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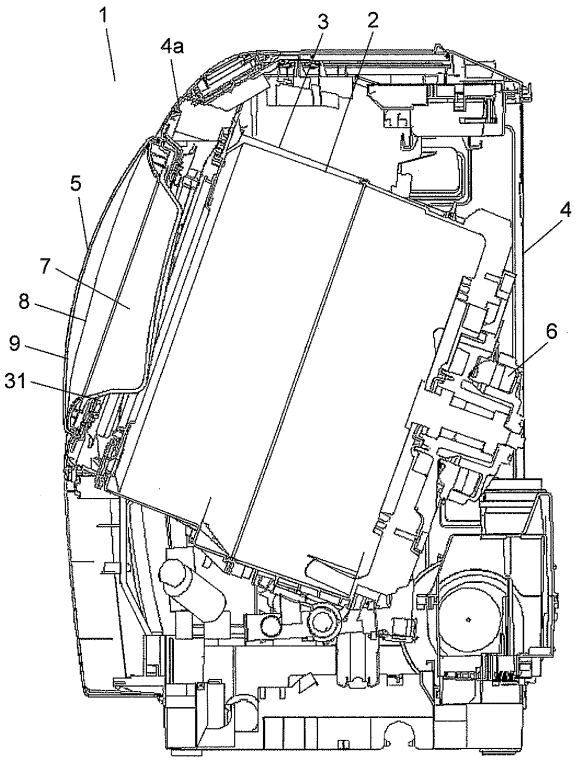
(54) Drum-type washing machine

(57) Lid cover (9) includes first engaging tabs (9a) formed on its rear face and protruding rearward along the outer circumference. Lid unit (8) includes first tab holes (8b) with which the tabs (9a) are engaged by using first stopper (8a) provided on an inner face of lid unit (8), thereby fixing lid cover (9) to lid unit (8). Lid cover (9) includes surface in-parts on its surface and in a range corresponding to at least first tab holes (8b). The light coming from the inside of the lid cover disperses and transmits through the surface in-parts. This structure allows extending a transparent area as far as the outer rim, where the lid cover is engaged with the lid unit, of the lid cover, and yet, the engaging section is not seen from the outside, so that a quality look and a fine appearance of the lid can be improved.

FIG. 1



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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a drum-type washing machine including a rotary drum shaping like a cylinder with a bottom.

BACKGROUND OF THE INVENTION

[0002] A conventional drum-type washing machine includes a cylindrical rotary drum which has a bottom and is installed in a water tub such that the rotary axis stays horizontally from the opening, i.e. the front of the drum, to the bottom, i.e. the rear face of the drum, or slants downward from the horizontal direction. The laundry is put into the drum by opening the lid placed to the front of the housing of the washing machine. Driving of the rotary drum with a motor allows carrying out at least one of the steps of washing, rinsing, and dehydrating.

[0003] The lid to be used in the drum-type washing machine is disclosed in, e.g. Unexamined Japanese Patent Application Publication No. 2007 - 68810 (Patent Document1), and this lid is generally formed of a lid unit having a see-through window through which a user can monitor the laundry and a transparent lid cover fitted on the front face of the lid unit for covering the lid unit. Patent Document 1 specifically discusses a structure where an opaque decorative plate is fit to the surface of the outer circumference of the transparent cover such that this plate can conceal the interior mounting mechanism of the lid cover from the user in order to exhibit a fine appearance of the drum-type washing machine.

[0004] However, this conventional structure reveals a problem, i.e. the number of components and the number of the manufacturing steps increase due to this decorative plate, which incur a rise in the manufacturing cost. The transparence of the lid cover is indeed not needed for an area irrelevant to the see-through of the laundry, but a placement of the opaque decorative plate loses the transparence of the lid cover along the circumference of the cover. The decorative plate of the lid cover thus somewhat spoils a fine appearance of the lid as a whole.

[0005] Since the users have a variety of sense of values, the manufacturers sometimes need to provide a step-up model, in which a fine appearance of the entire lid is further enhanced, and a standard model with the price kept inexpensive, although these two models have the same washing function. In such a case, the step-up model needs an extra decorative plate having undergone, e.g. a painting process, while the standard model has no such a decorative plate. This extra decorative plate requires a structure, e.g. engaging holes, which allows attaching or detaching the extra decorative plate with ease; however, the standard model is obliged to expose this attaching/detaching mechanism to the user through the transparent lid cover, so that the fine appearance can be spoiled.

SUMMARY OF THE INVENTION

[0006] The present invention aims to provide a drum-type washing machine with a quality look as well as a fine appearance. The lid cover of this drum-type washing machine includes a fixing section which allows the lid cover to be elastically engaged with the lid unit, and the lid cover is transparent including the outer circumference where the fixing section is provided; however, the fixing section cannot be seen from the outside, and yet, no extra member or no extra assembling step is needed for concealing the fixing section.

[0007] The drum-type washing machine of the present invention comprises a cylindrical rotary drum having a bottom plate, and a water tub accommodating the drum therein, and a housing accommodating the drum and the tub therein, and a lid provided to the front of the housing.

[0008] The lid is formed of a lid unit having a first window through which a user can monitor the inside of the drum, and a transparent lid cover placed on the front face of the lid unit for covering the lid unit. The lid cover includes multiple first engaging tabs protruding rearward on its rear face along the outer circumference. The lid unit includes first tab holes which are engaged with the first engaging tabs by the first stopper provided on the inner face of the lid unit. The lid unit includes a structure which allows a decorative plate of the lid cover to be mounted to the lid unit. The decorative plate includes a second window corresponding to the first window of the lid unit and multiple second engaging tabs protruding rearward on its rear face along its outer circumference. To mount the decorative plate to the lid unit, the lid unit includes second tab holes which are engaged with the second engaging tabs of the decorative plate by the second stopper provided on the inner face of the lid unit. The lid cover has surface in-parts within a range corresponding to at least the first tab holes, and the light dispersed from the inside transmits through the surface in-parts.

[0009] The structure discussed above allows the lid cover to be transparence as far as the outer circumference where the fixing section is formed for fixing the lid cover to the lid unit, and the fixing section cannot seen from the outside, yet no extra member as well as no extra assembling step is needed for concealing the fixing section from the user, so that the washing machine can exhibit a quality look as well as a fine appearance.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Fig. 1 shows a sectional view of a drum-type washing machine in accordance with an embodiment of the present invention.

Fig. 2 shows a perspective view of the drum-type washing machine shown in Fig. 1.

Fig. 3A shows an enlarged sectional view of an essential part of a lid of the drum-type washing machine

shown in Fig. 1.

Fig. 3B shows an enlarged sectional view of Fig. 3A.

Fig. 4 shows a perspective view of a lid cover of the drum-type washing machine shown in Fig. 1.

Fig. 5 shows a perspective view of an essential part of a lid unit of the drum-type washing machine shown in Fig. 1.

Fig. 6 shows an enlarged sectional view of an essential part of another lid unit of the drum-type washing machine shown in Fig. 1.

Fig. 7 shows a perspective view of a decorative plate of the drum-type washing machine shown in Fig. 1.

DESCRIPTION OF EXEMPLARY EMBODIMENT

[0011] An exemplary embodiment of the present invention is demonstrated hereinafter with reference Figs. 1 - 7. The description below is a specific instance of the present invention, which cannot be limited to this instance.

