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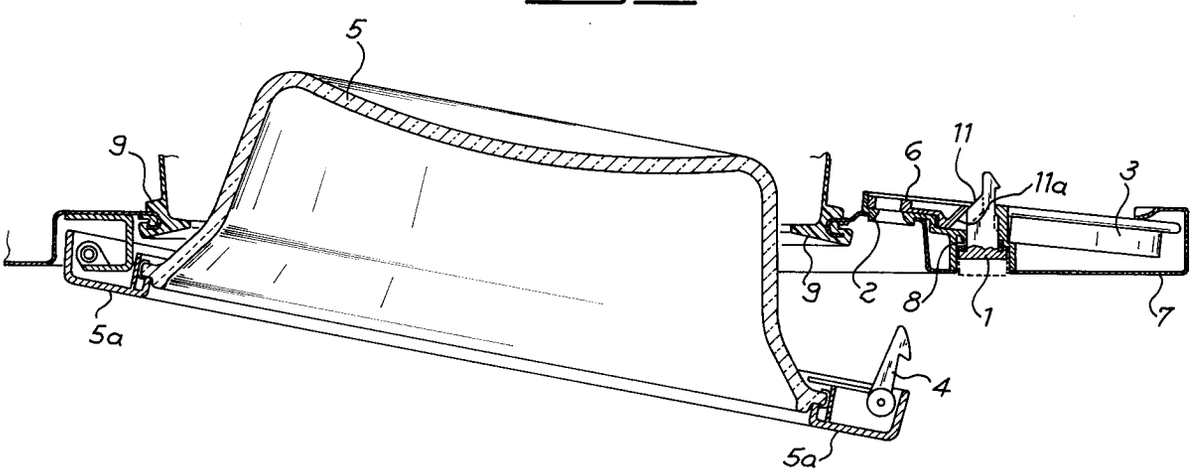
(54) A device for opening the port-hole door of a domestic washing machine.

(57) A device for opening the port-hole door (5) of domestic washing machines comprises a push button (1) built in the door locking assembly (3) itself, in a more cost-effective embodiment, which is also advantageous for the overall appearance of the machine. The push button (1), mounted on the washing machine front wall (7) close to the port-hole (5), carries on the inside of its body a sloping flat surface (11) adapted to come into engagement with a locking slider (11a) for a latch provided for closing the port-hole door (5). Displacement of said slider sets the latch (4) free, whereby the port-hole door (5) can be opened.

Fig.3



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This invention is concerned with a push-button device for opening the port-hole shaped door in domestic washing machines.

Several means are already known for opening the port-hole door of domestic washing machines, mainly lever shaped, but also by means of a sliding member.

These approaches my be relatively cost-effective but the aesthetic appearance on the machine doesn't certainly meet one's expectancy, in particular considering the present marketplace requirements.

Port-hole door opening devices have already been provided using a push-button located on the machine control panel. This approach is certainly an improvement concerning the aesthetic appearance, but it requires a moving slider adapted to connect the push-button device to the latching members, and this largely complicates the construction of the machine, with associated cost drawbacks, besides having a negative influence on the safety required against accidental openings of the port-hole door.

It is an object of this invention to provide a device which, by overcoming known drawbacks of the opening means already known, has all the desired advantages of cost-effectiveness and aesthetic appearance, of course Without compromising the required safety levels.

The device according to this invention is characterized by a push-button device, built into the port-hole door latching assembly, and mounted on the front wall of the machine, close to said port-hole, and provided towards the inside with a movable body having a sloping flat surface adapted to engage a corresponding surface of a movable slider which normally retains the port-hole door closing latch, in order to free said latch for opening said port-hole door.

The subject of this invention will become apparent from the following detailed description of a preferred embodiment thereof, given herein for exemplary but non limiting purposes, reference being made to the attached drawings, wherein:

Figure 1 shows a schematic front view of a domestic washing machine, including the inventive device;

Figure 2 shows a cross sectional view along line II-II of Figure 1; and

Figure 3 shows a view corresponding to that of Figure 2, but with the port-hole door open.

Referring now to the drawings, push button 1 according to this invention is mounted in a built-in arrangement on the latching assembly of port-hole door 5, as it is shown in Figures 2 and 3, in order to be actuated from outside on the machine front wall 7, in a position close to said port-hole 5. As it is shown in Figure 1, the general arrangement obtained is simple and straightforward, as it is presently required in modern machines, where as far as possible an attempt is made to render as unconspicuous as possible the front panel controls, even reducing the number thereof.

