States. "Purchasing, installing and operating dental amalgam separators: Practical issues". The Journal of the American Dental Association. 134 (8): 1054–65. doi:10.14219/jada.archive.2003.0319. PMID 12956345. Recently, the EPA has enacted nation-wide regulations requiring amalgam separators in dental offices.

[0011] Previously known apparatus for removing amalgam particles from dental office suction effluent are known to include a collecting tank for collecting a day's accumulation of suction effluent from one or more sources of such waste. The waste is sucked from the dental chair suction apparatus and into the collecting tank by a vacuum pump. When the vacuum pump is turned off, an outlet valve is opened and the accumulated waste is deposited into a separation device intended to separate metal particles from the effluent liquid. Flow into the separation device is induced by the head of fluid in the collecting tank. Particles passing through the separation device are separated from the waste by gravity and settle to the bottom of the separation device. The flow rate is dependent on the head inside the collecting tank; as the head diminishes, the flow rate also diminishes. The changes in flow rate are undesirable because the particle separation rate is affected, and the system becomes prone to plugging when the flow rate decreases. Also, since the waste can be deposited only when the vacuum pump is off, waste is usually moved to the separation device at the end of the day. As a result, the collecting tank and separation device tend to be undesirably large and the whole process is time consuming.

[0012] Another known apparatus is a centrifuge type system that separates heavier metal particles from effluent liquid by collecting the particles at the peripheral wall of the

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centrifuge. This apparatus does not effectively separate lighter particles, and is expensive to purchase and operate due to the complexity of its mechanical parts.

[0013] Yet another known apparatus uses a dedicated mechanical pump to suction waste liquids through a separator device. Again, a dedicated pump can be expensive to purchase and to maintain, and can be undesirably space-consuming.

[0014] Such known systems can become quite complex, unwieldy and expensive, as for example that disclosed in U.S. Pat. No. 5,885,076 granted 23 Mar. 1999. It teaches the use of sedimentation, co-precipitation and filtration in an expensive complicated apparatus that is probably economical, if at all, only for relatively large installations such as a military base dental complex.

[0015] U.S. Pat. No. 6,692,636 and U.S. Pat. No. 6,596,754 are patents that disclose systems for removing amalgam from dental office suction effluent.

[0016] After collecting the amalgam and other solid waste the dentist is left with the problem of what to do with the waste. Either the dentist has to deal with his own hazardous waste or he can send his collected material to a recycler. In either case, the "collection container" needs to be disposable and easily replaceable.

[0017] Existing recycling programs generally require the provision of bulky shipping materials and the delivery of those materials to the dentist for every full container. If such materials are not provided and the materials are not properly recycled a large part of the benefit of collecting the amalgam waste can be lost. It is important that the waste is recycled under federal guidelines in order to make sure the full benefits of amalgam separation are achieved.

[0018] Additionally, containers for collection, such as dental amalgam recycling systems, can be compromised by incorrect installation or misalignment, which can cause O-rings to deform and/or seal irregularly, and result in leakage.

SUMMARY OF THE INVENTION

[0019] The present invention overcomes many of the shortcomings of the prior technology and achieves further advantages that will be apparent after reviewing the following detailed description.

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[0020] In one aspect, the invention comprises a dental amalgam recycling system for recycling particles from a dental liquid effluent drawn from a suctioning device. In certain embodiments, the dental amalgam recycling system of the invention comprises:

[0021] (a) an air-water separator tank for receiving said effluent, said air-water separator tank having an air-water separator tank inlet in fluid communication with said suctioning device, an air-water separator tank liquid effluent outlet and an air-water separator tank air outlet;

[0022] (b) a detachable recycling container, said recycling container acting primarily under the influence of gravity to cause settlement of said particles; said recycling container having a recycling container effluent inlet port connected to said air-water separator tank liquid effluent outlet and said recycling container further having an effluent outlet port;

[0023] (c) wherein the air-water separator tank also includes an internal suction conduit;

[0024] (d) wherein the recycling container comprises threads;

[0025] (e) wherein the recycling container effluent inlet port and the recycling container outlet port are not the same height.

[0026] In certain embodiments, the dental amalgam recycling system further comprises (f) a threaded shipping cap, wherein the threads of the shipping cap and the threads of the recycling container are complementary such that, when the shipping cap is fitted in place, the shipping cap forms a tight seal with said recycling container.

[0027] While in use, the dental amalgam recycling system is functionally associated with a vacuum pump having a vacuum pump inlet. The vacuum pump is typically a pre-existing part of the dental office facility. In particular embodiments, the dental amalgam recycling system is physically connected with a vacuum pump via a suction conduit in the air-water separator. In certain preferred embodiments, the suction conduit is an internal suction conduit within the air-water separator.

[0028] In certain embodiments, the dental amalgam recycling system of the invention further comprise a first plug for said recycling container inlet port and a second plug for said recycling container effluent outlet port. Said first and second plugs may be held tightly in place by said threaded shipping cap when said shipping cap is fitted in place.

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[0029] In certain embodiments, the dental amalgam recycling system of the invention further comprise an O-ring that provides an air and effluent tight seal when said shipping cap is fitted in place.

[0030] In certain embodiments, the invention comprises a container, useful as a dental amalgam recycling container, comprising threads for attachment of a shipping cap. In certain embodiments, the dental amalgam recycling container further comprises two plugs held in place by said shipping cap and an O-ring fitted in an O-ring groove to prevent leaks. The dental amalgam recycling containers of the present invention may further comprise a two tier cap that enables people with hands of different sizes to grip the cap and tighten to achieve a very tight seal.

[0031] In certain embodiments, the invention comprises an adapter for an air-water separator tank, wherein the adapter enables a recycling container without compatible effluent ports to attach to an air-water separator tank. Said air-water separator tank may comprise, for example, a component of a dental amalgam recycling system, as described above. In certain embodiments, the adapter may comprise threads. In alternative embodiments, the adaptor may be without threads.

[0032] As described above, the potential for leakage exists in a collection canister such as a recycling container used in the dental amalgam recycling systems described herein. Such leakage may occur, for example, due to incorrect installation, or due to misalignment of a container and its intended mating partner, such as the air-water separation tank or its intended cap, such as a threaded shipping cap, which may cause O-rings to deform and/or seal irregularly. In order to address this problem and/or reduce the potential for leakage, a collection canister, such as a recycling container used in a dental amalgam recycling system, may have one or more irregular 'keyways' cast into its outside top mating surface, and the intended mating partner, such as the air-water separation tank, or the shipping cap, may have one or more corresponding 'key(s)' be cast into its mating surface, such that the key(s) and keyway(s) must be aligned in order for the collection canister (e.g., the recycling container) and its mating partner (e.g., the air-water separation tank; or the shipping cap) to mate properly. This key/keyway system can help ensure even pressure across the entire circumference of the O-ring surface on each port. Similarly, such key(s) and keyway(s) may be

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used to ensure proper replacement of the container and/or the air-water separation tank, such that incorrect replacement can be avoided or minimized.

BRIEF DESCRIPTION OF THE DRAWINGS

[0033] FIG. 1 is a schematic front view of an embodiment of particle removal and recycling apparatus according to the invention, for particular use in a dental office.

[0034] FIG. 2 is a schematic side view of an embodiment of particle removal and recycling apparatus according to the invention, for particular use in a dental office.

[0035] FIG. 3 a is a schematic view of an embodiment of a universal adapter for fitting various different sized recycling containers to the air-water separator of the present invention.

[0036] FIG. 3 b is a schematic view of an alternative embodiment of a universal adapter for fitting various different sized recycling containers to the air-water separator of the present invention.

[0037] FIG. 4 a is a schematic view of an embodiment of a recycling container and cap system of the invention.

[0038] Fig. 4 b is a schematic perspective depiction of an embodiment of a recycling container and cap system of the invention.

[0039] FIG. 5 a is a schematic inside view of an embodiment of a recycling cap for the recycling containers of the invention.

[0040] Fig. 5 b is a schematic depiction of a recycling cap according to the invention fitting on a partial view of a recycling container according to the invention.

[0041] 1-Backplate

[0042] 2-Waste Inlet (from dental practice)

[0043] 3-Air/water Separator Top

[0044] 4-Top Support Bracket

[0045] 5-Air/Water Separation Tank

[0046] 6-Suction tube

[0047] 7-Air/Water Separator Base

[0048] 8-Outlet Tube (to vacuum system)

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[0049] 9-Recycling Container Top

[0050] 10-Lower Support Bracket

[0051] 11-Restrictor

[0052] 12-Detachable Recycling Container

[0053] 13-Retaining Pins (2)

[0054] 14- air-water separator tank effluent outlet port

[0055] 15- recycling container inlet port

[0056] 16- recycling container outlet port

[0057] 17- recycling container threads

[0058] 18- two tier recycling cap

[0059] 19- O-ring groove

[0060] 20- cap plugs

[0061] 21- O-ring

[0062] Figure 6A is a schematic view of a first embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0063] Figure 6B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0064] Figure 7A is a schematic view of a second embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0065] Figure 7B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0066] Figure 8A is a schematic view of a third embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0067] Figure 8B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0068] Figure 9A is a schematic view of a fourth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0069] Figure 9B is a schematic view of the same embodiment, viewing the top of the container from directly above.

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[0070] Figure 10A is a schematic view of a fourth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0071] Figure 10B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0072] Figure 11A is a schematic view of a fifth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0073] Figure 11B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0074] Figure 12A is a schematic view of a sixth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0075] Figure 12B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0076] Figure 13A is a schematic view of a seventh embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0077] Figure 13B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0078] Figure 14A is a schematic view of a eighth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0079] Figure 14B is a schematic view of the same embodiment, viewing the top of the container from directly above.

[0080] Figure 15A is a schematic view of a ninth embodiment of a detachable container according to the present invention, viewing the top of the container at an angle.

[0081] Figure 15B is a schematic view of the same embodiment, viewing the top of the container from directly above.

DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

[0082] According to one aspect of the instant invention, an apparatus is provided for removing and recycling metal-containing particles and other waste particles from effluent, particularly effluent from a dental office. While herein the term "metal particles" may

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frequently be employed, it is contemplated that the apparatus is capable of separating other solid particles from effluent liquid.

