



(19)

Europäisches Patentamt

European Patent Office

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(11)

EP 0 858 768 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
19.08.1998 Bulletin 1998/34

(51) Int. Cl.⁶: **A47L 15/42, A47L 15/44,
A47L 15/46**

(21) Application number: **98100268.6**

(22) Date of filing: **09.01.1998**

(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: **11.02.1997 IT PN970008**

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(54) Household dishwashing machine

(57) The outer casing of the dishwashing machine has two side walls (2) and houses a washing vessel (4) that is adapted to be closed by a door (6) provided with wash and rinse aid dispensing means (14) and comprising, on the upper portion thereof, a control panel (8) housing the various switching and control elements (9). The washing vessel has a top wall (10) whose front edge (11) has a recess (12) with respect to the front edge (13) of the side walls (2), said recess being adapted to accommodate a corresponding portion of the control panel (8), which protrudes towards the interior of the washing vessel, when the door (6) is closed.

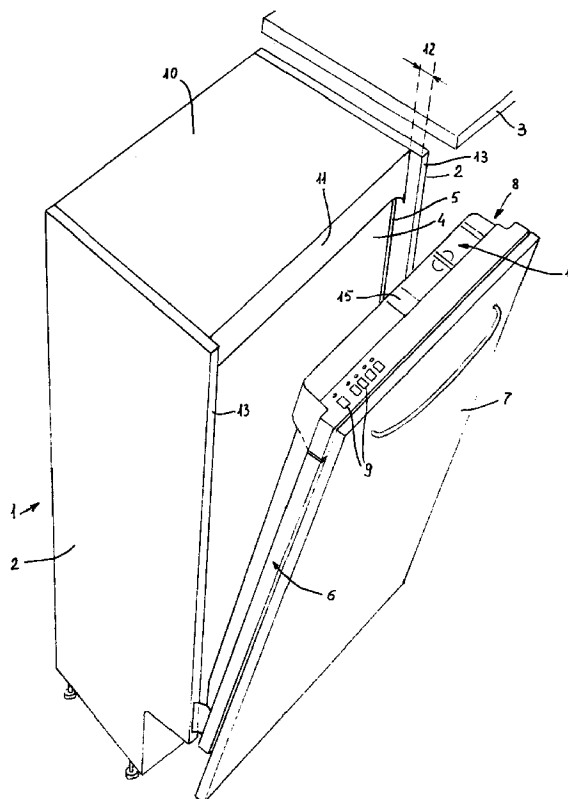


Fig. 1

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Description

The present invention refers to a household dishwashing machine with front loading door.

Household dishwashing machine are largely known to be provided with substantially standardized overall dimensions, ie. with a width that generally amounts to either approx. 60 cm or approx. 45 cm, and a height that generally amounts to either approx. 90 cm or approx. 85 cm.

In any case, household dishwashing machines comprise an outer casing accomodating a washing vessel made of metal and/or plastics in its interior, said vessel being open frontally and being further arranged to be closed, through the interposition of a sealing gasket, by means of a door that is hinged on its lower side on to a horizontal axis, such as this is for instance described in GB-B-2 166 790 and the Italian utility model no. 221 380, the latter concerning in particular a dishwashing machine of the type for built-in installation.

The loading door has a hollow construction and usually accomodates, further to the various control and regulation means, dispensing means for the wash and rinse agents and aids, with the related wiring harnesses, which are accessible through respective apertures that are appropriately provided in an intermediate portion on the internal surface of the door, such as this is for instance described in US-A-5 330 102. According to these solutions, however, such wash and rinse aid dispensers are practically poorly and inconveniently accessible by the user, while both manufacturing and assembly of the whole machine turn out to be undesirably complicated.

In view of reducing the drawback of such a poor accessibility of said wash and rinse aid dispensers, ie. of making it more convenient for said dispensers to be accessed by the user, a solution has been proposed calling for said dispensers to be housed below the control and regulation means in an upper portion of the door, duly enlarged and protruding towards the interior of the washing vessel. In this case, however, the need quite obviously arises for greater space requirements by said enlarged portion, due to an increased depth dimension (and possibly also height dimension) thereof, to be duly coped with, thereby reducing the useful space actually available in the interior of the washing vessel. This in turn undesirably reduces the load capacity of the machine.

