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(54) Door for washing machines and the like, with an interchangeable bezel and means for ensuring door tightness when the bezel is absent.

(57) A hinged door for front-loading washing machines and the like, comprises a window (1), a frame (2), a bezel (3) and a handle (4). Disposed along the inner part of the frame are fixing means (6) for axially retaining the window along its flanged periphery or collar (5). The frame (2) also comprises means (11) for snap-fitting the bezel (3), an elastically loaded catch (23) supported rotatably by said frame (2) and a hinge arm 40.

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Door for washing machines and the like, with an interchangeable bezel and means for ensuring door tightness when the bezel is absent.

This utility model relates to a hinged door for washing machines and the like, comprising a transparent material part or window, a plastic frame, this latter covered by an exposed plastics bezel, and a handle.

Doors of the said type are known, they comprise an interchangeable external bezel, the purpose of which is not only aesthetic but is also to keep the window, typically of glass, clamped against the frame.

The main drawback of this construction is that without the said bezel and handle it is not possible to obtain door watertightness, because in such a case the pressure exerted by the water on the window would cause it to separate from the frame and/or would cause the door to open.

This gives rise to several problems in that the bezel and handle become essential for the washing machine water-tightness tests, as the one is required for retaining the transparent window against the frame, and the other is required for keeping the door closed, but at the same time these components differ from one model to another and can vary according to market requirements.

Consequently, if the washing machine is produced to satisfy different customers' requirements, its bezel and handle may have to differ in the appearance from one customer to another.

This means that in order to be able to carry out water-tightness tests, such washing machines must be constructed already provided with their bezel (with handle), which can differ according to customers requirements, making it necessary to know in advance, and with certainty, the number of such domestic appliances to be produced for each customer, with the consequent need to have often to delay water-tightness test until the final external appearance which the door has to have has been established.

The object of the present utility model is therefore to provide a door in which the bezel and handle are not essential for obtaining the necessary water-tightness and closure during testing, but instead perform only an aesthetic function, thus making it possible to carry out water-tightness tests without the bezel and handle. This means that the machine can be individualised aesthetically on the assembly line as late as possible, and in the limit the machine can be packaged and despatched without the bezel and handle, to allow the customer to carry our final personalisation with his own choice of colours and shapes (within the limits allowed by the design).

This and further objects, which will be apparent to an expert tof the art, are attained by a hinged door for front-loading washing machines and the like, comprising a window, a frame, a bezel and a handle, and is characterized by comprising, disposed along the inner part of the frame, fixing means for axially retaining the window along the flanged periphery thereof, the frame also comprising means for snap-fitting the bezel, an elastically loaded catch supported rotatably by the frame, and a bracket for fixing the hinge.

The fixing means are integral with the frame and are represented by at least two substantially C-shaped equidistant regions thereof, comprising an inclined upper part to allow the flanged periphery of the window to slide along it and then be axially secured within said regions by the aforesaid part and by a ledge disposed below it, to thus obtain snap-fitting between the window and frame.

The means for snap-fitting the bezel to the frame, these means being of known type, consists of undercut-type engagement means relying on the elasticity of the material of the frame and bezel. To enhance the reliability of the engagement, these means are provided simultaneously along different parts of the circumference.

The catch comprises an arm or appendix which, when loaded by the spring and when the door is completely assembled rests on an L-shaped part of the handle, which is snap-mounted on the same rotation pin as the catch, this pin being supported in the frame When the handle is absent, the catch can be easily operated by a suitable tool (false handle or screwdriver).

On the other side of the door to and diametrically opposite the handle there is the bracket to which the hinge is fixed by means of the end of an arcuate arm thereof, and by screw means which clamp the hinge.

The window and frame are fixed together by pressing, i.e. by forcing the flanged periphery of the window into the C-shaped regions of the frame. The catch with the relative spring is mounted in the correct position on the frame by inserting the hinge pin into the frame. In a position diametrically opposite this is fixed the curved arm of the hinge, which has already been fixed to the washing machine, to result in a door which although incomplete, because it lacks the handle and bezel, ensures the necessary water-tightness during testing without the need for the presence of the two said missing parts, which now have only a purely aesthetic function, and await their final and simple fitting once their aesthetic appearance has been defined.

