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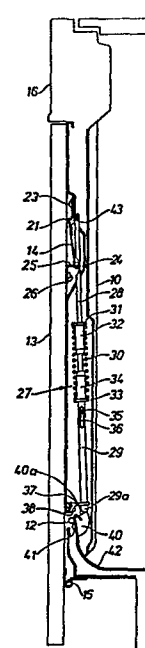
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⑤④ **Device in a door with a decorator plate for a domestic appliance, preferably a dish-washing machine.**

⑤⑦ In a door (10) with a decorator plate (13) for a domestic appliance, preferably a dish-washing machine, the door (10) is pivotally supported at its lower end and provided with a control panel (16) at its upper end. When the door is closed the decorator plate (13) and the panel (16) form an approximately continuous front surface of the door. The decorator plate (13) is pivotally supported in points situated below the support of the door and is linked to the door (10) by link arms (14) disposed at the two sides of the door. The decorator plate (13) is acted upon by spring means (28, 29, 30) to abutment against the door (10) when the door is in closed position or within the area adjacent the closed position. In the other set positions of the door the decorator plate (13) is completely released from the spring means (28, 29, 30).



Device in a door with a decorator plate for a domestic appliance,
preferably a dish-washing machine

This invention relates to a device of the type defined in the preamble of the
appending Claim 1.

The purpose of the decorator plate, which for instance can be a veneered
wooden plate and is joined to the door of a domestic appliance, is to make it
5 possible to adapt the domestic appliance to the interior fittings of the kitchen in
which the appliance is to be placed. Especially in a dish-washing machine the upper
part of the door has a panel for control and indicating means. The panel projects
past the front surface of the door and the intention is that the panel and the
decorator plate should form a uniform front. The gap between the panel and the
10 decorator plate should be small, and the plate extends below the door of the
dish-washing machine to fit to the height of the skirting of the other cabinet
fittings.

Both the door and the decorator plate are pivotally supported at their lower
ends, and at its upper part the plate is linked to the door. The support of the
15 decorator plate is situated below the support of the door so that on opening of the
door the plate would hit the panel if the linked connection would not allow the
plate to move outwards from the door and parallel thereto past the panel.

In order for the decorator plate to associate closely to the door when the
latter is in closed position, various solutions have been proposed. In DE-29 37 384
20 decorator plate and door are connected to each other by a link arm in such a
manner that the arm forces the plate to abutment against the door during its
closing movement. However, this may involve danger for instance for children who
might have a finger or a hand between the door and the decorator plate when the
door is to close. Due to the comparatively large lever arm pressing the decorator
25 plate towards the door the cutting force on the finger or the hand will be great.

DE-GM 8,135,542 presents a solution to the problem by proposing a link arm in the form of a spring-leg in which the compulsory connection between door and decorator plate has been replaced by a resilient connection. Thus, the risk of damage by squeezing is considerably reduced. Here, however, the want for
5 sufficient cohesion force between decorator plate and door is opposed to the demand for avoiding the risk of damage, which limits the allowable cohesion force. Further, the location of the support points of the link arm is such that when the door is closed, the lever arm which together with the cohesion force exerts a torque on the decorator plate is very small which may cause that vibrations
10 generated by the machine make the plate oscillate and clatter against the door. To avoid such vibrations the spring force can be increased, but then also the risk of damage will increase.

The object of the invention is to remove the above drawbacks and to provide a device in which the risk of damage by squeezing is minimized at the same time as
15 a cohesion force is provided which is sufficient to ensure that there will be no undesired noise. Another object of the invention is to provide a connection between decorator plate and door which allows the plate to be readily removed from the door for cleaning. These objects are achieved in a device having the characteristics defined in the appending claims.

20 The invention will now be described by way of example in connection with an embodiment referred to in the accompanying drawings.

Figs. 1 - 3 show schematically a door of a dish-washing machine with decorator plate with the door set in different positions. Fig. 4 illustrates in what way the plate can be removed from the door. Fig. 5 is a side view of a door of a
25 dish-washing machine and illustrates the invention more in detail. Fig. 6, finally, is a front view of a part of the door of Fig. 5 with the decorator plate removed.