[0083] According to one aspect of the invention, an apparatus for removing metal particles and other solid particles from liquid suction effluent can be installed in a dental office using a pre-existing suction/vacuum pump system. The apparatus may share a common vacuum pump with conventional dental chair suction apparatus, without interrupting the use of suction equipment at the dental chairs.

[0084] Removal of solid particles from liquid suction effluent is effected by sedimentation.

[0085] In accordance with a one embodiment of the invention, the dental office suction effluent is passed from dental chair suction equipment outlets to an air water separator tank via a suitable inlet port for the tank. The air-water separator tank in turn passes effluent into a sedimentary deposit tank, closed on all sides when in use and preferably readily detachable for emptying or replacement.

[0086] In certain aspects of the instant invention the sedimentary deposit tank has a secondary function as a recycling container. In another aspect of the invention this recycling container can have features built in to make recycling easier and to reduce the amount of packaging and waste in the recycling system.

[0087] In another embodiment of the invention designed to minimize the space required to install the amalgam recycling system the air-water suction tube is internalized – within the air-water separator tank.

[0088] **Figure 1** and **Figure 2** shows two views of the separation apparatus according to the present invention in detail. Effluent from the dental chairs and a quantity of air are sucked through a suction apparatus exhaust conduit, through an air-water separator tank inlet **2**, and thence into an air-water separator tank **5**. The liquid effluent passes out of the air-water separator tank **5** via air-water separator tank outlet port **14**, while air passes downstream via the air suction tube **6** while maintaining constant vacuum upstream of amalgam separator.

[0089] The air-water separator tank effluent outlet port **14** passes effluent by gravity out of the air-water separator tank **5** and into the detachable recycling container **12** through

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the recycling container inlet port **15** for target particle separation by sedimentation. Solids settle and accumulate in the bottom of Recycle container **12**. Liquid content of waste flows primarily by gravity, although intermittently assisted by vacuum through Restrictor **11** which slows the flow rate of liquid to assist in sedimentation process and ultimately "clean" effluent discharge through the recycling container outlet port **16**.

[0090] Outlet ports **16** and inlet port **15** can be a variety of shapes and sizes, square, oval (as depicted), round or even more unusual shapes like a star. Preferred ports are those that provide a tight seal, allow for easy removal, and do not break. Oval or round are preferred embodiments. Round are most preferred.

[0091] A vacuum at the outlet tube **8** is generated when the vacuum pump is operating, thereby sucking air out of the air-water separator tank **5** via suction tube **6** while maintaining vacuum upstream of amalgam separator apparatus. Effluent from the recycling container **12** passes through the restrictor **11** where remaining non-settable fine particles are removed from the effluent and into the recycling container outlet port **16** to be discharged from the apparatus via common outlet tube **8.** Matter sucked by the vacuum pump, generally free of removed solids, is discharged via vacuum pump into a municipal drain of the public sewage system.

[0092] The system is provided with a simple back plate **1** for easy dental office placement as well as removable retaining pins **13** to ensure the recycling container does not detach from the air-water separation tank **5** when there is no vacuum in the system.

[0093] In certain embodiments, the recycling container ports **16** and **15** may be different heights in order to aid in alignment of the detachable recycling container **12** in the air-water separator base **7**. In a preferred embodiment, the outlet port **16** engages before the inlet port **15** while during removal the inlet port **15** disengages first. This causes a small volume of fluid to be pulled out of the collection container back into air-water separator tank **5** creating head space and eliminating upward force of vacuum which eases removal of recycle container **12** by operator. Existing devices require rocking, wiggling or applying extensive down force for removal of recycle container **12**.

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[0094] In one preferred embodiment of the invention designed to minimize recycling costs and waste, the recycling container/sedimentary deposit tank has threads **17** built into the container to enable the addition of a liquid tight top for shipping.

[0095] **Figure 3** shows a schematic diagram of an adapter according to the invention to enable the use of recycling containers from a variety of sources that are lacking in correctly shaped ports **16** and **15** or otherwise are unable to fit the air-water separator tank **5** according to the invention due to shape differences.

[0096] **Figure 4 a** shows a schematic diagram of the recycling container and cap system (see **Figure 5** for more cap **18** detail) according to the present invention. The cap **18** is a two tier shape to allow for a tight grip by both a big and smaller hand in order to achieve a strong seal as required by the invention. An O-ring **21** is provided and fits into an O-ring groove on the recycling container **12**. Plugs **20** are used to provide a first leak proof seal for the recycling container **12**. These plugs **20** are held in place by the cap **18** when the cap is threaded onto the recycling container as depicted in **Figure 5b**.

[0097] **Figures 6 through Figure 15** show several embodiments of a recycling container of the present invention, which include the inlet port and outlet port on the top mating surface, and irregular keyways cast into the outer top mating surface.

[0098] Generally, under present practice, the dental staff will not be able to remove deposited sediment from the recycle container nor remove accumulated particle residues from the restrictor unit themselves. Thus, it is desirable that such removal be done by a competent effluent residue processing facility. Therefore, under present practice, it is expected to be preferred that the recycling container with its enclosed restrictor unit be removed when full, or periodically replaced by fresh tanks from time to time as required. The spent tank with an accumulation of metallic and other particles can then be sent to a processing facility for proper disposal of the targeted metallic particles, such as mercury, and recovery of precious metals such as silver.

[0099] Although the sedimentary deposit process is effective to remove a satisfactorily high proportion of the target particles desired to be removed from the effluent, the recycling container desirably includes an outlet restrictor right in the chamber to catch any floating materials as well as any other materials that did not settle out.

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[00100] If the recycle container is not changed as required or filled beyond normal capacity, waste liquid from dental practice may back up into air water separator tank. Should this occur, effluent overflows through the air suction tube and into the outlet port and is discharged into the vacuum pump draw line and thence eventually into the municipal drain. However, it is desirable that the system should operate in such a manner as to avoid having the air-water separator tank become completely full, since effluent exiting through the air outlet port will contain particles that will not be separated by the separator. If, however, such a by-pass condition occurs at no time will the suction generated by the vacuum pump be lost or interrupted at the dental office.

[00101] In a further embodiment of the invention oriented towards large-scale institutional applications, in which many dental chairs or other sources of effluent are connected to the same suction and drain services, several parallel-connected recycling containers and associated apparatus, each such composite apparatus including a air-water separator tank and preferably one, or alternatively two attached recycling containers, may be operated in parallel to provide sufficient treatment capacity for large effluent volumes.

[00102] All publications, web-sites, patents and patent applications cited in the specification are hereby incorporated herein by reference in their entirety for the disclosure for which they are cited.

[00103] Having read the above specification, other alternatives and variants of the above described methods and apparatus suitable for practicing the methods will occur to those skilled in the technology. Such alternatives, modifications and variants fall within the scope of the present invention.

[00104] The invention as described above also includes the following non-limiting claims, which describe particular embodiments of the invention.

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Claims

1. A dental amalgam recycling system for recycling particles from a dental liquid effluent drawn from a suctioning device, comprising:

   (a) an air-water separator tank for receiving said effluent, said air-water separator tank having an air-water separator tank inlet in fluid communication with said suctioning device; an air-water separator tank liquid effluent outlet; and an air-water separator tank air outlet;

   (b) a detachable recycling container, said recycling container acting primarily under the influence of gravity to cause settlement of said particles; said recycling container having a recycling container effluent inlet port connected to said air-water separator tank liquid effluent outlet; and said recycling container further having an effluent outlet port;

   (c) wherein the air-water separator tank also includes an internal suction conduit;

   (d) wherein the recycling container comprises threads;

   (e) wherein the recycling container effluent inlet port and the recycling container outlet port are not the same height.

2. The dental amalgam recycling system of claim 1, further comprising: (f) a threaded shipping cap for said recycling container; and

3. The dental amalgam recycling system according to claim 1, further comprising a first plug for said recycling container inlet port and a second plug for said recycling container effluent outlet port.

4. A dental amalgam recycling system according to claim 3 wherein said first and second plugs are held tightly in place by said threaded shipping cap when said shipping cap is fitted in place.

5. A dental amalgam recycling system according to claim 4 further comprising an O-ring that provides an air and effluent tight seal when said shipping cap is fitted in place.

6. A dental amalgam recycling container comprising threads for attachment of a shipping cap.

7. A dental amalgam recycling container according to claim 6 further comprising two plugs held in place by said shipping cap and an O-ring fitted in an O-ring groove to prevent leaks.

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8. A dental amalgam recycling container according to claim 7 further comprising a two tier cap that enables people with hands of different sizes to grip the cap and tighten to achieve a very tight seal.

9. An adapter for an air-water separator tank wherein the adapter enables a recycling container without compatible effluent ports to attach to the air-water separator tank of the dental amalgam recycling system of claim 1.

10. An adapter according to claim 9, wherein the adapter is without threads.

11. A dental amalgam recycling system according to claim 1, wherein said recycling container further comprises one or more irregular keyways cast into its outside top mating surface; and said air-water separation tank has one or more keys cast into its mating surface, such that the keys of the air-water separation tank and the keyways of said recycling container must be aligned in order for said recycling container and said air-water separation tank to mate securely.

12. A dental amalgam recycling system according to claim 2, wherein said recycling container further comprises one or more irregular keyways cast into its outside top mating surface; and said threaded shipping cap has one or more keys cast into its mating surface, such that the keys of said shipping cap and the keyways of said recycling container must be aligned in order for said recycling container and said shipping cap to mate securely.

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ABSTRACT

The present invention provides dental amalgam recycling systems, useful for recycling particles from a dental liquid effluent drawn, for example, from a suctioning device.

