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(54) **BLENDER FOR INGREDIENTS INTO SOFT-SERVE FREEZER PRODUCTS AND METHOD**

MIXER FÜR ZUTATEN ZUR HERSTELLUNG VON SERVIERFERTIG WEICHEN
GEFRIERPRODUKTEN UND VERFAHREN

MELANGEUR POUR INGREDIENTS PERMETTANT D'OBTENIR DES PRODUITS CONGELES
MOUS ET PROCEDE

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(56) References cited:
GB-A- 1 465 312 US-A- 2 247 287
US-A- 3 014 437 US-A- 3 291 076
US-A- 3 291 076 US-A- 5 271 572
US-A- 5 690 283 US-A- 5 743 639

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Description

Background of the Invention

[0001] This invention relates generally to a method and an apparatus for dispensing flavored, flowable frozen foods to a customer for soft-serve ice cream, ice milk, ices, smoothies, slushes, shakes or the like.

[0002] U.S. Patent No. 4,793,520 issued December 27, 1988 and certain patents cited therein, disclose various approaches to mixing several different flavoring liquids to a base mix of ice cream. U.S. Patent No. 3,001,770 issued to Mueller on September 26, 1961 shows a machine for mixing different flavoring liquids with ice cream and has a device for injecting nuts into the mixture. To the best of my knowledge, there is no apparatus available which can be connected to a conventional freezer machine for soft-serve ice cream or some other semi-frozen edible product, and which is useful to select and blend one or more different ingredients into the food product of the freezer machine for dispensing into a cone or cup to a customer immediately upon demand. The present invention is addressed to this need.

[0003] GB 1 465 312 discloses an ice cream freezer apparatus in accordance with the preamble of claim 1 having a dispenser for dispensing together ice cream and solid material such as nuts. The apparatus comprises a dispenser comprising a dispenser nozzle, an inlet for admitting ice cream to the nozzle, an outlet for dispensing ice cream from the nozzle, a wall surrounding the nozzle to define a chamber, a port formed in said wall for admitting the solid material into the chamber, and an outlet of said chamber located for cooperation with the outlet of the nozzle to permit the dispensing together from the dispenser of ice cream and the solid material. The port is bored in the wall of the housing, extending downwardly and partly circumferentially so as to impart a spiral downward movement to the solid material supplied to the port. The supply of solid material is by way of a pipe which is connected to a blower through the intermediary of an air control valve, and solid material is delivered into the pipe upstream of the valve by way of a solid-material supply pump. In use, the solid material is fed through the port into the chamber by air under pressure.

Summary of the invention

[0004] According to the present invention, there is provided an apparatus for dispensing a chilled confection comprising a blend of frozen edible base product and edible ingredient solids according to claim 1. Preferred embodiments of the apparatus are defined in the dependent claims 2 to 23.

[0005] Further according to the present invention, there is provide a method for blending dry edible solid ingredients with a frozen base product according to claim 24. Preferred embodiments of the method are defined in the dependent claims 25 to 34.

[0006] Described briefly, a typical embodiment of the invention comprises method and apparatus readily adaptable to use with conventional, commercially available freezer dispensers for semi-frozen foods, and enabling selection and blending various different food ingredients in solid form into a food product dispensed as a fluid (hereinafter referred to as frozen base product) from the freezer dispenser at a temperature below 0 degrees Celsius, and dispensing selected blends of solids in frozen base product in fluid form to a customer's container on demand.

Brief Description of the Drawings

[0007]

Fig. 1 is a side elevational view of a conventional soft-serve ice cream freezer machine with a blender dispenser mounted to it according to one embodiment of the present invention.

Fig. 2A is an enlarged front view in section of an ingredient storage and transfer assembly.

Fig. 2B is a front view in section on the same scale as Fig. 2A and showing a blender assembly.

Fig. 3 is a side view of an ingredient container module.

Fig. 4 is a top plan view of an array of eight ingredient containers on a scale intermediate Figs. 1 and 3.

Fig. 5 is a perspective view of a mounting base for the ingredient storage assembly.

Fig. 6 is a face view of an upper support plate for the ingredient storage assembly.

Fig. 7 is a face view of a lower support plate for the ingredient storage assembly.

Fig. 8 is a perspective view of a dispensing module.

Fig. 9 is an enlarged elevational view of a blending auger.

Fig. 10 is a bottom view of the blending auger.

Fig. 11 is a fragmentary longitudinal sectional view taken at line 11-11 in Fig. 10, viewed in the direction of the arrows and showing the blending auger in a blender hopper which is shown in full section.

Fig. 12 is an elevational view of the auger in the hopper shown in section and viewed in the direction of arrows 12-12 in Fig. 11.

Fig. 13 is a fragmentary longitudinal sectional view of part of the blending auger and blender hopper taken at line 13-13 in Fig. 10 and showing the shape of the lower end portion of the auger core at a position about 60 degrees of rotational index about axis 93 from the Fig. 11 position.

Fig. 14 is a view similar to Fig. 13 but taken at line 14-14 in Fig. 10 and showing the shape of the auger core and flights at a slightly further rotational index position where portions of the core are cut-out to admit ingredient solids into a downward flowing frozen confection base product.

Fig. 15 is a top view of the blender hopper, showing

one possible outlet shape, and showing mounting flanges.

Fig. 16A is a top plan view of a transfer impeller.

Fig. 16B is a section taken at line B-B in Fig. 16A and viewed in the direction of the arrows.

Fig. 17 is a top plan view of an agitator.

Fig. 18 is a bottom view of a blender housing, with bottom coverings removed.

Fig. 19 is a front view of a data entry panel.

Description of the Illustrated Embodiment

[0008] Referring now to the drawings in detail, a soft-serve ice cream freezer assembly 11 is supported on wheels 12 and has a discharge spigot 13 on a front plate 14 removable from the freezer, usually by loosening four knobs. The spigot has an operating handle 16. Upon pulling the handle down, a frozen, usually unflavored, base product is discharged from the freezer through the spigot. Examples of such soft serve freezers are Taylor Model 754,338, 339, 741, H84, 8754, C706, C707, and C708. Other brands of freezers may be used also. Some older Taylor models and other brands are identified in my above-mentioned patent.

[0009] Apparatus incorporating an embodiment of the present invention includes an ingredient storage assembly, a blender assembly, means for transfer of selected ingredients from the storage assembly to the blender assembly, and related mounting, selection and control devices.

[0010] The ingredient storage and transfer assembly 18 is attached to the top of the freezer by use of a mounting plate 19 (Fig. 1). This plate uses a double-faced bonding tape that bonds the plate to the top of the freezer cabinet. Other or additional fasteners may be used, if desired. Mounting base 21 is a molded plastic part Fig. 5 having a flange 21F with slots 21S in its rear-edge receiving upstanding studs (not shown) on the mounting plate 19. It is attached to the mounting plate by use of two clamping knobs 22 screwed onto the studs and securing the mounting base to the mounting plate.

[0011] The upper end of the mounting base 21 supports and centers the top flange of funnel 23. An upper support plate 24 (Figs. 2A and 6) rests on the top flange of the funnel. This plate supports eight removable modules 25 in a circular array about an axis 26 through the center of the plate 24. A lower support plate 27 (Figs. 2A and 7) rests on the ledge 21L of the mounting base. It is connected to upper support plate 24 by an array of eight circularly spaced vertical support plates 28, preferably made of molded plastic and having bosses 28B at upper and lower edges receiving screws through the holes 24H and 27H in the upper and lower support plates 24 and 27, respectively. This assembly of plates 24, 27 and 28 provides a receiver frame in the ingredient storage assembly 18 for the eight removable dispensing modules 25 mentioned above. These modules have motor housings 29 supporting container bases 31 receiving eight

ingredient containers 32. Each of these containers contains a different type of solids capable of being blended into the base product flowing from the freezer to the spigot outlet when the handle 16 is pulled down. A "solid" for such purposes may be defined as a discrete tangible edible item appearing dry to touch at 22,2°C (72°F), elastic or inelastic, porous or nonporous, hollow or not hollow, and having a maximum overall dimension in any direction less than or equal to about 7,62 mm (0.300 inches). Some types of solids include, but are not limited to, nuts of different types and flavors, raisins, M & M's, chocolate chips, different flavors of fruit bits, different flavors of candy bits and sprinkles, to name a few. Others may be used too. Also, if it is found that customers have a greater preference for one type than some of the other types, more than one of the containers can be filled with the preferred type.

[0012] All of the eight modules can be identical, so a description of one will suffice. Referring to Fig. 2A, note that the module shown to the left of the axis 26 shows motor housing 29 with a gear motor assembly 34 inside, but a gear motor assembly for the module to the right side of axis 26 is omitted from the drawing to show other details of the module. Referring specifically to Figs. 2A and 8, each motor housing 29, usefully made of molded plastic, has a mounting portion 29M which is shaped like a sector of a circle, and is received on upper support plate 24. The housing has a cylindrical wall 29W projecting up from portion 29M and forming an upwardly opening cylindrical chamber 29C (Fig. 2A). The bottom 29B of chamber 29C is the top of an area of mounting portion 29M and has a hole 29H which is in registry with one of the eight holes 24P in the support plate 24.

[0013] Container base 31 (also usefully made of molded plastic) sits atop the motor housing 29 and has three hooks received on posts 29P of housing 29 and engaging and hooked to screws 33 in posts 29P by a counterclockwise twist of the base 31 relative to the housing 29. The bottom 31B of the container base 31 has a hole 31P (Fig. 8) which is in a sector diametrically opposite (relative to axis 41) the sector in which hole 24P in the upper support plate 24, and hole 29H in the housing 29 are located, the latter holes 24P and 29H being open to the funnel 23.

[0014] The gear motor assembly 34 with motor portion 36 and reduction gear portion 37 is fastened by screws (not shown) to the bottom of the mounting portion 29M of the motor housing. The output drive shaft 37S of the gear portion projects up through a small hole in the center of chamber bottom 29B, and through the hub 38H of ingredient transfer impeller 38 (Figs. 16A, 16B) which has four blades 38B circularly spaced about the shaft axis 41. The blades are about half the height of the chamber 29C. The upper portion of the leading (when the impeller is driven in the direction of arrow 42) edge of each blade is sloped up toward the trailing edge. This feature helps avoid jamming of certain types of ingredients between the impeller blades and the roof of the chamber 29C. The shaft 37S also projects through a small hole in the center

of bottom 31B of the container base 31 and through the hub of the four-arm agitator 43 (Fig. 17). The shaft receiving holes in the center of the transfer impeller hub and in the center of the agitator hub have a flat which matches the flat on drive shaft 37S to drive the impeller and agitator when the motor is energized. A rubber cap 44 holds the agitator on the shaft.

[0015] As shown in Fig. 17, the agitator arms are slightly offset ahead of radii from the rotational axis 41 of the agitator. Accordingly the leading edges of the agitator arms are about one-half arm's width ahead of the leading edge of the transfer impeller blades. This is shown in Fig. 17 where the impeller arms are shown in dotted lines. This feature assists in the transfer of ingredients from a container 32 to chamber 29C.

[0016] The container base 31 provides an upwardly opening cylindrical chamber which friction fits and receives the neck portion 32N at the open end of container 32. The fit is close enough that there is no leakage of the dry ingredients up and out of the base 31 around the container neck.

[0017] Each module is retained in place in at least two ways. The first way involves a motor housing retainer plate 46 fastened to upper support plate 24 by four screws 47 equally-spaced circularly, about axis 26, with spacers 48 between plates 24 and 46. The spacing thereby provided admits the tongue 29T (Fig. 8) of the motor housing and prevents it from tipping up.

[0018] A second way the module is retained is by a clamping knob 51 fixed to a screw 52 which is freely receivable into a slot in leg 53L of bracket 53 which is fixed to the inside wall of motor housing 29. The slot is forked with its open end facing toward axis 26. The screw is threaded into lower support plate 27 so that, when a module is properly inserted as in the direction of arrow 56 (Fig. 2A) toward axis 26, the screw is received in the fork slot and the knob 51 can be turned to clamp the module to the lower support plate 27. So it is clamped to the receiver frame of plates 24, 27, 28.

[0019] Each of the modules has two electrical contactors 58 on the inner face of the motor housing and which, when the module is installed, engage contactors such as 59 mounted on the vertical supports 28, to enable electric power feed from an electronic controller 61 (Fig. 1) to the motors 36. An eight pair connector socket 62 fixed in the mounting base receives mating plug 63 fixed in the lower support plate 27. The two contactors 59 from all of the eight stations are wired to plug 63. A pair of leads from the socket at 62 extend in wire 64 to the plug 66 received in socket 67 at the end of wiring 68 which enters the wiring harness 69, which extends to the controller 61. The wiring harness also contains cables 71, 72 and 73, each of which has an electrical socket at the end for connection to some component of the apparatus. Cable 71 connects to a plug 74 for communication with the data entry panel 76. Cable 72 connects to a plug 77 for cable 78 to an auger drive motor 79. The plug on cable 73 is connected to socket 81 for the dispenser start switch 82.

This arrangement makes it easy to disconnect the electrical components by simply removing the mounting base cover panel 83 from the bottom of the mounting base and unplugging the electrical connectors.

[0020] The data entry panel (DEP) 76 is received in a downwardly opening slot 84 (Figs. 2A, 2B and 5) by sliding it upward into the slot 84 and into chamber 85 in the mounting base. It is retained in place by the mounting base cover panel 83 which is screwed into the bottom of the mounting base. The face of the keypad has legends for programming the equipment, as will be described hereinafter. The output from the keypad is fed through connector 74 and cable 71 in harness 69 to the controller 61.

[0021] A blender assembly 90 has a housing 91 (Fig. 2B and Fig. 18 bottom view) mounted to and supported on the freezer by a mounting bracket (not shown) to secure the blender assembly to the freezer. The blender assembly is coupled to spigot 13 by adapter 92 having upper end 92U received on and sealed by an o-ring to the spout. The adapter has flange 92F receiving a collar 92C connected to the upper end portion 90U of the blender assembly by a split ring retainer 92R in a circular groove in the upper end portion of the blender assembly. The adapter is sealed by an o-ring to the inside surface of the upper end portion 90 U of the blender assembly. Varieties of mounting brackets and adapters are available to accommodate different freezer configurations. Since a freezer typically dispenses in some axial direction, it can be convenient but is not necessary to adopt such axis in implementing the present invention. In the present example, an axis 93 is established by the housing 91 for the blender assembly. A blender hopper 94 is mounted to housing 91.

[0022] Since the blender hopper is to receive solid ingredients from selected ones of containers 32, the housing 91 has two upwardly-opening circular ports 91P to which tubing 96 can be connected to deliver ingredients from hopper 23 through the housing 91 to the blender hopper 94. In Fig. 18, these ports are shown, but need not be, located on diametrically opposite sides of the cylindrical wall 91W of the housing and which is centered on axis 93. It is adequate to use only one of these ports for connection to the tubing, but two of them are provided to facilitate alternate entry locations for adaptation to freezers of different designs.

[0023] The illustrated transfer tubing 96 comprises lengths of transparent PVC plastic with assorted shapes assembled to adapt to the particular freezer configuration. The tubing has a conical upper end portion 96U receiving the tapered lower end portion 23L of hopper 23. As can be seen in Fig. 2B, while the lower end portion of the dispensing hopper 23, and the upper end portion 96U of the tubing 96 are conical in shape to fit well together and avoid entry of dirt into the tubing 96, they are not wedged together. Being a slip-fit, the dispensing hopper and assembly above it can be separated easily from the apparatus below it if, and when desired. The lower

end of tubing 96 has the elbow 96E received in one of the ports 91P of the housing 91. The unused port (or ports, if provided) 91P can be closed by a cap or caps such as 91T in Fig. 11.

[0024] In the illustrated example, the blender hopper 94 (Figs. 12 and 15), usefully made of molded plastic, is shown in the form of a stepped conical device having two diametrically opposite outwardly-extending top flanges 94F, each extending approximately 60 degrees about axis 93. The blender hopper is mounted to the bottom of the housing 91 by placing the top edge of the hopper against the bottom face of the housing. Then the hopper is turned clockwise (as viewed from above) to move the hopper flanges 94F into position in grooves formed between arcuate retainer clips 91R (Fig. 2B) and flanges 91B (Fig. 18) on the bottom of the housing. The retainer clips are of the same shape as the flanges 91B and are screwed into the bottom of housing 91 at flanges 91B (Fig. 18).

