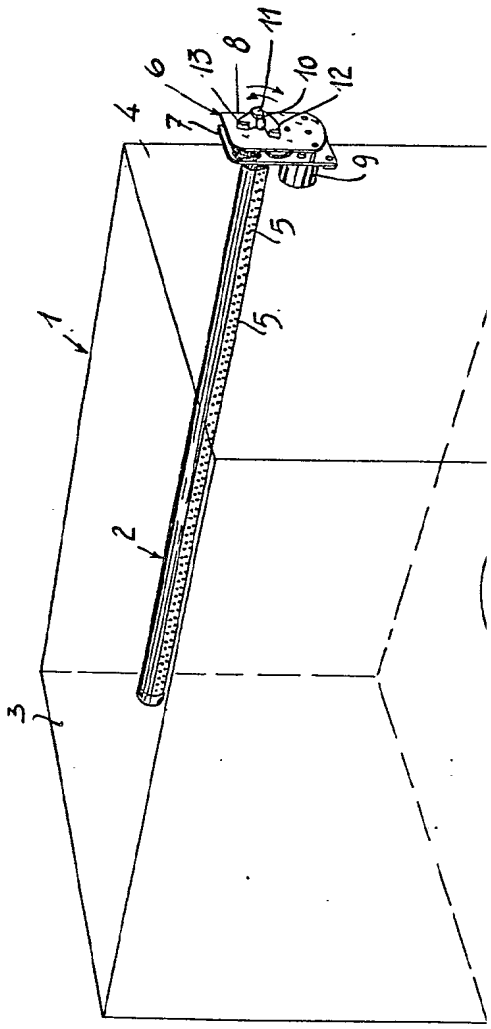

1
2
3
4
5
5'
6
7
8
9
10
11
12
13

1123787 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheets 1 & 2

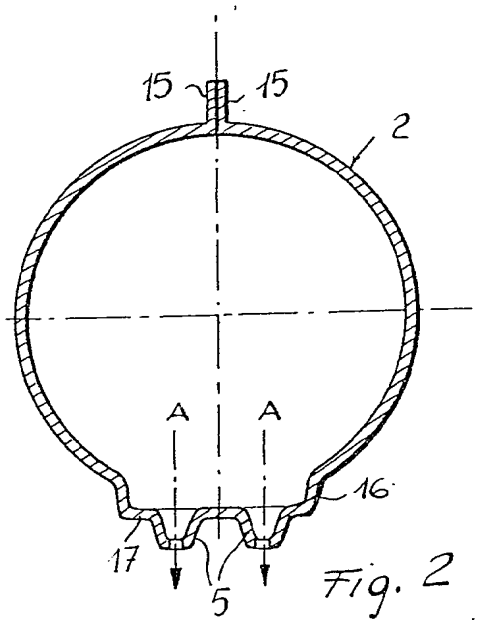


Fig. 2

Petitioner Samsung Ex-1004, 0837

1123787 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheets 1 & 2

Fig. 2

Fig. 1

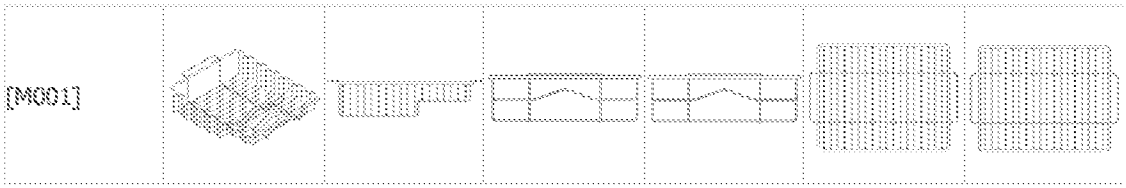
Petitioner Samsung Ex-1004, 0838

주방용 식기건조대

Details | **Publ. Full Text** | **Registr. Details** | **Administrative Actions**

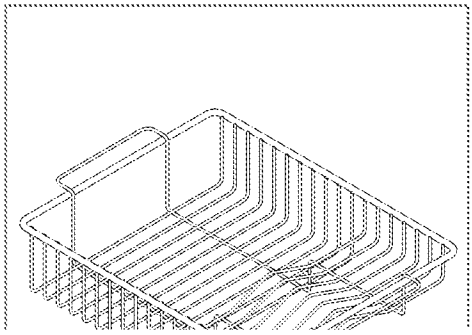
Details Biographical Information Essentials of creation Legal Status Multiple Design Info.

All Images View



(21) Application No(Date)	302021001059O(2021.03.04)
(71) Applicant	NA SEUNG HITECH CO., LTD
(11) Publication No(Date)	(2021.10.13) Full-doc Down
(65) Open Pub. No(Date)	
(11) Registration No(Date)	3011304700000(2021.10.01)
(30) Priority No.(Date)	
Legal Status	**Registered**
Examination Status(Date)	Decision to grant (General)(2021.09.23)
Retroacted Section(Date)	(2021.03.04)
Trial Info	
Original Application No.	
Related Application No.	
Design Type	Basic Single Public
(52) Design Class.	C5530
(51) Locarno Class.	07-05

Download Zoom



(19) 대한민국특허청(KR)
(12) 등록디자인공보(S)

(45) 공고일자 2021년10월13일
(11) 등록번호 30-1130470
(24) 등록일자 2021년10월01일

(52) 분류 C5-530
(51) 국제분류 07-05
(21) 출원번호 30-2021-0010590
(22) 출원일자 2021년03월04일

(73) 디자인권자
나승하이텍(주)
경기도 김포시 통진읍 김포대로2385번길 67-34
(72) 창작자
추교완
경기도 부천시 원미구 석천로 216 , 503동 2401호(중동, 은하마을)
(74) 대리인
양성보

담당심사관 : 조한진

(54) 명칭 주방용 식기건조대

디자인도면

물품류

제7류

디자인의 대상이 되는 물품

주방용 식기건조대

디자인의 설명

1. 재질은 금속재임.

2. 본 디자인은 주방용 식기건조대에 관한 것으로, 싱크인 되어 다용도로 사용 가능함.

3. 도면의 간단한 설명

[도면 1.1]은 디자인의 전체적인 형태를 표현한 것임.

[도면 1.2]는 디자인의 정면부분을 표현한 것이며, 배면부분은 이와 대칭되게 표현되므로 도시를 생략하였음.

[도면 1.3]은 디자인의 좌측부분을 표현한 것임.

[도면 1.4]는 디자인의 우측부분을 표현한 것임.

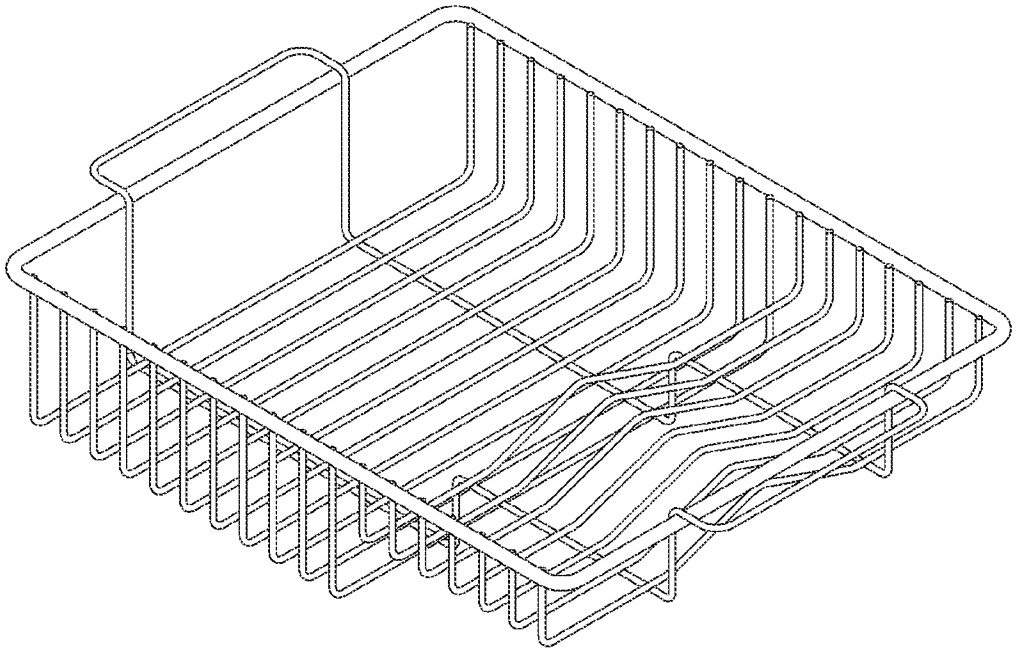
[도면 1.5]는 디자인의 평면부분을 표현한 것임.

[도면 1.6]은 디자인의 저면부분을 표현한 것임.

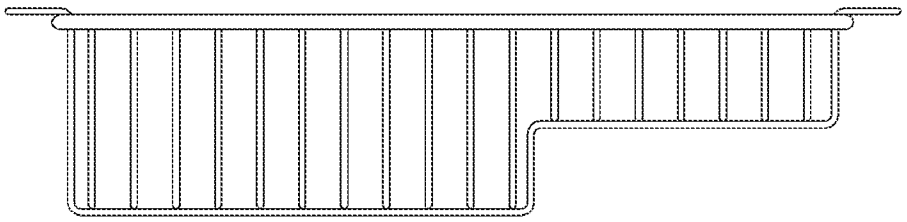
디자인 창작 내용의 요점

"주방용 식기건조대"의 형상과 모양의 결합을 디자인 창작내용의 요점으로 함.

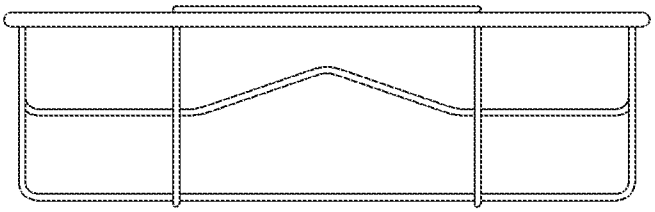
도면 1.1



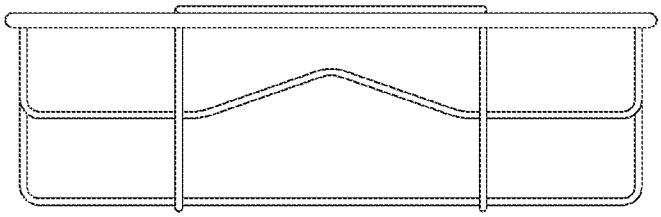
도면 1.2



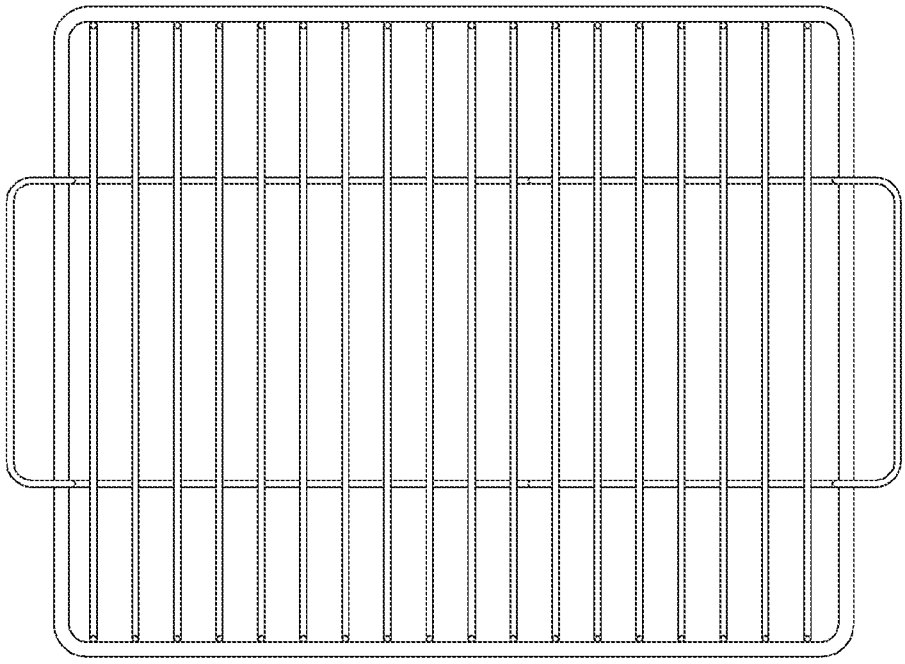
도면 1.3



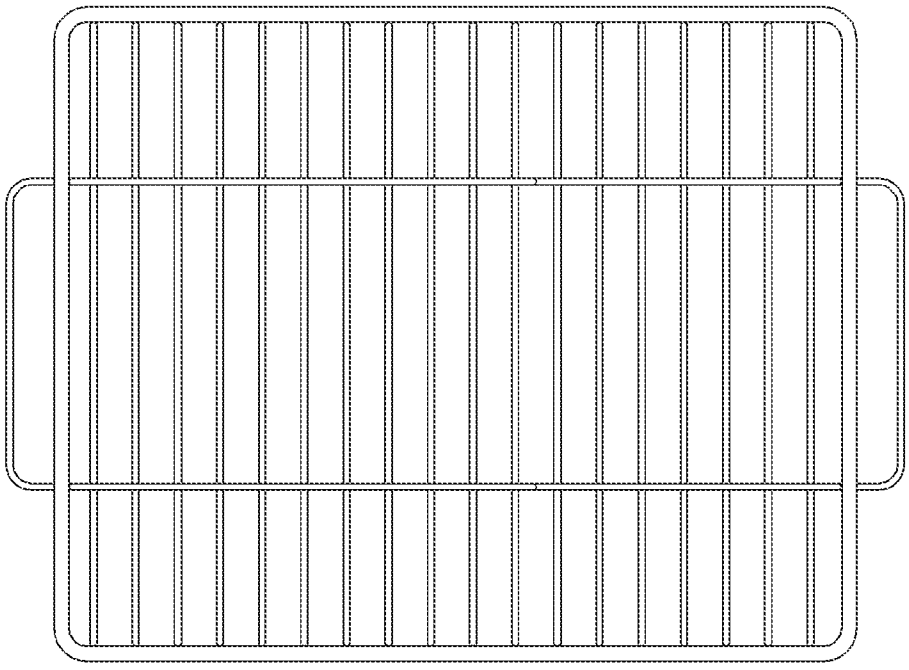
도면 1.4



도면 1.5



도면 1.6



Espacenet

Bibliographic data: DE2907916 (A1) — 1980-09-11

Tunnel type pasteurising system - has spray pipe with angled nose pieces on nozzles to prevent blockage

Inventor(s): RIEMANN KLAUS; WINKLER HEINRICH; FRUENDT JOACHIM; MNILK REINHOLD ± (RIEMANN,KLAUS, ; WINKLER,HEINRICH, ; FRUENDT,JOACHIM, ; MNILK,REINHOLD, ; RIEMANN, KLAUS, 4600 DORTMUND, DE, ; WINKLER, HEINRICH, 4750 UNNA-MASSEN, DE, ; FRUENDT, JOACHIM, ; MNILK, REINHOLD, 4600 DORTMUND, DE)

Applicant(s): HOLSTEIN & KAPPERT MASCHF ± (HOLSTEIN UND KAPPERT GMBH, ; HOLSTEIN UND KAPPERT GMBH, 4600 DORTMUND, DE)

Classification: **- international:** ***A23L3/04; A61L2/04; B05B1/20; B05B13/02;*** (IPC1-7): A61L3/02; B05B13/00

- cooperative: A23B2/22 (EP); A61L2/04 (EP); B05B1/20 (EP); B05B13/0278 (EP)

Application number: DE19792907916 19790301

Priority number(s): DE19792907916 19790301

Also published as: DE2907916 (C2)

Abstract of DE2907916 (A1)

The appliance is for the spraying of vessels in tunnel pasteurisers, having parallel spray pipes. The spray pipes are located above a support and conveyor plane for the vessels, at right angles to their direction of movement, and with outlets directed against the vessels. The outlets (5) are formed as passages in the jacket (4) of the spray pipe (2), and each has a nose, in front of the outlet in directon of flow, which slopes inwads. The max. length of the nose corresponds to the largest distance between the edges of the passages, in the direction of flow. The angle between the pipe jacket and nose is less than 90 deg., pref. 45 deg.

(51) Int. Cl. 3 = Int. Cl. 2 Int. Cl. 2: B 05 B 13/00
A 61 L 3/02

(19) BUNDESREPUBLIK DEUTSCHLAND

DEUTSCHES PATENTAMT

Patentschrift

(11) Offenlegungsschrift 29 07 916

(21) Aktenzeichen: P 29 07 916.1
(22) Anmeldetag: 1. 3. 79
(43) Offenlegungstag: 11. 9. 80

(30) Unionspriorität:
(32) (33) (31) —

(54) Bezeichnung: Vorrichtung zur Beaufschlagung von Waren mit Flüssigkeit

(71) Anmelder: Holstein und Kappert GmbH, 4600 Dortmund

(72) Erfinder: Riemann, Klaus, 4600 Dortmund; Winkler, Heinrich, 4750 Unna-Massen; Fründt, Joachim; Mnilk, Reinhold; 4600 Dortmund

DE 29 07 916 A 1

9. 80 030 037/82 4/70

Petitioner Samsung Ex-1004, 0845

Holstein und Kappert GmbH

, den 21.02.79

1

das Deutsche Patenamt, München

Patentanspruch

Vorrichtung zur Beaufschlagung von Waren mit Flüssigkeit, insbesondere zur Berieselung von Gefäßen in Tunnelpasteurisiermaschinen mit mehreren parallel zueinander verlaufenden Spritzrohren, die oberhalb einer Abstütz- und Förderebene für die Gefäße vorzugsweise quer zu deren Bewegungsrichtung angeordnet sind und gegen die Gefäße gerichtete Austrittsöffnungen aufweisen, dadurch gekennzeichnet, daß die Austrittsöffnungen (5) als Durchbrüche des Rohrmantels (4) ausgebildet und mit einer in Strömungsrichtung vor der Austrittsöffnung nach innen weisenden geneigten Nase ausgestattet sind, deren Länge maximal dem größten Randabstand der Ausnehmungen (5) in Strömungsrichtung entspricht, wobei der von dem Rohrmantel und der Nase eingeschlossene Winkel weniger als 90°, vorzugsweise 45° beträgt.

030037/0082

Petitioner Samsung Ex-1004, 0846

Vorrichtung zur Beaufschlagung von Waren mit Flüssigkeit

Die Erfindung bezieht sich auf eine Vorrichtung zur Beaufschlagung von Waren mit Flüssigkeit, insbesondere zur Berieselung von Gefäßen in Tunnelpasteurisiermaschinen mit mehreren parallel zueinander verlaufenden Spritzrohren, die oberhalb einer Abstütz- und Förderebene für die Gefäße vorzugsweise quer zu deren Bewegungsrichtung angeordnet sind und gegen die Gefäße gerichtete Austrittsöffnungen aufweisen.

In einer Tunnelpasteurisiermaschine werden die Gefäße in aufeinanderfolgenden Behandlungszonen mit Flüssigkeit unterschiedlicher Temperatur beaufschlagt, auf diese Weise stetig bis hin zur Pasteurisiertemperatur erhitzt und anschließend wieder auf die Umgebungstemperatur zurückgekühlt. Die einzelnen Behandlungsabteilungen weisen zur gleichmäßigen Beaufschlagung oberhalb der Transportebene quer gerichtete Zulaufrohre auf, die mit einer Vielzahl von Sprühdüsen verhältnismäßig komplizierter Art ausgestattet sind. Die einzelnen Sprühdüsen erzeugen einen breit gefächerten Flüssigkeitsstrahl, der in Richtung auf die Gefäße wirkt und diese umfließt. Bei einer mehrstöckigen Bauweise dieser Tunnelpasteurisiermaschinen gelangt die Sprühflüssigkeit anschließend auf die Gefäße der unteren Etage und läuft schließlich in den Sammelbehälter zurück, um erneut in Umlauf gebracht zu werden. Die sich im Laufe der Zeit in diesem Behälter ansammelnden Schmutzpartikel werden zwangsläufig infolge der hohen Strömungsgeschwindigkeit mitgerissen und in Schwebe gehalten. Diese lagern sich im Innern der Sprührohre ab und führen allmählich zu einer Verstopfung einzelner Düsen, wodurch die Wirksamkeit des Sprühvorganges und damit der Erfolg des Pasteuri-

Petitioner Samsung Ex-1004, 0847

sierverfahrens beeinträchtigt wird. Darüberhinaus stauen sich die Schmutzpartikel in relativ kurzer Zeit an dem der Eintrittsseite gegenüberliegenden Ende einzelner Sprührohre auf und führen so zwangsläufig zu einer völligen Verstopfung der hier angeordneten hinteren Düsengruppen. Dadurch wird je nach Verschmutzungsgrad der zu behandelnden Gefäße relativ häufig eine Reinigung der Sprührohre sowie auch ein Austausch der verstopften Düsen notwendig, was infolge des dadurch bedingten Ausbaus sehr zeitraubend und schwierig ist.

Die Erfindung hat sich zur Vermeidung dieser Nachteile bei einer Vorrichtung der eingangs genannten Art die Aufgabe gestellt, die Behandlung der Gefäße in der Weise durchzuführen, daß eine Verstopfung einzelner Düsen bzw. Ablagerungen innerhalb des Sprührohres vermieden werden und die Eingliederung der Düsen zur Verteilung der Flüssigkeit entbehrlich wird. Gleichzeitig soll die Strömung der Flüssigkeit innerhalb des Rohres derart gelenkt werden, daß eine gleichmäßige Druckverteilung bis hin zur letzten Austrittsöffnung gewährleistet ist. Diese Aufgabe wird gemäß der Erfindung dadurch gelöst, daß die Austrittsöffnungen als Durchbrüche des Rohrmantels ausgebildet und mit einer in Strömungsrichtung vor der Austrittsöffnung nach innen weisenden geneigten Nase ausgestattet sind, deren Länge maximal dem größten Randabstand der Ausnehmungen in Strömungsrichtung entspricht, wobei der von dem Rohrmantel und der Nase eingeschlossene Winkel weniger als 90°, vorzugsweise 45° beträgt. Durch diese Ausbildung ergibt sich der außerordentliche Vorteil, daß die Flüssigkeit durch relativ große Öffnungen in die Gefäße gesprüht werden kann. Die unmittelbar vor einer

Petitioner Samsung Ex-1004, 0848

jeden Austrittsöffnung nach innen weisende, schräg gerichtete Nase erzeugt im Bereich des freien Querschnittes der Austrittsöffnungen eine erhöhte Turbulenz, die einen breit gefächerten Flüssigkeitsstrahl nach außen treten läßt. Dadurch ist eine einwandfreie Beaufschlagung aller darunter befindlichen Gefäße sichergestellt. Darüberhinaus ist durch die spezielle Ausbildung, das heißt, durch die Schrägstellung der Nase, eine Gewähr dafür gegeben, daß insbesondere bei sehr langen Spritzrohren bzw. sehr breiten Maschinen eine gleichmäßige Verteilung des Flüssigkeitsdrucks gewährleistet ist.

In der Zeichnung ist ein Ausführungsbeispiel der Erfindung vereinfacht und schematisch dargestellt.

In den Behandlungsräumen einer nicht näher dargestellten Tunnelpasteurisiermaschine sind mehrere quer zur Bewegungsrichtung der Gefäße 1 verlaufende Sprührohre 2 angeordnet und einseitig mit einer Flüssigkeitszuleitung 3 verbunden. Diese kann gegebenenfalls gleichzeitig die Abstützung eines Rohrendes übernehmen. Das Sprührohr 2 weist auf der zu den Gefäßen 1 weisenden Mantelfläche 4 eine Vielzahl von Austrittsöffnungen 5 auf, deren Achse in dem gezeichneten Ausführungsbeispiel parallel zu den Gefäßen verläuft. Unmittelbar vor einer jeden Austrittsöffnung 5 ist eine nach innen weisende, schräg gerichtete Nase 6 vorgesehen. Diese Nase kann während des Herstellvorganges der Austrittsöffnungen 5 auf einfache Weise ausgestanzt und innerhalb eines Winkelbereiches von weniger als 90 ^{o} nach innen umgebördelt werden, sodaß weitere Fertigungsmaßnahmen nicht erforderlich sind. Zur optimalen Druckverteilung insbesondere bei langen Sprührohren empfiehlt sich ein von dem Rohrmantel und der Nase eingeschlossener

Petitioner Samsung Ex-1004, 0849

Winkel von weniger als 90°, vorzugsweise 45°.

Am Ende eines jeden Sprührohres 2 ist eine Austrittsöffnung 7 vorgesehen. Diese erstreckt sich gemäß dem dargestellten Ausführungsbeispiel etwa über die gesamte Breite des hier verwendeten rechteckigen Querschnitts. Die trotz der Vorschaltung verschiedener Filter mitgerissenen Schmutzpartikel gelangen so durch die Austrittsöffnung 7 nach außen. Ein stetiger Aufbau derartiger Partikel am Ende eines solchen Sprührohres und das dadurch verursachte allmähliche Verstopfen dieser Rohre ist damit ausgeschaltet. Der freie Durchtrittsquerschnitt der Austrittsöffnungen 5 des Sprührohres 2 ist ebenfalls so bemessen, daß die gegebenenfalls mitgerissenen Schmutzpartikel einwandfrei abgespritzt werden.

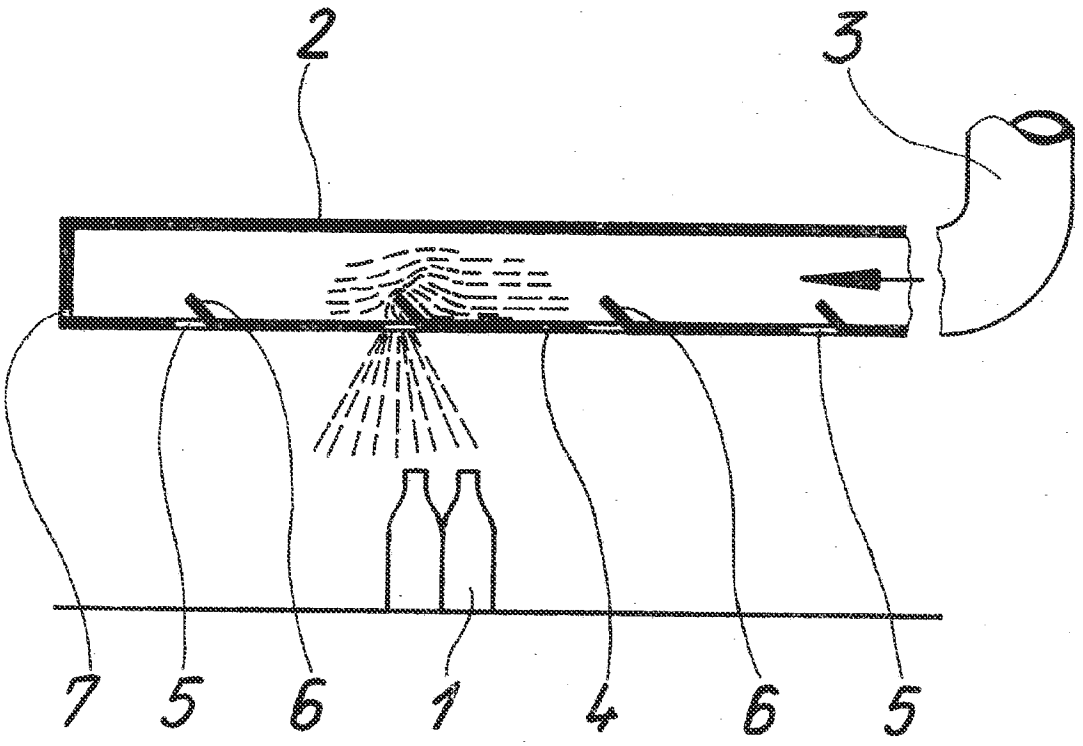
Die Nasen 6 entsprechen, wie im Ausführungsbeispiel gezeigt, in der Breite einer Austrittsöffnung 5, sodaß auch hier genügend Spielraum zum Durchtritt von Schmutzpartikeln verbleibt und deren Ansammlung ausgeschaltet wird.

Petitioner Samsung Ex-1004, 0850

Leerseite

Nummer: 29 07 916
Int. Cl.³: B 05 B 13/00
Anmeldetag: 1. März 1979
Offenlegungstag: 11. September 1980

2907916



Petitioner Samsung Ex-1004, 0852

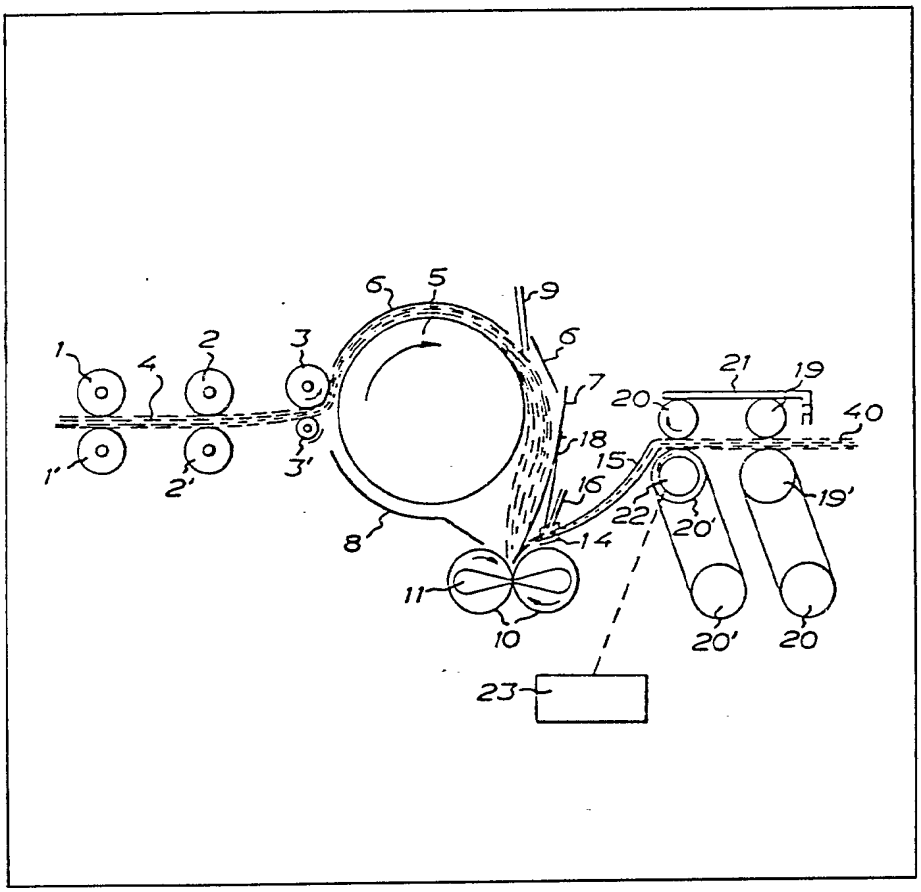
This application was originally made under the Patent Cooperation Treaty with the Swedish Patent Office acting as the receiving office on (86) 9 Jan 1979, being given an application number PCT/SE79/00002. This application was searched by the Swedish Patent Office acting as the International Search Authority (ISA), and published by the International Bureau on (87) 26 Jul 1979 under serial number WO 79/00489 in the English language. The application was communicated to the European Patent Office and given an application number EP79900060 with subsequent conversion to a UK Application under Section 81(1)(a) of The Patents Act 1977. The text of the application as filed is contained in the publication made by the International Bureau as identified above.

(12) **UK Patent Application** (19) **GB** (11) **2 058 852 A**

(21) Application No **8032906**
(22) Date of filing **9 Jan 1979**
(30) Priority data
(31) **7800246**
(32) **10 Jan 1978**
(33) **Sweden (SE)**
(43) Date of issue
15 Apr 1981
(51) **INT CL³**
(As given by ISA)
D01H 1/12, D02G 3/34
(52) Domestic classification
D1D AEX
D1F X
(56) Documents cited by ISA
DE, A1, 2613263
DE, A1, 2617563
AT, B, 339778
US, A, 3511042
Textil Praxis Internationat (TPI), 1976, July, Dr. H. Stalder, Nenautige Spinn-Verfahren, pages 747 to 751 (especially pages 748 to 749)
(58) Field of search by ISA
IPC²: D01H 1/00, 1/10-1/14, 13/22 D02G 3/00, 3/04, 3/22, 3/34, 3/38, 3/44
Deutsches Klassen: 76c: 9, 24/01, 30/10, 31
US Classification: 57: 58, 36-58, 95; 57: 90-91; 57: 139-140; 57: 156
ESA Recon (Frescati), Compendex
(71) Applicants
Peo Teknokonsult AB, Bruksgatan, S—312 02 Laholm, Sweden
(72) Inventor
Per Ola Olsson
(74) Agents
Boult, Wade & Tennant, 27 Furnival Street, London EC4A 1PQ

(54) A method and apparatus for the production of fancy yarn

(57) A method and an apparatus for the production of fancy yarn includes the supply of elongate fancy material pieces (17) by gas under pressure to suction-loaded spinning cylinders (10) which spin the fancy material pieces together with separately supplied basic yarn pieces to form fancy yarn. The fancy material pieces are flung by means of the gas under pressure, which is preferably generated in a jet injector (14), against a screen (7) which is located in the region of the nip between the spinning cylinders. Elongate fancy material pieces which have become rolled together during transport to the screen (7) are straightened out after impingement against the screen (7) by the suction prevailing in the nip of the spinning cylinders (10) whereby the fancy material pieces are given the desired elongate form in the fancy yarn.



GB 2 058 852 A

Petitioner Samsung Ex-1004, 0853

Espacenet

Bibliographic data: KR20050068480 (A) — 2005-07-05

DISHWASHER

Inventor(s): PARK KI NAM [KR]; WOO JE HAK [KR] ± (PARK, KI NAM, ; WOO, JE HAK)

Applicant(s): SAMSUNG ELECTRONICS CO LTD [KR] ± (SAMSUNG ELECTRONICS CO., LTD)

Classification: **- international:** ***A47L15/50;*** (IPC1-7): A47L15/50
- cooperative: **A47L15/50 (KR);** A47L15/22 (KR)

Application number: KR20030099942 20031230 Global Dossier

Priority number(s): KR20030099942 20031230

Abstract not available for KR20050068480 (A)

Google Patents kr20050068480

Dishwasher

Abstract

translated from Korean

The present invention relates to a dishwasher, and more particularly, to a dishwasher provided to improve the washing efficiency of the dish by improving the structure of the dish basket.

To this end, the present invention is a washing chamber, the upper injection basket and the lower tableware baskets respectively provided on the upper and lower portions of the washing room so that the dishes are stacked, the upper injection nozzle rotatably installed in the lower portion of each dish basket to spray water to each side of the dish basket in the dishwasher having a lower part and four nozzles, the central portion of the lower dish basket is provided with a first loading portion formed so that a plurality of rice bowls are stacked along the front and rear directions of the lower dish basket, and one side and the other side of the central portion of the upper dish basket. Sides are provided with a second loading part formed to load a plurality of dishes and a plurality of soup bowls along the front and rear directions of the upper tableware biscuits, respectively. The upper tableware baskets on both sides of the second loading part have a plurality of plates along the front and rear directions of the top table basket, respectively. A second loading portion is formed which is configured to load the cup

KR20050068480A
South Korea

Download PDF Find Prior Art Similar

Other languages: Korean

Inventor: 박기남, 우제학

Worldwide applications

2003 · KR

Application KR1020030099942A events

2003-12-30 · Application filed by 삼성전자주식회사

2003-12-30 · Priority to KR1020030099942A

2005-07-05 · Publication of KR20050068480A

Status · Ceased

Info: Cited by (3), Legal events, Similar documents, Priority and Related Applications

External links: Espacenet, Global Dossier, Discuss

Classifications

- A47L15/50 Racks ; Baskets

View 1 more classification

Landscapes

Washing And Drying Of Tableware

Show more

Claims (9)

Hide Dependent

translated from Korean

In the dishwasher having a plurality of dish baskets provided in the washing room so that the washing room, dishes are stacked, The first basket portion is provided in the central portion of the one dish basket is formed so that a plurality of rice bowls are stacked along the front and rear direction of the dish basket, and one side and the other side of the other one of the other basket baskets, respectively Accordingly, the second loading part is formed so that a plurality of dishes and soup bowls are stacked, and the third loading part is formed in the dish baskets on both sides of the second loading part so that a plurality of cups are placed in the front and rear directions of the dish basket. A dishwasher characterized by the above. The method of claim 1, The dish basket includes an upper dish basket and a lower dish basket respectively provided on the upper and lower portions of the washing chamber, and an upper spray nozzle and a lower portion installed on the lower portion of the dish basket so as to spray water to the side of the dish basket. Each injection nozzle is provided The first loading portion is provided in the lower dish basket, and the second loading portion and the third loading portion is provided in the upper dish basket. The method of claim 2, The length of the left and right sides of the dish basket is provided longer than the length of the front and rear, the center of the jet nozzle is located on the same axis as the center of the dish basket, the length of the jet nozzle is approximately in the front and rear length of the dish basket The lower part nozzle is provided to approach the dish washer, characterized in that provided to spray the washing water at a higher pressure than the upper injection nozzle. The method of claim 3, wherein The second loading portion is provided so that the plate and the soup bowl standing sideways, the first loading portion and the third loading portion dishwasher, characterized in that the rice bowl and cup is provided upside down to be loaded . The method of claim 4, wherein The second loading portion has a pair of first support protrusions extending upwardly to support the front and back of each plate standing sideways and a pair of upwardly extending upwards to support the front and back of each soup bowl standing sideways. Dishwasher according to claim 2, wherein the second support protrusions are formed along the front and rear directions of the upper dish basket. The method of claim 4, wherein The third loading dishwasher, characterized in that provided to be inclined upward toward the inside of the upper dish basket. The method of claim 4, wherein The first loading step is formed in each of the staircase and comprises a first step and a second step part provided on the front side and the rear side of the first loading part, respectively, and the connection portion provided between each of the stair parts, And the first stair part is provided to be higher toward the front side, and the second stair part is provided to be higher to the rear side. The method of claim 7, wherein And the first and second staircases comprise a plurality of steps formed along the length direction of the first loading part, and each of the steps is provided to be inclined upward toward the inside of the lower dish basket. The method of claim 8, And the inclination of the steps away from the center side of the first loading part is provided to have a more steep inclination than the step closer to the center side of the first loading part.

Description

translated from Korean

Dishwasher {Dishwasher}

The present invention relates to a dishwasher, and more particularly, to a dishwasher provided to improve the washing efficiency of the dish by improving the structure of the dish basket.

In general, a dishwasher is a device provided to automatically wash dishes. A washing chamber is formed in a main body having a box shape with an open front to form a dish washing space. The door is installed.

Petitioner Samsung Ex-1004, 0855

Upper and lower dish baskets are installed at the upper and lower portions of the washing chamber so that the dishes are stably loaded and washed by the washing water sprayed into the washing chamber. In addition, the dishes that are washed through the dishwasher are mainly used in homes such as rice bowls, soup bowls, plates, cups, etc. Since the mainstream, each dish basket is equipped with rice bowls or cups upside down to load A stacking unit, a cup stacking unit, a dish stacking unit, a soup bowl stacking unit, and the like, which are provided to be stacked on a side of a plate or soup bowl, are formed.

A lower part of the washing chamber is provided with a sump collecting water for washing, a circulation pump connected to one side of the sump to circulate the washing water, and a drain pump connected to the other side of the sump to drain the washing water to the outside.

In addition, an upper injection nozzle and a lower partial nozzle are formed at the lower part of the upper table basket and the lower table basket, each of which has a plurality of injection holes formed along the lengthwise direction to spray the washing water toward each of the dish baskets. It is connected to each circulation pump to spray the washing water received.

The lower part nozzle is connected directly to the circulation pump, and the upper part injection nozzle is connected to the circulation pump through a connection duct extending from the circulation pump to the upper part of the washing chamber, and the lower part nozzle connected directly to the circulation pump without the connection duct is Compared to the spray nozzle, the washing water is sprayed at a relatively high pressure. In addition, each of these injection nozzles are provided so that their center is located on the same axis as the center of each dish basket and is rotatable.

In addition, the washing room is provided with a longer left and right length than the front and rear length so that the user can store the dishes more conveniently, each basket is also provided with a left and right length longer than the front and rear length to correspond to the shape of the washing room, each jet nozzle The length of the dish basket is about the length of the front and rear of the basket so as not to deviate from the outside of the basket.

Thus, when the conventional dishwasher configured as described above operates the circulation pump, the washing water is supplied to each spray nozzle side, and the washing water is sprayed to each basket through the spray hole of each spray nozzle, and the dishes inside the dish basket are washed. The washing water sprayed to the basket side is collected again to the sump, and then supplied to the spray nozzle again according to the operation of the circulation pump and circulated. And when the washing is completed, the drain pump is operated and the wash water is drained to the outside.

On the other hand, each tableware loaded on the dish basket is easy to be washed and difficult to clean depending on the characteristics of the contents contained therein. Among them, the most difficult to wash is the rice bowl, which is the most difficult to wash because the rice paste often dries, and the soup bowls, dishes, etc., which mainly contain broth or oily food, are difficult to wash next, Cups and the like are the easiest to wash.

However, in the conventional dish washing, since the rice bowl loading part, the soup bowl or the dish loading part, and the cup loading part are provided indiscriminately on one side of the upper dish basket and one side of the lower dish basket, the following problems occur.

That is, the lower part nozzle is designed to spray the washing water at a higher water pressure than the upper injection nozzle connected to the circulation pump through the connecting duct, so that the dishes loaded on the lower table basket are cleaned more cleanly than the dishes loaded on the upper table basket. do. In addition, as the right and left lengths of the dish baskets are longer than the front and rear lengths, and the length of each jet nozzle is about the length of the front and back of the dish baskets, the corners of each side of the dish basket and the right and left end sides of the dish basket are not provided with the right supply. Since the zone is formed, the utensils loaded on the blind spot of each dish basket are washed less than the utensils loaded on the part other than the blind spot.

However, in the conventional dishwasher basket, the rice bowl loading portion is provided indiscriminately such that the rice bowl loading portion is provided on the blind spot side of the upper dish basket or the cup loading portion is installed inside the blind spot of the lower dish basket. Dishes are washed more than necessary, while dishes that are difficult to clean, such as rice bowls, are less washed, which has a problem that the washing efficiency of the dishes is lowered.

The present invention is to solve such a problem, it is an object of the present invention to provide a dish washer to improve the washing efficiency of the dish by improving the structure of the dish basket.

In order to achieve the above object, the present invention provides a dishwasher having a plurality of dish baskets provided in the washing chamber so that a washing room and tableware are stacked, wherein one of the centers of the dish baskets is located along the front and rear directions of the dish basket. The first loading portion is formed to be a plurality of rice bowls are provided, and the second loading portion is formed so that a plurality of dishes and soup bowls are placed in one side and the other side of the other one side of the dish basket along the front and rear directions of the dish basket, respectively. The dish baskets on both sides of the second stacking portion may be provided with a third stacking portion formed to stack a plurality of cups along the front and rear directions of the dish basket.

And the dish basket includes an upper table basket and a lower table basket respectively provided on the upper and lower portions of the washing chamber, and an upper injection nozzle rotatably installed on the lower portion of each of the dish baskets to spray water toward each of the dish baskets. Lower part four nozzles are respectively provided, wherein the first loading portion is provided in the lower dish basket, and the second loading portion and the third loading portion are provided in the upper dish basket.

In addition, the length of the left and right sides of the dish basket is provided longer than the length of the front and rear, the center of the jet nozzle is located on the same axis as the center of the dish basket, the length of the jet nozzle is approximately front and rear of the dish basket It is provided to be close to the length, the lower part nozzle is characterized in that it is provided to spray the washing water with a higher water pressure than the upper injection nozzle.

In addition, the second loading portion is provided so that the plate and the soup bowl standing sideways, and the first loading portion and the third loading portion is provided so that the rice bowl and cup upside down can be loaded. .

In addition, the second loading portion is formed to extend upward to support the front and back of each of the soup bowls standing sideways and a pair of first support protrusions extending upwardly to support the front and back of each of the plates set sideways The pair of second supporting protrusions are formed along the front and rear directions of the upper table basket, respectively.

In addition, the third loading is characterized in that it is provided to be inclined upward toward the inner tableware basket.

In addition, each of the first loading step is formed in a stair shape and each of the first step and the second step portion provided on the front side and the rear side of the first loading portion, and the connecting portion provided between each step The first stair part is provided to be higher toward the front side, and the second stair part is characterized to be provided to be higher toward the rear side.

The first and second staircases may include a plurality of steps formed along a length direction of the first loading part, and each of the steps may be inclined upward toward the inside of the lower table basket.

In addition, the inclination of the step away from the center side of the first loading portion is characterized in that it is provided to have a more steep inclination than the step closer to the center side of the first loading portion.

Hereinafter, with reference to the accompanying drawings, preferred embodiments of the present invention will be described in detail.

As the dishwasher according to the present invention is provided to automatically wash the dishes, as shown in Figure 1, the washing chamber (2) to form a dish washing space inside the main body (1) made of a box shape with an open front is provided, the door 3 is provided on the open front of the main body 1 rotatably provided in the vertical direction to open and close the washing chamber (2).

An upper table basket 4 and a lower table basket 5 are respectively provided in the upper and lower portions of the washing room 2 so as to load a plurality of dishes therein, and each of the dish baskets 4 and 5 has washing water therein. It is made through the wire of the grid shape so that it is supplied smoothly.

In addition, rollers 4a and guide rails 4b are provided on both sides of the upper table basket 4 and both inner walls of the washing chamber, respectively, and the upper table basket 4 is moved forward and backward along the guide rail 4b through the roller 4a. The rollers 5a are also provided at the lower portion of the lower tableware basket 5 so as to move along the rear surface of the open door 3, such as the rollers 4a and 5a. And through the structure of the guide rail (4b) each of the dish baskets (4, 5) can be pulled out of the washing room (2) in the state that the door (3) is open.

And the upper injection nozzle (4) and the upper injection nozzle formed with a plurality of injection holes (6a, 7a) along the longitudinal direction in the lower portion of the lower dish basket (5) to spray the washing water toward each of the dish basket (4,5) (6) and the lower part four nozzles 7 are arranged to be rotatable, respectively, and the injection nozzles 6 and 7 are installed such that the center thereof is located on the same axis as the center of the dish baskets 4 and 5.

In addition, the lower part of the washing chamber (2), the water collecting tank (2a) for collecting the washing water that is sprayed to each of the dish baskets (4,5) through the respective spray nozzles (6,7) and collected to the bottom of the washing chamber (2) is provided, and one side of the sump (2a) is connected to the circulation pump (2b) for supplying the washing water collected in the sump (2a) to each injection nozzle (6,7) side, the sump (2a) The other side of the drain pump (2c) is connected to drain the washing water in the washing room (2) to the outside in the state where the dish washing is finished.

When the circulation pump 2b is operated through the structure, the washing water in the sump 2a is supplied to each of the injection nozzles 6 and 7 so that the respective injection holes 6a and 6b of the injection nozzles 6 and 7 are discharged. Sprayed to each side of the dish basket (4,5) side, washing water sprayed to the side of the dish basket (4,5) falls to the bottom of the washing room (2), collected in the sump (2a), and then again each spray nozzle (6,7) it is delivered to the side, the circulation of this washing water is repeated, and the dishes inside the dish baskets 4 and 5 are washed. In addition, when the washing is completed, the drain pump 2c is operated to drain the washing water collected in the sump 2a to the outside of the washing chamber 2.

On the other hand, the lower part nozzle (7) located in the lower part of the washing chamber (2) is directly connected to the circulation pump (2b), the upper injection nozzle (6) located in the upper part of the washing chamber (2) is the washing chamber (2). The lower part nozzle (7) directly connected to the circulation pump (2b) without the connection duct (6b) is provided to be connected to the circulation pump (2b) through a long extending connection duct (6b). Compared with 6), the washing water is sprayed with relatively high water pressure.

In addition, the tableware stacked in the dish basket is made of rice bowl soup bowls, etc., the mainstream, each dish is easy to be washed and difficult to clean depending on the characteristics of the contents contained therein. Among them, the most difficult to wash is the rice bowl, which is the most difficult to wash because the rice paste often dries, and the soup bowls, dishes, etc., which mainly contain broth or oily food, are difficult to wash next. Cups and the like are the easiest to wash.

Therefore, when you want to wash a large amount of various dishes at once using a dishwasher, dishes that are difficult to be washed, such as rice bowl is to be washed through the lower part nozzle (7) with a strong injection force of washing water and easier to wash than the rice bowl One other tableware is advantageous in terms of washing efficiency of the tableware to be washed through the upper injection nozzle (6), the spraying power of the wash water is weaker than the lower part nozzle (7).

In consideration of the washing efficiency of the dishes, the dish washer according to the present invention, as shown in Figure 2, the first loading portion 10 is provided in the lower dish basket 5 provided to intensively load the rice bowl in the upper dish basket 4, a second loading portion 20 provided to intensively load plates and a third loading portion 30 provided to intensively load cups are provided in the upper bowl. Therefore, if the rice bowl is concentrated in the first loading part 10 and the other dishes are concentrated in the second and third loading parts 20 and 30, and the dishwasher is operated, the rice bowl has a strong washing water jetting force. The washing is carried out through the spray nozzle (7) and other dishes are washed through the upper spray nozzle (6), the spraying power of the washing water is weak compared to the lower part of the nozzle (7) improves the overall washing efficiency of the dish.

In addition, the washing room 2 is provided with longer left and right lengths than the front and rear lengths so that the user can store the dishes more conveniently from the outside, and each of the dish baskets 4 and 5 also has the shape of the washing room 2. Correspondingly, the left and right lengths are provided longer than the front and rear lengths, and the respective injection nozzles 6 and 7 are arranged so that their lengths are approximately the lengths of the front and rear lengths of the dish baskets 4 and 5 so as not to deviate from the outside of the baskets 4 and 5. do.

With this structure, as shown in FIGS. 3 (a) and 3 (b), the diameters of the circular trajectories drawn by rotating the respective injection nozzles 6 and 7 are approximately the lengths of the front and rear sides of the dish baskets 4 and 5. In this way, each corner side and the left and right both end sides in each of the dish baskets 4 and 5 form a blind spot (X) where the supply of washing water is less smooth than the center, and the blind spot (X).) The central portion of the inner dish baskets (4, 5) is more smoothly supplied to the wash water than the blind spot (X).

Therefore, the first loading portion 10 provided in the lower table basket (5) is preferably provided to avoid the blind spot (X) so that the washing of the rice bowl more effectively, is provided in the upper table basket (4) The second loading part 20 and the third loading part 30 are provided with a second loading part 20 on which plates and soup bowls, which are harder to wash than the cup, is provided to avoid the blind spot X and the cup is loaded. It is preferable that the loading part 30 is provided on the blind spot X side.

To this end, the first loading portion 10 is provided along the front and rear directions of the lower dish basket 5 at the center of the lower dish basket 5 so that a plurality of rice bowls are loaded. Therefore, the rice bowl loaded on the first loading part 10 is washed through the lower part nozzle (7) having the strong injection force of the washing water, and at the same time, the lower bowl basket (5) is loaded on the portion where the injection water is most smoothly supplied. This allows for a cleaner cleaning.

In addition, the second loading part 20 is provided in the central portion one side and the other side of the upper tableware 4 so that a plurality of dishes and a plurality of soup bowls are placed along the front and rear directions of the upper tableware 4, respectively. Damage is disposed, and the third loading portion 30 is provided on both sides of the second loading portion 20 so that a plurality of cups are stacked in the front and rear directions of the upper table basket 4, respectively, and are disposed on the blind spot X side. Therefore, dishes such as dish soup cups, which are easier to wash than rice bowls, have a lower spraying force than the lower part nozzles 7 through the second loading part 20 and the third loading part 30. 6) is washed through, and more easily among these cups are placed on the blind spot (X) side of the upper tablewares (4), and the dish or soup bowl is somewhat difficult to clean than the cup is blind spot (X) is placed to avoid.

Therefore, the first second third loading portion (10, 20, 30) is to be loaded on the site where the spray supply of the appropriate washing water is made according to the degree of difficulty of washing each tableware loaded on each dish basket (4, 5) By doing so, the washing efficiency of the overall tableware is improved.

In addition, the second loading portion 20 that is loaded with the plate and soup bowl is provided so that the plate and the soup bowl is set up sideways, which is to allow the plate and soup bowl to be loaded more inside the second loading portion (20) To this end, one side of the second loading portion 20 has a pair of first support protrusions 21 extending upwardly to support the front and back of each plate standing sideways front and rear of the upper tableware 4 A pair of second supporting protrusions 22 formed along the direction and extending upwardly to support the front and back of each soup bowl, which are also standing sideways, are formed on the other side of the second loading part 20. Is formed along the front-back direction.

And each of the third loading portion 30 is loaded with the cup upside down, as shown in Figure 4, this third loading portion 30 is due to the centrifugal force due to the rotation of the upper injection nozzle (6) It is preferable to be provided to be inclined upward toward the inside of the upper dish basket 4 so that the washing water is bent outward and is easily transferred into the cup.

In addition, as shown in detail in FIG. 5, the first loading part is formed in a stair shape, respectively, and is provided on the front side and the rear side of the first loading part 10, respectively. 12) and a connecting portion 13 provided between each of the stairs 11 and 12, wherein each of the stairs 11 and 12 is formed in a plurality of longitudinal directions of the first loading portion 10. Steps 11a and 12a are provided, and each of the steps 11a and 12a and the connecting portion 13 has a plurality of rice bowls upside down and stacked side by side.

As described above, the stairs 11 and 12 provided in the shape of stairs through the stairs 11a and 12a have a plurality of rice bowls stacked in a stacked state in the first loading part 10 so as to be stacked in multiple stages. 1 Load 10 More rice bowls to be loaded in the inner space.

In addition, the first stair part 11 is provided to be higher toward the front side, and the second stair part 12 is provided to be higher toward the rear side, which is higher as the stair part provided in the first loading part 10 toward one side. The stairs 11a and 12a of the stairs 11 and 12 are brought into close contact with the lower part nozzles 7 so as to provide a more smooth supply of the washing water than the case where the stairs are formed to be higher or higher toward the center side. To do so,

In addition, the washing water sprayed through the respective injection holes 7a of the lower part injection nozzle 7 is slightly curved outwardly under the influence of the centrifugal force due to the rotation of the lower part injection nozzle 7 as in the upper injection nozzle 6. When the rice bowls loaded on the first loading part 10 in the upright state are loaded to form a vertical direction with the washing water sprayed into the inside, the most effective washing is performed. Accordingly, the stairs 11a and 12a are inclined upwardly to the inside of the lower table basket 5 so that the washing water sprayed from the respective injection holes 7a of the lower partial nozzle 7 is loaded into each of the stairs 11a and 12a. It is preferable that the prepared rice bowl is sprayed in a substantially vertical direction. And the phenomenon in which the washing water is bent to the outside is more prominent in the outer portion of the lower part nozzle (7) where the centrifugal force acts more than the central side, so that each step (11a, 12a) of the first loading portion (10) More preferably, the inclination of the steps 11a and 12a far from the center side is provided to have a more steep inclination than the steps 11a and 12a close to the center side of the first loading part 10.

Next will be described in detail the operation and effect of the dishwasher according to the present invention configured as described above.

First, each of the dish baskets 4 and 5 is pulled out of the washing room 2 in the state in which the door 3 is opened, and then a plurality of various dishes are loaded into each of the dish baskets 4 and 5. At this time, as shown in Figure 6, the first loading portion (10) provided in the central portion of the lower tableware (5) is concentrated in a state in which the bowl is difficult to wash upside down, the upper tableware (4) The second loading portion 20 provided in the central portion is loaded intensively in a state in which the dishes and soup bowls which are less difficult to wash than the rice bowl are standing sideways, and each third loading portion 30 outside the second loading portion 20. There is a rather easy to clean cup is loaded in a concentrated state, such as a rice bowl, although not shown through the drawings other tableware is loaded in the lower dish basket (5) outside the first loading portion (10).

In this state, each of the dish baskets 4 and 5 is pushed into the washing chamber 2, the door 2 is closed, and the circulation pump 2b is operated. The washing water in the sump 2a is sprayed. Washing water supplied to the nozzles 6 and 7 and sprayed to each of the dish baskets 4 and 5 through the respective injection holes 6a and 7a of the spray nozzles 6 and 7 and sprayed to the side of the dish baskets 4 and 5 is dropped to the bottom of the washing room (2) and collected in the sump (2a) and then delivered to each spray nozzle (6,7) side, the circulation of the wash water is repeated and various dishes in the dish basket (4,5) is washed do.

In addition, at this time, each of the loading unit 10, 20, 30 is made to supply more and more powerful and smooth washing water in the order of the third loading section 30, the second loading section 20, the first loading section 10, in order to cope with each dish, a cup which is easy to be washed is placed in the third loading part 30, a dish or soup bowl which is easy to be washed next to the second loading part 20, and a rice bowl that is the most difficult to wash is first loaded. As it is loaded in the unit 10, various utensils are subjected to the spray supply of the washing water corresponding to the degree of difficulty in washing the utensils, thereby improving the overall washing efficiency of the utensils.

As described above in detail, the dishwasher according to the present invention may receive the spray supply of the washing water corresponding to the degree of difficulty in washing various dishes loaded on the dish basket through the configuration of the respective loading units, thereby washing the dishes. It has the advantage that the efficiency is further improved.

1 is a cross-sectional view showing the overall structure of a dish washer according to the present invention.

2 is a perspective view showing the structure of each dish basket and the jet nozzle in the dish washing machine according to the present invention.

3 (a) and 3 (b) are plan views showing the structure of the upper dish basket and the lower dish basket, respectively, in the dish washing machine according to the present invention.

FIG. 4 is a cross-sectional view taken along the line A-A of FIG. 2 and viewed in the direction of the arrow, illustrating the spraying structure of the washing water.

FIG. 5 is a cross-sectional view taken along the line B-B of FIG. 2 and viewed in the direction of the arrow, illustrating the spraying structure of the washing water.

FIG. 6 is a perspective view showing the structure of each dish basket and a jet nozzle in the dish washing machine according to the present invention as shown in FIG.

Explanation of symbols on main parts of drawing

1: body 2: washing room

4: upper tableware basket 5: lower tableware basket

6: upper spray nozzle 7: lower spray nozzle

6a, 7a: injection hole 10: 1st loading part

20: 2nd loading part 21: 1st support protrusion

22: 2nd support protrusion 30: 3rd loading part

Cited By (3)

Publication number	Priority date	Publication date	Assignee	Title
KR100934697B1 *	2007-12-27	2009-12-31	웅진코웨이주식회사	Rack for dishwashing with variable structure
CN110292339A *	2018-03-21	2019-10-01	惠而浦公司	Dish-washing machine
US11559208B2	2018-03-21	2023-03-07	Whirlpool Corporation	Dishwasher
Family To Family Citations				

* Cited by examiner, † Cited by third party, ‡ Family to family citation

Similar Documents

Publication	Publication Date	Title
KR100879873B1	2009-01-22	Racks for dishwashers and compact dishwashers with them
KR101054422B1	2011-08-03	Combined structure of water guide in dishwasher
KR20050105711A	2005-11-08	A rack structure of dish washer
KR20050106706A	2005-11-08	A dish washer including the apparatus for preventing separation of the water guide
KR20040080381A	2004-09-18	Dish washer
KR102076613B1	2020-02-13	Dishwasher with dishwashing function using water pressure and ultrasonic
KR102075888B1	2020-02-10	Dishwasher with dishwashing function using water pressure and ultrasonic
JP5006716B2	2012-08-22	Dishwasher
CN101416859A	2009-04-29	Dishwasher
KR20050068480A	2005-07-05	Dishwasher
KR19990075791A	1999-10-15	Basket of dishwasher
CN109717781A	2024-07-19	Tableware cleaning machine
KR102091187B1	2020-03-18	Dish washer
JP4770564B2	2011-09-14	dishwasher
KR20050070426A	2005-07-07	Dishwasher
KR20040006218A	2004-01-24	A dishwasher
KR100652263B1	2006-11-30	Rack support for dishwashers

Petitioner Samsung Ex-1004, 0859

CN115267676B	2022-05-13	Dishwasher
CN220494969U	2024-02-20	Household appliance
JPH11290261A	1999-10-26	Tableware basket for tableware washing machine
KR20230093765A	2023-06-12	Dishwasher with elevating structure
JP3780022B2	2006-06-14	dishwasher
KR20150039938A	2015-04-14	Up down dishwasher with large capacity
CN223208367U	2025-08-12	Base station and cleaning device
CN216776898U	2022-06-21	Spray arm for cleaning machine and cleaning machine with spray arm

Priority And Related Applications

Priority Applications (1)

Application	Priority date	Filing date	Title
KR1020030099942A	2003-12-30	2003-12-30	Dishwasher

Applications Claiming Priority (1)

Application	Filing date	Title
KR1020030099942A	2003-12-30	Dishwasher

Legal Events

Date	Code	Title	Description
2003-12-30	A201	Request for examination	
2003-12-30	PA0109	Patent application	**Patent event code:** PA01091R01D **Comment text:** Patent Application **Patent event date:** 20031230
2003-12-30	PA0201	Request for examination	
2005-07-05	PG1501	Laying open of application	
2005-08-26	E902	Notification of reason for refusal	
2005-08-26	PE0902	Notice of grounds for rejection	**Comment text:** Notification of reason for refusal **Patent event date:** 20050826 **Patent event code:** PE09021S01D
2006-01-11	E601	Decision to refuse application	
2006-01-11	PE0601	Decision on rejection of patent	**Patent event date:** 20060111 **Comment text:** Decision to Refuse Application **Patent event code:** PE06012S01D **Patent event date:** 20050826 **Comment text:** Notification of reason for refusal **Patent event code:** PE06011S01I

Data provided by IFI CLAIMS Patent Services

(19)대한민국특허청(KR)
(12) 공개특허공보(A)

(51) 。Int. Cl.[7]
A47L 15/50

(11) 공개번호 10-2005-0068480
(43) 공개일자 2005년07월05일

(21) 출원번호 10-2003-0099942
(22) 출원일자 2003년12월30일

(71) 출원인 삼성전자주식회사
경기도 수원시 영통구 매탄동 416

(72) 발명자 박기남
경기도수원시팔달구원천동326-4번지205호
우제학
경기도수원시팔달구매탄3동

(74) 대리인 서봉석

심사청구 : 있음

(54) 식기세척기

요약

본 발명은 식기세척기에 관한 것으로, 더욱 상세하게는 식기바스켓의 구조를 개선하여 식기의 세척효율이 향상되도록 마련된 식기세척기에 관한 것이다.

이를 위해 본 발명은 세척실, 식기가 적재되도록 세척실의 상부와 하부에 각각 마련된 상부식기바스켓과 하부식기바스켓, 각 식기바스켓 측으로 물을 분사하도록 각 식기바스켓 하부에 회전 가능하게 설치되는 상부분사노즐과 하부분사노즐을 구비하는 식기세척기에 있어서, 하부식기바스켓의 중앙부에는 상기 하부식기바스켓의 전후방향을 따라 복수의 밥그릇이 적재되도록 형성된 제1적재부가 마련되고, 상부식기바스켓의 중앙부 일측과 타측에는 각각 상부식기비스켓의 전후방향을 따라 복수의 접시와 복수의 국그릇이 적재되도록 형성된 제2적재부가 마련되며, 제2적재부 양측의 상기 상부식기바스켓에는 상부식기바스켓의 전후방향을 따라 각각 복수의 컵이 적재되도록 형성된 제2적재부가 마련된다.

대표도

도 2

명세서

도면의 간단한 설명

도 1은 본 발명에 따른 식기세척기의 전체적인 구조를 나타낸 단면도이다.

도 2는 본 발명에 따른 식기세척기에 있어서 각 식기바스켓과 분사노즐의 구조를 발취하여 나타낸 사시도이다.

도 3(a)와 (b)는 각각 본 발명에 따른 식기세척기에 있어서, 상부식기바스켓과 하부식기바스켓의 구조를 나타낸 평면도로, 회전하는 분사노즐의 구조를 가상선으로 도시한 것이다.

도 4는 도 2를 절취선 A-A를 따라 절취한 후 화살표방향에서 바라본 단면도로, 세척수의 분사구조를 함께 도시한 것이다.

도 5는 도 2를 절취선 B-B를 따라 절취한 후 화살표방향에서 바라본 단면도로, 세척수의 분사구조를 함께 도시한 것이다.

도 6은 도 2와 같이 본 발명에 따른 식기세척기에 있어서 각 식기바스켓과 분사노즐의 구조를 발취하여 나타낸 사시도로, 식기들이 적재된 상태를 나타낸 것이다

* 도면의 주요부분에 대한 부호의 설명 *

Petitioner Samsung Ex-1004, 0861

1: 본체 2: 세척실

4: 상부식기바스켓 5: 하부식기바스켓

6: 상부분사노즐 7: 하부분사노즐

6a, 7a: 분사공 10: 제1적재부

20: 제2적재부 21: 제1지지돌기

22: 제2지지돌기 30: 제3적재부

발명의 상세한 설명

발명의 목적

발명이 속하는 기술 및 그 분야의 종래기술

본 발명은 식기세척기에 관한 것으로, 더욱 상세하게는 식기바스켓의 구조를 개선하여 식기의 세척효율이 향상되도록 마련된 식기세척기에 관한 것이다.

일반적으로 식기세척기는 식기를 자동으로 세척하도록 마련된 장치로, 전면이 개방된 박스형상으로 이루어진 본체 내부에 식기세척공간을 형성하는 세척실이 마련되고, 본체의 개방된 전면에는 세척실을 개폐하기 위한 도어가 설치된다.

세척실의 상부와 하부에는 식기들이 안정적으로 적재되어 세척실 내부로 분사되는 세척수에 의해 세척되도록 하는 상부식기바스켓과 하부식기바스켓이 각각 설치된다. 그리고 식기세척기를 통해 세척되는 식기는 통상 가정에서 많이 사용되는 밥그릇, 국그릇, 접시, 컵 등이 주류를 이루게 되므로, 각 식기바스켓에는 밥그릇이나 컵 등을 거꾸로 엎어서 적재할 수 있도록 마련된 밥그릇 적재부 및 컵 적재부와, 접시나 국그릇 등을 옆으로 세워서 적재할 수 있도록 마련된 접시 적재부 및 국그릇 적재부 등이 형성된다.

세척실의 하부에는 세척수를 집수하는 집수통과, 세척수를 순환시키도록 집수통의 일측과 연결된 순환펌프, 그리고 세척수를 외부로 배수시키도록 집수통의 타측에 연결되는 배수펌프가 설치된다.

또 상부식기바스켓과 하부식기바스켓의 하부에는 각 식기바스켓 측으로 세척수를 분사시키도록 다수의 분사공이 길이방향을 따라 형성된 상부분사노즐과 하부분사노즐이 각각 배치되는데, 각 분사노즐은 순환펌프로부터 세척수를 공급받아 세척수를 분사하도록 각각 순환펌프와 연결된다.

여기서 하부분사노즐은 순환펌프와 직접 연결되고, 상부분사노즐은 순환펌프로부터 세척실의 상부로 연장된 연결덕트를 통해 순환펌프와 연결되며, 연결덕트가 없이 순환펌프에 직접 연결된 하부분사노즐은 상부분사노즐에 비해 상대적으로 높은 수압으로 세척수를 분사하게 된다. 또 이러한 각 분사노즐은 그 중심이 각 식기바스켓의 중심과 동일 축선상에 위치되며 회전 가능하도록 마련된다.

또 세척실은 사용자가 식기를 보다 편리하게 수납할 수 있도록 전후 길이보다 좌우 길이가 더 길게 마련되고, 각 바스켓 역시 이러한 세척실의 형상에 대응하도록 좌우 길이가 전후 길이보다 길게 마련되며, 각 분사노즐은 바스켓 외측으로 벗어나지 않도록 그 길이가 대략 식기바스켓의 전후길이 정도가 되도록 마련된다.

따라서 이와 같이 구성되는 종래 식기세척기는 순환펌프를 작동시키게 되면 각 분사노즐 측으로 세척수가 공급되고, 이러한 세척수는 각 분사노즐의 분사공을 통해 각 바스켓 측으로 분사되며 식기바스켓 내부 식기가 세척되도록 하고, 식기바스켓 측으로 분사된 세척수는 다시 집수통으로 집수된 후 순환펌프의 동작에 따라 다시 분사노즐로 공급되며 순환하게 된다. 그리고 세척이 완료된 상태에서는 배수펌프가 작동하게 되며 세척수가 외부로 배수된다.

한편, 식기바스켓에 적재되는 각 식기는 내부에 담게 되는 내용물의 특성에 따라 세척되기 용이한 것과 세척되기 어려운 것들이 있다. 이중 가장 세척되기 어려운 것이 밥그릇인데, 이러한 밥그릇은 밥풀이 자주 말라붙게 되어 가장 세척하기 어려우며, 육수나 기름진 음식 등을 주로 담게 되는 국그릇, 접시 등이 다음으로 세척되기 어렵고, 물이나 음료수를 담는 컵 등이 가장 세척이 용이하게 된다.

그러나 종래 식기세척는 상기 밥그릇 적재부, 국그릇이나 접시 적재부, 그리고 컵 적재부 등이 상부식기바스켓의 일측과 하부식기바스켓의 일측에 무분별하게 마련되어 있기 때문에 다음과 같은 문제점이 발생하게 된다.

즉, 하부분사노즐은 연결덕트를 통해 순환펌프와 연결된 상부분사노즐에 비해 높은 수압으로 세척수를 분사하도록 마련된 만큼, 하부식기바스켓에 적재된 식기가 상부식기바스켓에 적재되는 식기보다 상대적으로 보다 깨끗하게 세척된다. 또 식기바스켓은 좌우 길이가 전후길이보다 길게 마련되고 각 분사노즐의 길이가 식기바스켓의 전후길이 정도가 되도록 마련된 만큼, 식기바스켓의 각 모서리 측과 좌우 양단부 측이 세척수의 공급이 제대로 이루어지지 않는 사각지대를 형성하게 되므로, 각 식기바스켓의 사각지대에 적재된 식기가 사각재대가 아닌 다른 부위에 적재된 식기보다 덜 세척되게 된다.

Petitioner Samsung Ex-1004, 0862

그런데, 종래 식기세척기의 식기바스켓에는 밥그릇 적재부가 상부식기바스켓의 사각지대 측에 마련되거나 컵 적재부가 하부식기바스켓의 사각지대 내측에 설치되는 등 무분별하게 마련되어 있기 때문에, 컵과 같이 세척되기 용이한 식기는 필요 이상으로 깨끗하게 세척되는 반면, 밥그릇과 같이 세척되기 어려운 식기는 덜 세척되는 등 식기의 세척효율이 저하되는 문제점을 가지고 있다.

발명이 이루고자 하는 기술적 과제

본 발명은 이와 같은 문제점을 해결하기 위한 것으로, 본 발명의 목적은 식기바스켓의 구조를 개선하여 식기의 세척효율이 향상되도록 한 식기세척기를 제공하는 것이다.

발명의 구성 및 작용

이와 같은 목적을 달성하기 위해 본 발명은 세척실, 식기가 적재되도록 상기 세척실에 마련된 복수의 식기바스켓을 구비하는 식기세척기에 있어서, 상기 어느 하나의 식기바스켓 중앙부에는 상기 식기바스켓의 전후방향을 따라 복수의 밥그릇이 적재되도록 형성된 제1적재부가 마련되고, 상기 나머지 하나의 식기바스켓 중앙부 일측과 타측에는 각각 상기 식기바스켓의 전후방향을 따라 복수의 접시와 국그릇이 적재되도록 형성된 제2적재부가 마련되며, 상기 제2적재부 양측의 상기 식기바스켓에는 상기 식기바스켓의 전후방향을 따라 각각 복수의 컵이 적재되도록 형성된 제3적재부가 마련된 것을 특징으로 한다.

그리고 상기 식기바스켓은 상기 세척실의 상부와 하부에 각각 마련된 상부식기바스켓과 하부식기바스켓을 포함하고, 상기 각 식기바스켓의 하부에는 상기 각 식기바스켓 측으로 물을 분사하도록 회전 가능하게 설치된 상부분사노즐과 하부분사노즐이 각각 마련되며, 상기 제1적재부는 상기 하부식기바스켓에 마련되고, 상기 제2적재부와 상기 제3적재부는 상기 상부식기바스켓에 마련된 것을 특징으로 한다.

또한, 상기 식기바스켓은 좌우 측의 길이가 전후방의 길이보다 길게 마련되되, 상기 분사노즐의 중심은 상기 식기바스켓의 중심과 동일 축선상에 위치되고, 상기 분사노즐의 길이는 대략 상기 식기바스켓의 전후방 길이에 근접하도록 마련되며, 상기 하부분사노즐은 상기 상부분사노즐보다 높은 수압으로 세척수를 분사하도록 마련된 것을 특징으로 한다.

또한, 상기 제2적재부는 상기 접시와 국그릇이 옆으로 세워져 적재될 수 있도록 마련되고, 상기 제1적재부와 제3적재부는 상기 밥그릇과 컵이 거꾸로 업어져 적재될 수 있도록 마련된 것을 특징으로 한다.

또한, 상기 제2적재부에는 옆으로 세워진 상기 각 접시의 전면과 배면을 지지하도록 상측으로 연장형성된 한 쌍의 제1지지돌기와 옆으로 세워진 상기 각 국그릇의 전면과 배면을 지지하도록 상측으로 연장형성된 한 쌍의 제2지지돌기가 각각 상기 상부식기바스켓의 전후방향을 따라 형성된 것을 특징으로 한다.

또한, 상기 제3적재는 상기 상부식기바스켓의 내측으로 상향 경사지도록 마련된 것을 특징으로 한다.

또한, 상기 제1적재는 각각 층계모양으로 형성되고 상기 제1적재부의 전방 측과 후방 측에 각각 마련되는 제1층계부 및 제2층계부와, 상기 각 층계부 사이에 마련되는 연결부를 포함하고, 상기 제1층계부는 전방 측으로 갈수록 높아지도록 마련되고, 상기 제2층계부는 후방 측으로 갈수록 높아지도록 마련된 것을 특징으로 한다.

또한, 상기 제1 및 제2층계부는 상기 제1적재부의 길이방향을 따라 형성된 복수의 계단을 포함하고, 상기 각 계단은 상기 하부식기바스켓의 내측을 향해 상향 경사지도록 마련된 것을 특징으로 한다.

또한, 상기 제1적재부의 중앙 측에서 멀리 떨어진 상기 계단의 경사는 상기 제1적재부의 중앙 측에 가까운 계단보다 더 급한 경사를 갖도록 마련된 것을 특징으로 한다.

이하에서는 본 발명의 바람직한 실시예를 첨부된 도면을 참조하여 상세히 설명한다.

본 발명에 따른 식기세척기는 식기의 세척이 자동으로 이루어지도록 마련된 것으로 도 1에 도시된 바와 같이, 전면이 개방된 박스형상으로 이루어진 본체(1) 내부에 식기세척공간을 형성하는 세척실(2)이 마련되고, 본체(1)의 개방된 전면에는 세척실(2)을 개폐하기 위해 상하방향으로 회동가능하게 마련된 도어(3)가 설치된다.

세척실(2)의 상부와 하부에는 내부에 다수의 식기를 적재하도록 마련된 상부식기바스켓(4)과 하부식기바스켓(5)이 각각 마련되고, 이러한 각 식기바스켓(4,5)은 세척수가 내부로 원활하게 공급되도록 격자형상의 와이어를 통해 이루어진다.

또 상부식기바스켓(4)의 양측과 세척실의 양측 내벽에는 각각 로울러(4a)와 안내레일(4b)이 마련되어 상부식기바스켓(4)이 로울러(4a)를 통해 안내레일(4b)을 따라 전후방으로 이동되도록 하고, 하부식기바스켓(5)의 하부에도 역시 로울러(5a)가 마련되어 하부식기바스켓(5)이 개방된 도어(3)의 배면을 따라 이동하도록 마련되는데, 이러한 로울러(4a,5a) 및 안내레일(4b)의 구조를 통해 각 식기바스켓(4,5)은 도어(3)가 개방된 상태에서 세척실(2) 외부로 인출 가능하게 된다.

그리고 상부식기바스켓(4)과 하부식기바스켓(5)의 하부에는 각 식기바스켓 (4,5)측으로 세척수를 분사시키도록 길이방향을 따라 다수의 분사공(6a,7a)이 형성된 상부분사노즐(6)과 하부분사노즐(7)이 각각 회전 가능하도록 배치되며, 이러한 분사노즐(6,7)은 그 중심이 식기바스켓(4,5)의 중심과 동일 축선상에 위치되도록 설치된다.

Petitioner Samsung Ex-1004, 0863

또한 세척실(2)의 하부에는 각 분사노즐(6,7)을 통해 각 식기바스켓(4,5) 측으로 분사된 후 세척실(2) 바닥으로 모이게 되는 세척수를 집수하기 위한 집수통(2a)이 마련되고, 집수통(2a)의 일측에는 이렇게 집수통(2a)에 집수된 세척수를 다시 각 분사노즐(6,7) 측으로 공급시키기 위한 순환펌프(2b)가 연결되며, 집수통(2a)의 타측에는 식기 세척이 종료된 상태에서 세척실(2) 내부의 세척수를 외부로 배수시키기 위해 배수펌프(2c)가 연결된다.

이러한 구조를 통해 순환펌프(2b)를 작동시키게 되면 집수통(2a) 내부의 세척수는 각 분사노즐(6,7) 측으로 공급되어 분사노즐(6,7)의 각 분사공(6a,6b)을 통해 각 식기바스켓(4,5) 측으로 분사되고, 식기바스켓(4,5) 측으로 분사된 세척수는 세척실(2) 바닥으로 떨어지며 집수통(2a)으로 모아진 후 다시 각 분사노즐(6,7) 측으로 전달되고, 이러한 세척수의 순환이 반복되며 식기바스켓(4,5) 내부의 식기가 세척된다. 그리고 세척이 완료된 상태에서는 배수펌프(2c)가 작동되어 집수통(2a)에 모인 세척수가 세척실(2) 외부로 배수되도록 한다.

한편, 세척실(2)의 하부에 위치되는 하부분사노즐(7)은 순환펌프(2b)와 직접 연결되고, 세척실(2)의 상부에 위치되는 상부분사노즐(6)은 세척실(2) 상부로 길게 연장된 연결덕트(6b)를 통해 순환펌프(2b)와 연결되도록 마련되는데, 연결덕트(6b)가 없이 순환펌프(2b)에 직접 연결된 하부분사노즐(7)은 상부분사노즐(6)에 비해 상대적으로 높은 수압으로 세척수를 분사하게 된다.

그리고 이와 아울러 식기바스켓에 적재되는 식기는 밥그릇 국그릇 접시 컵 등이 주류를 이루게 되는데, 각 식기는 내부에 담게 되는 내용물의 특성에 따라 세척되기 용이한 것과 세척되기 어려운 것들이 있다. 이중 가장 세척되기 어려운 것이 밥그릇인데, 이러한 밥그릇은 밥풀이 자주 말라붙게 되어 가장 세척하기 어려우며, 육수나 기름진 음식 등을 주로 담게 되는 국그릇, 접시 등이 다음으로 세척되기 어렵고, 물이나 음료수를 담는 컵 등이 가장 세척이 용이하게 된다.

따라서 식기세척기를 이용하여 많은 량의 각종 식기를 한번에 세척시키고자 할 경우 밥그릇과 같이 세척되기 어려운 식기는 세척수의 분사력이 강한 하부분사노즐(7)을 통해 세척되도록 하고 밥그릇에 비해 세척되기 용이한 기타 다른 식기들은 하부분사노즐(7)보다 세척수의 분사력이 약한 상부분사노즐(6)을 통해 세척시키는 것이 식기의 세척 효율면에서 유리하게 된다.

이러한 식기의 세척효율을 고려하여 본 발명에 따른 식기세척기는 도 2에 도시된 바와 같이, 밥그릇을 집중적으로 적재시킬 수 있도록 마련된 제1적재부(10)가 하부식기바스켓(5)에 마련되고, 국그릇이나 접시를 집중적으로 적재시킬 수 있도록 마련된 제2적재부(20)와 컵을 집중적으로 적재시킬 수 있도록 마련된 제3적재부(30)가 상부식기바스켓(4)에 마련된다. 따라서 제1적재부(10)에 밥그릇을 집중적으로 적재시키고 제2 및 제3적재부(20,30)에 기타 식기들을 집중적으로 적재신 후 식기세척기를 동작시키면 밥그릇은 세척수 분사력이 강한 하부분사노즐(7)을 통해 세척되게 되고 기타 다른 식기는 하부분사노즐(7)에 비해 세척수의 분사력이 약한 상부분사노즐(6)을 통해 세척되게 됨으로써 전체적인 식기의 세척효율이 향상된다.

또한, 세척실(2)은 사용자가 외부에서 식기를 보다 편리하게 수납할 수 있도록 전후 길이보다 좌우 길이가 더 길게 마련되고, 각 식기바스켓(4,5) 역시 이러한 세척실(2)의 형상에 대응하도록 좌우 길이가 전후 길이보다 길게 마련되며, 각 분사노즐(6,7)은 식기바스켓(4,5) 외측으로 벗어나지 않도록 그 길이가 대략 식기바스켓(4,5)의 전후길이 정도가 되도록 마련된다.

이러한 구조에 의해 도 3(a)와 도 3(b)에 도시된 바와 같이, 각 분사노즐(6,7)이 회전하며 그리게 되는 원궤적의 지름은 대략 식기바스켓(4,5)의 전후방 길이와 대응하게 되고, 이를 통해 각각의 식기바스켓(4,5)에 있어서 각 모서리 측과 좌우 양단부 측은 중앙 측보다 세척수의 공급이 덜 원활하게 되는 사각지대(X)를 형성하게 되며, 사각지대(X) 안쪽 식기바스켓(4,5)의 중앙부는 사각지대(X)에 비해 상대적으로 세척수의 공급이 원활하게 된다.

따라서 하부식기바스켓(5)에 마련되는 상기 제1적재부(10)는 밥그릇의 세척이 더욱 효과적으로 이루어지도록 사각지대(X)를 피해 마련되는 것이 바람직하며, 상부식기바스켓(4)에 마련되는 제2적재부(20)와 제3적재부(30)는 컵보다 세척되기 어려운 접시와 국그릇이 적재되는 제2적재부(20)가 사각지대(X)를 피해 마련되고 컵이 적재되는 제3적재부(30)가 사각지대(X) 측에 마련되는 것이 바람직하게 된다.

이를 위해 상기 제1적재부(10)는 복수의 밥그릇이 적재되도록 하부식기바스켓(5)의 중앙부에 하부식기바스켓(5)의 전후방향을 따라 마련된다. 따라서 이러한 제1적재부(10)에 적재되는 밥그릇은 세척수의 분사력이 강한 하부분사노즐(7)을 통해 세척됨과 동시에 하부식기바스켓(5)에서도 세척수의 분사공급이 가장 원활하게 이루어지는 부위에 적재됨으로써 보다 깨끗하게 세척될 수 있도록 한다.

또 제2적재부(20)는 상부식기바스켓(4)의 중앙부 일측과 타측에 각각 상부식기바스켓(4)의 전후방향을 따라 복수의 접시와 복수의 국그릇이 적재되도록 마련되어 사각지대(X)를 피해 배치되고, 제3적재부(30)는 제2적재부(20) 양측에 상부식기바스켓(4)의 전후방향을 따라 각각 복수의 컵이 적재되도록 마련되어 사각지대(X) 측에 배치된다. 따라서 밥그릇보다 세척이 용이한 접시 국그릇 컵과 같은 식기들은 상기 제2적재부(20)와 제3적재부(30)를 통해 하부분사노즐(7)보다 세척수의 분사력이 다소 약한 상부분사노즐(6)을 통해 세척되고, 또 이들 중 더 세척하기 용이한 컵은 상부식기바스켓(4)의 사각지대(X) 측에 배치되며, 또 컵보다 다소 세척하기 힘든 접시나 국그릇은 사각지대(X)를 피해 배치된다.

따라서 이러한 제1 제2 제3적재부(10,20,30)는 각 식기바스켓(4,5)에 적재되는 각 식기기 세척하기 힘든 정도에 따라 이에 알맞은 세척수의 분사공급이 이루어지는 부위에 적재되도록 함으로써 전체적인 식기의 세척효율이 향상되도록 한다.

또 접시와 국그릇이 적재되는 제2적재부(20)는 이러한 접시와 국그릇이 옆으로 세워져 적재되도록 마련되는데, 이는 접시와 국그릇이 제2적재부(20) 내부에 보다 많이 적재될 수 있도록 하기 위한 것이며, 이를 위해 제2적재부(20)의 일측에는

Petitioner Samsung Ex-1004, 0864

옆으로 세워지는 각 접시의 전면과 배면을 지지하도록 상측으로 연장형성된 한 쌍의 제1지지돌기(21)가 상부식기바스켓(4)의 전후방향을 따라 형성되고, 제2적재부(20)의 타측에는 역시 옆으로 세워지는 각 국그릇의 전면과 배면을 지지하도록 상측으로 연장형성된 한 쌍의 제2지지돌기(22)가 상부식기바스켓(4)의 전후방향을 따라 형성된다.

그리고 각 제3적재부(30)에는 컵이 거꾸로 업어진 상태로 적재되는데, 도 4에 도시된 바와 같이, 이러한 제3적재부(30)는 상부분사노즐(6)의 회전에 따른 원심력으로 인해 외측으로 휘어지며 분사되는 세척수가 컵 내부로 용이하게 전달되도록 상부식기바스켓(4)의 내측을 향해 상향 경사지도록 마련되는 것이 바람직하다.

또한, 제1적재부는 도 5에 상세히 도시한 바와 같이 각각 층계모양으로 형성되고 제1적재부(10)의 전방 측과 후방 측에 각각 마련되는 제1층계부(11) 및 제2층계부(12)와, 각 층계부(11,12) 사이에 마련되는 연결부(13)를 포함하여 구성되는데, 각 층계부(11,12)는 제1적재부(10)의 길이방향을 따라 형성된 복수의 계단(11a,12a)을 구비하며, 각 계단(11a,12a)과 상기 연결부(13)에는 복수의 밥그릇이 거꾸로 엎어져 나란히 적재되게 된다.

이와 같이 각 계단(11a,12a)을 통해 층계모양으로 마련되는 층계부(11,12)는 제1적재부(10) 내부에 엎어진 상태로 적재되는 다수의 밥그릇이 다단으로 적재되도록 함으로써 제한된 제1적재부(10) 내부 공간에 보다 많은 밥그릇이 적재되도록 한다.

또 제1층계부(11)는 전방 측으로 갈수록 높아지도록 마련되고, 제2층계부(12)는 후방 측으로 갈수록 높아지지도록 마련되는데, 이는 제1적재부(10)에 마련되는 층계부가 일측으로 갈수록 높아지도록 마련된 하나의 층계부로 구성되거나 중앙부 측으로 갈수록 높아지도록 마련될 경우보다 층계부(11,12)의 각 계단(11a,12a)을 하부분사노즐(7)에 밀착시켜 보다 원활한 세척수의 공급을 가능하게 하기 위함이다,

또한 하부분사노즐(7)의 각 분사공(7a)을 통해 분사되는 세척수는 상부분사노즐(6)에서와 같이 하부분사노즐(7)의 회전에 따른 원심력의 영향으로 외측방향으로 다소 휘어지며 분사되게 되고, 엎어진 상태로 제1적재부(10)에 적재된 밥그릇은 내부로 분사되는 세척수와 수직방향을 이루도록 적재되었을 때 가장 효과적인 세척이 이루어지게 된다. 따라서 상기 계단(11a,12a)은 하부식기바스켓(5)의 내측으로 다소 상향 경사지도록 마련되어 하부분사노즐(7)의 각 분사공(7a)으로부터 분사되는 세척수가 각 계단(11a,12a)에 적재된 밥그릇에 거의 수직방향으로 분사되도록 마련되는 것이 바람직하다. 그리고 이와 같이 세척수가 외측으로 휘어지는 현상은 중앙측보다 원심력이 크게 작용하는 하부분사노즐(7)의 외측에서 더욱 두드러지게 발생하게 되므로, 각 계단(11a,12a)은 제1적재부(10)의 중앙 측에서 멀리 떨어진 계단(11a,12a)의 경사가 제1적재부(10)의 중앙 측에 가까운 계단(11a,12a)보다 더 급한 경사를 갖도록 마련되는 것이 더욱 바람직하다.

다음은 이와 같이 구성된 본 발명에 따른 식기세척기의 동작 및 작용효과를 상세히 설명한다.

먼저 도어(3)가 개방된 상태에서 각 식기바스켓(4,5)을 세척실(2) 외부로 인출한 후 각 식기바스켓(4,5)에 다수의 각종 식기를 적재시킨다. 이때 도 6에 도시된 바와 같이, 하부식기바스켓(5)의 중앙부에 마련된 제1적재부(10)에는 세척하기 힘든 밥그릇이 거꾸로 업어진 상태에서 집중적으로 적재되고, 상부식기바스켓(4)의 중앙부에 마련된 제2적재부(20)에는 밥그릇 보다 덜 세척하기 어려운 접시와 국그릇이 옆으로 세워진 상태에서 집중적으로 적재되며, 또 제2적재부(20) 외측의 각 제3적재부(30)에는 다소 세척이 용이한 컵이 밥그릇과 같이 엎어진 상태에서 집중적으로 적재되고, 도면을 통해 도시하지는 않았으나 이 밖의 다른 식기는 제1적재부(10) 외측의 하부식기바스켓(5)에 적재된다.

그리고 이 상태에서 각 식기바스켓(4,5)을 세척실(2) 내부로 밀어넣고 도어(2)를 폐쇄한 후 순환펌프(2b)를 작동시키게 되면 집수통(2a) 내부의 세척수는 각 분사노즐(6,7) 측으로 공급되어 분사노즐(6,7)의 각 분사공(6a,7a)을 통해 각 식기바스켓(4,5) 측으로 분사되고, 식기바스켓(4,5) 측으로 분사된 세척수는 세척실(2) 바닥으로 떨어지며 집수통(2a)으로 모아진 후 다시 각 분사노즐(6,7) 측으로 전달되고, 이러한 세척수의 순환이 반복되며 식기바스켓(4,5) 내부의 각종 식기가 세척된다.

또 이때 각 적재부(10,20,30)는 제3적재부(30) 제2적재부(20) 제1적재부(10) 순서로 점점 더 강력하고 원활한 세척수의 분사공급이 이루어지며, 이에 대응하도록 각각의 식기는 세척되기 쉬운 컵이 제3적재부(30)에, 다음으로 세척되기 용이한 접시나 국그릇은 제2적재부(20)에, 그리고 가장 세척하기 어려운 밥그릇은 제1적재부(10)에 적재되는 만큼, 각종 식기가 그 세척되기 어려운 정도에 따라 이에 대응하는 세척수의 분사공급을 받게 되어 전체적인 식기의 세척효율이 향상된다.

발명의 효과

이상에서 상세히 설명한 바와 같이, 본 발명에 따른 식기세척기는 상기 각 적재부의 구성을 통해 식기바스켓에 적재되는 각종 식기가 세척되기 어려운 정도에 따라 이에 대응하는 세척수의 분사공급을 받을 수 있도록 하여 식기의 세척효율이 보다 향상되도록 하는 이점을 갖는다.

(57) 청구의 범위

청구항 1.

세척실, 식기가 적재되도록 상기 세척실에 마련된 복수의 식기바스켓을 구비하는 식기세척기에 있어서,

상기 어느 하나의 식기바스켓 중앙부에는 상기 식기바스켓의 전후방향을 따라 복수의 밥그릇이 적재되도록 형성된 제1적재부가 마련되고, 상기 나머지 하나의 식기바스켓 중앙부 일측과 타측에는 각각 상기 식기바스켓의 전후방향을 따라 복수의 접시와 국그릇이 적재되도록 형성된 제2적재부가 마련되며, 상기 제2적재부 양측의 상기 식기바스켓에는 상기 식기바스켓의 전후방향을 따라 각각 복수의 컵이 적재되도록 형성된 제3적재부가 마련된 것을 특징으로 하는 식기세척기.

Petitioner Samsung Ex-1004, 0865

청구항 2.

제 1항에 있어서,

상기 식기바스켓은 상기 세척실의 상부와 하부에 각각 마련된 상부식기바스켓과 하부식기바스켓을 포함하고, 상기 각 식기바스켓의 하부에는 상기 각 식기바스켓 측으로 물을 분사하도록 회전 가능하게 설치된 상부분사노즐과 하부분사노즐이 각각 마련되며,

상기 제1적재부는 상기 하부식기바스켓에 마련되고, 상기 제2적재부와 상기 제3적재부는 상기 상부식기바스켓에 마련된 것을 특징으로 하는 식기세척기.

청구항 3.

제 2항에 있어서,

상기 식기바스켓은 좌우 측의 길이가 전후방의 길이보다 길게 마련되되, 상기 분사노즐의 중심은 상기 식기바스켓의 중심과 동일 축선상에 위치되고, 상기 분사노즐의 길이는 대략 상기 식기바스켓의 전후방 길이에 근접하도록 마련되며, 상기 하부분사노즐은 상기 상부분사노즐보다 높은 수압으로 세척수를 분사하도록 마련된 것을 특징으로 하는 식기세척기.

청구항 4.

제 3항에 있어서,

상기 제2적재부는 상기 접시와 국그릇이 옆으로 세워져 적재될 수 있도록 마련되고, 상기 제1적재부와 제3적재부는 상기 밥그릇과 컵이 거꾸로 업어져 적재될 수 있도록 마련된 것을 특징으로 하는 식기세척기.

청구항 5.

제 4항에 있어서,

상기 제2적재부에는 옆으로 세워진 상기 각 접시의 전면과 배면을 지지하도록 상측으로 연장형성된 한 쌍의 제1지지돌기와 옆으로 세워진 상기 각 국그릇의 전면과 배면을 지지하도록 상측으로 연장형성된 한 쌍의 제2지지돌기가 각각 상기 상부식기바스켓의 전후방향을 따라 형성된 것을 특징으로 하는 식기세척기.

청구항 6.

제 4항에 있어서,

상기 제3적재는 상기 상부식기바스켓의 내측으로 상향 경사지도록 마련된 것을 특징으로 하는 식기세척기.

청구항 7.

제 4항에 있어서,

상기 제1적재는 각각 층계모양으로 형성되고 상기 제1적재부의 전방 측과 후방 측에 각각 마련되는 제1층계부 및 제2층계부와, 상기 각 층계부 사이에 마련되는 연결부를 포함하고,

상기 제1층계부는 전방 측으로 갈수록 높아지도록 마련되고, 상기 제2층계부는 후방 측으로 갈수록 높아지도록 마련된 것을 특징으로 하는 식기세척기.

청구항 8.

제 7항에 있어서,

Petitioner Samsung Ex-1004, 0866

상기 제1 및 제2층계부는 상기 제1적재부의 길이방향을 따라 형성된 복수의 계단을 포함하고, 상기 각 계단은 상기 하부 식기바스켓의 내측을 향해 상향 경사지도록 마련된 것을 특징으로 하는 식기세척기.

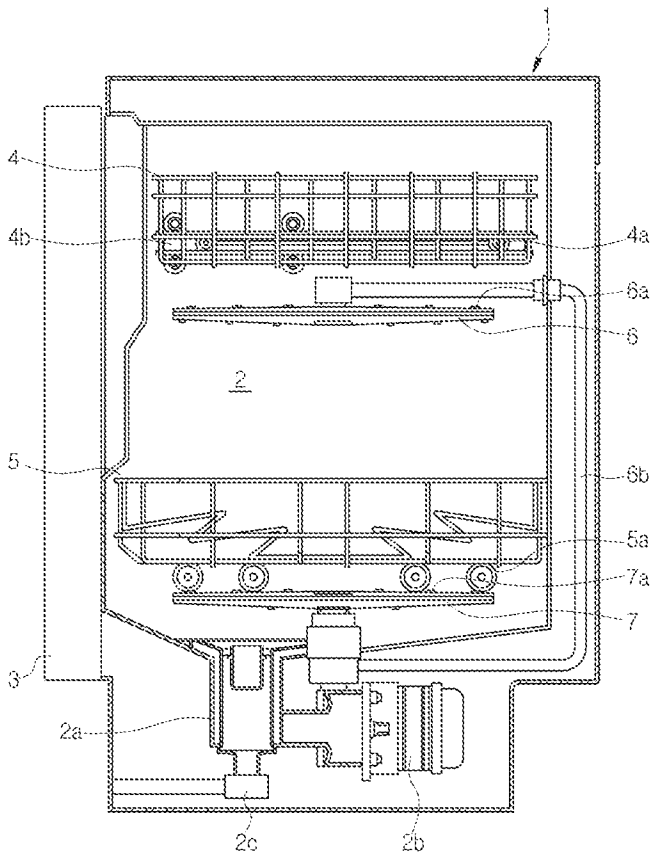
청구항 9.

제 8항에 있어서,

상기 제1적재부의 중앙 측에서 멀리 떨어진 상기 계단의 경사는 상기 제1적재부의 중앙 측에 가까운 계단보다 더 급한 경사를 갖도록 마련된 것을 특징으로 하는 식기세척기.

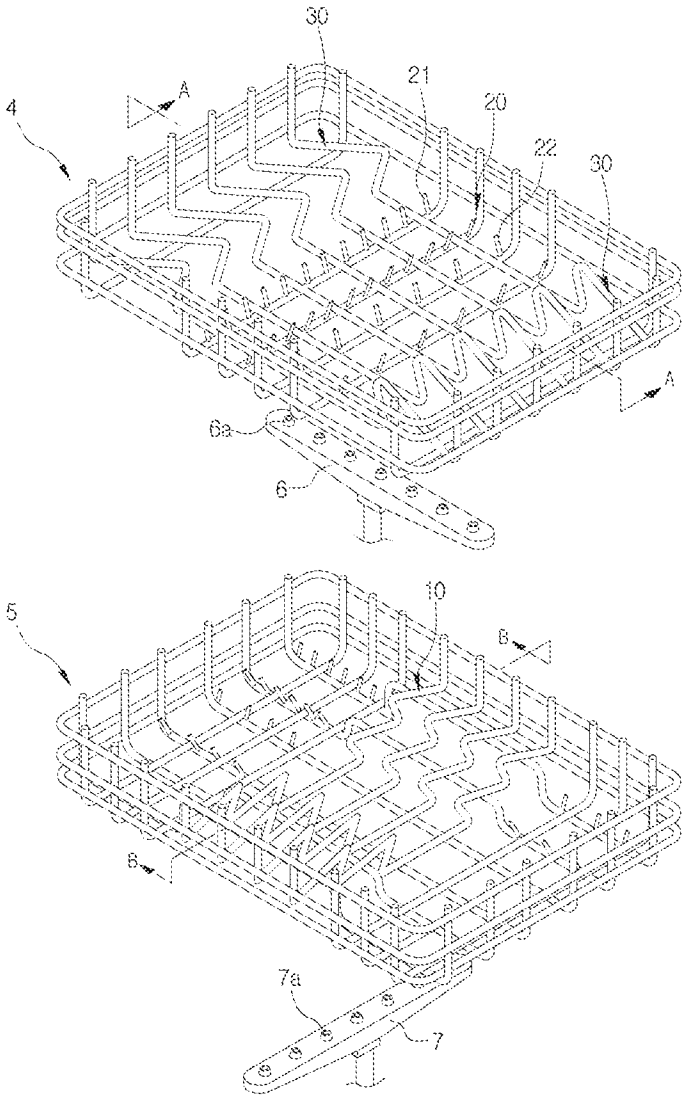
도면

도면1



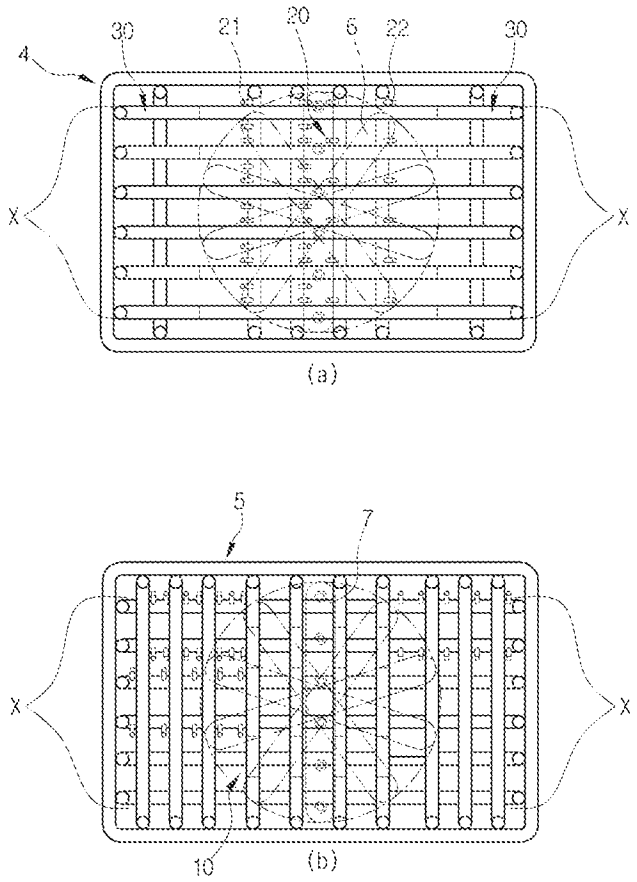
Petitioner Samsung Ex-1004, 0867

도면2

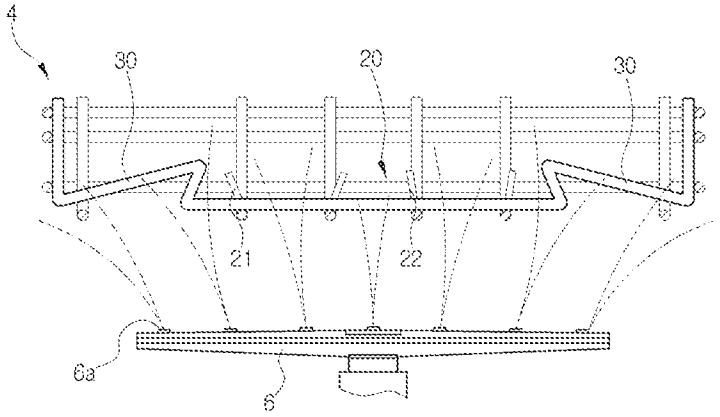


Petitioner Samsung Ex-1004, 0868

도면3

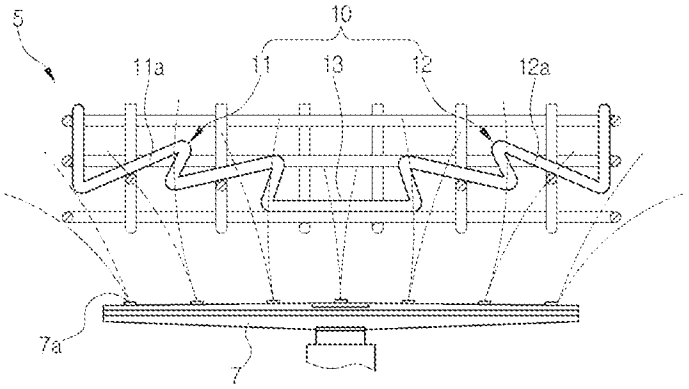


도면4

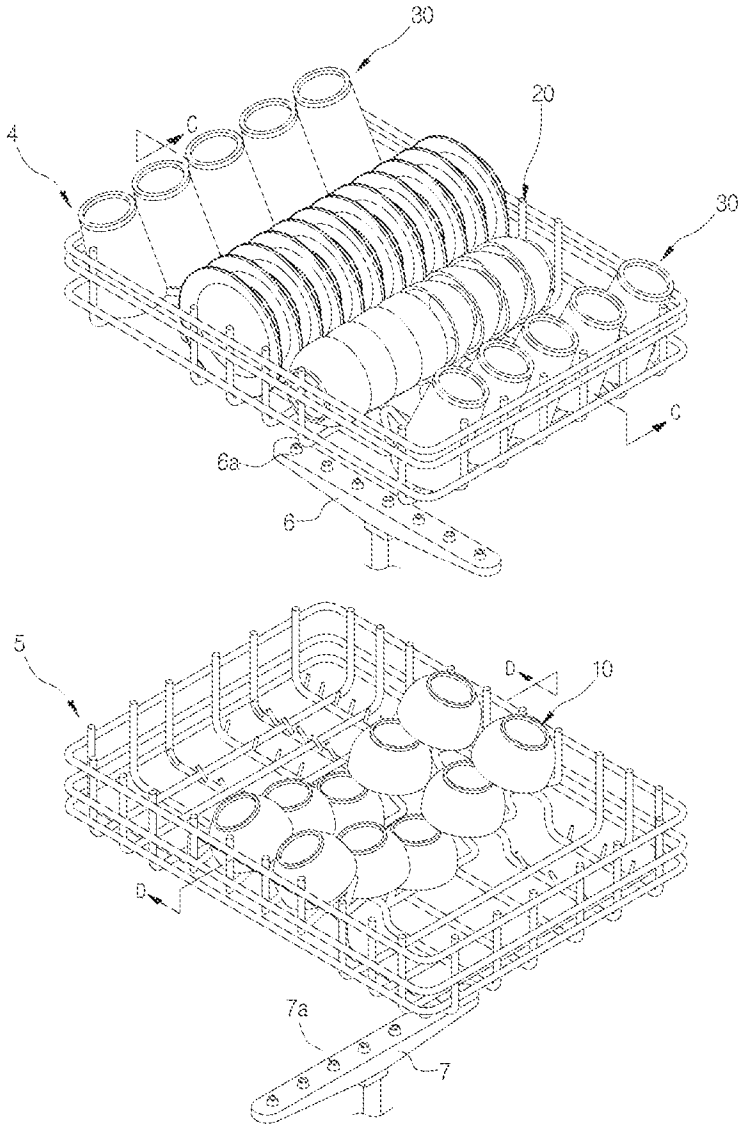


Petitioner Samsung Ex-1004, 0869

도면5



도면6



Petitioner Samsung Ex-1004, 0870

Doc Code: IDS.SIZEFEE
Document Description: Assertion of whether IDS Size Fee Due

PTO/SB/08C (01-25)
Approved for use through 01/31/2028. OMB 0651-0070
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT SIZE FEE – WRITTEN ASSERTION UNDER 37 CFR 1.98

Complete if Known

Application or Patent No.:	First Named Inventor:	Art Unit:
19/297,954	Mark S. Feddema	
Filing Date:	Attorney Docket Number:	Examiner:
August 12, 2025	SUB-13230-US-CON3	

Please see 37 CFR 1.17(v) and attached Instructions for completing this form to make the appropriate selection of an assertion under 37 CFR 1.98. For the information disclosure statement (IDS) submitted herewith, the applicant or patent owner certifies the following with respect to the cumulative number of applicant-provided or patent-owner provided items of information submitted to date including those in the accompanying IDS (select only one):

☑ No IDS size fee is required under 37 CFR 1.17(v) at this time.

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(1).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(2).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(3).

NOTE: This form must be accompanied by PTO/SB/08a and/or PTO/SB/08b or equivalent.

DEPOSIT ACCOUNT

The Director is authorized to charge the fee indicated above in the amount of $ _____ for the IDS submitted herewith to deposit account _____.

SIGNATURE

This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications.

If applicant or patent owner is a juristic entity (e.g., an LLC or corporation), this form must be signed by a registered practitioner. See 37 CFR 1.31.

If applicant or patent owner is a person or persons, this form may be signed by either a registered practitioner, or the applicant or patentee. Note that if multiple people together are the applicant or patentee (e.g., there are joint inventors who together are the applicant), then a signature is required from each person who is an applicant or patentee. *Submit multiple forms if more than one signature is required, see below*.*

Signature	Date
/brianrcheslek/	2025-09-17
Name (Print/Typed)	Practitioner Registration Number (if applicable)
Brian R. Cheslek	58,329

■ * Total of one forms are submitted.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0070. Public burden for this form is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Office of the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Instructions for Filling out the
"Information Disclosure Statement Size Fee – Written Assertion Under 37 CFR 1.98" Form
(Not to be Submitted to the USPTO)

Note: This form is to be used when applicant or patent owner files an Information Disclosure Statement (IDS) for consideration by the examiner. This form must be accompanied by PTO/SB/08a and/or PTO/SB/08b or equivalent.

Determining the cumulative number of applicant-provided or patent owner-provided items of information

The IDS size fee is based on the cumulative number of items of information provided by an applicant or patent owner during the pendency of the application or reexamination proceeding. It is the applicant's and patent owner's responsibility to track the cumulative number of items of information provided in the application or proceeding and provide a written assertion of any applicable IDS size fee due.

In determining the applicable written assertion for the cumulative number of applicant-provided or patent owner-provided items of information, "provided" refers to the items cited on an IDS under 37 CFR 1.98(a)(1) by an applicant or patent owner, whether or not an actual copy of the cited item is submitted by the applicant or patent owner to the USPTO. If a particular item provided by an applicant or patent owner on an IDS was not considered because the item was non-compliant and that particular item is provided on an IDS a second time in the same application or patent, it will not be counted again.

An item of information that an applicant cited in a parent application will not be counted in a child application (e.g., a continuation, continuation-in-part, or divisional application) for the purpose of the IDS size fees unless it is resubmitted, i.e., provided by the applicant on an IDS in the child application. Applicants who wish to avoid paying the IDS size fees in a child application for items of information considered in a parent application may do so by not resubmitting the items. An item of information must be resubmitted in the continuing application if the applicant desires the item of information to be printed on the patent. See MPEP 609.02, subsection II.A.2.

The cumulative count is determined for each application or patent separately. Continuing, CPA, and reissue applications and post-issuance proceedings will start with a count of zero. A request for continued examination (RCE) is not the filing of a new application, and thus the count will not reset when an RCE is filed.

Written Assertion

Check "[ ] No IDS size fee is required under 37 CFR 1.17(v) at this time" on the above PTO/SB/08c form when the IDS does not cause the cumulative number of applicant-provided or patent owner-provided items in this application or proceeding to:

- exceed 50, 100, or 200 items of information.

Check "[ ] The IDS is accompanied by the IDS size fee under 1.17(v)(1)" on the above PTO/SB/08c form when the IDS causes the cumulative number of applicant-provided or patent owner-provided items in this application or proceeding to:

- exceed 50 items of information but not exceed 100 items of information.

Check "[ ] The IDS is accompanied by the IDS size fee under 1.17(v)(2)" on the above PTO/SB/08c form when the IDS causes the cumulative number of applicant-provided or patent owner-provided items in this application or proceeding to:

- exceed 100 items of information but not exceed 200 items of information.

Note: If a fee under 1.17(v)(1) was previously paid, the fee currently due is the difference between the 1.17(v)(2) fee and the previously paid 1.17(v)(1) fee.

Doc Code: IDS.SIZEFEE
Document Description: Assertion of whether IDS Size Fee Due

Check "[ ] The IDS is accompanied by the IDS size fee under 1.17(v)(3)" on the above PTO/SB/08c form when the IDS causes the cumulative number of applicant-provided or patent owner-provided items in this application or proceeding to:

- exceed 200 items of information.

Note: If a fee under 1.17(v)(1) or (v)(2) was previously paid, the fee currently due is the difference between the 1.17(v)(3) fee and the previously paid 1.17(v)(1) or (v)(2) fee.

Select only one assertion on the PTO/SB/08c form above.

Note: the cumulative count of items of information includes all items of information already of record in a pending application or proceeding that were submitted via IDS(s) including those submitted prior to January 19, 2025.

Method of Payment

This section should only be filled out if the IDS size fee is due. Fees may be paid by check or money order (made payable to the Director of the United States Patent and Trademark Office), credit card (Form PTO-2038), or deposit account. When paying by deposit account, the amount of the IDS size fee to be charged to the deposit account must be specified to comply with 37 CFR 1.98(a)(4). General authorizations to charge fees to a deposit account are not compliant written assertions. When paying by credit card, to protect your credit card information, do not submit Form PTO-2038 electronically through USPTO's patent electronic filing system or any other USPTO Web site.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

Routine uses of the information in this record may include disclosure to:

1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;

2) a federal, state, local, or international agency, in response to its request;

3) a contractor of the USPTO having need for the information in order to perform a contract;

4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;

5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;

6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;

7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;

8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c));

9) the Office of Personnel Management (OPM) for personnel research purposes; and

10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

PTO/SB/08a (01-25)
Approved for use through 11/30/2027. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

U.S. PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Inventor of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	3433363	A	1969-03-18	Clearman et al.	
	2	3464566	A	1969-09-02	Gilson	
	3	4046261	A	1977-09-06	Yake	
	4	4339051	A	1982-07-13	Crawford	
	5	4917248	A	1990-04-17	Friskney	
	6	5158185	A	1992-10-27	Michael et al.	
	7	5205419	A	1993-04-27	Purtilo	
	8	5601195	A	1997-02-11	Finola et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	19297954
	Filing Date	2025-08-12
	First Named Inventor	Mark S. Feddema
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SUB-13230-US-CON3

	9	6571965	B1	2003-06-03	Beck et al.	
	10	6848585	B2	2005-02-01	VanLandingham	
	11	7231929	B2	2007-06-19	Landsiedel et al.	
	12	8651287	B2	2014-02-18	Moser et al.	
	13	9949613	B2	2018-04-24	Blanchard et al.	
	14	10349804	B2	2019-07-16	Tuller	
	15	10463226	B2	2019-11-05	Mesa et al.	
	16	10512385	B2	2019-12-24	Tuller et al.	
	17	10638912	B1	2020-05-05	Visin et al.	

If you wish to add additional U.S. Patent citation information, please click the Add button. Add

U.S. PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Inventor or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	19297954
	Filing Date	2025-08-12
	First Named Inventor	Mark S. Feddema
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SUB-13230-US-CON3

	1	20050109378	A1	2005-05-26	Landsiedel et al.	
	2	20060250058	A1	2006-11-09	Stevens et al.	
	3	20060254994	A1	2006-11-16	Lim	
	4	20060254992	A1	2006-11-16	Lim	
	5	20070247039	A1	2007-10-25	Anderson et al.	
	6	20080083678	A1	2008-04-10	Graute	
	7	20090120883	A1	2009-05-14	Jadhav et al.	
	8	20120298598	A1	2012-11-29	Ennen et al.	
	9	20190290097	A1	2019-09-26	Naik et al.	
	10	20200187750	A1	2020-06-18	Feddema et al.	
	11	20210076900	A1	2021-03-18	Feddema et al.	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

If you wish to add additional U.S. Published Application citation information, please click the Add button Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	106073675	CN	A	2016-11-09	Zhang et al.		☒
	2	106998989	CN	A	2017-08-01	Cho et al.		☒
	3	0186157	EP	A1	1986-07-02	Hüttemann et al.		☒
	4	1138249	EP	A2	2001-10-04	Vogel et al.		☒
	5	2815690	EP	A1	2014-12-24	Jerg		☒
	6	3222191	EP	A1	2017-09-27	Roderick et al.		☐
	7	200300795	KR	Y1	2002-12-30	Kang		☒
	8	20050068480	KR	A	2005-07-05	Park et al.		☒

If you wish to add additional Foreign Patent Document citation information, please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	DONS APPLIANCES, An Overview of KitchenAid Dishwasher KDTM404KPS, announced in YouTube on Jan. 19, 2021 [online], [site visited Apr. 5, 2022], Available from the internet URL: https://www.youtube.com/watch?v=2gO_C6t6tBM , An Overview of KitchenAid Dishwasher (KDTM404KPS) | KitchenAid Dishwasher Review 2021 (Year: 2021)	☐
	2	APPLIANCE FACTORY PARTS, Part GEHWD28X10210, available in https://www.appliancefactoryparts.com customer review oldest date Dec. 27, 2014 [online], [site visited Apr. 5, 2022], Available from the internet URL: https://www.appliancefactoryparts.com/search/part/1109159/, (Year: 2014).	☐

If you wish to add additional non-patent literature document citation information, please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered and whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

TIMING STATEMENT

Please see 37 CFR 1.97(e) to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached timing statement under 37 CFR 1.97(e).

