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- **Szczepanowski, Adam**
113 48 Stockholm (SE)
- **Pimputkar, Girish**
112 21 Stockholm (SE)
- **Bari, Elisabetta**
30026 Pordenone (IT)

(71) Applicant: **Electrolux Home Products Corporation N.V.**
1930 Zaventem (BE)

(74) Representative: **Samzelius, Roger Mikael**
AB Electrolux
Group Intellectual Property
105 45 Stockholm (SE)

(72) Inventors:
• **Olson, Niklas**
112 46 Stockholm (SE)

(54) **Dishwasher**

(57) The present invention relates to a dishwasher comprising, a dishwasher basket, tubing for supply of washing liquid, and a washing device, configured to selectively operate in a washing mode or a resting mode during washing operations of the dishwasher. The washing device comprises at least one pin shaped utensil holder for holding a hollow utensil to be washed through an orifice thereof and at least one spray nozzle cooperating with the at least one utensil holder. In the washing mode,

the at least one spray nozzle is connected to the tubing for washing liquid for receiving washing liquid there from, and the at least one pin shaped utensil holder is, in a washing position, positioned to hold a hollow utensil to be washed such that the hollow utensil is supported in the dishwasher basket and such that the orifice is directed towards the at least one spray nozzle. In the resting mode, the at least one spray nozzle is disconnected from the tubing for washing liquid.

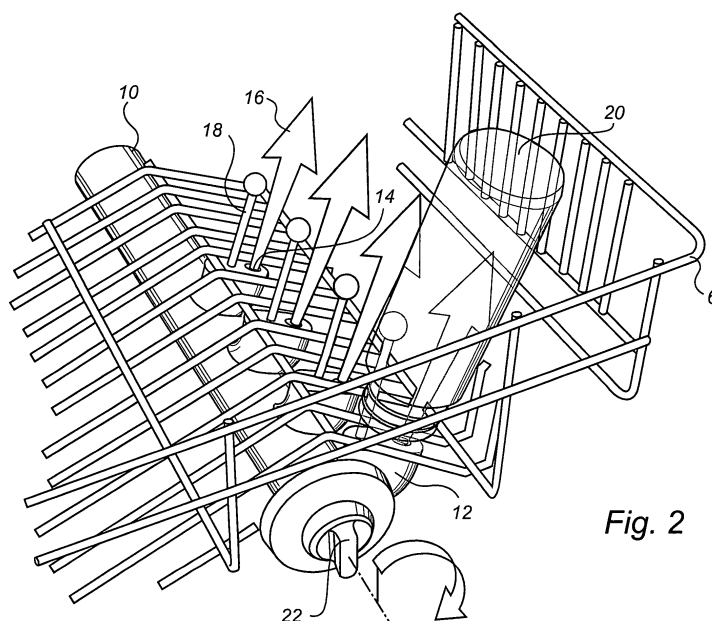


Fig. 2

Description

Technical Field of the Invention

[0001] The present invention relates to a dishwasher comprising a dishwasher basket and tubing for supply of washing liquid. The dishwasher further comprises a utensil holder for holding a hollow utensil to be washed through an orifice thereof.

Background Art

[0002] A dishwasher of the above mentioned type is disclosed in US2007/0144985. The dishwasher is arranged with a utensil holder with a shaft which is able to project into the interior of a hollow bodied dish.

[0003] The utensil holder of prior art is disadvantageous in that it is inflexible and for hollow and narrow objects, and the cleaning result is not satisfying.

Summary of the Invention

[0004] An object of the present invention is to provide an improved dishwasher, which eliminates or at least reduces at least one of the above mentioned problems.

[0005] This object is met by a dishwasher as set forth in the appended independent claim. Further embodiments are defined in the dependent claims.

