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

(11) Publication number : **0 486 790 B1**

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification : **27.07.94 Bulletin 94/30**

(51) Int. Cl.^{5} : **A47L 15/44**

(21) Application number : **91116393.9**

(22) Date of filing : **26.09.91**

(54) **Dish-washing machine with multidose dispenser of powder detergent.**

(30) Priority : **03.10.90 IT 4575890**

(43) Date of publication of application : **27.05.92 Bulletin 92/22**

(45) Publication of the grant of the patent : **27.07.94 Bulletin 94/30**

(84) Designated Contracting States : **DE ES FR GB SE**

(56) References cited :
DE-A- 3 833 961
DE-A- 3 903 636
DE-B- 1 239 822

(73) Proprietor : **RO-SA MICROMECCANICA S.n.c.**
Via XXIX Aprile, 101
I-30024 Musile di Piave, Venezia (IT)

(72) Inventor : **Sandrin, Gianni**
Via Lombardia 3
W-33080 Porcia, Pordenone (IT)

(74) Representative : **Giugni, Valter et al**
PROPRIA S.r.l.,
Via Mazzini 13
I-33170 Pordenone (IT)

EP 0 486 790 B1

Description

The current trend toward the use of household electrical apparatus and appliances featuring an ever-increasing number of automatisms, recently became so ample as to include the elimination of the preliminary set-up operations and, in particular, the elimination of those operations required to fill the dispenser of the concerned appliance with detergents and other substances every time the machine has to be used, by replacing them with automatically controlled operations actuated by special devices.

At present, the dishwashing machines are prearranged to feed the washing tank with powder or liquid detergents by means of a conventional detergent dispenser connected with said tank and subdivided into various separated and independent compartments each one of them containing the respective detergent.

In this manner, the different compartments of the dispenser are filled with predetermined doses of powder or liquid detergents which are then directly or indirectly removed by the water of the washing tank. The dispensing devices presently employed in case of powder detergents are of the single-dose type so that the user, at every washing cycle, must fill a special tray with detergent which then, through a signal command sent by an appropriate control device (programmer) is introduced into the washing tank to be dissolved in the washing water.

These devices are rather reliable and simple in their use, but they compel the user to perform, at every washing cycle, a new filling operation.

Further, the filling operation requires a great attention since the occurrences in which the amount of detergent is incorrect, and often excessive, are quite frequent, and obviously these erroneous amounts of detergent determine a loss of money as well as a higher pollution of the drained water.

Furthermore, when using a dishwashing machine, it is necessary, as a rule, to open its door completely and fill the dispensers located at the inner side of the door itself so that the user is compelled to bend almost down to the floor with a considerable discomfort and also, especially in the case of aged persons, a great effort.

Washing machines equipped with means suitable to contain large amounts of detergents, particularly liquid detergents, are well-known in the prior art.

These prior art detergent containing means consist essentially in a plurality of high capacity rigid type containers, appropriate to hold liquid substances, connected with the washing tank through their respective conduits, the latter being provided with volumetric pumps.

Although these rigid type containers satisfactory fed with liquid detergent or liquid detergent components the washing tank of the machine, the room they take up is not however available, as a rule, inside the washing machine but must be found outside of it.

In fact, examples of washing machines and dishwashing machines in which the reservoirs of liquid substances are arranged outside the machine, preferably assembled together into an appropriate container placed side by side with the machine, are well-known in the prior art.

The height and depth of said prior art container correspond, as a rule, to those of the machine itself so to comply, at least in part, with the existing dimensional standards.

However, this type of embodiment has two disadvantages: first of all, it takes up an additional room which, as it is well-known, especially in the modern houses is limited, and secondly, it demands the use of detergents in liquid form which, at the present time, are still less effective and more polluting than the detergents in powder form.

Further, each one of the different washing programmes prearranged by the manufacturer of dishwashing machines may normally call for different amounts of detergents; such "to-size" dosage has already been divulged in DE - 3833961 and in DE - 3903636; especially the latter document illustrates a detergent dispenser mounted inside the door of a dishwashing machine, and which is able to contain a plurality of dosages which are singolarly poured into the washing tub according to the washing phase.

However these documents do refer to detergent dispensers designed to operate with liquid detergents only, what is keeping the cited drawbacks pertinent to such a type of substances; therefore no solution is yet available relevant to dispensers of detergent in powder form, able to contain a quantity of powder sufficient for a plurality of washing cycles and to supply a dosed quantity of it for each washing cycle and according to the washing phase.

Therefore, it is desirable and it is an object of the present invention to provide a dishwashing machine equipped with a powder detergent reservoir which makes it possible both to accomplish several consecutive washing cycles without the need of replenishing every time the required amount of detergent and delivery, into the washing tank, in due times during the washing cycle, the single doses of detergent, being the amount of the latter differentiated in accordance with the type of the preselected washing programme.

This object is attained by means of a simple in its design, easy-to-use, reliable and economic integrated device to be installed in a removable manner inside a dishwashing machine, being said integrated device so made as to incorporate the functions of both a multidose reservoir and a dispenser of detergent in powder form, and being said integrated device obtainable with the customary processing techniques.

The invention will be best understood from the following description given by way of non-limiting ex-

ample when read in connection with the accompanying drawings, in which:

- Fig. 1 shows schematically a detergent reservoir-dispenser device according to the invention.
- Fig. 2 and 3 show schematically two variations of a detail of said device.
- Fig. 4 and 5 show schematically two variations of a second detail of said device.
- Fig. 6 shows schematically a handle for engaging and disengaging said device.
- Fig. 7 shows schematically two views of a further detail.
- Fig. 8 illustrates the method of insertion and extraction of said device at the inner side of the door.
- Fig. 9 shows the device in its inserted and engaged position.
- Fig. 10 illustrates a typical method for filling the device with detergent in powder form.

The automatic powder detergent dispenser is composed of a shell 1 screwed and gasketed into and against an opening obtained on the inner wall of the door 2 of the dishwashing machine and of a reservoir-dispenser 3 inserted into said shell 1 in such a way as to allow the user to slide it out for an easy replenishment of detergent as it will be explained later on.

Said reservoir-dispenser, removable by the user, is inserted and fixed into said shell 1 by means of a handle which has also the function of locking the reservoir-dispenser in place.

Said reservoir-dispenser, essentially shaped like an "L" as illustrated in Fig. 1, can be inserted into said shell 1 installed on the door inner wall, in such a way and position that its upper part, when the door is closed, cannot be lapped by the water, as illustrated in Fig. 8 and 9.

This embodiment, which has the advantage of limiting the area of direct exposure to the spouts of water, reduces the possibility of water seepages and maintains lower the average temperature inside the detergent dispenser thus allowing a better detergent preservation.

The lower part of the reservoir-dispenser, corresponding to the base of said "L", houses the detergent dispenser and, obviously, said part of the reservoir-dispenser, when the door is closed, is disposed in a downward direction since the detergent is fed by gravity into the washing tank.

The removable reservoir, which consists of a box-like hollow body 4, can be filled with an amount of detergent sufficient for numerous washing cycles. The lower part of said removable reservoir is connected with a dispenser 5 provided with a feedbox 6 which receives the detergent from the reservoir and conveys then it to a predetermined-volume container or metering chamber 7.

A first separating element 8, placed between the reservoir feedbox 6 and said metering chamber 7, can slide transversally and hence preclude or enable the passage of the detergent in powder form into the metering chamber 7.