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REPLACEMENT SHEET

1/26

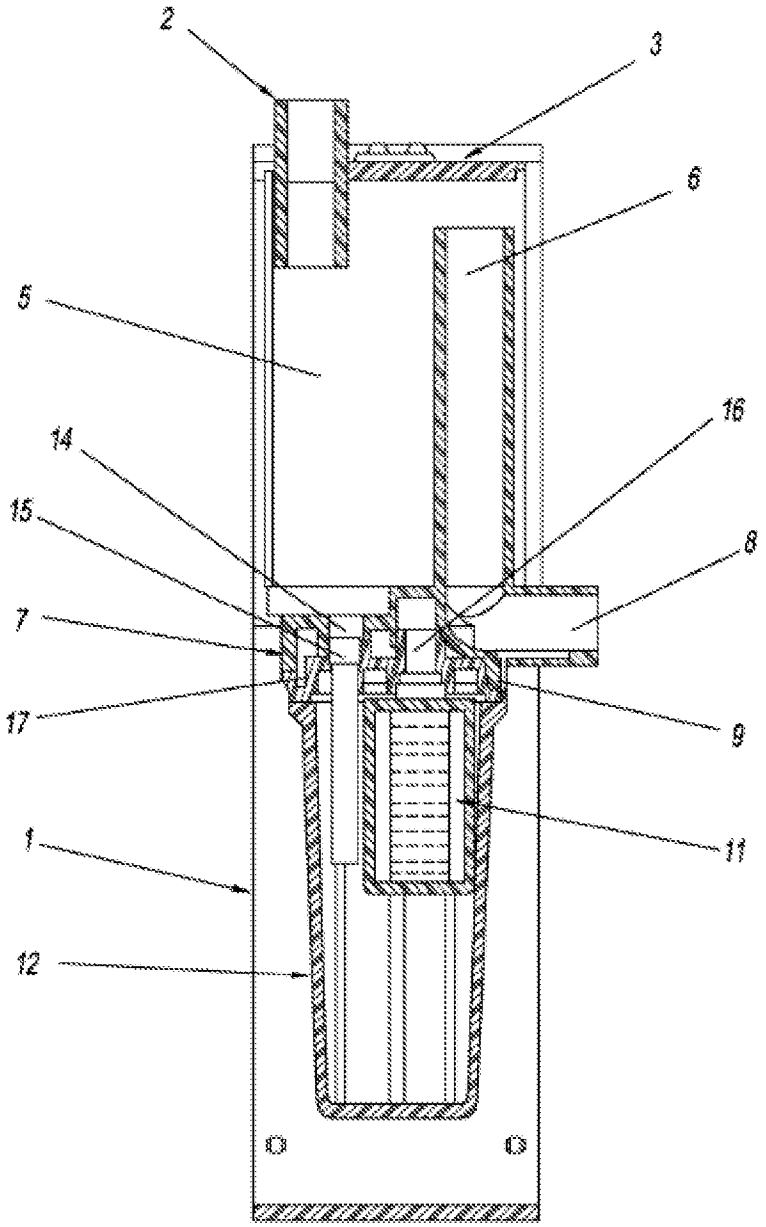


FIGURE 1

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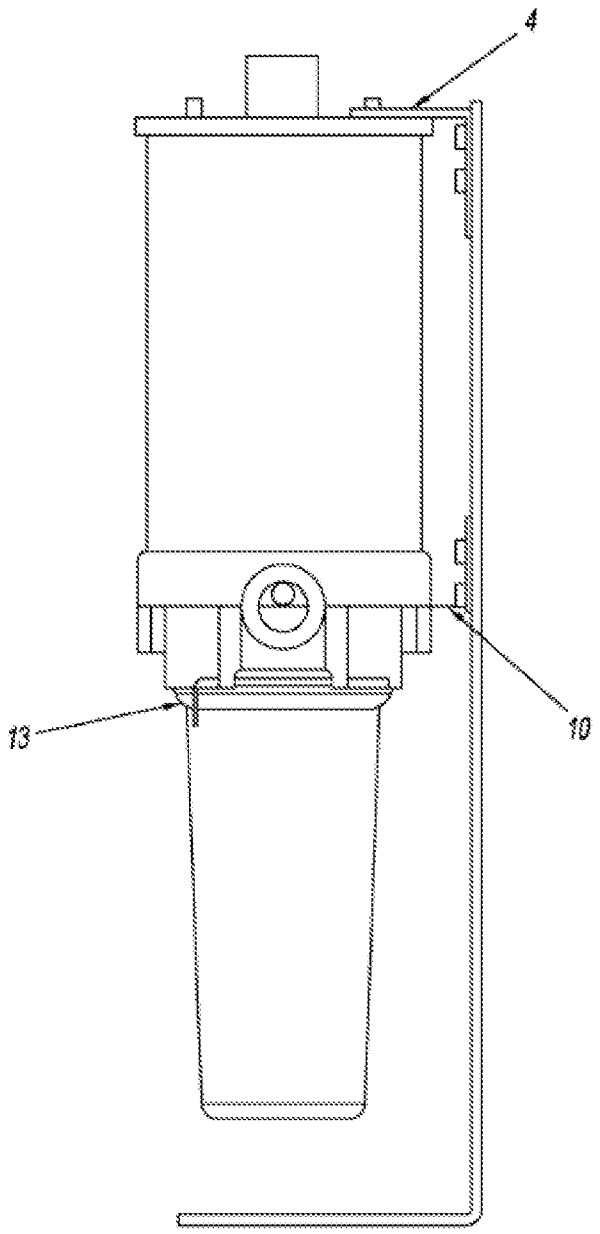


FIGURE 2

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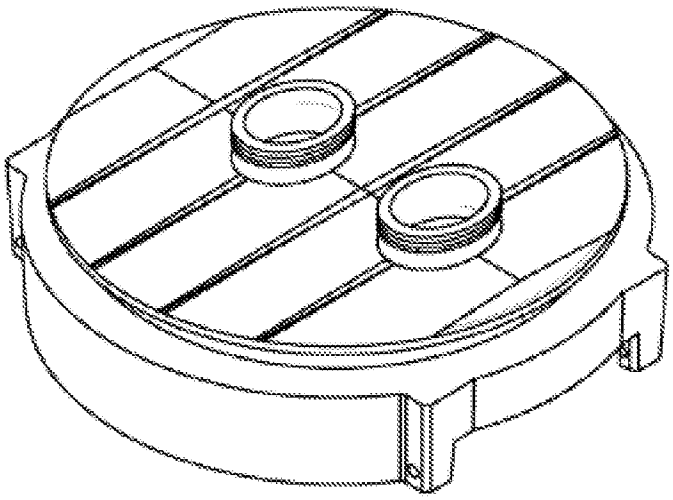


FIGURE 3A

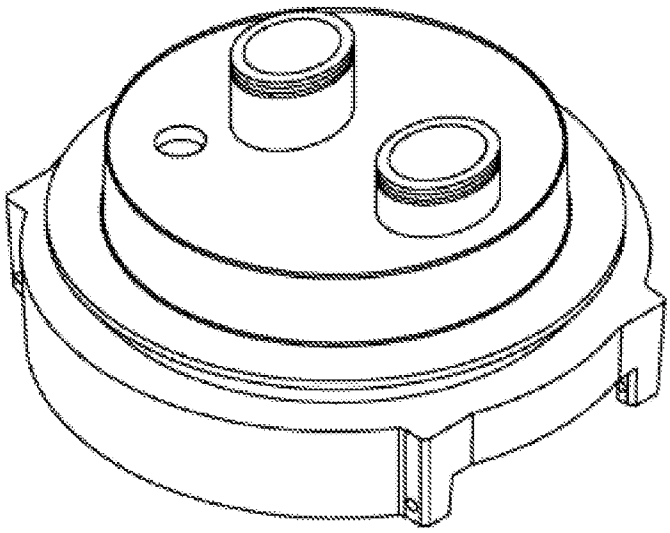


FIGURE 3B

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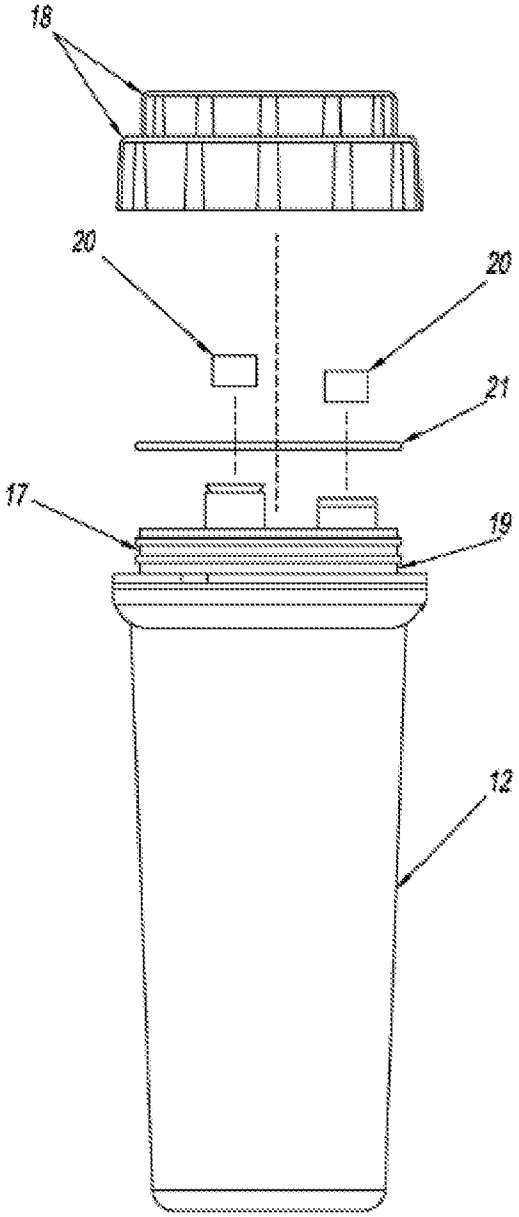


FIGURE 4A

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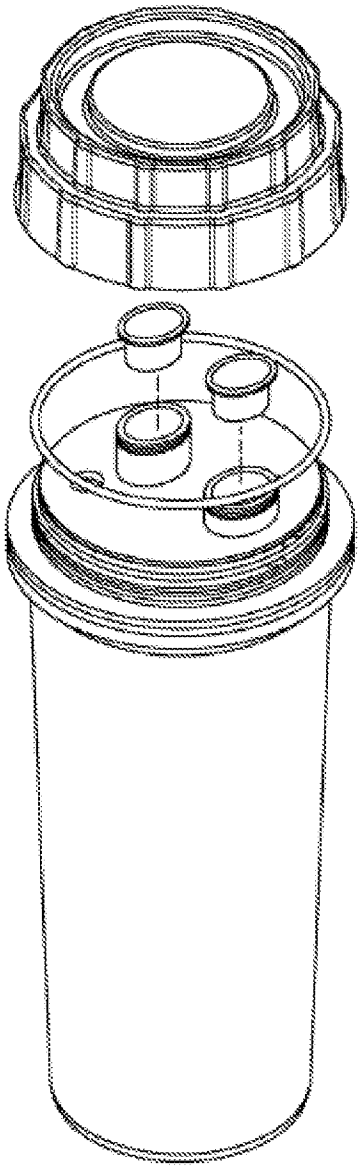