☒ A timing statement under 37 CFR 1.97(e) is not submitted herewith.

TIMING FEE

☐ The fee set forth in 37 CFR 1.17(p) has been submitted herewith.

COPIES

☐ An identification of an earlier application pursuant to 37 CFR 1.98(d)(1) is attached.

SIZE FEE ASSERTION

Please see 37 CFR 1.17(v) and the IDS Auto-Load Instructions for completing this form to make the appropriate selection of an assertion under 37 CFR 1.98. For the information disclosure statement (IDS) submitted herewith, the applicant or patent owner certifies the following with respect to the cumulative number of applicant-provided or patent-owner provided items of information submitted to date including those in the accompanying IDS (select only one):

☒ No IDS size fee is required under 37 CFR 1.17(v) at this time.

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(1).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(2).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(3).

SIGNATURE

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/brianrcheslek/	Date (YYYY-MM-DD)	2025-09-17
Name/Print	Brian R. Cheslek	Registration Number	58,329

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 222 191 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
27.09.2017 Bulletin 2017/39

(21) Application number: **17160208.9**

(22) Date of filing: **09.03.2017**

(51) Int Cl.:
A47L 15/00 *(2006.01)* ***A47L 15/42*** *(2006.01)*
A47L 15/22 *(2006.01)* ***A47L 15/23*** *(2006.01)*

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD

(30) Priority: **24.03.2016 US 201615079167**

(71) Applicant: **Whirlpool Corporation**
Benton Harbor, MI 49022 (US)

(72) Inventors:
- **Roderick, Frederick T.**
  21025 Comerio (IT)
- **Rappette, Antony M.**
  21025 Comerio (IT)
- **Lottinville, Daniel**
  21025 Comerio (IT)
- **Brightbill, David**
  21025 Comerio (IT)
- **Jaske, Matthew**
  21025 Comerio (IT)
- **Welch, Rodney**
  21025 Comerio (IT)
- **Lagness, Michael**
  21025 Comerio (IT)

(74) Representative: **Guerci, Alessandro**
Whirlpool EMEA S.p.A.
Patent Department
Viale G. Borghi 27
21025 Comerio (VA) (IT)

(54) DISHWASHER WITH TUBE WASH SYSTEM

(57) A dishwasher (10) for treating dishes according to an automatic cycle of operation includes a tub (14) at least partially defining a treating chamber (16) with an access opening, a sump (34) fluidly coupled to the tub (14), and a liquid recirculation circuit fluidly coupling the sump (34) to the treating chamber (16). The liquid recirculation circuit includes at least one rotating spray tube (26, 28, 30, 32) having a longitudinal body axis (102) defining a rotational axis. A plurality of spray nozzles (64) are provided in the rotating spray tube (26, 28, 30, 32).

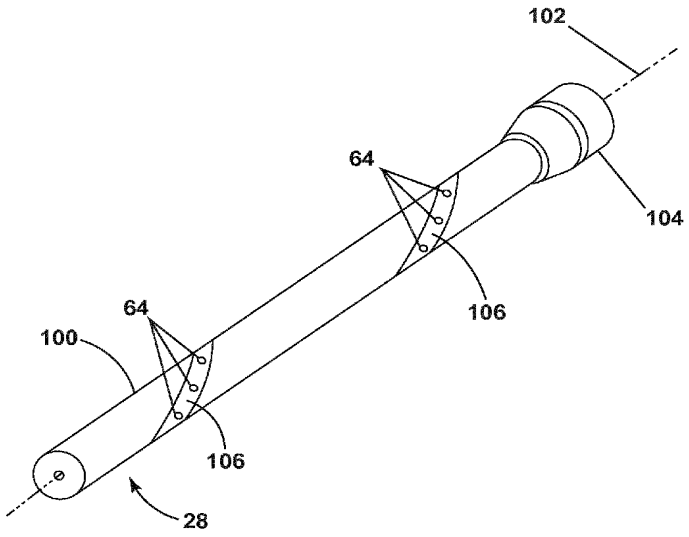


FIG. 4

EP 3 222 191 A1

Petitioner Samsung Ex-1004, 0883

Description

BACKGROUND OF THE INVENTION

[0001] Contemporary automatic dishwashers for use in a typical household include a tub and at least one rack or basket for supporting soiled dishes within the tub. At least an upper rack and a lower rack for holding dishes to be cleaned are typically provided within the treating chamber. A silverware basket for holding utensils, silverware, etc. is also usually provided and normally removably mounts to the door or within the lower rack.

[0002] A spraying system can be provided for recirculating liquid throughout the tub to remove soils from the dishes. The spraying system can include various sprayers, including one or more rotatable sprayers. Various sprayers of the spraying system can be configured to spray toward the racks or silverware basket. One specific type of sprayer that can be included within the spraying system is a rotating spray tube having a plurality of spray holes or nozzles.

BRIEF DESCRIPTION OF THE INVENTION

[0003] The invention relates to a dishwasher for treating dishes according to an automatic cycle of operation. In one aspect of the invention, the dishwasher includes a tub at least partially defining a treating chamber with an access opening, a sump fluidly coupled to the tub, and a liquid recirculation circuit fluidly coupling the sump to the treating chamber. The liquid recirculation circuit includes at least one rotating spray tube having a longitudinal body axis defining a rotational axis. A plurality of spray nozzles are provided in the rotating spray tube and are arranged in a spiral pattern about the longitudinal axis.

[0004] In another aspect of the invention, the dishwasher includes a tub having at least one wall partially defining a treating chamber with an access opening, a sump fluidly coupled to the tub, and a liquid recirculation circuit fluidly coupling the sump to the treating chamber. The liquid recirculation circuit includes at least one rotating spray tube located adjacent the at least one wall. The at least one rotating spray tube has a longitudinal body axis defining a rotational axis and a plurality of spray nozzles provided in the rotating spray tube. The liquid recirculation circuit further includes a pump drawing liquid from the sump and pumping the drawn liquid to the at least one rotating spray tube. The nozzles are arranged in a non-linear pattern on the rotating spray tube such that the flow of liquid leaving the nozzles and running down the at least one wall to the sump does not exceed the pump's capacity to draw liquid from the sump.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] In the drawings:

FIG. 1 is a schematic, cross-sectional view of a dishwasher with a spraying system according to an embodiment of the invention.

FIG. 2 is a schematic view of a control system for the dishwasher of FIG. 1.

FIG. 3 is a schematic front view of a dish rack and spray tube for use in the dishwasher of FIG. 1.

FIG. 4 is an enlarged perspective view of a rotating spray tube of FIG. 3.

FIG. 5 is an enlarged schematic side view of a spray nozzle for use with the rotating spray tube of FIG. 4 according to an embodiment of the invention.

FIG. 6 is an enlarged, cross-sectional view of the rotating spray tube of FIG. 3 according to an embodiment of the invention.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0006] FIG. 1 illustrates a schematic, cross-sectional view of an exemplary automated dishwasher 10 according to an embodiment of the invention. The dishwasher 10 shares many features of a conventional automated dishwasher, which will not be described in detail herein except as necessary for a complete understanding of the invention. A chassis 12 can define an interior of the dishwasher 10 and can include a frame, with or without panels mounted to the frame. For built-in dishwashers, outer panels are typically not needed. For dishwashers that are not built into existing cabinetry, the chassis 12 can include the panels mounted to the frame to form a cabinet for the dishwasher 10. An open-faced tub 14 can be provided within the chassis 12 and can at least partially define a treating chamber 16 for washing or otherwise treating dishes. The open face of the tub 14 defines an access opening for the treating chamber 16.

[0007] A closure element, such as a door assembly 18, can be movably mounted to the dishwasher 10 for movement between opened and closed positions to selectively open and close the treating chamber access opening defined by the open face of the tub 14. Thus, the door assembly 18 provides accessibility to the treating chamber 16 for the loading and unloading of dishes or other washable items. It should be appreciated that the door assembly 18 can be secured to the lower front edge of the chassis 12 or to the lower front edge of the tub 14 via a hinge assembly (not shown) configured to pivot the door assembly 18. When the door assembly 18 is closed, user access to the treating chamber 16 can be prevented, whereas user access to the treating chamber 16 can be permitted when the door assembly 18 is open. Alternatively, the closure element can be slidable relative to the chassis 12, such as in a drawer-type dishwasher, wherein the access opening for the treating chamber 16 is formed by an open-top tub. Other configurations of the closure element relative to the chassis 12 and the tub 14 are also within the scope of the invention.

[0008] Dish holders, illustrated in the form of upper,

Petitioner Samsung Ex-1004, 0884

middle, and lower dish racks 20, 22, 24, can be located within the treating chamber 16 and receive dishes for treatment, such as washing. The upper, middle, and lower racks 20, 22, 24 are typically mounted for slidable movement in and out of the treating chamber 16 for ease of loading and unloading. Other dish holders can be provided, such as a silverware basket, separate from or integral with any of the upper, middle, and lower racks 20, 22, 24. As used in this description, the term "dish(es)" is intended to be generic to any item, single or plural, that may be treated in the dishwasher 10, including, without limitation, dishes, plates, pots, bowls, pans, glassware, and silverware. While the dishwasher 10 is illustrated herein as having three dish racks 20, 22, 24, it will be understood that any suitable number and configuration of dish racks is also within the scope of the invention.

[0009] A spray system can be provided for spraying liquid in the treating chamber 16 and can be provided, for example, in the form of an upper spray tube 26, an upper middle spray tube 32, a lower middle spray tube 28, and a lower spray tube 30. The upper spray tube 26, the upper middle spray tube 32, and the lower middle spray tube 28 are located, respectively, above the upper rack assembly 20, above the middle rack assembly 22, and above the lower rack assembly 24. The lower spray tube 30 is located beneath the lower rack assembly 24. By example, the illustrated spray tubes 26, 28, 30, 32 each include a connector 96 located at the rear end of the spray tube 26, 28, 30, 32 and adapted to mate or dock with a header 98 that is provided on a manifold 80. The manifold 80 can be mounted at the rear of the tub 14, such as to a supply tube 42, or in any other suitable location.

[0010] It will be further understood that the spray tubes 26, 28, 30, 32, while illustrated as being positioned beneath a central region of the dish racks 20, 22, 24, can also be provided adjacent the opposing walls of the tub 14. Further, at least two of the spray tubes 26, 28, 30, 32 can be adjacent different ones of the at least two opposing walls of the tub 14, even being provided in such a configuration that the at least two spray tubes 26, 28, 30, 32 are provided adjacent opposing side walls as well as adjacent to the bottom of the same dish rack 20, 22, 24. It will also be understood that each of the levels of spray tubes 26, 28, 30, 32 can comprise multiple spray tubes 26, 28, 30, 32 provided in parallel with one another and spread out horizontally across the width of the manifold 80, which can extend generally from one side wall to another side wall of the tub 14.

[0011] The spray tubes 26, 28, 30, 32 can be provided at an angle relative to the rack assemblies 20, 22, 24. In an exemplary embodiment, a front or second end of the spray tube 26, 28, 30, 32 can be positioned in a higher position than the first or rear end of the spray tube 26, 28, 30, 32 where the connector 96 is located. While the spray tubes 28, 30, 32 are illustrated herein as being positioned at an angle, it will be understood that the angle of the spray tubes 26, 28, 30, 32 can be any suitable angle relative to the plane of the rack assemblies 20, 22, 24, including a zero degree angle, or the spray tubes 26, 28, 30, 32 can be provided in a horizontal position at a 90 degree angle. Further, the spray tubes 26, 28, 30, 32 need not be provided at identical angles, and any combination of angles of the spray tubes 26, 28, 30, 32 is also within the scope of the invention.

[0012] The spray assemblies 26, 28, 30, 32 are illustrated as spray tubes by example but are not limited to only tubes. For example, the spray assemblies 26, 28, 30, 32 could comprise a combination of rotating spray arms and rotating or stationary spray tubes. Furthermore, the spray system can include additional and/or alternative spray assemblies. For example, a distribution header or spray manifold can be located at the rear of the tub 14 at any vertical position. An exemplary spray manifold is set forth in detail in U.S. Patent No. 7,594,513, issued September 29, 2009, and titled "Multiple Wash Zone Dishwasher".

[0013] A recirculation system can be provided for recirculating liquid from the treating chamber 16 to the spray system. The recirculation system can include a sump 34 and a pump assembly 36. The sump 34 collects the liquid sprayed in the treating chamber 16 and can be formed by a sloped or recess portion of a bottom wall of the tub 14. The pump assembly 36 can include both a drain pump 38 and a recirculation pump 40. The drain pump 38 can draw liquid from the sump 34 and pump the liquid out of the dishwasher 10 to a household drain line (not shown). The recirculation pump 40 can draw liquid from the sump 34, and the liquid can be simultaneously or selectively pumped through a supply conduit or tube 42, into the manifold 80, and then distributed to each of the spray tubes 26, 28, 30, 32 for selective spraying. The supply tube 42 and manifold 80 extend along a wall of the tub 14 and fluidly connect the pump assembly 36 to the at least one spray tube 26, 28, 30, 32.

[0014] While not shown, a liquid supply system can include a water supply conduit coupled with a household water supply for supplying water to the treating chamber 16. A heating system including a heater 44 can be located, for example, within the sump 34 for heating the liquid contained in the sump 34.

[0015] A control system including a controller 46 can also be included in the dishwasher 10, which can be operably coupled with various components of the dishwasher 10 to implement a cycle of operation. The controller 46 can be located within the door assembly 18 as illustrated, or it can alternatively be located somewhere within the chassis 12. The controller 46 can also be operably coupled with a control panel or user interface 48 for receiving user-selected inputs and communicating information to the user. The user interface 48 can include operational controls such as dials, lights, switches, and displays enabling a user to input commands, such as a cycle of operation, to the controller 46 and receive information.

[0016] As illustrated schematically in FIG. 2, the con-

Petitioner Samsung Ex-1004, 0885

troller 46 can be coupled with the heater 44 for heating the wash liquid during a cycle of operation, the drain pump 38 for draining liquid from the treating chamber 16, and the recirculation pump 40 for recirculating the wash liquid during the cycle of operation. The controller 46 can be provided with a memory 50 and a central processing unit (CPU) 52. The memory 50 can be used for storing control software that can be executed by the CPU 52 in completing a cycle of operation using the dishwasher 10 and any additional software. For example, the memory 50 can store one or more pre-programmed cycles of operation that can be selected by a user and completed by the dishwasher 10. The controller 46 can also receive input from one or more sensors 54. Non-limiting examples of sensors that can be communicably coupled with the controller 46 include a temperature sensor and turbidity sensor to determine the soil load associated with a selected grouping of dishes, such as the dishes associated with a particular area of the treating chamber 16.

[0017] The dishwasher 10 can include all of the above exemplary systems, a selection of the above exemplary systems, and/or other systems not listed above as desired. Further, some of the systems can be combined with other systems and/or can share components with other systems. Examples of other systems that the dishwasher can further include are a dispensing system that supplies one or more treating agents or chemistries to the treating chamber 16 and an air supply system that may provide air, which can be heated or not heated, to the treating chamber 16, such as for drying and/or cooling the dishes. An exemplary air supply system is set forth in U.S. Patent Application No. 12/959,673, filed December 3, 2010 and published as U.S. Patent Application Publication No. 2012/0138106 on June 7, 2012.

[0018] Referring now to FIG. 3, a front view of an exemplary dish rack 22 and spray tube 28 is illustrated. The dish rack 22 can be constructed of a wire frame effectively forming opposing side walls 60, front and rear walls (not shown), and a bottom wall 66 that together define an open-top holding compartment 68. The bottom wall 66 can be completely flat, as illustrated by example, to form a flat bottom dish rack or it can have a varied configuration comprising a plurality of inclined and, possibly, flat walls that effectively forms an overall horizontal bottom of an inclined bottom. Additionally, a plurality of supports 70, such as panels, tines, or other structures, can extend upwardly from the bottom wall 66 and/or the side walls 60, or the front and rear walls (not shown) to support various dish items.

[0019] The dish rack 22 can be equipped with the spray tube 28 adapted to provide treating liquid to dish items placed on the dish rack 22. The spray tube 28 can be stationary or can selectively rotate about its longitudinal axis. By rotating the spray tube 28, the treating liquid can be sprayed in multiple spray angles and trajectories. In the case that the spray tube 28 is rotatable, rotation of the spray tube 28 can be driven by a single drive mechanism that is coupled directly to the spray tube 28. It will also be understood that rotations of a plurality of spray tubes 26, 28, 30, 32 can be driven concurrently by a single unified drive mechanism that can control the rotation of multiple spray tubes 26, 28, 30, 32 by the use of, for example, a series of gears that connects the spray tubes 26, 28, 30, 32 and drives them all to rotate in parallel. The mechanism or actuator for driving the rotation of the spray tubes 26, 28, 30, 32, either in series or individually, can be any suitable driving mechanism, non-limiting examples of which include an electric or hydraulic motor selectively operable to directly drive rotation of one or more spray tubes 26, 28, 30, 32 or a gear assembly, which could be provided in the form of a worm gear assembly, spur gears, etc. Nozzles on the spray tube 28 may be oriented such that the spray itself may cause the spray tube 28 to rotate.

[0020] The dish rack 22 is provided with an attachment mechanism 62 that extends downwardly from the bottom wall 66 of the dish rack 22 to attach to and support the spray tube 28. The attachment mechanism 62 can be any suitable shape that provides support for the front end of the spray tube 28 and allows for selective rotation of the spray tube 28. Non-limiting examples of such an attachment mechanism include a hook, a hanger, a bracket, etc.

[0021] The spray tube 28 can be fixedly mounted to the dish rack 22 by the attachment mechanism 62 for movement therewith when the dish rack 22 is slid relative to the tub 14, or the spray tube 28 can be fixedly mounted to the tub 14 so as to retain its position relative to the tub 14 upon movement of the dish rack 20. In the former case, the spray tube 28 can dock with the supply tube 42 (FIG. 1) or other structure of the liquid supply and/or recirculation systems, such as the manifold 80, when the dish rack 22 is slid to its most rearward position in the tub 14 to establish fluid communication with the liquid supply and/or recirculation systems. By example, the connector 96 (FIG. 1) located at the rear end of the spray tube 28 can be adapted to selectively mate or dock with the header 98 (FIG. 1) provided on the manifold 80. The manifold 80 can be adapted to selectively mate or dock with the supply tube 42.

[0022] The spray tube 28 can be provided with a plurality of spray nozzles 64 that can be positioned to spray treating liquid onto the dish items contained within the holding compartment 68 of the dish rack 22. The spray nozzles 64 can be provided along the length of the spray tube 28 in any suitable configuration, which will be described in more detail below. The spray nozzles 64 can be provided on or slightly lifted away from the surface of the spray tube 28, or they can be indented or recessed into the surface of the spray tube 28. The volume and velocity of the treating liquid emitted from the spray nozzles 64 can be based on the type of dish item contained within the dish rack 22, can be generic for all types of dish items, and/or can be variable from one treating cycle of operation to another and/or within a single treating cycle of operation. Additionally, the spray nozzles 64 can

Petitioner Samsung Ex-1004, 0886

spray liquid alternately (*e.g.*, between rows - one row at a time wherein the rows are sequenced on and off, within rows - sets of nozzles 64 within a row sequenced on and off), continuously, and/or intermittently.

[0023] FIG. 4 illustrates an enlarged perspective view of an exemplary embodiment of the spray tube 28 for use in the dishwasher 10 according to the disclosure herein. It will be understood that the spray tube 28 having such a structure and design can be used at any suitable position within the dishwasher 10 and can be provided in any suitable quantity necessary within the dishwasher 10 for providing sufficient treating liquid to the dishes being treated. The spray tube 28 has a longitudinal body 100 that is provided as a hollow, cylindrical tube. The spray tube 28 has a longitudinal body axis 102 that defines a rotational axis for the spray tube 28.

[0024] The spray tube 28 can also be provided with a channel 106 provided on its surface. In an exemplary embodiment, the channel 106 spirals around the axis 102 of the spray tube 28 along the longitudinal length of the spray tube 28. The spiral channel 106 can include any suitable number of revolutions about the axis 102 of the spray tube 28. In an exemplary embodiment, the spiral channel 106 will complete at least one full revolution about the spray tube 28. The channel 106 can be a recessed channel 106 in the surface of the spray tube 28. It is also contemplated that the spray tube 28 can include an additional piece that wraps around the spray tube 28, non-limiting examples of which include a decorative piece, which can be formed of metal, and which covers the surface of the spray tube 28 where no nozzles 64 are present. The nozzles 64 for supplying treating liquid to dishes can also be arranged in a spiral pattern about the longitudinal axis 102 of the spray tube 28 with or without a channel. In an exemplary embodiment, the nozzles 64 are located within the spiral channel 106.

[0025] While the pattern of the nozzles 64 is illustrated as being a spiral pattern, it will also be understood that any suitable non-linear pattern of arrangement of the nozzles 64 is within the scope of the disclosure. By using a non-linear arrangement of the nozzles 64, over-accumulation of treating liquid in the sump 34 at one time can be avoided. When the flow of treating liquid leaving the nozzles 64 all runs down at least one wall of the tub 14 to the sump 34, the capacity of the pump assembly 36 to draw the liquid from the sump 34 can be exceeded. By varying the direction of the flow of treating liquid leaving the nozzles 64, the over-accumulation of treating liquid can be prevented. It will be further understood that the nozzles 64 could also be arranged in a linear pattern if the nozzles 64 were not all oriented to release the spray in a uniform or linear direction. By example, all of the nozzles 64 on a spray tube 28 could be provided in a single line along the length of the longitudinal axis 102 so long as the nozzles 64 provided in the line were oriented or angled in such a way that the nozzles 64 did not all release the spray in the same direction. By further example, the nozzles 64 could alternate orientations with the spray being directed in an opposite direction between the two possible orientations. Alternatively, the nozzles 64 could vary slightly down in their orientation down the length of the longitudinal axis 102 such that the nozzles 64 gradually change the direction in which the spray is released from one end of the spray tube 28 to the other end.

[0026] The spray tube 28 can also be provided with an end cap 104 provided at the front end of the spray tube 28. The end cap 104 at least selectively prevents treating liquid from exiting the spray tube 28 at the front end nearest the door assembly 18. In one embodiment, the end cap 104 can be a solid plug that does not permit any treating liquid from exiting the front end of the spray tube 28. In another embodiment, the end cap 104 can be provided as a drain valve that can selectively allow or prevent the escape of treating liquid from the front end of the spray tube 28. Any suitable type of drain valve can be used within the end cap 104, non-limiting examples of which include a flapper valve, check valve, or other type of pressurized valve.

[0027] FIG. 5 illustrates an enlarged cross-sectional view of a design for a nozzle 64 according to an embodiment of the invention. The nozzle 64 comprises a head portion 110 and an inlet tube 112. The head portion 110 can have a cylindrical shape, a hexagonal shape, or any other suitable geometry. The inlet tube 112 extends from the exterior side of the spray tube 28, passing through an opening 120 in the spray tube 28, and into the interior 118 of the spray tube 28. The inlet tube 112 can have an angled or curved portion 114 that defines an inlet opening 116 into which treating liquid can flow. The angle of the curved portion 114 can be any suitable angle for directing a flow of water in the spray tube 28 into the inlet tube 112. The treating liquid flows from the back end to the front end of the spray tube 28 along the flow path indicated by the arrow 108. The inlet opening 116 of the inlet tube 112 faces the liquid flow path 108. Further, the inlet tube 112 and the angled portion 114 extend into the interior 118 of the spray tube 28 to an extent that the body axis 102 of the spray tube 28 passes through the inlet opening 116.

[0028] While the spray tube 28 is illustrated herein as having nozzles 64 placed within openings 120 to direct the flow of treating liquid out of the spray tube 28, in an additional embodiment of the invention, it is contemplated that the spray tube 28 could be provided only with openings 120 not having nozzles 64 placed within the openings 120. The openings 120 can be drilled or formed so as to that allow the flow of treating liquid out of the interior 118 of the spray tube 28. Without the nozzles 64 present to guide and direct the spray of the treating liquid, it is contemplated that the directionality of spray through the openings 120 can be determined by the angle at which the opening 120 is provided within the cylindrical body 100 of the spray tube 28. For example, some openings 120 can pass straight through the spray tube 28, perpendicular to the body axis 102, while other openings

Petitioner Samsung Ex-1004, 0887

120 can be provided at angles in order to direct the spray of treating liquid in a different direction. Any suitable combination of angles of the openings 120 can be employed. The openings 120, like the nozzles, can be provided in any suitable non-linear pattern, including the spiral pattern described above, or even in a linear pattern with varying angles of openings 120 such that the spray does not all leave the spray tube 28 in a uniform direction.

[0029] FIG. 6 illustrates an enlarged cross-sectional view of a spray tube 28 according to an embodiment of the invention. In this embodiment, the spray tube 28 has a through opening 120 which wash liquid can pass through to exit the spray tube 28. The through opening has a centerline, which can form an angle relative to a tangent line on the surface of the spray tube 28. Ideally, this angle is zero degrees relative to the tangent line, which would result in the centerline being tangential to the surface. However, practically, a tangential centerline for the through opening is not physically possible. In most cases, the centerline will form a small angle, generally less than 10 degrees, relative to the tangent line.

[0030] The purpose of such a through opening 120 that has a centerline tangent to the surface or forming a small angle relative to a tangent line is for the liquid being emitted to impart a rotational force to the spray tube 28. These "tangent" through openings can be thought of a rotational through openings. Not all of the through openings need be "tangent" through openings to impart rotation to the tube.

[0031] In this case of "tangent" through openings, the center line of the through opening 120 does not pass through the longitudinal axis of rotation 102 of the spray tube 28. While the through opening 120 is illustrated herein as not being provided with a nozzle 64, it will be understood that a nozzle 64 could be inserted within the through opening 120 provided at the angle illustrated in FIG. 6. An orientation of the through opening 120 or nozzle 64 such as this could allow for the force of the spray of the wash liquid exiting the spray tube 28 to at least partially drive the rotation of the spray tube 28.

[0032] In a traditional dishwasher, spray assemblies can be a significant contributor to space constraints. Using a rotating spray tube rather than a spray arm reduces the height of the spray assemblies and allows for more usable space in the dish racks. However, rotating spray tubes that spray treating liquid in a single line from multiple nozzles cause a large volume of liquid to flow down the walls of the tub in a single wave, resulting in an over-accumulation of water in the sump that may exceed the capacity of the pump for removing the liquid from the sump. Further, the treating liquid flowing down the wall or walls of the tub in a single wave can also increase turbulence in the water gathered in the sump, resulting in the pump taking in air. Aspects of the present disclosure provide similar or improved performance to contemporary appliances without requiring additional mechanics or increased space within the dishwasher.

[0033] To the extent not already described, the different features and structures of the various embodiments can be used in combination with each other as desired. While the invention has been specifically described in connection with certain specific embodiments thereof, it is to be understood that this is by way of illustration and not of limitation. In addition to the concepts covered by the below claims, the following concepts can also provide the basis for claims in any possible combinations:

[0034] A dishwasher for treating dishes according to an automatic cycle of operation, the dishwasher comprising a tub having at least one wall at least partially defining a treating chamber with an access opening, a sump fluidly coupled to the tub, a liquid recirculation circuit fluidly coupling the sump to the treating chamber and including at least one rotating spray tube located adjacent the at least one wall and having a longitudinal body axis defining a rotational axis and a plurality of spray nozzles provided in the rotating spray tube, and a pump configured to draw liquid from the sump and pump the drawn liquid to the at least one rotating spray tube, wherein the nozzles are arranged in a non-linear pattern on the at least one rotating spray tube such that the flow of liquid leaving the nozzles and running down the at least one wall to the sump does not exceed a capacity of the pump to draw the liquid from the sump.

[0035] A dishwasher wherein the non-linear arrangement is a spiral pattern.

[0036] A dishwasher wherein tub comprises at least two opposing walls and the at least one rotating tube comprises at least two rotating tubes, with each of the at least two tubes being adjacent a different one of the at least two opposing walls.

[0037] A dishwasher further comprising a dish rack located adjacent the at least two rotating tubes.

[0038] A dishwasher wherein the at least two rotating tubes are located adjacent a bottom of the dish rack.

[0039] A dishwasher wherein the liquid circulation circuit further comprises a supply tube extending along a wall of the tub, and fluidly connecting the pump to the at least one rotating spray tube.

[0040] A dishwasher wherein the liquid circulation circuit further comprises a header fluidly coupling the supply tube to the rotating spray tube.

Claims

1. A dishwasher (10) for treating dishes according to an automatic cycle of operation, the dishwasher (10) comprising:

   a tub (14) at least partially defining a treating chamber (16) with an access opening;
   a sump (34) fluidly coupled to the tub (14); and
   a liquid recirculation circuit fluidly coupling the sump (34) to the treating chamber (16) and including at least one rotating spray tube (26, 28, 30, 32) having a longitudinal body axis (102) de-

Petitioner Samsung Ex-1004, 0888

fining a rotational axis and a plurality of spray nozzles (64) provided in the least one rotating spray tube (26, 28, 30, 32) and arranged in a spiral pattern about the longitudinal axis (102).

2. The dishwasher (10) of claim 1 wherein the rotating spray tube (26, 28, 30, 32) further comprises a spiral channel (106) and the spray nozzles (64) are located in the channel (106).

3. The dishwasher (10) of claim 2 wherein the spiral channel (106) makes at least one revolution about the rotating spray tube (26, 28, 30, 32).

4. The dishwasher (10) of claim 1 wherein the rotating spray tube (26, 28, 30, 32) has first and second opposing ends, with the first end fluidly coupled to the liquid recirculation circuit.

5. The dishwasher (10) of claim 4 wherein the second end is higher than the first end.

6. The dishwasher (10) of claim 5 wherein the second end comprises a drain valve.

7. The dishwasher (10) of claim 5 wherein the second end is plugged.

8. The dishwasher (10) of claim 1 wherein each spray nozzle (64) comprises an inlet tube (112) extending into an interior (118) of the at least one rotating spray tube (26, 28, 30, 32).

9. The dishwasher (10) of claim 8 wherein the inlet tube (112) has an inlet opening (116) facing a liquid flow path (108) through the at least one rotating spray tube (26, 28, 30, 32).

10. The dishwasher (10) of claim 9 wherein the longitudinal body axis (102) passes through the inlet (116).

11. The dishwasher (10) of claim 1 wherein the at least one rotating spray tube (26, 28, 30, 32) comprises multiple rotating spray tubes (26, 28, 30, 32).

12. The dishwasher (10) of claim 11 further comprising a dish rack (20, 22, 24) located within the treating chamber (16) and the multiple rotating spray tubes (26, 28, 30, 32) are located adjacent a portion of the dish rack (20, 22, 24).

13. The dishwasher (10) of claim 12 wherein the portion of the dish rack (20, 22, 24) is a bottom (66) of the dish rack (20, 22, 24).

14. The dishwasher (10) of claim 1 further comprising a pump (40) configured to draw liquid from the sump (34) and pump the drawn liquid to the at least one rotating spray tube (26, 28, 30, 32).

15. The dishwasher (10) of claim 14 wherein the nozzles (64) are arranged in a non-linear pattern on the at least one rotating spray tube (26, 28, 30, 32) such that the flow of liquid leaving the nozzles (64) and entering the sump (34) does not exceed a capacity of the pump (40) to draw the liquid from the sump (34).

Petitioner Samsung Ex-1004, 0889

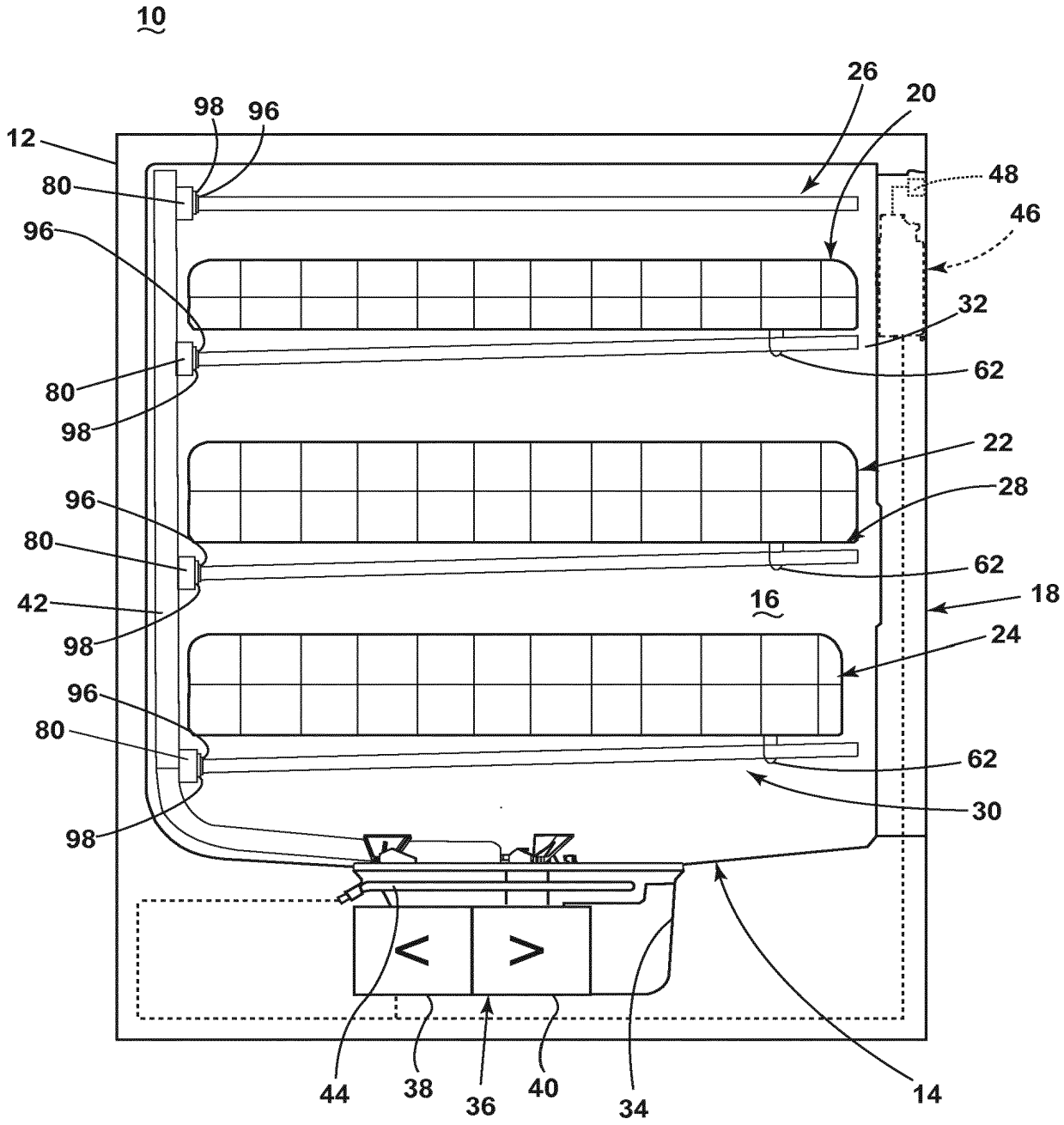


FIG. 1

Petitioner Samsung Ex-1004, 0890

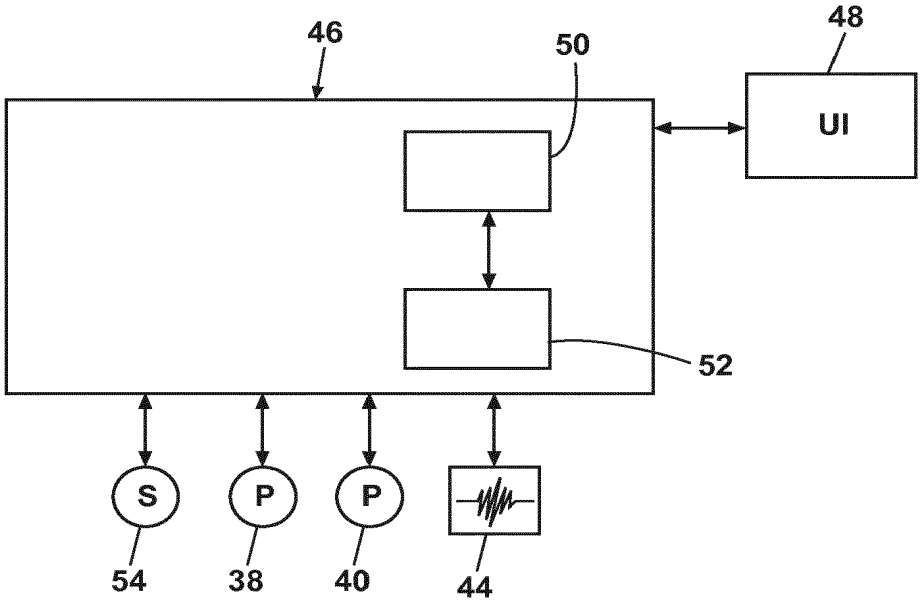


FIG. 2

Petitioner Samsung Ex-1004, 0891

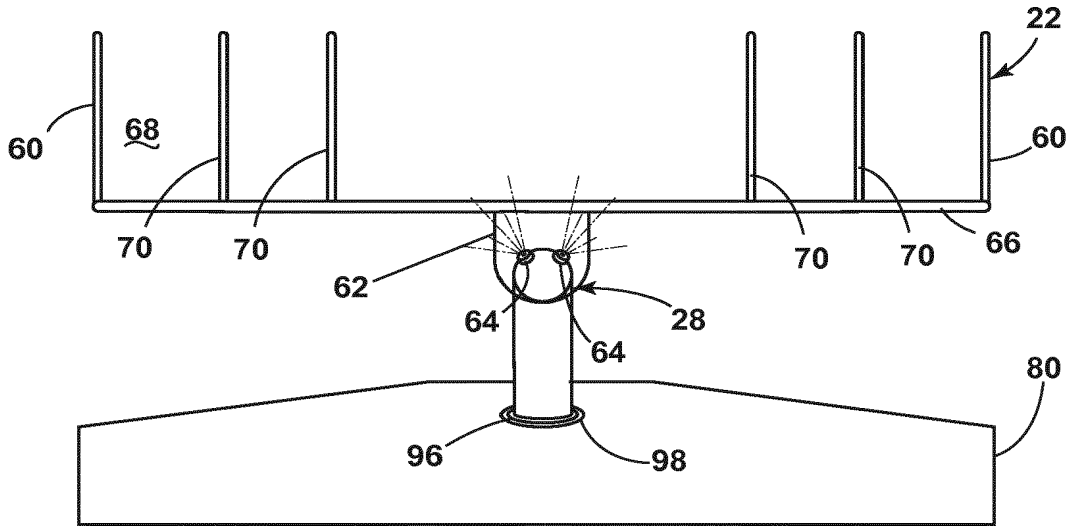


FIG. 3

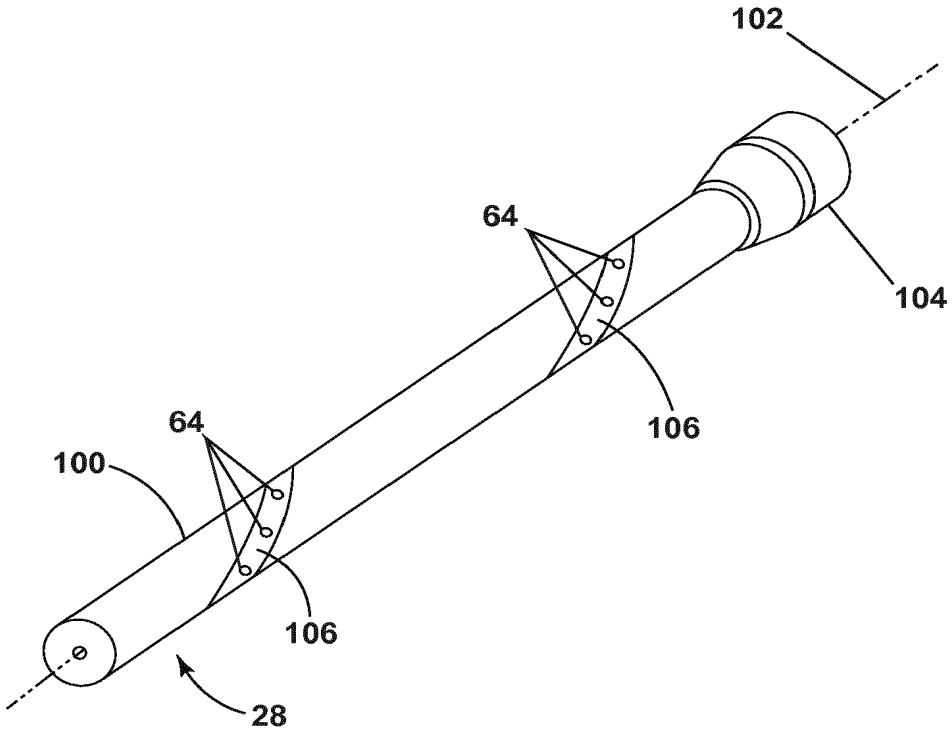


FIG. 4

Petitioner Samsung Ex-1004, 0892

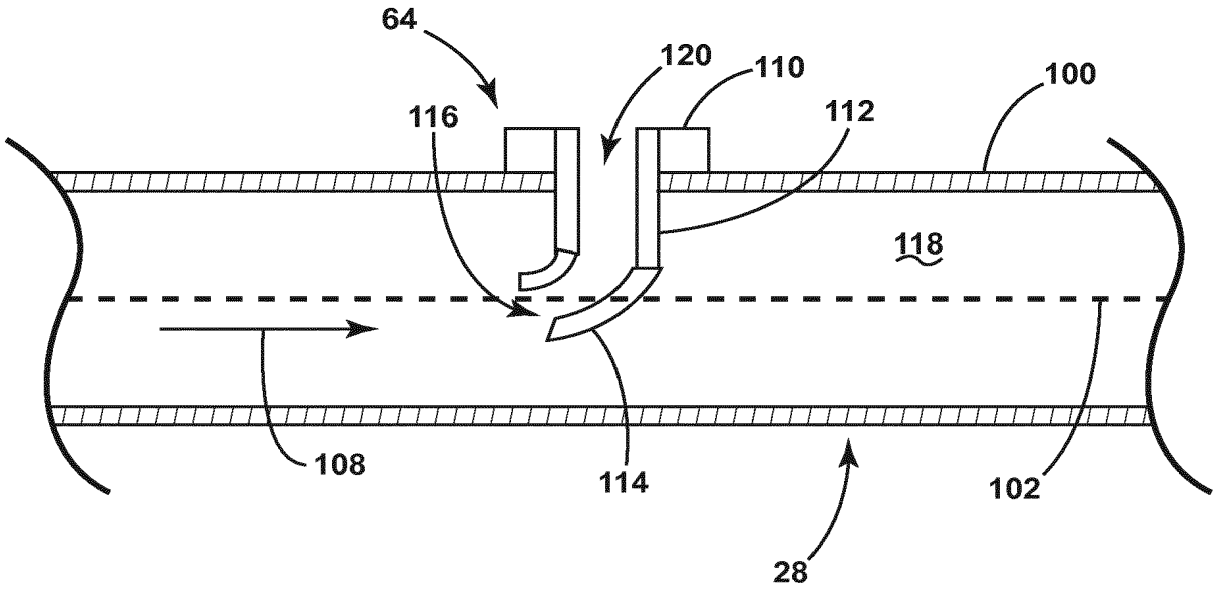


FIG. 5

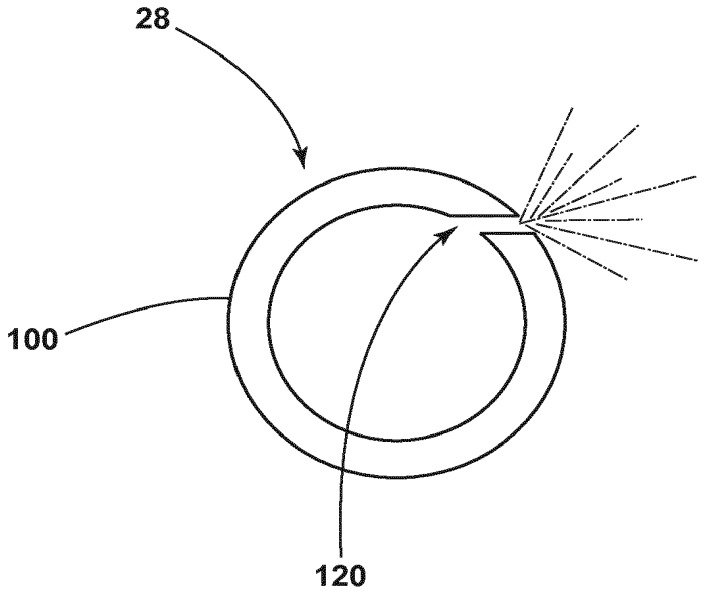


FIG. 6

Petitioner Samsung Ex-1004, 0893

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 17 16 0208

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 2016/058264 A1 (THIYAGARAJAN RAMASAMY [US]) 3 March 2016 (2016-03-03) * paragraph [0029] - paragraph [0056]; figures 2-9 *	1-5, 11-15 8-10	INV. A47L15/00 A47L15/42 A47L15/22 A47L15/23
X	US 3 213 866 A (MARTINIAK LEONARD J) 26 October 1965 (1965-10-26) * column 3, line 49 - column 5, line 54; figures 1-4 *	1,3-5, 12-15	
X	US 3 146 953 A (JOSEF KOMANNS HEINRICH) 1 September 1964 (1964-09-01) * column 2, line 3 - column 2, line 69; figures 1-4 *	1-5,7	
Y	EP 2 454 983 A1 (ELECTROLUX HOME PROD CORP [BE]) 23 May 2012 (2012-05-23) * paragraph [0026]; figure 1 *	8-10	
Y	GB 2 322 067 A (DAEWOO ELECTRONICS CO LTD [KR]) 19 August 1998 (1998-08-19) * abstract *	8-10	TECHNICAL FIELDS SEARCHED (IPC) A47L
A	JP H11 253381 A (HOSHIZAKI ELECTRIC CO LTD) 21 September 1999 (1999-09-21) * figure 5 *	1,7	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 May 2017	Beckman, Anja

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

Petitioner Samsung Ex-1004, 0894

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 16 0208

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-05-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2016058264 A1	03-03-2016	NONE	
US 3213866 A	26-10-1965	CH 418546 A	15-08-1966
		DK 105225 C	05-09-1966
		GB 1068640 A	10-05-1967
		NL 6414287 A	21-06-1965
		SE 304824 B	07-10-1968
		US 3213866 A	26-10-1965
US 3146953 A	01-09-1964	NL 300017 A	11-05-2017
		US 3146953 A	01-09-1964
EP 2454983 A1	23-05-2012	AU 2011331382 A1	30-05-2013
		CN 103249345 A	14-08-2013
		EP 2454983 A1	23-05-2012
		ES 2435447 T3	19-12-2013
		KR 20130119448 A	31-10-2013
		RU 2013127214 A	27-12-2014
		US 2014150831 A1	05-06-2014
		WO 2012065873 A2	24-05-2012
GB 2322067 A	19-08-1998	CN 1190571 A	19-08-1998
		GB 2322067 A	19-08-1998
		JP H10225421 A	25-08-1998
JP H11253381 A	21-09-1999	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

Petitioner Samsung Ex-1004, 0895

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 7594513 B **[0012]**
- US 95967310 A **[0017]**
- US 20120138106 A **[0017]**

Petitioner Samsung Ex-1004, 0896

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
19/297,954	**09/17/2025 05:08:50 PM Z ET**	**SUB-13230-US-CON3**

Title of Invention

DISHWASHER WITH A DISH RACK

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	2948	FILED BY	Megan Boot
PATENT CENTER #	72333264	FILING DATE	08/12/2025
CUSTOMER #	130333	FIRST NAMED INVENTOR	Mark S. Feddema
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	BRIAN CHESLEK

Documents

TOTAL DOCUMENTS: 13

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2025-09-17 SUB-13230-US-CON3 WHI025 P328A IDS Transmittal.pdf	1	Transmittal Letter	64 KB
2025-09-17 SUB-13230-US-CON3 WHI025 P328A IDS SB08.pdf	8	Information Disclosure Statement (IDS) Form (SB08)	1274 KB
2025-09-17 SUB-13230-US-CON3 WHI025 P328A IDS SB08C Size Fee Form.pdf	4	Assertion regarding Information Disclosure Statement (IDS) Size Fee (SB/08C)	251 KB
FR1_CN106073675A.pdf	13	Foreign Reference	1781 KB
FR2_CN106998989A.pdf	102	Foreign Reference	13367 KB
FR3_EP0186157A1.pdf	24	Foreign Reference	2721 KB

FR4_EP1138249A2.pdf	17	Foreign Reference	642 KB
FR5_EP2815690A1.pdf	15	Foreign Reference	600 KB
FR6_EP3222191A1.pdf	14	Foreign Reference	360 KB
FR7_KR200300795Y1.pdf	30	Foreign Reference	4790 KB
FR8_KR20050068480A.pdf	17	Foreign Reference	11859 KB
NPL1_Dons Appliances - Overview of KitchenAid Dishwasher.pdf	2	Non Patent Literature	585 KB
NPL2_APPLIANCE FACTORY PARTS - Part GEHWD28X10210.pdf	2	Non Patent Literature	341 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2025-09-17 SUB-13230-US-CON3 WHI025 P328A IDS Transmittal.pdf	8D7EF78866E04A15B65F60D8364C8FB6C6A6E1CB2FCE79801 29914DF4CDC20DE6750FAA34308AB73634C60A9328CD763D 05754D053A74E4F9CF58F0ED376660A
2025-09-17 SUB-13230-US-CON3 WHI025 P328A IDS SB08.pdf	F8D4CDCBB87CD8DCADD5B39E8F763A5A14EF1E3830BE303 56246ABE477C3F36D5CD66FCAE662BCC5183653A10925F71E 2FBD2D21ADB824C01B28796857C3AC80
2025-09-17 SUB-13230-US-CON3 WHI025 P328A IDS SB08C Size Fee Form.pdf	4B3CDAC2B256A3AE973755BA2AB0DD264D809A012B019118 9FEF07055197EEBD758A356E070EF983824972E83A8CA1B9D 25EB7611D94B232A1D4E72C3B32194C
FR1_CN106073675A.pdf	D82ECF338EE9F92889DD12258BEF1DC514F4741438A8526CA 62A81A71478D6182A5D7551CD58E8A8D3584532E1AC8333AD E33A682C6A7B92E63F4B07B5EB4C9D
FR2_CN106998989A.pdf	87B89F2FA815D11E571C210B6E7776F8DC4A261C47F086814 A9DF622B6037ED61FBA7DE8F8E96B7328E55201B5F0763D2C B5521EF336850D699AD616635050FF
FR3_EP0186157A1.pdf	511335B2BFF5167F47F460C7AE2494D81264E46CE2248F4805 9CC01D76AF87DD106A4715AAC3253611E7FCFB90E9756B1A 2FE39A0E793CEAB31EE0D84D7571E6
FR4_EP1138249A2.pdf	D4897FCF85FB61CA436B8E9AB99845C6AFC0D347BAA21B8D AEB43E3F6BB0E930E5FE8B51B469A91BD9BA3C780D11465A 325833763879F9E3CCF482D191A00A1A
FR5_EP2815690A1.pdf	9EA3A709551A31C0D1D4C10291B37623AAEE548C54CD6669 C15EC0C94FB733B42DE44E272CB0AD41959462BB4265D1458

	77FEAC158B17AD740DCBC6E9168E4F2
FR6_EP3222191A1.pdf	DB864E9F5121F114148A649EC6E169405FF41C008E525B5D3 A9E7FA8D0B9FAC159D0651E34EB42116CF95490C3DE5EA1B 62ECE3B2E61D51DA79DB56D06A85250
FR7_KR200300795Y1.pdf	326697E100D3D6C6D24D295D0A672FE800B0827B73B434971 B9115AE4AAA15F127849BABF4E2D54A2230FFB9F96D257903 3E1A37EB5DE4A523D5390ECCF2C898
FR8_KR20050068480A.pdf	F719D468A19EE707092027CD6CF1EE704B7F8E00F6B3079A5 BF08C38F50D6B6AE3A804F7F52E9A983C66B3611C3E13B03F 51E9CFCB189C334B0DE02655643DCE
NPL1_Dons Appliances - Overview of KitchenAid Dishwasher.pdf	18F2CB2A0A1945BE00348D20201C9FA9754D2144F6500DD97 C3CCD3507CFBB445BA982C873CE3EB0780ADDE7ECA3FAC5 18F6E946E93751D2C05F43964057B3FB
NPL2_APPLIANCE FACTORY PARTS - Part GEHWD28X10210.pdf	6BBC4A95A1417C4162F7E4B4CAB816C03F5F607707BB5AFC 3885D6A147857A869C1BDD6948D7239D92B862DC804011B46 C0B92CC4E856D14054B8D6CAB40F280

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

KR200300795 Y1

Title :

식기세척기의 세척수 분사장치 Dishwasher, the washing water injection device

Abstract :

본 고안은 식기세척기의 세척수 분사장치에 관한 것으로서, 특히 한 개의 노즐로 세척수의 분사방향을 각각 다르게 설정할 수 있도록 구성하여 노즐들이 결합되는 회전관의 가공이 간편하게 이루어질 수 있도록 한 고안에 관한 것이다. 전술한 본 고안은, 케이스(10)의 내부 하측 탱크(11)에 담겨진 세척수가 펌프(12)에 의하여 공급관(13)을 통해 이송되고, 공급관(13)은 분기되어 케이스(10)의 내부 상,하부로 각각 배관되며 상,하부 공급관(13)들 출구(13a)에 축(21)으로 각각 결합된 지지관(20)의 양측에는 회전관(30)들이 각각 결합되고, 회전관(30)에 일정간격을 이루어 장착된 노즐(40)들에서 분사되는 세척수가 랙(14)에 놓여진 식기(14a)들의 상,하부에 고르게 분사되는 식기세척

The present invention relates to a dishwasher, the washing water injection device, in particular one nozzle injection direction of the wash water so that it can be configured to set different rotating tube are coupled so that it can be easily processed relates to a design. The present invention described above, the inside of the case 10 is the wash water is contained in the lower tank 11 by pump 12 through the supply pipe (13), the supply pipe 13 is branched off into the inside of the upper case 10 and the lower pipe outlet (13a) in the upper and lower supply pipe (13) are coupled to each other at both sides of the support tube 20, shaft

Petitioner Samsung Ex-1004, 0900

기(1)에 있어서, 상기 회전관(30)에는 수직선에서 일정 경사각(α)을 이루도록 분사공(31)들이 일렬로 뚫려지고, 분사공(31)들에는 노즐(40)들의 분사관(41)이 각각 삽입되어 결합되며, 분사관(41)들은 그 일측에 경사면(41a)이 형성된 원추형 관으로 이루어져 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향으로 결합되면 세척수가 경사지게 분사되어 회전관(30)의 추진력이 형성되고, 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 반대 방향으로 결합되면 세척수가 수직으로 분사되어 강한 세척력이 형성됨을 특징으로 하는 식기세척기의 세척수 분사장치에 의하여 달성될 수 있다.

21, coupling respectively the rotary pipe (30) are made at predetermined intervals mounting rotary pipe 30 and the nozzle 40, the wash water is injected from the (14a) of the rack 14 is placed in the dishwasher the dishwasher which evenly sprayed on the bottom (1), the rotating tube 30 at a predetermined inclination (α) of the vertical injection holes 31 are arranged to achieve, the injection holes 31 of the semicircular ring 33 bored is a nozzle 40 is inserted into the injection pipe 41 are respectively coupled to the injection pipe (41) slope (41A) is formed on the one side of the injection pipe (41) consists of a conical tube (41a), the injection hole 31 of the slope angle of inclination (α) of the same direction is coupled to the wash water is injected in the inclined rotation tube 30 is formed, the injection pipe (41) of the driving force (41a), the injection

Petitioner Samsung Ex-1004, 0901

hole 31 of the slope angle of inclination (α) and the opposite direction is coupled to the wash water is injected in a strong vertical characterized in that the formed by a dishwasher, the washing water injection device can be achieved.

Claim(s) :

1.

케이스(10)의 내부 하측 탱크(11)에 담겨진 세척수가 펌프(12)에 의하여 공급관(13)을 통해 이송되고, 공급관(13)은 분기되어 케이스(10)의 내부 상,하부로 각각 배관되며 상,하부 공급관(13)들 출구(13a)에 축(21)으로 각각 결합되어 회전 가능하게 장착된 지지관(20)의 양측에는 회전관(30)들이 각각 결합되고, 회전관(30)에 일정간격을 이루어 장착된 노즐(40)들에서 분사되는 세척수가 랙(14)에 놓여진 식기(14a)들의 상,하부에 고르게 분사되는 식기세척기(1)에 있어서,

1.

The inside of the case 10 is the wash water is contained in the lower tank 11 by pump 12 through the supply pipe (13), the supply pipe 13 is branched off into the inside of the upper case 10 and the lower pipe outlet (13a) in the upper and lower supply pipe (13) are respectively coupled to the shaft (21) rotatably mounted on both sides of the support tube (20) coupled to the rotary pipe (30) are made at predetermined intervals, the rotary pipe (30) is mounted, the wash water

Petitioner Samsung Ex-1004, 0902

상기 회전관(30)에는 수직선에서 일정 경사각(α)을 이루도록 분사공(31)들이 일렬로 뚫려지고, 분사공(31)들에는 노즐(40)들의 분사관(41)이 각각 삽입되어 결합되며, 분사관(41)들은 그 일측에 경사면(41a)이 형성된 원추형 관으로 이루어져 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향으로 결합되면 세척수가 경사지게 분사되어 회전관(30)의 추진력이 형성되고, 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 반대 방향으로 결합되면 세척수가 수직으로 분사되어 강한 세척력이 형성됨을 특징으로 하는 식기세척기의 세척수 분사장치.

2.

제 1항에 있어서, 상기 노즐(40)은 회전관(30)의 외부를 감싸도록 설치되는 반원형의 상,하부캡(42)(43)들의 외측 플랜지(42a)(43a)를 관통하여 체결되는 볼트(44)에 의하여 고정되고, 상부캡(42)의 중앙에 돌출된 분사관(41)의 하부

is injected from the gas injection nozzle 40 is placed on the rack (14) (14a) of the dishwasher the dishwasher which evenly sprayed on the bottom (1),

the rotating tube 30 at a predetermined inclination (α) of the vertical injection holes 31 are arranged to achieve, the injection holes 31 of the semicircular ring 33 bored is a nozzle 40 is inserted into the injection pipe 41 are respectively coupled to the injection pipe (41) slope (41A) is formed on the one side of the injection pipe (41) consists of a conical tube (41a), the injection hole 31 of the slope angle of inclination (α) of the same direction is coupled to the wash water is injected in the inclined rotation tube 30 is formed, the injection pipe (41) of the driving force (41a), the injection hole 31 of the slope angle of inclination (α) and the opposite direction is

Petitioner Samsung Ex-1004, 0903

가 회전관(30)에 뚫려진 분사공(31)에 삽입되어 패킹(45)으로 밀폐되며, 분사관(41)은 그 일측에 경사면(41a)이 형성된 원추형 관으로 이루어짐을 특징으로 하는 식기세척기의 세척수 분사장치.

coupled to the wash water is injected in the vertical characterized in that the formed a strong the dishwasher, the washing water injection device.

2.

According to claim 1, wherein the rotating tube 30 of the nozzle 40 is provided so as to surround the outside of the upper and lower caps 42, 43 of the semicircular outer flange fastened to the through-bolt 44 by (42a) (43a), is fixed to the injection pipe (41) projecting in the center of the top cap 42, the lower portion of the injection hole 31 bored with rotating tube 30 is inserted into the packing 45 is sealed, the injection pipe 41 is formed on one side thereof, the inclined surface (41a) is constituted by a conical tube, characterized in that the dishwasher, the

Petitioner Samsung Ex-1004, 0904

washing water injection device.

Description :

식기세척기의 세척수 분사장치 {a water sprayer for dishwasher}

Dishwasher {a water wash water jet of sprayers for dishwasher}

도 1은 본 고안의 일실시예를 예시한 사시도,

1 is a perspective view showing an embodiment of the

도 2는 본 고안의 일부를 확대한 분해사시도,

present invention, Figure 2 is an exploded perspective view of an enlarged view of a portion of the subject innovation,

도 3a와 도 3b는 본 고안에 의한 분사장치의 노즐들의 단면도,

Figure 3a and Figure 3b is a device according to the present invention,

도 4는 본 고안의 일부를 확대한 단면도,

Figure 4 is a cross-sectional view of the injection nozzle of the present invention,

도 5는 본 고안이 장착된 식기세척기의 개략적인 장치도.

Figure 5 is an enlarged sectional view of a part of the present design of the device schematic diagram of a dishwasher with her.

* 도면의 주요부분에 대한 부호의 설명 *

1: 식기세척기 10: 케이스

11: 탱크 12: 펌프

13: 공급관 13a: 출구

13b: 보스 14: 랙

14a: 식기 20: 지지관

21: 축 30: 회전관

31: 분사공 40: 노즐

41: 분사관 41a: 경사면

42: 상부캡 42a, 43a: 플랜지

43: 하부캡 44: 볼트

45: 패킹 α, beta : 경사각

본 고안은 식기세척기의 세척수 분사장치에 관한 것으로서, 더욱 상세하게는 한 개의 노즐로 세척수의 분사방향을 각각 다르게 설정할 수 있도록 구성하여 노즐들이 결합되는 회전관의 가공이 매우 간편하게 이루어질 수 있도록 한 고안에 관한 것이다.

일반적으로 식기세척기(食器洗滌機)는 식기의 세척을 보다 위생적이고 능률적으로 수행할 수 있도록 하기 위한 것으로서 주로 세척기의 하부 탱크에 담

* Description of the Related Art *

1: Dishwasher

Pump

13: supply line 10: Case 11: the tank 12: outlet

20: support boss 14: rack 14a: group 13a: 13b:

30 axial rotary pipe

31: Injection hole 40: pipe 21: Nozzle

41: injection pipe 41a: slope

42: upper cap 42a, 43a: flange

43: bottom cap 44: bolt

45: packing: inclination angle α, beta of

the dishwasher, the washing water injection apparatus of the present design relates to, and more particularly, to a single

Petitioner Samsung Ex-1004, 0906

겨진 세척수가 펌프에 의하여 공급관을 통해 이송되면 공급관에 회전 가능하게 장착된 회전관의 노즐을 통해 세척수가 고압으로 분사되어 랙에 놓여진 식기들을 세척할 수 있도록 되어 있다.

상기 공급관은 분기되어 세척기의 내부 상,하부로 각각 배관되고, 공급관들의 선단에서 축으로 결합되어 회전 가능하게 장착된 지지관의 양측에는 회전관들이 각각 결합되어 회전되는 노즐들에서 분사되는 세척수가 식기들의 상,하부에 고르게 분사되는 구성으로 되어 있다.

또한, 상기 회전관에 결합된 노즐들은 경사 및 수직을 이루어 각각 장착되어 경사진 노즐에서 분사되는 세척수의 추진력을 이용하여 회전관을 회전시키고, 수직으로 분사되는 세척수에서는 강한 세척력을 얻을 수 있도록 되어 있다.

따라서, 상기 회전관에는 노즐들이 결합되는 분사공들이 일정간격을 이루어 뚫려져 있고, 분사공들은 수직방향과 경사방

nozzle injection direction of the wash water so that it can be configured to set different rotating tube are coupled so that it can be made easier machining is very relates to a design.

Generally, the dishwasher (食 器 washing tableware washing more hygienic 滌機), mainly intended to be carried out in the lower portion of the washing machine, the wash water contained in the tank by the pump is transported through the supply pipe the supply pipe rotatably mounted on a rotating tube, the wash water is injected at a high pressure through the nozzle is placed in the rack so that it is possible to clean.

The supply pipe is branched into the interior of the washing machine, and upper and lower end of the pipe from the supply pipe is coupled to the axis rotatably mounted on both sides of the support tube

Petitioner Samsung Ex-1004, 0907

향을 이루어 각각 2방향으로 뚫려진다.

그러나, 전술한 바와 같이 회전관에 경사방향이 서로 다른 분사공들을 형성하는 경우에는 분사공을 뚫는 작업이 매우 까다롭고 불편할 뿐 아니라 상당한 시간이 소요되어 그 생산성이 현저하게 저하되는 등의 폐단이 발생되었다.

물론, 경우에 따라서는 분사공이 1방향을 이루도록 형성한 다음 세척수의 분사방향이 서로 다른 2종류의 노즐을 각각 분사공에 결합하여 사용하는 경우도 있었으나 이때에는 종류가 서로 다른 노즐을 사용함에 따라 전체적인 제조원가가 상승되는 등의 폐단이 발생되었다.

본 고안은 상기한 문제점을 감안하여 창안한 것으로서, 그 목적은 한 개의 노즐로 세척수의 분사방향을 각각 다르게 설정할 수 있도록 구성하여 노즐들이 결합되는 회전관의 가공이 매우 간편하게 이루어질 수 있

213 is rotated rotary pipe are respectively coupled, the wash water is injected from the nozzle onto the lower dish, has a configuration which is sprayed evenly to the fermentation broth.

In addition, the rotary pipe nozzle coupled to each of the warp and mounted on the floor and made perpendicular to the wash water to be sprayed from the nozzle is rotated by the driving force of the vertical rotating in the washing water and sprayed to obtain a strong cleaning power.

Therefore, the nozzles are coupled to the injection hole is drilled made at predetermined intervals, and injection holes are respectively made in the vertical direction and the oblique direction is bored in the second direction.

However, as described above rotary pipe inclined

Petitioner Samsung Ex-1004, 0908

는 식기세척기의 세척수 분사 장치를 제공함에 있는 것이다.

상기한 목적을 달성하기 위한 본 고안의 특징은, 케이스(10)의 내부 하측 탱크(11)에 담겨진 세척수가 펌프(12)에 의하여 공급관(13)을 통해 이송되고, 공급 관(13)은 분기되어 케이스(10)의 내부 상,하부로 각각 배관되며 상,하부 공급관(13)들 출구(13a)에 축(21)으로 각각 결합되어 회전 가능하게 장착된 지지관(20)의 양측에는 회전관(30)들이 각각 결합되고, 회전관(30)에 일정간격을 이루어 장착된 노즐(40)들에서 분사되는 세척수가 랙(14)에 놓여진 식기(14a)들의 상,하부에 고르게 분사되는 식기세척기(1)에 있어서, 상기 회전관(30)에는 수직선에서 일정 경사각(α)을 이루도록 분사공(31)들이 일렬로 뚫려지고, 분사공(31)들에는 노즐(40)들의 분사관(41)이 각각 삽입되어 결합되며, 분사관(41)들은 그 일측에 경사면(41a)이 형성된 원추형 관으로 이루어져 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향으로 결합되면 세척수가

direction are different from each other, in the case of forming the injection port, the injection port through the work very difficult and inconvenient as well as a significant amount of time is spent the productivity is remarkably reduced, it was the evils.

Of course, in some cases, the injection hole is formed in a first direction, the injection direction of the wash water to achieve the two different types of nozzles. When using a combination of each injection port, but also in this case, depending on the use of the nozzle to the type are different from each other overall production costs are rising, it was the evils.

The present invention has been invented in view of the above problems, and its object is the injection direction of the wash water

경사지게 분사되어 회전관(30)의 추진력이 형성되고, 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 반대 방향으로 결합되면 세척수가 수직으로 분사되어 강한 세척력이 형성됨을 특징으로 하는 식기세척기의 세척수 분사장치에 의하여 달성될 수 있는 것이다.

이하, 상기한 목적을 달성하기 위한 바람직한 실시예를 첨부된 도면에 의하여 상세히 설명하면 다음과 같다.

도 1 내지는 도 5에서 도시한 바와 같이, 식기세척기(1)의 케이스(10) 내부 하측에는 탱크(11)가 설치되어 있고, 탱크(11)에는 세척수가 담겨져 있다.

상기 탱크(11)에는 세척수 공급관(13)이 접속되어 있고, 공급관(13)에는 펌프(12)가 장착되어 공급관(13)을 통해 세척수를 고압으로 이송시킬 수 있도록 되어 있다.

상기 공급관(13)은 분기되어 케이스(10)의 내부 상,하부로

to one of the nozzles can be set differently for each nozzle that is coupled to the rotating tube configured to machining is very simple, can be made of the dishwasher, the washing water injection to provide a device.

The invented for achieving the above object, the case 10 of the inner lower side of the features are contained in the tank 11 to the pump 12 by the wash water supply pipe (13) is transported through the supply pipe (13) is branched piping on the interior of the case 10 and the lower portion, each of the outlet (13a) in the upper and lower supply pipe (13) are respectively coupled to the shaft (21) rotatably mounted on both sides of the support tube (20) coupled to the rotary pipe (30) are made at predetermined intervals, the rotary pipe (30) is mounted, the wash water is injected from the gas

Petitioner Samsung Ex-1004, 0910

각각 배관되어 있고 상,하부 공급관(13)들의 출구(13a)에는 원통형 지지관(20)들이 각각 결합되어 있다.

상기 지지관(20)들의 중앙에는 축(21)이 관통 설치되어 있고, 축(21)의 하부는 공급관(13)의 출구(13a) 중앙에 돌출된 보스(13b)에 결합되어 지지관(20)이 공급관(13)의 출구(13a)에서 회전 가능하게 장착된다.

상기 지지관(20)의 양측에는 그 외측이 막혀진 회전관(30)들이 각각 결합되어 지지관(20)의 내부와 서로 연통되고 지지관(20)과 함께 회전된다.

상기 회전관(30)에는 노즐(40)들이 일정간격을 이루어 장착되어 있고, 회전되는 노즐(40)들에서 분사되는 세척수가 랙(14)에 놓여진 식기(14a)들의 상,하부에 고르게 분사되어 식기(14a)를 자동으로 세척할 수 있도록 되어 있다.

물론, 전술한 구성으로 이루어진 식기세척기(1)는 이미 알려진 공지의 기술사상이다.

injection nozzle 40 is placed on the rack (14) (14a) of the dishwasher the dishwasher which evenly sprayed on the bottom (1), the rotating tube 30 at a predetermined inclination (α) of the vertical injection holes 31 are arranged to achieve, the injection holes 31 of the semicircular ring 33 bored is a nozzle 40 is inserted into the injection pipe 41 are respectively coupled to the injection pipe (41) slope (41A) is formed on the one side of the injection pipe (41) consists of a conical tube (41a), the injection hole 31 of the slope angle of inclination (α) of the same direction is coupled to the wash water is injected in the inclined rotation tube 30 is formed, the injection pipe (41) of the driving force (41a), the injection hole 31 of the slope angle of inclination (α) and the opposite direction is coupled to the wash water is injected in a strong

Petitioner Samsung Ex-1004, 0911

그러나, 본 고안에 있어서 가장 중요한 특징은 상기 회전관(30)에 형성된 세척수 분사공(31)들이 일렬을 이루어 1방향으로 뚫려지고, 회전관(30)에 결합되는 노즐(40)들은 1종류로 형성되어 분사관(41)의 가공이 매우 용이하면서도 세척수의 분사방향은 서로 다르게 형성할 수 있도록 함에 있는 것이다.

즉, 상기 회전관(30)에는 가상의 수직선에서 일정 경사각(α)을 이루도록 분 사공(31)들이 일렬로 뚫려져 있고, 상기 경사각(α)은 약 20。를 유지하는 것이 바람직하다.

상기 회전관(30)에 뚫려진 분사공(31)들에는 노즐(40)들의 분사관(41)이 각각 삽입되어 결합되어 있다.

상기 노즐(40)들에 형성된 분사관(41)들은 그 일측에 경사면(41a)이 형성된 원추형 관으로 이루어져 있고, 분사관(41)에 형성된 경사면(41a)의 경사각(beta)도 상기 분사공(31)들의 경사각(α)과 상응하는 약 20。로 형성되어 있다.

vertical characterized in that the formed by a dishwasher, the washing water injection device, which will be achieved.

Hereinafter, a preferred embodiment for achieving the above object will be described in detail by the accompanying drawings as follows.

1 to, as shown in FIG. 5, inside the lower side of the dishwasher (1) of the case 10 is installed, the tank 11, the wash water is contained in the tank 11.

The tank 11, the wash water supply pipe 13 is connected to the supply pipe 13 has a pump (12) is equipped with a high-pressure washing water supply pipe 13 is to be transferred.

The supply pipe 13 is branched piping on the interior of the case 10 and the lower portion, each of

Petitioner Samsung Ex-1004, 0912

상기 노즐(40)의 분사관(41)을 통해 분사되는 세척수는 경사면(41a)에 의하여 경사면(41a)의 경사각을 따라 약 20。 경사지도록 분사된다.

상기 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향을 이루도록 결합되면 도 3a에서 도시한 바와 같이, 회전관(30)의 수직선에서 그 일측으로 경사진 분사공(31)의 경사각(α)과 노즐(40)의 분사관(41)에 형성된 경사면(41a)의 경사각(beta)을 합친 약 40。의 경사각을 이루어 분사된다.

따라서, 세척수가 회전관(30)의 일측으로 약 40。 경사지도록 분사됨에 따라 회전관(30)에 강한 추진력과 함께 원심력이 형성되어 회전관(30)이 지지관(20)의 축(21)을 중심으로 회전되는 것이다.

상기 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향을 이루도록 결합되는 노즐(40)은 주로 회전관(30)에 뚫려진 분사공(31)들의 최 외측에 결합되어

the upper and lower supply pipe (13) of the outlet (13a) has a cylindrical support tubes 20 are respectively coupled.

The support tubes 20 are installed in the center of the shaft 21 penetrates the bottom of the shaft 21, and the outlet (13a) projecting in the center of the supply pipe (13) is coupled with the support tube (20) boss (13b), the outlet (13a) of the supply pipe (13) is rotatably mounted in.

The other side of the support tube (20) on both sides of the rotary pipe (30) are respectively coupled to the clogged binary support tube 20 and the interior of the support tube (20) being in communication with one another and rotate together.

The rotary pipe 30 has a nozzle 40 that is mounted is made at predetermined intervals, is rotated, the

회전력을 높일 수 있도록 되어 있고, 경사를 이루어 분사되는 세척수도 회전력을 얻는 용도 외에도 식기(14a)들을 세척함을 당연하다.

상기 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 반대 방향으로 결합되면 도 3b에서 도시한 바와 같이 회전관(30)에 뚫려진 분사공(31)의 경사각(α)과 노즐(40)의 분사관(41)에 형성된 경사면(41a)의 경사각(beta)이 서로 마주보게 되어 양측 경사각들이 서로 상쇄되어 세척수가 수직으로 분사된다.

따라서, 세척수가 회전관(30)의 상부 수직으로 강하게 분사되어 랙(14)에 놓여진 식기(14a)들을 효과적으로 세척할 수 있는 것이다.

한편, 상기 노즐(40)은 회전관(30)의 외부를 감싸도록 설치되는 반원형의 상,하부캡(42)(43)들의 외측 플랜지(42a)(43a)를 관통하여 체결되는 볼트(44)에 의하여 고정되고, 상부캡(42)의 중앙에 돌출된 분사관(41)의 하부가 회전관

wash water is injected from the gas injection nozzle 40 is placed on the rack (14) (14a) of the dishwasher is sprayed evenly on the bottom (14a) can be cleaned in the dishwasher is adapted automatically.

Of course, the above-described configuration (1) is already known in the technical concept of the dishwasher.

However, according to the present invention, the greatest feature of the rotary pipe (30) of the wash water jet holes 31 are lined up in one direction to rotate the semicircular ring 33 bored is coupled to the pipe 30 and the nozzle 40, are formed in the injection pipe (41) of one kind, it is very easy while processing the spraying direction of the washing water so as to be formed differently.

In other words, in the rotary pipe 30 has a virtual

(30)에 뚫려진 분사공(31)에 삽입되어 패킹(45)으로 밀폐되며, 분사관(41)은 그 일측에 경사면(41a)이 형성된 원추형 관으로 구성되어 있다.

따라서, 상부캡(42)을 회전관(30)에 결합시킬 때 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향을 이루도록 결합시키거나 상부캡(42)을 180。 회전시켜 경사면(41a)이 분사공(31)의 경사각(α)과 반대 방향을 이루도록 결합시킨 후 플랜지(42a)(43a)들에 볼트(44)를 체결하여 하부캡(43)을 결합시키면 매우 간편하게 노즐(40)의 설치작업이 완료되는 등의 이점이 있다.

이상에서는 본 고안의 바람직한 실시예에 대하여 도시하고 또한 설명하였으나, 본 고안은 상기한 실시예에 한정되지 아니하며, 청구범위에서 청구하는 본 고안의 요지를 벗어남이 없이 당해 본 고안이 속하는 분야에서 통상의 지식을 가진 자라면 누구든지 다양한 변형 실시가 가능한 것은 물론이고, 그

vertical line to achieve a predetermined inclination (α) of the threaded hole (31) there becomes bored in an hour, the inclination angle (α) is preferably about 20 d. it is desirable to maintain a.

The rotary pipe 30 has a nozzle 40 having a spray hole 31 bored in the injection pipe (41) are respectively inserted bond.

The nozzle 40 is formed in the injection pipe (41), the inclined surface (41a) is formed on one side thereof, and a conical tube (41) consists of the inclination angle of the inclined surface (41a) formed in the injection pipe, the injection hole 31 (FIG angle of inclination (α) and the corresponding It is formed to about 20 D..

The nozzle (40) of the wash water is injected through the injection pipe (41) is inclined at an inclination angle of the

와 같은 변경은 기 재된 청구범위 내에 있게 된다.

inclined surface (41a) along the inclined surface (41a) by about 20 d. jet inclined.

이상에서 상술한 바와 같은 본 고안은, 회전관(30)에 뚫려진 세척수 분사공(31)들이 일렬을 이루어 1방향으로 형성된 것이므로 한번의 프레싱 공정에 의하여 매우 간편하게 분사공(31)들을 뚫는 작업을 수행 할 수 있을 뿐 아니라, 분사공(31)에 결합되는 노즐(40)들을 1종류로 형성하더라도 회전관(30)에 결합되는 노즐(40)들의 방향을 서로 달리하면 분사관(41)의 경사면(41a)과 회전관(30)에 뚫려진 분사공(31)의 경사각(α)이 적절하게 조화되어 세척수의 분사방향을 각각 다르게 형성할 수 있는 것이므로 전체적인 식기 세척기의 제조원가를 저렴하게 유지할 수 있는 것으로서 식기세척기의 대외 경쟁력을 최대한 높여줄 수 있는 등의 이점이 있는 것이다.

The injection pipe (41) of the inclined surface (41a) is injection holes (31) in the same direction as the angle of inclination (α) is combined to fulfill as shown in Figure 3a, pipe 30 inclined to one side in the vertical line of the injection hole 31 of the nozzle (40) of the inclination angle (α) of the inclination angle of the inclined surface (41a) formed in the injection pipe (41) that combines a fraction of air injection forming the inclination angle of about 40 contains a.

Thus, one side of the rotary pipe (30), the washing water is jet inclined about 40 contains strong impulses to rotate as tube 30 is formed with a centrifugal tube 20, the rotation shaft 21 to the

Petitioner Samsung Ex-1004, 0916

support tube 30 is rotated in the center.

The injection pipe (41) of the inclined surface (41a) is injection holes (31) in the same direction as the angle of inclination (α) of the nozzle 40 is coupled to fulfill the rotating tube 30 primarily on the outermost side of the bored binary injection hole 31 can be increased so that the rotational force is coupled to, and may the wash water injected made an inclination in addition to the purpose to obtain a rotational force by washing the dishes (14a), of course.

The injection pipe (41) of the inclined surface (41a) is injection hole 31 and the opposite direction of the inclination angle (α) as shown in Figure 3b, when coupled to a pipe 30 and the injection hole 31 bored with rotation as the angle of inclination (α) of the injection pipe (41) and nozzle 40 is inclined at an

Petitioner Samsung Ex-1004, 0917

inclination angle of the inclined surface (41a) formed in the third insulating film are both side inclination angle (beta), see the facing each other, the wash water is perpendicular to cancel each other out.

Thus, vertically upper portion of the wash water is injected rotary tube 30 is placed on the rack (14) strongly to effectively wash dishes (14a).

On the other hand, the rotary pipe 30 of the nozzle 40 is provided so as to surround the outside of the upper and lower caps 42, 43 of the semicircular outer flange fastened to the through-bolt 44 by (42a) (43a), is fixed to the injection pipe (41) projecting in the center of the top cap 42, the lower portion of the injection hole 31 bored with rotating tube 30 is inserted into the packing 45 is sealed, the injection pipe 41 is the

Petitioner Samsung Ex-1004, 0918

inclined surface (41a) is formed on one side thereof It is configured as a conical tube.

Thus, when rotating the top cap 42 and the injection pipe 41 of the pipe 30 and the inclined surface (41a) is injection holes (31) in the same direction as the angle of inclination (α) or combined to fulfill the inclined surface (41a) between the upper cap 42 is injection hole 31 180 D. rotating the angle of inclination (α) and (42a) (43a) then coupled to opposite direction, tightening the bolt in the flange (44) when coupled to the lower cap 43, nozzle 40 is very easily is an advantage such that the installation is complete.

In the above described with respect to preferred embodiments of the subject innovation also shown and described, but, the present design is not limited to the above

Petitioner Samsung Ex-1004, 0919

embodiment, as claimed in the present invention without departing from the gist of the present design, those of ordinary skill in the art to which anyone various modifications It is possible, of course, that such changes and is able within the scope of the group in the method.

As described above in the above, the present design is a wash water jet hole 31 bored in the tubes 30 are arranged, it is formed in the first direction once made so very easily by the pressing process, tore through injection hole 31 not only can you perform an action that is coupled to the injection hole 31 of the nozzle 40, even if formed into one kind of the nozzle 40 is coupled to the pipe 30, the rotation direction of the injection pipe (41) with each other and the rotation of the inclined surface (41a) drilled two binary

Petitioner Samsung Ex-1004, 0920

injection holes 31 of the tube 30, the inclination angle (α) is appropriate for the injection direction of the wash water because it can be formed differently the overall manufacturing costs of the dishwasher can be kept low as can enhance the competitiveness of the dishwasher there is an advantage such that as much as possible.

Date translated: 18 September 2017

(19) 대한민국특허청(KR)
(12) 등록실용신안공보(Y1)

(51) 。Int. Cl. [7]
A47L 15/14

(45) 공고일자 2003년01월14일
(11) 등록번호 20-0300795
(24) 등록일자 2002년12월30일

(21) 출원번호 20-2002-0031416
(22) 출원일자 2002년10월22일

(73) 실용신안권자 강성수
경기도 의정부시 의정부2동 604-7 승원빌라 28차 401호

(72) 고안자 강성수
경기도 의정부시 의정부2동 604-7 승원빌라 28차 401호

(74) 대리인 안춘호

심사관 : 홍재영

기술평가청구 : 없음

(54) 식기세척기의 세척수 분사장치

요약

본 고안은 식기세척기의 세척수 분사장치에 관한 것으로서, 특히 한 개의 노즐로 세척수의 분사방향을 각각 다르게 설정할 수 있도록 구성하여 노즐들이 결합되는 회전관의 가공이 간편하게 이루어질 수 있도록 한 고안에 관한 것이다. 전술한 본 고안은, 케이스(10)의 내부 하측 탱크(11)에 담겨진 세척수가 펌프(12)에 의하여 공급관(13)을 통해 이송되고, 공급관(13)은 분기되어 케이스(10)의 내부 상,하부로 각각 배관되며 상,하부 공급관(13)들 출구(13a)에 축(21)으로 각각 결합된 지지관(20)의 양측에는 회전관(30)들이 각각 결합되고, 회전관(30)에 일정간격을 이루어 장착된 노즐(40)들에서 분사되는 세척수가 랙(14)에 놓여진 식기(14a)들의 상,하부에 고르게 분사되는 식기세척기(1)에 있어서, 상기 회전관(30)에는 수직선에서 일정 경사각(α)을 이루도록 분사공(31)들이 일렬로 뚫려지고, 분사공(31)들에는 노즐(40)들의 분사관(41)이 각각 삽입되어 결합되며, 분사관(41)들은 그 일측에 경사면(41a)이 형성된 원추형 관으로 이루어져 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향으로 결합되면 세척수가 경사지게 분사되어 회전관(30)의 추진력이 형성되고, 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 반대 방향으로 결합되면 세척수가 수직으로 분사되어 강한 세척력이 형성됨을 특징으로 하는 식기세척기의 세척수 분사장치에 의하여 달성될 수 있다.

Petitioner Samsung Ex-1004, 0922

대표도

도 1

명세서

도면의 간단한 설명

도 1은 본 고안의 일실시예를 예시한 사시도,

도 2는 본 고안의 일부를 확대한 분해사시도,

도 3a와 도 3b는 본 고안에 의한 분사장치의 노즐들의 단면도,

도 4는 본 고안의 일부를 확대한 단면도,

도 5는 본 고안이 장착된 식기세척기의 개략적인 장치도.

* 도면의 주요부분에 대한 부호의 설명 *

1 : 식기세척기 10 : 케이스

11 : 탱크 12 : 펌프

13 : 공급관 13a : 출구

13b : 보스 14 : 랙

14a : 식기 20 : 지지관

21 : 축 30 : 회전관

31 : 분사공 40 : 노즐

41 : 분사관 41a : 경사면

42 : 상부캡 42a, 43a : 플랜지

43 : 하부캡 44 : 볼트

45 : 패킹 α, β : 경사각

고안의 상세한 설명

고안의 목적

고안이 속하는 기술 및 그 분야의 종래기술

본 고안은 식기세척기의 세척수 분사장치에 관한 것으로서, 더욱 상세하게는 한 개의 노즐로 세척수의 분사방향을 각각 다르게 설정할 수 있도록 구성하여 노즐들이 결합되는 회전관의 가공이 매우 간편하게 이루어질 수 있도록 한 고안에 관한 것이다.

Petitioner Samsung Ex-1004, 0923

일반적으로 식기세척기(食器洗滌機)는 식기의 세척을 보다 위생적이고 능률적으로 수행할 수 있도록 하기 위한 것으로서 주로 세척기의 하부 탱크에 담겨진 세척수가 펌프에 의하여 공급관을 통해 이송되면 공급관에 회전 가능하게 장착된 회전관의 노즐을 통해 세척수가 고압으로 분사되어 랙에 놓여진 식기들을 세척할 수 있도록 되어 있다.

상기 공급관은 분기되어 세척기의 내부 상,하부로 각각 배관되고, 공급관들의 선단에서 축으로 결합되어 회전 가능하게 장착된 지지관의 양측에는 회전관들이 각각 결합되어 회전되는 노즐들에서 분사되는 세척수가 식기들의 상,하부에 고르게 분사되는 구성으로 되어 있다.

또한, 상기 회전관에 결합된 노즐들은 경사 및 수직을 이루어 각각 장착되어 경사진 노즐에서 분사되는 세척수의 추진력을 이용하여 회전관을 회전시키고, 수직으로 분사되는 세척수에서는 강한 세척력을 얻을 수 있도록 되어 있다.

따라서, 상기 회전관에는 노즐들이 결합되는 분사공들이 일정간격을 이루어 뚫려져 있고, 분사공들은 수직방향과 경사방향을 이루어 각각 2방향으로 뚫려진다.

그러나, 전술한 바와 같이 회전관에 경사방향이 서로 다른 분사공들을 형성하는 경우에는 분사공을 뚫는 작업이 매우 까다롭고 불편할 뿐 아니라 상당한 시간이 소요되어 그 생산성이 현저하게 저하되는 등의 폐단이 발생되었다.

물론, 경우에 따라서는 분사공이 1방향을 이루도록 형성한 다음 세척수의 분사방향이 서로 다른 2종류의 노즐을 각각 분사공에 결합하여 사용하는 경우도 있었으나 이때에는 종류가 서로 다른 노즐을 사용함에 따라 전체적인 제조원가가 상승되는 등의 폐단이 발생되었다.

고안이 이루고자 하는 기술적 과제

본 고안은 상기한 문제점을 감안하여 창안한 것으로서, 그 목적은 한 개의 노즐로 세척수의 분사방향을 각각 다르게 설정할 수 있도록 구성하여 노즐들이 결합되는 회전관의 가공이 매우 간편하게 이루어질 수 있는 식기세척기의 세척수 분사장치를 제공함에 있는 것이다.

상기한 목적을 달성하기 위한 본 고안의 특징은, 케이스(10)의 내부 하측 탱크(11)에 담겨진 세척수가 펌프(12)에 의하여 공급관(13)을 통해 이송되고, 공급관(13)은 분기되어 케이스(10)의 내부 상,하부로 각각 배관되며 상,하부 공급관(13)들 출구(13a)에 축(21)으로 각각 결합되어 회전 가능하게 장착된 지지관(20)의 양측에는 회전관(30)들이 각각 결합되고, 회전관(30)에 일정간격을 이루어 장착된 노즐(40)들에서 분사되는 세척수가 랙(14)에 놓여진 식기(14a)들의 상,하부에 고르게 분사되는 식기세척기(1)에 있어서, 상기 회전관(30)에는 수직선에서 일정 경사각(α)을 이루도록 분사공(31)들이 일렬로 뚫려지고, 분사공(31)들에는 노즐(40)들의 분사관(41)이 각각 삽입되어 결합되며, 분사관(41)들은 그 일측에 경사면(41a)이 형성된 원추형 관으로 이루어져 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향으로 결합되면 세척수가 경사지게 분사되어 회전관(30)의 추진력이 형성되고, 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 반대 방향으로 결합되면 세척수가 수직으로 분사되어 강한 세척력이 형성됨을 특징으로 하는 식기세척기의 세척수 분사장치에 의하여 달성될 수 있는 것이다.

고안의 구성 및 작용

이하, 상기한 목적을 달성하기 위한 바람직한 실시예를 첨부된 도면에 의하여 상세히 설명하면 다음과 같다.

도 1 내지는 도 5에서 도시한 바와 같이, 식기세척기(1)의 케이스(10) 내부 하측에는 탱크(11)가 설치되어 있고, 탱크(11)에는 세척수가 담겨져 있다.

상기 탱크(11)에는 세척수 공급관(13)이 접속되어 있고, 공급관(13)에는 펌프(12)가 장착되어 공급관(13)을 통해 세척수를 고압으로 이송시킬 수 있도록 되어 있다.

Petitioner Samsung Ex-1004, 0924

상기 공급관(13)은 분기되어 케이스(10)의 내부 상,하부로 각각 배관되어 있고 상,하부 공급관(13)들의 출구(13a)에는 원통형 지지관(20)들이 각각 결합되어 있다.

상기 지지관(20)들의 중앙에는 축(21)이 관통 설치되어 있고, 축(21)의 하부는 공급관(13)의 출구(13a) 중앙에 돌출된 보스(13b)에 결합되어 지지관(20)이 공급관(13)의 출구(13a)에서 회전 가능하게 장착된다.

상기 지지관(20)의 양측에는 그 외측이 막혀진 회전관(30)들이 각각 결합되어 지지관(20)의 내부와 서로 연통되고 지지관(20)과 함께 회전된다.

상기 회전관(30)에는 노즐(40)들이 일정간격을 이루어 장착되어 있고, 회전되는 노즐(40)들에서 분사되는 세척수가 랙(14)에 놓여진 식기(14a)들의 상,하부에 고르게 분사되어 식기(14a)를 자동으로 세척할 수 있도록 되어 있다.

물론, 전술한 구성으로 이루어진 식기세척기(1)는 이미 알려진 공지의 기술사상이다.

그러나, 본 고안에 있어서 가장 중요한 특징은 상기 회전관(30)에 형성된 세척수 분사공(31)들이 일렬을 이루어 1방향으로 뚫려지고, 회전관(30)에 결합되는 노즐(40)들은 1종류로 형성되어 분사관(41)의 가공이 매우 용이하면서도 세척수의 분사방향은 서로 다르게 형성할 수 있도록 함에 있는 것이다.

즉, 상기 회전관(30)에는 가상의 수직선에서 일정 경사각(α)을 이루도록 분사공(31)들이 일렬로 뚫려져 있고, 상기 경사각(α)은 약 20。를 유지하는 것이 바람직하다.

상기 회전관(30)에 뚫려진 분사공(31)들에는 노즐(40)들의 분사관(41)이 각각 삽입되어 결합되어 있다.

상기 노즐(40)들에 형성된 분사관(41)들은 그 일측에 경사면(41a)이 형성된 원추형 관으로 이루어져 있고, 분사관(41)에 형성된 경사면(41a)의 경사각(β)도 상기 분사공(31)들의 경사각(α)과 상응하는 약 20。로 형성되어 있다.

상기 노즐(40)의 분사관(41)을 통해 분사되는 세척수는 경사면(41a)에 의하여 경사면(41a)의 경사각을 따라 약 20。 경사지도록 분사된다.

상기 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향을 이루도록 결합되면 도 3a에서 도시한 바와 같이, 회전관(30)의 수직선에서 그 일측으로 경사진 분사공(31)의 경사각(α)과 노즐(40)의 분사관(41)에 형성된 경사면(41a)의 경사각(β)을 합친 약 40。의 경사각을 이루어 분사된다.

따라서, 세척수가 회전관(30)의 일측으로 약 40。 경사지도록 분사됨에 따라 회전관(30)에 강한 추진력과 함께 원심력이 형성되어 회전관(30)이 지지관(20)의 축(21)을 중심으로 회전되는 것이다.

상기 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향을 이루도록 결합되는 노즐(40)은 주로 회전관(30)에 뚫려진 분사공(31)들의 최 외측에 결합되어 회전력을 높일 수 있도록 되어 있고, 경사를 이루어 분사되는 세척수도 회전력을 얻는 용도 외에도 식기(14a)들을 세척함을 당연하다.

상기 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 반대 방향으로 결합되면 도 3b에서 도시한 바와 같이 회전관(30)에 뚫려진 분사공(31)의 경사각(α)과 노즐(40)의 분사관(41)에 형성된 경사면(41a)의 경사각(β)이 서로 마주보게 되어 양측 경사각들이 서로 상쇄되어 세척수가 수직으로 분사된다.

따라서, 세척수가 회전관(30)의 상부 수직으로 강하게 분사되어 랙(14)에 놓여진 식기(14a)들을 효과적으로 세척할 수 있는 것이다.

한편, 상기 노즐(40)은 회전관(30)의 외부를 감싸도록 설치되는 반원형의 상,하부캡(42)(43)들의 외측 플랜지(42a)(43a)를 관통하여 체결되는 볼트(44)에 의하여 고정되고, 상부캡(42)의 중앙에 돌출된 분사관(41)의 하부가 회전관(30)에 뚫려진 분사공(31)에 삽입되어 패킹(45)으로 밀폐되며, 분사관(41)은 그 외측에 경사면(41a)이 형성된 원추형 관으로 구성되어 있다.

Petitioner Samsung Ex-1004, 0925

따라서, 상부캡(42)을 회전관(30)에 결합시킬 때 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향을 이루도록 결합시키거나 상부캡(42)을 180。 회전시켜 경사면(41a)이 분사공(31)의 경사각(α)과 반대 방향을 이루도록 결합시킨 후 플랜지(42a)(43a)들에 볼트(44)를 체결하여 하부캡(43)을 결합시키면 매우 간편하게 노즐(40)의 설치작업이 완료되는 등의 이점이 있다.

이상에서는 본 고안의 바람직한 실시예에 대하여 도시하고 또한 설명하였으나, 본 고안은 상기한 실시예에 한정되지 아니하며, 청구범위에서 청구하는 본 고안의 요지를 벗어남이 없이 당해 본 고안이 속하는 분야에서 통상의 지식을 가진 자라면 누구든지 다양한 변형 실시가 가능한 것은 물론이고, 그와 같은 변경은 기재된 청구범위 내에 있게 된다.

고안의 효과

이상에서 상술한 바와 같은 본 고안은, 회전관(30)에 뚫려진 세척수 분사공(31)들이 일렬을 이루어 1방향으로 형성된 것이므로 한번의 프레싱 공정에 의하여 매우 간편하게 분사공(31)들을 뚫는 작업을 수행 할 수 있을 뿐 아니라, 분사공(31)에 결합되는 노즐(40)들을 1종류로 형성하더라도 회전관(30)에 결합되는 노즐(40)들의 방향을 서로 달리하면 분사관(41)의 경사면(41a)과 회전관(30)에 뚫려진 분사공(31)의 경사각(α)이 적절하게 조화되어 세척수의 분사방향을 각각 다르게 형성할 수 있는 것이므로 전체적인 식기 세척기의 제조원가를 저렴하게 유지할 수 있는 것으로서 식기세척기의 대외 경쟁력을 최대한 높여줄 수 있는 등의 이점이 있는 것이다.

(57) 청구의 범위

청구항 1.

케이스(10)의 내부 하측 탱크(11)에 담겨진 세척수가 펌프(12)에 의하여 공급관(13)을 통해 이송되고, 공급관(13)은 분기되어 케이스(10)의 내부 상,하부로 각각 배관되며 상,하부 공급관(13)들 출구(13a)에 축(21)으로 각각 결합되어 회전 가능하게 장착된 지지관(20)의 양측에는 회전관(30)들이 각각 결합되고, 회전관(30)에 일정간격을 이루어 장착된 노즐(40)들에서 분사되는 세척수가 랙(14)에 놓여진 식기(14a)들의 상,하부에 고르게 분사되는 식기세척기(1)에 있어서,

상기 회전관(30)에는 수직선에서 일정 경사각(α)을 이루도록 분사공(31)들이 일렬로 뚫려지고, 분사공(31)들에는 노즐(40)들의 분사관(41)이 각각 삽입되어 결합되며, 분사관(41)들은 그 일측에 경사면(41a)이 형성된 원추형 관으로 이루어져 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 동일한 방향으로 결합되면 세척수가 경사지게 분사되어 회전관(30)의 추진력이 형성되고, 분사관(41)의 경사면(41a)이 분사공(31)의 경사각(α)과 반대 방향으로 결합되면 세척수가 수직으로 분사되어 강한 세척력이 형성됨을 특징으로 하는 식기세척기의 세척수 분사장치.

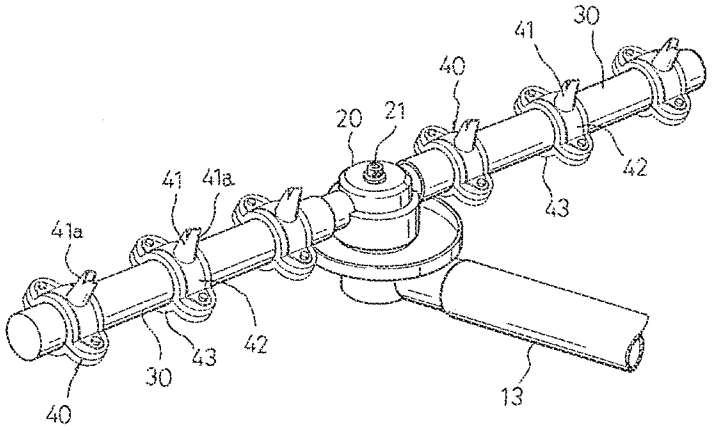
청구항 2.

제 1항에 있어서, 상기 노즐(40)은 회전관(30)의 외부를 감싸도록 설치되는 반원형의 상,하부캡(42)(43)들의 외측 플랜지(42a)(43a)를 관통하여 체결되는 볼트(44)에 의하여 고정되고, 상부캡(42)의 중앙에 돌출된 분사관(41)의 하부가 회전관(30)에 뚫려진 분사공(31)에 삽입되어 패킹(45)으로 밀폐되며, 분사관(41)은 그 일측에 경사면(41a)이 형성된 원추형 관으로 이루어짐을 특징으로 하는 식기세척기의 세척수 분사장치.

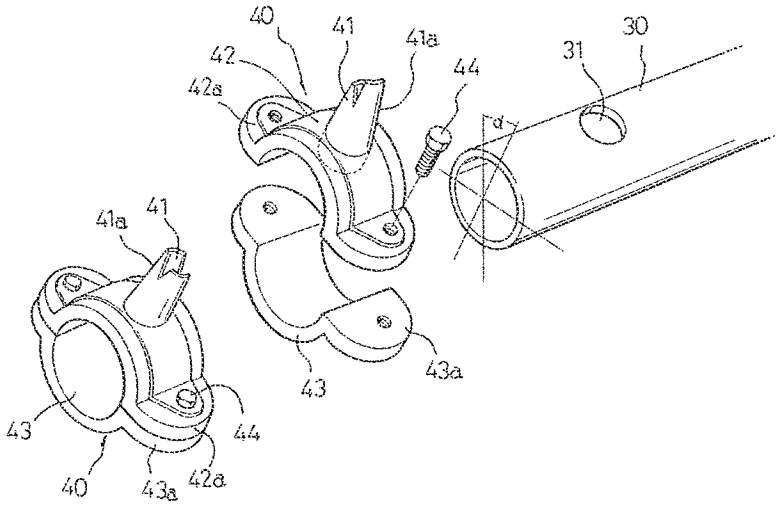
Petitioner Samsung Ex-1004, 0926

도면

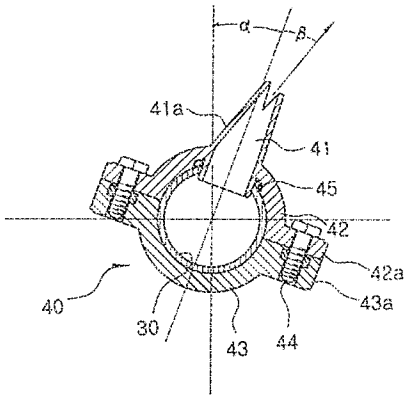
도면 1


41
30
40
20
21
42
43
41
41a
41a
42
30
43
40
13

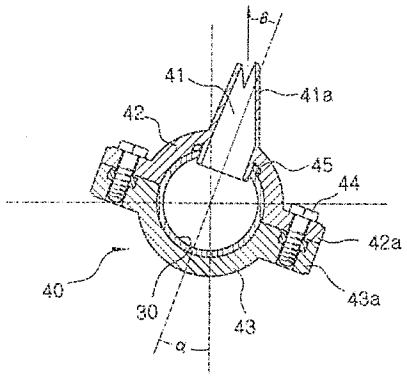
도면 2


40
41
41a
42
42a
44
31
30
41a
41
43
44
40
43a
42a
43
43a

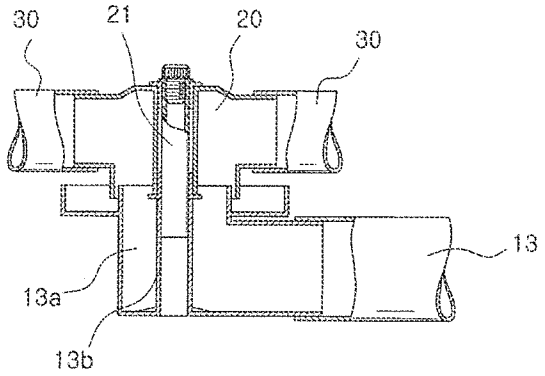
도면 3a


α
β
41a
41
45
42
42a
43a
40
30
43
44

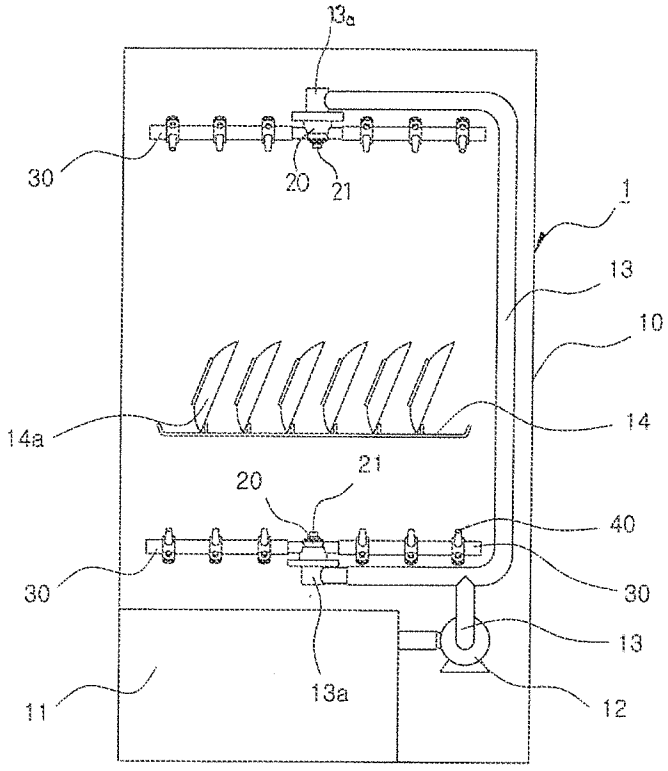
도면 3b


β
41
41a
42
45
44
42a
43a
40
30
43
α

도면 4


30
21
20
30
13
13a
13b

도면 5


13a
30
20
21
1
13
10
14a
14
20
21
40
30
30
13
11
13a
12

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	:	Mark S. Feddema
Application No.	:	19/297,954
Filing Date	:	August 12, 2025
Confirmation No.	:	2948
For	:	DISHWASHER WITH A DISH RACK

Dear Commissioner:

INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. § 1.97(b)

Pursuant to 37 C.F.R. §§ 1.56 and 1.97(b), Applicant brings to the attention of the Examiner each document listed on the attached Form PTO/SB/08a. This Information Disclosure Statement is being filed within three months of the filing of the above-referenced application.

Copies of the listed foreign patent documents and non-patent literature are attached. Applicant respectfully requests that the Examiner consider the listed documents and evidence that consideration by making appropriate notations on the attached form. At least an English language abstract of any foreign patent document is incorporated herein by reference in its entirety as Applicant's concise explanation of the relevancy of the document under MPEP 609.04 and 37 C.F.R. §1.98(a)(3)(i).

This submission does not represent that a search has been made or that no better art exists and does not constitute an admission that any listed document is material or constitutes "prior art." Applicant reserves the right to present to the Office the relevant facts and law regarding the appropriate status of each document. Applicant further reserves the right to take appropriate action to establish the patentability of the disclosed invention over each document listed, should one or more be applied against the claims of the present application.

If there is any fee due in connection with the filing of this Statement, please charge the fee to our Deposit Account No. 16-2463.

Respectfully submitted,

PRICE HENEVELD LLP

September 17, 2025
Date

/brianrcheslek/
Brian R. Cheslek, Reg. No. 58,329
3400 Innovation Court, S.E.
P.O. Box 2567
Grand Rapids, Michigan 49501-2567
Tel: 616.949.9610
Fax: 616.957.8196
bcheslek@priceheneveld.com

BRC/mad

Espacenet

Bibliographic data: EP2815690 (A1) — 2014-12-24

Glass holder for a dish basket of a dishwasher, dish basket for a dishwasher and dishwasher

Inventor(s): JERG HELMUT [DE] ± (JERG HELMUT)

Applicant(s): BSH BOSCH & SIEMENS HAUSGERAETE GMBH [DE] ± (BSH BOSCH UND SIEMENS HAUSGERÄTE GMBH, ; BSH HAUSGERÄTE GMBH)

Classification: **- international:** ***A47L15/50***
- cooperative: **A47L15/505 (EP)**

Application number: EP20140171964 20140611 Global Dossier

Priority number(s): DE201310211564 20130619

Also published as: EP2815690 (B1) DE102013211564 (A1) DE102013211564 (B4) PL2815690 (T3)

Abstract of EP2815690 (A1)

Die Erfindung betrifft einen Glashalter (15) zum Halten eines Stielglases (16) für einen Geschirrkorb (1) einer Geschirrspülmaschine (2), wobei der Glashalter (15) einen Kelchträger (20) zum Tragen eines Kelches (17) des Stielglases (16) aufweist, welcher dazu eingerichtet ist, den Kelch (17) an lediglich einem Punkt (P 1) zu berühren.

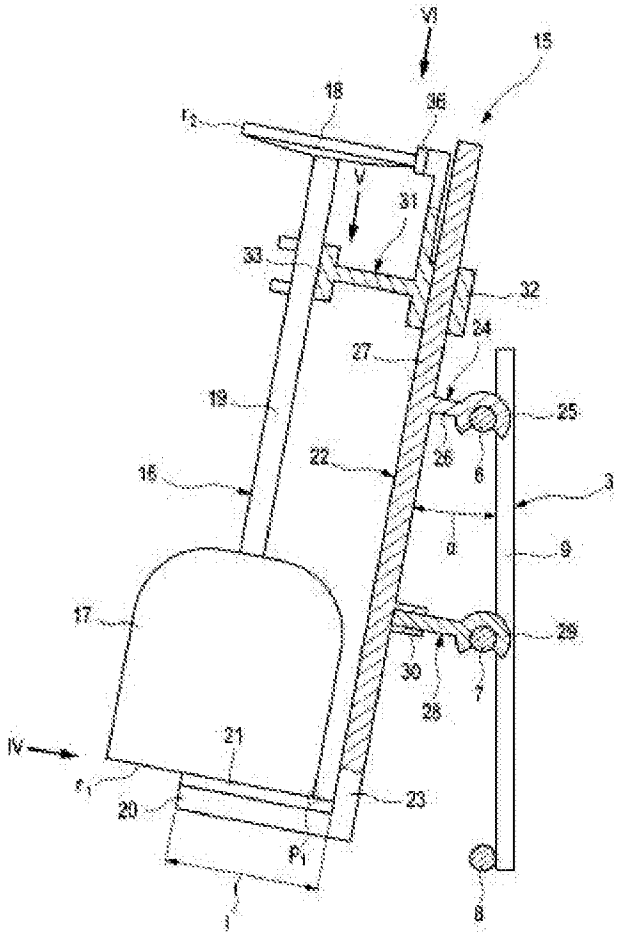

VI
15
16
36
F_2
V
31
33
32
24
27
19
25
22
26
6
16
3
8
9
17
29
30
28
7
IV
21
F_1
20
23
1
8

Fig. 3

Patent Translate

Powered by EPO and Google

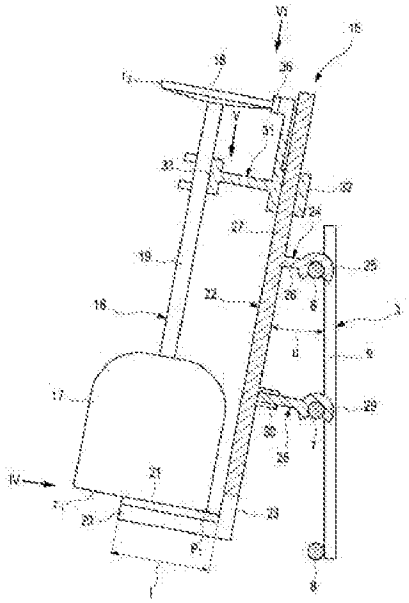
Notice

This translation is machine-generated. It cannot be guaranteed that it is intelligible, accurate, complete, reliable or fit for specific purposes. Critical decisions, such as commercially relevant or financial decisions, should not be based on machine-translation output.

ABSTRACT EP2815690A1

[0001]

The invention relates to a glass holder (15) for holding a stemmed glass (16) for a crockery basket (1) of a dishwasher (2), wherein the glass holder (15) has a bowl support (20) for supporting a bowl (17) of the stemmed glass (16), which bowl support is designed to touch the bowl (17) at only one point (P₁).



Petitioner Samsung Ex-1004, 0933

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 815 690 A1

(12) EUROPÄISCHE PATENTANMELDUNG

(43) Veröffentlichungstag:
24.12.2014 Patentblatt 2014/52

(51) Int Cl.:
A47L 15/50 *(2006.01)*

(21) Anmeldenummer: **14171964.1**

(22) Anmeldetag: **11.06.2014**

(84) Benannte Vertragsstaaten:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Benannte Erstreckungsstaaten:
BA ME

(30) Priorität: **19.06.2013 DE 102013211564**

(71) Anmelder: **BSH Bosch und Siemens Hausgeräte GmbH**
81739 München (DE)

(72) Erfinder: **Jerg Helmut**
89537 Giengen (DE)

(54) Glashalter für einen Geschirrkorb einer Geschirrspülmaschine, Geschirrkorb für eine Geschirrspülmaschine und Geschirrspülmaschine

(57) Die Erfindung betrifft einen Glashalter (15) zum Halten eines Stielglases (16) für einen Geschirrkorb (1) einer Geschirrspülmaschine (2), wobei der Glashalter (15) einen Kelchträger (20) zum Tragen eines Kelches (17) des Stielglases (16) aufweist, welcher dazu eingerichtet ist, den Kelch (17) an lediglich einem Punkt (P_1) zu berühren.

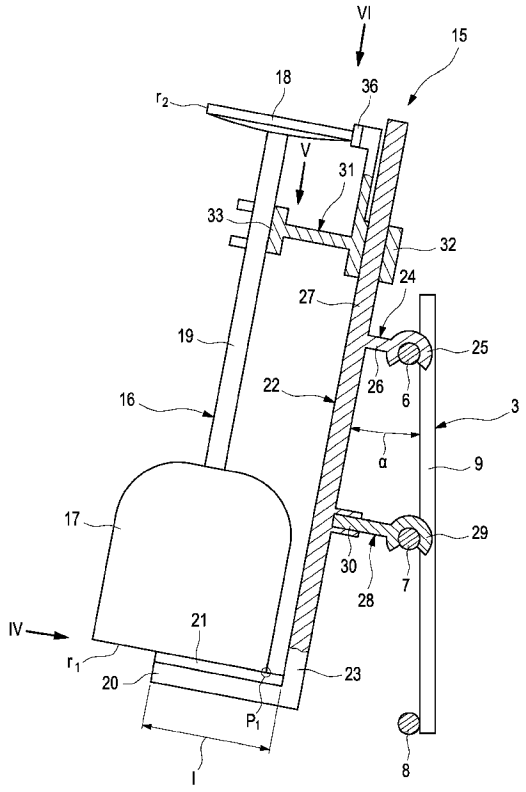


Fig. 3

EP 2 815 690 A1

Petitioner Samsung Ex-1004, 0934

Beschreibung

[0001] Die vorliegende Erfindung betrifft einen Glashalter für einen Geschirrkorb einer Geschirrspülmaschine, einen Geschirrkorb für eine Geschirrspülmaschine und eine Geschirrspülmaschine.

