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(54) HOME APPLIANCE HAVING LIGHT EMITTING MODULE

HAUSHALTSGERÄT MIT LICHTEMITTIERENDEM MODUL

APPAREIL DOMESTIQUE DOTÉ D'UN MODULE D'ÉMISSION DE LUMIÈRE

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Description

[0001] The present invention relates to a structural feature of a light emitting module mounted on a housing assembly of a home appliance.

[0002] Decorating a cabinet of a home appliance, such as a washing machine or a refrigerator, with a light source has become relatively common. With regard to a light emitting manner of the light source, currently, an LED point light source is relatively widely used, and light can be diffused by using a light guide member or a diffusion plate. For example, Chinese invention publications CN1553974A and CN105780390A describe such a display apparatus. However, this light emitting manner usually sacrifices light intensity, leading to poor light purity. Secondly, a bright spot at the light source cannot be avoided, and distribution of light is uneven, leading to a rough visual effect. A combination of a point light source and a light guide member has a complex structure and a high requirement on assembly. In addition, the light guide member or the diffusion plate is usually a transparent member or a translucent member with diffusion powder, and has a relatively high price.

[0003] DE 10 2005 047 915 A1 discloses a controllable status displaying unit which is mounted in a dishwasher door panel. The status-displaying unit comprises a number of illumination elements, wherein the illumination elements emit light rays, which are reflected and then passed through a gap to be visible to the user.

[0004] EP 2 363 055 A1 discloses a projector adapted to be installed in a household appliance for projecting visible information onto a projection surface lying outside of said household appliance, the projector comprising a focusing unit that is adapted for focusing a light beam that emanates from a light source onto said projection surface, wherein the focusing unit further comprises at least one fixation element that is adapted to arrange the focusing unit in at least two different focusing positions within said projector.

[0005] DE 10 2013 004 042 A1 discloses a household appliance like a refrigerator, which comprises at least one illuminating element in one of the side-walls of the refrigerator. The illuminating element comprises a light and a reflector element located behind a window element, and the light rays from the illuminating element are reflected and then passed through the window element into the interior of the refrigerator.

[0006] An objective of the present invention is to provide a home appliance having a light emitting module, where the light emitting module emits uniform and soft light, and has a simple structure and relatively low costs.

[0007] For the above objective, the present invention provides a home appliance as defined in the independent claim attached. Preferred facultative embodiments of the invention with various features (which may also be combined among themselves for yielding further preferred embodiments of the invention) added are defined in dependent claims, described in the subsequent description, or exhibited in the attached drawing.

[0008] Accordingly the present invention provides a home appliance having a light emitting module, comprising a housing assembly, wherein the light emitting module is located on the housing assembly, wherein the light emitting module comprises a base, a light source and a light shield, wherein the light shield comprises a light-shielding area, wherein the light-shielding area externally shields the entire light source to prevent the light ray emitted by the light source from directly emitting outside the light shield, the light source is located between the base and the light shield, the base has a diffuse reflection area that receives illumination from the light source, an outer part opposite to the diffuse reflection area has a light transmission area, and a light ray emitted by the light source passes through the light transmission area after being reflected by the diffuse reflection area, wherein the light transmission area is formed on the light shield, wherein the light shield has a light-transmitting hollow portion or a transparent portion, wherein the light emitting module is externally covered with a protection cover, wherein at least a portion of the protection cover that covers the light transmission area is transparent or translucent, thereby allowing light to pass through.

[0009] The light emitting module using the above structure has a simple structure, and can be conveniently assembled and disassembled. A price is low because no transparent light guide member or diffusion plate is used. By using principles of diffuse reflection and shielding, light emitted has high purity, low light intensity attenuation, and a uniform color in a light emitting area, and a light ray does not directly irradiate an eye and is relatively soft, and there is not an area with uneven brightness or a bright spot.

[0010] The home appliance may be a washing machine, a refrigerator, a dishwasher, or a kitchen appliance.