Exemplary Embodiment

[0012] Fig. 1 shows a lateral sectional view of a drum-type washing machine in accordance with this embodiment of the present invention. Fig. 2 shows a perspective view of the drum-type washing machine shown in Fig. 1. In Figs. 1 and 2, drum-type washing machine 1 in accordance with this embodiment includes rotary drum 2 shaping like a cylinder and having a bottom plate, and drum 2 is placed in water tub 3 such that drum 2 is oriented from a open front toward a rear bottom with its rotary axis kept horizontally or slanting downward. A user can put the laundry into drum 2 by opening lid 5 provided to the front section of housing 4 of washing machine 1, and rotary drum 2 is driven by motor 6, so that at least one of the steps of washing, rinsing, or dehydrating can be carried out.

[0013] Figs. 3A and 3B show enlarged sectional views of an essential part of the lid. Fig. 3B shows a further enlarged view of Fig. 3A for illustrating an engaging mechanism for lid unit 8, lid cover 9, and decorative plate 109. As shown in Fig.1-Fig. 3B, lid 5 is formed of lid unit 8 having window 7 (first window), through which a user can monitor the laundry from the outside, transparent lid cover 9 fitted onto the front face of lid unit 8, and decorative plate 109 placed between lid cover 9 and lid unit 8. Decorative plate 109 includes window 109f (second window) shaped like window 7 and placed correspondingly to window 7 of lid unit 8.

[0014] Fig. 4 shows a perspective view of lid cover 9 in accordance with this embodiment. In Fig.3A-Fig. 4, multiple engaging tabs 9a (first engaging tab) protruding rearward are unitarily molded with lid cover 9 on the rear face along the outer circumference of lid cover 9.

[0015] Fig. 5 shows a perspective view of an essential part of lid unit 8 in accordance with this embodiment. In Fig. 3A-Fig. 5, lid unit 8 has multiple tab holes 8b (first tab holes) corresponding to engaging tabs 9a. Each one of tab holes 8b receives tab 9a, and elastically engages tab 9a with stopper 8a which prevents tab 9a from slipping-off, thereby fitting and fixing lid cover 9 to lid unit 8 (refer to Figs. 3A and 3B). The foregoing structure allows lid cover 9 to fit and cover lid unit 8 on the front face, and lid cover 9 is fixed to lid unit 8. Lid cover 9 has positioning projection 41 as shown in Fig. 4 for being mated with positioning hole 42 provided to lid unit 8. Thus tab hole 8b, which is prepared to lid unit 8 correspondingly to each one of multiple engaging tabs 9a, is not available only to positioning projection 41 although tab hole 8b is available to each one of engaging tabs 9a.

[0016] The foregoing structure of fixing lid cover 9 to lid unit 8 allows positioning projection 41 and the fixing section 11, which is formed of engaging tab 9a, stopper 8a, and tab hole 8b, not to be seen from the outside without losing the transparence of lid cover 9. To be more specific, as shown in Figs. 3A and 3B, lid cover 9's surface in-parts 9b corresponding to at least fixing sections 11 are shaped such that the light from the inside can be refracted or dispersed while it transmits through lid cover 9. Surface in-parts 9b are shaped like peaks and valleys drawn with solid lines or an annular shape drawn with dotted lines in Figs. 3A and 3B, and this shape allows refracting or dispersing the light coming from the inside.

[0017] Surface in-parts 9b can be shaped such that the light coming from the inside can be refracted or dispersed. To be more specific the surface in-parts 9b can be shaped in one of the following shapes: (1) An annular or an arc shaped wrinkle grooved in a radial direction, (2) Annular or arc wavy form grooved in the radial direction, or (3) rough surface with peaks and valleys extending in every direction. Use of one of the foregoing shapes on the surface in-parts 9b allows preventing the stopper 8a from being viewed from the outside because of the foregoing peak-and-valley pattern which does not lose the transparence.

[0018] As discussed above, this embodiment provides the following structure: transparent lid cover 9 is fit onto the front face of lid unit 8, and engaging tabs 9a provided on the rear face along the outer circumference of cover 9 and protruding rearward are elastically engaged with tab hole 8b by stopper 8a for mounting lid cover 9 to lid unit 8. In this case, surface in-parts 9b are shaped such that the light coming from the inside can be refracted, dispersed, and then transmit through cover 9 while lid cover 9 can be kept transparent at least in the area corresponding to fixing section 11. As a result, the light reflected on stoppers 8a, tab holes 8b, and tabs 9a of fixing section 11, is refracted or dispersed as shown with the solid or broken arrow marks in Fig. 3 when the reflected light transmits through surface in-parts 9b of lid cover 9. The engaging mechanism discussed above thus cannot be seen expressly with human eyes. This structure needs no extra components or no extra assembling steps. A fine-embossed face is not employed to surface in-parts 9b because the fine-embossed face invites diffuse re-

flection which somewhat loses the transparence, and shows a shadow of stopper 8a. In stead, surface in-parts 9b discussed previously provides the pattern of peaks and valleys, which allows the light coming from the inside to be refracted and dispersed, so that the problem invited by the fine-embossed face does not occur.

[0019] The structure discussed above allows preventing the wash water, rinse water, or a splash from leaking to the outside during the respective corresponding steps while lid 5 is kept closed. The user can monitor the laundry through transparent lid cover 9 and window 7 while the machine carries out the steps of washing, rinsing, or dehydrating. Transparent lid cover 9 is fit on the front face of lid unit 8 to be elastically engaged with lid unit 8 through fixing section 11. In this case, a some area of cover 9 corresponding to at least fixing section 11 is kept transparent, and the surface in-parts 9b is shaped such that the reflected light on the fixing section 11 is refracted and dispersed, so that the transparence or a feeling of transparency cannot be lost. The transparent range is not reduced but increased while fixing section 11 is kept from being viewed from the outside, and lid cover 9 exhibiting a quality look is thus obtainable. This structure needs no extra components or extra assembling steps, so that this structure does not cause an increment in the cost. On top of that, the peak-and-valley pattern used in this structure does not show the shadow of fixing section 11 to the outside but rather produces some design effect.

[0020] Lid unit 8 includes convex wall 8e which bulges outward along the outer circumference, and protruding rib 8d is formed on the edge of convex wall 8e so that recessed groove 8f is formed. Tab holes 8b are formed on groove 8f such that holes 8b extend through along the back and forth direction. Lid cover 9 is generally made of synthetic resin, and includes surrounding wall 9c (first surrounding wall) which surrounds and covers as far as the outer circumference of lid unit 8. On end face 9d of this surrounding wall 9c, engaging tab 9a is molded unitarily. Protruding rib 8d including stepped face 8c confronting end face 9d is formed along the outer circumference of lid unit 8. Rib 8d and convex wall 8e are unitarily molded together, thereby forming groove 8f, so that transparent lid cover 9 can surround as far as the outer circumference of lid unit 8 and can cover lid unit 8. This structure allows extending a uniform transparent wall as far as the outer circumference which is subject to human eyes viewing from diagonally to the front, thereby improving a quality look of lid cover 9.

