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

(11) EP 0 859 079 A1

(12) EUROPEAN PATENT APPLICATION

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

(51) Int Cl.[6]: **D06F 39/14**, E05D 3/06

(21) Application number: **98200440.0**

(22) Date of filing: **12.02.1998**

(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: **17.02.1997 IT MI970326**

(71) Applicant: **CANDY S.p.A.**
I-20052 Monza (Milano) (IT)

(72) Inventor: **Fumagalli, Silvano**
20052 Monza (MI) (IT)

(74) Representative: **Mittler, Enrico**
c/o Mittler & C. s.r.l.,
Viale Lombardia, 20
20131 Milano (IT)

(54) Hinge for electrical appliance door, particularly for laundry washing and/or drying machine

(57) 1. Hinge for electrical appliance door, particularly for laundry washing and/or drying machine comprising a frame (1) with a front panel (2) provided with an opening acceding to a washing and/or drying tank (6). The hinge (15) comprises a part (16, 17) fixedly mounted to the panel (2) and at least one arm (18) coupled at a first end (19) to said fixed part (16, 17) in such a way as to be turnable around a first axis (22) and at a second end (21) to said door (3). Said second end (21) of said arm (18) is coupled to the door (3) in such a way as to be turnable around a second axis (27) substantially parallel to the first axis (22).

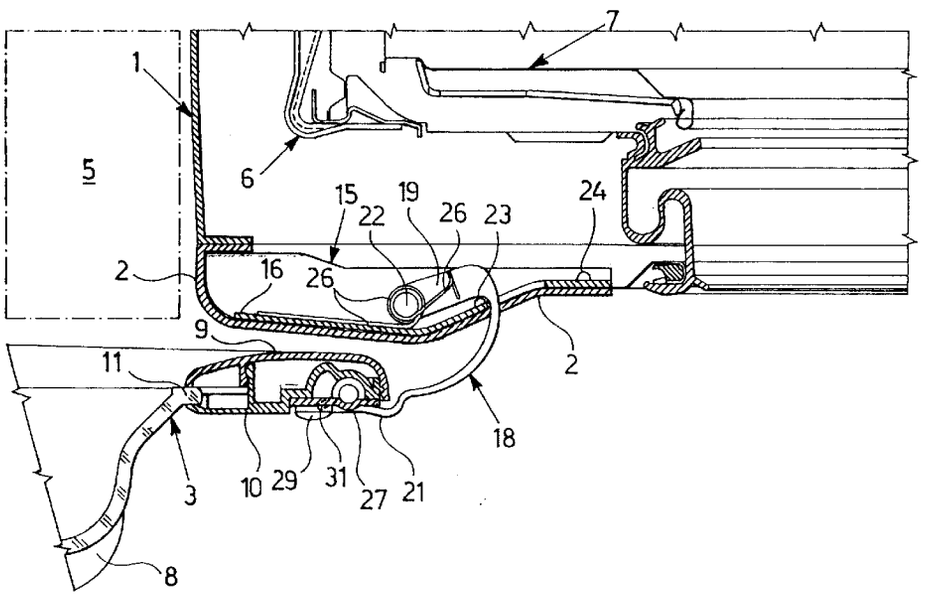


Fig. 3

EP 0 859 079 A1

Description

The present invention refers to a hinge for electrical appliance door, particularly for laundry washing and/or drying appliances, such as washing machines, washing-drying machines, dryers, in particular of the type with front loading.

Appliances for washing and/or drying laundry, in particular the ones with front loading, comprise a frame with a front panel in which there is an opening acceding to the washing/drying tank, and a door or window that can be open to allow the access to the tank itself. The window is hinged to the frame in such a way as to be rotatable around a vertical axis.

A strongly felt problem is to provide the maximum possible accessibility to the washing tank in order to facilitate the operations of loading and unloading the laundry. To this purpose, one must in fact consider that these electrical appliances are often located in narrow rooms.

One route followed by manufacturers has brought to the marketing of highly compact washing machines and/or dryers, with a depth of 42 or even 33 cm instead of the traditional 60 cm. However the dimensions of the electrical appliance cannot be reduced beyond a certain limit, and in addition the design of appliances with restrained dimensions is complicated, especially in case of high performance appliances.

