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(54) **A WASHING MACHINE HAVING A FRONT DOOR**

WASCHMASCHINE MIT VORDERTÜR

LAVE-LINGE AVEC PORTE FRONTALE

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Description

[0001] The present invention relates to a washing machine having a drum wherein laundry to be washed is to be disposed, a loading opening through which laundry can be loaded to the drum, a front door closing the loading opening and having a frame cover and a door frame connected to the frame cover by means of welding, and each of the frame cover and the door frame having respective welding lines on at least one portion of a side facing a respective other of the frame cover and the door frame.

[0002] Washing machines comprise a drum realizing a washing process inside, a loading opening through which laundry is loaded to the drum, a front door closing the loading opening and a door glass provided between the front door and the drum. The front door comprises a door frame and a frame cover connected to the door frame, and the door frame is made of a lower cost material than the frame cover.

[0003] In document WO 2012/153261 A1 a connection between a frame cover and a door frame belonging to the front door of a washing machine is disclosed. A front-loading washing machine is described having a door that includes an annular door frame, a plastic frame cover covering the door frame, and a circular window component with an edge held between the door frame and the frame cover. The door frame and the cover are bound by means of fastening elements.

[0004] The fastening element has a bonding element that is made/bonded integrally as a single piece with the frame cover, and one end of the bonding element, which protrudes through an aperture in the door frame opposite the frame cover, is widened toward the aperture edge, forming a head fastening the door frame by a form-fitted connection.

[0005] Objects of the present invention include to provide a washing machine having a front door, in which fitting precision and welding strength between the door frame and the frame cover are improved.

[0006] The invention provides a solution to these objects as defined in the independent claim attached. Preferred embodiments of the invention are defined in dependent claims attached as well as in the subsequent description and the drawing attached.

[0007] Accordingly, the present invention provides a washing machine having a drum wherein laundry to be washed is to be disposed, a loading opening through which laundry can be loaded to the drum, a front door closing the loading opening and having a frame cover and a door frame connected to the frame cover by means of welding, and each of the frame cover and the door frame having respective welding lines on at least one portion of a side facing a respective other of the frame cover and the door frame. The frame cover and the door frame comprise at least one notch provided on one of the welding lines, and at least one placement portion on another of the welding lines for mating the notch, with the notch disposed in the placement portion.

[0008] Thereby, welding strength and the contact surface in the welding line are increased.

[0009] In a preferred embodiment of the present invention, the welding lines are provided on the welding portions embodied on at least one of an outer edge facing outwards and on at least one of an inner edge provided on the opposite side. Thus, the door frame and the frame cover are connected on at least one edge.

[0010] In a further preferred embodiment of the present invention, the welding lines are provided throughout the inner edges and the outer edges of the door frame and of the frame cover, respectively. Therefore, the length of the welding seam is increased.

[0011] In yet another preferred embodiment of the present invention, the door frame comprises a fixation tab provided towards the frame cover, near the welding portion provided on the outer edge. Thus, the welding portions do not slide in an undesired manner during the welding process.

[0012] In yet a further preferred embodiment of the present invention, the welding portions, provided on the inner edge side, are provided in L form in an opposite manner with respect to each other. Thus, the edge line on the welding portion is expanded.

[0013] In still another preferred embodiment of the present invention, the welding portion provided on the outer edge side of the door frame is provided in a manner extending towards the frame cover. Thus, a gap is formed for the placement of door glass in between.

[0014] In still a further preferred embodiment of the present invention, the frame cover, wherein the welding portion provided on the outer edge side of the frame cover, is provided in an extended manner towards the door frame against the welding portion of the door frame. In this case, a gap is provided for the placement of door glass in between.

[0015] Preferred embodiments of the invention will now be described in detail with reference to the Figures of the drawing attached. In the drawing, there is shown:

In Figure 1, a representative view of a washing machine having the subject matter front door;

In Figure 2, a representative view of the subject matter front door;

In Figure 3a, a detailed view regarding the interconnection of the door frame and of the frame cover of the subject matter front door on the outer edge; and

In Figure 3b, a cross sectional view regarding the interconnection of the door frame and of the frame cover of the subject matter front door on the inner edge.

