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(71) Applicant: **BSH HAUSGERÄTE GMBH** [DE/DE]; Carl-Wery-Str. 34, 81739 München (DE).

(72) Inventors: **CUI, Jianmin**; No. 20 Yin Yuan Xi Chun, Room 404, Nanjing city, Nanjing, Jiangsu 210000 (CN). **GU, Xuebin**; No.18 Guanghua Dong Street, Nanjing, Jiangsu 210000 (CN). **SCHLASS, Alexander**; Sanddornweg 15, 14624 Dallgow-Döberitz (DE). **ZHAN, Yang**; Yishengjiayuan, Xiaguan district, Nanjing, Jiangsu 210000 (CN).

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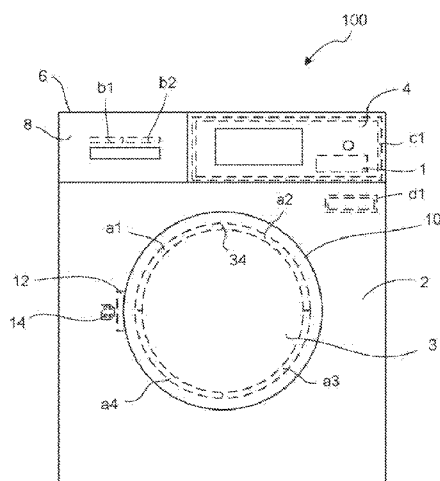


FIG. 1

(57) Abstract: The present invention discloses a household appliance (100), including an enclosure assembly (2) that forms appearance of the household appliance, a light source (14, 140, 1400) controlled by a control apparatus (1), and a light guide apparatus (16, 16a, 16b, 1610) that fits with the light source and is located on the enclosure assembly, where the light source includes at least two light-emitting elements (14), the light guide apparatus (16, 16a, 16b, 1610) includes light guide elements (16, 16a, 16b, 1610) whose quantity corresponds to that of the light-emitting elements (14), and each light-emitting element (14) corresponds to one light guide element (16, 16a, 16b, 1610). Thus, the light-emitting elements (14) can be separately controlled, so that light in different colors or with different dynamic features may be emitted by using the light guide element (16, 16a, 16b, 1610).



HOUSEHOLD APPLIANCE

The present invention relates to components of a household appliance, and in particular, to a light-emitting apparatus of the household appliance.

5

To achieve some decorative or functional indication effects, light-emitting apparatuses are disposed on enclosures of some household appliances. The light-emitting apparatus includes a light source such as an LED lamp, and a light guide element that guides the light source to a target position or converts the light source to a target shape.

10

An objective of the present invention is to provide a household appliance with more flexible and diversified light-emitting effects.

For the above objective, the technical solutions used in the present invention are: A household appliance is provided, including an enclosure assembly that forms appearance of the household appliance, a light source controlled by a control apparatus, and a light guide apparatus that fits with the light source and is located on the enclosure assembly, wherein the light source includes at least two light-emitting elements, the light guide apparatus includes light guide elements whose quantity corresponds to that of the light-emitting elements, and each light-emitting element corresponds to one light guide element.

20

The household appliance may be embodied as, but is not limited to, a washing machine, a refrigerator, a range hood, an air conditioner, a dishwasher, a microwave oven, a vacuum cleaner, and the like.

25

The enclosure assembly may be the generic form for mechanical parts that form an external contour of the household appliance, for example, the enclosure assembly includes an enclosure body, and a door, windows, a drawer panel and the like disposed on the enclosure body.

30

A light-emitting system including the at least two light-emitting elements and the light guide elements may separately control the light-emitting elements, so that the light guide element emits light in different colors or with different dynamic features.

As an optional implementation manner, the light guide element is a flexible light guide bar whose peripheral surface is optically transmittive. In this way, the light guide bar may form various random light output patterns, makes light pass uniformly, and has a simple structure and low costs.

As an optional implementation manner, the light-emitting elements are centrally arranged, and light receiving ends of light guide bars are separately arranged correspondingly opposite to the light-emitting elements. The light-emitting elements are centrally arranged, so that connections and installation of wires are simpler, and heat dissipation of the light-emitting element is more compact and centralized, thereby simplifying design of a mechanism.

As an optional implementation manner, the enclosure assembly has an outer surface, the light guide apparatus includes a first light guide element, and the first light guide element includes an axial first part and a second part, where the first part is shaded by a light shading element, so that light scattered by the first part cannot pass through the outer surface of the enclosure assembly, and the second part is not shaded by the light shading element, so that light scattered by the second part can pass through the outer surface of the enclosure assembly. According to different arrangements of the light shading element, the light guide apparatus may output different light-emitting patterns to the outer surface of the enclosure assembly, so that the light guide apparatus may achieve a visual effect of segmentally emitting light. The light shading element may be an opaque mechanical part in a plate shape, or an opaque sleeve sleeved on the first light guide element, or an opaque coating coated on the first light guide element.

As an optional implementation manner, at least one part of the outer surface of the enclosure assembly is covered by a translucent plate.

