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

(11) EP 0 848 929 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
24.06.1998 Bulletin 1998/26

(51) Int. Cl.[6]: **A47L 15/42**

(21) Application number: **97204039.8**

(22) Date of filing: **19.12.1997**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **20.12.1996 IT MI962706**

(71) Applicant:
Premark International Holdings B.V.
3447 Woerden (NL)

(72) Inventor: **Coraini, Rinaldo**
37040 Bevilacqua - Verona (IT)

(74) Representative:
Perani, Aurelio et al
c/o JACOBACCI & PERANI S.p.A
Via Visconti di Modrone, 7
20122 Milano (IT)

(54) Water distributing device for dishwasher

(57) Water distributing device for dishwasher comprising a drain pipe (7, 14) for draining the water out of the washing tank (9) and a supply pump (3) whose impeller is housed in a cylindrical seat (2) which is integral with the drain pipe (7, 14), is connected to it via at least one hole (6), and is also integral with the pipe (17, 19) supplying the lower sprayer (25). The device according to the present invention encloses in a single structure other pipes (16, 28, 36, 37) and devices (12, 13, 21, 24) on both the inside and the outside of this washing tank (9).

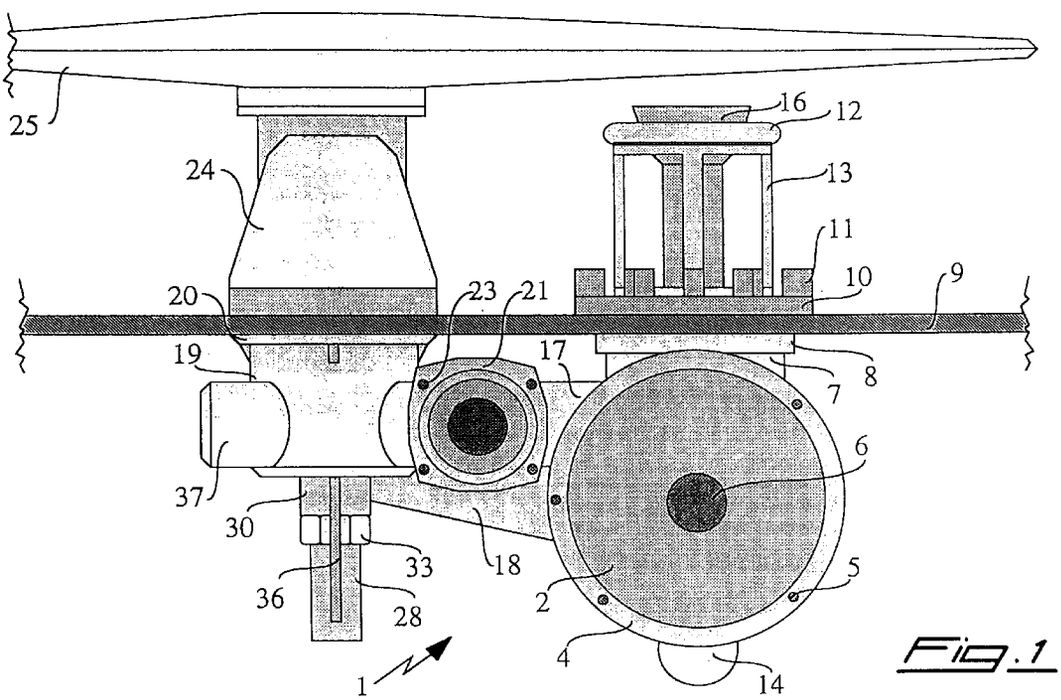


Fig.1

EP 0 848 929 A1

Description

The present invention relates to a water distributing device for a dishwasher, and in particular a device for mounting at the bottom of the tank of a dishwasher in order to distribute the water to other devices on both the inside and outside of the tank.

It is known that the tank of a dishwasher comprises in its interior one or more sprayers for washing the crockery, etc., these sprayers being supplied with and driven by water from a pump situated outside the tank. This pump takes the water from the tank and supplies it to the sprayers via a plurality of pipes which may in turn be connected to other devices such as the rinse aid dispenser, for example. The sprayers are also connected to the external water main via another supply pipe, possibly having its own ancillary pump. The dishwasher tank additionally comprises a drain hole and an overflow hole, both connected to the drain pipe leading to the domestic drainage system. Another device usually present inside the dishwasher tank is the bell of the pressure switch which controls the level of water in the tank on the basis of the pressure of the air trapped inside the bell.