[0006] According to a first aspect of the invention, there is provided a dishwasher comprising a dishwasher basket, tubing for supply of washing liquid, and a washing device. The washing device is configured to selectively operate in a washing mode or a resting mode during washing operations of the dishwasher. The washing device comprises at least one pin shaped utensil holder for holding a hollow utensil to be washed through an orifice thereof and at least one spray nozzle cooperating with the at least one utensil holder. In the washing mode, the at least one spray nozzle is connected to the tubing for washing liquid for receiving washing liquid there from, and the at least one pin shaped utensil holder is, in a washing position, positioned to hold a hollow utensil to be washed such that the hollow utensil is supported in the dishwasher basket and such that the orifice is directed towards the at least one spray nozzle. In the resting mode, the at least one spray nozzle is disconnected from the tubing for washing liquid.

[0007] Thus the invention is based on the idea of providing a dishwasher with a flexible washing device which can be put in a washing mode, connected to the tubing for washing liquid, or in a resting mode, disconnected from the tubing for washing liquid. The dishwasher is thereby more flexible and when the washing device is put in the resting mode, the dishwasher can be used just as an ordinary dishwasher without the washing device.

[0008] Another advantage with the present invention is that the nozzle is placed in relation to the pin shaped utensil holder and therefore a jet from the nozzle is di-

rected into for example a bottle placed on the utensil holder. This is advantageous for the cleaning result as the probability that the jet of washing liquid can reach the bottom of the utensil is enhanced.

[0009] A washing operation of the dishwasher is an arbitrary washing program chosen by the user. A common washing program comprises a rinsing sequence, a washing sequence and a drainage sequence.

[0010] The washing device can operate in a washing mode or in a resting mode during the washing operation of the dishwasher. The mode can be preset by the user for example at loading of the dishwasher. During the washing operation of the dishwasher the utensil holder can be in a resting position or in a washing position. If the washing device set in the resting mode and the utensil holder is put in a resting position, the spray nozzle is disconnected from the tubing for washing liquid whereby no jet of washing liquid is originating from the spray nozzle. If the washing device set in the washing mode and the utensil holder is put in a washing position, the spray nozzle is connected to the tubing for washing liquid whereby jet of washing liquid is originating from the spray nozzle.

[0011] The disconnection of the spray nozzle in the resting mode is advantageous in that the washing liquid can be effectively used for washing of the items to be washed. Further, a drop of pressure of the washing liquid originating in an additional jet of washing liquid, can be restricted. If every spray nozzle is disconnected, the dishwasher can be used just as normal, with only minor affection by the washing device with respect to the loading space and the pressure of washing liquid.

[0012] The dishwasher is typically a house hold dishwashing machine which can be a table-top dishwasher or a dishwasher standing on the floor.

[0013] The washing liquid is normally water which during cleaning sequences can be mixed with dishwasher detergents.

[0014] The dishwasher is typically provided with a spray arm arranged underneath each dishwasher basket. The spray arm is arranged to rotate and to spray the washing liquid towards the items to be washed. The spray arm is provided with spray arm nozzles. Thus, normally, the dishwasher is provided with spray arm nozzles in addition to the spray nozzles of the washing device.

[0015] The pin shaped utensil holder can for example be a pin provided with a spherical head on top. But it can also be any other elongated body arranged to support the hollow utensil. An elongated shape is advantageous in that it can support even very narrow and hollow items from the inside, while leaving space inside the utensil for the washing liquid originated from the spray nozzle. The washing liquid can thereby enter the utensil via the orifice and the bottom of the utensil can be cleaned by the washing liquid. The pin shaped utensil holder can for example protrude from the bottom of the dishwasher basket. The hollow utensil can for example hang on the utensil holder and only be supported from

its inside of the utensil holder. Alternatively the hollow utensil can be supported by both the utensil holder and the dishwasher basket. The utensil holder can be arranged with any suitable angle relative the bottom surface by the dishwasher basket.

[0016] The spray nozzle can be one single spray nozzle, or several spray nozzles arranged close to each other. The spray nozzle can be fixedly arranged or slightly movable.