[0016] In this detailed description, a washing machine with a front door is explained with references to examples without forming any restrictive effect in order to make the

subject more understandable.

[0017] With reference to Figure 1 and 2, a washing machine generally comprises a drum 20 manufactured from steel material wherein washing process is realized, a loading opening 30 through which laundry is loaded to the drum 20, a front door 10 closing the loading opening 30, and a door glass 17 provided on the front door 10. The front door 10 is formed by interconnecting a frame cover 14 and a door frame 11 produced by pouring plastic into a mold, and comprises a door arm 18 connected to the frame cover 14. The door frame 11 of the front door 10 is produced of lower-cost material when compared with the frame cover (14). The materials may be ABS/PP, ABS/PC and PP/PC. The frame cover 14 is generally made of ABS material which provides a more aesthetical appearance when compared with the PP and PC materials.

[0018] With reference to Figure 2, 3a and 3b, a welding portion 121 extends from the outer edge 12, provided on the wall of the annular door frame 11 facing the outer side, towards the direction where the door frame 11 is connected to the frame cover 14. Near the welding portion 121, a rectangular fixation tab 125 is provided towards the frame cover 14. The welding portion 121 has a welding line 122 with notches 123 provided towards the frame cover 14. A welding portion 131, which is in L form, is provided towards the direction where the door frame 11 is connected to the frame cover 14, by leaving a certain distance from the inner edge 13 provided on the side of the door frame 11 facing the door glass 17. The welding portion 131 comprises a welding line 132 where the welding portion 131 is connected to the frame cover 14. There are notches 133 on the welding line 132. The inner edge 13 has an arm part 135 embodied in L form towards the door glass 17. The door frame 11 is produced by pouring material into the mold with the desired shape.

[0019] With reference to Figure 2, 3a and 3b, the circular frame cover 14 has a welding portion 151 provided in tab form towards the door frame 11 from the outer edge 15 provided on the side thereof facing the outwards, and there is a welding line 152 in the welding portion 151. There are notches 153 on the welding line 152. While the inner edge 16 of the frame cover 14 is produced by means of molding, it is shaped like the door frame 11. A welding portion 161 extends so as to face the door frame 11 from the inner edge 16 of the frame cover 14. The welding portion 161 comprises a welding line 162 having notches 163 and providing connection to the door frame 11. Said welding portion 161 has an L-like form. At the same time, an arm portion 165 is provided in a crosswise manner from the inner edge 16 towards the door glass 17.

[0020] With reference to Figure 3a, the interconnection of the door frame 11 and of the frame cover 14 to each other is provided by means of ultrasonic welding. The welding portion 151 provided on the outer edge 15 of the frame cover 14 and the welding portion 121 provided on the outer edge 12 of the door frame 11 are overlapped,

and the notches 123, 153, provided on the welding lines 122, 152, are welded to each other by means of ultrasonic vibrations provided by the ultrasonic supply. The notches 123, 153 seat to the placement parts 124, 154 provided between the notches 123, 153 of the frame cover 14 and the door frame 11. The fixation tab 125, provided in the welding part 121 of the door frame 11, prevents undesired sliding of the frame cover 14 during ultrasonic welding when the welding portions 121, 151 overlapped.

