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(11) **EP 1 281 346 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**05.02.2003 Bulletin 2003/06**

(51) Int Cl.7: **A47L 15/44**

(21) Application number: **01830512.8**

(22) Date of filing: **01.08.2001**

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

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(54) **Domestic dishwasher with a front door and a detergent measurer which can be refilled on the top of the door**

(57) Dishwasher machine of the domestic type with a front door hinged at the bottom wherein the detergent measurer/dispenser device is housed in the volume 21 of the upper side of a frame of the door and is equipped with an opening for the loading (22) of detergent which is open on the upper edge of the door and which is accessible with a slight opening of the door, in an almost vertical position, and also equipped with a distinct open-

ing for the dispensing (23) of the detergent in the washing chamber closed by a hinged, sliding or rotating diaphragm shutter, made to open during the course of a machine cycle, so that the detergent loading operations are eased and inside the frame a recess, extending up to the top of the door, is available, which increases the useful volume of the washing chamber and allows the installation in the recess, in a conveniently practicable position, of an additional basket (90).

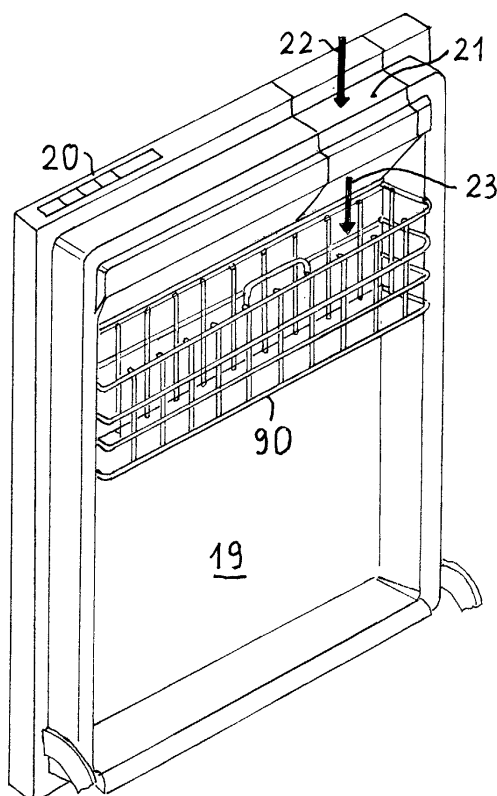


FIG. 18

EP 1 281 346 A1

## Description

**[0001]** The present invention regards a domestic dishwasher machine, with a front door hinged at the bottom and equipped with a detergent measurer/dispenser housed in the frame of the door which can be refilled from the top.

**[0002]** It is known that in modern dishwasher machines, with a front door hinged at the bottom, the devices for operating the machine and for dispensing the detergent are generally housed in the volume of the door, interposed between an outer front wall and an inner counterdoor, conveniently shaped through drawing to form a recess, surrounded by a frame, which increases the useful volume of the washing chamber below.

**[0003]** Whereas the operation devices are conveniently housed in the upper part of the frame and can be actuated from the top of the door or from a frontal control panel arranged at the top, the dispensing device is arranged approximately in a midway position of the counterdoor, or a bit lower, so as not to interfere with the upper rack or the lower rack with which the machine is usually equipped.

**[0004]** Consequently the recess which increases the useful volume of the washing chamber is confined to only the lower part of the front door and allows the use of a bigger single lower rack.

**[0005]** Indeed, there are substantial difficulties, if not absolute impossibility, in realising two separated recesses in the inner counterdoor by drawing to allow two racks, upper and lower, of a larger size to be housed in the washing chamber and at the same time provide a housing for the dispensing device in the volume of the door between the two recesses.

**[0006]** As well as this drawback, prior art dishwasher machines have the drawback that the dispensing device, to be filled with detergent, requires the complete opening of the door and its arrangement in a virtually horizontal position. This is indispensable and a consequence of the constructive and functional concept upon which commonly used dispenser devices are based, essentially consisting of a reservoir closed with a lid, thus with a single opening which is used for the loading and the dispensing of detergent and is arranged vertically, when the door of the dishwasher machine is closed, to allow the discharge of detergent due to gravity. Necessarily, if one wishes to avoid the detergent spilling out of the reservoir, whose lid, during loading, must be open, one has to arrange the reservoir, therefore the door of the machine, in a virtually horizontal position.

**[0007]** Since the door is hinged at the bottom the loading operation is particularly inconvenient and anti-ergonomic. The document EP0671143 describes a dishwasher machine which avoids these drawbacks and these limitations with the offset of requiring a greater height of the machine: the devices for controlling and dispensing the detergent are housed, instead of in the door, in the top part of the body of the machine, as in a

common washing machine.

**[0008]** Thus, the advantage of a greater capacity of the washing chamber is achieved at the expense of a larger general encumbrance, which precludes the installation of the dishwasher machine under a work surface of a standardised height.

**[0009]** These drawbacks and limitations are completely eliminated by the dishwasher which is object of the present invention wherein the operating devices and those for dispensing are both housed in the loading door, in particular on the upper side of the frame formed by the counterdoor and are accessible for controlling the dishwasher and for loading the detergent, from the top of the door, with the door only slightly open, thus in a conveniently practicable position, while the dispensing of detergent and possible additives, takes place through suitable shutters, distinct from those for loading, which open to the inside of the washing chamber.

**[0010]** In this way the counterdoor can have a recess extending practically for the entire height of the door and the washing chamber, of increased volume with respect to known dishwashers, can house two larger racks of equal size, particularly in the horizontal direction corresponding to the depth of the washing chamber which has been increased by the depth of the recess of the counterdoor, or else modular racks, with a corresponding total depth, as described in the document EP0143754, or even three racks, one of which is fixed or removably hooked to the inside of the door, in the recess of the counterdoor, immediately under the upper side of the frame.

**[0011]** The characteristics and advantages of the invention will become clearer from the following description, made with reference to the attached drawings wherein:

- figure 1 is a comprehensive perspective view, from the inside, of a door of a dishwasher machine of the type known in the art;

- figure 2 is a comprehensive perspective view, from inside, of a door of a dishwasher machine realised according to the present invention;

- figure 3 is a partial perspective view of the door of figure 2 which shows in detail a first embodiment of a detergent measurer/dispenser, according to the present invention and with the dispensing shutter open and the loading shutter closed;

- figure 4 is a section, according to the view A-A of figure 3, of the measurer device of figure 3;

- figure 5 is a partial perspective view of the same door as in figure 3, with the dispenser shutter closed and the loading shutter open;

- figure 6 is a section view, similar to that of figure 4, of a second embodiment of a detergent measurer/dispenser according to the present invention;

- figure 7 is a frontal view of the measurer/dispenser of figure 6;

- figure 8 is a top view of the measurer/dispenser of

figure 6;

- figure 9 is a section view, similar to that of figures 4 and 6 of a third embodiment of a measurer/dispenser according to the present invention;
- figure 10 is a section view of a first variant of the measurer/dispenser of figure 9;
- figure 11 is a section view of a second variant of the measurer/dispenser of figure 9;
- figure 12 is a section view of a third variant of the measurer/dispenser of figure 9;
- figure 13 is a partial perspective view of the door of figure 2 which shows in detail a third embodiment of a measurer/dispenser according to the present invention, with the loading shutter open and the discharge shutter closed;
- figure 14 is a perspective view of the measurer of figure 13, with the loading shutter closed and the discharge shutter open;
- figure 15 is a section view of the measurer of figures 13 and 14;
- figure 16 is a perspective view of a variant of the measurer of figure 3;
- figure 17 is a section view, according to the view I-I of figure 16, of the variant of figure 16;
- figure 18 is a perspective view of the door of figure 2 which shows the advantageous use of the counterdoor recess as housing for a cutlery basket;
- figure 19 is a partial exploded view of the door of figure 2 which shows in detail a variant of the measurer of figures 6, 7, 8;
- figure 20 is a front view of the measurer of figure 19 with the loading/discharge shutter open;
- figure 21 is a front view of the measurer of figure 19 with the loading/discharge shutter closed;
- figure 22 is a front view of a further variant of the measurer of figure 19, with the loading/discharge shutter open;
- figure 23 is a front view of the measurer of figure 19 with the loading shutter in an intermediate position to close the discharge opening and not the loading one;
- figure 24 is a front view of the measurer of figure 22 with the loading shutter closed.