[0017] The hollow utensil can for example be a narrow glass, a vase or a baby bottle.

[0018] In an embodiment of the invention, the dishwasher basket is an upper dishwasher basket in a dishwasher that can comprise also a lower dishwasher basket. The upper dishwasher basket is typically arranged for holding glasses and cups whereas the lower dishwasher basket is typically arranged for table cutlery, plates and larger dishes. The space underneath the lower basket is typically more restricted than that of the upper dishwasher basket. A washing device can therefore be added to the upper dishwasher basket without any extensive reconstruction of the typical dishwasher.

[0019] In another embodiment of the invention, the at least one pin shaped utensil holder is connected to the dishwasher basket, at least when the utensil holder is in the washing mode. An advantage with the utensil holder in the dishwasher basket is that the utensil holder can be integrated and does not necessarily need any extra space outside the dishwasher basket. The dishwasher basket together with the washing device is further simple to pull out and load in the pulled out state. The construction is simple and a reconstruction of an ordinary dishwasher can be focused on the upper dishwasher basket.

[0020] In the resting mode, the at least one pin shaped utensil holder can be positioned such that at most a minor portion thereof projects into the dishwasher basket. The load capacity of the dishwasher basket can thus be essentially unaffected by the washing device while in the resting mode. The at least one pin shaped utensil holder can for example be pivotally arranged relative the dishwasher basket, whereby the at least one utensil holder is pivotal between the washing position and the resting position. The resting position of the utensil holder can be a position underneath the bottom of the dishwasher basket or a position essentially parallel to the bottom. The dishwasher basket can be provided with a switch/knob/handle for putting the utensil holder in the resting or the washing position. The switch can simultaneously be arranged to switch on and off the washing liquid in the respective position.

[0021] In another embodiment of the invention, the at least one spray nozzle is fixedly connected to the at least one pin shaped utensil holder such that it is moved together with the at least one pin shaped utensil holder between the positions thereof. Thereby the spray nozzle can be oriented in a preferable direction relative the utensil holder. The position of and the distance between the nozzle and the utensil holder can also be optimized.

[0022] In another embodiment of the invention, the at least one pin shaped utensil holder is detachably connected to the dishwasher basket. In the washing mode, the at least one pin shaped utensil holder is attached and set in the washing position, and, in the resting mode, the at least one pin shaped utensil holder is detached and removed to a resting position outside the dishwasher. The detachable connection can for example be a threaded connection, a screw connection or a snap connection. The washing liquid can be automatically switched of simultaneously as the utensil holder is removed.

[0023] In another embodiment of the invention, the washing device includes several pin shaped utensil holders and several spray nozzles cooperating with the several pin shaped utensil holders, wherein each pin shaped utensil holder is arranged to be individually movable between the washing position and the resting position. Thus, individual washing devices can be arranged in the washing mode simultaneously as other washing devices are arranged in the resting mode. This is advantageous in that the loading space of the dishwasher can be optimized and fully utilized.

[0024] The washing device can alternatively include several pin shaped utensil holders and several spray nozzles cooperating with the several pin shaped utensil holders, wherein all the utensil holders are connected and can be simultaneously moved between the washing position and the resting position.

[0025] The disconnection of each nozzle can be arranged close to the nozzle or at a distance from the nozzle along the tubing. The disconnection can alternatively be arranged simultaneously for a plural of nozzles. The disconnection can be arranged at one central point or simultaneously at several points for example close to every spray nozzle. The disconnection can be controlled by a knob which can be turned into a connection position or a disconnection position. The knob can be arranged to simultaneously turn the utensil holder into a washing position or into a resting position.

