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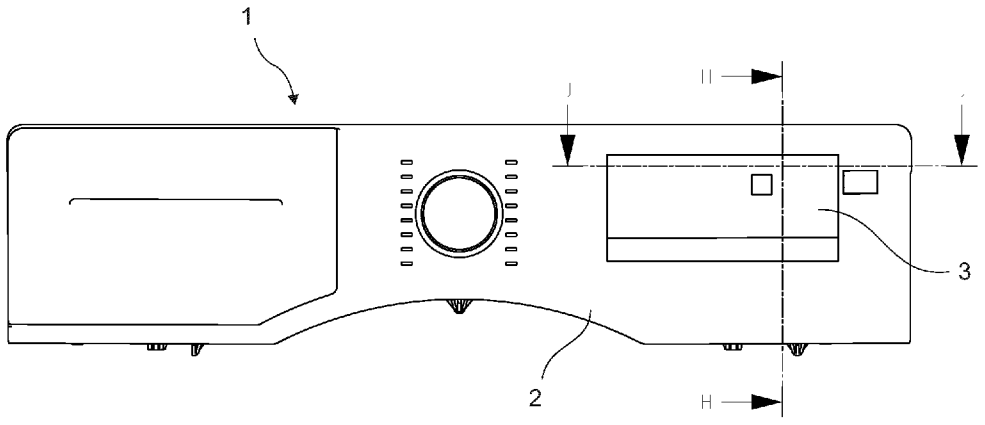
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(54) Title: A LAUNDRY TREATMENT APPLIANCE COMPRISING AN IMPROVED CONTROL PANEL ASSEMBLY

Fig. 1



(57) Abstract: The present invention relates to a laundry washing and/or drying machine having a control panel assembly whereby the control panel cover is conveniently and securely mountable to said laundry treatment appliance. The present invention more particularly relates to a laundry treatment appliance comprising a control panel assembly (1) for effecting control of said laundry treatment appliance, said control panel assembly (1) comprising a control panel housing (2) into which a control panel cover (3) covering a control panel body (4) are mounted.

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Description

A LAUNDRY TREATMENT APPLIANCE COMPRISING AN IMPROVED CONTROL PANEL ASSEMBLY

[0001] The present invention relates to a laundry washing and/or drying machine having a control panel assembly whereby the control panel cover is conveniently and securely mountable to said laundry treatment appliance.

[0002] Modern laundry treatment appliances have different structural forms. A washing machine usually accommodates the control panel units on the upper front face of the appliance. Laundry treatment appliances comprise a control panel body whereby the user can browse and choose from various functions and programs of the laundry treatment appliance whereby the corresponding function on the control panel assembly of the appliance is executed. This control panel body is generally covered by the control panel cover to improve user's viewing experience and display additional functions using LEDs or similar methods to illuminate text and symbols. Light beams from a light source positioned on an electronic control card are directed to a single area on the control panel's main body as an indicator of the specific function chosen by the user. This is accomplished by means of a beam collector portion positioned between the electronic control card and the main body. For ease of access, the control panel body and control panel cover are housed in a control panel housing designed in a way to face the user.

[0003] It is also a well-known issue that the multi-sectioned structure of the laundry treatment appliances, i.e. washing machines, drying machines and combo washing and drying machines requires a precise installation. When interconnection of the related parts is not performed accurately due to various structural design weaknesses, having structural connection problems in the long-run will be unavoidable. The manufacturers should therefore solve the problems related with installation of these appliances so that both the installation process can be easier and end-user experience can be improved.

[0004] Interengaging mechanisms used in a laundry washing and/or drying machine during installation of different parts in a manner to be mounted to

each other is important in many respects because structural integrity of certain parts also affects distant mechanical elements. To this end, an interconnection structure utilized to ensure uniform engagement of a plurality of elements while avoiding occurrence of non-symmetrical split lines between the mounted parts is important not only because serious structural problems may occur in time but also it is undesirable especially in terms of perceptual quality on the part of users, which is an essential quality factor.