**[0012]** For a better understanding of the invention and of the different problems which have to be tackled, solved and reconciled, figure 1 represents a dishwasher door known to the art in a perspective view from the inside.

**[0013]** A counterdoor panel 2, made of stainless steel, shaped by drawing to form a frame with upper 3, lower 4 and lateral 5, 6 sides which surround a lower recess 7, is juxtaposed to a frontal panel of which only the edge 1 is visible.

**[0014]** The frame has a flat and continuous edge, represented by the broken line 8, for a coupling which seals against spray and steam with a corresponding rubber gasket mounted on the mouth of the washing chamber.

**[0015]** On the lower side 4 of the frame is mounted a rubber gasket 9 which forms a sealing coupling with a corresponding bottom surface of the washing chamber.

**[0016]** The operating and programming devices are housed in the space between the frontal panel and the counterdoor 2, with a push-button panel conveniently accessible from the top, with the door only slightly open, or alternatively displayed on the front panel.

**[0017]** It should be remembered that the door is hinged at the bottom, through brackets 11, 12 for articulating and limiting the range of movement.

**[0018]** The detergent measurer and dispensing device 13 is arranged in the counterdoor 2, half way up, above the lower recess 7 and housed in the space between the frontal panel and the counterdoor.

**[0019]** Different solving embodiments are adopted by the device, such as that described in the documents US3,419,190; EP0332152; EP0010049; FR2593379; EP0602572 and EP0780087.

**[0020]** In general, the device comprises a small reservoir for after-wash liquid additives (rinse aids), with a refill cap 14 and a dosage and loading reservoir 15 for detergent powder or tablets, closed by a free-opening, curtain or rotating diaphragm shutter 16.

**[0021]** The reservoir 15 can be divided into two compartments, one for containing washing detergent, the other for containing pre-wash additives.

**[0022]** The shutter 16 is forced or polarised into the open position by a spring (not illustrated), is closed manually, is kept closed by a stop key or a pawl and is opened by an electromagnetic control which acts upon the stop device during the course of the wash cycle.

**[0023]** The same electromagnet which operates the opening of the shutter 16, in the steps following the wash cycle, can actuate a small piston pump to dispense the after-wash additives.

**[0024]** These components and the relative linkages are housed in the back or on the side of the measurer device, behind the counterdoor.

**[0025]** For more detailed information on these devices we refer to the quoted documents.

**[0026]** The essential function of the shutter 16 is to protect against sprays and to avoid detergent falling into the washing chamber until the start of the wash step, at least for washing detergent. The pre-wash additives can, however, be dispensed into the chamber up to the start of the washing operations.

**[0027]** Whatever the type of measurer device used it is fundamental to note a common characteristic: the opening for loading the measurer with washing detergent is the same as was used for dispensing.

**[0028]** The dispensing takes place by gravity, with the simple opening of the shutter, when the door is closed, thus in vertical position, as illustrated, according to the direction of the arrow 17.

**[0029]** The loading of the detergent must, however, be carried out according to the direction of the arrow 18 and, to avoid the falling of the detergent, the door must

be arranged in a virtually horizontal position, so that the operational conditions for the loading of the different detergents and additives and for the manual closure of the shutter are extremely inconvenient. Moreover, the position half way up the height of the measurer/dispenser prevents the realisation of the door with an inner recess extending up to the upper side of the frame, thus making it difficult to fully exploit the volume available in the thickness of the door to increase that of the washing chamber.

**[0030]** Figure 2, by schematic comparison, represents the constructive concepts forming the basis of the present invention.

**[0031]** In figure 2 the counterdoor has a recess 19 extending practically for the whole height of the door and, without modifying the arrangement of the controls and the relative panel 20, or the conformation of the frame in any way, thus without the need for any modification of the body of the dishwasher machine, the measurer/dispenser device, described in detail hereafter with reference to different embodiments, is housed in the volume 21, indicated with a broken line, that being in a portion of the upper side of the frame and is equipped with two distinct openings that can be closed independently, one for the loading of the detergent in the direction of the arrow 22 and the other for the dispensing of the detergent in the direction of the arrow 23.

**[0032]** In this way three fundamental effects are realised:

- the loading operation of the detergent and the associated arrangement operations of the measurer can be carried out with the door in a practically vertical position, only slightly open or at the most with an inclination of the door in the order of 60°-90° from the horizontal plane, thus in a convenient manner;
- it is possible to increase the volume available for the washing chamber and to allow the use of washing racks of the same size or which are modular, both in the lower and upper part of the washing chamber.
- It is also possible to obtain, in particular for pre-wash detergent, but if so desired also for washing detergent, a controlled draw through water jet nozzles arranged on the roof of the washing chamber in direct proximity to the measurer device, which is much more reliable and rapid than that obtained with the more or less random orientation of the jets in the washing chamber, when the water jet system is active.

**[0033]** Regarding which, one must, however, observe that the presence of a pre-wash detergent containing compartment is not indispensable and some measurer devices are not provided with it, leaving the responsibility and the burden of putting the pre-wash additive directly into the washing chamber to the user.

**[0034]** The perspective views of figures 3, 5 and the

section of figure 4 (according to the view A-A of figure 3), represent a first embodiment of the measurer/dispenser device according to the invention.

**[0035]** In the volume of the upper side 25 of the frame is housed the measurer device consisting of a reservoir 26 for the liquid additives and two compartments 27, 28 for containing pre-wash and washing detergent, respectively, which are open at the top at the upper face of the frame for the loading of the detergent which can take place (fig. 5) conveniently from above, in the direction indicated by the arrow 29, with the door of the dishwasher machine slightly open.

**[0036]** Also the loading of the liquid additives takes place from above, with the opening of a screw-lid, arranged on the upper face of the frame, which allows the access to the reservoir 26.

**[0037]** The front or edge face of the frame has a continuous contact surface, defined by the broken line 31, with a sealing gasket 32 (fig. 4) mounted in the body 33 of the dishwasher machine (of which the upper part can be seen in fig. 4).

**[0038]** The dispensing of the liquid additives takes place, through a conventional command, through an opening 34 which opens on the front face of the frame, inside the washing chamber relative to the position of the gasket.

**[0039]** On the front face of the frame, inside the washing chamber, the compartments 27, 28 are closed by a shutter that can open, hinged above, pulled into open position by a non-illustrated spring and locked into closed position by a stop device (key or pawl) 36, which is per se known and is operated for the opening of the shutter 35 during the course of the wash cycle.

**[0040]** The function of the shutter 35 is to prevent the detergent from escaping from the compartments through gravity, until the wash cycle is activated and, for the washing detergent, until the start of the actual main washing step.

**[0041]** Moreover, only for compartment 28 for containing washing detergent, it has the function of preventing the penetration of sprays which could cause the dissolving and carrying away of detergent before the start of the washing step.

**[0042]** This function is not required for the compartment 27, intended to contain the pre-wash detergent which must be dispensed into the washing chamber from the first step of the machine's cycle.

**[0043]** For this purpose the shutter 35, at the compartment 27, is equipped with openings 37, conveniently sized to prevent the escape of detergent, which is generally in granules or tablets, and at the same time to allow the penetration of sprays into the compartment which cause the detergent to be carried away from the first step of the machine's cycle.

**[0044]** Alternatively, as represented in the variant of figures 16 and 17, the inner closing shutter can consist of two independent elements, 35A and 35B, respectively, for closing the two compartments, inside the washing

chamber.