[0026] In another embodiment of the invention, the washing device comprises nozzle tubing for supply of washing liquid to the at least one spray nozzle. A spray arm and spray arm tubing for supply of washing liquid to the spray arm are connected to the dishwasher basket. The nozzle tubing can be connected to the spray arm tubing. This is a space saving construction, where the reconstruction of a typical dishwasher machine to a dishwasher machine according to the invention can be focused to a reconstruction of the dishwasher basket.

[0027] Alternatively, the nozzle tubing can be connected to the tubing of the dishwasher independently of the spray arm tubing. This is advantageous due to that the pressure of washing liquid in the spray arms will not be influenced by a presence of washing devices.

Brief Description of the Drawings

[0028] The invention may be performed in many vari-

ous ways, and by way of example only, some embodiments thereof will now be described in detail with reference being made to the accompanying drawings in which,

Fig. 1 is a schematic view of an embodiment of a dishwasher according to the present invention,
 Fig. 2 is schematic view of a part of a dishwasher basket in an embodiment of the invention,
 Fig. 3 is a schematic view/outline of the tubing in an embodiment of the invention, and
 Fig. 4 is a schematic view/outline of the tubing in an embodiment of the invention.

Detailed Description of Preferred Embodiments of the Invention

[0029] The present invention will be described in more detail hereinafter with reference to the accompanying drawings, in which a preferred embodiment of the invention is shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiment set forth herein; rather, the embodiment is provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. In the drawings, like numbers refer to like elements.

[0030] Fig. 1 shows a perspective view of a dishwasher 1 according to a preferred embodiment of the invention. The dishwasher 1 includes a washing chamber 2, a lower dishwasher basket 4, an upper dishwasher basket 6 and a front 8. The upper dishwasher basket 6 is provided with a set of four washing devices loaded with a bottle 20 on each washing device. A switch or knob 22 is provided on the upper dishwasher basket 6. The dishwasher is provided with spray arms 30, 32, one arranged underneath each dishwasher basket. Of clarity reasons these are not shown in Fig. 1 or Fig. 2. The spray arms 30, 32 are schematically shown in Fig. 3 and Fig. 4.

[0031] Fig. 2 shows a close up of a part of the upper dishwasher basket 6 shown in Fig. 1. A tubing 10 is provided at the bottom of the dishwasher basket 6. Protrusions 12 are connected to the tubing 10 along its length. At the upper surface of each protrusion 12 a nozzle 14 is arranged for directing a beam of washing liquid upwards and into the bottle 20. A pin shaped utensil holder 18 is arranged next to the nozzle 14. The pin-shaped utensil holder 18 is arranged with a round head at its outer end and is protruding upwards in the dishwasher basket 6. A bottle 20 is placed on one of the pin shaped utensil holders 18. A knob 22 is arranged at the outer end of the tubing 10 for the user to turn the washing device into a washing mode (shown) or into a resting mode (not shown).

[0032] The user can load the dishwasher 1 by placing for example a baby bottle 20 on a pin shaped utensil holder 18 such that the pin shaped utensil holder 18 is arranged inside the bottle 20 and the bottle 20 is sup-

ported by the dishwasher basket 6. Thereby the nozzle 14 and the pin shaped utensil holder 18 are arranged such that the nozzle 14 is facing the orifice of the bottle 20 and the beam 16 of washing liquid is directed into the inner of the bottle 20. The arrows pointing upwards from each nozzle 14 represents a beam 16 of washing liquid.

[0033] To put the pin shaped utensil holder 18 in a resting mode, the knob 22 is turned whereby the pin shaped utensil holders 18 is moved in between the bars of the basket 6 and into a resting position parallel to the bottom of the dishwasher basket 6. In this resting position the utensil holder 18 could be just a minor hindrance for for example plates to be put inbetween the bars, but substantially no hindrance for glasses or cups or other items to be put on top of the bottom of the basket 6. The nozzles 14 are disconnected simultaneously as the utensil holders 18 are put in the resting position.