A solution has also been proposed, such as this is described for instance in EP-A-0 671 143, which calls for the control organs and the aid dispensers to be included in the outer cabinet of the machine, in a front position thereof comprised between the washing vessel and the worktop of the machine. According to this solution, in particular, the wash and rinse aid dispensers are of the pull-out drawer type.

On the other hand, since the worktop of a dishwashing machine usually protrudes frontally by a few

centimeters, it substantially covers said drawer-like dispensers, even when the latter are in their pulled-out position, thereby making them inconveniently or even poorly visible and accessible by the user. The same considerations of course apply to the control organs.

Therefore, the present invention in particular refers to a household dishwashing machine of the preferred type, in which the upper portion of the loading door is substantially constituted by a box-like control panel structure housing at least the main control and regulation organs of the machine, such as this is described for instance in the above cited Italian utility model no. 221 380.

It is a main purpose of the present invention to provide a household dishwashing machine having a simple, easily assemblable structure, in which at least the main control and regulation organs, along with the wash and rinse aid dispensers, are easily and conveniently accessible by the user.

It is a further purpose of the present invention to provide a dishwashing machine of the above cited kind, in which at least the main control and regulation organs, as well as the wash and rinse aid dispensers, are grouped in a conveniently accessible position on the front loading door, without this contributing to substantially decrease the load capacity of the machine.

According to the present invention, these and further aims are reached in a household dishwashing machine having the features and characteristics as recited in the appended claims.

The invention is particularly suitable for application in a dishwashing machine having a height dimension of approx. 90 cm. However, it similarly applies also to dishwashing machines having a different height.

Anyway, the invention will be more readily and clearly understood from the description that is given below by way of non-limiting example with reference to the accompanying drawings, in which

- Figure 1 is a schematical, perspective view of a preferred embodiment of the dishwashing machine with the loading door thereof partially opened, wherein the worktop of the machine is shown in a disassembled, ie. removed position for reasons of greater clarity;

- Figures 2 through to 4 are schematical views of respective variants of the dishwashing machine embodiment shown in Figure 1;

- Figure 5 is a schematical, enlarged-section view of the upper front portion of the dishwashing machine shown in Figure 1, with the loading door closed.

With particular reference to Figures 1 and 5, the dishwashing machine according to the present invention can be noticed to mainly include an outer casing 1 provided with two opposite side walls 2, and provided as

well with a frontally protruding worktop 3 on top thereof.

Said outer casing 1 houses a substantially parallel-epiped-shaped washing vessel 4 having the front side thereof open and capable of being closed, through the interposition of a sealing gasket 5, by means of a door 6 which is hinged on its lower side on to the outer cabinet about a horizontal axis. In the example described below, the dishwashing machine is of the so-called "built-in" type, with the outer surface of the door 6 entirely covered by a decorative panel 7

In a per se known manner, the door 6 comprises on its upper side a substantially box-shaped control panel structure 8, which is preferably made of plastics and houses at least the main control and regulation organs of the machine. Such organs are generally indicated at 9, comprise preferably push-button type devices and are accessible, when the door 9 is opened, in correspondence of the top surface of said box-shaped control panel structure 8. When the door 6 is closed, said organs 9 are on the contrary concealed by the protruding worktop 3.

The washing vessel 4 has a substantially plane top wall 10, the front edge 11 of which is made to include at least a recess (indicated at 12) with respect to the front edge 13 of the side walls 2. In a preferred manner, said recess 12 extends full-width between said side walls 2, and the wall 10 has a substantial thickness (of some centimeters, for instance) enabling some contrivances to be implemented, as described in greater detail further on.

In the section comprised between the side walls 2, the box-shaped control panel structure 8 is protruding towards the interior of the washing vessel 4, wherein the recess 12 of the top wall 10 is adapted to accommodate a corresponding upper portion of said control panel when the door 6 is closed. This makes it possible for the control panel structure 8 to be given a particularly large, ie. largest than normal useful volume, without any need arising for the inner volume of the washing vessel 4 to undergo any corresponding reduction. In fact, as it clearly emerges from the illustration in Figure 5, when the loading door 6 is closed the upper portion of said control panel 8 is situated above the upper inner surface of the washing vessel and is partially accommodated in the recess 12 of the top wall 10. According to the invention, therefore, for a same internal size as in the case of a dishwashing machine with a traditional control panel construction, the control panel structure 8 can be given an additional volume delimited by: side walls 2, thickness of the top wall 10, and depth of the recess 12. In other words, said additional volume is equal to the volume of the recess 12.