The end of said metering chamber 7, positioned toward the washing tank is hermetically closed by means of a hinged movable lid 9 which, when swung closed, lies flat on a seat provided with a well-dimensioned water-tight gasket 10.

The purpose of said gasket 10 is to preclude that spouts of water leak into the side compartments 7a of the chamber 7 thus clogging said compartments and hence impairing their function.

Said compartments 7a, as shown in Fig. 1, collect the detergent occasionally strained out from the separating element 8 and discharge then said detergent into the washing tank when the movable lid 9 swings open.

The coupling between the box-like hollow body 4 and the dispenser 5 can be assured by a spring-lock restrained joint 18 or by an equivalent means, capable to assure however a perfect seal.

Said first separating element 8 consists of a movable very flat perforated lamina 11, preferably a thin chrome-nickel steel diaphragm, superimposed and sliding over the aperture 12 of the metering chamber 7, said aperture 12 and that of said movable lamina being identical and coincident so that for opening the passage between the feedbox 6 and the metering chamber 7 it is required that the movable lamina 11 slides over said aperture 12.

A distinctive feature of the device is the special configuration of the contact zone between the sliding diaphragm and the rims of the apertures of both the feedbox 6 and metering chamber 7.

In fact, the hermetic peripheral closing contact of said movable perforated lamina in correspondence with the rims of the apertures of both the feedbox and metering chamber is assured by a perimetrical knife-edge contact 13 which closes perpendicularly and elastically between the inlet lip of the metering chamber 7 and a lip, elastically fixed at the outlet of the feedbox 6 so as to assure between them an uninterrupted and uniform contact suited to preclude the passage of detergent.

The elastic pressure necessary for granting the required seal and elasticity to said contact parts 13 is, preferably, assured by a plurality of springs 14 acting on said parts.

Fig. 2 and 3 show respectively an enlarged view of said contact zone and a variation to spring 14, consisting of an elastomer element 14, compressible between said movable parts 13 and said feedbox 6.

To drive the movement of the movable lamina 11 and movable lid 9, it would be simple and easy to have recourse to the available techniques usually employed for the actuation of mechanical elements which are well-known to anyone skilled in art.

A preferred embodiment of a driving mechanism is described hereinafter:

Said elements 11 and 12 are actuated, preferably by means of a rotary motion, applied to them through corresponding shafts, cams, pins or other equivalent means 15 on which they are keyed.

Said elements, comprised in said dispenser, are out-timed in their movements so that when the detergent has to be released into the washing tank, said first separating element, normally open, closes before said movable lid opens and, conversely, after said detergent has been released, said movable lid closes before said first separating element opens.

Said means 15, which transmit the motion to the movable perforated lamina 11 and to the movable lid 9, are driven by an actuator 16, mounted outside the shell on the inner side of the door, and they are acting on said means 15 through one or more pin-like elements 17, the latter being part of said actuator 16, as shown in Fig. 1 and 5.

It is evident that the device will operate properly when, with the actuator in a stop motion condition, said element 17 will be set inwardly inside the shell and will engage with said means 15 through appropriate openings obtained on the wall of the shell 1.

The operation of this device is the following:

To fill the reservoir with detergent, the user disengages and slides, in a combined outward-upward direction, out of the housing shell 1 located on the inner wall of the door, and away from the actuator 16, the complete reservoir-dispenser unit.

In this way, the device can be removed and placed onto a table to be filled with detergent in powder form.

To replenish the detergent, it is sufficient to disengage the locking and sealing means 18, disjoin the reservoir from the dispenser 5 and fill then the reservoir with detergent. After this filling operation, the reservoir will be joined again with the dispenser and the device is then re-inserted into its housing shell inside the dishwashing machine.

When detergent has to be supplied to the dishwashing machine, the actuator 16, being powered, makes the pin 17 come out its seat thus actuating the means 15 which slide closed the separating lamina 8 and swing open the lid 9.

The operation sequence takes place as follows:

- Sliding closed of diaphragm 8 and hence closing of the passage of detergent in powder form into the metering chamber 7;
- Swinging open of lid 9 and hence falling of the detergent into the washing tank;
- Swinging closed of lid 9;
- Sliding open, in a rest position, of diaphragm 8 and hence refilling of the detergent dose thus allowing the replenishment of detergent in the metering chamber 7.

During the above described operation sequence, the washing pump is kept in a stop motion condition in order to avoid that spouts of water can enter inside the device. The detergent is supplied to the washing tank every time an appropriate electrical actuator is energized by the programmer of the dishwashing machine.

Said actuator is acting on the movable lamina as well as on the movable lid in accordance with the above described operation sequence, i. e. first, the detergent already in the metering chamber falls into the washing tank, then, the movable lid swings closed and, finally, the movable lamina slides open so to allow the replenishment of the required amount of detergent into the metering chamber.

An useful improvement of this device is obtained if, as shown in the drawings, said movable lid 9 is arranged remarkably slanting with respect to the longitudinal axis of the metering chamber 7. In fact, with this arrangement it is possible to swing open the movable lid by means of a minimum rotation of the shaft 15 on which the movable lid is keyed thus simplifying the driving mechanism.

As a matter of fact, if said lid 9 were arranged perpendicularly with respect to the longitudinal axis of the metering chamber 7, in order to swing open said movable lid it would be necessary to make it rotate a complete right angle, which is a more complex operation than that performable by the use of the above described improvement.

It is evident that it is possible to adjust the amount of detergent to be supplied into the washing tank at every washing cycle, simply performing said operation so many times as required by means of proper control commands sent to the actuator by the programmer.

A further improvement of this device is obtained by providing the dispenser with a special engaging and locking handle 22.

Said handle is rotatably mounted on that part of the dispenser facing the washing tank, the rotary motion of said handle being controlled by a counteracting spring, not shown in the drawings, said counteracting spring, when in its rest position, making said handle rest against and into an undercut provided on the dispenser housing shell, as shown in Fig. 8 and 9.

Also, said handle can advantageously lock in place the dispenser, once the latter is inserted into its housing shell 1, by adopting the following arrangement:

A pin-like or plate-like shaped tongue 25 is fixed on the inner wall of the door in correspondence with a protruding element 23 of the base 24 of said handle. A recess 26, coincident with said tongue 25, is provided in said protruding element 23 so that, when the handle is being rotated outwardly forcing the counteracting spring action, said recess 26 disengages from said tongue 25 and when the handle is released, said recess engages with said tongue 25.

The operation of this handle will appear clear from the following description:
To set in place the device, the user first insert the dispenser completely into the housing shell 1 utilizing said handle 22. The handle, being now released, due to the action of the counteracting spring is moved to rest against the dispenser housing shell surface while the tongue 25 is being inserted into the recess 26 thus locking in place the dispenser.

Conversely, to slide the dispenser out its housing shell, the user will proceed by following the reverse operation sequence which is not here described for the sake of brevity.

However, to obtain a perfect operation of the device it is necessary to adopt a further improvement. In fact, due to both the progressive emptying of the reservoir 4 and the effect of the rapid cooling of the dispenser wall facing the washing tank during the prewashing cycles as well as to the cold water circulation, a vacuum may occur inside the reservoir 4 which could impair the regular and accurate filling of the metering chamber 7.

To counter an inconvenience of this type, a further improvement of the device should be adopted. This improvement will consist in a compensating valve installed at the top 27 of the reservoir, for instance as shown in the drawings.

