



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
26.09.2018 Bulletin 2018/39

(51) Int Cl.:
A47L 15/00 (2006.01) **A47L 15/14** (2006.01)
A47L 15/23 (2006.01) **A47L 15/22** (2006.01)

(21) Application number: **18162180.6**

(22) Date of filing: **16.03.2018**

(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:
KH MA MD TN

(71) Applicant: **Candy S.p.A.**
20052 Monza (MB) (IT)
(72) Inventor: **FUMAGALLI, Aldo**
I-20900 Monza, Monza e Brianza (IT)
(74) Representative: **Leihkauf, Steffen Falk**
Jacobacci & Partners S.p.A.
Via Senato, 8
20121 Milano (IT)

(30) Priority: **21.03.2017 IT 201700031111**

(54) **DISHWASHER WITH ROTARY-TRANSLATING SPRAYING ARM**

(57) A dishwasher (1) comprises a washing container (2), a rotatable spraying arm (5) forming a plurality of spraying nozzles (6), a pump (7) hydraulically connected with the spraying arm (5) to feed the spraying nozzles (6), wherein the spraying arm (5) comprises a hub portion (14) and at least one end segment (17) translatable with

respect to the hub portion (14) and a synchronization device (18) to synchronize the translation movement of the end segment (17) with the rotary movement of the hub portion (14) so as to translate the end segment (17) depending on the distance of the internal surface (16) from the rotation axis (13).

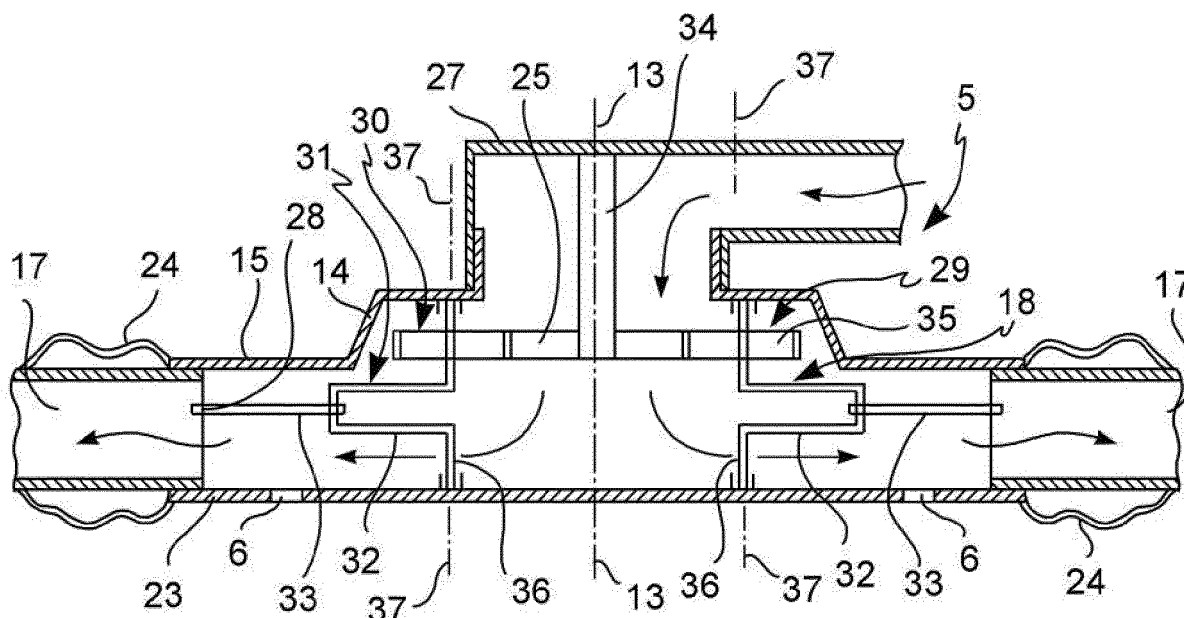


FIG. 2

Description

[0001] The present invention relates to a dishwasher of the type comprising a washing container for receiving dishes to be washed, a spraying device for spraying a washing liquid on the dishes arranged in the washing container and a heating device adapted to heat the washing liquid.

[0002] Dishwashers are known in which the washing liquid is distributed in the washing container and on the dishes by means of nozzles formed in rotating arms hydraulically connected with a pump for the pressurization and recirculation of the washing liquid.

[0003] The rotating arms are put in rotation by virtue of an orientation of the nozzles of the arms, with at least one jet vector component in a direction tangential to the vertical rotation axis, and the consequent reaction force of the washing liquid jet.

[0004] Due to the rectangular shape of the washing container and the circular trajectory of the rotating spraying arms, the washing liquid is not uniformly distributed in all areas of the washing container, with a lack of distribution of the liquid in the corner areas of the washing container which are not covered by the movement of the spraying arms.

[0005] Furthermore, stationary spraying devices or nozzles are known, whose invariable spraying directions may not, however, guarantee a uniform washing of all the dishes arranged in the washing container.

[0006] Furthermore, washing liquid distribution bars have been proposed, equipped with spraying nozzles, and moved with an alternating rectilinear movement by virtue of a motorized movement system.

[0007] Finally, rotating spraying arms are known, near the ends thereof secondary spraying arms are connected, also rotating, which perform a satellite movement with respect to the main movement of the rotating arms.

[0008] The prior art systems, however, are not satisfactory, since they are not capable of spraying the washing liquid in sufficient quantity and with sufficient intensity in all areas of the washing container or of the dish racks and/or their movement and actuation mechanisms are expensive, mechanically complex, and of high energy consumption.

[0009] It is therefore the object of the present invention to provide a dishwasher having features such as to obviate the drawbacks of the background art.