[0025] The hopper has an inner wall surface which is stepped. In the illustrated example, the wall surface includes an upper cylindrical portion 94U with flanges 94F at the top, the upper portion extending downward to a first circle. An upper conical portion 94H extends downward from the first circle to a second circle. A second cylindrical portion 94C extends downward from the second circle to a third circle. A second conical portion 94L extends downward from the third circle to a fourth circle at the bottom of the hopper. A blending chamber 94M is surrounded by the lower portion 94L of the hopper.

[0026] The blender hopper surrounds a blending auger 97 of the screw type and which is centered on axis 93. The blending auger has a gear 98 integral with it or affixed to it and driven by a gear set 99 in a drive housing portion 91G of housing 91. At this point it should be mentioned that, while Fig. 1 shows tubing 96 entering housing 91 at a port location offset from and forward of axis 93, Fig. 2B shows tubing 96 entering the housing at 91P to the right of axis 93. As mentioned above, the two ports are available for the use of whichever one or both are convenient, depending on the configuration of the freezer. Also, if desired, locations of the ports relative to each other and to the drive housing portion 91G can be different from shown. There is an opening 91H (Fig. 18) through wall 91W in the proximal end of drive housing portion 91G where one of the gears in the gear set 99 engages gear 98 on the auger, as shown in Fig. 2B. The gear set is driven by a pinion 102 on the output shaft of blender motor 79 mounted to the distal end of the drive housing portion 91G.

[0027] The housing ports 91P open downward into a space 91C (Fig. 11) under the cylindrical inner wall 91W of the housing 91 and open to the upper ends of the screw flights of auger 97. The blending auger 97 (Figs. 9-14), which may usefully made of molded plastic, has a central, axially extending hollow core 97C (Fig. 10) on which there are two helical flights 97A and 97B, each of which is centered relative to axis 93. Each of the flights has a leading

edge which is beveled downward and rearward as shown at 97L (Fig. 12). Each flight is contoured to have a profile which fits the profile of the stepped conical inside wall surface 94H, 94C and 94L of the blender hopper 94.

Thus, it is seen that the auger flights have a profile contoured to sweep the inside space of the blender hopper outboard of the auger core as the auger is rotated on axis 93. To improve the efficiency of the auger, the perimeter of each flight has an edge which is cylindrical or beveled to conform to where it is axially along the auger relative to the inside wall surface of the hopper.

[0028] A spindle tube 103 is a stationary tube having a longitudinal axis co-linear with axis 93, and is fixed to the housing 91. The tube delivers the flow of the frozen base product from the freezer to the blending chamber 94M. The tube also serves as an axle spindle for rotational bearing of the auger. The lower end 103B of the tube 103 is spaced above the base 94B of the blender hopper. The resulting space between the end of the tube 103 and the base 94B of the blender hopper allows the solids delivered by the auger to enter into the flow path of the frozen base product.

[0029] While the frozen base product flows, the auger 97 rotates clockwise (viewed from above) on the tube 103 and delivers the selected solids into the blending chamber 94M. The inside diameter d1 (Fig. 14) of the tube 103 is less than the overall maximum diametrical dimension d2 (Figs. 14 and 15) of the fluted hopper outlet opening 94D. This allows unrestricted flow from the tube 103 through the blending chamber 94M and then through the hopper outlet opening 94D (Fig. 14). This size differential allows for the inclusion of the solids into the frozen base product in the blending chamber 94M for delivery of the blended product out through the blended product outlet opening 94D. It should be understood that the outlet opening can be circular or other shapes.

[0030] Two diametrically opposite cutouts 97P (Figs. 9 and 11) in the auger core 97C near the bottom of the auger 97, allow the solids to be introduced into the flow path of the frozen base product while the auger 97 is rotating. The rotation of the auger 97, at approximately 400 rpm, inhibits the frozen base product from entering the outer circumference of the blending chamber 94M and working upward along hopper wall surface 94L. The rapid rotation of the auger 97 tends to confine flow of the base product to a flow path directly downward from the opening of the tube 103 and through the opening 94D.

[0031] The two helical flights 97A and 97B of the auger 97 are each provided with a two-step diminishing radius (with respect to the rotational axis 93). This diminishing radius provides a swept volume profile by the rotating auger and which fits the above-mentioned contour profile of the stepped inside wall surface (94H, 94C and 94L) of the blender hopper 94. The diminishing radius of the contoured wall of the blending chamber 94M causes the solids to be forced inward toward the flow path of the frozen base product. The diminishing radius also counters the tendency for the base product to flow to the outer perim-

eters of the blending chamber 94M. The diametrically opposite cutouts 97P in the core wall of the auger, enable the solids to be forced inwardly into the frozen base product as it flows from the lower end 103L of the spindle tube to the outlet opening 94D.

[0032] The cutouts 97P through the core wall under flights 97A and 97B at the bottom faces such as 97U (Figs. 9 -14) may be formed in or cut in or otherwise provided in a material. Therefore the term "cutout" should not be construed as limited to an opening that is cut into the material.

[0033] Fig. 13 shows the core wall portions at section 13-13 in Fig. 10, immediately uphill of the beginning of the cutouts 97. Fig. 14 shows where the inner surface of the core flares outward in curves at section 14-14 to blend into the bottom faces of flights 97A and 97B immediately below where the cutouts begin downward toward the lower ends of the flights.

[0034] This provides easy entrance of solids into the frozen base product stream under the lower end 103L of spindle tube 103 flowing to outlet 94D as the auger rotates in the direction of arrow 104 (Fig. 10), which is clockwise when viewed from the top of the auger. Portions of the inside wall of the core 97C continues down as shown in Figs. 11 and 14 supporting the tips 97T of the flights in cantilever fashion at the bottom ends of the flights.

[0035] It should be noted that while it is very convenient, and preferred to have the auger axis in line with the axis direction of discharge of base product from the freezer, it is not absolutely necessary. Also, while it is preferred to have the passageway from the spigot through the blender provided by a tube which also serves as the bearing axle for the auger, the auger axis could be offset from the tube axis. Also, while the tube can serve directly as the bearing for the auger, as shown, it could simply serve as a mounting for separate bearings.

[0036] Referring to Fig. 18, the data entry panel (DEP) 76 has numerals 1-8, each designating a "key" by which the dispenser operator can select a different one of the eight ingredient containers. It also has several other "key" identifying legends on it, including a "cancel entry" legend, a "+", a "-", and an "alt time adj" legend. It also has an "output level" indicator light emitting diode set with eight enumerated levels, and an "overload" indicator light.

Operation

[0037] As indicated above, a typical embodiment of the invention is intended to be attached to a freezer capable of delivering an icy base product, to blend or mix various ingredient solids into the base product as it flows from the freezer toward a customer's serving cup. The system example described above accommodates eight different ingredients. The operator can select a single ingredient or up to as many as eight different ingredients to be blended into a single serving of the frozen base product.

[0038] To dispense a serving to a customer, the operator determines the output level (the duration of time of operation of each of the selected ingredients) per cycle of dispensing ingredients requested by the customer. Then the operator touches those of the selector "keys" needed for the ingredients requested by the customer. This sets up the program for the controller 61 to activate, in sequence, the dispenser motors 36 for those of the eight containers holding the ingredients requested by the customer. Then the operator pulls the draw handle 16 down, enabling the frozen base product to flow down through the auger axis passageway in spindle tube 103. When the operator pulls the draw handle down, the draw switch 82 is closed which activates the dispensing motor 36 in the dispensing module that represents the lowest numbered choice in the operator's selection 1-8. As the motor activates, it rotates the transfer impeller 38 that takes the ingredient solids from the selected container 32 and transfers them to the registering openings 29H, 24P dropping the solids into the dispensing hopper 23. The transfer impeller serves both as a valve and a device to transfer the ingredients toward the dispenser hopper 23. The solids flow down through the transfer tubing 96 into the blender hopper 94 and down through the hopper under control of the auger 97, into the blender chamber 94M where the solids are integrated into the frozen base product as the base product flows out of the lower end of spindle tube 103.

[0039] At the same time that the draw switch is closed to start the dispensing process, the blender motor 79 is activated, rotating the blending auger 97 in a clockwise direction (viewed from above) to force the ingredient solids into the frozen base product while it flows from the spindle tube through the hopper outlet opening 94D into a cone or dish for the customer. If the operator has selected a multiple of possible choices of ingredients, the system dispenses each choice singularly and in the ascending sequence of the numbers of the choices selected on the DEP (data entry panel) 76. The operating time is equal for each dispensing module during a sequence through the operator's selection. When the system has sequenced through all of the choices (completed a cycle), it returns to the initial choice and continues the rotation through the selected choices until the operator chooses to discontinue the process by closing the spigot draw handle. The operating time for each module can be changed to increase or decrease the cycle time for each serving, by touching the "alt time adj" "key" and the "+" or "-" key. As the operator changes the cycle time, the "output level" lights are illuminated accordingly to indicate the output of the solids into the frozen base product. For example, if the adjustment is such that light 9 is on, it indicates that each module in a selection following the "alt time adj" adjustment will dispense solids longer in a cycle than if the adjustment were such that light 6 was on. The average typical cycle time is 1 second. The preferred minimum cycle time is 0.2 seconds. The preferred maximum cycle time is 2.0 seconds. Other cycle charac-

teristics can be specified, if desired. The draw duration is typically between 5 and 10 seconds. This depends primarily upon the size of serving to be delivered to the customer, and the delivery speed of which the freezer is capable. In any case, the controller 61 will repeat the cycling through the choices as long as the draw switch 82 remains closed. It should be understood that some freezers have switch keys, rather than handles to operate a switch to draw the frozen base product from the freezer. In such cases, such switch can be used instead of switch 82 to operate the apparatus of the present invention. Therefore the term "switch" where used in the claims which follow herein, should not be construed as limited to a separate, handle operated switch, except where required by claim context.

[0040] To refill a container, the module is removed by loosening the retaining knob 51, and pulling the module radially outward. Then it is inverted, so that the container 32 is upright. Then the module is pulled upward off the container. Then the container can be refilled with the same ingredient, or cleaned and refilled with some other ingredient.

[0041] From the above description, it can be recognized that all of the disclosed apparatus can be easily disassembled for cleaning, and then re-assembled.

[0042] The apparatus can be powered conveniently by any suitable electric source, an example being a power supply portion of controller 61 and operable on either 110 or 220 volts at 50 or 60 hertz.

[0043] The above description refers to the use of a draw handle to initiate delivery of base product from the freezer, and delivery through a spigot, and a switch associated with the draw handle to initiate operation of the dispenser motors and the auger. It should be noted that the invention is useful on a variety of freezers. Therefore, initiation of flow of the base product and controller functions can be triggered by some initiator other than a draw handle. Examples includes but are not limited to a switch key or a sound or voice-activated switch. The use of the term "key" should be understood to mean some activator spot or device responsive to the operator's command, however delivered. Wiring, electronics and software for the selector and controller to produce the functions described herein are well within the skill of the art, and description herein would be superfluous.

[0044] Therefore, while the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only a preferred embodiment has been shown and described and that all changes and modifications that come within the scope of the invention are desired to be protected. It should be understood that while the use of the word preferable, preferably or preferred in the description above indicates that the feature so described may be more desirable, it nonetheless may not be necessary, and embodiments lacking the same may be contemplated as within the scope of the invention. The scope

of the invention is defined by the claims that follow.

Claims

1. Apparatus for dispensing a chilled viscous confection comprising a blend of frozen edible base product and edible ingredient solids, the apparatus comprising :

a receiver (90) adapted for stationary attachment to a freezer (11) producing a frozen edible base product and adapted for receiving the frozen base product from a dispensing outlet (103) of the freezer (11);
said receiver (90) having a blending chamber (94M);

characterized in that the apparatus further comprises:

a conveyor auger (97) having a portion (97L) in said blending chamber (94M);
an auger drive motor (79) coupled to said auger (97) for driving said auger in rotation;
a plurality of containers (32) for ingredient solids;
a plurality of valves (38), each of said valves being associated with a different one of said containers (32) for controlling delivery of solids from said containers;
a dispensing hopper (23) associated with said valves (38) to receive solids delivered from said containers (32);
a passageway (96) from said dispensing hopper (23) to said blending chamber (94M) for delivery of solids from said dispensing hopper to said blending chamber;
a plurality of valve drive motors (34, 36), each of said valve drive motors (34, 36) being coupled to a different one of said valves (38);
a controller (61) coupled to said valve drive motors (34, 36) and having a selector (76) for selecting and enabling selected ones of said valve drive motors (34, 36) to operate in sequence; and
a switch (82) coupled to said controller (61) and operable to activate said controller (61) to operate selected ones of said valve drive motors (34, 36) to operate valves coupled to selected ones of said valve drive motors, to deliver solids from containers (32) associated with said valves (38) which are coupled to selected ones of said ones of said drive motors (34, 36), to said dispensing hopper (23) for delivery to said blending chamber (94M) for said auger (97) to move said delivered solids into said base product

during the dispensing of said base product from said freezer (11).

2. The apparatus of claim 1 and further comprising:

a tube (103) having an inlet end for coupling to the dispensing outlet of the freezer (11), said tube (103) providing a rotational axis (93) for said auger (97) to be driven in rotation on said axis (93); and said tube having an outlet end (103L) at said blending chamber (94M).

3. The apparatus of claim 2 and wherein:

said receiver includes a blender hopper (94) which has upper and lower ends and a wall which has an inside surface which is circular about said axis (93), said inside surface having a profile defined by a cylindrical portion (94C) and a converging portion (94L) extending downward from said cylindrical portion (94C) and inward toward said axis (93); said blending chamber (94M) is in space encompassed by said converging portion (94L); said auger (97) has first (97A) and second (97B) helical flights, each flight (97A, 97B) having an upper end and a lower end, and said flights (97A, 97B) have a profile matching said profile (94H, 94C, 94L) of said inside wall surface of the blender hopper (94) to fit said inside wall surface and sweep the said delivered solids down said inside wall surface toward said blended product outlet (94) as said auger (97) is rotated on said axis (93).

4. The apparatus of claim 3 and wherein:

said auger (97) has a hollow core (97C), with said tube (103) extending axially in said core (97C); portions (97P) of said core (97C) are cut out beginning at diametrically opposite locations near said outlet end (103L) of said tube (103) to provide cutouts (97P) on said core (97C); and said cutouts (97P) are closer to said blended product outlet (94D) than is said outlet end (103L) of said tube (103) for enabling said solids when swept down said inside wall by rotation of said auger (97) to move inward toward said axis (93) of rotation and through said cutouts (97P) and blend into said base product passing from said outlet end (103L) of said tube (103) toward said blended product outlet (94D).

5. The apparatus of claim 2 and wherein:

said receiver includes a blender hopper (94) which has upper and lower (94L) ends and a

wall which is circular about said axis, the wall having an inside surface portion profile defined in part by:

a first cylindrical upper wall portion (94U) extending in a direction axially downward relative to said upper end to a first circle, a first conical wall portion (94H) extending downward and inward from the first circle to a second circle, a second cylindrical wall portion (94C) extending downward from the second circle to a third circle, and a second conical wall portion (94L) extending from the third circle downward and inward toward a fourth circle at said lower end; said blending chamber (94M) is in space encompassed by said second conical wall portion (94L); said auger (97) has a first helical flight (97A) having an upper end and a lower end, the lower end of said flight being in said blending chamber (94M); said flight (97A) has an outer perimetrical edge with a profile matching said wall surface profile to fit the said wall inside surface of the blender hopper (94) and sweep said solids down the said wall inside surface as said auger (97) is rotated on said axis (93).

6. The apparatus of claim 5 and wherein:

said tube surface which provides a rotational axis (93) is an exterior cylindrical bearing surface; said auger (97) has a hollow core (97C) with an interior cylindrical surface portion rotatably received on said bearing surface of said tube (103), whereby said tube (103) provides said rotational axis (93) for said auger (97).