The use of a conventional valve consisting of a movable stem applied and passing through said reservoir top and beating against the corresponding upper wall of the housing shell 1, said valve closing and opening suitable holes made on said top in the nearest proximity of said stem, creates however the inconvenience that when the reservoir has to be filled with detergent, said reservoir, as a rule, is placed to rest onto a table so that said reservoir actuates the opening of said valve with the consequence that the valve gets immediately clogged with detergent so losing its efficiency and damaging the table surface as well.

To avoid said inconveniences, it is suggested to provide the reservoir with a special, free from moving parts flat valve, consisting of a plug 31, made of a material permeable to the air but not to the detergent, as for instance a sintered material, covering and closing permanently the inner side of the reservoir vent hole 30 so that the reservoir outer surface surrounding said vent hole 30 remains flat.

The corresponding zone of the surface of the shell 1 is slightly hollowed outwardly and in this shallow recessing it is obtained a second hole 32, coaxial with the first one and provided with an extending outwardly regular cylindrical crown 35 inside which a finned pin 33, provided with a plurality of longitudinal channels 34 arranged between a fin and the other, is axially inserted.

The upper end of said pin 33 is provided with a horizontally disposed closing valve 37 which can cover the rim of crown 35 and hence close said channels 34. Inside the shell, the lower end of said pin is provided with a stop element 36 against which the reservoir is pressing during the insertion of the dispenser.

The geometry and dimensions of the valve assembly are such that when the reservoir is inserted inside its housing shell, the former, by beating with its upper wall against the pin 37, pushes the latter up thus lifting the valve and hence freeing the channels 34.

In short, when the device is inserted into its housing shell, an air passage is automatically opened between the exterior and the interior of the reservoir via said channels 34, shallow recessing on the shell, vent hole 30 and plug 31, the latter allowing the inflow of air without being however clogged due to its characteristics.

When the reservoir is being filled with detergent, the plug 31, due to the characteristics of the material with which it is made from, cannot be clogged and further, the surface of the reservoir resting onto the table during the detergent replenishment is regular and flat.

To avoid that humidity and heat coming from the washing tank could possibly enter inside the reservoir 4 by passing through the interface 39 existing between said reservoir and the inner wall of the housing shell 1 and then through the vent hole 30, it is advisable to seal said passage by means of an appropriate, resilient lip type gasket 38, tapered toward the shell, as shown on the drawing by dotted line 40, and enclosing the stop element 36, so that when the dispenser is inserted into the shell, the bottom wall 37 of the former, by pushing against the stop element 36, causes the contact and hence the closing of said gasket 38 against the said shallow recessing thus inhibiting the passage between the interface 39 and the inside of the reservoir.

Claims

1. A dishwashing machine, particularly a domestic dishwashing machine, comprising a washing tank, a door (2) to load and close said washing tank, an housing shell (1) obtained on the inner wall of said door, and a reservoir-dispenser assembly (3) containing detergent in powder form, said reservoir-dispenser (3) consisting of a detergent reservoir (4) and a dispenser (5), the latter, detachable from the former, being capable of releasing a single dose of detergent at a time and containing an amount of detergent sufficient for a plurality of washing cycles, said reservoir-dispenser assembly (3) being removably inserted into said housing shell (1) fixed behind the inner wall of said door (2), and being positioned in such a way, that when said door (2) is closed, said reservoir-dispenser assembly (3) is disposed with the reservoir (4) facing upward so that the deter-

gent releasing mouth of the dispenser (5) is facing downward, the dose of detergent required during said washing cycles, being drawn from said reservoir (4) through said dispenser (5), characterized in that the bottom of said reservoir (4) communicates with a metering chamber (7) of said dispenser (5) through a feedbox (6) and a movable separating element (8) introducible between said feedbox and said metering chamber.

2. A dishwashing machine according to claim 1, characterized in that said metering chamber (7) leads directly to said washing tank through a movable lid (9) located on the bottom of said metering chamber, said movable lid being normally closed.

3. A dishwashing machine according to claim 2, characterized in that said movable lid (9) when in its normally closed position and with the door closed, is remarkably slanting with respect to the longitudinal axis of the metering chamber (7).

4. A dishwashing machine according to claims 1, 2 or 3, characterized in that said first separating element (8), when the detergent has to be released from the metering chamber (7) to the washing tank, closes before said movable lid (9) opens and conversely, after the detergent is released, said movable lid (9) closes before said first separating element opens.

5. A dishwashing machine according to claim 4, characterized in that said first separating element (8) and said movable lid (9) rotate on their respective shafts or pins (15), said shafts or pins being driven by one or more actuating elements (16, 17) located inside said door.

6. A dishwashing machine according to any one of claims from 1 to 5, characterized in that said first separating element (8) consists of a movable, preferably very thin perforated lamina (11), superimposed and capable of sliding across the aperture (12) of the metering chamber (7) and located at the bottom of the feedbox so as to close the latter, said aperture and that of said movable lamina being identical so that for opening the first separating element it is required that said movable perforated lamina (11) slides across said aperture (12).

7. A dishwashing machine according to claim 6, characterized in that the hermetic peripheral closing contact of said movable perforated lamina is assured by a movable wall (13) closing elastically against the nonperforated surface of said movable lamina (11).

8. A dishwashing machine according to any one of the preceding claims, characterized in that said movable lid (9), closing said metering chamber, closes hermetically by means of appropriate gaskets (10) also the downward directed side compartments (7a) and encloses said movable perforated lamina (11) and said movable wall (13).

9. A dishwashing machine according to any one of the preceding claims, characterized in that the reservoir-dispenser assembly (3) is provided with a handle (22) which can be opened by swinging it toward the washing tank and can be closed by letting it swing automatically back to its closed position, said handle being provided with a recess (26) suitable to get engaged, when said handle has to be closed, with a tongue (25) fixed on the inner wall of the door and to get disengaged from said tongue when said handle has to be opened.

10. A dishwashing machine according to any one of the preceding claims, characterized in that the upper part of the reservoir (4) includes an air inflow valve, said valve being automatically opened when the reservoir-dispenser assembly (3) is inserted into the housing shell (1).

11. A dishwashing machine according to claim 10, characterized in that said valve consists, inside the reservoir (4), of a vent hole (30) obtained on the upper wall of said reservoir and of a plug (31) which covers and closes from the inside said vent hole (30), said plug being made of a material permeable to the air and not to the detergent, as for instance a sintered material, and of an outward shallow recessing obtained on the housing shell (1) in front of said vent hole (30), said shallow recessing being provided with a second hole (32) substantially coaxial with the first one and provided with an extending outwardly regular cylindrical crown (35) inside which a finned pin (33), provided with a plurality of longitudinal channels (34) arranged between a fin (33a) and the other, is axially inserted, the upper end of said pin (33) being provided with a horizontally disposed closing valve (37) which can cover the rim of the crown (35) and hence close said channels (34), and the valve end inside the housing shell being provided with a stop element (36) against which the reservoir is pressing during the insertion of the dispenser.

12. A dishwashing machine according to claim 11, characterized in that a gasket (38) is interposed between the external perimeter of said vent hole (30) and the inner part of said shallow recessing of the housing shell (1), said gasket being capable of closing the passage from the interface (39)

of the housing shell (1) to the vent hole (30) and hence to the inside of the reservoir (4).