[0011] The housing assembly may be a combination of parts that are disposed around internal parts and that form an appearance of the home appliance, and for example, includes a housing body, a door body/cover body, and a control panel.

[0012] The "outer part" is relative to an internal space surrounded by the housing assembly.

[0013] In a specific implementation, the protection cover may be entirely transparent or entirely translucent.

[0014] The light shield includes a light-shielding area made from an opaque material, and the light-shielding area externally shields the entire light source to prevent the light ray emitted by the light source from directly emitting outside the light shield. In this way, the light ray received by a user is softer and not dazzling.

[0015] The light source is a strip structure, and the light transmission area is a strip structure that matches the light source in shape and equidistantly extends along with the light source. Such a structural relationship between the light transmission area and the light source brings uniform light rays passing through the light transmission

area.

[0016] The light source is an LED strip. Hence, a wire harness, a PCB, and a control panel are integrated, so that a quantity of parts is reduced, assembly is simple, and damage is unlikely to be caused.

[0017] The diffuse reflection area may be implemented as a curved-surface structure. The diffuse reflection area of the curved-surface structure can receive more light rays and emit light rays that relatively more intensive, so that a clearer and brighter visual effect can be produced.

[0018] Preferably, the housing assembly includes a door body, the light emitting module is located on the door body, and the light transmission area is close to an edge of the door body and is of a closed loop structure.

[0019] Preferably, the light emitting module is in a loop shape, and constitutes a part of the door body.

[0020] Preferably, the home appliance of the present invention includes a control apparatus connected to the light source, where the control apparatus is set to be capable of controlling at least one of an emitted light color, a switching frequency, brightness, a brightness change, and the like of the light source.

[0021] The following further describes the present invention by using a washing machine as an example with reference to the figures of the accompanying drawing. It can be understood that the present invention may be also applied to other home appliances. When the light emitting module is applied to home appliances other than a washing machine, construction principles thereof are consistent. Hence, the present invention may be fully explained by merely using a washing machine as an example. In the drawing,

FIG. 1 is a schematic exploded view of a light emitting module applied to a door body of a washing machine;

FIG. 2A is a front view of a door body of a washing machine;

FIG. 2B is a sectional view along an A-A direction in FIG. 2A;

FIG. 3A is a schematic diagram of an assembly status of a base and a light source of a light emitting module; and

FIG. 3B is a sectional view along a B-B direction in FIG. 3A.

[0022] In a specific implementation, a light emitting module 10 is mounted on a door body 100 of a washing machine. As shown in FIG. 1, the light emitting module includes a base 2, a light source 4, and a light shield 6. The light source 4 is located between the base 2 and the light shield 6.

[0023] As shown in FIG. 3A and FIG. 3B, the base 2 is provided with a circle of locating wall 22, and several locating columns 24 disposed close to the locating wall 22. There is a gap between the locating column 24 and the locating wall 22, so that the locating column 24 and the locating wall 22 clamp the light source 4 therebetween to hold the light source 4.

[0024] As shown in FIG. 2A and FIG. 2B, the light shield 6 covers the base 2 and light source 4, and abuts against the locating wall 22. The base 2 has a diffuse reflection area 26 that receives illumination from the light source 4. The diffuse reflection area 26 is a curved-surface structure that curves toward the light source 4 and the light shield 6. There is a gap between the base 2 and the light shield 6, so that a light transmission area 8 is formed on the gap. The light transmission area 8 is located at an outer part opposite to the diffuse reflection area 26. The light shield 6 includes a light-shielding area 62 made from an opaque material. The light-shielding area 62 externally shields the entire light source 4 to prevent a light ray emitted by the light source 4 from directly emitting outside the light shield 6. Hence, the light ray emitted by the light source 4 can pass through the light transmission area 8 only after being reflected by the diffuse reflection area 26, so as to be observed by a human eye outside the door body 100.