The present invention will be more apparent from the accompanying drawings, in which:

Figure 1 is a diagrammatic front view of the door ready for use, with (in the right hand half) some parts shown in section or removed for greater clarity;

Figure 2 is a diagrammatic section on the line II-II of Figure 1;

Figure 3 is a diagrammatic section on the line III-III of Figure 1;

Figure 4 is a view of a handle from below;

Figure 5 is a section on the line v-v of Figure 4.

With reference to the figures, the door comprises a substantially frusto-conical window 1, an annular frame 2 on which the previously assembled catch 23 and spring 26 can be seen, an annular bezel 3 and a handle 4 for opening the door. Towards its front end, the window 1 comprises an outwardly projecting collar or flanged periphery 5 arranged to cooperate with at least two substantially C-shaped regions 6 (see Figure 3 in particular), which project from an inner part of the frame 2 and are equidistant.

Each region 6 comprises an inclined upper part 7 and a ledge 8, these being either continuous along the entire frame or alternating in order to simplify their moulding. There thus forms between the two a recess 9 of a certain angular width, into which the collar 5 of the window 1 penetrates when by virtue of the elasticity of the plastics material of the frame, the window 1 is forced into this latter.

On the outer side of the frame 2 there is a discontinuous wall or flange 11 comprising externally a rim 12 with inclined or arcuate faces to facilitate the sliding of an outer wall 13 on the bezel 3, this wall comprising a hook-shaped portion at its end with its lower part 14 rounded and its upper part 15 flat to allow the frame and bezel to be snap-fitted together (see Figure 3 in particular) by forcing this latter over the former.

The bezel 3 comprises inwardly projecting, discontinuous equiradial walls 16 provided with a rim 17 arranged to snap-cooperate with grooves or undercuts 18, which are shaped in such a manner as to retain said rim by engagement and are provided in discontinuous, radially more inner walls 18A of the frame 2. Further more inner equiradial walls 50 of the bezel 3 cooperate with the end part of the window 1, to lock it finally in the finished door.

This is also aided, with synergic action, by the inner end 20 of the bezel 3, which acts on the outer side 19 of the window 1. The frame 2 supports on a transverse pin 25, a catch 23 and a torsion spring 26 which urges the catch in a clockwise direction (with reference to Figure 2). The purpose of the catch is to keep the door closed, and for this purpose it penetrates into an aperture 21 in the washing machine 43 and cooperates with the edges thereof.

The catch 23 comprises an arm or appendix 28, which when the door is completely assembled rests on the end 29 of an inner part 30 of the handle 4, this part being L-shaped in cross-section (Figure 2).

On the inner side of the handle 4 there are also provided two appendices 34 comprising, in a lateral position, two reinforcement ribs 35 for a head 36 and is arranged to snap-fit onto the pin 25 on which the catch 23 is hinged.

On that side of the door opposite the handle 4 there is provided a hinge 39 about which the door can rotate for its opening and closure.

The hinge 39 comprises an arcuate arm 40 fixed at its end 41 to the frame 2, and a further arm 42 fixed to a structural part 43 of the washing machine The two arms are joined together by a pin 44. The arm 40 and frame 2 are joined together by at least two screws 45.

Door assembly is commenced by fixing the window 1 to the frame 2. This is done by forcing the window collar 5 so that it slides along the inclined walls 7 of the element 6 of the frame 2 so as to insert said collar 5 into the recesses 9 in said elements. At this point the catch 23 and spring 26 are positioned in the frame 2 by inserting the pin 25 into this latter, this being possible because of the presence of a corridor present in the frame 2 (not shown in the figure). The pin 25 is locked in position by one or more tangs provided in the frame, and also not shown, which can bend when the pin is moving in its direction of insertion, but not in the oppositie direction. However, this locking could be also attained by other means known to the expert of the art. The unit which has now been obtained is fixed to the hinge arm 40 by the screws 45 (the other arm 42 having been already fixed to the washing machine 43).

At this stage in the door assembly, the window 1 has been inserted and axially locked in the regions 6 of the frame 2. The incomplete door is closed, and remains in its closed position by virtue of the engagement of the catch 23 with the aperture 21, so that the washing machine can be subjected to its water-tightness test without the need for completing the door by fitting its optional aesthetic elements, namely the handle 4 and bezel 3. The door assembly is completed by snap-forcing the outer end 13 of the bezel 3 over the rim 11 present on the outside of the frame 2.