Patentansprüche

1. Geschirrspülmaschine, insbesondere eine solche für die Anwendung im Haushalt, mit einer Spülwanne, einer Tür (2) zum Beschicken und Schließen dieser Spülwanne, einem an der Innerwand der genannten Tür herausgewonnenen Schalengehäuse (1), sowie einem Spülmittel-Vorratsbehälter- und Dosiereinrichtungszusammenbau (3) zum Aufnehmen von pulverförmigem Spülmittel, wobei solcher Vorratsbehälter-Dosiereinrichtungszusammenbau (3) aus einem Spülmittel-Vorratsbehälter (5) und einer Dosiereinrichtung (5) besteht, wobei letztere, die vom ersteren trennbar ist, so ausgebildet ist, daß sie jeweils eine einzige Dosis Spülmittel auslassen kann, und eine für mehrere Spülvorgänge ausreichende Menge Spülmittel enthält, wobei ferner solcher Vorratsbehälter-Dosiereinrichtungszusammenbau (3) im genannten, hinter der Innenwand der Tür (2) befestigten Schalengehäuse (1) ausnehmbar eingefügt und so angeordnet ist, daß der genannte Vorratsbehälter-Dosiereinrichtungzusammenbau (3) im geschlossenen Zustand der Tür (2) mit dem nach oben zugewandten Vorratsbehälter (4) so angeordnet ist, daß die Spülmittelauslaßmündung der Dosiereinrichtung (5) nach unten gewandt ist, wobei die für die Durchführung der genannten Spülvorgänge benötigte Spülmitteldosis aus solchem Vorratsbehälter (4) durch solche Dosiereinrichtung (5) entnommen wird, **dadurch gekennzeichnet, daß** der Boden des genannten Vorratsbehälters (4) mit einer Dosierkammer (7) der genannten Dosiereinrichtung (5) durch einen Trichter (6) und ein zwischen solchem Trichter und solcher Dosierkammer einschiebbares, bewegbares Trennmittel (8) in Verbindung steht.

2. Geschirrspülmaschine nach Anspruch 1, **dadurch gekennzeichnet**, daß die genannte Dosierkammer (7) direkt zur Spülwanne durch eine bewegbar am Boden der genannte Dosierkammer angebrachte Klappe (9) führt, wobei solche bewegbar angebrachte Klappe normalerweise geschlossen ist.

3. Geschirrspülmaschine nach Anspruch 2, **dadurch gekennzeichnet,** daß die genannte bewegbar angebrachte Klappe (9), als sie sich in ihrer normalerweise geschlossene Lage befindet und die Gerätetür geschlossen ist, eine beachtliche Neigung im Verhältnis zur Längsachse der Dosierkammer (7) aufweist.

4. Geschirrspülmaschine nach Anspruch 1, 2 oder 3, **dadurch gekennzeichnet**, daß das genannte bewegbare Trennmittel (8), als Spülmittel aus der Dosierkammer (7) in die Spülwanne ausgelassen werden soll, vor dem Öffnen der genannten bewegbar angebrachten Klappe (9) schließt und die genannte bewegbar angebrachte Klappe (9) nach der Spülmittelzugabe aus der Dosierkammer hingegen vor dem Öffnen des genannten bewegbaren Trennmittel schließt.

5. Geschirrspülmaschine nach Anspruch 4, **dadurch gekennzeichnet,** daß das genannte bewegbare Trennmittel (8) und die genannte bewegbar angebrachte Klappe (9) sich um ihre eigene Wellen bzw. Stifte (5) drehen, wobei die genannten Wellen bzw. Stifte durch ein oder mehrere im Türinnern angebrachten Betätigungsmittel (16, 17) angetrieben werden.

6. Geschirrspülmaschine nach irgendeinem der vorhergehenden Ansprüche 1 bis 5, **dadurch gekennzeichnet**, daß das genannte bewegbare Trennmittel (8) aus einer bewegbaren, vorzugsweise sehr dünnen Lochfolie (11) besteht, die quer durch die Öffnung (12) der Dosierkammer (7) bewegbar, überlappend darauf und so im Bereich des Trichterbodens angeordnet ist, daß letzterer dadurch verschließbar ist, wobei die Öffnung der Dosierkammer und solche bewegbare Lochfolie ähnliche Bohrungsebenen aufweisen, sodaß das Gleiten der genannten bewegbaren Lochfolie (11) quer durch die Öffnung (12) zum Öffnen des genannten bewegbaren Trennmittels benötigt wird.

7. Geschirrspülmaschine nach Anspruch 6, **dadurch gekennzeichnet,** daß die periphere Dichtschließung der bewegbaren Lochfolie durch eine bewegbar vorgesehene Wand (13) gesichert ist, die gegen die ungelocherte Fläche der genannten bewegbaren Lochfolie (11) federnd schließt.

8. Geschirrspülmaschine nach irgendeinem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß die genannte bewegbar angebrachte Klappe (9), die zum Verschließen der genannten Dosierkammer dient, zugleich auch die nach unten gerichteten, solche bewegbare Lochfolie (11) und solche bewegbar vorgesehene Wand (13) umgrenzenden Seitenfächer (7a) schließt.

9. Geschirrspülmaschine nach irgendeinem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß der Vorratsbehälter-Dosiereinrichtungszusammenbau (3) mit einem Griff (22) versehen ist, welcher zum Öffnen gegen die

Spülwanne drehbar zu bewegen und zum Schließen automatisch in seine Schließlage rückbewegbar ist, wobei solcher Griff mit einer Aussparung (26) versehen ist, die so beschaffen ist, daß sie bei verschlossener Lage des Griffes in Eingriff mit einem auf der Türinnenwand vorgesehenen Vorsprung (25) kommen und sich bei geöffneter Lage des Griffes dagegen aus dem genannten Vorsprung auslösen kann.

10. Geschirrspülmaschine nach irgendeinem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß der obere Teil des Vorratsbehälters (4) ein Lufteinlaßventil aufweist, wobei solches Lufteinlaßventil bei Einführung des Vorratsbehälter-Dosiereinrichtungszusammenbaus (3) in das dafür vorgesehene Schalengehäuse (1) automatisch geöffnet wird.

11. Geschirrspülmaschine nach Anspruch 10, **dadurch gekennzeichnet**, daß das genannte Lufteinlaßventil innerhalb des Vorratsbehälters (4) aus einer in der oberen Wand des genannten Vorratsbehälters herausgewonnenen Luftdurchflußbohrung (30) sowie einem Verschluß (31) besteht, welcher die genannte Luftdurchlaßbohrung (30) von innen aus deckt und schließt, wobei solcher Verschluß aus einem luftdurchlässigen, jedoch spülmittelundurchlässigen Material, wie z.B. einem Sintermaterial, und einer im Schalengehäuse (1) gegenüber der genannten Luftdurchlaßbohrung (30) herausgewonnenen, nach außen gerichteten Vertiefung besteht, wobei solche Vertiefung mit einer zweiten Bohrung (32) , die im wesentlichen koaxial mit der genannten ersten Bohrung ist und nach außen mit einem regelmäßigen Zylinderkranz (35) hinausragt, in den ein berippter Axialstift (33), welcher mit einer Pluralität von zwischen einer Rippe (33a) und der darauffolgenden angeordneten Längsnuten (34) versehen ist, eingeführt wird, wobei der obere Teil des genannten Stiftes (33) mit einer horizontal verschiebbaren Verschlußklappe (37), die den Umfangsrand des Zylinderkranzes (35) decken und daher die genannten Nuten (34) abdichten kann, und der untere, innerhalb des Schalengehäuses liegende Teil mit einem Anschlagkörper (36) versehen ist, gegen den der Vorratsbehälter während der Einführung der Dosiervorrichtung drückt.