[0025] The light emitting module 10 is externally covered with a protection cover 12 that may be transparent. The protection cover 12 also seals the gap between the base 2 and light shield 6. Hence, a closed light emitting chamber 40 is formed among the base 2, the light shield 6, and the protection cover 12. The light source 4 is accommodated in the light emitting chamber 40 to be prevented from being intruded and damaged by water and dust.

[0026] In this embodiment, the light source 4 is an LED strip in a closed loop shape. The light transmission area 8 is a strip structure that matches the light source 4 in shape and equidistantly extends along with the light source 4. Referring to FIG. 2A, in this embodiment, the light transmission area 8 is formed as a strip structure in closed loop shape. In addition, the light transmission area 8 is close to an edge of the door body.

[0027] As shown in FIG. 1, the light emitting module 10 is in a loop shape on the whole, and constitutes a part of the door body.

[0028] In addition, the washing machine includes a control apparatus (not shown in the accompanying drawing) connected to the light source 4. The control apparatus is set to be capable of controlling at least one of an emitted light color, a switching frequency, brightness, a brightness change, and the like of the light source 4. Hence, the light source 4 may be controlled by the control apparatus to emit light in various forms, and present the light to users through the light transmission area 8. The various forms of the light may include a color change, a brightness change, a flicker, and the like.

Claims

1. A home appliance having a light emitting module, comprising a housing assembly (100), wherein the light emitting module (10) is located on the housing

assembly (100), wherein the light emitting module comprises a base (2), a light source (4) and a light shield (6), wherein the light shield (6) comprises a light-shielding area (62), wherein the light-shielding area (62) externally shields the entire light source (4) to prevent the light ray emitted by the light source (4) from directly emitting outside the light shield (6), the light source (4) is located between the base (2) and the light shield (6), **characterized in that** the base (2) has a diffuse reflection area (26) that receives illumination from the light source (4), an outer part opposite to the diffuse reflection area (26) has a light transmission area (8), and a light ray emitted by the light source (4) passes through the light transmission area (8) after being reflected by the diffuse reflection area (26), wherein the light transmission area (8) is formed on the light shield (6), wherein the light shield (6) has a light-transmitting hollow portion or a transparent portion, wherein the light emitting module (10) is externally covered with a protection cover (12), wherein at least a portion of the protection cover (12) that covers the light transmission area is transparent or translucent, thereby allowing light to pass through.

2. The home appliance according to claim 1, **characterized in that**: the light-shielding area (62) is made from an opaque material.

3. The home appliance according to claim 1, **characterized in that**: the light source (4) is a strip structure, and the light transmission area (8) is a strip structure that matches the light source (4) in shape and equidistantly extends along with the light source (4).

4. The home appliance according to claim 3, **characterized in that**: the light source (4) is an LED strip.

5. The home appliance according to claim 1, **characterized in that**: the diffuse reflection area (26) is a curved-surface structure.

6. The home appliance according to claim 1, **characterized in that**: the housing assembly comprises a door body (100), the light emitting module (10) is located on the door body (100), and the light transmission area (8) is close to an edge of the door body (100) and is of a closed loop structure.

7. The home appliance according to claim 6, **characterized in that**: the light emitting module (10) is in a loop shape, and constitutes a part of the door (100).

8. The home appliance according to claim 1, comprising a control apparatus connected to the light source (4), wherein the control apparatus is set to be capable of controlling at least one of an emitted light color, a switching frequency, brightness, a brightness change, and the like of the light source (4).