The process of assembling the hydraulic system comprising the abovementioned pipes and devices obviously requires a considerable amount of labour, both in terms of the amount of time required to carry out the many assembly stages, and as regards the care demanded during these stages. Equally obvious are all the disadvantages in terms of costs and maintenance due to the complexity of this water distributing equipment.

It is therefore an object of the present invention to provide a water distributing device having a compact structure which can be mounted simply and quickly in the dishwasher. A further object of the present invention is to provide a water distributing device that is economical to produce and requires minimal maintenance. These objects are achieved with a device having the principal features specified in the first claim.

The device according to the present invention can advantageously replace the hydraulic distributing system composed of the abovementioned pipes and devices, which are generally installed at different locations inside and outside the tank, by bringing them together in a single compact structure. Another advantage of the device according to the present invention is that it provides a mechanical mounting for certain devices, such as the lower sprayer and the water filter, which are situated inside the dishwasher tank, as well as for other devices, such as the water supply pump and the rinse aid dispenser, which are located on the outside of the tank.

Other advantages and features of the device according to the present invention will be clear to those skilled in the art from the following detailed description of one embodiment thereof with reference to the accompanying drawings, in which:

- Fig. 1 shows a front view of the device of the present invention fixed to the base of the tank of a dishwasher;
- Fig. 2 shows a side view of the device of Fig. 1;
- Fig. 3 shows a plan view from above of the hollow body of the device of Fig. 1;
- Fig. 4 shows a sectional view of the device of Fig. 1 on the plane marked IV-IV in Fig. 3;
- Fig. 5 shows a view of the underside of the hollow support of the device of Fig. 1; and
- Fig. 6 shows a sectional view through the hollow support of Fig. 5 on the plane marked VI-VI.

Referring to Figures 1 to 3, it can be seen that the distributor device according to the present invention comprises a hollow body 1 made preferably of plastic and comprising a cylindrical seat 2 which houses the impeller of the supply pump 3, indicated schematically in Fig. 2 with thin lines. In the present embodiment the pump 3 is a straight centrifugal pump, but in other embodiments of the present invention this pump may obviously be of a different type. To fix the pump 3 to the hollow body 1, the cylindrical seat 2 has a circular external sealing flange 4 containing a plurality of threaded seats 5 for the fixing screws of the pump 3. In the centre of the cylindrical seat 2 is a hole 6 giving communication between said seat and the interior of a vertical cylindrical pipe 7 preferably made in one piece with the seat. The top end of the vertical pipe 7 has a male thread and is provided with an annular projection 8, situated underneath this thread, which acts as stop against the lower surface of the base 9 of the dishwasher tank. The cylindrical pipe 7, having an external diameter approximately equal to the diameter of the drain hole in the base 9 of the tank, can be inserted into the hole and fixed to the base with a female-threaded ring nut 10. Screwing the ring nut 10 around the threaded surface of the pipe 7 locks the base 9 of the tank between the annular projection 8 and said nut, so that the entire hollow body 1 is fixed underneath the tank. The top of the ring nut 10 preferably has a plurality of vertical tongues 11 to facilitate its screwing onto the pipe 7. A seat for the water filter (not shown in the figures) is fixed to the upper end of the pipe 7. This seat comprises a ring 12 coaxial with the pipe 7 and spaced from the latter by a plurality of legs 13. Fixed to the lower end of the pipe 7 is an elbow pipe 14 whose internal diameter is less than that of the pipe 7. The free end 15 of the elbow pipe 14 is connected in turn to the dishwasher drain pipe (not shown in the figures) which runs to the drainage system. A vertical tube 16 is fitted removably inside the upper end of the elbow pipe 14, its top end being preferably flared and projecting above the ring 12 of the water filter seat. The tube 16, whose external diameter is approximately equal to the internal diameter of the elbow pipe 14, therefore acts as a plug preventing the water from get-

ting between the pipe 7 and the pipe 14. The presence of the tubular plug 16 does not however prevent the water from passing from the vertical pipe 7 to the cylindrical seat 2 through the hole 6, because the internal diameter of this pipe is greater than the external diameter of the plug 16. The latter also acts as an overflow for the dishwasher tank because if the level of water inside the tank rises above the top of the plug 16, the excess water will automatically drain out through the pipe 14.