As it is already known, port-hole door 5 of a washing machine is kept locked in a closed position, with peripheral rubber ring 9 acting as a seal, through engagement of a latch 4, hinged at one end, onto the metal ring 5a which surrounds port-hole 5. Engagement takes place with a corresponding stop portion in an area 2 of door-latching and -locking, located near port-hole door 5 on the inner side of wall 7. Push button 1 is then located immediately between said latching and locking area 2 and a part 3 including the door-locking electrical components.

It should also be noted, as it is already known in the art, that latch 4 is pushed into engagement with portion 2 by a slider 6 normally kept in a closed position by a pawl (not shown), which is actuated when the machine is switched on. In fact, as it is presently provided in general for washing machines, when port-hole door 5 is closed, and as soon as the machine actuating switch is pressed, thereby starting the washing sycle, the components of door lock 3 are supplied with an electrical voltage and one among them, i.e. a thermistor, rapidly reaches its thermal stabilization temperature thereby heating the bi-metallic couple it is lying upon and whose mechanical distortion causes the electrical closure of a microswitch which in turn supplies power to the electro-mechanical components of the machine. In this way, a mechanical locking of port-hole door 5 is obtained by means of said pawl which stops slider 6. Only after said locking operation has taken place can the washing machine start on its washing program at the end of which, a certain time interval will have to elapse, as determined by the thermal inertia of the bimetal, before the pawl can unlock the slider allowing it to move, for instance in a lever like fashion, in order to free latch 4 and to open the locking arrangement. It should be noted that the same degree of safety concerning the port-hole door locking is obtained also in case of a possible power failure in that thermal inertia keeps the port-hole door safely closed until the washing machine moving members have come to a stop.

According to this invention, once slider 6 has been unlocked by the fact that the washing cycle termination safety members end their function, it is just necessary to press push-button device 1 all the way inwards, to its position shown in full lines in Figure 3. It carries on its body a sloping flat surface 11 adapted to react against a corresponding sloping surface 11a on slider 6, in order to move the latter towards the unlocking position of

latch 4, which gets free from engagement with stop 2, thereby allowing port-hole door 5 to open completely as started and made easier by the spring recovery of seal ring 9 which had been kept compressed while the machine was closed. Meanwhile, push button 1 goes back to its starting position, shown in broken lines in Figure 3, under the biasing action of a quick-return spring 8 provided between the body and the seat of push button 1. It should be noted that a possible actuation of push-button device 1 while the machine is operating, i.e. when the locking microswitch is subjected to a voltage, would not result in any opening effect in that slider 6 would be unable to unlock latch 4, because the former is kept in a closing position by the locking pawl.

Claims

1. An opening device for port-hole door (5) of a domestic washing machine which includes a front wall (7) as well as the following members mounted therewithin, close to port-hole (5): a portion (2) for latching and locking a latch member (4) hingedly mounted on peripheral ring (5a) of said port-hole (5); a movable slider (6) for locking said latch (4) on said member (2), and in addition an assembly (3) of door-locking electrical components, characterized by including a push-button device (1) built into said front wall (7) between said latching and locking member (2) and said electric assembly (3), having towards the inside a movable body provided with a sloping flat surface (11) adapted to come into engagement with a corresponding surface (11a) of said moving slider (6) in order to free latch (4) for opening port-hole door (5).

2. The device of claim 1, characterized in that said push-button device (1) is provided with a quick return spring (8) in order to be brought back to the starting position after each operation.