Another route consists in intervening on the appliance window to improve its manoeuvrability.

Normally, the window is mounted onto a front panel of the frame by means of a hinge housed behind of the same front panel. The hinge comprises one or more arms rigidly connected to the window and turnable around a vertical axis of rotation steady with respect to the appliance frame. The opening angle of these windows is therefore rather limited, and in any case smaller than 180 degrees, problem that reduces the accessibility to the washing tank, especially in consideration of the fact that the window generally comprises a concave central part of glass that when the window is open hinders the access to the tank.

There are also known hinges that allow an opening angle of the window of 180 degrees; these hinges however require the interruption of the window frame, fact that has an impact on the aesthetics of the appliance.

In view of the state of the art described above, an object of the present invention is to provide for a hinge for appliance door, particularly for laundry washing and/or drying machine, allowing an opening angle of the window of 180 degrees without compromising the aesthetic features of the electrical appliance.

According to the present invention, such object is attained by means of a hinge for electrical appliance door, particularly for laundry washing and/or drying machine comprising a frame with a panel provided with an opening acceding to a washing and/or drying tank, said hinge comprising a part fixedly mounted to the panel and at least one arm coupled at a first end to said fixed part in such a way as to be turnable around a first axis and at one second end to said door, characterised in that said second end of said arm is coupled to the door in such a way as to be tumable around a second axis substantially parallel to the first axis.

The characteristics and advantages of the present invention will be rendered more evident by the following detailed description of an embodiment thereof, that is illustrated purely as an example in the enclosed drawings, where:

Figure 1 is a schematic perspective view of a washing machine;
Figure 2 is a section view according to the line II-II of Figure 1, showing a hinge for window according to the present invention;
Figure 3 is a section analogous to that in Fig. 2, but with the window completely open;
Figure 4 is an elevation view of the hinge for the window of the appliance of Fig. 1;
Figure 5 is a back view of a portion of a window frame of the appliance of Figure 1;
Figure 6 is a cross-section according to the line IV-IV of Figure 5;
Figure 7 is a cross-section according to the line VII-VII of Figure 5; and
Figure 8 schematically shows trajectories drawn by the window during the opening of the same;

With reference to the drawings, Figure 1 schematically shows a washing machine or a washing-drying machine or even a drier machine of the type with front loading, comprising a frame 1 having a front panel 2 in which an opening for the access to the washing/drying tank is provided; such opening is closed by a window 3 hinged to the front panel 2 in such a way as to be rotatable around a vertical axis to allow the access to the washing tank. An unlocking button 4 is provided for the opening of the window 3. In Figure 1 there is also schematically shown, with dots and dashes, the volume of a possible additional piece of furniture 5 set near the washing machine.

The sectional view of Figure 2 brings out in detail the features of the present invention. In it, it is possible to see in section according to a horizontal plane the frame 1 of the washing machine, inside of which the washing/drying tank 6 is housed and, inside the tank 6, a basket 7 to load the laundry. Frontally to the frame 1 the front panel 2 is mounted. Hinged to the panel 2, in the way that will be described in detail afterwards, there is the window 3, that comprises a concave central part 8 of glass, and an annular frame generally of plastic material comprising an external ring 9 and an internal counter-ring 10 snap mounted on the ring 9 in such a way as to fasten an annular flange 11 of the central part 8 of glass.

The front panel 2 is generally made of a substantially plane metal sheet that is bent along the edges in

such a way so as to form vertical flanges 12 that are then welded in a number of points to corresponding vertical flanges 13 of the frame 1. As it can be seen in Figure 2, between the front profile of the frame 1 and the internal surface 14 of the panel 2 there is an interspace inside which a hinge 15 shown in elevation in Figure 4 is housed.

The hinge 15 comprises substantially two parallel horizontal brackets 16 connected at one fore end by a vertical flange 17. On each bracket 16, at one first end 19, a respective arm 18 is hinged, having substantially the shape of a portion of spiral. In the shown example, the two arms 18 are hinged to the respective brackets 16 by means of a single vertical pin 22 extending for the entire length of the hinge 15; as an alternative, it is possible to replace the single pin 22 with two half pins of minor length. In the flange 17 two openings 20 are created that allow the passage of the other end 21 of the arms 18.