The handle is then fitted to the door. To do this, the arm 28 of the catch 24 is raised by pressing against the end region of the catch so as to overcome the reaction force of the spring 26 which has been mounted on the pin 25 together

with said catch. Said arm 28 is inserted into the inner cavity 33 of the L-shaped element 30 so that it interacts with the part 29 of said element. At the same time, the open side 38 of the bore 37 of the element 33 is placed to coincide with the pin 25, and the element 36 is then forced onto this latter so that the arm 28 of the catch 24 forces the L-shaped element 30 towards the frame 2. The handle 4 is thus fixed to the door.

Claims

1. A hinged door for front-loading washing machines and the like, comprising a window (1), a frame (2), a bezel (3) and a handle (4), characterized by comprising, disposed alon the inner part of the frame (2), fixing means (6) for axially retaining the window (1) along its flanged periphery or collar (5), the frame (2) also comprising means (11) for snap-fitting the bezel (3), and elastically loaded catch (23) supported rotatably by said frame (2), and a hinge arm 40.

2. A door as claimed in Claim 1, characterized in that the fixing means (6) are integral with the frame (2) and are represented by at least two regions disposed equispaced along the inner part of the frame (2).

3. A door as claimed in Claim 2, characterized in that the equispaced regions (6) comprise an upper inclined part (7) to allow the flanged periphery or collar (5) of the window (1) to slide along it for snap-fitting purposes, and a lower ledge (8), these defining between them a cavity (9) for receiving said collar (5).

4. A door as claimed in the preceding claims, characterized in that the catch (23) is rotatably disposed on a transverse pin (25) supported by the frame (2), and comprises an arm or appendix (28) engaging an inner part (30) of the handle (4), there being mounted on said pin (25) a torsion spring (26) which urges the catch (23), this latter being also operable by another implement during testing, without the need to use said handle (4).

5. A door as claimed in Claim 4, characterized in that the handle (4) is able to be removably fitted to the door by comprising at least two appendices (34) for snap-mounting onto the pin (25).

6. A door as claimed in Claim 1, characterized in that the bezel (3), which can be removably fitted to the frame (2), comprises internally projecting, discontinuous equiradial walls (16) provided with a rim (17) for snapping into slots or grooves (18) provided in discontinuous walls (18A) of the frame (2), there being provided further more inner equiradial walls (50) cooperating with an upper part of the window (1), and there cooperating with an outer side (19) of the window (1) an inner end (20) of the bezel (3).

7. A door as claimed in Claim 1, characterized in that the hinge (39) comprises an arcuate arm (40) fixed at its end (41) to the frame (2), and a further arm (42) fixed to a structural part (43) of the washing machine, the two arms (40, 42) being coupled by a pin (44).

8. A door as claimed in Claim 7, characterized in that the arm (40) of the hinge (39) is fixed to the frame (2) by screws (45) which grip the hinge.

