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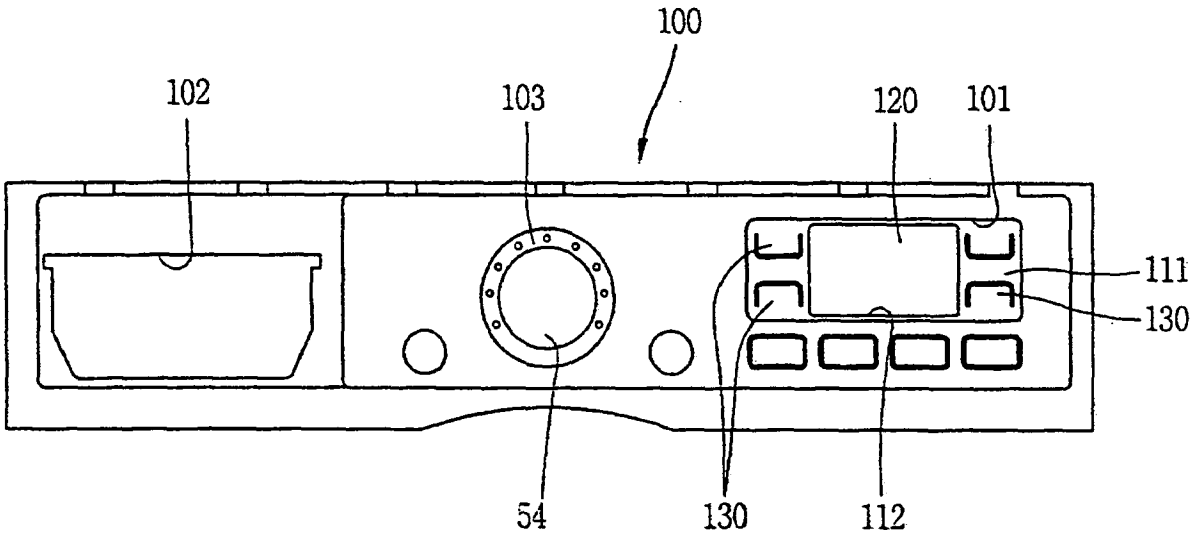
(54) Control panel window assembly of washing/drying machine

(57) A control panel window assembly of a washing/drying machine including a control panel (100) with a window hole (101) on which a display part (120) is mounted, wherein a control panel window (111) is mounted at the window hole (101), the control panel window includes: a display window (112) formed to cover a portion of the display part (120), and a plurality of button portions (130) formed at both sides of the display window (112).

Fig. 2



EP 2 034 080 A1

Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a control panel window assembly suitably applied for a washing/drying machine having a stainless steel cabinet to provide the sense of high-end metal quality and improve user convenience, and a washing/drying machine having the same.

2. Description of the Related Art

[0002] In general, a washing/draying machine includes a washing machine, a drier, a refresher, or the like.

[0003] A drum type washing machine performs washing by using a frictional force between a drum that rotates upon receiving driving force of a motor and the laundry put in the drum together with a detergent and washing water. With the advantages that the laundry is little damaged and not entangled and it can obtain a striking and rubbing washing effect, demands for the drum type washing machine are increasing.

[0004] FIG. 1 is a perspective view showing a general drum type washing machine.

[0005] The drum type washing machine 1 includes a cabinet 10 constituting an external appearance, a tub (not shown) installed within the cabinet 10, and a drum 30 rotatably accommodated within the tub and receiving the laundry.

[0006] A front cover 16 is mounted on a front side of the cabinet 10, and a door 14 for opening and closing the entrance of the drum 30 is mounted at a substantially central portion of the front cover 16. A control panel 60 is attached to an upper portion of the front cover 16, including a manipulation unit for inputting washing conditions a display part 58 or the like to display a washing state.

[0007] In order to input the washing conditions, the manipulation unit may include button portions 70 or a dial knob 54 allowing the user to rotate it with his hands to input washing conditions.

[0008] Recently, demands for the drum type washing machine including the cabinet with at least a portion made of a material providing the sense of metallic quality or stainless steel to provide a high-end touch are increasing.

[0009] However, the related art control panel window assembly including the display part 58, the lower button portions 70 or the like on the control panel 60 cannot provide such sense of quality similar to that of the cabinet made of stainless steel.

[0010] In addition, with respect to operations performed by pressing the button portions 70 positioned below the display part 58, corresponding information is not provided to the user, so in order to providing such information, a plurality of holes 59 should be formed, resulting in degradation of the productivity of the control panel 60 and making the structure complicated.

[0011] Also, a contact switch positioned at the rear side of the button portions 70 is used, making it difficult to configure a touch type button which is thin and smooth and to modularize the control panel window assembly.