7. The apparatus of claim 6 and wherein:

said auger (97) has a second helical flight (97B) which has an upper end at a location diametrically opposite, relative to said axis, the upper end of said first flight (97A); and said second flight (97B) has a lower end at a location diametrically opposite relative to said axis (93), the lower end of said first flight (97A) and the lower end of said second flight (97B) is in said blending chamber (94M).

8. The apparatus of claim 7 and wherein:

said auger (97) has a gear (98) above the upper ends of said flights (97A, 97B); and said gear (98) is centered on said axis (93); and said auger drive motor (79) is coupled by gearing to said gear (98).

9. The apparatus of claim 7 and wherein:

portions of said auger core (97C) have cut-outs (97P) at diametrically opposite locations near said lower ends of said auger flights (97A, 97B); and
the interior surface portion of the core (97C) is flared outward diametrically from said cylindrical surface portion (94C) to the bottom faces of the flights at the top of the cut-outs (97P).

10. The apparatus of claim 9 and wherein:

said outlet end (103L) of said tube (103) is adjacent the said bottom faces of the flights (97A, 97B) at the tops of the cut-outs (97P).

11. The apparatus of claim 10 and wherein:

the lead of each flight (97A, 97B) is the same as the lead of the other flight (97B, 97A) and is a distance, measured in the direction of said axis, between points 360 degrees apart on the outer peripheral edge of a flight; and
the distance between the second circle and the third circle on said blender hopper (94) and measured in the direction of said axis (93) is substantially equal to half the lead of the flights (97A, 97B).

12. The apparatus of claim 10 and wherein:

the bottom of said blending chamber (94M) is at said fourth circle;
the lower ends (97T) of said flights (97A, 97B) are at the bottom (94B) of said blending chamber (94M); and
the inside diameter of said auger (97) at said lower ends (97T) of said flights (97A, 97B) is substantially the same as the inside diameter of said interior cylindrical surface of said auger core (97C).

13. The apparatus of claim 10 and wherein:

the upper ends of said flights (97A, 97B) have leading edges (97L) which are beveled downward and rearward from said leading edges (97L).

14. The apparatus of claim 13 and wherein:

said leading edges (97L) extend radially outward at diametrically opposite locations relative to said axis (93).

15. The apparatus of claim 1 and further comprising:

(1) a mounting base (21) arranged for stationary attachment to said freezer (11);
(2) a plurality of storage modules (25) mounted to said mounting base (21), each module (25) having:

- (a) a motor housing (29) containing one of said valve drive motors (34) and having a valve cavity (29C) containing one of said valves (38), the valve cavity (29C) having a bottom (29B); and
- (b) a container base (31) secured to said motor housing (29) and covering said cavity (29C), and said container base (31) having an upwardly opening socket receiving an open end (32N) of one of said containers (32); and
- (c) a fastener (33) securing said module (25) to said mounting base (21), said fastener (33) being operable to a loose condition to enable removal of said module (25) from said containers base (31).

16. The apparatus of claim 15 and wherein:

each of said storage modules (25) has a plan view shape like a sector (1-8) of a circle, and said modules (25) are mounted to said mounting base (21) in side-by-side arrangement whereby said plurality of modules (25) form a circle of said modules, and each of said modules (25) is removable from the circle independently of the other modules.

17. The apparatus of claim 15 and wherein:

each of said valves is a transfer impeller (38) coupled to said drive motor (34) for rotation by said drive motor to transfer solids dropped from a container (32) mounted in a container base socket (31) having a bottom (31B), through a first hole (31P) in the bottom of the socket (31), from the valve cavity (29C) to a second hole (29H) in the bottom (29B) of the valve cavity (29C) for dropping the solids into the dispensing hopper (23).

18. The apparatus of claim 17 and further comprising:

an agitator (42) in each of said container base sockets (31) and coupled to said drive motor (34), said agitator (43) projecting into the open end of the container (32) received in said socket (31) to stir solids in said container (32) while said transfer impeller transfers (38) said solids in said cavity (29C) from said first hole (31P) to said second hole (29H).

19. The apparatus of claim 18 and wherein:

said transfer impeller (38) has at least two arms (38B) extending outward radially relative to a rotational axis (41) of the impeller (38), said arms (38B) being about one-half as high as said valve cavity (29C) from the bottom of said cavity to the bottom of said container base socket, and said arms (38B) having faces which are leading during rotation of said impeller beveled at the top of the arms; and
 said agitator (43) has arms generally parallel to said impeller arms and having leading faces indexed rotationally ahead of said leading faces of said impeller arms (38B).

20. The apparatus of claim 15 and wherein:

said containers (32) received in said container base sockets (31) are retained by friction fit into said sockets, but each of said modules (25) is removable by hand from the container (32) received in the module socket and without tools, to refill a container (32) with solids when the open end (32N) of the container (32) is facing upward.

21. The apparatus of claim 1 and wherein:

said selector (76) includes a panel having:
 a plurality of selector keys, each of said keys having indicia distinguishing said key from all others of said keys to enable selection of said valve drive motors (34, 36); and
 a cycle time adjusting key.

22. The apparatus of claim 21 and further comprising:

lights associated with said keys to indicate state of actuation of said keys.

23. The apparatus of claim 21 and further comprising:

solids of one type of ingredient contained in at least one of said containers (32); solids of another type of ingredient contained in another of said containers (32); solids of a third type of ingredient contained in a third one of said containers (32); and
 solids of different types of ingredients in others of said containers (32).

24. A method for blending dry edible solid ingredients with a frozen base product by means of the apparatus of claim 1, the method comprising:

starting a flow of the frozen base product from

a freezer outlet (103) to a blending chamber (94M) to flow through the chamber (94M) to a blended product outlet (94D);
 selecting a plurality of types of edible ingredient solids and entering solids of the selected types into said blending chamber (94M);
 augering said selected types of solids into the flow of said base product when flowing through said chamber (94M) and thereby producing a blend of said solids in said frozen base product; and
 delivering said blend out of said blending chamber (94M) through said blended product outlet (94D).

25. The method of claim 24 and further comprising:

storing in containers (32), a plurality of solids of different types of edible ingredients, each different type in a different container;
 selecting certain ones of said different types for blending;
 releasing the solids of the selected types from those of said containers (32) storing said selected types, into the flow of said frozen-base product; and
 blending the solids of the selected types into the flow of said frozen-base product.

26. The method of claim 25 and further comprising:

rotating transfer impellers (38) by motor drivers (34, 36) for releasing said solids.

27. The method of claim 25 and further comprising:

releasing said solids of said selected types in sequence of one type following another type.

28. The method of claim 27 and further comprising:

predetermining the said sequence prior to starting the flow of said frozen base product;
 releasing each of said selected types for a certain period, and releasing all selected types in a release sequence cycle; and
 repeating said sequence cycles while said frozen base product continues to flow to the blending chamber (94M).

29. The method of claims 28 and further comprising:

actuating a device (16) for starting the flow of said frozen base product from the freezer outlet (103); and
 responding to the actuation of the device (16) to initiate the releasing and augering of said solids into said blending chamber (94M).

30. The method of claims 29 and further comprising:

using actuation of said device (16) to initiate operation of both a blender motor (79) and the said sequence cycle.

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31. The method of claim 24 and further comprising:

using a rotary auger (97) having spiral flights (97A, 97B) formed around a hollow core (97C) with a longitudinal axis (93); and flowing said frozen base product from said freezer outlet (103) downward through said core (97C) toward said blended product outlet (94D).

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32. The method of claim 31 and further comprising:

providing a wall having an inside surface (94H, 94C, 94L) circular around said axis (93) and surrounding said auger (97);
providing matching profiles of said auger (97) and said inside surface thereby fitting said auger (97) to said inside surface;
sweeping downward on said surface with said auger flights (97A, 97B) while rotating said auger (97) relative to said wall, on said axis (93);
using a conical portion (94H) of said interior surface to guide said solids inward as they are swept downward by said rotating auger (97), into said frozen base product flowing downward from said core (97C) through said chamber (94M) to said blended product outlet (94D).

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33. The method of claim 32 and further comprising:

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admitting solids swept downward, into said flowing frozen base product, through cutouts (97P) between flights (97A, 97B) in said core (97C).

34. The method of claim 33 and further comprising:

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enabling solids guided inward into said cutouts (97P) as said auger (97) is rotated, to move upward relative to the bottom of the flight above the cutout (97P) at the location of entry of the solid into the cutout, and move inwardly along a curved surface (97C) of said auger (97) toward said axis (93) and into said flowing frozen base product.

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Patentansprüche

1. Vorrichtung zum Ausgeben eines gekühlten, zähflüssigen Konfekts mit einer Mischung aus einem gefrorenen, essbaren Ausgangsprodukt und essbaren, festen Speisebestandteilen, wobei die Vorrichtung aufweist:

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eine Aufnahmeeinrichtung (90), die zur stationären Befestigung an einer Gefriermaschine (11), welche ein gefrorenes, essbares Ausgangsprodukt herstellt, und zum Aufnehmen des gefrorenen Ausgangsprodukts aus einem Ausgabeauslass (103) der Gefriermaschine (11) ausgebildet ist;

wobei die Aufnahmeeinrichtung (90) eine Mischkammer (94M) aufweist;

dadurch gekennzeichnet, dass die Vorrichtung ferner aufweist:

eine Förderschneckeneinrichtung (97) mit einem Teilabschnitt (97L) in der Mischkammer (94M);

einen Förderschneckenantriebsmotor (79), der mit der Förderschneckeneinrichtung (97) zum Antreiben der Förderschnecke in eine Drehbewegung gekoppelt ist;

mehrere Behälter (32) für feste Speisebestandteile;

mehrere Ventile (38), wobei jedes Ventil einem anderen der Behälter (32) zum Steuern der Abgabe von Festbestandteilen aus den Behältern zugeordnet ist;

einen Ausgabetrichter (23), der den Ventilen (38) zugeordnet ist, um aus den Behältern (32) abgegebene Festbestandteile aufzunehmen;

einen Durchlass (96) von dem Ausgabetrichter (23) zu der Mischkammer (94M) zum Zuführen von Festbestandteilen aus dem Ausgabetrichter in die Mischkammer; mehrere Ventilantriebsmotoren (34, 36), von denen jeder der Ventilantriebsmotoren (34, 36) mit einem anderen Ventil (38) gekoppelt ist;

eine Steuereinheit (61), die mit den Ventilantriebsmotoren (34, 36) gekoppelt ist und eine Auswahleinrichtung (76) aufweist zum Auswählen und Einschalten ausgewählter der Ventilantriebsmotoren (34, 36), so dass diese nacheinander betrieben werden; und eine Schalteinrichtung (82), die mit der Steuereinheit (61) gekoppelt und dazu betriebsfähig ist, die Steuereinheit (61) so zu aktivieren, dass ausgewählte der Ventilantriebsmotoren (34, 36) so betrieben werden, dass mit den Ventilantriebsmotoren gekoppelte Ventile aktiviert werden, um Festbestandteile aus den Behältern (32), die den mit ausgewählten Antriebsmotoren (34, 36) gekoppelten Ventilen (38) zugeordnet sind, in den Ausgabetrichter (23) zum Zuführen in die Mischkammer (94M) abzugeben, so dass die Förderschnecke (94) die zugeführten Festbestandteile beim Ausgeben des Ausgangsprodukts aus der Gefriermaschi-

ne (11) in das Ausgangsprodukt bewegen kann.

2. Vorrichtung nach Anspruch 1, die ferner aufweist:

ein Rohr (103) mit einem Einlassende zum Ankoppeln an den Ausgabeauslass der Gefriermaschine (11), wobei das Rohr (103) eine Drehachse (93) bereitstellt, so dass die Förderschnecke (97) in eine Drehbewegung um die Achse (93) angetrieben wird, und wobei das Rohr ein Auslassende (103L) an der Mischkammer (94M) aufweist.

3. Vorrichtung nach Anspruch 2, bei der:

die Aufnahmeeinrichtung einen Mischtrichter (94) mit einem oberen und einem unteren Ende und eine Wand umfasst, die eine innenseitige, kreisförmig um die Achse (93) ausgebildete Oberfläche hat, wobei die innenseitige Oberfläche ein durch einen zylindrischen Teilbereich (94C) und einen sich von dem zylindrischen Teilbereich (94C) nach unten und in Richtung auf die Achse (93) einwärts erstreckenden, konvergierenden Teilbereich (94L) begrenztes Profil aufweist;
die Mischkammer (94M) von dem konvergierenden Teilbereich (94L) räumlich umgeben ist;
die Förderschnecke (97) einen ersten (97A) und einen zweiten (97B) schraubenförmigen Gewindegang aufweist, wobei jeder Gewindegang (97A, 97B) ein oberes Ende und ein unteres Ende aufweist, und
die Gewindegänge (97A, 97B) ein Profil aufweisen, das an das Profil (94H, 94C, 94L) der innenseitigen Wandoberfläche des Mischtrichters (94) angepasst ist, so dass es an der innenseitigen Wandoberfläche anliegt und die abgegebenen Festbestandteile entlang der innenseitigen Wandoberfläche abwärts in Richtung auf den Mischproduktauslass (94) gestrichen werden, wenn die Förderschnecke (97) um die Achse (93) gedreht wird.

4. Vorrichtung nach Anspruch 3, bei der:

die Förderschnecke (97) einen hohlen Kern (97C) aufweist, wobei sich das Rohr (103) axial in dem Kern (97C) erstreckt;
Teilbereiche (97P) des Kerns (97C) beginnend an diametral gegenüberliegenden Stellen nahe dem Auslassende (103L) des Rohrs (103) ausgeschnitten sind, so dass Durchbrüche (97P) in dem Kern (97C) gebildet sind; und
die Durchbrüche (97B) sich näher an dem Mischproduktauslass (94D) befinden als das Auslassende (103L) des Rohrs (103), um den

Festbestandteilen, wenn sie durch die Drehbewegung der Förderschnecke (97) entlang der innenseitigen Wand abwärts gestrichen werden, zu ermöglichen, sich einwärts in Richtung auf die Drehachse (93) und durch die Durchbrüche (97P) zu bewegen und sich in das von dem Auslassende (103L) des Rohrs (103) in Richtung auf den Mischproduktauslass (94D) bewegende Ausgangsprodukt einzumischen.

5. Vorrichtung nach Anspruch 2, bei der:

die Aufnahmeeinrichtung einen Mischtrichter (94) mit einem oberen und einem unteren (94L) Ende und eine kreisförmig um die Achse ausgebildete Wand aufweist, wobei die Wand einen innenseitigen Oberflächenprofilabschnitt aufweist, der teilweise begrenzt ist durch:

einen ersten zylindrischen oberen Wandbereich (94U), der sich in Bezug auf das obere Ende in einer Richtung axial abwärts bis zu einem ersten Kreis erstreckt, einen ersten konischen Wandbereich (94H), der sich von dem ersten Kreis abwärts und einwärts bis zu einem zweiten Kreis erstreckt, einen zweiten zylindrischen Wandbereich (94C), der sich von dem zweiten Kreis abwärts bis zu einem dritten Kreis erstreckt, und einen zweiten konischen Wandbereich (94L), der sich von dem dritten Kreis abwärts und einwärts in Richtung auf einen vierten Kreis an dem unteren Ende erstreckt;
wobei die Mischkammer (94M) von dem zweiten konischen Wandbereich (94L) räumlich umgeben ist;
die Förderschnecke (97) einen ersten schraubenförmigen Gewindegang (97A) mit einem oberen Ende und einem unteren Ende aufweist, wobei das untere Ende des Gewindegangs sich in der Mischkammer (94M) befindet;
der Gewindegang (97A) eine äußere Umfangskante mit einem Profil hat, das mit dem Profil der Wandoberfläche zusammen passt, um an der wandinnenseitigen Oberfläche des Mischtrichters (94) anzuliegen und die Festbestandteile entlang der innenseitigen Wandfläche abwärts zu streichen, wenn die Förderschnecke (97) um die Achse (93) gedreht wird.

6. Vorrichtung nach Anspruch 5, bei der:

die eine Drehachse (93) bereitstellende Rohroberfläche eine äußere zylindrische Lagerlauffläche ist;
die Förderschnecke (97) einen hohlen Kern

(97C) mit einem innenseitigen, zylindrischen Oberflächenbereich aufweist, der auf der Lagerlauffläche des Rohrs (103) drehbar aufgenommen ist, wobei das Rohr (103) die Drehachse (93) für die Förderschnecke (97) bereitstellt.