As an optional implementation manner, the light guide apparatus includes a second light guide element, where at least one part of the second light guide element is not shaded by the light shading element, so that light scattered by the at least one part can pass through the outer surface of the enclosure assembly, and an end of the at least one part of the second light guide element is connected to or overlaps an end of the second part of the

first light guide element, so that projections of the at least one part of the second light guide element, and the second part of the first light guide element onto the outer surface of the enclosure assembly are connected to each other. Such disposing may form, on the outer surface of the enclosure, a light-emitting effect that the first light guide element and the second light guide element are independent but connected to each other. The light shading element may be an opaque mechanical part in a plate shape, or an opaque sleeve sleeved on the second light guide element, or an opaque coating coated on the second light guide element.

10 As an optional implementation manner, the at least two light guide elements form, on an outer surface of the enclosure assembly, a light-emitting pattern formed by connecting at least two light-emitting segments.

15 As an optional implementation manner, each light-emitting segment corresponds to at least one part of each light guide element, and light scattered outward by the at least one part of the light guide element can pass through the enclosure assembly.

20 As an optional implementation manner, the second part of the first light guide element is away from a light receiving end of the first light guide element.

As an optional implementation manner, the control apparatus controls the light-emitting elements to be turned on or turned off at the same time or at different times.

25 As an optional implementation manner, different visual effects transferred by means of the light guide elements when the light-emitting elements is turned on or turned off at the same time or at different times separately correspond to different running states or warning information of the household appliance. The information conveyed in this way is more impressive than information conveyed by using a monitor, and may be also observed from a farther distance.

30 As an optional implementation manner, the control apparatus controls the light-emitting elements to gradually become brighter or gradually fade away at the same time or at different times.

As an optional implementation manner, the light-emitting element may emit light in different colors.

5 As an optional implementation manner, the at least two light guide elements form, on an outer surface of the enclosure assembly, a light-emitting pattern formed by connecting at least two light-emitting segments.

As an optional implementation manner, the light-emitting pattern is an enclosed pattern.

10 As an optional implementation manner, the light-emitting segments are sequentially turned on and turned off.

As an optional implementation manner, the light-emitting segments are turned on at the same time and turned off at the same time at a preset frequency.

15 As an optional implementation manner, the at least two light-emitting elements are integrated on one light-emitting base. Thus, it is convenient for installation of the light-emitting elements, and installation positions are also more accurate.

20 As an optional implementation manner, ends of the light guide elements, which are close to the light-emitting elements, are integrated on one light guide base. Thus, it is convenient for installation of the light guide elements, and installation positions are also more accurate.

25 The following section further describes preferred embodiments of the present invention by using an application in a washing machine as an example. Therein reference is made to the accompanying drawing. In the drawing,

FIG. 1 is a front schematic diagram of a washing machine;

30 FIG. 2 is a schematic partial diagram, obtained after a door body and a case body are cut at a hinge, of a light guide bar and a light-emitting module in a first assembling mode;

FIG. 3 is an enlarged front diagram of a cut part in FIG. 2;

FIG. 4 is a schematic partial diagram, obtained after the door body and the case body are cut at the hinge, of the light guide bar and the light-emitting module in a second assembling mode;

FIG. 5 is a schematic diagram of a light-emitting module close to the hinge, and a receiving end of a light guide bar on the door;

FIG. 6 is a schematic diagram of an emitting surface of the light-emitting module around the hinge;

FIG. 7 is a rear schematic diagram of the receiving end of the light guide bar on the door;

FIG. 8 is a schematic diagram of a receiving surface of the receiving end of the light guide bar on the door;

FIG. 9 is a schematic diagram of an installation structure of the light guide bar;

FIG. 10 is a schematic diagram of an internal structure of the door body, where to clearly display a key portion, the middle of the schematic diagram is omitted, and two ends are close to each other;

FIG. 11 is a schematic diagram of an overlapping part of light guide bars.

As shown in FIG. 1, a washing machine 100 has a housing 2, a control panel 4 installed on the housing 2, a drawer 6 disposed on the housing 2, and a door 10 that is installed on the housing 2 to close a laundry delivery and fetch opening 3 on the housing 2. The door 10 is connected to the housing 2 by using a hinge 12. The drawer 6 has a drawer panel 8 that fits with the housing 2. The washing machine 100 further has a control apparatus 1 that controls various circuit modules within the washing machine 100, thereby controlling running of the washing machine 100.

The door 10 has an enclosed circular light-emitting ring, where a long-strip-shaped first light-emitting segment a1, second light-emitting segment of a2, third light-emitting segment a3, and fourth light-emitting segment a4 are consecutively connected to form the enclosed circular light-emitting ring. Four light sources 14 are provided at a position close to the hinge 12 on the housing 2. Each light source 14 corresponds to one of light-emitting segments of a1 to a4. The control apparatus 1 controls the light source 14 to be turned on or turned off.

Moreover or alternatively, there is a fifth light-emitting segment b1 and a sixth light-emitting segment b2 on the drawer panel 8, to separately indicate different laundry processing solvents stored in the drawer 6.