**[0045]** Although the element 35A is operated in a known way, during the course of the wash cycle, the element 35B can be made to open with the closing of the door of the machine, by the interference of an appendage 38 with a support frame 39, of the sealing gasket 32, inside the washing chamber, or even by inertia or gravity with the closing of the door.

**[0046]** As illustrated in figure 17, with the opening of the shutter 35B the detergent contained in the conveniently hopper-shaped compartment 27, falls, due to gravity, into the washing chamber, according to the direction indicated by the arrow 40, without the need of any liquid spray.

**[0047]** Taking another look at figure 4 one notes that below the compartments 27, 28, in the volume of the frame, a wide space 41 is available for housing the control device (electromagnet and linkages) of the shutter 35 and of the liquid additive emission pump.

**[0048]** Alternatively, the space for housing the control devices can be formed between or alongside the compartments or in suitable recesses thereof.

**[0049]** In the described embodiment an important aspect to be considered consists of the fact that the compartments 27, 28 are equipped with two openings, for loading and dispensing, respectively, which are outside and inside the washing chamber, respectively.

**[0050]** Therefore, when the inner shutter 35 is open, in the absence of suitable measures, the washing chamber, instead of hermetically closed would be in communication with the external environment through the loading openings, a circumstance which must be avoided to prevent the escape of steam, if not of liquids, during the course of the wash cycle.

**[0051]** For this purpose the compartments 27, 28 are equipped (figures 3, 4, 5, 16, 17) with a lid 42 that can be opened which in the illustrated embodiment is hinged near to the contact surface of the counterdoor with the sealing gasket. The lid 42, with an appropriate sealing gasket, can be clicked open and closed, manually, on the opening for loading the compartments 27, 28 but preferably is held open by a return spring (not illustrated), and closed automatically, without the need for the user to intervene, by the interference of the lid 42 with the upper part 33 of the body of the dishwasher machine, when the door is closed.

**[0052]** It is clear that other devices can also be used such as bistable spring devices which, in the absence of an external intervention, keep the lid in a stable open or closed position.

**[0053]** Figures 3 and 5 represent the lid 42 in closed and open position, respectively. The section of figure 4 shows the lid 42 closed, suitably conformed to abut with the upper part of the machine body which ensures its hermetic closure.

**[0054]** The lid in open position which interferes with the upper part 33 of the machine body and possibly with a working plane 44 under which the dishwasher ma-

chine can be housed flush is represented with the broken line 43.

**[0055]** Figures 6, 7, 8 represent a second embodiment of a measurer/dispenser device in section (according to the view B-B), from the front and from above, respectively. Also in this case the device is housed in the upper side of the frame of the door and consists of a reservoir 45 for liquid additives, a container 46 for washing detergent and an optional container 47 for pre-wash detergent.

**[0056]** The reservoir 45 is equipped with a refill mouth 48, open on the outside of the washing chamber, on the outer face of the frame, and closed by a screw lid 49.

**[0057]** The containers 46, 47, separated by a diaphragm 50, are equipped with an upper dispensing opening outside of the sealing gasket and closed by a first sliding shutter 51, and with a lower dispensing opening, inside the sealing gasket, closed by a second sliding shutter 52, which slides on rails 53, 54.

**[0058]** As opposed to the previous embodiment, the dispensing opening and the relative shutter 52 are arranged on the inner inclined face of the frame, substantially aligned with the drawing profile of the counterdoor.

**[0059]** There is nothing to stop the shutter 52 from being arranged on the inner front face of the frame, parallel to the plane of the door. Nevertheless, the inclined arrangement allows the encumbrance and the vertical thickness of the upper side of the frame to be reduced, giving the advantage of the increase in the useful volume of the washing chamber.

**[0060]** The sliding shutter 52 is pulled back into open position, represented in figure 8, by a spring 57 which is housed in a groove 56 and is held in closed position by a pawl 58 (fig. 7) which is actuated by conventional actuation devices. The space 55 for such devices can be formed between the containers 46, 47 and the front panel, or in a volume between the reservoir 45 and the containers 46, 47.

**[0061]** The first sliding shutter 51, however, is actuated manually, both to open and close it.

**[0062]** The operation of the measurer is very simple: before starting the wash cycle the user pushes the shutter 52 into closed position and the shutter 51 into open position (as shown in figure 8) to carry out the loading of detergent.

**[0063]** Then he closes the shutter 51 and starts the wash cycle. For safety a microswitch (not illustrated) can be foreseen which is actuated by the closed shutter 51 and prevents the activation of the wash cycle if the shutter has not been closed.

**[0064]** To allow the pre-wash detergent to be taken away the shutter 52 is suitably equipped with openings 59, arranged at the dispenser of the container 47 when the shutter 52 is in closed position, so as to allow the entry of the washing liquid with the activation of the machine's cycle. It is also possible to foresee a window 60, for the entry of liquid, in the wall of the container 47.

**[0065]** It is clear, while the basic concept of the use of

two distinct openings for loading and dispensing detergent remains unchanged, that the characteristics of the two embodiments described can be combined in various ways.

**[0066]** For example, as illustrated in the section view of figure 9, to close the opening for loading the container 61 with washing detergent (and the corresponding container with pre-wash detergent, if foreseen) one can use a hinged lid 62, like that of the embodiment described with reference to figures 3, 4, 5 and to close the dispensing opening one can adopt a sliding shutter 63, the same as that of the embodiment of figure 6, from which it differs, in the presented alternative, only because it is arranged in a vertical plane.

**[0067]** The useful space 64 for the electromechanical actuation devices is formed under the container 61, which is suitably funnel-shaped.

**[0068]** Totally similar is the variant represented in figure 10, with the only difference that the dispensing shutter 65 is substantially parallel to the inner face of the upper side of the frame and the useful space 66 for the actuation devices is formed between the detergent container 67 and the front panel.

**[0069]** Up to now different embodiments have been considered in which the loading opening opens outside of the washing chamber.

**[0070]** There is nothing to stop the loading opening, still exhibited on the upper face of the frame, from being foreseen inside the washing chamber or exhibited partially both inside and outside.

**[0071]** The section of figure 12, similar to that of figure 10, shows an embodiment wherein the loading opening opens inside the washing chamber and is closed by a lid 68, hinged about an axis 69. A spring which is not illustrated tightens to open the lid, with a rotation represented by the arrow 70. Also in this case the lid 68 is preferably closed automatically, with the closing of the door, by interference with the sealing gasket 32 and with the relative support 72.

**[0072]** The dispenser opening's shutter is identical to that of figures 6, 7, 8 and does not require explanations.

**[0073]** The section view of figure 11 shows a variant which can be considered the combination of the versions represented in figure 10 and figure 12. In this case the loading opening partially opens on the inside and partially on the outside of the washing chamber, relative to the sealing gasket 32, and is closed by a lid 75 which is hinged about an axis 76 and arranged automatically in closed position by interference with the sealing gasket 32, which forms a seal with said lid.

**[0074]** For the extraction of the pre-wash detergent from the relative compartment, if foreseen, the lid 75 can have an opening which faces a water jet nozzle 74.

**[0075]** Apart from sliding curtain shutters it is possible to use flat shutters with a diaphragm which rotates about an axis perpendicular to the plane of the shutter.

**[0076]** Figures 13, 14 represent a solution of this type in perspective view and figure 15 represents it in section

view.

**[0077]** With reference to figure 13 which represents a portion of the door, in open position, the opening for loading the compartment 77, for the washing detergent, is closed by a sliding shutter 78, represented in open position. The loading opening opens inside the sealing gasket which abuts onto the frame of the door, along the broken line 79.

**[0078]** The opening for loading the compartment 80 for pre-wash detergent, also open inside the gasket, is never closed by the shutter 78, to allow the detergent to be carried away right from the start of the machine's cycle, due to sprays or preferably due to a water jet nozzle positioned on the loading opening.