According to a feature of the present invention, appropriate advantage can be taken of the above cited additional volume by using said control panel structure 8 to also house wash and/or rinse aid dispensing means therein, said dispensing means, which can be of any appropriate type for the intended application

and purpose, being generally indicated at 14 in the Figures. In a preferred manner, said dispensing means 14 are of the type provided with filling lids on top, which are therefore readily and conveniently accessible to the user as soon as the door 6 is opened as shown in Figure 1.

In a preferred manner, furthermore, the control panel structure 8 is capable of accommodating also a locking and releasing mechanism for the door 6, which is generally indicated at 15 in the Figures and may for instance be of the type described in GB-B-2 238 576.

In any case, all of the above cited operational component parts of the machine are advantageously grouped in the control panel structure 8, which may be pre-assembled and tested separately.

As this has already been stated earlier in this description, the top wall 10 of the washing vessel may have a substantial thickness and may at least partly be made of plastics. As a result, said wall 10 may be made to include at least a recess and/or cavity adapted to substantially accommodate further operational component parts of the machine.

For instance, the lower surface of the wall 10 may include a recess 16 in which at least an auxiliary rotating spray arm 17 may be accommodated without it protruding in the interior of the washing vessel 4 to any substantial extent.

Alternatively, or in addition thereto, at least a spray nozzle 18 may be provided in correspondence of the wall 10, said nozzle being then capable of spraying a jet of water towards the interior of the washing vessel and being associated to a respective water supply conduit, the end portion 19 of which extends through the space comprised in the largest overall thickness of the wall 10. In a preferred manner, said spray nozzle 18 and/or said end portion 19 of the water supply conduit is made integrally with the wall 10.

Should the dishwashing machine be provided with a (per se known and, therefore, not shown) drying system of the type comprising at least a condenser for the removal of the steam that develops in the washing vessel 4, said condenser may in an advantageous manner be arranged in said wall 10, in correspondence of a respective recess 20. Said recess 20 may be of a substantially closed type and be made integrally with the wall 10, so as to form the actual steam condenser. In any case, the space available within the largest thickness of the wall 10 is used in an optimum manner.

It will be appreciated that the above described dishwashing machine may be the subject of a number of modifications without departing from the scope of the present invention.

For instance, other operational component parts than the above described ones may be arranged in correspondence of the wall 10. Furthermore, the same dishwashing machine may be of a different type, such as for instance of the so-called free-standing type shown in Figure 2, ie. without the front decorative panel

7. In this case, the control and regulation organs 9 of the machine can be accessible on the front side of the control panel structure 8, which may be provided also with a handle 21 for actuating the locking and releasing mechanism 15 of the door 6.

Alternatively, the dishwashing machine may be of the built-in type shown in Figure 3, in which the outer surface of the door 6 is only partially covered by a decorative panel 7, below the control panel 8. In this case, for a same overall size, the control panel structure 8 may have a still greater depth and, therefore, feature a still greater volume adapted to accommodate the respective component parts, according to the invention.

At least the top wall 10 of the washing vessel 4 may of course be of the traditional type substantially made of thin sheet-metal material, as shown in Figure 4, with a front cross-piece 22 provided for stiffening and support purposes and made for instance of plastic material to a larger thickness than the wall itself. In such a case, the recess 12 is provided on the front edge of said cross-piece 22.