[0010] It is a particular object of the invention to provide a dishwasher having features such as to distribute the washing liquid even in the corner areas of the washing container.

[0011] It is a further object of the invention to provide a dishwasher having a robust washing liquid distribution system, with a simple and reliable structure.

[0012] These and other objects are achieved by means of a dishwasher according to claim 1. Advantageous embodiments are the subject of the dependent claims.

[0013] According to an aspect of the invention, a dish-

washer comprises a washing container for receiving dishes to be washed, at least one spraying arm rotatably mounted in the washing container and forming a plurality of spraying nozzles for spraying a washing liquid in the washing container, a pump hydraulically connected with the spraying arm to feed the washing liquid to the spraying nozzles, a heating device for heating the washing liquid, and control means which control the actuation of the pump and of the heating means, in which the spraying arm comprises a hub portion rotatably connected about a rotation axis, and a bar portion extending from the hub portion in a direction transversal (preferably radial) to the rotation axis, towards an internal surface of the washing container, the bar portion forming a plurality of said spraying nozzles and being connected to the hub portion so as to rotate together with the hub portion about the rotation axis, characterized in that:

[0014] the bar portion comprises an end segment translatable with respect to the hub portion away from and towards the rotation axis, and the spraying arm comprises a synchronization device connected with the washing container and with the end segment and configured to synchronize the translation movement of the end segment with the rotary movement of the hub portion so as to translate the end segment depending on the distance of the internal surface from the rotation axis.

[0015] In particular, the end segment moves away from the rotation axis at the corner regions of the washing container which are further away from the rotation axis, and the end segment moves towards the rotation axis at the side regions of the washing container which are closer to the rotation axis.

[0016] Thereby, an automatic adjustment of the position and of the extension of the spraying arm to the distance between the internal surface of the washing container and the rotation axis of the spraying arm is obtained, resulting in the washing liquid being sprayed also on the dishes arranged in the corner regions of the washing container.

[0017] To better understand the invention and appreciate the advantages thereof, a number of embodiments thereof will be described below by way of non-limiting example, with reference to the accompanying Figures, in which:

- Figure 1 is a diagrammatic front view of a dishwasher according to an embodiment of the invention;
- Figure 2 is a sectional view of a part of a spraying arm for a dishwasher according to an embodiment,
- Figure 3 is a sectional view of a part of a spraying arm for a dishwasher according to a further embodiment,
- Figure 4 is a diagrammatic view of the rotary-translation movement of the spraying arm in Figure 2,
- Figure 5 is a diagrammatic view of the rotary-translation movement of the spraying arm in Figure 3,
- Figure 6 is a diagrammatic view of the rotary-translation movement of the spraying arm according to a

further embodiment,

- Figure 7 is a sectional view of a part of a spraying arm for a dishwasher according to a further embodiment,

[0018] Figure 8 is a diagrammatic, top view of a cam track of the spraying arm in Figure 7.

[0019] With reference to the Figures, a dishwasher 1 comprises at least one washing container 2 adapted to receive dishes 3 to be washed and closable by means of a door 4 (indicated in Figure 1 only diagrammatically, by means of a dashed line).

[0020] Inside the dishwasher 1 at least one spraying arm 5 is positioned, rotatably mounted in the washing container and forming a plurality of spraying nozzles 6 for spraying a washing liquid on the dishes 3 received in the washing container 2. A pump 7 is hydraulically connected, for example by means of a supply duct 8, with the spraying arm 5 to feed the washing liquid to the spraying nozzles 6.

[0021] The dishwasher 1 further comprises a heating device 9 adapted to heat the washing liquid, for example an electrical resistor arranged in a washing liquid collection tank 10. The collection tank 10, preferably formed in a lower region of the washing container 2 or below the washing container 2, is connected with the pump 7 to allow the drawing of the cold or heated washing liquid required for the washing treatment of the dishes 3. The collection tank 10 and/or the pump 7 are further connected with an inlet valve 11 for loading mains water, and to a draining duct 12 for draining the washing liquid.

[0022] The dishwasher 1 further comprises control means, for example, an electronic control unit 40, configured to allow the selection of a dish washing treatment program among a plurality of dish washing treatment programs, and to control the actuation of the pump 6, of the heating device 10 and of the inlet valve 11.

[0023] In a conventional manner, the one or more spraying arms 5 may be put in rotation by virtue of an orientation of the spraying nozzles 6, with at least one jet vector component in a direction tangential to the (vertical) rotation axis 13, and the consequent reaction force of the washing liquid jets produced by means of the pressure and the speed of the liquid conveyed by means of the pump 7.

[0024] Alternatively, the one or more spraying arms 5 may be actuated in rotation by means of a rotary actuator, for example an electric motor or an electromechanic or electrohydraulic actuator.

[0025] The spraying arm 5 comprises a hub portion 14 rotatably supported about a rotation axis 13, and an elongated portion in the shape of a bar 15 extending from the hub portion 14 in a direction transversal (preferably radial) to the rotation axis 13, towards an internal surface 16 of the washing container 2.

[0026] The bar portion 15 forms a plurality of spraying nozzles 6 and is connected to the hub portion 14 so as to rotate together with the hub portion 14 about the rota-

tion axis 13.

[0027] According to an aspect of the invention, the bar portion 15 comprises an end segment 17 which forms one or more of the spraying nozzles 6 and which is translatable with respect to the hub portion 14 away from and towards the rotation axis 13. The spraying arm 5 further comprises a synchronization device 18 connected with the washing container 2 and to the end segment 17 and configured to synchronize the translation movement 20 of the end segment 17 with the rotary movement 21 of the hub portion 14 so as to translate the end segment 17 depending on the distance of the internal surface 16 from the rotation axis 13 (**Figures 4, 5, 6**).