Moreover or alternatively, there is a seventh light-emitting segment c1 on the control panel 4.

Moreover or alternatively, there is an eighth light-emitting segment d1 on the housing 2.

The seventh light-emitting segment c1 and the eighth light-emitting segment d1 may also be formed by connecting multiple light-emitting segments.

Light-emitting states of the forgoing light-emitting segments of a1 to a4, b1, b2, c1, and d1 are controlled by the control apparatus 1, so that the light-emitting segments are turned on or turned off at the same time or at different times, or gradually become brighter or gradually fade away at the same time or at different times, or emit light in different colors, so as to produce a decorative effect, and/or indicate different running states of the washing machine 100 to a user that or send warning information. For example, the first light-emitting segment a1, the second light-emitting segment a2, the third light-emitting segment a3, and the fourth light-emitting segment a4 on the door 10 are sequentially turned on and turned off to indicate running of a program, or the first light-emitting segment a1, the second light-emitting segment a2, the third light-emitting segment a3, and the fourth light-emitting segment a4 are turned on at the same time and turned off at the same time at a preset frequency to prompt that running of a program ends.

The following describes forming principles and structure features of the light-emitting

segments of a1 to a4 by using the door 10 as an example. Principles and structures of other light-emitting segments can be easily understood according to the following description.

5 As shown in FIG. 2 and FIG. 3, a light-emitting module 140 is fixed on the housing 2, and the light-emitting module 140 is connected to the control apparatus 1 (not shown in the accompanying drawings) by using a wire (not shown in the accompanying drawings). A light guide bar 16 is fixed on door 10, and a light receiving end 161 thereof passes through a hole or gap 18 on the hinge 12 to approach the light-emitting module 140, and
10 is opposite to the light-emitting module 140, so as to receive light emitted from the light-emitting module 140. The light guide bar 16 is fixed relative to the hinge 12, for example, the light guide bar 16 is clamped in the hole or gap 18 on the hinge 12, and the light receiving end 161 of the light guide bar 16 is not directly connected to the light-emitting module 140. The light receiving end 161 of the light guide bar 16 leaves or approaches
15 the light-emitting module 140 as the door 10 is opened or closed. When the door 10 is closed, a gap is reserved between the light receiving end 161 of the light guide bar 16 and the light-emitting module 140.

As shown in FIG. 4, a light receiving end 1610 of the light guide bar and a light-emitting
20 module 1400 may have another assembling mode: the light-emitting module 1400 is fixed on the door 10, and a wire 20 connected to the light-emitting module 1400 passes through the hinge 12 and then is connected to the control apparatus 1 disposed in the housing 2.

As shown in FIG. 5 to FIG. 8, the light-emitting module 140 around the hinge 12 includes
25 a light-emitting base 141, and four light sources 14 are fixed in the light-emitting base 141. A translucent plate or translucent film 142 is provided in a light emitting direction of the light source 14. The light receiving end 161 of the light guide bar 16 is disposed opposite to the light-emitting module 140. Light receiving ends 161 of the four light guide bars 16 are also integrated on one light guide base 162, and a translucent plate or translucent film
30 163 is also provided in a light receiving direction thereof. When the light-emitting module 140 and the light receiving end 161 of the light guide bar 16 approach each other, the light receiving end 161 of each light guide bar 16 is separately opposite to one of the light sources 14, so as to receive light from the light source 14.

Under control of the control apparatus 1, when a relative distance D between the light source 14 and the light guide element 16 is greater than or equal to a preset value D_0 , the light source 14 is to be closed. Thus, it can be imaged that when the light source 14 is in an on state, if the door 10 is opened, the relative distance D between the light guide element 16 and the light source 14 increases, so that the light source 14 is turned off.

In addition, when the door 10 is gradually closed, and the relative distance D between the light source 14 and the light guide element 16 gradually reduces to become less than or equal to the preset value D_0 , the light source 14 is turned on. It may be understood that, a prerequisite is that the control apparatus is powered on.

The relative distance D between the light source 14 and the light guide element 16 may be measured by using a sensor (not shown in the accompanying drawings), or a micro switch (not shown in the accompanying drawings) electrically connected to the light source 14 is disposed at a suitable position. When the relative distance D between the light source 14 and the light guide element 16 reaches a critical value, the micro switch is triggered, so that the light source 14 is turned off.

As shown in FIG. 2 to FIG. 4 and in FIG. 9 to FIG. 11, the light guide bar 16 is preferably flexible fiber whose peripheral surface is optically transmittive, and is in a long-strip-shaped and cylindrical structure. Light is uniformly emitted from the peripheral surface after entering the light guide bar 16 from the receiving end 161, so that the peripheral surface of the entire light guide bar 16 is luminous. Light guide fiber with this feature may be purchased from the market.