[0021] With reference to Figure 3b, the welding portions 131, 161, provided on the inner edge 13, 16 side of the door frame 11 and the frame cover 14, overlap, and the door glass 17 is disposed between the arm portions 135, 165 extending from the door frame 11 and from the frame cover 14 towards the door glass 17. The welding portions 131, 161 are interconnected to each other by means of ultrasonic welding. The notches 133, 163, provided on the welding lines 132, 162 existing on the welding portions 131, 161, are welded to each other as a result of ultrasonic vibrations. The notches 133, provided on the welding line 132 of the door frame 11, are seating to the welding portions 164 provided between the notches 163 provided on the welding line 162 of the frame cover 14 as a result of ultrasonic welding. Correspondingly, the notches 163, provided on the welding line 162 of the frame cover 14, are seating to the placement portions 134 provided in the welding line 132 of the door frame 11. Since the notches 123, 133, 153, 163, provided on the welding lines 122, 132, 152, 162, increase the contact surface, the strength of ultrasonic supply is improved.

[0022] The protection scope of the present invention is set forth in the annexed claims and cannot be restricted to the illustrative disclosures given above, under the detailed description. It is because a person skilled in the relevant art can obviously produce similar embodiments under the light of the foregoing disclosures, without departing from the main principles of the present invention.

LIST OF REFERENCE NUMERALS

[0023]

10	Front door
11	Door frame
12	Outer edge
121	Welding portion
122	Welding line
123	Notch
124	Placement portion
125	Fixation tab
13	Inner edge
131	Welding portion
132	Welding line
133	Notch
134	Placement portion
135	Arm portion
14	Frame cover

15 Outer edge
 151 Welding portion
 152 Welding line
 153 Notch
 154 Placement portion
 16 Inner edge
 161 Welding portion
 162 Welding line
 163 Notch
 164 Placement portion
 165 Arm portion
 17 Door glass
 18 Door arm
 20 Drum
 30 Loading opening

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5. A washing machine according to claim 2, wherein the welding portions (131, 161), provided on the inner edge (13, 16) side, are provided in L form in an opposite manner with respect to each other.

6. A washing machine according to claim 2, wherein the welding portion (121) provided on the outer edge (12) side of the door frame (11) is provided in a manner extending towards the frame cover (14).

7. A washing machine according to claim 6, wherein the welding portion (151), provided on the outer edge (15) side of the frame cover (12), is provided in an extended manner towards the door frame (11) against the welding portion (121) of the door frame (11).

Claims

1. A washing machine having a drum (20) wherein laundry to be washed is to be disposed, a loading opening (30) through which laundry can be loaded to the drum (20), a front door (10) closing the loading opening (30) and having a frame cover (14) and a door frame (11) connected to the frame cover (14) by means of welding, and each of the frame cover (14) and the door frame (11) having respective welding lines (122, 132, 152, 162) on at least one portion of a side facing a respective other of the frame cover (14) and the door frame (11), **characterized by** the frame cover (14) and the door frame (11) comprising at least one notch (123, 133, 153, 163) provided on one of the welding lines (122, 132, 152, 162), and at least one placement portion (124, 134, 154, 164) on another of the welding lines (122, 132, 152, 162) for mating the notch (123, 133, 153, 163), with the notch (123, 133, 153, 163) disposed in the placement portion (124, 134, 154, 164).
2. A washing machine according to claim 1 wherein the welding lines (122, 132, 152, 162) are provided on welding portions (121, 131, 151, 161) embodied on at least one of an outer edge (12, 15) facing outwards and on at least one of an inner edge (13, 16) provided on the opposite side.
3. A washing machine according to claim 2 wherein the welding lines (122, 132, 152, 162) are provided throughout the inner edges (13, 16) and outer edges (12, 15) of the door frame (11) and of the frame cover (14), respectively.
4. A washing machine according to any one of the preceding claims, wherein the door frame (11) comprises a fixation tab (125) provided towards the frame cover (14) at a vicinity of the welding portion (121) provided on the outer edge (12).