[0028] In particular, the end segment 17 moves away from the rotation axis 13 when the bar portion 15 is oriented towards the corner regions 19 of the washing container 2 which are further away from the rotation axis 13, and the end segment 17 moves towards the rotation axis 13 when the bar portion 15 is oriented towards the wall regions 22 of the washing container 2 which are closer to the rotation axis 13.

[0029] Thereby, an automatic adjustment of the position and of the extension of the spraying arm 5 to the change in distance between the internal surface 16 of the washing container 2 and the rotation axis 13 of the spraying arm 5 is obtained. As a result, the washing liquid is sprayed also on the dishes 3 arranged in the corner regions of the washing container 2 (**Figures 4, 5, 6**).

[0030] According to an embodiment, the rotation axis 13 is substantially vertical and the internal surface 16 is substantially rectangular, as shown in **Figures 1, 4, 5, 6**.

[0031] According to embodiments, the bar portion 15 may extend on two opposite sides of the hub portion 14, may protrude in a direction substantially radial with respect to the rotation axis 13, may lie and rotate on a plane substantially perpendicular to the rotation axis 13 and may have a rectilinear development, possibly tapered towards the free ends.

[0032] Advantageously, the hub portion 14 and the bar portion 15 and the end segment 17 may form one or more spraying nozzles 6, so as to ensure the most uniform possible washing liquid distribution.

[0033] According to an embodiment, the spraying arm 5 comprises two translatable end segments 17 (forming the two radially outermost ends of the bar portion 15), arranged on two sides diametrically opposite (**Figures 2, 4**) with respect to the hub portion 13 and translatable with respect to one another and with respect to the hub portion 14. Advantageously, the synchronization device 18 is configured to make the two end segments 17 translate with respect to the hub portion 14 in an alternate and opposing manner, and in a manner synchronized with the instantaneous orientation of the spraying arm 5 with respect to the washing container 2.

[0034] This allows a bilateral elongation and shortening of the spraying arm 5, synchronized with the instantaneous orientation of the spraying arm 5 with respect to the washing container 2 (**Figure 4**).

[0035] According to a further embodiment, the spraying arm 5 comprises a single translatable end segment 17 (forming only one of the two radially outermost ends of the bar portion 15), translatable with respect to the hub portion 14 (**Figures 3, 5**). In this case, the synchronization device 18 may be configured to make the single translating end segment 17 translate, with respect to the hub portion 14, in an alternating manner and synchronized with the instantaneous orientation of the spraying arm 5 with respect to the washing container 2.

[0036] This allows a unilateral elongation and shortening of the spraying arm 5, synchronized with the instantaneous orientation of the spraying arm with respect to the washing container 2 (**Figure 5**).

[0037] According to a yet further embodiment, the spraying arm 5 comprises two end segments 17 firmly connected to one another and forming both the radially outermost ends of the bar portion 15 or forming the entire bar portion 15. The two end segments 17 may be formed in a single piece or connected to one another so as to be translatable as a single body with respect to the hub portion 14 (**Figure 6**). In this embodiment, the synchronization device 18 may be configured to make the two end segments 17 together or the entire bar portion 15 translate with respect to the hub portion 14, in an alternating manner and synchronized with the instantaneous orientation of the spraying arm 5 with respect to the washing container 2.

[0038] This allows a rotary-translation of the spraying arm 5, without changing the length thereof, in synchrony with the instantaneous orientation of the spraying arm with respect to the washing container 2 (**Figure 6**).

[0039] In an embodiment, the synchronization device 18 is configured so as to translate the at least one translatable end segment 17:

- in a protracted position at each passage through the corner regions 19 of the washing container 2,
- in a retracted position at each passage through the wall regions 22 of the washing container 2.

[0040] This allows a greater washing liquid distribution frequency in the corner regions 19, at the cost of greater friction and loss of energy due to the more frequent translations of the end segments 17.

[0041] Alternatively, the synchronization device 18 is configured so as to translate the at least one translatable end segment 17 in the protracted position only at each nth passage through one of the corner regions 19 of the washing container 2, in which $n > 1$, preferably $n = 2$ or 3, and to translate or keep the translatable end segment 17 in the retracted position at each passage through one of the wall regions 22 of the washing container 2.

[0042] This reduces the frictional resistance and energy losses due to the translations of the end segments 17, at the cost of a lower washing liquid distribution frequency in the corner regions 19. Obviously, in some cases, a lower spraying frequency is desired in the corner

regions.

[0043] According to an embodiment, the spraying arm 5 forms one or more spraying nozzles 6, which:

- with end segment 17 in retracted position, are not fed with washing liquid or are only partially fed, and which
- with end segment 17 in protracted or extended position, are fed with washing liquid,

[0044] so as to increase the dispensing of the washing liquid with the increase of the length of the spraying arm 5.

[0045] According to an embodiment, the end segments 17 are slidably connected, for example, inserted telescopically with the hub portion 14 or with a radially inner portion 23, not translatable, of the bar portion 15.

[0046] For the waterproofing of the sliding or translatable connection between the end segments 17 and the hub portion 14 or the radially inner portion 23, a sliding gasket interposed therebetween or a bellow gasket 24 arranged around the sliding/translatable connection may be provided for (**Figures 2, 3**).

[0047] Advantageously, the hub portion 14, the bar portion 15 and the translatable end segment/s 17 are hollow plastic profiles, preferably made of fiber-filled polymers, e.g., calcium- or talc-filled polypropylene.