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7. Vorrichtung nach Anspruch 6, bei der:

die Förderschnecke (97) einen zweiten schraubenförmigen Gewindegang (97B) mit einem oberen Ende an einer zu dem oberen Ende des ersten Gewindeganges (97A), bezüglich der Achse diametral gegenüberliegenden Stelle aufweist; und

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der zweite Gewindegang (97B) an einer zu dem unteren Ende des ersten Gewindeganges (97A) bezüglich der Achse (93) diametral gegenüberliegenden Stelle ein unteres Ende aufweist und das untere Ende des zweiten Gewindeganges (97B) sich in der Mischkammer (97M) befindet.

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8. Vorrichtung nach Anspruch 7, bei der:

die Förderschnecke (97) oberhalb des oberen Endes der Gewindegänge (97A, 97B) ein Ritzel (98) aufweist; und

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das Ritzel (98) auf der Achse (93) zentriert ist; und

der Förderschneckenantriebsmotor (79) durch ein Getriebe mit dem Ritzel (98) gekoppelt ist.

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9. Vorrichtung nach Anspruch 7, bei der:

Bereiche des Förderschneckenkerns (97C) an diametral gegenüberliegenden Stellen nahe den unteren Enden der Förderschnecken-Gewindegänge (97A, 97B) Durchbrüche (97P) aufweisen; und

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der innenseitige Oberflächenbereich des Kerns (97C) von dem zylindrischen Oberflächenbereich (94C) zu den Unterseiten der Gewindegänge an der Oberseite der Durchbrüche (97P) diametral nach außen aufgeweitet ist.

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10. Vorrichtung nach Anspruch 9, bei der:

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das Auslassende (103L) des Rohrs (103) sich neben den Unterseiten der Gewindegänge (97A, 97B) an den Oberseiten der Durchbrüche (97P) befindet.

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11. Vorrichtung nach Anspruch 10, bei der:

die Ganghöhe eines jeden Gewindeganges (97A, 97B) die gleiche wie die Ganghöhe des anderen Gewindeganges (97B, 97A) und ein in der Richtung der Achse gemessener Abstand zwischen Punkten ist, die auf der äußeren Um-

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fangskante eines Gewindeganges 360 Grad voneinander entfernt sind; und
der Abstand zwischen dem zweiten Kreis und dem dritten Kreis in dem Mischtrichter (94), gemessen in der Richtung der Achse (93), im Wesentlichen gleich der Hälfte der Ganghöhe der Gewindegänge (97A, 97B) ist.

12. Vorrichtung nach Anspruch 10, bei der:

die Unterseite der Mischkammer (94M) an dem vierten Kreis ist;

die unteren Enden (97T) der Gewindegänge (97A, 97B) auf Höhe der Unterseite (94B) der Mischkammer (94M) sind; und
der innenseitige Durchmesser der Förderschnecke (97) an den unteren Enden (97T) der Gewindegänge (97A, 97B) im Wesentlichen der gleiche ist wie der innenseitige Durchmesser der innenseitigen, zylindrischen Oberfläche des Förderschneckenkerns (97C).

13. Vorrichtung nach Anspruch 10, bei der:

die oberen Enden der Gewindegänge (97A, 97B) Vorderkanten (97L) aufweisen, die nach unten und hinten bezüglich der Vorderkanten (97L) abgeschrägt sind.

14. Vorrichtung nach Anspruch 13, bei der:

die Vorderkanten (97L) sich an diametral gegenüberliegenden Positionen bezüglich der Achse (93) radial nach außen erstrecken.

15. Vorrichtung nach Anspruch 1, die ferner aufweist:

(1) eine Montagebasis (21), der zur stationären Befestigung an der Gefriermaschine (11) ausgebildet ist;
(2) mehrere auf der Montagebasis (21) montierte Bevorratungsmodule (25), wobei jedes Modul (25) aufweist:

(a) ein Motorgehäuse (29), das einen der Ventilantriebsmotoren (34) enthält und einen eines der Ventile (38) enthaltenden Ventilhohlraum (29C) aufweist, wobei der Ventilhohlraum (29C) einen Boden (29B) hat; und

(b) eine Behälterbasis (31), die an dem Motorgehäuse (29) befestigt ist und den Hohlraum (29C) abdeckt, wobei die Behälterbasis (31) einen sich nach oben öffnenden, ein offenes Ende (32N) von einem der Behälter (32) aufnehmenden Sockel aufweist, und

(c) ein Befestigungselement (33), das das

Modul (25) an der Montagebasis (21) befestigt, wobei das Befestigungselement (33) in einen gelösten Zustand gebracht werden kann, um das Entfernen des Moduls (25) aus der Behälterbasis (31) zu ermöglichen.

16. Vorrichtung nach Anspruch 15, bei der:

jedes der Bevorratungsmodule (25) eine Grundrissform wie ein Sektor (1-8) eines Kreises aufweist, und die Module (25) an der Montagebasis (21) nebeneinander montiert sind, wobei die mehreren Module (25) einen Kreis aus den Modulen bilden, und wobei jedes der Module (25) unabhängig von den anderen Modulen aus dem Kreis herausnehmbar ist.

17. Vorrichtung nach Anspruch 15, bei der:

jedes der Ventile ein mit dem Antriebsmotor (34) zur Drehung durch den Antriebsmotor gekoppelter Übertragungsimpeller (38) ist, um Festbestandteile, die aus einem in einem Behälterbasissockel (31) mit einem Boden (31B) montierten Behälter (32) durch ein erstes Loch (31B) im Boden des Sockels (31) herabgefallen sind, aus dem Ventilhohlraum (29C) zu einem zweiten Loch (29H) im Boden (29B) des Ventilhohlraums (29C) zu befördern, um die Festbestandteile in den Abgabetrichter (23) fallen zu lassen.

18. Vorrichtung nach Anspruch 17, die ferner aufweist:

einen Rührer (42) in jedem der mit dem Antriebsmotor (34) gekoppelten Behälterbasissockel (31), wobei der Rührer (42) in das offene Ende des in dem Sockel (31) aufgenommenen Behälters (32) hineinragt, um Festbestandteile in dem Behälter (32) zu rühren, während der Übertragungsimpeller (38) die Festbestandteile in dem Hohlraum (29C) von dem ersten Loch (31B) zu dem zweiten Loch (29A) befördert.

19. Vorrichtung nach Anspruch 18, bei der:

der Übertragungsimpeller (38) mindestens zwei Arme (38B) hat, die sich bezüglich einer Drehachse (41) des Impellers (38) radial nach außen erstrecken, wobei die Arme (38B) etwa halb so hoch wie der Ventilhohlraum (29C) vom Boden des Hohlraums bis zum Boden des Behälterbasissockels sind, und wobei die Arme (38B) Flächen haben, die bei der Drehbewegung des an der Oberseite der Arme abgeschrägten Impellers vorseilen; und
der Rührer (42) zu den Impeller-Armen allgemein parallele Arme mit vorseilenden Flächen hat, die in der Drehrichtung vor den vor-

auseilenden Stirnflächen der Impeller-Arme (38B) eingereiht sind.

20. Vorrichtung nach Anspruch 15, bei der:

die in den Behälterbasissockeln (31) aufgenommenen Behälter (32) durch Reibung in den Sockeln gehalten sind, wobei jedoch jedes der Module (25) von Hand und ohne Werkzeug aus dem in dem Modulsockel aufgenommenen Behälter (32) abnehmbar ist, um einen Behälter (32) mit Festbestandteilen nachzufüllen, wenn das offene Ende (32N) des Behälters (32) nach oben weist.

21. Vorrichtung nach Anspruch 1, bei der:

die Auswahleinrichtung (76) ein Bedienpaneel enthält mit:

mehreren Auswahl-tasten, wobei jede Taste Markierungen aufweist, die diese Taste von allen anderen Tasten unterscheidet, um eine Auswahl der Ventilantriebsmotoren (34, 36) zu ermöglichen; und
einer Zyklusdauereinstelltaste.

22. Vorrichtung nach Anspruch 21, die ferner aufweist:

den Tasten zugeordnete Beleuchtungen zum Anzeigen des Betätigungszustands der Tasten.

23. Vorrichtung nach Anspruch 21, die ferner aufweist:

Festbestandteile einer Ingredienzart, die in mindestens einem der Behälter (32) enthalten sind; Festbestandteile einer weiteren Ingredienzart, die in einem anderen der Behälter (32) enthalten sind; Festbestandteile einer dritten Ingredienzart, die in einem dritten der Behälter (32) enthalten sind; und
Festbestandteile unterschiedlicher Ingredienzarten in anderen der Behälter (32).

24. Verfahren zum Mischen von trockenen, essbaren festen Speisebestandteilen mit einem gefrorenen Ausgangsprodukt durch die Vorrichtung nach Anspruch 1, wobei das Verfahren umfasst:

Starten eines Stroms des gefrorenen Ausgangsprodukts aus einem Gefriermaschinen-auslass (103) zu einer Mischkammer (94M) zum Strömen durch die Kammer (94M) zu einem Mischproduktauslass (94D);
Auswählen mehrerer Arten essbarer Festbestandteile und Einbringen der ausgewählten Arten von Festbestandteilen in die Mischkammer (94M);

Schneckenfördern der ausgewählten Arten von Festbestandteilen in den Strom des Ausgangsprodukts beim Strömen durch die Kammer (94M) und dabei Erzeugen einer Mischung der Festbestandteile in dem gefrorenen Ausgangsprodukt; und
 Ausgeben der Mischung aus der Mischkammer (94M) durch den Mischproduktauslass (94D).

25. Verfahren nach Anspruch 24, ferner umfassend:

Speichern mehrerer Festbestandteile unterschiedlicher essbarer Ingredienzarten in Behältern (32), jede unterschiedliche Art in einem anderen Behälter;
 Auswählen bestimmter der unterschiedlichen Arten zum Mischen;
 Abgeben der Festbestandteile der ausgewählten Arten aus denjenigen der Behälter (32), die die ausgewählten Arten bevorraten, in den Strom des gefrorenen Ausgangsprodukts; und
 Mischen der Festbestandteile der ausgewählten Arten in den Strom des gefrorenen Ausgangsprodukts.

26. Verfahren nach Anspruch 25, ferner umfassend:

Drehen des Übertragungsimpellers (38) durch Antriebsmotoren (34, 36) zum Abgeben der Festbestandteile.

27. Verfahren nach Anspruch 25, ferner umfassend:

Abgeben der Festbestandteile der ausgewählten Arten in einer Reihenfolge, bei der eine Art auf eine andere Art folgt.

28. Verfahren nach Anspruch 27, ferner umfassend:

Vorausbestimmen der Reihenfolge vor dem Starten des Stroms des gefrorenen Ausgangsprodukts;
 Abgeben jeder der ausgewählten Arten für eine bestimmte Zeitdauer und Abgeben aller ausgewählten Arten in einem Abgabereihenfolgezyklus; und
 Wiederholen der Reihenfolgezyklen, während das gefrorene Ausgangsprodukt fortfährt zur Mischkammer (94M) zu strömen.

29. Verfahren nach Anspruch 28, ferner umfassend:

Betätigen einer Einrichtung (16) zum Starten des Stroms des gefrorenen Ausgangsprodukts aus dem Gefriermaschinenauslass (103); und
 Reagieren auf die Betätigung der Einrichtung (16), um das Abgeben und Schneckenfördern der Festbestandteile in die Mischkammer (94M)

zu veranlassen.

30. Verfahren nach Anspruch 29, ferner umfassend:

Benutzen einer Betätigung der Einrichtung (16), um sowohl den Betrieb eines Mischermotors (79) und des Reihenfolgezyklus zu veranlassen.

31. Verfahren nach Anspruch 24, ferner umfassend:

Verwenden einer Drehförderschnecke (97) mit schraubenförmigen Gewindegängen (97A, 97B), die um einen hohlen Kern (97C) mit einer Längsachse (93) ausgebildet sind; und
 Strömenlassen des gefrorenen Ausgangsprodukts aus dem Gefriermaschinenauslass (103) abwärts durch den Kern (97C) in Richtung auf den Mischproduktauslass (94D).

32. Verfahren nach Anspruch 31, ferner umfassend:

Bereitstellen einer Wand mit einer kreisförmig um die Achse (93) angeordneten und die Förderschnecke (97) umgebenden, innenseitigen Oberfläche (94H, 94C, 94L);
 Bereitstellen von aufeinander angepassten Profilen der Förderschnecke (97) und der innenseitigen Oberfläche, wodurch die Förderschnecke (97) an der innenseitigen Oberfläche anliegt;
 Abwärtsstreichen entlang der Oberfläche mittels der Gewindegänge (97A, 97B) der Förderschnecke, während sich die Förderschnecke (97) relativ zur Wand auf der Achse (93) dreht;
 Verwenden eines konischen Bereichs (94H) der innenseitigen Oberfläche, um die Festbestandteile, während sie durch die sich drehende Förderschnecke (97) abwärts gestrichen werden, einwärts zu führen in das aus dem Kern (97C) durch die Kammer (94M) abwärts zu dem Mischproduktauslass (94D) strömende, gefrorene Ausgangsprodukt.

33. Verfahren nach Anspruch 32, ferner umfassend:

Einlassen von abwärts gestrichenen Festbestandteilen in das strömende, gefrorene Ausgangsprodukt durch Durchbrüche (97B) zwischen den Gewindegängen (97A, 97B) des Kerns (97C).

34. Verfahren nach Anspruch 33, ferner umfassend:

Ermöglichen, dass Festbestandteile, die einwärts in die Durchbrüche (97B) geführt werden, wenn die Förderschnecke (97) sich dreht, sich bezüglich der Unterseite des Gewindeganges oberhalb des Durchbruchs (97P) an der Eintrittsstelle der Festbestandteile in den Durch-

bruch aufwärts bewegen, und sich entlang einer gekrümmten Oberfläche (97C) der Förderschnecke (97) in Richtung auf die Achse (93) und in das strömende, gefrorene Ausgangsprodukt einwärts bewegen.

5

Revendications

1. Appareil de distribution d'une confiserie visqueuse réfrigérée comprenant un mélange d'un produit de base comestible congelé et d'ingrédients solides comestibles, l'appareil comprenant :

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un récepteur (90) adapté à une fixation stationnaire à un congélateur (11) produisant un produit de base comestible congelé et adapté à recevoir le produit de base congelé par une sortie de distribution (103) du congélateur (11) :
ledit récepteur (90) ayant une chambre de mélange (94M) ;

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caractérisé en ce que l'appareil comprend en outre :

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une vis sans fin de transport (97) ayant une partie (97L) dans ladite chambre de mélange (94M) ;

un moteur (79) d'entraînement de vis sans fin couplé à ladite vis sans fin (97) pour entraîner ladite vis sans fin en rotation ;

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une pluralité de récipients (32) pour ingrédients solides ;

une pluralité de vannes (38), chacune desdites vannes étant associée avec un différent desdits récipients (32) pour commander la distribution de solides à partir desdits récipients ;

35

une trémie de distribution (23) associée avec lesdites vannes (38) pour recevoir des solides distribués à partir desdits récipients (32) ;

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une voie de passage (96) de ladite trémie de distribution (23) jusqu'à ladite chambre de mélange (94M) pour une distribution de solides de ladite trémie de distribution jusqu'à ladite chambre de mélange ;

45

une pluralité de moteurs (34, 36) d'entraînement de vannes, chacun desdits moteurs (34, 36) d'entraînement de vannes étant couplé à une différente desdites vannes (38) ;

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un contrôleur (61) couplé auxdits moteurs (34, 36) d'entraînement de vannes et ayant un sélecteur (76) pour sélectionner et activer des moteurs sélectionnés desdits moteurs (34, 36) d'entraînement de vannes pour qu'ils fonctionnent en séquence ; et

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un commutateur (82) couplé audit contrôleur (61) et utilisable pour activer ledit contrôleur (61) pour opérer des moteurs sélectionnés desdits

moteurs (34, 36) d'entraînement de vannes pour opérer des vannes couplées à des moteurs sélectionnés desdits moteurs d'entraînement de vannes, pour distribuer des solides à partir de récipients (32) associés avec lesdites vannes (38) qui sont couplées à des moteurs sélectionnés desdits moteurs (34, 36) d'entraînement, jusqu'à ladite trémie de distribution (23) pour une distribution jusqu'à ladite chambre de mélange (94M) pour que ladite vis sans fin (97) amène lesdits solides distribués dans ledit produit de base pendant la distribution dudit produit de base à partir dudit congélateur (11).