[0005] In the state of the art, the control panel cover is attached to the laundry treatment appliance either from the front by double sided adhesives or from the back by ultrasonic welding. Models that are attached to the front by adhesives are generally produced as a large plaque that is subsequently cut into control panel cover units. While this method saves on production costs, it requires the control panel cover to be completely flat. As flat panels contain no parts for centering, this can cause problems with proper adhesion during production and result in off-center panels. In comparison, ultrasonic welding is more durable and less costly. However, welding requires additional machinery and operations.

[0006] Among others, a prior art publication in the technical field of the invention may be referred to as WO2011144484, which discloses a display device of a laundry treatment appliance which comprises a printed circuit board (PCB), a support and a display film. The PCB has LEDs disposed on certain positions and the support comprises loopholes corresponding to those positions of the LEDs. The support is mountable on the PCB via several clasps that correspond to slots on the PCB. The support also comprises light guide posts that guide light emitted by LEDs onto a display film. In this manner, the text and symbols on the display film are illuminated as required. Other examples may be referred to as EP2644765, EP2647326, EP2589696 and KR101366560.

[0007] The present invention, on the other hand, addresses the situation where the control panel cover is quickly, conveniently and inexpensively mountable to the laundry treatment appliance.

[0008] To this end, the present invention provides a control panel assembly

where the control panel cover is mountable onto the control panel housing by a mounting rim surrounding its edges. The control panel cover is secured onto the control panel body proper by fastening means comprising a fastening slot and a fastening tab. In this manner, the control panel cover is securely attached to the control panel assembly and cannot be prized off by sharp objects or blunt force.

[0009] The present invention provides a control panel assembly for a laundry treatment appliance for convenient and secure mounting of the control panel cover to said laundry treatment appliance as provided by the characterizing features defined in Claim 1.

[0010] Primary object of the present invention is to provide a control panel assembly for a laundry treatment appliance, such as a laundry washing and/or drying machine, whereby the control panel cover is conveniently and securely mountable to said laundry treatment appliance.

[0011] The present invention proposes a control panel body protected by an outer control panel cover, the two being mounted in an interengaged relationship into the respective space in front of the electronic control card as delimited by a control panel housing.

[0012] The control panel cover comprises a continuous circumferential mounting rim in flush surface contact with the surrounding front side portion of the control panel housing so that removal of the control panel cover or control panel body is prevented as no sharp objects can be inserted into the gap between the control panel housing and the control panel cover interlocked with the control panel body. Even in that case, a plurality of fastening slots of the control panel cover, receiving fastening tabs of said control panel body cannot be directly accessed as said fastening slots are configured to extend out from said circumferential mounting rim in an inner and concealed location.

[0013] As a further precaution, said circumferential mounting rim and said fastening slots extend into said control panel housing in different inclinations with respect to the control panel assembly front surface so that removing fastening tabs of said control panel body out from said fastening slots is even more difficult by inserting a sharp tool from outside the front

panel.

[0014] Accompanying drawings are given solely for the purpose of exemplifying a control panel assembly, whose advantages over prior art were outlined above and will be explained in brief hereinafter.

[0015] The drawings are not meant to delimit the scope of protection as identified in the Claims, nor should they be referred to alone in an effort to interpret the scope identified in said Claims without recourse to the technical disclosure in the description of the present invention.

[0016] Fig. 1 demonstrates a front view of a control panel assembly according to the present invention.

[0017] Fig. 2 demonstrates a perspective view of a control panel assembly according to the present invention.

[0018] Fig. 3a demonstrates a cross-sectional view of the control panel cover taken along line H-H of Figure 1.

[0019] Fig. 3b demonstrates a close up L view of the control panel cover of Figure 3a.

[0020] Fig. 4 demonstrates a cross-sectional view of the control panel cover taken along line J-J of Figure 1.

[0021] Fig. 5 demonstrates a perspective view of a control panel cover according to the present invention.

[0022] Fig. 6a demonstrates a close up K view of a fastening slot according to the present invention.