SUMMARY OF THE INVENTION

[0012] Therefore, in order to address the above matters, the various features described herein have been conceived. One aspect of the exemplary embodiments is to provide a control panel window assembly including a control panel with a window hole on which a display part is mounted, wherein a control panel window is mounted at the window hole and the control panel window includes: a display window formed to cover a portion of the display part; button portions formed at both sides of the display window.

[0013] The button portions are configured in a cantilever form on the control panel window.

[0014] With such configuration, because there is no need to fabricate the display window mounted on the display part and the button portions as separate components, the productivity can be improved and a fabrication cost can be reduced, and a restoring unit such as a spring to return a pressed button to its original state is not required.

[0015] The display window is formed to be bent toward the rear side of the control panel window. Namely, edges of the display window are bent inwardly to prevent an injection-molded product or the like stacked on a rear surface of the control panel window from being separated from the control panel window.

[0016] A TPU (Thermoplastic Polyurethane) elastic resin may be stacked on the rear surface of the control panel window. The TPU elastic resin has nearly similar physical properties to that of rubber. The resin may be attached to the rear surface of the control panel window to increase elastic return force of the button portions with a cantilever shape, and a gap between the button portions and the control window may be filled with the resin.

[0017] Here, silicon may be attached to the TPU elastic resin.

[0018] A light emitting element may be mounted on a portion of a rear surface of the TPU elastic resin corresponding to the button portions. Namely, the light emitting element may be positioned between the button portions and the TPU elastic resin to provide illumination effect to a button portion selected by the user. In addition, when the button portions are etched to be formed, a selected function can be illuminated by light so as to be informed to the user.

[0019] The light emitting element may be an LED (Light Emitting Diode), and the LED may include a light guide plate (LGP). With the LGP, light can be evenly transmitted to the entire LED.

[0020] A switch may be mounted on a rear surface of

the light emitting element, and a circuit board is installed at a rear side of the switch. Here, the switch may be a dome switch. By employing dome switches, the button portions may be implemented as soft touch type button portions and the thickness from the button portions to the circuit board can be reduced.

[0021] A contact protrusion may be formed at the TPU elastic resin in contact with the switch. The contact protrusion comes in contact with the dome type switch to press the switch although the user lightly touches the button portions.

[0022] The control panel window may be made of stainless steel so as to be in harmony with the cabinet of the washing/drying machine which is made of metal such as stainless steel in the high-end trend of the washing/drying machine.

[0023] Here, the control panel window may be made of stainless steel of a SUS 304 group which has good corrosion resistance and suitable for mechanical working such as drawing.

[0024] This specification provides a washing/drying apparatus including a plurality of button portions for function selection, a display part for displaying various information, and a control panel including a plurality of button holes in which the plurality of button portions are installed and a window hole on which the display part is installed, wherein the above-mentioned control panel window assembly is mounted.

[0025] Here, the control panel window may be made of stainless steel of a SUS 304 group, and a coupling flange is formed to be bent at edges of the control panel window so as to be combined with the control panel.

[0026] Because the coupling flange is formed at the edges of the control panel window, the control panel window can be fixed to the control panel without using a fastening unit such as a screw or the like.

[0027] As mentioned above, the present invention provides the washing/drying machine having the control panel window assembly that can meet the needs of users who prefer a washing/drying machine that can be in harmony with the cabinet made of stainless steel and have a high-end image.

[0028] In addition, because characters indicating functions of button portions are etched to be formed on the button portions and light is provided to the function indication characters by using the light emitting element, operation information of a button portion selected by the user can be clearly and accurately provided, and the button portions can be aesthetically improved.

[0029] Also, because button functions are indicated on the button portions by themselves, it is not necessary to additionally form a function indication means at an outer side of button portions, so the productivity can be improved.

[0030] Moreover, because the soft touch button portions are implemented by using the dome type switches, user convenience can be improved, and because the control panel window assembly is modularized by including the circuit board and the dome type switches, the assembling characteristics of the control panel window assembly can be improved.

[0031] The foregoing and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032]

FIG. 1 is a perspective view schematically showing a general drum type washing machine;
FIG. 2 shows a control panel according to an embodiment of the present invention;
FIG. 3 is an enlarged view of a control panel window assembly in FIG. 2;
FIG. 4 is a sectional view taken along line IV-IV in FIG. 3;
FIG. 5 is a sectional view taken along line V-V in FIG. 3;
FIG. 6 is a sectional view taken along line VI-VI in FIG. 3;
FIG. 7 is an exploded sectional view of the control panel window assembly in FIG. 6; and
FIG. 8 is a perspective view of a switch in FIG. 7.

DETAILED DESCRIPTION OF THE INVENTION

[0033] A drum type washing machine as an example of a washing/drying machine according to embodiments of the present invention will now be described with reference to the accompanying drawings.

[0034] FIG. 2 shows a control panel according to an embodiment of the present invention.