2. Appareil selon la revendication 1 et comprenant en outre :

un tube (103) ayant une extrémité d'entrée pour un couplage à la sortie de distribution du congélateur (11), ledit tube (103) créant un axe de rotation (93) pour ladite vis sans fin (97) afin qu'elle soit entraînée en rotation sur ledit axe (93) ; et ledit tube ayant une extrémité de sortie (103L) au niveau de ladite chambre de mélange (94M).

3. Appareil selon la revendication 2 et dans lequel :

ledit récepteur inclut une trémie de mélangeur (94) qui a des extrémités supérieure et inférieure et une paroi qui a une surface intérieure qui est circulaire autour dudit axe (93), ladite surface intérieure ayant un profil défini par une partie cylindrique (94C) et une partie convergente (94L) s'étendant vers le bas à partir de ladite partie cylindrique (94C) et vers l'intérieur vers ledit axe (93) ;

ladite chambre de mélange (94M) est dans l'espace englobée par ladite partie convergente (94L) ;

ladite vis sans fin (97) a un premier (97A) et un deuxième (97B) filets hélicoïdaux, chaque filet (97A, 97B) ayant une extrémité supérieure et une extrémité inférieure, et

lesdits filets (97A, 97B) ont un profil correspondant audit profil (94H, 94C, 94L) de ladite surface de paroi intérieure de la trémie de mélangeur (94) pour s'ajuster à ladite surface de paroi intérieure et balayer lesdits solides distribués le long de ladite surface de paroi intérieure vers ladite sortie (94) de produit mélangé lorsque ladite vis sans fin (97) est mise en rotation sur ledit axe (93).

4. Appareil selon la revendication 3 et dans lequel :

ladite vis sans fin (97) a un coeur creux (97C), avec ledit tube (103) s'étendant axialement

dans ledit coeur (97C) ;
des parties (97P) dudit coeur (97C) sont décou-
pées en commençant en des positions diamé-
tralement opposées à proximité de ladite extré-
mité de sortie (103L) dudit tube (103) pour créer
des découpes (97P) sur ledit coeur (97C) ; et
lesdites découpes (97P) sont plus proches de
ladite sortie (94D) de produit mélangé que ne
l'est ladite extrémité de sortie (103L) dudit tube
(103) pour permettre que lesdits solides, lors-
qu'ils sont balayés le long de ladite paroi inté-
rieure par rotation de ladite vis sans fin (97),
soient déplacés vers l'intérieur vers ledit axe de
rotation (93) et à travers lesdites découpes
(97P) et mélangés dans ledit produit de base
passant de ladite extrémité de sortie (103L) du-
dit tube (103) vers ladite sortie (94D) de produit
mélangé.

5. Appareil selon la revendication 2 et dans lequel :

ledit récepteur inclut une trémie de mélangeur
(94) qui a des extrémités supérieure et inférieure
(94L) et une paroi qui est circulaire autour dudit
axe, la paroi ayant un profil de partie de surface
intérieure défini en partie par :

une première partie de paroi supérieure cy-
lindrique (94U) s'étendant dans une direc-
tion axialement vers le bas par rapport à
ladite extrémité supérieure jusqu'à un pre-
mier cercle, une première partie de paroi
conique (94H) s'étendant vers le bas et vers
l'intérieur à partir du premier cercle jusqu'à
un deuxième cercle, une deuxième partie
de paroi cylindrique (94C) s'étendant vers
le bas à partir du deuxième cercle jusqu'à
un troisième cercle, et une deuxième partie
de paroi conique (94L) s'étendant à partir
du troisième cercle vers le bas et vers l'in-
térieur vers un quatrième cercle au niveau
de ladite extrémité inférieure ;
ladite chambre de mélange (94M) est dans
l'espace englobée par ladite deuxième par-
tie de paroi conique (94L) ;
ladite vis sans fin (97) a un premier filet hé-
licoïdal (97A) ayant une extrémité supérieu-
re et une extrémité inférieure, l'extrémité in-
férieure dudit filet étant dans ladite chambre
de mélange (94M) ;
ledit filet (97A) a un bord périmétrique ex-
térieur avec un profil correspondant audit
profil de surface de paroi pour s'ajuster à
ladite surface intérieure de paroi de la tré-
mie de mélangeur (94) et balayer lesdits so-
lides le long de ladite surface intérieure de
paroi lorsque ladite vis sans fin (97) est mise
en rotation sur ledit axe (93).

6. Appareil selon la revendication 5 et dans lequel :

ladite surface de tube qui crée un axe de rotation
(93) est une surface d'appui cylindrique
extérieure ;
ladite vis sans fin (97) a un coeur creux (97C)
avec une partie de surface cylindrique intérieure
reçue en rotation sur ladite surface d'appui dudit
tube (103), d'où il résulte que ledit tube (103)
crée ledit axe de rotation (93) pour ladite vis sans
fin (97).

7. Appareil selon la revendication 6 et dans lequel :

ladite vis sans fin (97) a un deuxième filet héli-
coïdal (97B) qui a une extrémité supérieure en
une position diamétralement opposée, par rap-
port audit axe, à l'extrémité supérieure dudit pre-
mier filet (97A) ; et
ledit deuxième filet (97B) a une extrémité infé-
rieure en une position diamétralement opposée,
par rapport audit axe (93), à l'extrémité inférieu-
re dudit premier filet (97A) et l'extrémité inférieu-
re dudit deuxième filet (97B) est dans ladite
chambre de mélange (94M).

8. Appareil selon la revendication 7 et dans lequel :

ladite vis sans fin (97) a une roue dentée (98)
au-dessus des extrémités supérieures desdits
filets (97A, 97B) ; et
ladite roue dentée (98) est centrée sur ledit axe
(93) ; et
ledit moteur (79) d'entraînement de vis sans fin
est couplé par engrenage avec ladite roue den-
tée (98).

9. Appareil selon la revendication 7 et dans lequel :

des parties dudit coeur (97C) de vis sans fin ont
des découpes (97P) en des positions diamétra-
lement opposées à proximité desdites extrémi-
tés inférieures desdits filets (97A, 97B) de vis
sans fin ; et
la partie de surface intérieure du coeur (97C)
est évasée vers l'extérieur diamétralement à
partir de ladite partie de surface cylindrique
(94C) jusqu'aux faces de fond des filets au som-
met des découpes (97P).

10. Appareil selon la revendication 9 et dans lequel :

ladite extrémité de sortie (103L) dudit tube (103)
est adjacente auxdites faces de fond des filets
(97A, 97B) au sommet des découpes (97P).

11. Appareil selon la revendication 10 et dans lequel :

le pas de chaque filet (97A, 97B) est le même que le pas de l'autre filet (97B, 97A) et est une distance, mesurée dans la direction dudit axe, entre des points espacés de 360 degrés sur le bord périphérique extérieur d'un filet ; et la distance entre le deuxième cercle et le troisième cercle sur ladite trémie de mélangeur (94) et mesurée dans la direction dudit axe (93) est substantiellement égale à la moitié du pas des filets (97A, 97B).

12. Appareil selon la revendication 10 et dans lequel :

le fond de ladite chambre de mélange (94M) est au niveau dudit quatrième cercle ; les extrémités inférieures (97T) desdits filets (97A, 97B) sont au niveau du fond (94B) de ladite chambre de mélange (94M) ; et le diamètre intérieur de ladite vis sans fin (97) au niveau desdites extrémités inférieures (97T) desdits filets (97A, 97B) est substantiellement le même que le diamètre intérieur de ladite surface cylindrique intérieure dudit coeur (97C) de vis sans fin.

13. Appareil selon la revendication 10 et dans lequel :

les extrémités supérieures desdits filets (97A, 97B) ont des bords antérieurs (97L) qui sont biseautés vers le bas et vers l'arrière à partir desdits bords antérieurs (97L).

14. Appareil selon la revendication 13 et dans lequel :

lesdits bords antérieurs (97L) s'étendent radialement vers l'extérieur en des positions diamétralement opposées par rapport audit axe (93).

15. Appareil selon la revendication 1 et comprenant en outre :

(1) une base de montage (21) agencée pour une fixation stationnaire audit congélateur (11) ;
(2) une pluralité de modules de stockage (25) montés sur ladite base de montage (21), chaque module (25) ayant :

(a) un logement (29) de moteur contenant un desdits moteurs (34) d'entraînement de vannes et ayant une cavité (29C) de vanne contenant une desdites vannes (38), la cavité (29C) de vanne ayant un fond (29B) ; et
(b) une base (31) de récipient fixée audit logement (29) de moteur et recouvrant ladite cavité (29C), et ladite base (31) de récipient ayant une emboîture s'ouvrant vers le haut recevant une extrémité ouverte (32N) d'un desdits récipients (32) ; et

(c) un dispositif de fixation (33) fixant ledit module (25) à ladite base de montage (21), ledit dispositif de fixation (33) étant utilisable en un état desserré pour permettre la dépose dudit module (25) de ladite base (31) de récipient.

16. Appareil selon la revendication 15 et dans lequel :

chacun desdits modules de stockage (25) a une forme, en vue en plan, semblable à un secteur (1-8) d'un cercle, et lesdits modules (25) sont montés sur ladite base de montage (21) selon un agencement côte à côte, d'où il résulte que ladite pluralité de modules (25) forment un cercle desdits modules, et chacun desdits modules (25) peut être enlevé du cercle indépendamment des autres modules.

17. Appareil selon la revendication 15 et dans lequel :

chacune desdites vannes est une roue de transfert (38) couplée audit moteur (34) d'entraînement pour une rotation par ledit moteur d'entraînement pour transférer des solides tombés d'un récipient (32) monté dans une emboîture (31) de base de récipient ayant un fond (31B), à travers un premier trou (31P) dans le fond de l'emboîture (31), de la cavité (29C) de vanne jusqu'à un deuxième trou (29H) dans le fond (29B) de la cavité (29C) de vanne pour laisser tomber les solides dans la trémie de distribution (23).

18. Appareil selon la revendication 17 et comprenant en outre :

un agitateur (42) dans chacune desdites emboîtures (31) de base de récipient et couplé audit moteur (34) d'entraînement, ledit agitateur (43) se projetant dans l'extrémité ouverte du récipient (32) reçu dans ladite emboîture (31) pour agiter des solides dans ledit récipient (32) tandis que ladite roue de transfert (38) transfère lesdits solides dans ladite cavité (29C) dudit premier trou (31P) jusqu'audit deuxième trou (29H).

19. Appareil selon la revendication 18 et dans lequel :

ladite roue de transfert (38) a au moins deux bras (38B) s'étendant vers l'extérieur radialement par rapport à un axe de rotation (41) de la roue (38), lesdits bras (38B) ayant environ la moitié de la hauteur de ladite cavité (29C) de vanne du fond de ladite cavité au fond de ladite emboîture de base de récipient, et lesdits bras (38B) ayant des faces qui sont des faces antérieures pendant la rotation de ladite roue biseautées au sommet des bras ; et

- ledit agitateur (43) a des bras généralement parallèles auxdits bras de roue et ayant des faces antérieures indexées en rotation en avant desdites faces antérieures desdits bras (38B) de roue. 5
- 20.** Appareil selon la revendication 15 et dans lequel :
- lesdits récipients (32) reçus dans lesdites emboîtures (31) de base de récipient sont maintenus par frottement de façon ajustée dans lesdites emboîtures, mais chacun desdits modules (25) peut être sorti à la main du récipient (32) reçu dans l'emboîture de module et sans outils, pour le remplissage d'un récipient (32) avec des solides lorsque l'extrémité ouverte (32N) du récipient (32) fait face vers le haut. 10 15
- 21.** Appareil selon la revendication 1 et dans lequel :
- ledit sélecteur (76) inclut un panneau ayant :
- une pluralité de touches de sélecteur, chacune desdites touches ayant des indices distinguant ladite touche de toutes les autres desdites touches pour permettre la sélection desdits moteurs (34, 36) d'entraînement de vannes ; et 20 25
- une touche de réglage de durée de cycle. 30
- 22.** Appareil selon la revendication 21 et comprenant en outre :
- des lumières associées avec lesdites touches pour indiquer un état d'actionnement desdites touches. 35
- 23.** Appareil selon la revendication 21 et comprenant en outre :
- des solides d'un type d'ingrédient contenus dans au moins un desdits récipients (32) ; des solides d'un autre type d'ingrédient contenus dans un autre desdits récipients (32) ; des solides d'un troisième type d'ingrédient contenus dans un troisième desdits récipients (32) ; et des solides de différents types d'ingrédients dans d'autres desdits récipients (32). 40 45
- 24.** Procédé de mélange d'ingrédients solides comestibles secs avec un produit de base congelé au moyen de l'appareil selon la revendication 1, le procédé comprenant :
- le démarrage d'un flux du produit de base congelé d'une sortie (103) de congélateur jusqu'à une chambre de mélange (94M) pour qu'il s'écoule à travers la chambre (94M) jusqu'à une 50 55
- sortie (94D) de produit mélangé ; la sélection d'une pluralité de types d'ingrédients solides comestibles et l'entrée des solides des types sélectionnés dans ladite chambre de mélange (94M) ; l'amenée par une vis sans fin desdits types sélectionnés de solides dans le flux dudit produit de base lorsqu'il s'écoule à travers ladite chambre (94M) et produisant ainsi un mélange desdits solides dans ledit produit de base congelé ; et la distribution dudit mélange à l'extérieur de ladite chambre de mélange (94M) par ladite sortie (94D) de produit mélangé.
- 25.** Procédé selon la revendication 24 et comprenant en outre :
- le stockage dans des récipients (32) d'une pluralité de solides de différents types d'ingrédients comestibles, chaque type différent dans un récipient différent ; la sélection de certains desdits types différents pour un mélange ; la libération des solides des types sélectionnés desdits récipients (32) stockant lesdits types sélectionnés dans le flux dudit produit de base congelé ; et le mélange des solides des types sélectionnés dans le flux dudit produit de base congelé.
- 26.** Procédé selon la revendication 25 et comprenant en outre :
- la mise en rotation de roues de transfert (38) par des entraîneurs motorisés (34, 36) pour libérer lesdits solides.
- 27.** Procédé selon la revendication 25 et comprenant en outre :
- la libération desdits solides desdits types sélectionnés en séquence d'un type suivant un autre type.
- 28.** Procédé selon la revendication 27 et comprenant en outre :
- la prédétermination de ladite séquence avant le démarrage du flux dudit produit de base congelé ; la libération de chacun desdits types sélectionnés pendant une certaine durée, et la libération de tous les types sélectionnés dans un cycle séquentiel de libération ; et la répétition desdits cycles séquentiels tandis que ledit produit de base congelé continue à s'écouler jusqu'à la chambre de mélange (94M).