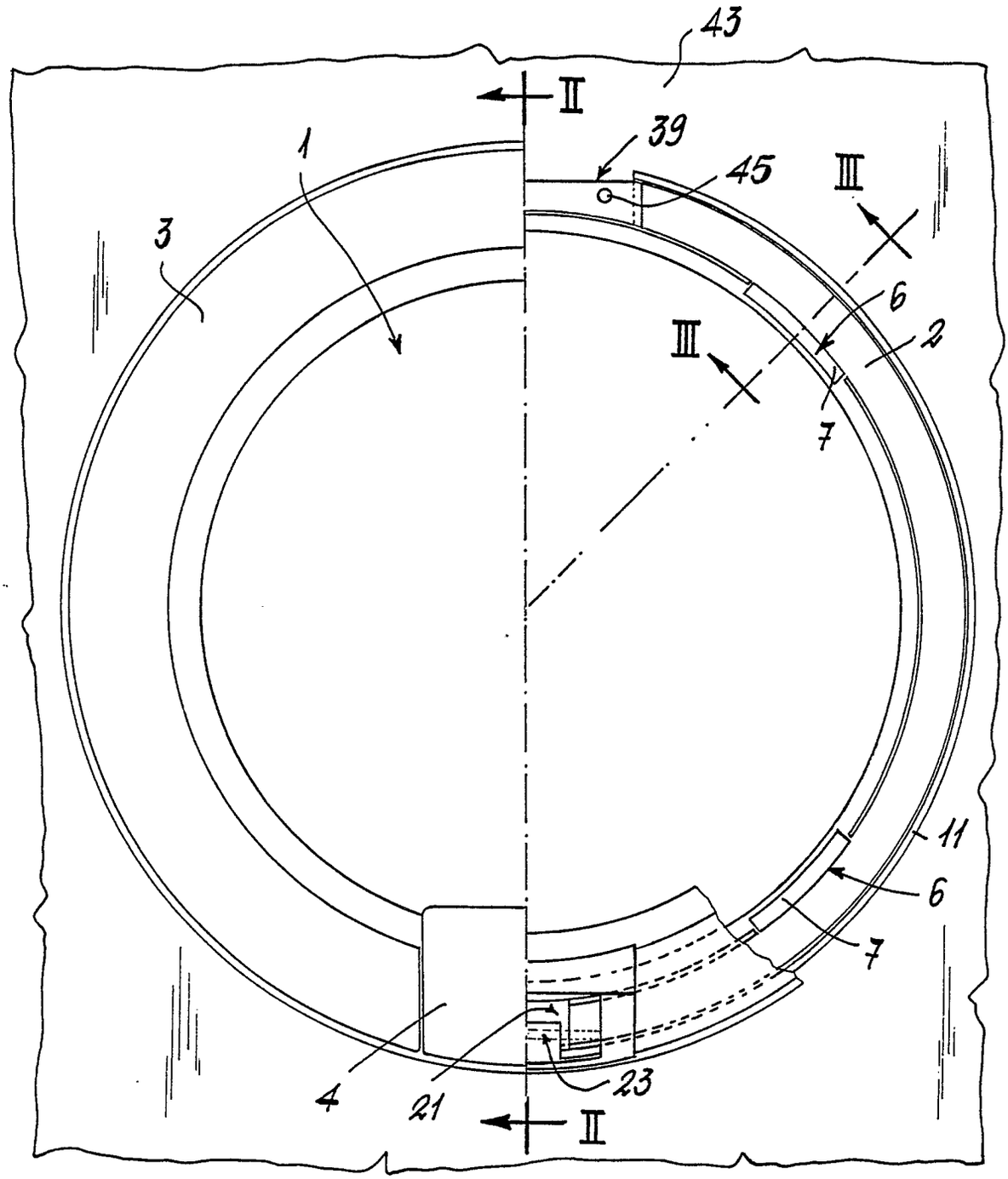

Fig. 1

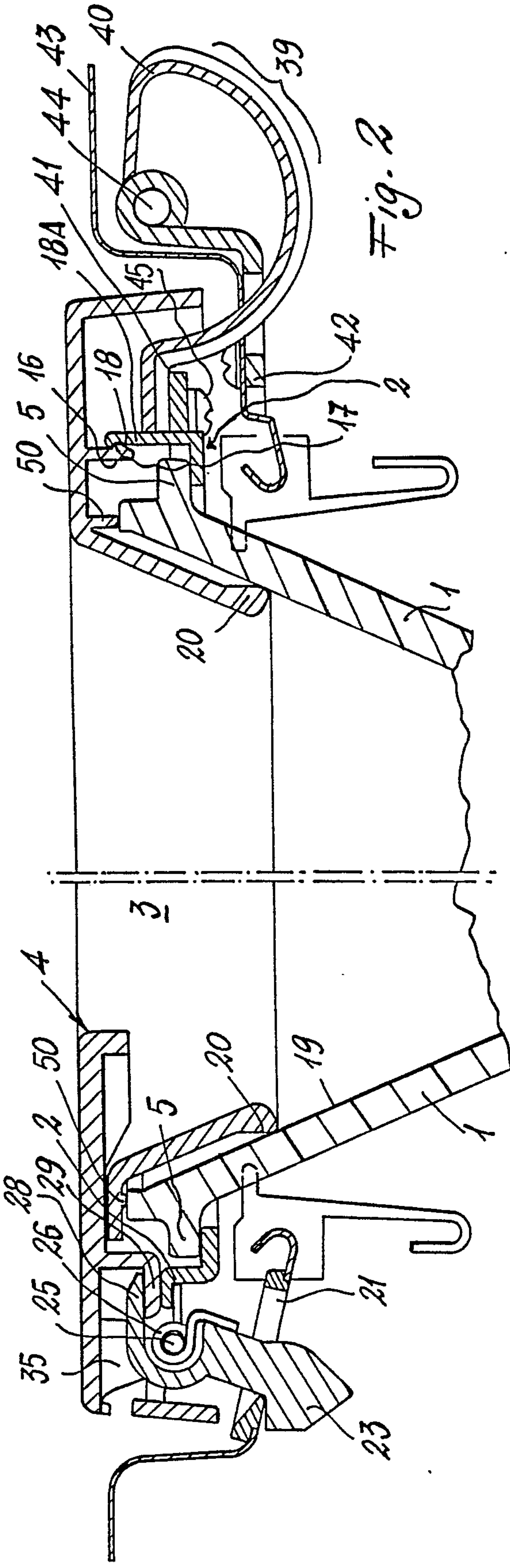

Fig. 2

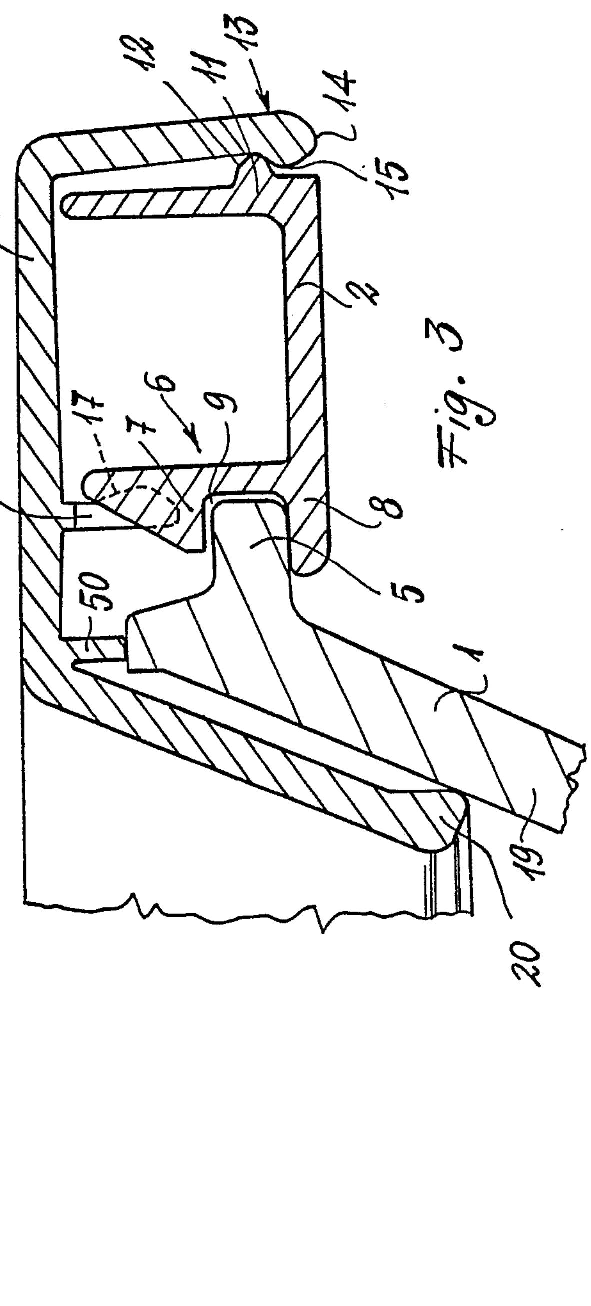

Fig. 3

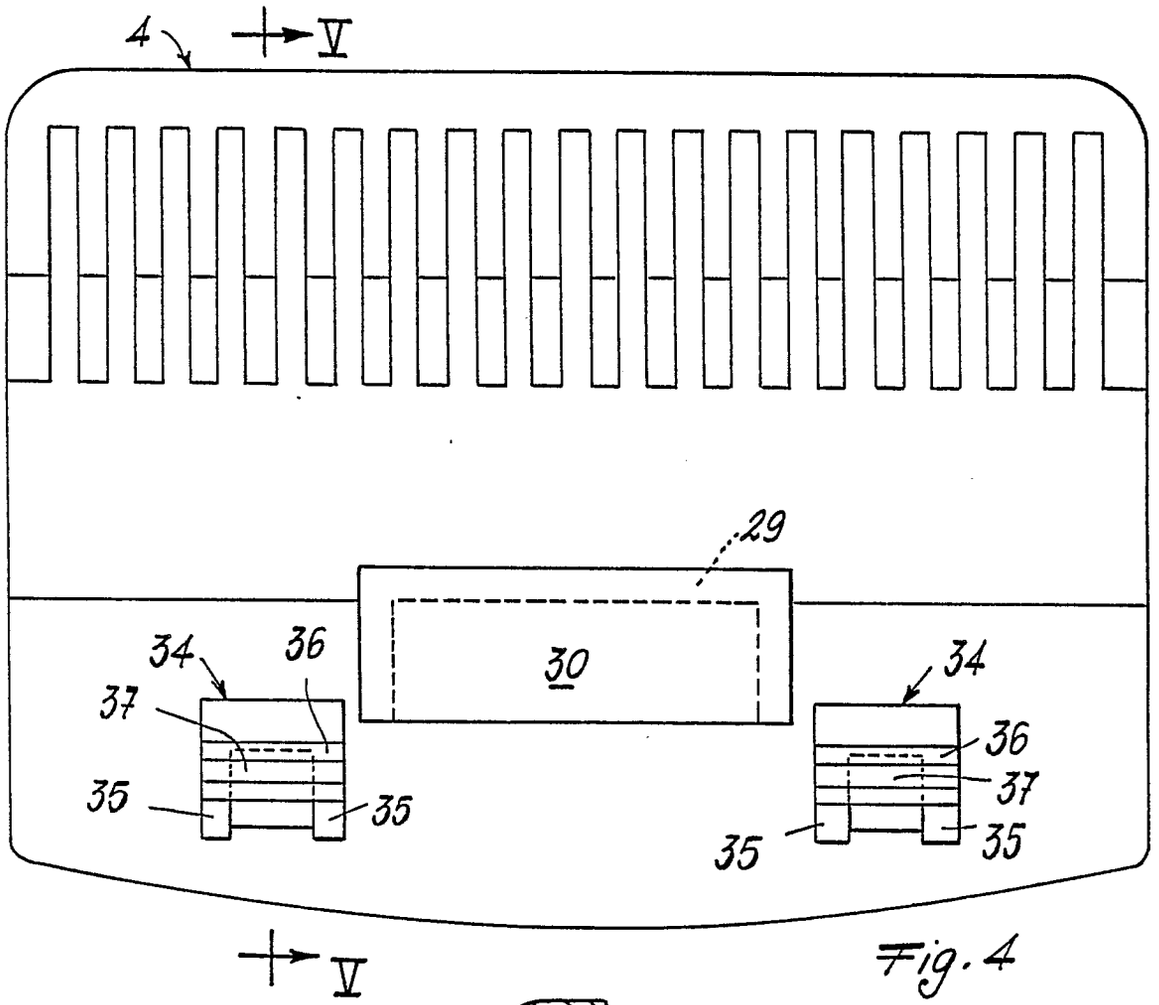

Fig. 4

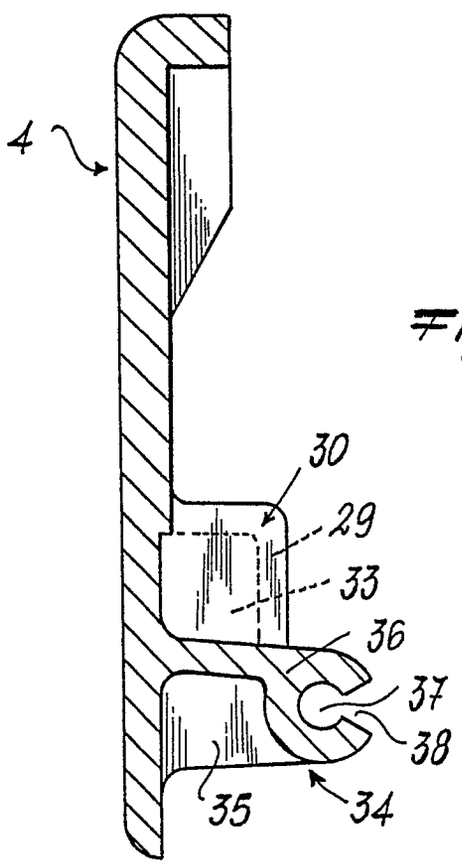

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number

EP 88 20 1076

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)
P,X	DE-A-3 603 211 (MIELE) * Figures; column 2, lines 49-68 *	1,6	D 06 F 39/14
A	---	2	
A	GB-A-2 118 580 (FAINI SPA) * Figures; page 1, lines 68-114 * ---	1,6	
A	GB-A-2 115 473 (TOKYO SHIBAURA DENKI K.K.)) * Figures 2,3,5; abstract * -----	1,2,6,7	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

D 06 F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	08-09-1988	COURRIER,G.L.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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