FIGURE 4B

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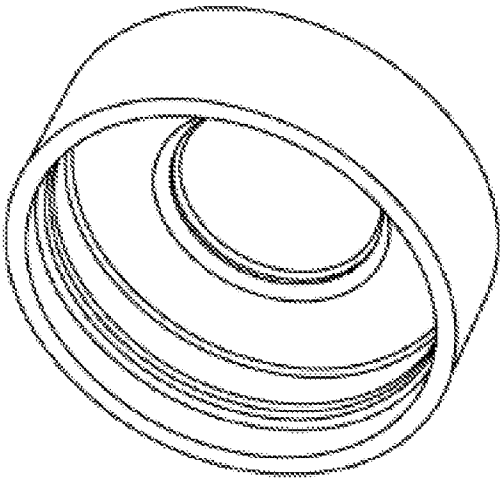


FIGURE 5A

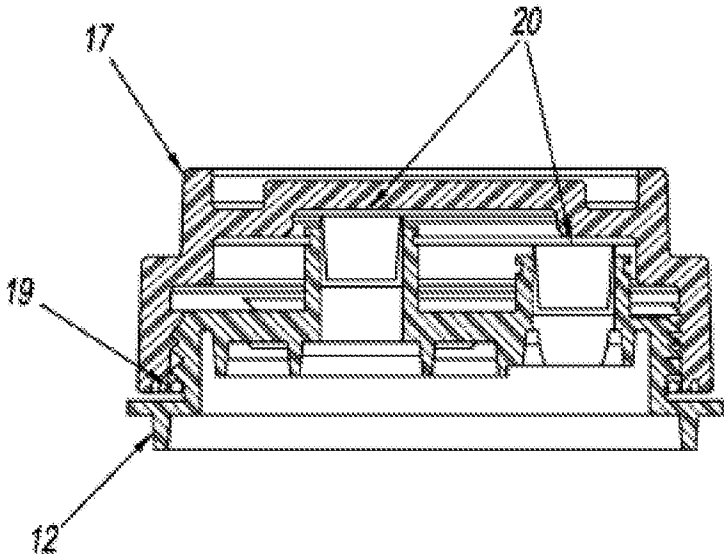


FIGURE 5B

Solmetex Ex. 2002
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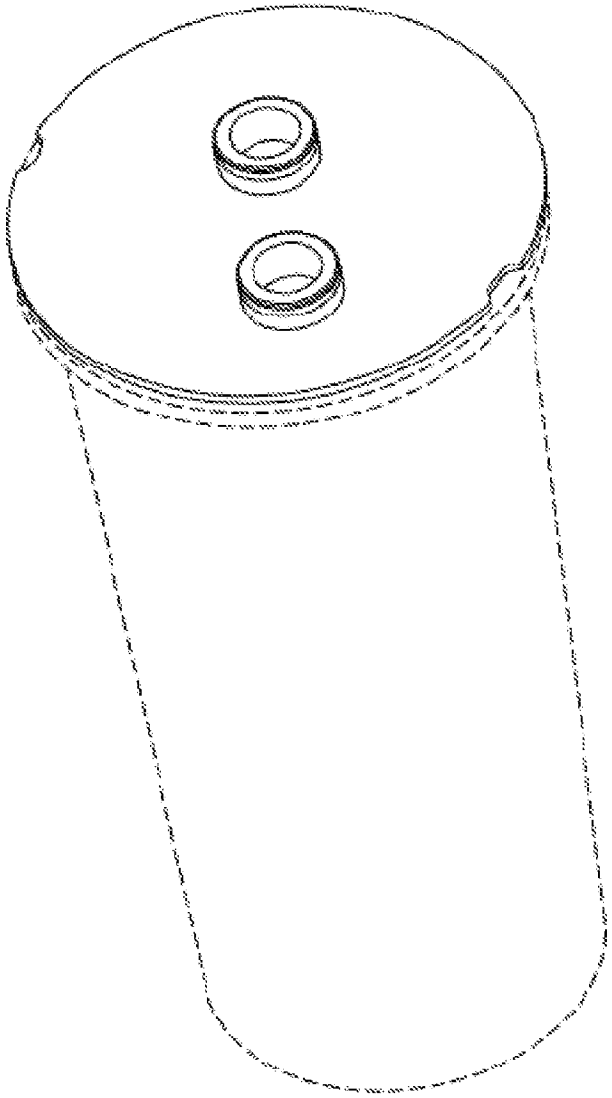


FIGURE 6A

Solmetex Ex. 2002
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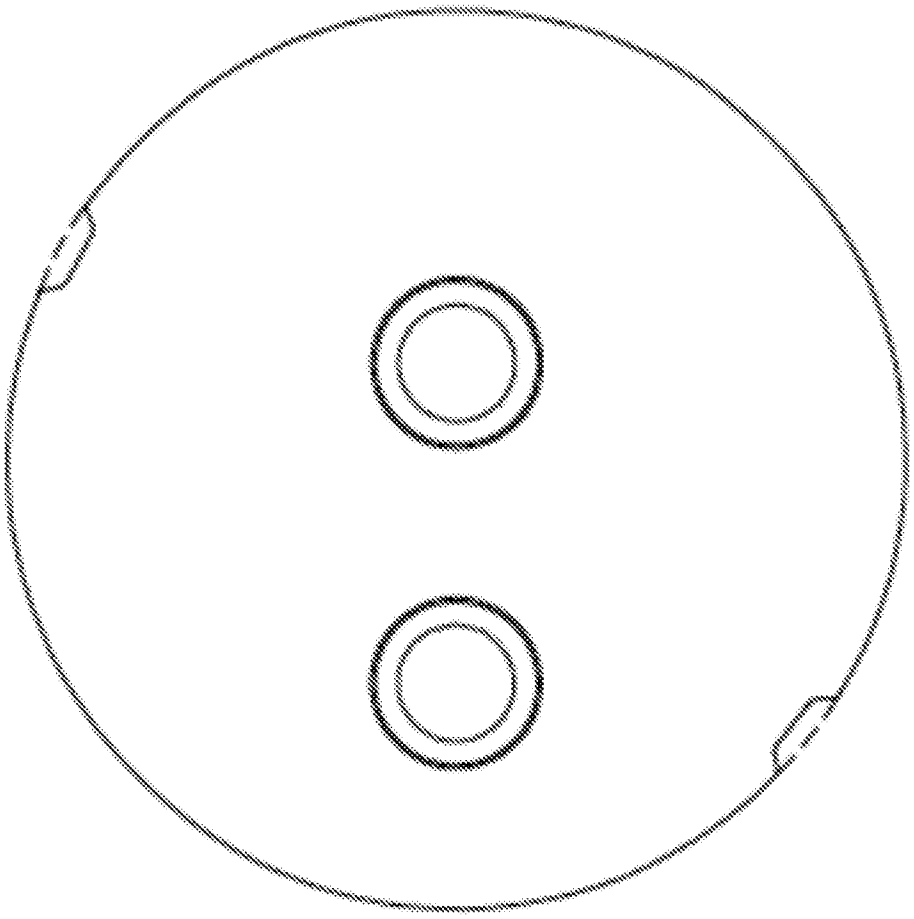