29. Procédé selon la revendication 28 et comprenant en outre :

l'actionnement d'un dispositif (16) pour démarrer le flux dudit produit de base congelé à partir de la sortie (103) de congélateur ; et
la réponse à l'actionnement du dispositif (16) pour initier la libération et l'amenée par une vis sans fin desdits solides dans ladite chambre de mélange (94M). 5 10

30. Procédé selon la revendication 29 et comprenant en outre :

l'utilisation de l'actionnement dudit dispositif (16) pour initier le fonctionnement à la fois d'un moteur (79) de mélangeur et dudit cycle séquentiel. 15

31. Procédé selon la revendication 24 et comprenant en outre :

l'utilisation d'une vis sans fin (97) rotative ayant des filets (97A, 97B) en spirale formés autour d'un coeur creux (97C) avec un axe longitudinal (93) ; et
le flux dudit produit de base congelé de ladite sortie (103) de congélateur vers le bas à travers ledit coeur (97C) vers ladite sortie (94D) de produit mélangé. 20 25 30

32. Procédé selon la revendication 31 et comprenant en outre :

la prévision d'une paroi ayant une surface intérieure (94H, 94C, 94L) circulaire autour dudit axe (93) et entourant ladite vis sans fin (97);
la prévision de profils de correspondance de ladite vis sans fin (97) et de ladite surface intérieure, ajustant ainsi ladite vis sans fin (97) à ladite surface intérieure ;
le balayage vers le bas sur ladite surface avec lesdits filets (97A, 97B) de vis sans fin tout en mettant en rotation ladite vis sans fin (97) par rapport à ladite paroi, sur ledit axe (93);
l'utilisation d'une partie conique (94H) de ladite surface intérieure pour guider lesdits solides vers l'intérieur alors qu'ils sont balayés vers le bas par ladite vis sans fin (97) rotative dans ledit produit de base congelé s'écoulant vers le bas dudit coeur (97C) à travers ladite chambre (94M) jusqu'à ladite sortie (94D) de produit mélangé. 35 40 45 50

33. Procédé selon la revendication 32 et comprenant en outre: 55

l'admission des solides balayés vers le bas dans ledit produit de base congelé s'écoulant, à tra-

vers des découpes (97P) entre les filets (97A, 97B) dans ledit coeur (97C).

34. Procédé selon la revendication 33 et comprenant en outre :

la possibilité pour les solides guidés vers l'intérieur dans lesdites découpes (97P) alors que ladite vis sans fin (97) est en rotation, de se déplacer vers le haut par rapport au fond du filet au-dessus de la découpe (97P) au point d'entrée du solide dans la découpe, et de se déplacer vers l'intérieur le long d'une surface (97C) incurvée de ladite vis sans fin (97) vers ledit axe (93) et dans ledit produit de base congelé s'écoulant.