Helicoidal springs 26 bias the arms 18 clockwise, to a position of extension of the ends 21 outside the openings 20 (position shown in Figure 3).

The hinge 15 is housed in the interspace formed between the frame 1 and the front panel 2 of the machine. The two brackets 16 have dimensions and profile suitable to be housed, with a minimum clearance, inside the aforementioned interspace, and they extend up to the bent edge of the panel 2; the flange 17 is fixed, for example by means of two pairs of screws 23, 24, to the inside wall of the panel 2. As it can be seen in Figure 2, a first pair of screws 23 fixes the flange 17 to the panel 2 in correspondence of a drawn region of the same, while the second pair of screws 24 fixes the flange 17 to the panel 2 in correspondence of an edge of the opening provided in the same for the access to the washing tank 6; the fixing of the flange 17 in correspondence of the drawn region, more rigid, guarantees a better solidity and a minor deflection to stresses during the opening of the window; in addition, thanks to the fact that the brackets 16 extend up to the end of panel 2, contrasting against the flange 12 of the same, the hinge 15 results to be fixed more steadily to the frame 1.

According to the present invention, the ends 21 of the arms 18 are not connected stiffly to the window 3, but they are instead themselves hinged to the frame of the window 3. To this purpose, on the internal side of the counter-ring 10, shown in Figure 5, a vertical seating 25 for a pin 27 is created which extends for the entire height of the hinge 15 and is inserted in respective through holes provided in the ends 21 of the arms 18. A bracket 28, applied onto the inside wall of the counter-ring 10 and fixed to the latter by means, for example , of rivets 29, keeps the pin 27 in position inside the seating 25. In addition, always on the internal side of the counter-ring 10 two seatings 30 (Figure 6) are provided suitable to accommodate turningly the ends 21 of the arms 18; the latter are provided with respective flaps 31, clearly visible in Figures 2 and 3, that when the window is close (as shown in Figure 2) are housed in the respective holes 32, closed above and below, of the seatings 30.

When the window is close, condition shown in Figure 2, the arms 18 are almost totally retracted, and the flaps 31 are housed in the respective holes 32. The window is generally provided with a latch to keep it closed. To open the window, the user must press the button 4 to determine the release of the latch. Once the latch is released, the springs 26 bias the window to open at least partially, in such a way as to ease getting hold of the window itself by the user in order to open the window further.

The hinge 15, having two different and independent axes of rotation, allows a wide range of rotating movements of the window, in addition consenting an opening angle of 180 degrees of the same, as shown in Figure 3. It is possible for example to initially rotate the window clockwise only around pin 22 by a certain angle A (Figure 8), even sharp, and then continue the opening operation rotating the window only around the pin 27: in this way the window draws a trajectory T1 characterised by a minor volume encumbrance than that of the trajectory T2 that the window would draw if only the rotation around the pin 22 were possible.

In the initial steps of opening the window, thanks to the fact that the flaps 31 of the arms 18 are housed in the respective holes of the seatings 30 provided in the counter-ring 10, the window itself can swing around the pin 27.

Claims

1. Hinge for electrical appliance door, particularly for laundry washing and/or drying machine comprising a frame (1) with a panel (2) provided with an opening acceding to a washing and/or drying tank (6), said hinge (15) comprising a part (16, 17) fixedly mounted to the panel (2) and at least one arm (18) coupled at a first end (19) to said fixed part (16, 17) in such a way as to be turnable around a first axis (22) and at a second end (21) to said door (3), characterised in that said second end (21) of said arm (18) is coupled to the door (3) in such a way as to be turnable around a second axis (27) substantially parallel to a first axis (22).

2. Hinge according to claim 1, characterised in that said fixed part (16, 17) is fixed to an internal wall (14) of said panel (2).

3. Hinge according to claim 2, characterised in that said fixed part (16, 17) of the hinge comprises a flange (17) for the fixing to said internal wall (14) of the panel (2), and at least one bracket (16) fixedly mounted to said flange (17) and extending up to an edge of said panel inside an interspace between said panel (2) and the frame (1).

4. Hinge according to claim 3, characterised in that said flange (17) is fixed to said internal wall (14) of the panel (2) at least in correspondence of a drawn region of the panel (2) having a concavity facing toward the appliance front that surrounds said opening acceding to the tank (6).