Fig. 1 shows a door 10 of a dish-washing machine 11, not shown in detail. At its lower end the door is supported for pivoting about a shaft 12. A decorator plate 13 of solid wood, veneered particle board or the like, is attached to the door
30 by link arms 14 disposed at the two side edges of the plate. At its lower end the plate 13 is supported in points forming a pivot axis 15 parallel to the shaft 12. The pivot axis is situated generally straight below the shaft 12. The door has a control panel 16 which projects past the front surface of the door. When the door is closed the decorator plate 13 forms a uniform front with the panel.

35 When the door 10 is opened the decorator plate 13 will move from the door and downwards and forwards so that its upper edge is moved past the lower edge 17 of the panel. Fig. 3 shows the relative positions of door and decorator plate when the door is fully opened.

In the embodiment, the entire decorator plate 13 can be removed, for instance for cleaning. This is illustrated schematically in Fig. 4. For this purpose the decorator plate can be provided with shafts 18, 19 disposed at a distance from the plate and co-acting with a hook-shaped end 14a of the link arms 14 respectively with a hook-shaped lower support 20.

Figs. 1 - 4 illustrate schematically a door of a dish-washing machine with decorator plate which is in part previously known and is the basis of the following description of the features which are characteristic of the invention.

As also appears from Fig. 5, the door 10 is supported for pivoting about the shaft 12. Likewise, the decorator plate 13 is supported for pivoting about the axis 15. At each side a link arm 14 is pivotally supported on a shaft 21 disposed at a tin plate 22 which is attached to the door by screws 23. The hook-shaped end 14a of the link arm accomodates a support shaft 24 arranged on the decorator plate 13 and supported by a mounting angle 25 fixed to the plate by screws 26.

The decorator plate 13 should be connected to the door 10 in such a way that on opening of the door it can move from the door and past the panel 16. When the door is closed, however, the decorator plate should be pressed by a force towards the door such that decorator plate and door seem to form an integral unit. This force is created by a spring arrangement designed so as to provide a great pressing force when the distance is small whereas a moderate increase of the distance between the upper part of the decorator plate and the door, for instance of 2 to 3 cm, reduces this force to a very low level thus generally eliminating the risk of damage on movement of the door.

The spring arrangement, generally denoted by 27, comprises two rods 28, 29 which are telescopically movable relative to one another and are biased from one another by a coil spring 30. The coil spring is stressed between a flange 31 on a sleeve 32 which is attached to the rod 28 and another flange 33 on a sleeve 34 which is attached to the rod 29. The sleeves 32, 34 also serve as guides for the spring 30. A pin 35 on the rod 28 runs in an elongate groove 36 in the rod 29, which is tubular, in order to limit the relative movement of the rods 28, 29. The rod 29 is guided in a hole in a guide plate 37 which is attached to the door by a screw 38. The lower end 29a of the rod 29 rests on an inclined surface 40a of a guide cam 40 which by a screw 41 is attached to a metal plate 42 fixedly arranged in the dish-washing machine. The upper end of the rod 28 is linked to a lever arm 43 attached to the link arm 14 and extending upwards inwards in Fig. 5.

When the door 10 is in the closed position shown in Fig. 5 the end 29a of the rod 29 abuts the highest point of the surface 40a, and the force exerted by the spring 30 presses the rod 28 upwards. Together with the lever arm 43 the link

arm 14 forms a unit which is pivotable about the shaft 21. When the rod 28 acts on the lever arm 43 the unit will thus be turned counterclockwise and the decorator plate 13 will be moved towards the door 10 and be pressed to the door with a force which is adjustable to the desired magnitude by the properties selected for the spring and by the size of the lever arm 43 and the link arm 14.