[0021] As shown in Figs. 3A and 3B, fixing section 11 is formed of engaging tab 9a, engaging section 9e forming a stopper hole (first engaging section) punched on tab 9a, and claw-shaped stopper 8a (first claw) formed on the inner circumference of tab hole 8b for elastically engaging with engaging section (stopper hole) 9e. This structure allows lid cover 9 to be fixed to lid unit 8 through the elastic engagement.

[0022] Engaging section 9e can be replaced with an engaging hook (first engaging hook) formed on engaging tab 9a (first engaging tab), and the hook is engaged with rear opening rim of tab hole 8b. Tab 9a can be thus fixed to tab hole 8b. The fixation between tab 9a and tab hole 8b is thus not limited to this embodiment.

[0023] Lid unit 8 is formed of lid frame 20 and transparent window plate 23. Lid frame 20 is formed of front frame 21 and rear frame 22 made of synthetic resin and fitted their concave shapes together for forming window 7. Window plate 23 is sandwiched between front frame 21 and rear frame 22. Protruding rib 8d is formed on front frame 21, and the outer circumference face of surrounding wall 9c is nearly flush and solid with the outer circumference face of rib 8d. Rear frame 22 includes flange 22a facing outward at its front end for being fitted to front frame 21. Flange 22a is mated with step 21a at rear inside of protruding rib 8d. This structure allows lid frame 20 to be formed by integrating front frame 21 elastically engaged with lid cover 9 and rear frame 22 together. In this case, front frame 21 is elastically engaged with lid cover 9, and these two elements can be handled as one single member with their concave sections fitting to each other. Rear frame 22 and front frame 21 sandwich window-plate 23 with their concave sections fitting to one another, and these three elements can be handled as one single member. Then lid cover 9 is fit to front frame 21 for elastically engaging with each other, and they can be fixed to each other. On top of that, surrounding wall 9c of lid cover 9 is nearly flush and solid with the outer face of protruding rib 8d, so that the outer surface of lid cover 9 extends to a greater area including a three-dimensional region and is simplified. Rear frame 22 includes flange 22a facing outward at its front end for fitting to front frame 21. Flange 22a is mated with step 21a inside the rear end of protruding rib 8d. An outer wall of rear frame 22 is thus located inside the outer walls of lid cover 9 and front frame 21, so that a region viewed from the outside, with lid cover 9 closed, gives a less thick image to the user.

[0024] Surface in-parts 9b, formed on lid cover 9 and corresponding to at least fixing sections 11, are modified in their shape for the light coming from the inside to be refracted or dispersed when the light transmits through lid cover 9. This modified surface-shape can be one of the following shapes: (1) An annular or an arc shaped wrinkle grooved in a radial direction as shown with broken lines in Figs. 3A and 3B, (2) Annular or arc wavy form grooved in the radial direction as shown with solid lines in Fig. 3, or (3) rough surface with peaks and valleys formed thereon and extending in every direction. Use of one of these shapes to the surface in-parts 9b allows preventing stoppers 8a from being viewed from the outside because of the foregoing peaks and valleys pattern which yet prevents the transparence from being lost. Surface in-parts 9b is preferably not to undergo a finely embossing process in order to avoid losing the transparence. Thus for instance, the pattern of peaks and valleys extending in every direction should have a roughness greater than a knurled pattern.

[0025] As shown in Figs. 1 and 2, housing 4 of the

washing machine includes uphill slant face 4a at the upper front, and round inlet/outlet 31 of the laundry is formed on this slant face 4a. Lid 5 is hinged to inlet 31 to open or close inlet 31 and is roundly shaped like inlet 31. Front frame 21 of lid frame 20 is molded of, e.g. polypropylene, and rear frame 22 is molded of, e.g. polypropylene having greater resistance against chemicals than front frame 21. Window plate 23 is made of, e.g. glass, and lid cover 9 is formed of, e.g. transparent ABS resin. Placement of positioning projection 41 allows identifying how to mount cover 9 to lid unit 8 with ease, so that no wrong mounting can be expected. This simple mounting of cover 9 to lid unit 8 can advantageously avoid wondering which way cover 9 should be mounted, and cover 9 cannot be rotated, thus it can be mounted free from flaws.

[0026] A step-up model of the foregoing drum-type washing machine is demonstrated hereinafter. This step-up model is enhanced the quality look of its lid as a whole. Fig. 6 shows an enlarged sectional view of another essential part of the lid of the drum-type washing in accordance with the embodiment. Fig. 7 shows a perspective view of a decorative plate of the drum-type washing machine shown in Fig. 6. As shown in Figs. 5 - 7, decorative plate 109 includes multiple engaging tabs 109a unitarily molded along its outer rim, and tabs 109a protrude rearward on the rear face. Lid unit 8 has tab holes 108b (second tab hole) for receiving tabs 109a and elastically engaging tabs 109a with stoppers 108a (second stopper) formed on its inner face, so that tabs 109a is prevented from slipping off and decorative plate 109 can be fit and fixed to lid unit 8. Each one of engaging tabs 109a has engaging section 109e (second engaging section) forming a stopper hole which is elastically engaged with stopper 108a of front frame 21. Decorative plate 109 includes surrounding wall 109g (second surrounding wall) located inside the surrounding wall 9c of lid cover 9 and entering into recessed groove 8f. Tab 109a is unitarily molded with the end face of surrounding wall 109g at a place corresponding to tab hole 108b.

[0027] As shown in Fig. 6, the fixing section is formed of engaging tab 109a, engaging section 109e forming a stopper hole punched on tab 109a, and claw-shaped stopper 108a (second claw) formed on the inner circumference of tab hole 108b for elastically engaging with engaging section (stopper hole) 109e. This structure allows decorative plate 109 to be fixed to lid unit 8 through the elastic engagement. However, second engaging section (stopper hole) 109e can be replaced with an engaging hook (second engaging hook) formed on engaging tab 109a (second engaging tab), and the hook is engaged with rear opening rim of tab hole 108b. Tab 109a can be thus fixed to tab hole 108b. The fixation between tab 109a and tab hole 108b is thus not limited to this embodiment. Surface in-parts 9b, formed on lid cover 9 correspondingly to at least tab holes 108b of decorative plate 109, are modified in their shape for the light coming from the inside to be refracted or dispersed when the light transmits through lid cover 9. These surface in-parts 9b are shaped identically to surface in-parts 9b corresponding to tab holes 8b and located at the same positions.

[0028] The mounting structure of decorative plate 109 to lid unit 8 and the advantages of this mounting structure are similar to those of lid cover 9 mounted to lid unit 8, so that detailed description is omitted here. The foregoing structure allows decorative plate 109 to be held in groove 8f formed on front frame 21 of lid unit 8.

[0029] The structure discussed above shows that tab holes 8b and 108b are alternately placed in groove 8f along the circumferential direction of front frame 21. Although the user often touches the lid when he/she loads/unloads the laundry to/from the drum, lid cover 9 and decorative plate 109 cannot be floated, because the alternate placement of tab holes 8b and 108b allows the elastic engaged sections between decorative plate 109 and lid cover 9 to be located equidistantly along the circumferential direction. This structure prevents cover 9 and plate 109 from floating.

[0030] Since decorative plate 109 is elastically engaged with front frame 21, it can be mounted to the step-up model during the manufacturing steps for enhancing the fine appearance of the lid, while the standard model needs no decorative plate 109 because its cost should be kept at a lower level. These two models can be thus selected with ease in the manufacturing process.