Connected to the cylindrical seat 2 of the impeller of the pump 3 is one end of a horizontal cylindrical pipe 17 which is approximately tangential to the external surface of the seat. This horizontal pipe acts as a delivery duct for the water which, after entering the seat 2 through the central hole 6, is pumped by centrifugal force by the vanes of the impeller of the pump 3. The cylindrical seat 2, the horizontal pipe 17 and a vertical reinforcing rib 18 are also preferably made as one piece. The other end of the horizontal pipe 17 is connected to a cylindrical well 19 located underneath the supply hole of the water taken from the base 9 of the tank. This well is aligned with said supply hole and is suitably provided with a sealing flange 20 that presses against the lower edge of the hole. The horizontal pipe 17 is also provided with a side opening connected to a polygonal flange 21 by a horizontal connector 22 whose longitudinal axis is perpendicular to that of the pipe 17. The flange 21 has a plurality of threaded holes 23 for the attachment of the rinse aid dispenser (not shown in the figures). This dispenser is activated by the change of pressure in the connector 22, which occurs whenever water is introduced into the pipe 17.

The supply hole in the base 9 of the tank is covered by a hollow mounting 24 of generally frustoconical shape and preferably made of plastic, its longitudinal axis coinciding with the axis of this supply hole and consequently with that of the cylindrical well 19. The hollow mounting 24 supports a lower sprayer 25 which is mounted on the top thereof in such a way as to enable it to spin.

Referring now also to Figure 4, it can be seen that the hollow mounting 24 comprises in its interior a coaxial sleeve 26 fixed by a plurality of radial tongues 27 to the inner walls of said mounting. A tube 28 is inserted into the sleeve 26 from the top, its axis likewise coinciding with that of the mounting 24, and the tube passes through the mounting, the base 9 of the tank and the well 19 to emerge from a central hole 29 in the base of the well. A further coaxial sleeve 30 is preferably fixed underneath this hole as a guide for the tube 28. The mains water delivery pipe is fitted to the lower end of the tube 28. The direct connection which the tube 28 effects between the lower sprayer 25 and the water mains enables clean water to be introduced into the tank from the mains, optionally pumped by an auxiliary pump (not shown in the figures), if the pressure of the mains is insufficient. The tube 28 also serves to fix the hollow mounting 24 to the hollow body 1. For this purpose the tube 28 is given an annular projection 31 towards its upper end and a thread 32 in the vicinity of its lower end. The annular projection 31 rests on the upper edge of the sleeve 26, while the thread 32 takes a nut 33 which abutting against the lower edge of the sleeve 30 locks the tube 28 axially and consequently immobilizes the hollow mounting 24 over the well 19. The bottom 9 of the tank is therefore locked between the mounting 24 and the well 19, so that the device according to the present invention is firmly anchored to the tank.

Referring now also to Figures 5 and 6, mounted on one side of the frustoconical surface of the hollow mounting 24 is a bell 34 in the form of a frustoconical segment whose underside is open and communicates with a vertical tube 35 fixed inside the mounting 24. The free end of the tube 35 is inserted into another vertical tube 36 which runs down through the base of the well 19. Connected to the free end of the vertical tube 36 is the pressure switch (not shown in the figures) that controls the level of water in the tank of the dishwasher.

Where the dishwasher is fitted with one or more upper sprayers, as in the present embodiment, the well 19 is optionally connected to another horizontal pipe 37 to carry the water to these upper sprayers.

The hollow body 1, preferably made as one integral component, therefore comprises the seat 2 for the pump 3 impeller, the vertical pipe 7, the seat for the filter, the elbow pipe 14, the horizontal pipes 17, 22 and 37, the well 19, the sleeve 30 and the tube 36. Besides the hollow body 1, the other components making up the device according to the present invention are the frustoconical mounting 24 for the sprayer 25, the vertical tube 28, the tubular plug 16, the nut 33, the ring nut 11, and a plurality of seals (not shown).

Assembly of the device according to the present invention comprises in the first place a preparatory stage in which the pump 3 is screwed to the flange 4, the rinse aid dispenser is screwed to the flange 21, the pressure switch is connected to the tube 36 and the dishwasher drain pipe is connected to the elbow pipe 14. After this preparatory stage, the hollow body 1 is fixed to the underside of the base 9 of the tank by inserting the vertical pipe 7 through the drain hole and screwing on the ring nut 10. During this assembly stage it is important to check that the cylindrical well 19 is aligned with the tank's supply hole. At this point the frustoconical mounting 24 is placed over this latter hole and fixed to the well 19 via the tube 28, which in turn is locked in place by means of the nut 33. During this further assembly stage it is important to ensure that the tube 35 of the mounting 24 is correctly inserted into the complementary tube 36. The assembly of the device according to the present invention is finally completed by connecting the tube 28 to the water mains and the optional pipe 37 to the upper sprayer.