Patentansprüche

1. Haushaltsgerät mit einem Leuchtmodul, das eine Gehäusebaugruppe (100) umfasst, wobei sich das Leuchtmodul (10) an der Gehäusebaugruppe (100) befindet,
wobei das Leuchtmodul ein Grundelement (2), eine Lichtquelle (4) und eine Lichtabschirmung (6) umfasst, wobei die Lichtabschirmung (6) einen lichtabschirmenden Bereich (62) umfasst, wobei der lichtabschirmende Bereich (62) die gesamte Lichtquelle (4) nach außen abschirmt und so verhindert, dass der von der Lichtquelle (4) abgestrahlte Lichtstrahl direkt aus der Lichtabschirmung (6) nach außen abgestrahlt wird, wobei sich die Lichtquelle (4) zwischen dem Grundelement (2) und der Lichtabschirmung (6) befindet,
dadurch gekennzeichnet, dass
das Grundelement (2) einen streuend reflektierenden Bereich (26) aufweist, der von der Lichtquelle (4) beleuchtet wird, ein dem streuend reflektierenden Bereich (26) gegenüberliegender Außenteil einen lichtdurchlässigen Bereich (8) aufweist und ein von der Lichtquelle (4) abgestrahlter Lichtstrahl durch den lichtdurchlässigen Bereich (8) hindurchtritt, wenn er von dem streuend reflektierenden Bereich (26) reflektiert worden ist, wobei der lichtdurchlässige Bereich (8) an der Lichtabschirmung (6) ausgebildet ist, wobei die Lichtabschirmung (6) einen lichtdurchlässigen, hohlen oder einen transparenten Abschnitt aufweist, wobei das Leuchtmodul (10) außen mit einer Schutzabdeckung (12) abgedeckt ist, wobei zumindest ein Abschnitt der Schutzabdeckung (12), der den lichtdurchlässigen Bereich abdeckt, transparent oder durchscheinend ist, so dass Licht hindurchtreten kann.

2. Haushaltsgerät nach Anspruch 1, **dadurch gekennzeichnet, dass**: der lichtabschirmende Bereich (62) aus einem lichtundurchlässigen Material hergestellt ist.

3. Haushaltsgerät nach Anspruch 1, **dadurch gekennzeichnet, dass**: es sich bei der Lichtquelle (4) um eine streifenförmige Konstruktion und bei dem lichtdurchlässigen Bereich (8) um eine streifenförmige Konstruktion handelt, die der Lichtquelle (4) in der Form entspricht und sich in gleichem Abstand dazu zusammen mit ihr erstreckt.

4. Haushaltsgerät nach Anspruch 3, **dadurch gekennzeichnet, dass**: es sich bei der Lichtquelle (4) um einen LED-Streifen handelt.

5. Haushaltsgerät nach Anspruch 1, **dadurch gekenn-**

zeichnet, dass: es sich bei dem streuend reflektierenden Bereich (26) um eine Konstruktion mit gekrümmter Fläche handelt.

6. Haushaltsgerät nach Anspruch 1, **dadurch gekennzeichnet, dass**: die Gehäusebaugruppe einen Türkörper (100) umfasst, wobei sich das Leuchtmodul (10) an dem Türkörper (100) befindet und der lichtdurchlässige Bereich (8) in der Nähe einer Kante des Türkörpers (100) liegt und als geschlossener Kreis aufgebaut ist.

7. Haushaltsgerät nach Anspruch 6, **dadurch gekennzeichnet, dass**: das Leuchtmodul (10) eine Schleifenform aufweist und einen Teil der Tür (100) bildet.

8. Haushaltsgerät nach Anspruch 1, das eine Steuervorrichtung umfasst, die mit der Lichtquelle (4) verbunden ist, wobei die Steuervorrichtung so eingestellt ist, dass sie in der Lage ist, eine abgestrahlte Lichtfarbe, eine Schaltfrequenz, eine Helligkeit, eine Helligkeitsänderung und/oder dergleichen der Lichtquelle (4) zu steuern.