[0002] Stielgläser, wie beispielweise Weingläser, können zum Spülen in einem Geschirrkorb einer Geschirrspülmaschine platziert werden. Um einen sicheren Stand der Stielgläser, insbesondere von Stielgläsern unterschiedlicher Stiellänge, zu gewährleisten, können in den Geschirrkorb einbringbare Glashalter eingesetzt werden.

[0003] Die EP 2 353 488 D1 beschreibt einen derartigen Glashalter für einen Geschirrkorb einer Geschirrspülmaschine. Dieser Glashalter weist einen Kelchhalter auf, der einen Kelch eines zu spülenden Stielglases trägt. Der Kelchhalter ist kegelstumpfförmig ausgebildet und weist drei Rippen auf. Der Kelch liegt auf jeder der Rippen auf. Der Kelchhalter berührt den Kelch somit an drei Punkten.

[0004] Vor diesem Hintergrund besteht eine Aufgabe der vorliegenden Erfindung darin, einen verbesserten Glashalter für einen Geschirrkorb einer Geschirrspülmaschine zur Verfügung zu stellen.

[0005] Demgemäß wird ein Glashalter zum Halten eines Stielglases für einen Geschirrkorb einer Geschirrspülmaschine vorgeschlagen, wobei der Glashalter einen Kelchträger zum Tragen eines Kelches des Stielglases aufweist. Der Kelchträger ist dazu eingerichtet, den Kelch an lediglich einem Punkt zu berühren.

[0006] Dadurch, dass der Kelchträger den Kelch an lediglich einer Kontaktstelle punktweise berührt, wird sich auf dem Kelch befindliches Wasser lediglich an dieser Kontaktstelle vom Kelch abgeleitet. Das Entstehen von Wasserflecken auf dem Kelch beim Verdunsten des Wassers wird dadurch verhindert oder auf ein Minimum reduziert. Der Kelchträger berührt den Kelch vorzugsweise an einem tiefsten Punkt desselben. Unter punktförmig ist vorliegend eine, insbesondere kreisförmige, Auflagefläche mit einem Durchmesser von einem Millimeter, bevorzugt von 0,5 Millimeter, weiter bevorzugt von 0,2 Millimeter zu verstehen.

[0007] Gemäß einer Ausführungsform ist der Kelchträger senkrecht zu einem Grundträger des Glashalters angeordnet.

[0008] Der Kelchträger und der Grundträger sind vorzugsweise einstückig ausgebildet. Der Glashalter ist vorzugsweise als Kunststoffspritzgussbauteil ausgebildet. Der Grundträger ist insbesondere stabförmig und kann einen rechteckigen oder kreisrunden Querschnitt aufweisen. Der Kelchträger erstreckt sich bevorzugt seitlich aus dem Grundträger heraus. Unter senkrecht ist vorliegend ein Winkel von 90° ± 10°, bevorzugt von 90° ± 5°, weiter bevorzugt von 90° ± 1° zu verstehen. Der Kelchträger kann einen rechteckförmigen Querschnitt aufweisen.

[0009] Gemäß einer weiteren Ausführungsform weist der Kelchträger einen Tropfenabzug zum Ableiten eines Wassertropfens von einem Rand des Kelches auf.

[0010] Der Tropfenabzug des Kelchträgers ist bevorzugt einstückig mit dem Kelchträger ausgebildet. Der Kelch des Stielglases liegt auf einem Punkt, bevorzugt dem tiefsten Punkt des Stielglases, auf dem Tropfenabzug des Kelchträgers auf. Ein sich auf einem Rand des Kelches befindlicher Wassertropfen läuft über den Tropfenabzug ab, wodurch das Entstehen eines Wasserflecks auf dem Kelch verhindert wird.

[0011] Gemäß einer weiteren Ausführungsform weist der Tropfenabzug des Kelchträgers einen dreieckförmigen Querschnitt auf.

[0012] Vorzugsweise weist der Tropfenabzug des Kelchträgers im Querschnitt die Form eines gleichschenkligen Dreiecks auf. Der dreieckförmige Querschnitt des Tropfenabzugs des Kelchträgers und der rechteckförmige Querschnitt des Kelchträgers bilden zusammen einen hausförmigen Querschnitt.

[0013] Gemäß einer weiteren Ausführungsform weist der Glashalter einen Stielhalter zum Halten eines Stiels des Stielglases auf.

[0014] Der Stielhalter ist vorzugsweise als Kunststoffspritzgussbauteil ausgeführt. Der Stielhalter kann dazu eingerichtet sein, den Stiel formschlüssig zu umgreifen.

[0015] Gemäß einer weiteren Ausführungsform ist der Stielhalter dazu eingerichtet, den Stiel an maximal zwei Punkten zu berühren.

[0016] Der Stielhalter berührt den Stiel nicht flächig. Hierdurch wird die Bildung von Wasserflecken auf dem Stiel unterbunden.

[0017] Gemäß einer weiteren Ausführungsform ist der Stielhalter dazu eingerichtet, den Stiel zumindest abschnittsweise zu umgreifen.

[0018] Vorzugsweise weist der Stielhalter einen Greifabschnitt mit zwei elastisch verformbaren Greifarmen auf. Der Stiel kann in den Greifabschnitt eingeclipst werden. Dabei können sich die Greifarme elastisch verformen und umgreifen den Stiel. Die Greifarme sind voneinander beabstandet angeordnet. Der Abstand der Greifarme voneinander ist vorzugsweise so groß, dass ein gleichzeitiger Kontakt beider Greifarme mit dem Stiel ausgeschlossen ist.

[0019] Gemäß einer weiteren Ausführungsform ist der Stielhalter entlang eines Grundträgers des Glashalters verschiebbar.

[0020] Hierdurch ist der Glashalter komfortabel auf unterschiedliche Stiellängen einstellbar. Der Stielhalter kann eine Verdrehsicherung aufweisen, die ein Verdrehen des Stielhalters relativ zu dem Grundträger verhindert. Der Stielhalter kann eine Schiebehülse aufweisen. Der Grundträger ist in der Schiebehülse vorzugsweise derart reibungsbehaftet geführt, dass die Schiebehülse mit geringem Kraftaufwand auf dem Grundträger verschiebbar ist.

[0021] Gemäß einer weiteren Ausführungsform weist der Stielhalter einen Tropfenabzug zum Ableiten eines Wassertropfens von einem Rand eines Fußes des Stielglases auf.

Petitioner Samsung Ex-1004, 0935

[0022] Der Tropfenabzug des Stielhalters kann einstückig mit diesem ausgebildet sein. Vorzugsweise ist der Tropfenabzug des Stielhalters an einem tiefsten Punkt des Fußes angeordnet. Der Tropfenabzug des Stielhalters berührt den Rand des Fußes vorzugsweise lediglich punktweise.

[0023] Gemäß einer weiteren Ausführungsform weist der Tropfenabzug des Stielhalters einen dreieckförmigen Querschnitt auf.

[0024] Vorzugsweise weist der Tropfenabzug des Stielhalters im Querschnitt die Form eines gleichschenkligen Dreiecks auf.

[0025] Gemäß einer weiteren Ausführungsform ist der Glashalter in einen Bügel des Geschirrkorbs einhängbar.

[0026] Hierzu weist der Glashalter bevorzugt zwei Einhängelemente auf. Die Einhängelemente können in unterschiedliche Streben des Bügels eingehängt werden. In den Bügel können bevorzugt mehrere Glashalter eingehängt werden.

[0027] Gemäß einer weiteren Ausführungsform ist ein Winkel zwischen einem Grundträger des Glashalters und dem Geschirrkorb einstellbar.

[0028] Insbesondere ist ein Winkel zwischen dem Grundträger und einer vertikalen Strebe eines Bügels des Geschirrkorbs einstellbar. Hierzu kann der Glashalter ein verstellbares Einhängelement aufweisen, das in eine horizontale Strebe eines Bügels des Geschirrkorbs einhängbar ist. Insbesondere ist das Einhängelement längenverstellbar. Das Einhängelement kann eine Verrastung aufweisen, wodurch der Grundträger in vorbestimmten Winkelpositionen arretierbar ist.

[0029] Weiterhin wird ein Geschirrkorb für eine Geschirrspülmaschine mit einem Bügel und zumindest einem derartigen Glashalter vorgeschlagen. Der zumindest eine Glashalter ist in den Bügel eingehängt.

[0030] Vorzugsweise sind eine von Vielzahl Glashaltern in den Bügel eingehängt. Hierdurch können Gläser unterschiedlicher Form und/oder Stiellängen in einem Spülgang gereinigt werden.

[0031] Gemäß einer Ausführungsform weist der Geschirrkorb einen einbringbaren Zusatzbügel auf, in den der zumindest eine Glashalter einhängbar ist.

[0032] Der Zusatzbügel ist in den Geschirrkorb einbringbar und wieder aus diesem entnehmbar. Der Zusatzbügel kann beispielsweise in zwei Außenbügel des Geschirrkorbs eingehängt werden.

[0033] Weiterhin wird eine Geschirrspülmaschine mit einem derartigen Geschirrkorb vorgeschlagen.

[0034] Weitere mögliche Implementierungen der Erfindung umfassen auch nicht explizit genannte Kombinationen von zuvor oder im Folgenden bezüglich der Ausführungsbeispiele beschriebenen Merkmale oder Ausführungsformen. Dabei wird der Fachmann auch Einzelaspekte als Verbesserungen oder Ergänzungen zu der jeweiligen Grundform der Erfindung hinzufügen.

[0035] Weitere vorteilhafte Ausgestaltungen und Aspekte der Erfindung sind Gegenstand der Unteransprüche sowie der im Folgenden beschriebenen Ausführungsbeispiele der Erfindung. Im Weiteren wird die Erfindung anhand von bevorzugten Ausführungsformen unter Bezugnahme auf die beigelegten Figuren näher erläutert.

Fig. 1 zeigt eine schematische perspektivische Ansicht eines Geschirrkorbs mit einem Glashalter;

Fig. 2 zeigt eine schematische perspektivische Ansicht eines Zusatzbügels für den Geschirrkorb gemäß Fig. 1;

Fig. 3 zeigt eine schematische Schnittansicht eines Glashalters;

Fig. 4 zeigt eine schematische Ansicht IV des Glashalters gemäß Fig. 3;

Fig. 5 zeigt eine schematische Ansicht V des Glashalters gemäß Fig. 3; und

Fig. 6 zeigt eine schematische Ansicht VI des Glashalters gemäß Fig. 3.

[0036] In den Figuren sind gleiche oder funktionsgleiche Elemente mit denselben Bezugszeichen versehen worden, sofern nichts anderes angegeben ist.

[0037] Die Figur 1 illustriert einen Geschirrkorb 1 einer Geschirrspülmaschine 2. Der Geschirrkorb 1 kann ein oberer oder ein unterer Geschirrkorb der Geschirrspülmaschine 2 sein. Der Geschirrkorb 1 ist vorzugsweise mit einem Drahtmaterial gebildet. Der Geschirrkorb 1 weist vorzugsweise mehrere Bügel 3, 4, 5 auf. In Figur 1 sind beispielsweise drei Außenbügel 3, 4, 5 dargestellt. Der Außenbügel 3 kann mehrere horizontal verlaufende Streben, insbesondere Drähte, 6, 7, 8, und mehrere vertikal verlaufende Streben, insbesondere Drähte, 9, 10, aufweisen. Die horizontalen Streben 6, 7, 8 sind voneinander beabstandet angeordnet und mittels der vertikalen Streben 9, 10 miteinander verbunden, beispielweise verschweißt.

[0038] Der Geschirrkorb 1 kann einen in Figur 2 illustrierten Zusatzbügel 11 aufweisen. Der Zusatzbügel 11 kann eine horizontal verlaufende Strebe 12 und zwei seitlich an der horizontal verlaufenden Strebe 12 angebrachte vertikale Streben 13, 14 aufweisen. Der Zusatzbügel 11 ist in den Geschirrkorb 1 einbringbar und kann beispielsweise in zwei parallel verlaufende Außenbügel 4, 5 eingehängt werden. Hierzu weisen die vertikalen Streben 13, 14 an jeweils einem Endabschnitt einen entsprechenden Haken auf.

[0039] Ein Glashalter 15 ist in einen der Bügel 3, 4, 5, 11 einhängbar. Der Glashalter 15 ist entlang des Bügels 3, 4, 5, 11 verschiebbar. Vorzugsweise sind mehrere Glashalter 15 in den Geschirrkorb 1 eingehängt.

[0040] Die Figur 3 illustriert den Glashalter 15 schematisch in einer Querschnittsansicht. Der Glashalter 15 ist dazu eingerichtet, ein Stielglas 16 zu halten. Das Stiel-

Petitioner Samsung Ex-1004, 0936

glas 16 weist einen Kelch 17 mit einem Rand r_1 und einen Fuß 18 auf. Der Fuß 18 ist mit dem Kelch 17 über einen Stiel 19 verbunden.

[0041] Der Glashalter 15 ist vorzugsweise als Kunststoffbauteil ausgebildet. Der Glashalter 15 weist einen Kelchträger 20 zum Tragen des Kelches 17 des Stielglases 16 auf. Der Kelchträger 20 ist dazu eingerichtet, den Kelch 17 an lediglich einem Punkt P_1 punktweise zu berühren.

[0042] Hierzu weist der Kelchträger 20 einen Tropfenabzug 21 auf, auf dem der Kelch an dem Punkt P_1 seines Rands r_1 aufliegt. Der Tropfenabzug 21 des Kelchträgers 20 weist, wie in der Figur 4 illustriert, vorzugsweise einen dreieckförmigen Querschnitt auf. Insbesondere weist der Tropfenabzug 21 des Kelchträgers 20 im Querschnitt die Form eines gleichschenkeligen Dreiecks auf. Der Tropfenabzug 21 des Kelchträgers 20 erstreckt sich aus einer Oberseite des Kelchträgers 20 hinaus. Der Kelchträger 20 ist einstückig mit dem Tropfenabzug 21 ausgebildet. Der Kelchträger 20 und der Tropfenabzug 21 weisen im Querschnitt eine Hausform auf. Unter Hausform ist die Form eines Rechtecks mit einem aufgesetzten Dreieck zu verstehen. Der Tropfenabzug 21 des Kelchträgers 20 dient dazu, einen Wassertropfen an dem tiefsten Punkt, dem Punkt P_1, des Kelches 17 abzuleiten. Hierdurch wird die Entstehung von Wasserflecken auf dem Kelch 17 vermieden.

[0043] Der Glashalter 15 weist ferner einen stabförmigen Grundträger 22 auf. Der Grundträger 22 weist beispielsweise im Querschnitt eine Rechteckform oder eine Kreisform auf. An einem ersten Endabschnitt 23 des Grundträgers 22 ist der Kelchträger 20 vorgesehen. Der Kelchträger 20 ist seitlich an dem Endabschnitt 23 des Grundträgers 22 und senkrecht zu diesem angeordnet. Unter "senkrecht" ist vorliegend ein Winkel von 90° ± 10°, bevorzugt von 90° ± 5°, weiter bevorzugt von 90° ± 1° zu verstehen. Der Kelchträger 20 und der Grundträger 22 sind vorzugsweise einstückig ausgebildet. Insbesondere sind der Kelchträger 20 und der Grundträger 22 als Kunststoffspritzgussbauteil ausgeführt. Eine Länge l des Kelchträgers 20 ist derart bemessen, dass der Kelch 17 beim Auflegen auf den Kelchträger 20 diesen lediglich an dem einen Punkt P_1 berührt. Die Länge l ist geringer als ein Durchmesser des Rands r_1 des Kelchs 17.

[0044] Der Glashalter 15 weist ferner ein bevorzugt einstückig mit dem Grundträger 22 ausgebildetes erstes Einhängelement 24 auf. Das erste Einhängelement 24 ist beispielsweise in die Strebe 6 des Bügels 3 des Geschirrkorbs 1 eingehängt. Hierzu weist das erste Einhängelement 24 einen U-förmigen Umgreifabschnitt 25 auf, der den Bügel 3, insbesondere die Strebe 6 des Bügels 3, zumindest abschnittsweise umgreift. Das erste Einhängelement 24 weist ferner einen stabförmigen Verbindungsabschnitt 26 auf, der den Umgreifabschnitt 25 einstückig mit dem Grundträger 22 verbindet. Der Umgreifabschnitt 25 kann derart ausgebildet sein, dass dieser beim Aufdrücken oder Aufclipsen auf den Bügel 3 elastisch verformt wird und dadurch den Bügel 3 formschlüssig hält. Das erste Einhängelement 24 ist vorzugsweise an einem zweiten Endabschnitt 27 schräg nach oben beabstandet von dem ersten Endabschnitt 23 des Grundträgers 22 vorgesehen.

[0045] Der Glashalter 15 weist einen beabstandet von dem ersten Einhängelement 24 angeordnetes zweites Einhängelement 28 auf. Das zweite Einhängelement 28 ist vorzugsweise in seiner Länge verstellbar ausgebildet. Hierdurch kann ein Winkel α zwischen dem Grundträger 22 des Glashalters 15 und dem Bügel 3, 4, 5, 11 des Geschirrkorbs 1, insbesondere zwischen dem Grundträger 22 und der vertikalen Strebe 9, 10, des Geschirrkorbs 1 eingestellt werden. Das zweite Einhängelement 28 weist analog zu dem ersten Einhängelement 24 einen Umgreifabschnitt 29 auf. Über einen Verbindungsabschnitt 30, der insbesondere längenverstellbar ausgebildet ist, ist der Umgreifabschnitt 29 mit dem Grundträger 22 verstellbar verbunden. Der Verbindungsabschnitt 30 ist beispielsweise über eine Verrastung mit dem Grundträger 22 verbunden.

[0046] Der Glashalter 15 weist einen Stielhalter 31 zum Halten des Stiels 19 des Stielglases 16 auf. Der Stielhalter 31 ist vorzugsweise an dem zweiten Endabschnitt 27 des Grundträgers 22 angeordnet. Der Stielhalter 31 ist vorzugsweise entlang des Grundträgers 22 des Glashalters 15 verschiebbar. Hierzu weist der Stielhalter 31 vorzugsweise eine Schiebehülse 32 auf, die auf dem Grundträger 22 geführt ist. Durch Verschieben der Schiebehülse 32 auf dem Grundträger 22 ist der Glashalter 15 auf eine Stiellänge des Stielglases 16 einstellbar. Vorzugsweise weist die Schiebehülse 32 eine Verdrehsicherung auf, die ein Verdrehen der Schiebehülse 32 relativ zu dem Grundträger 22 verhindert. Der zweite Endabschnitt 27 ist derart reibungsbehaftet in der Schiebehülse 32 aufgenommen, dass diese mit geringem Kraftaufwand entlang des zweiten Endabschnitts 27 verschiebbar ist. Der Stielhalter 31 weist vorzugsweise ein Kunststoffmaterial auf und ist insbesondere als Kunststoffspritzgussteil ausgeführt.

[0047] Der Stielhalter 31 ist dazu eingerichtet, den Stiel 19 an maximal zwei Punkten P_2, P_3 zu berühren. Hierzu weist der Stielhalter 31, wie in der Figur 5 illustriert, einen Greifabschnitt 33 auf. Der Greifabschnitt 33 weist vorzugsweise zwei elastisch verformbare Greifarme 34, 35 auf. Die Greifarme 34, 35 sind voneinander beabstandet angeordnet. Der Abstand der Greifarme 34, 35 voneinander ist so groß, dass ein gleichzeitiger Kontakt beider Greifarme 34, 35 mit dem Stiel 19 ausgeschlossen ist. Der Stiel 19 des Stielglases 16 kann in den Greifabschnitt 33 eingeclipst werden. Der Stielhalter 31 ist somit dazu eingerichtet, den Stiel 19 zumindest abschnittsweise zu umgreifen. Der Stielhalter 31 ist vorzugsweise dazu eingerichtet, den Stiel 19 derart zu halten, dass der Kelch 17 den Grundträger 22 nicht berührt. Insbesondere ist eine Länge des Stielhalters 31 derart bemessen, dass der Kelch 17 beabstandet von dem Grundträger 22 im Punkt P_1 auf dem Kelchträger 20 aufliegt.

Petitioner Samsung Ex-1004, 0937

[0048] Der Stielhalter 31 kann, wie die Figur 6 zeigt, einen Tropfenabzug 36 aufweisen. Der Tropfenabzug 36 des Stielhalters 31 ist dazu eingerichtet, einen Wassertropfen von einem Rand r_2 des Fußes 18 des Stielglases 16 abzuleiten. Der Tropfenabzug 36 des Stielhalters 31 weist vorzugsweise analog zu dem Tropfenabzug 21 des Kelchträgers 20 einen dreieckförmigen Querschnitt auf. Der Tropfenabzug 36 des Stielhalters 31 berührt den Rand r_2 des Fußes 18 vorzugsweise an lediglich einem Punkt P_4. Der Tropfenabzug 36 des Stielhalters 31 ist vorzugsweise einteilig mit der Schiebehülse 32 ausgeführt.

[0049] Obwohl die Erfindung vorliegend anhand bevorzugter Ausführungsbeispiele beschrieben wurde, ist sie darauf nicht beschränkt, sondern vielfältig modifizierbar.

Verwendete Bezugszeichen:

[0050]

1	Geschirrkorb
2	Geschirrspülmaschine
3	Außenbügel
4	Außenbügel
5	Außenbügel
6	Strebe
7	Strebe
8	Strebe
9	Strebe
10	Strebe
11	Zusatzbügel
12	Strebe
13	Strebe
14	Strebe
15	Glashalter
16	Stielglas
17	Kelch
18	Fuß
19	Stiel
20	Kelchträger
21	Tropfenabzug
22	Grundträger
23	Endabschnitt
24	Einhängelement
25	Umgreifabschnitt
26	Verbindungsabschnitt
27	Endabschnitt
28	Einhängelement
29	Umgreifabschnitt
30	Verbindungsabschnitt
31	Stielhalter
32	Schiebehülse
33	Greifabschnitt
34	Greifarm
35	Greifarm
36	Tropfenabzug
l	Länge
P_1	Punkt
P_2	Punkt
P_3	Punkt
P_4	Punkt
r_1	Rand
r_2	Rand
α	Winkel

Patentansprüche

1. Glashalter (15) zum Halten eines Stielglases (16) für einen Geschirrkorb (1) einer Geschirrspülmaschine (2), wobei der Glashalter (15) einen Kelchträger (20) zum Tragen eines Kelches (17) des Stielglases (16) aufweist, welcher dazu eingerichtet ist, den Kelch (17) an lediglich einem Punkt (P_1) zu berühren.

2. Glashalter nach Anspruch 1, **dadurch gekennzeichnet, dass** der Kelchträger (20) senkrecht zu einem Grundträger (22) des Glashalters (15) angeordnet ist.

3. Glashalter nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Kelchträger (20) einen Tropfenabzug (21) zum Ableiten eines Wassertropfens von einem Rand (r_1) des Kelches (17) aufweist.

4. Glashalter nach Anspruch 3, **dadurch gekennzeichnet, dass** der Tropfenabzug (21) des Kelchträgers (20) einen dreieckförmigen Querschnitt aufweist.

5. Glashalter nach einem der Ansprüche 1 - 4, **gekennzeichnet durch** einen Stielhalter (31) zum Halten eines Stiels (19) des Stielglases (16).

6. Glashalter nach Anspruch 5, **dadurch gekennzeichnet, dass** der Stielhalter (31) dazu eingerichtet ist, den Stiel (19) an maximal zwei Punkten (P_2, P_3) zu berühren.

7. Glashalter nach Anspruch 5 oder 6, **dadurch gekennzeichnet, dass** der Stielhalter (31) dazu eingerichtet ist, den Stiel (19) zumindest abschnittsweise zu umgreifen.

8. Glashalter nach einem der Ansprüche 5 - 7, **dadurch gekennzeichnet, dass** der Stielhalter (31) entlang eines Grundträgers (22) des Glashalters (15) verschiebbar ist.

9. Glashalter nach einem der Ansprüche 5 - 8, **dadurch gekennzeichnet, dass** der Stielhalter (31) einen Tropfenabzug (36) zum Ableiten eines Wassertropfens von einem Rand (r_2) eines Fußes (18) des Stielglases (16) aufweist.

Petitioner Samsung Ex-1004, 0938

10. Glashalter nach Anspruch 9, **dadurch gekennzeichnet, dass** der Tropfenabzug (36) des Stielhalters (31) einen dreieckförmigen Querschnitt aufweist.

11. Glashalter nach einem der Ansprüche 1 - 10, **dadurch gekennzeichnet, dass** der Glashalter (15) in einen Bügel (3, 4, 5, 11) des Geschirrkorbs (1) einhängbar ist.

12. Glashalter nach einem der Ansprüche 1 - 11, **dadurch gekennzeichnet, dass** ein Winkel (α) zwischen einem Grundträger (22) des Glashalters (15) und dem Geschirrkorb (1) einstellbar ist.

13. Geschirrkorb (1) für eine Geschirrspülmaschine (2), mit einem Bügel (3, 4, 5) und zumindest einem Glashalter (15) nach einem der Ansprüche 1 - 12, wobei der zumindest eine Glashalter (15) in den Bügel (3, 4, 5) eingehängt ist.

14. Geschirrkorb nach Anspruch 13, **gekennzeichnet durch** einen in den Geschirrkorb (1) einbringbaren Zusatzbügel (11), in den der zumindest eine Glashalter (15) einhängbar ist.

15. Geschirrspülmaschine (2), mit einem Geschirrkorb (1) nach Anspruch 13 oder 14.

Petitioner Samsung Ex-1004, 0939

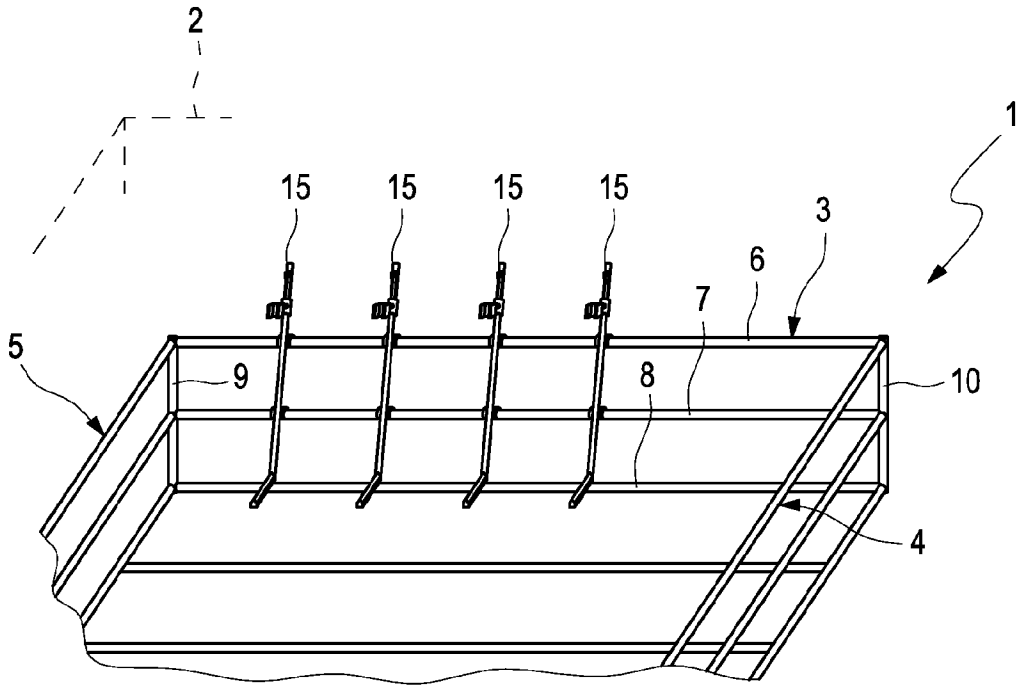


Fig. 1

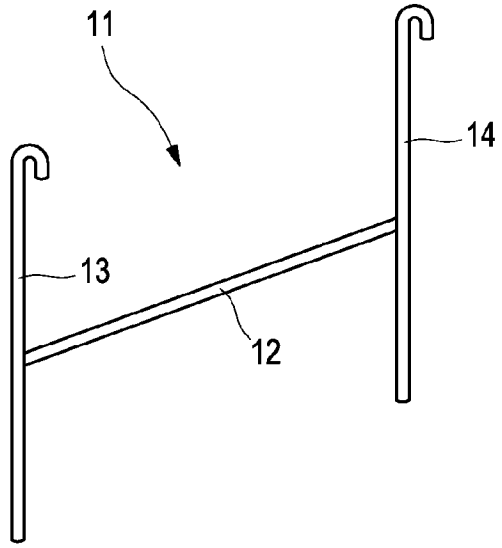


Fig. 2

Petitioner Samsung Ex-1004, 0940

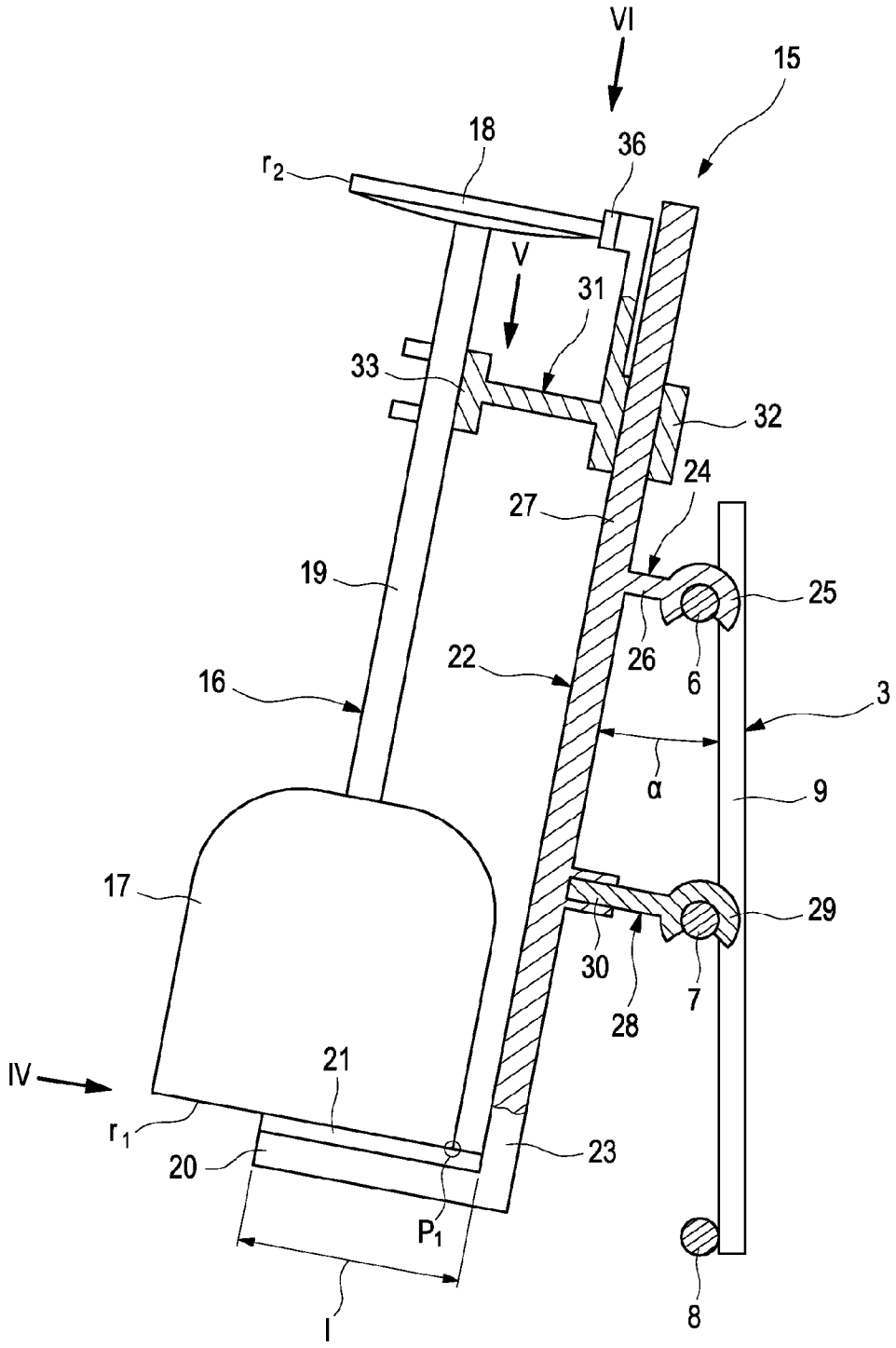


Fig. 3

Petitioner Samsung Ex-1004, 0941

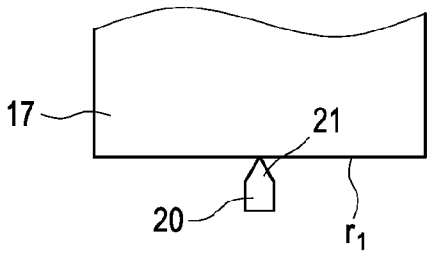


Fig. 4

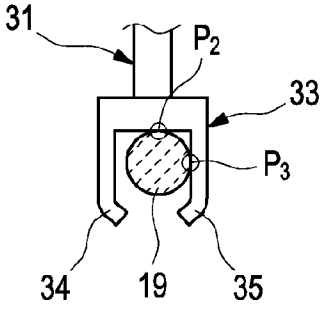


Fig. 5

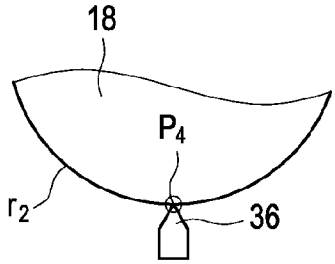


Fig. 6

Petitioner Samsung Ex-1004, 0942

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPÄISCHER RECHERCHENBERICHT

Nummer der Anmeldung
EP 14 17 1964

EINSCHLÄGIGE DOKUMENTE

Kategorie	Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile	Betrifft Anspruch	KLASSIFIKATION DER ANMELDUNG (IPC)
X	DE 10 2006 055346 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 29. Mai 2008 (2008-05-29)	1,2,5-7, 11-13,15	INV. A47L15/50
Y	* Seite 2, Absatz 5 - Absatz 6 * * Seite 3, Absatz 20 - Seite 4, Absatz 21; Abbildungen 1,2 *	3,4, 8-10,14	
Y,D	EP 2 353 488 A1 (MIELE & CIE [DE]) 10. August 2011 (2011-08-10) * Seite 5, Absatz 40 - Absatz 42; Abbildungen 11,12 *	3,4, 8-10,14	
Y	WO 2013/036468 A1 (PREMARK FEG LLC [US]; BOLDT ADRIAN [DE]; BRODOWSKI BJORN [DE]) 14. März 2013 (2013-03-14) * Abbildungen 5-8 *	3,9,10	
Y	FR 2 152 375 A1 (DIVERSEY FRANCE [FR]) 27. April 1973 (1973-04-27) * Seite 2, Zeile 4 - Zeile 10 * * Seite 3, Zeile 5 - Zeile 10; Abbildungen 1,2 *	3,9	
Y	EP 2 220 989 A1 (BONFERRARO SPA [IT]) 25. August 2010 (2010-08-25) * Spalte 3, Absatz 21; Abbildung 4 *	4,10	
Y	DE 100 15 003 A1 (AEG HAUSGERAETE GMBH [DE]) 11. Oktober 2001 (2001-10-11) * Spalte 3, Absatz 17 * * Spalte 7, Absatz 59 - Absatz 61; Abbildungen 6C,7 *	3,4,10	

RECHERCHIERTE SACHGEBIETE (IPC)

A47L

Der vorliegende Recherchenbericht wurde für alle Patentansprüche erstellt

Recherchenort	Abschlußdatum der Recherche	Prüfer
München	11. November 2014	Lodato, Alessandra

KATEGORIE DER GENANNTEN DOKUMENTE

X : von besonderer Bedeutung allein betrachtet
Y : von besonderer Bedeutung in Verbindung mit einer anderen Veröffentlichung derselben Kategorie
A : technologischer Hintergrund
O : nichtschriftliche Offenbarung
P : Zwischenliteratur

T : der Erfindung zugrunde liegende Theorien oder Grundsätze
E : älteres Patentdokument, das jedoch erst am oder nach dem Anmeldedatum veröffentlicht worden ist
D : in der Anmeldung angeführtes Dokument
L : aus anderen Gründen angeführtes Dokument

& : Mitglied der gleichen Patentfamilie, übereinstimmendes Dokument

EPO FORM 1503 03.82 (P04C03)

Petitioner Samsung Ex-1004, 0943

ANHANG ZUM EUROPÄISCHEN RECHERCHENBERICHT ÜBER DIE EUROPÄISCHE PATENTANMELDUNG NR. EP 14 17 1964

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten europäischen Recherchenbericht angeführten Patentdokumente angegeben.
Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am
Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

11-11-2014

Im Recherchenbericht angeführtes Patentdokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
DE 102006055346 A1	29-05-2008	CN 101528107 A	09-09-2009
		DE 102006055346 A1	29-05-2008
		EP 2096979 A1	09-09-2009
		WO 2008061898 A1	29-05-2008
EP 2353488 A1	10-08-2011	EP 2353488 A1	10-08-2011
		ES 2388725 T3	18-10-2012
		US 2011192808 A1	11-08-2011
WO 2013036468 A1	14-03-2013	EP 2753227 A1	16-07-2014
		WO 2013036468 A1	14-03-2013
FR 2152375 A1	27-04-1973	KEINE	
EP 2220989 A1	25-08-2010	KEINE	
DE 10015003 A1	11-10-2001	DE 10015003 A1	11-10-2001
		EP 1138249 A2	04-10-2001

EPO FORM P0461

Für nähere Einzelheiten zu diesem Anhang : siehe Amtsblatt des Europäischen Patentamts, Nr.12/82

Petitioner Samsung Ex-1004, 0944

IN DER BESCHREIBUNG AUFGEFÜHRTE DOKUMENTE

Diese Liste der vom Anmelder aufgeführten Dokumente wurde ausschließlich zur Information des Lesers aufgenommen und ist nicht Bestandteil des europäischen Patentdokumentes. Sie wurde mit größter Sorgfalt zusammengestellt; das EPA übernimmt jedoch keinerlei Haftung für etwaige Fehler oder Auslassungen.

In der Beschreibung aufgeführte Patentdokumente

- EP 2353488 D1 **[0003]**

Petitioner Samsung Ex-1004, 0945

Espacenet

Bibliographic data: CN106998989 (A) — 2017-08-01

Dish washing machine

Inventor(s): CHO HWANG-MOOK; PARK JUN-HONG; SEO EUNG-RYEOL; LEE GUN-UNG; LEE SEUNG-MOK; LEE CHANG-WOOK; PARK NAM-SOO ± (赵皇默, ; 朴峻弘, ; 徐应烈, ; 李健雄, ; 李承穆, ; 李昌旭, ; 朴南洙)

Applicant(s): SAMSUNG ELECTRONICS CO LTD ± (三星电子株式会社)

Classification: **- international:** ***A47L15/16; A47L15/42; A47L15/50***
- cooperative: A47L15/16 (EP, CN); A47L15/4221 (EP); A47L15/4282 (EP, CN, US); A47L15/504 (CN, US); Y02B40/00 (EP)

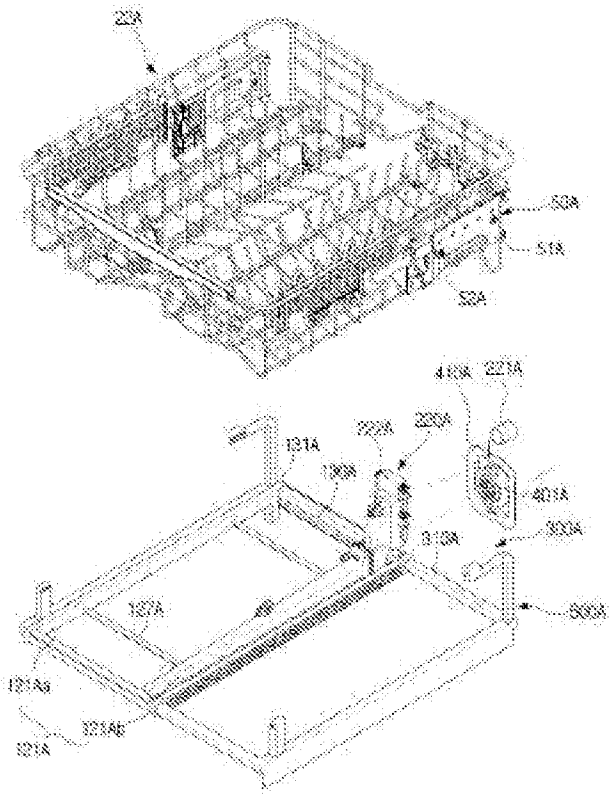
Application number: CN20158065190 20150924 Global Dossier

Priority number(s): KR20140133208 20141002 ; KR20150078919 20150604 ; WO2015KR10061 20150924

Also published as: CN106998989 (B) EP3200668 (A1) EP3200668 (A4) EP3200668 (B1) KR102458435 (B1) KR20160040075 (A) less

Abstract of CN106998989 (A)

Provided is a dish washing machine having a structure improved to increase washing efficiency. The dish washing machine includes a washing tub for washing dishes, an injection unit configured to inject washing water into the washing tub, and a deflection unit configured to move inside the washing tub to deflect the washing water injected from the injection unit toward the dishes. The deflection unit includes a first vane configured to be linearly movable in a direction in which the washing water is injected and a second vane configured to interwork with the first vane.



Petitioner Samsung Ex-1004, 0947

(19)中华人民共和国国家知识产权局

(12)发明专利申请

(10)申请公布号 CN 106998989 A
(43)申请公布日 2017.08.01

(21)申请号 201580065190.8

(22)申请日 2015.09.24

(30)优先权数据
10-2014-0133208 2014.10.02 KR
10-2015-0078919 2015.06.04 KR

(85)PCT国际申请进入国家阶段日
2017.05.22

(86)PCT国际申请的申请数据
PCT/KR2015/010061 2015.09.24

(87)PCT国际申请的公布数据
WO2016/052921 EN 2016.04.07

(71)申请人 三星电子株式会社
地址 韩国京畿道

(72)发明人 赵皇默 朴峻弘 徐应烈 李健雄 李承穆 李昌旭 朴南洙

(74)专利代理机构 北京市柳沈律师事务所 11105
代理人 张波

(51)Int.Cl.
A47L 15/16(2006.01)
A47L 15/42(2006.01)
A47L 15/50(2006.01)

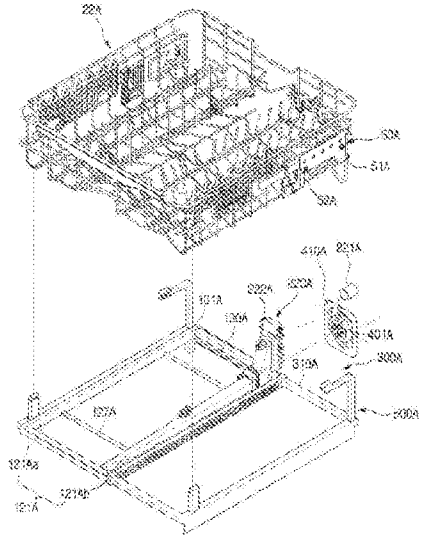
权利要求书5页 说明书32页 附图62页

(54)发明名称

洗碗机

(57)摘要

提供了一种具有改进的结构以提高洗涤效率的洗碗机。洗碗机包括用于洗涤餐具的洗涤桶、配置为将洗涤水喷射到洗涤桶中的喷射单元，以及配置为在洗涤桶内移动以使从喷射单元喷射的洗涤水朝向餐具偏转的偏转单元。偏转单元包括配置为在喷射洗涤水的方向上可线性移动的第一叶片以及配置为与第一叶片配合的第二叶片。



CN 106998989 A

Petitioner Samsung Ex-1004, 0948

1.一种洗碗机,包括:

洗涤桶,用于洗涤餐具;

喷射单元,配置成将洗涤水喷射到所述洗涤桶中;以及

偏转单元,配置为在所述洗涤桶内移动以使从所述喷射单元喷射的洗涤水朝向餐具偏转,

其中,所述偏转单元包括配置为可线性移动的第一叶片以及在所述第一叶片的移动方向上与所述第一叶片平行布置的第二叶片。

2.根据权利要求1所述的洗碗机,其中,所述第一叶片配置为在第一方向和与所述第一方向相反的第二方向上线性移动,并且

其中,所述第二叶片配置为与所述第一叶片配合。

3.根据权利要求1所述的洗碗机,其中,所述喷射单元包括喷射喷嘴,所述喷射喷嘴配置为将洗涤水沿从所述洗涤桶的中心朝向一侧的第一方向和从所述洗涤桶的中心朝向另一侧的第二方向喷射。

4.根据权利要求1所述的洗碗机,包括引导所述偏转单元的运动的轨道组件,

其中,所述轨道组件包括:

沿所述第一方向和所述第二方向延伸的轨道;以及

配置为使得所述轨道被安装的保持器单元。

5.根据权利要求4所述的洗碗机,其中,所述保持器单元包括:

配置为使得所述轨道被连接的保持器框架;

安装在所述保持器框架的一端上的前保持器;以及

安装在所述保持器框架的另一端上的后保持器。

6.根据权利要求5所述的洗碗机,还包括配置为储存餐具的餐具篮,

其中,所述前保持器和所述后保持器中的至少一个与所述餐具篮联接。

7.根据权利要求5所述的洗碗机,其中,所述偏转单元包括:

移动轨道,将所述第一叶片和所述第二叶片连接;以及

轨道联接部分,配置为使得所述第一叶片和所述第二叶片与轨道可移动地联接。

8.根据权利要求7所述的洗碗机,包括配置为移动所述偏转单元的电机组件,

其中,所述电机组件包括:

产生转矩的电机;

连接到所述电机的轴的第一齿轮;以及

第二齿轮,连接到所述第一齿轮并将所述电机的驱动力传递到所述偏转单元。

9.根据权利要求8所述的洗碗机,其中,所述第二齿轮形成在所述移动轨道的至少一部分上。

10.根据权利要求5所述的洗碗机,其中,所述偏转单元还包括叶片保持器,其配置为使得所述第一叶片和所述第二叶片与所述轨道可移动地联接,

其中,所述叶片保持器包括形成为使得所述第一叶片和所述第二叶片可旋转地联接的联接突起,并且

其中,所述第一叶片和所述第二叶片各自包括与所述联接突起可旋转地联接的联接槽。

Petitioner Samsung Ex-1004, 0949

11.根据权利要求1所述的洗碗机，其中，所述喷射单元包括：

固定喷嘴，设置在所述洗涤桶的后部，并且喷射洗涤水；以及

喷射壳体，设置成连接到固定喷嘴，并且包括喷射喷嘴，喷射喷嘴形成为在所述洗涤桶中向前和向后延伸并喷射洗涤水。

12.根据权利要求11所述的洗碗机，其中，所述喷射喷嘴包括：

第一喷嘴，形成在所述喷射壳体的一端上以在所述第一方向上喷射洗涤水；以及

第二喷嘴，形成在所述喷射壳体的另一端上以在所述第二方向上喷射洗涤水。

13.根据权利要求12所述的洗碗机，其中，所述喷射壳体包括：

第一喷射流道，配置为经由所述第一喷嘴喷射洗涤水；以及

第二喷射流道，配置为经由所述第二喷嘴喷射洗涤水，并且

其中，所述第一喷射流道和所述第二喷射流道通过分隔件分开。

14.根据权利要求11所述的洗碗机，其中，所述喷射壳体还包括配置为旋转所述第一叶片和所述第二叶片的旋转引导件。

15.根据权利要求13所述的洗碗机，包括流道切换单元，其配置为将洗涤水供应到所述第一喷射流道和所述第二喷射流道中的至少任一个。

16.根据权利要求15所述的洗碗机，其中，所述流道切换单元还包括产生驱动力的电机。

17.根据权利要求15所述的洗碗机，其中，所述流道切换单元包括流道切换保持器，其配置为沿所述第一方向和所述第二方向移动并且切换流道，并且

其中，所述流道切换保持器在沿所述偏转单元的移动方向被加压时将所述偏转单元的移动方向切换到相反方向。

18.根据权利要求1所述的洗碗机，还包括传感器单元，其配置为限制所述偏转单元的移动距离。

19.一种洗碗机，包括：

洗涤桶，用于洗涤餐具；

喷射单元，配置为沿从所述洗涤桶的中心朝向一侧的第一方向和与所述第一方向相反的第二方向喷射洗涤水；

第一叶片，配置为在所述洗涤桶内可线性移动以将洗涤水偏转到所述洗涤桶的至少一部分；以及

第二叶片，配置为与所述第一叶片平行地移动以将洗涤水偏转到所述洗涤桶的另一部分。

20.根据权利要求19所述的洗碗机，包括轨道，所述轨道在所述第一方向和所述第二方向上延伸，以引导所述第一叶片和所述第二叶片的运动。

21.根据权利要求20所述的洗碗机，还包括：

移动轨道，将所述第一叶片和所述第二叶片连接；以及

叶片保持器，配置为可移动地联接到所述轨道。

22.根据权利要求21所述的洗碗机，其中，所述第一叶片和所述第二叶片与所述叶片保持器可旋转地联接。

23.根据权利要求19所述的洗碗机，其中，所述喷射单元包括：

Petitioner Samsung Ex-1004, 0950

固定喷嘴，设置在所述洗涤桶的后部并且配置为喷射洗涤水；以及

喷射壳体，设置成连接到固定喷嘴并且包括喷射喷嘴，所述喷射喷嘴形成为在所述洗涤桶中向前和向后延伸以喷射洗涤水。

24.根据权利要求23所述的洗碗机，其中，所述喷射喷嘴包括：

第一喷嘴，形成在所述喷射壳体的一端上以在所述第一方向上喷射洗涤水；以及

第二喷嘴，形成在所述喷射壳体的另一端上以在所述第二方向上喷射洗涤水。

25.根据权利要求24所述的洗碗机，其中，所述喷射壳体包括：

第一喷射流道，配置为经由所述第一喷嘴喷射洗涤水；以及

第二喷射流道，配置为经由所述第二喷嘴喷射洗涤水，并且

其中，所述第一喷射流道和所述第二喷射流道通过分隔件分开。

26.根据权利要求25所述的洗碗机，其中，第一流道和第二流道各自使用密封构件密封。

27.根据权利要求23所述的洗碗机，其中，所述喷射壳体还包括配置为旋转所述第一叶片和所述第二叶片的旋转引导件。

28.根据权利要求25所述的洗碗机，包括流道切换单元，其配置为将洗涤水供应到所述第一喷射流道和所述第二喷射流道中的至少一个。

29.根据权利要求28所述的洗碗机，其中，所述流道切换单元还包括产生驱动力的电机。

30.根据权利要求28所述的洗碗机，其中，所述流道切换单元包括流道切换保持器，其配置为沿所述第一方向和所述第二方向移动并且切换流道，并且

其中，所述流道切换保持器在沿所述第一叶片和所述第二叶片的移动方向上被加压时将所述第一叶片和所述第二叶片的移动方向切换到相反方向。

31.根据权利要求30所述的洗碗机，还包括配置为限制所述第一叶片和所述第二叶片的移动距离的传感器单元。

32.根据权利要求19所述的洗碗机，包括配置为以可变安装位置将餐具储存在洗涤桶中的餐具篮，

其中，所述第一叶片和所述第二叶片设置在所述餐具篮的下方，并且包括用于与所述餐具篮联接的保持器单元。

33.根据权利要求32所述的洗碗机，其中，所述洗涤桶包括支撑具有可变安装位置的所述餐具篮的至少一个导轨。

34.一种洗碗机，包括：

洗涤桶，用于洗涤餐具；

第一喷嘴，配置为沿从所述洗涤桶的中心朝向一侧的第一方向喷射洗涤水；

第二喷嘴，配置为沿与所述第一方向相反的第二方向喷射洗涤水；

第一叶片，配置为能够移动以使从所述第一喷嘴喷射的洗涤水朝向餐具偏转；

第二叶片，配置为能够在所述第一叶片的移动方向上移动以使从所述第二喷嘴喷射的洗涤水朝向餐具偏转；以及

流道切换单元，配置为将洗涤水供应到所述第一喷嘴和所述第二喷嘴中的至少任一个。

Petitioner Samsung Ex-1004, 0951

35.根据权利要求34所述的洗碗机，其中，所述喷射单元包括：

固定喷嘴，设置在所述洗涤桶的后部并且配置为喷射洗涤水；以及

喷射壳体，设置成连接到固定喷嘴并且包括喷射喷嘴，喷射喷嘴形成为在所述洗涤桶中向前和向后延伸以喷射洗涤水。

36.根据权利要求35所述的洗碗机，其中，所述喷射壳体包括：

第一喷射流道，配置为经由所述第一喷嘴喷射洗涤水；以及

第二喷射流道，配置为经由所述第二喷嘴喷射洗涤水，并且

其中，所述第一喷射流道和所述第二喷射流道通过分隔件分开。

37.根据权利要求36所述的洗碗机，其中，第一流道和第二流道各自使用密封构件密封。

38.根据权利要求34所述的洗碗机，其中，所述流道切换单元包括配置为沿所述第一方向和所述第二方向移动并且切换流道的流道切换保持器，并且

其中，所述流道切换保持器在沿所述第一叶片和所述第二叶片的移动方向被加压时将所述第一叶片和所述第二叶片的移动方向切换到相反方向。

39.根据权利要求38所述的洗碗机，还包括配置为限制所述第一喷嘴和所述第二喷嘴的移动距离的传感器单元。

40.根据权利要求34所述的洗碗机，其中，所述流道切换单元包括产生驱动力的电机。

41.根据权利要求34所述的洗碗机，包括配置为以可变安装位置将餐具储存在洗涤桶中的餐具篮，

其中，所述喷射单元、所述第一叶片和所述第二叶片安装在所述餐具篮中。

42.根据权利要求41所述的洗碗机，其中，所述第一叶片和所述第二叶片包括用于与所述餐具篮联接的保持器单元。

43.一种洗碗机，包括：

形成外部的机壳，

洗涤桶，设置在所述机壳中并配置为洗涤餐具；

喷射单元，配置为将洗涤水喷射到所述洗涤桶中；

餐具篮，配置为以可变安装位置将餐具储存在所述洗涤桶中；

偏转单元，设置在所述餐具篮下方，位于从所述喷射单元喷射的洗涤水的路径上以切换喷射的洗涤水的方向；以及

动力传递装置，传递动力使得所述偏转单元能够在所述餐具篮下方移动，

其中，所述动力传递装置包括：

电机，固定到所述洗涤桶的一侧并配置为产生驱动力；以及

齿轮单元，配置为将电机的驱动力传递到所述偏转单元，并且包括形成在不同高度处以对应于所述餐具篮的可变位置的多个齿轮。

44.根据权利要求43所述的洗碗机，其中，所述齿轮单元包括：

第一齿轮，

与所述第一齿轮间隔开设置的第二齿轮；以及

配置为使得所述第一齿轮与所述第二齿轮连接的多个连接齿轮。

45.根据权利要求43所述的洗碗机，其中，所述偏转单元包括：

Petitioner Samsung Ex-1004, 0952

叶片，配置为在所述洗涤桶内移动以使从所述喷射单元喷射的洗涤水朝向餐具偏转；

轨道，引导所述叶片的运动；

带，在连接到驱动滑轮和惰带轮时旋转以将电机的驱动力传递到所述叶片；

后保持器，可旋转地支撑所述驱动带轮并且由于所述带的张力而与所述轨道的一端联接；以及

前保持器，可旋转地支撑所述惰带轮并且由于所述带的张力而与所述轨道的另一端联接。

46.根据权利要求45所述的洗碗机，其中，所述多个连接齿轮中的一个连接到所述驱动带轮。

47.根据权利要求46所述的洗碗机，其中，所述多个连接齿轮包括连接到所述第一齿轮的第一连接齿轮，连接到所述第二齿轮的第二连接齿轮以及水平地连接到所述第二连接齿轮的至少一个减速齿轮。

48.根据权利要求47所述的洗碗机，还包括将所述第一连接齿轮与所述第二连接齿轮垂直连接的连接轴。

49.根据权利要求47所述的洗碗机，其中，所述多个连接齿轮中的一个连接到所述驱动带轮。

50.根据权利要求46所述的洗碗机，其中，所述齿轮单元与所述餐具篮的一侧成一体。

51.根据权利要求47所述的洗碗机，其中，所述洗涤桶包括至少一个导轨，其支撑所述餐具篮使得所述餐具篮的高度是可变的，并且

其中，所述至少一个导轨包括支撑处于第一位置的餐具盘的第一导轨和支撑处于第二位置的餐具篮的、与所述第一轨道间隔开的第二导轨。

52.根据权利要求51所述的洗碗机，其中，当所述餐具篮处于所述第一位置时，所述第一齿轮连接到电机，并且

当所述餐具篮处于所述第二位置时，所述第二齿轮连接到电机。

53.根据权利要求43所述的洗碗机，其中，所述电机设置在所述洗涤桶的后部。

54.根据权利要求43所述的洗碗机，其中，所述喷射单元包括：

固定喷嘴，设置在所述洗涤桶的后部并且配置为喷射洗涤水；以及

喷射壳体，其设置成连接到所述固定喷嘴，并且包括多个连接开口和喷射喷嘴，多个连接开口形成在不同高度处以对应于所述餐具篮的可变位置，喷射喷嘴配置为喷射经由所述连接开口供应的洗涤水。

55.根据权利要求54所述的洗碗机，其中，所述喷射壳体包括配置为打开和关闭其中的所述多个连接开口的阀。

Petitioner Samsung Ex-1004, 0953

洗碗机

技术领域

[0001] 本公开的实施例涉及一种洗碗机，更具体地，涉及一种具有改进的结构以提高洗涤效率的洗碗机。

背景技术

[0002] 洗碗机通过将高压洗涤水喷洒到餐具上来洗涤餐具，并且每个包括用于洗涤餐具的洗涤桶、安装在洗涤桶中以储存餐具的餐具篮、用于收集洗涤餐具的洗涤水的水槽以及用于将洗涤水喷射到洗涤桶中的泵和喷嘴。

[0003] 通常，洗碗机采用具有旋转喷射喷嘴的转子型喷射结构。由于水压，旋转喷嘴在旋转时喷射洗涤水。

发明内容

[0004] 技术问题

[0005] 然而，由于这种旋转喷嘴仅在旋转半径的范围内喷射洗涤水，所以可能会发生洗涤水没有喷射到的区域。因此，为了防止发生洗涤水没有喷射到的区域，提供了所谓的线性型喷射结构。

[0006] 线性型喷射结构均包括固定在洗涤桶一侧的固定喷嘴和在洗涤桶内移动并将从固定喷嘴喷射的洗涤水朝向餐具偏转的叶片，从而根据偏转板的运动将洗涤水喷射到洗涤桶的区域。

[0007] 固定喷嘴包括多个喷射孔，它们在洗涤桶中左右布置，并且固定到洗涤桶的后壁。叶片在洗涤桶中左右延伸，以使从多个喷射孔喷射的洗涤水偏转，并且可以设置成在洗涤桶的前部和后部之间线性往复运动。

[0008] 此外，线性型喷射结构均包括能够驱动叶片的驱动装置。驱动装置可以以各种方式实现，但是可以设置为例如包括电机、连接到电机并将驱动力传递到叶片的带以及引导叶片的运动的轨道，使得当电机被驱动时，带旋转以使叶片在轨道上移动。

[0009] 在这样的线性型喷射结构的情况下，为了使从固定喷嘴喷射的水流撞击叶片，需要保持叶片的多于一定高度，并且叶片的高度减小内部体积，从而减小可装载板的最大尺寸。

[0010] 同时，餐具篮安装在洗涤桶的顶部和底部上以便可前后滑动。需要调整餐具篮的高度，以便储存和洗涤各种类型和尺寸的餐具，如碗和碟。

[0011] 技术方案

[0012] 因此，本公开的一方面是提供一种包括线性型喷射单元的洗碗机。

[0013] 本公开的一方面是提供一种具有改进的结构以提高洗涤效率的洗碗机。

[0014] 本公开的一方面是提供一种包括叶片单元和流道切换装置的洗碗机。

[0015] 本公开的一方面是提供一种具有线性型喷射结构的洗碗机，并且其可以通过降低喷嘴撞击距离来降低叶片的高度从而提供线性型的紧凑尺寸，以扩大餐具和锅具装载量。

Petitioner Samsung Ex-1004, 0954

[0016] 本公开的一方面是提供一种包括篮的高度可调的线性型喷射单元的洗碗机，以存储各种类型的餐具和锅具。

[0017] 本公开的一方面是提供一种包括用于高度可调的线性型喷射单元的驱动装置的洗碗机。

[0018] 本发明的另外的方面将部分地在下面的描述中阐述，并且部分地从描述中将是显而易见的，或者可以通过实践本发明来了解。

[0019] 根据本公开的一方面，洗碗机包括用于洗涤餐具的洗涤桶、用于将洗涤水喷射到洗涤桶中的喷射单元，以及在洗涤桶内移动以使从喷射单元喷射的洗涤水朝向餐具偏转的偏转单元，其中，偏转单元包括可线性移动的第一叶片和在第一叶片的移动方向上与第一叶片平行布置的第二叶片。

[0020] 第一叶片可以在第一方向和与第一方向相反的第二方向上线性移动，并且第二叶片可与第一叶片配合(interwork)。

[0021] 喷射单元可以包括喷射喷嘴，以将洗涤水沿从洗涤桶的中心朝向一侧的第一方向和从洗涤桶的中心朝向另一侧的第二方向喷射。

[0022] 洗碗机可以包括引导偏转单元的运动的轨道组件，并且轨道组件可以包括沿第一方向和第二方向延伸的轨道，以及配置为使得轨道被安装的保持器单元。

[0023] 保持器单元可以包括配置为使得轨道被连接的保持器框架、安装在保持器框架的一端上的前保持器和安装在保持器框架的另一端上的后保持器。

[0024] 洗碗机可以包括用于储存餐具的餐具篮，并且前保持器和后保持器中的至少一个可以与餐具篮联接。

[0025] 偏转单元可以包括将第一叶片和第二叶片连接的移动轨道以及配置为使得第一叶片和第二叶片与轨道可移动地联接的轨道联接部分。

[0026] 洗碗机可以包括用于移动偏转单元的电机组件。电机组件可以包括产生转矩的电机、连接到电机的轴的第一齿轮和连接到第一齿轮并将电机的驱动力传递到偏转单元的第二齿轮。

[0027] 第二齿轮可以形成在移动轨道的至少一部分上。

[0028] 偏转单元还可以包括叶片保持器，其配置为使得第一叶片和第二叶片与轨道可移动地联接。叶片保持器可以包括形成为使得第一叶片和第二叶片可旋转地联接的联接突起，并且第一叶片和第二叶片各自可以包括与联接突起可旋转地联接的联接槽。

[0029] 喷射单元可以包括设置在洗涤桶的后部并且喷射洗涤水的固定喷嘴，以及喷射壳体，喷射壳体设置成连接到固定喷嘴，包括形成为在洗涤桶中向前和向后延伸并喷射洗涤水的喷射喷嘴。

[0030] 喷射喷嘴可以包括形成在喷射壳体的一端上以在第一方向上喷射洗涤水的第一喷嘴和形成在喷射壳体的另一端上以在第二方向上喷射洗涤水的第二喷嘴。

[0031] 喷射壳体可以包括经由第一喷嘴喷射洗涤水的第一喷射流道，和经由第二喷嘴喷射洗涤水的第二喷射流道，并且第一喷射流道和第二喷射流道可以通过分隔件分开。

[0032] 喷射壳体可以包括旋转引导件以旋转第一叶片和第二叶片。

[0033] 洗碗机可以包括流道切换单元，以将洗涤水供应到第一喷射流道和第二喷射流道中的至少任一个。

Petitioner Samsung Ex-1004, 0955

[0034] 流道切换单元可以包括产生驱动力的电机。

[0035] 流道切换单元可以包括沿第一方向和第二方向移动并且切换流道的流道切换保持器，并且流道切换保持器可以在偏转单元的移动方向上被加压时将偏转单元的移动方向切换到相反方向。

[0036] 洗碗机可以包括用于限制偏转单元的移动距离的传感器单元。

[0037] 根据本公开的一方面，洗碗机包括用于洗涤餐具的洗涤桶、配置为沿从洗涤桶的中心朝向一侧的第一方向和与第一方向相反的第二方向喷射洗涤水的喷射单元、在洗涤桶内线性移动以将洗涤水偏转到洗涤桶的至少一部分的第一叶片，以及与第一叶片平行移动以将洗涤水偏转到洗涤桶的另一部分的第二叶片。

[0038] 洗碗机可以包括在第一方向和第二方向上延伸的轨道，以引导第一叶片和第二叶片的运动。

[0039] 洗碗机可以包括将第一叶片与第二叶片连接的移动轨道以及可移动地联接到轨道的叶片保持器。

[0040] 第一叶片和第二叶片可以与叶片保持器可旋转地联接。

[0041] 喷射单元可以包括设置在洗涤桶的后部并且喷射洗涤水的固定喷嘴，以及喷射壳体，喷射壳体设置成连接到固定喷嘴，包括形成为在洗涤桶中向前和向后延伸以喷射洗涤水的喷射喷嘴。

[0042] 喷射喷嘴可以包括形成在喷射壳体的一端上以在第一方向上喷射洗涤水的第一喷嘴和形成在喷射壳体的另一端上以在第二方向上喷射洗涤水的第二喷嘴。

[0043] 喷射壳体可以包括经由第一喷嘴喷射洗涤水的第一喷射流道，和经由第二喷嘴喷射洗涤水的第二喷射流道，并且第一喷射流道和第二喷射流道可以通过分隔件分开。

[0044] 第一流道和第二流道各自可以使用密封构件密封。

[0045] 喷射壳体可以包括配置为旋转第一叶片和第二叶片的旋转引导件。

[0046] 洗碗机可以包括流道切换单元，以将洗涤水供应到第一喷射流道和第二喷射流道中的至少任一个。

[0047] 流道切换单元可以包括产生驱动力的电机。

[0048] 流道切换单元可以包括沿第一方向和第二方向移动并且切换流道的流道切换保持器，并且流道切换保持器可以在第一叶片和第二叶片的移动方向上被加压时将第一叶片和第二叶片的移动方向切换到相反方向。

[0049] 洗碗机可以包括用于限制第一叶片和第二叶片的移动距离的传感器单元。

[0050] 洗碗机可以包括用于以可变安装位置将餐具储存在洗涤桶中的餐具篮。第一叶片和第二叶片可以设置在餐具篮的下方，并且可以包括与餐具篮联接的保持器单元。

[0051] 洗涤桶可以包括支撑具有可变安装位置的餐具篮的至少一个导轨。

[0052] 根据本公开的一方面，洗碗机包括用于洗涤餐具的洗涤桶、沿从洗涤桶的中心朝向一侧的第一方向喷射洗涤水的第一喷嘴、沿与第一方向相反的第二方向喷射洗涤水的第二喷嘴、可移动以使从第一喷嘴喷射的洗涤水朝向餐具偏转的第一叶片、可在第一叶片的移动方向上移动以使从第二喷嘴喷射的洗涤水朝向餐具偏转的第二叶片，以及用于将洗涤水供应到第一喷嘴和第二喷嘴中的至少任一个的流道切换单元。

[0053] 喷射单元可以包括设置在洗涤桶的后部并且喷射洗涤水的固定喷嘴，以及喷射壳

Petitioner Samsung Ex-1004, 0956

体，喷射壳体设置成连接到固定喷嘴，包括形成为在洗涤桶中向前和向后延伸以喷射洗涤水的喷射喷嘴。

[0054] 喷射壳体可以包括经由第一喷嘴喷射洗涤水的第一喷射流道，和经由第二喷嘴喷射洗涤水的第二喷射流道，并且第一喷射流道和第二喷射流道可以通过分隔件分开。

[0055] 第一流道和第二流道各自可以使用密封构件密封。

[0056] 流道切换单元可以包括沿第一方向和第二方向移动并且切换流道的流道切换保持器，并且流道切换保持器可以在第一叶片和第二叶片的移动方向上被加压时将第一叶片和第二叶片的移动方向切换到相反方向。

[0057] 洗碗机可以包括用于限制第一喷嘴和第二喷嘴的移动距离的传感器单元。

[0058] 流道切换单元可以包括产生驱动力的电机。

[0059] 喷射单元、第一叶片和第二叶片可以安装在餐具篮中。

[0060] 洗碗机可以包括以可变安装位置将餐具储存在洗涤桶中的餐具篮，并且第一叶片和第二叶片可以包括与餐具篮联接的保持器单元。

[0061] 根据本公开的另一方面，洗碗机包括形成外部的机壳、设置在机壳中并洗涤餐具的洗涤桶、将洗涤水喷射到洗涤桶中的喷射单元、以可变安装位置将餐具储存在洗涤桶中的餐具篮、设置在餐具篮下方的位于从喷射单元喷射的洗涤水的路径上以切换喷射的洗涤水的方向的偏转单元，以及传递动力使得偏转单元在餐具篮下方移动的动力传递装置。动力传递装置包括固定到洗涤桶的一侧并产生驱动力的电机以及齿轮单元，齿轮单元用于将电机的驱动力传递到偏转单元，并且包括形成在不同高度处以对应于餐具篮的可变位置的多个齿轮。

[0062] 齿轮单元可以包括第一齿轮、与第一齿轮间隔开设置的第二齿轮以及将第一齿轮与第二齿轮连接的多个连接齿轮。

[0063] 偏转单元可以包括在洗涤桶内可移动以使从喷射单元喷射的洗涤水朝向餐具偏转的叶片、引导叶片的运动的轨道、在连接到驱动滑轮和惰带轮时旋转以将电机的驱动力传递到叶片的带、可旋转地支撑驱动带轮并且由于带的张力而与轨道的一端联接的后保持器，以及可旋转地支撑惰带轮并由于带的张力而与轨道的另一端联接的前保持器。

[0064] 多个连接齿轮中的一个可以连接到驱动带轮。

[0065] 多个连接齿轮可以包括连接到第一齿轮的第一连接齿轮、连接到第二齿轮的第二连接齿轮以及水平地连接到第二连接齿轮的至少一个减速齿轮。

[0066] 洗碗机可以包括将第一连接齿轮与第二连接齿轮垂直连接的连接轴。

[0067] 齿轮单元可以与餐具篮的一侧成一体。

[0068] 洗涤桶可以包括支撑餐具篮使得餐具篮的高度可变的至少一个导轨，并且所述至少一个导轨可以包括支撑处于第一位置的餐具盘的第一导轨和支撑处于第二位置的餐具篮的与第一轨道间隔开的第二导轨。

[0069] 当餐具篮处于第一位置时，第一齿轮可以连接到电机，并且当餐具篮处于第二位置时，第二齿轮可以连接到电机。

[0070] 电机可以设置在洗涤桶的后部。

[0071] 喷射单元可以包括设置在洗涤桶的后部并且喷射洗涤水的固定喷嘴，以及喷射壳体，其设置成连接到固定喷嘴，并且包括形成在不同高度处以对应于餐具篮的可变位置的

Petitioner Samsung Ex-1004, 0957

多个连接开口以及喷射经由连接开口供应的洗涤水的喷射喷嘴。

[0072] 喷射壳体可以包括打开和关闭其中的多个连接开口的阀。

[0073] 有利效果

[0074] 根据本发明的一个实施例的洗碗机可以消除洗涤水不能到达的区域。

[0075] 此外，可以减小喷嘴撞击距离，并且可以通过叶片单元和流道切换装置降低叶片的高度，以提供线性型紧凑尺寸，从而扩大餐具装载量。

[0076] 此外，篮的高度可以经由高度可调的线性型喷射单元的驱动单元来控制，从而存储各种类型的餐具。

[0077] 此外，由于设置在篮中的高度可调的喷射单元的往复运动，洗涤水的喷射效率增加，并且可以通过调节喷射单元的位置来执行分离喷射或聚焦喷射。

[0078] 此外，由于流道的损失较少，因此能够降低功耗，提高洗涤效率。

附图说明

[0079] 结合附图，本发明的这些和/或其他方面将变得显而易见并且更容易理解，在附图中：

[0080] 图1是示出根据本公开的第一实施例的洗碗机的构造的横截面图；

[0081] 图2是安装在根据本公开的第一实施例的洗碗机的洗涤桶中的餐具篮的视图；

[0082] 图3是示出根据本公开的第一实施例的洗碗机的喷射单元和偏转单元的视图；

[0083] 图4是示出根据本公开的第一实施例的喷射单元和偏转单元的分解透视图；

[0084] 图5是示出根据本公开的第一实施例的喷射单元的流道切换单元的分解透视图；

[0085] 图6是示出根据本公开的第一实施例的喷射单元的电机组件的分解透视图；

[0086] 图7是示出根据本公开的第一实施例的电机组件和喷射单元的视图；

[0087] 图8是示出根据本公开的第一实施例的喷射单元和流道切换单元的视图；

[0088] 图9是示出根据本公开的第一实施例的由连接到电机组件的第一齿轮的第二齿轮操作的叶片的运动的视图；

[0089] 图10是图8所示的部分A的放大视图，其示出根据本公开的第一实施例的喷射单元的流道切换单元；

[0090] 图11是示出根据本发明的第一实施例的由流道切换单元和第一叶片执行的、经由第二喷射流道喷射洗涤水的操作的视图；

[0091] 图12是示出根据本公开的第一实施例的流道切换单元的流道切换保持器的操作的视图；

[0092] 图13是示出由根据本公开的第一实施例的流道切换单元执行的、喷射洗涤水到第一喷射流道的操作的视图；

[0093] 图14是根据本公开的第二实施例的偏转单元的分解透视图；

[0094] 图15是根据本公开的第二实施例的偏转单元的旋转叶片单元的透视图；

[0095] 图16是示出根据本公开的第二实施例的偏转单元的旋转叶片单元的运动的视图；

[0096] 图17至19是示出根据本公开的第二实施例的旋转叶片单元的旋转叶片的旋转操作的视图；

[0097] 图20是根据本公开的第三实施例的包括安装在其中的流道切换单元的喷射单元

Petitioner Samsung Ex-1004, 0958

的分解透视图；

[0098] 图21是根据本公开的第三实施例的流道切换单元的分解透视图；

[0099] 图22是示出根据本公开的第三实施例的喷射单元和流道切换单元的视图；

[0100] 图23和24是示出根据本公开的第三实施例的流道切换单元的操作的视图；

[0101] 图25是示出根据本公开的第四实施例的喷射单元和流道切换单元的视图；

[0102] 图26是根据本公开的第四实施例的流道切换单元的分解透视图；

[0103] 图27至29是示出根据本公开的第四实施例的流道切换单元的操作的视图；

[0104] 图30是示出根据本公开的第五实施例的喷射单元和偏转单元的视图；

[0105] 图31是示出根据本公开的第五实施例的喷射单元和流道切换单元的视图；

[0106] 图32是根据本公开的第五实施例的流道切换单元的分解透视图；

[0107] 图33是示出根据本公开的第五实施例的喷射流道，叶片单元的运动的示意图；

[0108] 图34至37是示出由根据本公开的第五实施例的流道切换单元执行的喷射洗涤水引起的叶片单元的运动的视图；

[0109] 图38是示出根据本公开的第六实施例的喷射单元和偏转单元的视图；

[0110] 图39是示出根据本公开的第六实施例的喷射单元和偏转单元的分解透视图；

[0111] 图40是根据本公开的第六实施例的喷射本体和喷射壳体的连接部分的示意图；

[0112] 图41是通过根据本公开的第六实施例的电机组件移动的叶片单元的示意图；

[0113] 图42至45是示出根据本公开的第六实施例的叶片单元的运动，洗涤水的偏转的视图；

[0114] 图46是示出根据本公开的第七实施例的喷射单元和偏转单元的视图；

[0115] 图47是用于驱动根据本公开的第七实施例的偏转单元的电机组件的分解透视图；

[0116] 图48和49是根据本公开的第七实施例的电机组件的分解透视图；

[0117] 图50和51是示出根据本公开的第七实施例的电机组件的驱动，偏转单元的运动的视图；

[0118] 图52是示出根据本公开的第八实施例的安装在可在不同高度安装的餐具篮中的喷射单元和偏转单元的视图；

[0119] 图53是示出根据本公开的第八实施例的在偏转单元的电机组件和洗涤桶的驱动组件之间的连接的视图；

[0120] 图54是根据本公开的第八实施例的驱动单元的分解透视图；

[0121] 图55是根据本公开的第八实施例的驱动单元的横截面图；

[0122] 图56和57是示出根据本公开的第八实施例的驱动单元的操作的视图；

[0123] 图58是示出根据本公开的第九实施例的洗碗机的构造的横截面图；

[0124] 图59是安装在根据本公开的第九实施例的洗碗机的洗涤桶中的餐具篮的视图；

[0125] 图60是示出根据本公开的第九实施例的洗碗机的喷射单元、偏转单元和动力传递装置的视图；

[0126] 图61是根据本公开的第九实施例的喷射单元的示意横截面图；

[0127] 图62是示出根据本公开的第九实施例的偏转单元和动力传递装置的分解透视图；

[0128] 图63是示出根据本公开的第九实施例的偏转单元的带和带保持器的分解透视图；

[0129] 图64是示出根据本公开的第九实施例的洗涤水喷射单元和动力传递装置的视图；

Petitioner Samsung Ex-1004, 0959

[0130] 图65是根据本公开的第九实施例的动力传递装置的齿轮单元的示意横截面图；

[0131] 图66是示出根据本公开的第九实施例的动力传递装置的电机和齿轮单元之间的连接的视图；以及

[0132] 图67和68是根据本公开的第九实施例的在不同高度安装的餐具篮的示意图。

具体实施方式

[0133] 现在将详细参考本发明的实施例，其示例在附图中示出，其中相同的附图标记始终表示相同的元件。

[0134] 在下文中，将参照附图详细描述本发明的示例性实施例。基于附图来定义本文使用的术语“前端”，“后端”，“顶部”，“底部”，“顶端”和“底端”。然而，各部件的形状和位置不限于此。

[0135] 在下文中，将参照附图详细描述本发明的示例性实施例。

[0136] 参考图1和2，将示意性地描述根据本发明的第一实施例的洗碗机1A的整体结构。

[0137] 洗碗机1A包括机壳10、设置在机壳10A内的洗涤桶11A、设置在洗涤桶11A内以储存餐具的餐具篮20A、设置在洗涤桶11A内以喷射洗涤水的喷射单元200A，以及设置成在洗涤桶11A内移动以使洗涤水朝向餐具偏转的偏转单元100A。

[0138] 机壳10A的前侧打开以将餐具储存在洗涤桶11A中或从洗涤桶11A取出餐具，并且安装门12A来打开和关闭洗涤桶11A。

[0139] 门12A与机壳10A的前侧的底部铰链联接并旋转，并且能够打开和关闭洗涤桶11A。洗涤桶11A可以包括顶壁11Ac、后壁11Aa、左右壁11Ad和11Ae以及底板11Ab。

[0140] 在机壳10A的洗涤桶11A的下方，设置用于储存洗涤水的水槽15A、设置为泵送水槽15A中的洗涤水的循环泵14A，以及将水槽15A内的洗涤水与废物一起排出到机壳10A外的排水泵13A。

[0141] 餐具篮20A可以是由线材形成的线架，以允许洗涤水通过而不积水。餐具篮20A可以可拆卸地设置在洗涤桶11A内。用于平滑地拆卸餐具篮20A的手柄23A可以设置在餐具篮20A的前侧的顶部上。

[0142] 餐具篮20A可以包括设置在洗涤桶11A的底部上的第一餐具篮21A和设置在洗涤桶11A的中间的第二餐具篮22A。

[0143] 第一餐具篮21A可以通过设置在洗涤桶11A的底板11Ab上方的固定轨道41A可滑动地联接。

[0144] 固定轨道41A在洗涤桶11A中向前和向后形成在洗涤桶11A的左右壁11Ad和11Ae上。固定辊53A安装在第一餐具篮21A的两侧上，以与固定轨道41A可旋转地联接。

[0145] 因此，第一餐具篮21A的固定辊53A与固定轨道41A联接，以使第一餐具篮21A向前和向后可滑动地移动，从而附接到洗涤桶11A或从洗涤桶11A拆卸。

[0146] 同时，设置在洗涤桶11A的中间的第二餐具篮22A可以通过设置在洗涤桶11A的中间的导轨42A可滑动地联接。

[0147] 导轨42A向前和向后形成在洗涤桶11A的左右壁11Ad和11Ae上。

[0148] 在第二餐具篮22A的两侧上，设置用于与导轨42A联接的引导单元50A。引导单元50A均可以包括与第二餐具篮22A固定联接的引导支架51A和形成在引导支架51A上的引导

Petitioner Samsung Ex-1004, 0960

辊52A。

[0149] 因此，第二餐具篮22A的引导辊52A与导轨42A联接，以使第二餐具篮22A在洗涤水槽11A中向前和向后可滑动地移动，从而附接到洗涤桶11A或从洗涤桶11A拆卸。

[0150] 同时，喷射单元200A设置成使得能够通过以高压喷射洗涤水来洗涤餐具。喷射单元200A可以包括设置在洗涤桶11A的顶壁11Ac上的旋转喷嘴16，以在旋转的同时喷射洗涤水；设置在洗涤桶11A的底部上的第一喷射单元210A以及设置在洗涤桶11A的中间并安装在第二餐具篮22的底部上的第二喷射单元220A。

[0151] 顶部上的旋转喷嘴16A由于水压而在第二餐具篮22A的上方旋转，并可以向下喷射洗涤水。为此，在旋转喷嘴16A的底端上，可以设置多个喷射孔16Aa。旋转喷嘴16A可以将洗涤水直接朝向储存在第二餐具篮22A中的餐具喷射。

[0152] 第一喷射单元210A可以固定到洗涤桶11A的一侧，并且可以设置成与洗涤桶11A的后壁11Aa相邻，以将洗涤水朝向洗涤桶11A的前方喷射。因此，由第一喷射单元210A喷射的洗涤水可能不会直接朝向餐具移动。

[0153] 由于第一偏转单元110A，由第一喷射单元210A喷射的洗涤水可朝向第一餐具篮21A偏转。第一喷射单元210A可以包括在洗涤桶11A的后壁11Aa上向前设置的第一固定喷嘴211A。

[0154] 第一偏转单元110A包括用于将从第一固定喷嘴211A喷射的洗涤水朝向第一餐具篮21A中的餐具偏转的叶片111A。叶片111A可以延伸到洗涤桶11A的左侧和右侧。也就是说，叶片111A的纵向一端可以邻近洗涤桶11A的左壁11Ad形成，并且叶片111A的纵向另一端可以邻近洗涤桶11A的右壁11Ae形成。

[0155] 叶片111A设置成使得能够沿着由第一固定喷嘴211A喷射的洗涤水的喷射方向线性地往复运动。叶片111A设置成沿着第一通道112A移动。因此，允许包括第一固定喷嘴211A和叶片111A的线性喷射结构从洗涤桶11A的底端向上洗涤洗涤桶11A的整个区域而没有盲点，这与仅在旋转喷嘴16A的旋转半径内喷射洗涤水不同。

[0156] 如图3至8所示，第二餐具篮22A可以位于洗涤桶11A的中间。

[0157] 在第二餐具篮22A中，可以安装用于喷射洗涤水的第二喷射单元220A和设置为将从第二喷射单元220A喷射的洗涤水朝向餐具偏转的第二偏转单元120A。

[0158] 第二喷射单元220A可以包括设置在洗涤桶11A的后壁11Aa上的第二固定喷嘴221A和安装在第二餐具篮22A的后部并连接到第二固定喷嘴221A的喷射壳体222A。

[0159] 第二固定喷嘴221A设置为固定到洗涤桶11A的后壁11Aa，以将洗涤水喷射到洗涤桶11A。用于连接第二固定喷嘴221A的固定喷嘴连接部分224A形成在喷射壳体222A的后侧。喷射壳体222A可以固定地设置在第二餐具篮22A的后部。

[0160] 喷射壳体222A可以包括形成为向前延伸的喷射本体240A以及形成在喷射本体240A的左侧和右侧的喷射喷嘴230A。

[0161] 在喷射壳体222A的下方，可以设置具有与喷射本体240A连接的开口前端的喷射本体连接部分223A。

[0162] 喷射喷嘴230A均可以包括从喷射本体240A的左侧突出的第一喷嘴231A和从喷射本体240A的右侧突出的第二喷嘴232A。这里，从喷射本体240A的左侧的方法，即从洗涤桶11A的中心朝向左壁11Ad的方向被指定为第一方向A，并且从喷射本体240A的右侧的方法，

Petitioner Samsung Ex-1004, 0961

即从洗涤桶11A的中心朝向右壁11Ae的方向被指定为第二方向B。

[0163] 因此，喷射喷嘴230A可以包括沿第一方向A形成的第一喷嘴231A和沿第二方向B形成的第二喷嘴232A。多个第一喷嘴231A和第二喷嘴232A可以形成在喷射本体240A的左侧和右侧上并且可以相互对称地设置。

[0164] 在包括喷射喷嘴230A的喷射本体240A内部，可以形成下面将描述的喷射流道700A(参照图8)。

[0165] 此外，第二喷射单元220A可以包括设置成经由第一喷嘴231A和第二喷嘴232A中的至少一个喷射洗涤水的流道切换单元600A。

[0166] 流道切换单元600A可以位于喷射壳体222A和喷射本体240A之间。

[0167] 在喷射本体的后段，形成有与喷射壳体222A的喷射本体连接部分223A对应的喷射壳体连接部分241A。流道切换单元600A可以配置在喷射本体240A的喷射壳体连接部分241A和喷射壳体222A的喷射本体连接部分223A之间。

[0168] 如图5所示，第二喷射单元220A的流道切换单元600A可以包括流道切换构件610A、流道切换保持器620A和密封构件630A。

[0169] 流道切换构件610A可旋转地安装以打开和关闭喷射流道700A。流道切换构件610A可以形成为板状。流道切换构件610A的外部可以由包括橡胶的密封材料形成，以完全密封喷射流道700A。

[0170] 流道切换旋转轴612A设置在流道切换构件610A的一端上，流道切换运动轴613A设置在其另一端上。

[0171] 流道切换构件610A的流道切换旋转轴612A由喷射本体240A的旋转轴固定槽243A可旋转地支撑。

[0172] 当流道切换运动轴613A围绕流道切换旋转轴612A旋转时，流道切换构件610A可以移动以打开和关闭喷射流道700A。

[0173] 这里，流道切换构件610A的流道切换运动轴613A固定到流道切换保持器620A。流道切换保持器620A可以包括形成为基于中心中的运动狭缝623A沿着第一方向A突出的第一加压部分621A，以及形成为沿第二方向B突出的第二加压部分622A。

[0174] 流道切换运动轴613A可以由于第一加压部分621A和第二加压部分622A而沿第一方向A或第二方向B可滑动地移动。由于流道切换运动轴613A的运动，流道切换构件610A围绕流道切换旋转轴612A旋转。

[0175] 例如，当流道切换保持器620A的第一加压部分621A沿第二方向B被加压时，流道切换运动轴613A在流道切换旋转轴612A上沿第二方向B旋转，从而移动流道切换构件610A。当第二加压部分622A沿第一方向A被加压时，流道切换运动轴613A在流道切换旋转轴612A上沿第一方向A旋转，从而移动流道切换构件610A。

[0176] 同时，用于安装流道切换保持器620A的保持器安装部分242A形成在喷射本体240A的喷射壳体连接部分241A中。保持器安装部分242A可以在被切割时形成在喷射本体240A的左侧和右侧的每一侧上。

[0177] 在喷射本体240A和喷射壳体222A之间，可以设置用于完全密封喷射流道700A的密封构件630A。

[0178] 同时，第二喷射单元220A可以设置在第二餐具篮22A的下方。

Petitioner Samsung Ex-1004, 0962

[0179] 经由第二喷射单元220A朝向洗涤桶11A的第一方向A和第二方向B喷射的洗涤水可以经由安装在第二餐具篮22A下方的第二偏转单元120A朝向顶部上的餐具偏转。

[0180] 第二偏转单元120A包括设置为沿着喷射洗涤水的方向往复运动的叶片单元121A。叶片单元121A可以包括设置成偏转经由喷射喷嘴230A的第一喷嘴231A喷射的洗涤水的第一叶片121Aa，以及设置成偏转经由第二喷嘴232A喷射的洗涤水的第二叶片121Ab。

[0181] 第一叶片121Aa和第二叶片121Ab沿纵向方向的一端可以与洗涤桶11A的前端相邻，并且其另一端可以与洗涤桶11A的后端相邻地形成。

[0182] 第一叶片121Aa和第二叶片121Ab可以平行设置。第一叶片121Aa和第二叶片121Ab可以互连以彼此配合。

[0183] 第一叶片121Aa和第二叶片121Ab可以包括偏转表面122A和123A，以允许分别经由第一喷嘴231A和第二喷嘴232A喷射的洗涤水偏转。第一叶片121Aa可以包括第一偏转表面122A，并且第二叶片121Ab可以包括第二偏转表面123A。

[0184] 由于叶片连接部分124A，第一叶片121Aa和第二叶片121Ab以一定的间隔彼此间隔开。叶片连接部分124A设置成连接第一叶片121Aa和第二叶片121Ab的端部。在本发明的实施例中，作为示例，叶片连接部分124A连接第一叶片121Aa和第二叶片121Ab的端部，但不限于此。

[0185] 第一叶片121Aa可以安装成能够沿洗涤桶11A的第一方向A和与第一方向A相反的第二方向B线性地往复运动。第二叶片121Ab可以安装成根据第一叶片121Aa沿洗涤桶11A的第一方向A和第二方向B线性往复运动。

[0186] 设置成以一定间隔间隔开的支撑肋127A可以安装在第一叶片121Aa和第二叶片121Ab之间。支撑肋127A设置为将第一叶片121Aa与第二叶片121Ab连接。支撑肋127A设置为在第一叶片121Aa和第二叶片121Ab移动的同时保持间隔并加强强度。在本发明的实施例中，作为示例，两个支撑肋设置为以一定间隔间隔开，但不限于此。例如，可以根据叶片单元的尺寸对支撑肋的数量进行各种修改。

[0187] 同时，第二偏转单元120A可以包括设置成移动叶片单元121A的电机组件400A。

[0188] 如图6和7所示，电机组件400A可以设置在喷射壳体222A的下方。

[0189] 电机组件400A可以包括固定到洗涤桶11A的后壁11Aa以产生驱动力的电机401A、与电机401A的电机轴402A连接的第一齿轮部分411A，以及与第一齿轮部分411A连接以将电机401A的驱动力传递到第二偏转单元120A的叶片单元121A的第二齿轮131A。

[0190] 第一齿轮部分411A具有圆筒形状，并且第一齿轮411Aa形成在其外周表面上。与固定到洗涤桶11A的电机401A联接的电机连接部分412A形成在第一齿轮部分411A的后端上。

[0191] 用于安装电机401A的电机安装部分410A可以设置在洗涤桶11A的后壁11Aa上。

[0192] 电机安装部分410A可以位于洗涤桶11A的后壁11Aa的中间，并且可以位于第二固定喷嘴221A的下方。电机安装部分410A可以设置在第二固定喷嘴221A的下方，同时以一定间隔与其间隔开。

[0193] 因此，第一齿轮部分411A的电机连接部分412A与形成在洗涤桶11A的后壁11Aa上的电机安装部分410A处的电机401A联接，以传递电机401A的转矩。

[0194] 此外，第一齿轮部分411A的第一齿轮411Aa被传递到第二齿轮131A，以允许第一叶片121Aa和第二叶片121Ab移动。

Petitioner Samsung Ex-1004, 0963

[0195] 电机组件400A的第二齿轮131A可以形成在第二偏转单元120A处。

[0196] 在第一叶片121Aa和第二叶片121Ab的后端，可以安装设置为从电机组件400A接收动力并移动第一叶片121Aa和第二叶片121Ab的移动轨道130A。第二齿轮131A可以形成在移动轨道130A上。第二齿轮131A可以形成在移动轨道130A的底侧的至少一部分上。

[0197] 第二偏转单元120A可以包括用于引导第一叶片121Aa和第二叶片121Ab的运动的轨道组件300A。轨道组件300A可以与第二喷射单元220A的喷射壳体222A的底部联接。

[0198] 轨道组件300A可以包括轨道310A和设置成允许轨道310A被安装的保持器单元500A(参见图4)。

[0199] 轨道310A可以包括连接到保持器单元500A并且设置为延伸其长度的延伸轨道311A。

[0200] 轨道310A沿洗涤桶11A的第一方向A和第二方向B延伸。轨道310A设置成可移动地连接第二偏转单元120A的第一叶片121Aa与第二叶片121Ab。

[0201] 轨道310A可以设置在洗涤桶11A的前端部分和后端部分中的每一个处。设置为允许连接轨道310A的保持器单元500A设置为将轨道310A与第二餐具篮22A的底侧连接。保持器单元500A可以包括将位于前端部的轨道310A与位于后端部的轨道310A连接的保持器框架530A、位于保持器框架530A的前端的前保持器510A，以及位于保持器框架530A的后端的保持器520A。

[0202] 前保持器510A和后保持器520A可以从保持器框架530A的两端向上延伸。用于与第二餐具篮22A联接的联接槽511A和521A可以分别形成在前保持器510A和后保持器520A的顶端上。

[0203] 因此，保持器单元500A的前保持器510A可以经由联接槽511A与第二餐具篮22A的前端连接，并且后保持器520A可以经由联接槽521A连接到第二餐具篮22A的后端。

[0204] 同时，喷射壳体222A可以包括设置在其下方的齿轮支架420A和设置成与齿轮支架420A联接的齿轮支架盖421A。在本发明的实施例中，作为示例，齿轮支架420A与喷射壳体222A一体化，但不限于此。例如，齿轮支架420A可以分离地安装在喷射壳体222A的下方。

[0205] 齿轮支架420A设置成允许安装电机组件400A的第一齿轮部分411A。齿轮支架420A可以包括设置成可旋转地容纳第一齿轮部分411A的第一齿轮容纳槽424A。

[0206] 齿轮支架420A和齿轮支架盖421A可以与固定槽425A和固定突起426A联接。在本发明的实施例中，作为示例，固定槽形成在齿轮支架处，固定突起形成在齿轮支架盖处，但不限于此。例如，可以使用诸如螺栓、钩等的固定构件来组装齿轮支架和齿轮支架盖。

[0207] 齿轮支架盖421A包括形成为允许第一齿轮部分411A可旋转的旋转支撑部分427A。

[0208] 此外，用于允许安装轨道310A的轨道安装部分423A可以形成在齿轮支架420A处(参照图7)。

[0209] 同时，第二偏转单元120A的叶片单元121A可以与安装在轨道安装部分423A处的轨道310A组装以可滑动地移动。

[0210] 如上所述，轨道组件300A的轨道310A可以安装在第二喷射单元220A的喷射壳体222A处，并且第二偏转单元120A可以由于轨道组件300A的保持器单元500A而安装在第二餐具篮22A的下方。

[0211] 这里，喷射壳体222A的固定喷嘴连接部分224A对应于第二固定喷嘴221A，并且设

Petitioner Samsung Ex-1004, 0964

置在喷射壳体222A的下方的齿轮支架420A和电机连接部分412A对应于安装在洗涤桶11A的电机安装部分410A处的电机401A。

[0212] 如图8所示，第二喷射单元220A的喷射流道700A如下。

[0213] 第二喷射单元220A的喷射流道700A可以形成在与喷射壳体222A连接的喷射本体240A的内部。

[0214] 第一喷射流道710A和第二喷射流道720A设置在喷射本体240A内部。第一喷射流道710A设置为允许供应到喷射流道700A的洗涤水经由第一喷嘴231A喷射。第二喷射流道720A设置为允许供应到喷射流道700A的洗涤水经由第二喷嘴232A喷射。

[0215] 第一喷射流道710A和第二喷射流道720A可以通过分隔件730A分开。

[0216] 在洗涤桶11A中向前和向后延伸的分隔件730A可以设置在喷射本体240A内。

[0217] 因此，基于分隔件730A，第一喷射流道710A形成在第一喷嘴231A的一侧上，并且第二喷射流道720A形成在第二喷嘴232A的一侧上。

[0218] 此外，流道切换单元600A设置成允许经由喷射流道700A的第一喷射流道710A和第二喷射流道720A中的一个供应洗涤水。

[0219] 流道切换单元600A可以设置在喷射本体240A的后端，即在分隔件730A的后端处。流道切换单元600A可以包括流道切换构件610A和流道切换保持器620A。

[0220] 流道切换构件610A可旋转地安装以打开和关闭喷射流道700A。流道切换旋转轴612A设置在流道切换构件610A的一端上，流道切换运动轴613A设置在其另一端上。

[0221] 流道切换构件610A的流道切换旋转轴612A由喷射本体240A的旋转轴固定槽243A可旋转地支撑。

[0222] 流道切换构件610A的旋转轴固定槽243A位于分隔件730A的一端。

[0223] 因此，流道切换构件610A设置成允许流道切换运动轴613A在流道切换旋转轴612A上旋转的同时打开和关闭第一喷射流道710A和第二喷射流道720A中的一个。

[0224] 这里，流道切换构件610A的流道切换运动轴613A固定到流道切换保持器620A。流道切换保持器620A可以包括形成为基于中心中的运动狭缝623A沿着第一方向A突出的第一加压部分621A，以及形成为沿第二方向B突出的第二加压部分622A。

[0225] 流道切换运动轴613A可以由于第一加压部分621A和第二加压部分622A而沿第一方向A和第二方向B中的一个方向可滑动地移动。由于流道切换运动轴613A的运动，流道切换构件610A被允许在流道切换旋转轴612A上旋转。

[0226] 流道切换保持器620A的第一加压部分621A和第二加压部分622A通过第一叶片121Aa和第二叶片121Ab的运动而加压，从而移动。

[0227] 例如，当流道切换保持器620A的第一加压部分621A沿第二方向B被加压时，流道切换运动轴613A在流道切换旋转轴612A上沿第二方向B旋转，从而移动流道切换构件610A。当第二加压部分622A沿第一方向A被加压时，流道切换运动轴613A在流道切换旋转轴612A上沿第一方向A旋转，从而移动流道切换构件610A。

[0228] 这里，传感器单元800可以设置在第一叶片121Aa和第二叶片121Ab之间。传感器单元800设置为感测第一叶片121Aa和第二叶片121Ab的位置。

[0229] 同时，如图9所示，第一叶片121Aa和第二叶片121Ab设置为通过电机组件400A移动。

Petitioner Samsung Ex-1004, 0965

[0230] 设置在第二餐具篮22A下方的第二偏转单元120A安装成由于电动机组件400A而接收电机401A的动力以移动。

[0231] 当安装在洗涤桶11A的后壁11Aa上的电机401A旋转时，由电机连接部分412A连接的第一齿轮部分411A旋转，并且第一齿轮411Aa由于第一齿轮部分411A的旋转而旋转。

[0232] 与第一齿轮411Aa接合并连接的第二齿轮131A由于第一齿轮411Aa的旋转而被允许在第一方向A和第二方向B上沿轨道310A移动。第二齿轮131A形成在连接第一叶片121Aa和第二叶片121Ab的轨道310A的底部上。

[0233] 这里，第一叶片121Aa和第二叶片121Ab可以经由轨道联接部分132A可移动地连接到轨道310A。

[0234] 如上所述，由于第二齿轮131A的运动，第一叶片121Aa和第二叶片121Ab可以在洗涤桶11A的第一方向A和第二方向B上往复运动。

[0235] 同时，可以通过用传感器单元800感测其位置来控制第一叶片121Aa和第二叶片121Ab的运动。

[0236] 如图10至13所示，由根据本发明的第一实施例的流道切换单元600A执行的流道切换操作如下。

[0237] 当洗涤水经由第二固定喷嘴221A供应时，洗涤水被供应到喷射壳体222A和喷射本体240A中。

[0238] 由于流道切换单元600A的流道切换构件610A，供应到喷射本体240A中的洗涤水流入在打开状态下的喷射流道700A的第二喷射流道720A，并且经由第二喷嘴232A喷射。

[0239] 经由第二喷嘴232A喷射的洗涤水由于第二叶片121Ab的第二偏转表面123A而偏转并且朝向第二餐具篮22A中的餐具喷射。

[0240] 这里，第二叶片121Ab允许经由第二喷嘴232A喷射的洗涤水在由于电机组件400A而沿着轨道310A在第一方向B上移动的同时朝向餐具偏转。

[0241] 如上所述，当第二叶片121Ab沿第二方向B移动时，与第二叶片121Ab配合的第一叶片121Aa沿第二方向B移动(参照图11)。

[0242] 第一叶片121Aa在靠近第一喷嘴231A在第二方向B上移动的同时对流道切换保持器620A的加压部分621A加压。

[0243] 第一加压部分621A被加压并沿第二方向B移动，并且流道切换保持器620A的流道切换运动轴613A基于流道切换旋转轴612A沿第二方向B移动。

[0244] 流道切换构件610A阻挡第二喷射流道720A并打开第一喷射流道710A。

[0245] 洗涤水流入打开的第一喷射流道710A，并经由第一喷嘴231A喷射。

[0246] 经由第一喷嘴231A喷射的洗涤水由于第一叶片121Aa的第一偏转表面122A而偏转并且朝向其上的第二餐具篮22A中的餐具喷射。

[0247] 这里，第一叶片121Aa在由于电机组件400A沿着轨道310A在第一方向A上移动的同时允许经由第一喷嘴231A喷射的洗涤水朝向餐具偏转。

[0248] 同时，第一叶片121Aa和第二叶片121Ab的位置通过传感器单元800感测，并且电机401A的驱动力被控制，由此控制第一叶片121Aa和第二叶片121Ab的运动。

[0249] 传感器单元800A可以包括设置在第一叶片121Aa处的第一传感器部分810A和设置在第二叶片121Ab处的第二传感器部分820A。

Petitioner Samsung Ex-1004, 0966

[0250] 第一传感器部分810A设置为感测第一叶片121Aa的位置，并且第二传感器部分820A设置为感测第二叶片121Ab的位置。

[0251] 因此，第一叶片121Aa和第二叶片121Ab的移动方向通过传感器单元800切换，这可以通过在第一方向A和第二方向B之间的往复运动而连续地进行。

[0252] 同时，在本发明的第一实施例中，作为示例，包括第一叶片121Aa和第二叶片121ab的第二偏转单元120A安装在第二餐具篮22A处，但不限于此。例如，第二喷射单元220A的第一叶片121Aa和第二叶片121Ab可以施加到位于洗碗机1A的底部的第一餐具篮21A。

[0253] 图14是根据本发明的第二实施例的偏转单元120B的分解透视图。图15是根据本发明的第二实施例的偏转单元120B的旋转叶片单元121B的透视图。图16是示出根据本发明的第二实施例的偏转单元120B的旋转叶片单元121B的运动的视图。图17至19是示出根据本发明的第二实施例的旋转叶片单元121B的旋转叶片121Ba和121Bb的旋转操作的视图。在下文中，可以参考图1至12找到附图中未示出的附图标记。此外，将省略与参考图1至12相同的描述。

[0254] 如图14至19所示，根据本发明的第二实施例的第二偏转单元120B设置成可以以一定角度旋转以切换洗涤水的移动方向。

[0255] 第二喷射单元220A包括喷射壳体222A和喷射本体240A，喷射本体连接到喷射壳体222A，包括其中的喷射流道700A和喷射喷嘴230A，喷射喷嘴设置在喷射本体两侧，以喷射洗涤水。喷射喷嘴230A可以在喷射本体240A的左侧和右侧上形成为多个。喷射喷嘴230A可以包括第一喷嘴231A和第二喷嘴232A。

[0256] 喷射流道700A可以形成在喷射本体240A内。此外，第二喷射单元220A可以包括设置成经由第一喷嘴231A和第二喷嘴232A中的至少一个喷射洗涤水的流道切换单元600A。

[0257] 由于流道切换部分600A的详细构造与第一实施例相同，因此省略其详细描述。

[0258] 同时，第二偏转单元120B设置成可以以一定角度旋转以切换喷射的洗涤水的移动方向。

[0259] 经由第二喷射单元220A朝向洗涤桶11A的第一方向A和第二方向B喷射的洗涤水可以经由安装在第二餐具篮22A下方的第二偏转单元120B朝向顶部上的餐具偏转。

[0260] 第二偏转单元120B包括设置为线性往复运动并且沿着喷射洗涤水的方向旋转的旋转叶片单元121B。

[0261] 旋转叶片单元121B可以包括设置成允许经由喷射喷嘴230A的第一喷嘴231A喷射的洗涤水偏转的第一旋转叶片121Ba，以及设置成允许经由第二喷嘴232A喷射的洗涤水偏转的第二旋转叶片121Bb。

[0262] 这里，第一旋转叶片121Ba和第二旋转叶片121Bb可以互连以彼此配合。第一旋转叶片121Ba和第二旋转叶片121Bb经由叶片连接部分124B连接。由于叶片连接部分124B，第一旋转叶片121Ba和第二旋转叶片121Bb以一定间隔隔开。叶片连接部分124B设置成连接第一旋转叶片121Aa和第二旋转叶片121Ab的前端。

[0263] 第一旋转叶片121Ba和第二旋转叶片121Bb可以包括连接其后端的移动轨道130B。移动轨道130B设置成具有对应于叶片连接部分124B的长度，以连接第一旋转叶片121Ba和第二旋转叶片121Bb。

[0264] 此外，在移动轨道130B的底部上，可以形成对应于下面将描述的电机组件400A的

Petitioner Samsung Ex-1004, 0967

第一齿轮411Aa的第二齿轮131B。

[0265] 同时，也可以在叶片连接部分124B和移动轨道130B之间设置加强肋127B。加强肋127B设置成以一定间隔连接叶片连接部分124B和移动轨道130B，以增强第一旋转叶片121Ba和第二旋转叶片121Bb的强度。

[0266] 此外，在叶片连接部分124B和移动轨道130B的角部处，可以设置用于可移动地连接旋转叶片单元121B与轨道组件300A的叶片保持器132B。

[0267] 叶片保持器132B可以分别在叶片连接部分124B和第一旋转叶片121Ba之间的连接部分处、叶片连接部分124B和第二旋转叶片121Bb之间的连接部分处、移动轨道130B和第一旋转叶片121Ba之间的连接部分处，以及移动轨道130B和第二旋转叶片121Bb之间的连接部分处。

[0268] 叶片保持器132B可以包括轨道联接孔，其形成为允许轨道组件300A的轨道310A穿透和移动；以及旋转突起133B，其设置成允许第一和第二旋转叶片121Ba和121Bb可旋转地安装。

[0269] 轨道联接孔134B可以形成在叶片保持器132B的左侧和右侧上，以允许叶片保持器132B沿着轨道310A沿第一方向A和第二方向B移动。

[0270] 旋转突起133B设置在叶片保持件132B的内表面上，以将第一旋转叶片121Ba与第二旋转叶片121Bb可旋转地连接。

[0271] 第一旋转叶片121Ba和第二旋转叶片121Bb在纵向方向上的一端可以与洗涤桶11A的前端相邻，并且其另一端可以与洗涤桶11A的后端相邻地形成。

[0272] 与叶片保持件132B的旋转突起133B联接的旋转突起联接槽122Ba，122Bb可以形成在第一旋转叶片121Ba和第二旋转叶片121Bb的两端上。

[0273] 因此，第一旋转叶片121Ba和第二旋转叶片121Bb可以通过其两端处的旋转突起联接槽122Ba和122Bb与叶片保持器132B的旋转突起133B之间的联接而旋转。

[0274] 第一旋转叶片121Ba和第二旋转叶片121Bb可以平行设置。第一旋转叶片121Ba和第二旋转叶片121Bb可互连以彼此配合。

[0275] 同时，第一旋转叶片121Ba和第二旋转叶片121Bb可以包括旋转偏转表面128B，以允许从第二喷射单元220A喷射的洗涤水偏转。

[0276] 第一旋转叶片121Ba和第二旋转叶片121Bb可以包括旋转偏转表面128B，以允许分别经由第一喷嘴231A和第二喷嘴232A喷射的洗涤水偏转。第一旋转叶片121Ba可以包括第一旋转偏转表面128Ba，并且第二旋转叶片121Bb可以包括第二旋转偏转表面128Bb。

[0277] 第一旋转叶片121Ba安装成能够沿着洗涤桶11A的第一方向A和与第一方向A相反的第二方向B线性地往复运动。第二旋转叶片121Bb设置成根据第一旋转叶片121Ba配合。

[0278] 第一旋转叶片121Ba和第二旋转叶片121Bb沿着轨道组件300A的轨道310A沿第一方向A和第二方向B往复运动。

[0279] 此外，第一旋转叶片121Ba和第二旋转叶片121Bb在洗涤桶11A的中心的喷射喷嘴230A附近旋转。第一旋转叶片121Ba和第二旋转叶片121Bb可以旋转以允许从中心喷射的洗涤水偏转以朝向洗涤桶11A的中心部分喷射。

[0280] 在本发明的实施例中，作为示例，第一旋转叶片121Ba和第二旋转叶片121Bb的旋转位置位于轨道组件300A的中心，但不限于此。然而，为了便于说明，假设旋转叶片在中心

Petitioner Samsung Ex-1004, 0968

旋转。

[0281] 第一旋转叶片121Ba和第二旋转叶片121Bb各自可以包括用于在其中心引导旋转的旋转引导孔125B。第一旋转叶片121Ba可以包括第一旋转引导孔125Ba，并且第二旋转叶片121Bb可以包括第二旋转引导孔125Bb。

[0282] 此外，旋转引导件270B形成在喷射本体240A的两侧。旋转引导件270B分别从喷射本体240A的左侧和右侧突出。这里，旋转引导件270B可以形成为比喷射本体240A的第一喷嘴231A和第二喷嘴232A长。

[0283] 旋转引导件270B可以包括旋转引导表面271B，其外横截面的顶部表面形成有向下的曲率。

[0284] 因此，旋转引导件270B插入到第一旋转叶片121Ba的第一旋转引导孔125Ba和第二旋转叶片121Bb的第二旋转引导孔125Bb中，并且在其运动的相反方向上对第一旋转叶片121Ba和第二旋转叶片121Bb加压，从而旋转第一旋转叶片121Ba和第二旋转叶片121Bb。

[0285] 然而，如图16所示，第一旋转叶片121Ba和第二旋转叶片121Bb由于电机组件400A而沿着轨道310A往复运动。

[0286] 由于流道切换部分400A的详细描述与第一实施例相同，因此省略。

[0287] 电机401A的驱动力被传递到第一齿轮部分411A的第一齿轮411Aa，并且第一齿轮411Aa的旋转使与第一齿轮411Aa接合的第二齿轮131B移动。

[0288] 第二齿轮131B由于第一齿轮411Aa的旋转而被允许在第一方向A和第二方向B上沿轨道310A移动。这里，与形成有第二齿轮131B的移动轨道130B连接的第一旋转叶片121Ba和第二旋转叶片121Bb也沿第一方向A和第二方向B移动。

[0289] 第一旋转叶片121Ba和第二旋转叶片121Bb的运动可由传感器单元800B感测和控制。传感器单元800B可以安装在保持器框架530A内，以感测第一旋转叶片121Ba和第二旋转叶片121Bb的移动位置。

[0290] 同时，如图17至19所示，根据本发明的第二实施例的旋转叶片单元121B的旋转操作如下。

[0291] 当第一齿轮411Aa由于电机401A的旋转而旋转时，第二齿轮在与第一齿轮411Aa接合的同时沿第一方向A移动。这里，洗涤水被供应到喷射本体240A内的第二喷射流道720A，并经由第二喷嘴232A喷射。

[0292] 第二旋转叶片121Bb以第一角度θ1从第一位置P1移动。第一位置P1是第二旋转叶片121Bb移动而不旋转的位置。第一角度θ1是第二旋转叶片121Bb不旋转的角度。第二旋转叶片121Bb不旋转的第一角度θ1可以包括大致垂直于洗涤水的角度，以允许从第二喷嘴232A喷射的洗涤水向上偏转。

[0293] 当第二旋转叶片121Bb朝向第二喷嘴232A进一步移动并且移动到第二位置P2时，旋转引导件270B插入到第二旋转叶片121Bb的旋转引导孔125B中。旋转引导件270B的旋转引导表面271B与形成在第二旋转叶片121Bb的后侧的底端上的旋转接触表面129B接触，并旋转第二旋转叶片121Bb。

[0294] 第二旋转叶片121Bb在旋转突起133B上旋转并形成第二角度θ2。第二角度θ2可以形成为允许从第二喷嘴232A喷射的洗涤水朝向洗涤桶11的中心偏转。

[0295] 相反，当第二旋转叶片121Bb沿洗涤桶11A的第二方向B移动并且从第二位置P2移

Petitioner Samsung Ex-1004, 0969

动到第一位置P1时，第二旋转叶片121Bb从洗涤水朝向洗涤桶11A的中心偏转的第二角度θ2旋转，以具有洗涤水朝向洗涤桶11A的顶部偏转的第一角度θ1。

[0296] 同时，如图19所示，第一旋转叶片121Ba的操作与第二旋转叶片121Bb的运动和旋转操作相同。将省略其详细描述。

[0297] 这里，洗涤水供应到喷射本体240A内的第一喷射流道710A，并且经由第一喷嘴231A喷射。

[0298] 图20是根据本发明的第三实施例的包括安装在其中的流道切换单元600C的喷射单元的分解透视图。图21是根据本发明的第三实施例的流道切换单元600C的分解透视图。图22是示出根据本发明的第三实施例的喷射单元和流道切换单元600C的视图。图23和24是示出根据本发明的第三实施例的流道切换单元600C的操作的视图。在下文中，可以参考图1至19找到附图中未示出的附图标记。此外，将省略与参考图1至19相同的描述。

[0299] 如图20至22所示，根据本发明的第三实施例的流道切换单元600C可以设置在喷射本体240A的喷射壳体连接部分241A和喷射壳体222A的喷射本体连接部分223A之间。

[0300] 流道切换单元600C可以包括流道切换构件610C、流道切换保持器620C和密封构件630C。

[0301] 流道切换构件610C可旋转地安装以打开和关闭喷射流道700A。流道切换构件610C可以包括具有扇形的流道切换面板611C。

[0302] 流道切换面板611C的外部可以由包括橡胶的密封材料形成，以完全密封喷射流道700A。

[0303] 流道切换面板611C设置在构件610C的前部，并且用于使流道切换面板611C旋转的流道切换旋转轴612C设置在其后部。

[0304] 流道切换旋转轴612C可以由喷射本体240A的旋转轴固定槽243A可旋转地支撑。旋转轴固定槽243A可以形成在用于将喷射流道700A分成第一喷射流道710A和第二喷射流道720A的分隔件730A的一端上。

[0305] 同时，用于允许安装流道切换保持器620C的保持器安装部分242A形成在喷射本体240A的喷射壳体连接部分241A中。保持器安装部分242A可以分开并形成在喷射本体240A的左侧和右侧中的每一个上。