[0031] The presence of surface in-parts 9b formed along the circumference of lid cover 9 allows tab holes 108b not to be seen from the outside even on the standard models having no decorative plate 109. The manufacturer can thus provide the users having a variety of sense of values with appropriate models.

[0032] As discussed previously, the drum-type washing machine of the present invention comprises a cylindrical rotary drum having a bottom plate, and a water tub accommodating the drum therein, and a housing accommodating the drum and the tub therein, and a lid provided to the front of the housing.

[0033] The lid is formed of a lid unit having a first window through which a user can monitor the inside of the drum, and a transparent lid cover fitted on the front face of the lid unit for covering the lid unit. The lid cover includes the multiple first engaging tabs protruding rearward on its rear face along the outer circumference. The lid unit includes the first tab holes which are engaged with the first engaging tabs by the first stopper provided onto the inner face of the lid unit. The lid unit includes a structure which allows a decorative plate of the lid cover to be mounted to the lid unit. The decorative plate includes a second window corresponding to the first window of the lid unit and multiple second engaging tabs protruding rearward on the rear face along the outer circumference. To mount the decorative plate to the lid unit, the lid unit includes second tab holes which are engaged with the second engaging tabs of the decorative plate by the second stoppers provided on the inner face of the lid unit. The lid cover has surface in-parts in a range corresponding to at least the first tab holes, and the light dis-

persed from the inside transmits through the surface in-parts.

[0034] A user put the laundry into the rotary drum by opening the lid, and then the lid is closed before the rotary drum is driven, and at least one of the steps of washing, rinsing, or dehydrating can be carried out. The structure discussed above allows preventing the wash water, rinse water, or a splash from leaking to the outside while the user can monitor the laundry from the outside through the transparent lid cover and the window. The transparent lid cover is fit on the front face of the lid unit, and the first engaging tabs protruding rearward on the rear face of the lid cover along the outer circumference are elastically engaged with the tab holes by using the first stoppers, for fixing the lid cover to the lid unit. The lid cover has the surface in-parts kept transparent and formed almost corresponding to at least the first tab holes, and through the surface in-parts, the light coming from the inside is refracted, dispersed and transmitted. This structure allows refracting and dispersing the light coming from the first tab holes when the light transmits through the lid cover. The structure discussed above needs no extra member as well as no extra assembling step dedicated to this structure. Since the surface in-parts can refract and disperse the light, the pattern of peaks and valleys is available, so that a fine-embossed face is not employed as the surface in-parts because the fine-embossed face invites diffuse reflection which somewhat loses the transparence and shows a shadow of the fixing section.

[0035] The decorative plate can be placed between the lid unit and the lid cover, so that the lid as a whole can be enhanced its fine appearance with ease. Through the transparent lid cover, the decorative plate can be seen, so that the decorative plate fixed to the lid unit will exhibit a gloss feeling as well as a deep feeling, thereby enhancing the fine appearance of the lid as a whole with ease.

[0036] The lid unit includes the convex wall along the outer rim, and the convex wall bulges outward along the circumferential direction. The protruding rib is formed at the edge of the convex wall, thereby forming the recessed groove. First tab holes and second tab holes are punched through on the groove along the back and forth direction. The lid cover includes the first surrounding wall which extends and surrounds as far as the outer rim of the lid unit, and the end face of the wall touches the end face of the protruding rib and enters into the groove. The first engaging tabs are formed on the end face of the first surrounding wall. The decorative plate includes the second surrounding wall which exists inside the first surrounding wall and enters also into the groove. The second engaging tabs are formed on the end face of the second surrounding wall.

[0037] The foregoing structure allows the lid cover to extend and surround as far as the outer rim of the lid unit for covering the lid unit, so that a uniform transparent area of the wall can be extended to a greater area including the circumference of the lid unit, which is subject to the human eyes viewing along a slant line from the front-upper or the front-side into the interior. The decorative plate can cover as far as the vicinity of the outer rim of the lid unit, so that the fine appearance of the lid as a whole can be improved with ease. The protruding rib allows preventing the first tab holes which hold the lid cover on the lid unit and the second tab holes which hold the decorative plate on the lid unit from being viewed by the human eyes along every direction around the lid. The tab holes thus cannot be viewed easily, so that the lid as a whole can be enhanced its fine appearance with ease.

[0038] The first engaging tab has a first engaging section forming a first stopper hole, while the first stopper forms a first claw. The first stopper hole and the first claw fix the first engaging tab into the first tab hole. The second engaging tab has a second engaging section forming a second stopper hole, while the second stopper forms a second claw. The second stopper hole and the second claw fix the second engaging tab into the second tab hole. This structure allows fixing the lid cover to the lid unit through the elastic engagement, and allows fixing the decorative plate to the lid unit through the elastic engagement.

[0039] Here is another aspect of the present invention, i.e. the first engaging tab has the first engaging section forming a first engaging hook, and the first stopper forms a rear opening rim of the first tab hole. The first engaging hook and the rear opening rim of the first tab hole allow fixing the first engaging tab into the first tab hole. The second engaging tab has the second engaging section forming a second engaging hook, and the second stopper forms a rear opening rim of the second tab hole. The second engaging hook and the rear opening rim of the second tab hole allow fixing the second engaging tab into the second tab hole. This structure allows fixing the lid cover to the lid unit through the elastic engagement, and allows fixing the decorative plate to the lid unit through the elastic engagement.

[0040] The present invention further has another aspect, i.e. the first tab holes and the second tab holes are punched at different places along the circumferential direction of the lid unit. This structure allows placing the first and second tab holes equidistantly along the circumferential direction. When external force is applied to the respective tab holes, the lid cover and the decorative plate resist floating from the lid unit, and these three structural elements can be fixed to one another through the elastic engagement.

[0041] The surface in-parts are formed in the range corresponding to both of the first and the second tab holes with the decorative plate not mounted yet. This structure allows two models to be available to the users having a variety of sense of values, i.e. one model is a step-up model of which lid is enhanced the fine appearance by the decorative plate, and the other model is a standard model having no decorative plate in order to keep the price inexpensive. The lid as a whole without the deco-

rative plate of the standard model still keeps a fine appearance.

Claims

1. A drum-type washing machine comprising:

   a cylindrical rotary drum having a bottom plate;
   a water tub accommodating the drum therein;
   a housing accommodating the drum and the tub therein; and
   a lid provided to a front section of the housing,

   wherein the lid is formed of a lid unit having a first window through which a user can monitor an inside of the rotary drum, and a transparent lid cover fitted on a front face of the lid unit for covering the lid unit,
   wherein the lid cover includes a plurality of first engaging tabs protruding rearward on its rear face along an outer circumference of the lid cover,
   wherein the lid unit includes first tab holes which are engaged with the first engaging tabs by first stoppers provided on an inner face of the lid unit,
   wherein a decorative plate can be disposed between the lid unit and the lid cover, and the decorative plate includes a second window corresponding the first window and a plurality of second engaging tabs protruding rearward on its rear face along an outer circumference of the decorative plate,
   wherein the lid unit includes second tab holes which can be engaged with the second engaging tabs by using second stoppers provided on the inner face of the lid unit,
   wherein the lid cover includes, on its surface and in a range corresponding to at least the first tab holes, surface in-parts through which a light coming from an inside of the lid cover disperses and transmits.