To define an extension path of the light guide bar 16 and make the extension path form a particular preset shape, for example, to obtain a circular light ring on the door 10 shown in FIG. 1, a guide slot 22 whose entirety extends in an arc is provided in the door 10. In addition, a cross sectional shape of the guide slot 22 is an arc that matches a cross sectional shape of the light guide bar 16. A translucent plate 24 covers an outer side of the light guide bar 16, so that light that passes through the light guide bar 16 can be emitted from the translucent plate 24. The translucent plate 24 forms at least one part of an outer surface of the door 10.

To obtain light with a clearer edge, light shading plates 26 may be disposed at two sides of the translucent plate 24. The shape of the translucent plate 26 may adapt to the shape of the light guide bar 16.

5 Because the light receiving ends 161 of the four light guide bars 16 on the door 10 are centralized together, to obtain the light-emitting segments of a1 to a4 that are connected to each other but independent of each other, the light guide bars 16 needs to be specially arranged. As an example, FIG. 10 shows arrangement structures of two light guide bars of 16a and 16b, which is described in detail below.

10 The door 10 has a translucent outer surface 101. The most part of the first light guide bar 16a is directly located below the translucent plate 24, and light emitted from the most part may pass through the outer surface 101 of the door, and form, on the outer surface 101 of the door 10, the first light-emitting segment a1. An axial first part 16b1 of the second light
15 guide bar 16b extends within an opaque mechanical part 30, and light emitted from the first part 16b1 cannot pass through the outer surface 101 of the door. The second light guide bar 16b further has an axial second part 16b2, where the part is not shaded by the opaque mechanical element 30, and is directly located below the translucent plate 24, and light emitted from the second part 16b2 can pass through the outer surface 101 of the
20 door, and form, on the outer surface 101 of the door 10, the second light-emitting segment a2. The second part 16b2 of the second light guide bar 16b is way from a light receiving end 161b of the second light guide bar 16b.

25 An end 162a, away from a light receiving end 161a thereof, of the first light guide bar 16a overlaps a connection 160b of the first part 16b1 and the second part 16b2 on the second light guide bar 16b, so that projections of the light transmitting part of the first light guide bar 16a, and the second part 16b2 of the second light guide bar 16b onto the outer surface 101 of the door 10 are connected to each other. Thus, the first light-emitting segment a1 and the second light-emitting segment a2 are connected to each other. An overlapping
30 area 32 of the first light guide bar 16a and the second light guide bar 16b corresponds to a connection area 34 of the first light-emitting segment a1 and the second light-emitting segment a2.

As shown in FIG. 11, after the first light guide bar 16a and the second light guide bar 16b

are overlapped, each of the first light guide bar 16a and the second light guide bar 16b deviates from an axial direction to deflect at a specific angle, where a deflection direction for example, is shown in the embodiment shown in the figure: the first light guide bar 16a laterally deflects at a specific angle and then deflects downward, so that an end surface 1600a thereof deviates from a direction of the outer surface 101 of the door 1; and the
5 1600a thereof deviates from a direction of the outer surface 101 of the door 1; and the second light guide bar 16b directly deflects downward, so that an end surface 1600b thereof also deviates from the direction of the outer surface 101 of the door 1.

Various specific implementation manners described in the foregoing and shown in the
10 accompanying drawings are only used to illustrate the present invention, and are not considered as the entirety of the present invention. Within the scope of the basic technical thought of the present invention, any type of modifications for the present invention made by persons of ordinary skills in the related technical field shall fall within the protection scope of the present invention.

CLAIMS

- 5 1. A household appliance, comprising an enclosure assembly (2, 4, 8, 10) that forms appearance of the household appliance, a light source (14, 140, 1400) controlled by a control apparatus (1), and a light guide apparatus (16, 16a, 16b, 1610) that fits with the light source and is located on the enclosure assembly, wherein the light source (14, 140, 1400) comprises at least two light-emitting
10 elements (14), the light guide apparatus (16, 16a, 16b, 1610) comprises light guide elements (16, 16a, 16b, 1610) whose quantity corresponds to that of the light-emitting elements, and each light-emitting element corresponds to one light guide element.
- 15 2. The household appliance according to claim 1, wherein the light guide element (16, 16a, 16b, 1610) is a flexible light guide bar whose peripheral surface is optically transmittive.
- 20 3. The household appliance according to claim 2, wherein the light-emitting element (14) is centrally arranged, and light receiving ends (161, 161a, 161b, 1610) of light guide bars (16, 16a, 16b, 1610) are separately arranged correspondingly opposite to the light-emitting elements (14).
- 25 4. The household appliance according to claim 3, wherein the enclosure assembly (2, 4, 8, 10) has an outer surface (101), the light guide apparatus (16, 16a, 16b, 1610) comprises a first light guide element (16b), and the first light guide element (16b) comprises an axial first part (16b1) and second part (16b2), wherein the first part (16b1) is shaded by a light shading element (30), so that light scattered by the first part cannot pass through the outer surface (101) of the enclosure
30 assembly, and the second part (16b2) is not shaded by the light shading element (30), so that light scattered by the second part can pass through the outer surface (101) of the enclosure assembly.