**[0079]** For the dispensing of the pre-wash detergent the compartment 80 is equipped with dispenser openings 81, which are permanently open.

**[0080]** The dispenser opening 83 (fig. 14) of the compartment 77, for example, but not necessarily, shaped like the segment of a circle, is closed by a flat shutter which rotates on a pin 84, perpendicular to the plane of the shutter.

**[0081]** The shutter 82 is pulled open by a non-illustrated spring and is kept closed by a pawl 85 which engages in a step 86 on the outer edge of the shutter.

**[0082]** Advantageously, the shutter 82 is also equipped with an arm or appendage 88 which forms, with a tab 87, integral with the sliding shutter 78, a device for interlocking through interference: if, due to the user being distracted, the sliding shutter 78 is not closed, the interference of the tab 87 with the appendage 88 prevents the opening of the shutter 82, even if the pawl is dislocated from the step 86 by the intervention of the control devices (electromagnets 89 in fig. 6 and the relative linkages).

**[0083]** It is only with the closing of the shutter 78, as represented in figure 14, that the shutter 82 can rotate on the pin 84 and arrange itself in open position.

**[0084]** The interlocking device has also the advantageous function of causing the closure and the displacement of the shutter 82 upon the simple actuation of the sliding shutter 78 in open position.

**[0085]** From figure 14, which represents the shutter 78 in closed position and the shutter 82 in open position, it is noted that the opening operation, carried out manually on the shutter 78, for loading the detergent, causes, by interference of the tab 87 with the appendage 88, the closure of the shutter 82, making the detergent loading operation extremely simple and ergonomically comfortable.

**[0086]** Clearly, in all of the embodiments and variants described there is, as already indicated, an advantage, not only in terms of ergonomics, but also of greater volume available for the washing chamber, with the same total encumbrance of the dishwasher machine as that of the machines of the prior art.

**[0087]** The greater available volume, formed inside the door, can be used, as illustrated as an example in

the perspective view of figure 18 which replicates figure 2 with the same reference numbers, to house a cutlery basket 90, arranged directly below the upper side of the frame, fixed or removably hooked in the recess 19 of the counterdoor.

[0088] It is also clear that the arrangement or removal of the cutlery, or of the entire basket, with the door only partially open, is particularly convenient.

[0089] Alternatively, it is possible to foresee a basket of the same type removably hooked to or integral with the upper rack arranged in the washing chamber (normally dishwasher machines foresee one upper and one lower rack) or even an upper rack of greater depth partially housed in the recess 19.

[0090] It is clear that the different embodying solutions described are susceptible to many variants, covered by the base concept of using detergent reservoirs with distinct openings for loading and dispensing.

[0091] For example, figures 19, 20, 21 represent a possible variant of the embodying solution described with reference to figures 6, 7, 8.

[0092] In figure 19 a single shutter 89, which slides on rails 90, 91 and is pulled into open position by a non-illustrated spring (in the same way as that described with reference to figures 6, 7, 8) simultaneously closes the loading opening 92 and the dispenser opening 93 of the compartment for the washing detergent.

[0093] This condition of the shutter is represented in figure 21. Clearly the two openings are both arranged (with respect to the abutment 94 of the door against the sealing gasket) inside the washing chamber.

[0094] The opening for loading the compartment for the pre-wash detergent is permanently open inside the washing chamber.

[0095] The dispenser of the compartment for the pre-wash detergent consists of suitable slits 95 which hold the detergent granules or powder but allows its removal when sprayed with a water jet through the slits themselves or the loading opening.

[0096] When the shutter 89 is in open position, as represented in figure 20, a tab 96 with slits 97 closes the dispenser opening of the compartment for the washing detergent and allows both the dry loading (in tablets, granules or powder) and the dispensing of the sprayed detergent through the slits 97 and/or the loading opening.

[0097] The shutter 89, when the loading is completed, is translated manually and is kept closed by the hooking of a pawl 98 (fig. 21).

[0098] Clearly, when the shutter 89 is in closed position the slits 97 face the slits 95 to allow the dispensing of the pre-wash detergent by sprays whereas the compartment for the washing detergent is completely closed and protected from the sprays.

[0099] Figures 22, 23, 24 represent a slight variant of the embodiment just described.

[0100] In this variant the two compartments for the washing and pre-wash detergent are not adjacent, but

conveniently spaced: the actuation devices can be housed in the space between them.

[0101] Moreover, the shutter, similar to that of figures 19, 20, 21, can take up three stable positions.

5 [0102] In rest state, as represented in figure 22, the loading opening 92 and dispensing opening 93 for the washing detergent are completely open.

[0103] For the loading of the detergent the user partially displaces the shutter in order to engage the pawl 98 in a suitable notch 99 in the shutter (fig. 23).

10 [0104] In this condition the dispensing opening 93 is closed, whereas the loading opening 92 remains open.

[0105] The loading opening for the pre-wash detergent is also open.

15 [0106] With the loading operation completed, the shutter 89 is fully displaced (fig. 24), in such a way closing the loading opening 92.

[0107] The extraction of the pre-wash detergent takes place as in the previous case.

20 [0108] The actuation of the pawl 98 at the start of the washing step unlocks the shutter 89 which moves back into rest position (fig. 22).

25 [0109] The inertia of the pawl, suitably shaped if necessary, in relation to the translation speed of the shutter, prevents the shutter from becoming locked in an intermediate position.

## Claims

- 30 1. Dishwasher machine of the domestic type with a front door which is hinged at the bottom and which comprises a counterdoor panel shaped to form a recess (19) surrounded by a frame for coupling with a sealing gasket (32) of the washing chamber, **characterised in that** a detergent measurer/dispenser device, consisting of a reservoir (26) for liquid additives and at least one compartment (28) for containing detergent, is housed in the volume of the upper side (25) of the frame, and **in that** said compartment (28) is equipped with a first loading opening, open on the upper face of the frame, which is accessible with a slight opening of the door and is closed by a first lid (42) that can be opened, and also equipped with a second detergent dispensing opening, which opens onto the inside of the washing chamber and is closed by a shutter (35) which is made to open during the course of a machine cycle.
- 35 2. Dishwasher machine according to claim 1 wherein said recess extends between the upper side and the lower side of the frame substantially for the whole height of the door.
- 40 3. Dishwasher machine according to claim 1 or 2 wherein said reservoir for liquid additives is equipped with a removable refill cap (30) on the upper face of said frame.
- 45 50 55

4. Dishwasher machine according to claim 1, 2 or 3 wherein said lid (42) is hinged, pulled open by elastic pulling means, automatically opened by said pulling means when said door opens and automatically closed when said door closes. 5
5. Dishwasher machine according to claim 1, 2 or 3 wherein said lid is a sliding shutter (51) capable of sliding along the plane of the upper face of the frame. 10
6. Dishwasher machine according to claim 1, 2, 3, 4 or 5 wherein said shutter (35) is hinged, pulled open by elastic pulling means and locked closed by a stop key (36), which can be actuated by control devices to open the shutter during the course of a machine cycle. 15
7. Dishwasher machine according to claim 1, 2, 3, 4 or 5 wherein said shutter is a sliding shutter (52, 63, 65, 73). 20
8. Machine according to claim 1, 2 or 3 wherein said shutter is a rotating diaphragm shutter (82). 25
9. Dishwasher machine according to claim 1, 2 or 3 wherein said lid and said shutter constitute a unitary sliding shutter element (89).
10. Dishwasher machine according to claim 9 wherein said unitary shutter element takes up three stable positions, these being: washing detergent dispenser open, washing detergent dispenser opening alone closed, and washing detergent loading and discharge openings closed simultaneously, in order to protect them against the sprays. 30 35
11. Machine according to claim 8, when dependent upon claim 5, comprising interlocking devices (87, 88) of said lid and said shutter to allow the opening of said shutter only when the lid is closed and to cause the reclosing of said shutter with the opening of said lid. 40
12. Machine according to any of the previous claims comprising at least one basket (90) housed in said recess near to the upper side of said frame. 45
13. Machine according to claim 12 wherein said basket is removably hooked to or is integral with an upper rack of said machine. 50
14. Machine according to any of the claims from 1 to 11 comprising an upper rack with greater depth, partially housed in said recess near to the upper side of said frame. 55