Claims

1. Household dishwashing machine comprising an outer cabinet with two side walls and accommodating a substantially parallelepiped-shaped washing vessel having an open front side capable of being closed by means of a door hinged on to said outer casing and provided with wash and rinse aid dispensing means, said door comprising at the top portion thereof a control panel structure that houses at least the main control and regulation organs of the machine, **characterized in that** said control panel structure (8) also houses said wash and rinse aid dispensing means (14).
2. Household dishwashing machine according to claim 1, **characterized in that** the washing vessel (4) has a top wall (10), the front edge (11) of which is made to include at least a recess (12) with respect to the front edge (13) of said side walls (2), said recess being adapted to accommodate, when the door (6) is closed, a corresponding upper portion of the control panel structure (8) protruding towards the interior of the washing vessel.
3. Household dishwashing machine according to claim 2, **characterized in that** the top wall (10) of the washing vessel (4) is made to include at least a recess and/or cavity (16; 20) adapted to substantially house further operational component parts (17; 18; 19) of the machine.
4. Household dishwashing machine according to claim 3, **characterized in that** said top wall (10) of the washing vessel (4) comprises on the lower side thereof at least a cavity (16) in which there is arranged at least a rotating spray arm (17).
5. Household dishwashing machine according to claim 3 or 4, **characterized in that** in correspondence of said top wall (10) of the washing vessel (4) there is provided at least a spray nozzle (18) adapted to direct a jet of water towards the interior of the same vessel and associated to a respective water supply conduit, the terminal portion (19) of which extends in the space comprised in the largest overall thickness of said top wall.
6. Household dishwashing machine according to claim 5, **characterized in that** said top wall (10) of the washing vessel (4) is at least partially made of plastics and comprises integrally said terminal portion (19) of the water supply conduit.
7. Household dishwashing machine according to claim 5, **characterized in that** said top wall (10) of the washing vessel (4) is at least partially made of plastics and comprises integrally said spray nozzle (18).
8. Household dishwashing machine according to claim 3, comprising a drying system of the type having at least a steam condenser, **characterized in that** said steam condenser is arranged in said top wall (10) of the washing vessel (4).
9. Household dishwashing machine according to claim 8, **characterized in that** said steam condenser is formed by a substantially closed cavity (20) that is made integrally with said top wall (10).
10. Household dishwashing machine according to claim 2, wherein said top wall of the washing vessel includes a portion having a smaller thickness and at least a front stiffening and support cross-piece having a greater thickness, **characterized in that** said recess (12) adapted to accommodate a corresponding portion of the control panel structure (8) is provided on the front edge of said cross-piece (22).