2. The drum-type washing machine of claim 1, wherein the lid unit includes a wall bulging toward an outer circumferential direction along an outer rim of the lid unit, and a protruding rib is formed at an edge of the wall for forming a recessed groove,
   wherein a first tab hole and a second tab hole, both of the holes extending through a back and forth direction, are formed in the groove,
   wherein the lid cover includes a first surrounding wall surrounds as far as the outer rim of the lid unit, and an edge of the first surrounding wall touches an end face of the protruding rib and enters into the recessed groove,
   wherein the first engaging tabs are formed on the edge of the first surrounding wall,
   wherein the decorative plate includes a second surrounding wall disposed inside the first surrounding wall and entering into the recessed groove, and
   wherein the second engaging tabs are formed on the edge of the second surrounding wall.

3. The drum-type washing machine of claim 2, wherein each one of the first engaging tabs includes a first engaging section forming a first stopper hole, and the first stopper forms a first claw,
   wherein the first stopper holes and the first claws fix the first engaging tabs to the first engaging holes,
   wherein each one of the second engaging tabs includes a second engaging section forming a second stopper hole, and the second stopper forms a second claw,
   wherein the second stopper holes and the second claws fix the second engaging tabs to the second engaging holes.

4. The drum-type washing machine of claim 2, wherein each one of the first engaging tabs includes a first engaging section forming a first engaging hook, and the first stopper forms a rear opening rim of the first tab hole,
   wherein the first engaging hooks and the rear opening rims of the first tab holes fix the first engaging tabs to the first engaging holes,
   wherein the second engaging tabs includes a second engaging section forming a second engaging hook, and the second stopper forms a rear opening rim of the second tab hole,
   wherein the second engaging hooks and the second the rear opening rims of the second tab holes fix the second engaging tabs to the second engaging holes.

5. The drum-type washing machine of claim 1, wherein the first tab holes and the second tab holes are provided at different places along the outer circumference of the lid unit.

6. The drum-type washing machine of claim 1, wherein the surface in-parts are formed in a range corresponding to both of the first tab holes and the second tab holes with the decorative plate not mounted to the lid unit.

7. The drum-type washing machine of claim 1, wherein the surface in-parts are modified into at least one of (1) an annular or an arc shaped wrinkle groove in a radial direction, (2) annular or arc wavy form grooves in the radial direction, or (3) rough surface with peaks and valleys extending in every direction.