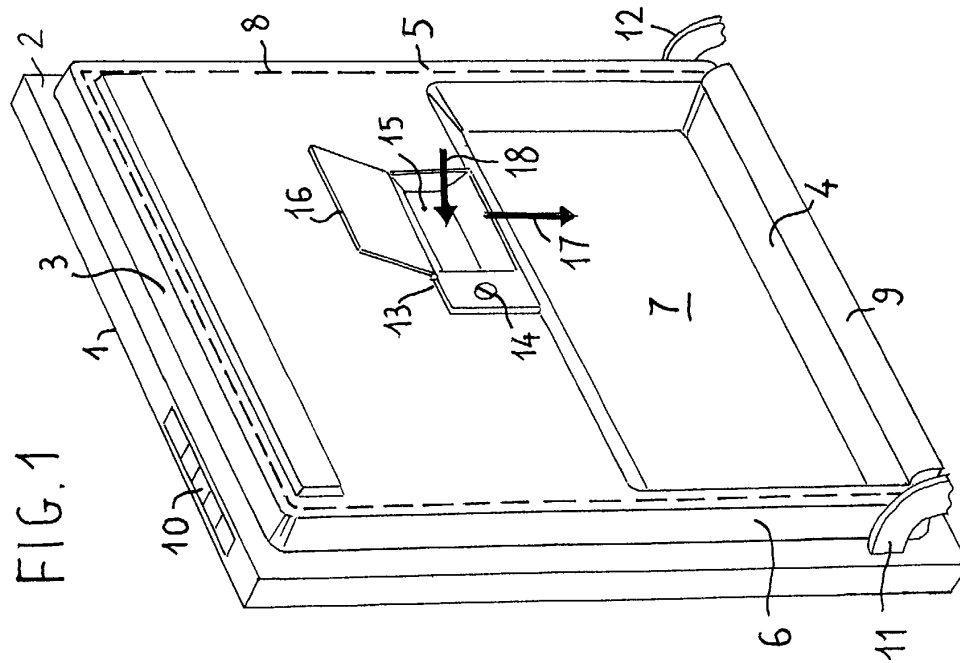
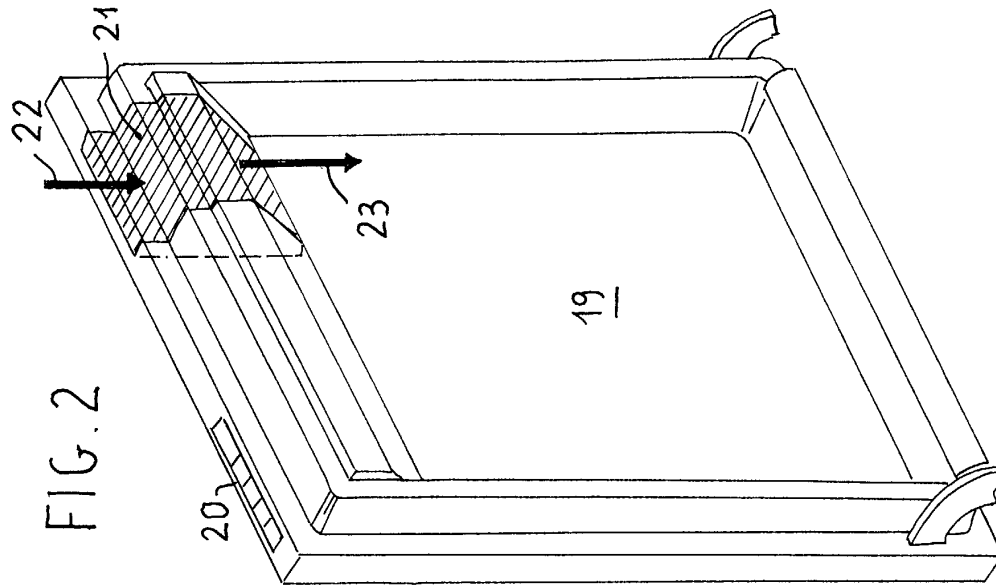


FIG. 3

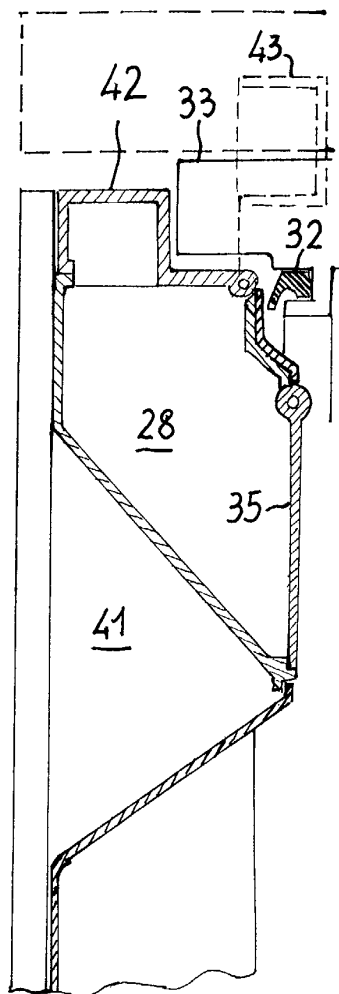
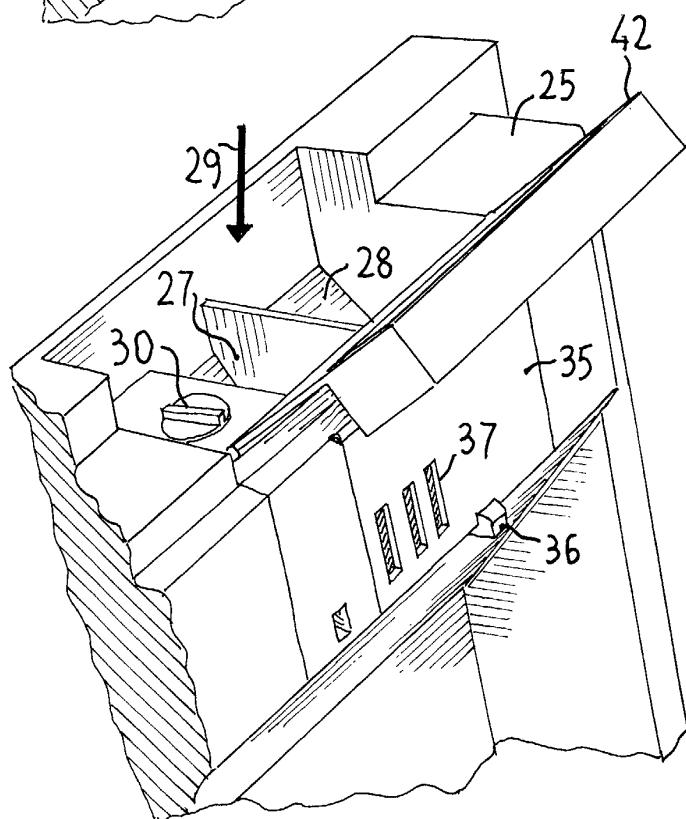
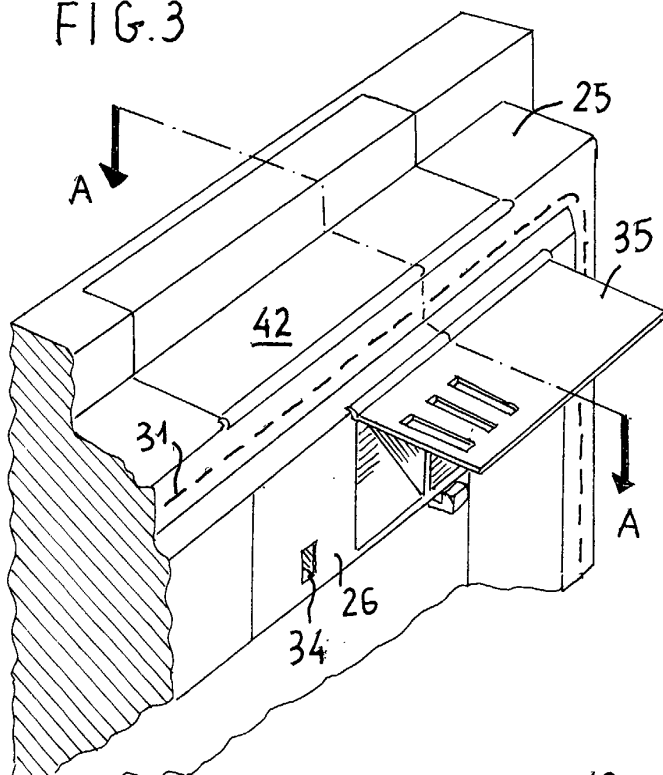