5. The household appliance according to claim 4, wherein at least one part of the outer surface (101) of the enclosure assembly is covered by a translucent plate (26).
- 5 6. The household appliance according to claim 4, wherein the light guide apparatus (16, 16a, 16b, 1610) comprises a second light guide element (16a), wherein at least one part of the second light guide element (16a) is not shaded by the light shading element (30), so that light scattered by the at least one part can pass through the outer surface (101) of the enclosure assembly, and an end (162a) of the at least one part of the second light guide element (16a) is connected to or overlaps an end (160b) of the second part (16b2) of the first light guide element (16b), so that projections of the at least one part of the second light guide element (16a), and the second part (16b2) of the first light guide element (16b) onto the outer surface of the enclosure assembly (101) are connected to each other.
- 10 7. The household appliance according to claim 3, wherein the at least two light guide elements (16, 16a, 16b, 1610) form, on an outer surface (101) of the enclosure assembly, a light-emitting pattern formed by connecting at least two light-emitting segments (a1 to a4, b1, b2, c1, d1).
- 15 8. The household appliance according to claim 4, wherein each light-emitting segment (a1 to a4, b1, b2, c1, d1) corresponds to at least one part of each light guide element (16, 16a, 16b, 1610), and light scattered outward by the at least one part of the light guide element can pass through the enclosure assembly (2, 4, 8, 10).
- 20 9. The household appliance according to claim 4, wherein the second part (16b2) of the first light guide element (16b) is away from a light receiving end (161b) of the first light guide element (16b).
- 25 10. The household appliance according to claim 1, wherein the control apparatus (1) controls the light-emitting elements (14) to be turned on or turned off at the same time or at different times.
- 30

11. The household appliance according to claim 10, wherein different visual effects transferred by means of the light guide elements (16, 16a, 16b, 1610) when the light-emitting elements (14) is turned on or turned off at the same time or at different times separately correspond to different running states or warning information of the household appliance.
12. The household appliance according to claim 10, wherein the control apparatus (1) controls the light-emitting elements (14) to gradually become brighter or gradually fade away at the same time or at different times.
13. The household appliance according to claim 1, wherein the light-emitting element (14) may emit light in different colors.
14. The household appliance according to any one of claims 10 to 13, wherein the at least two light guide elements (16, 16a, 16b, 1610) form, on an outer surface (101) of the enclosure assembly, a light-emitting pattern formed by connecting at least two light-emitting segments (a1 to a4, b1, b2, c1, d1).
15. The household appliance according to claim 14, wherein the light-emitting pattern is an enclosed pattern.
16. The household appliance according to claim 15, wherein the light-emitting segments (a1 to a4, b1, b2, c1, d1) are sequentially turned on and turned off.
17. The household appliance according to claim 14, wherein the light-emitting segments (a1 to a4, b1, b2, c1, d1) are turned on at the same time and turned off at the same time at a preset frequency.
18. The household appliance according to claim 1, wherein the at least two light-emitting elements (14) are integrated on one light-emitting base (141).
19. The household appliance according to claim 1, wherein ends of the light guide elements (16, 16a, 16b, 1610), which are close to the light-emitting elements (14), are integrated on one light guide base (162).