12. Geschirrspülmaschine nach Anspruch 11, **dadurch gekennzeichnet,** daß ein Dichtungsmittel (38) zwischen dem peripheren Außenrand der genannten Luftdurchlaßbohrung (30) und dem Innenteil der genannten Vertiefung im Schalengehäuse (1) angeordnet ist, wobei solches Dichtungsmittel den Durchlaß vom Hohlraum (39) innerhalb des Schalengehäuses (1) zur Luftdurchlaßbohrung (30) und, daher, zum Innern des Vorratsbehälters (4) abdichten kann.

Revendications

1. Machine à laver la vaisselle, en particulier machine à laver la vaisselle du type ménager, comprenant une cuve de lavage, une porte (2) pour charger et fermer ladite cuve de lavage, une enceinte (1) réalisée dans la paroi intérieure de ladite porte, ainsi qu'un ensemble (3) réservoir-distributeur contenant du détergent pulvérulent, ledit ensemble (3) réservoir-distributeur étant formé par un réservoir de détergent (4) et un distributeur de détergent (5), ce dernier, détachable du premier, étant apte à ne délivrer qu'une dose unique de détergent à la fois, et contenant une quantité de détergent suffisante pour une pluralité de cycles de lavage, ledit ensemble (3) réservoir-distributeur étant inséré amoviblement dans ladite enceinte (1), qui est fixée derrière la paroi intérieure de ladite porte (2), et étant positionné de façon telle que, lorsque cette porte (2) est fermée, ledit ensemble (3) réservoir-distributeur se situe avec le réservoir (4) tourné vers le haut d'une façon telle que la bouche de délivrance du détergent du distributeur (5) est tournée vers le bas, la dose de détergent requise pendant le déroulement des cycles de lavage étant tirée de ce réservoir (4) à travers ce distributeur (5), **caractérisée en ce que** le fond de ce réservoir (4) est en communication avec une chambre de dosage (7) de ce distributeur (5) à travers une trémie (6) et un élément mobile de séparation (8) apte à être introduit entre cette trémie et cette chambre de dosage.

2. Machine à laver la vaisselle selon la revendication 1, **caractérisée** en ce que cette chambre de dosage (7) donne directement dans ladite cuve de lavage à travers un clapet (9) mobile situé sur le fond de ladite chambre de dosage (7), ledit clapet mobile étant normalement fermé.

3. Machine à laver la vaisselle selon la revendication 2, **caractérisée** en ce que ledit clapet mobile (9), lorsqu'il se trouve dans sa position normalement fermée et la porte de la machine est fermée, est sensiblement incliné par rapport à l'axe longitudinal de la chambre de dosage (7).

4. Machine à laver la vaisselle selon les revendications 1, 2 ou 3, **caractérisée** en ce que ledit premier élément de séparation (8), lorsque le détergent doit être délivré de la chambre de dosage (7) à la cuve de lavage, va fermer avant que ledit cla-

pet mobile (9) va ouvrir et, une fois le détergent délivré, ledit clapet mobile (9) va au contraire fermer avant que ledit premier élément de séparation va ouvrir.

5. Machine à laver la vaisselle selon la revendication 4, **caractérisée** en ce que ledit premier élément de séparation (8) et ledit clapet mobile (9) tournent sur leurs arbres ou leurs fuseaux (15) respectifs, lesdits arbres ou fuseaux étant entraînés par un ou plusieurs éléments de commande (16, 17) situés dans ladite porte.

6. Machine à laver la vaisselle selon l'une quelconque des revendications précedentes 1 à 5, **caractérisée** en ce que ledit premier élément de séparation (8) est constitué par une lame perforée mobile (11), de préférence très mince, superposée à et apte à glisser sur l'ouverture (12) de la chambre de dosage (7) située au fond de la trémie de façon telle à fermer cette dernière, ladite ouverture et ladite lame perforée presentant des plans de percement identiques de façon que, pour ouvrir ce premier élément de séparation, il faut que ladite lame perforée mobile (11) glisse à travers ladite ouverture (12).

7. Machine à laver la vaisselle selon la revendication 6, **caractérisée** en ce que le contact assurant la fermeture périphérique hermétique de ladite lame perforée mobile est assuré par une paroi mobile (13) fermant de façon élastique contre la surface non-perforée de ladite lame mobile (11).

8. Machine à laver la vaisselle selon l'une quelconque des revendications précedentes, **caractérisée** en ce que ledit clapet mobile (9) renfermant ladite chambre de dosage ferme hermétiquement par l'intermédiaire de joints d'étanchéité (10) appropriés aussi des compartiments latéraux (7a) tournés vers le bas et circonscrivant ladite lame perforée mobile (11) et ladite paroi mobile (13).

9. Machine à laver la vaisselle selon l'une quelconque des revendications précedentes, **caractérisée** en ce que l'ensemble (3) réservoir-distributeur est pourvu d'une poignée (22) qui peut être ouverte en la tournant vers la cuve de lavage et peut être fermée en la laissant retourner automatiquement dans sa position de fermeture, ladite poignée étant pourvue d'une cavité (26) apte à s'engager, lorsque cette poignée se trouve dans sa position de fermeture, avec une languette (25) fixée sur la paroi intérieure de la porte, ainsi qu'à se désengager de ladite languette lorsque la poignée doit être ouverte.

10. Machine à laver la vaisselle selon l'une quelconque des revendications précedentes, **caractérisée** en ce que la partie supérieure du réservoir (4) comprend une soupape d'admission d'air, ladite soupape étant ouverte automatiquement lorsque l'ensemble (3) réservoir-distributeur est introduit dans l'enceinte (1).

11. Machine à laver la vaisselle selon la revendication 10, **caractérisée** en ce que ladite soupape est formée, à l'intérieur du réservoir (4), par un trou de passage de l'air (30), pratiqué dans la paroi supérieure dudit réservoir, et un bouchon (31) couvrant et fermant de l'intérieur ledit trou de passage de l'air (30), ledit bouchon étant constitué par un matériau qui est perméable à l'air, mais non au détergent, comme par exemple un matériau fritté, ainsi que par un léger creux vers l'extérieur de l'enceinte (1) pourvu en face dudit trou de passage de l'air (30), dans ce creux étant pratiqué un deuxième trou (32) qui est essentiellement coaxial avec le premier trou et se projète vers l'extérieur avec une couronne cylindrique régulière (35), dans ledit deuxième trou étant introduit un pivot axial aileté (33) pourvu d'une pluralité de cannelures longitudinales (34) situées entre une ailette (33a) et l'autre, l'extrémité supérieure dudit pivot (33) étant pourvue d'une soupape de fermeture à disposition horizontal (37) qui est à même de couvrir la partie périphérique de la couronne (35) et, par conséquent, de boucher lesdits cannelures (34), l'extrémité dudit pivot se trouvant à l'intérieur de l'enceinte étant à son tour pourvue d'un élément de butée (36) sur lequel va s'appuyer le réservoir pendant l'introduction du distributeur.

12. Machine à laver la vaisselle selon la revendication 11, **caractérisée** en ce que un joint d'étanchéité (38) est pourvu entre le périmètre extérieur dudit trou de passage de l'air (30) et la partie intérieure dudit léger creux de l'enceinte (1), ledit joint d'étanchéité étant capable de fermer le passage de l'interstice (39) de l'enceinte (1) au trou de passage de l'air (30) et, donc, à l'intérieur du réservoir (4).