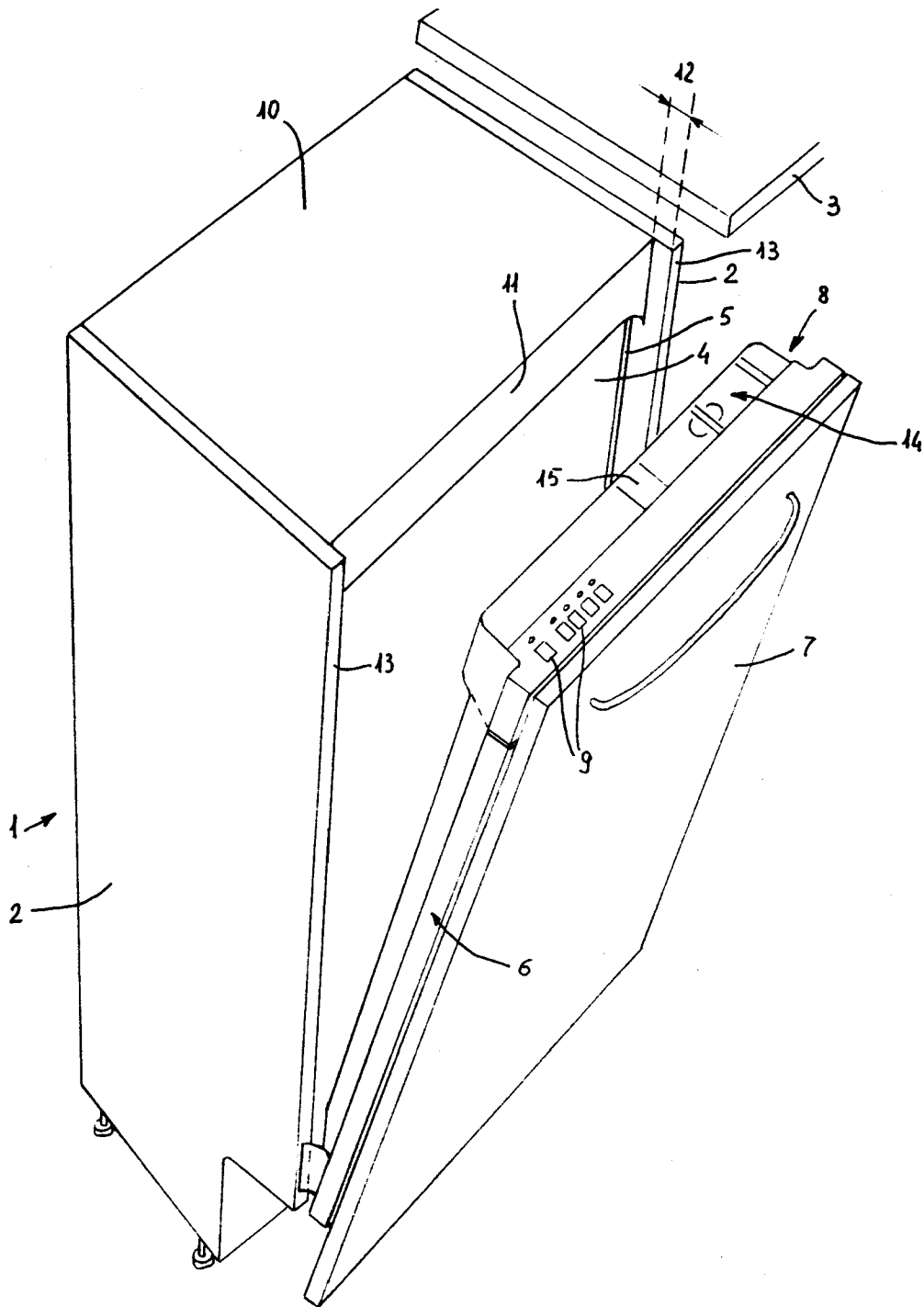
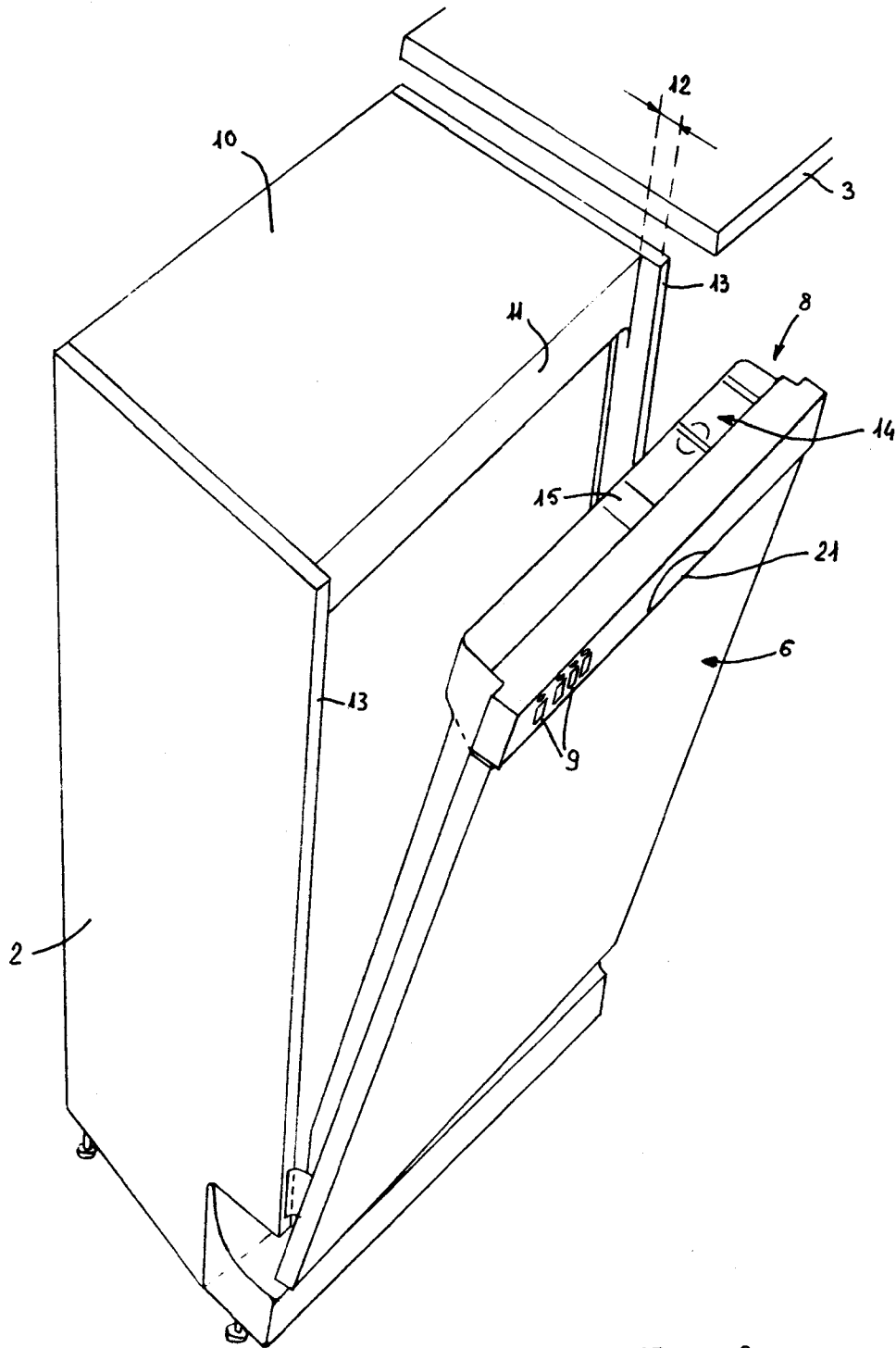