FIGURE 6B

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

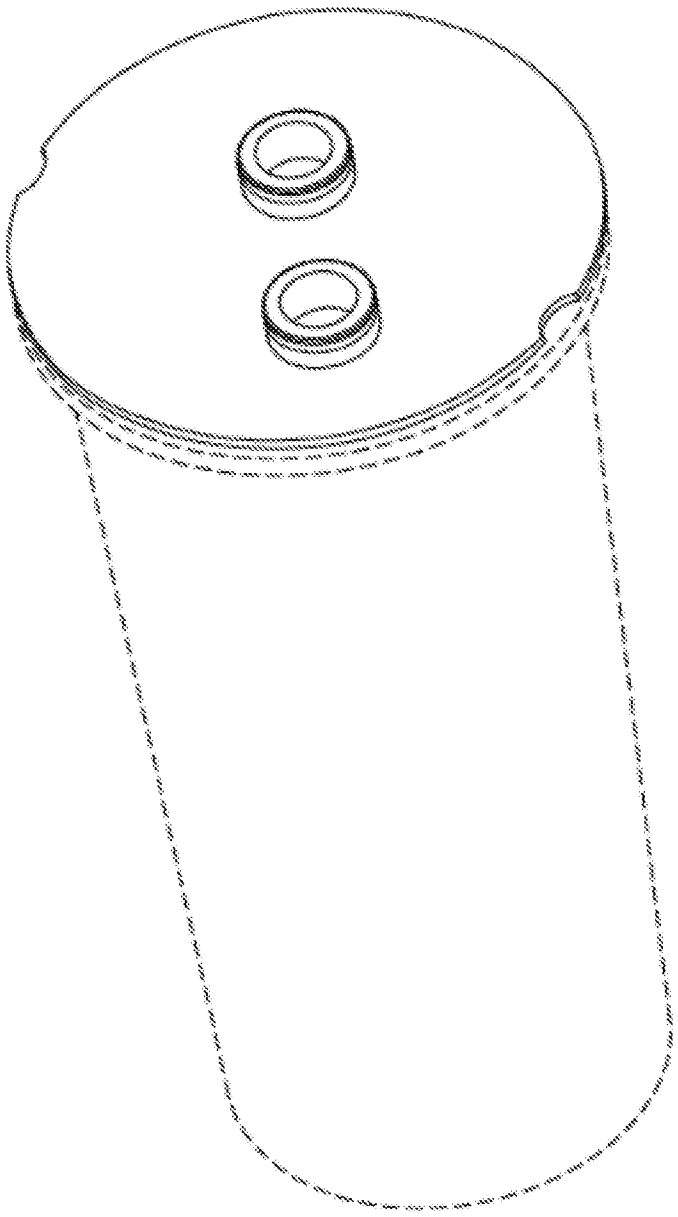


FIGURE 7A

Solmetex Ex. 2002
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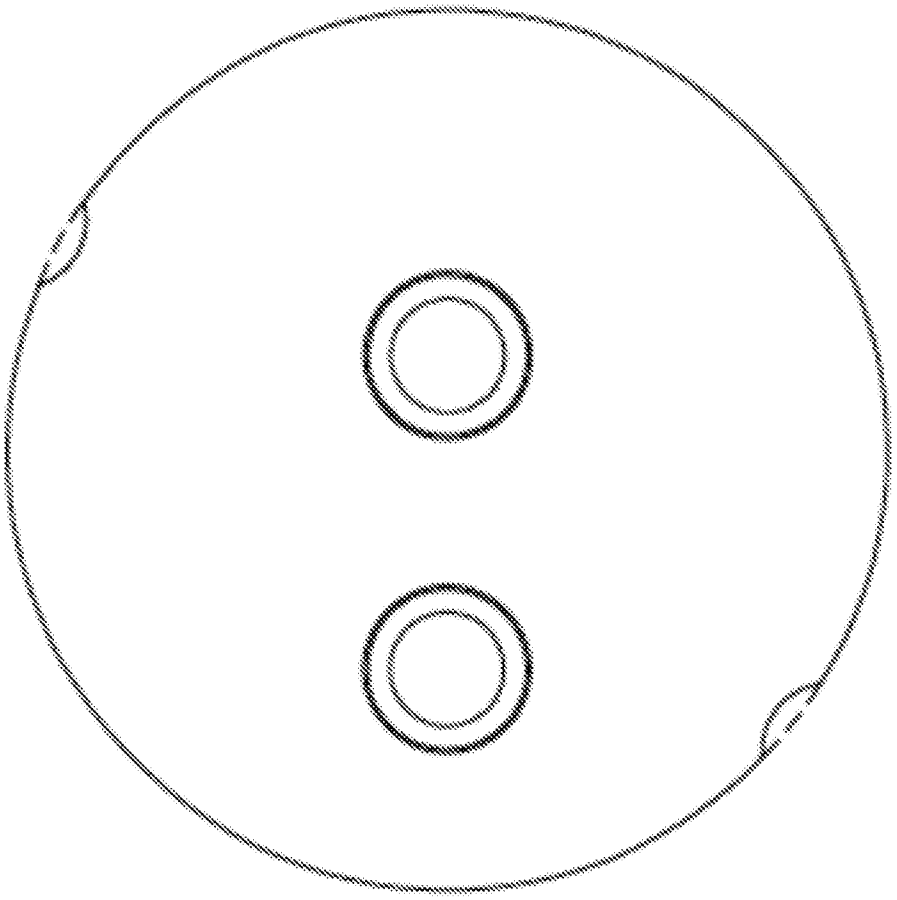


FIGURE 7B

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

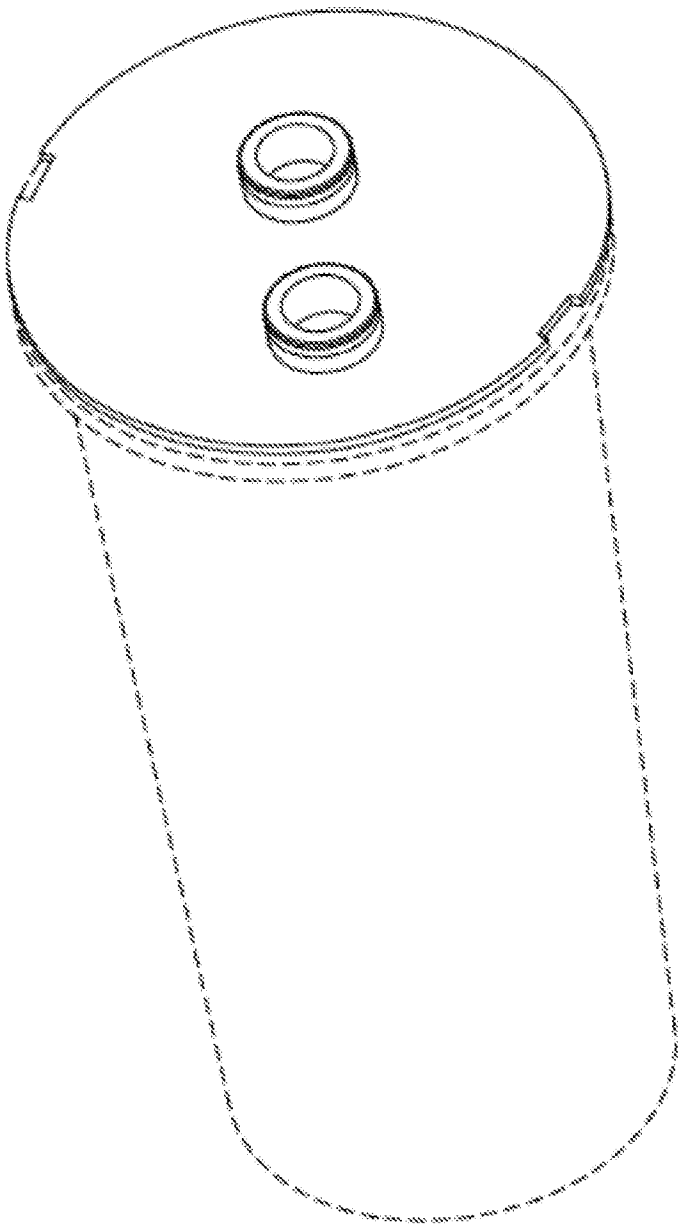


FIGURE 8A

Solmetex Ex. 2002
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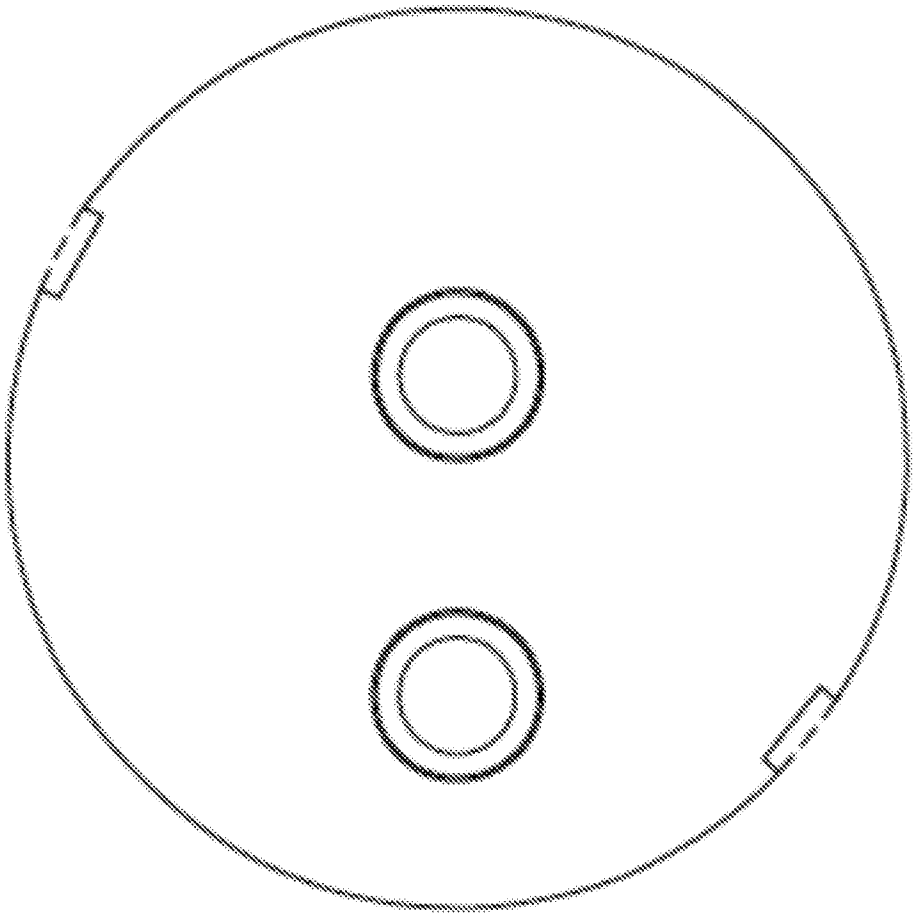


FIGURE 8B

Solmetex Ex. 2002
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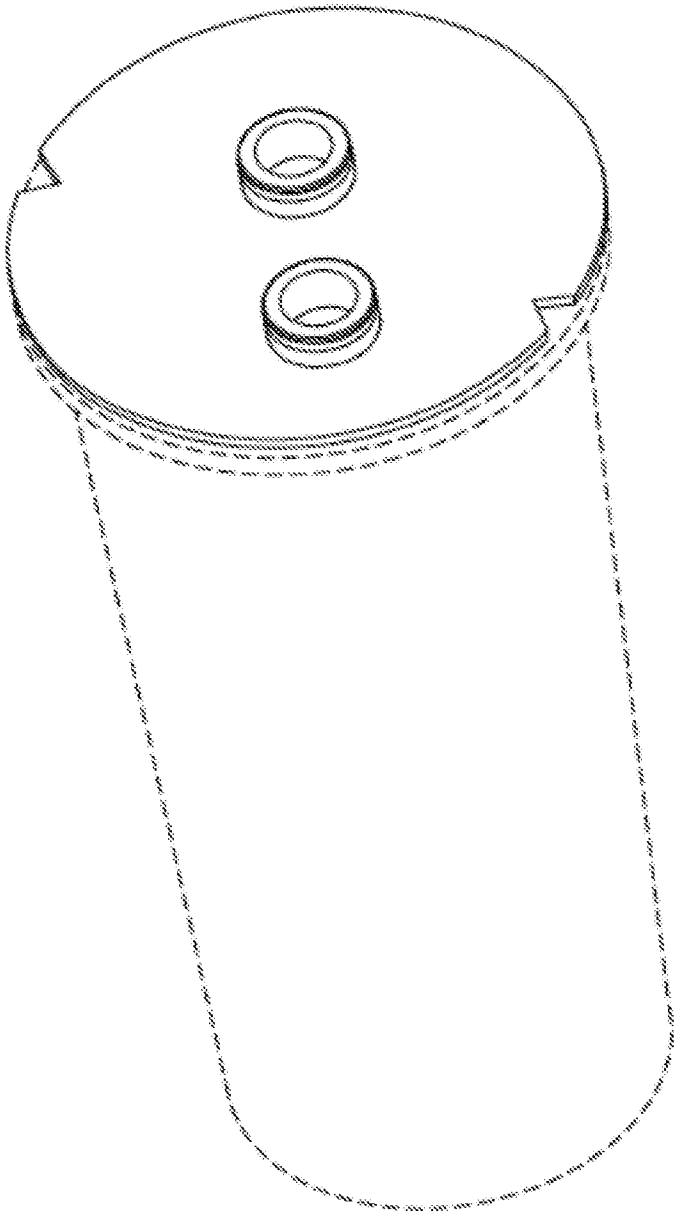