FIG. 4

FIG. 5

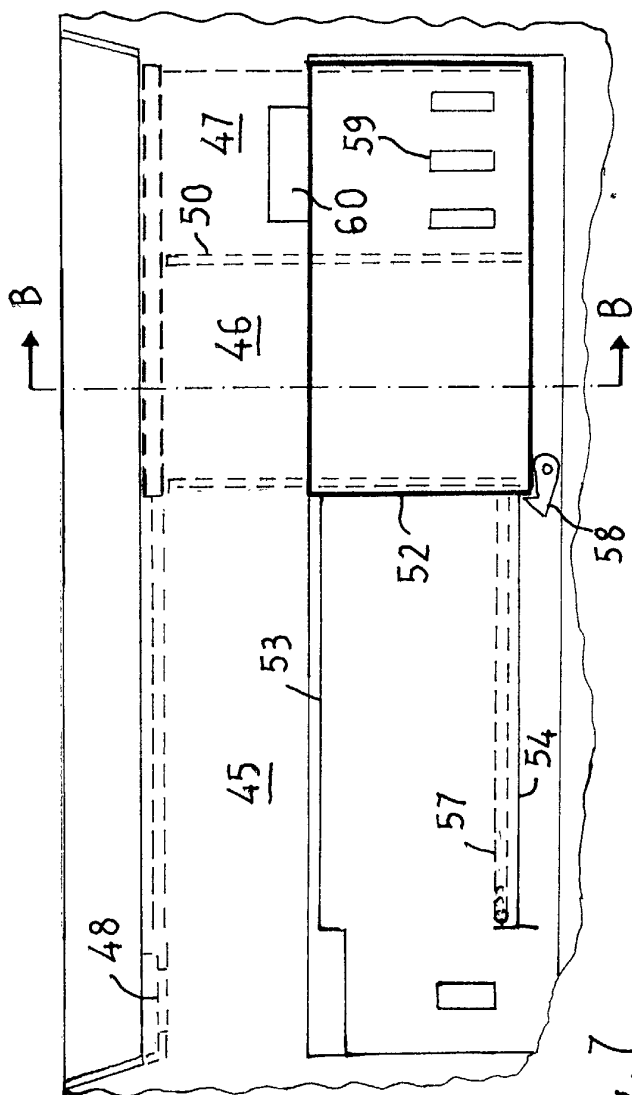


FIG. 7

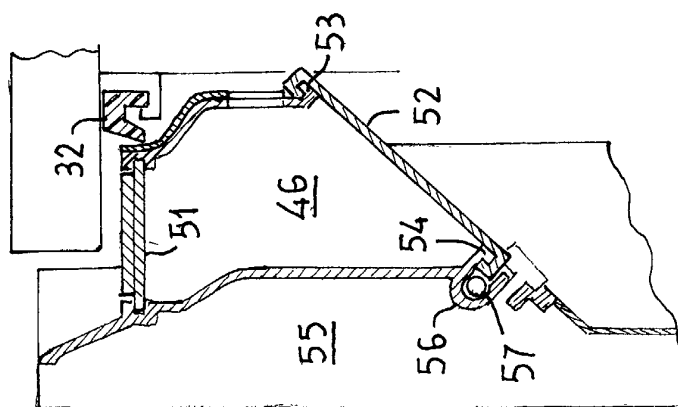


FIG. 6

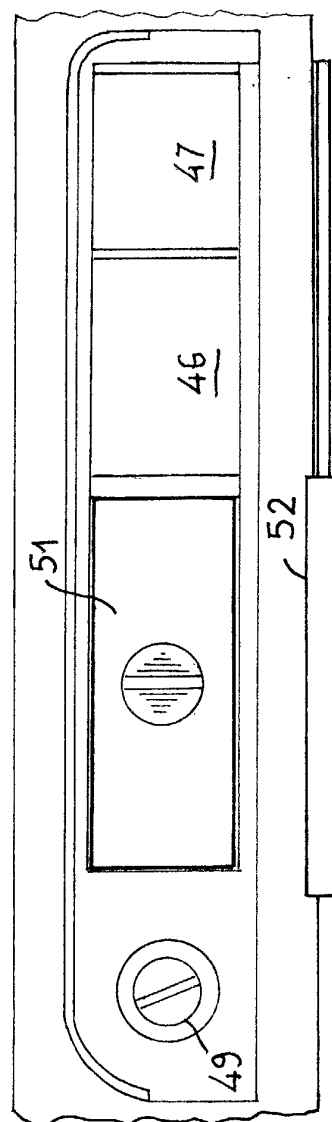


FIG. 8

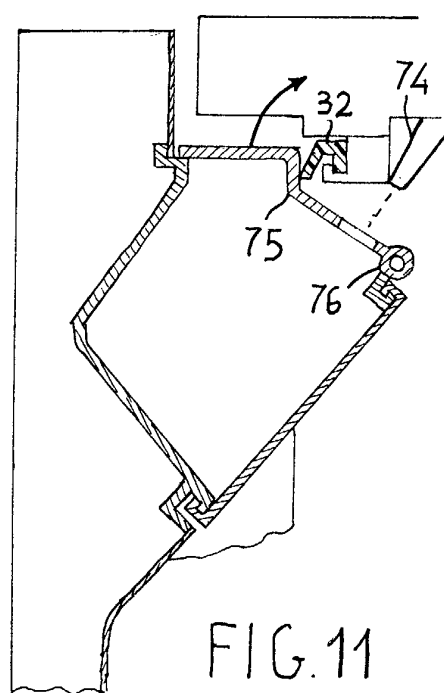
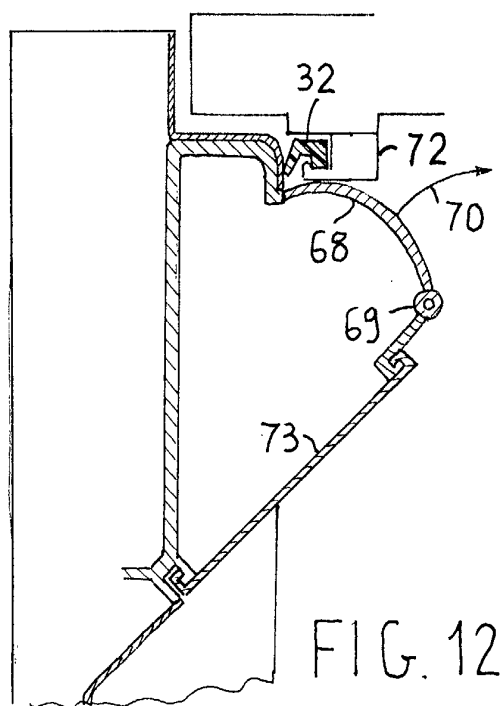
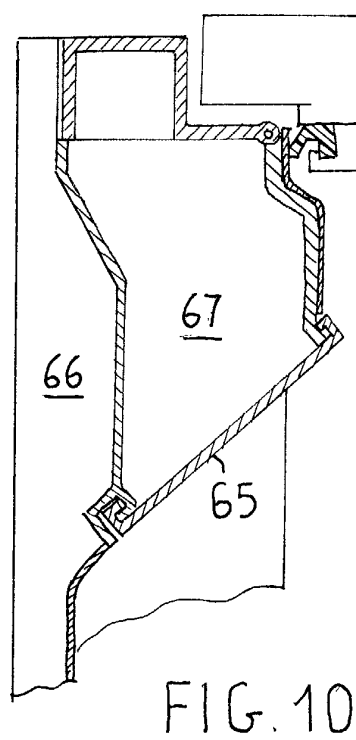
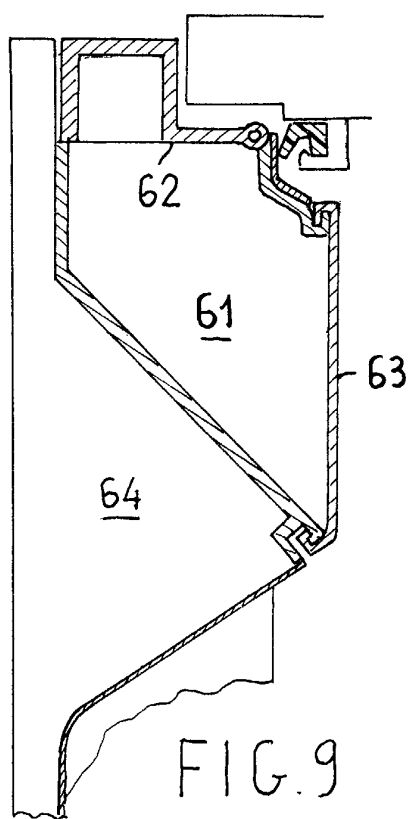