5. Hinge according to claim 4, characterised in that at least one arm (18) has substantially spiral shape, and in said flange (16) an opening (21) is provided suitable to enable the passage of the second end (21) of the arm (18).

6. Hinge according to claim 5, characterised in that said fixed part of the hinge comprises elastic means (26) suitable to bias the rotation of said arm (18) in the direction of opening of the door (3).

7. Hinge according to claim 6, characterised in that the door comprises a central part (8) of transparent material surrounded by a frame (9, 10, 28), said second end (21) of the arm (18) being hinged to said frame (9, 10, 28).

8. Hinge according to claim 7, characterised in that said second end (21) of the arm (18) is provided with a hole for a pin (27), and said frame (9, 10, 28) is provided with a seating (25) suitable to accommodate said pin (27).

9. Hinge according to claim 8, characterised in that said second end (21) of the arm (18) is provided with a protruding flap (31), and said frame (9, 10, 28) is provided with a respective seating (32) so as to accommodate said flap (31) in such a way as to prevent the door (3) from swinging around said second axis (27) at least in one initial step of the opening of the door (3).

10. Hinge according to claim 9, characterised in that said fixed part (16, 17) of the hinge comprises a pair of brackets (16).

11. Hinge according to claim 1, characterised in that said at least one arm (18) comprises a pair of arms.

12. Electrical appliance comprising a frame (19) with a panel (2) provided with an opening acceding to an inside chamber (6) of the electrical appliance, and a door (3) to close said opening, characterised in that said door (3) is coupled to said panel (2) by means of a hinge according to any one of the previous claims.