[0035] With Reference to FIG. 2, a detergent box hole 102 for drawing in or out a detergent box is formed at one portion of a control panel 100 according to an embodiment of the present invention. A knob hole 103 is formed at a substantially central portion, allowing a rotary knob 54 is insertedly positioned. A window hole 101 is formed at another portion of the control panel to mount a control panel window 111. The control panel window 111 includes a display window 112 for mounting a display part 120 displaying operation information of the washing/drying machine and a plurality of button portions 130.

[0036] A control panel window assembly is configured including the control panel window 111 and the display part 120, which will be described in detail hereafter.

[0037] FIG. 3 is an enlarged view of a control panel window assembly in FIG. 2, FIG. 4 is a sectional view taken along line IV-IV in FIG. 3, and FIG. 5 is a sectional view taken along line V-V in FIG. 3.

[0038] As shown in FIG. 3, the control panel window 111 includes the display window 112 taking the most area, on which the display part 120 is mounted, and the

button portions 130 formed at both sides of the display window 112.

[0039] In order to display more information to the user, effectively, the display window 112 is maximized and the button portions 130 are disposed at left and right sides of the display window 112. Namely, the button portions 130 of the control panel window 111 are formed to cover a portion of the display part 120.

[0040] The button portions 130 may be formed in a cantilever form on the control panel window 111. Namely, as shown in FIG. 3, the button portions 130 are formed in a cantilever manner and face each other based on a central line in a lengthwise direction of the control panel window 111.

[0041] The button portions 130 have a substantially rectangular or square shape, and one side of the button portions are integrally formed with the control panel window 111 so as to be connected with the control panel window 111 while the other three sides of the button portions are separated from the control panel window 111. Namely, the three remaining sides, excluding one side connected with the control panel window 111 are separated from the control panel window 111 with a gap 131 interposed therebetween.

[0042] Accordingly, when the user presses the button portions 130 formed as the cantilever with only one side connected with the control panel window 111, the button portions 130 perform a cantilever motion based on the portion connected with the control panel window 111 as a support point so as to return to the original position.

[0043] Here, the elastic return force of the button portions 130 may be determined by the length between the portion of the fixed end connected with the control panel window 111 and the portion of a free end facing the portion of the fixed end.

[0044] The free end portion and the fixed end portion of the button 130 may not only face (to be symmetrical) based on a central line in a lengthwise direction of the control panel window 111 but also face (to be symmetrical) based on a central line in a widthwise direction (substantially perpendicular to the central line in the lengthwise direction) of the control panel window 111. Also, the fixed end or the free end of the button portions 130 may be formed to be asymmetrical based on the central line in the lengthwise direction or in the widthwise direction of the control panel window.

[0045] With such configuration, the display window 112 on which the display part 120 is mounted and the button portions 130 do not need to be fabricated with separate components, so the productivity of the control panel window 111 can be improved, the fabrication costs may be reduced, and a restoring unit such as a spring for returning pressed button portions 130 to their original state is not required.

[0046] A coupling flange 113 is formed to be bent at edges of the control panel window 111. With the presence of the coupling flange 113 formed at the edges of the control panel window 111, the control panel window 111 can be fixed to the control panel without having to use a fastening unit such as a screw.

[0047] With reference to FIG. 4, the coupling flange 113 makes a step with the control panel window 111 and may be bent toward the rear side of the control panel window 111.

[0048] The edges of the display window 112 are bent toward the rear side of the control panel window 111. Accordingly, with the edges of the display window 112 bent to the inner side of the control panel window 111, an injection-molded product or the like stacked on the rear surface of the control panel window can be prevented from being separated from the control panel window 111.

[0049] With reference to FIG. 4, notably, an edge portion, forming the shortest side of the edges of the display window 112, is bent with a certain length toward the rear side of the control panel window 111, and the bent portion 112a is buried in the display part 120 or an injection-molded product. If a plastic resin product is injection-molded on the rear surface of the control panel window 111, the bent portion 112a would be buried in the injection-molded product to firmly combine the injection-molded product and the control panel window 111.

[0050] With reference to FIG. 5, notably, an edge portion, forming the longest side of the edges of the display window 112, is bent with a certain length toward the rear side of the control panel window 111 and the bent portion 112b is buried in the display part 120 or the injection-molded product. Here, the function of the bent portion 112b is the same as that of the bent portion 112a mentioned above, so its detailed description will be omitted.

[0051] Here, the control panel window assembly as shown in FIGS. 4 and 5 is illustrated to explain the coupling structure of the control panel window 111 and the display part 120, namely, the bent portions 112a and 112b of the control panel window 111. That is, FIGS. 4 and 5 does not illustrate the overall structure of the control panel window assembly.

[0052] The display part 120 is injection-molded on the rear surface of the control panel window 111 and other some materials or components are also stacked on the rear surface of the control panel window 111 to form the control panel window assembly 110. The configuration of the control panel window assembly 110 will now be described in detail.