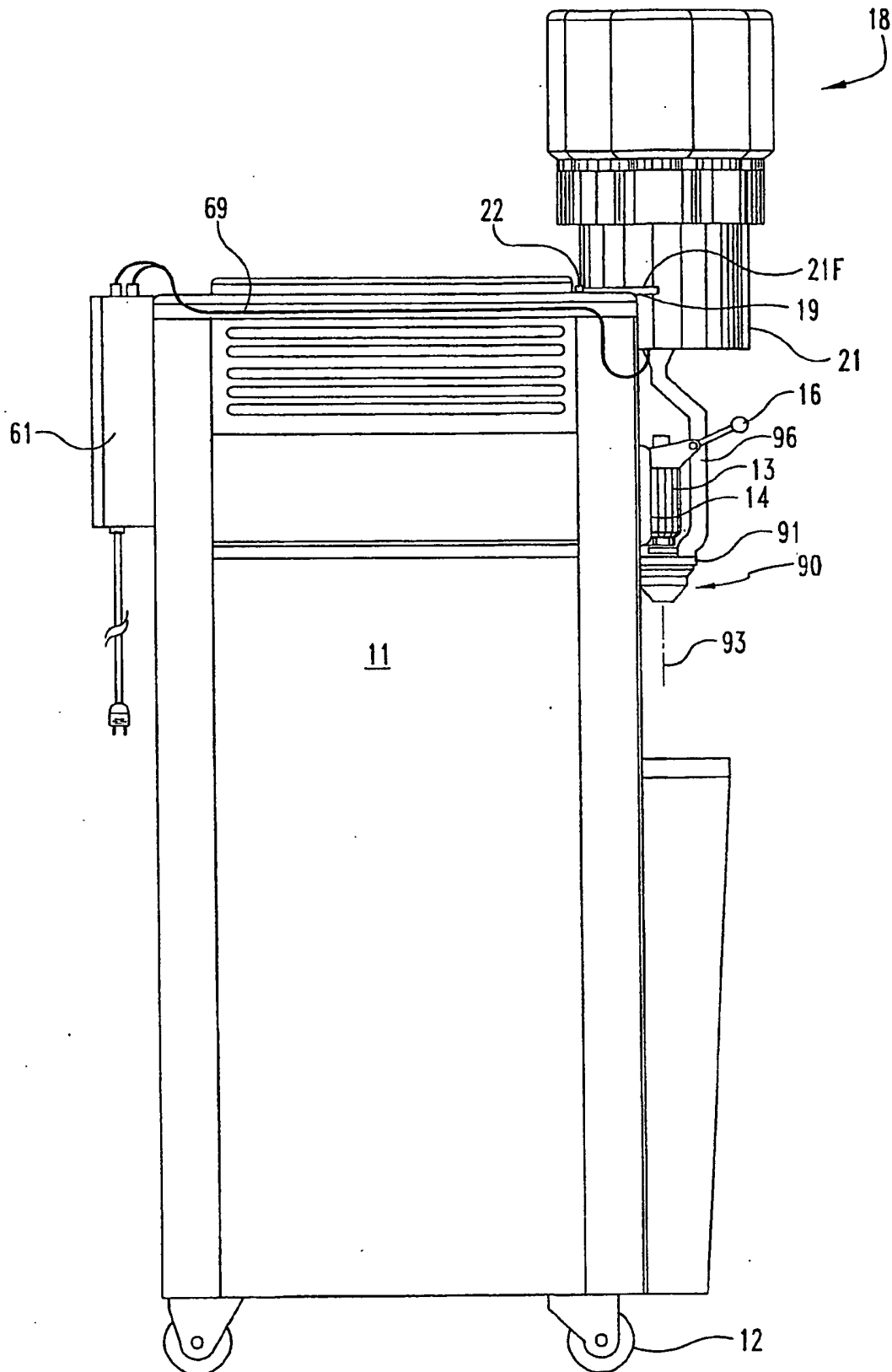


Fig. 1

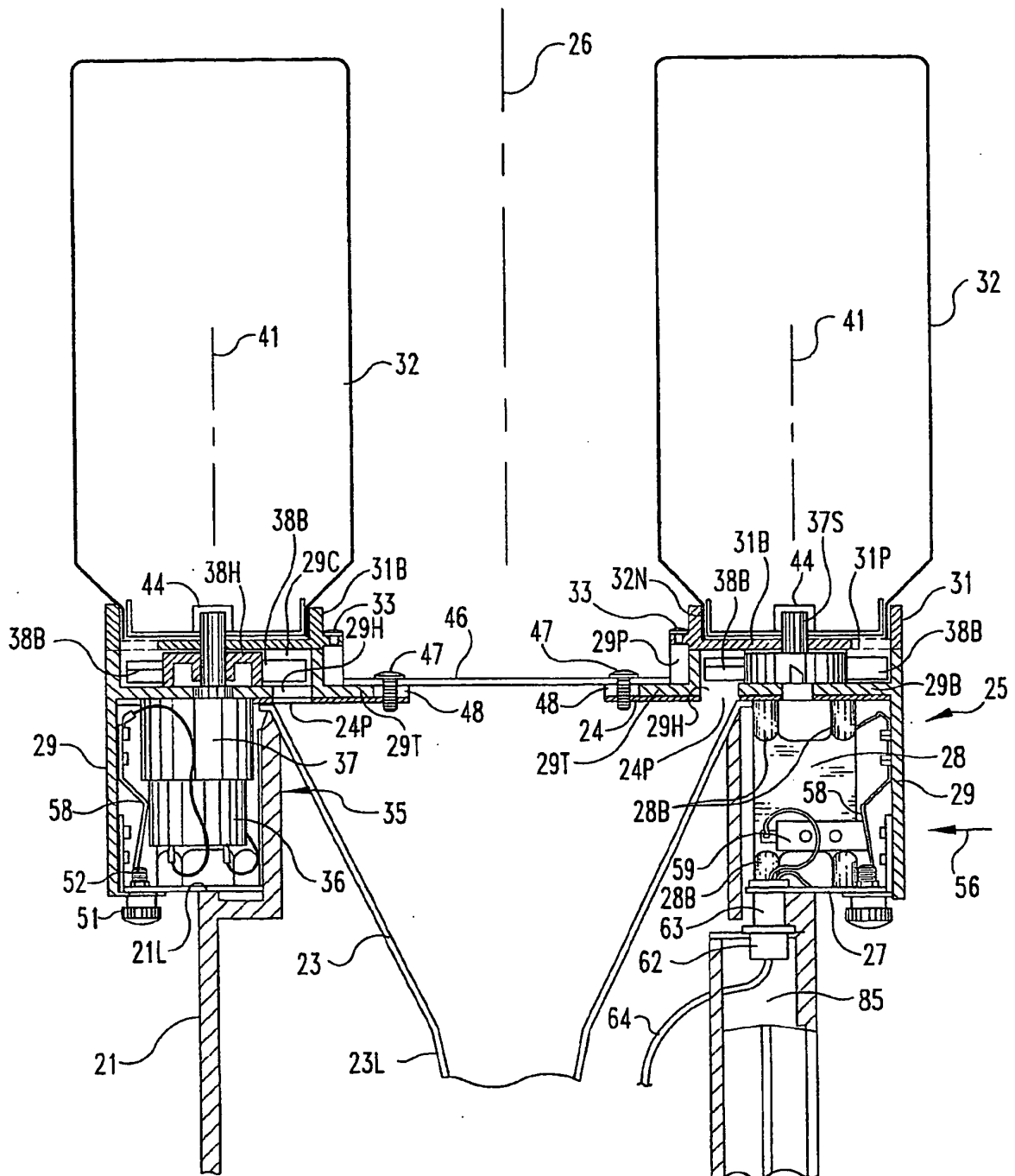


Fig. 2A

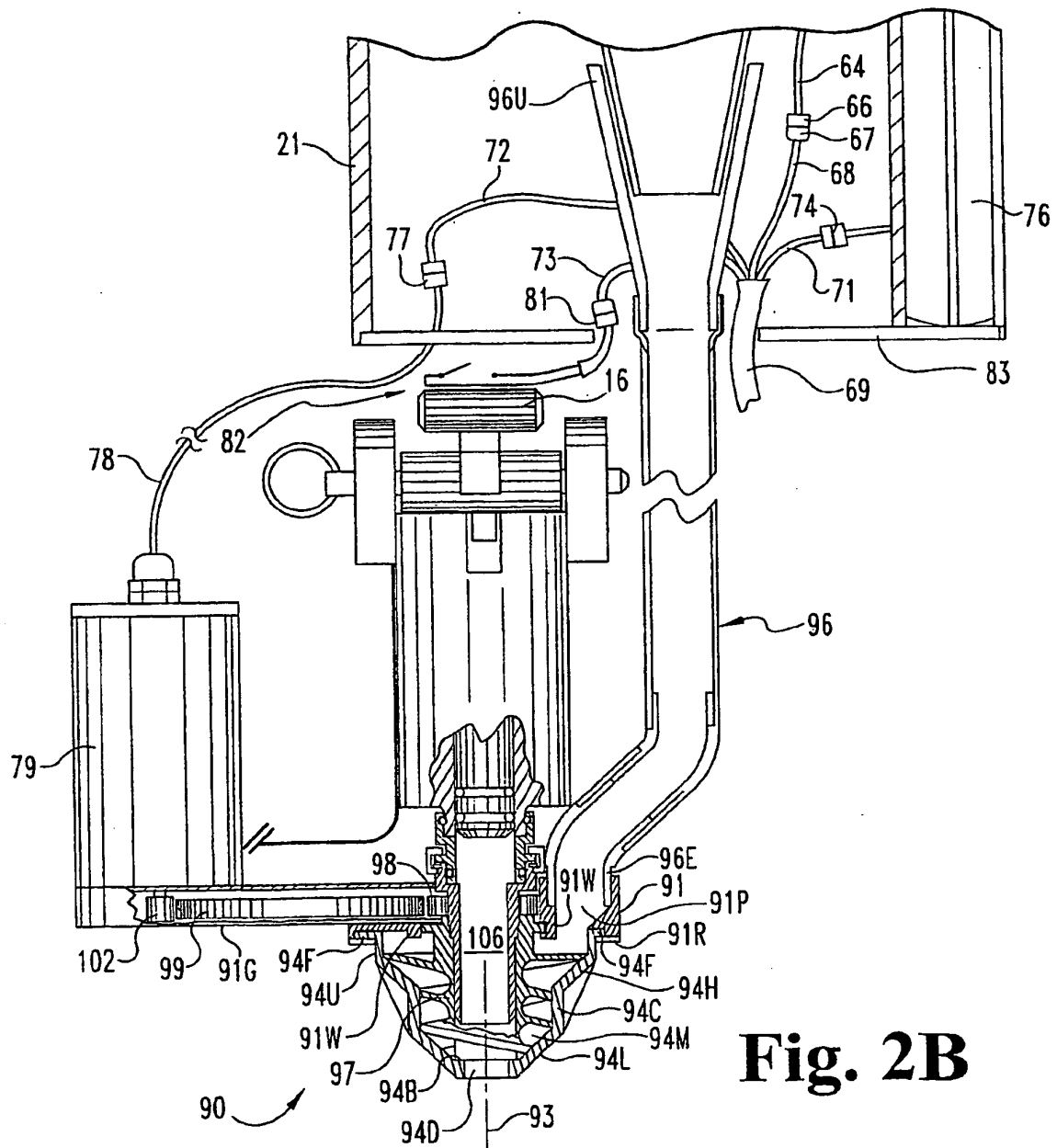


Fig. 2B

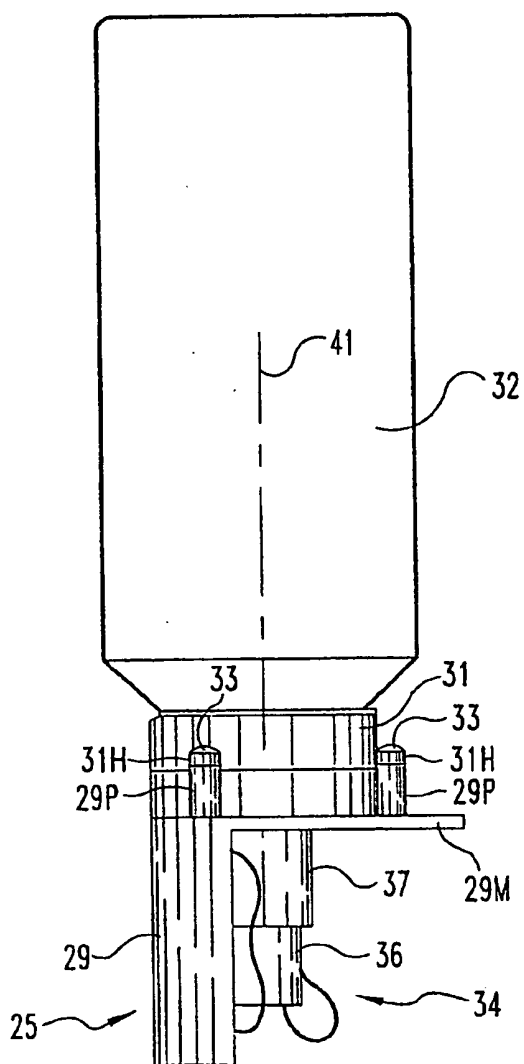


Fig. 3

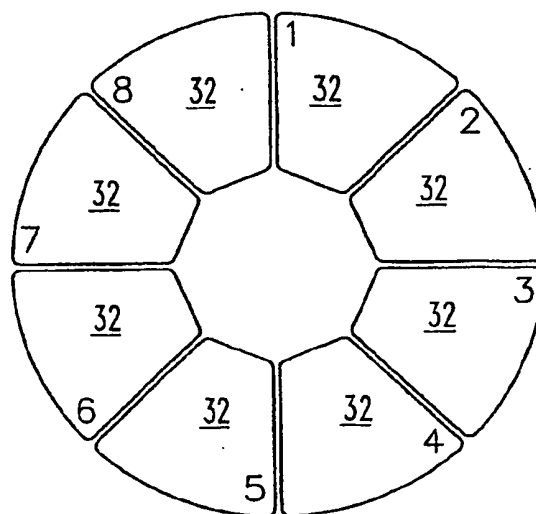


Fig. 4

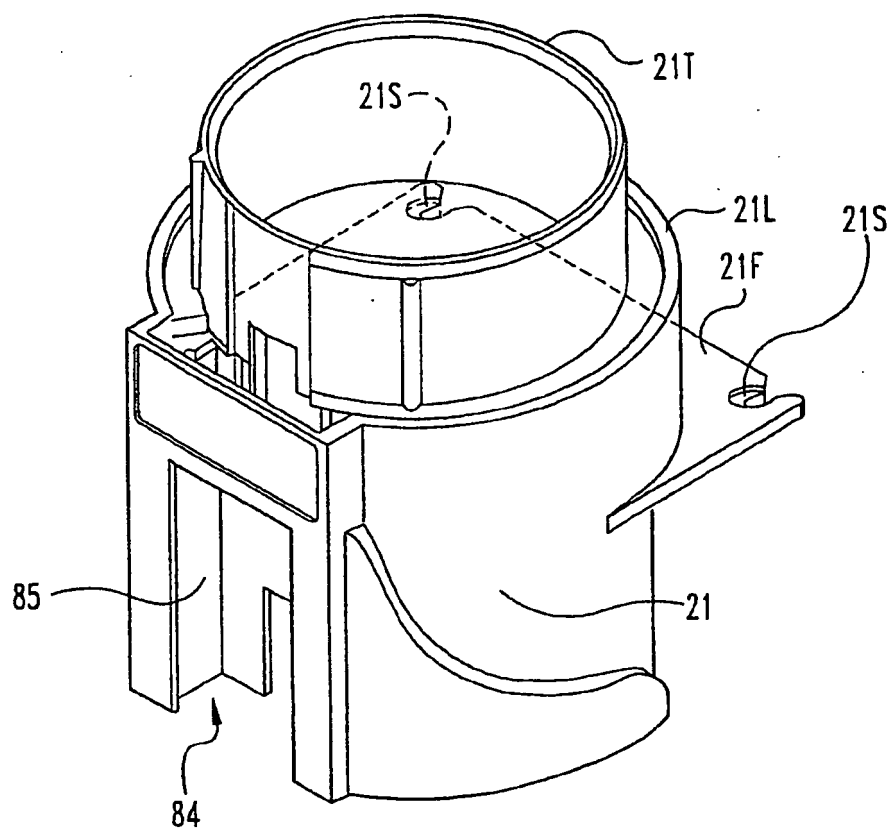


Fig. 5

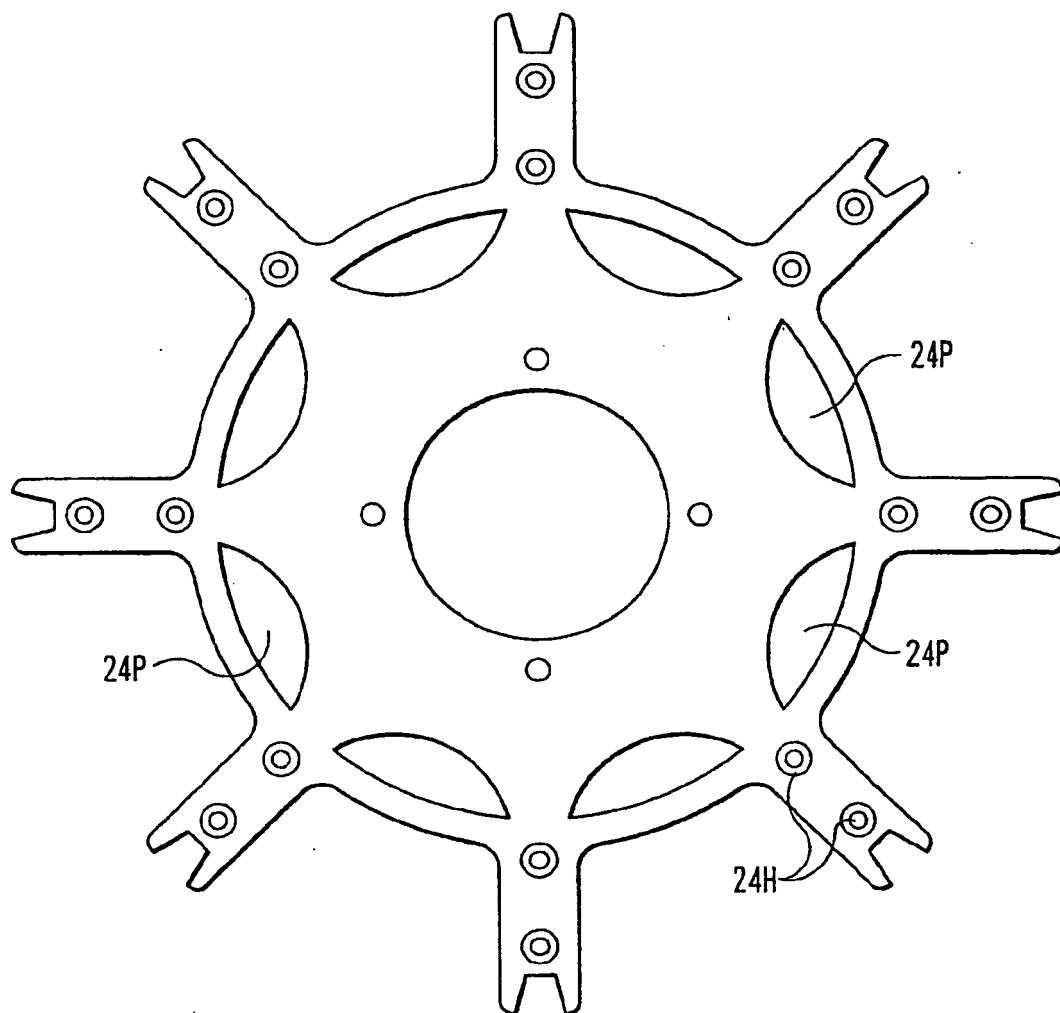


Fig. 6

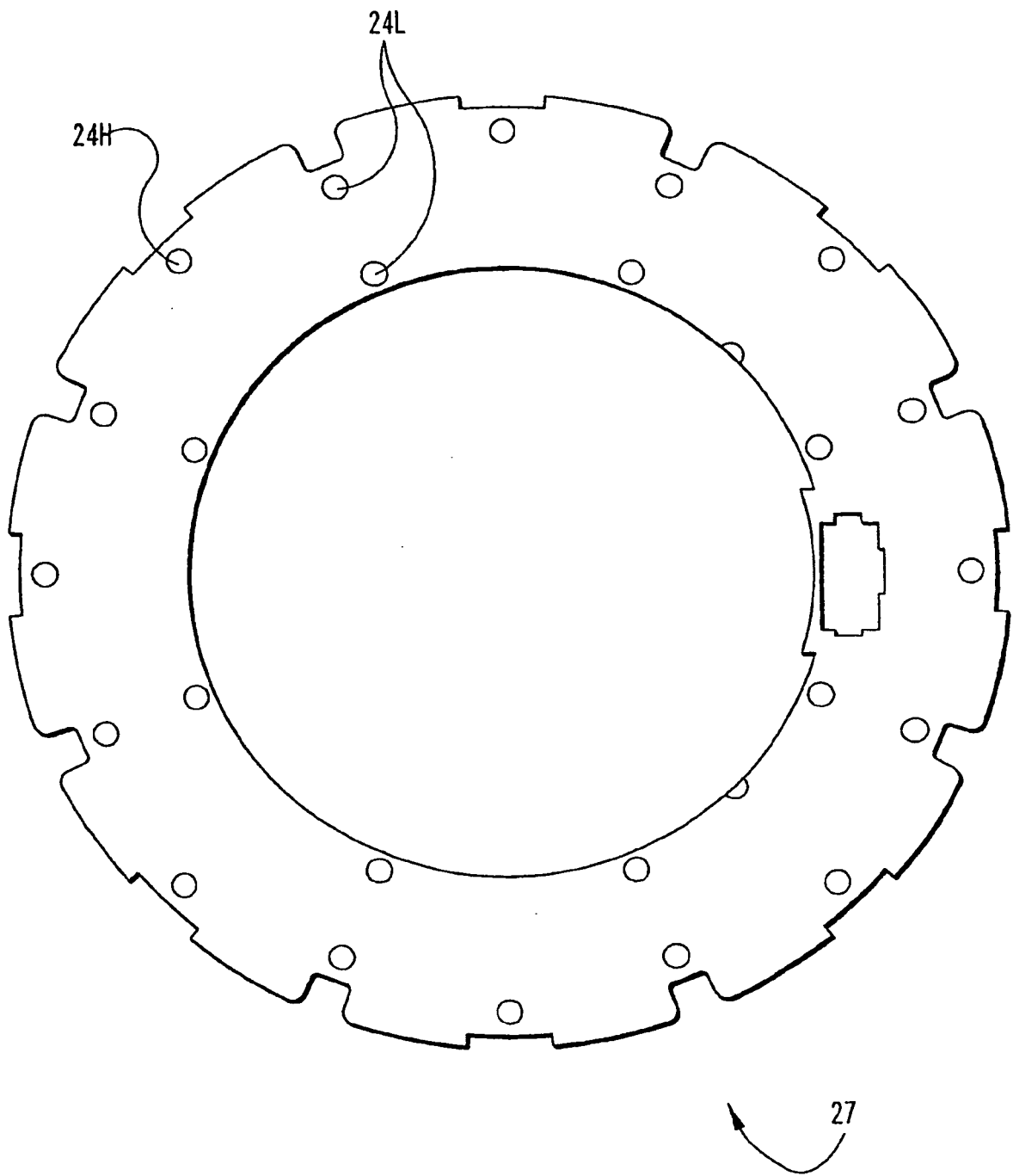


Fig. 7

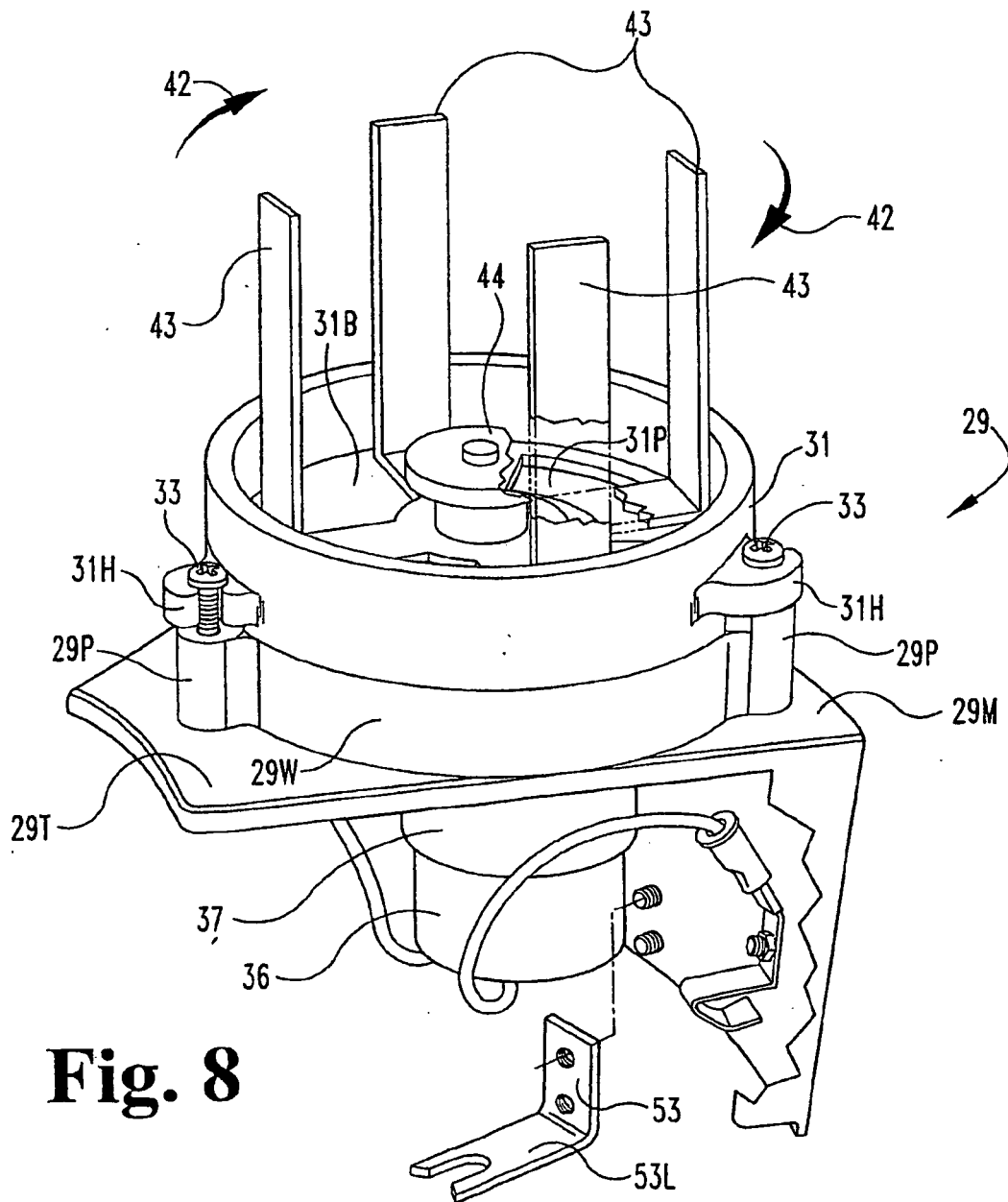


Fig. 8

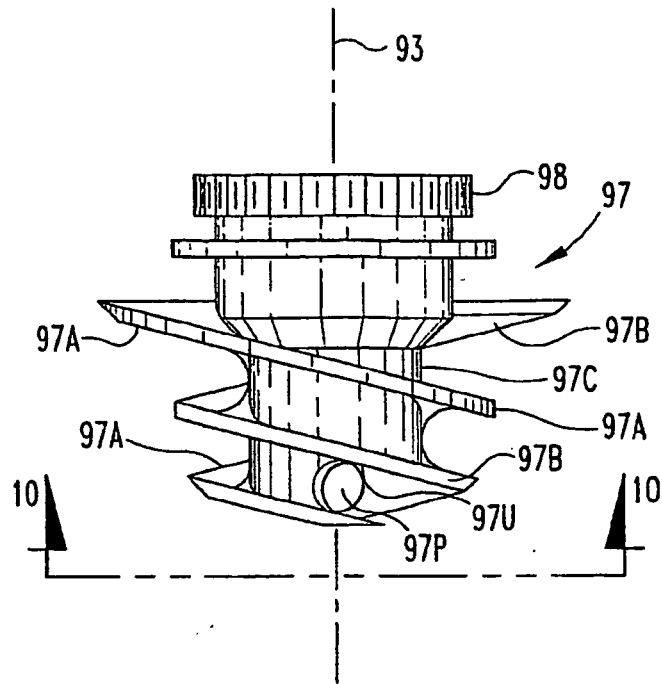


Fig. 9

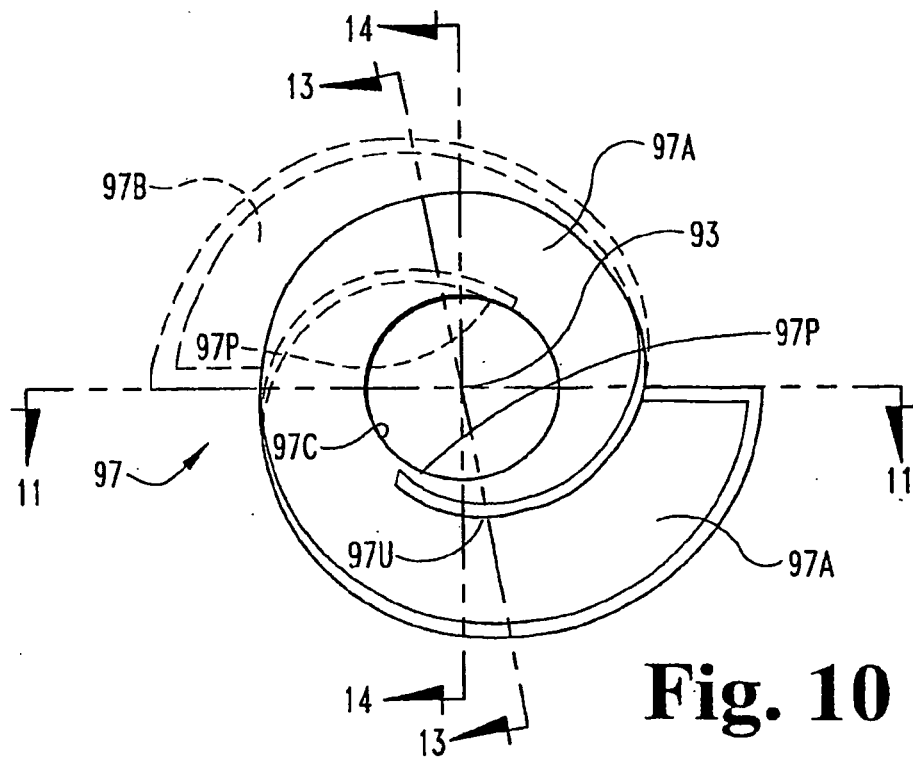