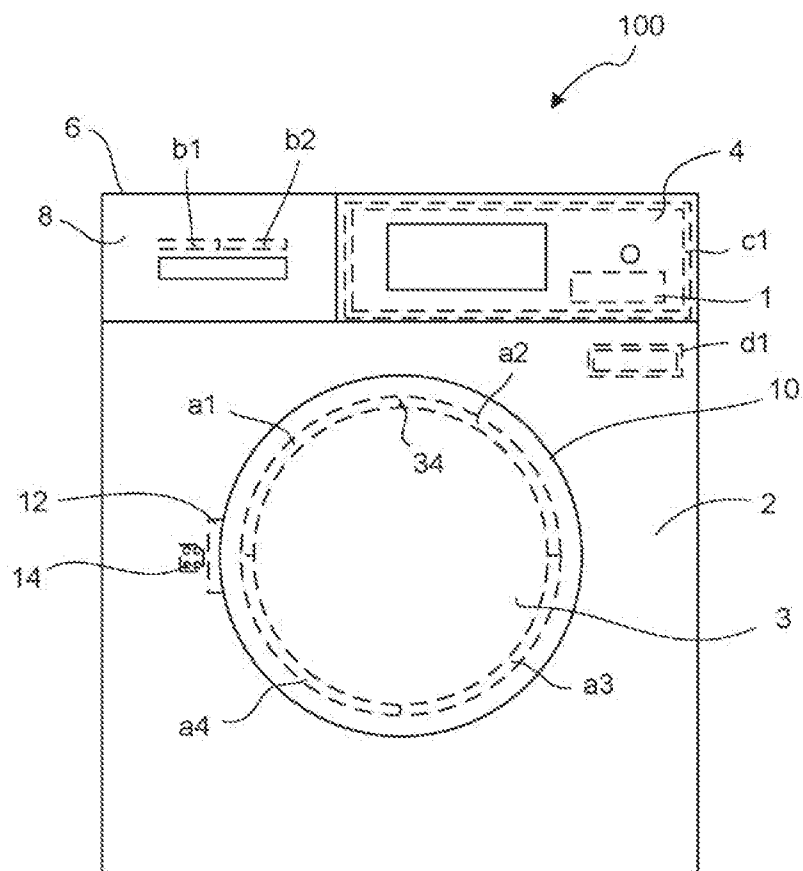


FIG. 1

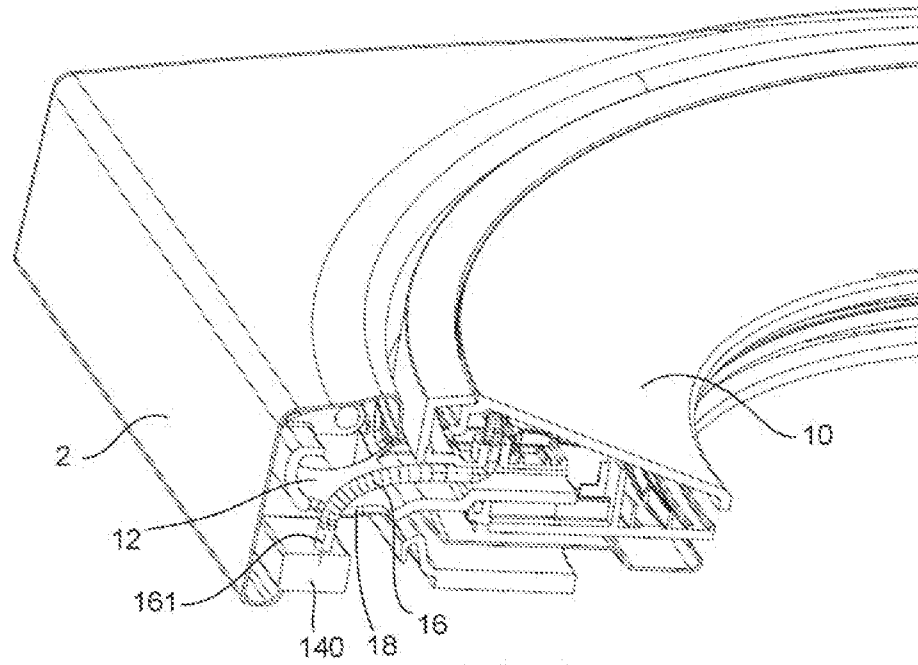


FIG. 2

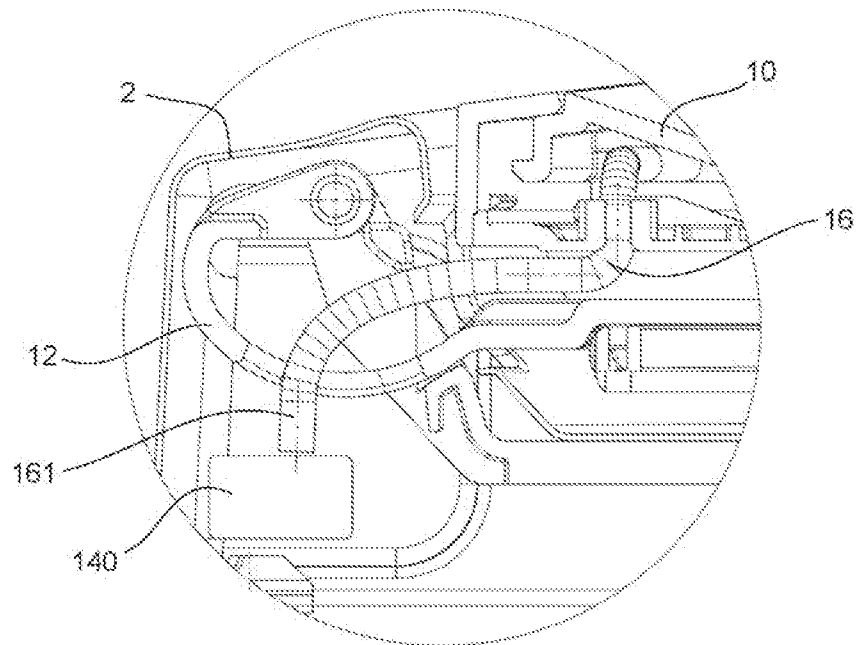


FIG. 3

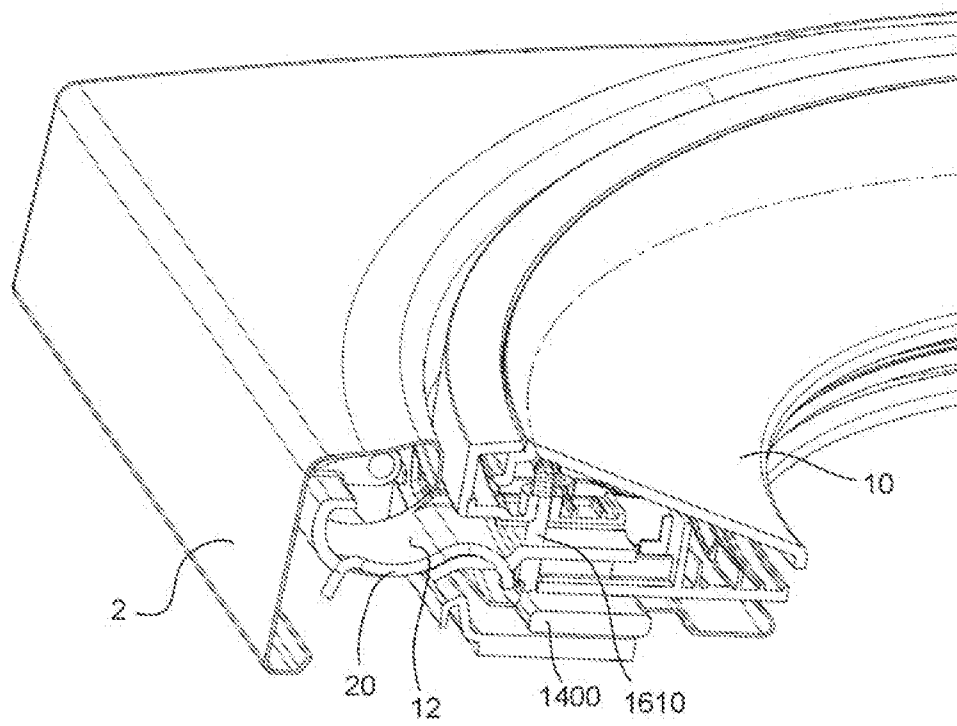


FIG. 4

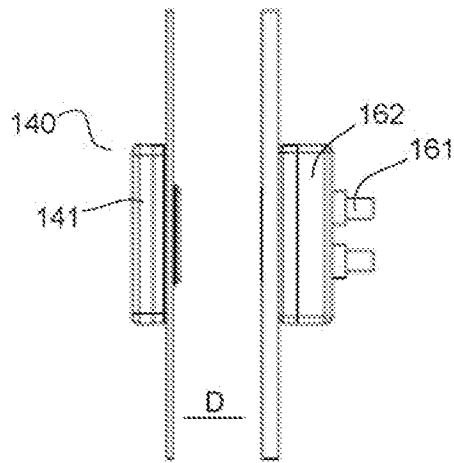


FIG. 5

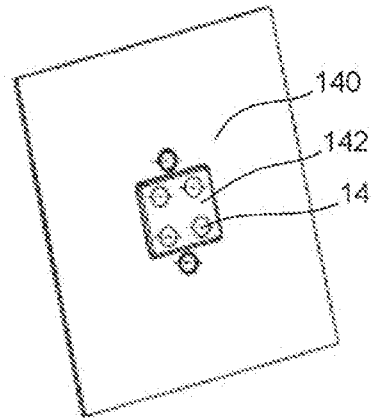


FIG. 6

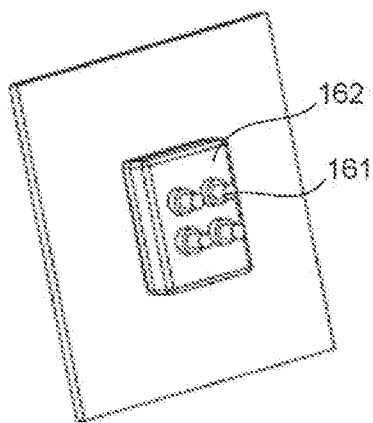


FIG. 7

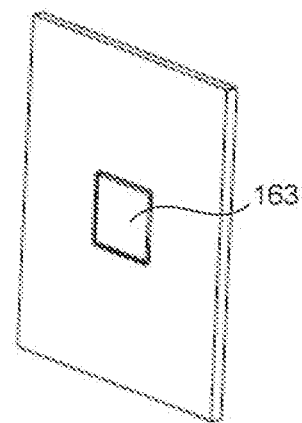


FIG. 8

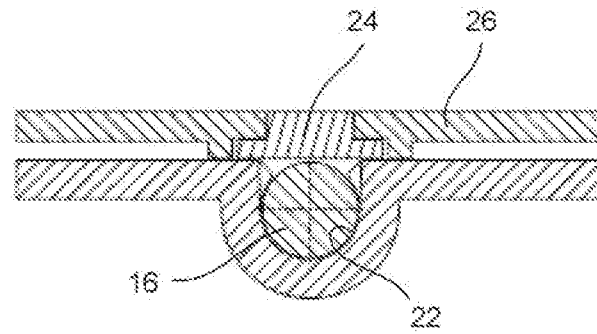


FIG. 9

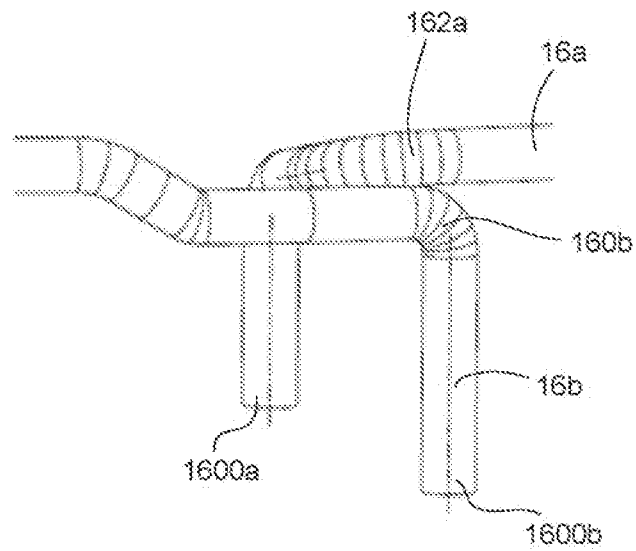


FIG. 11

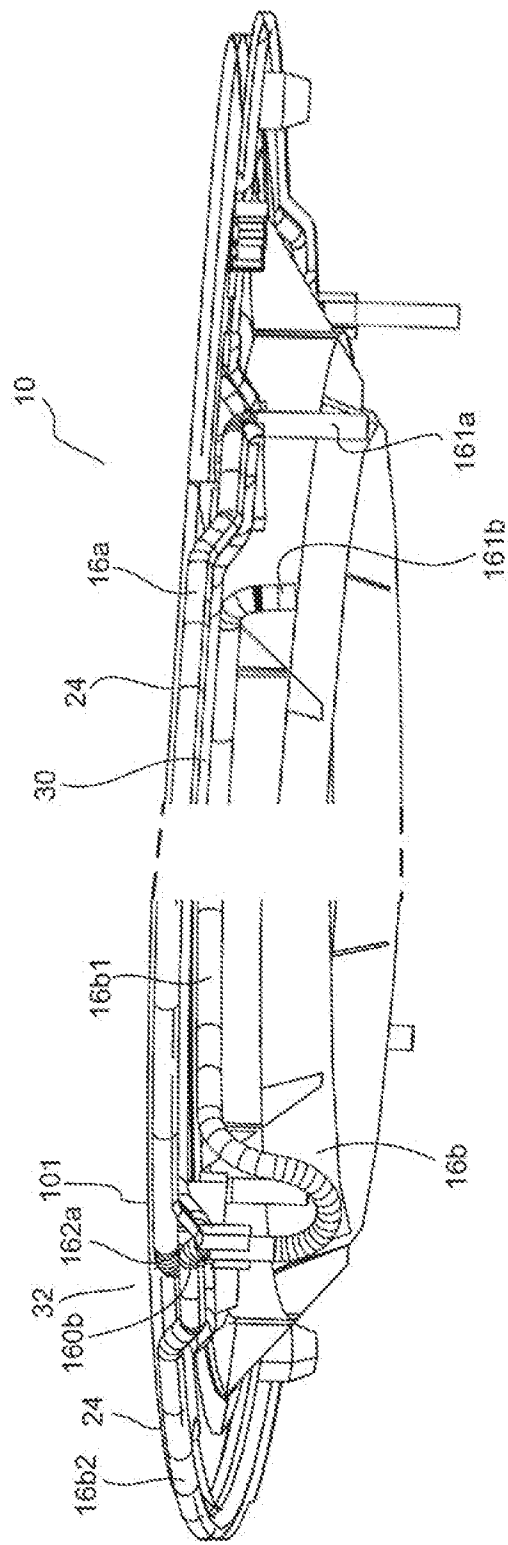


FIG. 10

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2015/059291

A. CLASSIFICATION OF SUBJECT MATTER