[0306] 在喷射本体240A和喷射壳体222A之间，可以设置用于完全密封喷射流道700A的密封构件630A。

[0307] 流道切换运动轴613C形成在流道切换保持器620C的中心。流道切换保持器620C可以包括形成为基于中心中的运动狭缝623C沿第一方向A突出的第一加压部分621C，以及形成为沿第二方向B突出的第二加压部分622C。

[0308] 流道切换运动轴613C可以由于第一加压部分621C和第二加压部分622C而沿第一方向A或第二方向B可滑动地移动。由于流道切换运动轴613C的运动，流道切换构件610C围绕流道切换旋转轴612C旋转。

[0309] 例如，当流道切换保持器620C的第一加压部分621C在第二方向B上被加压时，流道切换构件610C的流道切换面板611C移动以关闭第二喷射流道720A，同时流道切换运动轴613C在第二方向B上围绕流道切换旋转轴612C旋转。当第二加压部分622C在第一方向A上被加压时，流道切换构件610C的流道切换面板611C移动以关闭第一喷射流道710A，同时流道

Petitioner Samsung Ex-1004, 0970

切换运动轴613C在第一方向A上围绕流道切换旋转轴612C旋转。

[0310] 如图23和24所示，由根据本发明的第三实施例的流道切换单元600C执行的流道切换操作如下。

[0311] 当洗涤水经由第二固定喷嘴221A供应时，洗涤水被供应到喷射壳体222A和喷射本体240A中。

[0312] 由于流道切换单元600C的流道切换构件610C，供应到喷射本体240A中的洗涤水流入喷射流道700A的在打开状态下的第一喷射流道710A，并且通过第一喷嘴231A喷射。

[0313] 经由第一喷嘴231A喷射的洗涤水由于第一叶片121Aa的第一偏转表面122A而偏转并且朝向其上的第二餐具篮22A中的餐具喷射。

[0314] 这里，第一叶片121Aa在由于电机组件400A而沿着轨道310A在第二方向B上移动的同时使经由第二喷嘴232A喷射的洗涤水朝向餐具偏转。

[0315] 同时，当第一叶片121Aa靠近第一喷嘴231A移动时，传感器单元800C与流道切换保持器620C的第一加压部分621C接触。传感器单元800C通过控制电机组件400A来切换第一叶片121Aa的移动方向。

[0316] 当第一叶片121Aa的移动方向被切换并且第一叶片121Aa沿第一方向A移动时，第二叶片121Ab也沿第一方向A移动。

[0317] 第一加压部分621A被加压并沿第一方向A移动，并且流道切换保持器620C的流道切换运动轴613C基于流道切换旋转轴612C沿第一方向A移动。

[0318] 流道切换构件610C阻挡第二喷射流道720A并打开第一喷射流道710A。

[0319] 洗涤水流入打开的第一喷射流道710A，并经由第一喷嘴231A喷射。

[0320] 经由第一喷嘴231A喷射的洗涤水由于第一叶片121Aa的第一偏转表面122A而偏转并且朝向其上的第二餐具篮22A中的餐具喷射。

[0321] 这里，第一叶片121Aa在由于电机组件400A而沿着轨道310A在第一方向A上移动的同时使经由第一喷嘴231A喷射的洗涤水朝向餐具偏转。

[0322] 同时，第一叶片121Aa和第二叶片121Ab的位置通过传感器单元800C感测，并且电机401A的驱动力被控制，由此控制第一叶片121Aa和第二叶片121Ab的运动。

[0323] 因此，第一叶片121Aa和第二叶片121Ab的移动方向通过传感器单元800切换，并且该过程可以通过在第一方向A和第二方向B之间的往复运动而连续地进行。

[0324] 图25是示出根据本发明的第四实施例的喷射单元220A和流道切换单元600D的视图。图26是根据本发明的第四实施例的流道切换单元600D的分解透视图。图27至29是示出根据本发明的第四实施例的流道切换单元600D的操作的视图。在下文中，可以参考图1至24找到附图中未示出的附图标记。此外，将省略与参考图1至24相同的描述。

[0325] 如图25至29所示，根据本发明第四实施例的流道切换单元600D还可以包括流道切换电机700D。

[0326] 流道切换单元600D可以配置在喷射本体240A的喷射壳体连接部分241A和喷射壳体222A的喷射本体连接部分223A之间。

[0327] 流道切换单元600D可以包括流道切换构件610D、密封构件630D和设置为驱动流道切换构件610D的流道切换电机700D。

[0328] 流道切换构件610D可旋转地安装以打开和关闭喷射流道700A。流道切换构件610D

Petitioner Samsung Ex-1004, 0971

可以包括具有板状的流道切换面板611D。

[0329] 流道切换面板611D的外部可以由包括橡胶的密封材料形成，以完全密封喷射流道700A。

[0330] 用作流道切换面板611D的旋转中心的流道切换旋转轴612D设置在流道切换面板611D的一端。

[0331] 流道切换旋转轴612D可以由喷射本体240A的旋转轴固定槽243D可旋转地支撑。旋转轴固定槽243D可以形成在用于将喷射流道700A分成第一喷射流道710A和第二喷射流道720A的分隔件730A的一端上。

[0332] 流道切换单元600D的密封构件630D可以设置在喷射本体240A和喷射壳体222A之间，从而完全密封喷射流700A。

[0333] 同时，流道切换面板611D可以设置成在流道切换旋转轴612D上旋转。设置为使流道切换面板611D旋转的流道切换电机700D可以安装在齿轮支架盖421A的流道切换电机安装部分425D处。

[0334] 安装在流道切换电机安装部分425D中的流道切换电机700D设置成能够将电机轴711D可旋转地安装在喷射本体240A的旋转轴固定孔243D中。

[0335] 流道切换电机700D的电机轴711D可以与流道切换面板611D的流道切换轴612D连接，并且可以将流道切换电机700D的转矩传递到流道切换面板611D。

[0336] 如图27至29所示，由根据本发明的第四实施例的流道切换单元600D执行的流道切换操作如下。

[0337] 当洗涤水经由第二固定喷嘴221A供应时，洗涤水被供应到喷射壳体222A和喷射本体240A中。

[0338] 由于流道切换单元600D的流道切换构件610D，供应到喷射本体240A中的洗涤水流入喷射流道700A的在打开状态下的第一喷射流道710A，并且经由第一喷嘴231A喷射。

[0339] 这里，流道切换面板611D阻挡第二喷射流道720A。

[0340] 经由第一喷嘴231A喷射的洗涤水由于第一叶片121Aa的第一偏转表面122A而偏转并且朝向其上的第二餐具篮22A中的餐具喷射。

[0341] 第一叶片121Aa在由于电机组件400A而沿着轨道310A在第二方向B上移动的同时使经由第二喷嘴232A喷射的洗涤水朝向餐具偏转。

[0342] 同时，第一叶片121Aa靠近第一喷嘴231A移动并与传感器单元800D接触。

[0343] 传感器单元800D通过控制电机组件400A来切换第一叶片121Aa和第二叶片121Ab的移动方向。

[0344] 此外，传感器单元800D通过驱动流道切换单元600D的流道切换电机700D来旋转流道切换面板611D。

[0345] 由于流道切换面板611D的旋转，第二喷射流道720A打开，并且第一喷射流道710A关闭。

[0346] 洗涤水流入打开的第二喷射流道720A，并经由第二喷嘴232A喷射。

[0347] 经由第二喷嘴232A喷射的洗涤水由于第二叶片121Ab的第二偏转表面123A而偏转并且朝向第二餐具篮22A中的餐具喷射。

[0348] 因此，传感器单元800D可以控制第一叶片121Aa和第二叶片121Ab的移动方向以及

Petitioner Samsung Ex-1004, 0972

喷射流道700A的方向切换。在第一叶片121Aa和第二叶片121Ab中，该过程可以通过沿第一方向A和第二方向B往复运动而连续地进行。

[0349] 图30是示出根据本发明的第五实施例的喷射单元220A和偏转单元120E的视图。图31是示出根据本发明的第五实施例的喷射单元220A和流道切换单元600E的视图。图32是根据本发明的第五实施例的流道切换单元600E的分解透视图。图33是示出根据本发明的第五实施例的喷射流道700A，叶片单元121E的运动的示意图。图34至37是示出由根据本发明的第五实施例的流道切换单元600E执行的、由喷射洗涤水引起的叶片单元121E的运动的视图。在下文中，可以参考图1至29找到附图中未示出的附图标记。此外，将省略与参考图1至29相同的描述。

[0350] 如图30至37所示，根据本发明第五实施例的偏转单元120E可以设置为通过由喷射单元200A喷射的洗涤水的喷射力而移动。

[0351] 偏转单元120E设置成使经由第二喷射单元220A在洗涤桶11A的第一方向A和第二方向B上喷射的洗涤水朝向其上的餐具偏转。

[0352] 偏转单元120E包括设置为使得能够沿着喷射洗涤水的方向往复运动的叶片单元121E。叶片单元121E可以包括设置成偏转经由喷射喷嘴230A的第一喷嘴231A喷射的洗涤水的第一叶片121Ea，以及设置成偏转通过第二喷嘴232A喷射的洗涤水的第二叶片121Eb。

[0353] 第一叶片121Ea和第二叶片121Eb可以互连以彼此配合。第一叶片121Ea和第二叶片121Eb可以包括偏转表面122E和123E，以使分别经由第一喷嘴231A和第二喷嘴232A喷射的洗涤水偏转。第一叶片121Ea可以包括第一偏转表面122E，并且第二叶片121Ab可以包括第二偏转表面123E。

[0354] 第二偏转单元120A可以包括用于引导第一叶片121Ea和第二叶片121Eb的运动的轨道组件300E。轨道组件300E可以与第二喷射单元220A的喷射壳体222A的底部联接。

[0355] 轨道组件300E可以包括轨道310E和设置成使得轨道310E被安装的保持器单元500A。轨道310E可以包括连接到保持器单元500A并且设置为延伸其长度的延伸轨道311E。

[0356] 轨道310E沿洗涤桶11A的第一方向A和第二方向B延伸。轨道310E设置成可移动地连接第二偏转单元120A的第一叶片121Ea与第二叶片121Eb。

[0357] 同时，与轨道组件300E可移动地联接的第一叶片121Ea和第二叶片121Eb可以经由由流道切换单元600E切换的第一喷射流道710A和第二喷射流道720A中的一个喷射的洗涤水的水压而移动。

[0358] 流道切换单元600E可以包括流道切换构件610E、密封构件630E和设置为驱动流道切换构件610E的流道切换电机700E。

[0359] 流道切换构件610E可旋转地安装以打开和关闭喷射流道700A。流道切换构件610E可以包括具有板状的流道切换面板611E。

[0360] 用作流道切换面板611E的旋转中心的流道切换旋转轴612E设置在流道切换面板611E的一端。流道切换旋转轴612E可以由喷射本体240A的旋转轴固定槽243E可旋转地支撑。旋转轴固定槽243E可以形成在用于将喷射流道700A分成第一喷射流道710A和第二喷射流道720A的分隔件730A的一端上。

[0361] 流道切换单元600E的密封构件630E可以设置在喷射本体240A和喷射壳体222A之间，从而完全密封喷射流700A。

Petitioner Samsung Ex-1004, 0973

[0362] 同时，流道切换面板611E可以设置成可在流道切换旋转轴612E上旋转。流道切换电机700E的电机轴711E可以与流道切换面板611E的流道切换轴612E连接，并且可以将流道切换电机700E的转矩传递到流道切换面板611E。

[0363] 如图33至37所示，由根据本发明的第五实施例的流道切换单元600E执行的流道切换操作如下。

[0364] 当洗涤水经由第二固定喷嘴221A供应时，洗涤水被供应到喷射壳体222A和喷射本体240A中。由于流道切换单元600E，供应到喷射本体240A中的洗涤水流入喷射流道700A的在打开状态下的第二喷射流道720A，并且经由第二喷嘴232A喷射。

[0365] 流道切换面板611E阻挡第一喷射流道710A。

[0366] 经由第二喷嘴232A喷射的洗涤水由于第二叶片121Eb的第二偏转表面123E而偏转以朝向其上的餐具喷射。

[0367] 由于经由第二喷嘴232A喷射的洗涤水的水压，第二叶片121Ea沿着轨道310E在第二方向B上移动。第二叶片121Eb变得从L1到L2更远离第二喷嘴232A。这里，第一叶片121Ea变得从L'1到L'2更靠近第一喷嘴231A(参照图34和35)。

[0368] 同时，当第一叶片121Ea变得更靠近第一喷嘴231A并与传感器单元800E接触时，传感器单元800E通过驱动流道切换单元600E的流道切换电机700E来旋转流道切换面板611E。

[0369] 由于流道切换面板611E的旋转，第二喷射流道720A关闭，并且第一喷射流道710A打开。

[0370] 洗涤水流入打开的第一注入流道710A，并通过第一喷嘴231A喷射。通过第一喷嘴231A喷射的洗涤水对第一叶片121Ea的第一偏转表面122E加压，并且第一叶片121Ea由于洗涤水的水压而沿第一方向A移动。

[0371] 图38是示出根据本发明的第六实施例的喷射单元220F和偏转单元120A的视图。图39是示出根据本发明的第六实施例的喷射单元220F和偏转单元120A的分解透视图。图40是根据本发明的第六实施例的喷射本体240F和喷射壳体220F的连接部分的示意图。图41是通过根据本发明的第六实施例的电机组件401移动的叶片单元121A的示意图。图42至45是示出根据本发明的第六实施例的叶片单元121A的运动，洗涤水的偏转的视图。在下文中，可以参考图1至37找到附图中未示出的附图标记。此外，将省略与参考图1至37相同的描述。

[0372] 如图38至45所示，根据第六实施例的偏转单元120A包括设置成能够通过电机组件400A移动的叶片单元121A。

[0373] 同时，经由喷射单元220F喷射的洗涤水可以由通过电机组件400A左右移动的叶片单元121A来控制。

[0374] 喷射单元220F可以包括喷射壳体222F、喷射本体240F和形成在喷射本体240F的左侧和右侧上的喷射喷嘴230F。

[0375] 用于连接第二固定喷嘴221A的固定喷嘴连接部分224F形成在喷射壳体222F的后侧。喷射壳体222F可以包括喷射本体连接部分223F，喷射本体连接部分223F在喷射壳体222的底部上具有开口前部，以与喷射本体240F连接。

[0376] 喷射喷嘴230F各自可以包括从喷射本体240F的左侧突出的第一喷嘴231F和从喷射本体240F的右侧突出的第二喷嘴232F。这里，从喷射本体240F的左侧的方法，即洗涤桶11A的中心朝向左壁11Ad的方向被指定为第一方向A，并且从喷射本体240F的右侧的方法，

Petitioner Samsung Ex-1004, 0974

即洗涤桶11A的中心朝向右壁11Ae的方向被指定为第二方向B。

[0377] 此外，在形成有喷射喷嘴230F的喷射本体240F内，可以形成喷射流道700F，洗涤水通过喷射流道700F供应。

[0378] 喷射流道700F包括第一喷射流道710F和第二喷射流道720F。第一喷射流道710F和第二喷射流道720F可以通过分隔件730F分开。

[0379] 第一喷射流道710F设置为通过第一喷嘴231F喷射洗涤水，并且第二喷射流道720F设置为通过第二喷嘴232F喷射洗涤水。

[0380] 在喷射本体240F和喷射壳体222F之间，可以设置用于密封的密封构件630F。

[0381] 同时，经由固定喷嘴221A流入喷射壳体222F的洗涤水经由与喷射壳体222F连接的喷射本体240F供应到第一喷射流道710F和第二喷射流道720F，并经由第一喷嘴231F和第二喷嘴232F同时喷射。

[0382] 可以始终喷射经由第一喷嘴231F和第二喷嘴232F喷射的洗涤水。

[0383] 第二偏转单元120A的叶片单元121A可以通过轨道组件300A和电机组件400A沿洗涤桶11A的第一方向A和第二方向B移动。

[0384] 因此，沿轨道组件300A的轨道310A左右往复运动的第一叶片121Aa和第二叶片121Ab可以将从第一喷嘴231F和第二喷嘴232F喷射的洗涤水同时朝向其上的餐具喷射。

[0385] 详细地，如图41至45所示，经由喷射壳体222F供应到喷射本体240F中的洗涤水流入第一喷射流道710F和第二喷射流道720F。

[0386] 第一喷射流道710F的洗涤水经由第一喷嘴231F沿第一方向A喷射。第二喷射流道720F的洗涤水经由第二喷嘴232F沿第二方向B喷射。洗涤水经由第一喷嘴231F和第二喷嘴232F同时喷射。

[0387] 这里，叶片单元121A的运动由电机组件400A控制。

[0388] 电机组件400A沿第二方向B移动第一叶片121Aa和第二叶片121Ab。

[0389] 当第一叶片121Aa和第二叶片121Ab沿第二方向B移动时，第一叶片121Aa变得从d'1到d'2更靠近第一喷嘴231F，并且第二叶片121Ab变得从d1至d2更远离第二喷嘴232F。

[0390] 第一叶片121Aa和第二叶片121Ab的运动使从第一喷嘴231F和第二喷嘴232F喷射的洗涤水偏转以朝向其上的餐具供应。

[0391] 同时，可以通过传感器单元800F切换第一叶片121Aa和第二叶片121Ab的移动方向。

[0392] 第一叶片121Aa和第二叶片121Ab的运动可以由传感器单元800F感测以由电机组件400A驱动。

[0393] 同时，当第一叶片121Aa和第二叶片121Ab沿第一方向A移动时，第一喷嘴231F和第二喷嘴232F总是喷射洗涤水。

[0394] 图46是示出根据本发明的第七实施例的喷射单元和偏转单元120G的视图。图47是用于驱动根据本发明的第七实施例的偏转单元120G的电机组件400G的分解透视图。图48和49是根据本发明的第七实施例的电机组件400G的分解透视图。图50和51是示出根据本发明的第七实施例的电机组件400G的驱动，偏转单元120G的运动的视图。在下文中，可以参考图1至46找到附图中未示出的附图标记。此外，将省略与参考图1至46相同的描述。

[0395] 如图46和51所示，根据本发明第七实施例的设置为驱动偏转单元120G的电机组件

Petitioner Samsung Ex-1004, 0975

400G可以包括安装在洗涤桶11A的后壁11Aa上的电机安装部分410G的电机411G和设置为传递电机401G的动力的带组件500G。

[0396] 第二喷射单元220A可以包括设置在洗涤桶11A的后壁11Aa上的第二固定喷嘴221A和安装在第二餐具篮22A的后部中以连接到第二固定喷嘴221A的喷射壳体222A。第二固定喷嘴221A设置为固定到洗涤桶11A的后壁11Aa，以将洗涤水喷射到洗涤桶11A。用于连接第二固定喷嘴221A的固定喷嘴连接部分224A形成在喷射壳体222A的后侧。

[0397] 喷射壳体222A可以包括形成为向前延伸的喷射本体240A以及形成在喷射本体240A的左侧和右侧的喷射喷嘴230A。

[0398] 在喷射壳体222A的下方，可以设置具有与喷射本体240A连接的开口前端的喷射本体连接部分223A。

[0399] 同时，第二偏转单元120G包括设置为沿着喷射洗涤水的方向往复运动的叶片单元121G。叶片单元121G可以包括设置成偏转经由喷射喷嘴230A的第一喷嘴231A喷射的洗涤水的第一叶片121Ga，和设置成偏转经由第二喷嘴232A喷射的洗涤水的第二叶片121Gb。

[0400] 第一叶片121Ga和第二叶片121Gb可以互连以彼此配合。由于叶片连接部分124G，第一叶片121Ga和第二叶片121Gb以一定的间隔彼此间隔开。叶片连接部分124G设置成连接第一叶片121Ga和第二叶片121Gb的端部。

[0401] 同时，第二偏转单元120G可以包括设置成移动叶片单元121G的电机组件400G。

[0402] 电机组件400G可以设置在喷射壳体222A的下方。

[0403] 电机组件400G可以包括固定到洗涤桶11A的后壁11Aa并产生驱动力的电机401G和设置成连接到电机401G并将驱动力传递到叶片单元121G的带组件500G。

[0404] 带组件500G可以包括连接到电机401G并旋转的第一带轮531Ga和第二带轮531Gb、连接到第一带轮531Ga和第二带轮531Gb并旋转的带510G以及连接带510G和叶片单元121G的连接连杆550G。

[0405] 带组件500G可以安装在带框架501G上，带框架501G安装在洗涤桶11A的后壁11Aa上。带框架501G的一侧可以固定到洗涤桶11A的后壁11Aa，并且其另一侧可以固定到设置在喷射壳体222A下方的带框架支架229G。

[0406] 带框架501G可以包括电机安装开口502G，其对应于安装在洗涤桶11A的后壁11Aa的电机安装部分410G中的电机401G。

[0407] 包括可移动地安装带510G的带轨道507G的带安装部分505G可以设置在带框架501G的前部。在带安装部分505G的两端处，可以形成带轮安装开口506G，以安装用于支撑带510G的旋转的第一带轮531Ga和第二带轮531Gb。

[0408] 同时，第一带轮531Ga可以经由电机连接构件540G连接到电机401G，并且可以接收电机401G的驱动力。第一带轮531Ga连接到带510G并使带510G旋转。这里，带510G的一端由第二带轮531Gb可旋转地支撑。第二带轮531Gb可以使用第二带轮支架541G安装在带安装部分505G的带轮安装开口506G中。

[0409] 在带安装部分505G的前部，可以安装用于保护带510G的带盖520G。

[0410] 同时，在叶片单元121G的第一叶片121Ga和第二叶片121Gb的后级，可以安装设置为从电机组件400G接收动力并且移动第一叶片121Ga和第二叶片121Gb的移动轨道130G。

[0411] 移动轨道130G设置为连接第一叶片121Ga的后部的轨道联接部分132G与第二叶片

Petitioner Samsung Ex-1004, 0976

121Gb的后部的轨道联接部分132G。移动轨道130G可以具有朝向前下侧弯曲的形状，以保护轨道组件300G。

[0412] 同时，用于与带组件500G的带510G连接的带联接部分133G可以形成在移动轨道130G上。带联接部分133G可以形成在移动轨道130G的后侧的某一位置，以向后突出。带联接部分133G使用连接连杆550G可旋转地连接到带510G。

[0413] 连接连杆550G包括形成在一端的第一连接部分551G和形成在另一端的第二连接部分552G。

[0414] 第一连接部分551G与移动轨道130G的带联接部分133G联接，第二连接部分552G与固定到带510G的连接连杆固定构件560G联接。

[0415] 连接连杆550G的第一连接部分551G和第二连接部分552G可以与移动轨道130G的带联接部分133G和带510G的连接连杆固定构件560G可旋转地联接。

[0416] 因此，当电机组件400G的电机401G旋转时，连接到电机401G的第一带轮531Ga旋转，并且带510G由于第一带轮531Ga的旋转而旋转。

[0417] 这里，叶片单元121G的移动轨道130G通过连接到带510G的连接连杆550G而移动。

[0418] 图52是示出根据本发明的第八实施例的安装在可在不同高度安装的餐具篮中的喷射单元和偏转单元的视图。图53是示出根据本发明的第八实施例的在偏转单元的电机组件和洗涤桶11A的驱动组件400H之间的连接的视图。图54是根据本发明的第八实施例的驱动单元400H的分解透视图。图55是根据本发明的第八实施例的驱动单元400H的横截面图。图56和57是示出根据本发明的第八实施例的驱动单元400H的操作的视图。在下文中，可以参考图1至51找到附图中未示出的附图标记。此外，将省略与参考图1至51相同的描述。

[0419] 如图52至57所示，根据本发明第八实施例的第二喷射单元220H安装在第二餐具篮22A的下方，以将从第二喷射单元220H喷射的洗涤水朝向餐具偏转。

[0420] 第二喷射单元220H可以包括设置为固定到洗涤桶11A的后壁11Aa并喷射洗涤水的固定喷嘴221A、安装在第二餐具篮22A中以连接到固定喷嘴221A的喷射壳体222H，以及设置为在喷射壳体222H前方延伸的喷射本体240H。

[0421] 喷射壳体222H可以在其后侧包括多个固定喷嘴连接开口241H，并且喷射本体240H可以包括第一喷嘴231H和第二喷嘴232H，以将经由固定喷嘴连接开口241H供应的洗涤水向前喷射。

[0422] 固定喷嘴连接开口241H与第二固定喷嘴221A连接，从第二固定喷嘴221A接收洗涤水，并且允许洗涤水流入喷射壳体222H。流入喷射壳体222H的洗涤水被供应到经由喷射壳体222H的喷射本体连接部分223H连接的喷射本体240H。

[0423] 同时，固定喷嘴连接开口241H可以形成在不同的高度，以对应于第二餐具篮22A的可变位置。

[0424] 固定喷嘴连接开口241H可以包括位于喷射壳体222H的上部的第一固定喷嘴连接开口241Ha和位于第一固定喷嘴连接开口241Ha下方的第二固定喷嘴连接开口241Hb。

[0425] 也就是说，当第二餐具篮22A位于第一位置P1时，第二固定喷嘴221A连接到第一固定喷嘴连接开口241Ha。当第二餐具篮22A位于比第一位置P1高的第二位置P2时，第二固定喷嘴221A连接到第二固定喷嘴连接开口241Hb。

[0426] 同时，虽然图中未示出，但也可以在喷射壳体222H内设置配置为在第一固定喷嘴

Petitioner Samsung Ex-1004, 0977

连接开口241Ha和第二固定喷嘴连接开口241Hb之间移动以打开和关闭连接开口的阀。

[0427] 因此，当从第二喷射单元220H的第二固定喷嘴221A供应洗涤水时，洗涤水经由连接到第二固定喷嘴221A的喷射壳体222H的第一固定喷嘴连接开口241Ha和第二固定喷嘴连接开口241Hb中的一个供应，并且经由喷射喷嘴230H的第一喷嘴231H和第二喷嘴232H中的至少一个喷射。

[0428] 经由喷射喷嘴230H喷射的洗涤水经由第二偏转单元120A朝向其上的餐具偏转。

[0429] 这里，第二偏转单元120A设置在第二餐具篮22A的下方并当第二餐具篮22A的安装高度变化时与第二餐具篮22A一起移动。

[0430] 同时，第二偏转单元120A可以包括用于将动力传递到电机组件400A以移动叶片单元120A的驱动单元400H，以及设置为从驱动单元400H接收动力以移动叶片单元120A的电机组件400A。

[0431] 驱动单元400H包括设置在洗涤桶11A的后壁11Aa上并产生驱动力的电机400Ha。

[0432] 电机400Ha可以安装在设置在洗涤桶11A的后壁11Aa上的电机安装部分410H中。电机400Ha设置在电机安装部分410H的后部。电机400Ha的电机轴400Hb可以与电机安装部分410H的旋转支撑轴402Ha联接。电机安装部分410H可以包括用于安装电机400Ha的旋转支撑轴402Ha和位于旋转支撑轴402Ha上方的旋转轴401Ha。

[0433] 用于将电机400Ha的转矩传递到电机组件400A的第一电机连接部分401H和第二电机连接部分402H可以安装在电机安装部分410H中。第一电机连接部分401H安装在电机安装部分410H的旋转轴401Ha上，并且电机连接部分402H安装在旋转支撑轴402Ha上。第一电机连接部分401H和第二电机连接部分402H可以安装成彼此接合。

[0434] 因此，当洗涤桶11A的后壁11Aa上的电机400Ha旋转时，连接到电机轴400Hb的第一电机连接部分401H和与第一电机连接部分401H接合的第二电机连接部分402H一起旋转。

[0435] 同时，电机安装部分盖411H可以与电机安装部分410H的前侧联接。电机安装部分盖411H设置为保护第一和第二连接部分401H和402H。电机安装部分盖411H可以包括穿过其的第一安装开口411Ha和第二安装开口411Hb，以将第一电机连接部分401H和第二电机连接部分402H连接到电机组件400A的电机连接部分412A。第一安装开口411Ha可以设置在第二安装开口411Hb的上方。

[0436] 电机组件400A的电机连接部分412A可以包括第一齿轮部分411A和第二齿轮131A，设置为根据第二餐具篮22A的安装位置而连接到第一电机连接部分401H和第二电机连接部分402H中的任一个的电机连接部分412S设置在第一齿轮部分411A中，并且第二齿轮131A设置为与第一齿轮部分411A接合以移动叶片单元120A。

[0437] 因此，当第二餐具篮22A位于第一位置P1时，设置在第二餐具篮22A的后部的电机组件400A的电机连接部分412A与洗涤桶11A的第一电机连接部分401H联接。

[0438] 由于与第一电机连接部分401H连接的电机连接部分412A，电机400Ha的转矩经由第一齿轮部分411A传递到叶片单元120A，并且第一齿轮部分411A的第一齿轮411Aa和移动轨道130A的第二齿轮131A彼此接合并一起移动。

[0439] 此外，当第二餐具篮22A位于第二位置P2时，电机组件的电机连接部分412A与洗涤桶11A的第二电机连接部分402H联接。

[0440] 由于与第二电机连接部分402H连接的电机连接部分412A，电机400Ha的转矩经由

Petitioner Samsung Ex-1004, 0978

第一齿轮部分411A传递到叶片单元120A，并且第一齿轮部分411A的第一齿轮411Aa和移动轨道130A的第二齿轮131A彼此接合并一起移动。

[0441] 这里，第二电机连接部分402H可能被接合并且由于连接到电机400Ha的第一电机连接部分401H的旋转而接收转矩。参考图58和59，将示意性地描述根据本发明的第九实施例的洗碗机的整体结构。

[0442] 洗碗机1包括形成外部形状的机壳10、设置在机壳10内的洗涤桶11、设置在洗涤桶11内以储存餐具的餐具篮20、设置在洗涤桶11内以喷射洗涤水的喷射单元200、设置成在洗涤桶11内移动以使洗涤水朝向餐具偏转的偏转单元100，以及传送动力以移动偏转单元100的动力传递装置300。

[0443] 机壳10的前侧打开以将餐具储存在洗涤桶11中或从洗涤桶11取出餐具，并且安装门12来打开和关闭洗涤桶11。

[0444] 门12与机壳10的前侧的底部铰链联接并旋转，并且能够打开和关闭洗涤桶11A。洗涤桶11可以包括顶壁11c、后壁11a、左右壁11d和11e以及底板11b。

[0445] 在机壳10的洗涤桶11的下方，设置用于储存洗涤水的水槽15、设置为泵送水槽15中的洗涤水的循环泵14，以及将水槽15内的洗涤水与废物一起排出到机壳10外部的排水泵13。

[0446] 餐具篮20可以是由线材形成的线架，以允许洗涤水通过而不积水。餐具篮20可以可拆卸地设置在洗涤桶11内。用于平滑地拆卸餐具篮20的手柄23可以设置在餐具篮20的前侧的顶部上。

[0447] 餐具篮20可以包括设置在洗涤桶11的底部上的第一餐具篮21和设置在洗涤桶11的中间的第二餐具篮22。

[0448] 第一餐具篮21可以通过与洗涤桶11的底板11b向上间隔设置的固定轨道41可滑动地联接。

[0449] 固定轨道41在洗涤桶11中向前和向后形成在洗涤桶11的左右壁11d和11e上。固定辊53安装在第一餐具篮21的两侧上，以与固定轨道41可旋转地联接。

[0450] 因此，第一餐具篮21的固定辊53与固定轨道41联接，以将洗涤桶11A向前和向后地安装或拆卸。

[0451] 同时，设置在洗涤桶11的上部的第二餐具篮22的安装高度可以变化地设置成使得可以存储各种类型和尺寸的餐具。

[0452] 用于将第二餐具篮22安装在洗涤桶11中的导轨42可以向前和向后形成在洗涤桶11的左右壁11d和11e上。

[0453] 导轨42均包括形成为将第二餐具篮22支撑在第一位置P1的第一导轨42a和与第一导轨42a向上间隔形成的第二导轨42b。由第二导轨42b支撑的第二餐具篮22位于从第一位置P1向上间隔开的第二位置P2。

[0454] 因此，当第二餐具篮22位于第一位置P1时，可以存储具有大尺寸和体积的餐具，如盘子。当第二餐具篮22位于比第一位置P1高的第二位置P2时，可以存储具有较小尺寸和体积的餐具，如碗或扁平餐具。

[0455] 在第二餐具篮22的两侧，设置用于与导轨42连接的引导单元50。引导单元50均可以包括与第二餐具篮22固定联接的引导支架51、形成在引导支架51的顶部上的前端和后端

Petitioner Samsung Ex-1004, 0979

的第一引导辊52a和第二引导辊52b，以及设置在第二引导辊52b下方的第三引导辊52c。

[0456] 这里，引导支架51可以设置在第二餐具篮22的后部，以使导轨42和第二餐具篮22平滑地滑动。

[0457] 此外，第一引导辊52a和第二引导辊52b可以水平地彼此平行地形成。

[0458] 当第二餐具篮22的第一引导辊52a和第二引导辊52b与第一导轨42a联接并移动时，第二餐具篮22位于第一位置P1。

[0459] 此外，当第二餐具篮22的第一引导辊52a和第二引导辊52b与第二导轨42b联接并移动时，第二餐具篮22位于第二位置P2。

[0460] 这里，第三引导辊52c与第一导轨42a联接，以使第二餐具篮22稳定地滑动。

[0461] 同时，喷射单元200设置成能够通过以高压喷射洗涤水来洗涤餐具。喷射单元200可以包括设置在洗涤桶11的顶壁11c上以在旋转的同时喷射洗涤水的旋转喷嘴16、设置在洗涤桶11的底部上的第一喷射单元210和安装在第二餐具篮22的底部以设置在洗涤桶11的中间的第二喷射单元220。

[0462] 顶部上的旋转喷嘴16由于水压而在第二餐具篮22的上方旋转，并可以向下喷射洗涤水。为此，在旋转喷嘴16的底端上，可以设置多个喷射孔16a。旋转喷嘴16可以将洗涤水直接朝向储存在第二餐具篮22中的餐具喷射。

[0463] 第一喷射单元210可以固定到洗涤桶11的一侧，并且可以设置成与洗涤桶11的后壁11a相邻，以将洗涤水朝向洗涤桶11的前方喷射。因此，由第一喷射单元210喷射的洗涤水可能不会直接朝向餐具移动。

[0464] 由第一喷射单元210喷射的洗涤水可经由第一偏转单元110朝向第一餐具篮21中的餐具偏转。第一喷射单元210可以包括在洗涤桶11的后壁11a上向前设置的第一固定喷嘴211。

[0465] 第一偏转单元110包括用于将从第一固定喷嘴211喷射的洗涤水朝向第一餐具篮21中的餐具偏转的第一叶片111。叶片111可以延伸到洗涤桶11的左侧和右侧。也就是说，第一叶片111的纵向一端可以邻近洗涤桶11的左壁11d形成，并且第一叶片111的纵向另一端可以邻近洗涤桶11的右壁11e形成。

[0466] 第一叶片111A可以设置成使得能够沿着由第一固定喷嘴211喷射的洗涤水的喷射方向线性地往复运动。第一叶片111设置成沿着第一通道112移动。因此，允许包括第一固定喷嘴211和第一叶片111的线性喷射结构从洗涤桶11的底端向上洗涤洗涤桶11的整个区域而没有盲点，这可与仅在旋转喷嘴16的旋转半径内喷射洗涤水不同。

[0467] 如图60和61所示，设置在洗碗机1的洗涤桶11中使得其安装高度可变的第二餐具篮22可以包括用于喷射洗涤水的第二喷射单元220和设置为使从第二喷射单元220喷射的洗涤水朝向餐具偏转的第二偏转单元120。

[0468] 第二喷射单元220包括第二固定喷嘴221和设置成与第二餐具篮22一体形成以与第二固定喷嘴221连接的喷射壳体222。

[0469] 第二固定喷嘴221设置成固定到洗涤桶11的后壁11a以喷射洗涤水。因此，喷射壳体222可以固定地设置在第二餐具篮22的后侧上。

[0470] 多个连接开口223a和223b形成在喷射壳体222的后部，并且多个喷嘴225形成在喷射壳体222的前部，以向前喷射经由连接开口223a和223b供应的洗涤水。

Petitioner Samsung Ex-1004, 0980

[0471] 喷射喷嘴225可以在喷射壳体222的下方延伸，并且在洗涤桶的左右方向上延伸，并且可以形成多个喷射喷嘴225。

[0472] 此外，多个连接开口223可以形成在不同的高度处，以对应于第二餐具篮22的可变位置，并且包括第一连接开口223a和第二连接开口223b，第一连接开口223a形成为当第二餐具篮22位于第一位置P1时连接到第二固定喷嘴221，第二连接开口223b形成为当第二餐具篮22位于第二位置P2时连接到第二固定喷嘴221。第一连接开口223a可以位于第二连接开口223b的上方。

[0473] 配置为在第一连接开口223a和第二连接开口223b之间旋转以打开和关闭连接开口的阀224可以设置在喷射壳体222内。当第二固定喷嘴221连接到喷射壳体222的第一连接开口223a时，阀224向下旋转以打开第一连接开口223a并关闭第二连接开口223b。当第二固定喷嘴221连接到第二连接开口223b时，阀224向上旋转以打开第二连接开口223b并关闭第一连接开口223a。

[0474] 因此，当从第二喷射单元220的第二固定喷嘴221喷射洗涤水时，洗涤水经由连接到第二固定喷嘴221的喷射壳体222的连接开口223供应，并经由喷射喷嘴225从洗涤桶11的后部朝向前部喷射。

[0475] 如上所述，经由第二喷射单元220向前喷射的洗涤水经由设置成与第二餐具篮22的底部一体形成的第二偏转单元120而向上偏转。

[0476] 如图62至66所示，第二偏转单元120可以使从第二喷射单元220喷射的洗涤水朝向第二餐具篮22偏转。

[0477] 这里，由于第二偏转单元120设置成与第二餐具篮22的底部一体地形成，所以当第二餐具篮22的安装高度变化时，第二偏转单元120与第二餐具篮22一起移动。

[0478] 同时，第二偏转单元120可以包括传递动力以在第二餐具篮22下方移动的动力传递装置300。

[0479] 动力传递装置300可以包括固定到洗涤桶11的一侧并产生驱动力的电机301和设置成将电机301的驱动力传递到第二偏转单元120的齿轮单元310。

[0480] 电机301设置在洗涤桶11的后壁11a上。电机安装开口11f可以形成在洗涤桶11的后壁11a上，以暴露电机301的电机轴302。

[0481] 设置成与电机301联接的齿轮单元310可以固定到第二餐具篮22的后部。齿轮单元310设置为当第二餐具篮的安装高度变化时一起移动。

[0482] 齿轮单元310包括形成为可固定到第二餐具篮22的齿轮壳体300a以及设置在齿轮壳体300a内的多个齿轮311和312。

[0483] 多个齿轮311和312可以包括形成在不同高度的第一齿轮311、与第一齿轮311间隔开形成的第二齿轮312以及设置成将第一齿轮311与第二齿轮312连接的连接齿轮320。

[0484] 连接齿轮320可以包括连接到第一齿轮311的第一连接齿轮321、连接到第二齿轮312的第二连接齿轮322、连接第一连接齿轮321和第二连接齿轮322的连接轴320a、与连接轴320a联接并旋转的第三齿轮313，以及水平地连接到第三齿轮313的第四齿轮314。第四齿轮314连接到偏转单元100的驱动带轮131，这将在下面描述。

[0485] 在第三齿轮313和第四齿轮314之间，可以形成设置为减小电机301的转矩的至少一个减速齿轮324。

Petitioner Samsung Ex-1004, 0981

[0486] 第三齿轮313和第四齿轮314之间的减速齿轮324可以包括连接到第三齿轮313的第一减速齿轮324a和连接第一减速齿轮324a与第四齿轮314的第二减速齿轮324b。在本发明的实施例中，例如，在电机301和驱动带轮131之间设置两个减速齿轮，但是本发明不限于此。例如，根据电机的性能和尺寸，减速齿轮的数量和形状可以变化。

[0487] 第一齿轮311设置在齿轮壳体300a的顶端上，第二齿轮312从第一齿轮311向下间隔设置。

[0488] 为了对应于第二餐具篮22的第一位置P1和第二位置P2，第一齿轮311和第二齿轮312具有与第一位置P1和第二位置P2之间的间隔相同的间隔。

[0489] 因此，当第二餐具篮22位于第一位置P1时，齿轮单元310的第一齿轮311与电机301的电机轴302联接。当第二餐具篮22位于第二位置P2时，齿轮单元310的第二齿轮312与电机301的电机轴302联接。

[0490] 这里，连接到第一齿轮311的第一连接齿轮321和连接到第二齿轮312的第二连接齿轮322的驱动力传递到由连接轴320a水平连接的第三齿轮313。

[0491] 如上所述，经由动力传递装置300传递的电机301的驱动力传递到第二偏转单元120，以驱动第二偏转单元120。

[0492] 第二偏转单元120可以包括设置成在洗涤桶11内移动并使从第二喷射单元220喷射的洗涤水朝向餐具偏转的第二叶片121以及引导第二叶片121的运动的轨道122。

[0493] 轨道122设置成引导第二叶片121的运动。开口122a可以形成在轨道122的底表面中，并且内部空间122b可以形成在其中以连接到开口122a。

[0494] 在轨道122的内部空间122b中，设置带140。带140包括设置成可旋转地支撑带140的惰带轮180和驱动带轮131。驱动带轮131可以连接到传递电机301的驱动力的动力传递装置300的第四齿轮314。

[0495] 在第四齿轮314上，可以设置与驱动带轮131联接的旋转轴330。在本发明的实施例中，例如，旋转轴330设置在第四齿轮314上，但是本发明不限于此。例如，设置用于与驱动带轮连接的轴可以设置在第三齿轮和与第三齿轮连接的多个减速齿轮中的一个上。

[0496] 第二偏转单元120可以包括设置在与惰带轮180联接的轨道122的内部空间122b内并配置为线性往复运动的带保持器160、设置在与带保持器160联接的轨道122外部并配置为线性往复运动并与第二叶片121联接的的叶片保持器150、可旋转地支撑驱动带轮131并与轨道122的后端联接的后保持器130，以及可旋转地支撑惰带轮180并与轨道122的前端联接的前保持器190。

[0497] 轨道122可以由金属材料形成，并且可以在洗涤桶11中向前和向后较长地形成。带140设置在轨道122的内部空间122b中，以防止由于与洗涤桶11内的餐具的接触而导致的驱动干扰或由于与洗涤水的接触而腐蚀。

[0498] 带140可以缠绕在驱动带轮131和惰带轮180上，以形成闭合曲线，并且可以在动力传递装置300的电机301的旋转方向上旋转。带保持器160像皮带140一样设置在轨道122的内部空间122b中，并与带140的齿形141联接，以与带140一起移动。为此，带保持器160可以包括具有对应于带140的齿形141的形状的齿形联接部分164。

[0499] 此外，带保持器160可以包括由轨道122支撑的多个腿部160a和160b。多个腿部160a和160b可以包括横向突出并由轨道122的侧壁支撑的横向腿部160a和向下突出并且由

Petitioner Samsung Ex-1004, 0982

轨道122的底壁支撑的向下腿部160b。

[0500] 横向腿部160a可以是可弹性变形的，以减少由于与轨道122的碰撞和摩擦而引起的噪音和振动，并且使带保持器160能够在带保持器160移动时平稳地移动。横向腿部160a可以包括一种板簧。

[0501] 此外，带保持器160可以包括用于与叶片保持器150联接的紧固部分161。紧固部分161可以包括紧固孔152，紧固构件152插入该紧固孔151中。

[0502] 叶片保持器150与带保持器160联接以与带保持器160一起移动并将带保持器160的驱动力传递到第二叶片121。叶片保持器150设置成围绕轨道122的外表面以在洗涤桶11中前后移动。

[0503] 叶片保持器150经由轨道122的开口122a与带保持器160联接。为此，叶片保持器150可以包括用于与带保持器160联接的紧固孔151。

[0504] 因此，紧固构件152紧固到叶片保持器150的紧固孔151和带保持器160的紧固孔151，从而将叶片保持器150与带保持器160联接。

[0505] 紧固构件152可以从底部向上移动，并且可以顺序地紧固到叶片保持器150的紧固孔151和带保持器160的紧固孔。

[0506] 驱动带轮131包括设置成连接到动力传递装置300的旋转轴330以接收驱动力的旋转轴131a和设置成联接带140的带联接部分132。

[0507] 后保持器130可旋转地支撑驱动带轮131并且可以与轨道122的后端联接。

[0508] 惰带轮180包括旋转轴181和带联接部分182，带140与带联接部分182联接。

[0509] 前保持器190可以与轨道122的前端联接。前保持器190可以设置成在轨道122的纵向方向上移动，并且可以包括可旋转地支撑惰带轮180的带轮支架191。

[0510] 带轮支架191包括支撑惰带轮180的旋转轴181的带轮支撑表面192。

[0511] 轨道122、带140、驱动带轮131、后保持器130、惰带轮180和前保持器190可以由于带140的张力彼此组装。

[0512] 由于带140的张力，驱动带轮131在其变得更接近轨道122的方向上被加压，并且该力经由后保持器130的带轮支撑表面192传递到后保持器130，从而将后保持器130紧密地附接到轨道122的后端。

[0513] 此外，由于带140的张力，惰带轮180在其变得更接近轨道122的方向上被加压，并且该力经由前保持器190的带轮支撑表面192传递到前保持器190，从而将前保持器190紧密地附接到轨道122的前端。

[0514] 同时，前保持器190还可以包括用于保持带140的张力的弹性构件193。弹性构件193的一端可以由前保持器190支撑，并且弹性构件193的另一端可以由带轮支架191支撑。弹性构件193可以包括压缩弹簧。

[0515] 由于弹性构件193的弹力，带轮支架191可以沿着其变得更远离轨道122的方向被加压。

[0516] 这里，因为带轮支架191由于带140的张力而在其变得更靠近轨道122的方向上被加压，所以带轮支架191移动到带140的张力和弹性构件193的弹力保持平衡的位置。

[0517] 也就是说，当带140拉伸并且张力减小并且弹性构件193的弹力变得大于带140的张力时，带轮支架191由于弹性部件193的弹力而在其变得更远离轨道的方向上移动。如上

Petitioner Samsung Ex-1004, 0983

所述，当带轮支架191在其变得更远离轨道122的方向上移动时，带140再次拉紧，并且带140的张力恢复。

[0518] 由于这种构造，即使当带140由于热膨胀而拉伸时，带轮支架191移动并拉动带140，以保持带140的恒定张力，从而增加产品的可靠性。

[0519] 同时，前保持器190可以包括设置成将第二偏转单元120固定到第二餐具篮22的固定支架194。固定支架194可以包括设置成从前保持器190向上延伸的第一支架194a和从第一支架194a弯曲成水平延伸的第二支架194b。

[0520] 第二支架194b包括用于固定到第二餐具篮22的固定孔194c。固定孔194c可以横向地形成，以将第二支架194b插入到第二餐具篮22的底端中。在本发明的实施例中，例如，使用固定支架将第二偏转单元120固定到餐具篮，但是本发明不限于此。例如，第二偏转单元可以与餐具篮一体地形成。

[0521] 同时，安装在洗涤桶11中的第二餐具篮22可以根据与其联接的导轨42的位置而安装在第一位置P1和第二位置P2中的一个中。

[0522] 固定到第二餐具篮22的齿轮单元310和喷射壳体222由于第二餐具篮22的位置变化而一起移动，并且在洗涤桶11中的位置变化。

[0523] 这里，需要将喷射壳体222和齿轮单元310连接到固定喷嘴211和固定到洗涤桶11的后壁11a的电机轴302。

[0524] 如图64所示，喷射壳体222设置成根据第二餐具篮22的安装位置而分别插入到喷射壳体222的后部中的第一连接开口223a和第二连接开口223b中或从第一连接开口223a和第二连接开口223b分离。

[0525] 此外，齿轮单元310的第一齿轮311和第二齿轮312也分别设置成根据第二餐具篮22的安装位置而插入到电机轴302中或从电机轴302分离。

[0526] 这里，形成喷射壳体222的第一连接开口223a和第二连接开口233b的位置可以与形成齿轮单元310的第一齿轮311和第二齿轮312的位置水平地形成。

[0527] 因此，当第二餐具篮22位于第一位置P1时，喷射壳体222的第一连接开口223a连接到固定喷嘴211并接收洗涤水。

[0528] 电机301的电机轴302可以连接到齿轮单元310的第一齿轮311并且可以接收电机301的驱动力。经由第一齿轮311传递的驱动力经由连接到第一齿轮311的第一连接齿轮321和连接到第一连接齿轮321的连接轴320a传递到第三连接齿轮320，并且传递到驱动带轮131，同时经由第三连接齿轮320和第四连接齿轮320减小。

[0529] 此外，当第二餐具篮22位于第二位置P2时，喷射壳体222的第二连接开口223b连接到固定喷嘴211并接收洗涤水。

[0530] 电机轴302可以连接到齿轮单元310的第二齿轮312并且可以接收电机301的驱动力。经由第二齿轮312传递的驱动力经由连接到第二齿轮312的第二连接齿轮322和连接到第二连接齿轮322的连接轴320a传递到第三连接齿轮320，并且传递到驱动带轮131，同时经由第三连接齿轮320和第四连接齿轮320减小。

[0531] 同时，电机301的电机轴302包括第一联接部分303，其包括使第一齿轮311和第二齿轮312旋转的交替的突起和槽。

[0532] 此外，第二联接部分311a设置在第一齿轮311和第二齿轮312的后部中，以将电机

Petitioner Samsung Ex-1004, 0984

轴302的第一联接部分303与齿轮单元310连接。

[0533] 为了对应于第一联接部分303的形状，第二联接部分311a可以包括由交替的突起和槽形成的后表面。在本发明的实施例中，例如，第一联接部分和第二联接部分具有交叉形状，但是本发明不限于此。

[0534] 如图67和68所示，与洗碗机1的第二餐具篮22一体地形成的第二喷射单元220和第二偏转单元120经由动力传递装置300接收电机301的动力，并且当第二餐具篮22的高度变化时被驱动。

[0535] 当第二餐具篮22位于第一位置P1时，在洗涤桶11的顶壁11c和第二餐具篮22之间形成第一间隔11。当第二餐具篮22位于第二位置P2时，在洗涤桶11的顶壁11c和第二餐具篮22之间形成第二间隔12。第一间隔11可以比第二间隔12长。

[0536] 因此，当第二餐具篮22位于第一位置P1时，可以存储具有大尺寸和体积的餐具，如盘子。当第二餐具篮22位于比第一位置P1高的第二位置P2时，可以存储具有较小尺寸和体积的餐具，如碗或扁平餐具。

[0537] 从上面的描述可以看出，根据本发明的一个实施例的洗碗机可以消除洗涤水不能到达的区域。

[0538] 此外，可以减小喷嘴撞击距离，并且可以通过叶片单元和流道切换装置降低叶片的高度，以提供线性型紧凑尺寸，从而扩大餐具装载量。

[0539] 此外，篮的高度可以通过高度可调的线性型喷射单元的驱动单元来控制，从而存储各种类型的餐具。

[0540] 此外，由于设置在篮中的高度可调的喷射单元的往复运动，洗涤水的喷射效率增加，并且可以通过调节喷射单元的位置来执行分离喷射或聚焦喷射。

[0541] 此外，由于流道的损失较少，因此能够降低功耗，提高洗涤效率。

[0542] 虽然已经示出和描述了本发明的一些实施例，但是本领域技术人员将理解，在不脱离本发明的原理和精神的情况下，可以在这些实施例中进行改变，其范围在权利要求及其等同物中定义。