On opening of the door the end 29a of the rod 29 will slide along the inclined surface 40a and hence the rods 28, 29 will move away from each other a short distance limited to only some millimeters by the pin 35 and the groove 36. Thus, the spring 30 will lengthen and the spring force decrease. When the door has been opened so much that the end 29a of the rod has reached the lowest point of the inclined surface 40a the active spring force has ceased and during the continued opening movement the door 10 and the decorator plate 13 will move in the way which is shown schematically in Figs. 2 and 3.

As already mentioned in connection with Fig. 4 the entire decorator plate 13 can be removed, for instance for cleaning. In the embodiments according to Figs. 5 and 6 this is readily done by moving the upper end of the plate outwards until it is free from the panel 16, after which the door is moved obliquely outwards and upwards. Thereby the shaft 19 will unhook from the hook-shaped part 20, see Fig. 4, and the link arms 14 can swing upwards so that the end 14a can disengage from the shaft 24 (Fig. 6). Mounting of the decorator plate is done in the opposite order.

Thus, by the invention a device for mounting a decorator plate to a door of a domestic appliance, preferably a dish-washing machine, is obtained in which the decorator plate is kept pressed to the door when the latter is closed but in which at the same time the cohesion force is so small that no damage will be caused if during the closing movement or on swinging of the plate outwards from the door a finger or the like should come between the door and the plate.

Claims

1. A device in a door (10) with a decorator plate (13) for a domestic appliance, preferably a dish-washing machine, in which the door at its lower end is pivotally supported and at its upper end has control and indication means on a panel (16), which when the door is closed together with the plate (13) forms an approximately continuous front surface of the door, the decorator plate (13) being pivotally supported in points situated below the support of the door and being linked to the door (10) by link arms (14) disposed at the two sides of the door, and spring means (28,29,30) being arranged to urge the decorator plate (13) to abutment against the door (10), characterized in that the spring means (28,29,30) are arranged to act on the decorator plate (13) when the door (10) is in closed position or within the area adjacent the closed position whereas in the other set positions of the door the decorator plate (13) is completely released from the spring means (28,29,30).
2. A device according to Claim 1, characterized in that the link arms (14) are attached to the door (10) by means of upper links (21) and to the decorator plate (13) by means of lower links (24), the lower links (24) when the door is closed being situated below the corresponding upper links (21) and closer to the door than the upper links.
3. A device according to Claim 2, characterized in that the respective link arm (14) at the upper link (21) has a lever arm (43) whose free end co-acts with a spring means (28,29,30).
4. A device according to Claim 3, characterized in that the respective spring means is a telescopic push rod comprising at least two parts (28,29) being kept apart under the action of a spring (30) and extending generally parallel to the plane of the door, one end of the push rod engaging with the lever arm (43) whereas its opposite end (29a) when the door (10) is closed is arranged to co-act with a stationary stop (40) but to be released from the stop when the door has been swung a predetermined angle from its closed position.
5. A device according to Claim 4, characterized in that the relative movement of two co-acting push rod parts (28,29) is limited by a pin (35) arranged on one part (28) and running in an elongate groove (36) in the other part (29).
6. A device according to Claim 4, characterized in that the stop (40) is formed by an inclined surface (40a) against the uppermost point of which the push rod lies when the door (10) is closed.