[0048] According to an embodiment, the synchronization device 18 comprises a purely mechanical synchronization transmission with at least one stationary reference member 25 which is stationary with respect to the washing container 2, at least one alternating member 28 connected with the at least one translating end segment 17, and a synchronization mechanism 29 connected with the hub portion 14, to the stationary reference member and to the alternating member 28 to synchronize their relative movements.

[0049] The stationary reference member 25 may comprise, for example, a toothed wheel, a toothed crown, a pulley or a cam (**Figures 2, 3**), fixed and firmly connected to the washing container 2. Advantageously, the stationary reference member 25 is fastened to an extractable dish rack 26 or directly to the washing container 2, preferably together with (and inside) a duct portion 27 to which the hub portion 14 is rotatably coupled.

[0050] The synchronization mechanism 29 may comprise a gear, a lever transmission, a cam or toothed belt transmission, or a crankshaft mechanism.

[0051] Preferably, the synchronization mechanism 29 comprises:

- a reduction or multiplication mechanism 30, for example a gear, in connection between the hub portion 14 and the stationary reference member 25, and configured to make the desired ratio between an output motion frequency applied to the alternating member 28 and the rotation speed of the hub portion 14 with respect to the stationary reference member 25,
- a conversion mechanism 31, for example, a crank

32 and rod 33 mechanism, connected between the reduction or multiplication mechanism 30 and the alternating member 28 (in this case, the rod 33 or the end thereof connected with the end segment 17 of the spraying arm 5), to convert the rotary output motion of the reduction/multiplication mechanism 30 into a reciprocating translation motion of the alternating member 28.

[0052] Figure 2 shows a spraying arm 5 with a synchronization device 18 which actuates the reciprocating translation of two opposite end segments 17, while **Figure 3** shows a spraying arm 5 with a synchronization device 18 which actuates the reciprocating translation of a single end segment 17.

[0053] In the embodiment shown in **Figure 2**, the hub portion 14 is rotatably connected and in hydraulic communication with a fixed duct portion 27. The stationary reference member 25 is a fixed toothed wheel (coaxial to the rotation axis 13), connected to a fixed shaft 34 extending from the inside of the duct portion 27 to the inside of the hub portion 14.

[0054] The de/multiplication mechanism 30 comprises (on one single side or on two opposite sides of the rotation axis 13) a rotatable shaft 36 supported in the hub portion 14 so as to rotate together with the hub portion 14 about the rotation axis 13 and to be capable of rotating, with respect to the hub portion 14, about an own axis 37 spaced apart from the rotation axis 13, as well as a toothed wheel 35 fastened on the rotatable shaft 36 and meshed with the fixed toothed wheel 25.

[0055] The conversion mechanism 31 comprises (on one single side or on two opposite sides of the rotation axis 13) a crank 32 formed by or fastened on the shaft 36 and a rod 33 connected between the crank 32 and the translating end segment 17.

[0056] This embodiment allows a synchronized translation, but not necessarily of identical frequency, of the two end segments 17.

[0057] In the embodiment shown in **Figure 3**, the hub portion 14 is rotatably connected and in hydraulic communication with a fixed duct portion 27. The stationary reference member 25 is a fixed toothed wheel (coaxial to the rotation axis 13), connected to a fixed shaft 34 extending from the inside of the duct portion 27 to the inside of the hub portion 14.

[0058] The de/multiplication mechanism 30 comprises (on one single side of the rotation axis 13) a rotatable shaft 36 supported in the hub portion 14 so as to rotate together with the hub portion 14 about the rotation axis 13 and to be capable of rotating, with respect to the hub portion 14, about an own axis 37 spaced apart from the rotation axis 13, as well as a toothed wheel 35 fastened on the rotatable shaft 36 and meshing with the fixed toothed wheel 25. On the same rotatable shaft 36, a further toothed wheel 38 is fastened, which meshes, by means of a toothed crown 39, a crank 32' rotatably supported on the fixed shaft 34.

[0059] The conversion mechanism 31 comprises the crank 32 supported on the fixed shaft 34 and a rod 33 connected between the crank 32 and the translating end segment 17.

[0060] Figure 7 shows a spraying arm 5 with a synchronization device 18 which actuates the reciprocating translation of two opposite end segments 17, but which may even be used with a single translatable end segment 17.

[0061] In the embodiment shown in **Figure 7**, the hub portion 14 is rotatably connected and in hydraulic communication with a fixed duct portion 27. The stationary reference member 25 is a fixed cam track 41, for example, connected to a fixed shaft 34 extending from the inside of the duct portion 27 to the inside of the hub portion 14.

[0062] The de/multiplication mechanism 30 is implemented by means of the number of oscillations of the cam track 41 with respect to a circumference about the rotation axis 13, in the present case, four oscillations corresponding to the four corner regions 19 of the washing container 2. The conversion mechanism 31 is implemented by the sliding engagement of a cam follower 42 (for example, equipped with a roller to reduce friction) which rotates together with the hub portion 14 about the rotation axis 13 and which is fastened directly or by means of an extension bar 43 to the translating end segment 17.

[0063] The cam followers 42 of the two end segments 17 may slide in a same cam track 41 or in two different cam tracks 41, made, for example, on two opposite faces (above-below) of a cam plate 44.

[0064] Advantageously, the synchronization device 18 is arranged inside the spraying arm 5 and, possibly, partially inside a fixed duct portion 27 to which the spraying arm 5 is connected. More precisely, the synchronization device 18 is arranged inside a hydraulic conveying space formed in the spraying arm 5 and, possibly, in the fixed duct portion 27.

[0065] This protects the synchronization device from external influences and ensures factory-set synchronization for the entire service life of the spraying arm 5.