FIG. 13

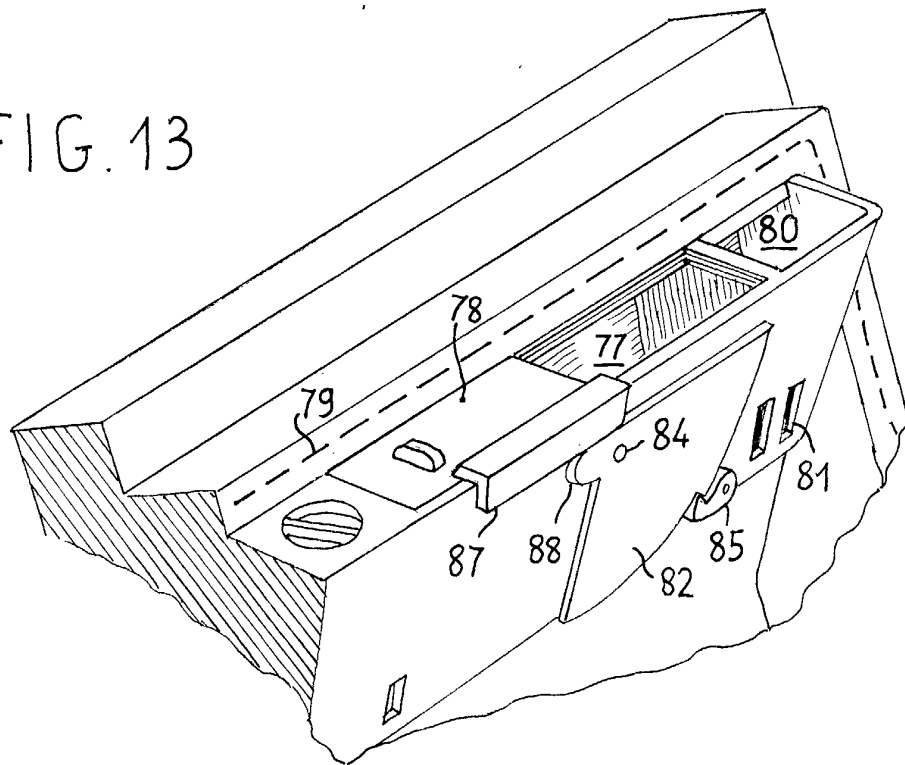


FIG. 14

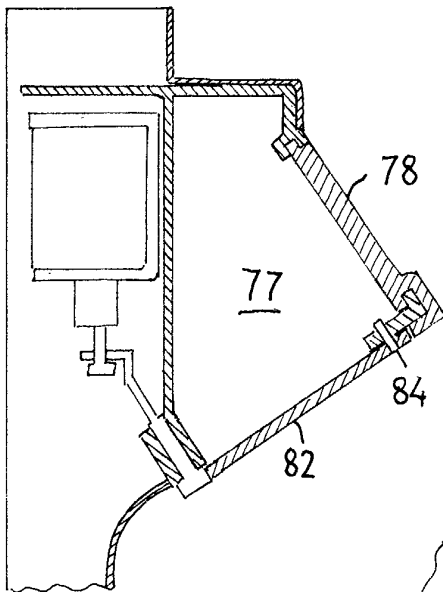
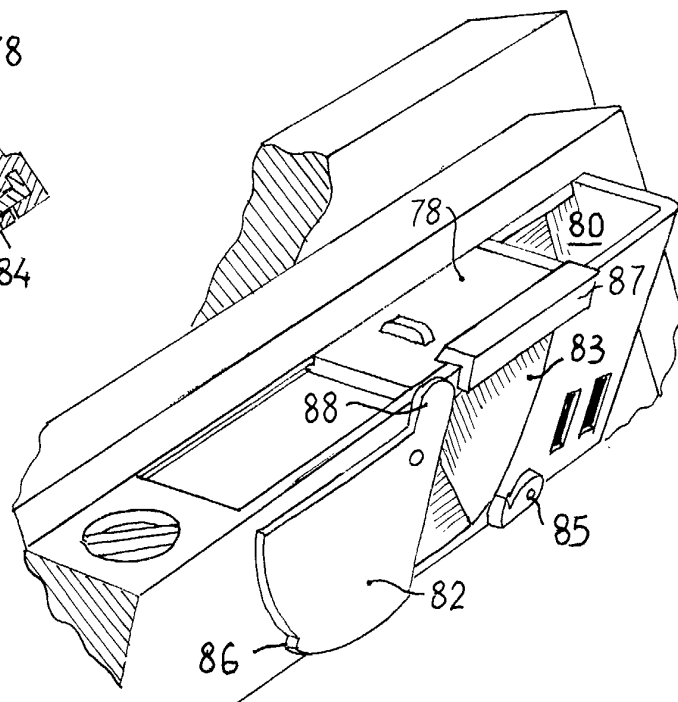


FIG. 15

FIG. 16

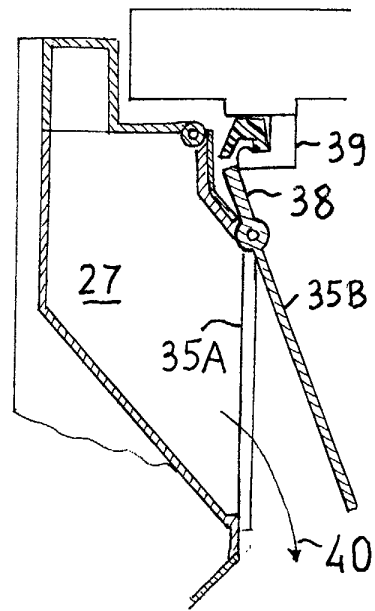
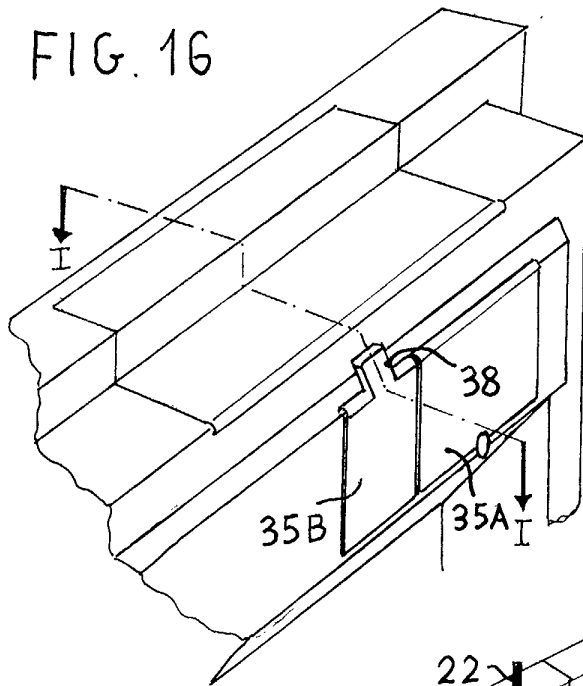