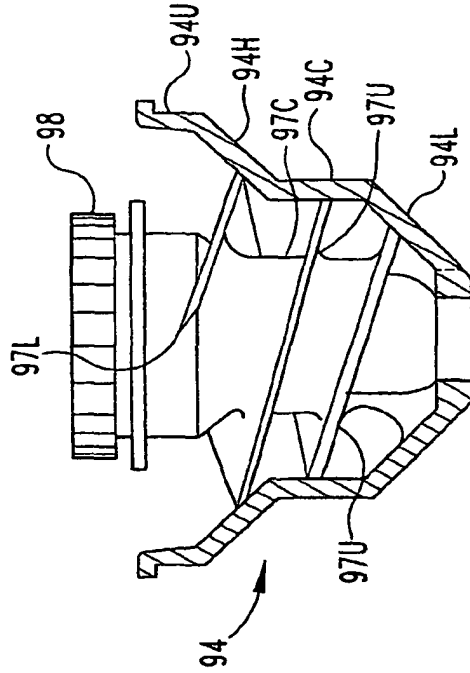
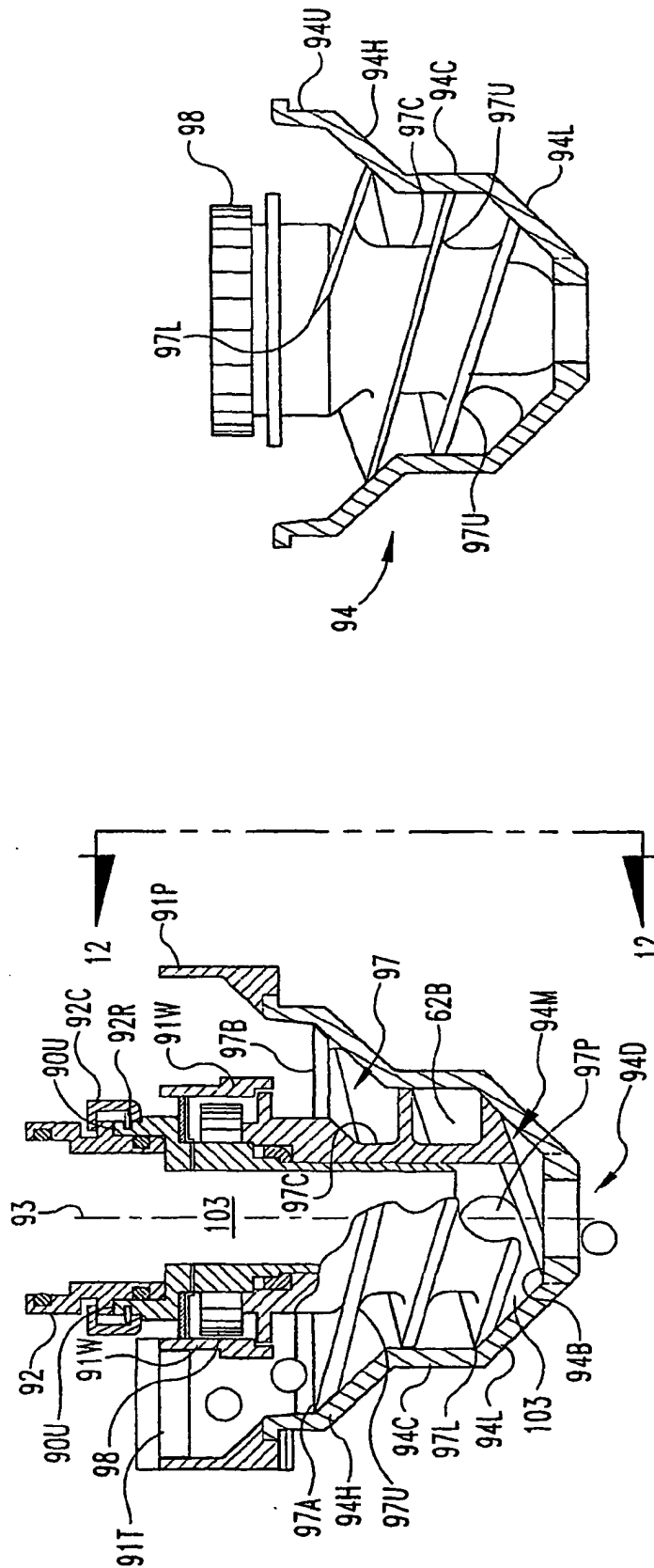


Fig. 10



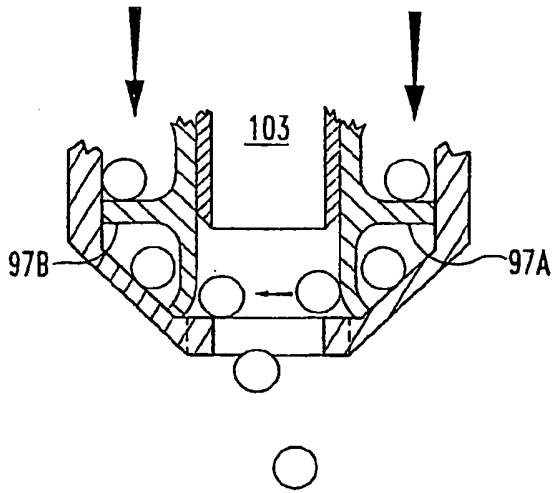


Fig. 13

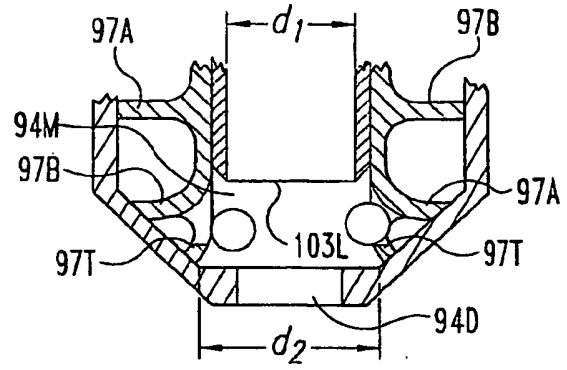


Fig. 14

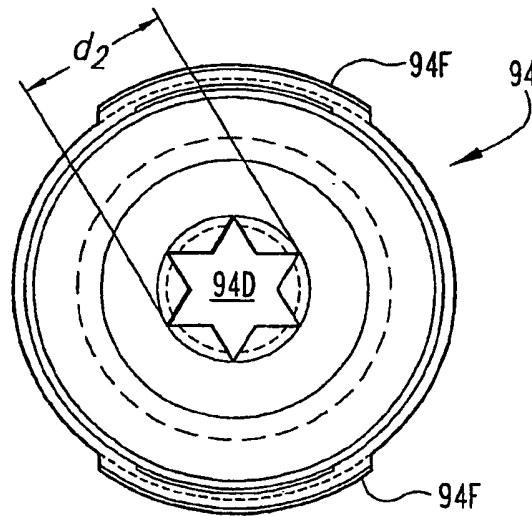


Fig. 15

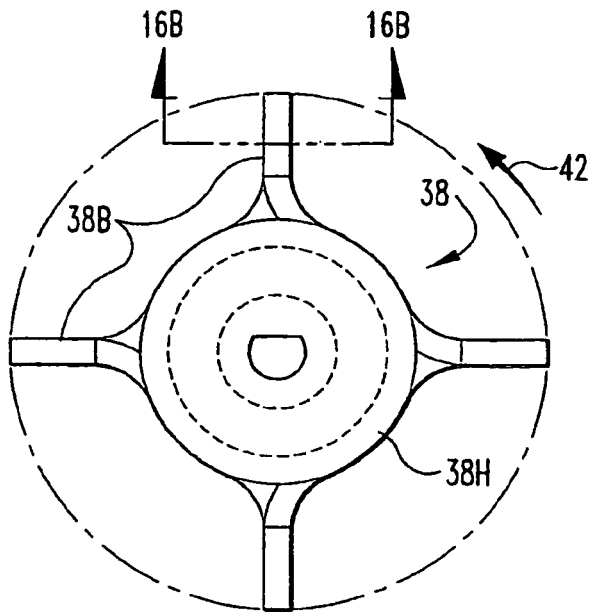


Fig. 16A



Fig. 16B

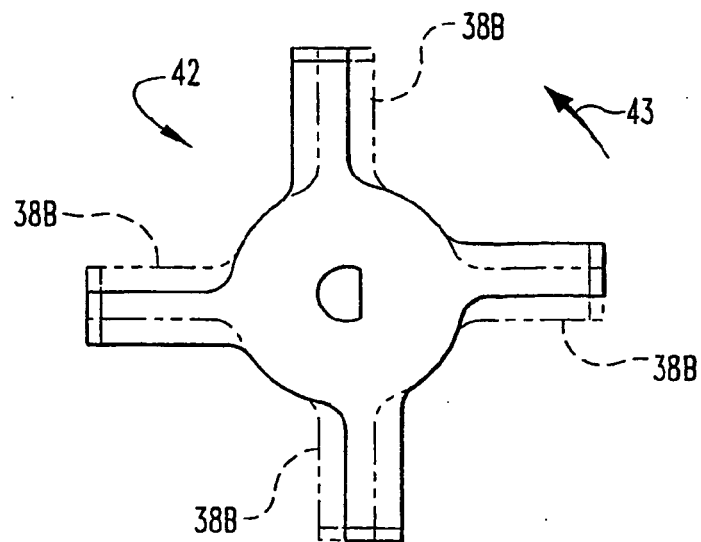


Fig. 17

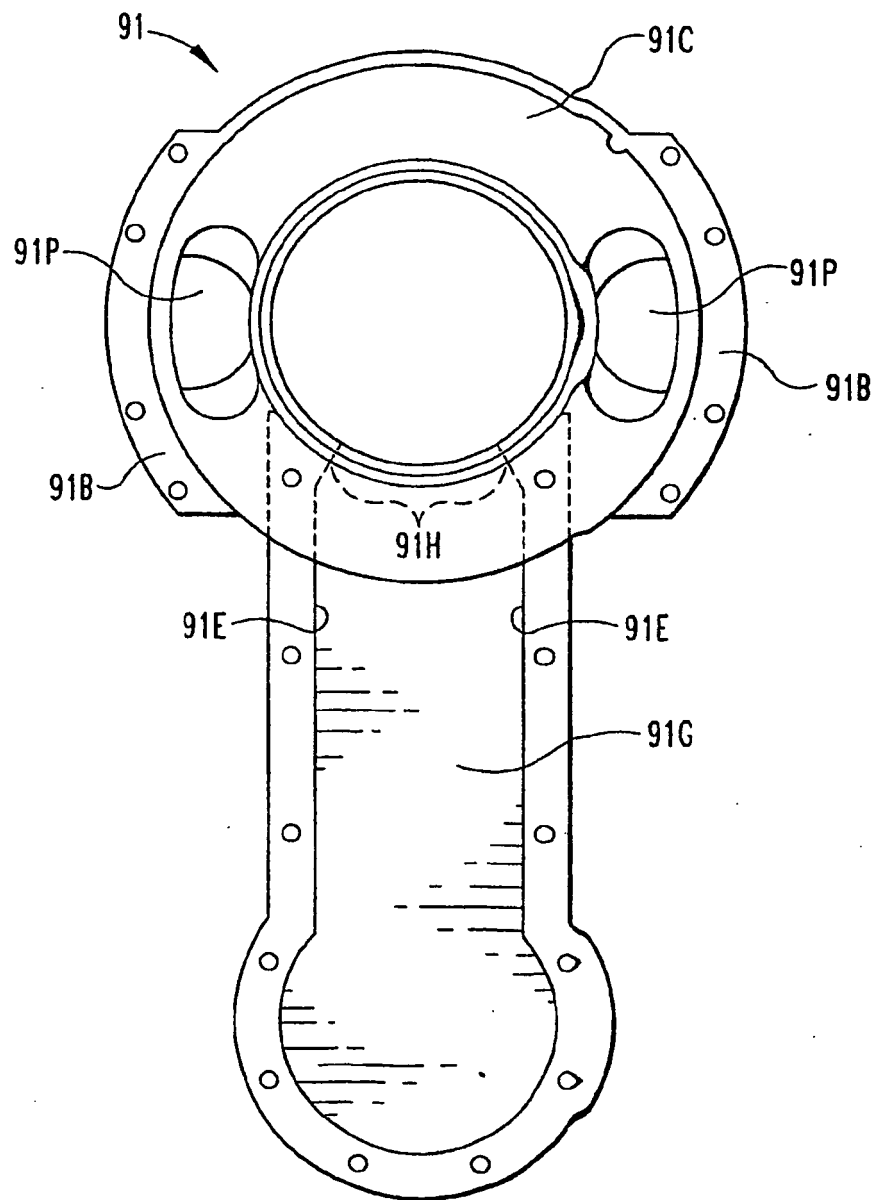


Fig. 18

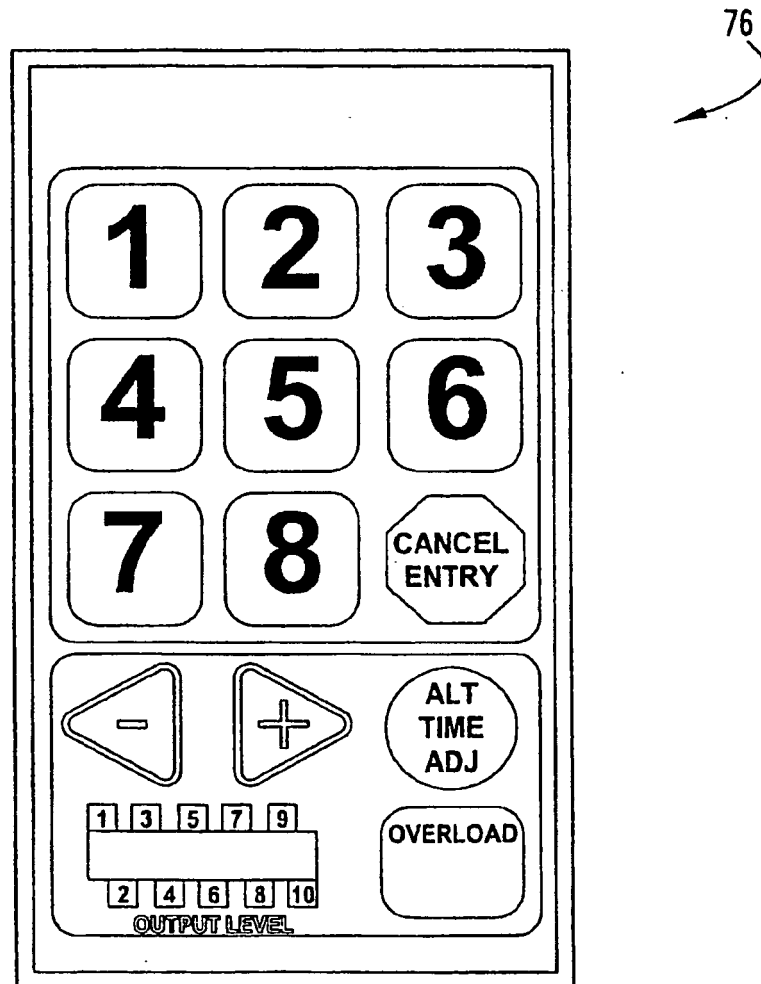


Fig. 19

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4793520 A [0002]
- US 3001770 A, Mueller [0002]
- GB 1465312 A [0003]