Petitioner Samsung Ex-1004, 0985

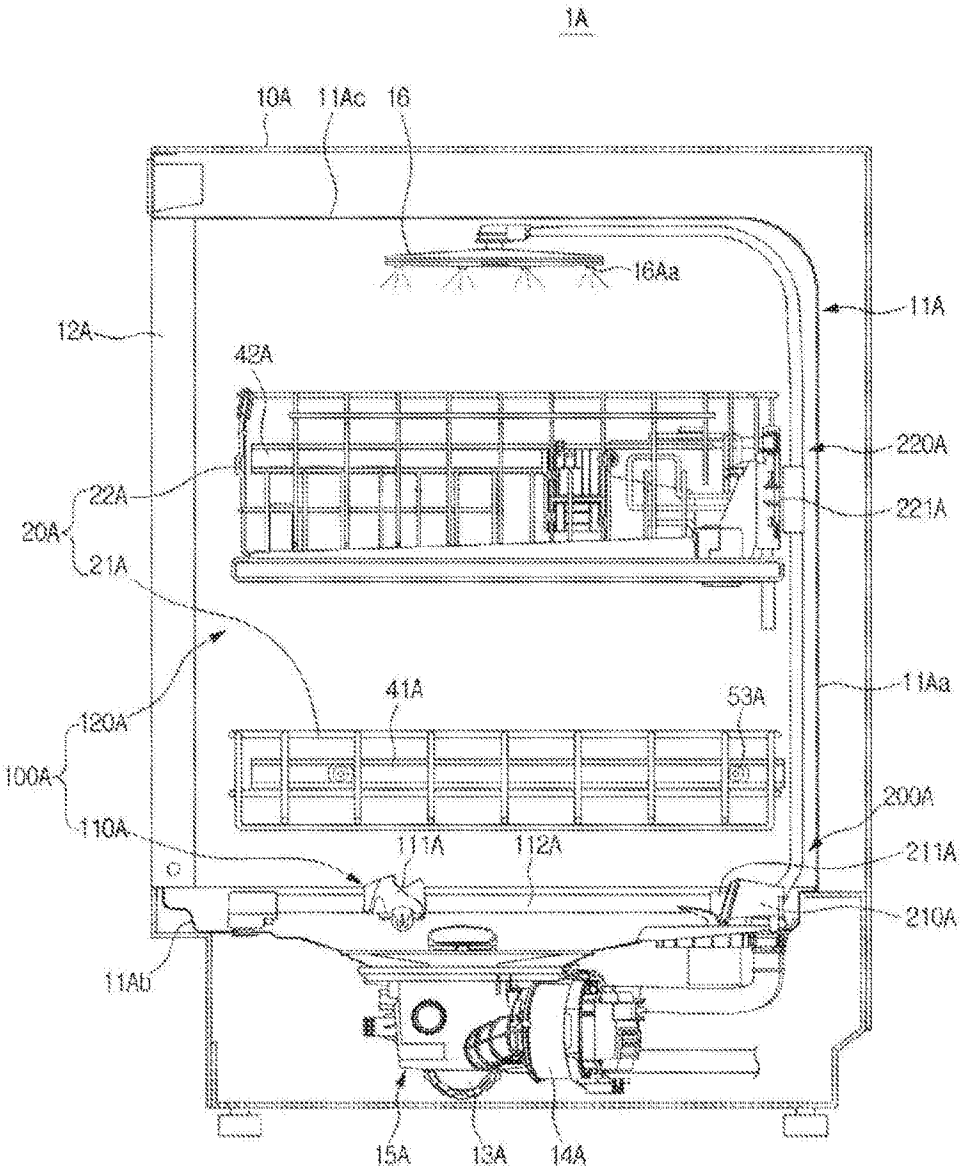


图1

Petitioner Samsung Ex-1004, 0986

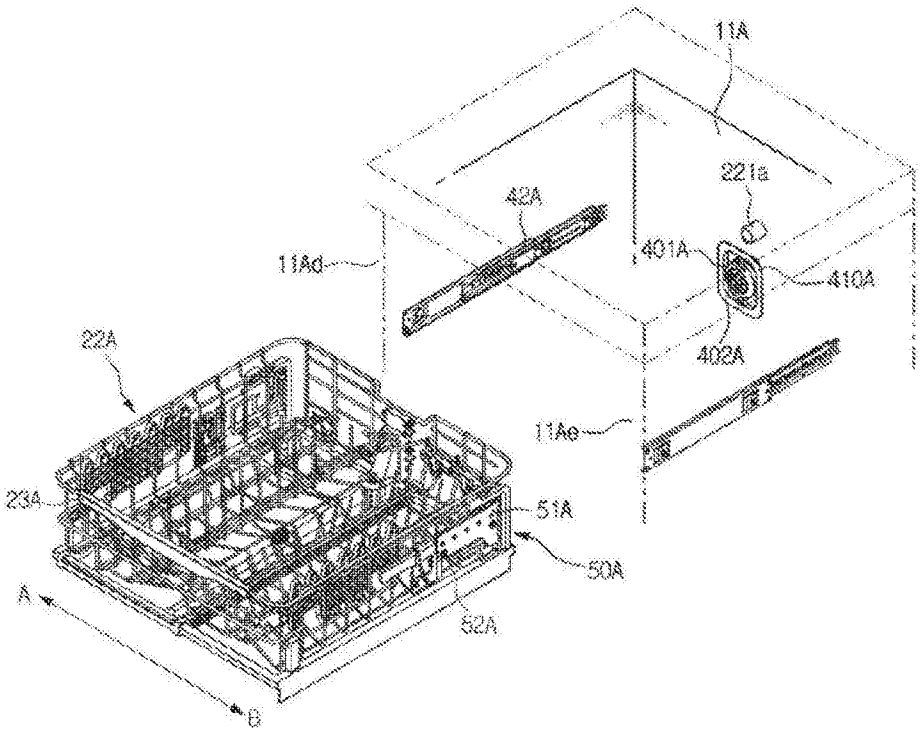


图2

Petitioner Samsung Ex-1004, 0987

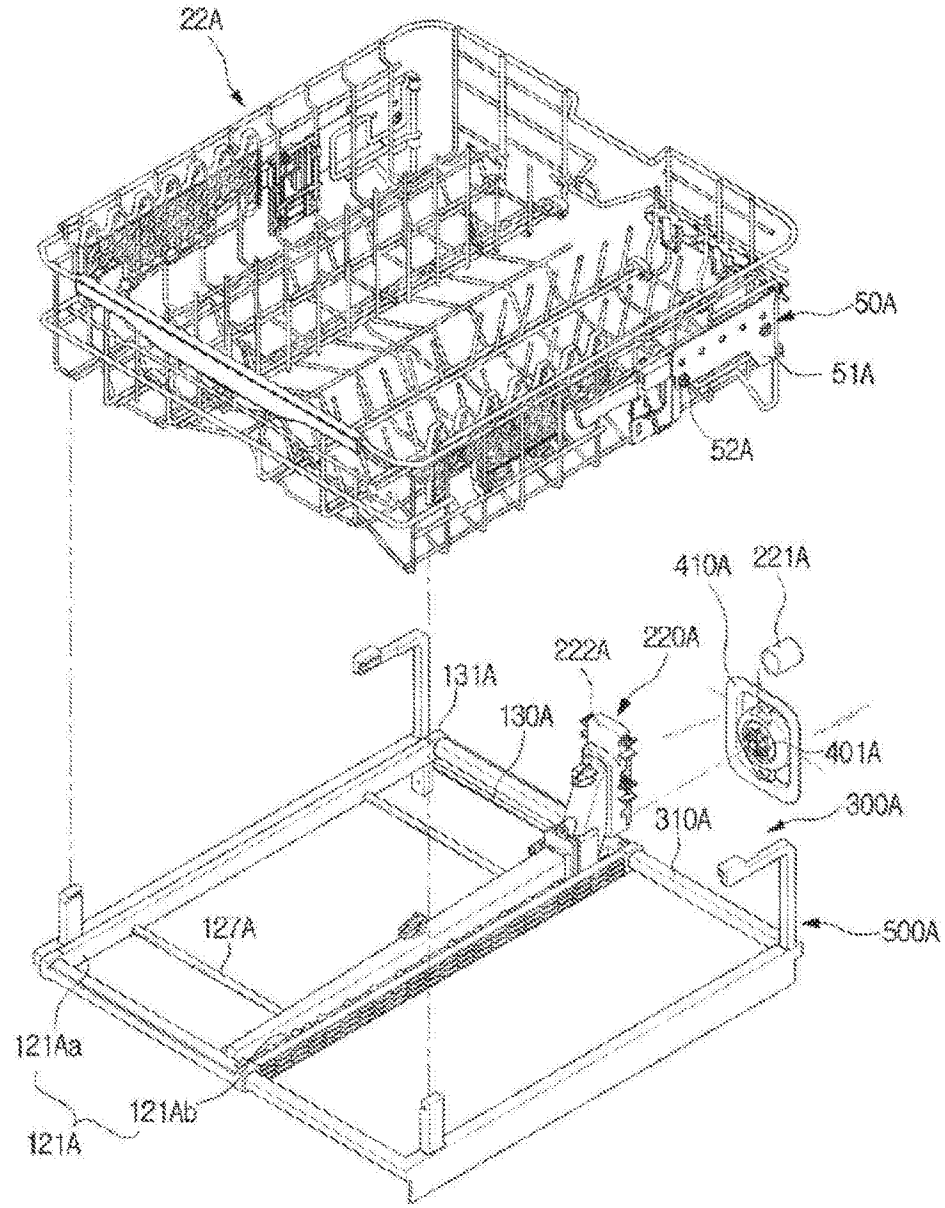


图3

Petitioner Samsung Ex-1004, 0988

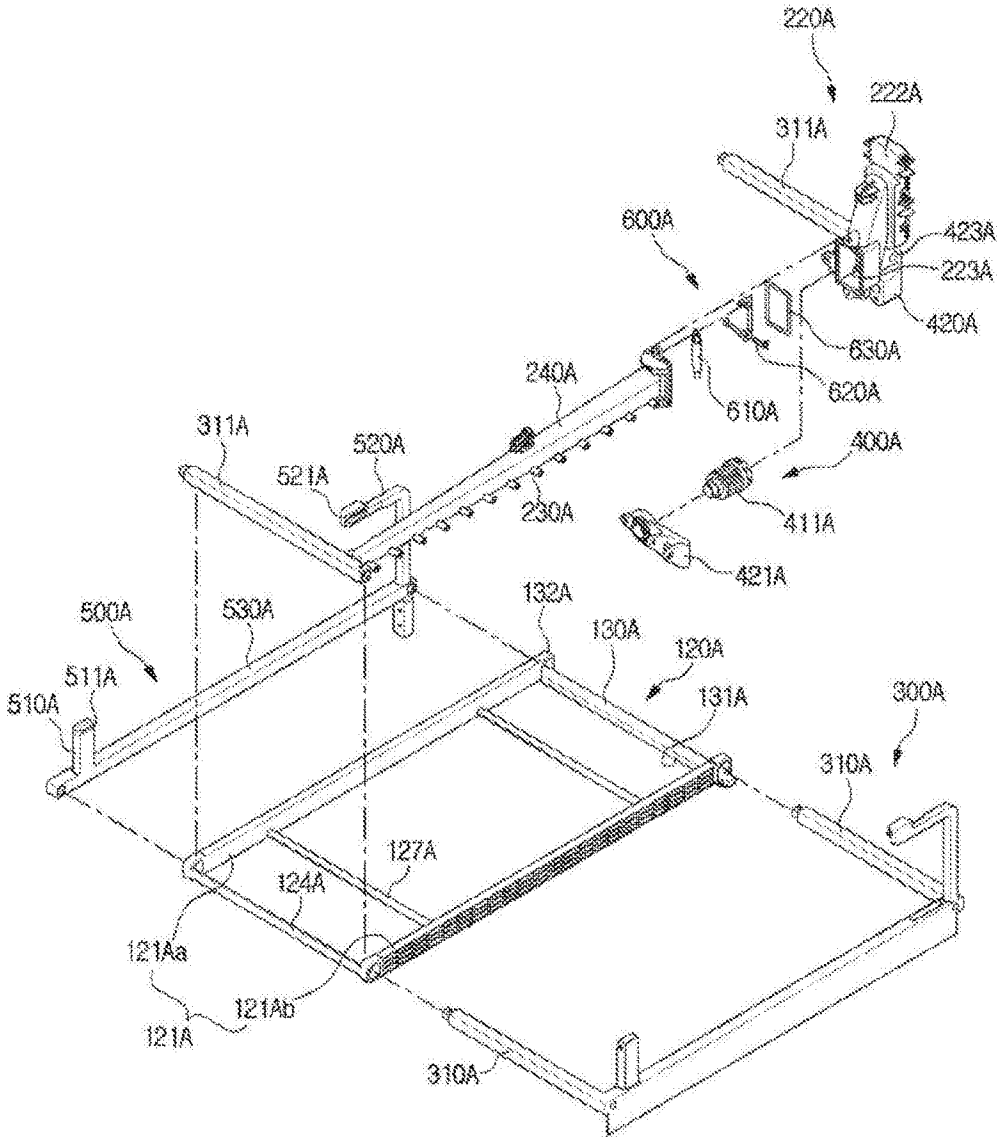


图4

Petitioner Samsung Ex-1004, 0989

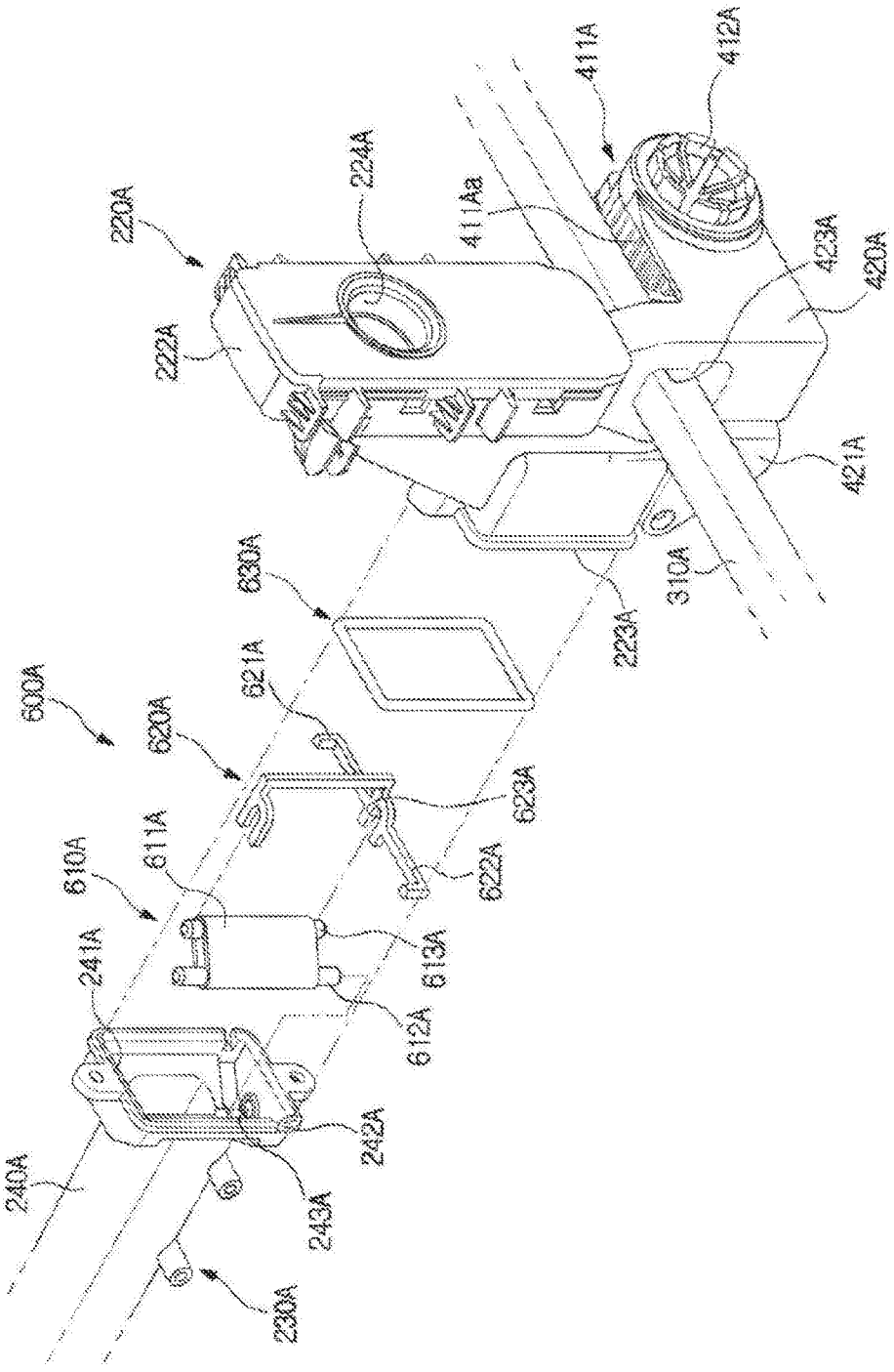


图5

Petitioner Samsung Ex-1004, 0990

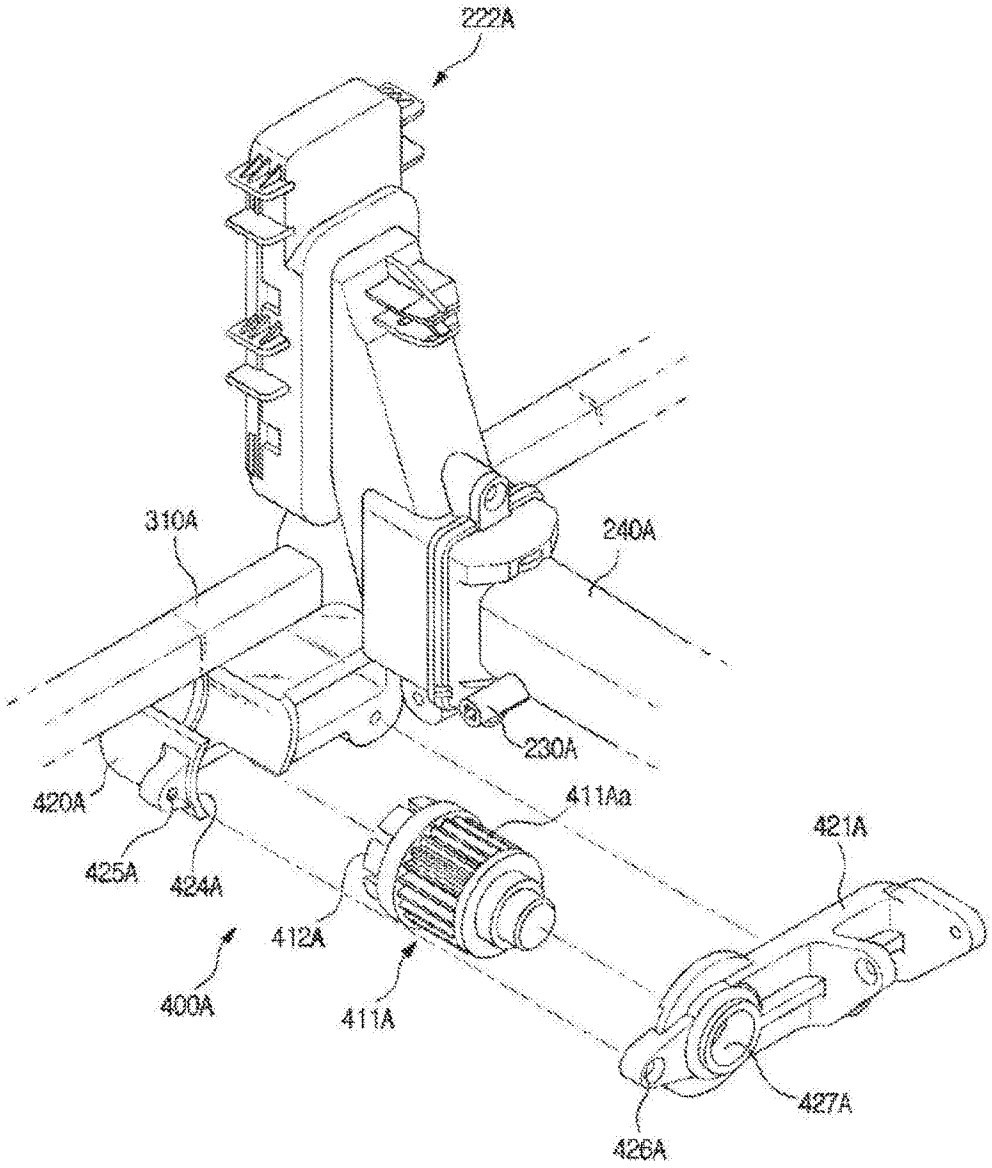


图6

Petitioner Samsung Ex-1004, 0991

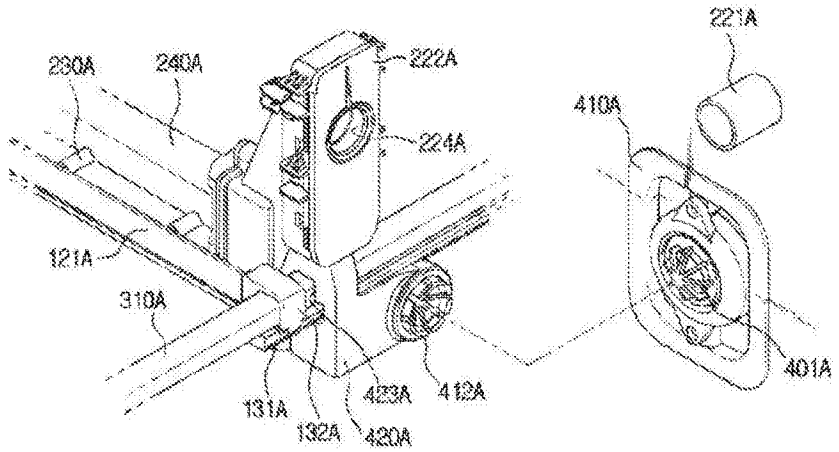


图7

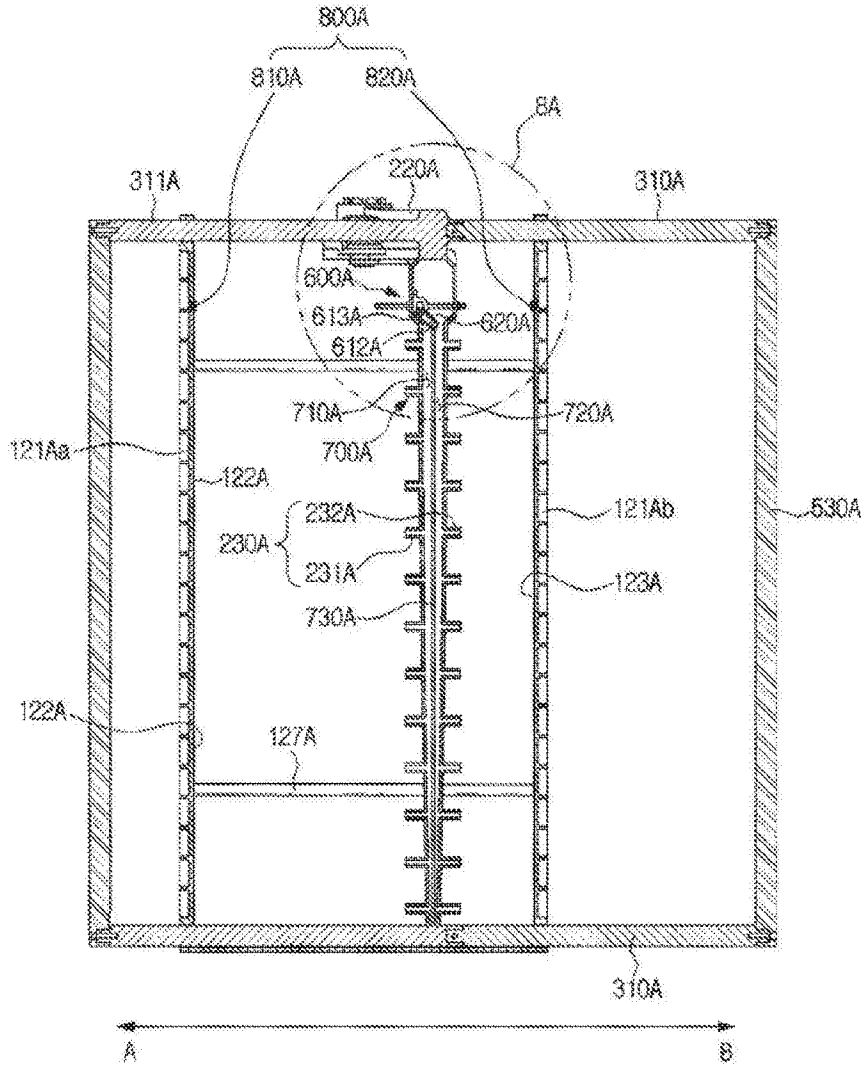


图8

Petitioner Samsung Ex-1004, 0992

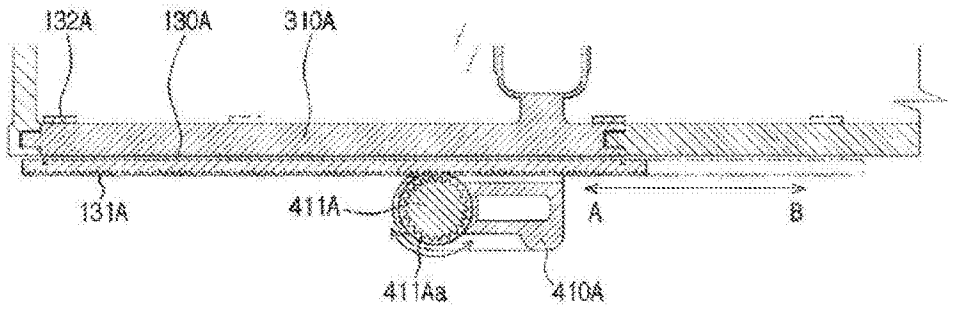


图9

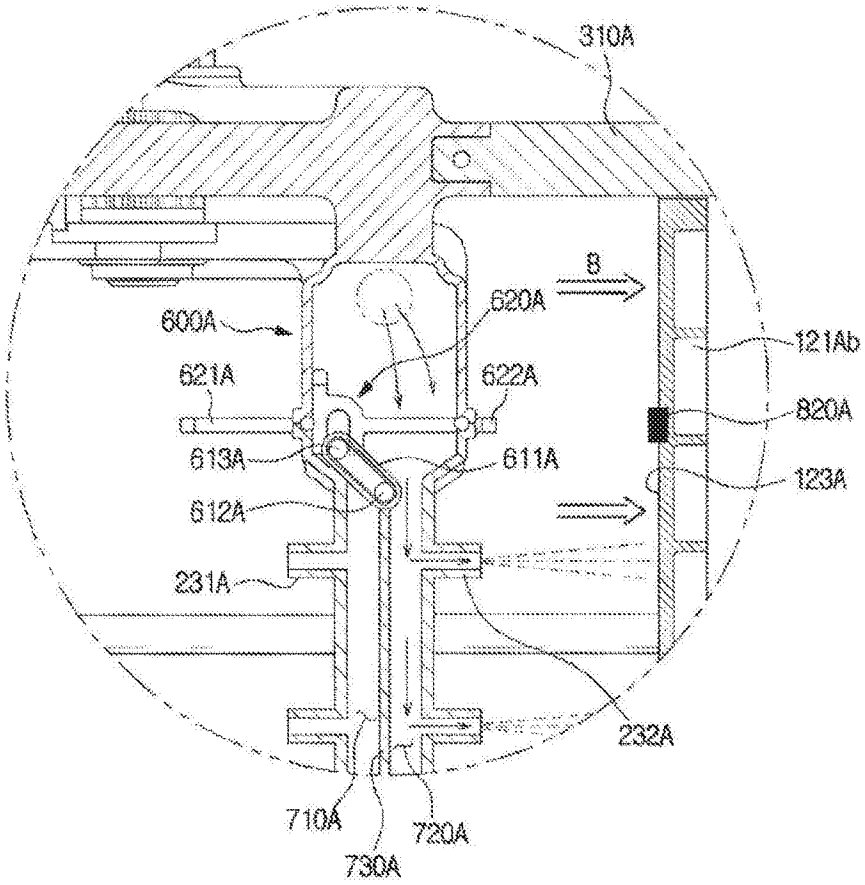


图10

Petitioner Samsung Ex-1004, 0993

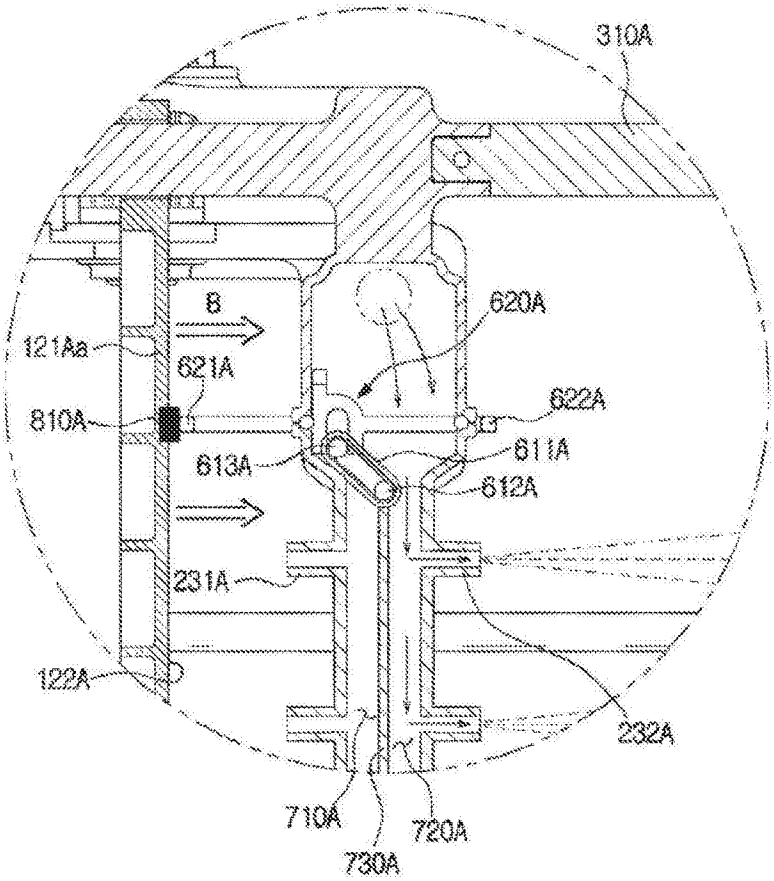


图11

Petitioner Samsung Ex-1004, 0994

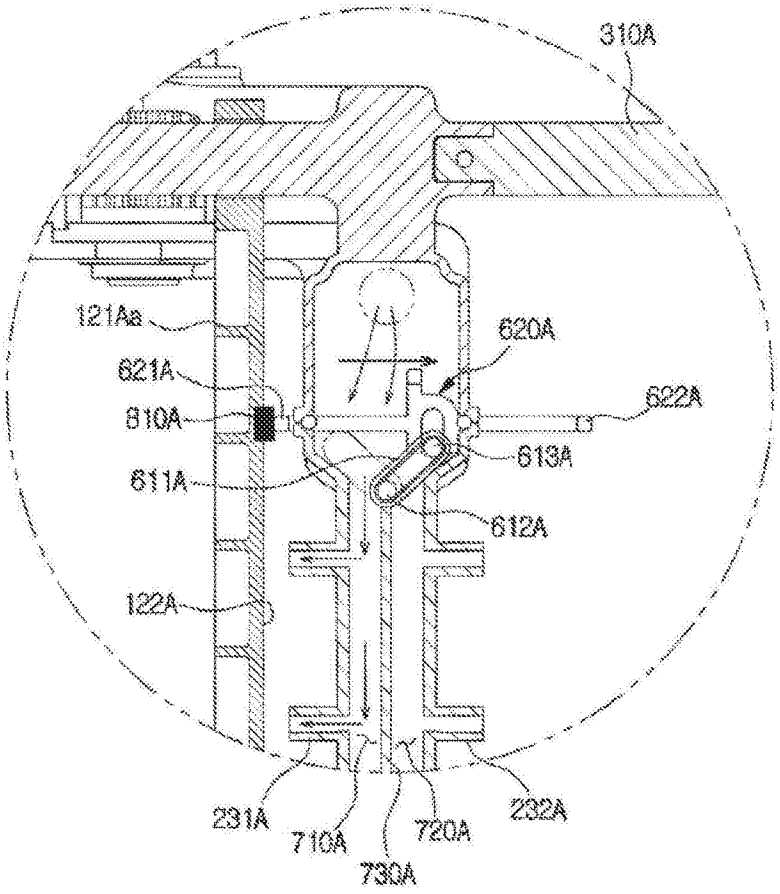


图12

Petitioner Samsung Ex-1004, 0995

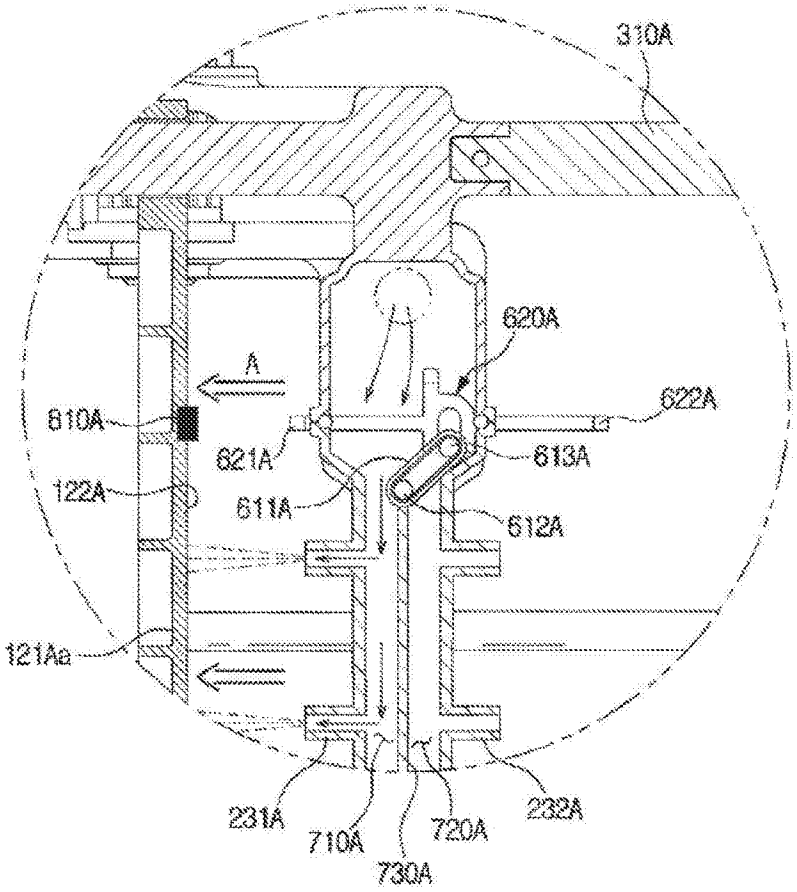


图13

Petitioner Samsung Ex-1004, 0996

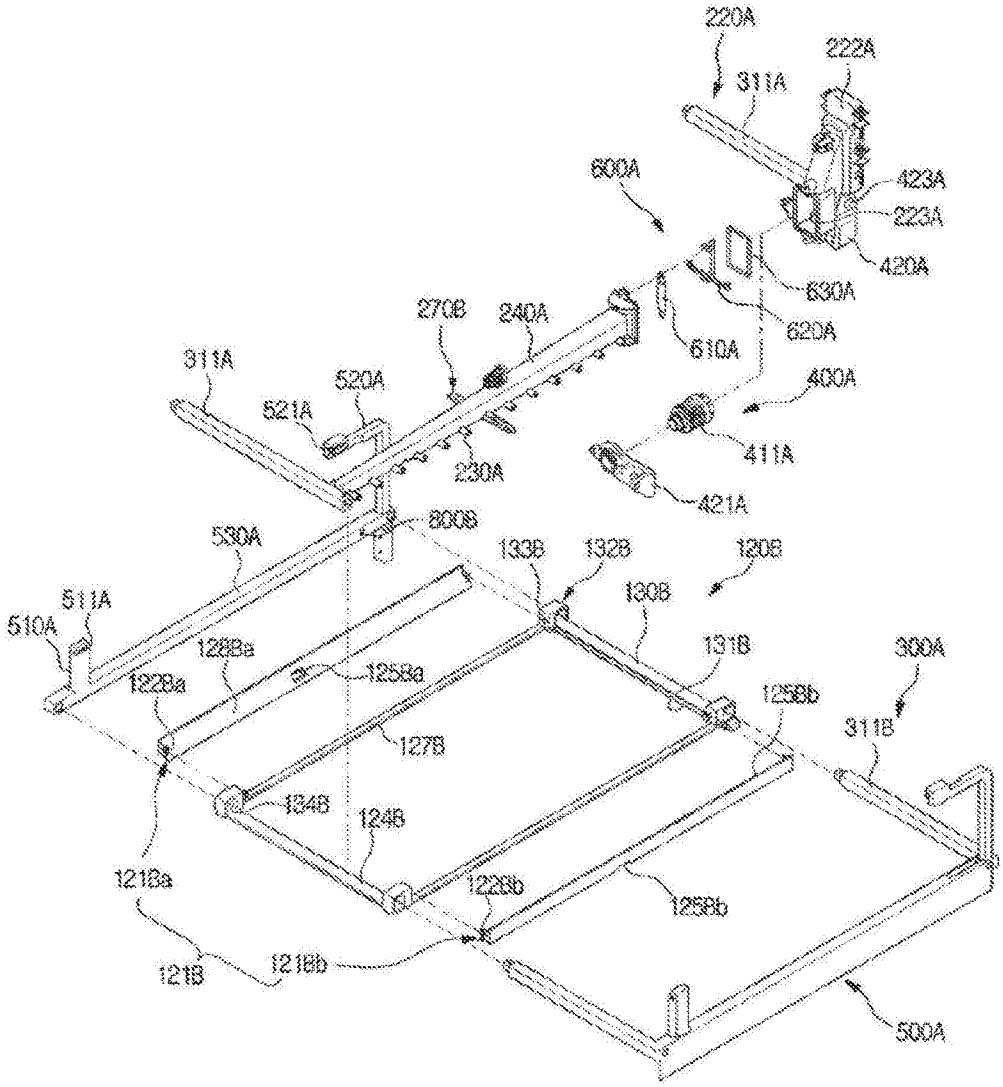


图14

Petitioner Samsung Ex-1004, 0997

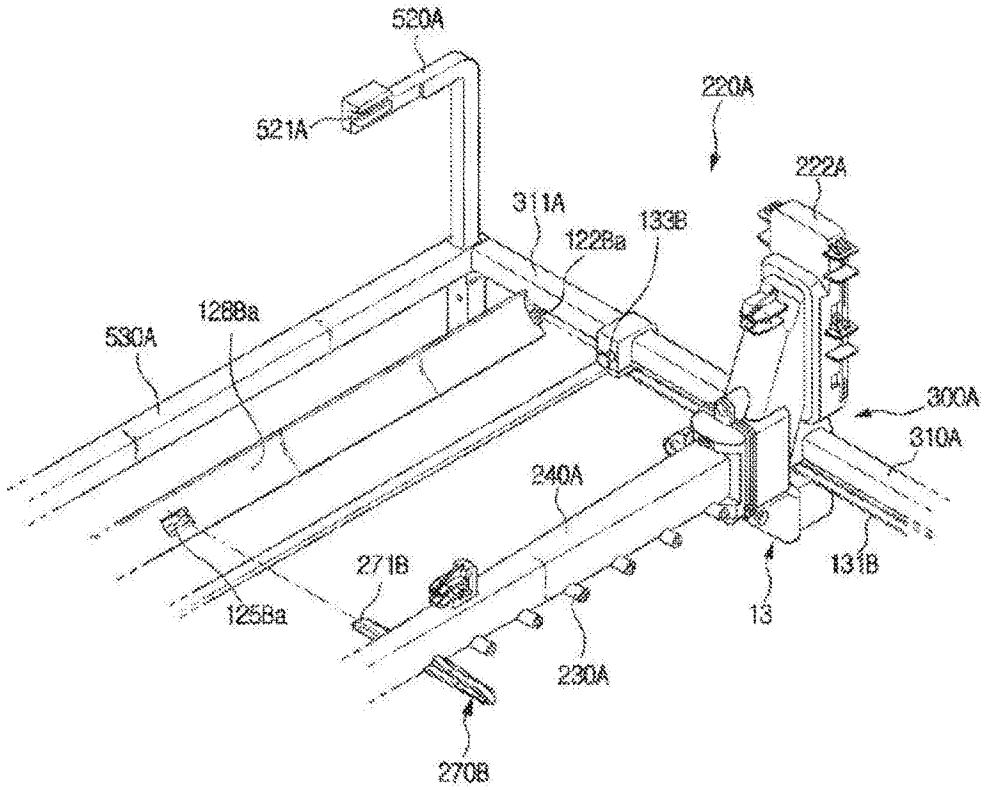


图15

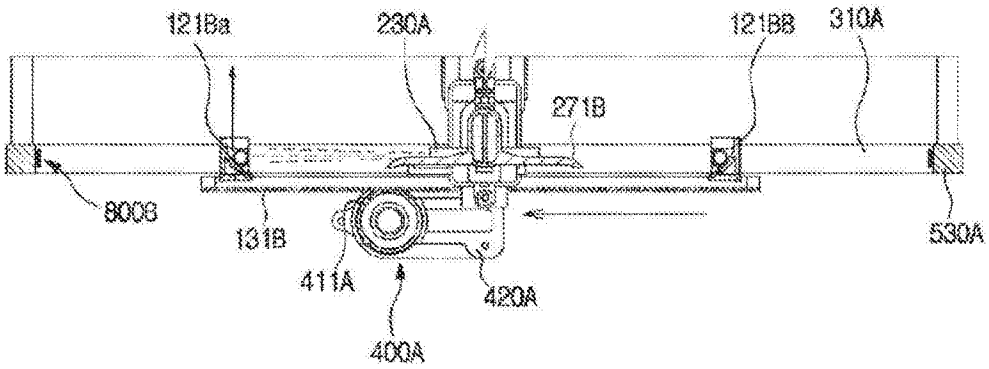


图16

Petitioner Samsung Ex-1004, 0998

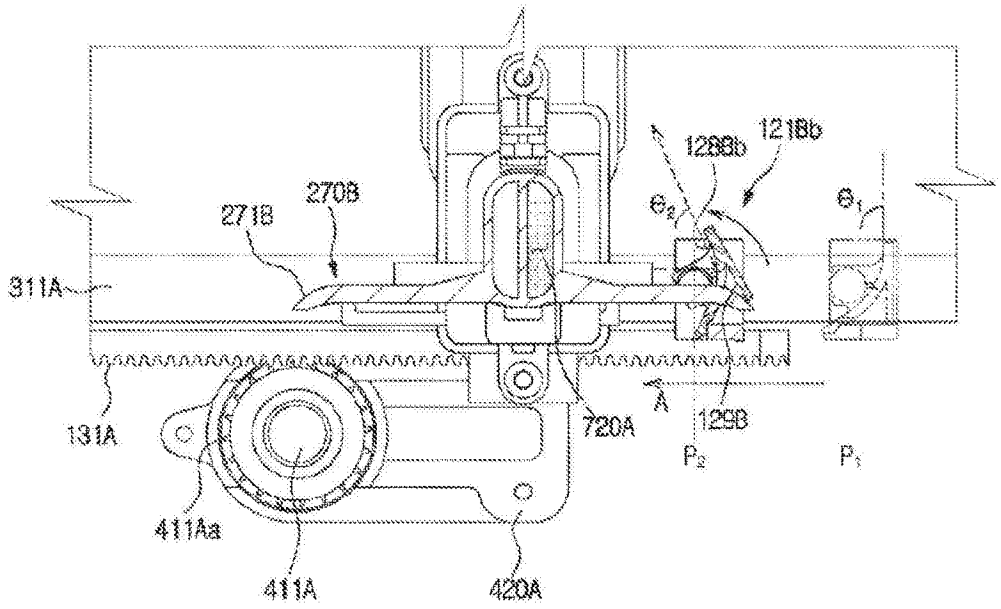


图17

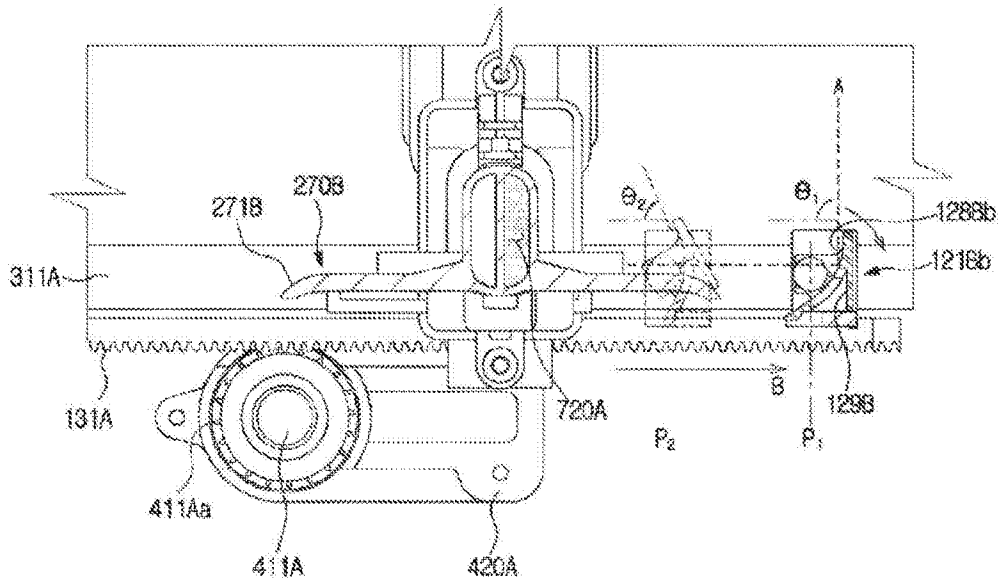


图18

Petitioner Samsung Ex-1004, 0999

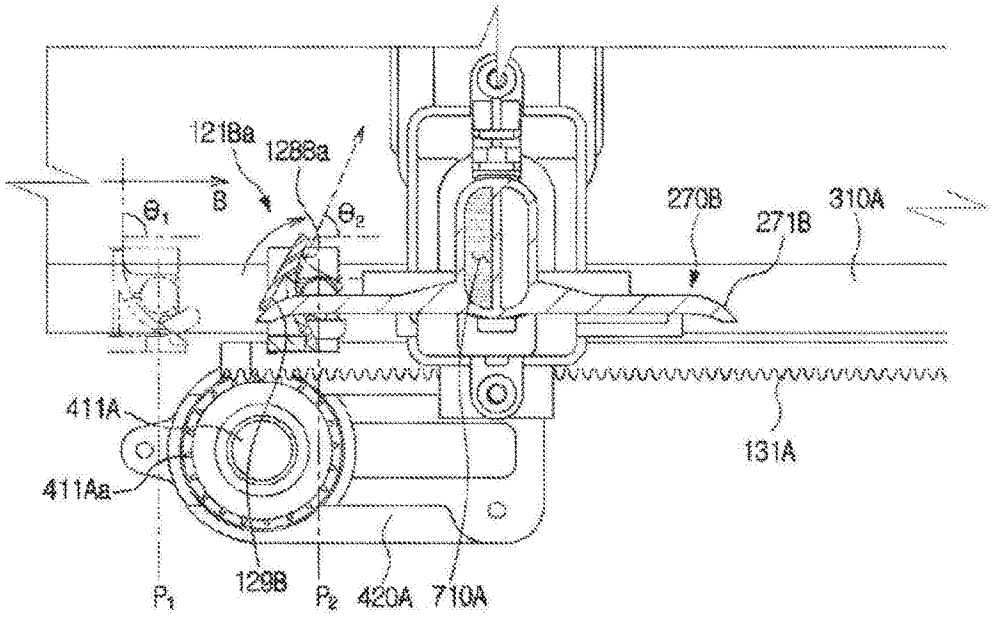


图19

Petitioner Samsung Ex-1004, 1000

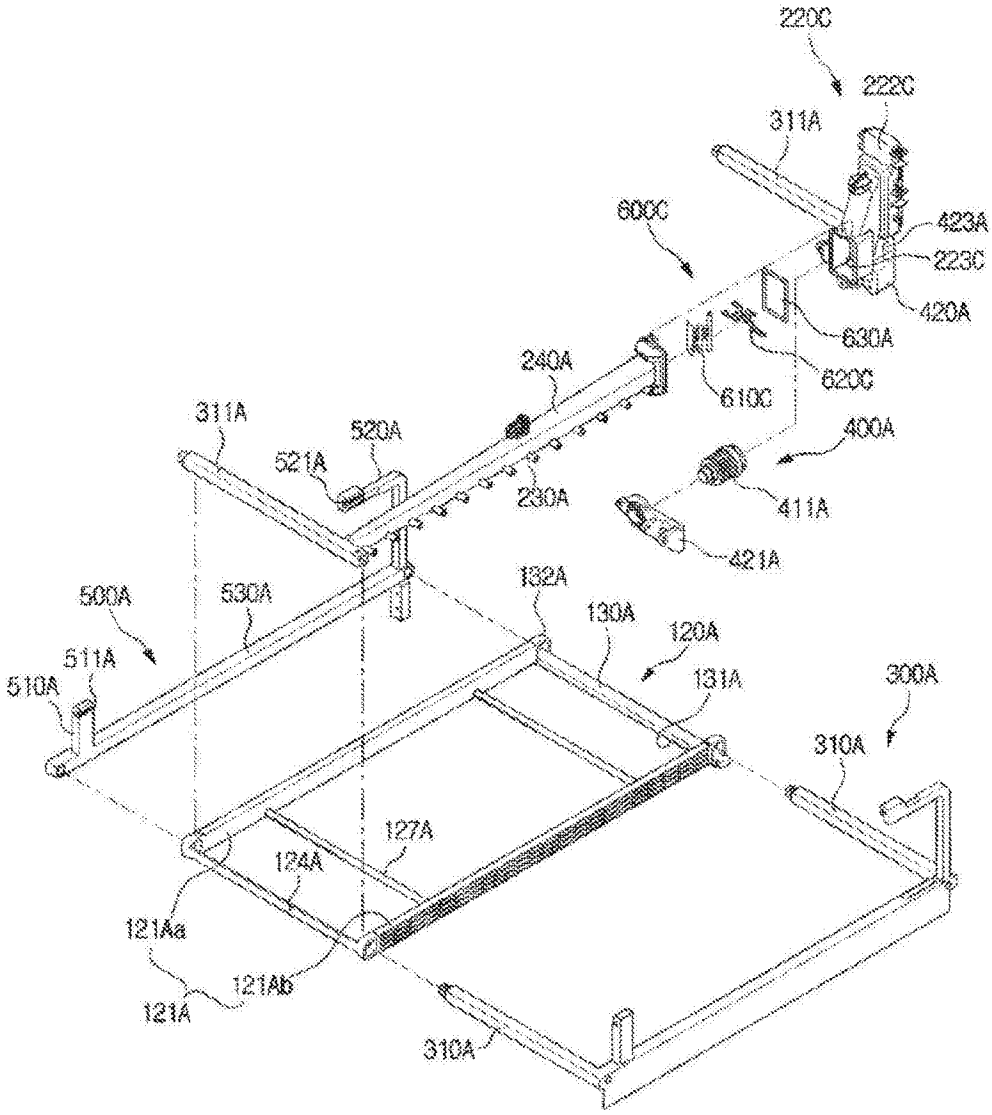


图20

Petitioner Samsung Ex-1004, 1001

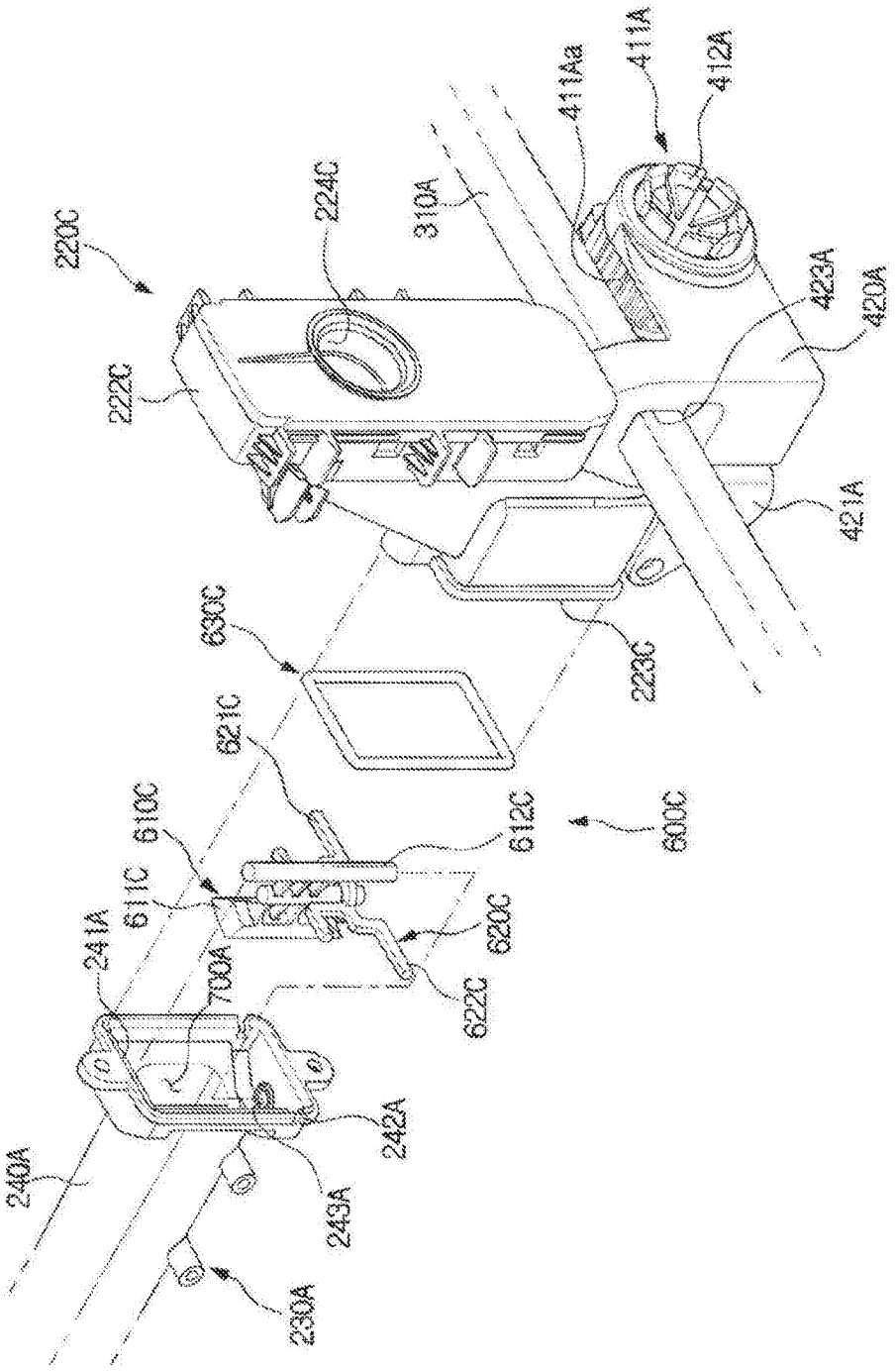


图21

Petitioner Samsung Ex-1004, 1002

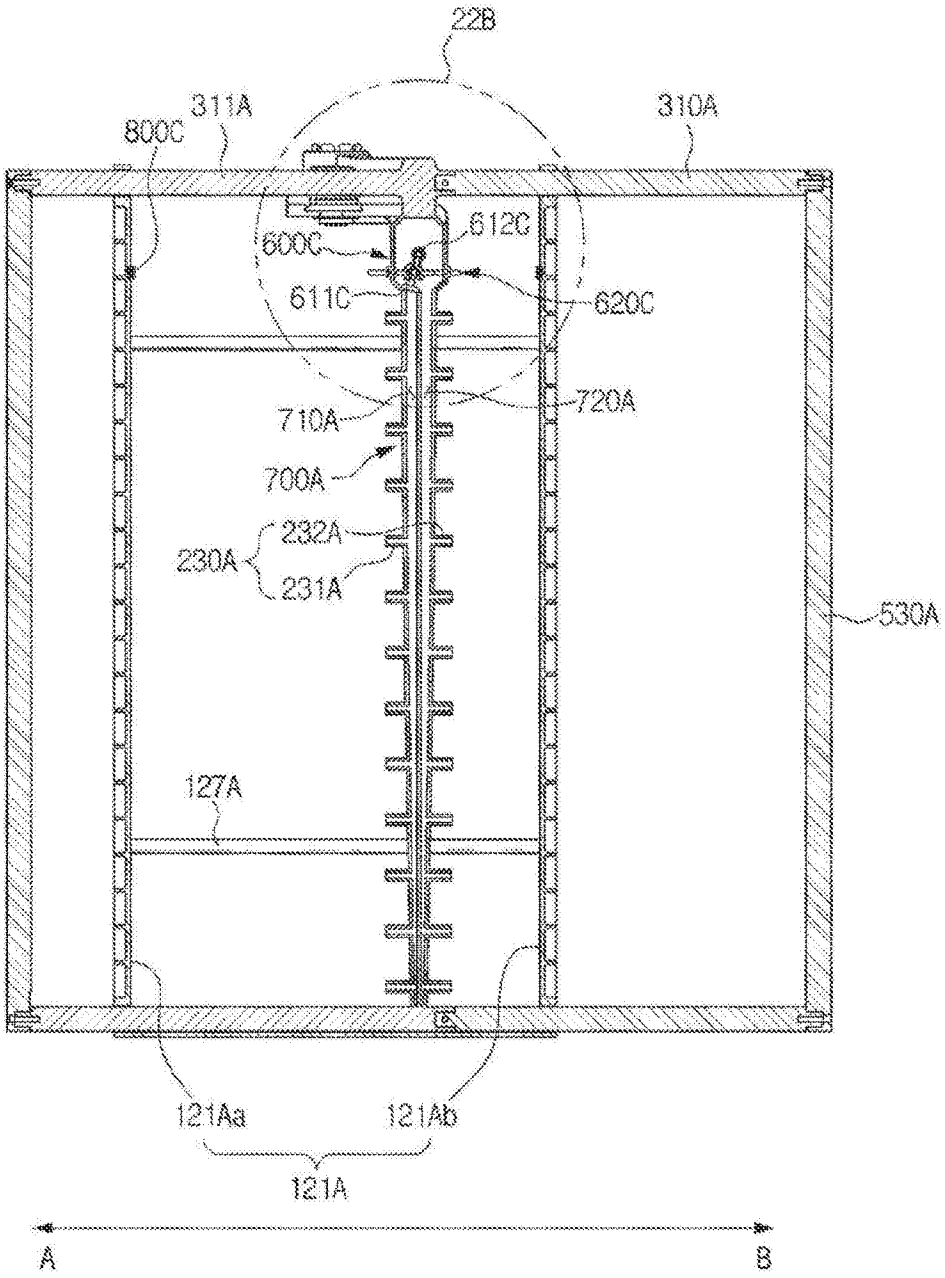


图22

Petitioner Samsung Ex-1004, 1003

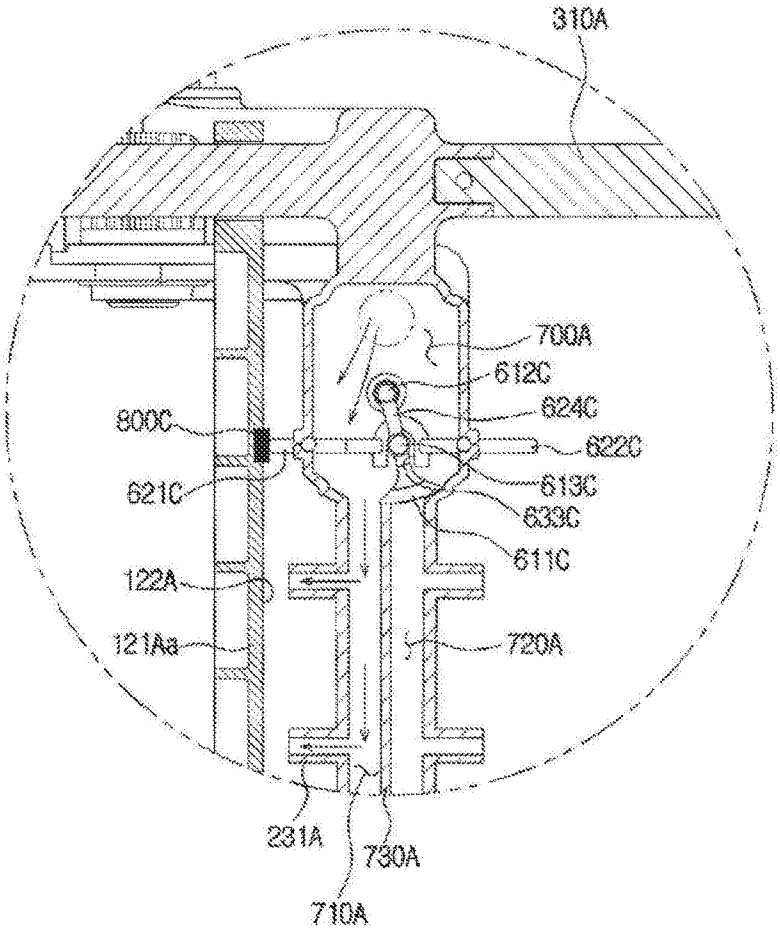


图23

Petitioner Samsung Ex-1004, 1004

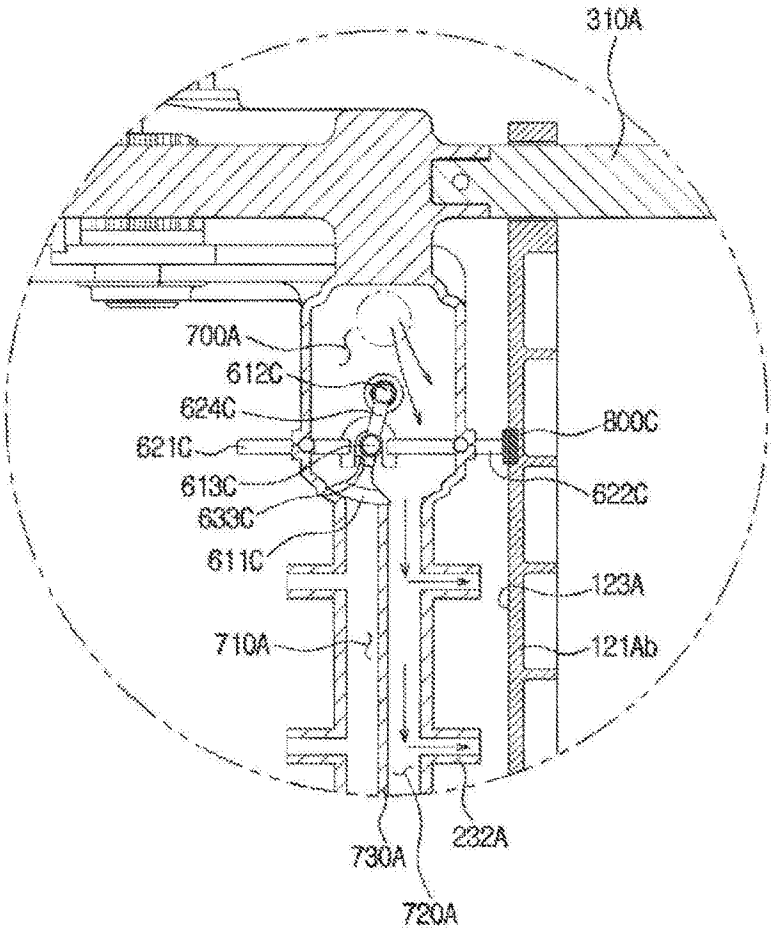


图24

Petitioner Samsung Ex-1004, 1005

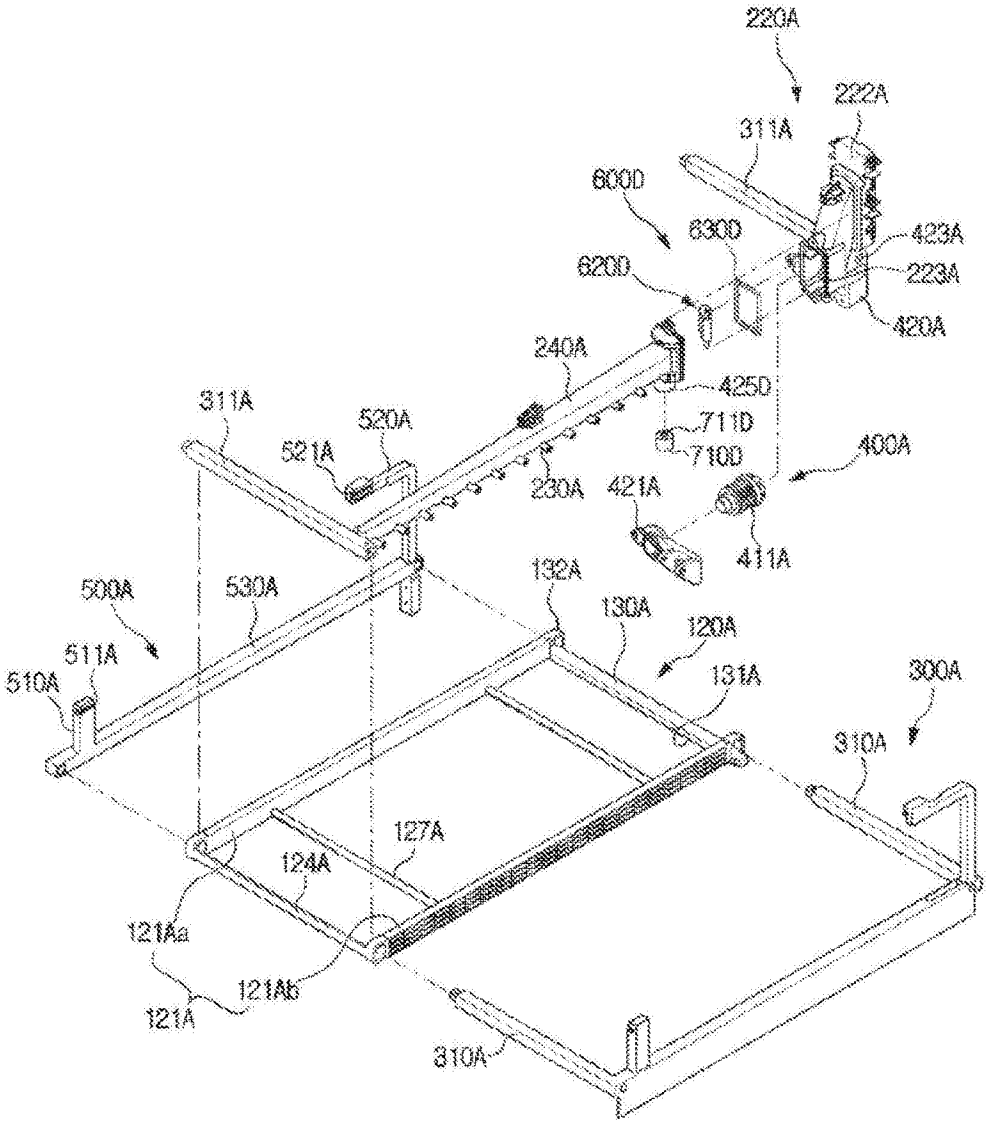


图25

Petitioner Samsung Ex-1004, 1006

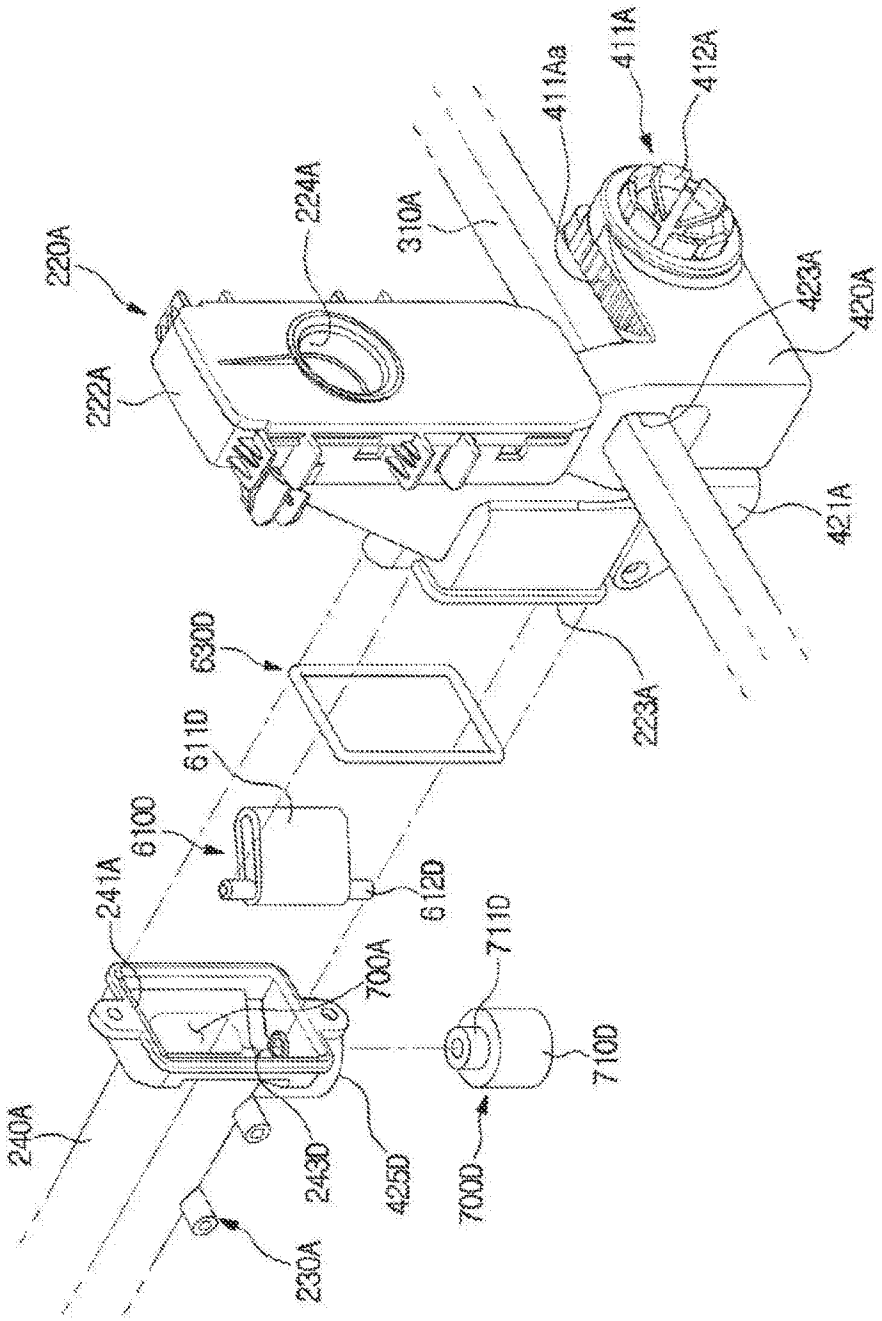


图26

Petitioner Samsung Ex-1004, 1007

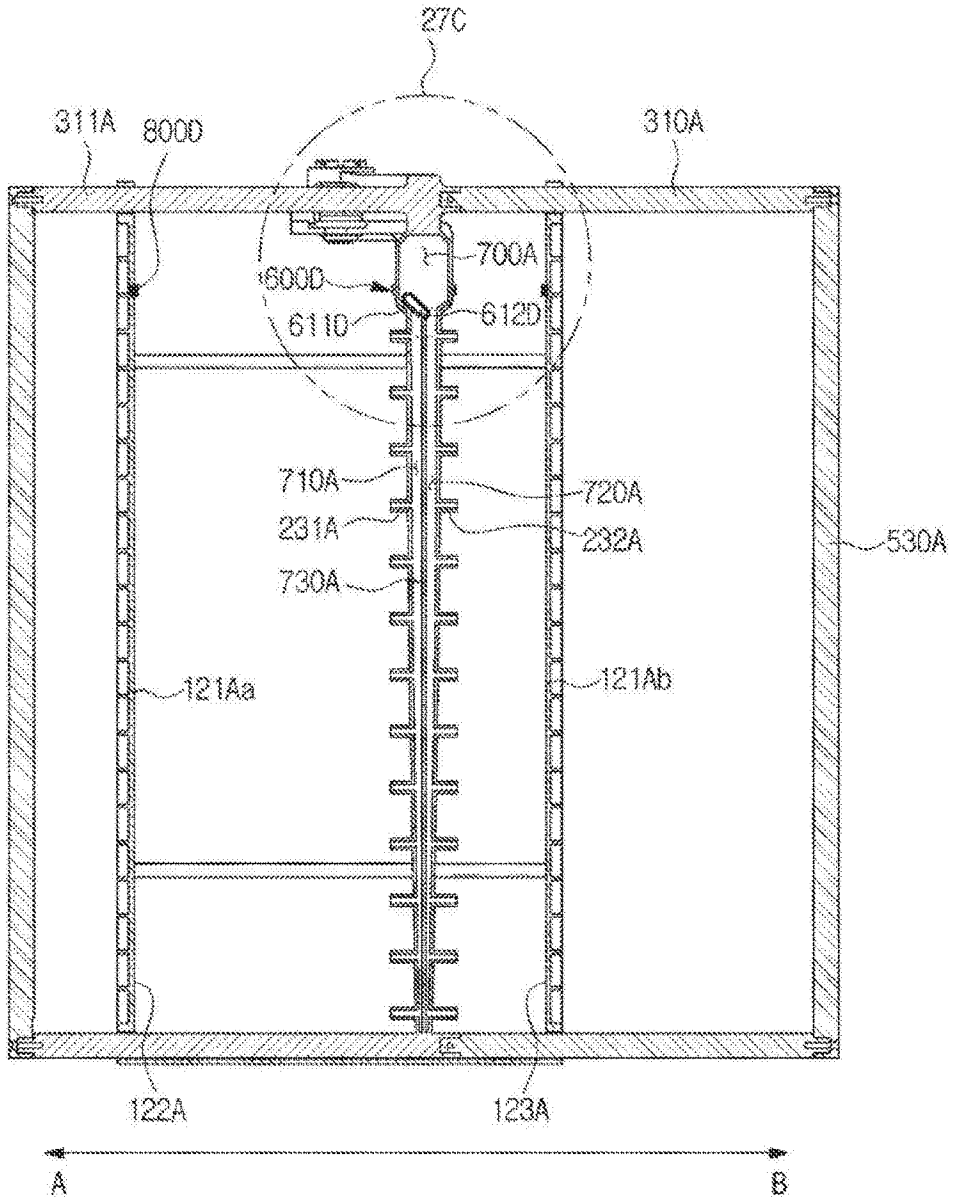


图27

Petitioner Samsung Ex-1004, 1008

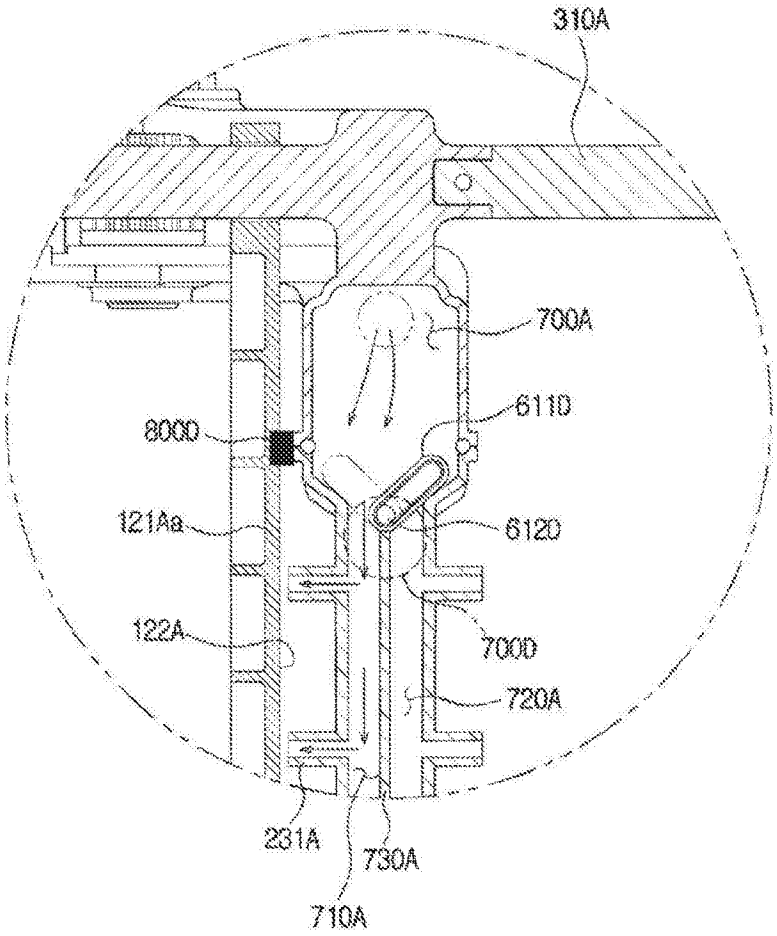


图28

Petitioner Samsung Ex-1004, 1009

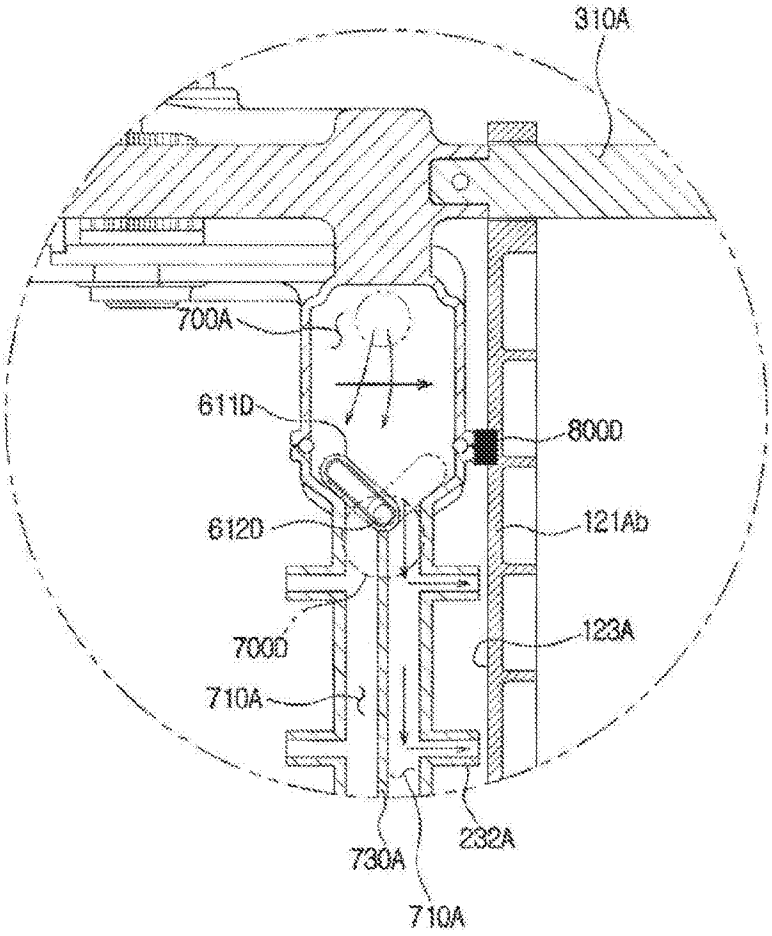


图29

Petitioner Samsung Ex-1004, 1010

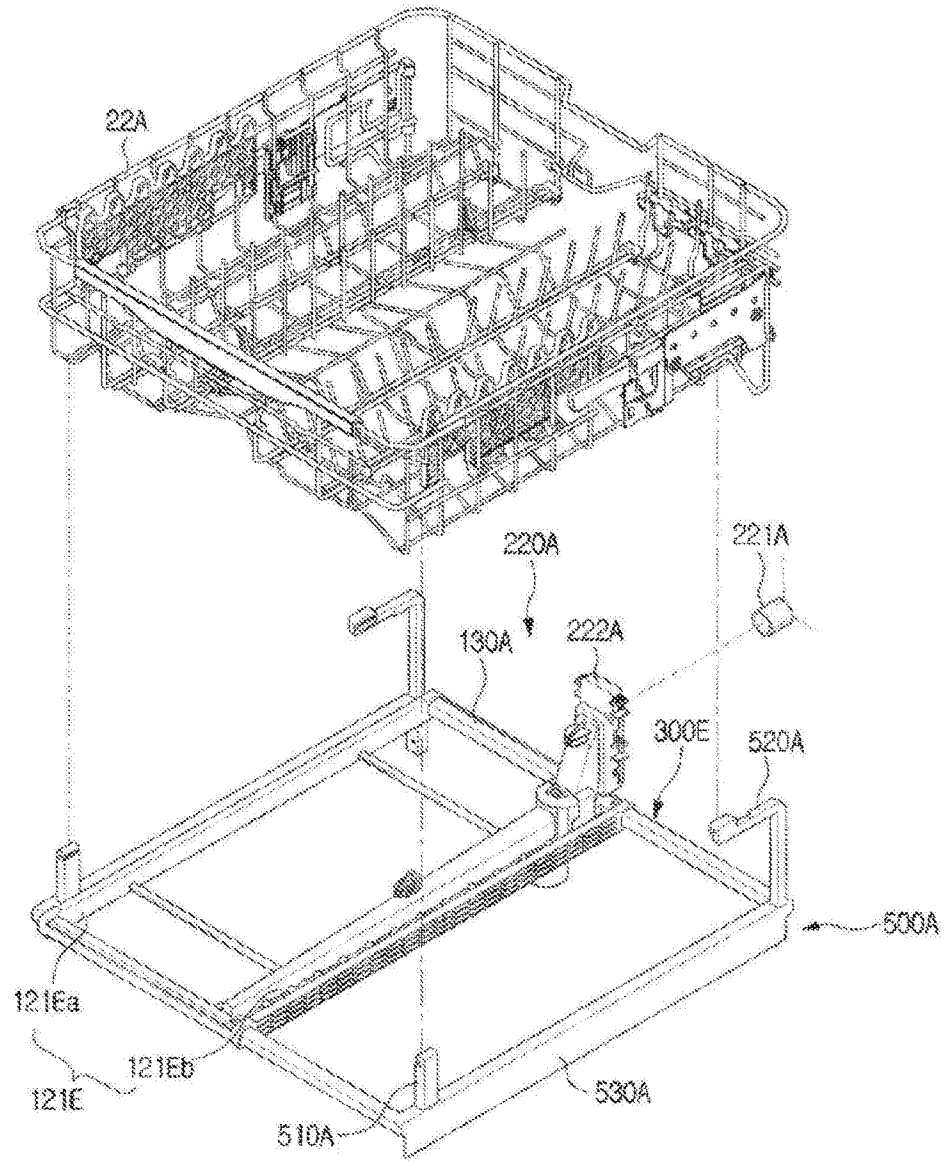


图30

Petitioner Samsung Ex-1004, 1011

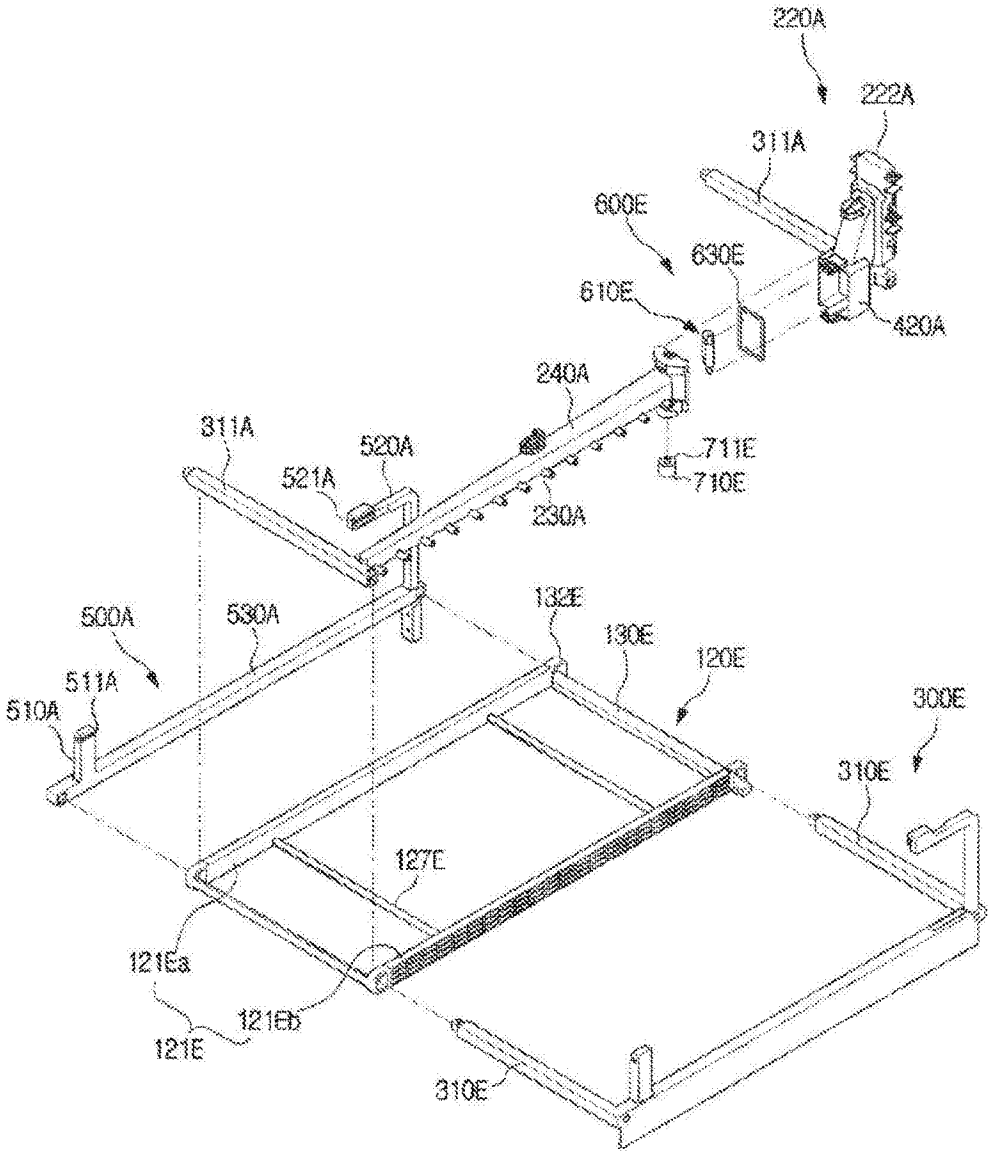


图31

Petitioner Samsung Ex-1004, 1012

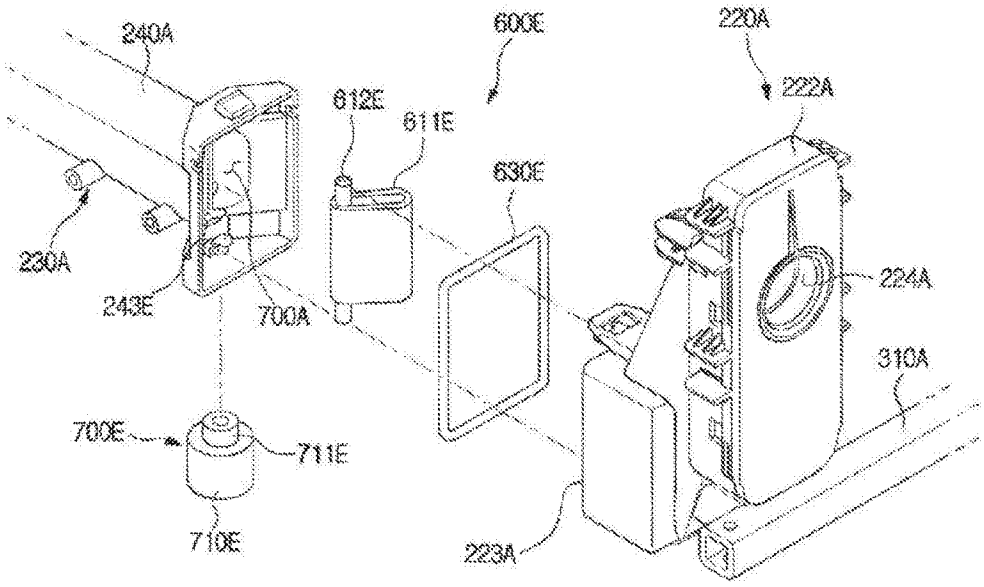


图32

Petitioner Samsung Ex-1004, 1013

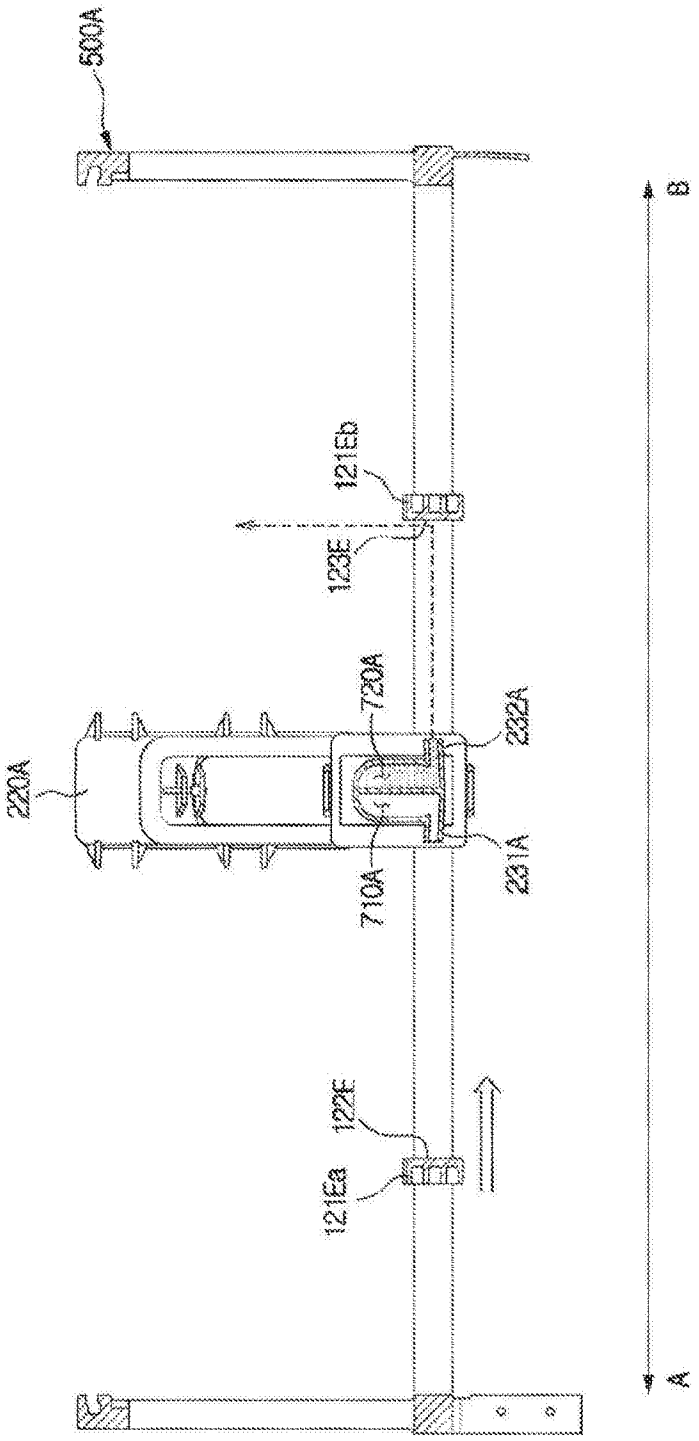


图33

Petitioner Samsung Ex-1004, 1014

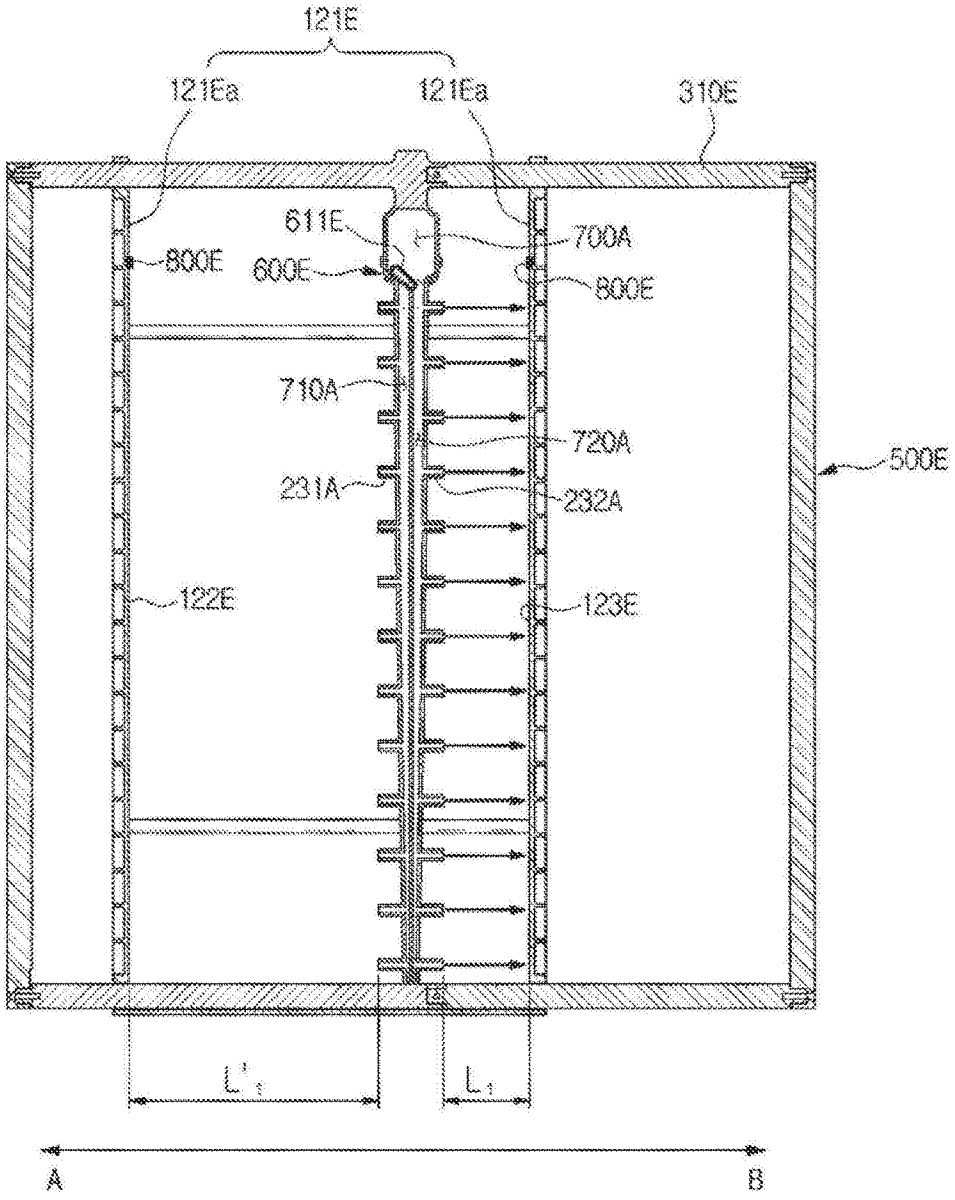


图34

Petitioner Samsung Ex-1004, 1015

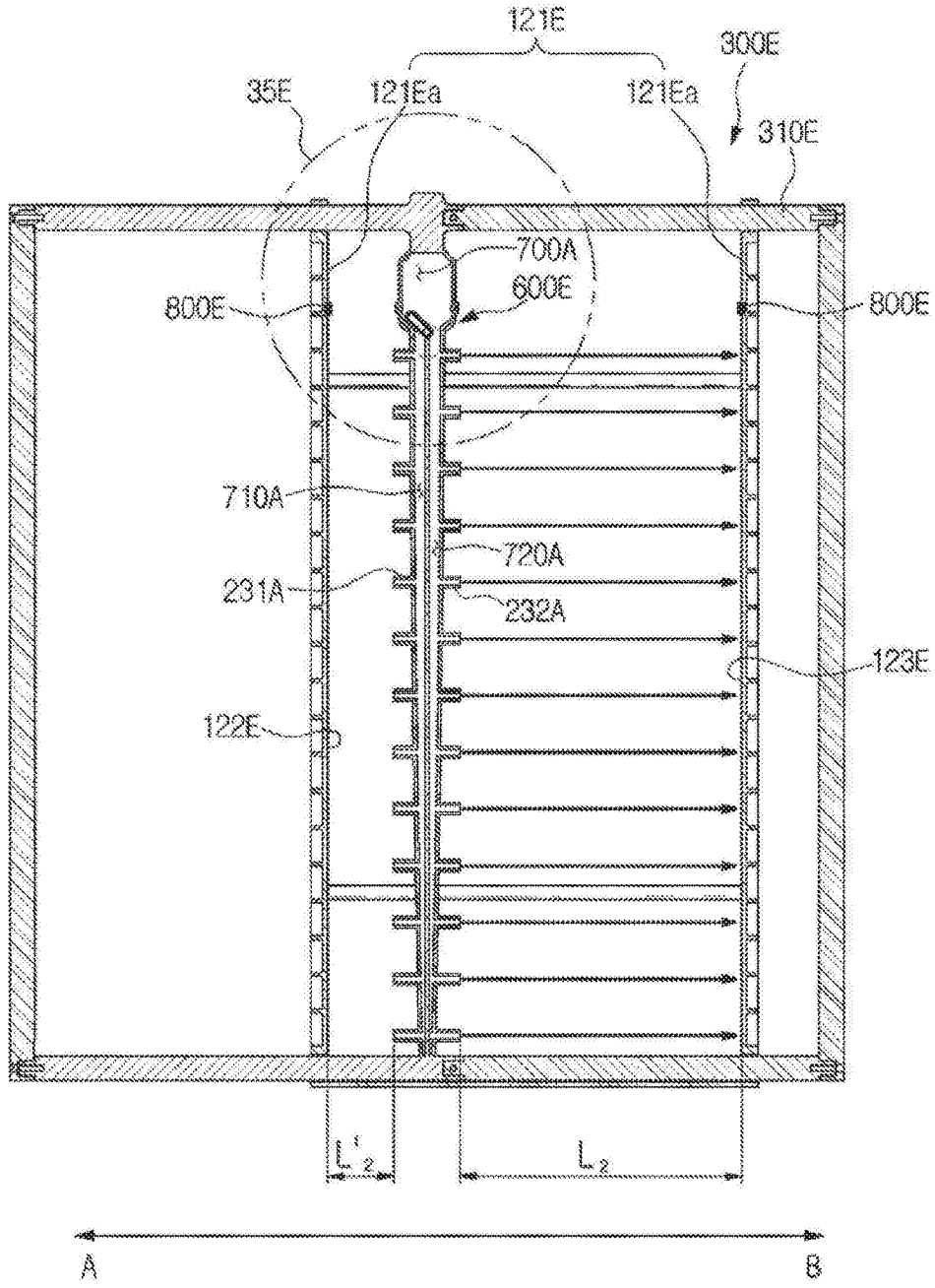


图35

Petitioner Samsung Ex-1004, 1016

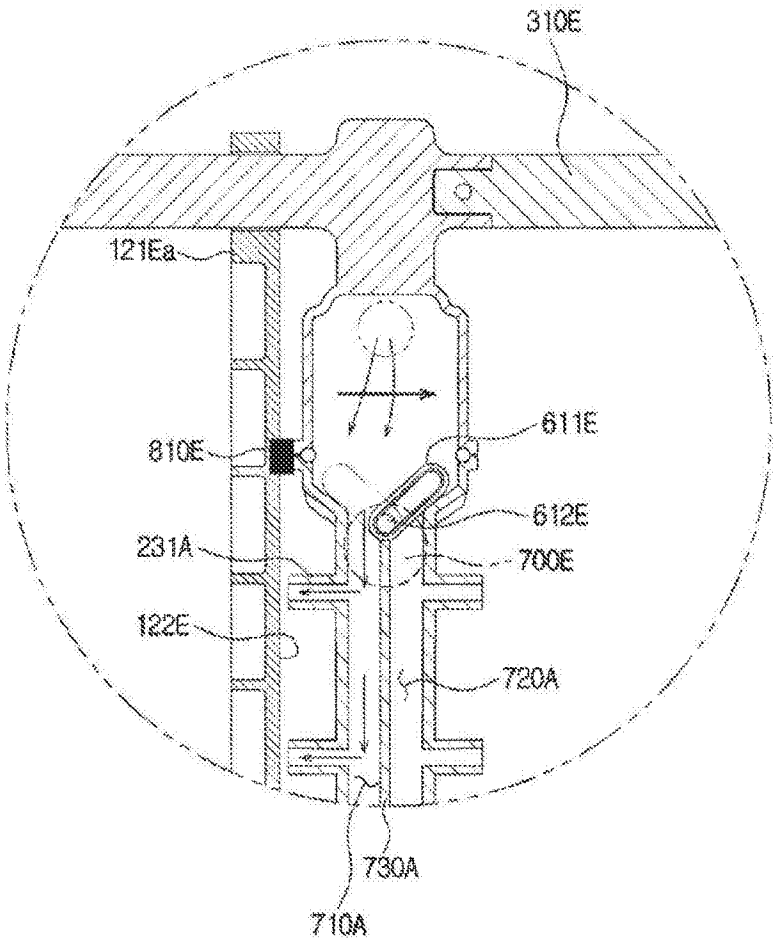


图36

Petitioner Samsung Ex-1004, 1017

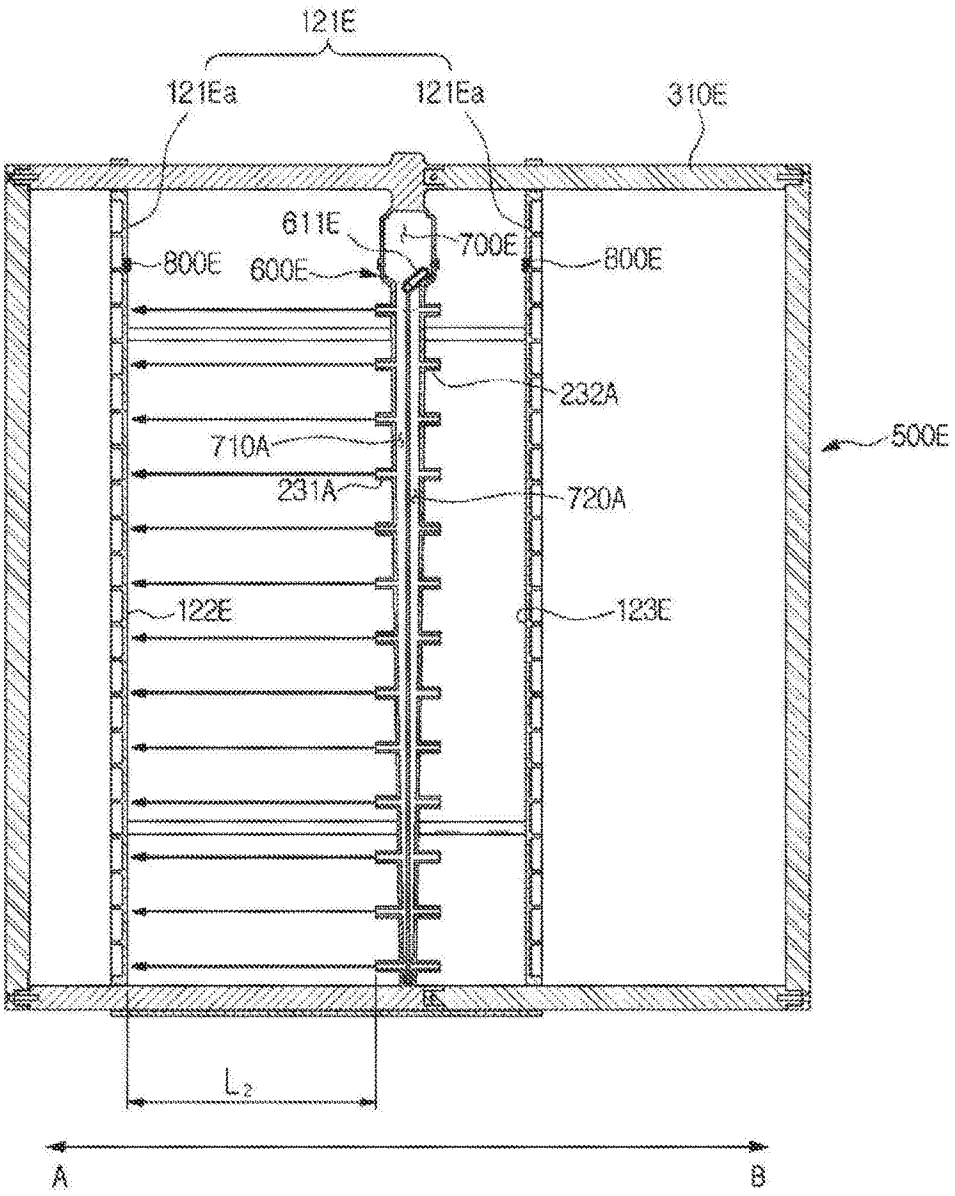


图37

Petitioner Samsung Ex-1004, 1018

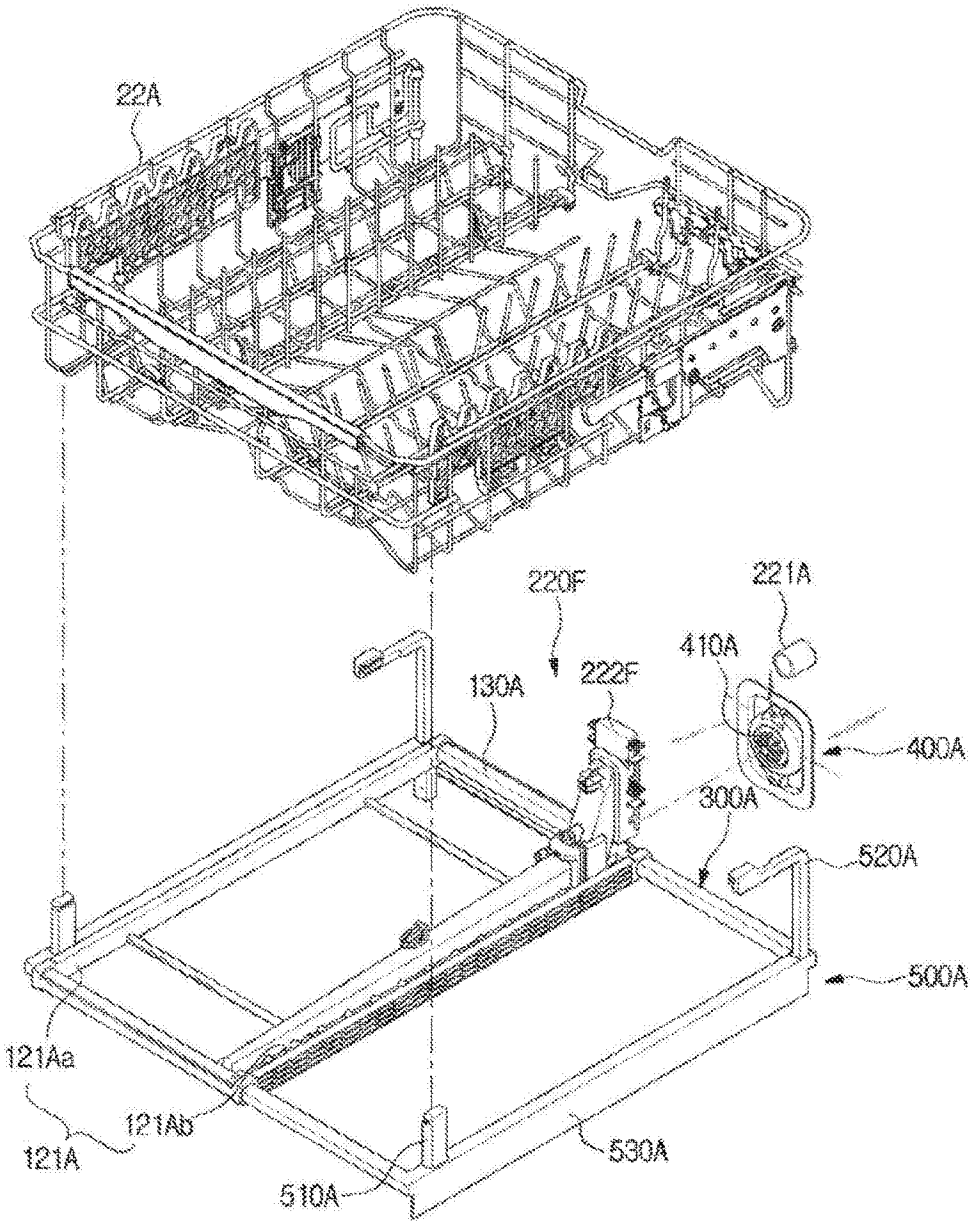


图38

Petitioner Samsung Ex-1004, 1019

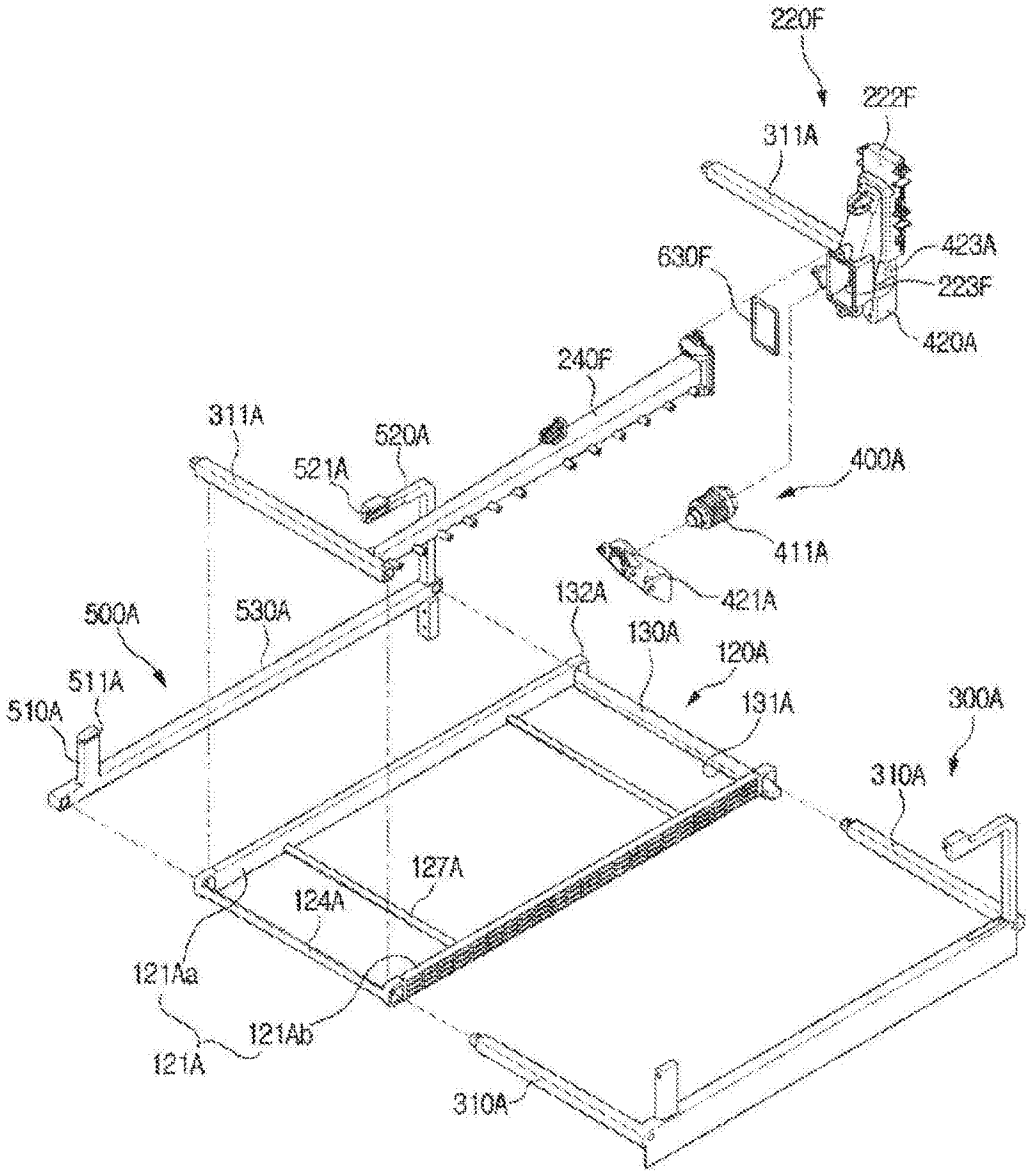


图39

Petitioner Samsung Ex-1004, 1020

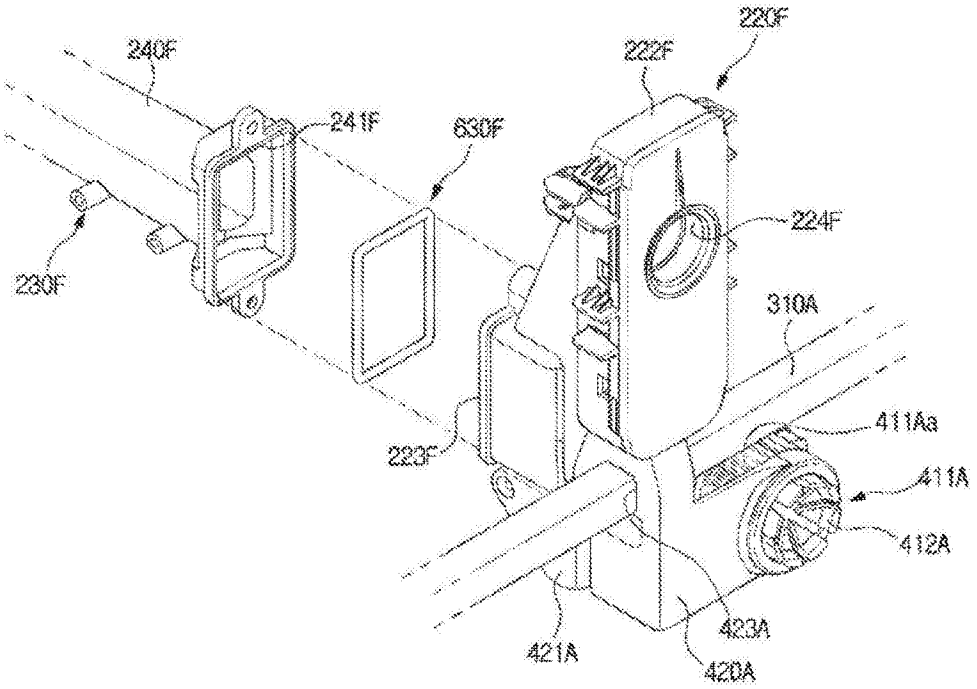


图40

Petitioner Samsung Ex-1004, 1021

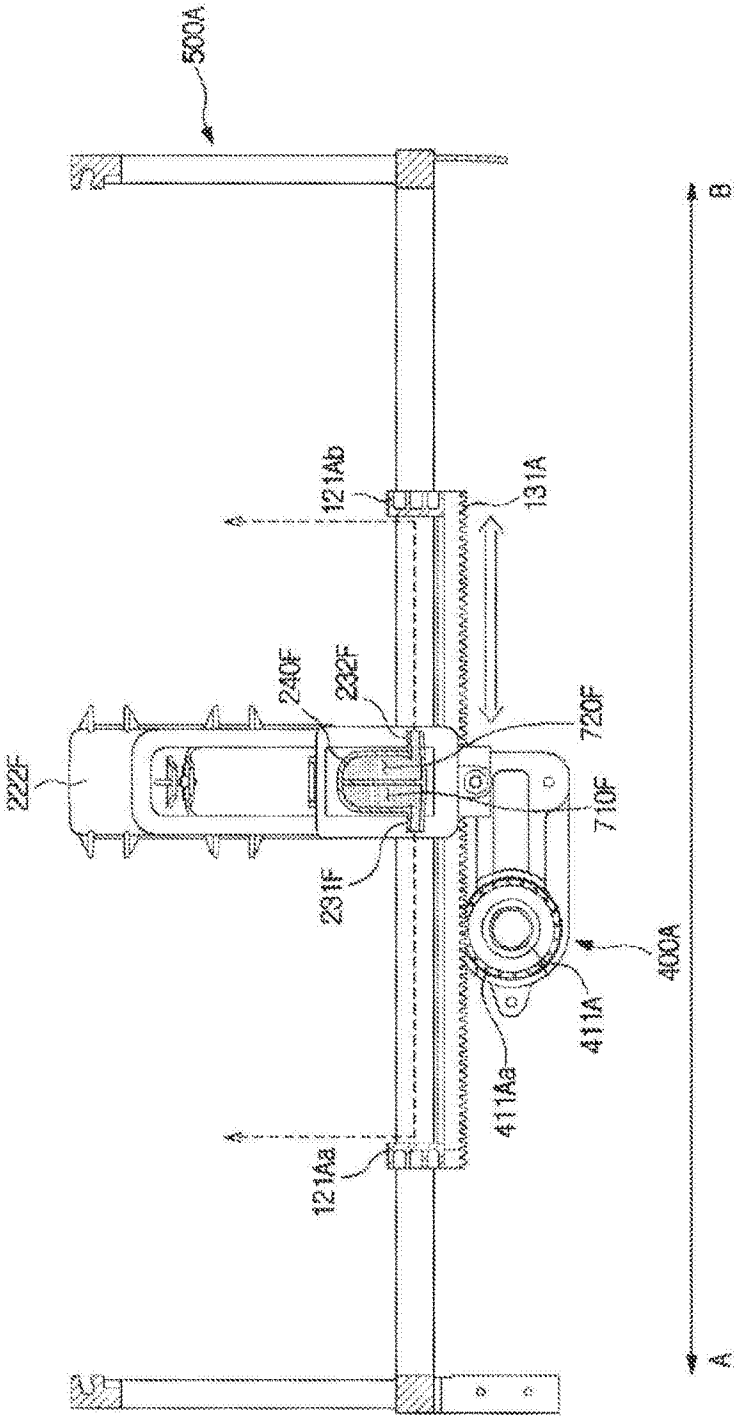


图41

Petitioner Samsung Ex-1004, 1022

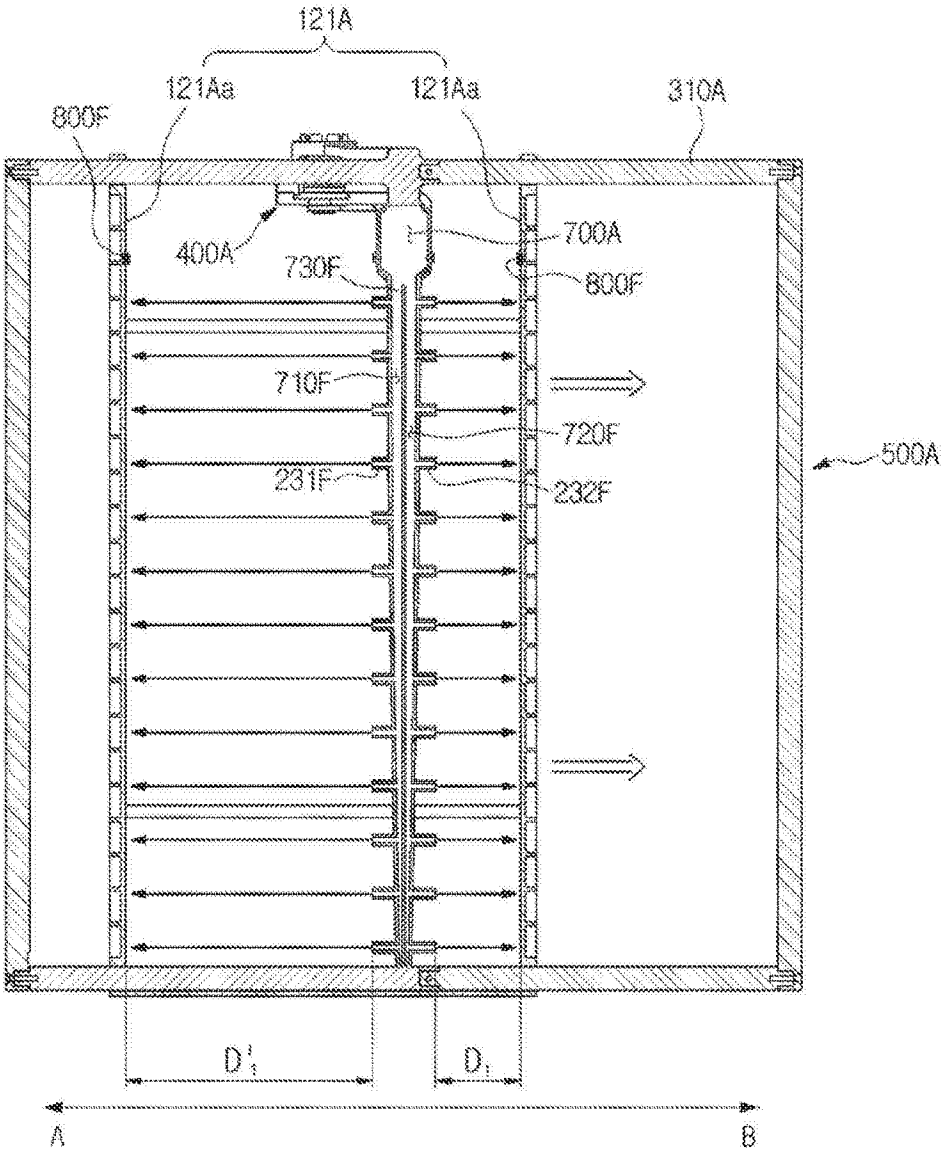


图42

Petitioner Samsung Ex-1004, 1023

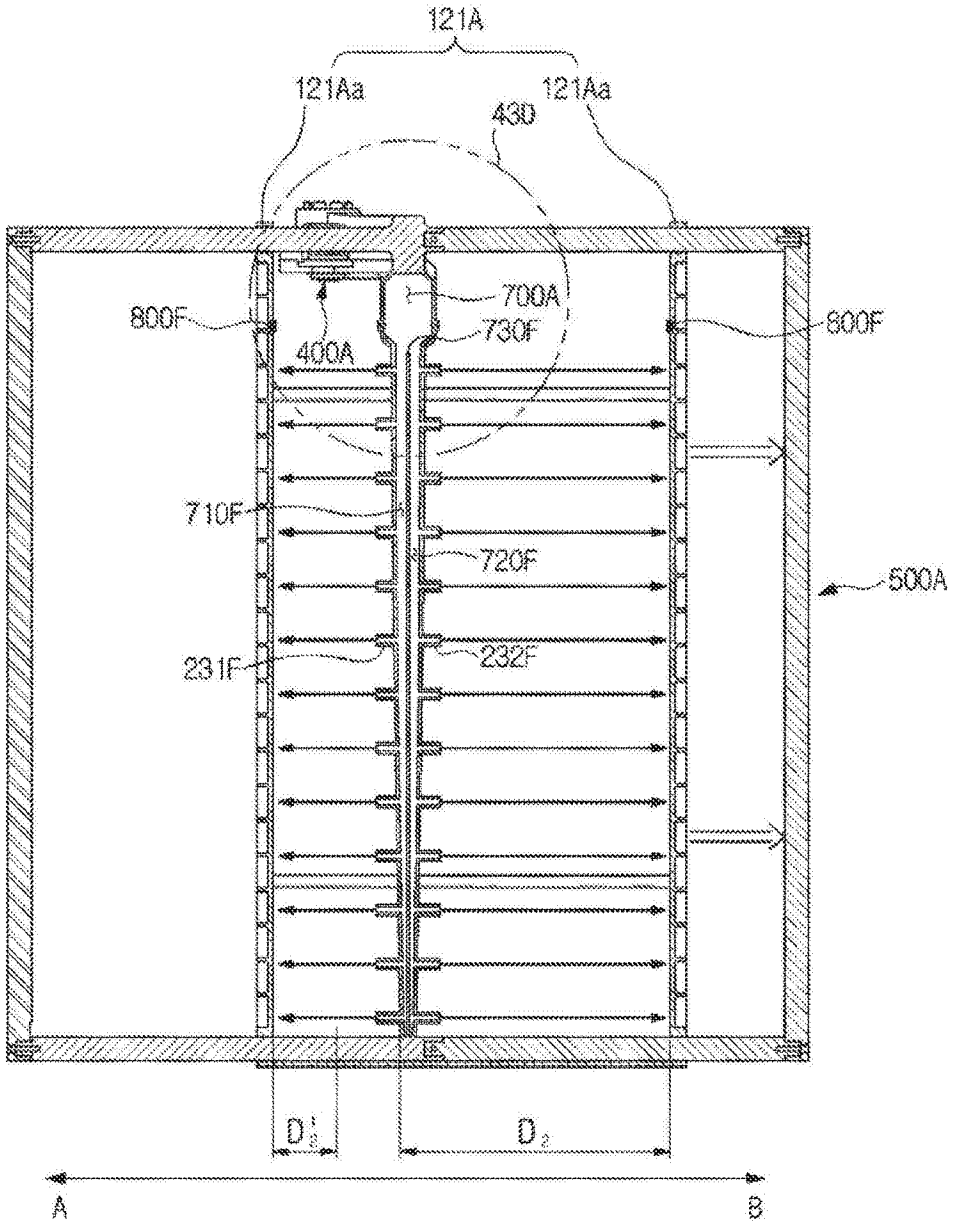


图43

Petitioner Samsung Ex-1004, 1024

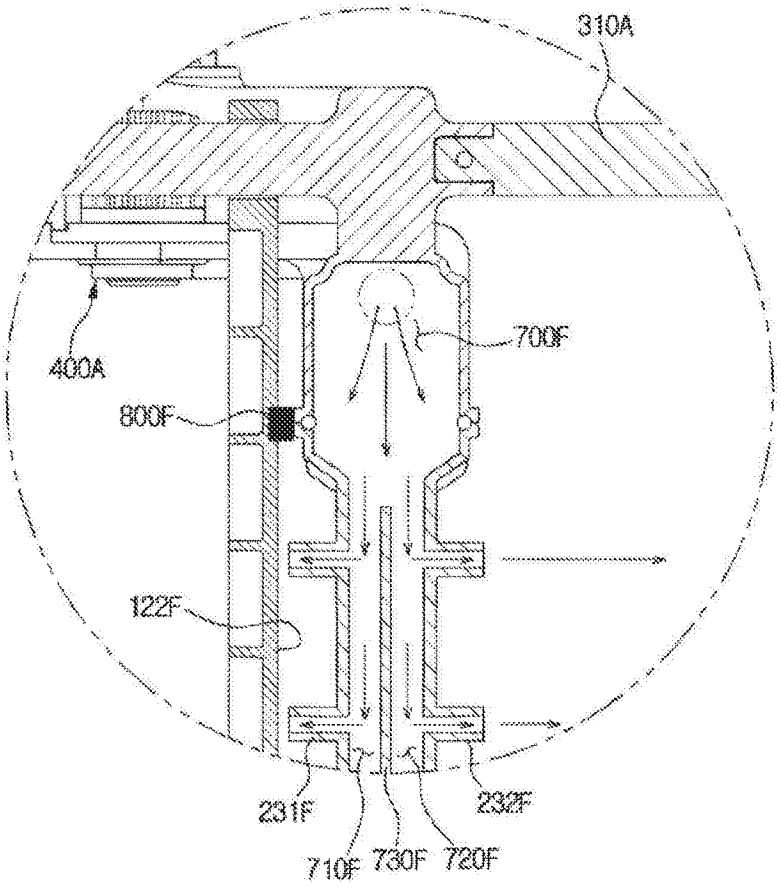


图44

Petitioner Samsung Ex-1004, 1025

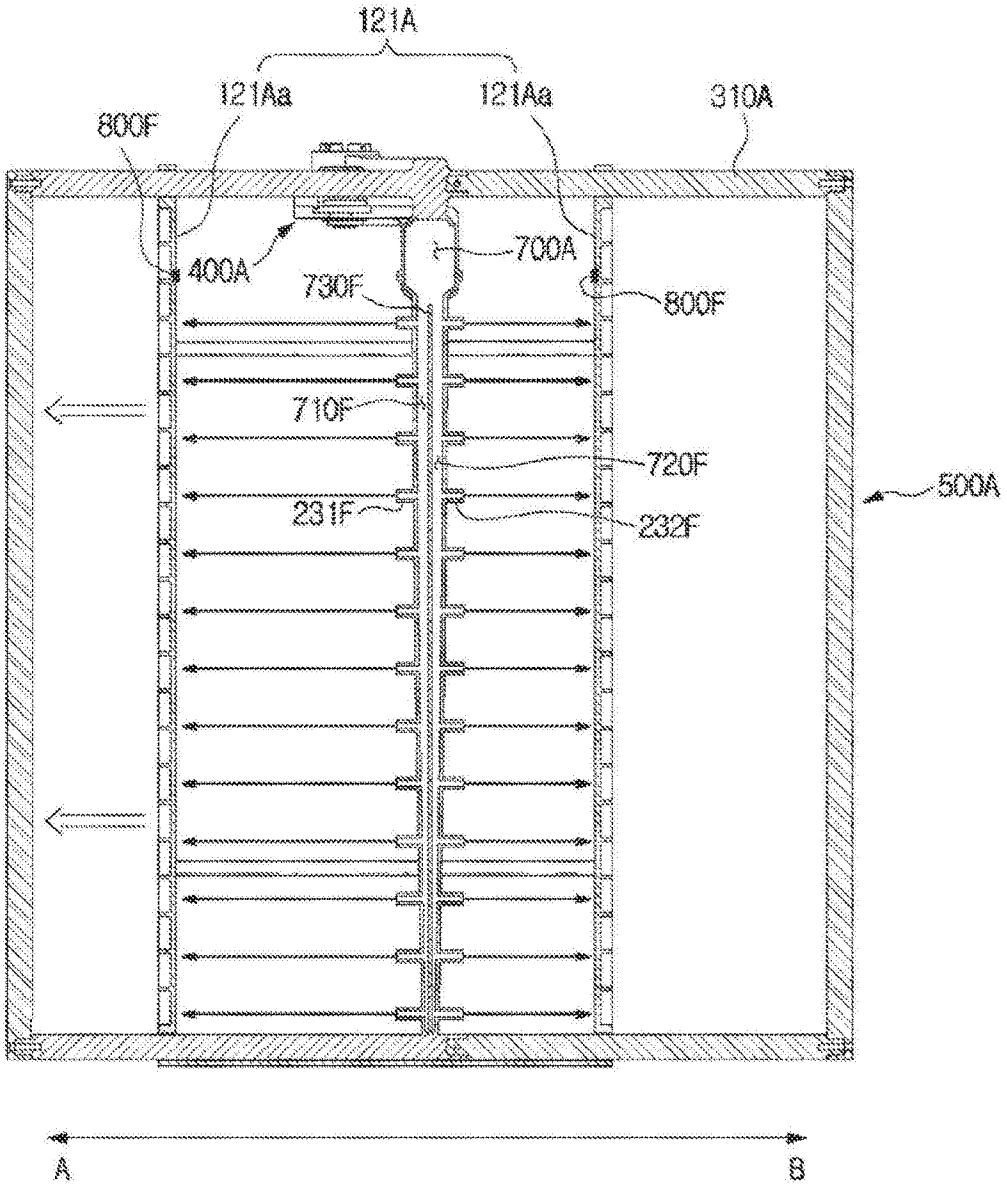


图45

Petitioner Samsung Ex-1004, 1026

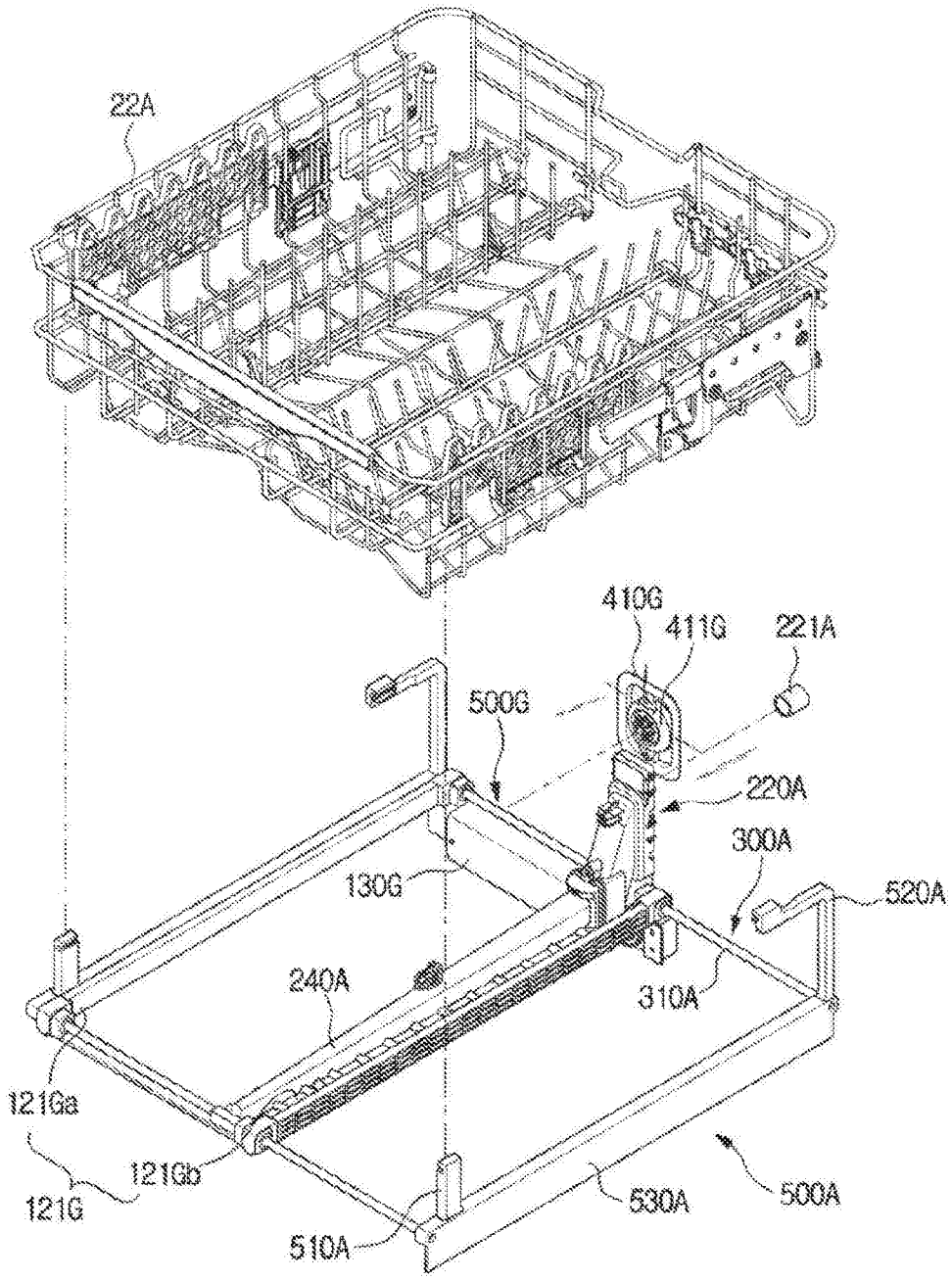


图46

Petitioner Samsung Ex-1004, 1027

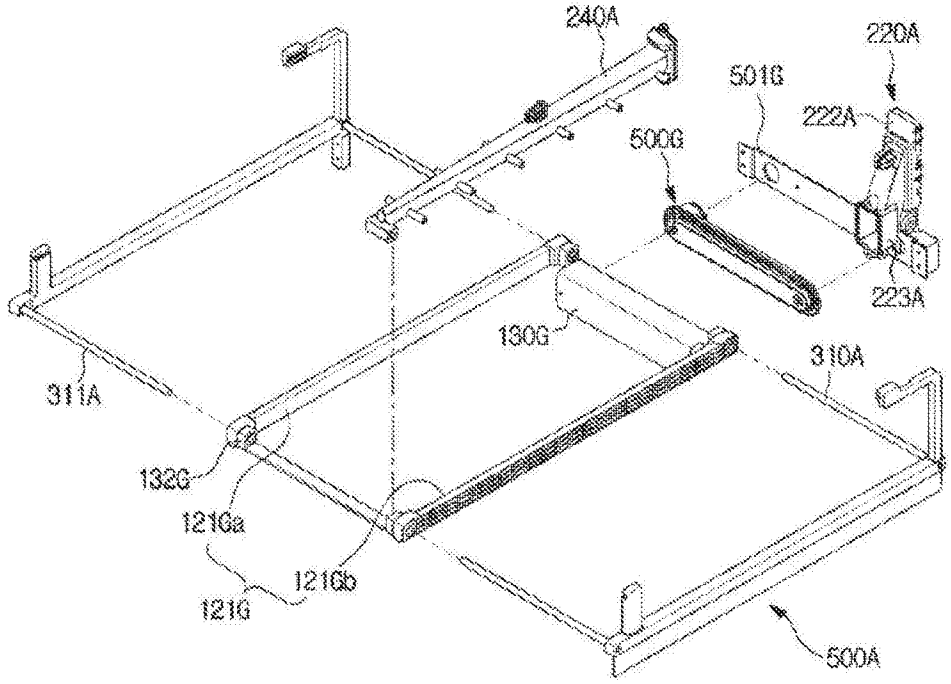


图47

Petitioner Samsung Ex-1004, 1028

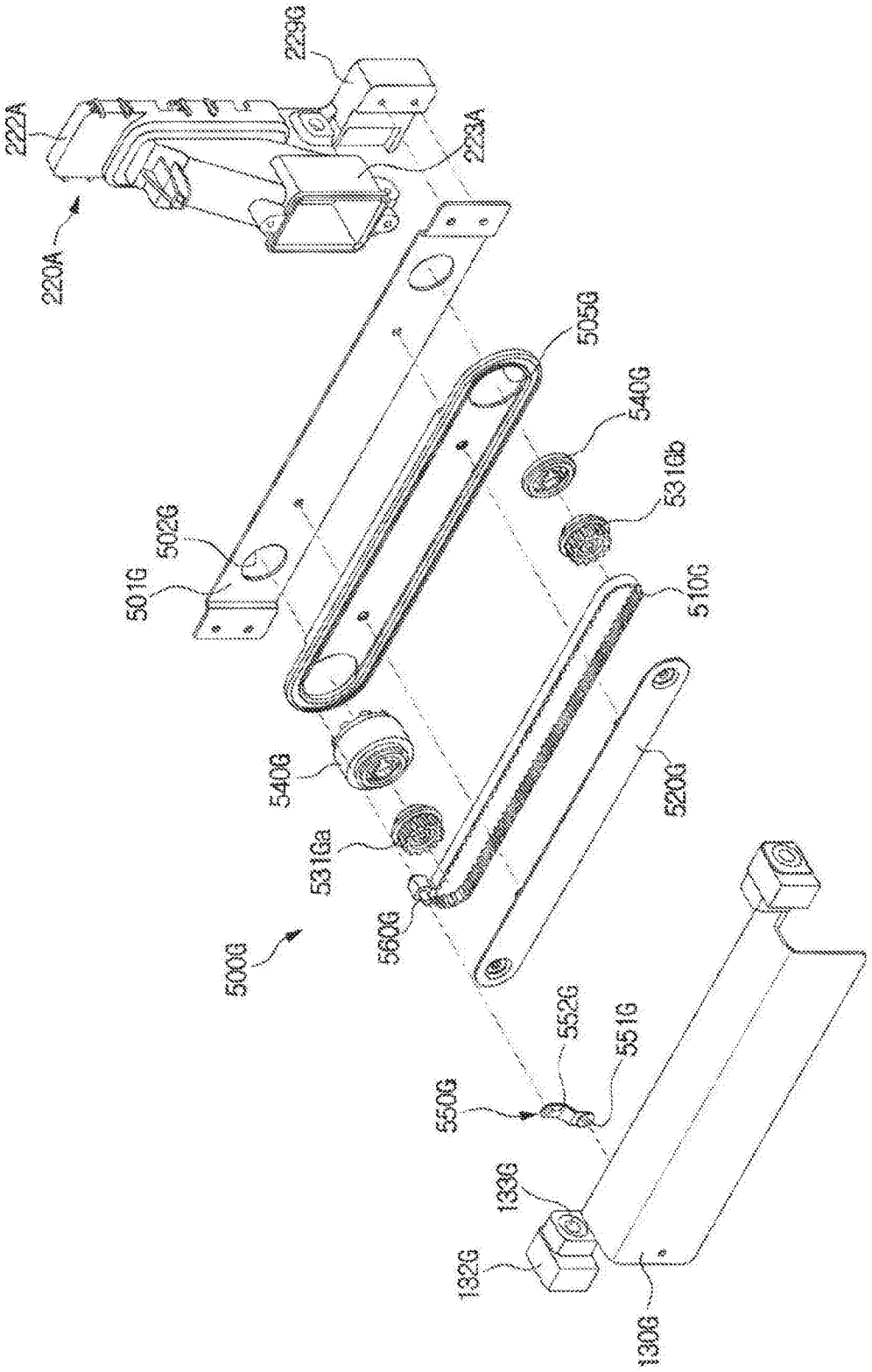


图48

Petitioner Samsung Ex-1004, 1029

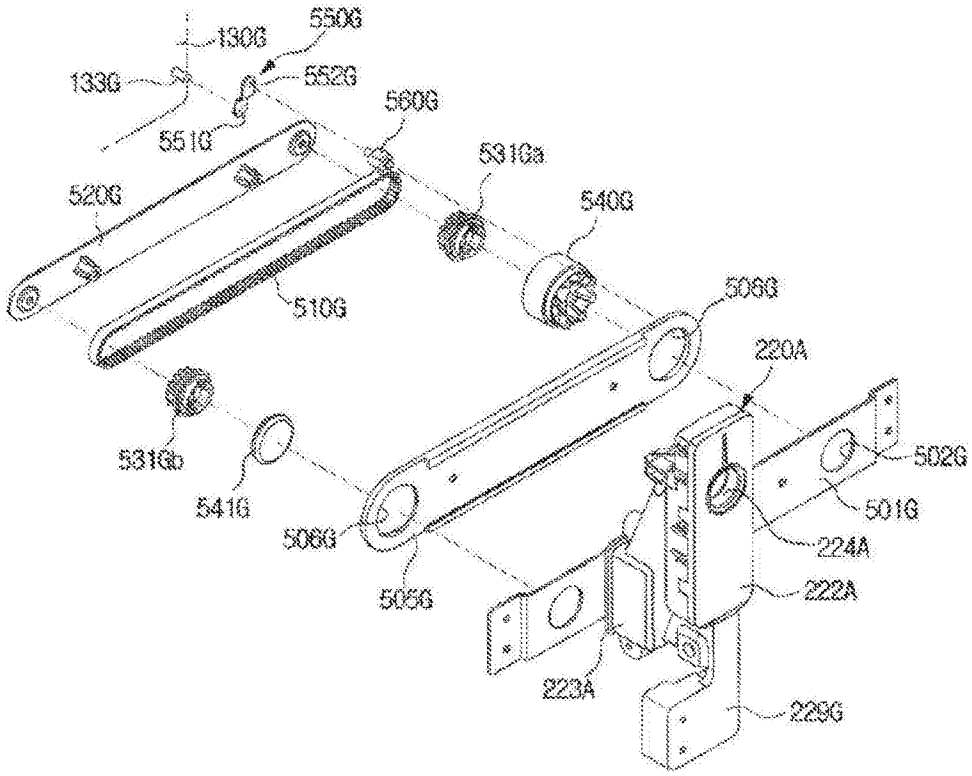


图49

Petitioner Samsung Ex-1004, 1030

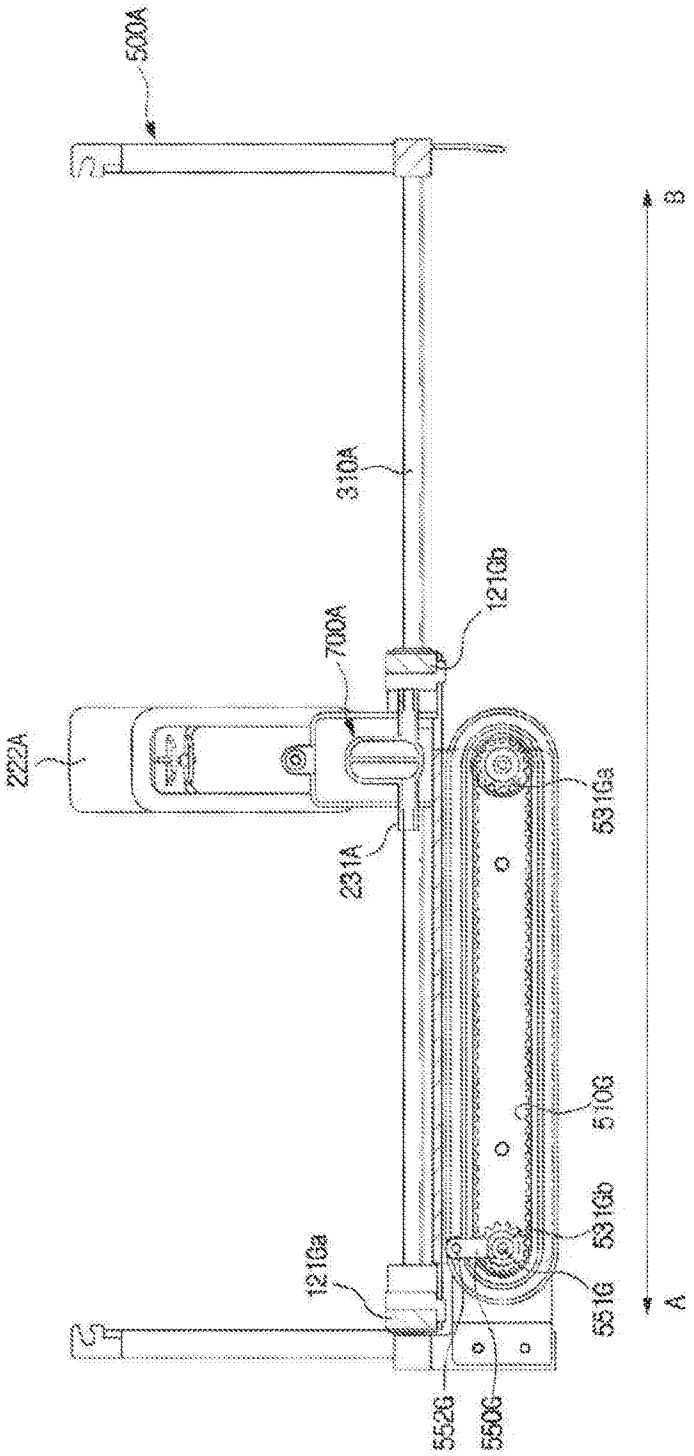


图50

Petitioner Samsung Ex-1004, 1031

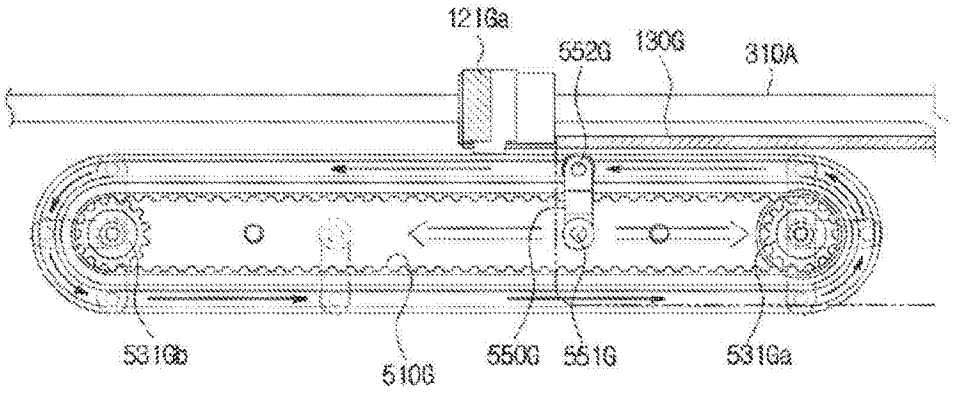


图51

Petitioner Samsung Ex-1004, 1032

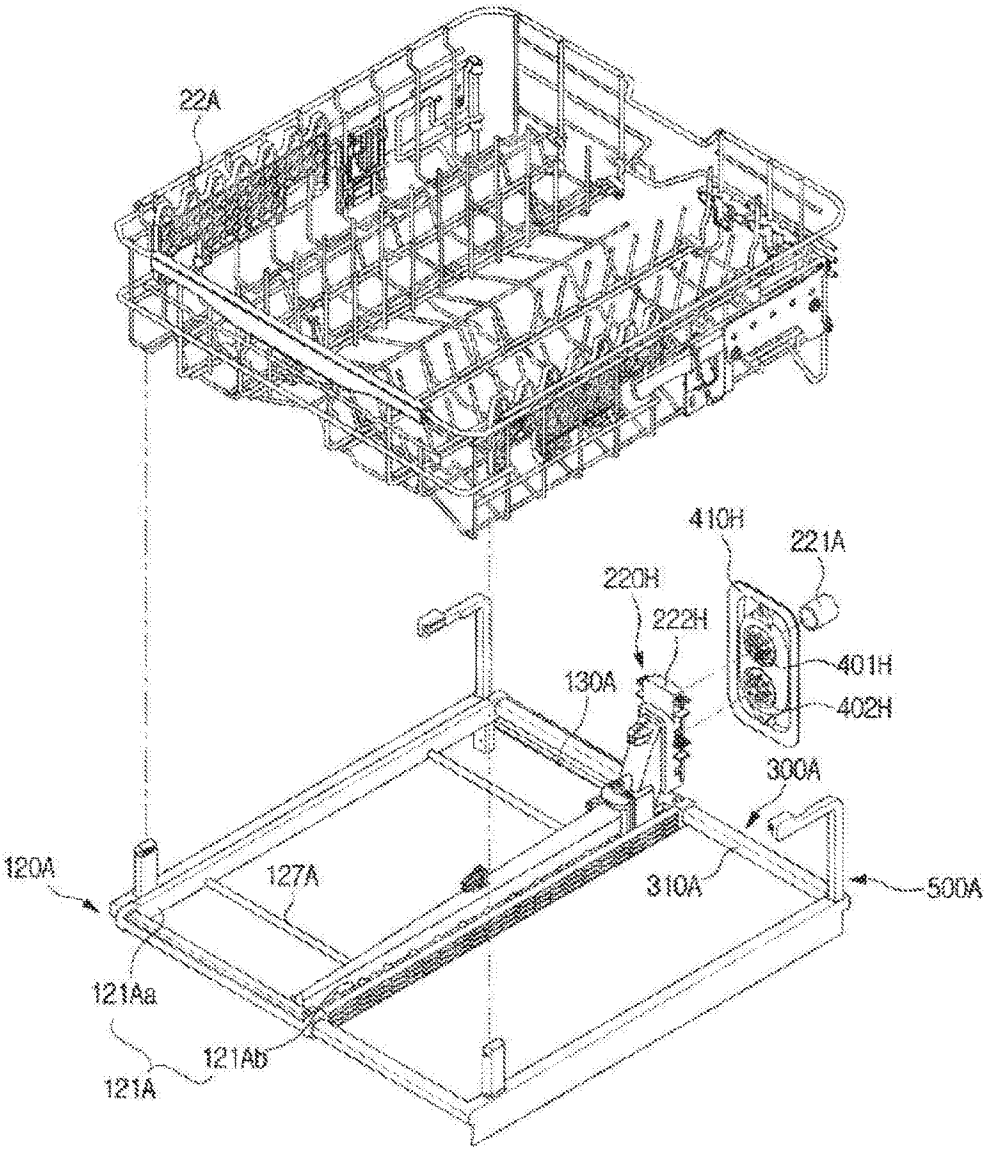


图52

Petitioner Samsung Ex-1004, 1033

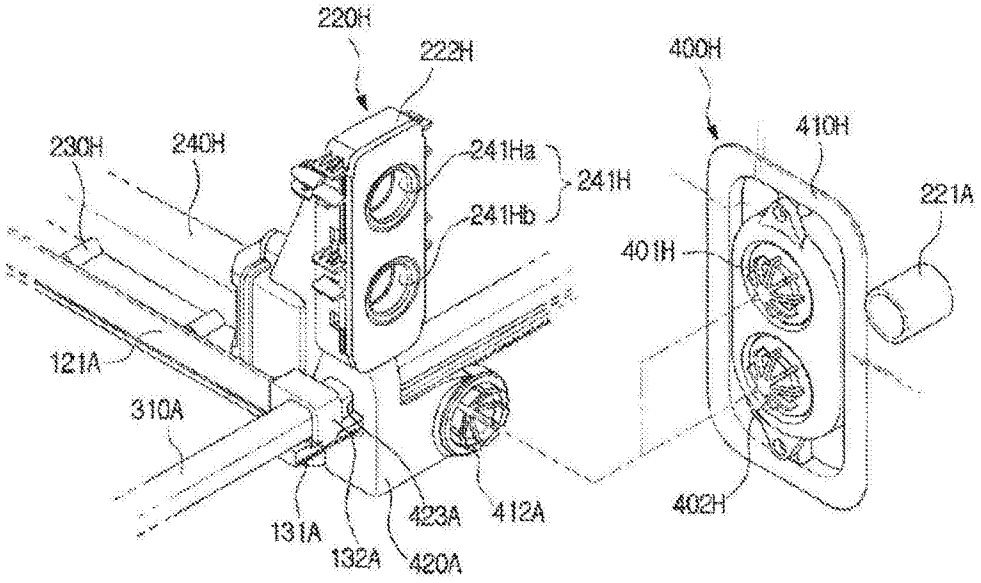


图53

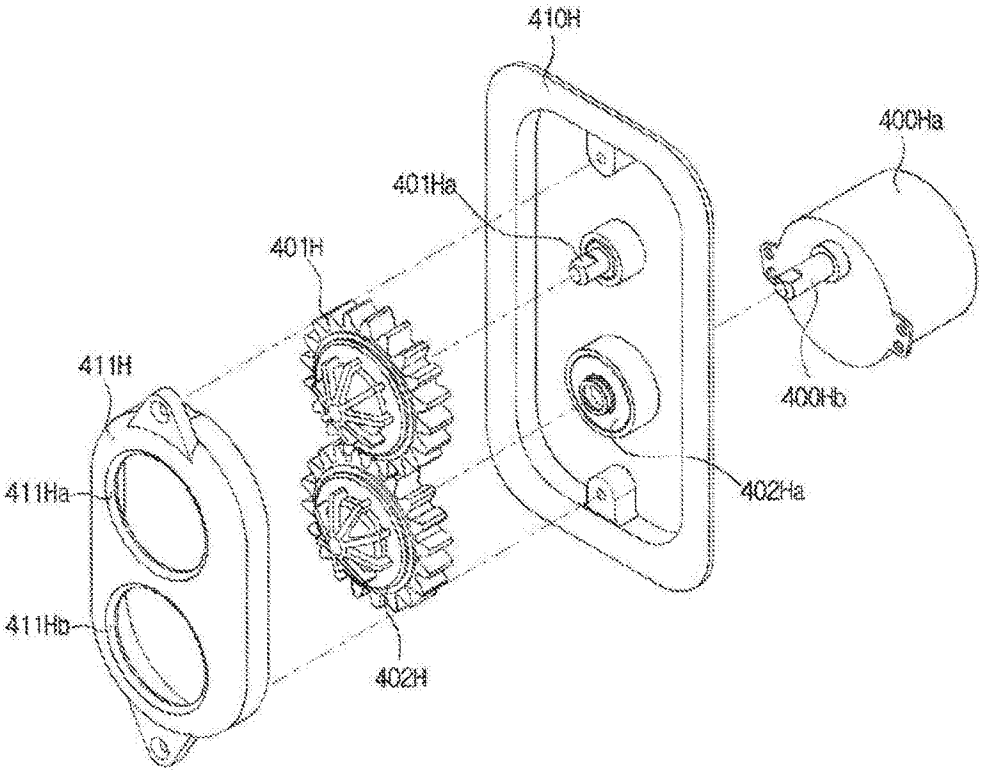


图54

Petitioner Samsung Ex-1004, 1034

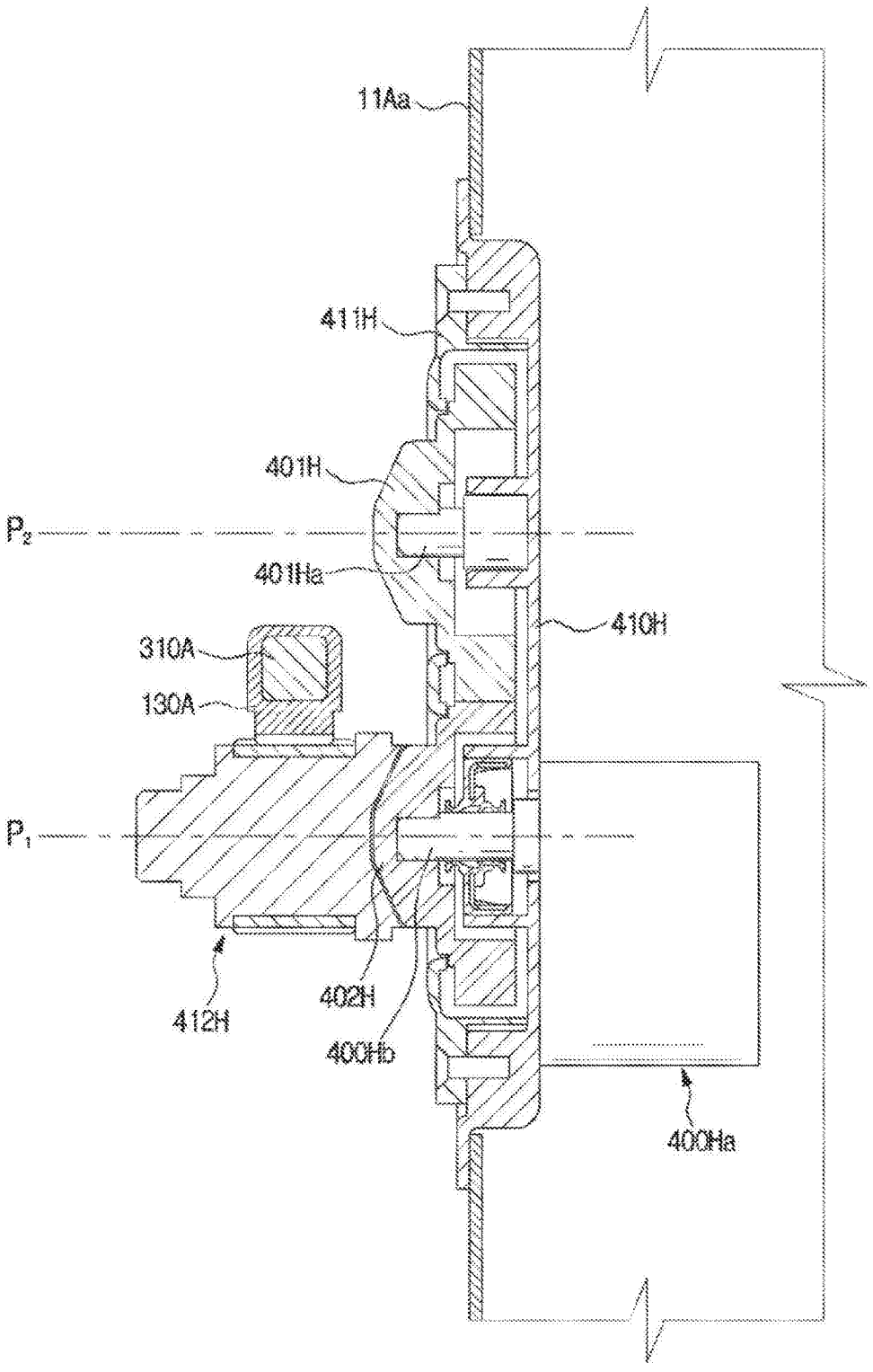


图55

Petitioner Samsung Ex-1004, 1035

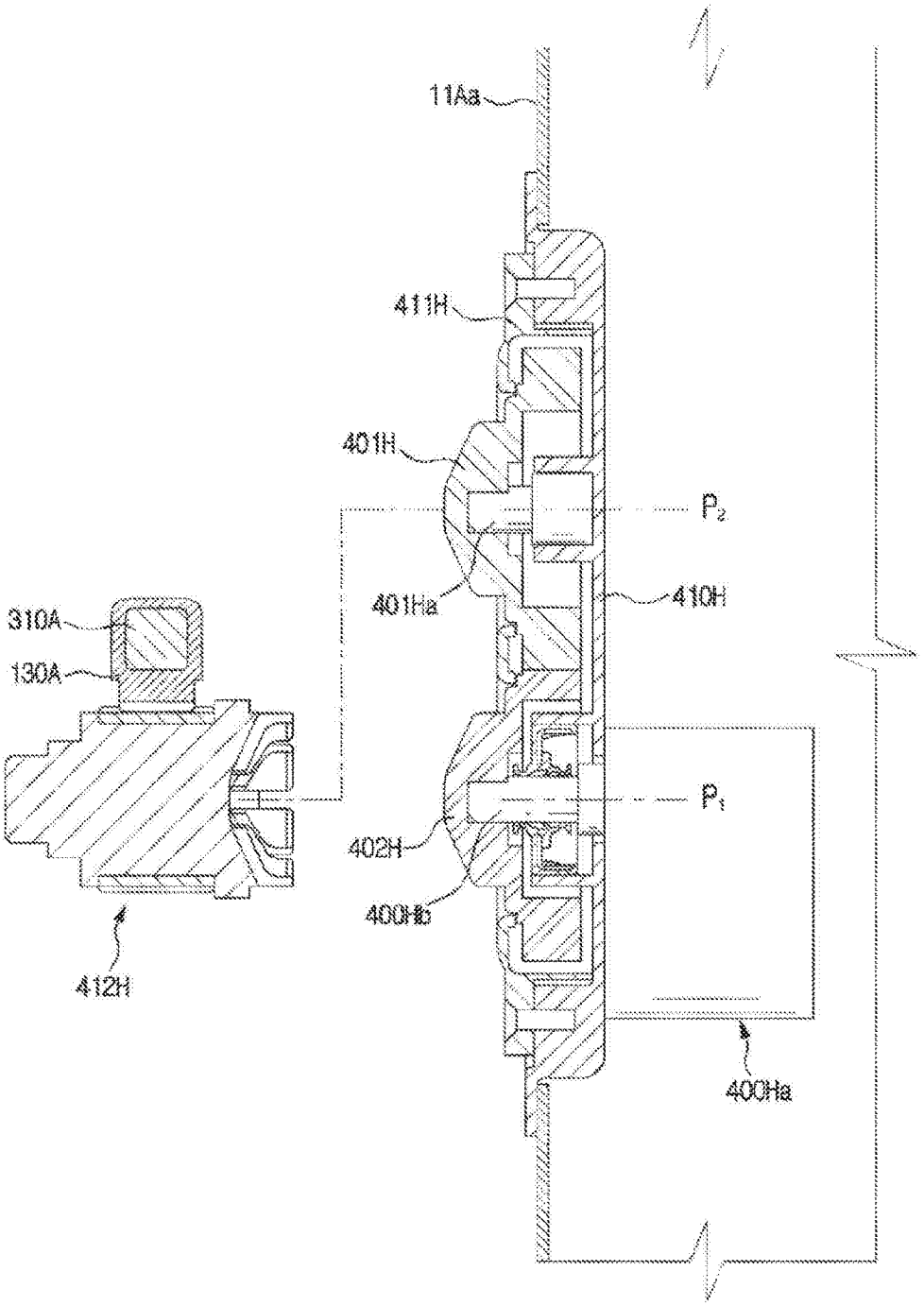


图56

Petitioner Samsung Ex-1004, 1036

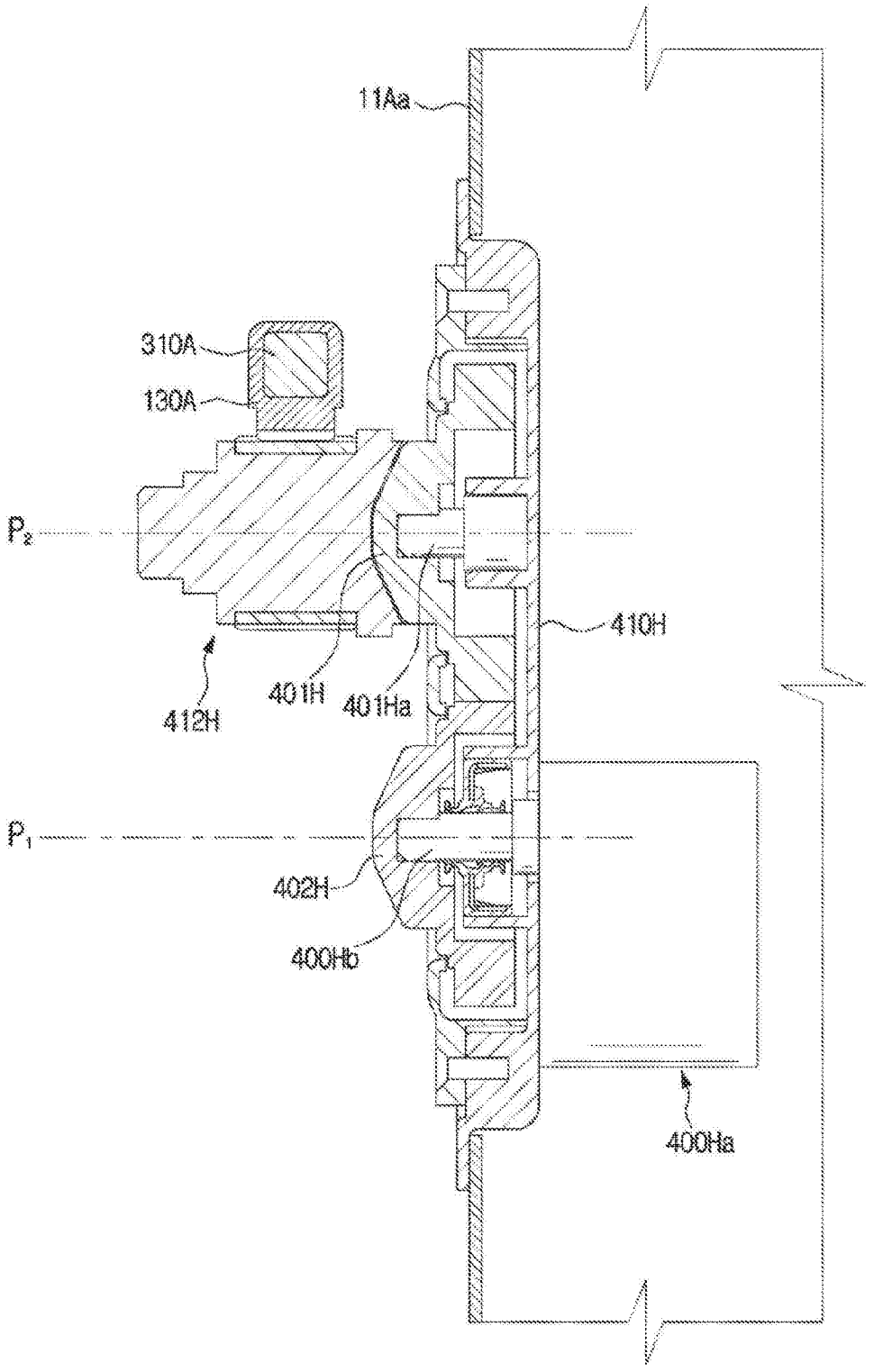


图57

Petitioner Samsung Ex-1004, 1037

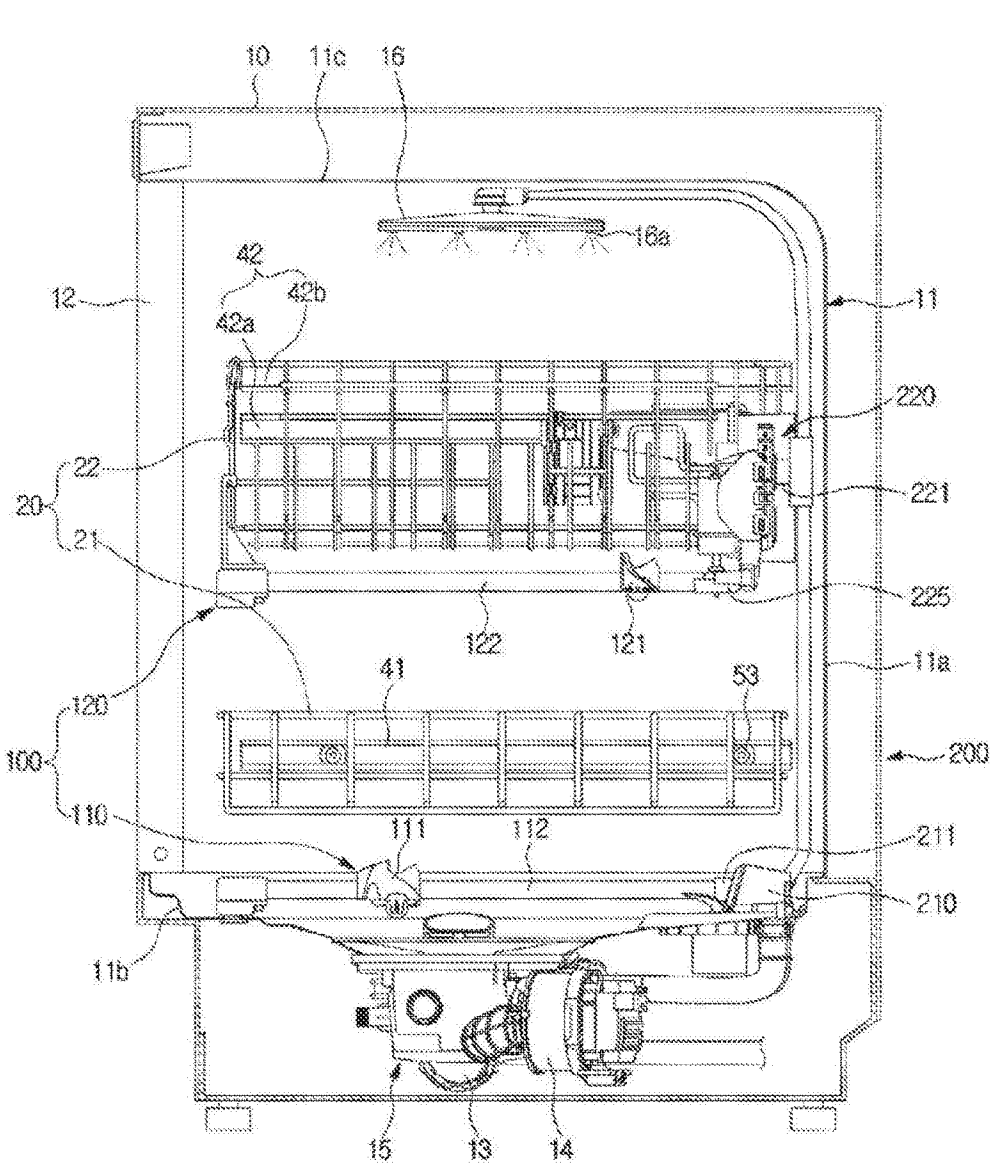


图58

Petitioner Samsung Ex-1004, 1038

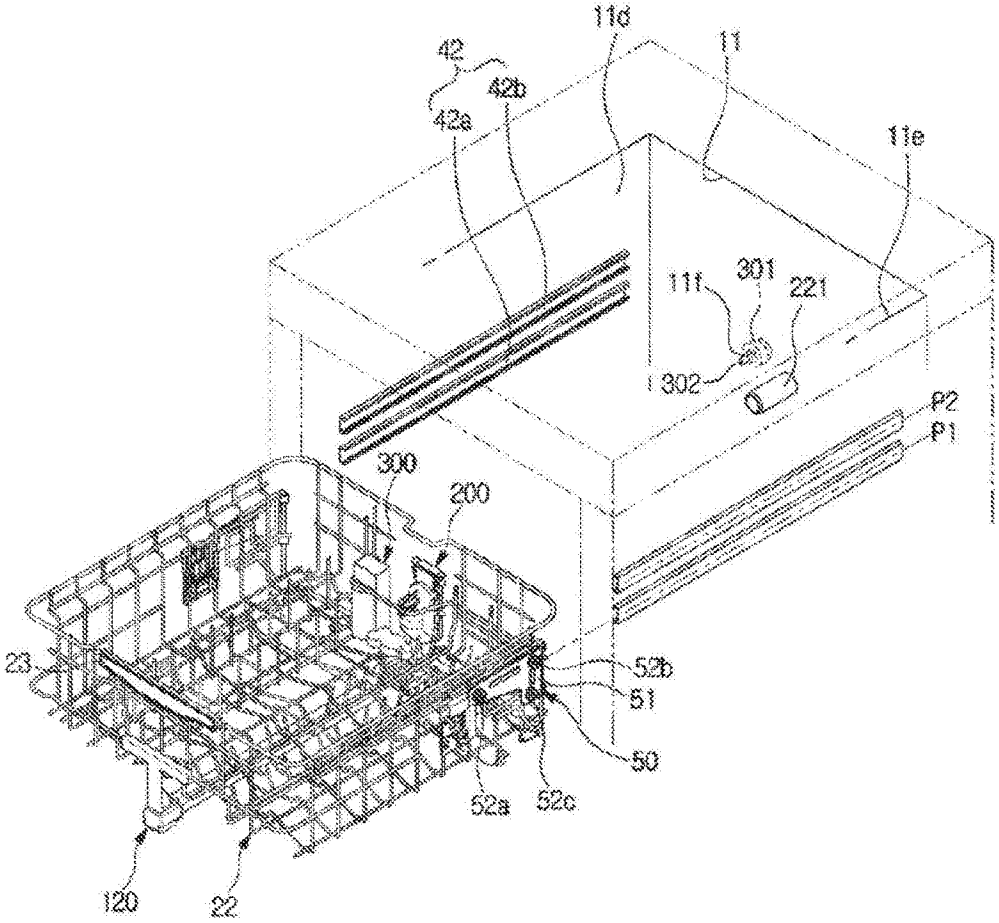


图59

Petitioner Samsung Ex-1004, 1039

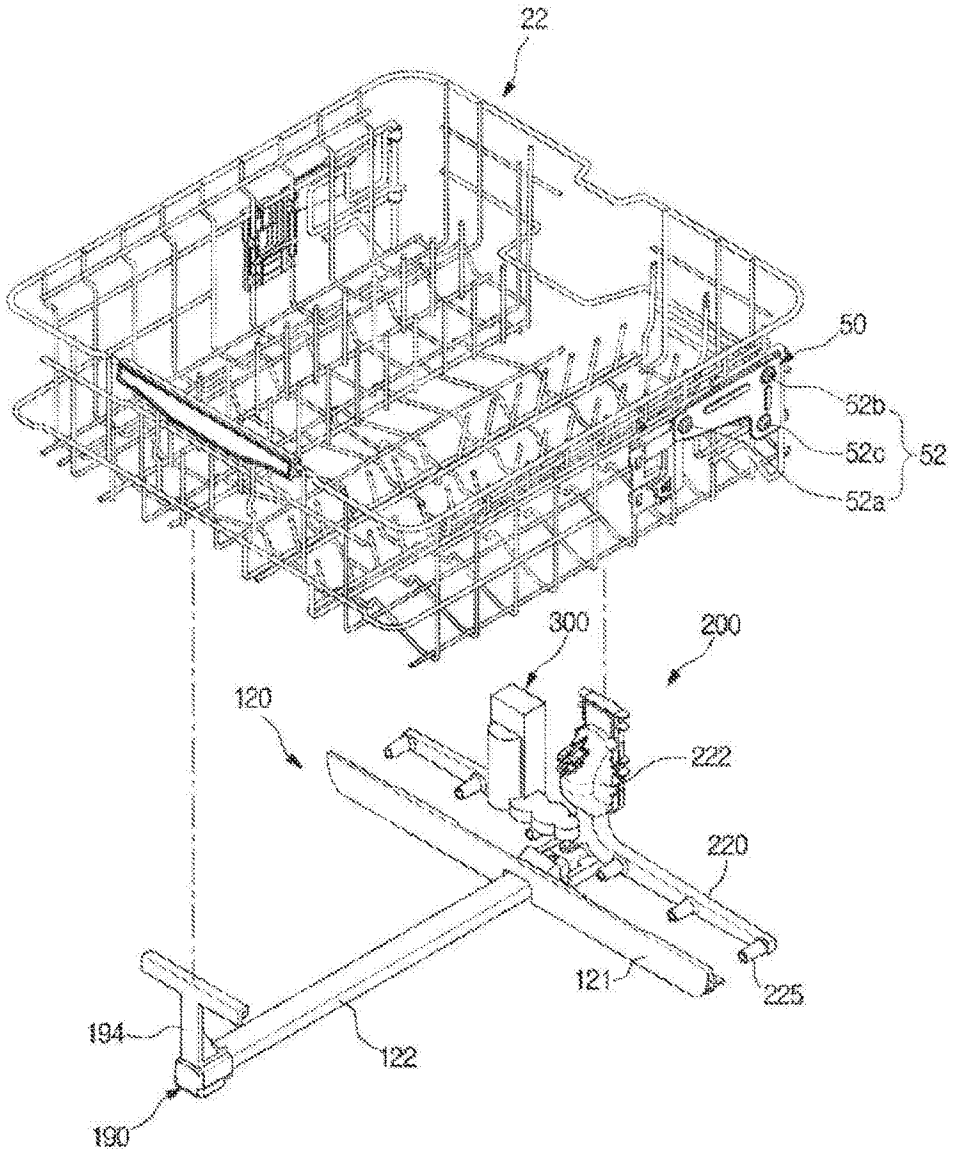


图60

Petitioner Samsung Ex-1004, 1040

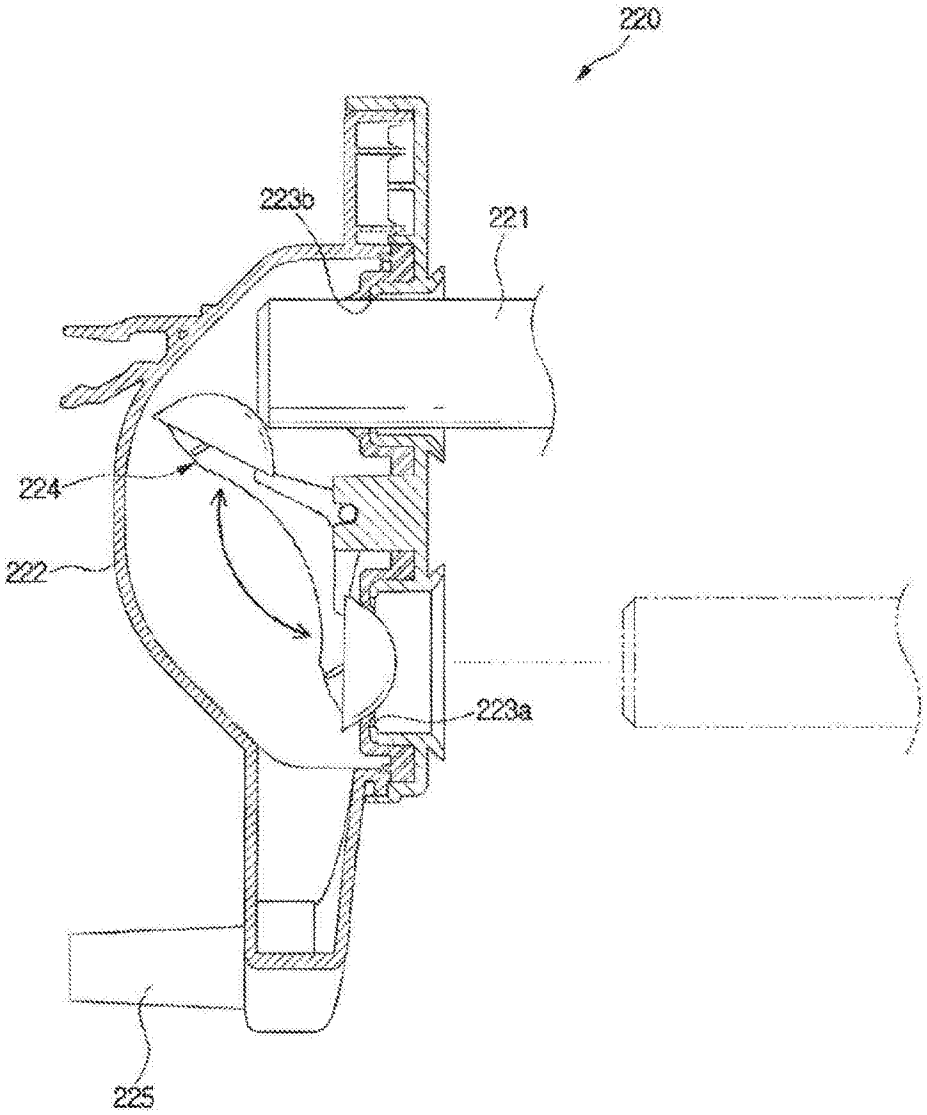


图61

Petitioner Samsung Ex-1004, 1041

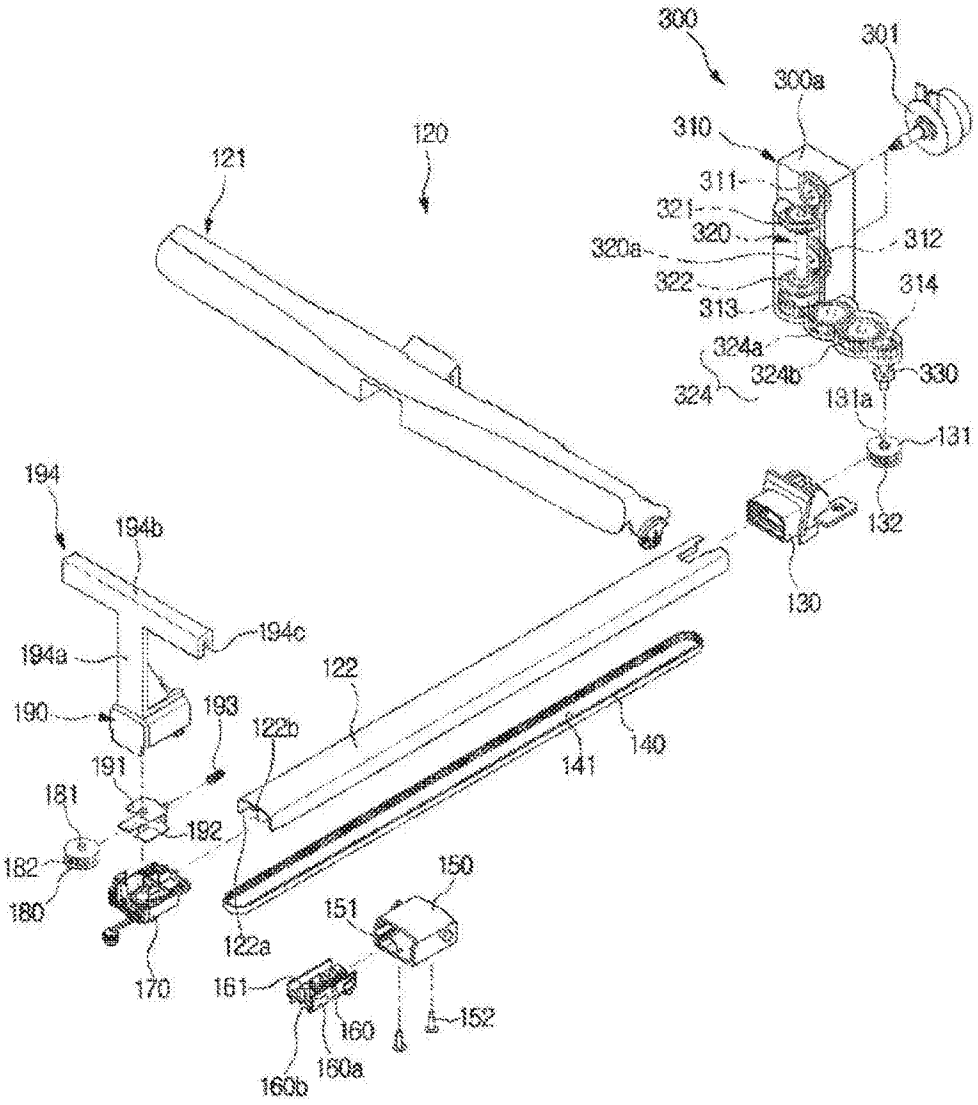


图62

Petitioner Samsung Ex-1004, 1042

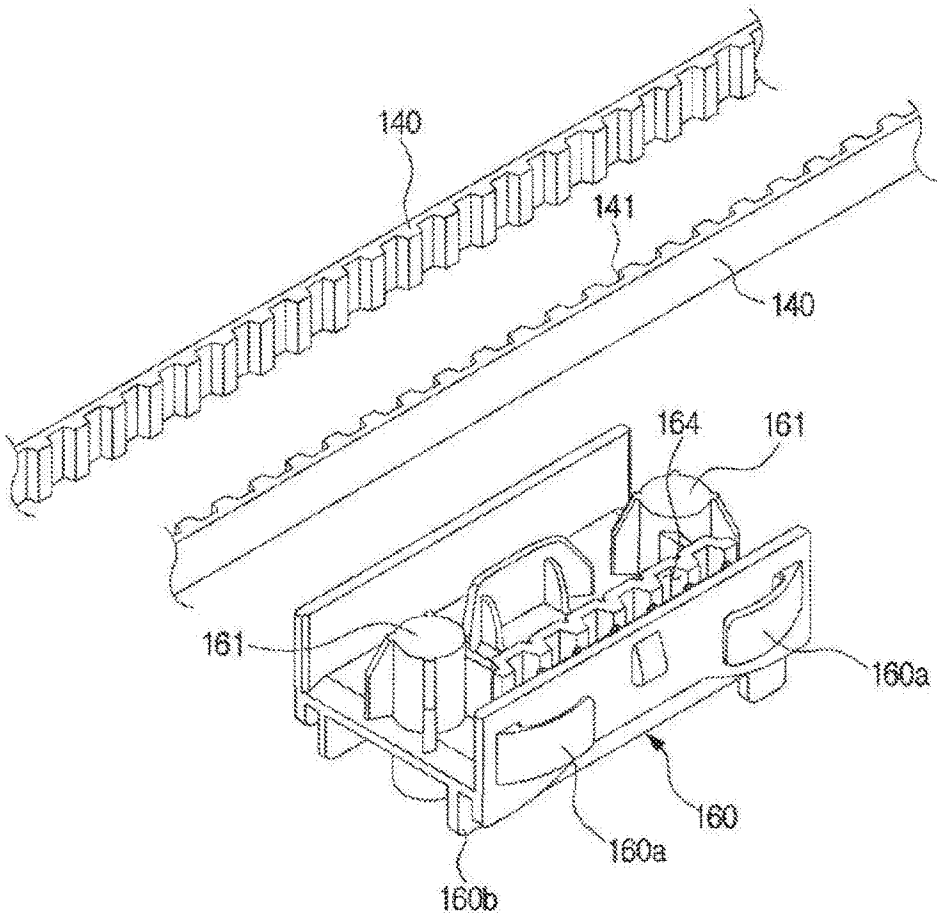


图63

Petitioner Samsung Ex-1004, 1043

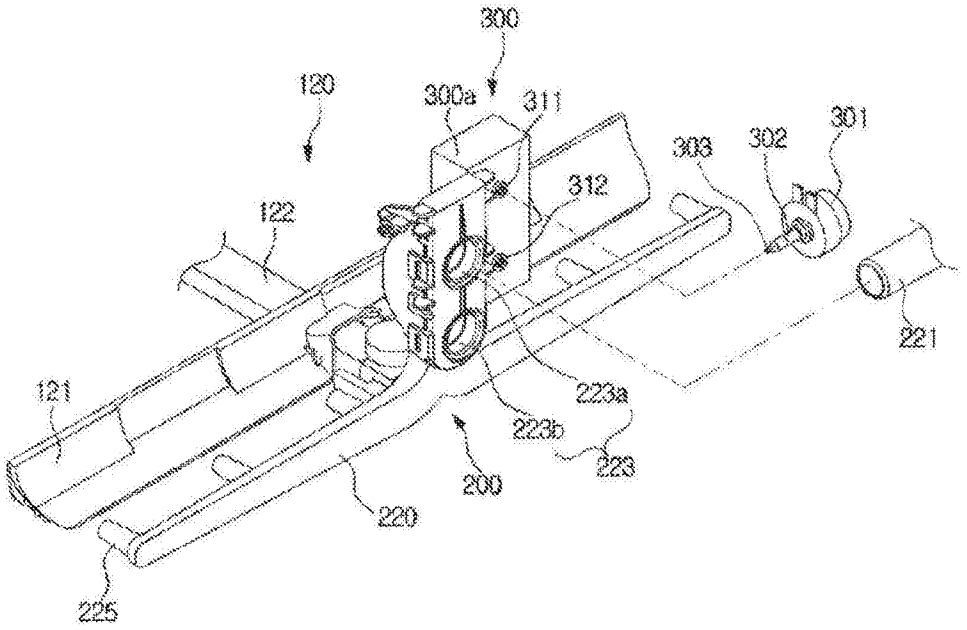


图64

Petitioner Samsung Ex-1004, 1044

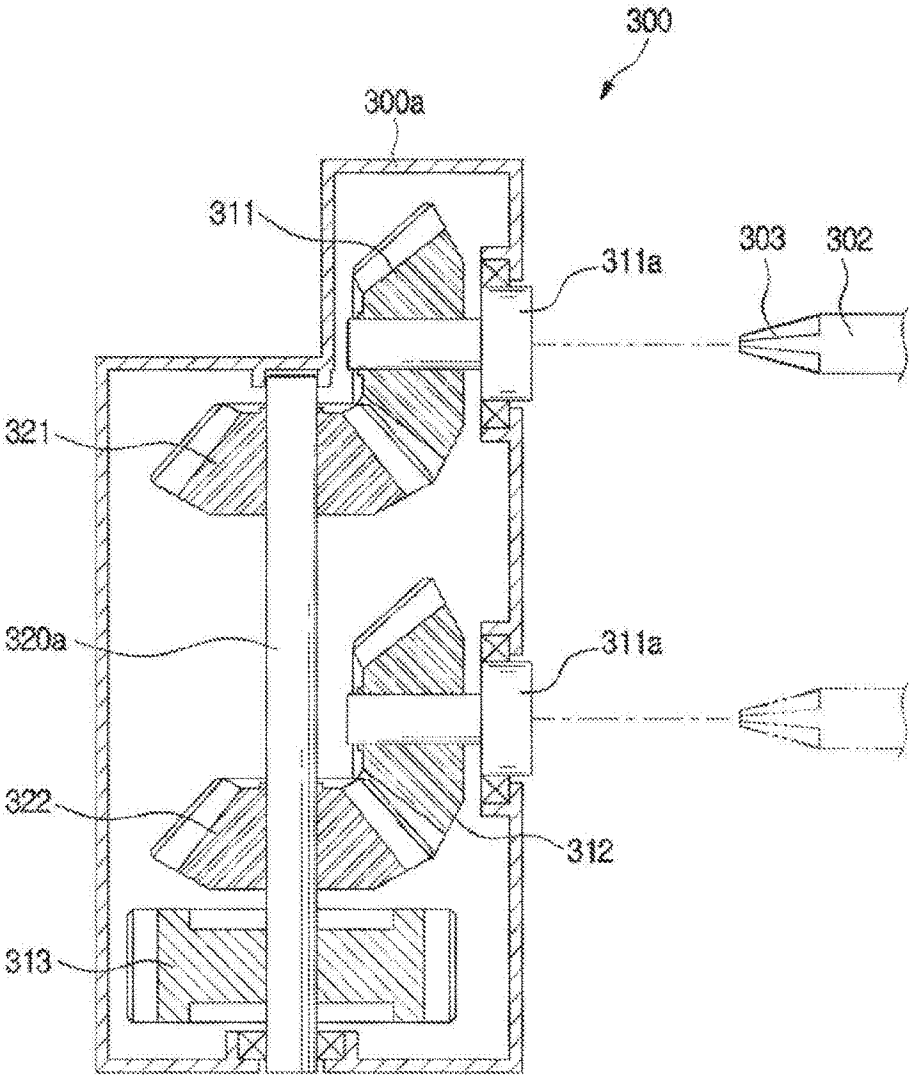


图65

Petitioner Samsung Ex-1004, 1045

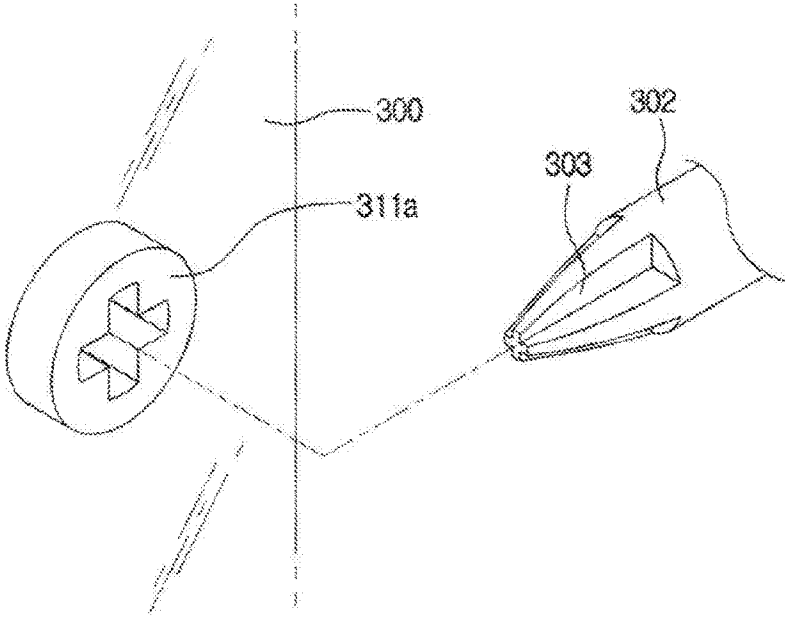


图66

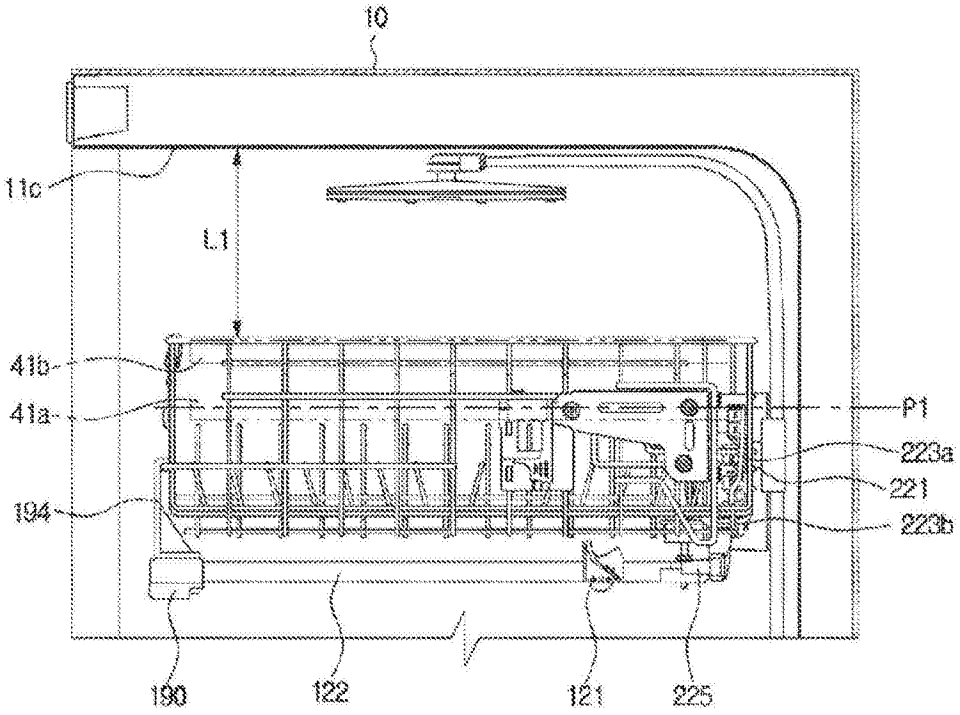


图67

Petitioner Samsung Ex-1004, 1046

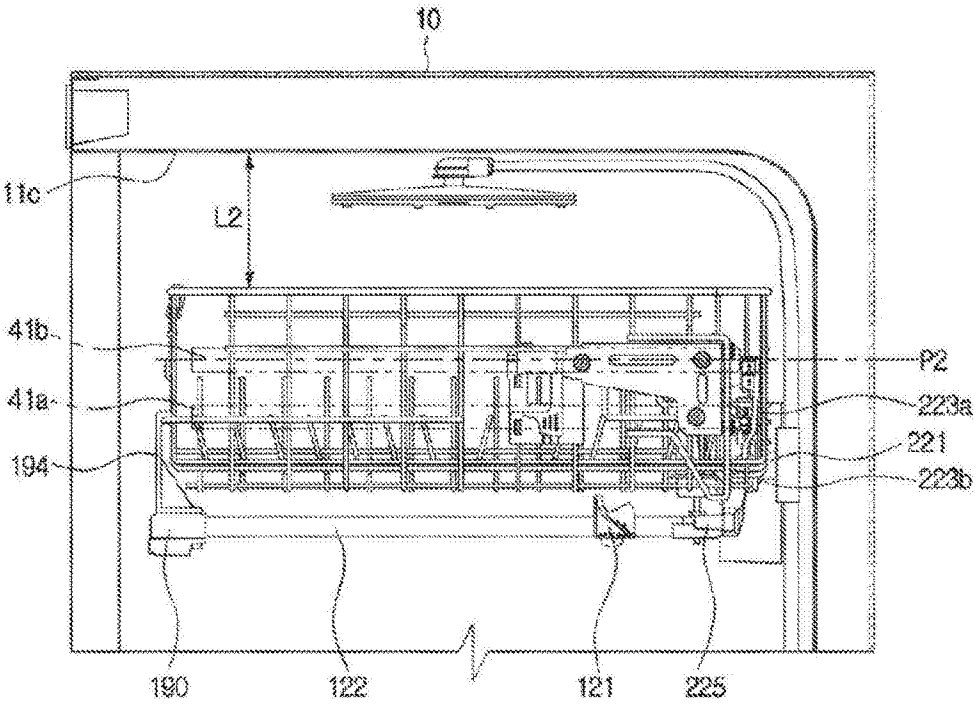


图68

Petitioner Samsung Ex-1004, 1047

Espacenet

Bibliographic data: EP1138249 (A2) — 2001-10-04

Dishwasher rack with dripping device

Inventor(s): VOGEL JUERGEN [DE]; STEINER WINFRIED [DE]; KOHLES KARLHEINZ [DE]; FUEGLEIN STEFAN [DE] ± (VOGEL, JUERGEN, ; STEINER, WINFRIED, ; KOHLES, KARLHEINZ, ; FUEGLEIN, STEFAN)

Applicant(s): AEG HAUSGERAETE GMBH [DE] ± (AEG HAUSGERAETE GMBH)

Classification: **- international:** ***A47L15/50;*** (IPC1-7): A47L15/50
- cooperative: **A47L15/50 (EP)**

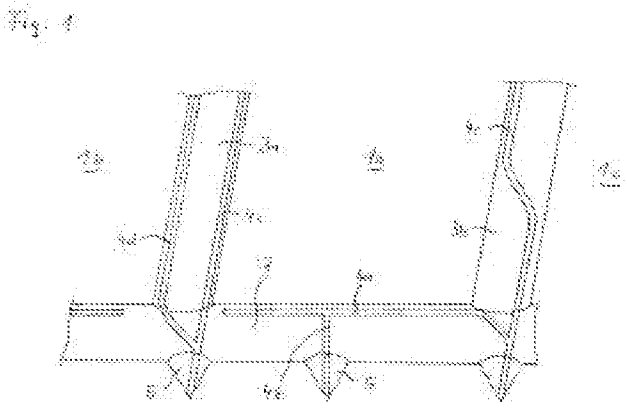
Application number: EP20010101611 20010125 Global Dossier

Priority number(s): DE20001015003 20000325

Also published as: EP1138249 (A3) EP1138249 (B1) DE10015003 (A1)

Abstract of EP1138249 (A2)

An element (4a-4e) with a capillary action fits in a support element (2) and/or a retaining element (3a,3b) for holding part of a dish brought in contact with the support element and/or retaining element. Alternatively, a draining ledge has an element with a capillary action below the part of the dish that is tilted, in order to draw off water remaining on the deepest place on the dish.



(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 138 249 A2

(12) EUROPÄISCHE PATENTANMELDUNG

(43) Veröffentlichungstag:
04.10.2001 Patentblatt 2001/40

(51) Int Cl.[7]: **A47L 15/50**

(21) Anmeldenummer: **01101611.0**

(22) Anmeldetag: **25.01.2001**

(84) Benannte Vertragsstaaten:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Benannte Erstreckungsstaaten:
AL LT LV MK RO SI

(30) Priorität: **25.03.2000 DE 10015003**

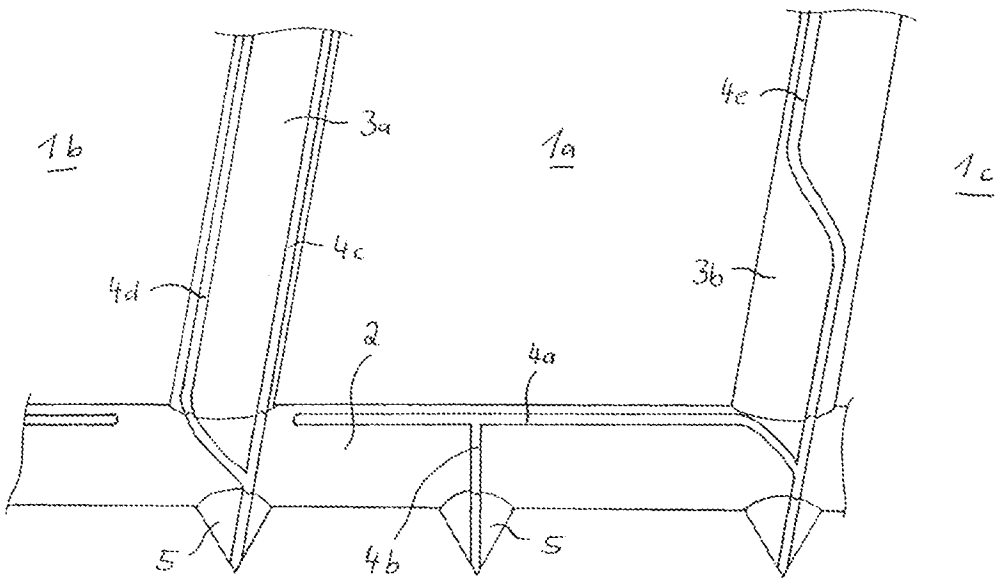
(71) Anmelder: **AEG Hausgeräte GmbH**
90429 Nürnberg (DE)

(72) Erfinder:
- **Vogel, Jürgen**
  90766 Fürth (DE)
- **Steiner, Winfried**
  90760 Fürth (DE)
- **Kohles, Karlheinz**
  90461 Nürnberg (DE)
- **Füglein, Stefan**
  90461 Nürnberg (DE)

(54) Geschirrkorb für eine Geschirrspülmaschine und Abtropfelement hierfür

(57) Die Erfindung betrifft einen Geschirrkorb für eine Geschirrspülmaschine, bei dem das an den Geschirrteilen nach dem Klarspülgang anhaftende Wasser weitgehend verringert wird. Dazu wird bei einem Auflageelement (2) und/oder einem Halteelement (3a, 3b) zum Lagern eines Geschirrteils in dem Kontaktbereich des Geschirrteils mit dem Auflageelement (2) und/oder dem Halteelement (3a, 3b) ein kapillarartig wirkendes Element (4a - 4e) vorgesehen. Alternativ wird eine Abtropfleiste mit einem kapillarartig wirkenden Element unterhalb eines gekippt stehenden Geschirrteils vorgesehen, um das an der tiefsten Stelle des Geschirrteils anhaftende Wasser abzuleiten. Bei einer weiteren Ausführungsform wird ein Abtropfelement mit einer kapillarartigen Ausformung für einen Geschirrkorb vorgesehen.

Fig. 1



EP 1 138 249 A2

Petitioner Samsung Ex-1004, 1049

Beschreibung

[0001] Die Erfindung betrifft einen Geschirrkorb für eine Geschirrspülmaschine und ein Abtropfelement hierfür.

[0002] Bei einer herkömmlichen Geschirrspülmaschine werden zur Halterung der Geschirrteile Geschirrkörbe aus Drahtgeflecht mit einer Kunststoffbeschichtung verwendet. Dabei werden für die verschiedenen Geschirrteile spezifische Halterungen vorgesehen, so daß eine möglichst gute Reinigungs- und Trockenwirkung erzielt wird. Für die Trokkenwirkung ist es von Vorteil, wenn das Wasser nach dem letzten Spülgang möglichst vollständig von den Geschirrteilen abfließt. Bei den Geschirrteilen bleiben jedoch, besonders an deren tiefsten Stellen und an den Berührungsstellen zu dem Drahtgeflecht des Geschirrkorbs, Wassertropfen haften.

[0003] Fig. 9 zeigt beispielhaft einen in einer Telleraufnahme 1a eines Geschirrkorbs stehend gelagerten Teller 12. Zwischen einem Auflagestab 2 des Geschirrkorbs und dem Teller 12 sowie zwischen Haltestäben 3a und 3b des Geschirrkorbs und dem Teller 12 bleiben Wassertropfen haften (in Fig. 9 als punktierte Flächen dargestellt), die während der Trockenphase verdunstet werden müssen.

[0004] Zur Verringerung der Haftung der Tropfen wird während des letzten Klarspülgangs ein Klarspülmittel dem Spülwasser zugegeben, um die Oberflächenspannung des Wassers herabzusetzen, wodurch die Tropfengröße verringert wird. Die Tropfenbildung kann dadurch jedoch nicht vollständig unterbunden werden. Während der Trockenphase, die sich an den Klarspülgang anschließt, müssen diese anhaftenden Wassertropfen z.B. durch Verdunsten beseitigt werden, um eine vollständige Trocknung der Geschirrteile zu erreichen. Der Wasserdampf kann auch auf anderen Wegen als durch Kondensieren entfernt werden, z.B. durch Ausblasen, Adsorbieren, usw. Dabei verlängert sich bei einer bestimmten Trocknungsleistung die zur Trocknung benötigte Zeit mit der Menge des an den Geschirrteilen anhaftenden Wassers.

[0005] Zur Verdunstung der Wassertropfen werden die Geschirrteile während des letzten Klarspülgangs durch heiße Spülflüssigkeit aufgeheizt, so daß die Verdunstung erhöht ist. Dies erfordert jedoch einen zusätzlichen Energieaufwand und auch hier ist die zur Verdunstung erforderliche Energie und Dauer der Trockenphase von der Menge des an den Geschirrteilen anhaftenden Wassers abhängig.

[0006] Es ist daher Aufgabe der Erfindung, die Menge des Wassers, das an in einem Geschirrkorb lagernden Geschirrteilen anhaftet, noch weiter zu verringern, um den Trockenvorgang zu verbessern.

[0007] Diese Aufgabe wird mit den Merkmalen des Anspruchs 1, 2 bzw. 16 gelöst.

[0008] Gemäß Anspruch 1 sind die Auflageelemente und/oder Halteelemente eines Geschirrkorbs zum Lagern der Geschirrteile zumindest im Auflagebereich der Geschirrteile an den Auflageelementen und/oder Halteelementen mit einem kapillarartig wirkenden Element ausgebildet. Das kapillarartig wirkende Element leitet das normalerweise im Auflagebereich zwischen Geschirrteil und Geschirrkorb haftende Wasser entlang des Auflageelements oder des Halteelements von dem Geschirrteil weg. Dadurch verringert sich die im Auflagebereich vorhandene Tropfengröße oder das Wasser wird vollständig aus diesem Bereich abgeleitet, so daß die zur Trocknung des Geschirrs notwendige Zeit oder die dazu notwendige Wärmeenergie verringert und die Trockenphase schnell und energiesparend durchgeführt werden kann.

[0009] Dabei wird durch das kapillarartig wirkende Element die Eigenschaft des Wassers ausgenutzt, daß das Wasser an Materialien, die durch das Wasser benetzt werden, an Kanten oder Hohlräumen bevorzugt entlang kriecht. Je geringer die bei der Benetzung des Materials entstehende Oberfläche des Wassers bei der Ausbreitung entlang der Kante oder des Hohlraums ist, desto weiter kann sich das Wasser an der Materialoberfläche ausbreiten und statt einer Tropfenbildung wird eine Verteilung bzw. Ableitung des Wassers entlang der Materialoberfläche erreicht. Die Kapillarwirkung führt z.B. dazu, daß sich das benetzende Wasser in einer Kapillarröhre oder an einer Kante eines Materials gegen die Schwerkraft nach oben anhebt. Im vorliegenden Fall wird durch die Kapillarwirkung die Ableitung eines an der Auflagefläche zwischen Geschirrteil und Geschirrkorb haftenden Tropfens nach unten unterstützt.

[0010] Auflageelemente und Halteelemente als solche sind dabei an sich bekannte Elemente eines herkömmlichen Geschirrkorbs. Für Teller sind z.B. die Auflageelemente zwei parallel verlaufende Gitterstäbe am Boden des Geschirrkorbs und die Halteelemente zwei parallel und geneigt nach oben verlaufende Stäbe. Für Tassen dienen allgemein gitterförmige Elemente am Geschirrkorbboden als Auflage- und Halteelement.

[0011] Dabei kann das erfindungsgemäße Auflageelement oder Halteelement mehrteilig ausgebildet sein, wobei die Kapillarwirkung durch parallele, geringfügig beabstandete Teile oder durch Stoßkanten der Einzelteile des jeweiligen Auflageelementes bewirkt werden können.

[0012] Gemäß Anspruch 2 wird für einen Geschirrkorb ein Abtropfsteg vorgesehen, der bevorzugt mittig unterhalb gekippt stehender Geschirrteile verläuft. Der Abtropfsteg wird vorteilhafterweise im Bereich der Bildung von "Tropfnasen" an der Unterseite der Geschirrteile, besonders bei einem in einer Telleraufnahme stehend gelagerten Teller, vorgesehen. Der Abtropfsteg muß dabei nicht unbedingt mit dem Geschirrteil in Berührung stehen. Für die Ableitung genügt auch, wenn dieser beabstandet vom Geschirrteil angeordnet ist, so daß zwischen dem Geschirrteil und dem Abtropfsteg eine Wasserbrücke durch das am Geschirrteil haftende Wasser ausgebildet wird. Zur Begünstigung der Ableitung des Wassers weist der Abtropfsteg ein kapillarartig wirkendes Element zum Ableiten auf.

Petitioner Samsung Ex-1004, 1050

[0013] Bei einer vorteilhaften Ausgestaltung des Abtropfstegs ist dieser abschnittsweise schräg verlaufend ausgebildet, d.h. z.B. in Form einer Sägezahnlinie. Dadurch wird erreicht, daß der Abtropfsteg bei in einer Telleraufnahme lagernden Tellern unterschiedlicher Größe, die zwischen den Auflagestäben unterschiedlich tief durchhängen, an die jeweiligen Tiefpunkte der Tellerränder angepaßt ist. Dabei wird vermieden, daß der Teller auf dem Abtropfsteg aufliegt und somit unsymmetrisch in der Telleraufnahme zu liegen kommt.

[0014] Bei einer besonders vorteilhaften Ausgestaltung ist das kapillarartig wirkende Element eine kapillarartige Ausnehmung, die in dem Auflageelement, dem Halteelement oder dem Abtropfsteg ausgebildet ist. Die Ausnehmung kann dabei einen dreieckigen, rechteckigen oder kreisabschnittsförmigen Querschnitt aufweisen. Die Kapillarwirkung ist dabei besonders groß, wenn die Querschnittsabmessung der kapillarartigen Ausnehmung im Vergleich zum Querschnitt des Auflageelements, des Halteelements oder des Abtropfstegs klein ist.

[0015] Die kapillarartige Ausnehmung kann dabei z.B. in eine horizontale Richtung oder vertikale Richtung vom Auflagebereich des Geschirrteils wegführen. Besonders günstig ist es jedoch, wenn zumindest das Ende der kapillarartigen Ausnehmung, das vom Geschirrteil wegführt, nach unten führend ausgebildet ist, so daß das Wasser sowohl durch die Kapillarwirkung als auch durch die Schwerkraft vom Geschirrteil weggeleitet wird, wobei sich am unten liegenden Ende ein Tropfen ausbilden und von der kapillarartigen Ausnehmung abtropfen kann.

[0016] Bei einer weiteren vorteilhaften Ausgestaltung endet das vom Geschirrteil wegführende Ende der kapillarartigen Ausnehmung in oder neben einem spitz- oder keilförmig ausgebildeten Vorsprung, der an der Unterseite des Geschirrkorbs ausgebildet ist. Dadurch wird die Tropfenbildung am nach unten vorstehenden Vorsprung begünstigt und das Wasser aus der kapillarartigen Ausnehmung sammelt sich an der Austrittsseite der kapillarartigen Ausnehmung in einem Tropfen, der vom Geschirrkorb abtropft. Damit wird auch die Trocknung des Geschirrkorbs begünstigt, weil die insgesamt von den Geschirrteilen und vom Geschirrkorb zu verdunstende Wassermenge verringert wird. Durch das Abtropfen des Wassers am Ende der Kapillare, kann ebenfalls das Wasser durch die Kapillarwirkung der kapillarartigen Ausnehmung nicht wieder aufgesaugt und in Richtung des Geschirrteils geleitet werden.

[0017] Die Ableitung des Wassers von der Berührungsfläche zwischen dem Auflageelement, dem Halteelement oder dem Abtropfsteg und dem Geschirrteil wird begünstigt, wenn die Auflagefläche bzw. Nachbarfläche (wenn, wie im Falle des Abtropfstegs das Geschirrteil nicht direkt aufliegt) möglichst klein gehalten wird. Dies wird besonders vorteilhaft dadurch erreicht, daß die Auflagefläche bzw. Nachbarfläche des Auflageelementes, des Halteelementes oder des Abtropfstegs spitz zulaufend ausgebildet ist und die kapillarartige Ausnehmung benachbart zur Spitze oder in die Spitze integriert ausgebildet ist.

[0018] Durch den spitzen Winkel der Berührungsfläche bzw. Nachbarfläche wird die Oberfläche zur Luft des zwischen dem Geschirrteil und dem Auflageelement, dem Halteelement oder dem Abtropfsteg haftenden Tropfens vergrößert, so daß die Kapillarwirkung der kapillarartigen Ausnehmung gegenüber der Haftung des Tropfens zwischen dem Geschirrteil und dem Auflageelement, dem Halteelement oder dem Abtropfsteg begünstigt wird.

[0019] Zusätzlich zu den kapillarartigen Ausnehmungen oder alternativ zu diesen können das Auflageelement, das Halteelement oder der Abtropfsteg zumindest im Bereich der Berührungsfläche bzw. Nachbarfläche zwischen dem Auflageelement, dem Halteelement oder dem Abtropfsteg und dem Geschirrteil eine poröse Struktur aufweisen. Durch die kleinen Abmessungen der porösen Strukturen wird hier ebenfalls die Kapillarwirkung erreicht und das Wasser vom Geschirrteil abgeleitet.

[0020] Das Ableiten des Wassers in den kapillarartigen Ausnehmungen oder in der porösen Struktur wird auch dadurch begünstigt, daß als Material der Auflageelemente oder Halteelemente zumindest im Bereich der Berührungsfläche ein Material eingesetzt wird, welches durch Wasser besonders gut benetzt wird. Alternativ können die Berührungsbereiche auch mit einem solchen Material beschichtet sein.

[0021] Der Geschirrkorb kann dabei auf herkömmliche Weise als schubladenartiger Auszug in der Geschirrspülmaschine gelagert sein oder als Einsatz für einen Geschirrkorb vorgesehen werden. In letzterem Fall können der Geschirrkorbeinsatz und der schubladenartige Auszug aus unterschiedlichen Materialien hergestellt sein, wobei der eine für die Wasserableitungseigenschaften optimiert ist, während der schubladenartige Auszug für die mechanische Stabilität optimiert ist.

[0022] Der Geschirrkorbeinsatz kann dann als Ganzes aus dem schubladenartigen Auszug entnommen werden und z.B. zur Lagerung des Geschirrs dienen, so daß das Geschirr nicht einzeln aus dem Geschirrkorbeinsatz entnommen und separat gestapelt werden muß.

[0023] Gemäß Anspruch 16 wird ein Abtropfelement für einen Geschirrkorb vorgesehen, das eine kapillarartige Ausformung zum Ableiten von an einem Geschirrteil anhaftenden Wasser aufweist. Die durch die kapillarartige Ausformung entstehende Kapillarwirkung entspricht der oben in Bezug auf das Auflageelement, das Halteelement oder den Abtropfsteg beschriebenen Kapillarwirkung.

[0024] Das Abtropfelement wird bei einem herkömmlichen Geschirrkorb an Stellen vorgesehen, an denen üblicherweise keine unmittelbare Berührung zwischen einem eingestellten Geschirrteil und dem Geschirrkorb vorhanden ist. Wie oben bereits erläutert, bildet sich an der tiefsten Stelle eines in den Geschirrkorb eingestellten Tellers eine "Tropfnase", die unvollständig abläuft und nach dem Klarspülgang am Teller haften bleibt. Wegen des großen Abstandes zu

Petitioner Samsung Ex-1004, 1051

den Auflageelementen, auf denen der Teller aufliegt, kann das Wasser nicht bis zu diesen abgeleitet werden. Wird dagegen ein solches Abtropfelement z.B. an einem Querstab, der die zwei Auflageelemente für die Teller miteinander verbindet, vorgesehen, so berührt das Abtropfelement den Teller in der Nähe des untersten Punkts oder ist von diesem nur wenig beabstandet.

[0025] Während des Klarspülgangs bildet sich eine Wasserbrücke zwischen dem Teller und dem Abtropfelement. Nach dem Klarspülgang, während der Trockenphase, wird durch die auf dem Abtropfelement ausgebildete, kapillarartige Ausformung das Wasser vom Teller weg zum Abtropfelement hin abgeleitet. Dabei erfolgt die Ableitung trotz eines Abstandes zwischen Teller und Abtropfelement. Auch wenn dabei die nächste Stelle des Abtropfelements zum Teller oberhalb der untersten Kante des Tellers liegt, wird aufgrund der Oberflächenspannung und Kapillarkraft der Tropfen zum Abtropfelement hin abgeleitet.

[0026] Bei einer vorteilhaften Ausgestaltung ist die kapillarartige Ausformung eine Kante zwischen dem Abtropfelement und z.B. einem Gitterstab des Geschirrkorbs. Am Abtropfelement kann auch eine Vertiefung vorgesehen werden in Richtung des Gitterstabs, so daß zwischen Gitterstab und Abtropfelement ein Spalt entsteht, entlang dem das Wasser abgeleitet wird.

[0027] Bei einer weiteren, besonders vorteilhaften Ausgestaltung ist die kapillarartige Ausformung eine Vertiefung in dem Abtropfelement oder ein Vorsprung, die günstigerweise von oben nach unten am Abtropfelement verlaufen. Bei den Vorsprüngen entsteht die Kapillarwirkung zwischen den Seitenwänden des Vorsprungs und der Seitenfläche des Abtropfelements, die eine Kante bildet.

[0028] Das Abtropfelement ist zu seinem unteren Ende hin spitz zulaufend, so daß das nach unten abgeführte Wasser sich zu einer Tropfenform ausbildet, die aufgrund der geringen Haftung am Abtropfelement von diesem abtropft.

[0029] Bei einer besonders vorteilhaften Ausgestaltung ist das Abtropfelement als Einzelteil ausgebildet, das an einen herkömmlichen Geschirrkorb befestigbar ist. Dadurch ist es nicht erforderlich, den herkömmlichen Geschirrkorb umzugestalten und der Geschirrkorb kann auf einfache und kostengünstige Weise mit dem Abtropfelement nachgerüstet werden.

[0030] Die Restmenge des an den Geschirrteilen anhaftenden Wassers kann durch eine Kombination der oben beschriebenen Elemente an einem Geschirrkorb sehr stark verringert werden. Dabei können die Elemente a) Auflageelement b) Halteelement, c) Abtropfsteg und d) Abtropfelement in beliebiger Kombination eingesetzt werden.

[0031] Anhand von Zeichnungen werden Ausführungsbeispiele der Erfindung näher erläutert.

[0032] Es zeigen:

Fig. 1 einen schematisch dargestellten Ausschnitt einer, Telleraufnahme eines Geschirrkorbs,

Fig. 2A bis 2D verschiedene Ausführungsformen von Auflagestäben oder Haltestäben im Querschnitt,

Fig. 3 einen schematisch dargestellten Ausschnitt einer Telleraufnahme gemäß einer zweiten Ausführungsform,

Fig. 4 eine Draufsicht auf eine Abtropfleiste, die unterhalb von Telleraufnahmen angeordnet ist,

Fig. 5 eine perspektivische Ansicht der Abtropfleiste von Fig. 4,

Fig. 6A bis 6C einen Abtropfclipp zum Aufrasten auf einen Geschirrkorb in einer ersten Ausführungsform,

Fig. 7 den Abtropfclipp von Fig. 6A, der auf einen Drahtbügel des Geschirrkorbs aufgerastet ist,

Fig. 8A und 8B zwei weitere Ausführungsformen eines Abtropfclipps und

Fig. 9 einen schematisch dargestellten Ausschnitt einer herkömmlichen Telleraufnahme eines Geschirrkorbs mit Tropfenbildung zwischen einem Teller und der Telleraufnahme.

[0033] Im folgenden werden die bei einem Geschirrkorb ausgebildeten kapillarartig wirkenden Elemente anhand einer Telleraufnahme des Geschirrkorbs detailliert beschrieben. Die kapillarartig wirkenden Elemente sind entsprechend auch bei der unten beschriebenen Abtropfleiste oder z.B. bei einer Tassenauflage anwendbar.

[0034] Fig. 1 zeigt schematisch einen Ausschnitt von Telleraufnahmen 1a, 1b, 1c eines Geschirrkorbs. Ein in die Telleraufnahme 1 eingestellter Teller liegt unten auf einem horizontal verlaufenden Auflagestab 2 auf. Beabstandet stehen auf dem Auflagestab 2 leicht geneigt nach oben verlaufende Haltestäbe 3a, 3b hervor, die den Teller in einer geneigten Stellung stehend halten.

[0035] Sowohl in den Auflagestab 2 als auch in die Haltestäbe 3a, 3b sind Ableitungskanäle 4 eingelassen, entlang derer das an der Auflagefläche zwischen dem Auflagestab 2 oder den Haltestäben 3a, 3b und dem in die Telleraufl-

Petitioner Samsung Ex-1004, 1052

nahme 1 eingestellten Teller haftenden Wasser aus dem Berührungsbereich nach unten abgeleitet wird.

[0036] Im Auflagestab 2 verläuft in dessen oberen Bereich ein ungefähr horizontal verlaufender Ableitungskanal 4a. Der horizontal verlaufende Ableitungskanal 4a ist in seinem mittleren Bereich mit einem Ableitungskanal 4b verbunden, der das Tropfenwasser vertikal nach unten ableitet.

[0037] An der Unterseite des Auflagestabs 2 sind Spitzen 5 ausgebildet, in denen die unteren Enden der vertikal verlaufenden Ableitungskanäle 4b, 4c, 4d, 4e enden. Die Spitzen 5 begünstigen das Abtropfen des abgeleiteten Wassers am Ende der Ableitungskanäle 4b, 4c, 4d, 4e.