During operation, the water from the mains supply enters via the tube 28 and is sprayed by the lower sprayer into the washing tank until the rise in the pres-

sure of the air inside the bell 34, detected by the pressure switch, indicates that a predetermined level has been reached. The inlet valve (not shown in the figures) is then closed and the pump 3 started. The water is drawn from the tank via the pipe 7 and is pumped into the sprayers via the pipe 17. The injection of the water into the latter pipe also causes the rinse aid dispenser to be activated. When the dishwasher has finished its cycle it is a simple matter to remove the tubular plug 16 to cause all the water contained in the tank to drain away via the domestic drainage system.

In other embodiments of the device according to the present invention, the vertical pipe 7 or the cylindrical well 19 may be taller than illustrated in the figures to enable the device to be fixed correctly to tanks in which the base is not flat but subdivided into two or more sections at different levels.

Other alternatives and/or additions may be carried out by those skilled in the art to the embodiments described and illustrated herein while remaining within the scope of the invention.

Claims

1. Water distributing device for dishwasher comprising a drain pipe (7, 14) for draining the water out of the washing tank (9) and a water supply pump (3) whose impeller is housed in a cylindrical seat (2), said device being characterized in that this cylindrical seat (2) is integral with the drain pipe (7, 14) and is connected to it via at least one hole (6).

2. Device according to claim 1, characterized in that the cylindrical seat (2) is integral with a pipe (17, 19) supplying a lower sprayer (25).

3. Device according to one of the preceding claims, characterized in that the drain pipe (7, 14) comprises a vertical pipe (7) inserted in the drain hole of the tank (9).

4. Device according to claim 3, characterized in that the longitudinal axis of the vertical pipe (7) is perpendicular to the longitudinal axis of the cylindrical seat (2).

5. Device according to claim 4, characterized in that the drain pipe (7, 14) comprises an elbow pipe (14) situated beneath the vertical pipe (7) and having an internal diameter smaller than the internal diameter of this pipe (7).

6. Device according to the claim 5, characterized in that it comprises a tubular plug (16) inserted removably in the upper end of the elbow pipe (14).

7. Device according to claim 7, characterized in that the pipe (17, 19) supplying the lower sprayer (25) comprises a horizontal pipe (17) that is approximately tangential to the outer surface of the cylindrical seat (2).

8. Device according to claim 8, characterized in that the horizontal pipe (17) is provided with a side opening connected to a flange (21) via a horizontal connector (22) whose longitudinal axis is perpendicular to that of the horizontal pipe (17).

9. Device according to one of the preceding claims, characterized in that the pipe (17, 19) supplying the lower sprayer (25) comprises a well (19) whose longitudinal axis is aligned with the hole through which the water is supplied to the tank (9) and is perpendicular to the longitudinal axis of the horizontal pipe (17).

10. Device according to one of the preceding claims, characterized in that the mounting (24) of the lower sprayer (25) is hollow and is positioned over the hole through which water is supplied to the tank (9).

11. Device according to one of the preceding claims, characterized in that the mounting (24) of the lower sprayer (25) comprises a coaxial sleeve (26) into which is inserted a tube (28) that projects from the base of the well (19).

12. Device according to one of the preceding claims, characterized in that the mounting (24) of the lower sprayer (25) comprises a bell (34) connected to at least one tube (35, 36) that projects from the well (19).

13. Device according to one of the preceding claims, characterized in that it comprises a hollow body (1) formed in one piece and comprising the cylindrical seat (2), the drain pipe (7, 14) of the tank (9), the pipe (17, 19) supplying the lower sprayer (25), and the horizontal connector (22).

14. Device according to the preceding claim, characterized in that the hollow body (1) formed in one piece also comprises the pipe (37) supplying one or more upper sprayers, this pipe being connected to the well (19).