INV. D06F39/00 A47L15/42 D06F39/12 D06F37/28 F25D27/00
H01H19/02

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)

D06F A47L F25D H01H

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)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 582 619 A1 (WHIRLPOOL CO [US]) 5 October 2005 (2005-10-05)	1-3,5-17
Y	paragraph [0027] - paragraph [0048]; figures 2,3	18,19

X	EP 2 363 056 A1 (INDESIT CO SPA [IT]) 7 September 2011 (2011-09-07)	1,2,13
Y	paragraph [0018] - paragraph [0022]	2
A		3-12, 14-19

X	EP 2 471 990 A1 (SAMSUNG ELECTRONICS CO LTD [KR]) 4 July 2012 (2012-07-04)	1,3,5, 8-12,18, 19
Y	paragraph [0026] - paragraph [0067]	2,18,19
A		4,6,7, 13-17

☐ Further documents are listed in the continuation of Box C.

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Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
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International application No
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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1582619	A1	05-10-2005	DE 102004016643 A1	27-10-2005
			EP 1582619 A1	05-10-2005
			US 2005257573 A1	24-11-2005

EP 2363056	A1	07-09-2011	NONE	

EP 2471990	A1	04-07-2012	CN 102535107 A	04-07-2012
			EP 2471990 A1	04-07-2012
			KR 20120075794 A	09-07-2012
			US 2012169193 A1	05-07-2012