[0053] FIG. 6 is a sectional view taken along line VI-VI in FIG. 3, FIG. 7 is an exploded sectional view of the control panel window assembly in FIG. 6, and FIG. 8 is a perspective view of a switch in FIG. 7.

[0054] As shown in FIGS. 6 and 7, the control panel window assembly 110 is formed by sequentially stacking the control panel window 111 made of stainless steel, a TPU elastic resin 140, a light emitting element 150, a switch 160, a circuit board 170, a display part 120, and an injection-molded product.

[0055] Here, the control panel window 111 is made of stainless steel in order to allow a cabinet of the washing/

drying machine fabricated by using metal such as stainless steel following the high-end trend and the control panel window 111 to have the same texture.

[0056] The control panel window 111 may be made of stainless steel of a SUS 304 group. The stainless steel of SUS 304 group contains 13% or more chromium and nickel and good corrosion resistance, without magnetism.

[0057] The control panel window may have a thickness of 0.15mm.

[0058] As for the section of the control panel window 111, the display window 112, the button portions 130, and a gap 131 are explicitly shown.

[0059] The TPU elastic resin 140 may be stacked on the rear surface of the control panel window 111. The TPU elastic resin 140 is also called thermoplastic polyurethane elastomer, which has physical properties substantially similar to rubber and melt with heat so as to be processed and fabricated.

[0060] With the TPU elastic resin 140 stacked on the rear surface of the control panel window 111, the elastic return force of the button portions 130 having the cantilever shape can be increased.

[0061] The gap 131 between the button portions 130 and the control panel window 111 is filled with the TPU elastic resin 140, and the resin 140 connects the free end of the button portions 130 and the control panel window 111, to allow the free end of the button portions 130 to have, specifically, a median degree of freedom of the free end and the fixed end.

[0062] Here, the TPU elastic resin 140 corresponding to the button portions 130 includes gap blocking protrusions 141 to fill the gap 131 between the button portions 140 and the control panel window 111. In addition, a contact protrusion 142 is formed on the rear surface of the TPU elastic resin 140.

[0063] In this case, silicon may be additionally stacked on the front or rear surface of the TPU elastic resin 140.

[0064] The light emitting element 150 is mounted on a portion, corresponding to the button portions 130, of the rear surface of the TPU elastic resin 140. Because the light emitting element 150 is stacked between the button portions 130 and the TPU elastic resin 140, an illumination effect can be provided to the button portions 130 selected by the user, and when the button portions 130 is formed to be etched, the selected function can be illuminated to accurately inform the user about whether or not the button portions 130 is operated. Namely, a button function indication character may be printed on the surface of the button portions 130, or the button function indication may be formed to penetrate the button portions 130 to accurately inform the user about the function of the button portions 130 by using light emitted from the light emitting element 150 and enhance aesthetic sense of the external appearance.

[0065] When the button function indication is penetratingly formed on the button portions 130 through etching, light emitted from the light emitting element 150 can penetrate the button function indication after passing through the TPU elastic resin 140 and then transferred to the front side of the button portions 130 to illuminate function of the button portions 130 selected by the user.

[0066] Here, the TPU elastic resin 140, which is formed as a type of print film and attached to silicon, is enough thin to allow light emitted from the light emitting element 150 to pass through the TPU elastic resin 140 to reach the button portions 130.

[0067] The light emitting element 150 includes an LED or an OLED. In this case, the light emitting element 150 may include a light guide plate (LGP). In general, the LGP refers to an acryl injection-molded product assembled in a backlight unit guiding light to liquid crystal within the LCD, and it is one of plastic molded lenses uniformly transferring light emitted from a CCFL (Cold Cathode Fluorescent Lamp) to the entire surface of the LCD.

[0068] By including such LGP in the light emitting element 150, light can be evenly transferred from the entire light emitting element 150.

[0069] The switch 160 is mounted on the rear surface of the light emitting element 150, and installed on the circuit board 170 positioned at a rear side of the switch 160. Various signal movement paths are formed on the circuit board 170 and the circuit board 170 receives a signal according to a contact of the switch 160.

[0070] Here, the switch 160 may be a dome switch as shown in FIG. 8. In order to reduce the thickness of the control panel window assembly 110, the dome switch may have a diameter of about 5mm and a weight of about 160 grams. The thickness of the circuit board 170 is about 0.8mm.

[0071] By employing the dome switch 160 and the circuit board 170, the button portions 130 may be implemented as a soft touch type of button portions, and the overall thickness of the button portions 130, the switch 160 and the circuit board 170 can be reduced.

[0072] The switch 160 is pressed by the contact protrusion 142 formed on the TPU elastic resin 140. That is, although the user slightly touches the button portions 130, the contact protrusion 142 of the TPU elastic resin 140 presses the dome switch 160 to allow the switch 160 and the circuit board 170 to be in contact with each other.