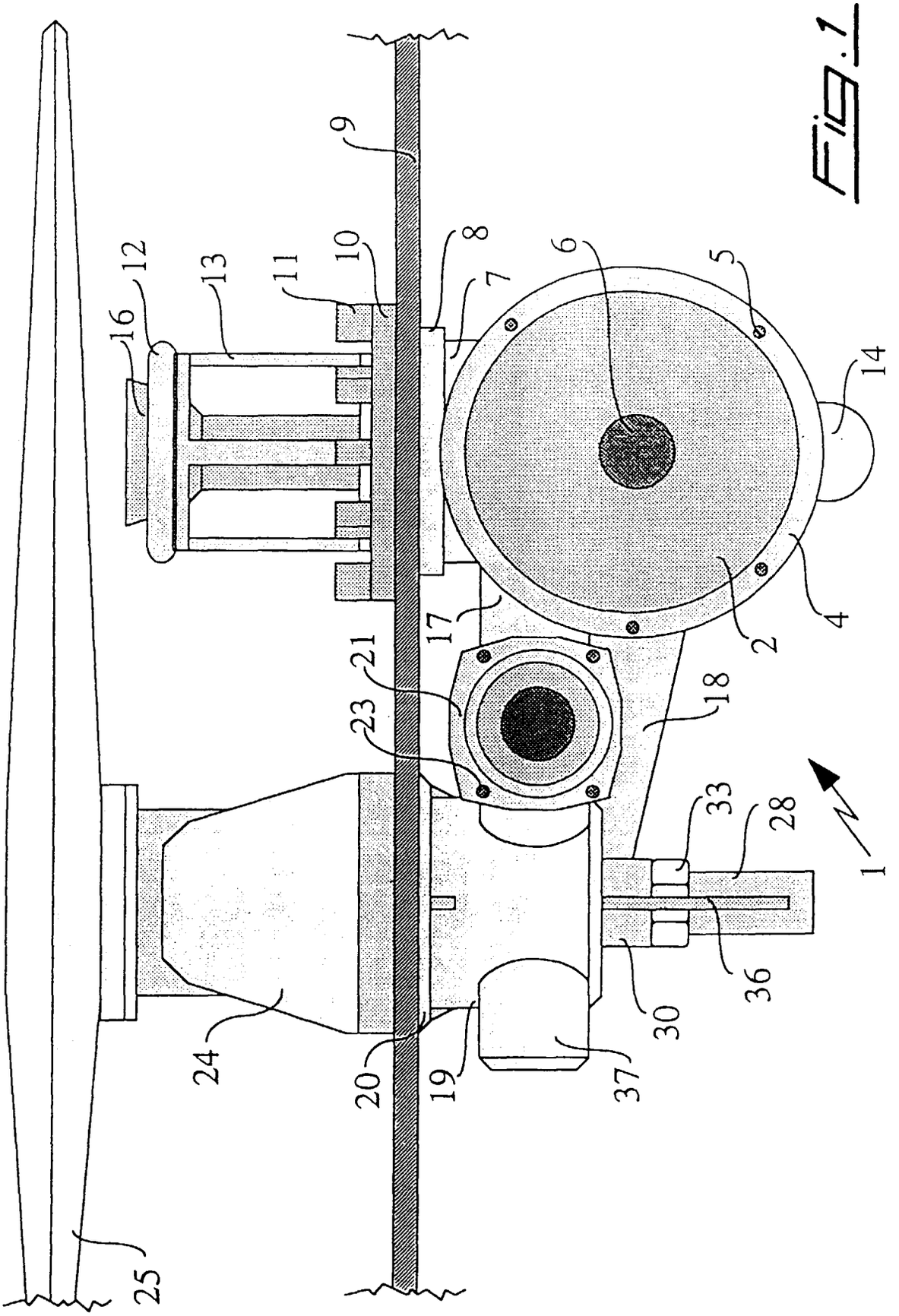