Revendications

1. Appareil domestique doté d'un module d'émission de lumière, comprenant un ensemble boîtier (100), dans lequel le module d'émission de lumière (10) est situé sur l'ensemble boîtier (100), dans lequel le module d'émission de lumière comprend une base (2), une source de lumière (4) et un élément de masquage de lumière (6), dans lequel l'élément de masquage de lumière (6) comprend une zone de masquage de lumière (62), dans lequel la zone de masquage de lumière (62) masque de manière externe la totalité de la source de lumière (4) pour empêcher le rayon de lumière émis par la source de lumière (4) d'être émis directement à l'extérieur de l'élément de masquage de lumière (6), la source de lumière (4) est située entre la base (2) et l'élément de masquage de lumière (6), **caractérisé en ce que** la base (2) est dotée d'une zone de réflexion diffuse (26) qui reçoit un éclairage à partir de la source de lumière (4), une partie externe opposée à la zone de réflexion diffuse (26) est dotée d'une zone de transmission de lumière (8) et un rayon de lumière émis par la source de lumière (4) passe au travers de la zone de transmission de lumière (8) après avoir été réfléchi par la zone de réflexion diffuse (26), dans lequel la zone de transmission de lumière (8) est formée sur l'élément de masquage de lumière (6), dans lequel l'élément de masquage de lumière (6) est doté d'une partie creuse de transmission de lumière ou d'une partie transparente, dans lequel le module d'émission de lumière (10) est recouvert de manière externe avec un couvercle de protection (12), dans lequel au moins une partie du couvercle de protection (12) qui recouvre la zone de transmission de lumière est transparente ou translucide, ce qui permet à la lumière de passer au travers.

2. Appareil domestique selon la revendication 1, **caractérisé en ce que** : la zone de masquage de lumière (62) est constituée d'un matériau opaque.

3. Appareil domestique selon la revendication 1, **caractérisé en ce que** : la source de lumière (4) est une structure en bande, et la zone de transmission de lumière (8) est une structure en bande qui concorde avec la source de lumière (4) en termes de forme et s'étend de manière équidistante conjointement avec la source de lumière (4).

4. Appareil domestique selon la revendication 3, **caractérisé en ce que** : la source de lumière (4) est une bande à diodes électroluminescentes, DEL.

5. Appareil domestique selon la revendication 1, **caractérisé en ce que** : la zone de réflexion diffuse (26) est une structure à surface incurvée.

6. Appareil domestique selon la revendication 1, **caractérisé en ce que** : l'ensemble boîtier comprend un corps de porte (100), le module d'émission de lumière (10) est situé sur le corps de porte (100), et la zone de transmission de lumière (8) est proche d'un bord du corps de porte (100) et est constituée d'une structure en boucle fermée.

7. Appareil domestique selon la revendication 6, **caractérisé en ce que** : le module d'émission de lumière (10) est sous la forme d'une boucle et constitue une partie de la porte (100).

8. Appareil domestique selon la revendication 1, comprenant un appareil de commande connecté à la source de lumière (4), dans lequel l'appareil de commande est réglé pour être apte à commander au moins l'un parmi une couleur de lumière émise, une fréquence de commutation, une luminosité, un changement de luminosité et similaires, de la source de lumière (4).