FIG. 1

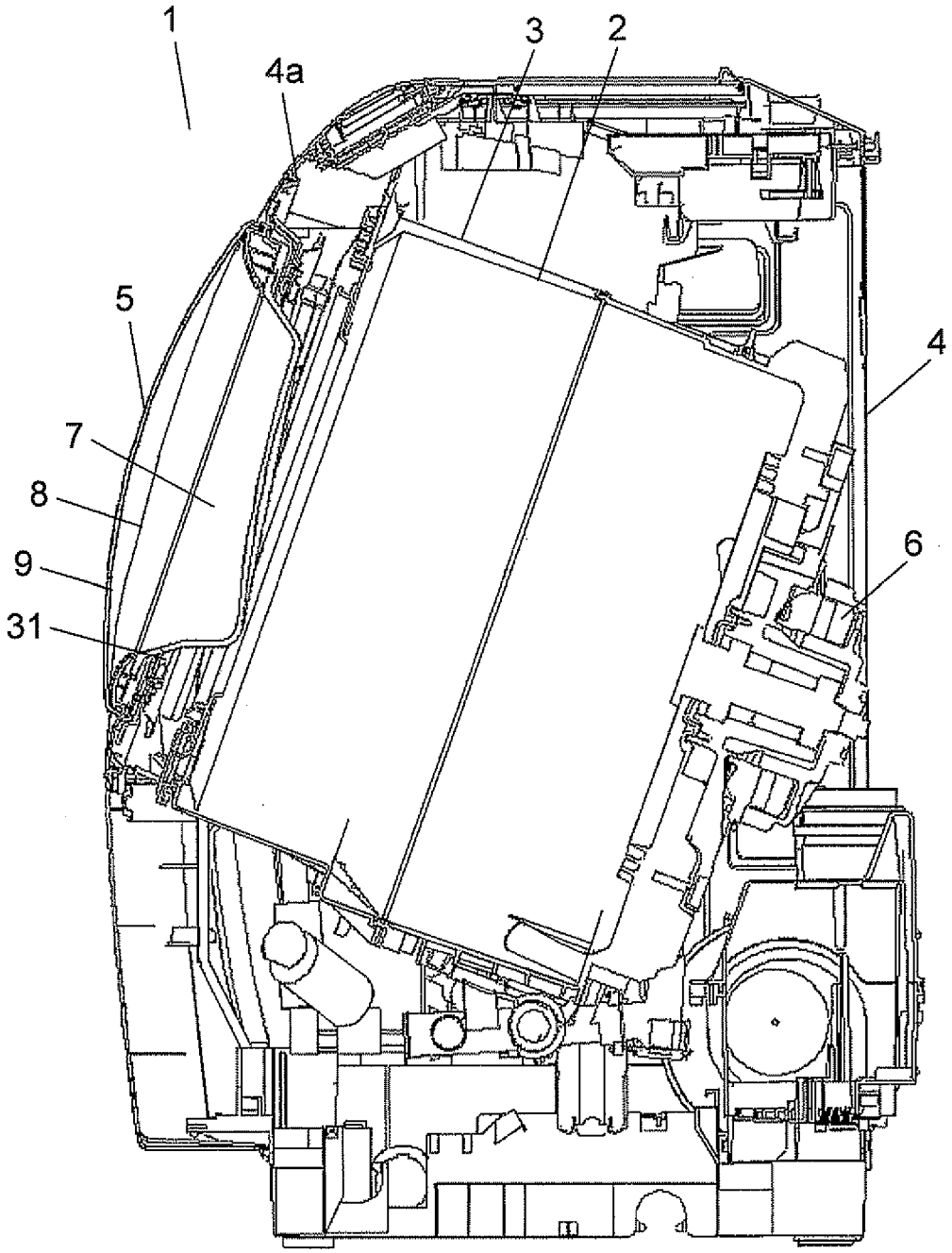


FIG. 2

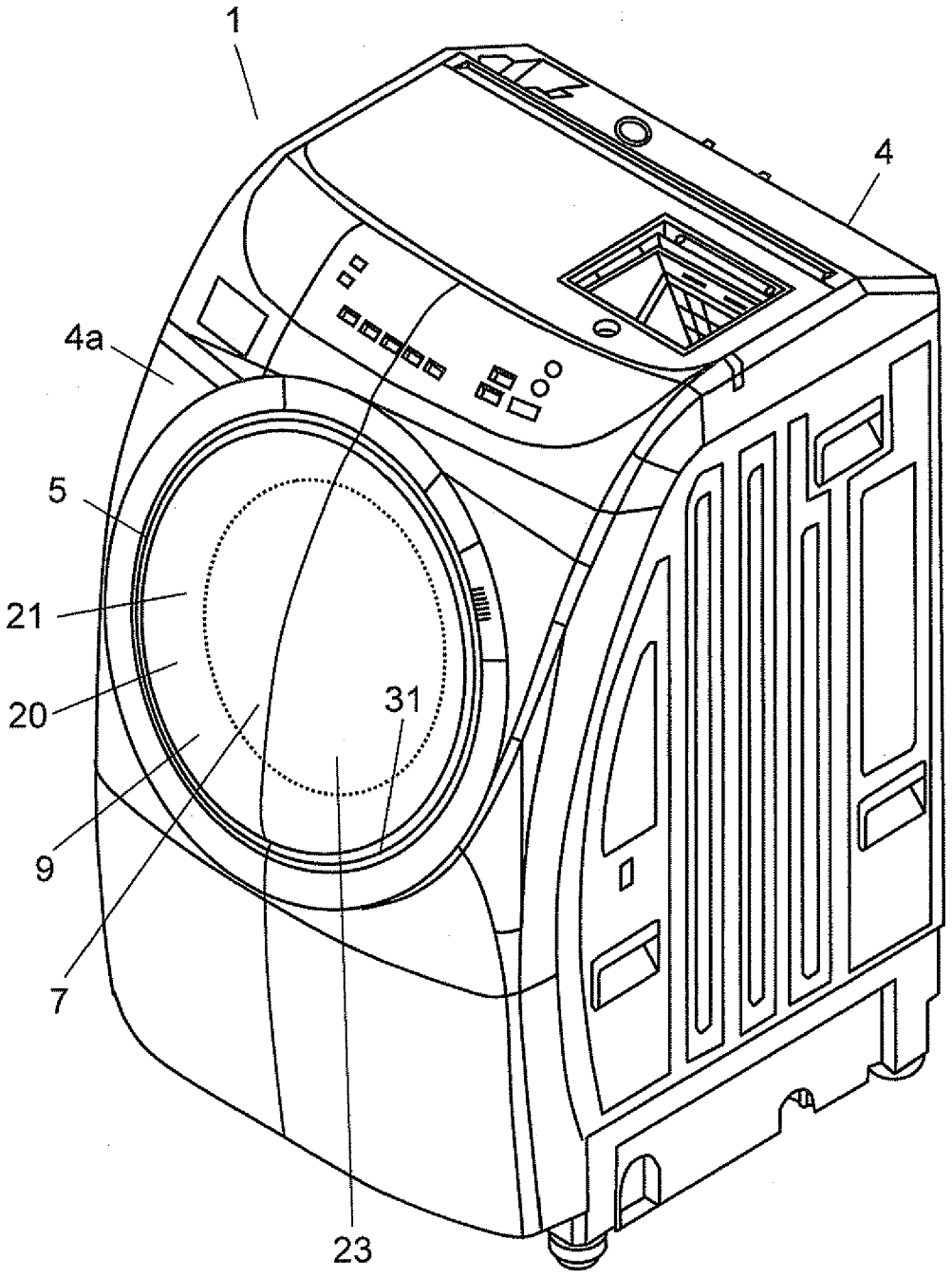
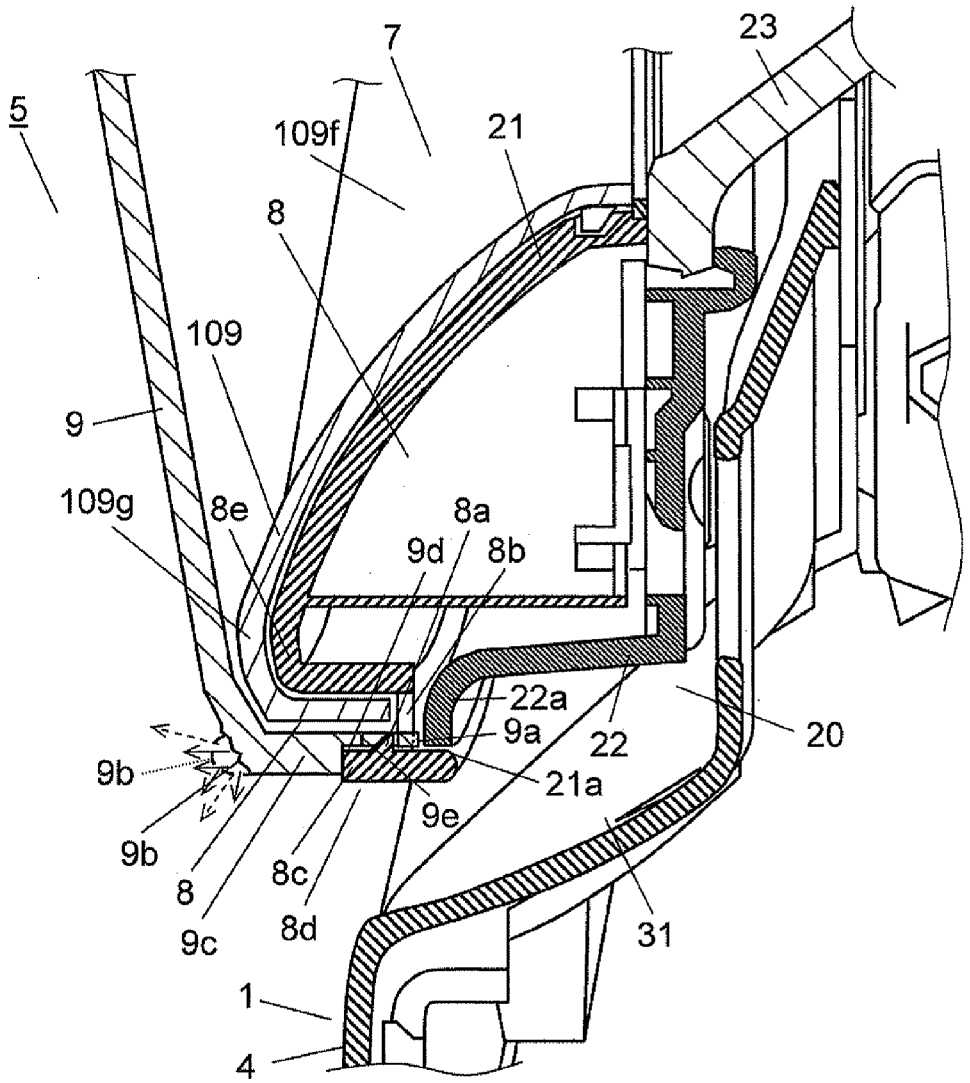


FIG. 3A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9d
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9b
8c
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8d
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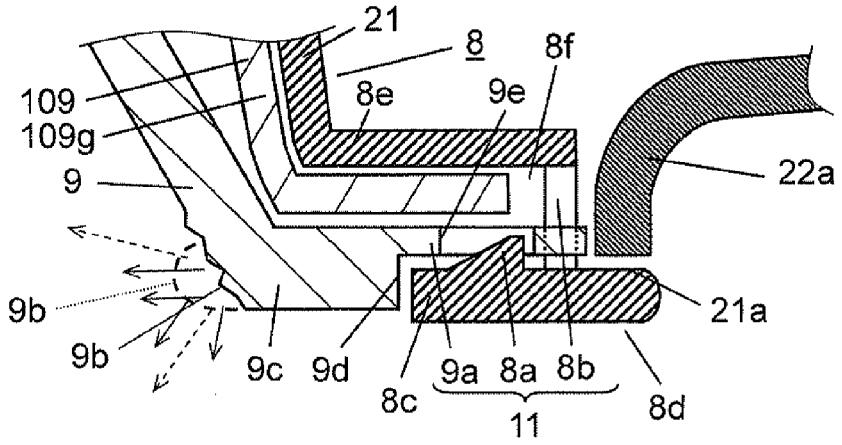
FIG. 3B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8e
9e
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8a
8b
8d
11