FIGURE 9A

Solmetex Ex. 2002
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REPLACEMENT SHEET

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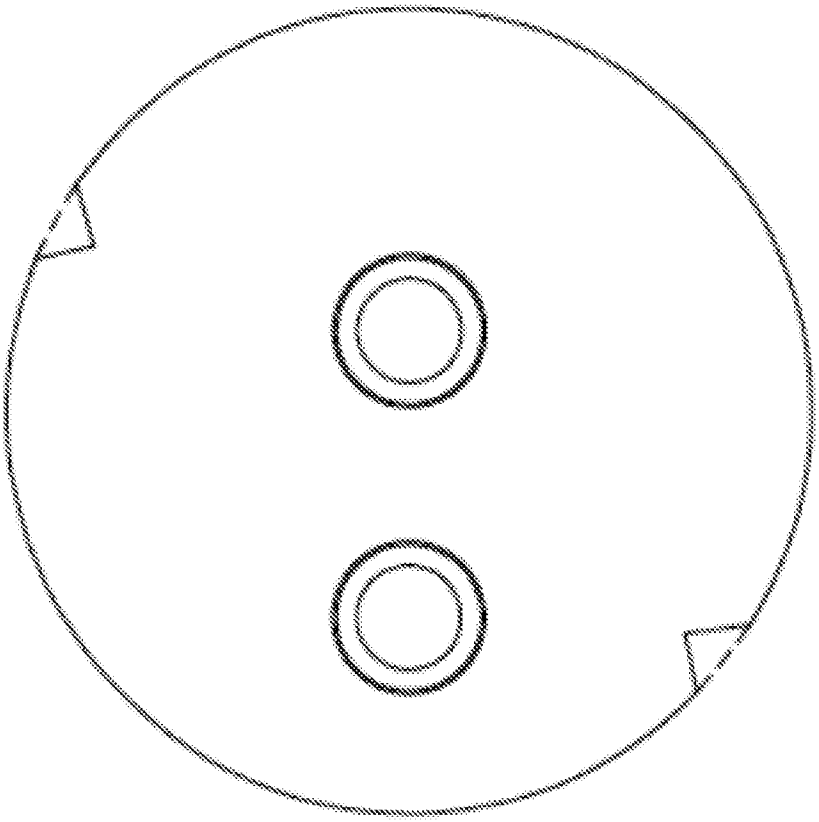


FIGURE 9B

Solmetex Ex. 2002
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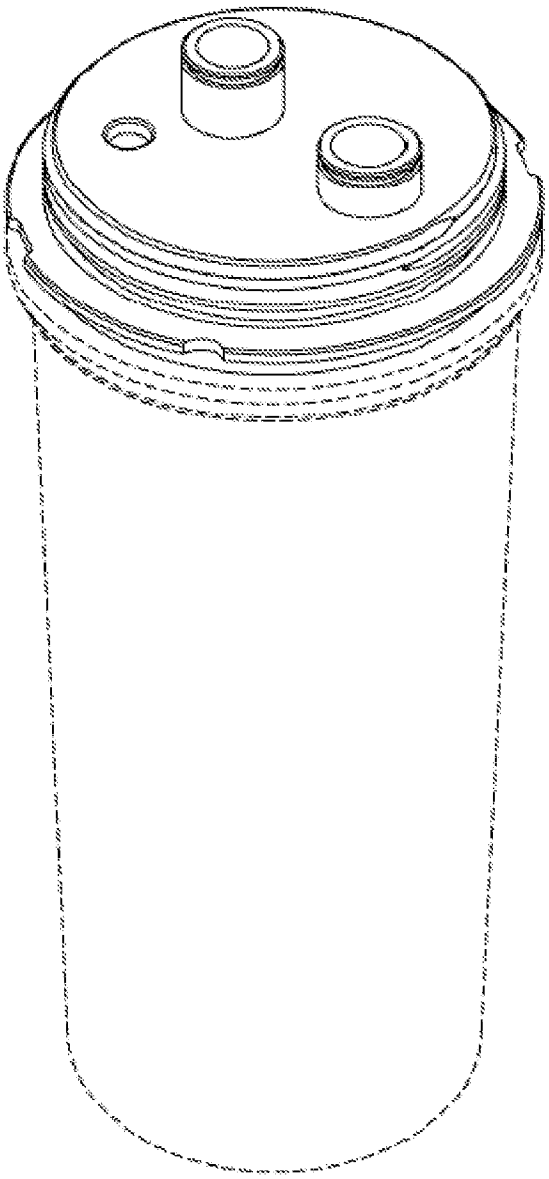


FIGURE 10A

Solmetex Ex. 2002
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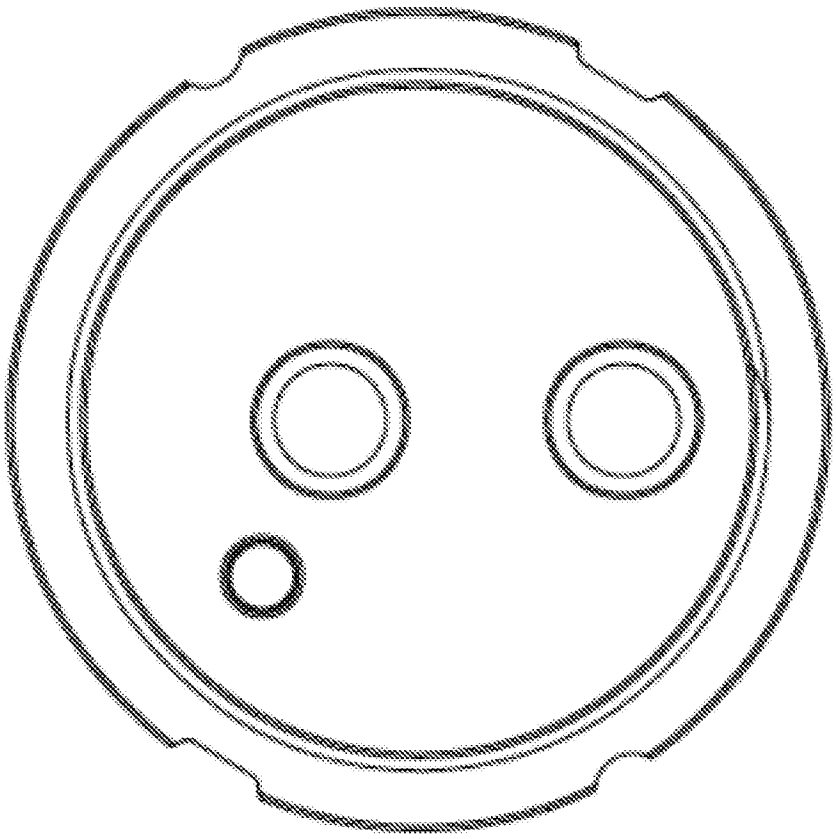