[0023] Fig. 6b demonstrates a close up K view of a fastening means according to the present invention.

[0024] Fig. 7a demonstrates a close up M view of a fastening slot according to the present invention.

[0025] Fig. 7b demonstrates a close up M view of a fastening means according to the present invention.

[0026] The following numerals are assigned to different part number used in the detailed description:

[0027] 1) Control panel assembly

[0028] 2) Control panel housing

[0029] 3) Control panel cover

[0030] 4) Control panel body

[0031] 5) Light openings

[0032] 6) Mounting means

[0033] 7) Mounting rim

[0034] 8) Fastening means

[0035] 9) Fastening slot

[0036] 10) Fastening tab

[0037] The present invention provides a control panel assembly (1) for an electrical household appliance such as for instance a laundry treatment appliance, comprising control panel housing (2) and control panel cover (3) covering control panel body (4). Among others, control panel body (4) comprises LEDs mounted on a printed circuit board (not shown), the light from which is guided towards the control panel cover's (3) transparent sections via light openings (5). Several connection means (6) and/or centering/additional fixation means can be conventionally used. Control panel assembly (1) is illustrated in Figures 1 and 2.

[0038] Control panel cover (3) comprises a continuous circumferential protrusion on all sides thereof, referred to as mounting rim (7). Mounting rim (7) allows control panel cover (3) to be securely mounted onto control panel housing (2) so that it cannot be prized off said control panel housing (2) by a sharp object. Control panel cover (3) is preferably manufactured by injection molding and mounting rim (7) advantageously allows control panel cover (3) to have a smooth surface on its user-visible areas without marks or plastic residues due injection molding process as the mounting rim (7) forming the outermost edges of the control panel cover (3) directly faces away from a user in front of the front panel of the laundry treatment appliance. As is known, plastic residues may adhere to outermost edges of any object manufactured by injection molding and if not cleaned thoroughly during quality control, can be viewed as a serious defect. Control panel cover (3) is illustrated in Figures 3a, 3b and 4.

[0039] Control panel cover (3) also comprises a plurality of fastening slots (9) (Figure 5). Each fastening slot (9) cooperates with a corresponding fastening tab (10) on control panel body (4), the two of which being

interlocked during mounting. Fastening tab (10) and fastening slot (9) constitute fastening means (8). The fastening tabs (10) are not manually detachable so that prizing off of the control panel cover (3) by force is prevented.

[0040] Additionally, the fact that said fastening slots (9) are configured to extend out from said circumferential mounting rim (7) in a spaced manner advantageously provides that said control panel cover (3) is securely attached to the control panel assembly and it cannot be prized off by sharp objects or blunt force as the mounting rim (7) prevents direct access to said fastening slots (9) with which said fastening tabs (10) are in interengagement relationship. As a further result of this structure, as already noted, any manufacturing defect can be effectively concealed, if not already found out during routine controls. Fastening means (8) are illustrated in Figures 6a, 6b, 7a and 7b.

[0041] In one embodiment of the present invention, a laundry treatment appliance is proposed, comprising a control panel assembly (1) for effecting control of said laundry treatment appliance, said control panel assembly (1) comprising a control panel housing (2) into which a control panel cover (3) covering a control panel body (4) are mounted.

[0042] In a further embodiment of the present invention, said control panel body (4) is protectively covered by said control panel cover (3) in an interengaged relationship in the manner that said control panel cover (3) comprises a continuous circumferential mounting rim (7) extending into said control panel housing (2) and a plurality of fastening slots (9) are configured to extend out from said circumferential mounting rim (7) extending into said control panel housing (2), said fastening slots (9) receiving fastening tabs (10) of said control panel body (4).

[0043] In a further embodiment of the present invention, said said control panel body (4) has a four-sided form and at least one fastening tab (10) extend out from each side thereof to engage with said fastening slots (9).

[0044] In a further embodiment of the present invention, said said circumferential mounting rim (7) and said fastening slots (9) extend into said control panel housing (2) in different inclinations with respect to the control panel

assembly (1) front surface.