13. Electrical appliance according to claim 12, characterised in that it is a washing machine.

14. Electrical appliance according to claim 12, characterised in that it is a drier machine.

15. Electrical appliance according to claim 12 or 13, characterised in that said panel (2) is a vertical front panel.

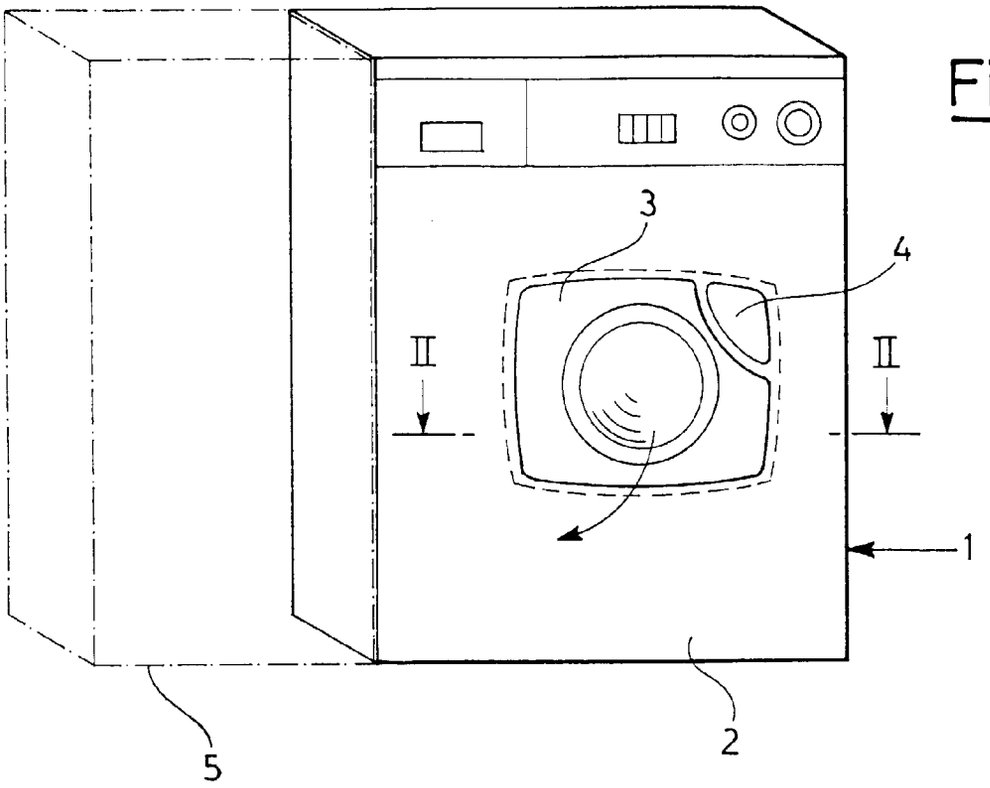


Fig. 1

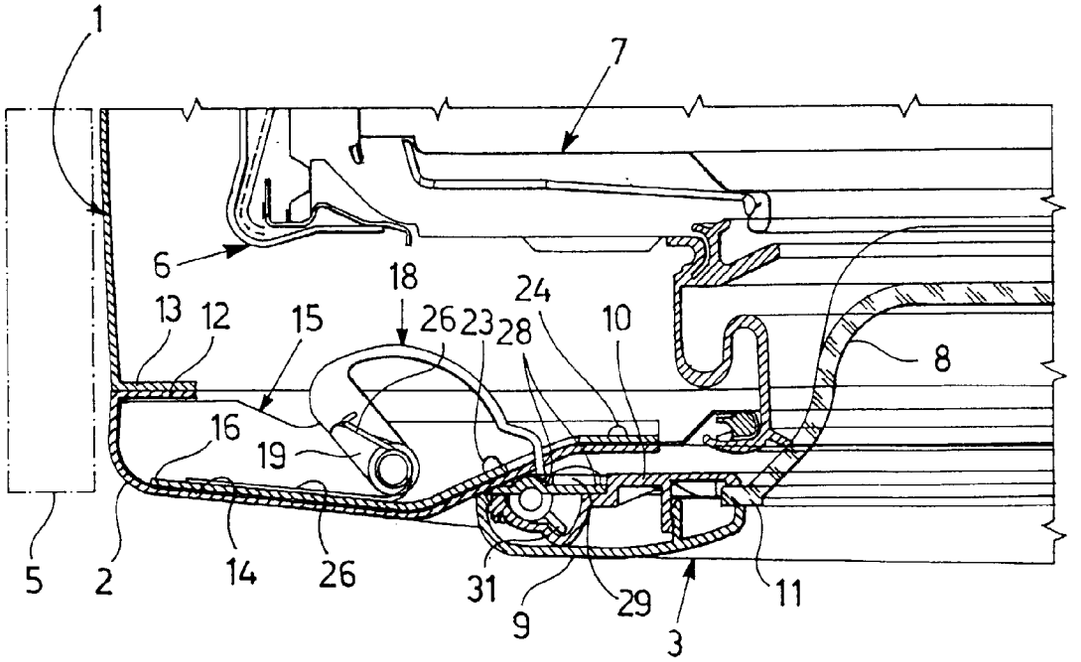


Fig. 2

Fig.3

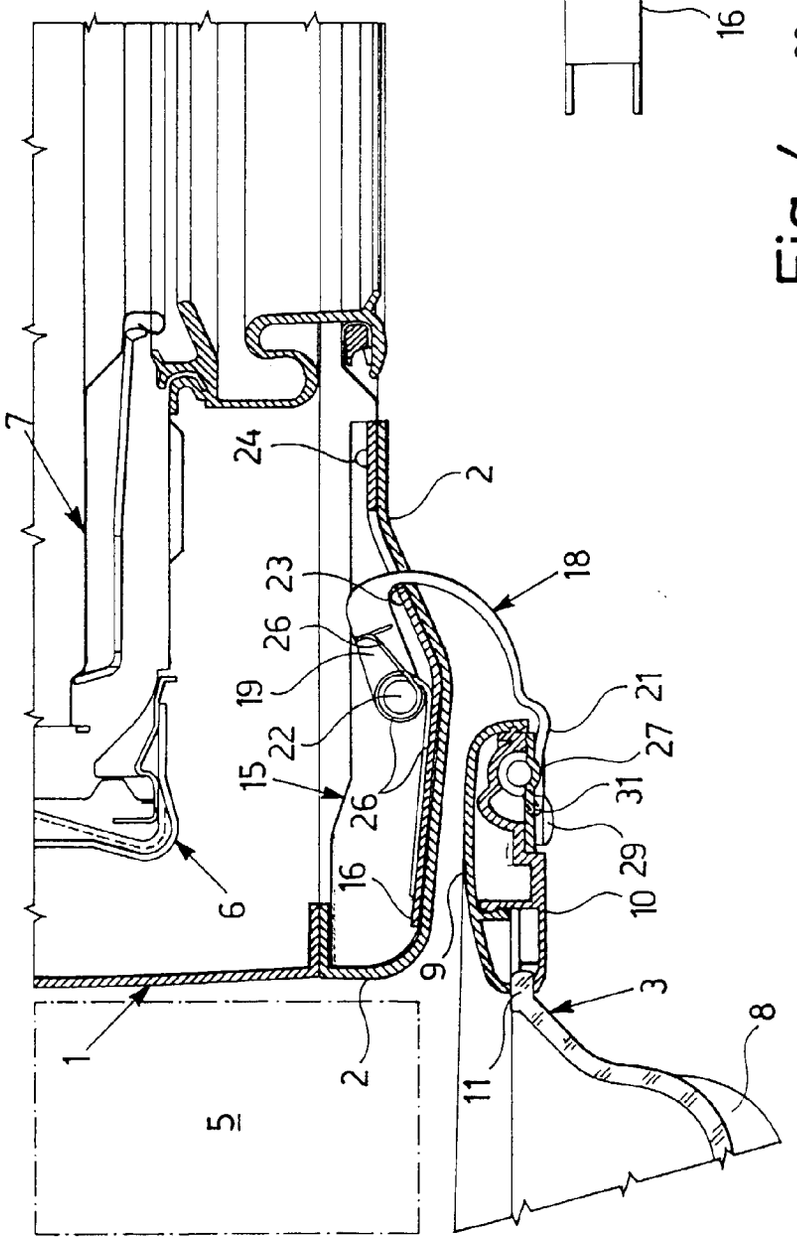
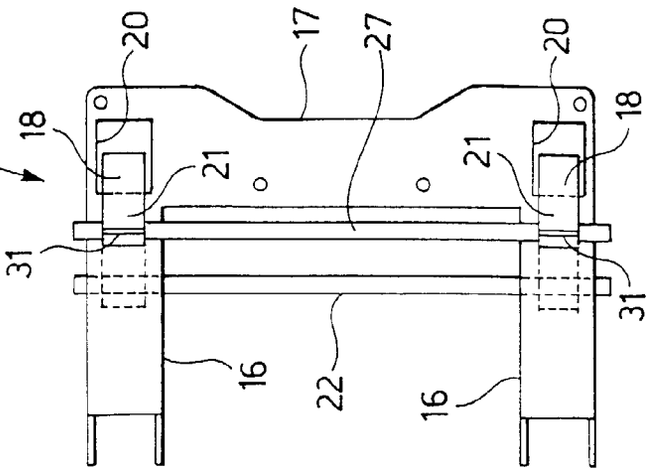