[0073] A plastic (PCB) injection-molded product or the display part 120 is stacked on the rear surface of the circuit board 170.

[0074] As so far described, because the control panel window assembly 110 is applied to the washing/drying machine having the main body made of stainless steel, the control panel window assembly can be in harmony with the cabinet made of stainless steel and users' demands on the washing/drying machine providing a high-end sense can be satisfied.

[0075] In the above description, the drum type washing machine has been explained as an example of the washing/drying machine, but the present invention can be also applicable to various types of washing/drying machines such as a dryer, a drum type washing machine with a

dryer, a composite washing system, a refresher, or the like.

[0076] As the present invention may be embodied in several forms without departing from the characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its scope as defined in the appended claims, and therefore all changes and modifications that fall within the metes and bounds of the claims, or equivalents of such metes and bounds are therefore intended to be embraced by the appended claims.

Claims

1. A control panel window assembly of a washing/drying machine, comprising:

a control panel with a window hole in which a display part displaying various information and a control panel window are mounted,

wherein the control panel window comprises:

a display window formed to cover a portion of the display part; and
a plurality of button portions formed around the display window.

2. The assembly of claim 1, wherein the button portions are formed in a cantilever shape on the control panel window.

3. The assembly of claim 1, wherein the button portions have a rectangular shape with at least one side separated from the control panel window.

4. The assembly of claim 1, wherein the button portions indicate each function.

5. The assembly of claim 1, wherein the button portions have each function indication etched to be formed.

6. The assembly of claim 1, wherein the display window is bent toward a rear side of the control panel window.

7. The assembly of claim 1, wherein a TPU (Thermoplastic Polyurethane) elastic resin is stacked on a rear surface of the control panel window.

8. The assembly of claim 7, wherein silicon is attached to the TPU elastic resin.

9. The assembly of claim 8, wherein a light emitting element is mounted on a rear surface, corresponding to the button portions, of the TPU elastic resin.

10. The assembly of claim 9, wherein a switch is mounted on a rear surface of the light emitting element and installed on a circuit board.

11. The assembly of claim 10, wherein the switch is a dome switch.

12. The assembly of clam 9, wherein the light emitting element is a light emitting diode (LED), and the LED includes a light guide plate (LGP).

13. The assembly of claim 9, wherein the TPU elastic resin in contact with the light emitting element includes a contact protrusion.