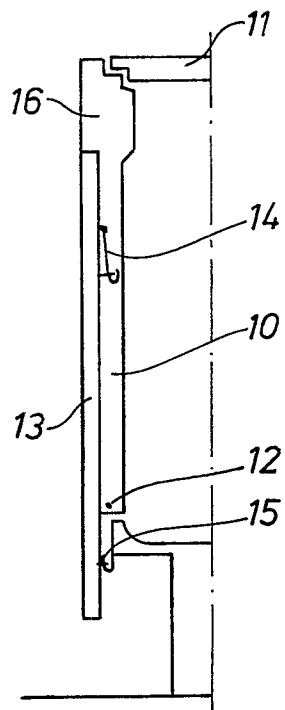


Fig. 1

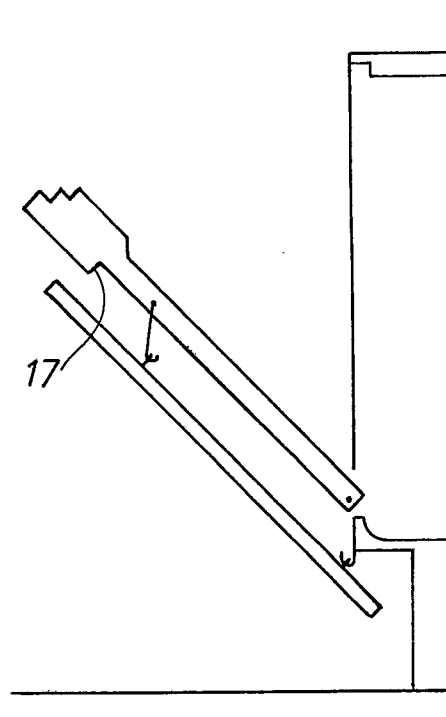


Fig. 2

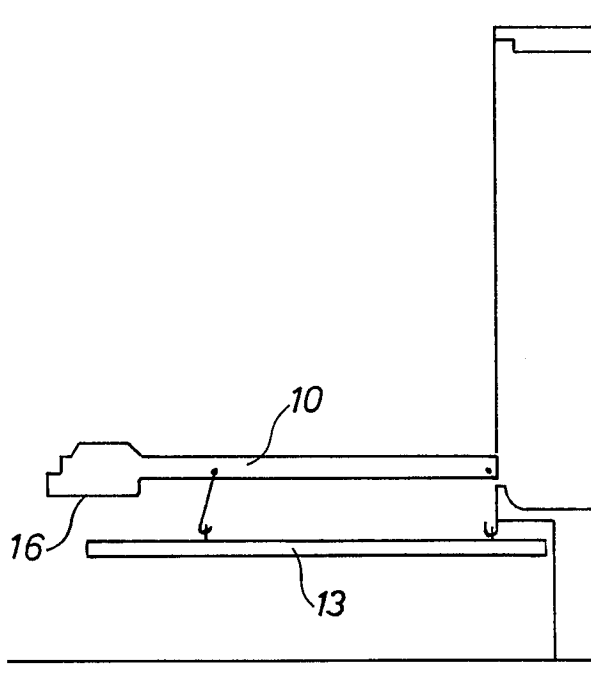


Fig. 3

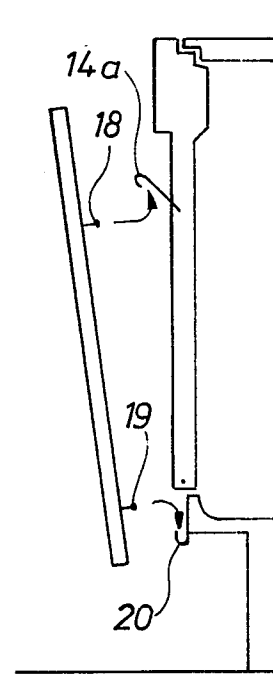
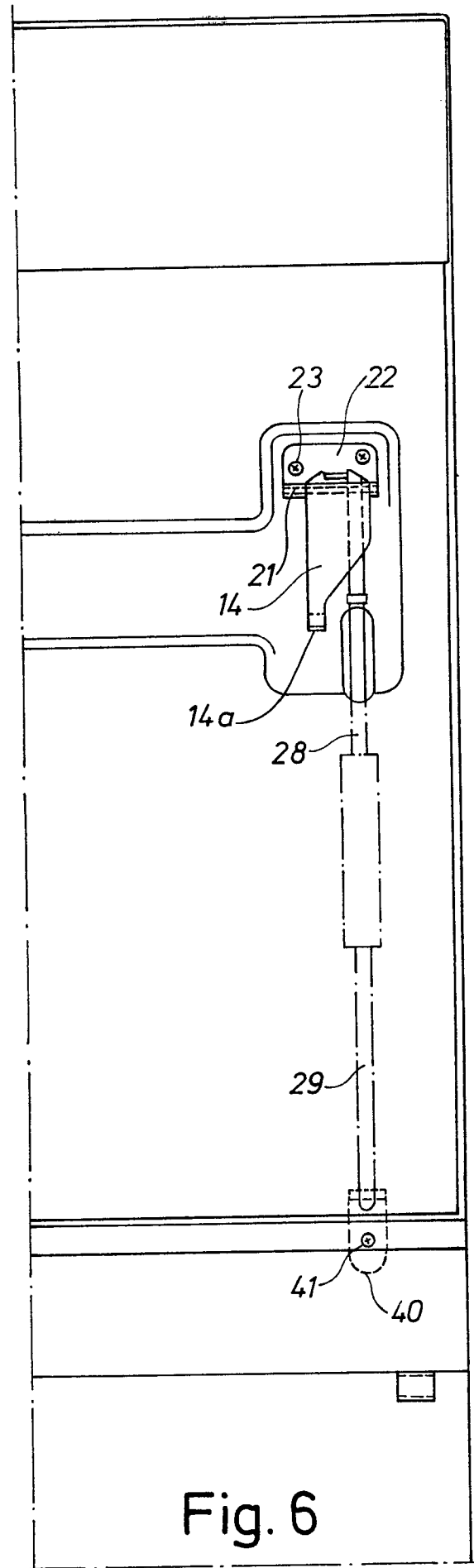
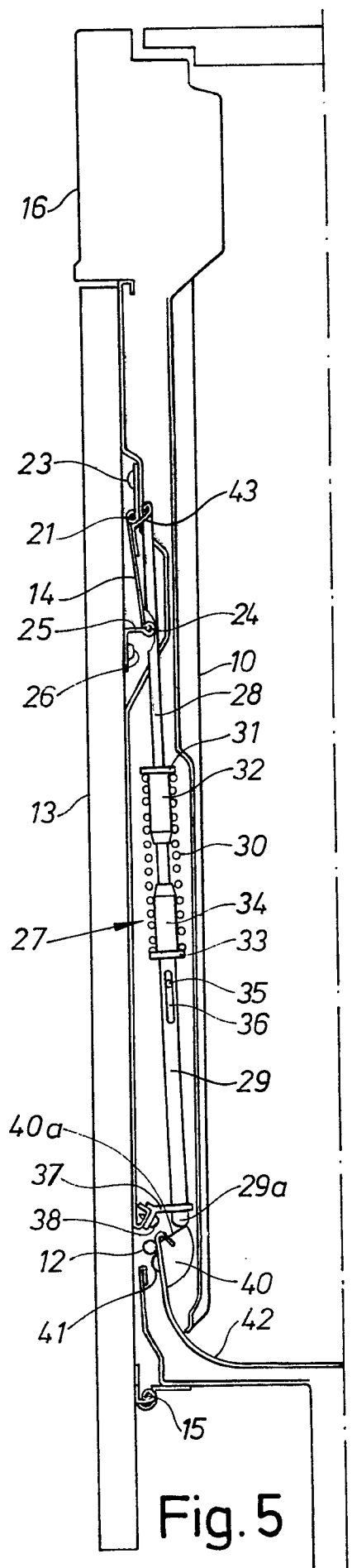


Fig. 4





European Patent
Office

EUROPEAN SEARCH REPORT

0162028

Application number

EP 85 85 0133

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.4)
A	EP-A-0 047 685 (ESSWEIN S.A.) * Page 5, line 34 - page 6, line 20; figures 4,5 *	1-3	A 47 L 15/42
A	--- DE-B-2 921 188 (BOSCH-SIEMENS) * Column 4, line 53 - column 6, last line; figure 2 *	1	
A	--- FR-A-2 477 391 (BOSCH-SIEMENS) * Whole document *	1	
A	--- DE-A-2 921 187 (BOSCH-SIEMENS) * Whole document *	1	
D,A	--- DE-A-3 211 949 (BUDERUS A.G.) * Whole document *	1	
D,A	--- DE-A-2 937 384 (BOSCH-SIEMENS) * Whole document *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			A 47 L A 47 B F 24 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 01-08-1985	Examiner SCHARTZ J.
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	