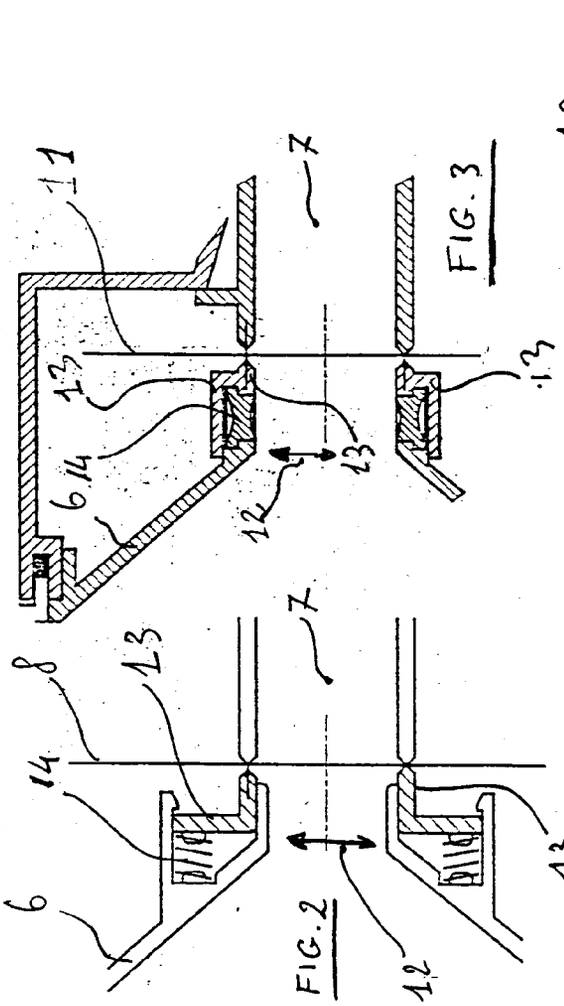


FIG. 2

FIG. 3

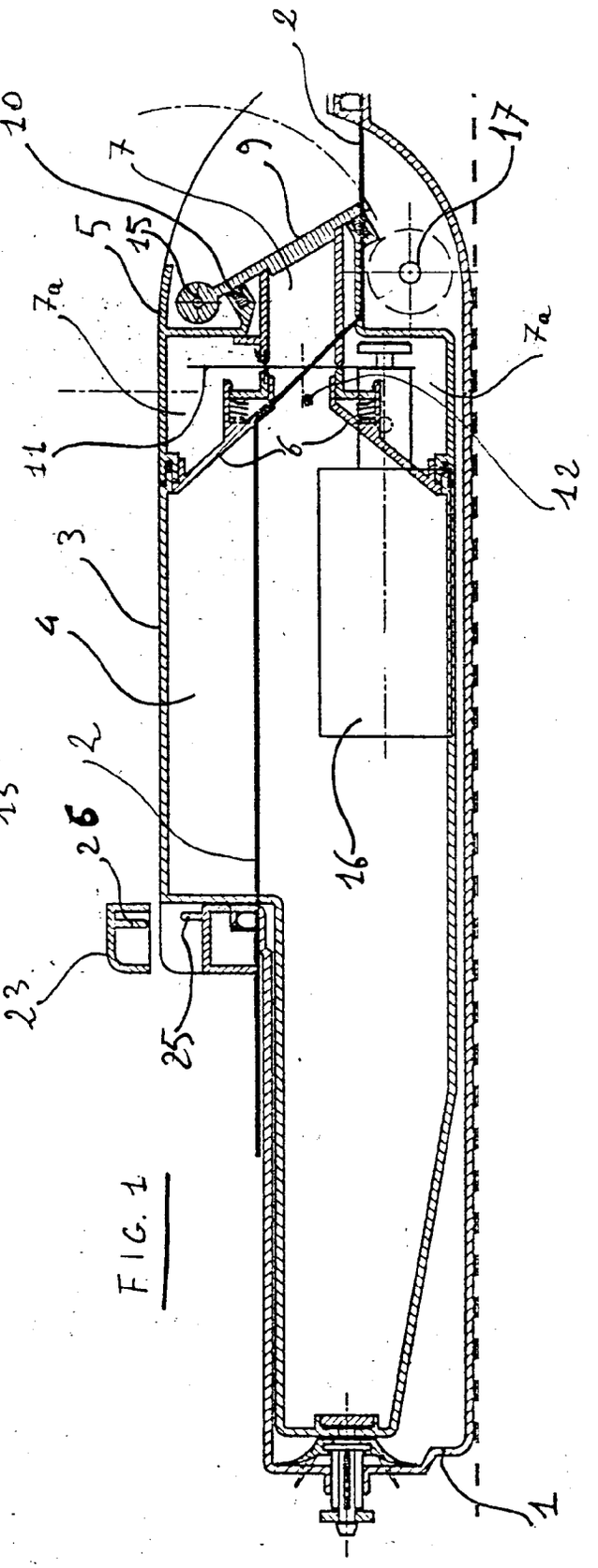


FIG. 1

FIG. 4

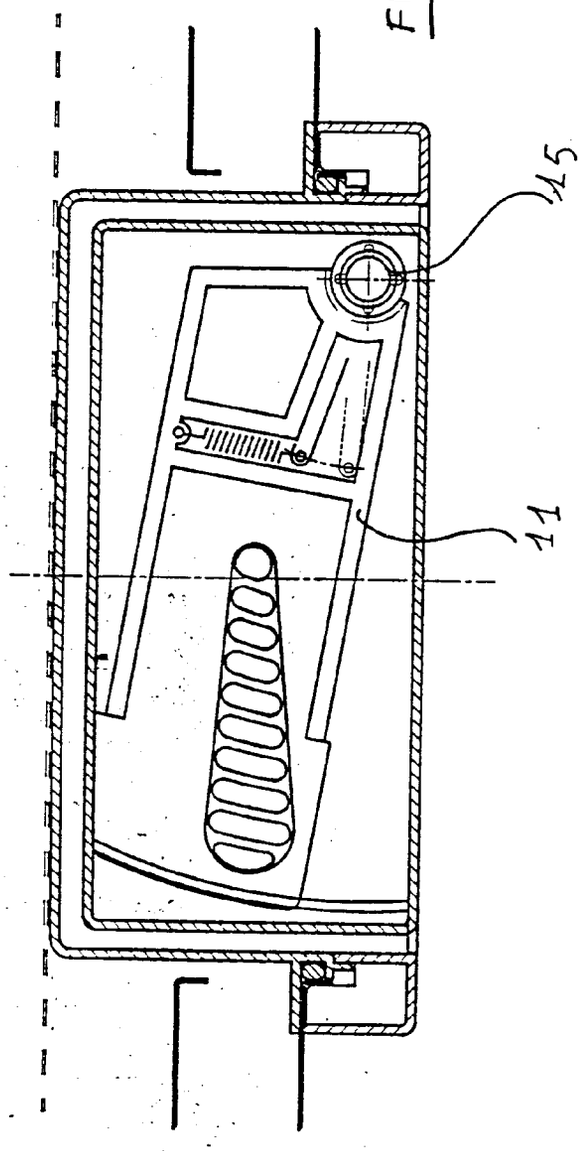
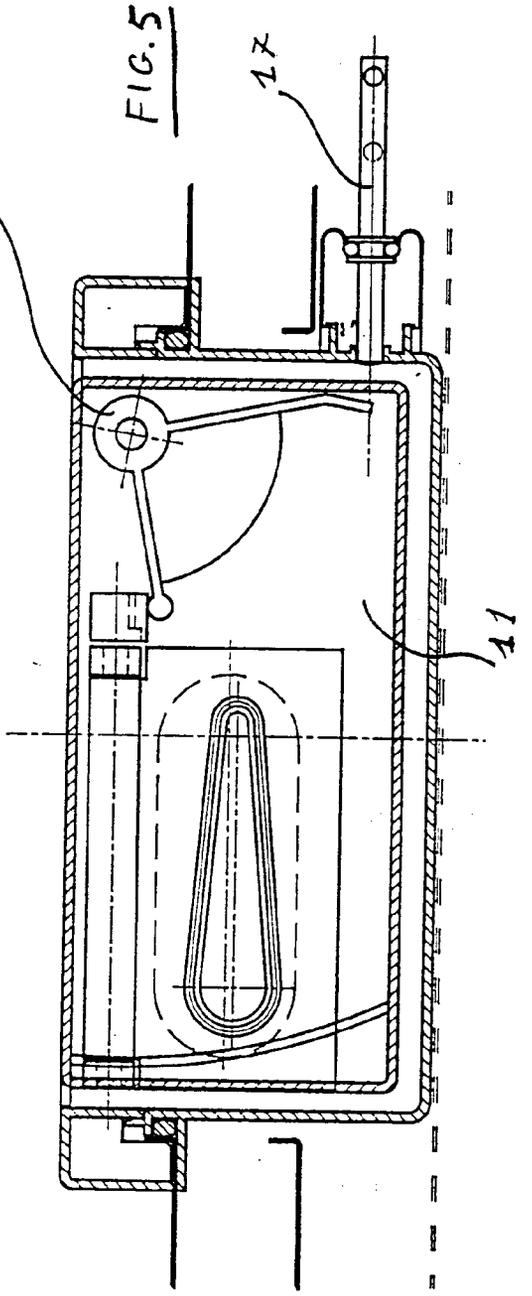