FIGURE 10B

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

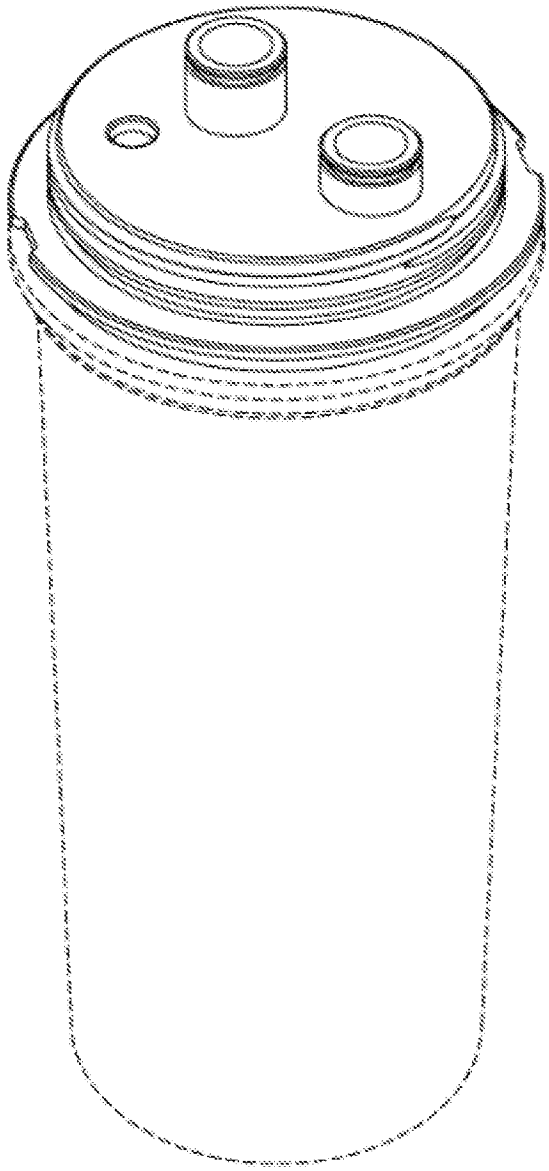


FIGURE 11A

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

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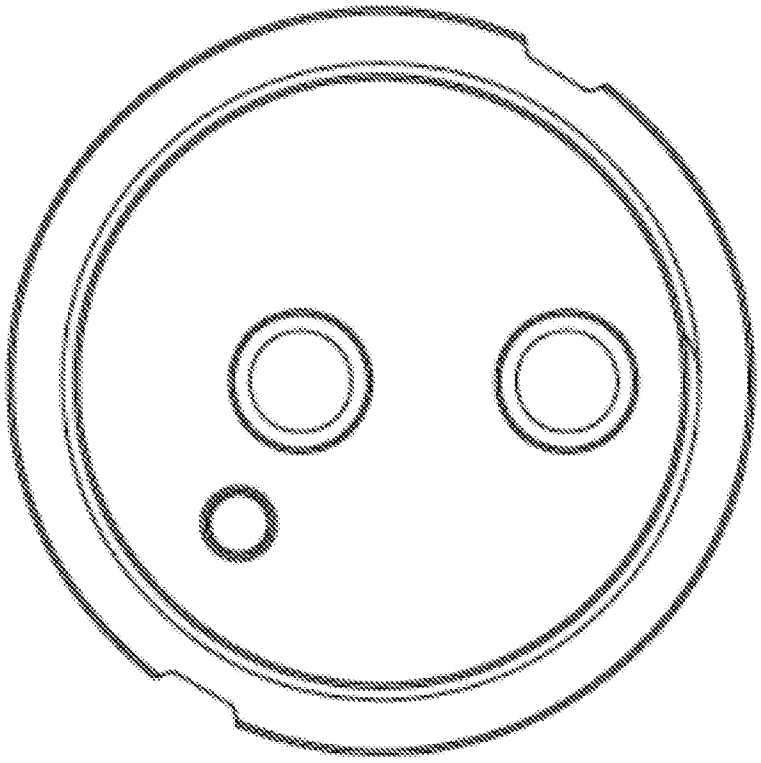


FIGURE 11B

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

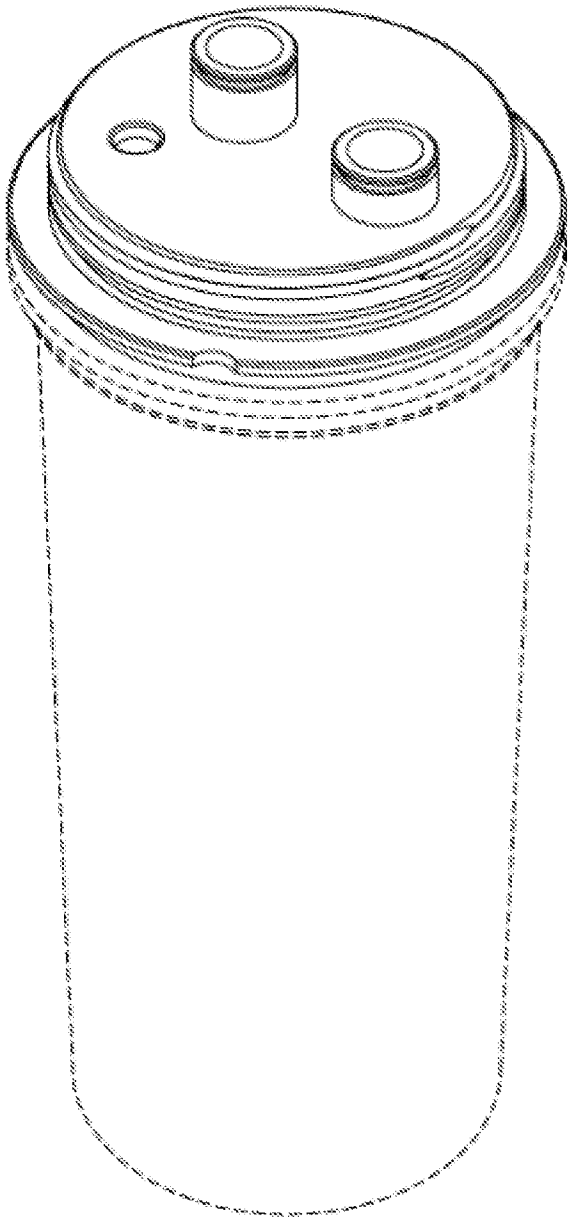


FIGURE 12A

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

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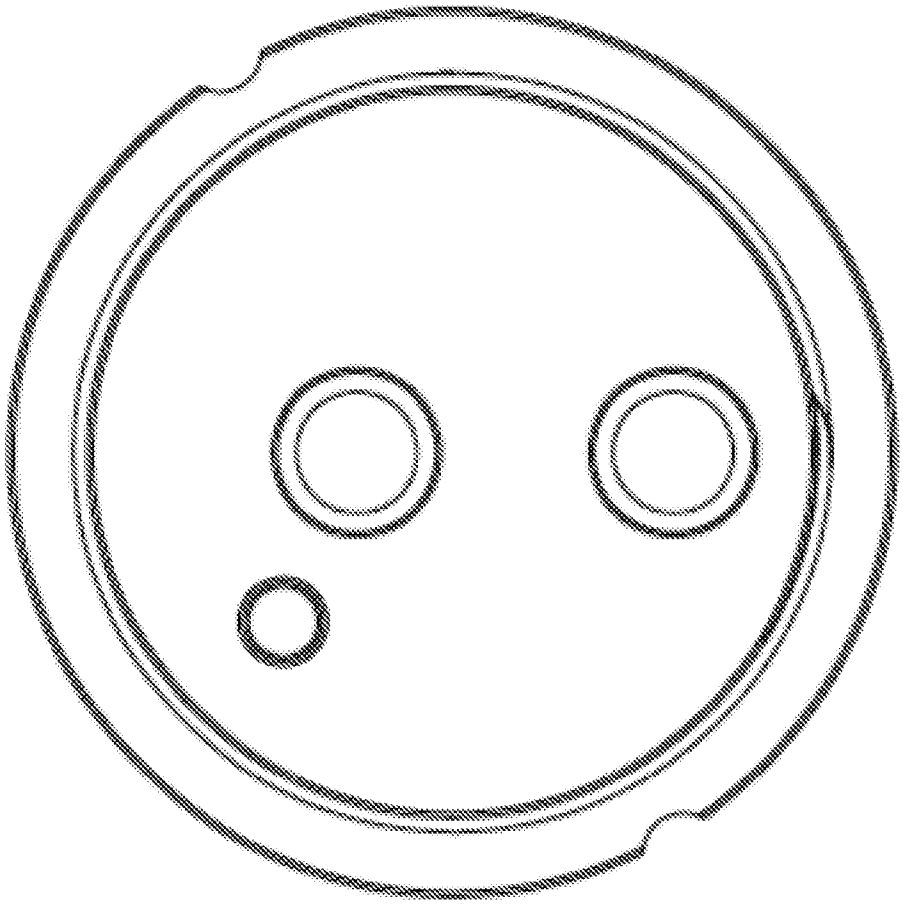