[0045] In a further embodiment of the present invention, said control panel assembly (1) comprises LEDs mounted on a printed circuit board.

[0046] In a further embodiment of the present invention, said the control panel cover (3) is mounted to said control panel housing (2) in the manner that said circumferential mounting rim (7) forms a flush surface in contact with said control panel housing (2).

[0047] In a further embodiment of the present invention, said said laundry treatment appliance is a washing machine, drying machine or combo washing/drying machine.

[0048] Therefore, a control panel assembly (1) for a laundry treatment appliance is proposed such that the control panel cover (3) is conveniently and securely mountable to said laundry treatment appliance via mounting rim (7) and fastening means (8) comprising fastening slot (9) and fastening tab (10).

Claims

1. A laundry treatment appliance comprising a control panel assembly (1) for effecting control of said laundry treatment appliance, said control panel assembly (1) comprising a control panel housing (2) into which a control panel cover (3) covering a control panel body (4) are mounted **characterized in that**; said control panel body (4) is protectively covered by said control panel cover (3) in an interengaged relationship in the manner that said control panel cover (3) comprises a continuous circumferential mounting rim (7) extending into said control panel housing (2) and a plurality of fastening slots (9) are configured to extend out from said circumferential mounting rim (7) extending into said control panel housing (2), said fastening slots (9) receiving fastening tabs (10) of said control panel body (4).
2. A laundry treatment appliance as in Claim 1, **characterized in that** said control panel body (4) has a four-sided form and at least one fastening tab (10) extend out from each side thereof to engage with said fastening slots (9).
3. A laundry treatment appliance as in Claim 1 or 2, **characterized in that** said circumferential mounting rim (7) and said fastening slots (9) extend into said control panel housing (2) in different inclinations with respect to the control panel assembly (1) front surface.
4. A laundry treatment appliance as in Claim 3, **characterized in that** control panel assembly (1) comprises LEDs mounted on a printed circuit board.
5. A laundry treatment appliance as in any preceding Claim, **characterized in that** the control panel cover (3) is mounted to said control panel housing (2) in the manner that said circumferential mounting rim (7) forms a flush surface in contact with said control panel housing (2).
6. A laundry treatment appliance as in any preceding Claim, **characterized in that** said laundry treatment appliance is a washing machine, drying machine or combo washing/drying machine.