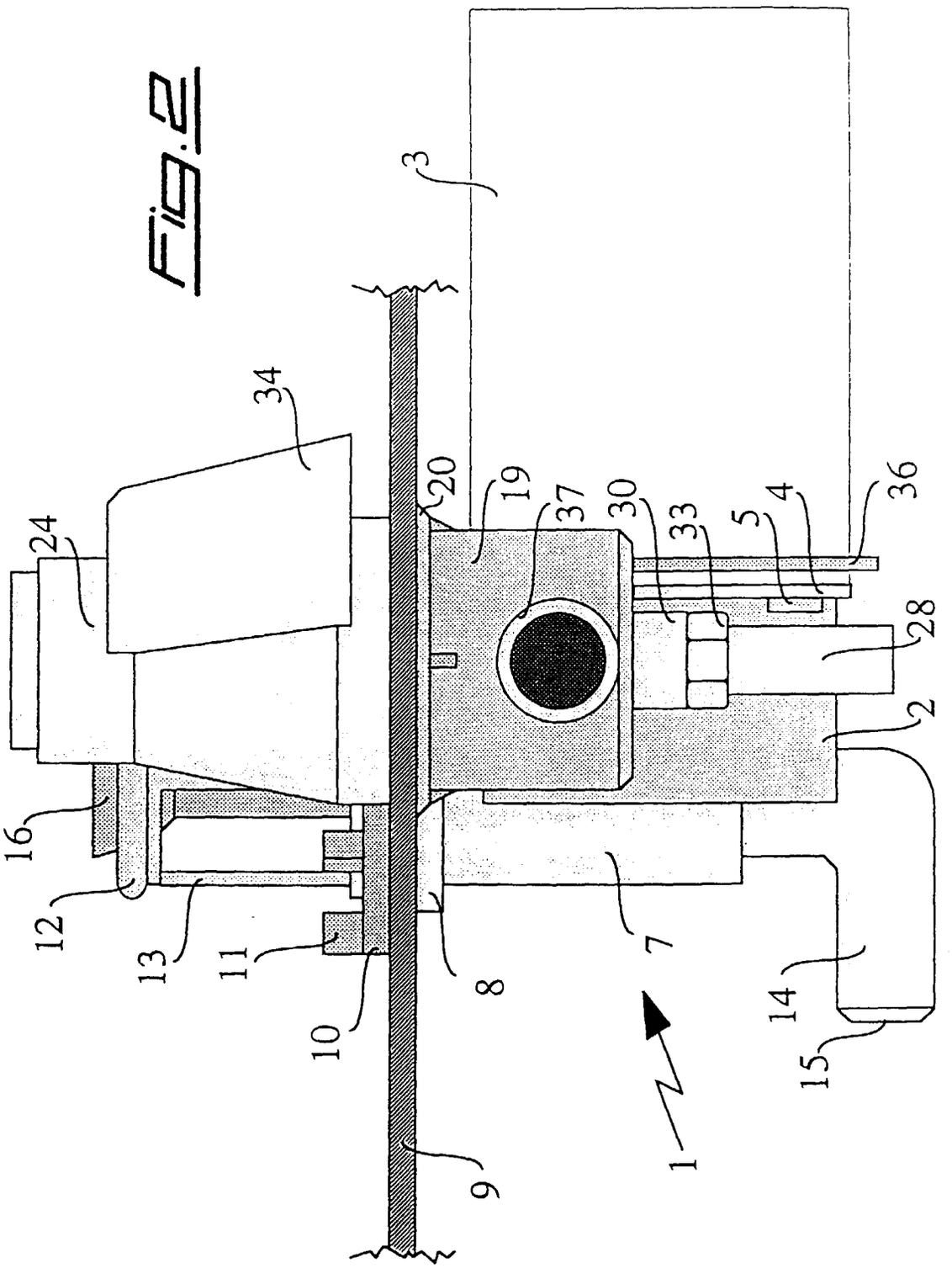