[0038] Im Bereich der Berührungsfläche zwischen dem Haltestab 3a, 3b und dem Teller verlaufen ungefähr vertikal weitere Ableitungskanäle 4c bis 4e. Der Ableitungskanal 4c im ersten Haltestab 3a leitet das von der zwischen unteren Tellerkante und dem ersten Haltestab 3a angesammelte Wasser zur Spitze 5 ab. Der zweite Ableitungskanal 4d im ersten Haltestab 3a leitet das im Kontaktbereich zwischen der Tellerunterseite eines in die Telleraufnahme 1b eingestellten Tellers und dem ersten Haltestab 3a angesammelte Wasser ebenfalls zur Spitze 5 ab.

[0039] Vor der Spitze 5 sind der erste und der zweite Ableitungskanal 4c, 4d des ersten Haltestabs 3a zusammengeführt. Am zweiten Haltestab 3b ist eine Abwandlung des Ableitungskanals dargestellt, bei der der Ableitungskanal 4e von der rückseitigen Auflagefläche des in die Telleraufnahme 1a eingestellten Tellers zur dahinter liegenden vorderseitigen Anlagefläche des in die Telleraufnahme 1c eingestellten Tellers geführt wird.

[0040] Die Fig. 2A bis 2D zeigen schematische Querschnittsansichten eines Auflagestabs 2 oder entsprechend eines Haltestabs 3. Die Grundform der Stäbe 2, 3 ist dabei rund mit einem spitzen Grat 6. Der Grat 6 steht in Richtung der Auflagestelle des Tellers am Stab 2, 3. Fig. 2A zeigt eine Ausführungsform des Stabs 2, 3, bei dem der Ableitungskanal 4 in den Grat 6, unmittelbar im Anlagebereich des Tellers, eingelassen ist. Der Ableitungskanal 4 hat in diesem Fall einen rechteckigen Querschnitt. Fig. 2A zeigt einen Querschnitt des Stabs 2, 3, bei dem der Ableitungskanal 4 einen dreieckigen Querschnitt aufweist.

[0041] Die Fig. 2C und 2D zeigen Ausführungsformen, bei denen der Ableitungskanal 4 versetzt zur Anlagefläche des Grats 6 angeordnet ist. Der Querschnitt des Kanals 4 in Fig. 2C ist dabei dreieckig und der Querschnitt des Ableitungskanals 4 in Fig. 2D weist die Form eines Kreisausschnitts auf.

[0042] Fig. 3 zeigt einen Ausschnitt einer zweiten Ausführungsform einer Geschirraufnahme des Geschirrkorbs. Für gleiche oder gleichwirkende Elemente werden die gleichen Bezugszeichen wie in Fig. 1 verwendet.

[0043] Bei dieser Ausführungsform ist der Auflagestab 2, auf dem der Tellerrand aufliegt, abschnittsweise schräg verlaufend ausgebildet. Dadurch sind die Ablaufkanäle 4a im Auflagestab 2 geneigt, wodurch das Ablaufen des Wassers gefördert wird. Die Grundlinie des Auflagestabs 2 ist sägezahnförmig ausgebildet. Die jeweiligen Abschnitte des Auflagestabs 2 sind durch den sägezahnförmigen Verlauf nach unten spitz zulaufend ausgebildet, so daß diese nach unten weisenden Ausformungen als Spitze 5 zum Ableiten des Wassers genutzt werden.

[0044] Fig. 4 zeigt eine Draufsicht auf einen Ausschnitt nebeneinander liegender Telleraufnahmen 1a, 1b, 1c. Zwischen einem hinteren und vorderen Auflagestab 2a, 2b (in Bezug auf Fig. 5) verläuft mittig eine Abtropfleiste 7. An der Oberseite der Abtropfleiste 7 ist ein spitz zulaufender Grat 6 ausgebildet, wobei die Oberkante des Grats 6 unterhalb der Ebene zwischen den Oberseiten des vorderen und hinteren Auflagestabs 2a, 2b liegt. D.h. die Abtropfleiste verläuft unterhalb der Unterkante eines in die Telleraufläge 1a, 1b oder 1c eingestellten Tellers, dessen tiefste Stelle zwischen den Auflagestäben 2a, 2b noch unterhalb der Oberseite der Auflagestäbe 2a, 2b liegt.

[0045] Die Auflageleiste 7 ist in Richtung der Auflagestäbe 2a, 2b sägezahnartig ausgebildet (abschnittsweise schräg verlaufend), wobei, wie aus Fig. 5 ersichtlich, die höchste Stelle der Oberkante des Grats 6 in der Nähe zweier gegenüberliegender Haltestäbe 3 liegt und in Richtung der Auflagestäbe 2a, 2b bis zu den nächsten gegenüberliegenden Haltestäben 3 abfällt, wo der nächste Abschnitt mit einer ansteigenden Stufe anfängt. Durch dieses Sägezahnmuster erfolgt eine Anpassung der Abtropfleiste 7 an verschieden große Teller, die in die Telleraufnahmen 1a, 1b, 1c eingestellt werden können, so daß der Abstand zwischen dem tiefstem Tellerrand und der Abtropfleiste 7 ungefähr konstant ist. Zusätzlich begünstigt die abschnittsweise geneigte Form der Abtropfleiste 7 das Abfließen des Wassers.

[0046] Die Oberkante des Grats 6 kann, muß aber den Tellerrand nicht unbedingt berühren, um das an der tiefsten Stelle des stehend gelagerten Tellers anhaftende Wasser abzuleiten, denn während des Klarspülgangs bildet sich zwischen Tellerrand und Abtropfleiste eine "Wasserbrücke", die während der Trockenphase erst dann abreißt, wenn das Wasser bereits nahezu vollständig vom Teller abgelaufen ist. Dies verhindert, daß größere Wassermengen zurückbleiben und zu Trockenflecken führen.

[0047] In der Abtropfleiste 7 sind zur Förderung der Ableitung des Wassers von den eingestellten Tellern Ablaufkanäle 4 eingelassen. Die Form der Ablaufkanäle 4 kann entsprechend der oben in Bezug auf die Auflagestäbe 2 und Haltestäbe 3 beschriebenen Ablaufkanäle 4, 4a bis 4e ausgebildet sein. Weiterhin kann das Querschnittsprofil der Abtropfleiste 7 dem Querschnittsprofil eines Auflage- oder Haltestabs 2, 3, wie in Fig. 2A bis 2D dargestellt, entsprechen oder eine rechteckige Grundform aufweisen, auf der an der Oberseite der Grat 6 ausgebildet ist.

[0048] Fig. 6A bis 6C zeigen verschiedene Ansichten eines Abtropfclipps 8. Fig. 6A zeigt eine Seitenfläche des Abtropfclipps 8, die einem in eine Telleraufnahme 1a eingestellten Teller zugewandt ist. Vom Abtropfclipp 8 stehen auf der Seitenfläche in Richtung des Betrachters von Fig. 6A Vorsprünge 9 mit einem quadratischen Querschnitt hervor.

Petitioner Samsung Ex-1004, 1053

[0049] Fig. 6B zeigt eine Draufsicht auf den Abtropfclipp 8, bei der das Querschnittsprofil der Vorsprünge 9 zu erkennen ist. Zum Aufrasten des Abtropfclipps 8 auf einen Drahtbügel 11 (Fig. 7) des Geschirrkorbs ist an der Oberseite eine Rundnut 10 in den Abtropfclipp 8 eingelassen. Fig. 6A zeigt eine Seitenansicht des Abtropfclipps 8, aus der das Profil der Rundnut 10 zum Aufrasten auf den Drahtbügel 11 ersichtlich ist.

[0050] Fig. 7 zeigt den Abtropfclipp 8 von Fig. 6A bis 6C in einer schematischen Darstellung nach Aufrasten auf den Drahtbügel 11. Der Drahtbügel 11 verläuft senkrecht zur Zeichenebene und parallel zur Zeichenebene sind (gestrichelt dargestellt, weil vor und hinter der Zeichenebene verlaufend) ein Auflagestab 2 und ein erster und zweiter Haltestab 3a, 3b einer Telleraufnahme 1a dargestellt. Der Drahtbügel 11 dient der Verbindung und Stabilisierung der parallel zur Zeichenebene verlaufenden Auflagestäbe 2. Weiterhin ist ein Teller 12 in Schnittansicht dargestellt, der in die Telleraufnahme 1a eingestellt ist.

[0051] Der Teller 12 liegt seitlich am ersten und zweiten Haltestab 3a, 3b an und liegt an der Unterkante auf den beiden in senkrechter Richtung zur Zeichenebene hintereinander angeordneten Auflagestäben 2 auf. Zwischen den beiden Auflagestäben 2 hängt der Teller 12 nach unten durch, so daß die tiefste Stelle des Tellers 12 in der Telleraufnahme 1a unterhalb der Auflagefläche des Tellers 12 auf den Auflagestäben 2 ist. In der Mitte zwischen den Auflagestäben 2 ist der Abtropfclipp 8 auf den Drahtbügel 11 aufgerastet und liegt somit in unmittelbarer Nähe des tiefsten Punkts des Tellerrandes. Dabei kann der Abtropfclipp 8 je nach Tellergröße direkt am Teller 12 aufliegen oder von diesem etwas beabstandet sein.

[0052] Unabhängig davon, ob der Abtropfclipp 8 vom Teller 12 beabstandet ist oder unmittelbar an diesem anliegt, bildet sich während des letzten Klarspülgangs eine Wasserbrücke zwischen dem Teller 12 und dem Abtropfclipp 8, wie dies durch die gepunktete Fläche 13 dargestellt ist. Durch die Kapillarwirkung der Winkel zwischen den Vorsprüngen 9 und der Seitenfläche des Abtropfclipps 8 wird das Wasser von der Grenzfläche zwischen Teller 12 und Abtropfclipp 8 abgezogen und in Richtung des spitzen Unterteils des Abtropfclipps 8 abgeleitet. Aufgrund der Benetzungseigenschaft des Wassers wird dabei auch die Ausbildung der "Tropfnase" am untersten Tellerrand vermieden und das Wasser zum Abtropfclipp 8 hin abgleitet.

[0053] Fig. 8A und 8B zeigen weitere Ausgestaltungen des Abtropfclipps 8. In Fig. 8A weisen die Vorsprünge 9 eine dreieckige Querschnittsfläche auf und stehen aus der Seite des Abtropfclipp 8 hervor. Bei der Ausführungsform des Abtropfclipps 8 in Fig. 8B sind statt der Vorsprünge in dem Seitenteil des Abtropfclipp 8 Vertiefungen 14 mit einem quadratischen Querschnitt eingelassen. Dabei wird jeweils bei den Abtropfclipps 8 der Fig. 6A, 8A und 8B die Kapillarwirkung durch die Kante zwischen dem Vorsprung 9 bzw. der Vertiefung 14 und der Seitenfläche des Abtropfclipps 8 und beim Abtropfclipp 8 von Fig.8B zusätzlich durch die sich eng gegenüberstehenden Seitenwände der Vertiefung 14 bewirkt.

Bezugszeichenliste

[0054]

1a, 1b, 1c:	: Telleraufnahme
2, 2a, 2b:	Auflagestab
3, 3a, 3b:	Haltestab
4, 4a, 4b, 4c, 4d, 4e:	Ableitungskanal
5:	Spitze
6:	Grat
7 :	Abtropfleiste
8:	Abtropfclipp
9:	Vorsprung
10 :	Rundnut
11:	Drahtbügel
12:	Teller
13:	Wassertropfen
14:	Vertiefung

Patentansprüche

1. Geschirrkorb für eine Geschirrspülmaschine, bei dem ein Auflageelement (2) und/oder ein Halteelement (3) zum Lagern eines Geschirrteils (12) zumindest im Auflagebereich des Geschirrteils (12) an dem Auflageelement (2) und/oder dem Halteelement (3) ein kapillarartig wirkendes Element zum Ableiten von an dem Geschirrteil (12) anhaftendem Wasser aufweist.

Petitioner Samsung Ex-1004, 1054

2. Geschirrkorb für eine Geschirrspülmaschine, bei dem ein Abtropfsteg (7) unterhalb eines im Geschirrkorb gekippt stehenden Geschirrteils (12) verlaufend angeordnet ist, wobei der Abtropfsteg (7) ein kapillarartig wirkendes Element zum Ableiten von an dem Geschirrteil (12) anhaftendem Wasser aufweist.

3. Geschirrkorb nach Anspruch 1 oder 2, bei dem das kapillarartig wirkende Element zumindest eine kapillarartige Ausnehmung (4) umfaßt, welche insbesondere einen dreieckigen, rechteckigen oder kreisabschnittsförmigen Querschnitt aufweist.

4. Geschirrkorb nach Anspruch 3, bei dem die kapillarartige Ausnehmung (4) an dem Auflageelement und/oder dem Halteelement und/oder dem Abtropfsteg (7) zumindest an ihrem von dem Geschirrteil (12) wegführenden Ende nach unten verlaufend ausgebildet ist.

5. Geschirrkorb nach Anspruch 3 oder 4, bei dem die kapillarartige Ausnehmung (4) neben oder in einem spitz oder keilförmig ausgebildeten Vorsprung (5), der an der Unterseite des Geschirrkorbs ausgebildet ist, endet.

6. Geschirrkorb nach einem der Ansprüche 3 bis 5, bei dem eine oder mehrere kapillarartige Ausnehmungen (4a, 4d) mit einer nach unten verlaufenden, weiteren kapillarartigen Ausnehmung (4b, 4e) verbunden sind.

7. Geschirrkorb nach einem der Ansprüche 3 bis 6, bei dem der mit dem Geschirrteil (12) in Berührung stehende Bereich des Auflageelements und/oder Halteelements und/oder der dem Geschirrteil (12) nächstgelegene Bereich des Abtropfstegs (7) in Richtung des Geschirrteils (12) spitz zulaufend ausgebildet ist.

8. Geschirrkorb nach Anspruch 7, bei dem die kapillarartige Ausnehmung benachbart zu dem spitz zulaufenden Bereich oder unmittelbar in dem spitz zulaufenden Bereich, welcher vorzugsweise als Grat (6) ausgebildet ist, verläuft.

9. Geschirrkorb nach einem der vorhergehenden Ansprüche, bei dem das Auflageelement (2) und/oder die Abtropfleiste (7) in Längsrichtung in Abschnitte unterteilt ist, in denen das Auflageelement und/oder die Abtropfleiste (7) jeweils geneigt ist.

10. Geschirrkorb nach einem der vorhergehenden Ansprüche, bei dem die Oberfläche des Auflageelements und/oder des Halteelementes und/oder der Abtropfleiste zumindest teilweise eine poröse Struktur aufweist.

11. Geschirrkorb nach einem der vorhergehenden Ansprüche, bei dem das Material an der Oberfläche des Geschirrkorbs durch Wasser gut benetzbar ist oder bei dem der Geschirrkorb zumindest im Bereich der Auflagefläche der Geschirrteile (12) oder unmittelbar angrenzend an diese mit einer mit Wasser gut benetzbaren Schicht beschichtet ist.

12. Abtropfelement, insbesondere mit einer an seinem unteren Ende spitz zulaufenden Ausbildung,für einen Geschirrkorb einer Geschirrspülmaschine mit mindestens einer kapillarartigen Ausformung zum Ableiten von an einem Geschirrteil (12) anhaftendem Wasser.

13. Abtropfelement nach Anspruch 12, bei dem zumindest eine der kapillarartigen Ausformungen ein Spalt zwischen dem Abtropfelement (8) und dem Geschirrkorb oder eine zwischen dem Abtropfelement (8) und dem Geschirrkorb ausgebildete Kante ist.

14. Abtropfelement nach Anspruch 12 oder 13, bei dem die kapillarartige Ausformung eine Vertiefung (14) in dem Abtropfelement (8) oder einen Vorsprung (8) an dem Abtropfelement (8) umfaßt, die einen dreieckigen, rechtekkigen oder kreisabschnittsförmigen Querschnitt aufweisen.

15. Abtropfelement nach einem der Ansprüche 12 bis 14, bei dem das vom Geschirrteil (12) wegführende Ende der kapillarartigen Ausformung neben oder im unteren Ende des Abtropfelements (8) endet.

16. Abtropfelement nach einem der Ansprüche 12 bis 15, das am Geschirrkorb, insbesondere an einem Draht (11) des Geschirrkorbs, befestigbar, vorzugsweise auf den Geschirrkorb aufrastbar, ist.

Petitioner Samsung Ex-1004, 1055

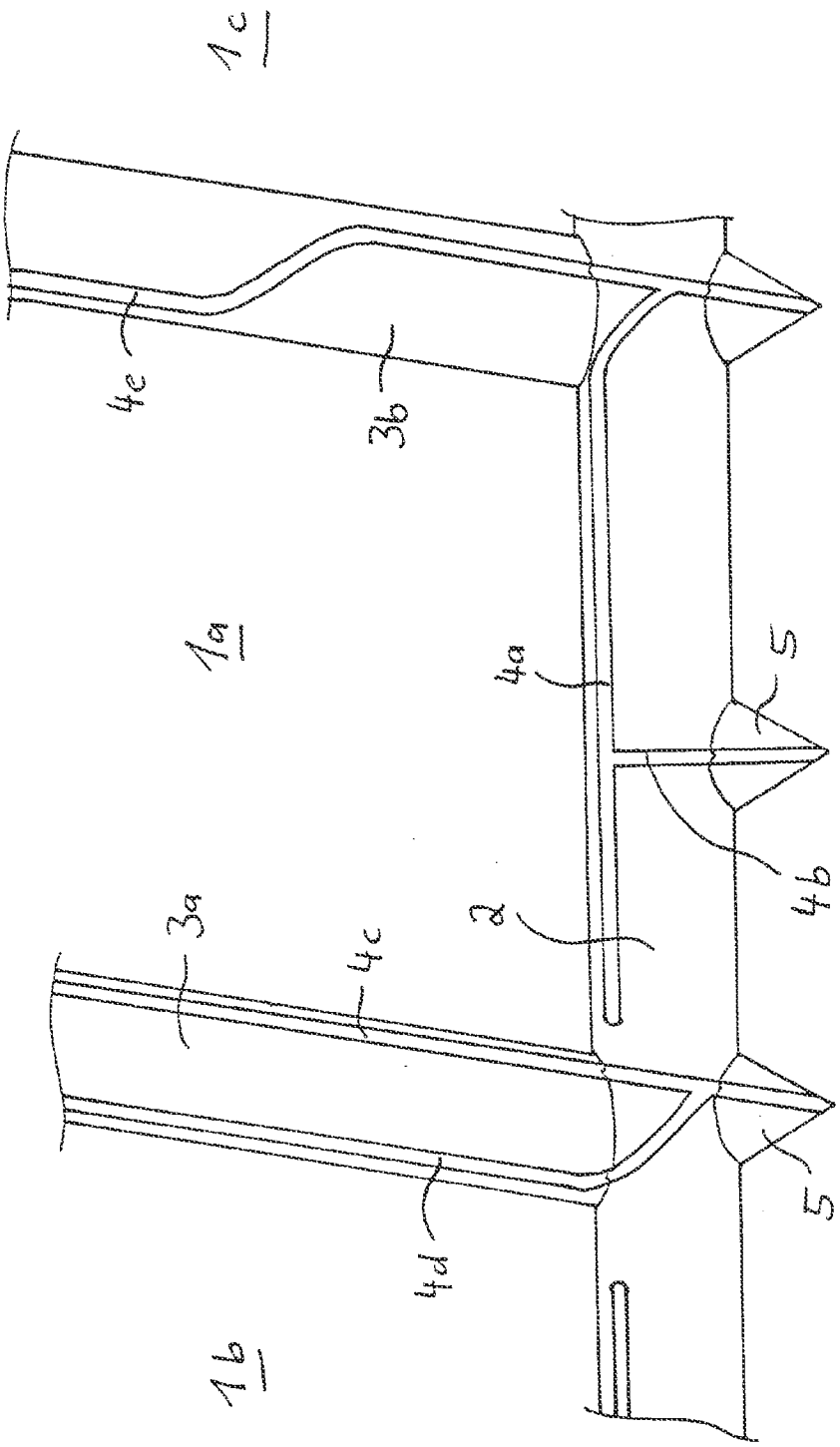


Fig. 1

Petitioner Samsung Ex-1004, 1056

Fig 2 A

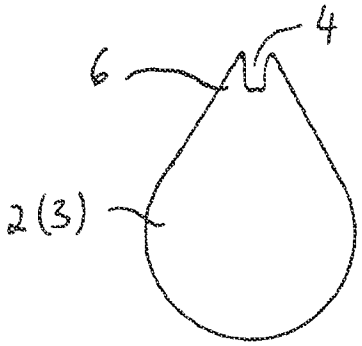
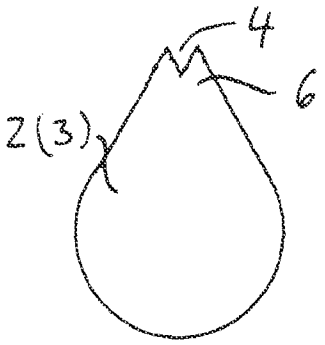


Fig 2 B



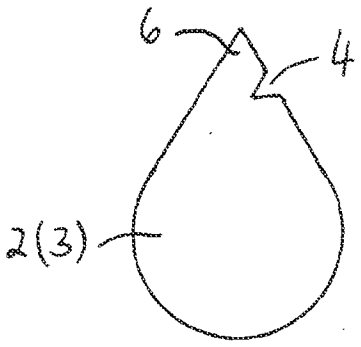


Fig 2 C

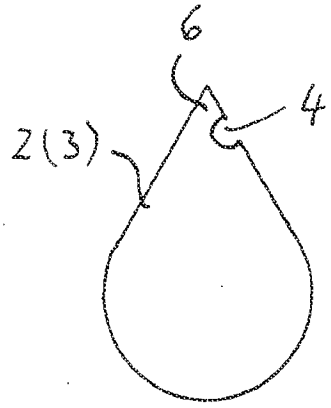


Fig 2 D

Petitioner Samsung Ex-1004, 1057

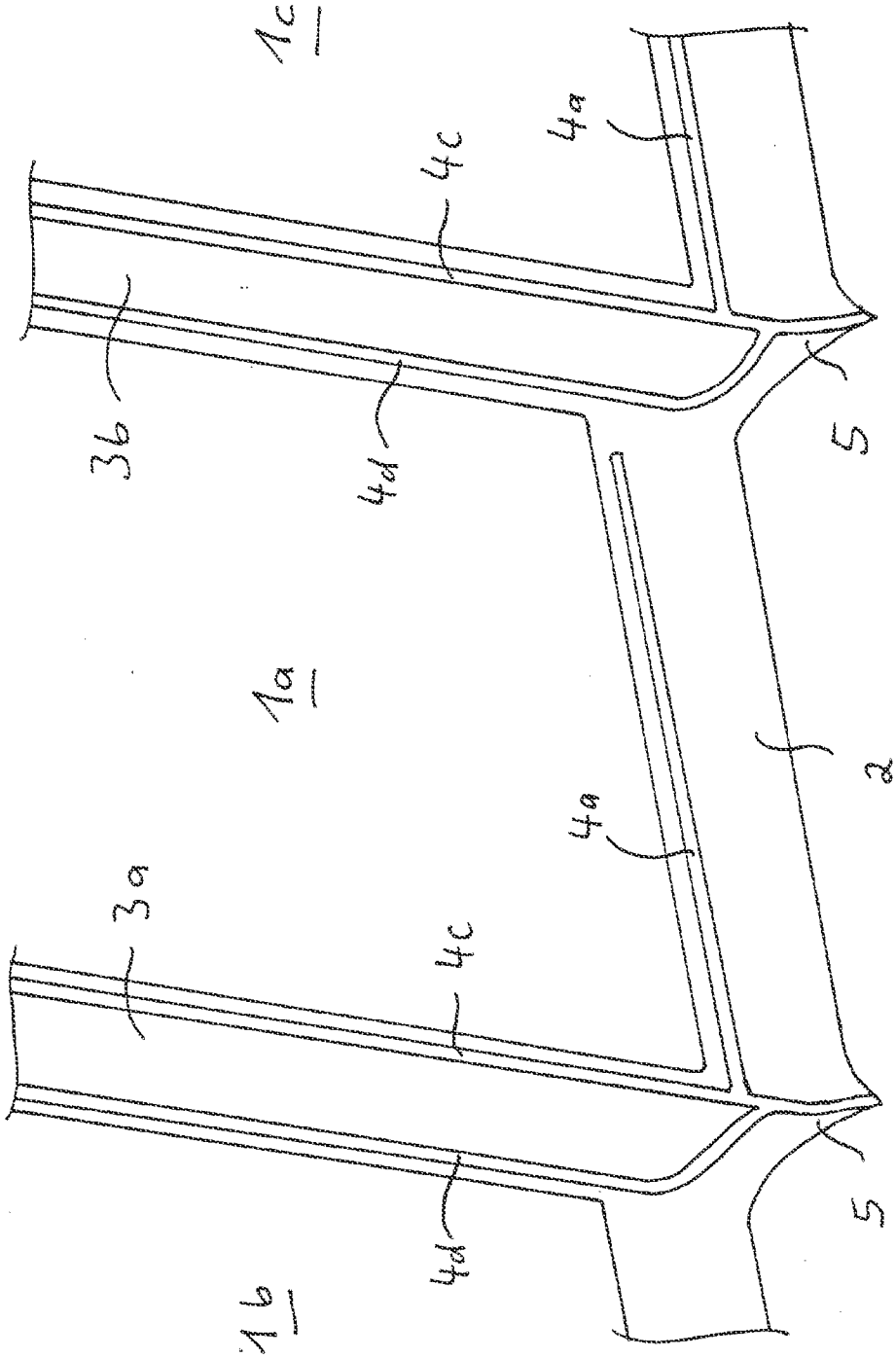


Fig. 3

Petitioner Samsung Ex-1004, 1058

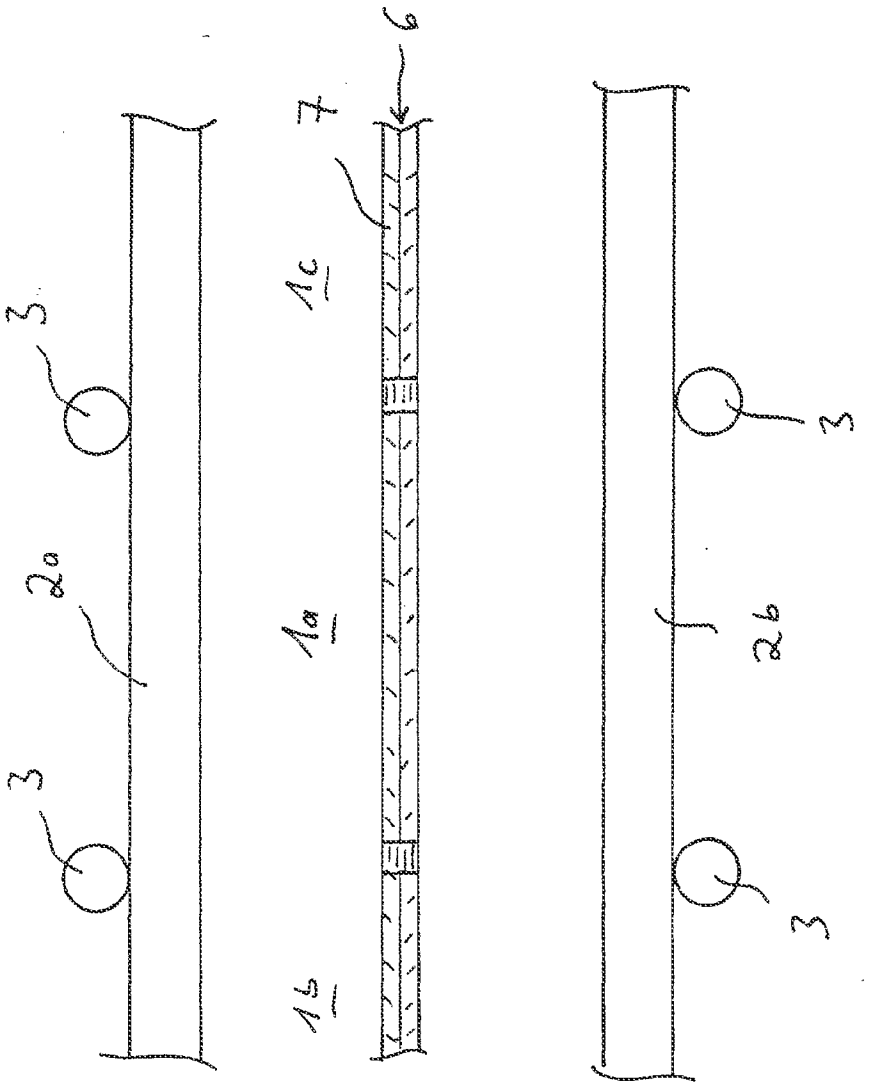


Fig. 4

Petitioner Samsung Ex-1004, 1059

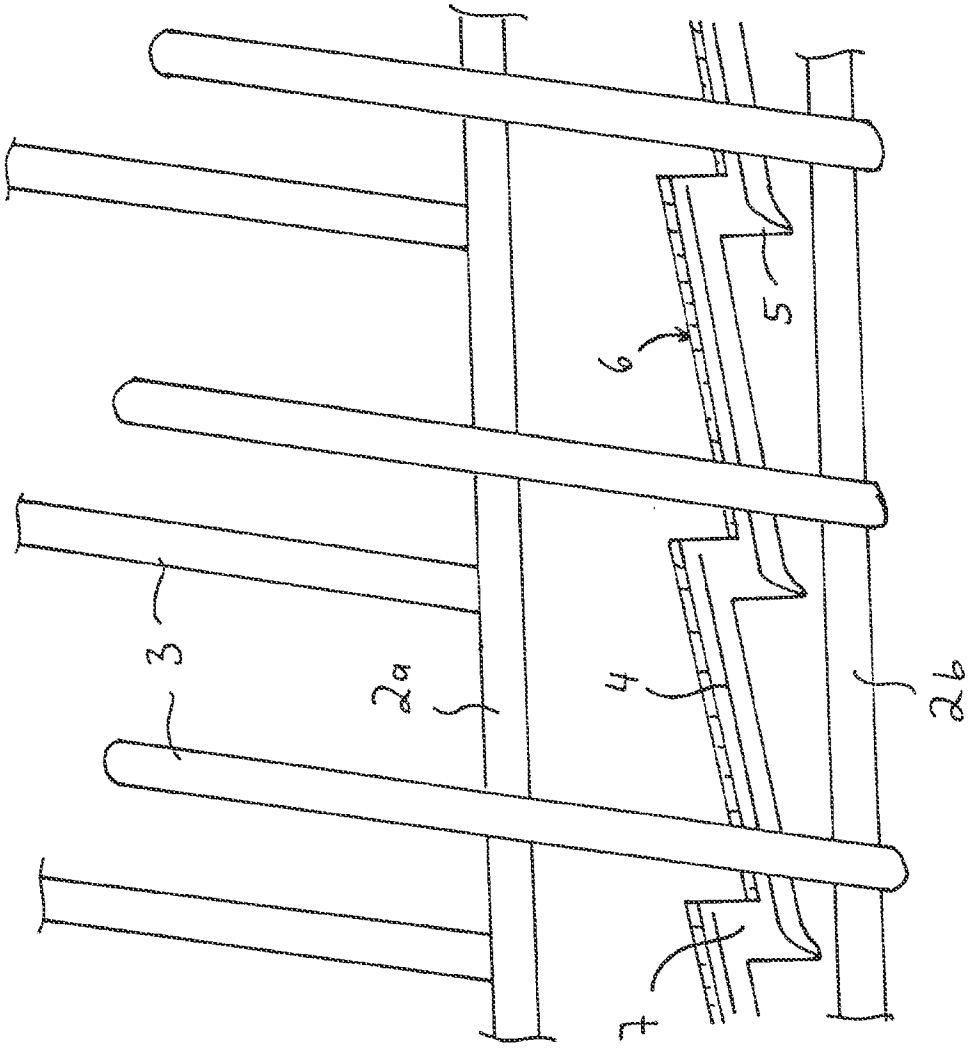


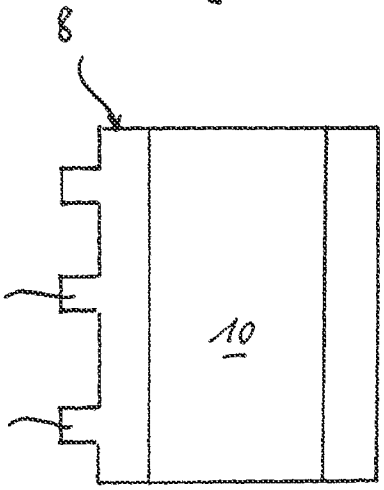
Fig 5

Petitioner Samsung Ex-1004, 1060

Fig. 6A



Fig. 6B



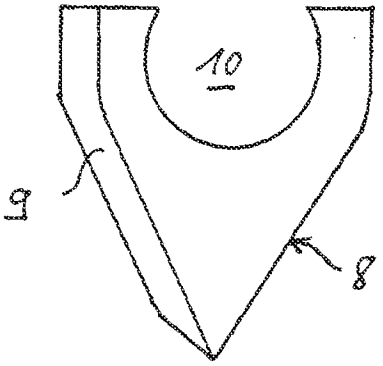
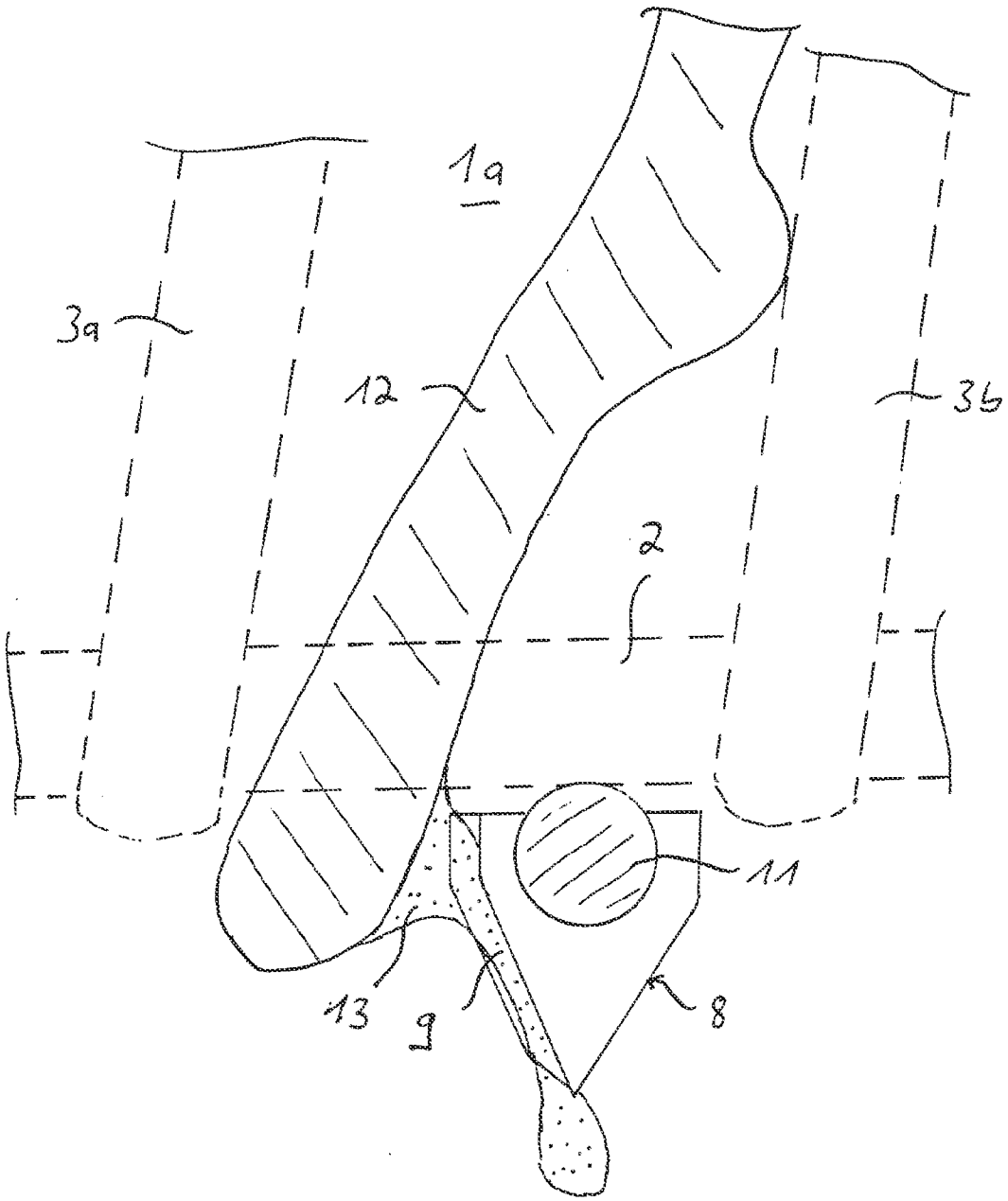


Fig. 6C

Petitioner Samsung Ex-1004, 1061

Fig. 7



Petitioner Samsung Ex-1004, 1062

Fig. 8A

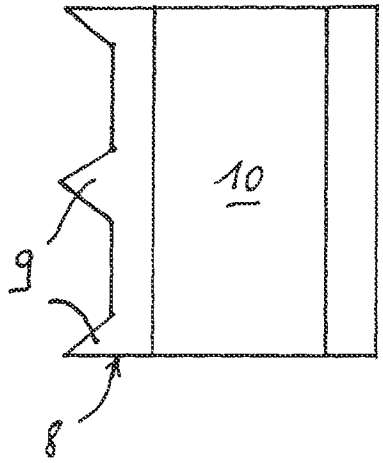
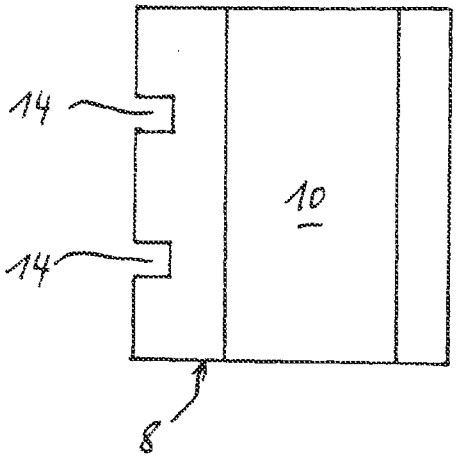


Fig. 8B



Petitioner Samsung Ex-1004, 1063

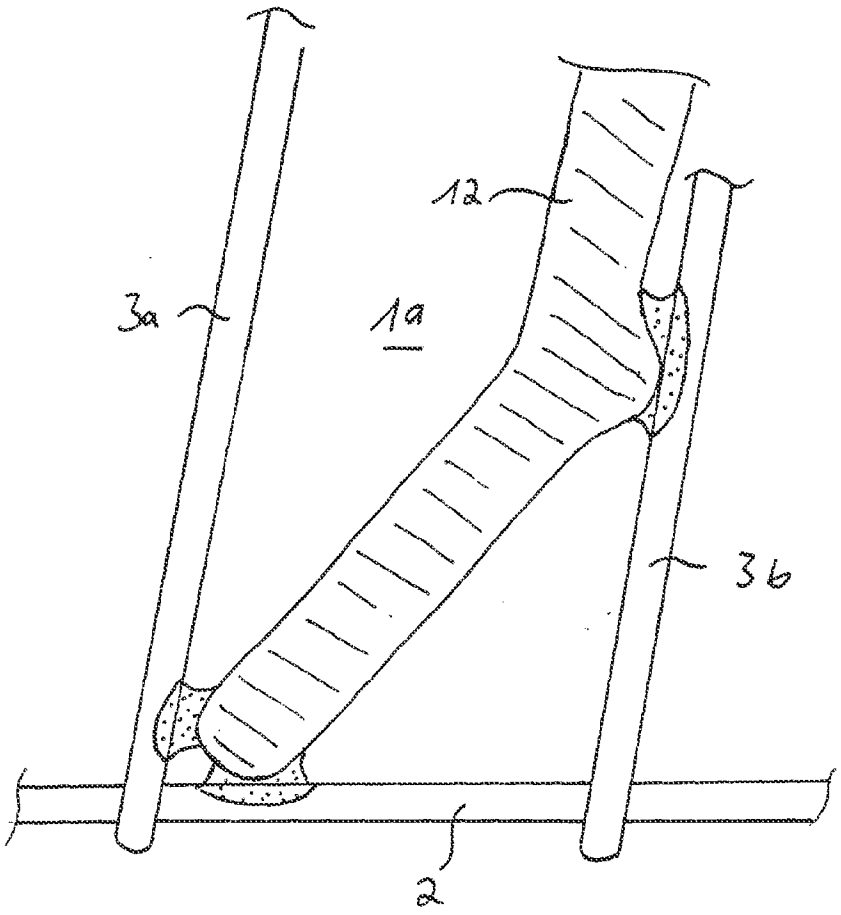


Fig. 9

(STAND DER TECHNIK)

Petitioner Samsung Ex-1004, 1064

Espacenet

Bibliographic data: CN106073675 (A) — 2016-11-09

Dish washing machine and control method thereof

Inventor(s): ZHANG HUAWEI; WU ZHIHENG; MAO LUYAO; GUO WEIKE; LIANG LANZHI; HUANG DONG ± (张华伟, ; 吴智恒, ; 毛璐瑶, ; 郭伟科, ; 梁澜之, ; 黄栋)

Applicant(s): GUANGDONG INST AUTOMATION ± (广东省自动化研究所, ; 广东省智能制造研究所)

Classification: - international: *A47L15/26; A47L15/42; A47L15/50*
- cooperative: A47L15/26 (CN); A47L15/42 (CN); A47L15/4214 (CN); A47L15/4278 (CN); A47L15/428 (CN); A47L15/4282 (CN); A47L15/50 (CN)

Application number: CN201610672124 20160816 Global Dossier

Priority number(s): CN201610672124 20160816

Also published as: CN106073675 (B)

Abstract of CN106073675 (A)

The invention discloses a dish washing machine which comprises a box door, a box body, an inner chamber, a dish basket, a frame type spray arm, a water supply pump, water supply pipes, a drainage pump, drainage pipes and a controller, wherein the frame type spray arm comprises a main water supply pipe, two side water supply pipes, a plurality of spray pipes and a driving device for driving the spray pipes to rotate; the two side water supply pipes are fixed on the wall of the inner chamber respectively through buckles; the two ends of the main water supply pipe are respectively communicated with the middle parts of the two side water supply pipes; the middle part is communicated with the water supply pipes; two ends of each spray pipe are communicated with the two side water supply pipes respectively through shaft sleeves; and reinforcing ribs are uniformly distributed on the side wall of the inner chamber. The control method disclosed by the invention can be used for controlling the spray pipes on the frame type spray arm to rotate back and forth for cleaning without dead angles, thereby improving the cleanness of the dish washing machine; meanwhile, sprayed washing water can be collected on tableware, thereby reducing the noise generated by spraying the washing water to the wall of the inner chamber; and the reinforcing ribs

are uniformly distributed on the inner side wall of the inner chamber, so that the noise generated by resonance can be avoided.

(19)中华人民共和国国家知识产权局

(12)发明专利申请

(10)申请公布号 CN 106073675 A
(43)申请公布日 2016.11.09

(21)申请号 201610672124.3

(22)申请日 2016.08.16

(71)申请人 广东省自动化研究所
地址 510075 广东省广州市越秀区先烈中路100号大院13号楼

(72)发明人 张华伟 吴智恒 毛璐瑶 郭伟科 梁澜之 黄栋

(74)专利代理机构 广州市南锋专利事务所有限公司 44228
代理人 刘娴 沈锐涛

(51)Int.Cl.
A47L 15/26(2006.01)
A47L 15/42(2006.01)
A47L 15/50(2006.01)

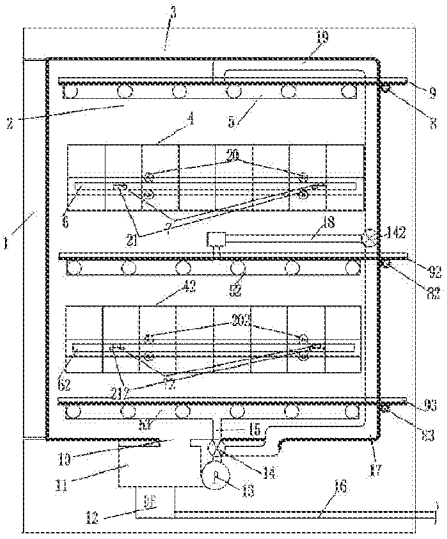
权利要求书2页 说明书5页 附图3页

(54)发明名称

一种洗碗机及其控制方法

(57)摘要

本发明公开了一种洗碗机，包括箱门、箱体、内胆、碗篮、架式喷臂、供水泵、供水管、排水泵、排水管和控制器，所述架式喷臂包括主供水管、两根侧供水管、多根喷淋管和驱动喷淋管转动的驱动装置，两根侧供水管分别通过卡扣固定在所述内胆壁上，主供水管两端分别与两根侧供水管的中部相连通，中部与所述供水管相连通，每根喷淋管的两端分别通过轴套与两根侧供水管相连通，所述内胆侧壁上均布有加强筋条。通过本发明公开的控制方法，能够控制架式喷臂上喷淋管来回转动，实现清洗无死角，提升洗碗机的洗净度，同时也能够使喷洒的洗涤水集中在餐具上，减少喷到内胆壁上而产生的噪音。而在内胆的内侧壁上均布设有加强筋条，能避免共振产生的噪音。



CN 106073675 A

Petitioner Samsung Ex-1004, 1067

1.一种洗碗机，包括箱门、箱体、内胆、碗篮、架式喷臂、供水泵、供水管、排水泵、排水管、水杯和控制器，碗篮通过碗篮架安装在内胆上，水杯安装在内胆底部，其特征在于：所述架式喷臂设有三套，分别设置在所述内胆的上部、中部和下部，所述碗篮设有两个，其中一个设置在上部和中部架式喷臂之间，另一个设置在中部和下部架式喷臂之间；所述架式喷臂包括主供水管、两根侧供水管、多根喷淋管和驱动喷淋管转动的驱动装置，两根侧供水管分别通过卡扣固定在所述内胆壁上，主供水管两端分别与两根侧供水管的中部相连通，中部与所述供水管相连通，每根喷淋管的两端分别通过轴套与两根侧供水管相连通，压力传感器与所述控制器电连接，所述内胆侧壁上均布有加强筋条。

2.根据权利要求所述1的洗碗机，其特征在于：所述碗篮架上还设有用于检测所述碗篮重量变化的压力传感器，压力传感器与所述控制器电连接；所述供水管包括下部供水支管、中部供水支管和上部供水支管，下部供水支管、中部供水支管和上部供水支管分别为所述上部、中部和下部架式喷臂的主供水管供水，下部供水支管的进水端与第一电磁水阀的一出水口相连，上部供水支管和中部供水支管的进水端分别与第二电磁水阀的两个出水口相连，第一电磁水阀的进水口与所述进水泵相连，另一个出水口与第二电磁水阀的进水口通过连接管相连通。

3.根据权利要求所述1的洗碗机，其特征在于：所述每根喷淋管502包括管体和开设在管体上的多个喷孔，设置在管体端部的喷孔的孔径大于设置在管体中间的喷孔，且由管体端部至中间位置，喷孔的孔径依次变小。

4.根据权利要求所述1-3任一项权利要求的洗碗机，其特征在于：所述每套架式喷臂的喷淋管由相对应的一套驱动装置驱动，所述驱动装置包括PWM变频电机和齿条或链条，在所述每根喷淋管上安装有与所述齿条相配合的齿轮，或者在所述每根喷淋管上安装有与所述链条相配合的链轮，PWM变频电机能够驱动齿条或链条正转或反转。

5.根据权利要求4所述的洗碗机，其特征在于：所述碗篮架包括支座和安装在支座上的导轨，在导轨上开设有矩形安装槽，支座一端固定于内胆壁，另一端设有与导轨相配合安装块，所述压力传感器固定在安装块的顶部且位于导轨和安装块之间，所述碗篮两侧安装有可在导轨上滑动的滚轮。

6.根据权利要求5所述的洗碗机，其特征在于：所述滚轮设有上下两排，将所述导轨夹在中间。

7.一种基于权利要求4所述洗碗机的控制方法，其特征在于：包括如下步骤：

S1：初始化准备：各部件按要求连接，并使下部喷淋管的喷孔朝上，中部和上部的喷淋管的喷孔朝下；洗涤前放入洗涤剂后，往碗篮放入待洗餐具，关上箱门后启动；通过压力传感器采集碗篮的重量变化，若下层碗篮重量有变化，则执行步骤S2；若上层碗篮重量有变化，则执行步骤S3；若上、下两层碗篮重量均有变化，则执行步骤S4；

S2：当餐具放置在下碗篮时，控制器控制第一电池水阀同时打开两个出水口，控制第二电池水阀关闭与上部供水支管相连的出水口，然后控制器控制供水泵供水，同时控制PWM变频电机驱动喷淋管在30°-45°的夹角范围内来回转动，直至清洗完成；

S3：当餐具放置在上碗篮时，处理器控制驱动中部喷淋管旋转的PWM变频电机动作，驱动中部架式喷臂的喷淋管转动至喷孔朝上，然后控制第一电磁水阀与下部供水支管相连通的出水口关闭，打开与连接管相连的出水口，控制第二电磁水阀的两个出水口都打开；最后

Petitioner Samsung Ex-1004, 1068

控制器控制供水泵供水，同时控制PWM变频电机驱动喷淋管在30°-45°的夹角范围内来回转动，直至清洗完成；

S4：当上碗篮和下碗篮都放置有餐具时，控制器控制第一电磁水阀和第二电磁水阀的出水口都打开，然后控制下部和上部的PWM变频电机电机动作，驱动上部喷淋管和下部喷淋管在30°-45°的夹角范围内来回转动，使上部喷淋管始终朝下喷洒洗涤水，下部喷淋管始终朝上喷洒洗涤水，控制中部的PWM变频电机驱动中部喷淋管360度旋转；同时控制器控制供水泵供水，使其在转动过程中喷洒的洗涤水既能洗涤上碗篮中的餐具又能清洗下碗篮中的餐具；

S5：洗涤完成后的污水经排水泵由排水管排出。

8.根据权利要求7所述洗碗机的控制方法，其特征在于：所述步骤S4中，在清洗污染程度不同的餐具时，将污染程度较高的餐具放置在下碗篮中，污染程度较低的放置于上碗篮中，控制器控制第一电池水阀的出水口完全打开，控制第二电磁水阀与中部架式喷臂的主供水管相连的出水口完全打开，控制第二电磁水阀与上部架式喷臂的主供水管相连的出水口部分打开，使流入中部喷淋管和下部喷淋管的洗涤水流量较大，对下碗篮中的餐具进行高强度清洗；而上部喷淋管的水流量较小，喷洒的洗涤水对上碗篮中的餐具进行常规洗涤。

Petitioner Samsung Ex-1004, 1069

一种洗碗机及其控制方法

技术领域

[0001] 本发明涉及洗碗设备技术领域，尤其是一种洗碗机及其控制方法。

背景技术

[0002] 洗碗机是通过向餐具喷洒洗涤水和洗涤剂去洗涤餐具上的食物残渣和污渍的一种电器。典型地，传统洗碗机包括用来提供洗涤空间的内胆，被设置在内胆中用来放置洗涤餐具的碗篮，将洗涤水喷射向碗篮的旋转式喷臂，用来存储洗涤水的水杯，以及用来将水杯中的洗涤水供应至喷臂的供应路径。

[0003] 如申请号为99221217.0的实用新型专利，公开一种分层控制式洗碗机，是在上、下喷淋器的其中一个输水管路中加装一个电磁阀。当餐具较少时，可将餐具只放在一层餐具架上，将输出水的电磁阀关闭，仅一个喷淋器对这一层餐具架上的餐具进行清洗，这样既节约用水，又节约电能。当上、下两层餐具架上均放置餐具时，将电磁阀打开，上、下喷淋器可同时工作，选择使用十分方便。当该洗碗机存在如下问题：

1.传统喷淋式洗碗机采用可旋转的喷臂，其旋转轨迹为一圆形，而内胆和碗篮都为矩形，这样造成清洗会存有死角。

[0004] 2.上述的洗碗机不管是上层、下层的，只能是单方向的喷水洗涤，而且还是朝上喷洒，需要较大的压力才能冲刷；所消耗的水电更多，导致水电的极大浪费。

[0005] 3.目前大多数洗碗机对于不同污染程度的餐具都采用同一洗涤程序，无法分开清洗。对于污染程度较高和污染程度低的餐具，采用适用于低污染程度的洗涤程序会洗不干净；而采用适用于高污染程度的洗涤程序，会浪费水电。

[0006] 4.传统洗碗机工作过程中由于流体和振动导致的噪声大，对家庭生活环境和个人健康产生不利影响。

发明内容

[0007] 本发明的目的在于克服上述已有技术的不足，提供一种清洗无死角、节水、节能、低噪音的洗碗机。

[0008] 为了实现上述目的，本发明采用的技术方案是：一种洗碗机，包括箱门、箱体、内胆、碗篮、架式喷臂、供水泵、供水管、排水泵、排水管、水杯和控制器，碗篮通过碗篮架安装在内胆上，水杯安装在内胆底部，其特征在于：所述架式喷臂设有三套，分别设置在所述内胆的上部、中部和下部，所述碗篮设有两个，其中一个设置在上部和中部架式喷臂之间，另一个设置在中部和下部架式喷臂之间；所述架式喷臂包括主供水管、两根侧供水管、多根喷淋管和驱动喷淋管转动的驱动装置，两根侧供水管分别通过卡扣固定在所述内胆壁上，主供水管两端分别与两根侧供水管的中部相连通，中部与所述供水管相连通，每根喷淋管的两端分别通过轴套与两根侧供水管相连通，压力传感器与所述控制器电连接，所述内胆侧壁上均布有加强筋条。

[0009] 进一步地，所述碗篮架上还设有用于检测所述碗篮重量变化的压力传感器，压力

Petitioner Samsung Ex-1004, 1070

传感器与所述控制器电连接；所述供水管包括下部供水支管、中部供水支管和上部供水支管，下部供水支管、中部供水支管和上部供水支管分别为所述上部、中部和下部架式喷臂的主供水管供水，下部供水支管的进水端与第一电磁水阀的一出水口相连，上部供水支管和中部供水支管的进水端分别与第二电磁水阀的两个出水口相连，第一电磁水阀的进水口与所述进水泵相连，另一个出水口与第二电磁水阀的进水口通过连接管相连通。

[0010] 进一步地，所述每根喷淋管502包括管体和开设在管体上的多个喷孔，设置在管体端部的喷孔的孔径大于设置在管体中间的喷孔，且由管体端部至中间位置，喷孔的孔径依次变小。

[0011] 进一步地，所述每套架式喷臂的喷淋管由相对应的一套驱动装置驱动，所述驱动装置包括PWM变频电机和齿条或链条，在所述每根喷淋管上安装有与所述齿条相配合的齿轮，或者在所述每根喷淋管上安装有与所述链条相配合的链轮，PWM变频电机能够驱动齿条或链条正转或反转。

[0012] 进一步地，所述碗篮架包括支座和安装在支座上的导轨，在导轨上开设有矩形安装槽，支座一端固定于内胆壁，另一端设有与导轨相配合安装块，所述压力传感器固定在安装块的顶部且位于导轨和安装块之间，所述碗篮两侧安装有可在导轨上滑动的滚轮。所述滚轮设有上下两排，将所述导轨夹在中间。

[0013] 本发明还公开一种基于上述洗碗机的控制方法，其特征在于：包括如下步骤：S1：初始化准备：各部件按要求连接，并使下部喷淋管的喷孔朝上，中部和上部的喷淋管的喷孔朝下；洗涤前放入洗涤剂后，往碗篮放入待洗餐具，关上箱门后启动；通过压力传感器采集碗篮的重量变化，若下层碗篮重量有变化，则执行步骤S2；若上层碗篮重量有变化，则执行步骤S3；若上、下两层碗篮重量均有变化，则执行步骤S4。

[0014] S2：当餐具放置在下碗篮时，控制器控制第一电池水阀同时打开两个出水口，控制第二电池水阀关闭与上部供水支管相连的出水口，然后控制器控制供水泵供水，同时控制PWM变频电机驱动喷淋管在30°-45°的夹角范围内来回转动，直至清洗完成。

[0015] S3：当餐具放置在上碗篮时，处理器控制驱动中部喷淋管旋转的PWM变频电机动作，驱动中部架式喷臂的喷淋管转动至喷孔朝上，然后控制第一电磁水阀与下部供水支管相连通的出水口关闭，打开与连接管相连的出水口，控制第二电磁水阀的两个出水口都打开；最后控制器控制供水泵供水，同时控制PWM变频电机驱动喷淋管在30°-45°的夹角范围内来回转动，直至清洗完成。

[0016] S4：当上碗篮和下碗篮都放置有餐具时，控制器控制第一电磁水阀和第二电磁水阀的出水口都打开，然后控制下部和上部的PWM变频电机电机动作，驱动上部喷淋管和下部喷淋管在30°-45°的夹角范围内来回转动，使上部喷淋管始终朝下喷洒洗涤水，下部喷淋管始终朝上喷洒洗涤水，控制中部的PWM变频电机驱动中部喷淋管360度旋转；同时控制器控制供水泵供水，使其在转动过程中喷洒的洗涤水既能洗涤上碗篮中的餐具又能清洗下碗篮中的餐具。

[0017] S5：洗涤完成后的污水经排水泵由排水管排出。

[0018] 进一步地，所述步骤S4中，在清洗污染程度不同的餐具时，将污染程度较高的餐具放置在下碗篮中，污染程度较低的放置于上碗篮中，控制器控制第一电池水阀的出水口完全打开，控制第二电磁水阀与中部架式喷臂的主供水管相连的出水口完全打开，控制第二

Petitioner Samsung Ex-1004, 1071

电磁水阀与上部架式喷臂的主供水管相连的出水口部分打开，使流入中部喷淋管和下部喷淋管的洗涤水流量较大，对下碗篮中的餐具进行高强度清洗；而上部喷淋管的水流量较小，喷洒的洗涤水对上碗篮中的餐具进行常规洗涤。

[0019] 本发明的有益效果是：由于采用架式喷臂及喷淋管，使用时驱动装置能够驱动喷淋管来回转动，能够实现洗碗篮中的餐具清洗无死角，提升洗碗机的洗净度，同时也能够使喷洒的洗涤水集中在餐具上，减少喷到内胆壁上而产生的噪音。另外，在内胆的内侧壁上均布设有加强筋条，能够提高内胆的强度，使其不会与供水泵的振动频率一致，能避免共振产生的噪音。

[0020] 进一步通过采用压力传感器可以使洗碗机感应到餐具的摆放位置，通过控制电磁水阀的开启或关闭，从而控制架式喷臂喷淋管的供水，实现洗碗机的分层分区域洗涤，有效降低了洗碗机的水耗、能耗和噪音。

附图说明

[0021] 下面结合附图对本发明作进一步的详细说明。

[0022] 图1为本发明的结构示意图。

[0023] 图2为本发明中碗篮与导轨连接处的示意图。

[0024] 图3 是本发明中架式喷臂的结构示意图。

具体实施方式

[0025] 如图1-3所示，本发明一种洗碗机，包括箱门1、箱体3、内胆2、碗篮、架式喷臂、供水泵13、供水管、排水泵12、排水管16和控制器。其中，箱门1安装在箱体3上，使用户可以选择性地打开和关闭设置在内胆2中的洗涤空间。箱门1或箱体3外表面可设置有控制面板，以便用户控制洗碗机。内胆2用以提供洗涤空间；箱体3用以限定洗碗机的外观尺寸，支撑和安装洗碗机的零部件。在洗碗机内胆2底部设有出水口10，在出水口10处连接有水杯11，用以存放和回收洗涤水。水泵13一端与供水管相连，另一端与水杯11相连，用以将水槽中的洗涤水泵入供水管路。排水泵12一端与水杯相连一端与排水管16相连，用于排出水杯11中的污水。在内胆2侧壁上还均布有加强筋条。

[0026] 碗篮包括上碗篮4和下碗篮42，分别通过上碗篮架、下碗篮架安装在内胆2上。上碗篮架包括支座21和安装在支座上的导轨6，在导轨6上开设有矩形安装槽，支座21一端固定于内胆壁，另一端设有与导轨相配合安装块，在上碗篮4两侧安装有可在导轨上滑动的滚轮20。滚轮20设有上下两排，分别为上滚轮和下滚轮，上下滚轮将导轨6卡在中间，使上碗篮4能在导轨6上前后滑动，而不能上下移动。下碗篮架包括支座212和安装在支座上的导轨62，在导轨62上开设有矩形安装槽，支座212一端固定于内胆壁，另一端设有与导轨相配合安装块，在下碗篮42两侧安装有可在导轨上滑动的滚轮202。滚轮202设有上下两排，分别为上滚轮和下滚轮，上下滚轮将导轨62卡在中间，使下碗篮42能在导轨62上前后滑动，而不能上下移动。

[0027] 上述架式喷臂设有三套，具体为分别设置在内胆2的上部、中部、下部的上部架式喷臂5、中部架式喷臂52、下部架式喷臂53；上碗篮4设置在上部和中部架式喷臂之间，下碗篮42设置在中部和下部架式喷臂之间。

Petitioner Samsung Ex-1004, 1072

[0028] 三套架式喷臂的结构相同，每套架式喷臂包括主供水管500、两根侧供水管501、多根喷淋管502和驱动喷淋管转动的驱动装置。两根侧供水管501分别通过卡扣506固定在内胆壁上，采用该连接方式，能够防止洗碗机工作时架式喷臂晃动。主供水管500两端分别与两根侧供水管501的中部相连通，中部与供水管相连通，每根喷淋管502的两端分别通过轴套504与两根侧供水管501相连通。轴套504必须能防止管道中的水泄漏，能使每根喷淋管在喷淋管驱动装置带动下能绕其轴向自由转动。

[0029] 进一步地，在上碗篮架和下碗篮架上分别设有用于检测所述碗篮重量变化的压力传感器7、压力传感器72，压力传感器7、72均与所述控制器电连接；具体的，压力传感器7固定在安装块21的顶部且位于导轨6和安装块21之间；压力传感器72固定在安装块212的顶部且位于导轨62和安装块212之间。当上碗篮4和/或下碗篮42放置有餐具时，对应的压力传感器7和/或压力传感器72就能感应到压力，将信号传递给洗碗机控制器。

[0030] 上述供水管包括下部供水支管15、连接管17、中部供水支管18和上部供水支管19。下部供水支管15、中部供水支管18和上部供水支管19分别为所述上部、中部和下部架式喷臂5、52、53的主供水管供水。下部供水支管15的进水端与第一电磁水阀14的一出水口相连；上部供水支管19和中部供水支管19的进水端分别与第二电磁水阀142的两个出水口相连。第一电磁水阀14的进水口与进水泵13相连，另一个出水口与第二电磁水阀142的进水口通过连接管17相连通。

[0031] 本实施例中，述每根喷淋管502包括管体和开设在管体上的多个喷孔503，设置在管体端部的喷孔的孔径大于设置在管体中间的喷孔，且由管体端部至中间位置，喷孔的孔径依次变小。如此的孔径设计，使喷孔的出口压力基本相同，从而增加洗涤能力，降低噪音。

[0032] 上述每套架式喷臂的喷淋管由相对应的一套驱动装置驱动。具体的，上部架式喷臂5的喷淋管的驱动装置包括PWM变频电机8和齿条9，在每根喷淋管上安装有与齿条9相配合的齿轮505；中部架式喷臂52的喷淋管的驱动装置包括PWM变频电机82和齿条92，在每根喷淋管上安装有与齿条92相配合的齿轮；下部架式喷臂53的喷淋管的驱动装置包括PWM变频电机83和齿条93，在每根喷淋管上安装有与齿条93相配合的齿轮。当然，本实施例中的齿条9及齿轮也可以用链条及链条替代。

[0033] 本发明还公开一种基于上述洗碗机的控制方法，包括如下步骤：S1：初始化准备：各部件按要求连接，并使下部喷淋管的喷孔朝上，中部和上部的喷淋管的喷孔朝下；洗涤前放入洗涤剂后，往碗篮放入待洗餐具，关上箱门1后启动；通过压力传感器7、压力传感器72分别采集上碗篮4、下碗篮42的重量变化，若下层碗篮重量有变化，则执行步骤S2；若上层碗篮重量有变化，则执行步骤S3；若上、下两层碗篮重量均有变化，则执行步骤S4。

[0034] S2：当餐具放置在下碗篮42时，控制器控制第一电池水阀14同时打开两个出水口，控制第二电池水阀142关闭与上部供水支管相连的出水口，然后控制器控制供水泵13供水，同时控制PWM变频电机驱动喷淋管在30°-45°的夹角范围内来回转动，直至清洗完成。

[0035] S3：当餐具放置在上碗篮4时，处理器控制驱动中部喷淋管旋转的PWM变频电机动作，驱动中部架式喷臂的喷淋管转动至喷孔朝上，然后控制第一电磁水阀14与下部供水支管相连通的出水口关闭，打开与连接管相连的出水口，控制第二电磁水阀142的两个出水口都打开；最后控制器控制供水泵13供水，同时控制PWM变频电机驱动喷淋管在30°-45°的夹角范围内来回转动，直至清洗完成。

Petitioner Samsung Ex-1004, 1073

[0036] S4：当上碗篮4和下碗篮42都放置有餐具时，控制器控制第一电磁水阀14和第二电磁水阀142的出水口都打开，然后控制下部和上部的PWM变频电机电机动作，驱动上部喷淋管和下部喷淋管在30°-45°的夹角范围内来回转动，使上部喷淋管始终朝下喷洒洗涤水，下部喷淋管始终朝上喷洒洗涤水，控制中部的PWM变频电机驱动中部喷淋管360度旋转；同时控制器控制供水泵13供水，使其在转动过程中喷洒的洗涤水既能洗涤上碗篮中的餐具又能清洗下碗篮中的餐具。

[0037] S5：洗涤完成后的污水经排水泵12由排水管16排出。

[0038] 进一步地，在上述步骤S4中，在清洗污染程度不同的餐具时，可将污染程度较高的餐具放置在下碗篮42中，污染程度较低的放置于上碗篮4中，控制器控制第一电池水阀14的出水口完全打开，控制第二电磁水阀142与中部架式喷臂的主供水管相连的出水口完全打开，控制第二电磁水阀142与上部架式喷臂的主供水管相连的出水口部分打开，使流入中部喷淋管和下部喷淋管的洗涤水流量较大，对下碗篮42中的餐具进行高强度清洗；而上部喷淋管的水流量较小，喷洒的洗涤水对上碗篮4中的餐具进行常规洗涤。

[0039] 最后应当说明的是，以上内容仅用以说明本发明的技术方案，本领域的普通技术人员对本发明的技术方案进行的简单修改或者等同替换，均不脱离本发明技术方案的实质和范围。

Petitioner Samsung Ex-1004, 1074

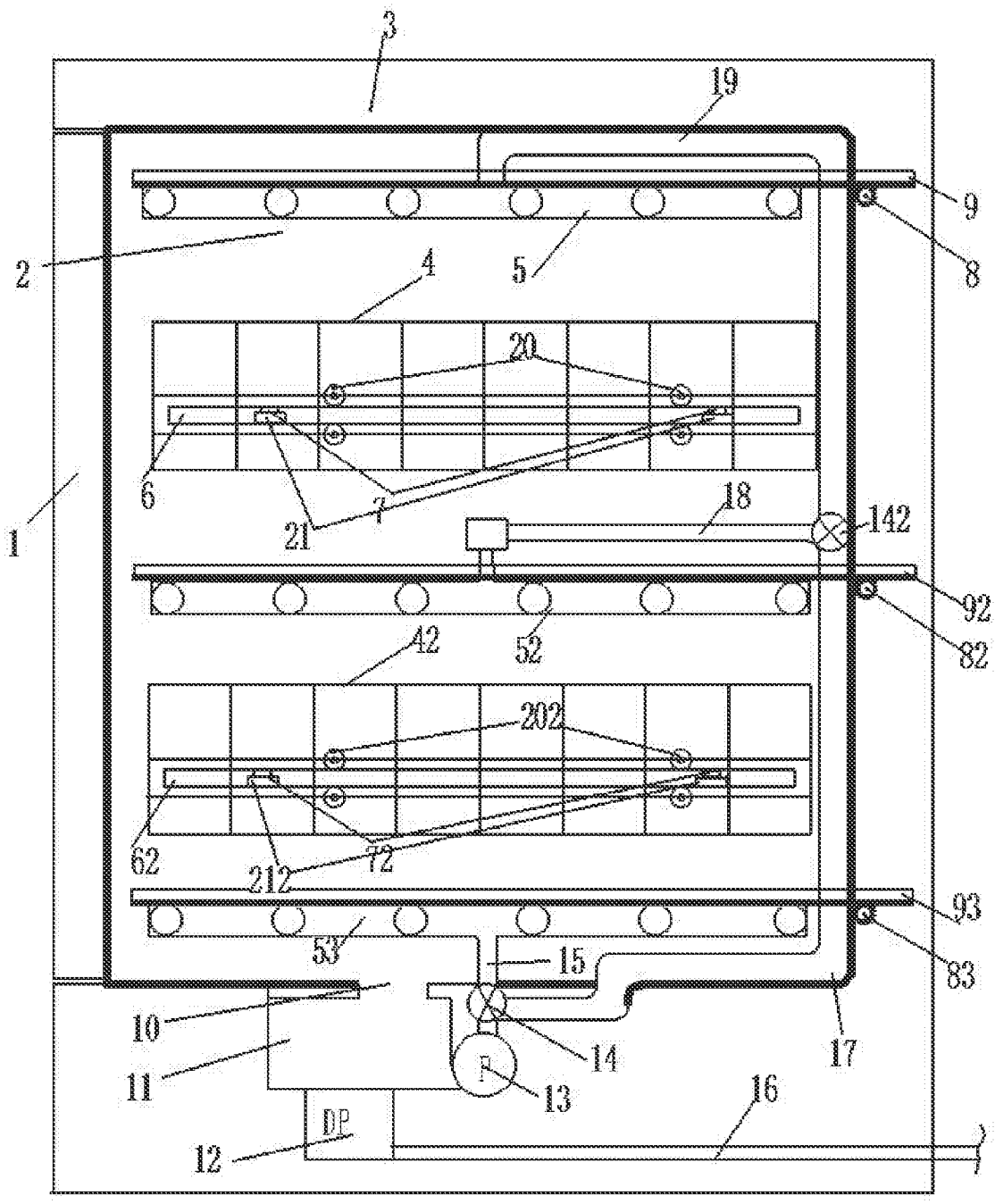


图1

Petitioner Samsung Ex-1004, 1075

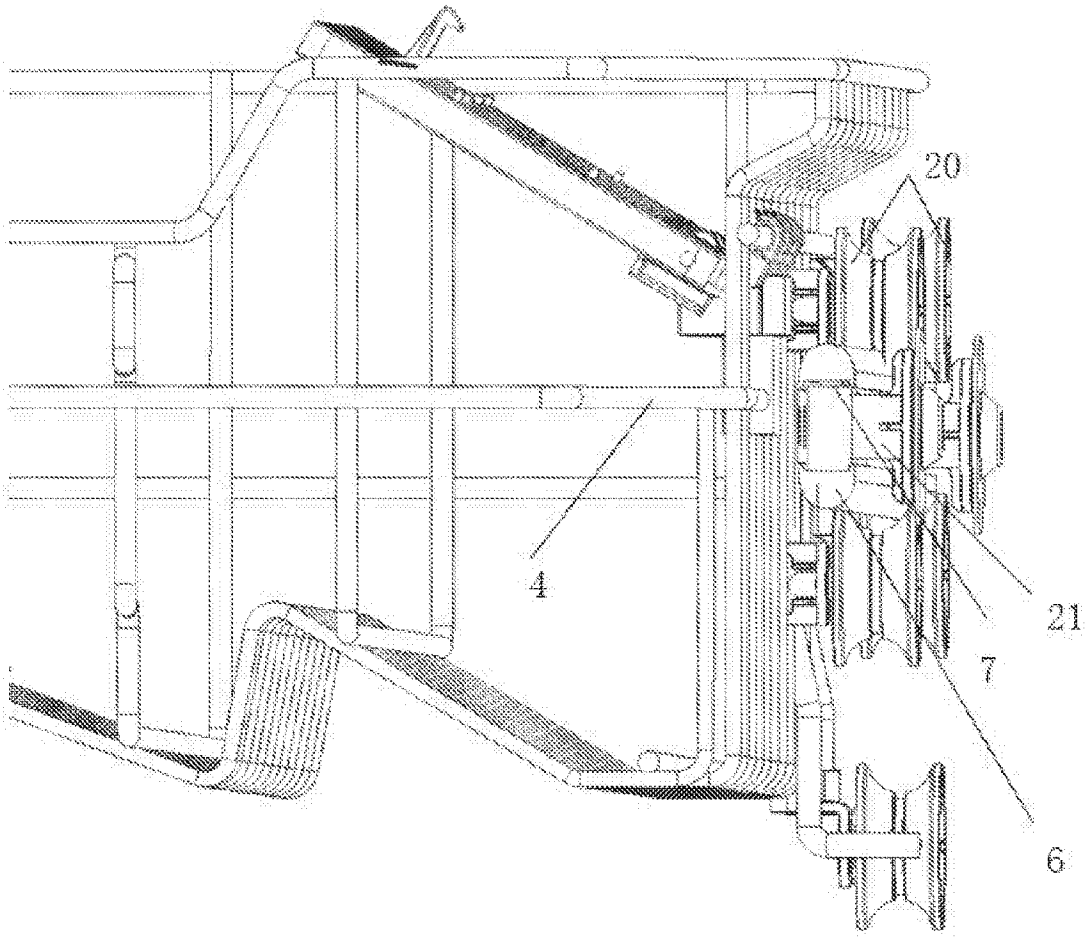


图2

Petitioner Samsung Ex-1004, 1076

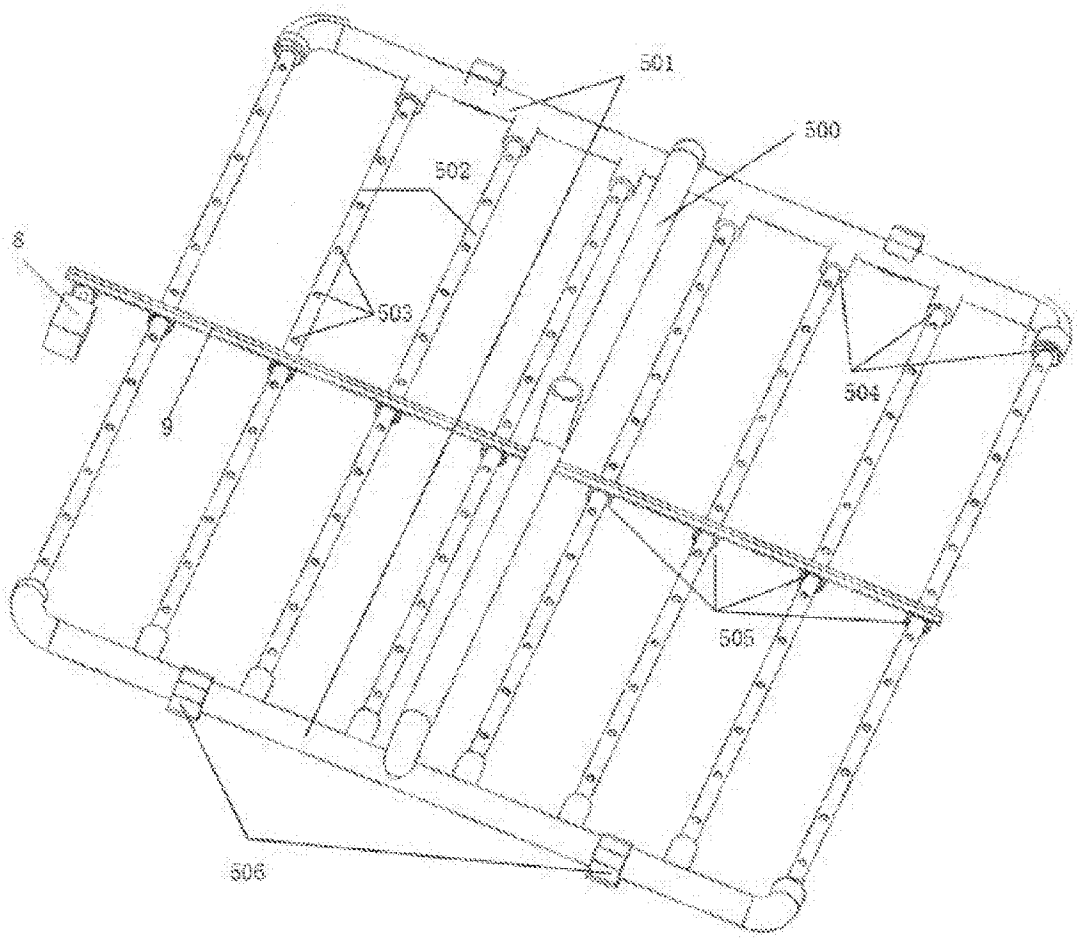


图3

Petitioner Samsung Ex-1004, 1077

Espacenet

Bibliographic data: EP0186157 (A1) — 1986-07-02

Domestic dishwasher.