[0066] Obviously, further changes and variations to the dishwasher 1 and the spraying arm 5 described so far may be introduced by those skilled in the art in order to meet contingent and specific needs, without thereby departing from the scope of protection of the invention as defined by the following claims.

Claims

1. A dishwasher (1), comprising:

- a washing container (2) for receiving dishes (3) to be washed,
- at least one spraying arm (5) rotatably mounted in the washing container (2) and forming a plurality of spraying nozzles (6) for spraying a wash-

ing liquid on the dishes in the washing container (2),

- a pump (7) hydraulically connected with the spraying arm (5) to feed the washing liquid to the spraying nozzles (6),

wherein the spraying arm (5) comprises:

- a hub portion (14) rotatably supported about a rotation axis (13), and

- a bar portion (15) extending from the hub portion (14) in a direction transversal to the rotation axis (13), towards an internal surface (16) of the washing container (2), wherein the bar portion (15) forms a plurality of said spraying nozzles (6) and is connected to the hub portion (14) so as to rotate together with the hub portion (14) about the rotation axis (13), **characterized in that:**

- the bar portion comprises at least one end segment (17) translatable with respect to the hub portion (14) away from and towards the rotation axis (13),

- the spraying arm (5) comprises a synchronization device (18) that synchronizes the translation movement of the end segment (17) with the rotary movement of the hub portion (14) so as to translate the end segment (17) depending on a distance between the internal surface (16) and the rotation axis (13).

2. A dishwasher (1) according to claim 1, wherein said at least one end segment (17) is in a protracted position, away from the rotation axis (13) when the bar portion (15) is oriented towards corner regions (19) of the washing container (2), and the end segment (17) is in a retracted position towards the rotation axis (13) when the bar portion (15) is oriented towards wall regions (22) of the washing container (2) closer to the rotation axis (13) than the corner regions (19).

3. A dishwasher (1) according to one of the previous claims, wherein the spraying arm (5) comprises two of said end segments (17) that form the two radially outermost ends of the bar portion (15) and that translate with respect to one another and with respect to the hub portion (14).

4. A dishwasher (1) according to claim 3, wherein the synchronization device (18) is configured to make the two end segments (17) translate with respect to the hub portion (14) in an alternate and opposing manner.

5. A dishwasher (1) according to one of claims 1 or 2, wherein the spraying arm (5) comprises a single end segment (17) forming only one of the two radially

outermost ends of the bar portion (15) and translatable with respect to the hub portion (14).

6. A dishwasher (1) according to one of claims 1 or 2, wherein the spraying arm (5) comprises two end segments (17) firmly connected to one another and that both form the radially outermost ends of the bar portion (15) or that form the entire bar portion (15), wherein said two end segments (17) translate as a single body with respect to the hub portion (14).

7. A dishwasher (1) according to one of the previous claims, wherein the spraying arm (5) forms one or more spraying nozzles (6) that:

- with end segment (17) in retracted position, are not fed with washing liquid or are only partially fed, and

- with end segment (17) in protracted position, are fed with washing liquid.

8. A dishwasher (1) according to one of the previous claims, wherein the end segments (17) are inserted telescopically with the hub portion (14) or with a radially inner portion (23), not translatable, of the bar portion (15).

9. A dishwasher (1) according to one of the previous claims, wherein in a connection area between the end segments (17) and the hub portion (14) a bellow gasket (24) is formed.

10. A dishwasher (1) according to one of the previous claims, wherein the synchronization device (18) comprises a purely mechanical synchronization transmission with at least one stationary reference member (25) that is stationary with respect to the washing container (2), at least one alternating member (28) connected with the at least one translating end segment (17), and a synchronization mechanism (29) connected with the hub portion (14), with the stationary reference member (25) and with the alternating member (28) to synchronize their relative movements.

11. A dishwasher (1) according to claim 10, wherein:

- the stationary reference member (25) is selected in the group consisting of:

- a toothed wheel,
- a toothed crown,
- a pulley,
- a cam,

fixed and firmly connected with the washing container (2) or with a dish rack (26) supported in an extractable manner in the washing container

(2).

- the synchronization mechanism (29) is selected from the group consisting of:

- a gear, 5
- a lever transmission,
- a cam transmission,
- a toothed belt transmission,
- a crankshaft mechanism. 10

12. A dishwasher (1) according to claim 10 or 11, wherein the synchronization mechanism (29) comprises:

- a de/multiplication mechanism (30) connected to the hub portion (14) and that interacts with the stationary reference member (25), to make the desired ratio between an output motion frequency applied to the alternating member (28) and the rotation speed of the hub portion (14) with respect to the stationary reference member (25), 15
- a conversion mechanism (31) connected between the de/multiplication mechanism (30) and the alternating member (28) to convert the rotary output motion of the de/multiplication mechanism (30) into a reciprocating translation motion of the alternating member (28). 20 25

13. A dishwasher (1) according to one of the previous claims, wherein the synchronization device (18) is arranged inside a hydraulic conveying space formed in the spraying arm (5) and extending in a fixed duct portion (27) to which the spraying arm (5) is connected. 30 35

14. A dishwasher (1) according to one of the previous claims, wherein the hub portion (14), the bar portion (15) and the translatable end segment (17) are hollow plastic profiles. 40

15. A dishwasher (1) according to one of the previous claims, wherein:

- the rotation axis (13) is substantially vertical and the internal surface (16) is substantially rectangular, and/or the bar portion (15) extends on two opposite sides of the hub portion (14), projects in a substantially radial direction with respect to the rotation axis (13) and rotates in a plane substantially perpendicular to the rotation axis (13), and/or the hub portion (14) and the bar portion (15) and the end segment (17) form one or more of the spraying nozzles (6). 45 50 55