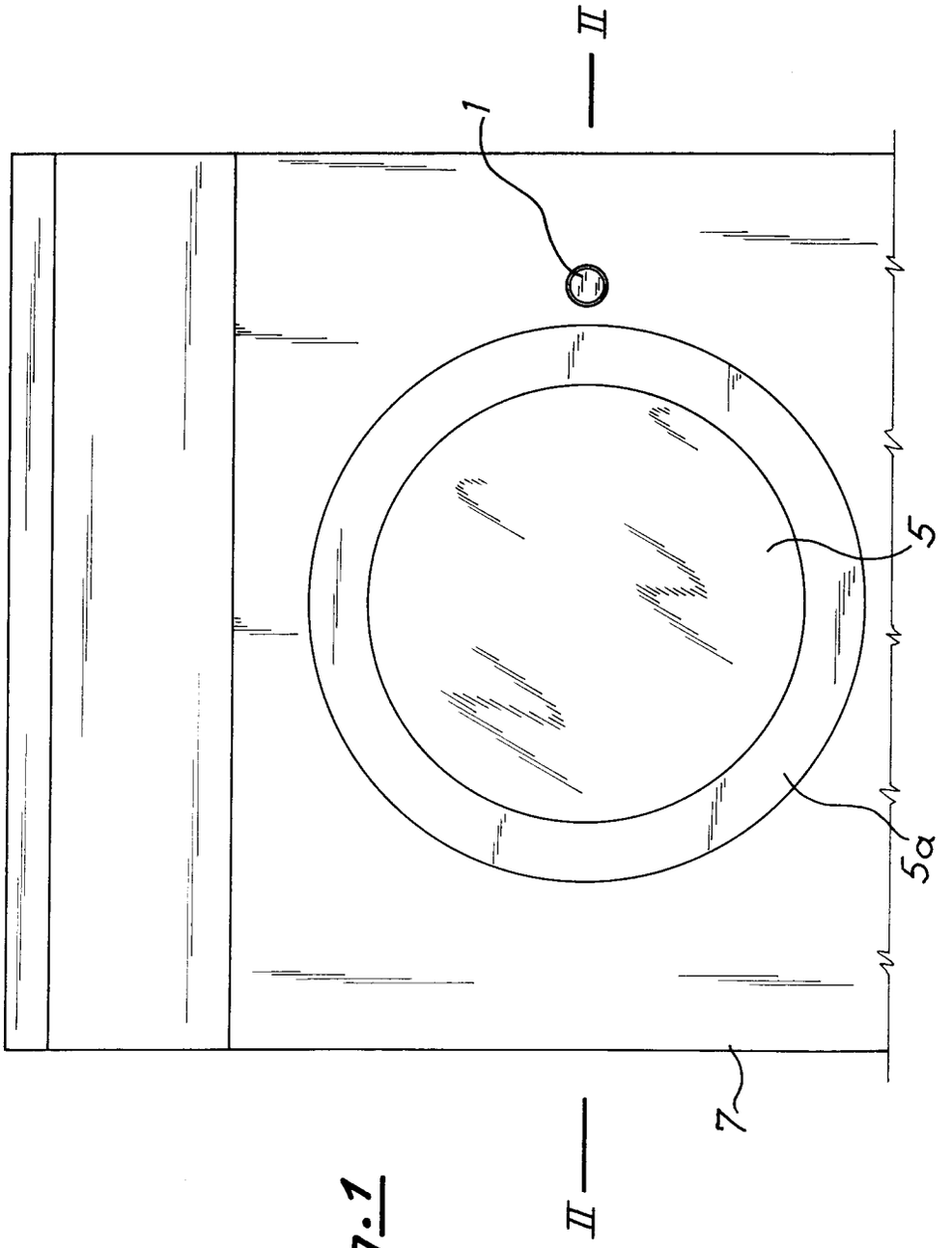

Fig.1

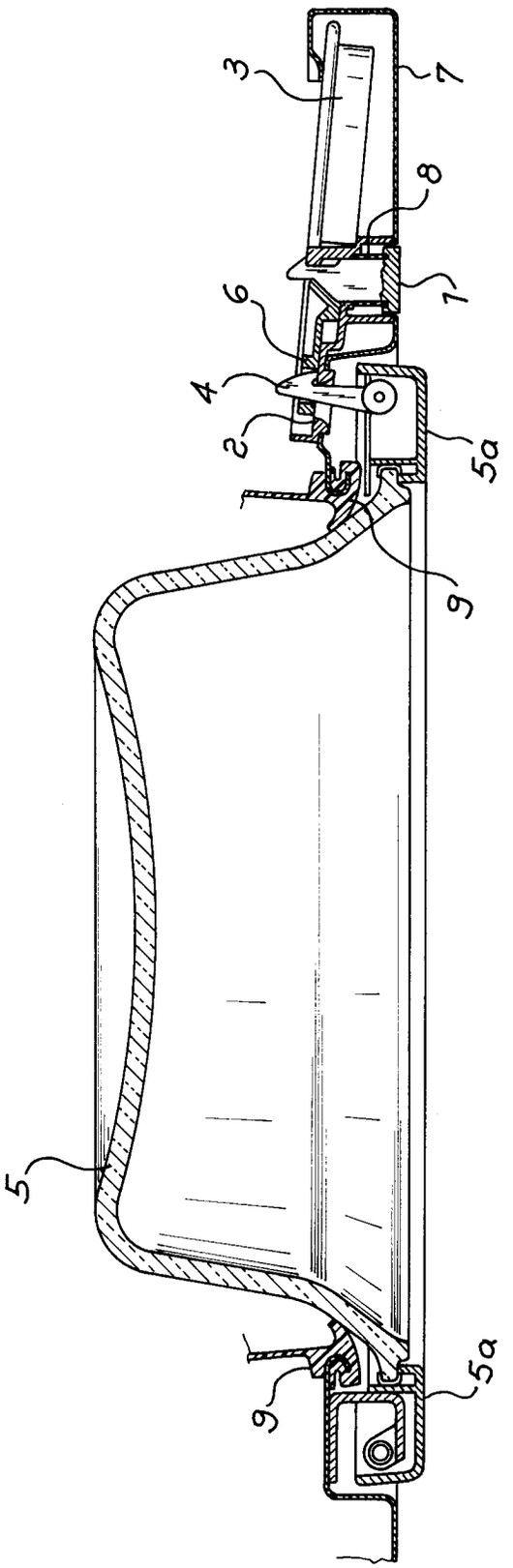

Fig.2

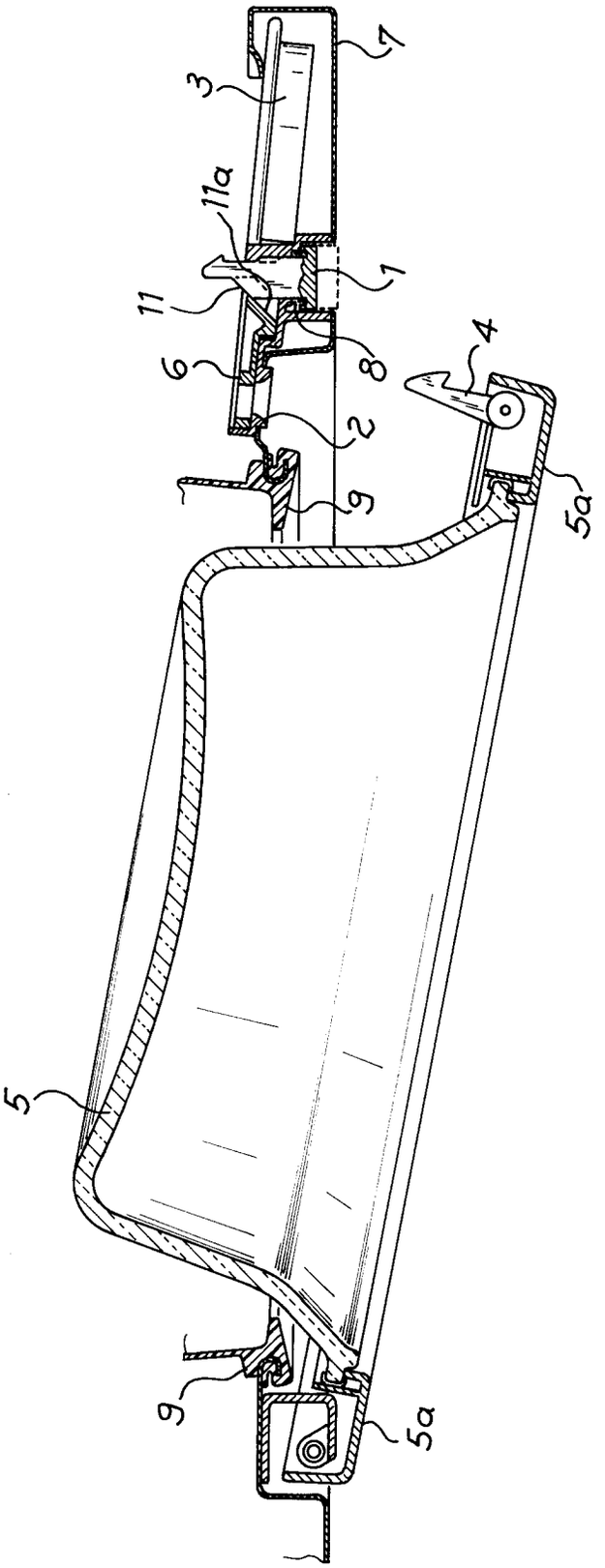

Fig.3

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EUROPEAN SEARCH REPORT

Application Number
EP 92 83 0488

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.5)
A	EP-A-0 076 409 (INDESIT INDUSTRIA ELETTRODOMESTICI ITALIANA S.P.A.) * page 6, line 18 - page 7, line 7 * * figure 1 *	1,2	D06F39/14 A47L15/42
A	FR-A-1 350 994 (COMPAGNIE FRANÇAISE THOMSON-HOUSTON) * page 4, column 1, line 26 - line 53; figures 2-4 *	1,2	
A	GB-A-2 031 053 (T.I. DOMESTIC APPLIANCES LIMITED) * page 2, line 31 - line 71 * * figures 1-4A *	1,2	
A	EP-A-0 331 643 (INDUSTRIE CANDY S.P.A.)		
A	GB-A-2 081 858 (PHILIPS ELECTRONICS AND ASSOCIATED INDUSTRIES)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
D06F A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	01 DECEMBER 1992	KELLNER M.

CATEGORY OF CITED DOCUMENTS

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