Patentansprüche

1. Waschmaschine mit einer Trommel (20), in der zu waschende Wäsche angeordnet werden soll, einer Beladeöffnung (30), durch die Wäsche in die Trommel (20) geladen werden kann, einer Fronttür (10), die die Beladeöffnung (30) verschließt und eine Rahmenabdeckung (14) und einen durch Verschweißen mit der Rahmenabdeckung (14) verbundenen Türrahmen (11) aufweist, wobei sowohl die Rahmenabdeckung (14) als auch der Türrahmen (11) an mindestens einem Abschnitt auf einer dem Türrahmen (11) beziehungsweise der Rahmenabdeckung (14) gegenüberliegenden Seite jeweilige Schweißnähte (122, 132, 152, 162) aufweist, **dadurch gekennzeichnet, dass** die Rahmenabdeckung (14) und der Türrahmen (11) mindestens eine an einer der Schweißnähte (122, 132, 152, 162) bereitgestellte Raste (123, 133, 153, 163) und an einer anderen Schweißnaht (122, 132, 152, 162) mindestens einen Platzierungsabschnitt (124, 134, 154, 164) umfassen, der mit der Raste (123, 133, 153, 163) zusammenpasst, wobei die Raste (123, 133, 153, 163) in dem Platzierungsabschnitt (124, 134, 154, 164) angeordnet ist.
2. Waschmaschine nach Anspruch 1, wobei die Schweißnähte (122, 132, 152, 162) an Schweißabschnitten (121, 131, 151, 161) bereitgestellt sind, die sich an mindestens einer nach außen weisenden Außenkante (12, 15) und mindestens einer an der gegenüberliegenden Seite bereitgestellten Innenkante (13, 16) befinden.
3. Waschmaschine nach Anspruch 2, wobei die Schweißnähte (122, 132, 152, 162) an allen Innenkanten (13, 16) und Außenkanten (12, 15) des Türrahmens (11) beziehungsweise der Rahmenabdeckung (14) bereitgestellt sind.

4. Waschmaschine nach einem der vorhergehenden Ansprüche, wobei der Türrahmen (11) eine Fixierung (125) umfasst, die in Richtung der Rahmenabdeckung (14) in der Nähe des an der Außenkante (12) bereitgestellten Schweißabschnitts (121) bereitgestellt ist. 5
5. Waschmaschine nach Anspruch 2, wobei die auf der Seite der Innenkante (13, 16) bereitgestellten Schweißabschnitte (131, 161) in Bezug zueinander in entgegengesetzter L-Form bereitgestellt sind. 10
6. Waschmaschine nach Anspruch 2, wobei der auf der Seite der Außenkante (12) des Türrahmens (11) bereitgestellte Schweißabschnitt (121) so bereitgestellt ist, dass er sich zur Rahmenabdeckung (14) hin erstreckt. 15
7. Waschmaschine nach Anspruch 6, wobei der auf der Seite der Außenkante (15) der Rahmenabdeckung (12) bereitgestellte Schweißabschnitt (151) so bereitgestellt ist, dass er sich dem Schweißabschnitt (121) des Türrahmens (11) entgegen zum Türrahmen (11) hin erstreckt. 20

Revendications

1. Lave-linge possédant un tambour (20) accueillant le linge à laver, une ouverture de chargement (30) à travers laquelle le linge peut être chargé dans le tambour (20), une porte frontale (10) fermant l'ouverture de chargement (30) et possédant une protection de structure (14) et une structure de porte (11) reliée à la protection de structure (14) par soudage, chacun de la protection de structure (14) et de la structure de porte (11) possédant des lignes de soudage respectives (122, 132, 152, 162) sur au moins une partie d'un côté faisant face à un autre respectif de la protection de structure (14) et de la structure de porte (11), **caractérisé par** la protection de structure (14) et la structure de porte (11) comprenant au moins une encoche (123, 133, 153, 163) prévue sur l'une des lignes de soudage (122, 132, 152, 162), et au moins une partie de positionnement (124, 134, 154, 164) sur une autre des lignes de soudage (122, 132, 152, 162) pour accouplement avec l'encoche (123, 133, 153, 163), l'encoche (123, 133, 153, 163) étant disposée dans la partie de positionnement (124, 134, 154, 164). 30 35 40 45 50
2. Lave-linge selon la revendication 1 dans lequel les lignes de soudage (122, 132, 152, 162) sont prévues sur des parties de soudage (121, 131, 151, 161) présentes sur au moins un bord extérieur (12, 15) dirigé vers l'extérieur et sur au moins un bord intérieur (13, 16) prévu sur le côté opposé. 55