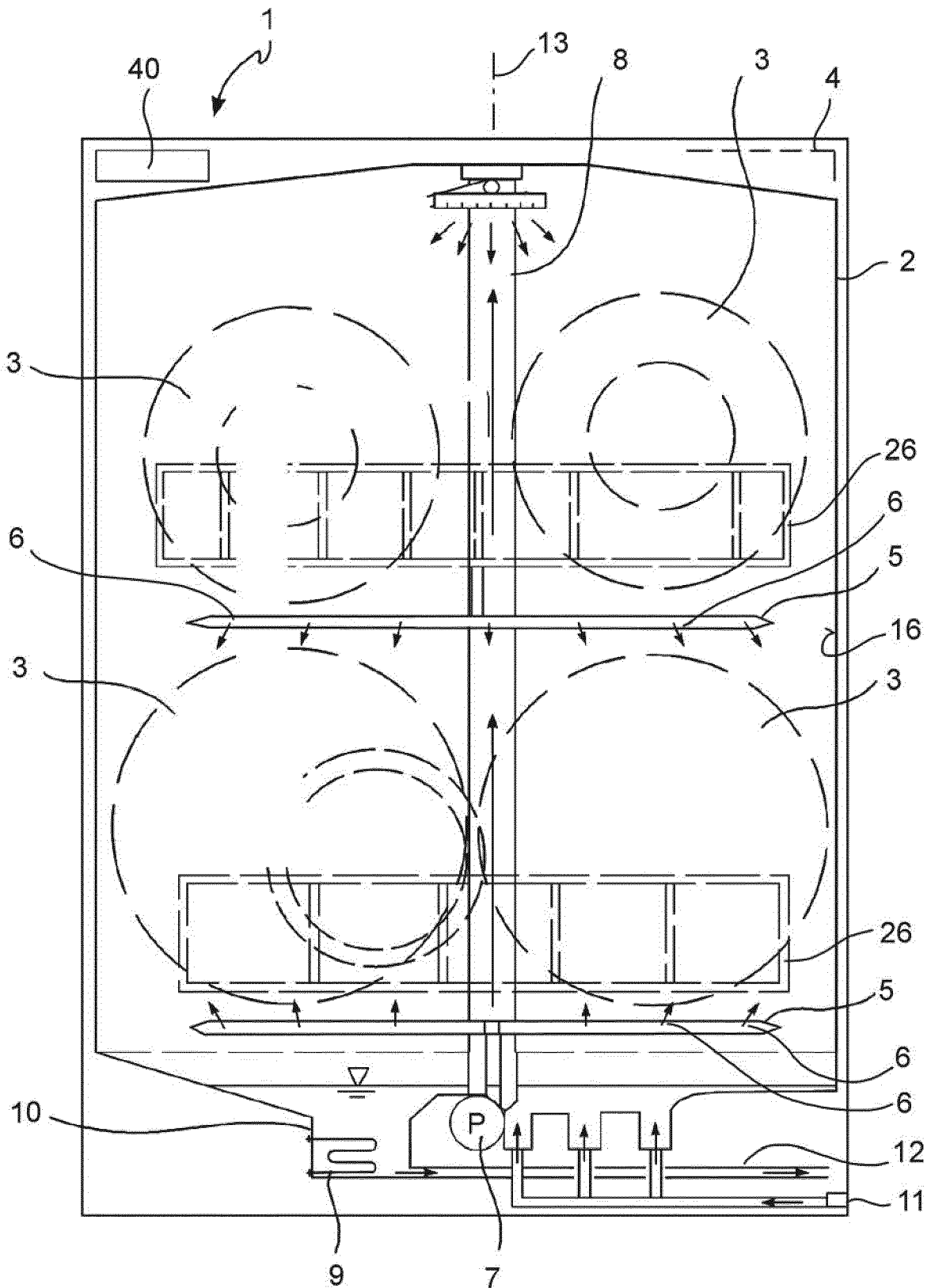


FIG. 1

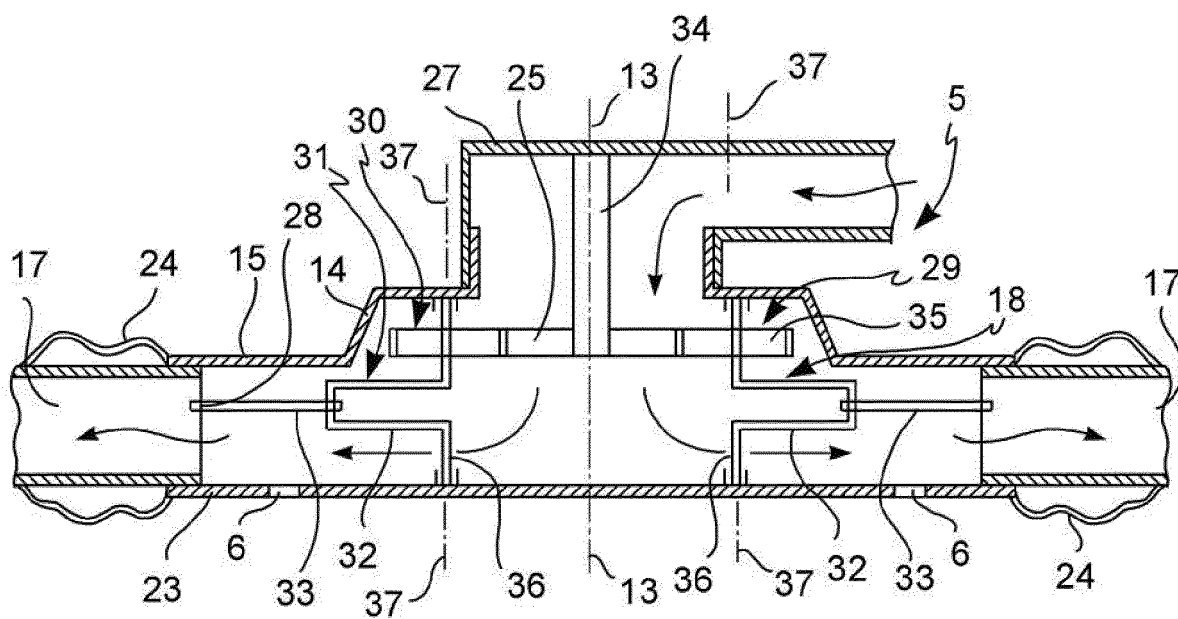


FIG. 2

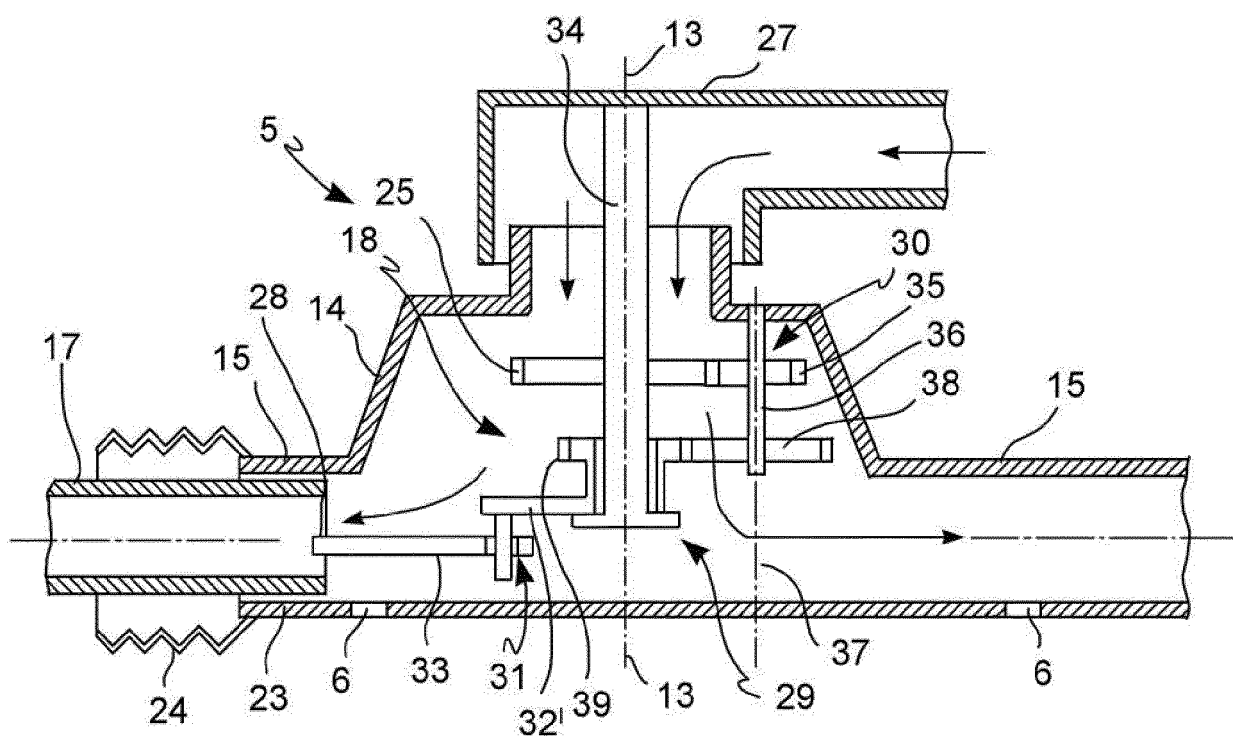


FIG. 3

FIG. 4

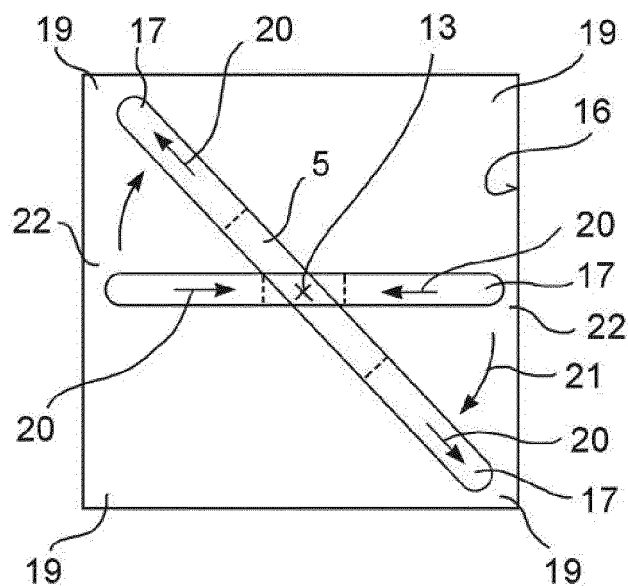