Fig.1

Fig.2



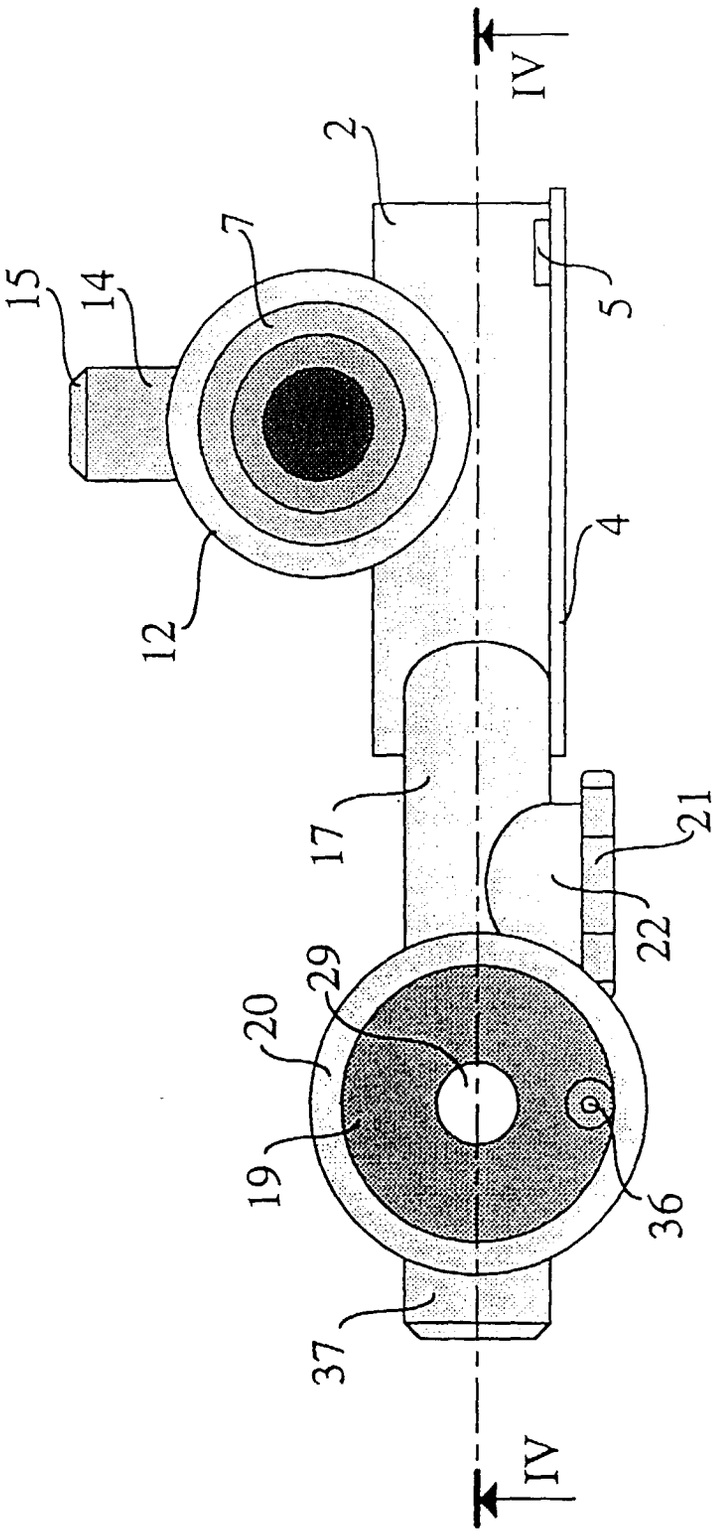


Fig. 3

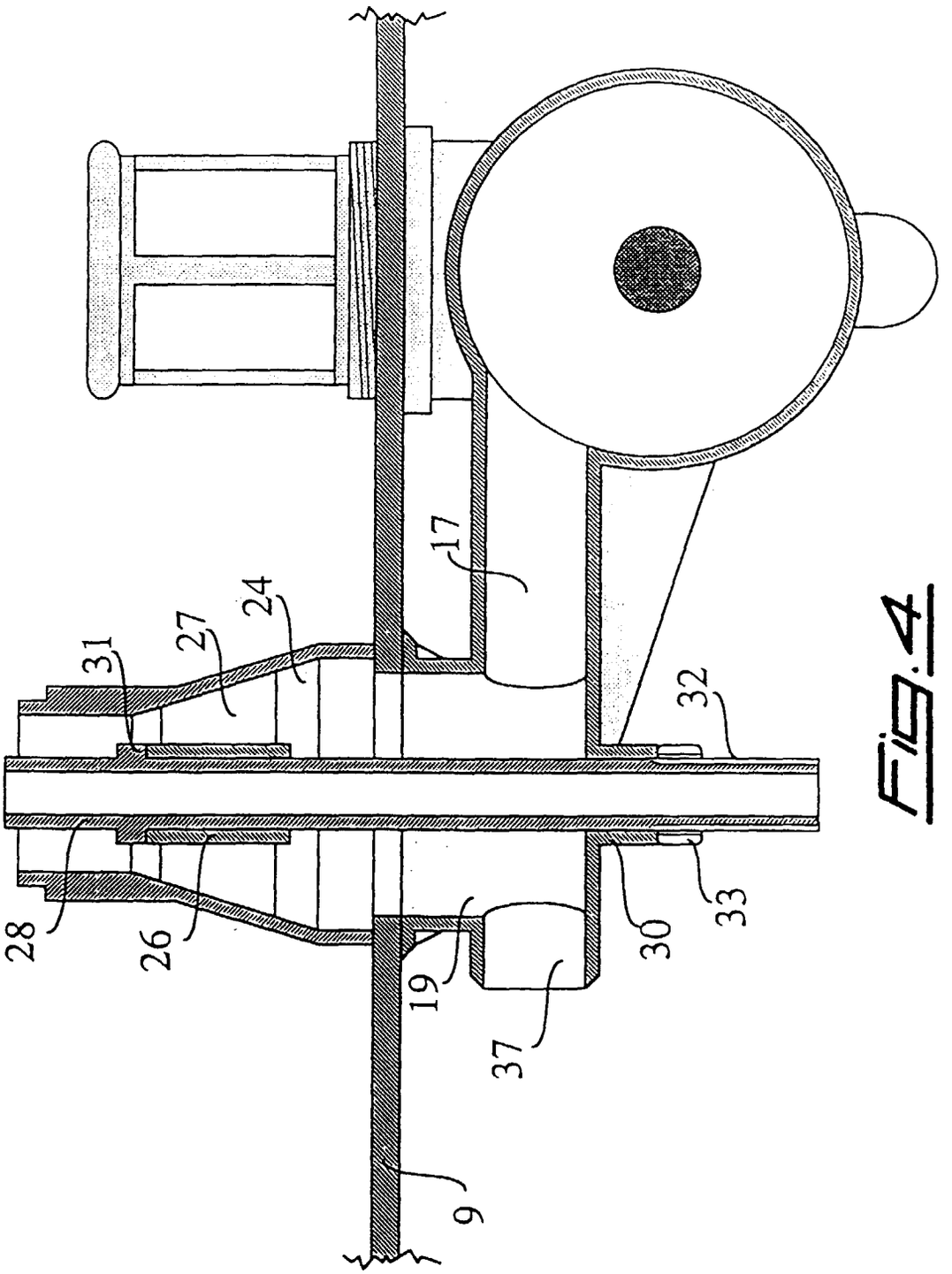


Fig.4

Fig.5

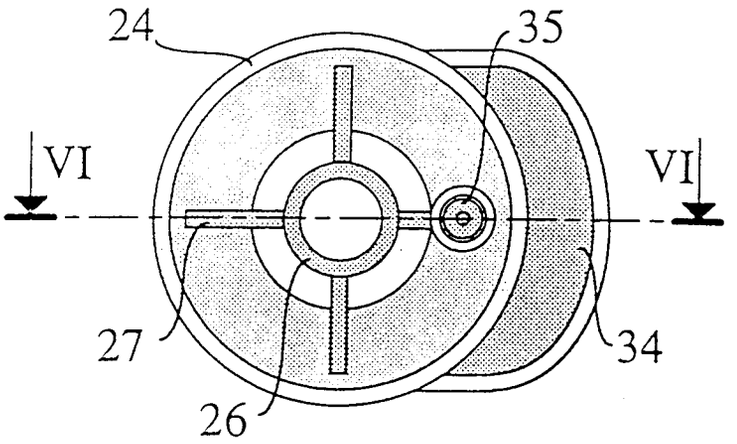
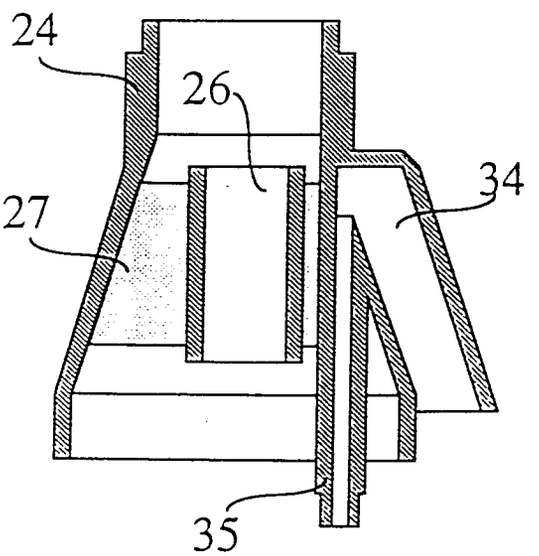


Fig.6



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 20 4039

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	US 4 028 012 A (CUSHING DONALD S) * column 2, line 36-55 * * column 3, line 33-46 * * column 4, line 8-16; figure 1 * ---	1,2 3,4	A47L15/42
Y A	US 4 822 241 A (JARVIS WILBUR W ET AL) * column 3, line 39 - column 5, line 47; figure 2 * ---	3,4 1,2	
A	EP 0 265 107 A (WHIRLPOOL CO) * column 3, line 31 - column 6, line 41; figure 2 * -----	1,2	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	7 April 1998	Laue, F

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)