Fig. 1

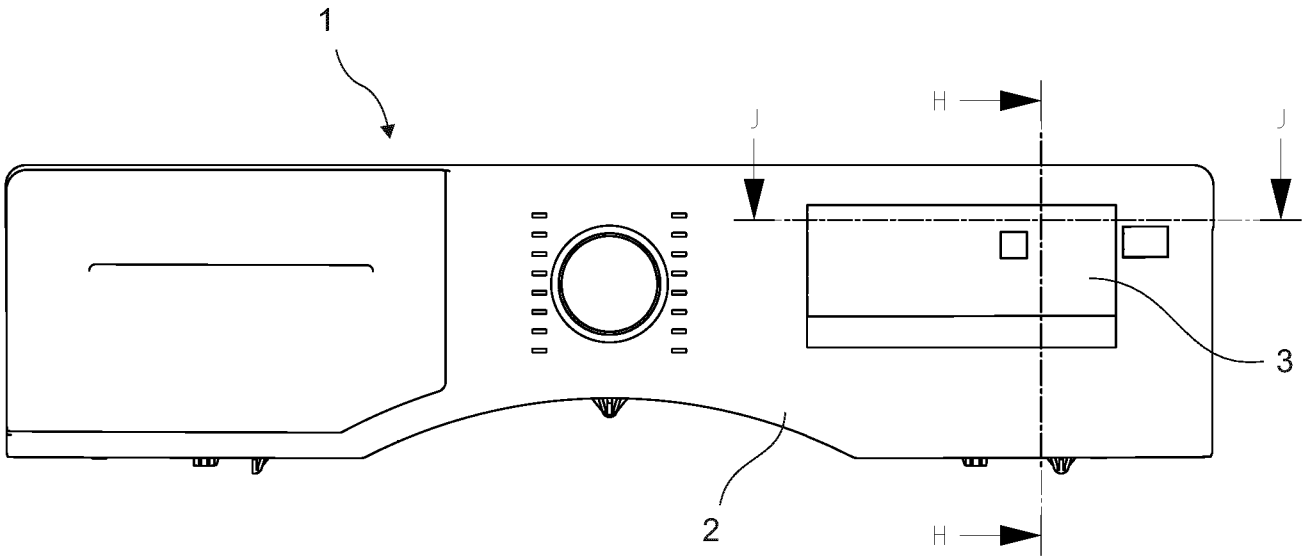


Fig. 2

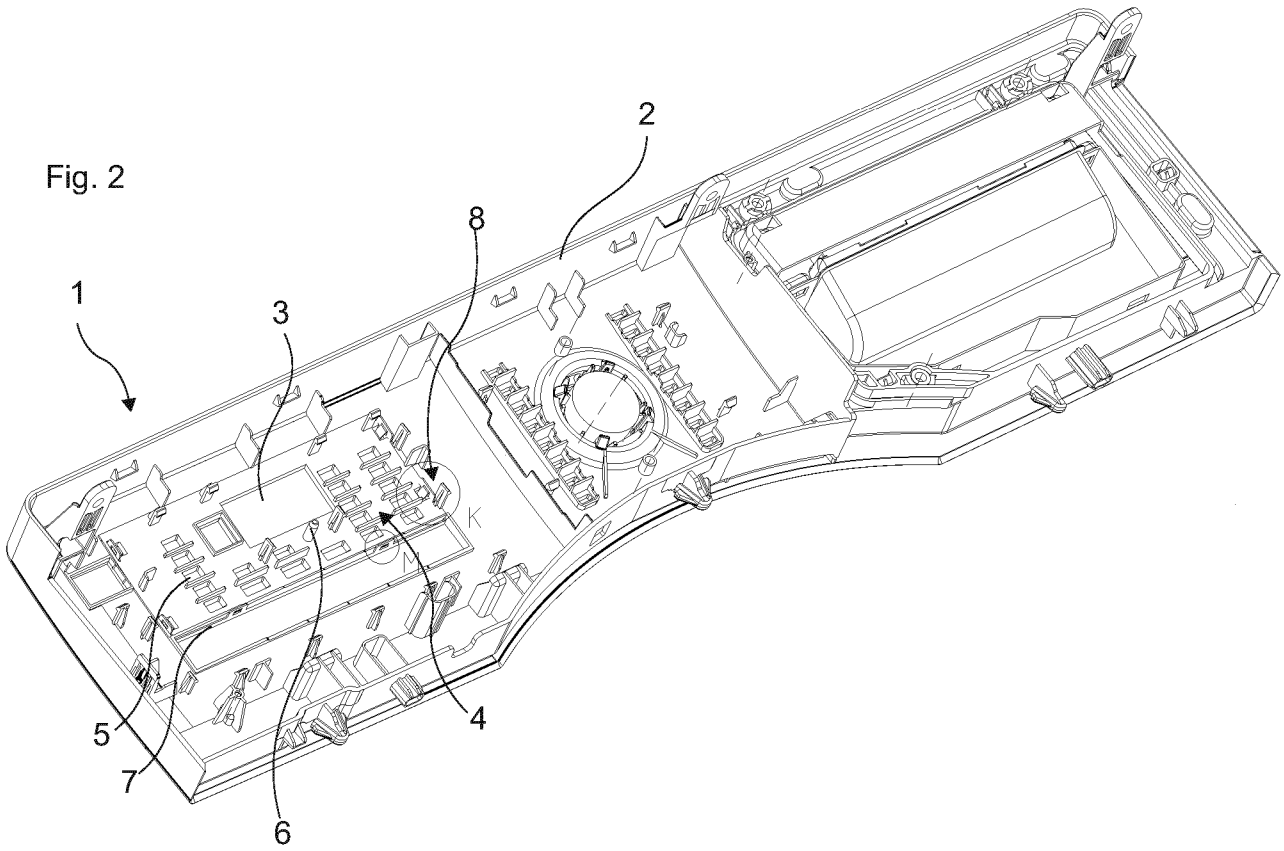


Fig. 3a

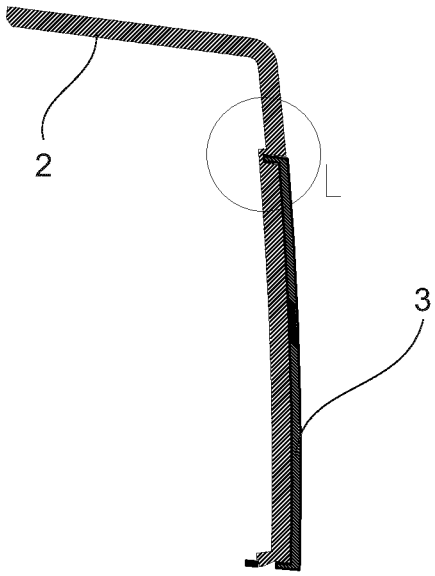


Fig. 3b

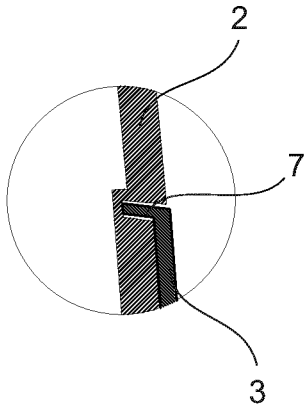


Fig. 4

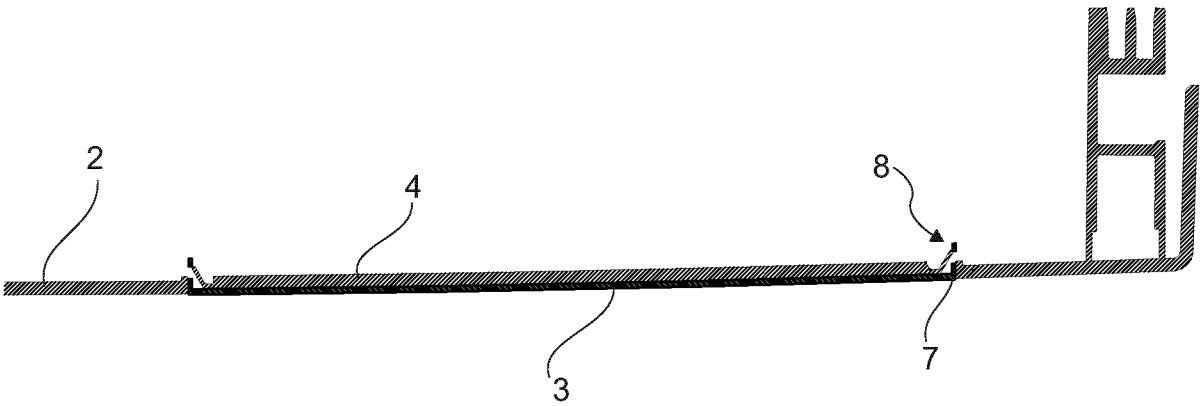


Fig. 5

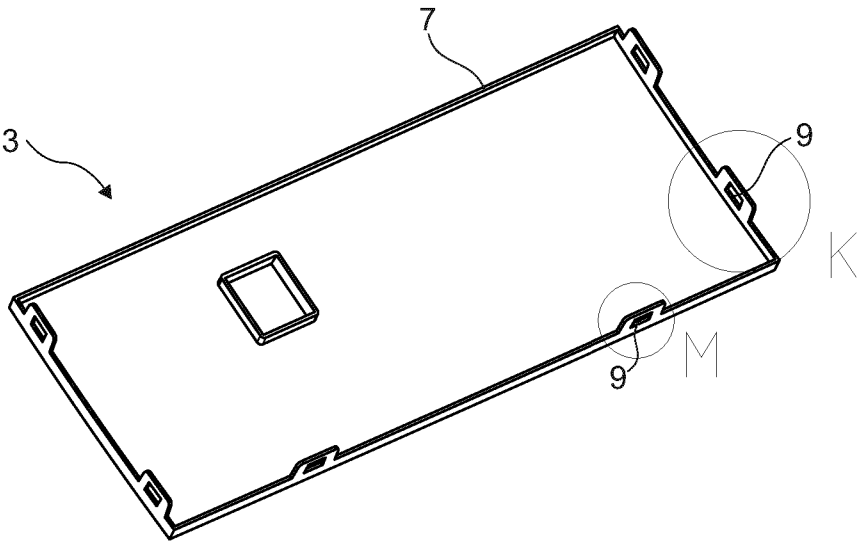


Fig. 6a

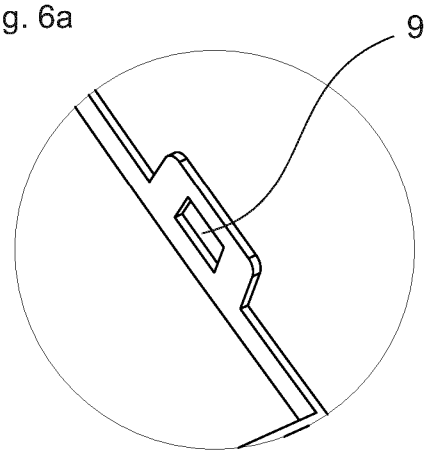


Fig. 6b

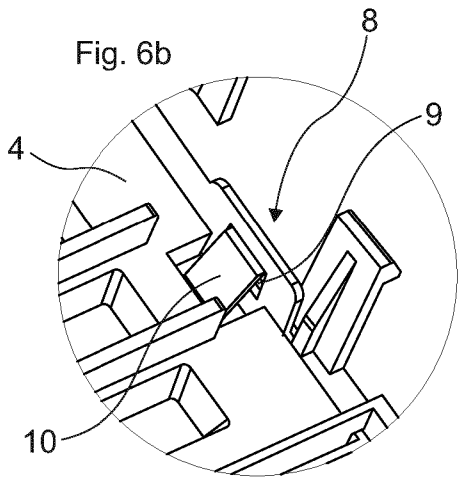


Fig. 7a

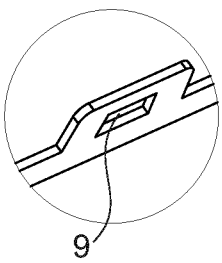
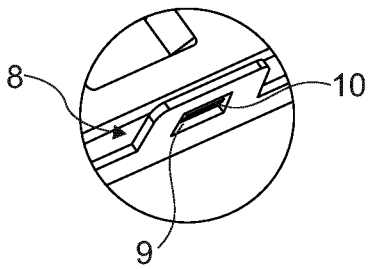


Fig. 7b



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/077801

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47L15/42 H05K5/02 D06F39/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A47L H05K D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	US 2005/183469 A1 (KANG DONG W [KR]) 25 August 2005 (2005-08-25) paragraph [0037]; figure 2a	1-6
A	EP 2 937 455 A1 (LG ELECTRONICS INC [KR]) 28 October 2015 (2015-10-28) figure 2	1,6
A	EP 2 837 728 A1 (ELECTROLUX APPLIANCES AB [SE]) 18 February 2015 (2015-02-18) figure 7	1,6

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
2 January 2018	11/01/2018

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Kising, Axel

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2017/077801

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 20 2006 006612 U1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 31 August 2006 (2006-08-31) figures 4,7	1,5,6
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A	EP 3 064 634 A1 (ELECTROLUX APPLIANCES AB [SE]) 7 September 2016 (2016-09-07) figures 2,5	1,5,6

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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