FIGURE 12B

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

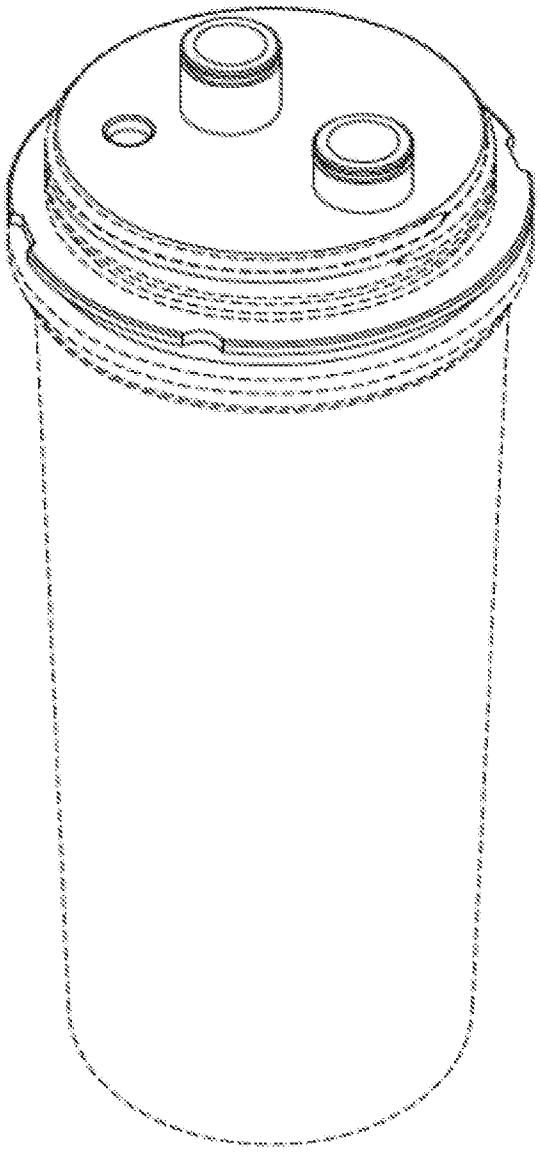


FIGURE 13A

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

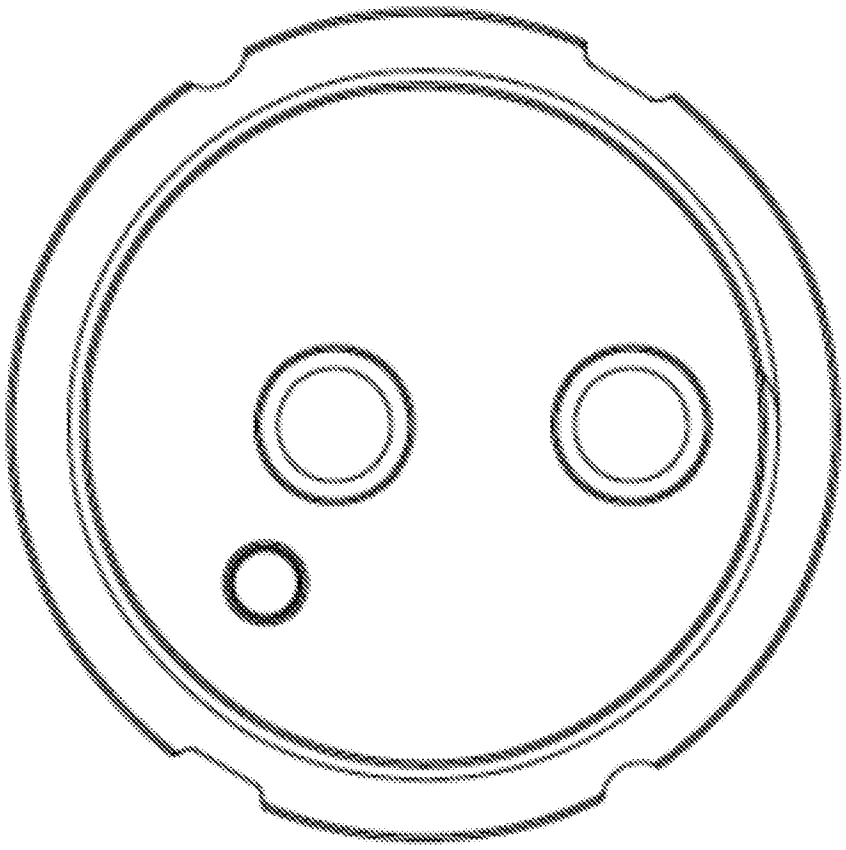


FIGURE 13B

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

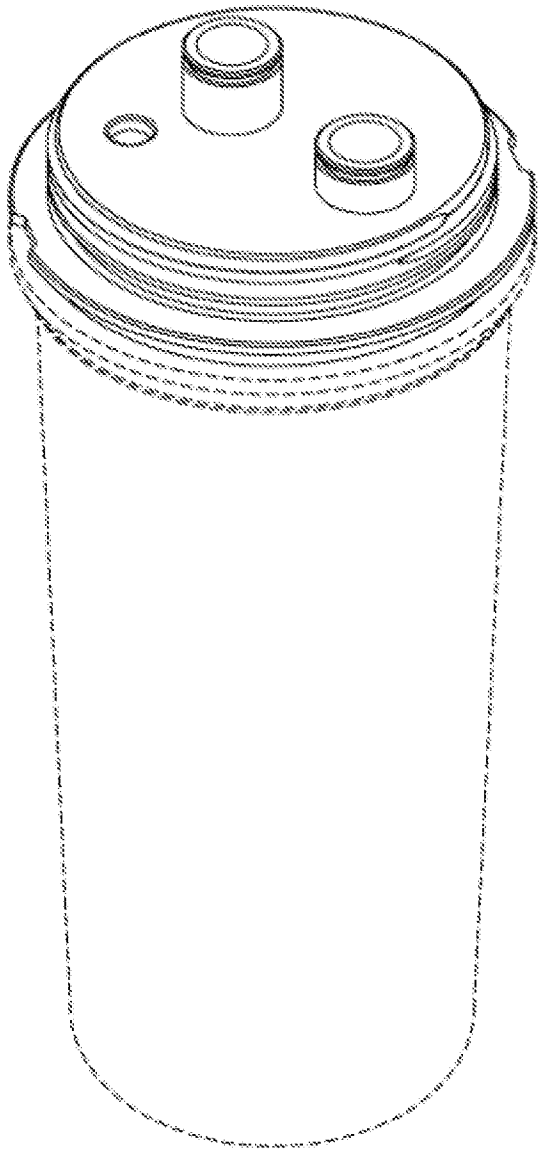


FIGURE 14A

Solmetex Ex. 2002
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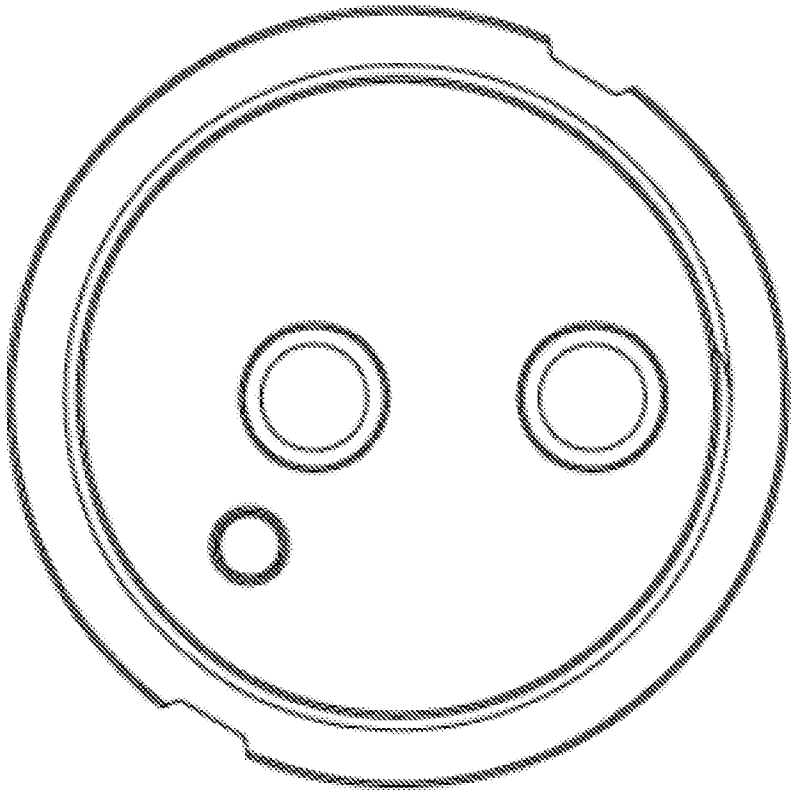


FIGURE 14B

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

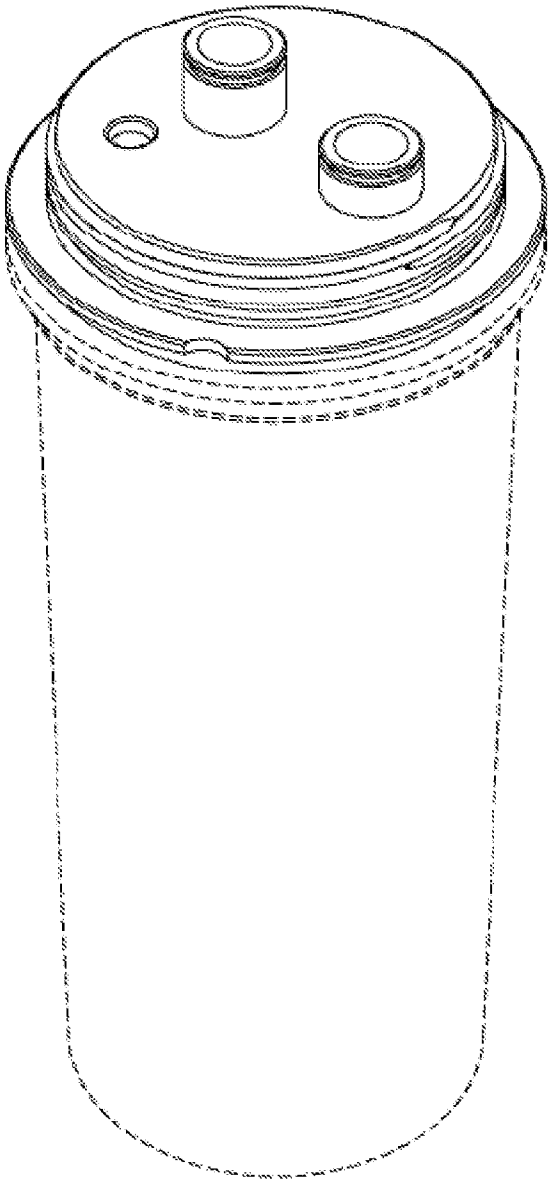


FIGURE 15A

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555

REPLACEMENT SHEET

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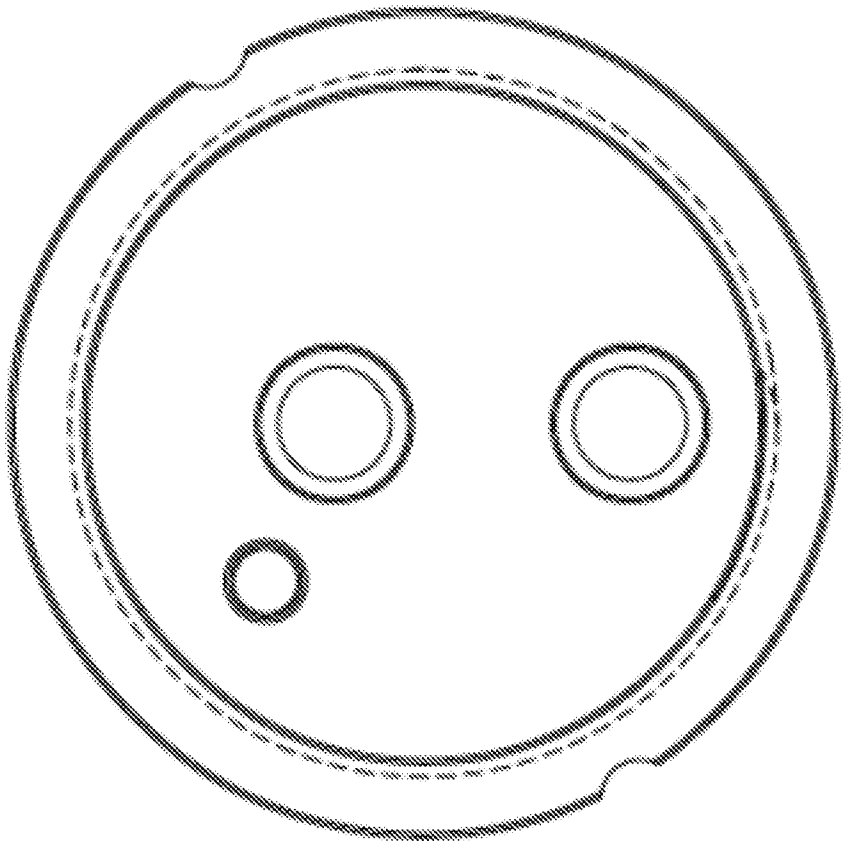


FIGURE 15B

Solmetex Ex. 2002
DRNA v. Solmetex - PGR2023-00555