Inventor(s): HUTTEMANN WILFRIED; HETTENHAUSEN ULRICH; DRALLE KLAUS ± (HUTTEMANN, WILFRIED, ; HETTENHAUSEN, ULRICH, ; DRALLE, KLAUS)

Applicant(s): MIELE & CIE [DE] ± (MIELE & CIE. GMBH & CO)

Classification: **- international:** ***A47L15/50;*** (IPC1-7): A47L15/50
- cooperative: **A47L15/502 (EP);** A47L15/505 (EP)

Application number: EP19850116349 19851220 Global Dossier

Priority number(s): DE19843447302 19841224

Also published as: EP0186157 (B1) DE3447302 (A1)

Abstract of EP0186157 (A1)

1. Domestic dishwasher with a cabinet interior enclosed by a door and comprising at least a spray arm device, a removable crockery basket and a separate cutlery basket in which items of cutlery can be placed for the purpose of washing, characterized in that the cutlery basket (5) provides cutlery slots (9) in the form of cutlery holders (9a) and cutlery rests (9b) for individual items or cutlery (6) placed separately and lengthwise alongside one another in the slots.

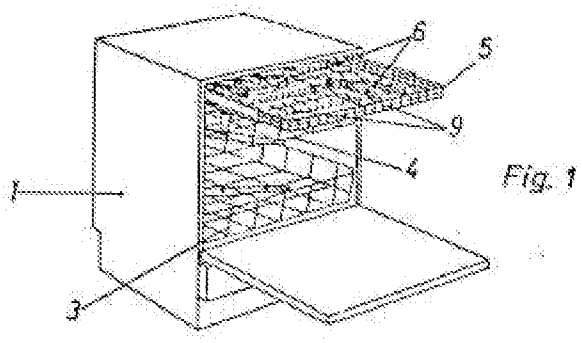


Fig. 1

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Veröffentlichungsnummer: **0 186 157**
A1

(12) EUROPÄISCHE PATENTANMELDUNG

(21) Anmeldenummer: 85116349.3

(22) Anmeldetag: 20.12.85

(51) Int. Cl.⁴: A 47 L 15/50

(30) Priorität: 24.12.84 DE 3447302

(43) Veröffentlichungstag der Anmeldung:
02.07.86 Patentblatt 86/27

(84) Benannte Vertragsstaaten:
CH DE FR IT LI NL SE

(71) Anmelder: Miele & Cie. GmbH & Co.
Carl-Miele-Strasse
D-4830 Gütersloh 1(DE)

(72) Erfinder: Hüttemann, Wilfried
Rasenstrasse 11
D-4800 Bielefeld 15(DE)

(72) Erfinder: Hettenhausen, Ulrich
Am Johannisbach 35
D-4800 Bielefeld 15(DE)

(72) Erfinder: Drallé, Klaus
Bosse-Strasse 15
D-4800 Bielefeld 1(DE)

(54) Geschirrspülmaschine für den Haushalt.

(57) Bei einer Geschirrspülmaschine (1) für den Haushalt, die mindestens einen aus dem Spülraum (2) herausziehbaren Geschirrkorb (3, 4) und einen separaten Besteckkorb (5) besitzt, sind in dem Besteckkorb (5) Besteckaufnahmen (9) für die vereinzelte, sortierte und jeweils auf der Seite liegende Aufnahme von Besteckteilen (6), wie Löffel, Gabeln, Messer und dgl. vorgesehen. Durch diese Ablage der Besteckteile (6) wird neben einer übersichtlichen, platzsparenden und hygienischen Besteckablage erreicht, daß das Spülwasser ungehindert und restlos von den Besteckteilen (6) ablaufen kann, wodurch ein optisches Reinigungs- und Trocknungsergebnis erzielbar ist.

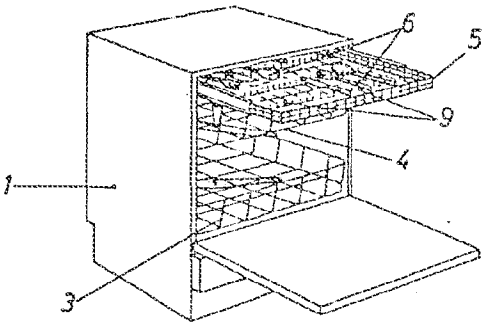


Fig. 1

EP 0 186 157 A1

Petitioner Samsung Ex-1004, 1079

Geschirrspülmaschine für den Haushalt

Der Gegenstand der Erfindung betrifft eine Geschirrspülmaschine für den Haushalt mit einem durch eine Tür verschließbaren Spülraum, welcher mindestens eine Sprühvorrichtung und einen herausziehbaren Geschirrkorb aufweist, sowie mit einem separaten Besteckkorb, in welchem zu spülende Besteckteile liegend ablegbar sind.

Eine derartige Geschirrspülmaschine ist aus dem DE-GM 18 74 123 bekannt.

Bei der bekannten Geschirrspülmaschine mit aus dem Spülraum herausziehbar angeordnetem Besteckkorb ist es als Nachteil anzusehen, daß das zu spülende Besteck weitgehend unsortiert und nur wahllos flach zum Spülen in dem Besteckkorb abgelegt werden kann. Hierdurch und durch die mechanische Wasserwirkung beim Spülen tritt eine gegenseitige Berührung der einzelnen Besteckteile beim Reinigungsvorgang auf, wodurch sich Schattenzonen beim Spülen ergeben, so daß das Besteck an den jeweiligen Berührungsstellen bzw. an den jeweiligen Schattenzonen nicht optimal gespült werden kann. Dies trifft insbesondere für aufeinanderliegende Löffel zu. Ein wesentlicher Nachteil bei dem bekannten Besteckkorb ist auch darin zu sehen, daß sich durch die flache Ablage der Besteckteile vorzugsweise in den Laffen der Löffel oder dergl. Wasser ansammelt, welches beim Trocknen des Bestecks nach dem Spülen nur durch viel Wärmeenergiezufuhr, da das Wasser nicht ablaufen konnte, wieder entfernt werden kann. Hierbei bleiben in der Regel jedoch noch unerwünschte Wasser- oder Trockenflecken an den Besteckteilen zurück.

Petitioner Samsung Ex-1004, 1080

Der Erfindung liegt die Aufgabe zugrunde, bei einer Geschirrspülmaschine der eingangs genannten Art diese Nachteile zu vermeiden und darüber hinaus eine leicht und bequem bedienbare Besteckaufnahme, bei welcher ein sortiertes Einordnen der einzelnen Besteckteile erfolgen kann, zu schaffen, durch welche das Reinigungsergebnis unter Einsparung an Energie gesteigert werden kann.

Die gestellte Aufgabe wird erfindungsgemäß gelöst durch die Merkmale des Kennzeichens des Anspruches 1.

Vorteilhafte Ausgestaltungen gehen aus den Unteransprüchen hervor.

Die mit der Erfindung erzielten Vorteile sind insbesondere darin zu sehen, daß sich durch das beim Reinigen und Trocknen auf der Seite liegende und sich gegenseitig nicht berührende Besteck keine Wassernester in den Löffellaffen oder dergl. bilden können. Das Spülwasser kann ungehindert restlos von den Besteckteilen abfließen, so daß nur noch der erwünschte dünne Wasserfilm auf der Besteckoberfläche nach dem Spülen verbleibt, welcher schnell und ohne großen Energieaufwand fleckenfrei während des Trocknungsvorgangs verdunsten kann. Hierdurch kann auch die Trocknungsprogrammzeit erheblich verkürzt werden.

Ferner ist der Besteckkorb bzw. das Besteck durch die neuartige Besteckablage zum Reinigen, Spülen und Trocknen hinsichtlich der Besteckeinordnung und Besteckentnahme leicht, bequem sowie übersichtlich und hygienisch zu handhaben. Die Besteckteile können sowohl für das Ablegen als auch für das Einsortieren in den Besteckkorb und nachträglich bei der Besteckkorbentleerung an ihren Griffteilen erfaßt werden. Ein unhygienisches Anfassen der Besteckoberteile, wie z. B. der Messerklingen, bei der Besteckablage bzw. der Entnahme aus dem Korb ist nicht mehr erforderlich. Durch die zusätzliche

Petitioner Samsung Ex-1004, 1081

Möglichkeit, die Besteckaufnahmen lösbar und in ihrer Anordnung und Aufteilung hinsichtlich unterschiedlicher Besteckarten bzw. Besteckgrößen wählbar im Korb anzuordnen, wird eine große Flexibilität beim Gebrauch des Besteckkorbes gegeben. Durch geschickte Aufteilung der Besteckaufnahmen können in einem Besteckkorb weitaus mehr Besteckteile als bisher untergebracht werden, wobei außerdem noch ein sortiertes Einordnen unterschiedlich langer Besteckteile problemlos möglich ist. Da sämtliche Besteckteile nicht miteinander in Berührung kommen und das Spülwasser ungehindert ablaufen kann, ist ein optimales Reinigungs- und Trocknungsergebnis erzielbar.

Die nachstehende Beschreibung dient der Erläuterung des Gegenstandes der Erfindung, von dem ein Ausführungsbeispiel in den Zeichnungen dargestellt ist.

Es zeigt:

Fig. 1 Eine Geschirrspülmaschine in perspektivischer Ansicht bei geöffnetem Spülraum, mit einer ersten Anordnungsvariante des Besteckkorbes innerhalb des Spülraumes,

Fig. 2 und 3 jeweils eine weitere mögliche Anordnung des Besteckkorbes innerhalb der Geschirrspülmaschine,

Fig. 4 den aus einem Rahmen und Korbeinsätzen und Besteckaufnahmen bestehenden Besteckkorb in der Draufsicht,

Fig. 5 den Rahmen des Besteckkorbes in der Draufsicht,

Fig. 6 den Rahmen in der Ansicht von hinten,

Fig. 7 den Rahmen des Besteckkorbes in der Seitenansicht,

Petitioner Samsung Ex-1004, 1082

Fig. 8 den Besteckkorb nach Fig. 4 im Schnitt nach der Linie A-B in vergrößerter Darstellung,

Fig. 9 einen Besteckhalter des Besteckkorbes gemäß Fig. 4 in Teildarstellung, in der Vorderansicht,

Fig. 10 den Besteckhalter in der Seitenansicht im Schnitt nach der Linie C-D gemäß Fig. 9, in vergrößerter Darstellung,

Fig. 11 den Besteckhalter in der Seitenansicht im Schnitt nach der Linie E-F gemäß Fig. 9, in vergrößerter Darstellung,

Fig. 12 den Besteckhalter in der Draufsicht,

Fig. 13 eine Besteckauflage des Besteckkorbes nach Fig. 4 in Teildarstellung, in der Vorderansicht,

Fig. 14 die Besteckauflage in der Seitenansicht im Schnitt nach der Linie G-H gemäß Fig.13 in vergrößerter Darstellung,

Fig. 15 ein weiteres Ausführungsbeispiel eines Besteckhalters,

Fig. 16 ein anderes Ausführungsbeispiel einer Besteckauflage,

Fig. 17 einen Tropfenableiter des Besteckkorbes am Beispiel eines in der Besteckaufnahme abgelegten Löffels,

Fig. 18 ein weiteres Ausführungsbeispiel eines Tropfenableiters.

Petitioner Samsung Ex-1004, 1083

Die in den Figuren 1 bis 3 gezeigte Geschirrspülmaschine 1 besitzt einen Spülraum 2, welcher mit zwei übereinander angeordneten und aus dem Spülraum 2 herausziehbaren Geschirrkörben 3 u. 4 bestückt ist. Den Geschirrkörben 3 u. 4 sind in an sich bekannter Weise nicht näher bezeichnete Sprühvorrichtungen zugeordnet, welche die Geschirrkörbe 3, 4 und das in den Körben abgelegte Geschirr sowohl von oben als auch von unten mit Spülflüssigkeit beaufschlagen. Die dargestellte Geschirrspülmaschine 1 besitzt beispielsweise drei als rotierende Sprüharme ausgebildete Sprühvorrichtungen, von denen eine unterhalb des unteren Geschirrkorbes 3 am Spülbehälterboden, die andere zwischen den beiden Geschirrkörben 3 u. 4 unterseitig am oberen Geschirrkorb 4 und die dritte oberhalb des oberen Geschirrkorbes 4 an der Spülraumdecke angeordnet ist.

Mit 5 ist ein separater, aus dem Spülraum 2 herausziehbarer Besteckkorb bezeichnet, der zur Aufnahme und sortierten Ablage kleiner und großer Besteckteile 6, wie Löffel, Gabeln, Messer, Schöpflöffel und dergl. vorgesehen ist. Die Besteckteile 6 werden ohne gegenseitige Berührung jeweils auf der Seite liegend in dem Besteckkorb 5 eingeordnet bzw. abgelegt.

Der Besteckkorb 5 (Fig. 4) besteht aus einem flachen, korbähnlichen Rahmen 7 mit/ohne Laufräder oder dergl. in den Grundabmessungen eines Geschirrkorbes 3 bzw. 4. Die Figuren 5 bis 7 zeigen den Rahmen 7 des Besteckkorbes 5 in allen Einzelheiten. Vorteilhafterweise ist der aus Querstreben 7a und Längsstreben 7b bestehende Rahmen vorderseitig (Fig. 7) mit einem Handgriff 7c versehen, welcher das Bewegen des Besteckkorbes 5 erleichtert. Im hinteren Bereich des Rahmens 7 (Fig. 6) ist der Verlauf der oberen Querstrebe 7a im Sinne eines Ausschnitts 7d abgewinkelt, um den Wagen an der im Spülbehälterdeckel angebrachten Sprühdüse für die Versorgung des mittleren Sprüharmes vorbeischieben zu können.

Petitioner Samsung Ex-1004, 1084

In dem Rahmen 7 sind ein oder mehrere flache Korbeinsätze 8 vorzugsweise auswechselbar vorgesehen. Der gewählten Ausführungsart nach Fig. 4 entsprechend sind zwei Korbeinsätze 8 in Form von Siebeinsätzen als Besteckkorbböden vorgesehen, welche mit Besteckaufnahmen 9 für die vereinzelte Ablage der jeweils auf der Seite abzulegenden Besteckteile 6 ausgestattet sind. Mittig im Besteckkorb 5 lassen die beiden Korbeinsätze 8 eine Öffnung 10 frei (Fig. 4), welche einerseits das Herausnehmen der Einsätze aus dem Besteckkorb 5 erleichtert und andererseits den Durchtritt von Spülflüssigkeit von der Spülraumdecke her zur Versorgung des mittleren Sprüharmes ermöglicht.

Der Besteckkorb 5 ist schubladenähnlich gelagert und geführt. Die Lagerung kann dabei entweder an einem der Geschirrkörbe 3 bzw. 4 vorgesehen sein oder unabhängig vom Geschirrkorb 3 bzw. 4 am Spülbehälter bzw. im Spülraum 2.

Eine bevorzugte Ausführungsart ist die Anordnung des Besteckkorbes 5 oberhalb des oberen Geschirrkorbes 4 im Spülraum 2 dicht unterhalb des an der Spülraumdecke befindlichen und nicht näher bezeichneten Sprüharmes, da hierbei das Besteck bzw. die Besteckteile 6 direkt von den Sprühstrahlen getroffen werden und die Reinigung daher sehr intensiv ist. Die Fig. 1 zeigt diese Anordnung des Besteckkorbes 5. Gemäß Fig. 2 ist eine Anordnung des Besteckkorbes 5 zwischen den Geschirrkörben 3 u. 4 und nach Fig. 3 eine Anordnung unterhalb des unteren Geschirrkorbes 3 gewählt. Für die vorgenannten Anordnungen sind entweder am betreffenden Geschirrkorb 3 bzw. 4 oder direkt an der Spülbehälterwand, also völlig getrennt von den Geschirrkörben 3 u. 4, entsprechende Führungen oder Gleitschienen, wie z. B. Teleskopführungen 11 oder dergl. zum schubladenähnlichen Herausziehen des Besteckkorbes 5 aus dem Spülraum 2 angeordnet. Der Besteckkorb 5 ist zweckmäßigerweise für ein Herausnehmen aus der Geschirrspülmaschine 1 lösbar mit den Führungen oder Gleitschienen verbunden.

Petitioner Samsung Ex-1004, 1085

Die Besteckaufnahmen 9 (Fig. 4 u. 8) bestehen aus am Boden des Besteckkorbes 5 angeordneten Besteckhaltern 9a und Besteckauflagen 9b. Die Besteckhalter 9a sind als Zahnleisten und die Besteckauflagen 9b als Leisten mit wellenförmiger bzw. sägezahnförmiger Auflagefläche oder dergl. für die Besteckteile 6 ausgebildet, wobei die Besteckhalter 9a und die Besteckauflagen 9b parallel zueinander im Besteckkorb 5 bzw. in den Korbeinsätzen 8 angeordnet sind. Die abzulegenden Besteckteile 6 können in den Haltern und Auflagen ohne gegenseitige Berührung hintereinander einsortiert werden. Vorzugsweise sind dabei einem abzulegenden Besteckteil 6, z. B. einem Messer (Fig. 8), jeweils zwei Besteckhalter 9a und zwei Besteckauflagen 9b im Besteckkorb 5 zugeordnet. Zumindest ist jedoch einem abzulegenden Besteckteil 6 mindestens ein Besteckhalter 9a und eine Besteckauflage 9b zuzuordnen. Vorzugsweise nehmen die Besteckhalter 9a die Griffteile der Besteckteile und die Besteckauflagen 9b die Schneiden, Laffen usw. der Messer bzw. Löffel und dergl. auf. Nach der gewählten Anordnung und Aufteilung der Besteckaufnahmen 9 gemäß Fig. 4 und 8, welche äußerst platzsparend und übersichtlich ist, dient die mittlere und den großen Besteckteilen 6 (z. B. große Löffel) zugeordnete Besteckauflage 9b zugleich als zweite Auflage für kleine Besteckteile 6 (z. B. kleine Löffel). Dies zeigt die Fig. 4 sehr deutlich. Natürlich ist es auch möglich, die Besteckteile umgekehrt als gezeigt einzuordnen, wobei die Griffteile dann auf den Besteckauflagen 9b aufliegen und die Messerschneiden oder dergl. in den Aufnahmeöffnungen 12 stecken.

Die Abstände zwischen den parallel in den Korbeinsätzen 8 ausgerichteten Besteckhaltern 9a und/oder den Besteckauflagen 9b sind hinsichtlich unterschiedlicher Bestecke bzw. Besteckgrößen, wie z. B. kleine und große Löffel, frei wählbar. Ebenso wählbar ist die Anordnung und Aufteilung der Besteckaufnahmen 9 in den Korbeinsätzen 8. Dies kann durch den Austausch von Korbeinsätzen 8 mit unterschiedlich

Petitioner Samsung Ex-1004, 1086

angeordneten, fest mit den Korbböden verbundenen Besteckaufnahmen 9 bzw. durch lösbare oder verschiebbare Besteckaufnahmen 9 erreicht werden. Gleichfalls ist es hierdurch möglich, die Anordnung der Besteckaufnahmen für die auf der Seite liegenden Besteckteile 6 für Rechts- bzw. Linkshänder entsprechend zu gestalten. Der im Besteckkorb 5 nach Fig. 4 rechtsliegende, herausnehmbare Korbeinsatz 8 zeigt beispielsweise die Anordnung der Besteckaufnahmen 9 für Linkshänder. Der linke Korbeinsatz 8 hingegen ist für Rechtshänder eingerichtet.

Wie in den Figuren 9 bis 12 und 15 näher veranschaulicht, besitzen die als Zahnleisten ausgebildeten Besteckhalter 9a der Besteckaufnahmen 9 die schon erwähnten Aufnahmeöffnungen 12 zwischen den begrenzenden, senkrechten Zahnstegen 13 für die Besteckhalterung. Vorteilhaft können längere und kürzere Zahnstege 13 in wechselnder Folge auf den Zahnleisten angeordnet sein. Dies erleichtert das Ablegen der Besteckteile 6.

Die mit den im Besteckkorb 5 auf der Seite liegenden Besteckteilen 6 in Berührung kommenden Anlageflächen 14 der Besteckhalter 9a und der Besteckauflagen 9b sind vorzugsweise schneidenförmig ausgebildet. Hierdurch ist gewährleistet, daß das Wasser beim Spülen sofort abgeleitet wird und sich keine Wassertropfen an den Berührungsstellen der Besteckteile mit den Besteckauflagen 9b festsetzen oder bilden können. Die Bildung von Wassernestern beispielsweise in den Löffellaffen ist durch die seitliche Ablage der Besteckteile 6 ebenso ausgeschlossen.

Die Aufnahmeöffnungen 12 zwischen den Zahnstegen 13 sind zweckmäßigerweise im oberen Bereich jeweils weiter als im unteren Bereich ausgebildet. Die Ausbildung kann aber auch so sein, daß sich die Aufnahmeöffnung 12 zwischen den Zahnstegen 13 zum Boden hin kontinuierlich verjüngen. Auch können unterschiedlich breite Aufnahmeöffnungen 12 vorgesehen werden, wenn Besteckteile 6 von den üblichen Abmessungen

Petitioner Samsung Ex-1004, 1087

stark abweichen. Die Zahnstege 13 der Besteckhalter 9a und die als Leisten mit wellenförmigen bzw. sägezahnförmigen Anlageflächen 14 ausgebildeten Besteckauflagen 9b sind im Querschnitt quadratisch, rechteckig, dreieckig oder ähnlich profiliert ausgebildet, wobei jeweils die Profilkanten die Anlageflächen 14 bilden und den auf der Seite liegenden Besteckteilen 6 zugekehrt sind. Die senkrechten Zahnstege 13 selbst sind vorzugsweise pyramidenförmig gestaltet.

Die in den Figuren 15 u. 16 gezeigten Besteckaufnahmen 9 sind als lösbare Besteckaufnahmen ausgebildet und besitzen hierfür unterseitig zur Verbindung mit den siebähnlichen Streben der Korbeinsätze 8 des Besteckkorbes 5 Befestigungsmittel 15 in Form von Rastnuten, die jedoch auch ein Verschieben der Besteckaufnahmen 9 im Besteckkorb 5 zulassen.

Zur Unterstützung einer schnellen Wasserableitung von den Besteckteilen 6 können noch zusätzliche Abtropfhilfen in Form von zwischen den Besteckauflagen 9b oder Besteckhaltern 9a der Besteckaufnahmen 9 angeordneten Tropfenableitern 16, 17 im Besteckkorb 5 vorgesehen werden. Nach Fig. 17 ist der Tropfenableiter 16 ähnlich wie eine Besteckauflage 9b ausgebildet, wobei eine saugfähige, elastische Auflage 16a des Tropfenableiters 16 vorgesehen ist, welcher bei Besteckberührung eventuell hängengebliebene Wassertropfen an den Besteckteilen 6 auf- oder absaugt. Zum besseren Verständnis ist der Tropfenableiter 16 nach Fig. 17 sowie der nachstehend beschriebene Tropfenableiter 17 in Fig. 18 bei einem Löffel als Besteckteil 6 gezeigt. Der Tropfenableiter 16 bzw. 17 berührt dabei die Löffellaffe des auf der Seite liegend abgelegten Löffels an der tiefsten Stelle. Bei einer sortierten Ablage aller Löffel, Messer, Gabeln oder dergl. im Besteckkorb 5 werden auch alle Besteckteile 6 entsprechend berührt, so daß keinerlei Wasser an den Löffeln oder dergl. hängenbleibt.

Petitioner Samsung Ex-1004, 1088

Bei dem in Fig. 18 gezeigten Tropfenableiter 17 übernimmt ein federnder Steg 17a für jeden Löffel oder dergl. die Ableitung hängengebliebener Wassertropfen an den Besteckteilen. Die federnden Stege 17a bieten den Vorteil, daß auch verschieden tief ausgebildete Besteckteile (z. B. große Löffel und kleine Löffel) sicher an den jeweils tiefsten Stellen zur Tropfenableitung berührt werden.

Abweichend von den hier dargestellten Ausführungsbeispielen kann auch eine Anordnung der Besteckaufnahmen 9 im Besteckkorb 5 vorgesehen werden, bei denen die Besteckaufnahmen 9 in übereinanderliegenden Ebenen angeordnet sind. Die einzelnen Ebenen für die Besteckablage können vorzugsweise durch Senken oder Vertiefungen in den Korbeinsätzen 8 realisiert werden. Beispielsweise kann der Besteckkorbboden nur im mittleren Bereich abgesenkt werden, um in diesem Bereich noch zusätzlich kleinere Besteckteile 6, wie z. B. kleine Löffel oder dergl. sortiert und auf der Seite liegend in entsprechenden Besteckaufnahmen 9 ablegen zu können.

Zweckmäßig kann es unter Umständen auch sein, in dem Besteckkorb 5 einen separaten Freiraum für Sonderbesteckteile, wie Schöpflöffel, Spießer oder ähnlich langes Besteck vorzusehen. Ein solcher Freiraum könnte beispielsweise über die vordere Breitseite des Besteckkorbes 5 verlaufend im Besteckkorb 5 vorgesehen werden. Die Ablage des langen Sonderbestecks erfolgt zweckmäßigerweise in zugeordneten Besteckaufnahmen 9 und entsprechend der Ablage der übrigen Besteckteile 6, wie z. B. Messer, Löffel usw.

Wie anfangs schon erwähnt, können die Korbeinsätze 8 z. B. als grobmaschige Siebeinsätze ausgebildet werden. Durch die grobmaschige Ausbildung wird beispielsweise verhindert, daß sich Speisereste beim Spülen im Besteckkorb 5 ablagern.

Petitioner Samsung Ex-1004, 1089

Ebenso ist es natürlich auch möglich, zusätzlich am Korbboden Stege und Nocken zur Wassertropfenableitung vorzusehen. Auch kann der Besteckkorb 5 bzw. jeder Korbeinsatz 8 für die Bestecke mit einer Aushebevorrichtung versehen werden, mittels welcher die gespülten Besteckteile 6 zum Herausnehmen etwas angehoben werden, so daß die Griffteile der Besteckteile 6 leicht unterfaßt werden können. Dies erleichtert das Herausnehmen der Besteckteile 6 aus dem Besteckkorb 5.

Selbstverständlich ist es auch möglich, dem Besteckkorb 5 abhängig von seiner Lage im Spülbehälter eigene Sprühdüsen bzw. Sprüharme oder dergl. zuzuordnen. Der Besteckkorb 5 kann vollständig aus Kunststoff oder aus einem Metall mit entsprechender Kunststoffummantelung gefertigt sein. Dies trifft ebenfalls für die Besteckaufnahmen 9 zu. Ebenso ist es unter Umständen vorteilhaft, den Besteckkorb 5 bzw. die Korbeinsätze 8 in den Abmessungen so zu gestalten, daß diese mit dem bereits übersichtlich eingeordneten Besteck direkt als Besteckeinsätze für eine Schublade eines Geschirrschrankes oder dergl. verwendbar sind. Hierdurch kann beispielsweise der Zeitaufwand für das Entnehmen der gereinigten Besteckteile 6 aus dem Besteckkorb 5 nach dem Spülen und Trocknen und das anschließende Einsortieren in die Besteckschublade entfallen.

Petitioner Samsung Ex-1004, 1090

Patentansprüche

1. Geschirrspülmaschine für den Haushalt mit einem durch eine Tür verschließbaren Spülraum, welcher mindestens eine Sprühvorrichtung und einen herausziehbaren Geschirrkorb aufweist, sowie mit einem separaten Besteckkorb, in welchem zu spülende Besteckteile liegend ablegbar sind,
dadurch gekennzeichnet,
daß der Besteckkorb (5) Besteckaufnahmen (9) in Form von Besteckhaltern (9a) und Besteckauflagen (9b) für die vereinzelte und jeweils auf der Seite liegende Aufnahme von Besteckteilen (6) besitzt.

2. Geschirrspülmaschine nach Anspruch 1,
dadurch gekennzeichnet,
daß die Besteckhalter (9a) als Zahnleisten und die Besteckauflagen (9b) als Leisten mit wellenförmig, sägezahnartig oder ähnlich gestalteten Auflageflächen für die Besteckteile (6) ausgebildet sind.

3. Geschirrspülmaschine nach Anspruch 1 und 2,
dadurch gekennzeichnet,
daß die Besteckhalter (9a) und die Besteckauflagen (9b) parallel zueinander im Besteckkorb (5), vorzugsweise am Korbboden, angeordnet und derart ausgestaltet sind, daß die Besteckteile (6) in den Haltern und Auflagen ohne gegenseitige Berührung hintereinander liegend sortiert ablegbar sind.

Petitioner Samsung Ex-1004, 1091

4. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß einem abzulegenden Besteckteil (6) mindestens ein Besteckhalter (9a) und eine Besteckauflage (9b) zugeordnet sind, und daß die Abstände zwischen den Besteckhaltern (9a) und/oder den Besteckauflagen (9b) wählbar sind.

5. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß die Besteckaufnahmen (9) lösbar oder verschiebbar und in ihrer Anordnung und Aufteilung hinsichtlich unterschiedlicher Bestecke bzw. Besteckgrößen wählbar im Besteckkorb (5) angeordnet sind.

6. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die als Zahnleisten ausgebildeten Besteckhalter (9a) unterschiedliche Aufnahmeöffnungen (12) zwischen den begrenzenden, senkrechten Zahnstegen (13) fürdie Besteckhalterung aufweisen, und daß vorzugsweise längere und kürzere Zahnstege in wechselnder Folge auf den Zahnleisten angeordnet sind.

7. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, daß die mit den abgelegten Besteckteilen (6) in Berührung kommenden Anlageflächen (14) der Besteckhalter (9a) und der Besteckauflagen (9b) schneidenförmig ausgebildet sind.

Petitioner Samsung Ex-1004, 1092

8. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß die Zahnstege (13) der Besteckhalter (9a), die Zahnleisten und die als wellenförmige und sägezahnförmige Leisten ausgebildeten Besteckauflagen (9b) im Querschnitt quadratisch, rechteckig, dreieckig, pyramidenförmig oder ähnl. profiliert ausgebildet sind.

9. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 8, dadurch gekennzeichnet, daß die Aufnahmeöffnungen (12) zwischen den Zahnstegen (13) der Besteckhalter (9a) jeweils im oberen Bereich weiter als im unteren Bereich ausgebildet sind.

10. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 9, dadurch gekennzeichnet, daß der Besteckkorb (5) mit den Besteckaufnahmen (9) vorzugsweise oberhalb des oberen Geschirrkorbes (4) im Spülraum (2) schubladenähnlich herausziehbar gelagert und geführt ist.

11. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 10, dadurch gekennzeichnet, daß der Besteckkorb (5) an einem Geschirrkorb (3 bzw. 4) vorzugsweise am oberen Geschirrkorb (4) schubladenförmig gelagert und geführt ist.

Petitioner Samsung Ex-1004, 1093

12. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 11, dadurch gekennzeichnet, daß der Besteckkorb (5) als flacher Einsatz mit/ohne Laufräder oder dergl. und gegebenenfalls mit einer eigenen Sprühvorrichtung ausgebildet ist und aus einem Rahmen (7) sowie aus ein oder mehreren aus dem Rahmen (7) herausnehmbaren Korbeinsätzen vorzugsweise in Form von grobmaschigen Siebeinsätzen (8) für die Besteckaufnahmen (9) besteht.

13. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 12, dadurch gekennzeichnet, daß der Besteckkorb (5) mit Tropfenableitern (16, 16a, 17, 17a) für die Besteckteile (6) und gegebenenfalls für den Korbboden versehen ist.

14. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 13, dadurch gekennzeichnet, daß die Besteckaufnahmen (9) im Besteckkorb (5) in unterschiedlichen, vorzugsweise durch Senken oder Vertiefungen in den Korbeinsätzen (8) hergestellte Ebenen angeordnet sind.

15. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 14, dadurch gekennzeichnet, daß der Besteckkorbboden im mittleren Bereich zur Aufnahme und Ablage kleinerer Besteckteile (6), wie kleine Löffel oder dergl. abgesenkt ausgebildet ist.

Petitioner Samsung Ex-1004, 1094

16. Geschirrspülmaschine nach mindestens einem der Ansprüche 1 bis 15, dadurch gekennzeichnet, daß im Besteckkorb (5) ein Freiraum für die Ablage langer Besteckteile, wie Schöpflöffel, Spießer oder ähnliches vorgesehen ist.

Petitioner Samsung Ex-1004, 1095

0186157

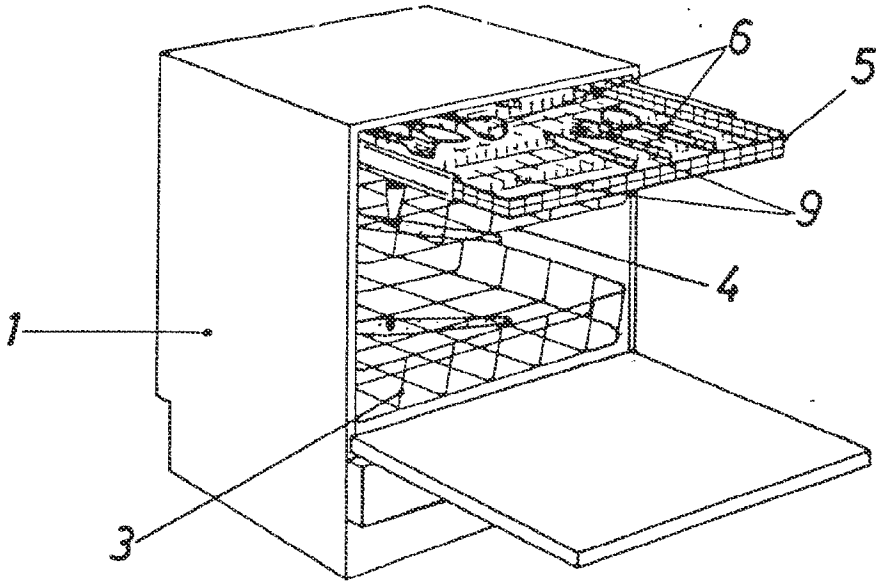


Fig. 1

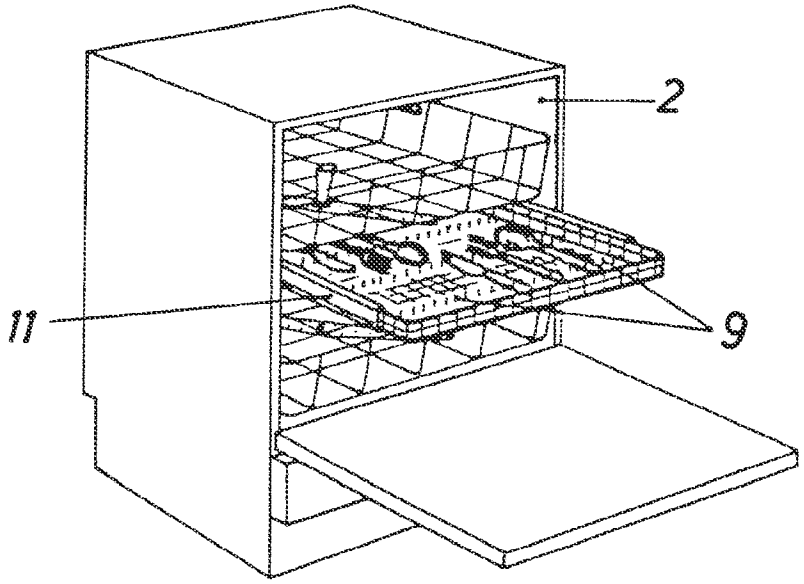


Fig. 2

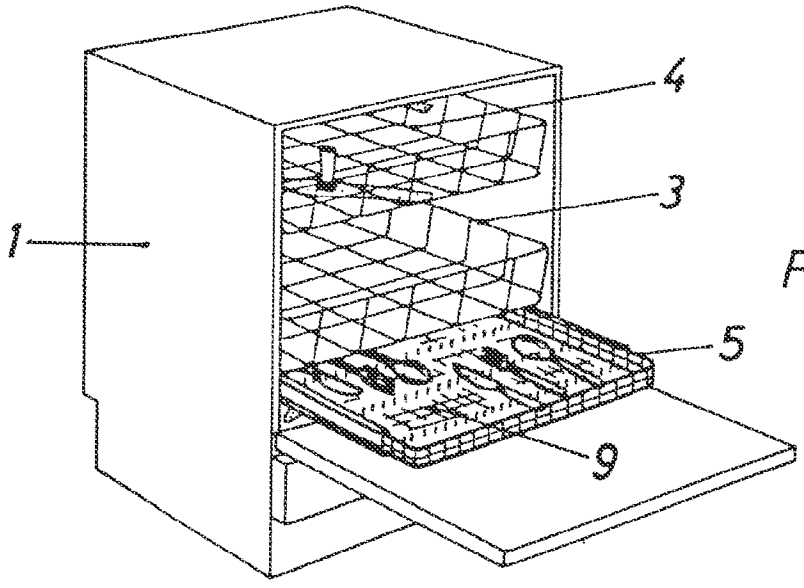


Fig. 3

Petitioner Samsung Ex-1004, 1096

0186157

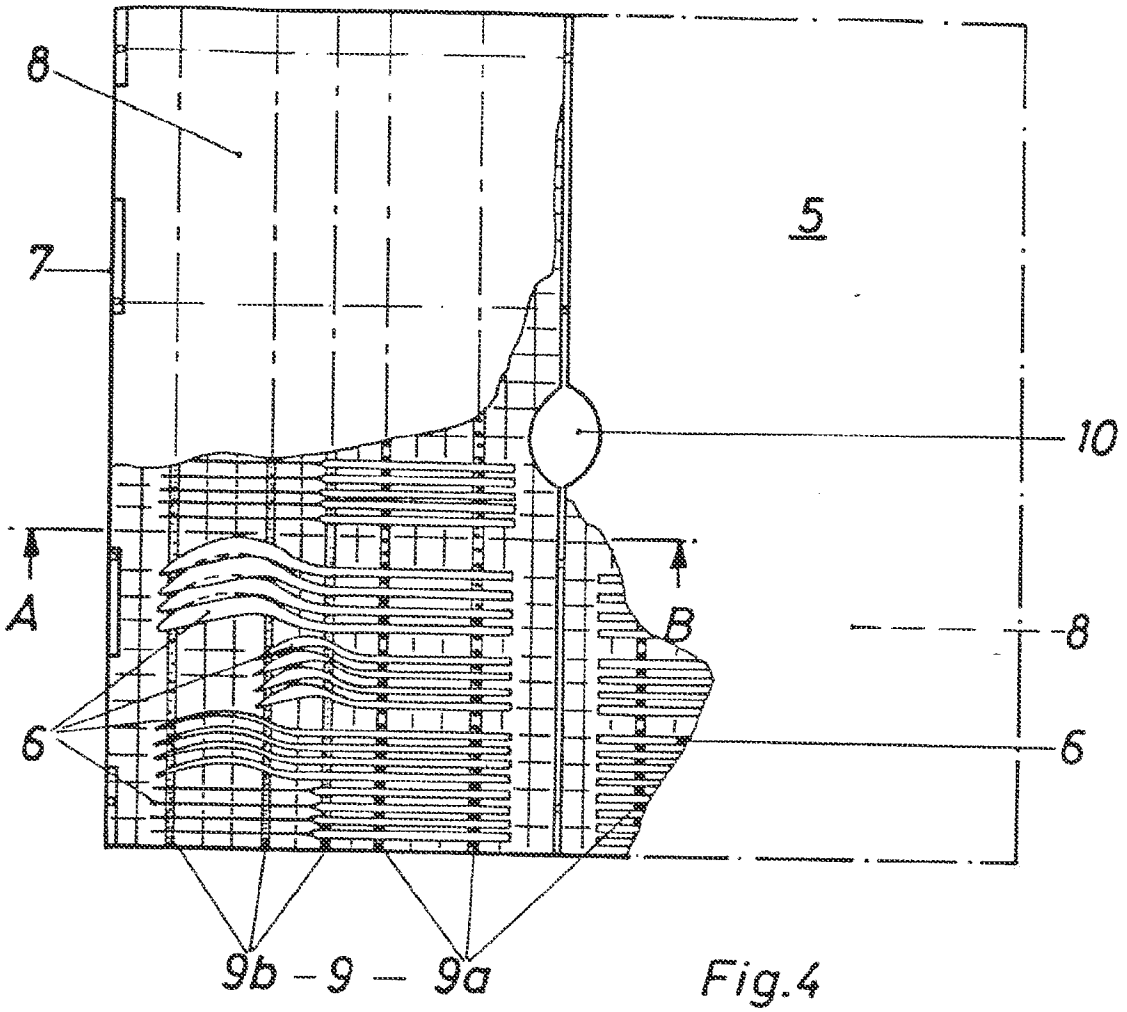


Fig.4

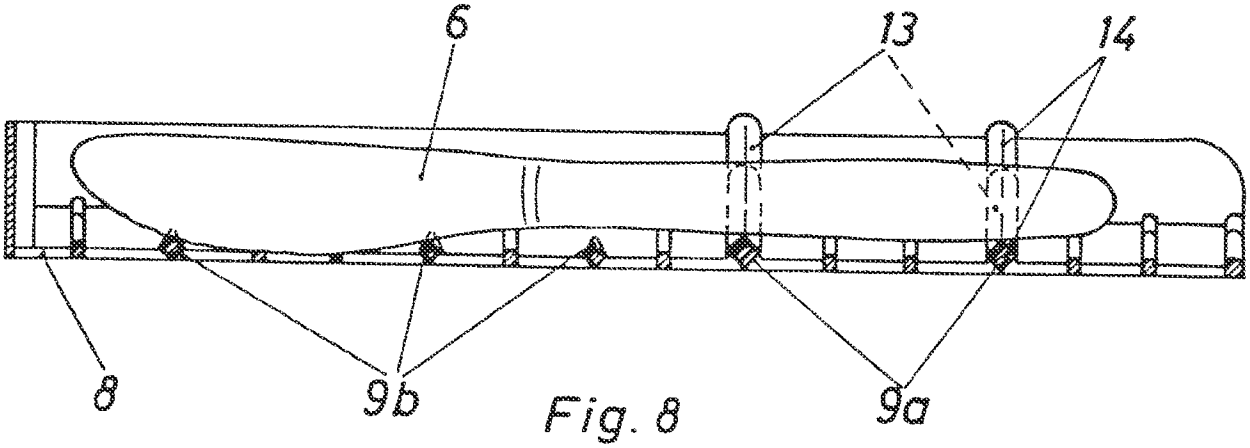


Fig. 8

Petitioner Samsung Ex-1004, 1097

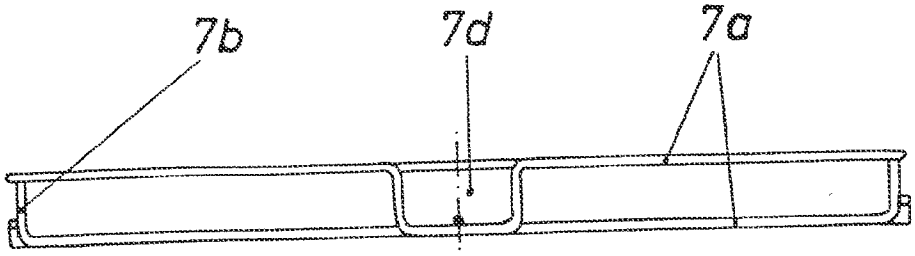


Fig. 6

Fig. 7

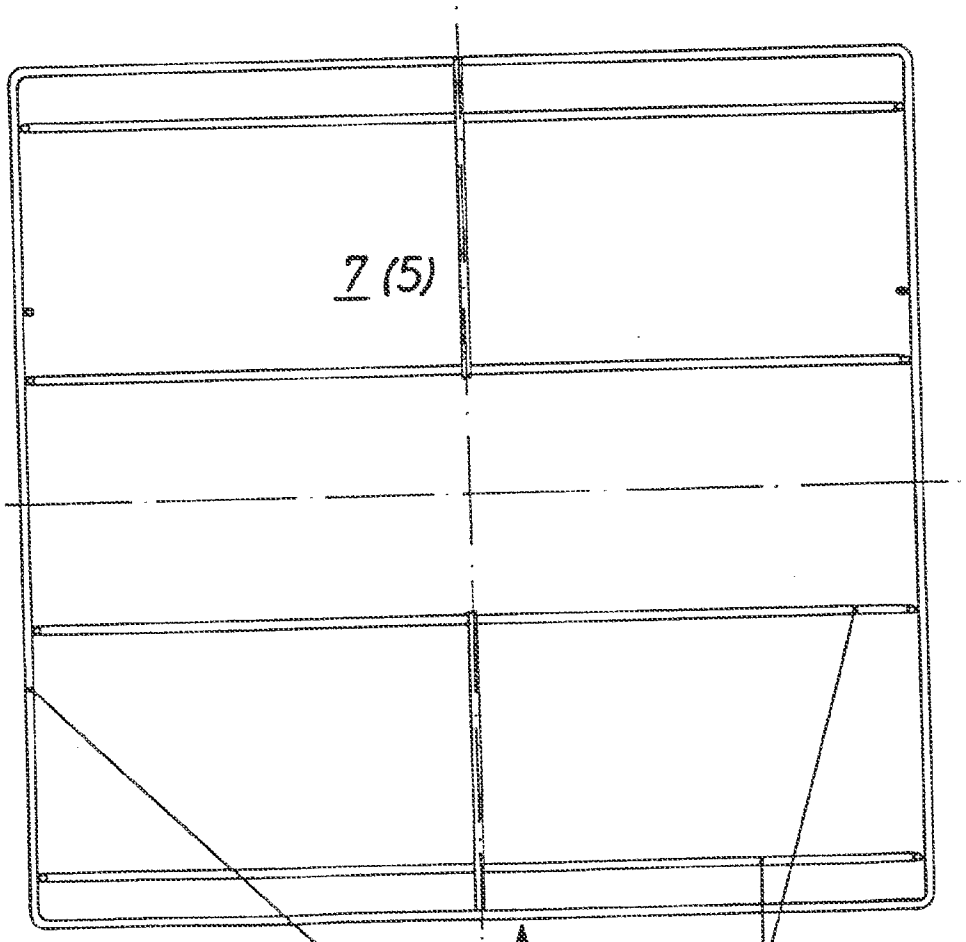
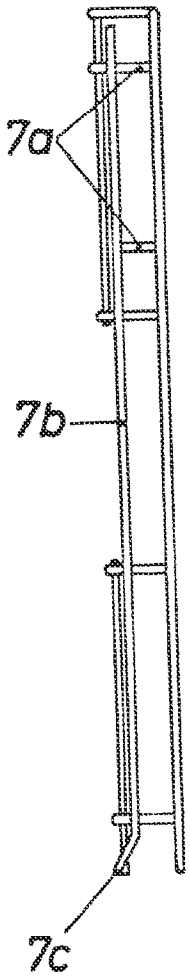
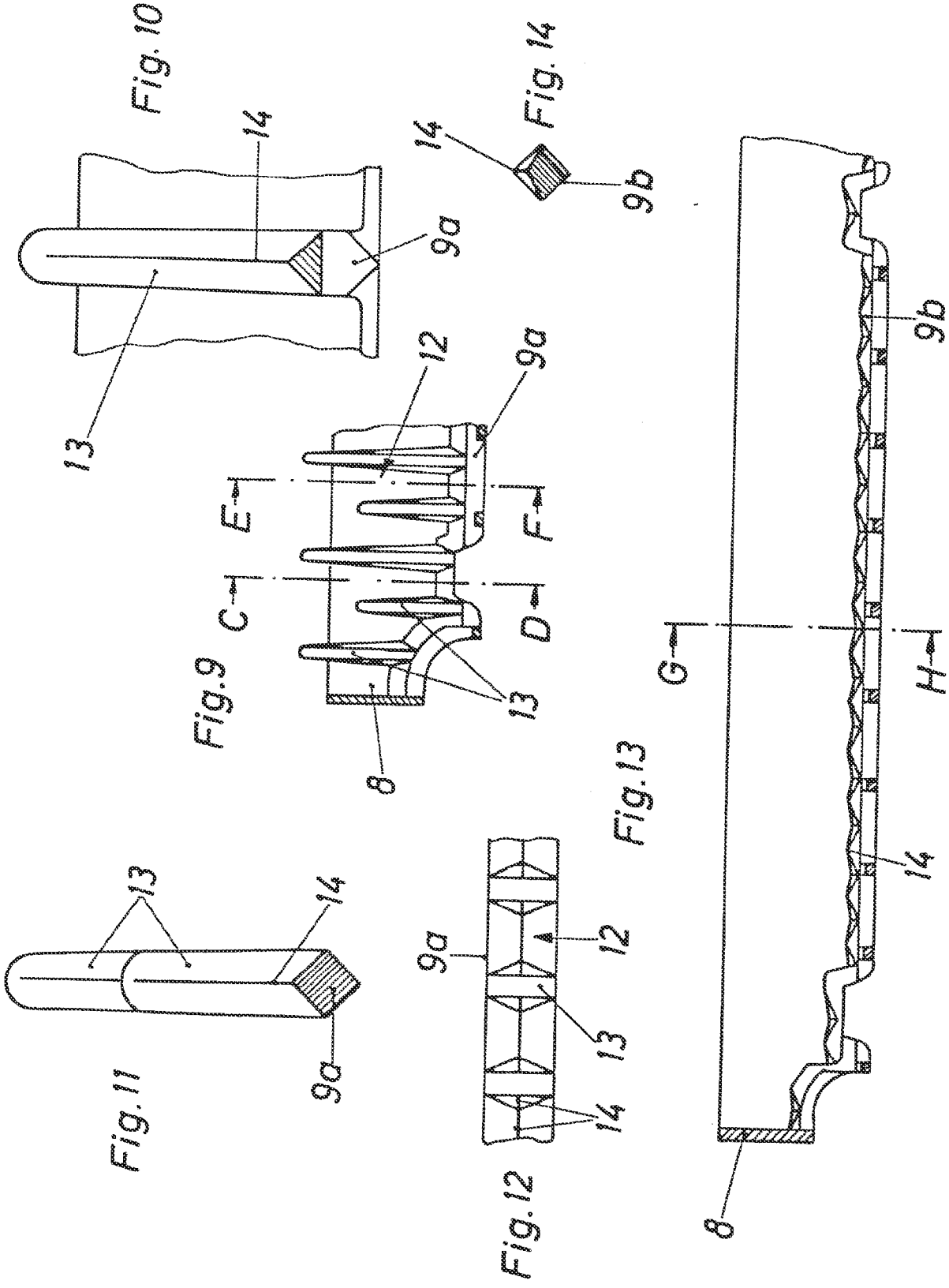


Fig. 5



Petitioner Samsung Ex-1004, 1098

0186157



Petitioner Samsung Ex-1004, 1099

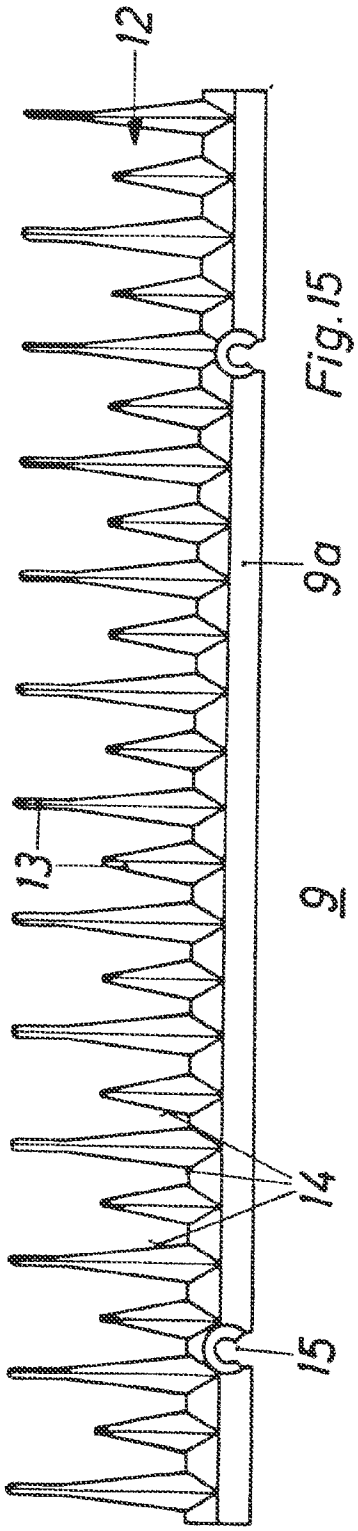


Fig.15

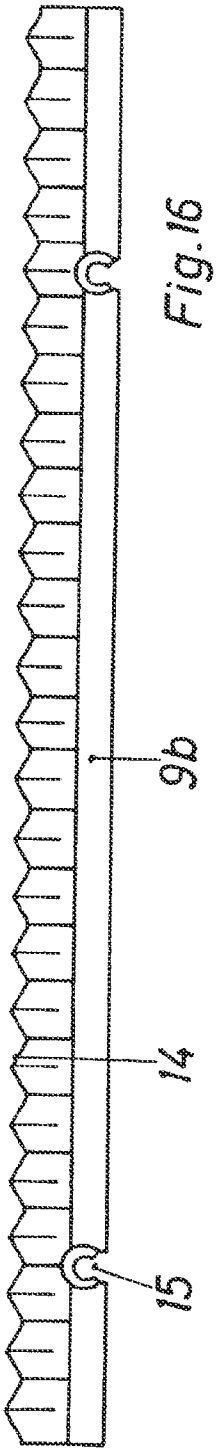


Fig.16

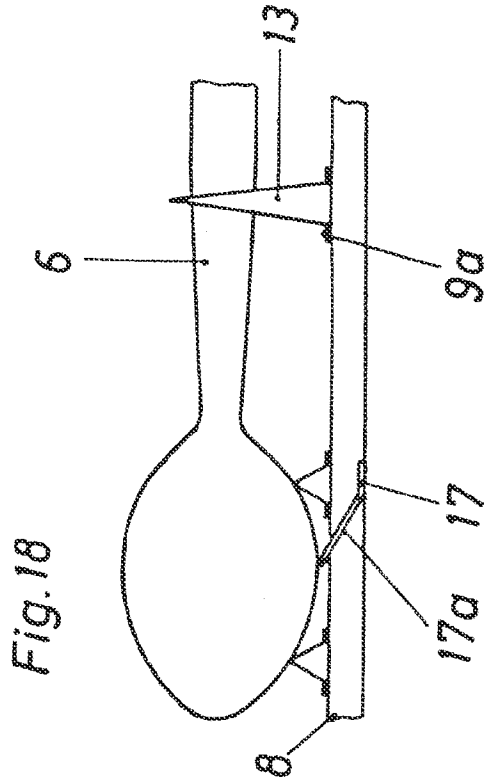


Fig.18

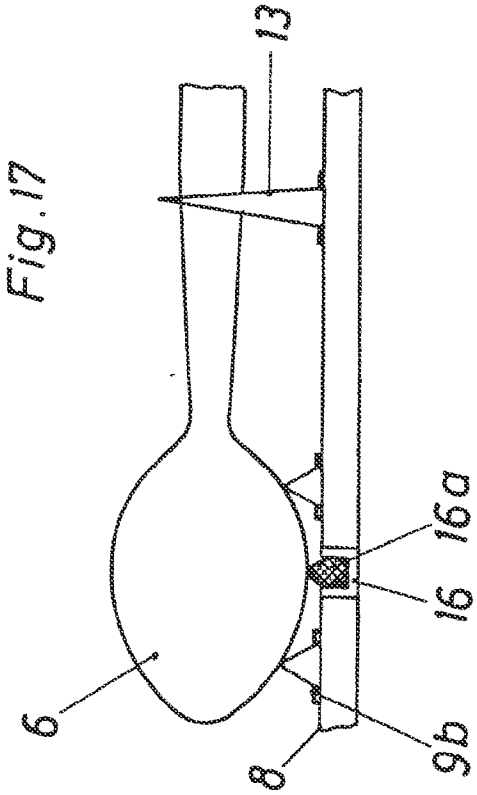


Fig.17

Petitioner Samsung Ex-1004, 1100

Europäisches Patentamt

EUROPÄISCHER RECHERCHENBERICHT

0186157
Nummer der Anmeldung

EP 85 11 6349

EINSCHLÄGIGE DOKUMENTE

Kategorie	Kennzeichnung des Dokuments mit Angabe, soweit erforderlich, der maßgeblichen Teile	Betrifft Anspruch	KLASSIFIKATION DER ANMELDUNG (Int Cl 4)
X	US-A-4 046 261 (YAKE) * Abbildungen 1,2; Spalte 2, Zeilen 1-19 *	1,3-5, 10,14, 16	A 47 L 15/50
A	DE-U-7 329 899 (MIELE) * Seite 2, Zeilen 32-33 *	8	
A	DE-A-1 403 633 (BROWN, BOVERI & CO.) * Abbildung 1 *	12,16	
A	FR-A-2 371 180 (MERLONI ELETTROMESTICI) * Seite 2, Zeilen 32-35 *	10	
A	US-A-1 390 157 (OHDE)		RECHERCHIERTE SACHGEBIETE (Int Cl 4) A 47 L A 47 G
A	DE-A-2 701 879 (KINNE & GENSCH)		

Der vorliegende Recherchenbericht wurde für alle Patentansprüche erstellt

Recherchenort	Abschlußdatum der Recherche	Prüfer
DEN HAAG	03-04-1986	BEUGELING G.L.H.

KATEGORIE DER GENANNTEN DOKUMENTE

X : von besonderer Bedeutung allein betrachtet
Y : von besonderer Bedeutung in Verbindung mit einer anderen Veröffentlichung derselben Kategorie
A : technologischer Hintergrund
O : nichtschriftliche Offenbarung
P : Zwischenliteratur
T : der Erfindung zugrunde liegende Theorien oder Grundsätze

E : älteres Patentdokument, das jedoch erst am oder nach dem Anmeldedatum veröffentlicht worden ist
D : in der Anmeldung angeführtes Dokument
L : aus andern Gründen angeführtes Dokument

& : Mitglied der gleichen Patentfamilie, übereinstimmendes Dokument

EPA Form 1503 03 82

Petitioner Samsung Ex-1004, 1101

Docusign Envelope ID: A6ADE896-44F1-454E-9903-404C54258193

COMBINED ASSIGNMENT AND DECLARATION FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET

☒ THIS DOCUMENT IS BEING SUBMITTED FOR DUAL PURPOSES

Title of Invention	DISHWASHER WITH A DISH RACK

As the below named inventor, I hereby declare that:

This declaration is directed to:
☐ The attached application, or
☒ United States application or PCT international application number 18/535,327 filed on December 11, 2023, and all related applications and issued patents.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby state that I reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information material to patentability of this application in accordance with 37 C.F.R §1.56.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WHEREAS, WHIRLPOOL CORPORATION (hereinafter referred to as "ASSIGNEE") having places of business at **2000 North M-63, Benton Harbor, Michigan 49022, U.S.A.** is desirous of acquiring the entire right, title and interest in and to said invention in the United States and throughout the world;

NOW, THEREFORE, in accord with my obligations by law and/or agreement, and/or for good and valuable consideration, the receipt and sufficiency of are hereby acknowledged, I (hereinafter referred to as "ASSIGNOR") hereby sell, assign and transfer unto said ASSIGNEE, the entire right, title and interest in and to said invention and application throughout the United States, including any and all United States Letters Patent granted on any division, continuation, continuation-in-part, reexamination and reissue of said application; and the entire right, title and interest in and to the said invention throughout the world, including the right to apply for patents and inventor certificates in respect thereof and to claim priority pursuant to rights accorded ASSIGNOR under terms of the Paris International Convention and all other available international conventions and treaties; and the entire right, title and interest in and to any and all patents, patents of addition, utility models, patents of importation, revalidation patents and inventor certificates which may be granted throughout the world in respect of said invention.

ALSO, ASSIGNOR hereby agrees to execute any documents that legally may be required in connection with the filing, prosecution and maintenance of said application or any other patent application(s) or inventor certificate(s) in the United States and in foreign countries for said invention, including additional documents that may be required to affirm the rights of ASSIGNEE in and to said invention, all without further consideration. ASSIGNOR also agrees, without further consideration but at no expense to ASSIGNOR, to identify and communicate to ASSIGNEE at ASSIGNEE'S request documents and information concerning the invention that are within ASSIGNOR'S possession or control and to provide further assurances and testimony on behalf of ASSIGNEE that lawfully may be required of ASSIGNOR in respect of the prosecution, maintenance and defense of any patent application or patent encompassed within the terms of this instrument. ASSIGNOR'S obligations under this instrument shall extend to ASSIGNOR'S heirs, executors, administrators and other legal representatives.

ASSIGNOR hereby authorizes and requests the Commissioner of Patents and Trademarks to issue any and all United States Letters Patent referred to above to ASSIGNEE, as the ASSIGNEE of the entire right, title and interest in and to the same, for ASSIGNEE'S sole use and behoof; and for the use and behoof of ASSIGNEE'S legal representatives and successors, to the full end of the term for which such Letters Patent may be granted, as fully and entirely as the same would have been held by ASSIGNOR had this agreement and sale not been made.

ASSIGNOR authorizes any member or representative of **WHIRLPOOL CORPORATION** to insert or complete any information in this document needed to effect its recordal in the U.S. Patent and Trademark Office.

LEGAL NAME OF INVENTOR

Inventor: Steven B. Balinski

Signature: Signed by: /Steven B. Balinski/ 477B5580B426497...

Date: 9/23/2025 | 9:09 AM PDT

Docusign Envelope ID: 4A239558-A47D-4F28-A335-77BAB0855396

COMBINED ASSIGNMENT AND DECLARATION FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET

☒ THIS DOCUMENT IS BEING SUBMITTED FOR DUAL PURPOSES

Title of Invention	DISHWASHER WITH A DISH RACK

As the below named inventor, I hereby declare that:

This declaration is directed to:
- ☐ The attached application, or
- ☒ United States application or PCT international application number 18/535,327 filed on December 11, 2023, and all related applications and issued patents.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby state that I reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information material to patentability of this application in accordance with 37 C.F.R §1.56.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WHEREAS, WHIRLPOOL CORPORATION (hereinafter referred to as "ASSIGNEE") having places of business at **2000 North M-63, Benton Harbor, Michigan 49022, U.S.A.** is desirous of acquiring the entire right, title and interest in and to said invention in the United States and throughout the world;

NOW, THEREFORE, in accord with my obligations by law and/or agreement, and/or for good and valuable consideration, the receipt and sufficiency of are hereby acknowledged, I (hereinafter referred to as "ASSIGNOR") hereby sell, assign and transfer unto said ASSIGNEE, the entire right, title and interest in and to said invention and application throughout the United States, including any and all United States Letters Patent granted on any division, continuation, continuation-in-part, reexamination and reissue of said application; and the entire right, title and interest in and to the said invention throughout the world, including the right to apply for patents and inventor certificates in respect thereof and to claim priority pursuant to rights accorded ASSIGNOR under terms of the Paris International Convention and all other available international conventions and treaties; and the entire right, title and interest in and to any and all patents, patents of addition, utility models, patents of importation, revalidation patents and inventor certificates which may be granted throughout the world in respect of said invention.

ALSO, ASSIGNOR hereby agrees to execute any documents that legally may be required in connection with the filing, prosecution and maintenance of said application or any other patent application(s) or inventor certificate(s) in the United States and in foreign countries for said invention, including additional documents that may be required to affirm the rights of ASSIGNEE in and to said invention, all without further consideration. ASSIGNOR also agrees, without further consideration but at no expense to ASSIGNOR, to identify and communicate to ASSIGNEE at ASSIGNEE'S request documents and information concerning the invention that are within ASSIGNOR'S possession or control and to provide further assurances and testimony on behalf of ASSIGNEE that lawfully may be required of ASSIGNOR in respect of the prosecution, maintenance and defense of any patent application or patent encompassed within the terms of this instrument. ASSIGNOR'S obligations under this instrument shall extend to ASSIGNOR'S heirs, executors, administrators and other legal representatives.

ASSIGNOR hereby authorizes and requests the Commissioner of Patents and Trademarks to issue any and all United States Letters Patent referred to above to ASSIGNEE, as the ASSIGNEE of the entire right, title and interest in and to the same, for ASSIGNEE'S sole use and behoof; and for the use and behoof of ASSIGNEE'S legal representatives and successors, to the full end of the term for which such Letters Patent may be granted, as fully and entirely as the same would have been held by ASSIGNOR had this agreement and sale not been made.

ASSIGNOR authorizes any member or representative of **WHIRLPOOL CORPORATION** to insert or complete any information in this document needed to effect its recordal in the U.S. Patent and Trademark Office.

LEGAL NAME OF INVENTOR

Inventor: Ryan Kevin Roth

Signature: Signed by: /Ryan Kevin Roth/ DA08E09EC92447C...

Date: 9/23/2025 | 7:24 PM PDT

Docusign Envelope ID: D832FACC-5CE9-457D-A3DE-BE9AECA2EF95

COMBINED ASSIGNMENT AND DECLARATION FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET

☒ THIS DOCUMENT IS BEING SUBMITTED FOR DUAL PURPOSES

Title of Invention	DISHWASHER WITH A DISH RACK

As the below named inventor, I hereby declare that:

This declaration is directed to:
☐ The attached application, or
☒ United States application or PCT international application number 18/535,327 filed on December 11, 2023, and all related applications and issued patents.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby state that I reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information material to patentability of this application in accordance with 37 C.F.R §1.56.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WHEREAS, WHIRLPOOL CORPORATION (hereinafter referred to as "ASSIGNEE") having places of business at **2000 North M-63, Benton Harbor, Michigan 49022, U.S.A.** is desirous of acquiring the entire right, title and interest in and to said invention in the United States and throughout the world;

NOW, THEREFORE, in accord with my obligations by law and/or agreement, and/or for good and valuable consideration, the receipt and sufficiency of are hereby acknowledged, I (hereinafter referred to as "ASSIGNOR") hereby sell, assign and transfer unto said ASSIGNEE, the entire right, title and interest in and to said invention and application throughout the United States, including any and all United States Letters Patent granted on any division, continuation, continuation-in-part, reexamination and reissue of said application; and the entire right, title and interest in and to the said invention throughout the world, including the right to apply for patents and inventor certificates in respect thereof and to claim priority pursuant to rights accorded ASSIGNOR under terms of the Paris International Convention and all other available international conventions and treaties; and the entire right, title and interest in and to any and all patents, patents of addition, utility models, patents of importation, revalidation patents and inventor certificates which may be granted throughout the world in respect of said invention.

ALSO, ASSIGNOR hereby agrees to execute any documents that legally may be required in connection with the filing, prosecution and maintenance of said application or any other patent application(s) or inventor certificate(s) in the United States and in foreign countries for said invention, including additional documents that may be required to affirm the rights of ASSIGNEE in and to said invention, all without further consideration. ASSIGNOR also agrees, without further consideration but at no expense to ASSIGNOR, to identify and communicate to ASSIGNEE at ASSIGNEE'S request documents and information concerning the invention that are within ASSIGNOR'S possession or control and to provide further assurances and testimony on behalf of ASSIGNEE that lawfully may be required of ASSIGNOR in respect of the prosecution, maintenance and defense of any patent application or patent encompassed within the terms of this instrument. ASSIGNOR'S obligations under this instrument shall extend to ASSIGNOR'S heirs, executors, administrators and other legal representatives.

ASSIGNOR hereby authorizes and requests the Commissioner of Patents and Trademarks to issue any and all United States Letters Patent referred to above to ASSIGNEE, as the ASSIGNEE of the entire right, title and interest in and to the same, for ASSIGNEE'S sole use and behoof; and for the use and behoof of ASSIGNEE'S legal representatives and successors, to the full end of the term for which such Letters Patent may be granted, as fully and entirely as the same would have been held by ASSIGNOR had this agreement and sale not been made.

ASSIGNOR authorizes any member or representative of **WHIRLPOOL CORPORATION** to insert or complete any information in this document needed to effect its recordal in the U.S. Patent and Trademark Office.

LEGAL NAME OF INVENTOR

Inventor: Joseph T. Ferencevich Signature: Signed by: /Joseph T. Ferencevich/ 600B6C1F45C7424...

Date: 9/24/2025 | 12:51 PM PDT

Docusign Envelope ID: E7610613-5605-4614-B552-C642CB248E8A

COMBINED ASSIGNMENT AND DECLARATION FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET

☒ THIS DOCUMENT IS BEING SUBMITTED FOR DUAL PURPOSES

Title of Invention	DISHWASHER WITH A DISH RACK

As the below named inventor, I hereby declare that:

This declaration is directed to:
☐ The attached application, or
☒ United States application or PCT international application number 18/535,327 filed on December 11, 2023, and all related applications and issued patents.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby state that I reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information material to patentability of this application in accordance with 37 C.F.R §1.56.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WHEREAS, WHIRLPOOL CORPORATION (hereinafter referred to as "ASSIGNEE") having places of business at **2000 North M-63, Benton Harbor, Michigan 49022, U.S.A.** is desirous of acquiring the entire right, title and interest in and to said invention in the United States and throughout the world;

NOW, THEREFORE, in accord with my obligations by law and/or agreement, and/or for good and valuable consideration, the receipt and sufficiency of are hereby acknowledged, I (hereinafter referred to as "ASSIGNOR") hereby sell, assign and transfer unto said ASSIGNEE, the entire right, title and interest in and to said invention and application throughout the United States, including any and all United States Letters Patent granted on any division, continuation, continuation-in-part, reexamination and reissue of said application; and the entire right, title and interest in and to the said invention throughout the world, including the right to apply for patents and inventor certificates in respect thereof and to claim priority pursuant to rights accorded ASSIGNOR under terms of the Paris International Convention and all other available international conventions and treaties; and the entire right, title and interest in and to any and all patents, patents of addition, utility models, patents of importation, revalidation patents and inventor certificates which may be granted throughout the world in respect of said invention.

ALSO, ASSIGNOR hereby agrees to execute any documents that legally may be required in connection with the filing, prosecution and maintenance of said application or any other patent application(s) or inventor certificate(s) in the United States and in foreign countries for said invention, including additional documents that may be required to affirm the rights of ASSIGNEE in and to said invention, all without further consideration. ASSIGNOR also agrees, without further consideration but at no expense to ASSIGNOR, to identify and communicate to ASSIGNEE at ASSIGNEE'S request documents and information concerning the invention that are within ASSIGNOR'S possession or control and to provide further assurances and testimony on behalf of ASSIGNEE that lawfully may be required of ASSIGNOR in respect of the prosecution, maintenance and defense of any patent application or patent encompassed within the terms of this instrument. ASSIGNOR'S obligations under this instrument shall extend to ASSIGNOR'S heirs, executors, administrators and other legal representatives.

ASSIGNOR hereby authorizes and requests the Commissioner of Patents and Trademarks to issue any and all United States Letters Patent referred to above to ASSIGNEE, as the ASSIGNEE of the entire right, title and interest in and to the same, for ASSIGNEE'S sole use and behoof; and for the use and behoof of ASSIGNEE'S legal representatives and successors, to the full end of the term for which such Letters Patent may be granted, as fully and entirely as the same would have been held by ASSIGNOR had this agreement and sale not been made.

ASSIGNOR authorizes any member or representative of **WHIRLPOOL CORPORATION** to insert or complete any information in this document needed to effect its recordal in the U.S. Patent and Trademark Office.

LEGAL NAME OF INVENTOR

Inventor: Sujit S. Naik Signature: Signed by: A382E5AEB27D411...

Date: 9/23/2025 | 10:28 AM PDT

Docusign Envelope ID: 128CD803-0B96-4492-BF89-F4DD9646C5AB

COMBINED ASSIGNMENT AND DECLARATION FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET

☒ THIS DOCUMENT IS BEING SUBMITTED FOR DUAL PURPOSES

Title of Invention	DISHWASHER WITH A DISH RACK

As the below named inventor, I hereby declare that:

This declaration is directed to:
☐ The attached application, or
☒ United States application or PCT international application number 18/535,327 filed on December 11, 2023, and all related applications and issued patents.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby state that I reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information material to patentability of this application in accordance with 37 C.F.R §1.56.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WHEREAS, WHIRLPOOL CORPORATION (hereinafter referred to as "ASSIGNEE") having places of business at **2000 North M-63, Benton Harbor, Michigan 49022, U.S.A.** is desirous of acquiring the entire right, title and interest in and to said invention in the United States and throughout the world;

NOW, THEREFORE, in accord with my obligations by law and/or agreement, and/or for good and valuable consideration, the receipt and sufficiency of are hereby acknowledged, I (hereinafter referred to as "ASSIGNOR") hereby sell, assign and transfer unto said ASSIGNEE, the entire right, title and interest in and to said invention and application throughout the United States, including any and all United States Letters Patent granted on any division, continuation, continuation-in-part, reexamination and reissue of said application; and the entire right, title and interest in and to the said invention throughout the world, including the right to apply for patents and inventor certificates in respect thereof and to claim priority pursuant to rights accorded ASSIGNOR under terms of the Paris International Convention and all other available international conventions and treaties; and the entire right, title and interest in and to any and all patents, patents of addition, utility models, patents of importation, revalidation patents and inventor certificates which may be granted throughout the world in respect of said invention.

ALSO, ASSIGNOR hereby agrees to execute any documents that legally may be required in connection with the filing, prosecution and maintenance of said application or any other patent application(s) or inventor certificate(s) in the United States and in foreign countries for said invention, including additional documents that may be required to affirm the rights of ASSIGNEE in and to said invention, all without further consideration. ASSIGNOR also agrees, without further consideration but at no expense to ASSIGNOR, to identify and communicate to ASSIGNEE at ASSIGNEE'S request documents and information concerning the invention that are within ASSIGNOR'S possession or control and to provide further assurances and testimony on behalf of ASSIGNEE that lawfully may be required of ASSIGNOR in respect of the prosecution, maintenance and defense of any patent application or patent encompassed within the terms of this instrument. ASSIGNOR'S obligations under this instrument shall extend to ASSIGNOR'S heirs, executors, administrators and other legal representatives.

ASSIGNOR hereby authorizes and requests the Commissioner of Patents and Trademarks to issue any and all United States Letters Patent referred to above to ASSIGNEE, as the ASSIGNEE of the entire right, title and interest in and to the same, for ASSIGNEE'S sole use and behoof; and for the use and behoof of ASSIGNEE'S legal representatives and successors, to the full end of the term for which such Letters Patent may be granted, as fully and entirely as the same would have been held by ASSIGNOR had this agreement and sale not been made.

ASSIGNOR authorizes any member or representative of **WHIRLPOOL CORPORATION** to insert or complete any information in this document needed to effect its recordal in the U.S. Patent and Trademark Office.

LEGAL NAME OF INVENTOR

Inventor: Frederick Thomas Roderick

Signature: Signed by: /Frederick Thomas Roderick/ A581D56D89CC4D0...

Date: 9/25/2025 | 1:47 PM PDT

Docusign Envelope ID: BBA9631E-346E-4259-B0DD-07F2D18CB1A3

COMBINED ASSIGNMENT AND DECLARATION FOR UTILITY OR DESIGN APPLICATION USING AN APPLICATION DATA SHEET

☒ THIS DOCUMENT IS BEING SUBMITTED FOR DUAL PURPOSES

Title of Invention	DISHWASHER WITH A DISH RACK

As the below named inventor, I hereby declare that:

This declaration is directed to: ☐ The attached application, or ☒ United States application or PCT international application number 18/535,327 filed on December 11, 2023, and all related applications and issued patents.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby state that I reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information material to patentability of this application in accordance with 37 C.F.R §1.56.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

WHEREAS, WHIRLPOOL CORPORATION (hereinafter referred to as "ASSIGNEE") having places of business at **2000 North M-63, Benton Harbor, Michigan 49022, U.S.A.** is desirous of acquiring the entire right, title and interest in and to said invention in the United States and throughout the world;

NOW, THEREFORE, in accord with my obligations by law and/or agreement, and/or for good and valuable consideration, the receipt and sufficiency of are hereby acknowledged, I (hereinafter referred to as "ASSIGNOR") hereby sell, assign and transfer unto said ASSIGNEE, the entire right, title and interest in and to said invention and application throughout the United States, including any and all United States Letters Patent granted on any division, continuation, continuation-in-part, reexamination and reissue of said application; and the entire right, title and interest in and to the said invention throughout the world, including the right to apply for patents and inventor certificates in respect thereof and to claim priority pursuant to rights accorded ASSIGNOR under terms of the Paris International Convention and all other available international conventions and treaties; and the entire right, title and interest in and to any and all patents, patents of addition, utility models, patents of importation, revalidation patents and inventor certificates which may be granted throughout the world in respect of said invention.

ALSO, ASSIGNOR hereby agrees to execute any documents that legally may be required in connection with the filing, prosecution and maintenance of said application or any other patent application(s) or inventor certificate(s) in the United States and in foreign countries for said invention, including additional documents that may be required to affirm the rights of ASSIGNEE in and to said invention, all without further consideration. ASSIGNOR also agrees, without further consideration but at no expense to ASSIGNOR, to identify and communicate to ASSIGNEE at ASSIGNEE'S request documents and information concerning the invention that are within ASSIGNOR'S possession or control and to provide further assurances and testimony on behalf of ASSIGNEE that lawfully may be required of ASSIGNOR in respect of the prosecution, maintenance and defense of any patent application or patent encompassed within the terms of this instrument. ASSIGNOR'S obligations under this instrument shall extend to ASSIGNOR'S heirs, executors, administrators and other legal representatives.

ASSIGNOR hereby authorizes and requests the Commissioner of Patents and Trademarks to issue any and all United States Letters Patent referred to above to ASSIGNEE, as the ASSIGNEE of the entire right, title and interest in and to the same, for ASSIGNEE'S sole use and behoof; and for the use and behoof of ASSIGNEE'S legal representatives and successors, to the full end of the term for which such Letters Patent may be granted, as fully and entirely as the same would have been held by ASSIGNOR had this agreement and sale not been made.

ASSIGNOR authorizes any member or representative of **WHIRLPOOL CORPORATION** to insert or complete any information in this document needed to effect its recordal in the U.S. Patent and Trademark Office.

LEGAL NAME OF INVENTOR

Inventor: David Jason Brightbill

Signature: Signed by: /David Jason Brightbill/ FAD2557B2A9A489...

Date: 9/24/2025 | 8:22 AM PDT

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
19/297,954	**10/09/2025 04:32:09 PM Z ET**	**SUB-13230-US-CON3**

Title of Invention

DISHWASHER WITH A DISH RACK

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	2948	FILED BY	Megan Boot
PATENT CENTER #	72649525	FILING DATE	08/12/2025
CUSTOMER #	130333	FIRST NAMED INVENTOR	Mark S. Feddema
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	BRIAN CHESLEK

Documents

TOTAL DOCUMENTS: 6

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
681 Roth Decl.pdf	1	Oath or Declaration filed	216 KB

Warning: The PDF file has been signed with a digital signature and the legal effect of the document will be based on the contents of the file not the digital signature.

681 Ferencevich Decl.pdf	1	Oath or Declaration filed	218 KB

Warning: The PDF file has been signed with a digital signature and the legal effect of the document will be based on the contents of the file not the digital signature.

681 Naik Decl.pdf	1	Oath or Declaration filed	214 KB

Warning: The PDF file has been signed with a digital signature and the legal effect of the document will be based on the contents of the file not the digital signature.

681 Brightbill Decl.pdf	1	Oath or Declaration filed	219 KB

Warning: The PDF file has been signed with a digital signature and the legal effect of

the document will be based on the contents of the file not the digital signature.

681 Balinski Decl.pdf	1	Oath or Declaration filed	215 KB

Warning: The PDF file has been signed with a digital signature and the legal effect of the document will be based on the contents of the file not the digital signature.

681 Roderick Decl.pdf	1	Oath or Declaration filed	221 KB

Warning: The PDF file has been signed with a digital signature and the legal effect of the document will be based on the contents of the file not the digital signature.

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
681 Roth Decl.pdf	A6738AC2B0D8448A8975F72850DBA49B8D99283F819F9E1B4 DF97BD654A72FB4D6A0C0CC266728CF5A1AA231CC46FEB20 F573DF25839B9F3EFAE2671A9F0890A
681 Ferencevich Decl.pdf	7D64F290ECC8B85C1B8CAD9CECCC995A06013465096E22D1 2631E0F2FA3F5A9F11925C3CF0A2073EB13E5DDAEC25D073 56F87FF5F467598E701A9E87B5BDF144
681 Naik Decl.pdf	B6635DD87954063FD8FE5AE8593940DD173A075D919741DC6 EB3F826D3173550B3CBD7547C788836FBCA3EBCE3CF68572 EDD7934A3098D8A598541016BC94DD2
681 Brightbill Decl.pdf	1EF32B9C84BCCE46838DF145CC411F38A1EB543F7DD915CE 6884C428B5EA2F5AAFE657D22D8215C2B8E1823CED4C7AA4 E4ED69D9E79473DE10515E6E9A0D1D4C
681 Balinski Decl.pdf	B3CC6307C061A4344EB9D49D6AD65F8E71DBFDFCD4B5AA8 A9BF1A0F331E197039AD9ACFC1B9B60B01CD26E3E3F63D38 BBD6E4DD8A24D3201015477F7BBD69B17
681 Roderick Decl.pdf	9798EF2EC90B52E0CEBA891A7A318D1937380F968A1B2D0EE 35920DF340D8C27CC52679EBA01AA7A257C239BCD57399942 1609A8B165FF975B106698F02C415E

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SUB-13230-US-CON3
	Application Number	19/297,954
Title of Invention	DISHWASHER WITH A DISH RACK	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Mark	S.	Feddema	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Kalamazoo	State/Province	MI	Country of Residence	US

Mailing Address of Inventor:

Address 1	2000 NORTH M-63
Address 2	MD 3601

City	BENTON HARBOR	State/Province	MI
Postal Code	49022	Country	US

Inventor 2 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	William	J.	Snell	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Elkhart	State/Province	IN	Country of Residence	US

Mailing Address of Inventor:

Address 1	2000 NORTH M-63
Address 2	MD 3601

City	BENTON HARBOR	State/Province	MI
Postal Code	49022	Country	US

Inventor 3 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Sachie		Kakehi	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

Petitioner Samsung Ex-1004, 1111

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SUB-13230-US-CON3
	Application Number	19/297,954
Title of Invention	DISHWASHER WITH A DISH RACK	

City	St. Joseph	State/Province	MI	Country of Residence	US

Mailing Address of Inventor:

Address 1	2000 NORTH M-63		
Address 2	MD 3601		
City	BENTON HARBOR	State/Province	MI
Postal Code	49022	Country	US

Inventor 4 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Steven	B.	Balinski	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Rockford	State/Province	MN	Country of Residence	US

Mailing Address of Inventor:

Address 1	5675 LAKE SARAH HEIGHTS DRIVE		
Address 2			
City	ROCKFORD	State/Province	MN
Postal Code	55373	Country	US

Inventor 5 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	David	Jason	Brightbill	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Berrien Center	State/Province	MI	Country of Residence	US

Mailing Address of Inventor:

Address 1	2000 NORTH M-63		
Address 2	MD 3601		
City	BENTON HARBOR	State/Province	MI
Postal Code		Country	US

Inventor 6 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Joseph	T.	Ferencevich	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	St. Joseph	State/Province	MI	Country of Residence	US

Petitioner Samsung Ex-1004, 1112

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SUB-13230-US-CON3
	Application Number	19/297,954
Title of Invention	DISHWASHER WITH A DISH RACK	

Mailing Address of Inventor:

Address 1	2000 NORTH M-63		
Address 2	MD 3601		
City	BENTON HARBOR	**State/Province**	MI
Postal Code	49022	**Country**	US

Inventor 7 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Sujit	S.	Naik	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	St. Joseph	**State/Province**	MI	**Country of Residence**	US

Mailing Address of Inventor:

Address 1	2000 NORTH M-63		
Address 2	MD 3601		
City	BENTON HARBOR	**State/Province**	MI
Postal Code	49022	**Country**	US

Inventor 8 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Frederick	Thomas	Roderick	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Coloma	**State/Province**	MI	**Country of Residence**	US

Mailing Address of Inventor:

Address 1	3170 KERLIKOWSKE ROAD		
Address 2			
City	COLOMA	**State/Province**	MI
Postal Code	49038	**Country**	US

Inventor 9 Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Ryan	Kevin	Roth	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	Grandville	**State/Province**	MI	**Country of Residence**	US

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SUB-13230-US-CON3
	Application Number	19/297,954
Title of Invention	DISHWASHER WITH A DISH RACK	

Mailing Address of Inventor:			
Address 1	4190 PRAIRIE STREET SW		
Address 2			
City	GRANDVILLE	State/Province	MI
Postal Code	49418	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	130333		
Email Address		Add Email	Remove Email

Application Information:

Title of the Invention	DISHWASHER WITH A DISH RACK		
Attorney Docket Number	SUB-13230-US-CON3	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	9	**Suggested Figure for Publication (if any)**	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SUB-13230-US-CON3
	Application Number	19/297,954
Title of Invention	DISHWASHER WITH A DISH RACK	

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	(●) Customer Number	( ) US Patent Practitioner	( ) Limited Recognition (37 CFR 11.9)
Customer Number	130333		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	19039228	2025-01-28

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
19039228	Continuation of	18535327	2023-12-11	12232681	2025-02-25

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
18535327	Continuation of	17830947	2022-06-02	11864712	2024-01-09

Prior Application Status	Patented				Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
17830947	Continuation of	16833984	2020-03-30	11375874	2022-07-05

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button.

Foreign Priority Information:

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SUB-13230-US-CON3
	Application Number	19/297,954
Title of Invention	DISHWASHER WITH A DISH RACK	

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button.

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SUB-13230-US-CON3
	Application Number	19/297,954
Title of Invention	DISHWASHER WITH A DISH RACK	

Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SUB-13230-US-CON3
	Application Number	19/297,954
Title of Invention	DISHWASHER WITH A DISH RACK	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

◉ Assignee	○ Legal Representative under 35 U.S.C. 117	○ Joint Inventor
○ Person to whom the inventor is obligated to assign.	○ Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☒

Organization Name	WHIRLPOOL CORPORATION		
Mailing Address Information For Applicant:			
Address 1	2000 NORTH M-63		
Address 2	MD 3601		
City	BENTON HARBOR	**State/Province**	MI
Country	US	Postal Code	49022
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button.

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SUB-13230-US-CON3
	Application Number	19/297,954
Title of Invention	DISHWASHER WITH A DISH RACK	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

If the Assignee or Non-Applicant Assignee is an Organization check here. ☒

Organization Name	WHIRLPOOL CORPORATION

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1	2000 NORTH M-63		
Address 2	MD 3601		
City	BENTON HARBOR	**State/Province**	MI
Country	US	Postal Code	49022
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button.

Signature:

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/brianrcheslek/			Date (YYYY-MM-DD)	2025-08-12
First Name	Brian	Last Name	Cheslek	Registration Number	58,329

Additional Signature may be generated within this form by selecting the Add button.

PTO/AIA/14 (01-22)
Approved for use through 05/31/2024. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	SUB-13230-US-CON3
	Application Number	19/297,954
Title of Invention	DISHWASHER WITH A DISH RACK	

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

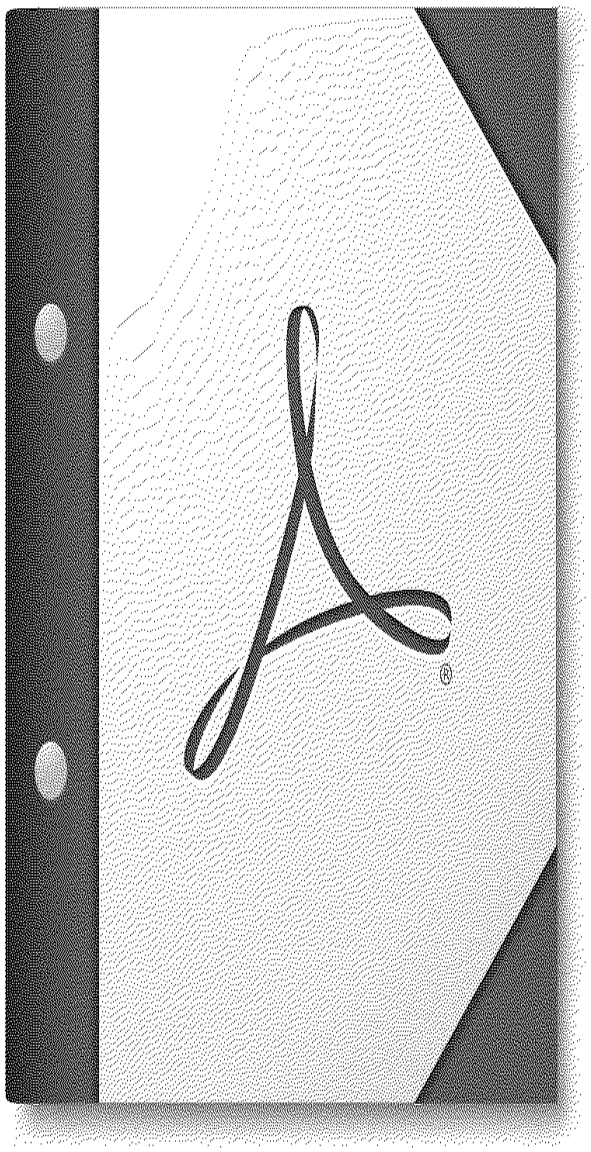
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Petitioner Samsung Ex-1004, 1121



For the best experience, open this PDF portfolio in Acrobat X or Adobe Reader X, or later.

Get Adobe Reader Now!

Petitioner Samsung Ex-1004, 1122

Doc Code: R48.REQ
Document Description: Request under Rule 48 correcting inventorship

PTO/AIA/40 (11-23)
Approved for use through 11/30/2027. OMB 0651-0031
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

REQUEST FOR CORRECTION IN A PATENT APPLICATION RELATING TO INVENTORSHIP OR AN INVENTOR NAME, OR ORDER OF NAMES, OTHER THAN IN A REISSUE APPLICATION (37 CFR 1.48)		
	Application Number	19/297,954
	Filing Date	August 12, 2025
	First Named Inventor	Mark S. Feddema
	Art Unit	
	Examiner Name	
	Practitioner Docket Number	SUB-13230-US-CON3

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Applicant hereby **requests that the inventorship be corrected or changed, or that the name of the inventor or a joint inventor, or the order of the names of joint inventors, be changed,** in the above-identified application. **Note**: 37 CFR 1.48 applies to any request to correct inventorship filed on or after September 16, 2012, regardless of the application filing date. **Do not submit this form after payment of the issue fee or if the application has been patented.** See 37 CFR 1.324 for correction of inventorship in a patent.

Please check the applicable box(es) below.

For a nonprovisional application:

☒ 1. This request is to correct or change the inventorship in a **nonprovisional** application (**under 37 CFR 1.48(a)**) and includes:

☒ An application data sheet (ADS) in accordance with 37 CFR 1.76(c) with the corrected or updated information shown with markings (*e.g.*, underlining for insertions, strikethrough for deletions). See the Manual of Patent Examining Procedure (MPEP) section 601.05(a) for information about filing an ADS in an application filed on/after September 16, 2012. For information about filing a Supplemental ADS in an application filed before September 16, 2012, see MPEP 601.05(b).

☒ The processing fee set forth in 37 CFR 1.17(i). $ 150.00

☒ An inventor is being added. An inventor's oath or declaration by any actual inventor who has not yet executed an oath or declaration is required (see 37 CFR 1.48(b)). See MPEP 602.01(a) for information about an inventor's oath or declaration for an application filed on/after September 16, 2012 (*e.g.*, form **PTO/AIA/01**). For information about an inventor's oath or declaration for an application filed before September 16, 2012 (*e.g.*, form **PTO/SB/01**), see MPEP 602.01(b).

☐ This request is being filed after the first Office action on the merits has been given or mailed (see 37 CFR 1.48(c) and 1.17(d)). Check one of the following:

☐ This request to correct or change the inventorship is due solely to the cancellation of claims in the application.

OR

☐ The fee set forth in 37 CFR 1.17(d) is due (in addition to the fee set forth in 37 CFR 1.17(i)). $ _____

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0031. Public burden for this form is estimated to average 45 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **If filing this completed form by mail, send to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

PTO/AIA/40 (11-23)
Approved for use through 11/30/2027. OMB 0651-0031
U.S. Patent and Trademark Office, U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

REQUEST FOR CORRECTION IN A PATENT APPLICATION RELATING TO INVENTORSHIP OR AN INVENTOR NAME, OR ORDER OF NAMES, OTHER THAN IN A REISSUE APPLICATION (37 CFR 1.48)

☐ 2. This request is to correct or update the name of the inventor or a joint inventor, or the order of names of joint inventors, in a **nonprovisional** application (**under 37 CFR 1.48(f)**) and includes:

☐ An application data sheet in accordance with 37 CFR 1.76(c) identifying the complete inventive entity, including the corrected or updated name of the inventor, or the new order of names shown with markings (*e.g.*, underlining for insertions, strikethrough for deletions). See the MPEP 601.05(a) for information about filing an ADS in an application filed on/after September 16, 2012. For information about filing a Supplemental ADS in an application filed before September 16, 2012, see MPEP 601.05(b).

☐ The processing fee set forth in 37 CFR 1.17(i). $ _____

For a provisional application:

☐ This request is to change or correct the inventorship, or correct or update the name of the inventor or a joint inventor, in a **provisional** application (**under 37 CFR 1.48(d)**) and includes:

☐ **Attached hereto** is a document that is signed by a party set forth in 37 CFR 1.33(b) and identifies each inventor by his or her legal name, in the preferred order. Note: the document may be an application data sheet in accordance with 37 CFR 1.76(c) that identifies the changes with markings (underlining for insertions, strikethrough for deletions).

☐ The processing fee set forth in 37 CFR 1.17(q). $ _____

Fee Payment Information:

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entitystatus. S ee 37 CFR 1.29.
Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 16-2463.

☒ Payment made via USPTO patent electronic filing system.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ Applicant*attorney or agent ☒ record
Registration number 58,329

☐ attorney or agent acting under 37 CFR 1.34
Registration number _____

Signature /brianrcheslek/

Typed or printed name Brian R. Cheslek

Date October 9, 2025

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. *Juristic entities must be represented by a patent practitioner (See 37 CFR 1.31, applicable to any paper filed on or after September 16, 2012 that is presented on behalf of a juristic entity, regardless of application filing date). Submit multiple forms if more than one signature is required, see below**.

☒ * Total of one forms are submitted.

Petitioner Samsung Ex-1004, 1124

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013), https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf.

Routine uses of the information in this record may include disclosure to: 1) law enforcement, in the event that the system of records indicates a violation or potential violation of law; 2) a federal, state, local, or international agency, in response to its request; 3) a contractor of the USPTO having need for the information in order to perform a contract; 4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record; 5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record; 6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations; 7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals; 8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)); 9) the Office of Personnel Management (OPM) for personnel research purposes; and 10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC PAYMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
19/297,954	**10/09/2025 02:28:18 PM Z ET**	**SUB-13230-US-CON3**

Title of Invention

DISHWASHER WITH A DISH RACK

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	2948	FILED BY	Megan Boot
PATENT CENTER #	72641785	AUTHORIZED BY	BRIAN CHESLEK
CUSTOMER #	130333	FILING DATE	08/12/2025
CORRESPONDENCE ADDRESS	-	FIRST NAMED INVENTOR	Mark S. Feddema

Payment Information

PAYMENT METHOD	PAYMENT TRANSACTION ID	PAYMENT AUTHORIZED BY
CARD / 9595	**E202509E38515999**	**Megan Boot**

PRE-AUTHORIZED ACCOUNT	PRE-AUTHORIZED CATEGORY
162463	**37 CFR 1.16 (National application filing, search, and examination fees); 37 CFR 1.17 (Patent application and reexamination processing fees); 37 CFR 1.20 (Post Issuance fees); 37 CFR 1.21 (Miscellaneous fees and charges)**

FEE CODE	DESCRIPTION	ITEM PRICE($)	QUANTITY	ITEM TOTAL($)
1830	PROCESSING FEE, EXCEPT IN PROVISIONAL APPLICATIONS	150.00	1	150.00
			TOTAL AMOUNT:	**$150.00**

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

New Applications Under 35 U.S.C. 111

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

Receipt will establish the filing date of the application

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
19/297,954	**10/09/2025 02:28:18 PM Z ET**	**SUB-13230-US-CON3**

Title of Invention

DISHWASHER WITH A DISH RACK

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	2948	FILED BY	Megan Boot
PATENT CENTER #	72641785	FILING DATE	08/12/2025
CUSTOMER #	130333	FIRST NAMED INVENTOR	Mark S. Feddema
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	BRIAN CHESLEK

Documents

TOTAL DOCUMENTS: 3

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2025-10-09 SUB-13230-US-CON3 WHI025 P328A Request to Correct Inventorship.pdf	3	Request under Rule 48 correcting inventorship	341 KB
2025-10-09 SUB-13230-US-CON3 WHI025 P328A ADS.pdf	11	Application Data Sheet	1007 KB
Warning: This is not a USPTO supplied ADS fillable form. Data in the form cannot be automatically loaded to other USPTO systems.			
2025-10-09 SUB-13230-US-CON3 WHI025 P328A Formals - Added Inventors.pdf	1	Oath or Declaration filed	965 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2025-10-09 SUB-13230-US-CON3 WHI025 P328A Request to Correct Inventorship.pdf	3F0D777901E44B1E8EE7D4AE4C00FE5C0481D4FBD84E7A7F107136E3DBD1189F7DD6F39AAEDC1F272966BE65727F52B16476340851530D871265DD5B0D002F43
2025-10-09 SUB-13230-US-CON3 WHI025 P328A ADS.pdf	63A204400049F4E89D7D14E364213FBD732285877F5C33174853F2C4E989A7E900854E6BFD7B793FB11E6920B66A16D4E65799ED0E87DD1B52CA8F4D0CEC2237
2025-10-09 SUB-13230-US-CON3 WHI025 P328A Formals - Added Inventors.pdf	F5DE6F255B102F0F2A625BB16F36009B78E8077498897B265015DB9182DC509165408BA06670E02A22D4E3D021DA279AF471A5ECACBAA842422622C6A502743C

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
19/297,954	08/12/2025	Mark S. Feddema	SUB-13230-US-CON3

CONFIRMATION NO. 2948

130333
PRICE HENEVELD LLP
WHIRLPOOL CORPORATION - MD 3601
2000 NORTH M63
BENTON HARBOR, MI 49022

37 CFR 1.48 ACKNOWLEDGEMENT LETTER

OC000000095866381

Date Mailed: 10/15/2025

NOTICE OF ACCEPTANCE OF REQUEST UNDER 37 CFR 1.48(a)

This is in response to the applicant's request under 37 CFR 1.48(a) submitted on 10/09/2025.

The request under 37 CFR 1.48(a) to correct the inventorship, to correct or update the name of an inventor, or to correct the order of names of joint inventors is accepted.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/ctuazon/

Petitioner Samsung Ex-1004, 1130

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
19/297,954	08/12/2025	OPAP	3200	SUB-13230-US-CON3	26	1

CONFIRMATION NO. 2948

UPDATED FILING RECEIPT

130333
PRICE HENEVELD LLP
WHIRLPOOL CORPORATION - MD 3601
2000 NORTH M63
BENTON HARBOR, MI 49022

OC000000095866380

Date Mailed: 10/15/2025

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Mark S. Feddema, Kalamazoo, MI;
William J. Snell, Elkhart, IN;
Sachie Kakehi, St. Joseph, MI;
Steven B. Balinski, Rockford, MN;
David Jason Brightbill, Berrien Center, MI;
Joseph T. Ferencevich, St. Joseph, MI;
Sujit S. Naik, St. Joseph, MI;
Frederick Thomas Roderick, Coloma, MI;
Ryan Kevin Roth, Grandville, MI;

Applicant(s)

WHIRLPOOL CORPORATION, BENTON HARBOR, MI;

Assignment For Published Patent Application

WHIRLPOOL CORPORATION, BENTON HARBOR, MI

Power of Attorney: The patent practitioners associated with Customer Number 130333

Domestic Applications for which benefit is claimed

This application is a CON of 19/039,228 01/28/2025
which is a CON of 18/535,327 12/11/2023 PAT 12,232,681
which is a CON of 17/830,947 06/02/2022 PAT 11,864,712
which is a CON of 16/833,984 03/30/2020 PAT 11,375,874

Petitioner Samsung Ex-1004, 1131

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) **- None.**
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 08/21/2025

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 19/297,954**

Projected Publication Date: 11/27/2025

Non-Publication Request: No

Early Publication Request: No
Title

DISHWASHER WITH A DISH RACK

Preliminary Class

134

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Petitioner Samsung Ex-1004, 1132

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

Petitioner Samsung Ex-1004, 1133

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

Petitioner Samsung Ex-1004, 1134

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
19/297,954	08/12/2025	Mark S. Feddema	SUB-13230-US-CON3

CONFIRMATION NO. 2948

130333
PRICE HENEVELD LLP
WHIRLPOOL CORPORATION - MD 3601
2000 NORTH M63
BENTON HARBOR, MI 49022

PUBLICATION NOTICE

OC000000098063527

Date Mailed: 11/28/2025

Title:DISHWASHER WITH A DISH RACK

Publication No.US-2025-0359724-A1
Publication Date:11/27/2025

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be viewed using the USPTO's publicly available Searchable Databases via the Patent Public Search tool at www.uspto.gov. The direct link to access the Patent Public Search tool is currently https://ppubs.uspto.gov/pubwebapp/static/pages/ppubsbasic.html.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through Patent Center, the USPTO's electronic patent application filing and management system. The direct link to access this status information is currently https://patentcenter.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of Patent Center.

Further assistance in electronically accessing the publication, or about Patent Center, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Petitioner Samsung Ex-1004, 1135

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

130333 7590 12/10/2025

PRICE HENEVELD LLP
WHIRLPOOL CORPORATION - MD 3601
2000 NORTH M63
BENTON HARBOR, MI 49022

EXAMINER	
ADHLAKHA, RITA P	
ART UNIT	PAPER NUMBER
1711	

DATE MAILED: 12/10/2025

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
19/297,954	08/12/2025	Mark S. Feddema	SUB-13230-US-CON3	2948

TITLE OF INVENTION: DISHWASHER WITH A DISH RACK

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1290	$0.00	$0.00	$1290	03/10/2026

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 40% the amount of undiscounted fees, and micro entity fees are 20% the amount of undiscounted fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

Petitioner Samsung Ex-1004, 1136

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via the USPTO patent electronic filing system.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications. **Because electronic patent issuance may occur shortly after issue fee payment, any desired continuing application should preferably be filed prior to payment of this issue fee in order not to jeopardize copendency.**

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

130333 7590 12/10/2025

PRICE HENEVELD LLP
WHIRLPOOL CORPORATION - MD 3601
2000 NORTH M63
BENTON HARBOR, MI 49022

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via the USPTO patent electronic filing system or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
19/297,954	08/12/2025	Mark S. Feddema	SUB-13230-US-CON3	2948

TITLE OF INVENTION: DISHWASHER WITH A DISH RACK

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1290	$0.00	$0.00	$1290	03/10/2026

EXAMINER	ART UNIT	CLASS-SUBCLASS
ADHLAKHA, RITA P	1711	134-05700D

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/AIA/122 or PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/AIA/47 or PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required)

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via the USPTO patent electronic filing system ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

❑ Applicant asserting small entity status. See 37 CFR 1.27

NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

❑ Applicant changing to regular undiscounted fee status.

NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

Petitioner Samsung Ex-1004, 1137

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
19/297,954	08/12/2025	Mark S. Feddema	SUB-13230-US-CON3	2948

130333 7590 12/10/2025

PRICE HENEVELD LLP
WHIRLPOOL CORPORATION - MD 3601
2000 NORTH M63
BENTON HARBOR, MI 49022

EXAMINER	
ADHLAKHA, RITA P	
ART UNIT	PAPER NUMBER
1711	

DATE MAILED: 12/10/2025

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Petitioner Samsung Ex-1004, 1138

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. The United States Patent and Trademark Office (USPTO) collects the information in this record under authority of 35 U.S.C. 2. The USPTO's system of records is used to manage all applicant and owner information including name, citizenship, residence, post office address, and other information with respect to inventors and their legal representatives pertaining to the applicant's/ owner's activities in connection with the invention for which a patent is sought or has been granted. The applicable Privacy Act System of Records Notice for the information collected in this form is COMMERCE/PAT-TM-7 Patent Application Files, available in the Federal Register at 78 FR 19243 (March 29, 2013).
https://www.govinfo.gov/content/pkg/FR-2013-03-29/pdf/2013-07341.pdf

Routine uses of the information in this record may include disclosure to:

1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;
2) a federal, state, local, or international agency, in response to its request;
3) a contractor of the USPTO having need for the information in order to perform a contract;
4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;
5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;
6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;
7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;
8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c));
9) the Office of Personnel Management (OPM) for personnel research purposes; and
10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Notice of Allowability	Application No. 19/297,954	Applicant(s) Feddema et al.	
	Examiner RITA P ADHLAKHA	Art Unit 1711	AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to claims filed 8/12/2025.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-26 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some* c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☑ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date See Continuation Sheet.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☑ Interview Summary (PTO-413), Paper No./Mail Date. 11/19/2025.
5. ☑ Examiner's Amendment/Comment
6. ☑ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/RITA P ADHLAKHA/
Primary Examiner, Art Unit 1711

Petitioner Samsung Ex-1004, 1140

Continuation of Attachment(s) 2. Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date: 8/12 /2025, 8/26/2025, 9/10/2025, 9/17/2025

Notice of Pre-AIA or AIA Status

1. The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in an interview with Brian Cheslek on 11/19/2025.

2. The application has been amended as follows:

AMEND CLAIM 1:

1. A dishwasher, comprising:

a tub defining a dish treating chamber;

a first lower dish rack and a second lower dish rack located in the dish treating chamber;

an upper dish rack located above the first lower dish rack and the second lower dish rack in the dish treating chamber, the upper dish rack defining a planar portion and a depression, ~~the depression extending below the planar portion,~~ wherein the depression includes a first angled wall and a second angled wall that each extend at an acute angle relative to the planar portion, and

wherein the first angled wall defines a first set of cup seats, and wherein the second angled wall defines a second set of cup seats; ~~and~~

wherein the planar portion includes a plurality of utensil holders ~~disposed in the planar portion, the plurality of utensil holders~~ configured to horizontally support utensils; and

wherein the depression extends entirely below a top of the utensil holders in the planar portion.

Allowable Subject Matter

3. Claims 1-26 are allowed.

The following is an examiner's statement of reasons for allowance: each of the claimed features of independent claim 1, from which all other claims depend from are not taught or disclosed by the prior art of record. The closest prior art of record, Tuller (USPPN 2015/0245762) at Fig. 8 discloses a rack

having inclined portions 67 for holding glassware, for example, and central portions 65 which may hold utensils thereon. Tuller does not disclose the planar portion and depression as claimed in which "wherein the planar portion includes a plurality of utensil holders configured to horizontally support utensils; and wherein the depression extends entirely below a top of the utensil holders in the planar portion" in combination with the other features of claim 1. Upon further search and consideration, the identified claims are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RITA P ADHLAKHA whose telephone number is (571)270-0378. The examiner can normally be reached M-F, 8-5pm EST.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached at 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of published or unpublished applications may be obtained from Patent Center. Unpublished application information in Patent Center is available to registered users. To file and manage patent submissions in Patent Center, visit: https://patentcenter.uspto.gov. Visit https://www.uspto.gov/patents/apply/patent-center for more information about Patent Center and https://www.uspto.gov/patents/docx for information about filing in DOCX format. For additional questions, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/RITA P ADHLAKHA/
Primary Examiner, Art Unit 1711

Examiner-Initiated Interview Summary	Application No. 19/297,954	Applicant(s) Feddema et al.		
	Examiner RITA P ADHLAKHA	Art Unit 1711	AIA (First Inventor to File) Status Yes	Page 1 of 1

All Participants (applicant, applicants representative, PTO personnel)	Title	Type
RITA P ADHLAKHA	Primary Examiner	Telephonic
BRIAN CHESLEK	Attorney	

Date of Interview: 19 November 2025

Issues Discussed:

Proposed Amendment(s)

Agreement reached regarding Examiner's Amendment to place application in condition for allowance based on prior art of record; telephone calls made 11/17/2025-11/19/2025.