7
24
2
18
23
26
19
22
15
21
27
31
29
10
3
8
11
9
16
6
1
5
2

Fig.4


15
18
20
17
27
21
31
16
22

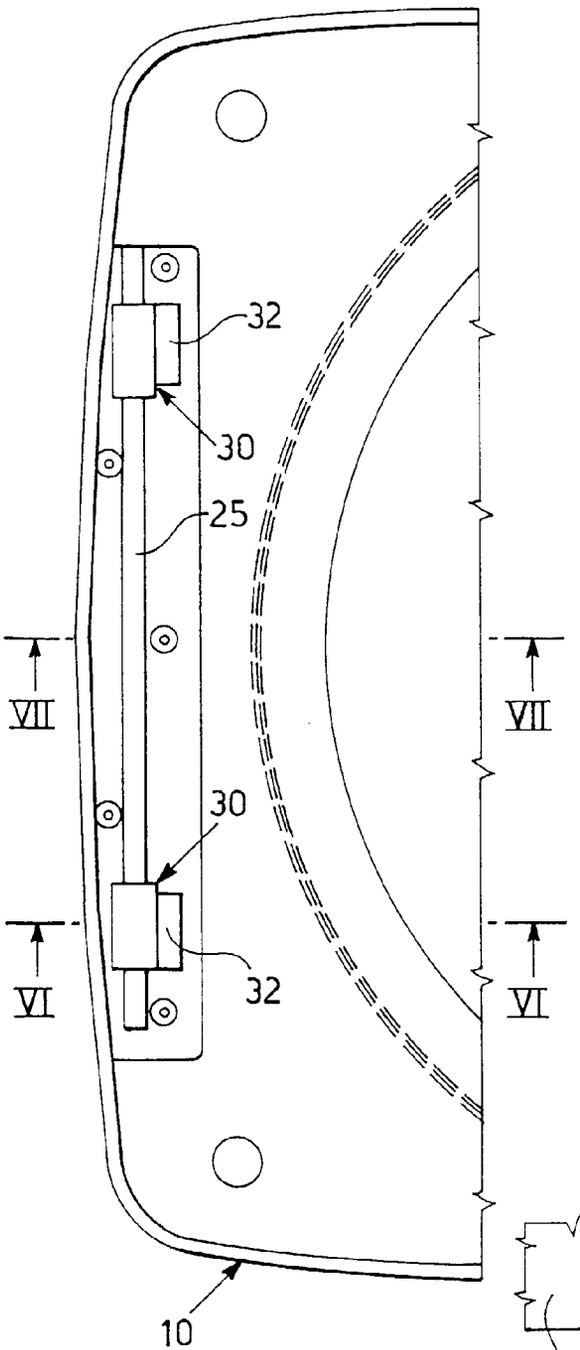


Fig. 5

Fig. 6

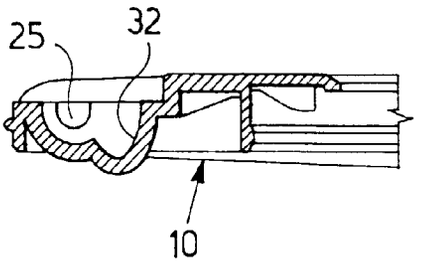


Fig. 7

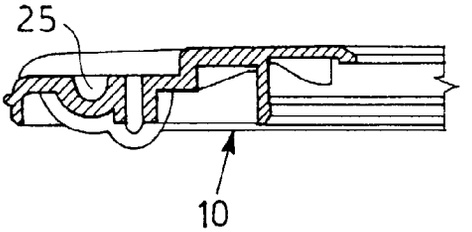
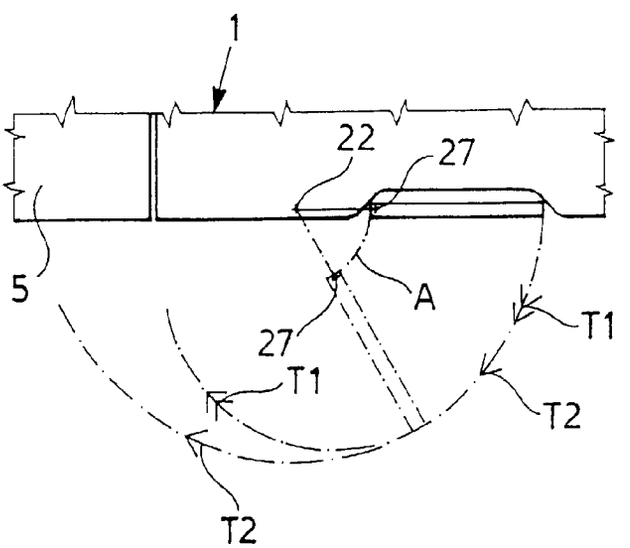


Fig. 8



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 20 0440

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)
X Y	AT 389 717 B (EUDORA WERKE WELS) 25 January 1990 * page 2, line 25 - line 40; figures 1-3 *	1,2,12, 13,15 3-11	D06F39/14 E05D3/06
X Y	CH 402 648 A (ODA) * page 2, line 48 - line 55; figures 2,3 *	1-3 6-11	
X Y	CH 290 826 A (LE RÊVE) * page 1, line 21 - line 34 *	1-3 8-11	
Y	EP 0 293 984 A (N.V. PHILIPS GLOEILAMPENFABRIEKEN) 7 December 1988 * column 3, line 14 - line 18 * * column 4, line 14 - line 22; figure 2 *	3-11	
Y	EP 0 616 069 A (MERLONI ELETTRODOMESITICI) 21 September 1994 * column 2, line 51 - column 3, line 27; figures 1-4 *	10,11	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) D06F E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	27 May 1998	Guillaume, G

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

EPO FORM 1503 03.82 (P04C01)