[0034] Fig. 3 and Fig. 4 shows two alternative tubing systems. The upper spray arm 30 is arranged underneath the upper dishwasher basket 6 and the lower spray arm 32 is arranged underneath the lower dishwasher basket 4. The upper dishwasher basket 6 is further provided with washing devices including nozzles 14. The washing liquid is supplied to the tubings by a pump 40. The tubings are provided with valves (35, 42) for control of the supply of washing liquid. Close to where the tubings enter the upper dishwasher basket 6, a disengaging coupling (not shown) is typically arranged, whereby the upper dishwasher basket 6 can be pulled out together with the upper spray arm 30 and the tubing connected to the washing device (including the nozzles 14). When the upper dishwasher basket 6 is back in the inserted position, the tubings for the upper spray arm 30 and the washing device are reconnected via the disengaging coupling.

[0035] In Fig. 3 the tubing 34 supplying the upper and the lower spray arm 30, 32 is connected to the nozzles 14 via a valve 35. In Fig. 4, the nozzles 14 are supplied by a tubing 36, which is connected to the pump, and which is parallel to the tubing 38 supplying the upper and the lower spray arm 30, 32. The tubing system of Fig. 4 includes a branch valve 42 which is arranged to distribute the washing liquid from the pump 40 and into the washing chamber 2 via the spray arms 30, 32 and, if connected, to the nozzles 14.

[0036] In the drawings and specification, there have been disclosed preferred embodiments and examples of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for the purpose of limitation, the scope of the invention being set forth in the following claims.

Claims

1. A dishwasher (1) comprising, a dishwasher basket (6), tubing (10, 34, 36) for supply of washing liquid, and a washing device, configured to selectively operate in a washing mode or a resting mode during

- washing operations of the dishwasher (1), which washing device comprises at least one pin shaped utensil holder (18) for holding a hollow utensil to be washed through an orifice thereof, at least one spray nozzle (14) cooperating with the at least one utensil holder (18), wherein in the washing mode, the at least one spray nozzle (14) is connected to the tubing (10, 34, 36) for washing liquid for receiving washing liquid there from, and the at least one pin shaped utensil holder (18) is, in a washing position, positioned to hold a hollow utensil to be washed such that the hollow utensil is supported in the dishwasher basket (6) and such that the orifice is directed towards the at least one spray nozzle (14), and wherein in the resting mode, the at least one spray nozzle (14) is disconnected from the tubing (10, 34, 36) for washing liquid.
2. A dishwasher (1) according to claim 1, wherein the dishwasher basket (6) is an upper dishwasher basket.
 3. A dishwasher (1) according to claim 1 or 2, wherein, at least in the washing mode, the at least one pin shaped utensil holder (18) is connected to the dishwasher basket (6).
 4. A dishwasher (1) according to any of claims 1-3, wherein, in the resting mode, the at least one pin shaped utensil holder (18) is, in a resting position, positioned such that at most a minor portion thereof projects into the dishwasher basket (6).
 5. A dishwasher (1) according to claim 4, wherein the at least one pin shaped utensil holder (18) is pivotally arranged relative the dishwasher basket (6), whereby the at least one utensil holder (18) is pivotal between the washing position and the resting position.
 6. A dishwasher (1) according to claim 5, wherein the at least one spray nozzle (14) is fixedly connected to the at least one pin shaped utensil holder (18) such that it is moved together with the at least one pin shaped utensil holder (18) between the positions thereof.
 7. A dishwasher (1) according to any claim 3 - 5, wherein the at least one pin shaped utensil holder (18) is detachably connected to the dishwasher basket (6), wherein, in the washing mode, the at least one pin shaped utensil holder (18) is attached and set in the washing position, and, in the resting mode, the at least one pin shaped utensil holder (18) is detached and removed to a resting position outside the dishwasher (1).
 8. A dishwasher (1) according to claim 7, wherein the at least one pin shaped utensil holder (18) is detachable connected by means of a threaded connection.
 9. A dishwasher (1) according to any of claims 4 - 8, wherein the washing device includes several pin shaped utensil holders (18) and several spray nozzles (14) cooperating with the several pin shaped utensil holders (18), wherein each pin shaped utensil holder (18) is arranged to be individually movable between the washing position and the resting position.
 10. A dishwasher (1) according to any of claims 1 - 9, wherein the washing device comprises nozzle tubing (34) for supply of washing liquid to the at least one spray nozzle (14), a spray arm (30, 32) and spray arm tubing (34) for supply of washing liquid to the spray arm (30, 32) are connected to the dishwasher basket (6), and wherein the nozzle tubing (34) is connected to the spray arm tubing (34).
 11. A dishwasher (1) according to any of claims 1 - 9, wherein the washing device comprises nozzle tubing (36) for supply of washing liquid to the at least one spray nozzle, a spray arm (30, 32) and spray arm tubing (38) for supply of washing liquid to the spray arm (30, 32) are connected to the dishwasher basket (6), and wherein the nozzle tubing (36) is connected to the tubing of the dishwasher independently of the spray arm tubing (38).