3. Lave-linge selon la revendication 2 dans lequel les lignes de soudage (122, 132, 152, 162) sont prévues sur l'ensemble des bords intérieurs (13, 16) et des bords extérieurs (12, 15) de la structure de porte (11) et de la protection de structure (14), respectivement. 5
4. Lave-linge selon l'une quelconque des revendications précédentes dans lequel la structure de porte (11) comprend une languette de fixation (125) prévue en direction de la protection de structure (14), à proximité de la partie de soudage (121) prévue sur le bord extérieur (12). 10
5. Lave-linge selon la revendication 2, dans lequel les parties de soudage (131, 161) prévues sur le côté du bord intérieur (13, 16) sont prévues en forme de L de manière opposée l'un par rapport à l'autre. 15
6. Lave-linge selon la revendication 2, dans lequel la partie de soudage (121) prévue sur le côté du bord extérieur (12) de la structure de porte (11) est prévue d'une manière s'étendant en direction de la protection de structure (14). 20
7. Lave-linge selon la revendication 6, dans lequel la partie de soudage (151) prévue sur le côté du bord extérieur (15) de la protection de structure (12) est prévue d'une manière étendue en direction de la structure de porte (11) contre la partie de soudage (121) de la structure de porte (11). 25 30 35 40 45 50