FIG. 5

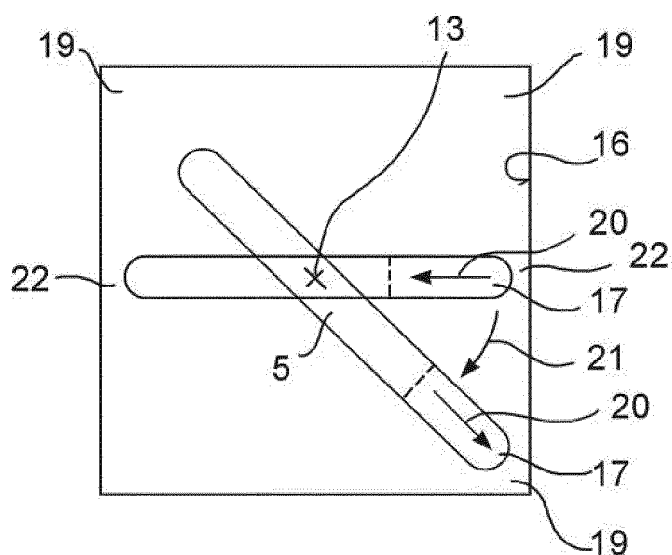
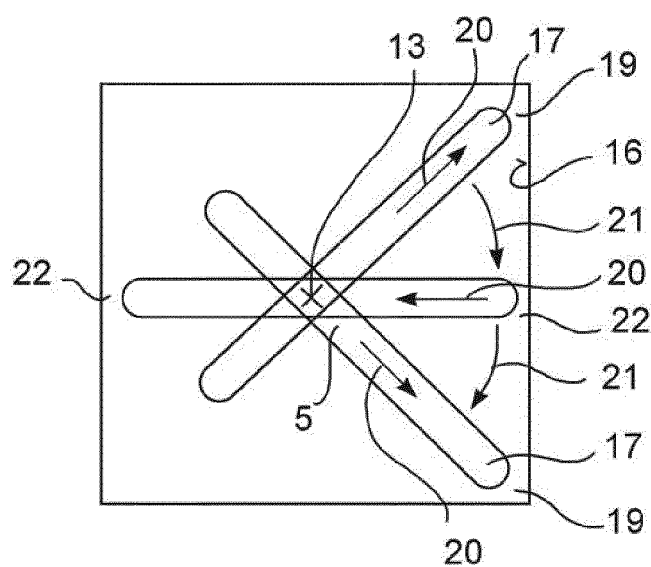


FIG. 6



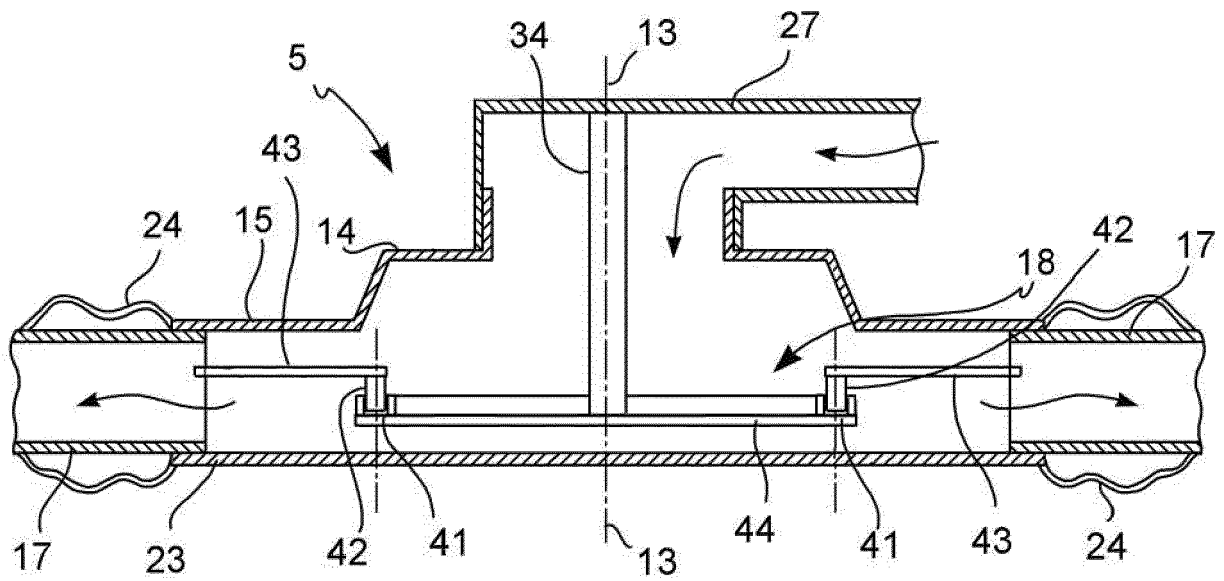


FIG. 7

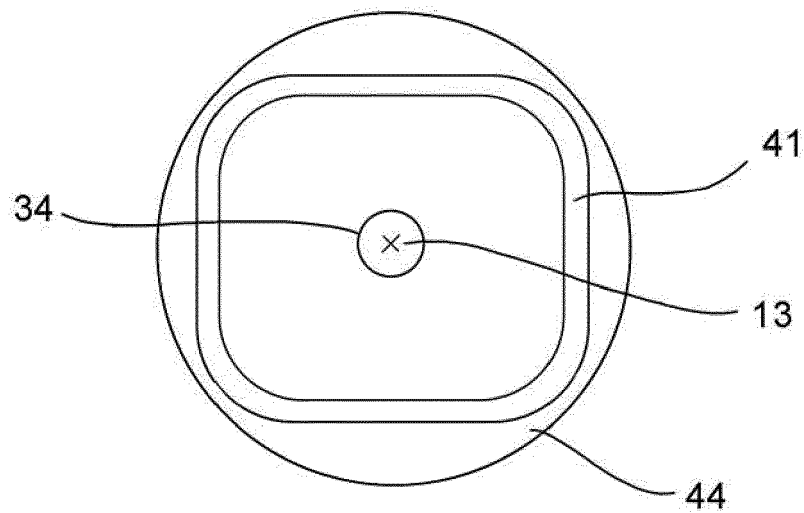


FIG. 8



EUROPEAN SEARCH REPORT

Application Number
EP 18 16 2180

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
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