14. The assembly of claim 1, wherein the control panel window is made of stainless steel.

15. The assembly of claim 14, wherein the control panel window is made of SUS 304 stainless steel.

Fig. 1

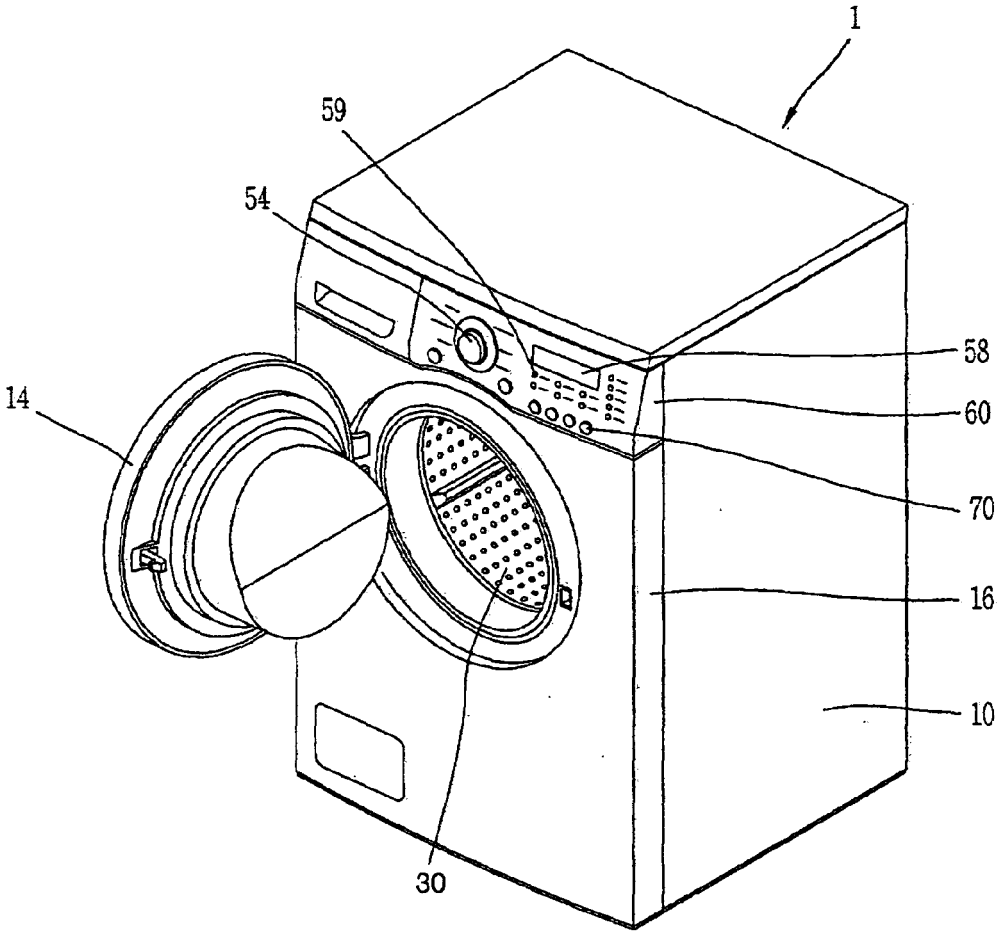


Fig. 2

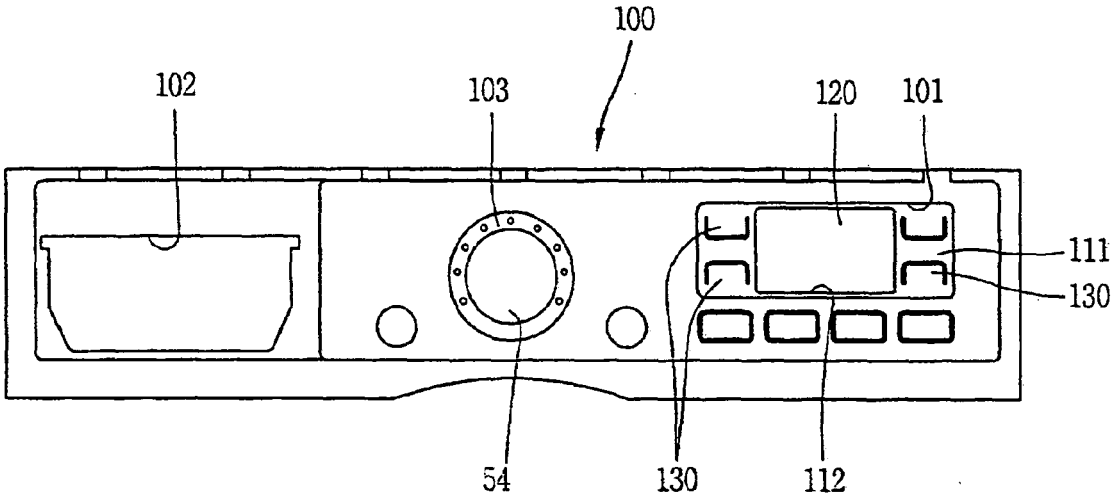


Fig. 3

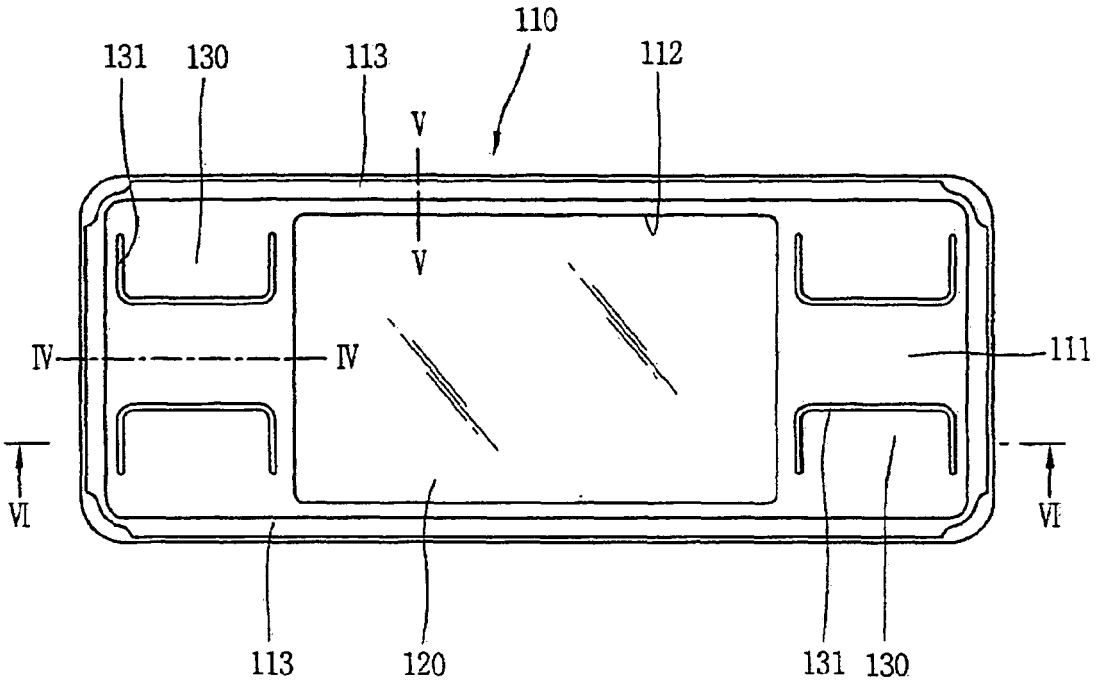


Fig. 4