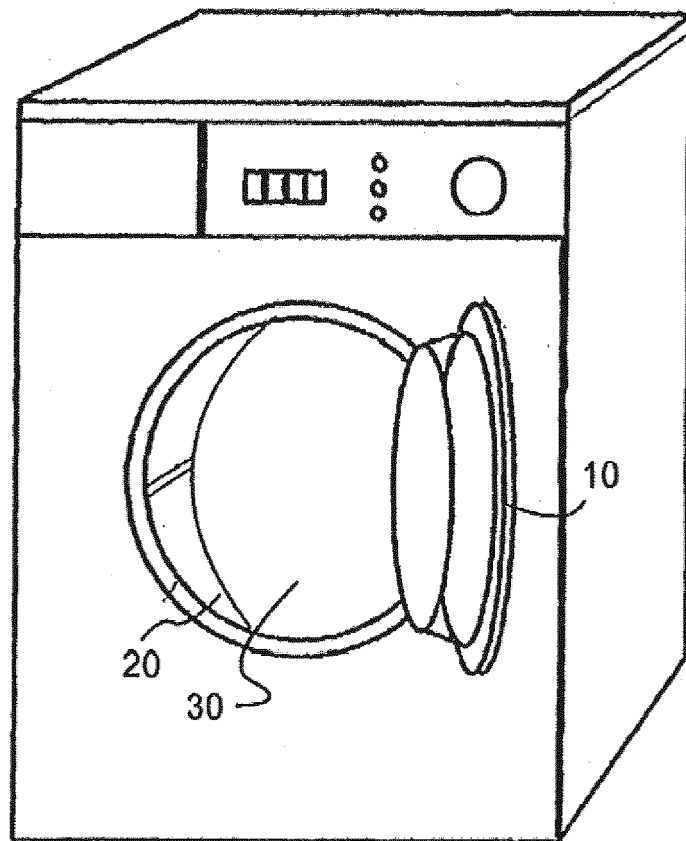


FIG 1

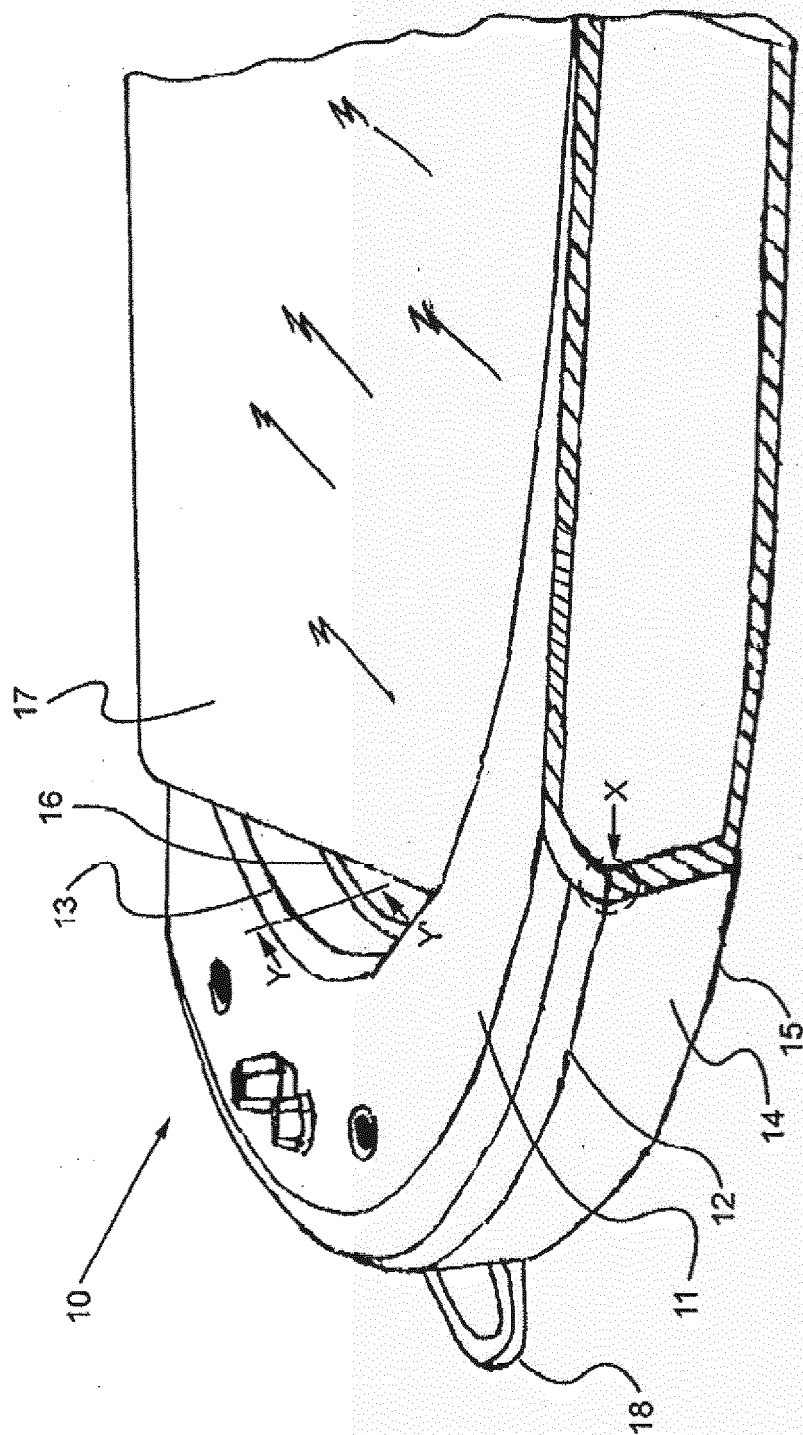


FIG 2

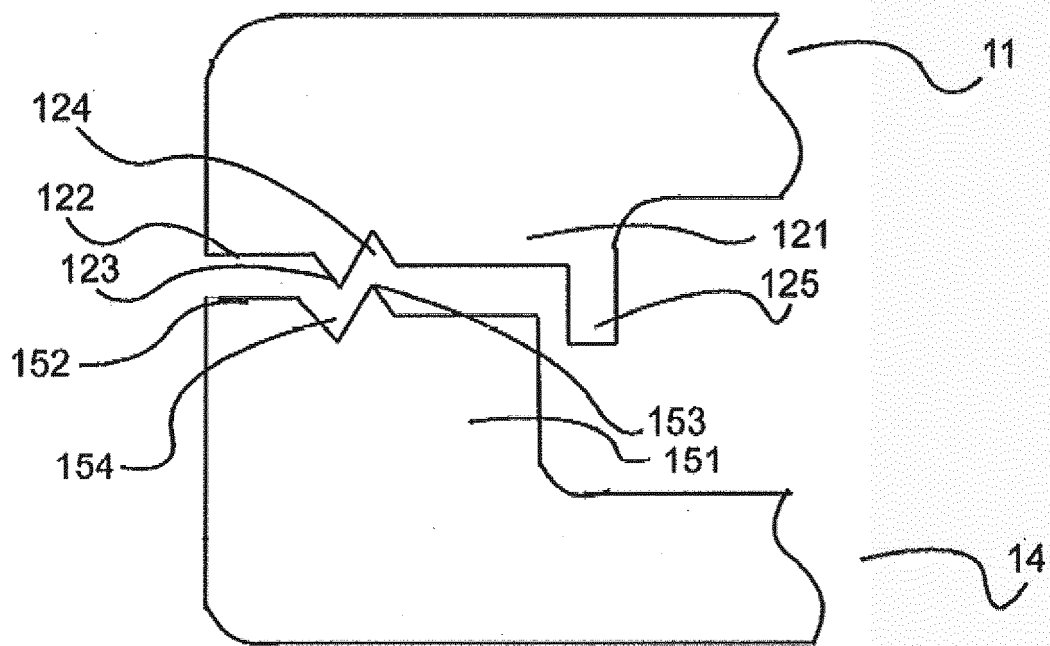


FIG 3a