/RITA P ADHLAKHA/ Primary Examiner, Art Unit 1711	

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

Applicant recordation instructions: It is not necessary for applicant to provide a separate record of the substance of interview.

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

Petitioner Samsung Ex-1004, 1145

Notice of References Cited	Application/Control No. 19/297,954	Applicant(s)/Patent Under Reexamination Feddema et al.	
	Examiner RITA P ADHLAKHA	Art Unit 1711	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Name	CPC Classification	US Classification
*	A	US-20150245762-A1	2015-09-03	TULLER; BARRY E.	A47L15/4285	312/228.1
	B					
	C					
	D					
	E					
	F					
	G					
	H					
	I					
	J					
	K					
	L					
	M					

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date YYYY-MM-DD	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title, Date, Publisher, Edition or Volume, Pertinent Pages
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in YYYY-MM-DD format are publication dates. Classifications may be US or foreign.

Petitioner Samsung Ex-1004, 1146

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	19/297,954	Feddema et al.
	Examiner	**Art Unit**
	RITA P ADHLAKHA	1711

CPC						
Symbol					**Type**	**Version**
A47L	/	15	/	502	F	2013-01-01
A47L	/	15	/	4221	I	2013-01-01
A47L	/	15	/	4246	I	2013-01-01
A47L	/	15	/	46	I	2013-01-01
A47L	/	15	/	505	I	2013-01-01
A47L	/	15	/	22	I	2013-01-01
A47L	/	15	/	4217	I	2013-01-01
A47L	/	15	/	503	I	2013-01-01
A47L	/	15	/	428	I	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	26	
/RITA P ADHLAKHA/ Primary Examiner, Art Unit 1711	20 November 2025	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

Petitioner Samsung Ex-1004, 1147

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	19/297,954	Feddema et al.
	Examiner	Art Unit
	RITA P ADHLAKHA	1711

INTERNATIONAL CLASSIFICATION				
CLAIMED				
A47L15/50	/	15	/	50
A47L15/42	/	15	/	42
A47L15/46	/	15	/	46
A47L15/22	/	15	/	22

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	26	
/RITA P ADHLAKHA/ Primary Examiner, Art Unit 1711	20 November 2025	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	19/297,954	Feddema et al.
	Examiner	**Art Unit**
	RITA P ADHLAKHA	1711

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	10	10	18	19										
2	2	11	11	19	20										
3	3	12	12	20	21										
4	4	13	13	21	22										
5	5	14	14	22	23										
6	6	15	15	23	24										
7	7	26	16	24	25										
8	8	16	17	25	26										
9	9	17	18												

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	26	
/RITA P ADHLAKHA/ Primary Examiner, Art Unit 1711	20 November 2025	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	3

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	19/297,954	Feddema et al.
	Examiner	Art Unit
	RITA P ADHLAKHA	1711

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/20/2025								
1	1	=								
2	2	=								
3	3	=								
4	4	=								
5	5	=								
6	6	=								
7	7	=								
8	8	=								
9	9	=								
10	10	=								
11	11	=								
12	12	=								
13	13	=								
14	14	=								
15	15	=								
26	16	=								
16	17	=								
17	18	=								
18	19	=								
19	20	=								
20	21	=								
21	22	=								
22	23	=								
23	24	=								
24	25	=								
25	26	=								

Petitioner Samsung Ex-1004, 1150

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	19/297,954	Feddema et al.
	Examiner	Art Unit
	RITA P ADHLAKHA	1711

CPC - Searched*		
Symbol	Date	Examiner
(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc. limited by text search	11/20/2025	rpa

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
Inventor and assignee search, keyword search, similarity search, review of IDS of record to identify relevant prior art	11/20/2025	rpa

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505). cpc. limited by text search	11/20/2025	rpa

/RITA P ADHLAKHA/ Primary Examiner, Art Unit 1711	

Petitioner Samsung Ex. 1004, 1151

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-25)
Approved for use through 11/30/2027. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	
Filing Date	
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

U.S. PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Inventor of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	2527178		1950-10-24	Elsaesser	
	2	8168006	B2	2012-05-01	Bengston et al.	
	3	9901240	B2	2018-02-27	Lee	
	4	10835098	B2	2020-11-17	Disch et al.	

If you wish to add additional U.S. Patent citation information, please click the Add button. Add

U.S. PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Inventor or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20060237051	A1	2006-10-26	Bengston et al.	
	2	20090320883	A1	2009-12-31	Falk	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	
	Filing Date	
	First Named Inventor	Mark S. Feddema
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SUB-13230-US-CON3

	3	20110203616	A1	2011-08-25	Berner et al.	
	4	20150245762	A1	2015-09-03	Tuller	
	5	20180242816	A1	2018-08-30	Cao et al.	
	6	20190290094	A1	2019-09-26	Balinski et al.	
	7	20190298146	A1	2019-10-03	Gutkowski	

If you wish to add additional U.S. Published Application citation information, please click the Add button Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	112018070373	BR	A2	2019-01-29	Michal		☒
	2	101612027	CN	A	2009-12-30	Falk		☒
	3	101966069	CN	A	2011-02-09	Jobst		☒
	4	102215985	CN	A	2011-10-12	Bernhard et al.		☒

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	
	Filing Date	
	First Named Inventor	Mark S. Feddema
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SUB-13230-US-CON3

	5	109475265	CN	A	2016-04-08	Michal		☒
	6	105496336	CN	A	2016-04-20	Li et al.		☒
	7	105559725	CN	A	2016-05-11	Cao		☒
	8	205697665	CN	U	2016-11-23	Cao et al.		☒
	9	108135432	CN	A	2018-06-08	Disch et al.		☒
	10	109259690	CN	A	2019-01-25	Wang et al.		☒
	11	102013213612	DE	A1	2015-01-15	Oberstaller et al.		☒
	12	102014208843	DE	A1	2015-11-12	Doppelbauer		☒
	13	102017200272	DE	A1	2018-07-12	Gebauer et al.		☒
	14	0963733	EP	A1	1999-12-15	Fumagalli		☐
	15	3439527	EP	A1	2019-02-13	Michal		☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	
Filing Date	
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

	16	2643809	FR	A1	1990-09-07	Clavel		☒
	17	2014094897	WO	A1	2014-06-26	Hederstierna et al.		☐
	18	2017176286	WO	A1	2017-10-12	Michal		☐

If you wish to add additional Foreign Patent Document citation information, please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information, please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/RITA P ADHLAKHA/	Date Considered	11/20/2025

*EXAMINER: Initial if reference considered and whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	
Filing Date	
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

TIMING STATEMENT

Please see 37 CFR 1.97(e) to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached timing statement under 37 CFR 1.97(e).

☒ A timing statement under 37 CFR 1.97(e) is not submitted herewith.

TIMING FEE

☐ The fee set forth in 37 CFR 1.17(p) has been submitted herewith.

COPIES

☐ An identification of an earlier application pursuant to 37 CFR 1.98(d)(1) is attached.

SIZE FEE ASSERTION

Please see 37 CFR 1.17(v) and the IDS Auto-Load Instructions for completing this form to make the appropriate selection of an assertion under 37 CFR 1.98. For the information disclosure statement (IDS) submitted herewith, the applicant or patent owner certifies the following with respect to the cumulative number of applicant-provided or patent-owner provided items of information submitted to date including those in the accompanying IDS (select only one):

☒ No IDS size fee is required under 37 CFR 1.17(v) at this time.

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(1).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(2).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(3).

SIGNATURE

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/brianrcheslek/	Date (YYYY-MM-DD)	2025-08-12
Name/Print	Brian R. Cheslek	Registration Number	58,329

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	
	Filing Date	
	First Named Inventor	Mark S. Feddema
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SUB-13230-US-CON3

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-25)
Approved for use through 11/30/2027. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

U.S. PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Inventor of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	2987260	A	1961-06-06	Sasnett	
	2	5626242	A	1997-05-06	Weizer	

If you wish to add additional U.S. Patent citation information, please click the Add button. Add

U.S. PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Inventor or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20050241680	A1	2005-11-03	Noh	
	2	20150190033	A1	2015-07-09	Shaffer et al.	
	3	20180220867	A1	2018-08-09	Carr et al.	

If you wish to add additional U.S. Published Application citation information, please click the Add button Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T[5]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

	1	1579313	CN	A	2005-02-16	Nito et al.		☒
	2	9317963	DE	U1	1995-03-23	Licentia Patent Verwaltungs GmbH		☒
	3	102014223373	DE	B3	2015-11-26	Isbilen		☒
	4	101217384	KR	B1	2012-12-31	Shoji et al.		☒
	5	2018082321	WO	A1	2018-05-11	Cao et al.		☒

If you wish to add additional Foreign Patent Document citation information, please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information, please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/RITA P ADHLAKHA/	Date Considered	11/20/2025

*EXAMINER: Initial if reference considered and whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

TIMING STATEMENT

Please see 37 CFR 1.97(e) to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached timing statement under 37 CFR 1.97(e).

☒ A timing statement under 37 CFR 1.97(e) is not submitted herewith.

TIMING FEE

☐ The fee set forth in 37 CFR 1.17(p) has been submitted herewith.

COPIES

☐ An identification of an earlier application pursuant to 37 CFR 1.98(d)(1) is attached.

SIZE FEE ASSERTION

Please see 37 CFR 1.17(v) and the IDS Auto-Load Instructions for completing this form to make the appropriate selection of an assertion under 37 CFR 1.98. For the information disclosure statement (IDS) submitted herewith, the applicant or patent owner certifies the following with respect to the cumulative number of applicant-provided or patent-owner provided items of information submitted to date including those in the accompanying IDS (select only one):

☒ No IDS size fee is required under 37 CFR 1.17(v) at this time.

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(1).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(2).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(3).

SIGNATURE

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/brianrcheslek/	Date (YYYY-MM-DD)	2025-08-26
Name/Print	Brian R. Cheslek	Registration Number	58,329

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Petitioner Samsung Ex-1004, 1162

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

Bibliographic Data

Application No: 19/297,954

Foreign Priority claimed: ○ Yes ◉ No

35 USC 119 (a-d) conditions met: ☐ Yes ☑ No ☐ Met After Allowance

Verified and Acknowledged: /RITA P ADHLAKHA/ Examiner's Signature | Initials

Title: DISHWASHER WITH A DISH RACK

FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
08/12/2025	134	1711	SUB-13230-US-CON3
RULE			

APPLICANTS

WHIRLPOOL CORPORATION, BENTON HARBOR, MI, UNITED STATES

INVENTORS

Mark S. Feddema, Kalamazoo, MI, UNITED STATES

William J. Snell, Elkhart, IN, UNITED STATES

Sachie Kakehi, St. Joseph, MI, UNITED STATES

Steven B. Balinski, Rockford, MN, UNITED STATES

David Jason Brightbill, Berrien Center, MI, UNITED STATES

Joseph T. Ferencevich, St. Joseph, MI, UNITED STATES

Sujit S. Naik, St. Joseph, MI, UNITED STATES

Frederick Thomas Roderick, Coloma, MI, UNITED STATES

Ryan Kevin Roth, Grandville, MI, UNITED STATES

CONTINUING DATA

This application is a CON of 19039228 01/28/2025

19039228 is a CON of 18535327 12/11/2023 PAT 12232681

18535327 is a CON of 17830947 06/02/2022 PAT 11864712

17830947 is a CON of 16833984 03/30/2020 PAT 11375874

FOREIGN APPLICATIONS

IF REQUIRED, FOREIGN LICENSE GRANTED**

08/21/2025

STATE OR COUNTRY

UNITED STATES

ADDRESS

PRICE HENEVELD LLP

WHIRLPOOL CORPORATION - MD 3601
2000 NORTH M63
BENTON HARBOR, MI 49022
UNITED STATES

FILING FEE RECEIVED

$7,865

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-25)
Approved for use through 11/30/2027. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

U.S. PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Inventor of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	2910207		1959-10-27	Andrew	
	2	3040901		1962-06-26	Andrew	
	3	D196450	S	1963-10-01	Claywell	
	4	3269548	A	1966-08-30	Geiger et al.	
	5	3361361		1968-01-02	Schutte	
	6	D212121	S	1968-08-27	Tuthill	
	7	3752322	A	1973-08-14	Fiocca et al.	
	8	D376451	S	1996-12-10	Osborn	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

	9	D383505	S	1997-09-09	Wise et al.	
	10	D383879	S	1997-09-16	Good	
	11	5673714	A	1997-10-07	Campagnolo et al.	
	12	D393505	S	1998-04-14	Good	
	13	7032604	B2	2006-04-25	Welch	
	14	7594513	B2	2009-09-29	Vanderroest et al.	
	15	7621286	B2	2009-11-24	Frei et al.	
	16	7896977	B2	2011-03-01	Gillum et al.	
	17	8007598	B2	2011-08-30	Chen et al.	
	18	8408403	B2	2013-04-02	Hedstrom et al.	
	19	8646620	B2	2014-02-11	Klump et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

	20	8778094	B2	2014-07-15	Blanchard et al.	
	21	8801863	B2	2014-08-12	Blanchard et al.	
	22	8813766	B2	2014-08-26	Bhajak et al.	
	23	8820544	B2	2014-09-02	Lindgren et al.	
	24	8915560	B2	2014-12-23	Cox et al.	
	25	D739094	S	2015-09-15	Ovesen	
	26	9241607	B2	2016-01-26	Porcaro, II et al.	
	27	D750855	S	2016-03-01	Lee et al.	
	28	9295369	B2	2016-03-29	Fauth et al.	
	29	9326657	B2	2016-05-03	Thiyagarajan	
	30	9420938	B2	2016-08-23	Forst et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

	31	9532701	B2	2017-01-03	Feddema et al.	
	32	9579009	B2	2017-02-28	Bhajak et al.	
	33	9596975	B2	2017-03-21	Bhajak et al.	
	34	9609999	B2	2017-04-04	Delle	
	35	9629516	B2	2017-04-25	Chen et al.	
	36	9914155	B2	2018-03-13	Disch et al.	
	37	D827953	S	2018-09-04	Lee et al.	
	38	10716449	B2	2020-07-21	Balinski et al.	
	39	D900417	S	2020-10-27	Baldwin et al.	
	40	10888212	B2	2021-01-12	Feddema et al.	
	41	10952589	B2	2021-03-23	Brightbill et al.	

Petitioner Samsung Ex-1004, 1169

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

	42	11006813	B2	2021-05-18	Naik et al.	
	43	D927101	S	2021-08-03	Baldwin et al.	
	44	11179019	B2	2021-11-23	Sayir	
	45	11219350	B2	2022-01-11	Fawaz et al.	
	46	D950877	S	2022-05-03	Tuang	
	47	11337583	B2	2022-05-24	Feddema et al.	
	48	D956372	S	2022-06-28	Pugh et al.	
	49	11375874	B2	2022-07-05	Feddema et al.	
	50	D957779	S	2022-07-12	Zang	
	51	D960466	S	2022-08-09	Viswanathan et al.	
	52	11484180	B2	2022-11-01	Dietrich et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	19297954
	Filing Date	2025-08-12
	First Named Inventor	Mark S. Feddema
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SUB-13230-US-CON3

	53	D973290	S	2022-12-20	Naik et al.	
	54	D977768	S	2023-02-07	Ding et al.	
	55	D398092	S	1998-09-08	Good	
	56	9113773	B2	2015-08-25	Bartloff et al.	
	57	D750854	S	2016-03-01	Lee et al.	

If you wish to add additional U.S. Patent citation information, please click the Add button. Add

U.S. PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Inventor or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20030226580	A1	2003-12-11	Welch	
	2	20070158472	A1	2007-07-12	Calhoun et al.	
	3	20080109387	A1	2008-05-08	Deaver et al.	
	4	20090159103	A1	2009-06-25	Gillum et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	19297954
	Filing Date	2025-08-12
	First Named Inventor	Mark S. Feddema
	Art Unit	
	Examiner Name	
	Attorney Docket Number	SUB-13230-US-CON3

	5	20090255560	A1	2009-10-15	Lehmann et al.	
	6	20100101611	A1	2010-04-29	Chen et al.	
	7	20100235008	A1	2010-09-16	Forbes, Jr. et al.	
	8	20110139181	A1	2011-06-16	Lee et al.	
	9	20120138106	A1	2012-06-07	Fountain et al.	
	10	20130255733	A1	2013-10-03	Ju et al.	
	11	20150129004	A1	2015-05-14	Lee et al.	
	12	20150201823	A1	2015-07-23	Poojary et al.	
	13	20170135547	A1	2017-05-18	Tuller	
	14	20170285081	A1	2017-10-05	Silverman	
	15	20170292999	A1	2017-10-12	Turner et al.	

Petitioner Samsung Ex-1004, 1172

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

	16	20200027096	A1	2020-01-23	Cooner	
	17	20210298561	A1	2021-09-30	Feddema et al.	
	18	20230066054	A1	2023-03-02	Feddema	

If you wish to add additional U.S. Published Application citation information, please click the Add button Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	101049224	CN	A	2007-10-10	Lee et al.		☒
	2	104905745	CN	A	2015-09-16	Hangzhou Sanhua Institute Co., Ltd.		☒
	3	105431070	CN	A	2016-03-23	Disch et al.		☒
	4	106923767	CN	A	2017-07-07	Han		☒
	5	107320043	CN	A	2017-11-07	Zhong et al.		☒
	6	304875005	CN	S	2020-10-19	Qingdao Haier Dishwasher Co., Ltd.		☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

	7	307125899	CN	S	2022-02-22	Cuckoo Homesys Co., Ltd.		☐
	8	2907916	DE	A1	1980-09-11	Riemann et al.		☒
	9	102009033895	DE	A1	2010-04-29	Chen et al.		☒
	10	1334687	EP	A1	2003-08-13	Steiner et al.		☒
	11	2192852	EP	B1	2011-09-14	Seyfettin et al.		☒
	12	2594186	EP	B1	2014-01-15	Milani et al.		☐
	13	2912983	EP	A2	2015-09-02	Tuller		☐
	14	1123787	GB	A	1968-08-14	Borghi		☐
	15	2058852	GB	A	1981-04-15	Oisson		☐
	16	301079101	KR	S	2020-10-19	Cuckoo Electronics Co., Ltd.		☐
	17	301079752	KR	S	2020-10-23	Cuckoo Electronics Co., Ltd.		☐

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

	18	301079754	KR	S	2020-10-23	Cuckoo Electronics Co., Ltd.		☐
	19	301130470	KR	S	2021-10-13	NA Seung Hitech Co., Ltd.		☐
	20	2009041899	WO	A1	2009-04-02	Svensson et al.		☐
	21	2016206712	WO	A1	2016-12-29	Wahlberg et al.		☐

If you wish to add additional Foreign Patent Document citation information, please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

If you wish to add additional non-patent literature document citation information, please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/RITA P ADHLAKHA/	Date Considered	11/20/2025

*EXAMINER: Initial if reference considered and whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

TIMING STATEMENT

Please see 37 CFR 1.97(e) to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached timing statement under 37 CFR 1.97(e).

☒ A timing statement under 37 CFR 1.97(e) is not submitted herewith.

TIMING FEE

☐ The fee set forth in 37 CFR 1.17(p) has been submitted herewith.

COPIES

☐ An identification of an earlier application pursuant to 37 CFR 1.98(d)(1) is attached.

SIZE FEE ASSERTION

Please see 37 CFR 1.17(v) and the IDS Auto-Load Instructions for completing this form to make the appropriate selection of an assertion under 37 CFR 1.98. For the information disclosure statement (IDS) submitted herewith, the applicant or patent owner certifies the following with respect to the cumulative number of applicant-provided or patent-owner provided items of information submitted to date including those in the accompanying IDS (select only one):

☐ No IDS size fee is required under 37 CFR 1.17(v) at this time.

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(1).

☒ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(2).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(3).

SIGNATURE

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/brianrcheslek/	Date (YYYY-MM-DD)	2025-09-10
Name/Print	Brian R. Cheslek	Registration Number	58,329

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

PE2E SEARCH - Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
L1	78	("20050241680"|"20150190033"|"20180220867"|"2987260"|"5626242"|"10835098"|"20060237051"|"20090320883"|"20110203616"|"20150245762"|"20180242816"|"20190290094"|"20190298146"|"2527178"|"8168006"|"9901240").PN.	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2025/11/12 09:19 PM
L2	18	("20050241680"|"20150190033"|"20180220867"|"2987260"|"5626242"|"10835098"|"20060237051"|"20090320883"|"20110203616"|"20150245762"|"20180242816"|"20190290094"|"20190298146"|"2527178"|"8168006"|"9901240").PN.	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2025/11/12 09:20 PM
L5	39	(Artificial Intelligence) More like doc: US-20150245762-A1 Text: (US-3126098-A OR US-2734520-A OR US-1562614-A OR US-2841288-A OR US-2907470-A OR US-2971652-A OR US-2910207-A OR US-3051183-A OR US-3040901-A OR US-3258127-A OR US-3269548-A OR US-3303934-A OR GB-1205641-A OR US-3454019-A OR US-3612285-A OR US-3752322-A OR US-4064887-A OR US-4134414-A OR US-4238035-A OR CA-1157746-A).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2025/11/14 10:11 AM
L6	39	(Artificial Intelligence) More like doc: US-20150245762-A1 Text: (US-3126098-A OR US-2734520-A OR US-1562614-A OR US-	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS,	OR	ON	ON	2025/11/14 12:18 PM

		2841288-A OR US-2907470-A OR US-2971652-A OR US-2910207-A OR US-3051183-A OR US-3040901-A OR US-3258127-A OR US-3269548-A OR US-3303934-A OR GB-1205641-A OR US-3454019-A OR US-3612285-A OR US-3752322-A OR US-4064887-A OR US-4134414-A OR US-4238035-A OR CA-1157746-A).did.	IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)				
L7	339	((("FEDDEMA") near3 ("Mark")) OR (("SNELL") near3 ("William")) OR (("KAKEHI") near3 ("Sachie")) OR (("BALINSKI") near3 ("Steven")) OR (("BRIGHTBILL") near3 ("David")) OR (("FERENCEVICH") near3 ("Joseph")) OR (("NAIK") near3 ("Sujit")) OR (("RODERICK") near3 ("Frederick")) OR (("ROTH") near3 ("Ryan"))).INV.	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2025/11/14 02:23 PM
L8	2	((("FEDDEMA") near3 ("Mark")) OR (("SNELL") near3 ("William")) OR (("KAKEHI") near3 ("Sachie")) OR (("BALINSKI") near3 ("Steven")) OR (("BRIGHTBILL") near3 ("David")) OR (("FERENCEVICH") near3 ("Joseph")) OR (("NAIK") near3 ("Sujit")) OR (("RODERICK") near3 ("Frederick")) OR (("ROTH") near3 ("Ryan"))).INV. AND rack SAME depression	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2025/11/14 04:14 PM
L9	9435	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2025/11/14 04:14 PM

		A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc.					
L10	740	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc. AND rack WITH (depression incline$2 angl$3)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2025/11/14 04:15 PM
L11	39	(Artificial Intelligence) More like doc: US-20150245762-A1 Text: (US-3126098-A OR US-2734520-A OR US-1562614-A OR US-2841288-A OR US-2907470-A OR US-2971652-A OR US-2910207-A OR US-3051183-A OR US-3040901-A OR US-3258127-A OR US-3269548-A OR US-3303934-A OR GB-1205641-A OR US-3454019-A OR US-3612285-A OR US-3752322-A OR US-4064887-A OR US-4134414-A OR US-4238035-A OR CA-1157746-A).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2025/11/14 04:57 PM
L12	386	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc. AND (cup glass mug) WITH hold$3	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2025/11/17 07:40 PM
L13	483	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT;	OR	ON	ON	2025/11/17 07:40 PM

		A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc. AND depress$5	IBM_TDB)				
L14	84	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc. AND depress$5 WITH (rack hold$3)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2025/11/17 07:40 PM
L15	32	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc. AND depress$5 WITH (glass glassware cup mug stemware wine)	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2025/11/17 07:41 PM
L16	35	(Artificial Intelligence) More like doc: US-2907470-A Text: (US-936725-A OR US-1270631-A OR US-1279071-A OR US-1421705-A OR US-1493948-A OR US-1760307-A OR US-1902237-A OR US-1834951-A OR US-2035625-A OR US-2151068-A OR US-2095685-A OR US-2123837-A OR US-2293893-A OR US-2433823-A OR US-2554232-A OR US-2907470-A OR US-7198054-B2 OR DE-940143-C OR US-20050133063-A1 OR CA-2487082-A1).did.	(US-PGPUB; USPAT; USOCR; FIT (AU, AP, AT, BE, BG, BR, BY, CA, CH, CN, CS, CU, CZ, DD, DE, DK, EA, EE, EP, ES, FI, FR, GB, HR, HU, ID, IE, IL, IS, IT, JP, KR, LT, LU, LV, MA, OA, RU, SU, WO, MC, MD, MY, NL, NO, NZ, PH, PL, PT, RO, RS, SE, SG, SI, SK, TH, TN, TR, TW, UA, VN); FPRS; EPO; JPO; DERWENT; IBM_TDB)	OR	ON	ON	2025/11/17 07:42 PM
L17	26	("2710617" | "2947311" | "3095885" | "3141618" | "3217721" | "3221754"	(US-PGPUB; USPAT; USOCR)	OR	ON	ON	2025/11/17 07:42 PM

		| "3329529" | "3466109" | "3486804" | "3586011" | "3594058" | "3884263" | "4134413" | "4653520" | "5829459" | "5934298" | "6289908").pn. AND (PGPB | USPT | USOC).dbnm.					
L18	1723	L9 AND (("WHIRLPOOL CORPORATION".ase. OR "SAMSUNG ELECTRONICS CO., LTD.".ase. OR "HAIER US APPLIANCE SOLUTIONS, INC.".ase. OR "LG ELECTRONICS INC.".ase. OR "BSH BOSCH UND SIEMENS HAUSGERAETE GMBH".ase. OR "BSH HAUSGERÄTE GMBH".ase. OR "MIDEA GROUP CO., LTD.".ase. OR "ELECTROLUX HOME PRODUCTS, INC.".ase. OR "GENERAL ELECTRIC COMPANY".ase. OR "BSH BOSCH UND SIEMENS HAUSGERATE GMBH".ase. OR "ILLINOIS TOOL WORKS INC.".ase. OR "ECOLAB USA INC.".ase. OR "ELECTROLUX APPLIANCES AKTIEBOLAG".ase. OR "MAYTAG CORPORATION".ase. OR "ELECTROLUX HOME PRODUCTS CORPORATION N.V.".ase. OR "FISHER & PAYKEL LIMITED".ase. OR "ARCELIK ANONIM SIRKETI".ase. OR "BSH HOME APPLIANCES CORPORATION".ase. OR "BSH	(US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT)	OR	ON	ON	2025/11/20 07:53 AM

		HAUSGERAETE GMBH".ase. OR "MIELE & CIE. KG".ase. OR "PREMARK FEG L.L.C.".ase. OR "MAYTAG CORP.".ase. OR "ECOLAB INC.".ase. OR "ELECTROLUX HOME PRODUCTS CORPORATION, N.V.".ase. OR "LG ELECTRONICS, INC.".ase.))					
L19	40	(Artificial Intelligence) Similar to: 19/297,954 with 0 CPC Selections and 0 Text Selections Text: (US-20180368654-A1 OR US-11395574-B2 OR US-20200305679-A1 OR US-20210330172-A1 OR US-20150201823-A1 OR EP-2896343-A1 OR US-10076224-B2 OR EP-3545811-A1 OR US-11389042-B2 OR US-20220338705-A1 OR US-11612298-B2 OR CN-113455987-A OR US-20190290094-A1 OR US-10716449-B2 OR EP-4111935-A1 OR US-20170055799-A1 OR US-20240108193-A1 OR US-20230000305-A1 OR US-20180249881-A1 OR EP-4245204-A1 OR US-11849900-B2 OR US-20230309784-A1 OR EP-4342356-A2 OR EP-4252613-A1 OR US-20150245762-A1 OR EP-3545811-B1 OR US-20180220862-A1 OR US-20130206180-A1 OR US-11857135-B2 OR EP-4111935-B1 OR US-12329346-B2 OR EP-2912983-A2 OR US-20240081610-A1 OR US-9635995-B2 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO))	OR	ON	ON	2025/11/20 02:04 PM

		US-20250194895-A1 OR US-10499790-B2 OR US-20170209018-A1 OR US-9357899-B2 OR US-20140111071-A1 OR US-20170135547-A1 OR US-20240057846-A1 OR US-8764908-B2 OR US-10512385-B2 OR US-11678785-B2 OR DE-102006012453-B4 OR US-20220338708-A1 OR US-20250288183-A1 OR US-20240215798-A1 OR US-20060254627-A1 OR US-20200221925-A1).did.					
L20	39	(Artificial Intelligence) Similar to: 19/297,954 with 0 CPC Selections and 1 Text Selection --- Text: (US-20220257089-A1 OR EP-3838101-A1 OR US-D1092881-S OR US-D1094929-S OR US-D1026361-S OR US-D956372-S OR US-D1014877-S OR US-D1015655-S OR US-D938108-S OR US-D1012386-S OR US-9750390-B2 OR US-20170150866-A1 OR US-9986885-B2 OR US-20170172375-A1 OR EP-3181033-B1 OR US-20170172372-A1 OR US-10307035-B2 OR US-20180235431-A1 OR US-9993132-B2 OR US-11672404-B2 OR US-12082762-B2 OR US-10098520-B2 OR KR-101750314-B1 OR US-20240324844-A1 OR EP-4292506-B1 OR EP-4292506-A1 OR US-11969129-B2 OR US-20230404355-A1 OR EP-4154791-A1 OR US-20230095126-A1 OR US-12029370-B2 OR US-20170258292-	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO))	OR	ON	ON	2025/11/20 02:05 PM

		A1 OR US-20170290489-A1 OR US-10314459-B2 OR EP-3834699-A1 OR US-11330958-B2 OR US-20210177237-A1 OR US-20170258291-A1 OR US-4719770-A OR US-20230371778-A1 OR CN-113455987-A OR EP-2225996-A1 OR EP-2889408-B1 OR US-20140190525-A1 OR US-9241607-B2 OR US-20150176181-A1 OR US-9587344-B2 OR EP-2889408-A1 OR US-20250283261-A1 OR KR-20250136684-A).did.					
L21	41	(Artificial Intelligence) Similar to: 19/297,954 with 1 CPC Selection and 1 Text Selection Text: (US-9986885-B2 OR US-20170172375-A1 OR EP-3181033-B1 OR US-20170172372-A1 OR US-20180235431-A1 OR US-10307035-B2 OR US-9993132-B2 OR KR-101750314-B1 OR US-20170290489-A1 OR CN-113455987-A OR US-20140190525-A1 OR US-9241607-B2 OR EP-3838101-A1 OR US-20220257089-A1 OR WO-2023136524-A1 OR KR-20230109422-A OR US-D1092881-S OR US-D1014877-S OR US-D1015655-S OR US-D956372-S OR US-20170150866-A1 OR US-D1094929-S OR US-D1026361-S OR US-D1012386-S OR US-D938108-S OR US-20060254627-A1 OR US-20100101611-A1 OR US-8007598-B2 OR US-7794550-B2 OR	(US-PGPUB; USPAT; USOCR; FIT (CN, FR, WO))	OR	ON	ON	2025/11/20 02:05 PM

		US-9750390-B2 OR US-11672404-B2 OR US-20180368654-A1 OR US-12082762-B2 OR US-20210330172-A1 OR US-8349089-B2 OR US-20100116296-A1 OR EP-2888987-A1 OR US-20250213097-A1 OR DE-102006012453-B4 OR US-10098520-B2 OR US-7137397-B2 OR US-20250194895-A1 OR US-20180256005-A1 OR US-20240081610-A1 OR EP-1241974-B1 OR US-9763557-B2 OR EP-3412196-A1 OR US-9526397-B2 OR EP-2803311-A1 OR CN-102599870-A).did.					

PE2E SEARCH - Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	British Equivalents	Time Stamp
N1	313	((("FEDDEMA") near3 ("Mark")) OR (("SNELL") near3 ("William")) OR (("KAKEHI") near3 ("Sachie")) OR (("BALINSKI") near3 ("Steven")) OR (("BRIGHTBILL") near3 ("David")) OR (("FERENCEVICH") near3 ("Joseph")) OR (("NAIK") near3 ("Sujit")) OR (("RODERICK") near3 ("Frederick")) OR (("ROTH") near3 ("Ryan"))).INV.	(US-PGPUB; USPAT)	OR	ON	ON	2025/11/14 02:24 PM
N2	2	((("FEDDEMA") near3 ("Mark")) OR (("SNELL") near3 ("William")) OR (("KAKEHI") near3 ("Sachie")) OR (("BALINSKI") near3 ("Steven")) OR (("BRIGHTBILL") near3 ("David")) OR (("FERENCEVICH")	(US-PGPUB; USPAT)	OR	ON	ON	2025/11/14 04:14 PM

		near3 ("Joseph")) OR (("NAIK") near3 ("Sujit")) OR (("RODERICK") near3 ("Frederick")) OR (("ROTH") near3 ("Ryan"))).INV. AND rack SAME depression					
N3	3655	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc.	(US-PGPUB; USPAT)	OR	ON	ON	2025/11/14 04:15 PM
N4	312	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc. AND rack WITH (depression incline$2 angl$3)	(US-PGPUB; USPAT)	OR	ON	ON	2025/11/14 04:15 PM
N5	265	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc. AND (cup glass mug) WITH hold$3	(US-PGPUB; USPAT)	OR	ON	ON	2025/11/17 07:40 PM
N6	237	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc. AND depress$5	(US-PGPUB; USPAT)	OR	ON	ON	2025/11/17 07:40 PM
N7	51	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR	(US-PGPUB; USPAT)	OR	ON	ON	2025/11/17 07:40 PM

		A47L15/503 OR A47L15/505).cpc. AND depress$5 WITH (rack hold$3)					
N8	20	(A47L15/502 OR A47L15/22 OR A47L15/4217 OR A47L15/4221 OR A47L15/4246 OR A47L15/428 OR A47L15/46 OR A47L15/503 OR A47L15/505).cpc. AND depress$5 WITH (glass glassware cup mug stemware wine)	(US-PGPUB; USPAT)	OR	ON	ON	2025/11/17 07:41 PM
N9	104	L10 AND ((211/41.8 OR 211/41.9 OR 211/181.1 OR 211/41.4 OR 211/71.01 OR 211/151 OR 211/171 OR 211/41.18 OR 211/41.2 OR 211/70.7 OR 211/13.1 OR 211/169 OR 211/184 OR 211/4 OR 211/41.1 OR 211/41.3 OR 211/59.1 OR 211/74 OR 211/75 OR 211/78 OR 211/79 OR 211/85.3 OR 211/85.31 OR 211/86.01 OR 134/25.2 OR 134/56D OR 134/198 OR 134/200 OR 134/58D OR 134/172 OR 134/201 OR 134/135 OR 134/137 OR 134/183 OR 134/174 OR 134/186 OR 134/103.3 OR 134/151 OR 134/177 OR 134/179 OR 134/180 OR 134/25.1 OR 134/103.2 OR 134/144 OR 134/145 OR 134/148 OR 134/176 OR 134/184 OR 134/188 OR 134/199 OR 134/34 OR 134/57D OR 134/92 OR 134/94.1 OR 134/1 OR 134/10 OR 134/103.1 OR 134/104.2 OR 134/107 OR 134/108 OR 134/109 OR 134/112 OR 134/121	(US-PGPUB; USPAT)	OR	ON	ON	2025/11/20 07:52 AM

		OR 134/124 OR 134/133 OR 134/134 OR 134/138 OR 134/139 OR 134/153 OR 134/157 OR 134/164 OR 134/166R OR 134/173 OR 134/175 OR 134/18 OR 134/182 OR 134/191 OR 134/36 OR 134/58R OR 134/95.1 OR 134/98.1 OR 134/99.2 OR 220/488 OR 220/377 OR 220/511 OR 220/529 OR 220/572).ccls.)					
N10	1723	L9 AND (("WHIRLPOOL CORPORATION".ase. OR "SAMSUNG ELECTRONICS CO., LTD.".ase. OR "HAIER US APPLIANCE SOLUTIONS, INC.".ase. OR "LG ELECTRONICS INC.".ase. OR "BSH BOSCH UND SIEMENS HAUSGERAETE GMBH".ase. OR "BSH HAUSGERÄTE GMBH".ase. OR "MIDEA GROUP CO., LTD.".ase. OR "ELECTROLUX HOME PRODUCTS, INC.".ase. OR "GENERAL ELECTRIC COMPANY".ase. OR "BSH BOSCH UND SIEMENS HAUSGERATE GMBH".ase. OR "ILLINOIS TOOL WORKS INC.".ase. OR "ECOLAB USA INC.".ase. OR "ELECTROLUX APPLIANCES AKTIEBOLAG".ase. OR "MAYTAG CORPORATION".ase. OR "ELECTROLUX HOME PRODUCTS CORPORATION N.V.".ase. OR "FISHER	(US-PGPUB; USPAT)	OR	ON	ON	2025/11/20 07:53 AM

		& PAYKEL LIMITED".ase. OR "ARCELIK ANONIM SIRKETI".ase. OR "BSH HOME APPLIANCES CORPORATION".ase. OR "BSH HAUSGERAETE GMBH".ase. OR "MIELE & CIE. KG".ase. OR "PREMARK FEG L.L.C.".ase. OR "MAYTAG CORP.".ase. OR "ECOLAB INC.".ase. OR "ELECTROLUX HOME PRODUCTS CORPORATION, N.V.".ase. OR "LG ELECTRONICS, INC.".ase.))					

PE2E SEARCH - Search History (Similarity Search)

Ref #	Sort and Retrieval Information	Text Selections	CPC Selections
L19	Sort results by: Similarity to Application # 19/297,954 Retrieve results by: Application # 19/297,954	No selections	No selections
L20	Sort results by: Similarity to Application # 19/297,954 Retrieve results by: Application # 19/297,954	(Claims) . A dishwasher, comprising: a tub defining a dish treating chamber; a first lower dish rack and a second lower dish rack located in the dish treating chamber; an upper dish rack located above the first lower dish rack and the second lower dish rack in the dish treating chamber, the upper dish rack defining a planar portion and a depression, the depression extending below the planar portion, wherein the depression includes a first angled wall and a second angled wall that each extend at an acute angle relative to	No selections

Petitioner Samsung Ex. 1004, 1191

		the planar portion, and wherein the first angled wall defines a first set of cup seats, and wherein the second angled wall defines a second set of cup seats; and a plurality of utensil holders disposed in the planar portion, the plurality of utensil holders configured to horizontally support utensils.	
L21	Sort results by: Similarity to Application # 19/297,954 Retrieve results by: Application # 19/297,954	(Claims) . A dishwasher, comprising: a tub defining a dish treating chamber; a first lower dish rack and a second lower dish rack located in the dish treating chamber; an upper dish rack located above the first lower dish rack and the second lower dish rack in the dish treating chamber, the upper dish rack defining a planar portion and a depression, the depression extending below the planar portion, wherein the depression includes a first angled wall and a second angled wall that each extend at an acute angle relative to the planar portion, and wherein the first angled wall defines a first set of cup seats, and wherein the second angled wall defines a second set of cup seats; and a plurality of utensil holders disposed in the planar portion, the plurality of utensil holders configured to horizontally support utensils.	(A47L15/502) Cutlery baskets

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed

PTO/SB/08a (01-25)
Approved for use through 11/30/2027. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

U.S. PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Inventor of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	3433363	A	1969-03-18	Clearman et al.	
	2	3464566	A	1969-09-02	Gilson	
	3	4046261	A	1977-09-06	Yake	
	4	4339051	A	1982-07-13	Crawford	
	5	4917248	A	1990-04-17	Friskney	
	6	5158185	A	1992-10-27	Michael et al.	
	7	5205419	A	1993-04-27	Purtilo	
	8	5601195	A	1997-02-11	Finola et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

	9	6571965	B1	2003-06-03	Beck et al.	
	10	6848585	B2	2005-02-01	VanLandingham	
	11	7231929	B2	2007-06-19	Landsiedel et al.	
	12	8651287	B2	2014-02-18	Moser et al.	
	13	9949613	B2	2018-04-24	Blanchard et al.	
	14	10349804	B2	2019-07-16	Tuller	
	15	10463226	B2	2019-11-05	Mesa et al.	
	16	10512385	B2	2019-12-24	Tuller et al.	
	17	10638912	B1	2020-05-05	Visin et al.	

If you wish to add additional U.S. Patent citation information, please click the Add button. Add

U.S. PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Inventor or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

	1	20050109378	A1	2005-05-26	Landsiedel et al.	
	2	20060250058	A1	2006-11-09	Stevens et al.	
	3	20060254994	A1	2006-11-16	Lim	
	4	20060254992	A1	2006-11-16	Lim	
	5	20070247039	A1	2007-10-25	Anderson et al.	
	6	20080083678	A1	2008-04-10	Graute	
	7	20090120883	A1	2009-05-14	Jadhav et al.	
	8	20120298598	A1	2012-11-29	Ennen et al.	
	9	20190290097	A1	2019-09-26	Naik et al.	
	10	20200187750	A1	2020-06-18	Feddema et al.	
	11	20210076900	A1	2021-03-18	Feddema et al.	

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

If you wish to add additional U.S. Published Application citation information, please click the Add button [Add]

FOREIGN PATENT DOCUMENTS [Remove]

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	106073675	CN	A	2016-11-09	Zhang et al.		☒
	2	106998989	CN	A	2017-08-01	Cho et al.		☒
	3	0186157	EP	A1	1986-07-02	Hüttemann et al.		☒
	4	1138249	EP	A2	2001-10-04	Vogel et al.		☒
	5	2815690	EP	A1	2014-12-24	Jerg		☒
	6	3222191	EP	A1	2017-09-27	Roderick et al.		☐
	7	200300795	KR	Y1	2002-12-30	Kang		☒
	8	20050068480	KR	A	2005-07-05	Park et al.		☒

If you wish to add additional Foreign Patent Document citation information, please click the Add button [Add]

NON-PATENT LITERATURE DOCUMENTS [Remove]

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	DONS APPLIANCES, An Overview of KitchenAid Dishwasher KDTM404KPS, announced in YouTube on Jan. 19, 2021 [online], [site visited Apr. 5, 2022], Available from the internet URL: https://www.youtube.com/watch?v=2gO_C6t6tBM , An Overview of KitchenAid Dishwasher (KDTM404KPS) | KitchenAid Dishwasher Review 2021 (Year: 2021)	☐
	2	APPLIANCE FACTORY PARTS, Part GEHWD28X10210, available in https://www.appliancefactoryparts.com customer review oldest date Dec. 27, 2014 [online], [site visited Apr. 5, 2022], Available from the internet URL: https://www.appliancefactoryparts.com/search/part/1109159/, (Year: 2014).	☐

If you wish to add additional non-patent literature document citation information, please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/RITA P ADHLAKHA/	Date Considered	11/20/2025

*EXAMINER: Initial if reference considered and whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

TIMING STATEMENT

Please see 37 CFR 1.97(e) to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached timing statement under 37 CFR 1.97(e).

☒ A timing statement under 37 CFR 1.97(e) is not submitted herewith.

TIMING FEE

☐ The fee set forth in 37 CFR 1.17(p) has been submitted herewith.

COPIES

☐ An identification of an earlier application pursuant to 37 CFR 1.98(d)(1) is attached.

SIZE FEE ASSERTION

Please see 37 CFR 1.17(v) and the IDS Auto-Load Instructions for completing this form to make the appropriate selection of an assertion under 37 CFR 1.98. For the information disclosure statement (IDS) submitted herewith, the applicant or patent owner certifies the following with respect to the cumulative number of applicant-provided or patent-owner provided items of information submitted to date including those in the accompanying IDS (select only one):

☒ No IDS size fee is required under 37 CFR 1.17(v) at this time.

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(1).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(2).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(3).

SIGNATURE

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/brianrcheslek/	Date (YYYY-MM-DD)	2025-09-17
Name/Print	Brian R. Cheslek	Registration Number	58,329

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	
Examiner Name	
Attorney Docket Number	SUB-13230-US-CON3

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /R.P.A/

UNITED STATES
PATENT AND TRADEMARK OFFICE

P.O. Box 1450
Alexandria, VA 22313 - 1450
www.uspto.gov

ELECTRONIC ACKNOWLEDGEMENT RECEIPT

APPLICATION #	RECEIPT DATE / TIME	ATTORNEY DOCKET #
19/297,954	**12/15/2025 05:53:52 PM Z ET**	**SUB-13230-US-CON3**

Title of Invention

DISHWASHER WITH A DISH RACK

Application Information

APPLICATION TYPE	Utility - Nonprovisional Application under 35 USC 111(a)	PATENT #	-
CONFIRMATION #	2948	FILED BY	Megan Boot
PATENT CENTER #	73602411	FILING DATE	08/12/2025
CUSTOMER #	130333	FIRST NAMED INVENTOR	Mark S. Feddema
CORRESPONDENCE ADDRESS	-	AUTHORIZED BY	BRIAN CHESLEK

Documents

TOTAL DOCUMENTS: 11

DOCUMENT	PAGES	DESCRIPTION	SIZE (KB)
2025-12-15 SUB-13230-US-CON3 WHI025 P328A IDS Transmittal.pdf	2	Transmittal Letter	66 KB
2025-12-15 SUB-13230-US-CON3 WHI025 P328A IDS SB08.pdf	6	Information Disclosure Statement (IDS) Form (SB08)	1274 KB
2025-12-15 SUB-13230-US-CON3 WHI025 P328A IDS SB08C Size Fee Form.pdf	4	Assertion regarding Information Disclosure Statement (IDS) Size Fee (SB/08C)	267 KB
FOR_1_CN106343937B.pdf	19	Foreign Reference	2713 KB
FOR_2_DE6810173U.pdf	17	Foreign Reference	1173 KB
NPL_1_Bosch 2019	26	Non Patent Literature	5485 KB

Brochure.pdf			
NPL_2_Bosch Takes Silence Press Release.pdf	7	Non Patent Literature	340 KB
NPL_3_Clemens - Grand Blog.pdf	4	Non Patent Literature	413 KB
NPL_4_Perratore - Consumer Reports.pdf	1	Non Patent Literature	1138 KB
NPL_5_Bosch GlobeNewswire.pdf	4	Non Patent Literature	532 KB
NPL_6_Bosch 800 Series Dishwasher SHPM88Z75N - YouTube.pdf	2	Non Patent Literature	684 KB

Digest

DOCUMENT	MESSAGE DIGEST(SHA-512)
2025-12-15 SUB-13230-US-CON3 WHI025 P328A IDS Transmittal.pdf	41BFDA01918DCBDAA78DF0D12D16A46CF2E796F537A0494F 7E42EA6A37F7DA2C0D8B08F6BA34A9AEA6BC7E2D15A96950 EC029F83E15B441B1EE2081E0D569078
2025-12-15 SUB-13230-US-CON3 WHI025 P328A IDS SB08.pdf	9E29FA3F699FAE4F76409D37EB32F4E7BBBF9408709498E16 2423A9DAF63A5763BF1C6E2E74CFDA52AB65394BEEE71996 7CF8E55C1EC3A208658C63BF8289904
2025-12-15 SUB-13230-US-CON3 WHI025 P328A IDS SB08C Size Fee Form.pdf	9971711ABABB70A50C2606823F07243C717AEC348F1E39794 ED999F97532274863675C0388E0131AB65BB91407423ACB416 5119D485C95FD2E746DDA5409BCBC
FOR_1_CN106343937B.pdf	D8205044DF329E6A2BFF5CD643C0C0D77071899FDD6600307 4C1DC20232FEDE19C8D7702EADED954C8CDDC2E4E5E58C E622FA82A5CB93422CB6E24353DF1AF6E
FOR_2_DE6810173U.pdf	7D5AB39C1755273BAA0E10C362AC539DB9A9B73177881F253 F3E60FF5D1FBD3F4BEBD793D4FD0D5EBFEF20D00F746CF13 5AF662477BB62700E6686A1CF96592D
NPL_1_Bosch 2019 Brochure.pdf	EE347239E9E94DA18DE8342551F04BF31D4EBDDED46C41B3 97EC5FEAD1E3454609D4F6828A79D10E0E7FE1B60AB968D60 25BC95803FC1CD084F2D910D471B465
NPL_2_Bosch Takes Silence Press Release.pdf	CFAE708C665B06398AC0DF230C27475027055E34D2BE9055C 11407E9BB9E8BF8B5D4D9D4E26B84C5F0D2C5C7BF3F3D18A 266B52F6E83722E10635C876B836E75
NPL_3_Clemens - Grand Blog.pdf	519B77F2B9B1CB52473D0F5D0A23C6CFB84FDDC34D4032E3 D17829A6042A12F7E4E5649BAD1E7272F67C0FDFDB75C6694

	876F0ECC3D2683C4C4AED51BDF58CA4
NPL_4_Perratore - Consumer Reports.pdf	211FDAE2A2EF126CF7B578ADE1074BED567C0E6E8D763873 35A5BD143DEE56530176F6FEC7446C996FD185B6EF6DE71B1 9C808EA91C3AEDDDD7A555EE2FA72DD
NPL_5_Bosch GlobeNewswire.pdf	1001C72911B13ECD206D4A5A4A40553105B7D67FF1318B81D 25C6D7C56047DE7956F5184463C1F8EB8ADF03D75B4F8A435 05576DE85D2E3FD5800EAE0862F978
NPL_6_Bosch 800 Series Dishwasher SHPM88Z75N - YouTube.pdf	50E2C16295F4285A862E23F7DC1F632AE27E15715B98D72CB C9622CE555B956A71E97BD814D1DE1CAA4641B5C7AEBB3E1 B52CCE22010D3203DB5D5638AA02C59

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

New Applications Under 35 U.S.C. 111

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

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

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

New International Application Filed with the USPTO as a Receiving Office

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

Attorney Docket No.: SUB-13230-US-CON3

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Art Unit	:	1711
Examiner	:	Rita P. Adhlakha
First Named Inventor	:	Mark S. Feddema
Application No.	:	19/297,954
Filing Date	:	August 12, 2025
Confirmation No.	:	2948
For	:	DISHWASHER WITH A DISH RACK

Dear Commissioner:

INFORMATION DISCLOSURE STATEMENT
AND PETITION UNDER 37 C.F.R. § 1.97(d)

Pursuant to 37 C.F.R. §§ 1.56 and 1.97(d), Applicant brings to the attention of the Examiner each document listed on the attached Form PTO/SB08a. This Information Disclosure Statement is being filed after a Notice of Allowance but on or before payment of the issue fee and is accompanied by a fee of $280.00, as specified by § 1.17(p) and a certification as specified under § 1.97(e).

To the knowledge of the undersigned, no item of information contained in this Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, after making a reasonable inquiry, no item of information contained in this Information Disclosure Statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing date of this Information Disclosure Statement.

A copy of each listed foreign patent document and non-patent literature is attached. Applicant respectfully requests that the Examiner consider each listed document and evidence that consideration by making appropriate notations on the attached form. At least an English language abstract of any foreign patent document is incorporated herein by reference in its entirety as Applicant's concise explanation of the relevancy of the document under MPEP 609.04 and 37 C.F.R. §1.98(a)(3)(i).

This submission does not represent that a search has been made or that no better art exists and does not constitute an admission that any listed document is material or constitutes "prior art." If it should be determined that any of the listed documents do not constitute "prior art" under

United States law, Applicant reserves the right to present to the Office the relevant facts and law regarding the appropriate status of such documents.

Applicant further reserves the right to take appropriate action to establish the patentability of the disclosed invention over each document listed, should one or more be applied against the claims of the present application.

If there is any fee due in connection with the filing of this Statement, please charge the fee to our Deposit Account No. 16-2463.

Respectfully submitted,

PRICE HENEVELD LLP

December 15, 2025
Date

/brianrcheslek/
Brian R. Cheslek, Reg. No. 58,329
3400 Innovation Court, S.E.
P.O. Box 2567
Grand Rapids, Michigan 49501-2567
Tel: 616.949.9610
Fax: 616.957.8196
bcheslek@priceheneveld.com

BRC/mad

PTO/SB/08a (01-25)
Approved for use through 11/30/2027. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	1711
Examiner Name	Rita P. Adhlakha
Attorney Docket Number	SUB-13230-US-CON3

U.S. PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Inventor of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	6869029	B2	2005-03-22	Ochoa, Sr. et al.	
	2	9445703	B2	2016-09-20	Hiedel et. al.	
	3	10045681	B2	2018-08-14	Schessl et al.	

If you wish to add additional U.S. Patent citation information, please click the Add button. Add

U.S. PATENT APPLICATION PUBLICATIONS Remove

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Inventor or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear
	1	20080169009	A1	2008-07-17	Mailander	

If you wish to add additional U.S. Published Application citation information, please click the Add button Add

FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2]	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages, Columns, Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	106343937	CN	B	2019-12-31	Cao et al.		☒

INFORMATION DISCLOSURE STATEMENT BY APPLICANT		
	Application Number	19297954
	Filing Date	2025-08-12
	First Named Inventor	Mark S. Feddema
	Art Unit	1711
	Examiner Name	Rita P. Adhlakha
	Attorney Docket Number	SUB-13230-US-CON3

	2	6810173	DE	U	1969-08-14	Robert Bosch Hausgeraete GmbH		☒

If you wish to add additional Foreign Patent Document citation information, please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	BOSCH Customer Brochure, 2019, Bosch 800 Series Dishwasher (SHPM88Z75N)	☐
	2	BOSCH Press Release, "Bosch Takes Silence to the Next Level with Innovative Dishwasher Line," May 15, 2013, Toronto, ON, Available from the Internet URL: https://www.bosch-home.ca/en/press/pressrelease-320 [site visited December 15, 2025]	☐
	3	JEFF CLEMENS, Grand Blog, "New Bosch Dishwashers Have Arrived At Grand," May 31, 2013, Available from the Internet URL: https://grandapplianceandtv.wordpress.com/2013/05/31/new-bosch-dishwashers-have-arrived-at-grand/ [site visited December 15, 2025]	☐
	4	ED PERRATORE, Consumer Reports News, "Four new Bosch dishwashers added to our list of top picks," July 18, 2013, Available from the Internet URL: https://www.consumerreports.org/cro/news/2013/07/four-new-bosch-dishwashers-added-to-our-list-of-top-picks/index.html [site visited December 15, 2025]	☐
	5	BOSCH HOME APPLIANCES, GlobeNewswire by notified, "Bosch Home Appliances Revolutionizes Dishwasher Category with New Advanced Drying Technologies," "New Dishwasher Line Answers Demand for Superior Drying and Cleaning Performance," February 19, 2019, Available from the Internet URL: https://www.globenewswire.com/news-release/2019/02/19/1734216/0/en/Bosch-Home-Appliances-Revolutionizes-Dishwasher-Category-with-New-Advanced-Drying-Technologies.html [site visited December 15, 2025]	☐
	6	ABT ELECTRONICS, YouTube Video, "Bosch 800 Series Dishwasher SHPM88Z75N," April 5, 2022, Available from the Internet URL: https://www.youtube.com/watch?v=v8lwDWJc-CQ [site visited December 15, 2025]	☐

If you wish to add additional non-patent literature document citation information, please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered and whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	1711
Examiner Name	Rita P. Adhlakha
Attorney Docket Number	SUB-13230-US-CON3

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

Petitioner Samsung Ex-1004, 1208

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	1711
Examiner Name	Rita P. Adhlakha
Attorney Docket Number	SUB-13230-US-CON3

TIMING STATEMENT

Please see 37 CFR 1.97(e) to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☒ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☒ See attached timing statement under 37 CFR 1.97(e).

☐ A timing statement under 37 CFR 1.97(e) is not submitted herewith.

TIMING FEE

☒ The fee set forth in 37 CFR 1.17(p) has been submitted herewith.

COPIES

☐ An identification of an earlier application pursuant to 37 CFR 1.98(d)(1) is attached.

SIZE FEE ASSERTION

Please see 37 CFR 1.17(v) and the IDS Auto-Load Instructions for completing this form to make the appropriate selection of an assertion under 37 CFR 1.98. For the information disclosure statement (IDS) submitted herewith, the applicant or patent owner certifies the following with respect to the cumulative number of applicant-provided or patent-owner provided items of information submitted to date including those in the accompanying IDS (select only one):

☒ No IDS size fee is required under 37 CFR 1.17(v) at this time.

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(1).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(2).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(3).

SIGNATURE

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 11.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/brianrcheslek/	Date (YYYY-MM-DD)	2025-12-15
Name/Print	Brian R. Cheslek	Registration Number	58,329

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

Application Number	19297954
Filing Date	2025-08-12
First Named Inventor	Mark S. Feddema
Art Unit	1711
Examiner Name	Rita P. Adhlakha
Attorney Docket Number	SUB-13230-US-CON3

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Petitioner Samsung Ex-1004, 1210

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Doc Code: IDS.SIZEFEE
Document Description: Assertion of whether IDS Size Fee Due

PTO/SB/08C (01-25)
Approved for use through 01/31/2028. OMB 0651-0070
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT SIZE FEE – WRITTEN ASSERTION UNDER 37 CFR 1.98

Complete if Known

Application or Patent No.:	First Named Inventor:	Art Unit:
19/297,954	Mark S. Feddema	1711
Filing Date:	**Attorney Docket Number:**	**Examiner:**
August 12, 2025	SUB-13230-US-CON3	Rita P. Adhlakha

Please see 37 CFR 1.17(v) and attached Instructions for completing this form to make the appropriate selection of an assertion under 37 CFR 1.98. For the information disclosure statement (IDS) submitted herewith, the applicant or patent owner certifies the following with respect to the cumulative number of applicant-provided or patent-owner provided items of information submitted to date including those in the accompanying IDS (select only one):

☑ No IDS size fee is required under 37 CFR 1.17(v) at this time.

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(1).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(2).

☐ The IDS is accompanied by the IDS size fee under 37 CFR 1.17(v)(3).

NOTE: This form must be accompanied by PTO/SB/08a and/or PTO/SB/08b or equivalent.

DEPOSIT ACCOUNT

The Director is authorized to charge the fee indicated above in the amount of $ _____ for the IDS submitted herewith to deposit account _____.

SIGNATURE

This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications.

If applicant or patent owner is a juristic entity (e.g., an LLC or corporation), this form must be signed by a registered practitioner. See 37 CFR 1.31.

If applicant or patent owner is a person or persons, this form may be signed by either a registered practitioner, or the applicant or patentee. Note that if multiple people together are the applicant or patentee (e.g., there are joint inventors who together are the applicant), then a signature is required from each person who is an applicant or patentee. *Submit multiple forms if more than one signature is required, see below*.*

Signature	Date
/brianrcheslek/	2025-12-15
Name (Print/Typed)	**Practitioner Registration Number (if applicable)**
Brian R. Cheslek	58,329

■ * Total of one forms are submitted.

A Federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with an information collection subject to the requirements of the Paperwork Reduction Act of 1995, unless the information collection has a currently valid OMB Control Number. The OMB Control Number for this information collection is 0651-0070. Public burden for this form is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the information collection. Send comments regarding this burden estimate or any other aspect of this information collection, including suggestions for reducing this burden to the Office of the Chief Administrative Officer, United States Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450 or email InformationCollection@uspto.gov. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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

Instructions for Filling out the
"Information Disclosure Statement Size Fee – Written Assertion Under 37 CFR 1.98" Form
(Not to be Submitted to the USPTO)

Note: This form is to be used when applicant or patent owner files an Information Disclosure Statement (IDS) for consideration by the examiner. This form must be accompanied by PTO/SB/08a and/or PTO/SB/08b or equivalent.

Determining the cumulative number of applicant-provided or patent owner-provided items of information

The IDS size fee is based on the cumulative number of items of information provided by an applicant or patent owner during the pendency of the application or reexamination proceeding. It is the applicant's and patent owner's responsibility to track the cumulative number of items of information provided in the application or proceeding and provide a written assertion of any applicable IDS size fee due.

In determining the applicable written assertion for the cumulative number of applicant-provided or patent owner-provided items of information, "provided" refers to the items cited on an IDS under 37 CFR 1.98(a)(1) by an applicant or patent owner, whether or not an actual copy of the cited item is submitted by the applicant or patent owner to the USPTO. If a particular item provided by an applicant or patent owner on an IDS was not considered because the item was non-compliant and that particular item is provided on an IDS a second time in the same application or patent, it will not be counted again.

An item of information that an applicant cited in a parent application will not be counted in a child application (e.g., a continuation, continuation-in-part, or divisional application) for the purpose of the IDS size fees unless it is resubmitted, i.e., provided by the applicant on an IDS in the child application. Applicants who wish to avoid paying the IDS size fees in a child application for items of information considered in a parent application may do so by not resubmitting the items. An item of information must be resubmitted in the continuing application if the applicant desires the item of information to be printed on the patent. See MPEP 609.02, subsection II.A.2.

The cumulative count is determined for each application or patent separately. Continuing, CPA, and reissue applications and post-issuance proceedings will start with a count of zero. A request for continued examination (RCE) is not the filing of a new application, and thus the count will not reset when an RCE is filed.

Written Assertion

Check "[ ] No IDS size fee is required under 37 CFR 1.17(v) at this time" on the above PTO/SB/08c form when the IDS does not cause the cumulative number of applicant-provided or patent owner-provided items in this application or proceeding to:

- exceed 50, 100, or 200 items of information.

Check "[ ] The IDS is accompanied by the IDS size fee under 1.17(v)(1)" on the above PTO/SB/08c form when the IDS causes the cumulative number of applicant-provided or patent owner-provided items in this application or proceeding to:

- exceed 50 items of information but not exceed 100 items of information.

Check "[ ] The IDS is accompanied by the IDS size fee under 1.17(v)(2)" on the above PTO/SB/08c form when the IDS causes the cumulative number of applicant-provided or patent owner-provided items in this application or proceeding to:

- exceed 100 items of information but not exceed 200 items of information.

Note: If a fee under 1.17(v)(1) was previously paid, the fee currently due is the difference between the 1.17(v)(2) fee and the previously paid 1.17(v)(1) fee.

Doc Code: IDS.SIZEFEE
Document Description: Assertion of whether IDS Size Fee Due

Check "[ ] The IDS is accompanied by the IDS size fee under 1.17(v)(3)" on the above PTO/SB/08c form when the IDS causes the cumulative number of applicant-provided or patent owner-provided items in this application or proceeding to:

- exceed 200 items of information.

Note: If a fee under 1.17(v)(1) or (v)(2) was previously paid, the fee currently due is the difference between the 1.17(v)(3) fee and the previously paid 1.17(v)(1) or (v)(2) fee.

Select only one assertion on the PTO/SB/08c form above.

Note: the cumulative count of items of information includes all items of information already of record in a pending application or proceeding that were submitted via IDS(s) including those submitted prior to January 19, 2025.

Method of Payment

This section should only be filled out if the IDS size fee is due. Fees may be paid by check or money order (made payable to the Director of the United States Patent and Trademark Office), credit card (Form PTO-2038), or deposit account. When paying by deposit account, the amount of the IDS size fee to be charged to the deposit account must be specified to comply with 37 CFR 1.98(a)(4). General authorizations to charge fees to a deposit account are not compliant written assertions. When paying by credit card, to protect your credit card information, do not submit Form PTO-2038 electronically through USPTO's patent electronic filing system or any other USPTO Web site.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

Routine uses of the information in this record may include disclosure to:

1) law enforcement, in the event that the system of records indicates a violation or potential violation of law;

2) a federal, state, local, or international agency, in response to its request;

3) a contractor of the USPTO having need for the information in order to perform a contract;

4) the Department of Justice for determination of whether the Freedom of Information Act (FOIA) requires disclosure of the record;

5) a Member of Congress submitting a request involving an individual to whom the record pertains, when the individual has requested the Member's assistance with respect to the subject matter of the record;

6) a court, magistrate, or administrative tribunal, in the course of presenting evidence, including disclosures to opposing counsel in the course of settlement negotiations;

7) the Administrator, General Services Administration (GSA), or their designee, during an inspection of records conducted by GSA under authority of 44 U.S.C. 2904 and 2906, in accordance with the GSA regulations and any other relevant (i.e., GSA or Commerce) directive, where such disclosure shall not be used to make determinations about individuals;

8) another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c));

9) the Office of Personnel Management (OPM) for personnel research purposes; and

10) the Office of Management and Budget (OMB) for legislative coordination and clearance.

If you do not furnish the information requested on this form, the USPTO may not be able to process and/or examine your submission, which may result in termination of proceedings, abandonment of the application, and/or expiration of the patent.

Espacenet

Bibliographic data: CN106343937 (B) — 2019-12-31

Knife and fork tray component used for dish washing machine and dish washing machine provided with same

Inventor(s): 曹红奎, ; 黎铭峰

Applicant(s): 佛山市顺德区美的洗涤电器制造有限公司, ; 美的集团股份有限公司

Classification: - international: *A47L15/00; A47L15/50*
- cooperative: A47L15/00 (CN); A47L15/502 (CN)

Application number: CN201610943203 20161101 Global Dossier

Priority number(s): CN201610943203 20161101

Also published as: CN106343937 (A)

Abstract of CN106343937 (A)

The invention discloses a knife and fork tray component used for a dish washing machine and the dish washing machine provided with the knife and fork tray component. The knife and fork tray component used for the dish washing machine comprises a tray body, a connecting rod support and a crank support, and an opening running through along the vertical direction is formed in the tray body; the connecting rod support and the crank support are respectively arranged in the opening; and the crank support is constructed to be that the crank support can move between a third position and a fourth position when the connecting rod support moves between a first position and a second position, the crank support is located at the third position and coordinates with the connecting rod support to close the opening when the connecting rod support is located at the first position, and the crank support is located at the fourth position and jointly defines a containing cavity sunk downward from the opening with the connecting rod support when the connecting rod support is located at the second position. The knife and fork tray component used for the dish washing machine according to the embodiment can be used for placing tableware, such as an egg beater or a teacup, with the volume larger than that of a knife, a fork and a spoon, and is convenient for collecting the knife and the fork.

Espacenet

Bibliographic data: CN106343937 (A) — 2017-01-25

Knife and fork tray component used for dish washing machine and dish washing machine provided with same

Inventor(s): CAO HONGKUI; LI MINGFENG ± (曹红奎, ; 黎铭峰)

Applicant(s): FOSHAN SHUNDE MIDEA WASHING APPLIANCES MFG CO LTD; MIDEA GROUP CO LTD ± (佛山市顺德区美的洗涤电器制造有限公司, ; 美的集团股份有限公司)

Classification: **- international:** ***A47L15/00; A47L15/50***
- cooperative: **A47L15/00 (CN); A47L15/502 (CN)**

Application number: CN201610943203 20161101 Global Dossier

Priority number(s): CN201610943203 20161101

Also published as: CN106343937 (B)

Abstract of CN106343937 (A)

The invention discloses a knife and fork tray component used for a dish washing machine and the dish washing machine provided with the knife and fork tray component. The knife and fork tray component used for the dish washing machine comprises a tray body, a connecting rod support and a crank support, and an opening running through along the vertical direction is formed in the tray body; the connecting rod support and the crank support are respectively arranged in the opening; and the crank support is constructed to be that the crank support can move between a third position and a fourth position when the connecting rod support moves between a first position and a second position, the crank support is located at the third position and coordinates with the connecting rod support to close the opening when the connecting rod support is located at the first position, and the crank support is located at the fourth position and jointly defines a containing cavity sunk downward from the opening with the connecting rod support when the connecting rod support is located at the second position. The knife and fork tray component used for the dish washing machine according to the embodiment can be used for placing tableware, such as an egg beater or a teacup, with the volume larger than that of a knife, a fork and a spoon, and is convenient for collecting the knife and the fork.

(19)中华人民共和国国家知识产权局

(12)发明专利

(10)授权公告号 CN 106343937 B
(45)授权公告日 2019.12.31

(21)申请号 201610943203.3

(22)申请日 2016.11.01

(65)同一申请的已公布的文献号
申请公布号 CN 106343937 A

(43)申请公布日 2017.01.25

(73)专利权人 佛山市顺德区美的洗涤电器制造有限公司
地址 528311 广东省佛山市顺德区北滘镇港前路20号
专利权人 美的集团股份有限公司

(72)发明人 曹红奎 黎铭峰

(74)专利代理机构 北京清亦华知识产权代理事务所(普通合伙) 11201
代理人 黄德海

(51)Int.Cl.
A47L 15/50(2006.01)
A47L 15/00(2006.01)

(56)对比文件
CN 103784100 A,2014.05.14,
WO 2016078892 A1,2016.05.26,
EP 2201887 B1,2012.07.18,
CN 203493593 U,2014.03.26,
CN 206507916 U,2017.09.22,

审查员 王颖翀

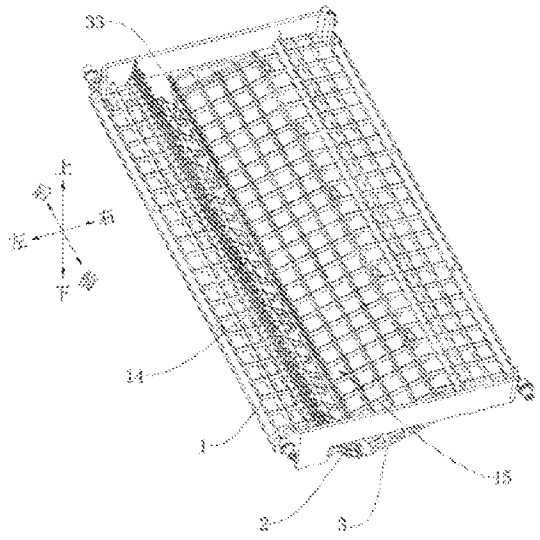
权利要求书1页 说明书7页 附图8页

(54)发明名称

用于洗碗机的刀叉托盘组件和具有其的洗碗机

(57)摘要

本发明公开了一种用于洗碗机的刀叉托盘组件和具有其的洗碗机，用于洗碗机的刀叉托盘组件包括：托盘本体、连杆支架和曲柄支架，托盘本体上设有沿上下方向贯通的开口；连杆支架和曲柄支架均设在开口内，曲柄支架被构造成连杆支架在第一位置和第二位置之间活动时，曲柄支架在第三位置和第四位置之间可活动，当连杆支架位于第一位置时，曲柄支架位于第三位置且曲柄支架与连杆支架配合关闭开口，连杆支架位于第二位置时，曲柄支架位于第四位置且连杆支架和曲柄支架共同限定出从开口向下凹陷的容纳腔。根据本发明实施例的用于洗碗机的刀叉托盘组件，可放置打蛋器或茶杯等比刀叉勺子体积较大的餐具且方便刀叉收取。



CN 106343937 B

Petitioner Samsung Ex-1004, 1218

1.一种用于洗碗机的刀叉托盘组件，其特征在于，包括：

托盘本体，所述托盘本体上设有沿上下方向贯通的开口；

连杆支架，所述连杆支架设在所述开口内且所述连杆支架的一侧与所述托盘本体可活动地连接，所述连杆支架在第一位置和第二位置之间可活动；

曲柄支架，所述曲柄支架设在所述开口内，所述曲柄支架的一侧与所述连杆支架可活动地连接，所述曲柄支架的另一侧与所述托盘本体可活动地连接，所述曲柄支架被构造成所述连杆支架在所述第一位置和所述第二位置之间活动时，所述曲柄支架在第三位置和第四位置之间可活动，当所述连杆支架位于所述第一位置时，所述曲柄支架位于所述第三位置且所述曲柄支架与所述连杆支架配合关闭所述开口，所述连杆支架位于所述第二位置时，所述曲柄支架位于所述第四位置且所述连杆支架和所述曲柄支架共同限定出从所述开口向下凹陷的容纳腔；放置刀叉时所述容纳腔位于所述刀叉的下方；

所述托盘本体邻近所述连杆支架的一侧上设有第一齿排以对刀叉的一端限位，所述连杆支架位于所述第二位置时，所述容纳腔位于所述刀叉的下方，所述曲柄支架上设有第二齿排，所述第二齿排与所述第一齿排共同限定所述刀叉。

2.根据权利要求1所述的用于洗碗机的刀叉托盘组件，其特征在于，所述托盘本体上设有滑槽，所述连杆支架上设有适于与所述滑槽配合的旋转轴，所述旋转轴在所述滑槽内活动以使得所述连杆支架在所述第一位置和所述第二位置之间可活动。

3.根据权利要求2所述的用于洗碗机的刀叉托盘组件，其特征在于，所述滑槽包括第一滑道和第二滑道，所述第一滑道沿竖直方向延伸，所述第二滑道沿水平方向延伸，所述第二滑道与所述第一滑道的上端相连，所述旋转轴在所述第一滑道和所述第二滑道内可活动。

4.根据权利要求2所述的用于洗碗机的刀叉托盘组件，其特征在于，所述滑槽形成在所述托盘本体的长度方向的两端，所述旋转轴的两端分别配合在所述滑槽内且在所述滑槽内可活动。

5.根据权利要求4所述的用于洗碗机的刀叉托盘组件，其特征在于，所述旋转轴的两端分别设有止挡块以阻挡所述旋转轴在所述滑槽内沿其自身的轴向移动。

6.根据权利要求1所述的用于洗碗机的刀叉托盘组件，其特征在于，所述连杆支架与所述曲柄支架相连的一侧上设有第一旋转卡轴，所述曲柄支架上设有第一旋转卡扣，所述第一旋转卡扣可转动地卡接在所述第一旋转卡轴上。

7.根据权利要求6所述的用于洗碗机的刀叉托盘组件，其特征在于，所述第一旋转卡扣为多个，所述第一旋转卡轴为多个，多个所述第一旋转卡扣分别与多个所述第一旋转卡轴配合。

8.根据权利要求1所述的用于洗碗机的刀叉托盘组件，其特征在于，所述托盘本体与所述曲柄支架相连的一侧上设有第二旋转卡轴，所述曲柄支架上设有适于与所述第二旋转卡轴配合的第二旋转卡扣，所述第二旋转卡扣与所述第二旋转卡轴可转动地卡接配合。

9.一种洗碗机，其特征在于，包括权利要求1-8项中任一项所述的用于洗碗机的刀叉托盘组件。

Petitioner Samsung Ex-1004, 1219

用于洗碗机的刀叉托盘组件和具有其的洗碗机

技术领域

[0001] 本发明涉及洗碗机技术领域，尤其涉及一种用于洗碗机的刀叉托盘组件和具有其的洗碗机。

背景技术

[0002] 洗碗机内部设置刀叉托盘来放置各种取食类餐具，如刀子、叉子和勺子等。传统洗碗机刀叉托盘能让刀叉摆放规整，但刀叉托盘占据的是洗碗机顶部空间，托盘至洗碗机内胆顶部距离很小，空间十分有限，容纳不下体积稍大的餐具，例如打蛋器等。同时用户需要取用刀叉时，需要手动一一将刀叉从托盘齿肋间抠出，收取不便。

发明内容

[0003] 本发明旨在至少在一定程度上解决相关技术中的技术问题之一。为此，本发明提出一种用于洗碗机的刀叉托盘组件，所述刀叉托盘组件可适于放置相对刀叉体积稍大的餐具且方便刀叉的收取。

[0004] 本发明还提出了一种具有所述用于洗碗机的刀叉托盘组件的洗碗机。

[0005] 根据本发明第一方面实施例的用于洗碗机的刀叉托盘组件，包括：托盘本体，所述托盘本体上设有沿上下方向贯通的开口；连杆支架，所述连杆支架设在所述开口内且所述连杆支架的一侧与所述托盘本体可活动地连接，所述连杆支架在第一位置和第二位置之间可活动；曲柄支架，所述曲柄支架设在所述开口内，所述曲柄支架的一侧与所述连杆支架可活动地连接，所述曲柄支架的另一侧与所述托盘本体可活动地连接，所述曲柄支架被构造成所述连杆支架在所述第一位置和所述第二位置之间活动时，所述曲柄支架在第三位置和第四位置之间可活动，当所述连杆支架位于所述第一位置时，所述曲柄支架位于所述第三位置且所述曲柄支架与所述连杆支架配合关闭所述开口，所述连杆支架位于所述第二位置时，所述曲柄支架位于所述第四位置且所述连杆支架和所述曲柄支架共同限定出从所述开口向下凹陷的容纳腔。

[0006] 根据本发明实施例的用于洗碗机的刀叉托盘组件，连杆支架和曲柄支架可活动地设在托盘本体的开口内，连杆支架活动至第二位置时曲柄支架活动至第四位置，此时，曲柄支架和连杆支架之间形成向下凹陷的容纳腔。从而不仅可放置打蛋器或茶杯等比刀叉勺子体积较大的餐具，以增加用于洗碗机的刀叉托盘组件的功能，并充分利用刀叉托盘组件的空间，而且用户通过将手伸入至容纳腔内可将刀叉一把一把的搂起来，从而不需要将刀叉一个一个地取出，收取便捷。

[0007] 另外，根据本发明实施例的用于洗碗机的刀叉托盘组件还可以具有如下附加的技术特征：

[0008] 根据本发明的一些实施例，所述托盘本体上设有滑槽，所述连杆支架上设有适于与所述滑槽配合的旋转轴，所述旋转轴在所述滑槽内活动以使得所述连杆支架在所述第一位置和所述第二位置之间可活动。

Petitioner Samsung Ex-1004, 1220

[0009] 可选地，所述滑槽包括第一滑道和第二滑道，所述第一滑道沿竖直方向延伸，所述第二滑道沿水平方向延伸，所述第二滑道与所述第一滑道的上端相连，所述旋转轴在所述第一滑道和所述第二滑道内可活动。

[0010] 可选地，所述滑槽形成在所述托盘本体的长度方向的两端，所述旋转轴的两端分别配合在所述滑槽内且在所述滑槽内可活动。

[0011] 进一步地，所述旋转轴的两端分别设有止挡块以阻挡所述旋转轴在所述滑槽内沿其自身的轴向移动。

[0012] 根据本发明的一些实施例，所述连杆支架与所述曲柄支架相连的一侧上设有第一旋转卡轴，所述曲柄支架上设有第一旋转卡扣，所述第一旋转卡扣可转动地卡接在所述第一旋转卡轴上。

[0013] 可选地，所述第一旋转卡扣为多个，所述第一旋转卡轴为多个，多个所述第一旋转卡扣分别与多个所述第一旋转卡轴配合。

[0014] 根据本发明的一些实施例，所述托盘本体与所述曲柄支架相连的一侧上设有第二旋转卡轴，所述曲柄支架上设有适于与所述第二旋转卡轴配合的第二旋转卡扣，所述第二旋转卡扣与所述第二旋转卡轴可转动地卡接配合。

[0015] 根据本发明的一些实施例，所述托盘本体邻近所述连杆支架的一侧上设有第一齿排以对刀叉的一端限位，所述连杆支架位于所述第二位置时，所述容纳腔位于所述刀叉的下方。

[0016] 可选地，所述曲柄支架上设有第二齿排，所述第二齿排与所述第一齿排共同限定所述刀叉。

[0017] 根据本发明第二方面实施例的洗碗机包括上述实施例的用于洗碗机的刀叉托盘组件。

[0018] 由于根据本发明上述实施例的用于洗碗机的刀叉托盘组件具有上述技术效果，因此，本发明实施例的洗碗机也具有上述技术效果，即根据本发明实施例的洗碗机，通过设置上述用于洗碗机的刀叉托盘组件，在对用于洗碗机的刀叉托盘组件进行清洗时，不仅可容纳体积稍大于刀叉以及勺子的餐具，而且方便收取刀叉。

[0019] 本发明的附加方面和优点将在下面的描述中部分给出，部分将从下面的描述中变得明显，或通过本发明的实践了解到。

附图说明

[0020] 图1是根据本发明一个实施例的用于洗衣机的刀叉托盘组件的结构示意图；

[0021] 图2是根据本发明一个实施例的用于洗衣机的刀叉托盘组件的爆炸图；

[0022] 图3是根据本发明另一个实施例的用于洗衣机的刀叉托盘组件的结构示意图；

[0023] 图4是根据本发明另一个实施例的用于洗衣机的刀叉托盘组件的爆炸图；

[0024] 图5是根据本发明实施例的用于洗衣机的刀叉托盘组件的放置物件的结构示意图；

[0025] 图6是根据本发明实施例的用于洗衣机的刀叉托盘组件的放置刀叉的结构示意图；

[0026] 图7是根据本发明实施例的用于洗衣机的刀叉托盘组件的托盘本体的剖视图；

Petitioner Samsung Ex-1004, 1221

[0027] 图8是根据本发明实施例的用于洗衣机的刀叉托盘组件的一个使用状态的剖视图；

[0028] 图9是根据本发明实施例的用于洗衣机的刀叉托盘组件的另一使用状态的剖视图。

[0029] 附图标记：

[0030] 100：用于洗碗机的刀叉托盘组件；

[0031] 1：托盘本体，11：开口，12：滑槽，121：第一滑道，122：第二滑道，123：第一开口，13：第二旋转卡轴，14：第一齿排，15：容纳腔；

[0032] 2：连杆支架，21：旋转轴，22：止挡块，23：第一旋转卡轴；

[0033] 3：曲柄支架，31：第一旋转卡扣，32：第二旋转卡扣，33：第二齿排；

[0034] 4：托盘框架，41：托盘框，42：托盘架；

[0035] 5：刀叉；

[0036] 6：打蛋器；

[0037] 7：茶杯。

具体实施方式

[0038] 下面详细描述本发明的实施例，所述实施例的示例在附图中示出。下面通过参考附图描述的实施例是示例性的，旨在用于解释本发明，而不能理解为对本发明的限制。

[0039] 在本发明的描述中，需要理解的是，术语“中心”、“纵向”、“横向”、“长度”、“宽度”、“厚度”、“上”、“下”、“前”、“后”、“左”、“右”、“竖直”、“水平”、“顶”、“底”“内”、“外”、“顺时针”、“逆时针”、“轴向”、“径向”、“周向”等指示的方位或位置关系为基于附图所示的方位或位置关系，仅是为了便于描述本发明和简化描述，而不是指示或暗示所指的装置或元件必须具有特定的方位、以特定的方位构造和操作，因此不能理解为对本发明的限制。

[0040] 此外，术语“第一”、“第二”仅用于描述目的，而不能理解为指示或暗示相对重要性或者隐含指明所指示的技术特征的数量。由此，限定有“第一”、“第二”的特征可以明示或者隐含地包括至少一个该特征。在本发明的描述中，“多个”的含义是至少两个，例如两个，三个等，除非另有明确具体的限定。

[0041] 在本发明中，除非另有明确的规定和限定，术语“安装”、“相连”、“连接”、“固定”等术语应做广义理解，例如，可以是固定连接，也可以是可拆卸连接，或成一体；可以是机械连接，也可以是电连接或彼此可通讯；可以是直接相连，也可以通过中间媒介间接相连，可以是两个元件内部的连通或两个元件的相互作用关系，除非另有明确的限定。对于本领域的普通技术人员而言，可以根据具体情况理解上述术语在本发明中的具体含义。

[0042] 下面参考附图描述根据本发明实施例的用于洗碗机的刀叉托盘组件100。

[0043] 结合图1-图9图所示，根据本发明实施例的用于洗碗机的刀叉托盘组件100可以包括托盘本体1、连杆支架2和曲柄支架3。

[0044] 具体地，托盘本体1上设有沿上下方向贯通的开口11，连杆支架2设在开口11内且连杆支架2的一侧与托盘本体1可活动地连接，连杆支架2在第一位置和第二位置之间可活动，曲柄支架3设在开口11内，曲柄支架3的一侧与连杆支架2可活动地连接，曲柄支架3的另一侧与托盘本体1可活动地连接，曲柄支架3被构造成连杆支架2在第一位置和第二位置之

Petitioner Samsung Ex-1004, 1222

间活动时，曲柄支架3在第三位置和第四位置之间可活动，当连杆支架2位于第一位置时，曲柄支架3位于第三位置且曲柄支架3与连杆支架2配合关闭开口11，连杆支架2位于第二位置时，曲柄支架3位于第四位置且连杆支架2和曲柄支架3共同限定出从开口11向下凹陷的容纳腔15。

[0045] 如图4和图7所示，托盘本体1上设有开口11，开口11沿上下方向贯穿托盘本体1，连杆支架2和曲柄支架3均设在开口11内，托盘本体1、连杆支架2和曲柄支架3配合连接以适于放置待洗涤的刀叉5等餐具。

[0046] 连杆支架2和曲柄支架3可活动地设在开口11内，连杆支架2和曲柄支架3配合以关闭开口11，从而适于放置待洗涤物件。结合图3-图9所示，连杆支架2的一侧与托盘本体1的开口11的一侧可活动地连接，曲柄支架3的一侧与托盘本体1的开口11的相对另一侧可活动地连接，连杆支架2的另一侧与曲柄支架3的两侧可活动地连接，这样，连杆支架2在第一位置和第二位置之间可活动，曲柄支架3在第三位置和第四位置之间可活动。

[0047] 具体地，连杆支架2和曲柄支架3被构造成，如图8所示，连杆支架2位于第一位置时，曲柄支架3位于第三位置，连杆支架2和曲柄支架3配合以关闭开口11，此时，连杆支架2、曲柄支架3和托盘本体1可大体位于同一平面上，连杆支架2、曲柄支架3和托盘本体1可适于放置刀叉5；如图3-图6以及图9所示，连杆支架2位于第二位置时，曲柄支架3位于第四位置，此时，连杆支架2和曲柄支架3相连的一侧可向下凹陷以形成容纳腔15。

[0048] 对于容纳腔15而言，容纳腔15可适于放置体积较大的餐具，例如，如图5所示，容纳腔15内可放置打蛋器6或茶杯7等比刀叉5勺子体积大的餐具。如图6所示，当用于洗碗机的刀叉托盘组件100上放置刀叉5、勺子等餐具时，刀叉5以及勺子可跨设在连杆支架2和曲柄支架3上，由此，在需要取用刀叉5时，可将连杆支架2调节至第二位置，曲柄支架3调节至第四位置，连杆支架2和曲柄支架3之间形成的容纳腔15位于刀叉5的下方，刀叉5处于悬空状态，用户通过将手伸入至容纳腔15内可将刀叉5一把一把的搂起来，从而不需要将刀叉5一个一个地取出，收取便捷。可选地，容纳腔15的大小可允许一只手四指的放置，从而可进一步地方便刀叉5的收取。

[0049] 由此，根据本发明实施例的用于洗碗机的刀叉托盘组件100，连杆支架2和曲柄支架3可活动地设在托盘本体1的开口11内，连杆支架2活动至第二位置时曲柄支架3活动至第四位置，此时，曲柄支架3和连杆支架2之间形成向下凹陷的容纳腔15。从而不仅可放置打蛋器6或茶杯7等比刀叉5勺子体积较大的餐具，以增加用于洗碗机的刀叉托盘组件100的功能，并充分利用刀叉托盘组件100的空间，而且用户通过将手伸入至容纳腔15内可将刀叉5一把一把的搂起来，从而不需要将刀叉5一个一个地取出，收取便捷。

[0050] 在本发明的一些实施例中，托盘本体1上可设有滑槽12，连杆支架2上设有适于与滑槽12配合的旋转轴21，旋转轴21在滑槽12内活动以使得连杆支架2在第一位置和第二位置之间可活动。从而实现连杆支架2与托盘本体1的可活动连接。如图4、图8和图9所示，连杆支架2与托盘本体1相连的一侧上设有旋转轴21，托盘本体1上设滑槽12，旋转轴21在滑槽12内可活动，而且旋转轴21在滑槽12内活动时，连杆支架2可沿逆时针或顺时针转动，以实现连杆支架2在第一位置和第二位置之间的活动，有利于连杆支架2和曲柄支架3之间形成向下凹陷的容纳腔15。

[0051] 可选地，如图8和图9所示，滑槽12可以包括第一滑道121和第二滑道122，第一滑道

Petitioner Samsung Ex-1004, 1223

121沿竖直方向延伸，第二滑道122沿水平方向延伸，第二滑道122与第一滑道121的上端相连，旋转轴21在第一滑道121和第二滑道122内可活动。旋转轴21安装在滑槽12内且可在第一滑道121和第二滑道122内滑动，旋转轴21定位在第一滑道121时，连杆支架2位于第一位置，旋转轴21由第一滑道121滑动至第二滑道122内并定位在第二滑道122时，连杆支架2位于第二位置。

[0052] 在如图8和图9所示的示例中，第一滑道121沿竖直方向延伸，第二滑道122与第一滑道121连通并与第一滑道121的上端相连，第二滑道122沿水平方向延伸且位于第一滑道121的右侧，旋转轴21位于第一滑道121的下端时，连杆支架2位于第一位置处，旋转轴21沿第一滑道121向上滑动并可沿第二滑道122活动至第二滑道122的右端固定，此时连杆支架2位于第二位置。

[0053] 进一步地，如图7和图9所示，在连杆支架2上还设有与滑槽12连通的第一开口123，旋转轴21可通过第一开口123装入滑槽12内。具体使用时，通过推拉连杆支架2和曲柄支架3，使得旋转轴21可在滑槽12内滑动，并可实现连杆支架2在第一位置和第二位置的固定，以及曲柄支架3在第三位置和第四位置的固定。

[0054] 例如，在连杆支架2位于第一位置，曲柄支架3位于第三位置，即用于洗碗机的刀叉托盘组件100处于如图8所示的状态时，通过对连杆支架2和曲柄支架3施加向下的力，旋转轴21从第一滑道121移动至第二滑道122，连杆支架2与曲柄支架3相连的一侧顺时针转动，曲柄支架3逆时针转动，以在曲柄支架3和连杆支架2之间形成向下凹陷的容纳腔15，此时，用于洗碗机的刀叉托盘组件100处于如图9所示的状态，连杆支架2位于第二位置，曲柄支架3位于第四位置。通过从下往上用力提拉曲柄支架3和连杆支架2，曲柄支架3顺时针转动，连杆支架2逆时针转动，从而可将曲柄支架3移动至第三位置处，将连杆支架2移动至第一位置处，用于洗碗机的刀叉托盘组件100即可恢复至如图8所示的状态。由此，用于洗碗机的刀叉托盘组件100的操作方便简单。

[0055] 在本发明的一些示例中，滑槽12形成在托盘本体1的长度方向的两端，旋转轴21的两端分别配合在滑槽12内且在滑槽12内可活动。从而方便连杆支架2与托盘本体1的安装拆卸，也可简化托盘本体1的结构。具体地，托盘本体1的长度方向(即如图1-图9所示的前后方向)的两端分别设有滑槽12，滑槽12为两个，两个滑槽12之间沿托盘本体1的长度方向间隔开且同轴设置，旋转轴21的两端分别与两个滑槽12配合且可在两个滑槽12内活动，以实现连杆支架2在第一位置和第二位置之间地活动。

[0056] 可选地，滑槽12也可以为一个且可由托盘本体1的长度方向的一端延伸至托盘本体1的另一端，即滑槽12可沿托盘本体1的长度方向延伸设置，旋转轴21位于滑槽12内且可在滑槽12内活动。

[0057] 进一步地，旋转轴21的两端可分别设有止挡块22以阻挡旋转轴21在滑槽12内沿其自身的轴向移动。换言之，旋转轴21的长度方向的两端分别设有止挡块22，通过止挡块22可止挡旋转轴21在滑槽12内沿托盘本体1的长度方向移动，从而保证用于洗碗机的刀叉托盘组件100的稳定性和可靠性。具体地，止挡块22可以为两个，旋转轴21位于两个滑槽12内时，两个止挡块22与两个滑槽12一一止挡配合，以止挡旋转轴21沿长度方向滑动。在如图4所示的示例中，旋转轴21安装在滑槽12内时，两个止挡块22分别位于两个滑槽12之间，且分别邻近对应的滑槽12并止挡在滑槽12朝向另一滑槽12的一侧，从而可进一步地限制连杆支架2

Petitioner Samsung Ex-1004, 1224

沿托盘本体1的前后方向滑动。可以理解的是，对于止挡块22的结构而言，本发明并不作特殊限定，只要能够止挡旋转轴21沿其自身轴向滑动即可。

[0058] 在本发明的一些实施例中，连杆支架2与曲柄支架3中的一个上可设有第一旋转卡轴23且连杆支架2与曲柄支架3的另一个上可设有适于与第一旋转卡轴23配合的第一旋转卡扣31。可选地，如图4、图8和图9所示，连杆支架2与曲柄支架3相连的一侧上可设有第一旋转卡轴23，曲柄支架3上设有第一旋转卡扣31，第一旋转卡扣31可转动地卡接在第一旋转卡轴23上。通过第一旋转卡扣31与第一旋转卡轴23的卡接配合，不仅方便连杆支架2与曲柄支架3的连接，也可实现连杆支架2与曲柄支架3的可活动连接。

[0059] 可选地，第一旋转卡扣31可以为多个，第一旋转卡轴23为多个，多个第一旋转卡扣31分别与多个第一旋转卡轴23配合。如图4所示，多个第一旋转卡扣31沿曲柄支架3的长度方向间隔开设置，多个第一旋转卡轴23分别与多个第一旋转卡扣31一一对应设置且多个第一旋转卡扣31分别与多个第一旋转卡轴23可活动配合连接，从而有利于实现连杆支架2与曲柄支架3的可活动连接。

[0060] 有利地，托盘本体1与曲柄支架3相连的一侧上可设有第二旋转卡轴13，曲柄支架3上设有适于与第二旋转卡轴13配合的第二旋转卡扣32，第二旋转卡扣32与第二旋转卡轴13可转动地卡接配合。通过第二旋转卡轴13与第二旋转卡扣32的配合连接，可实现托盘本体1与曲柄支架3的可活动连接。

[0061] 具体地，如图4所示，第二旋转卡扣32和第二旋转卡轴13可以分别为多个，多个第二旋转卡扣32沿曲柄支架3的长度方向间隔开设置，多个第二旋转卡轴13分别与多个第二旋转卡扣32一一对应设置且多个第二旋转卡扣32分别与多个第二旋转卡轴13可活动配合连接，从而有利于实现托盘本体1与曲柄支架3的可活动连接。

[0062] 在本发明的一些实施例中，托盘本体1邻近连杆支架2的一侧上可设有第一齿排14以对刀叉5的一端限位，连杆支架2位于第二位置时，容纳腔15位于刀叉5的下方。如图3-图9所示，托盘本体1上设有第一齿排14且第一齿排14位于开口11的一侧上，刀叉5放置在用于洗衣机的刀叉托盘组件100上时，刀叉5的一端位于第一齿排14的齿槽内，通过第一齿排14可限定刀叉5的一端，刀叉5的另一端位于开口11的相对另一侧上，换言之，刀叉5可跨设在开口11上，如图6和图9所示，当连杆支架2位于第二位置，曲柄支架3位于第四位置时，连杆支架2与曲柄支架3之间形成的容纳腔15位于刀叉5的下方，用户将手伸入至容纳腔15内，可将多个刀叉5同时收起，从而方便刀叉5的收取。

[0063] 进一步地，如图8和图9所示，曲柄支架3上可设有第二齿排33，第二齿排33与第一齿排14共同限定刀叉5。第二齿排33与第一齿排14间隔开且对应设置，通过第一齿排14和第二齿排33的齿槽可共同限定刀叉5勺子，以进一步地防止刀叉5勺子等在用于洗碗机的刀叉托盘组件100上移动。

[0064] 在本发明的一些实施例中用于洗碗机的刀叉托盘组件100还可以包括托盘框架4，托盘本体1安装在托盘框架4内。如图1-图2所示，托盘框架4可以包括托盘外框41和托盘架42，托盘本体1安装在托盘架42上，托盘架42安装在托盘外框41上，以有利于用于洗碗机的刀叉托盘组件100的装配。可选地，托盘框架4上的托盘本体1可以为至少一个，换言之，用于洗碗机的刀叉托盘组件100上可设有一个、两个或多个托盘本体1，例如，结合图1和图2所示，每个托盘框架4上可设有两个托盘本体1，两个托盘本体1分别安装在托盘架42上。

Petitioner Samsung Ex-1004, 1225

[0065] 此外，本发明还提出了一种具有上述实施例的用于洗碗机的刀叉托盘组件100的洗碗机。

[0066] 由于根据本发明上述实施例的用于洗碗机的刀叉托盘组件100具有上述技术效果，因此，本发明实施例的洗碗机也具有上述技术效果，即根据本发明实施例的洗碗机，通过设置上述用于洗碗机的刀叉托盘组件100，在对用于洗碗机的刀叉托盘组件100进行清洗时，不仅可容纳体积稍大于刀叉5以及勺子的餐具，而且方便收取刀叉5。

[0067] 在本发明中，除非另有明确的规定和限定，第一特征在第二特征“上”或“下”可以是第一和第二特征直接接触，或第一和第二特征通过中间媒介间接接触。而且，第一特征在第二特征“之上”、“上方”和“上面”可是第一特征在第二特征正上方或斜上方，或仅仅表示第一特征水平高度高于第二特征。第一特征在第二特征“之下”、“下方”和“下面”可以是第一特征在第二特征正下方或斜下方，或仅仅表示第一特征水平高度小于第二特征。

[0068] 在本说明书的描述中，参考术语“一个实施例”、“一些实施例”、“示例”、“具体示例”、或“一些示例”等的描述意指结合该实施例或示例描述的具体特征、结构、材料或者特点包含于本发明的至少一个实施例或示例中。在本说明书中，对上述术语的示意性表述不必须针对的是相同的实施例或示例。而且，描述的具体特征、结构、材料或者特点可以在任一个或多个实施例或示例中以合适的方式结合。此外，在不相互矛盾的情况下，本领域的技术人员可以将本说明书中描述的不同实施例或示例以及不同实施例或示例的特征进行结合和组合。

[0069] 尽管上面已经示出和描述了本发明的实施例，可以理解的是，上述实施例是示例性的，不能理解为对本发明的限制，本领域的普通技术人员在本发明的范围内可以对上述实施例进行变化、修改、替换和变型。

Petitioner Samsung Ex-1004, 1226

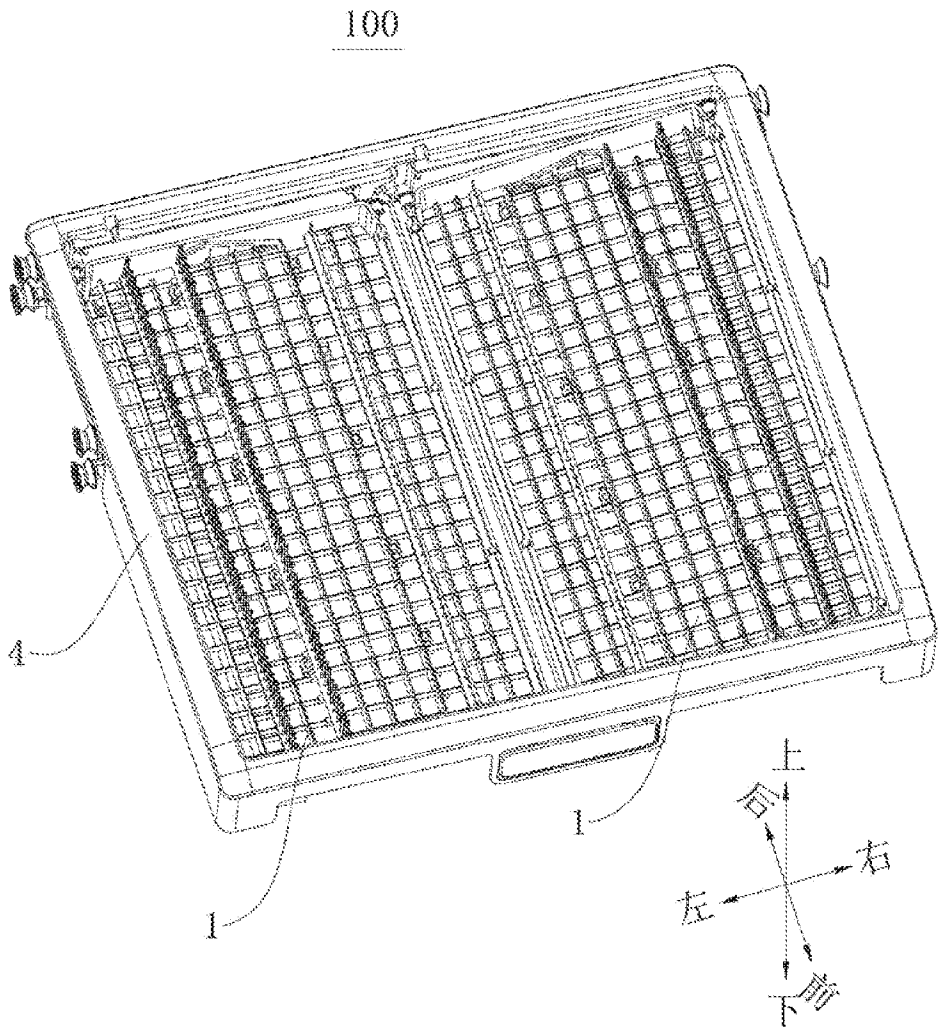


图1

Petitioner Samsung Ex-1004, 1227

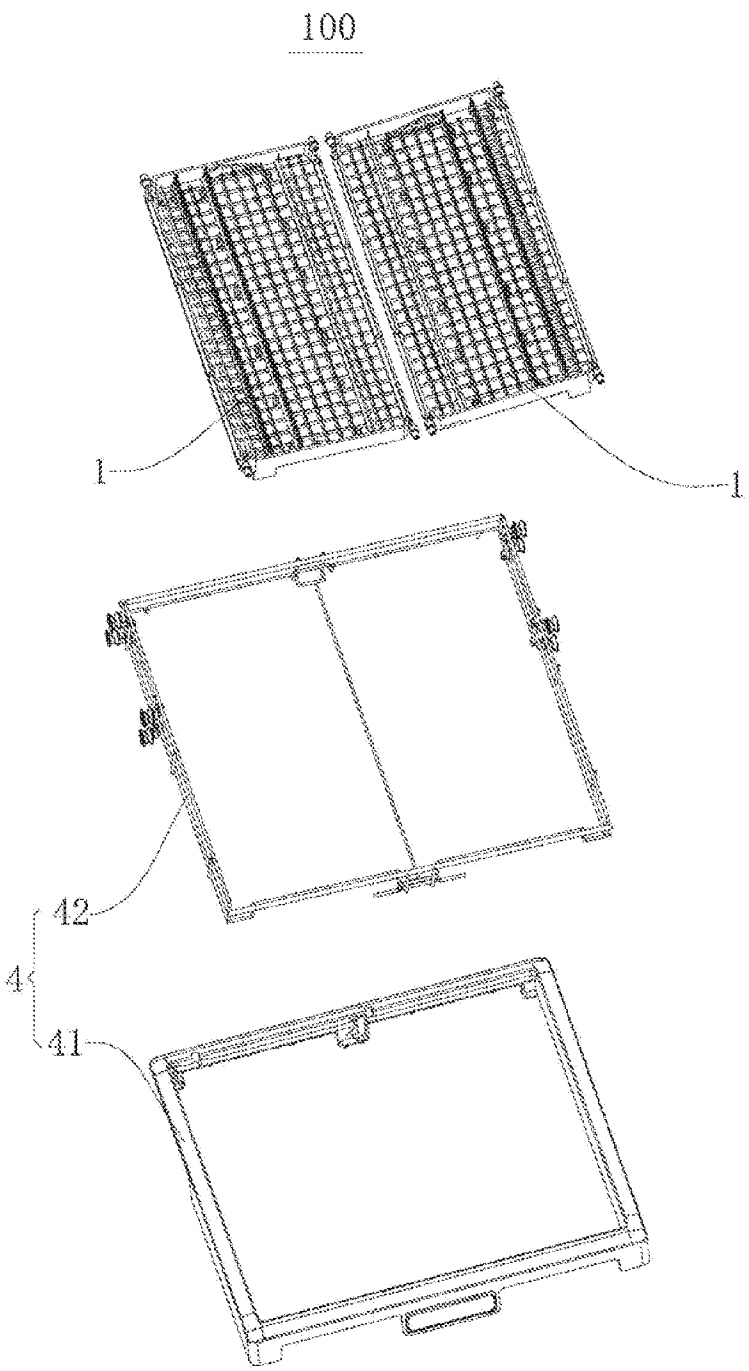


图2

Petitioner Samsung Ex-1004, 1228

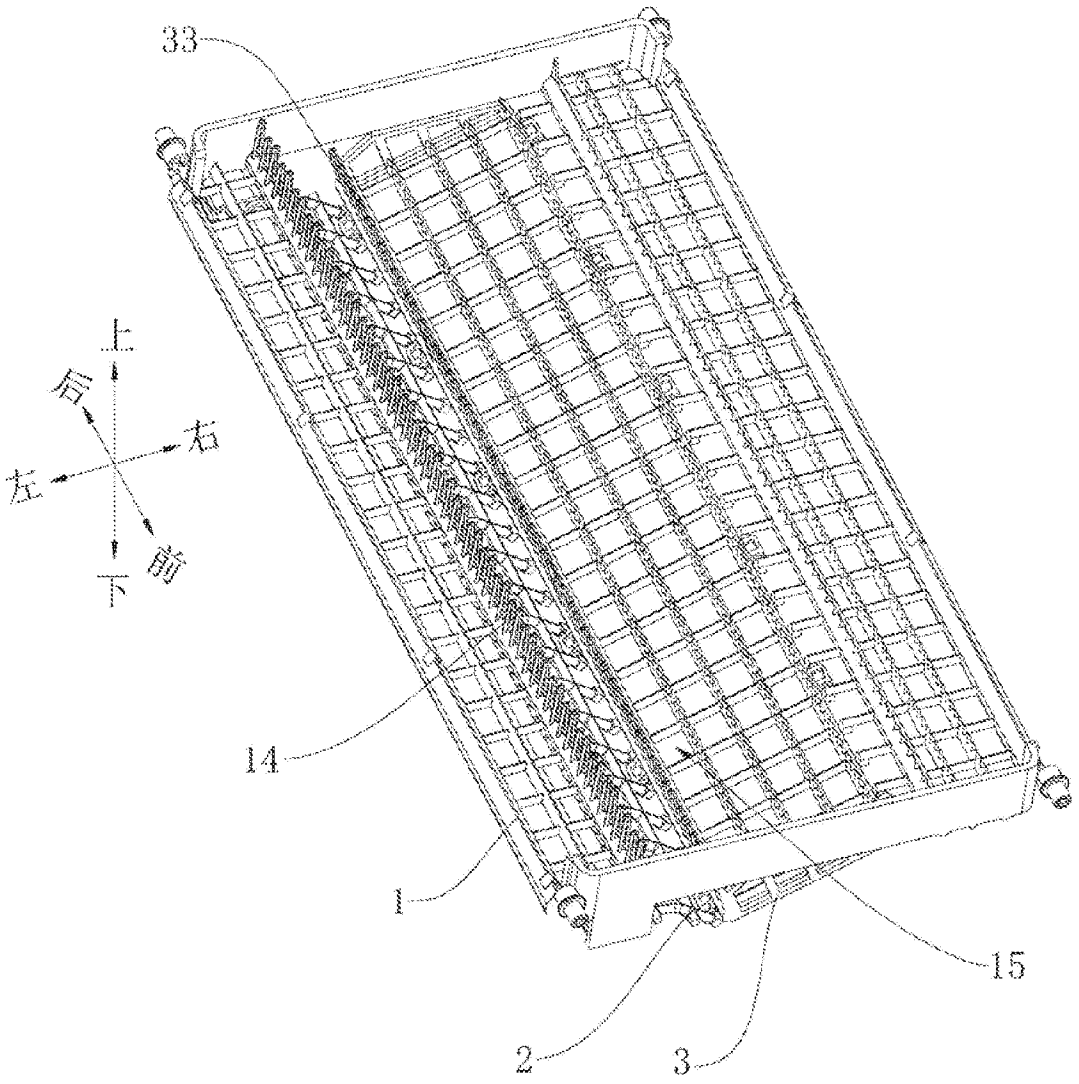


图3

Petitioner Samsung Ex-1004, 1229

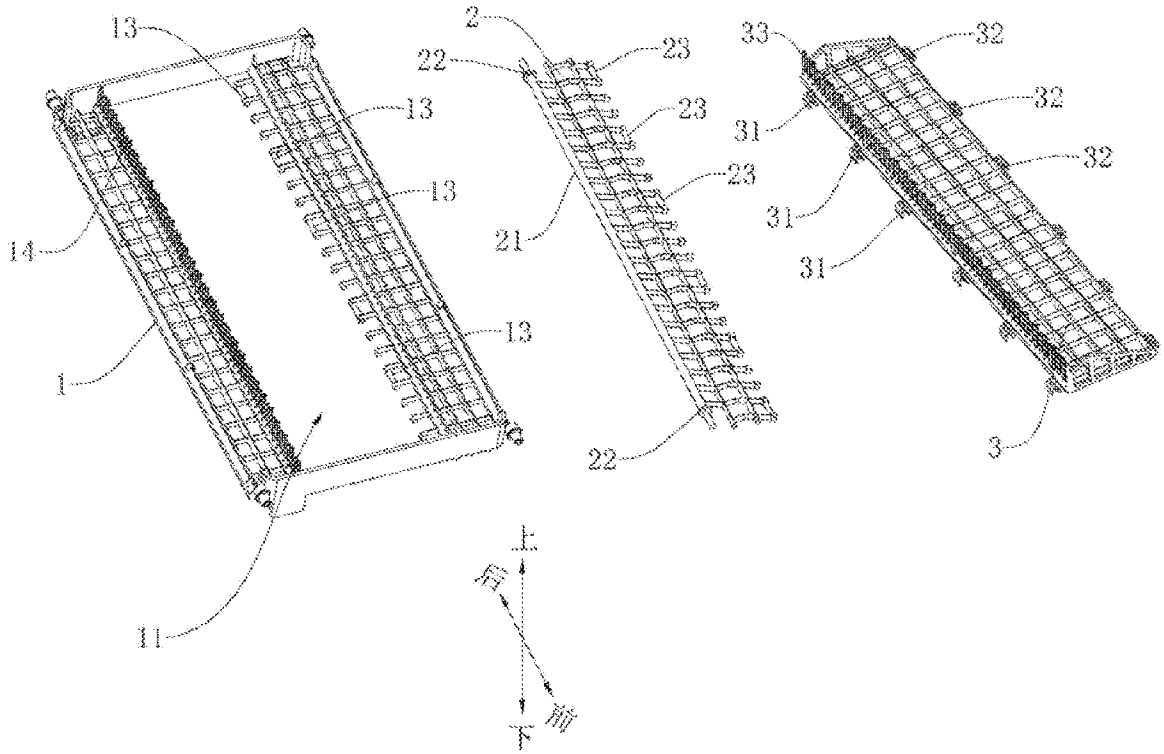


图4

Petitioner Samsung Ex-1004, 1230

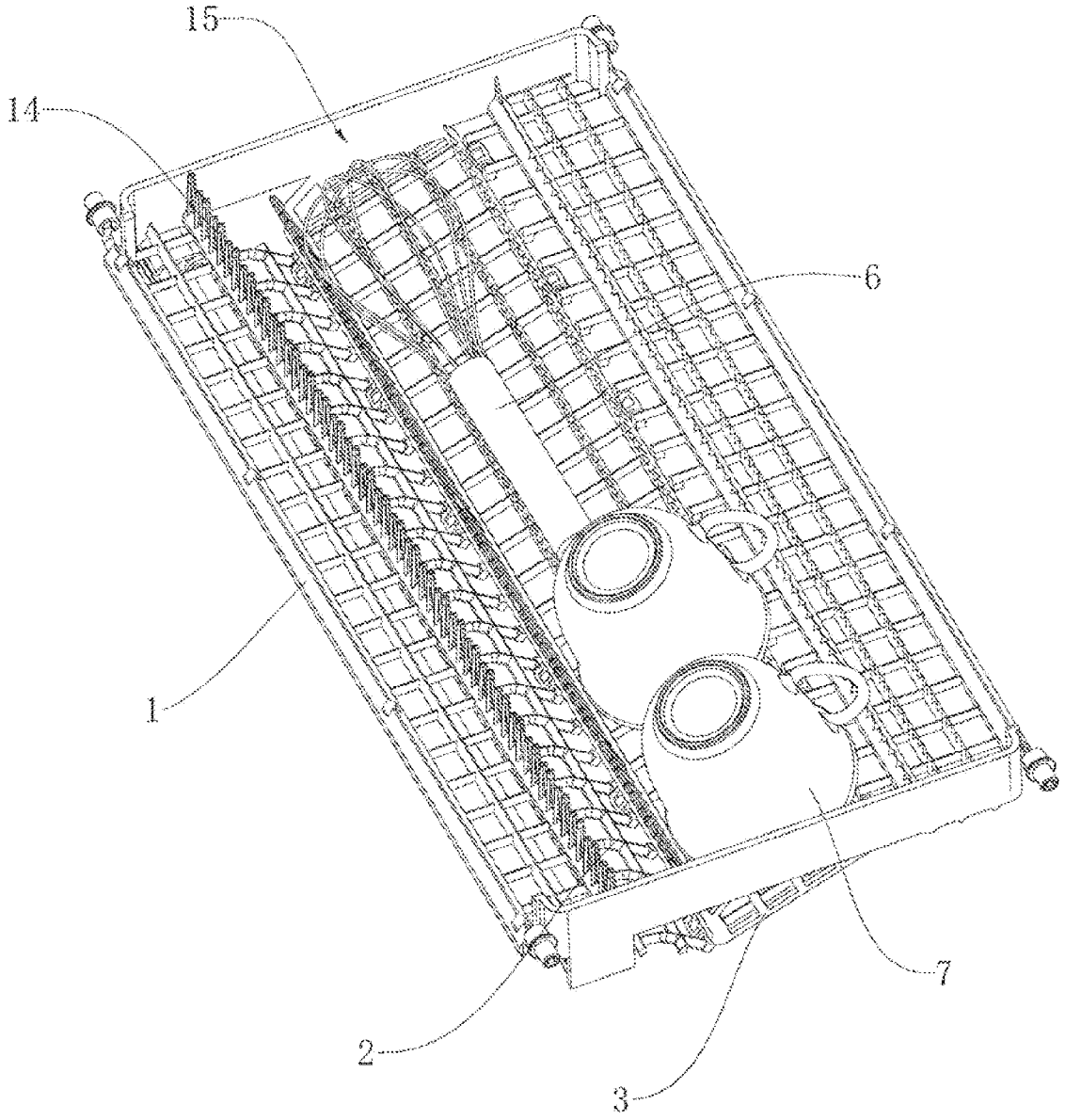


图5

Petitioner Samsung Ex-1004, 1231