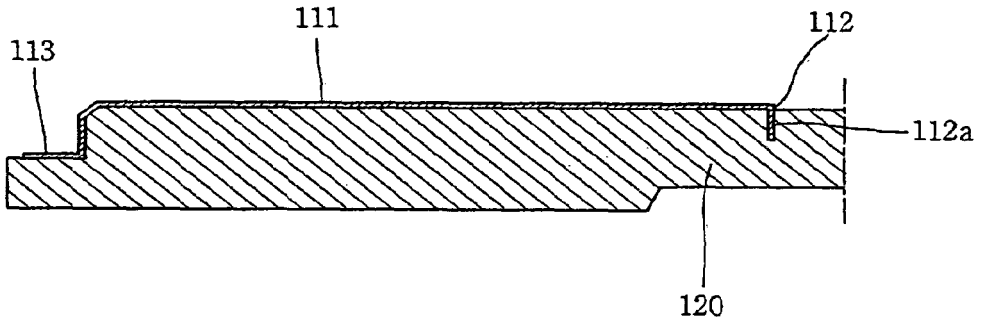


Fig. 5

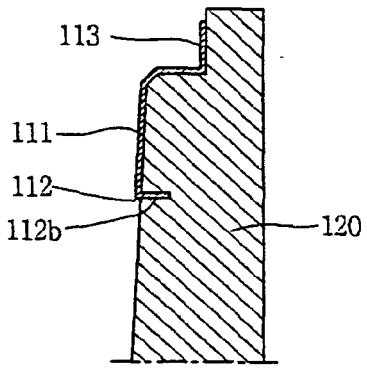
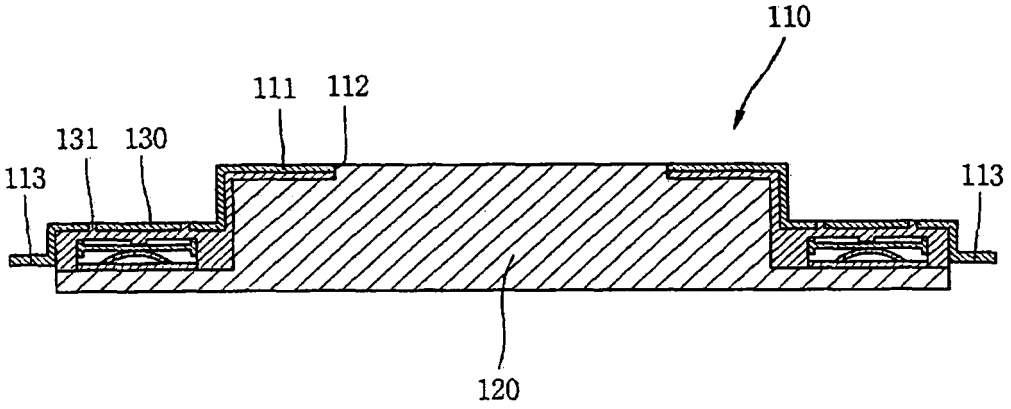


Fig. 6


110
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112
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130
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113
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Fig. 7