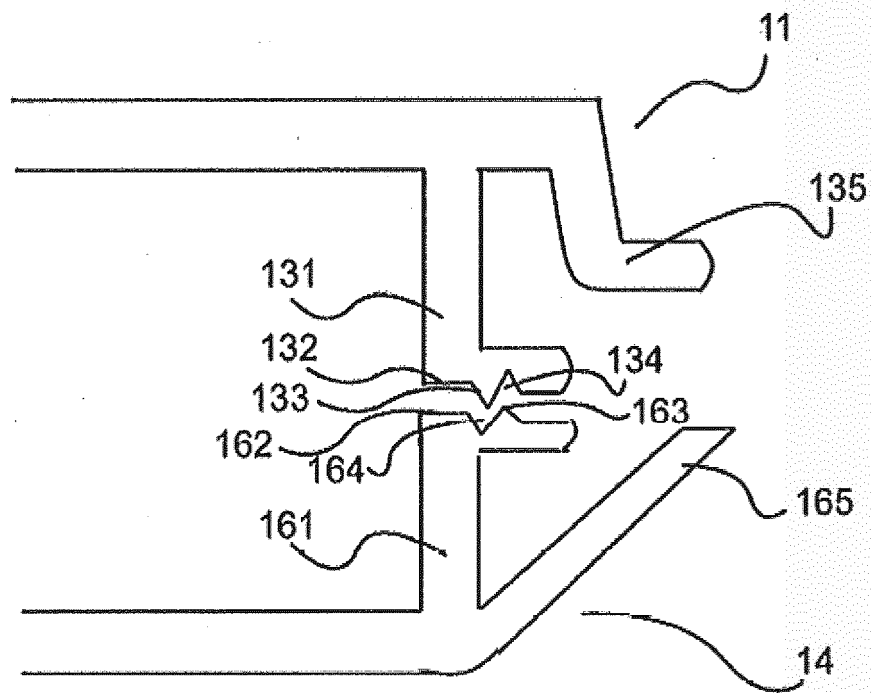


FIG 3b

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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