FIG. 4

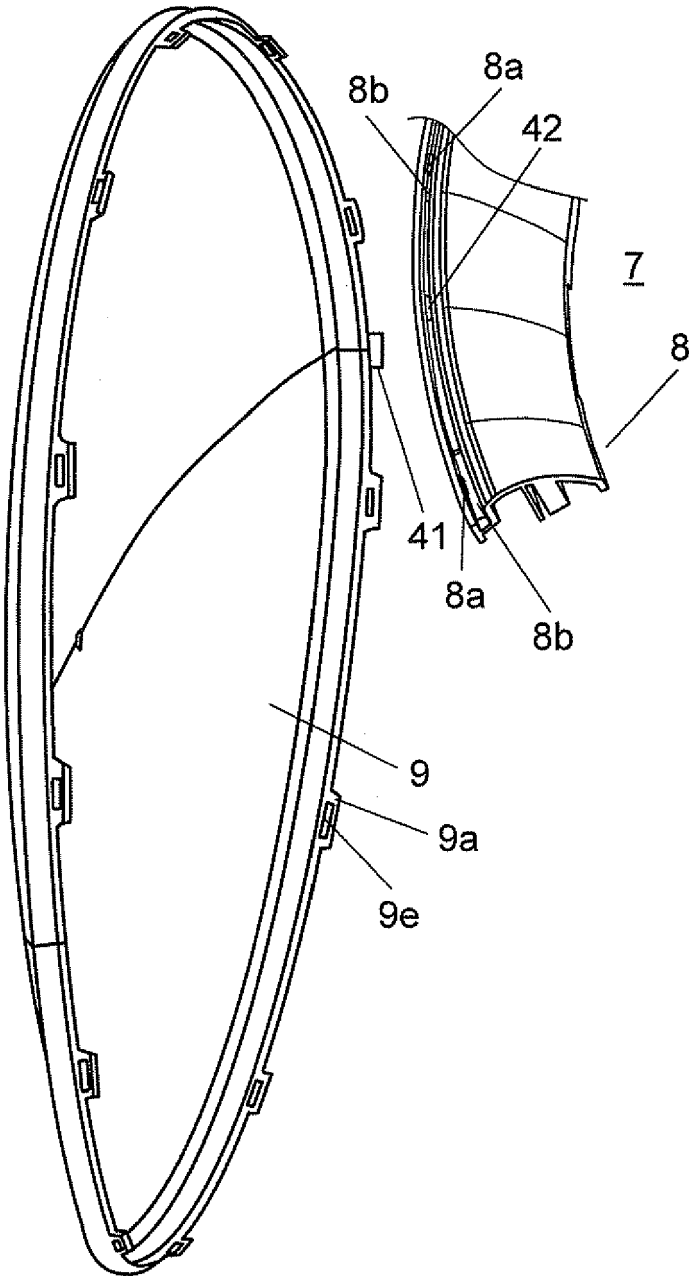


FIG. 5

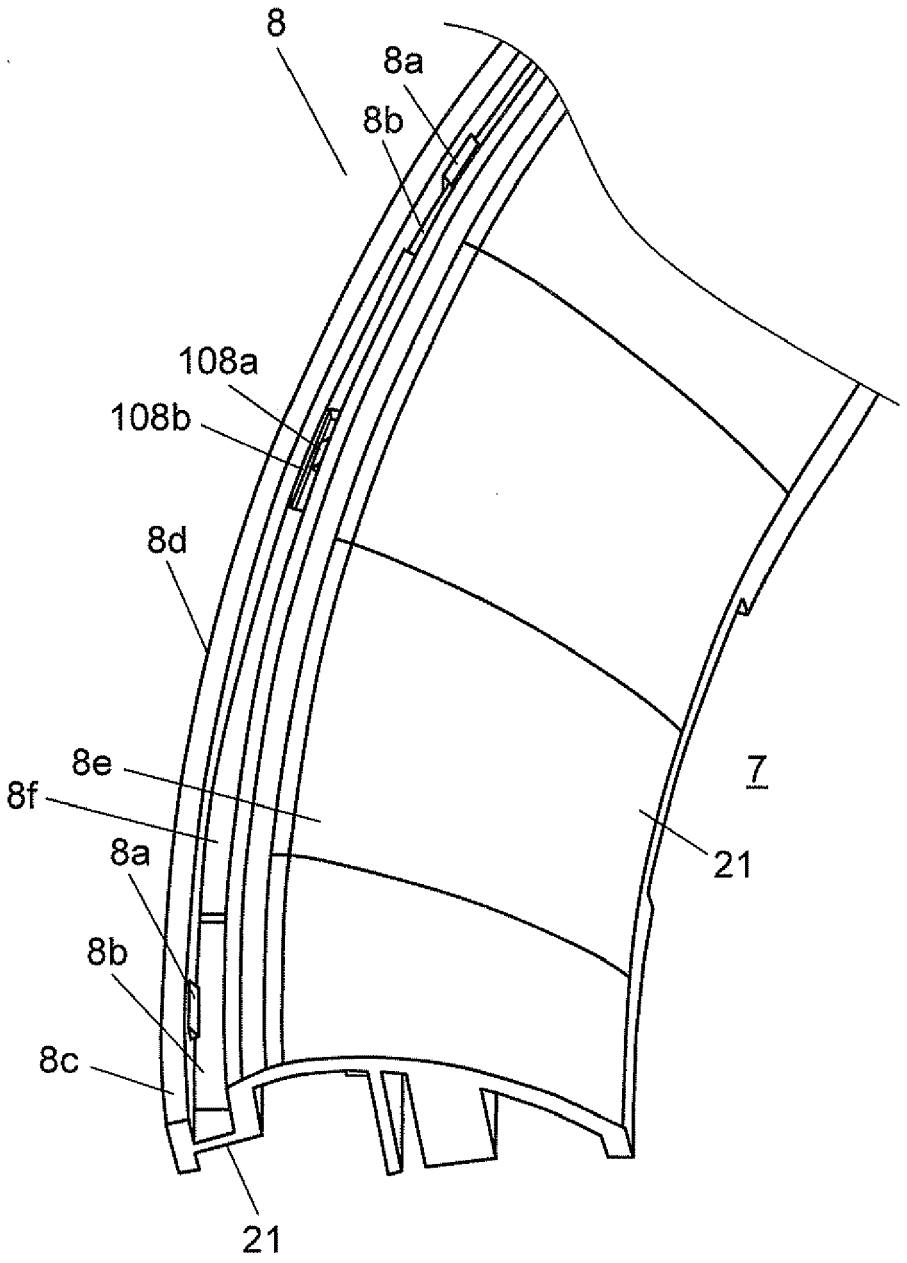
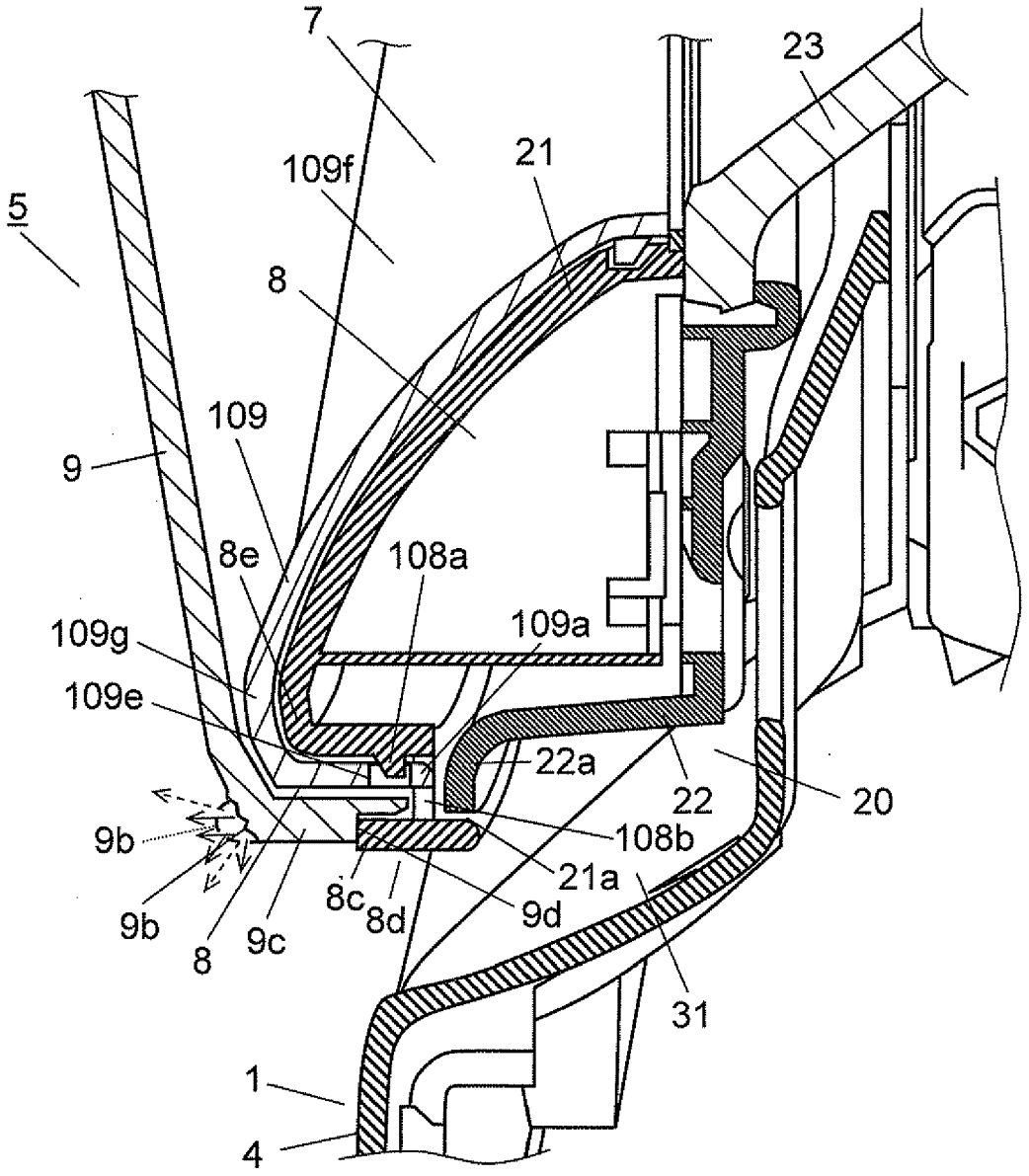