FIG. 5



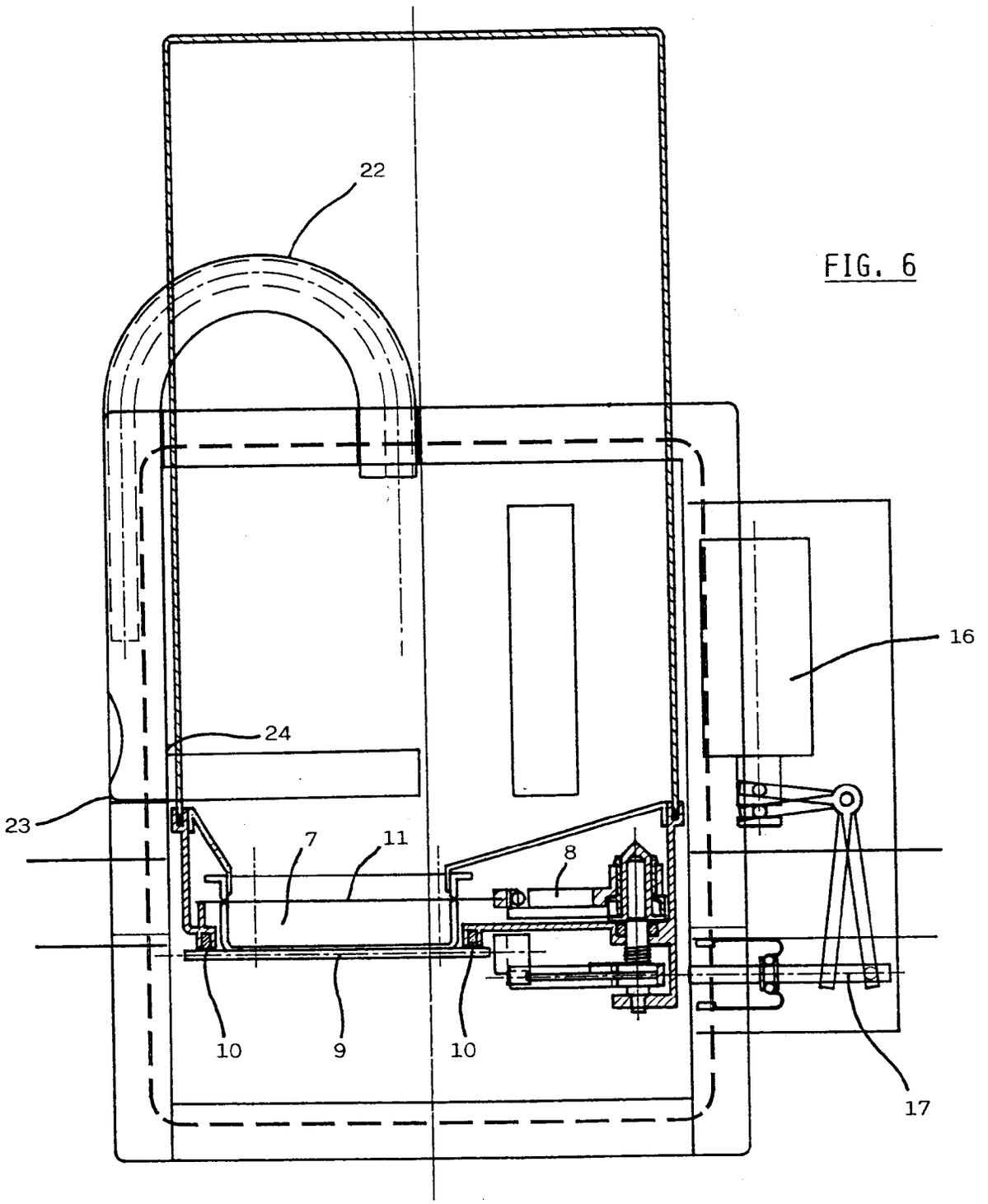


FIG. 6

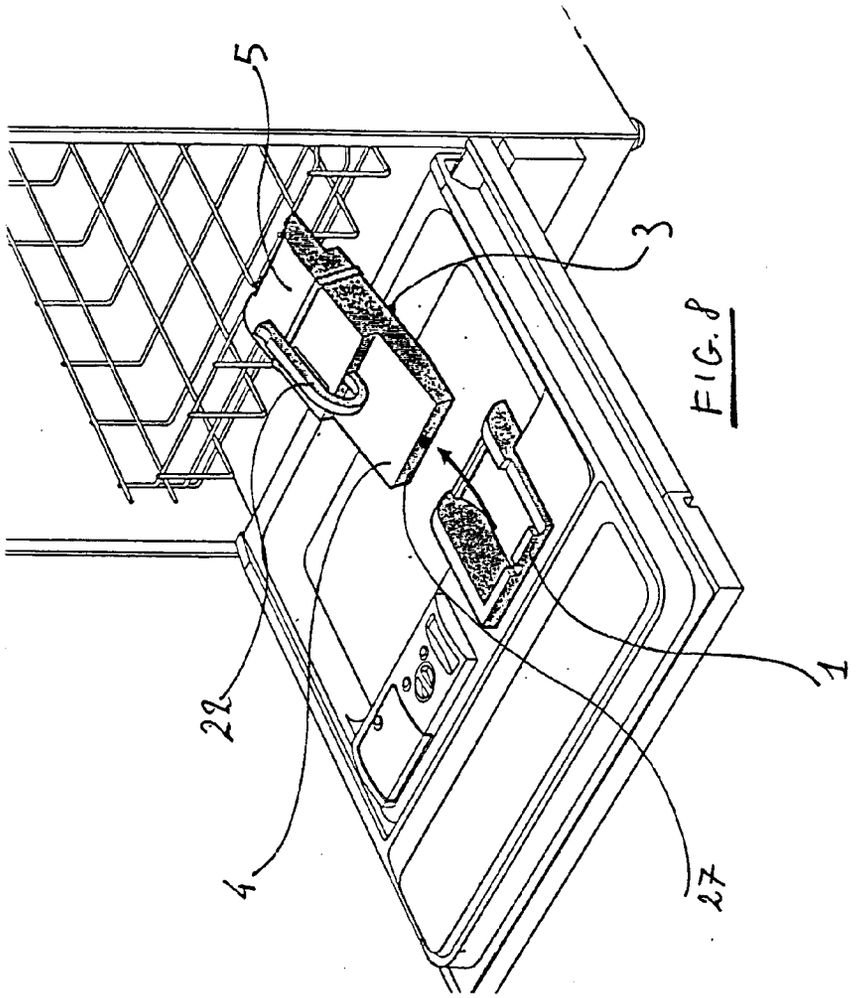


FIG. 8