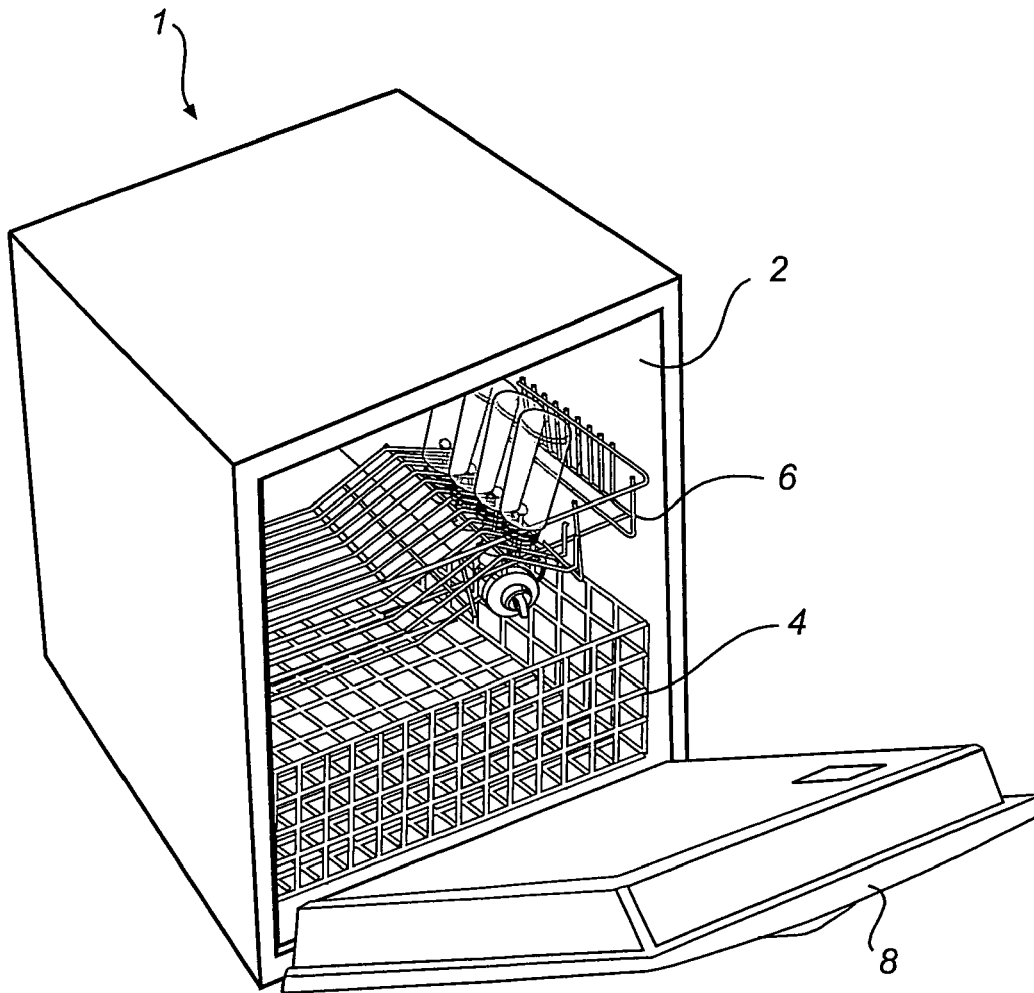


Fig. 1

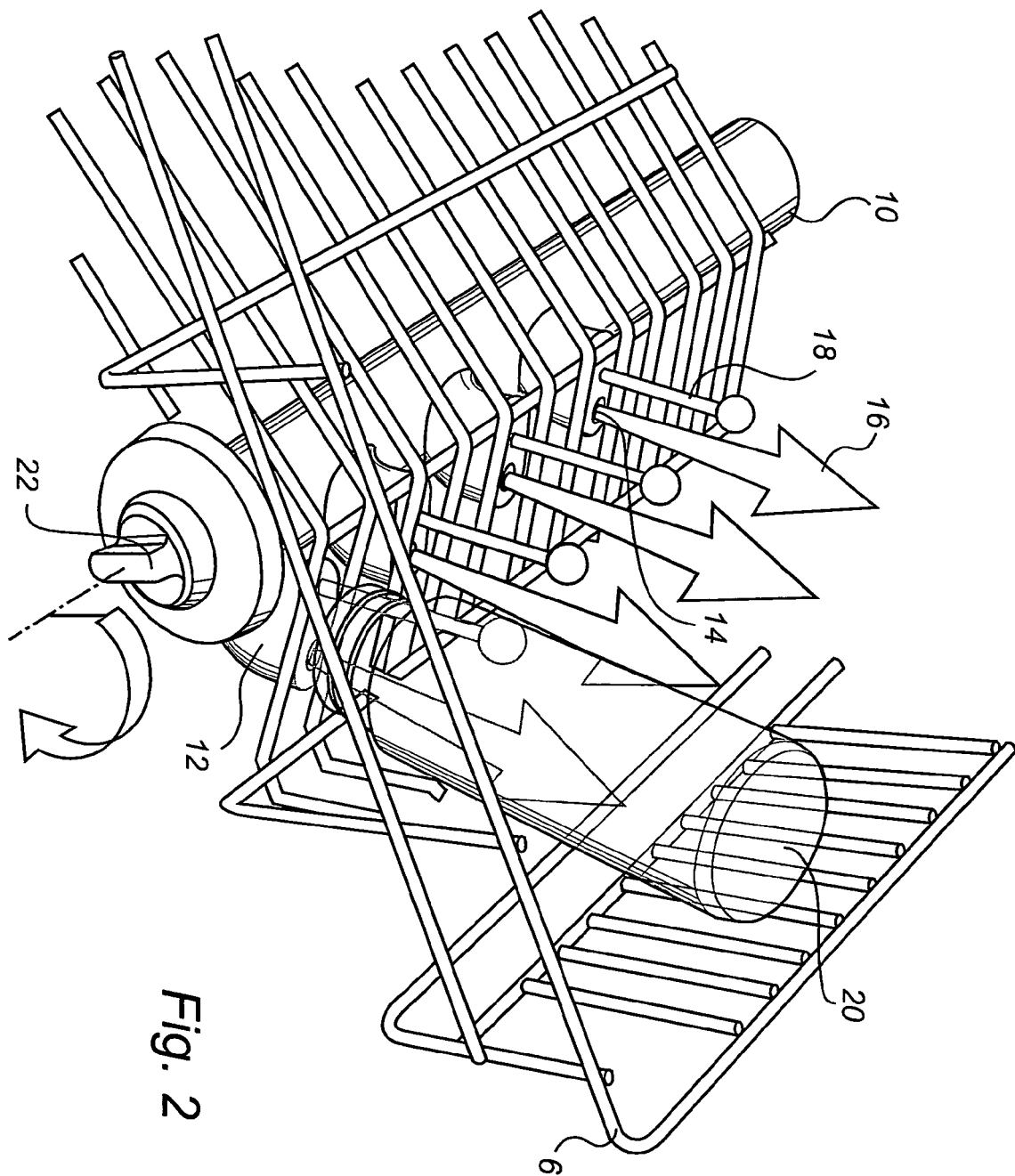


Fig. 2

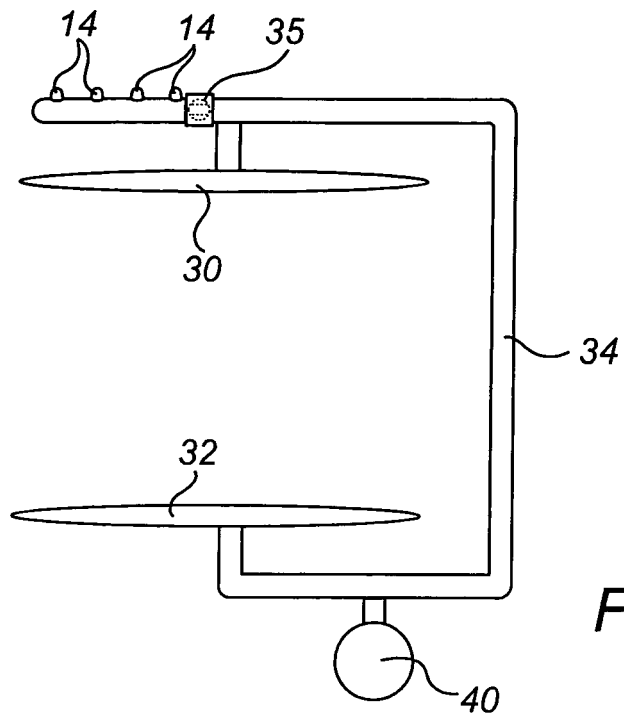


Fig. 3

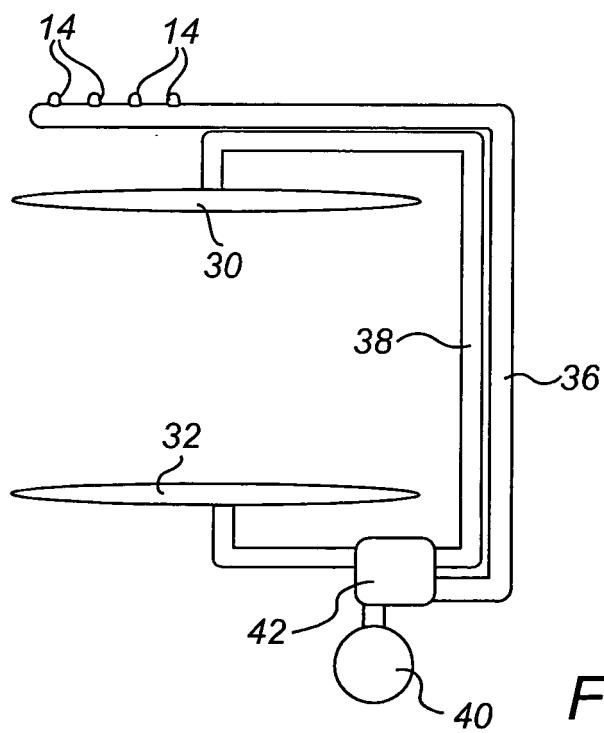


Fig. 4



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Application Number
EP 09 00 3065

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Place of search Munich		Date of completion of the search 17 July 2009	Examiner Lodato, Alessandra
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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