FIG. 6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9d
9b
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9c
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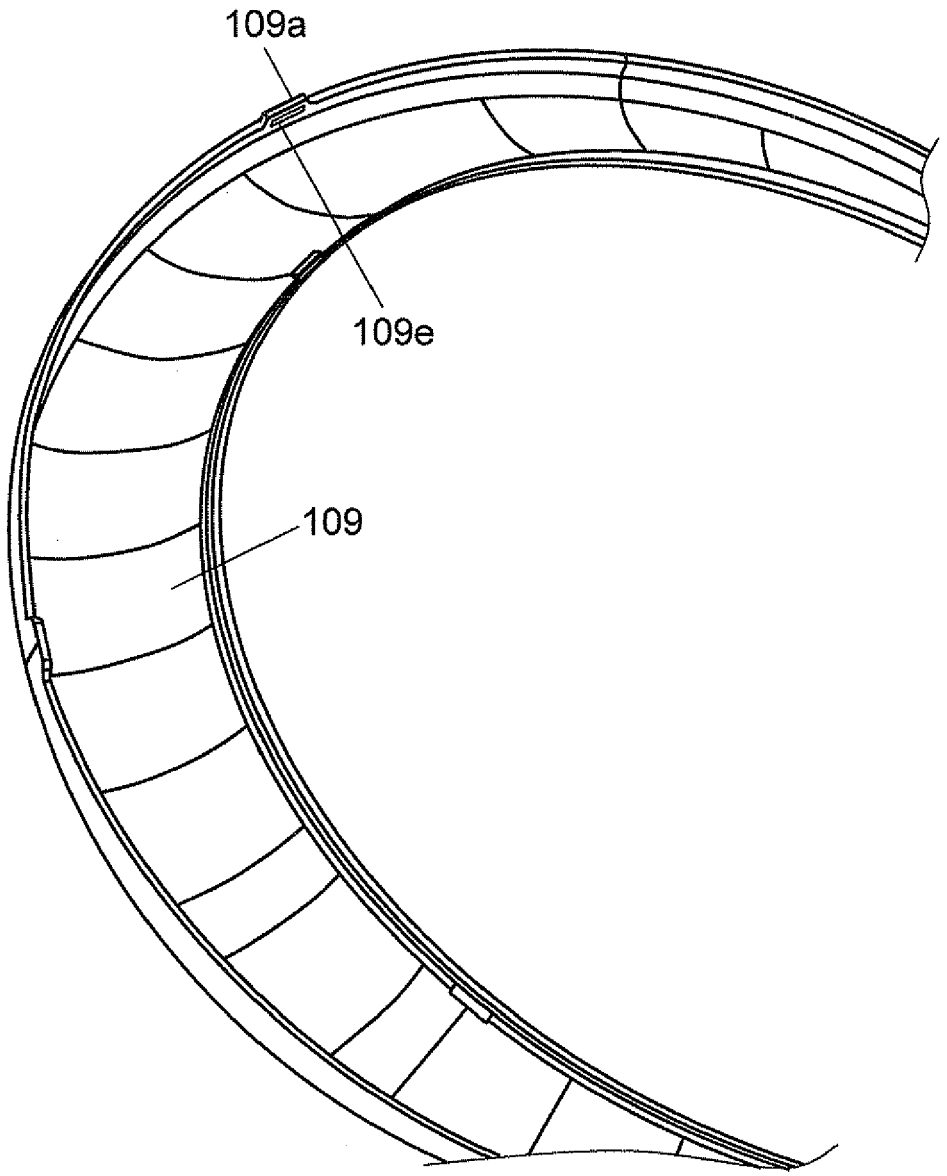
FIG. 7



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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