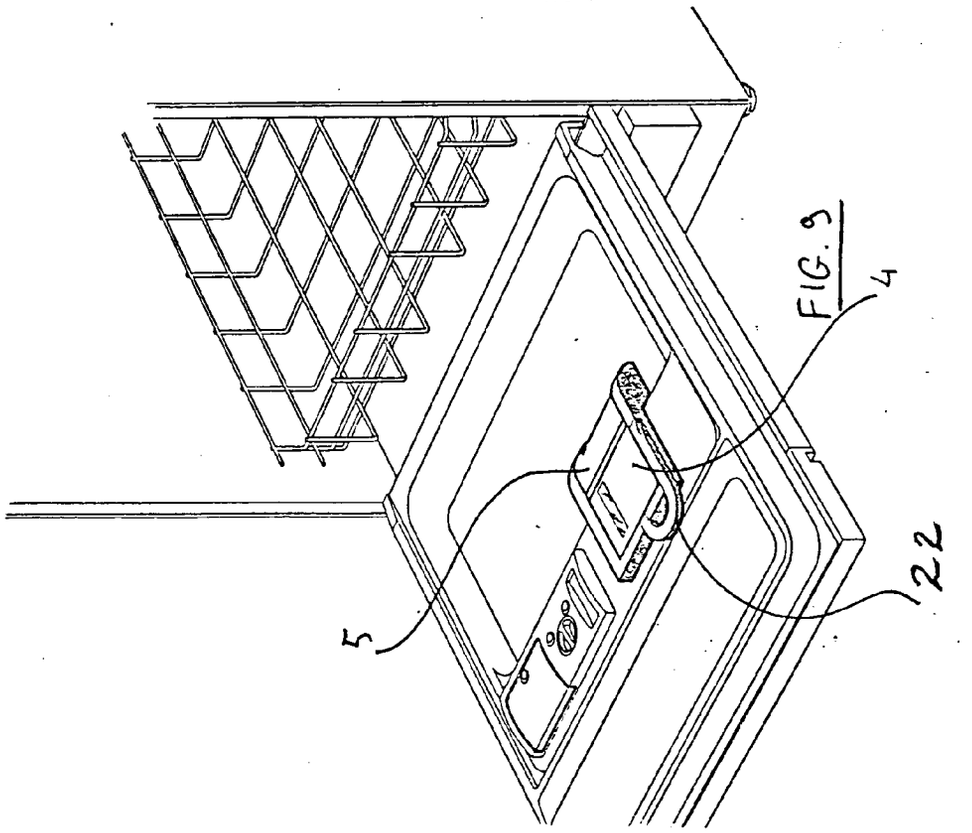


FIG. 9

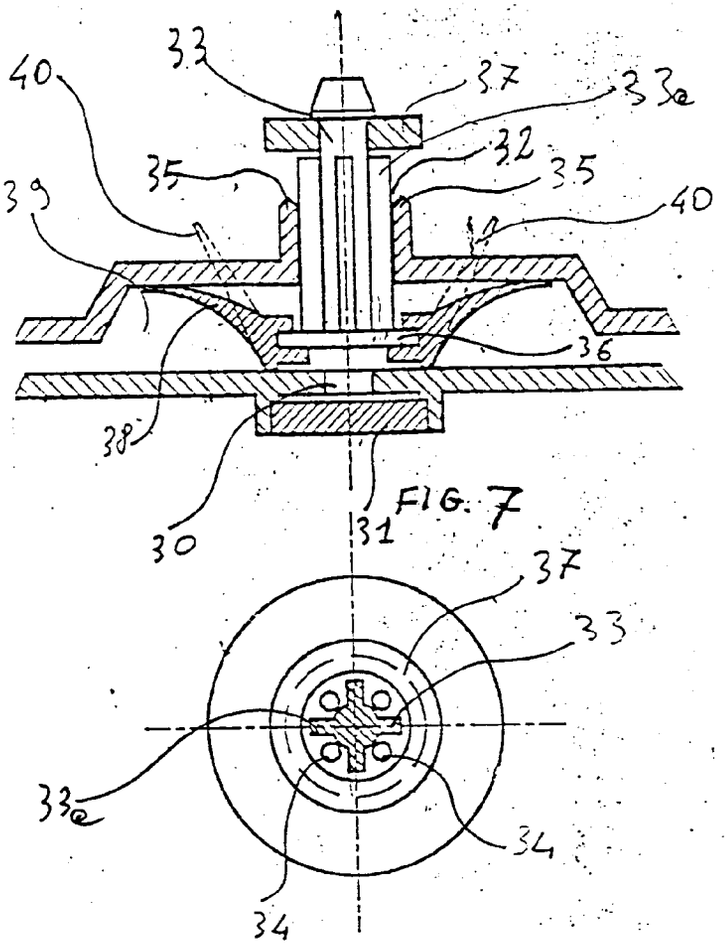


FIG. 7

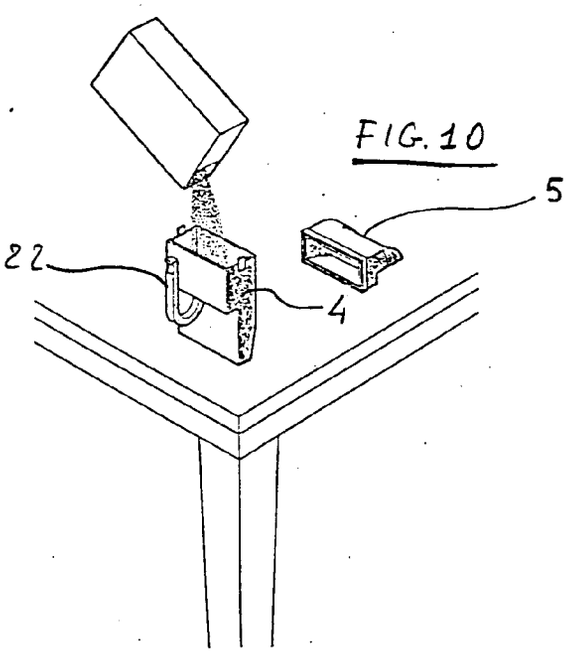


FIG. 10