FIG. 17

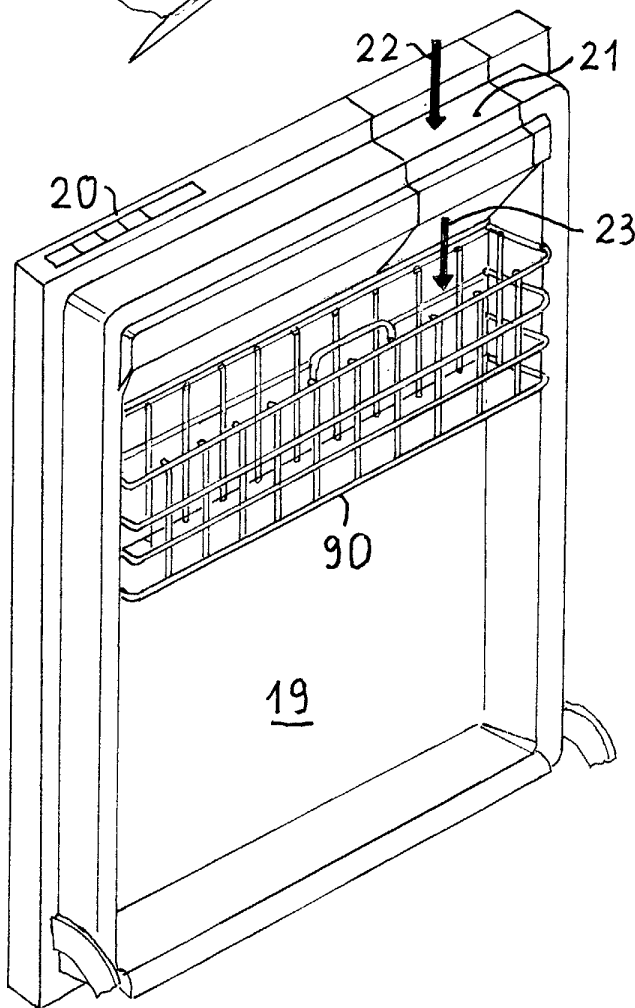


FIG. 18

FIG. 19

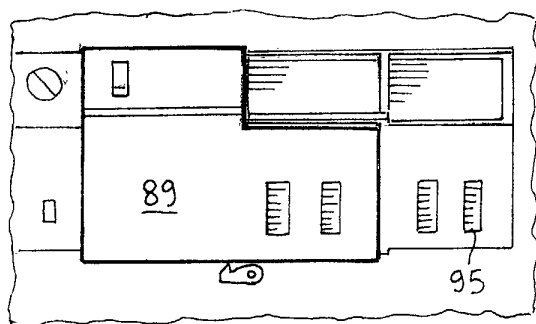
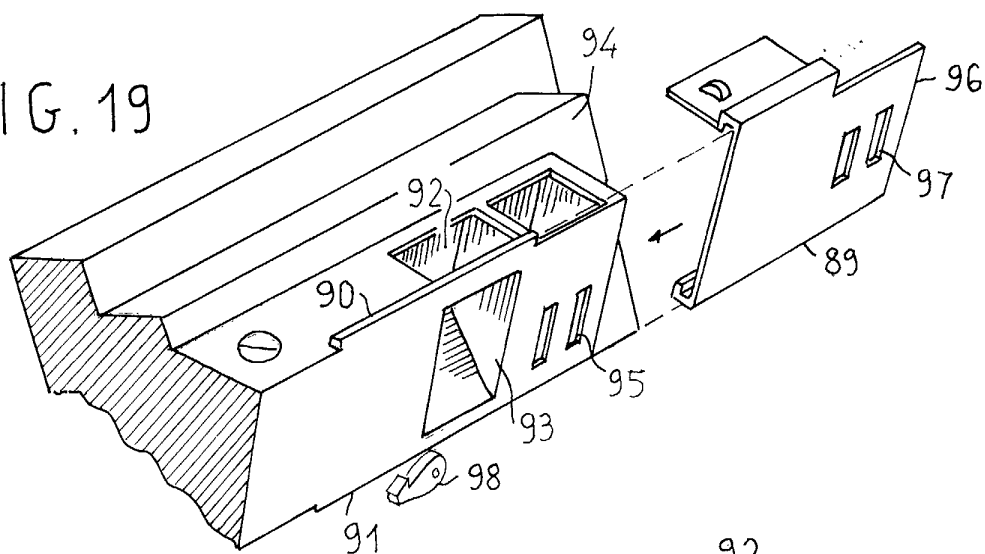


FIG. 20

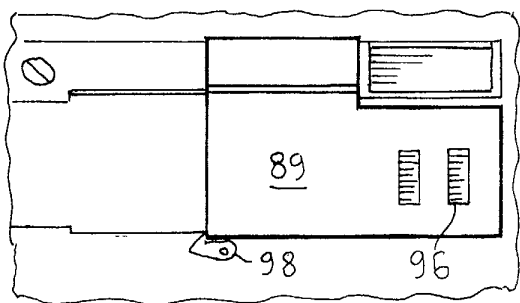


FIG. 21

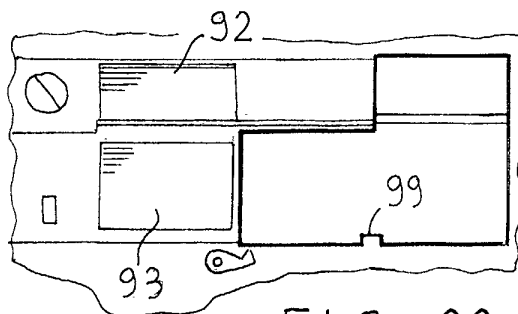


FIG. 22

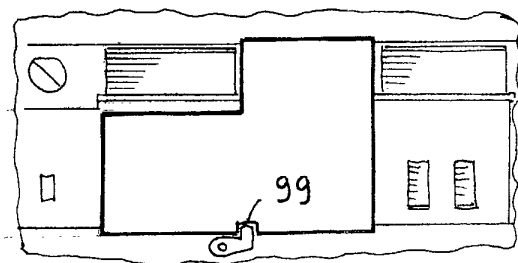


FIG. 23

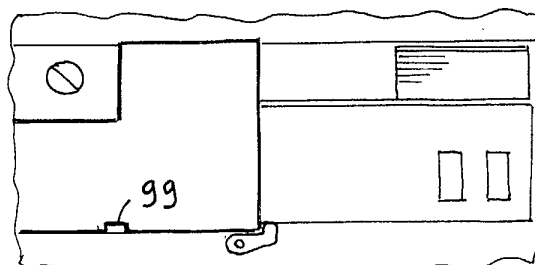


FIG. 24



European Patent  
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# EUROPEAN SEARCH REPORT

Application Number  
EP 01 83 0512

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The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>15 January 2002</b>	Examiner <b>Norman, P</b>
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	

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