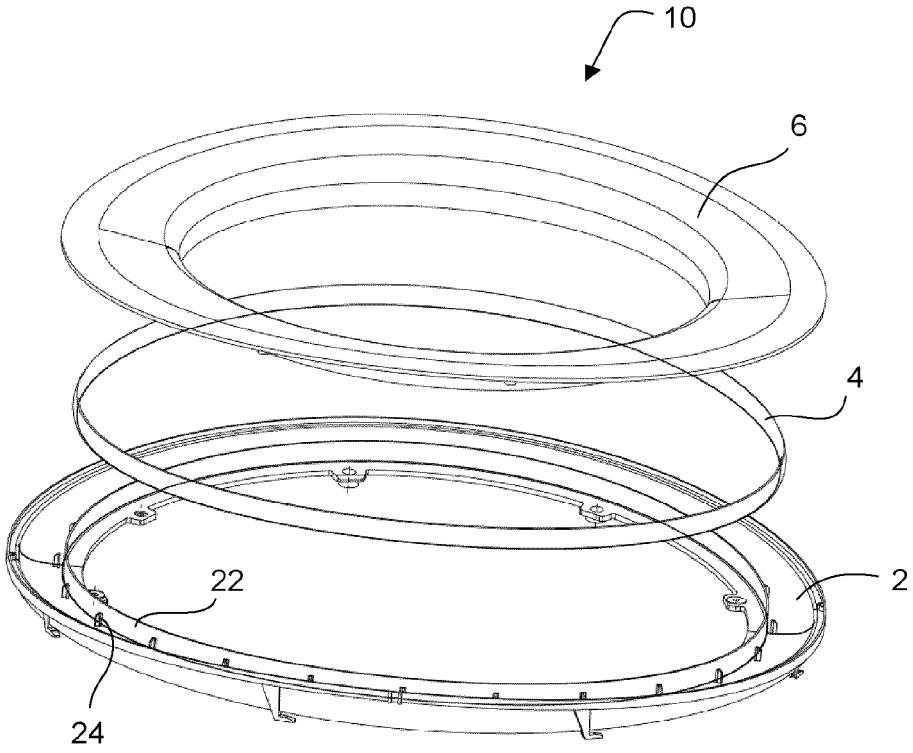


FIG. 1

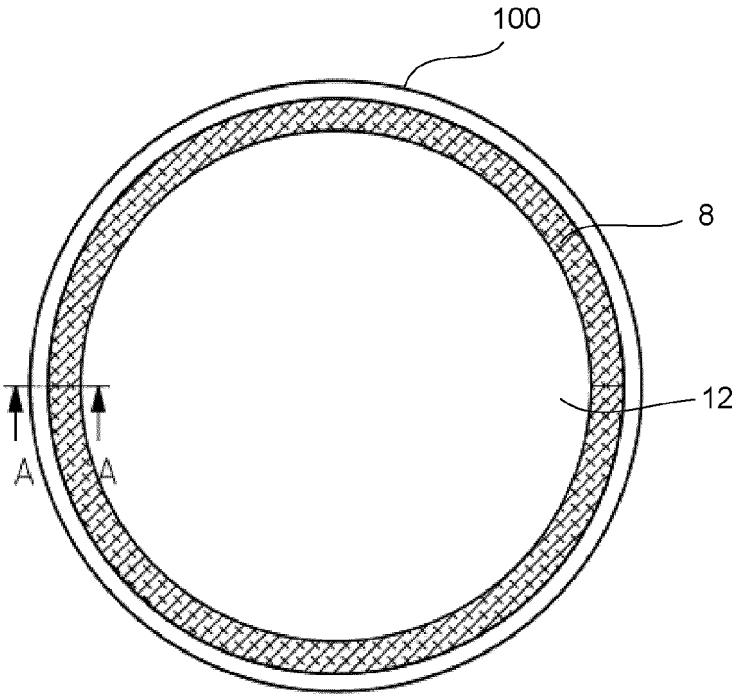


FIG. 2A

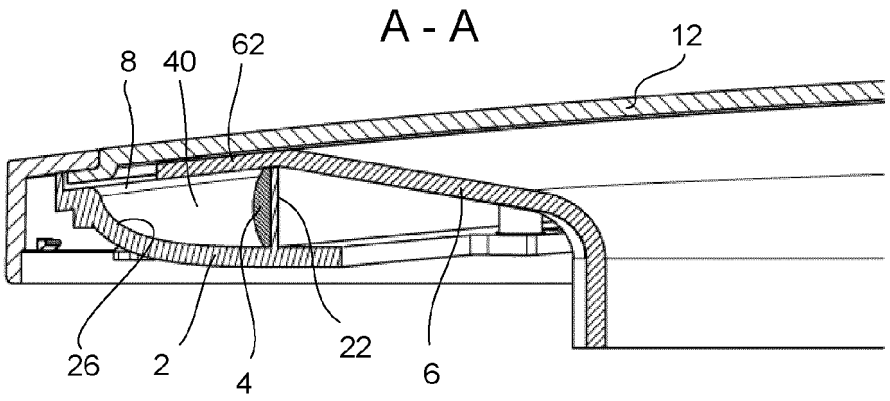


FIG. 2B

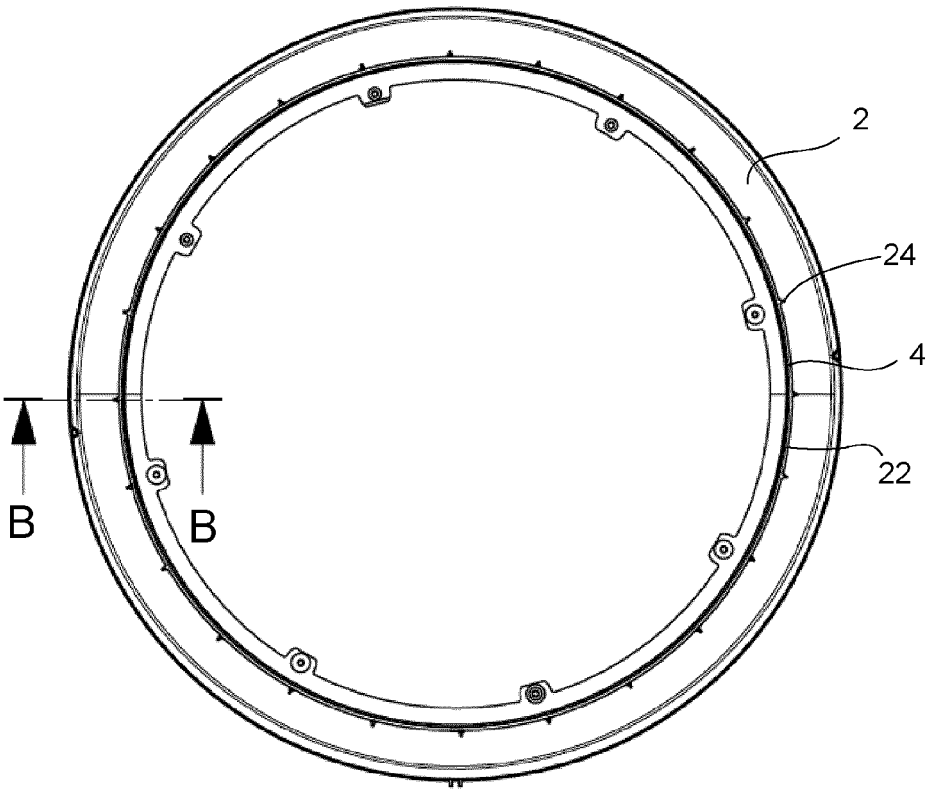


FIG. 3A

B - B

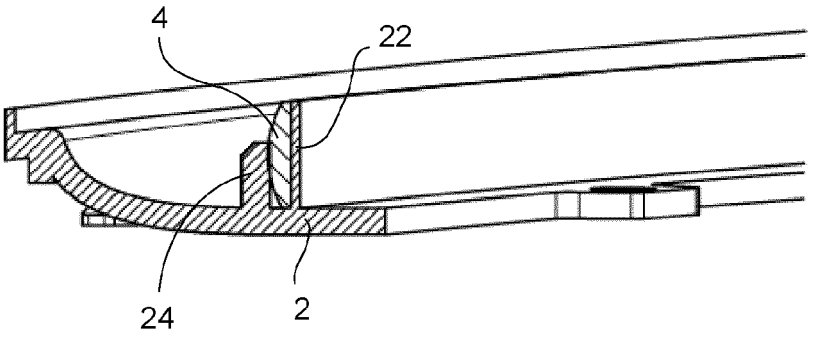


FIG. 3B

REFERENCES CITED IN THE DESCRIPTION

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