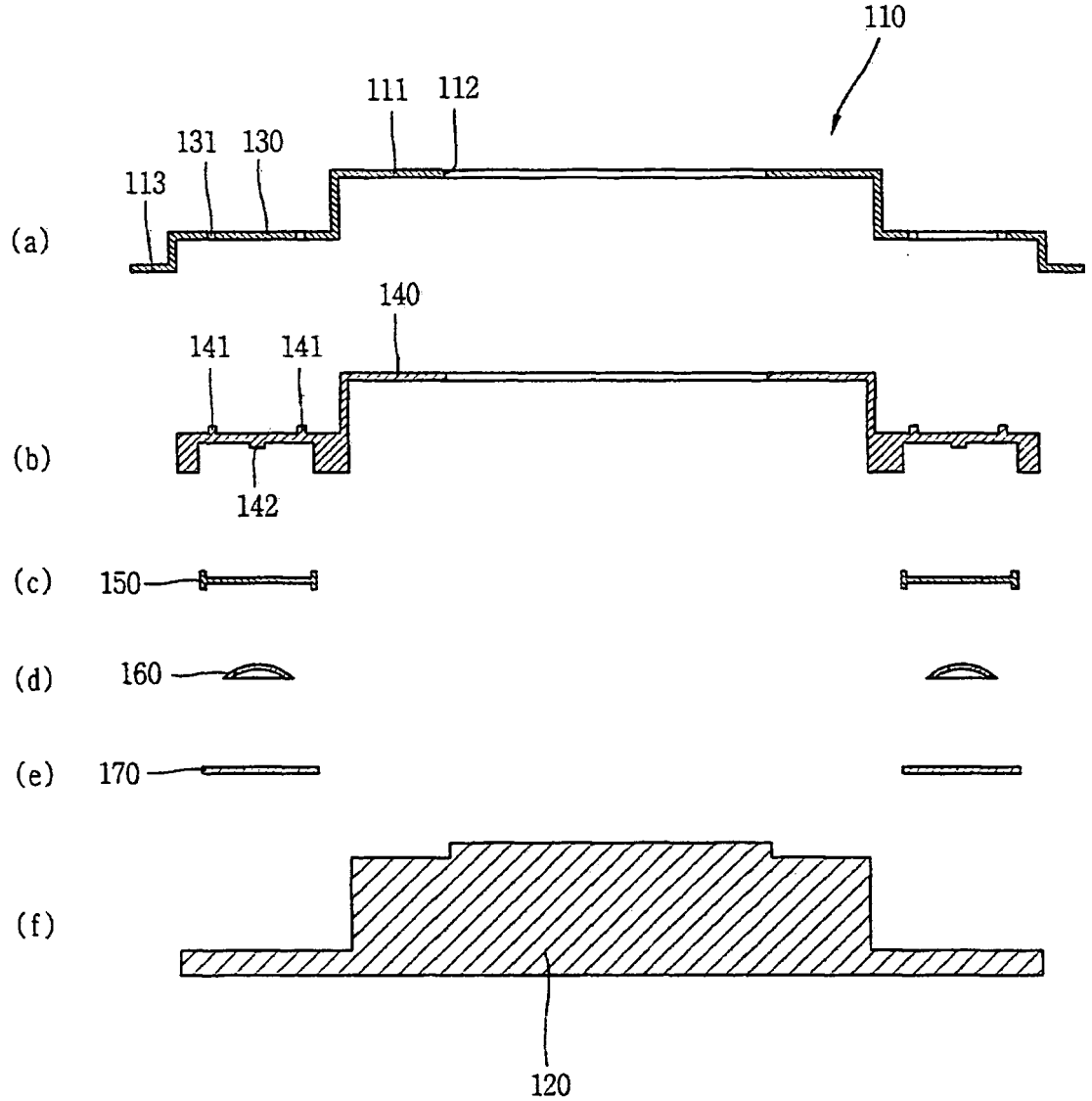
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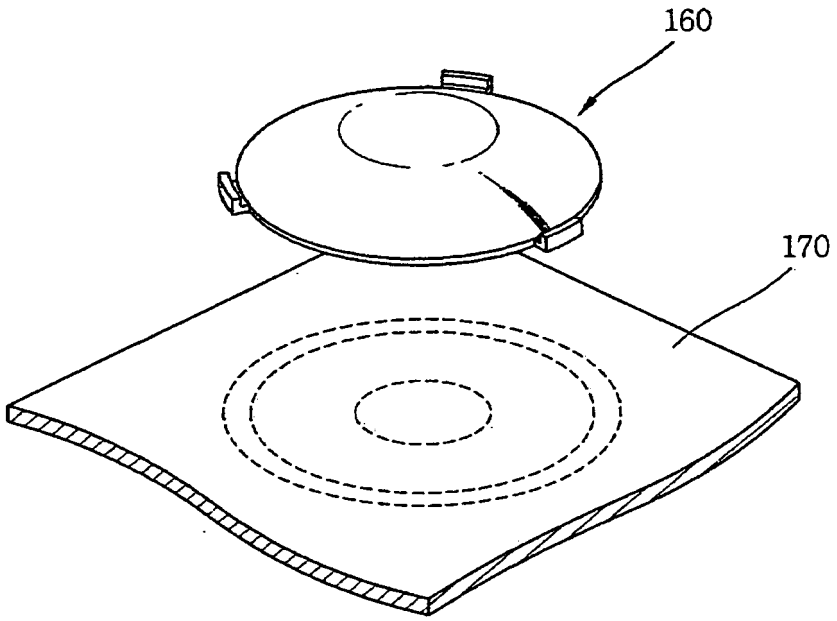
Fig. 8



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EUROPEAN SEARCH REPORT

Application Number
EP 08 01 5264

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	WO 2006/038147 A (ARCELIK ANONIM SIRKETI [TR]; AVCI KORKUT [TR]; TEZCAN CUNEYT [TR]) 13 April 2006 (2006-04-13) * paragraphs [0013] - [0018]; claims; figures *	1-5 6-15	INV. D06F39/00
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TECHNICAL FIELDS SEARCHED (IPC)
D06F A47L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 January 2009	Clivio, Eugenio

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 01 5264

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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22-01-2009

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