Fig. 1



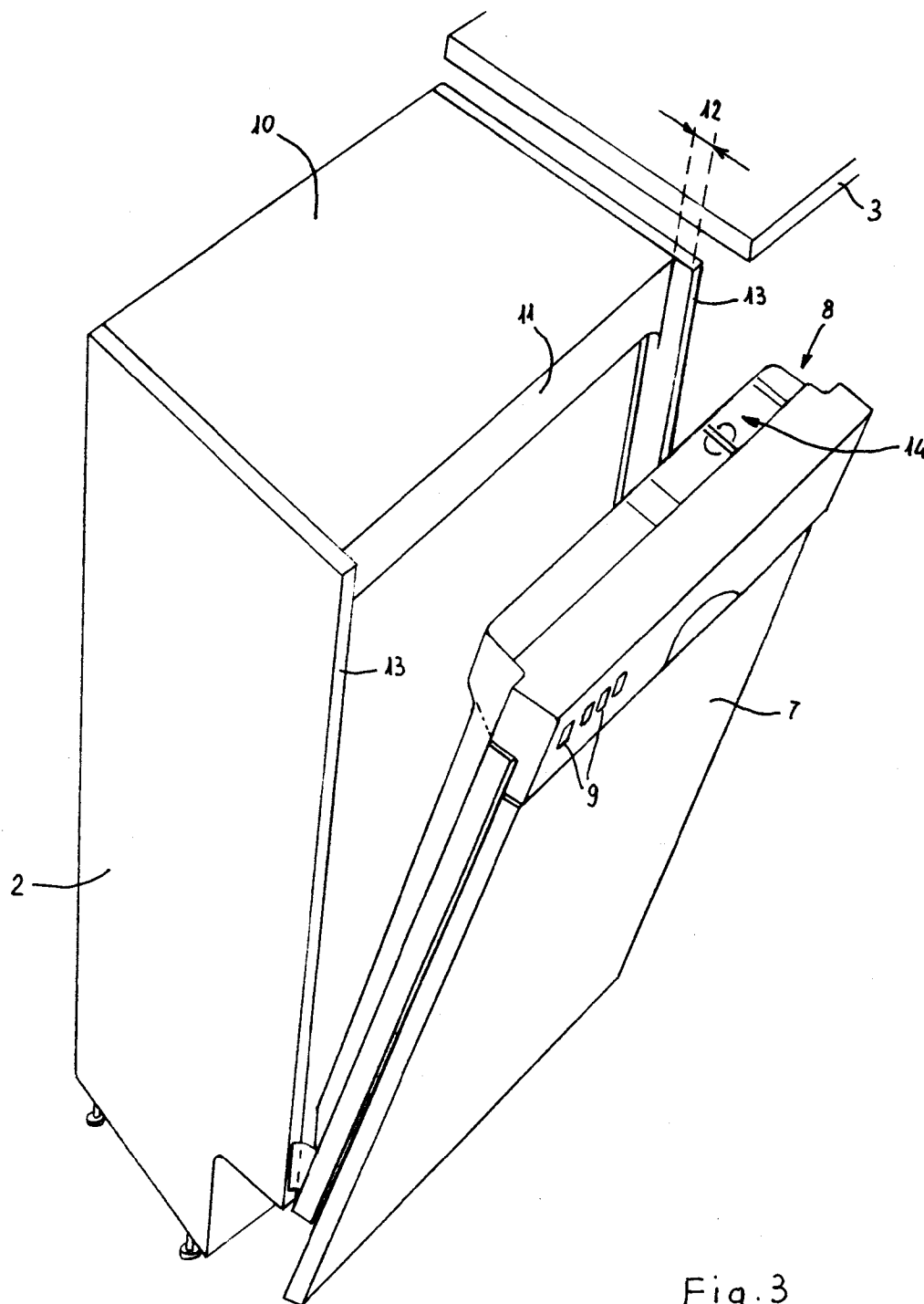


Fig. 3

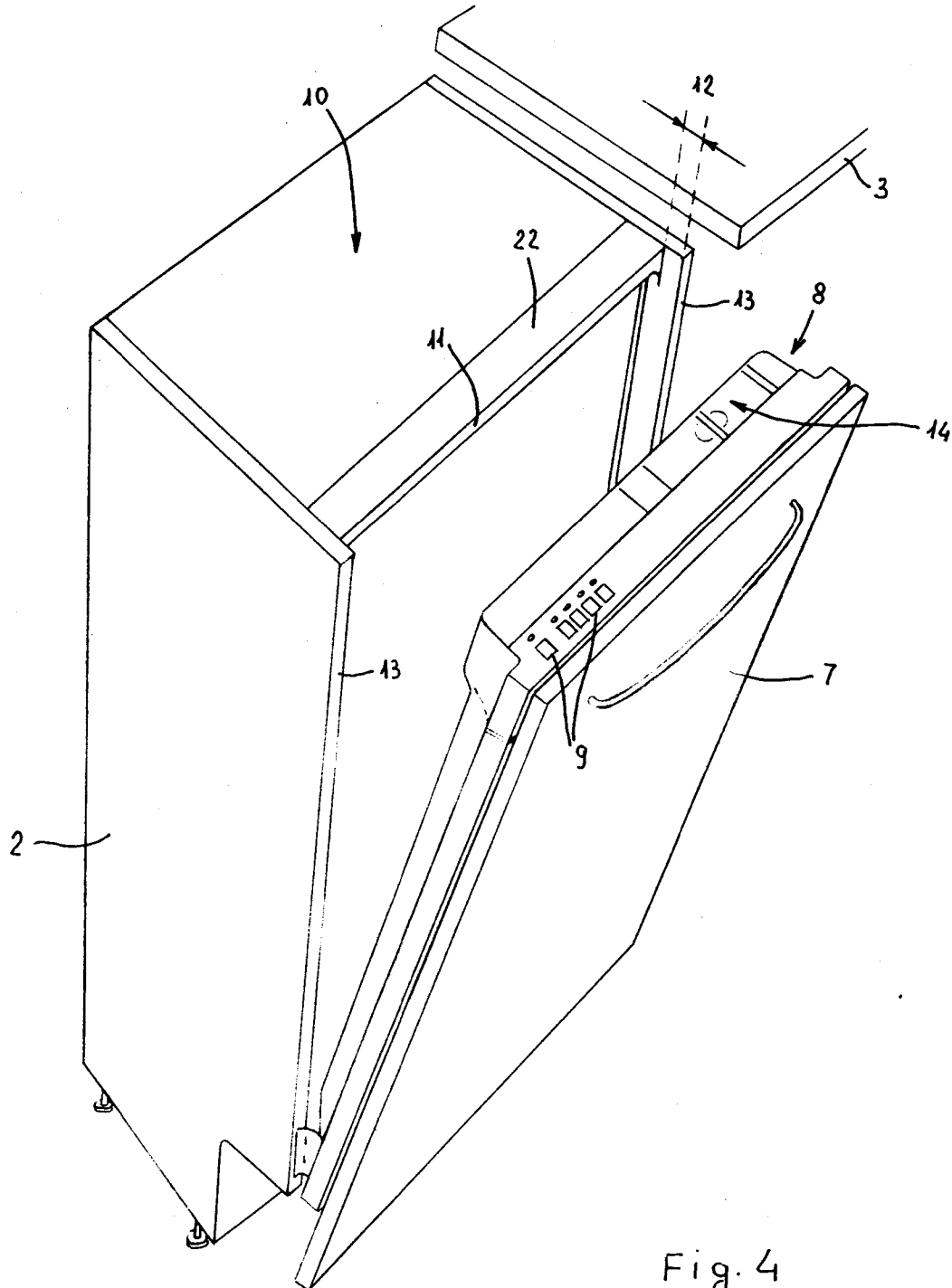


Fig. 4

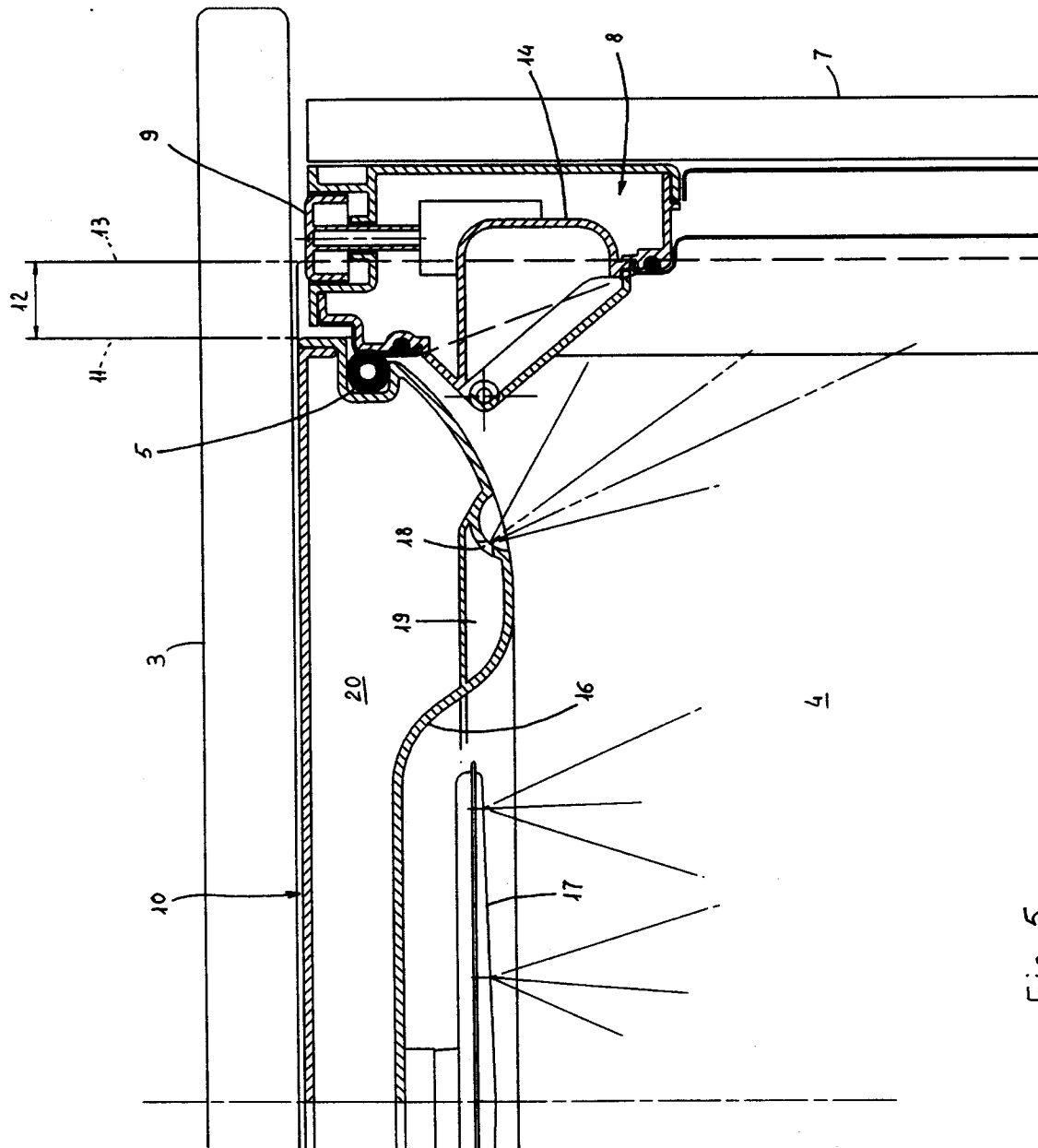


Fig. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 98 10 0268

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)
Y	GB 2 269 002 A (ZANUSSI ELETTRODOMESTICI S.P.A.) * claims; figures * ----	1	A47L15/42 A47L15/44 A47L15/46
Y	FR 2 593 697 A (ELTEK S.P.A.) * page 3, line 9 - line 15; figures 1,2 * ----	1	
A	EP 0 728 437 A (CANDY S.P.A.) * claims; figures * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A47L
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 March 1998	Examiner Courier, G
CATEGORY OF CITED DOCUMENTS		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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