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(54) **SPACER DEVICE**

ABSTANDSVORRICHTUNG

ESPACEUR

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Description

[0001] The present invention relates to a spacer device adapted to be used in a securing device to be applied to a machine, according to the preamble of claim 1.

[0002] Said spacer device is particularly adapted to be used in a laundry washing machine, a washing/drying machine or a clothes dryer for securing the oscillating assembly to the cabinet of the machine.

[0003] The structure of several household appliances includes an oscillating assembly placed inside the cabinet: in laundry washing machines, washing/drying machines and clothes dryers, the oscillating assembly consists of the tub assembly, generally comprising a tub used for containing water and/or wash liquid, and a drum used for containing the laundry to be treated. The tub is an assembly made up of two or three components, depending on whether the tub is made of steel or plastic, which cannot be disassembled because they are welded or plastically deformed together in a steel tub or glued together in a plastic tub. The drum is housed within the tub and can be rotated about its axis through a motor device.

[0004] The oscillating assembly is connected to the cabinet of the household appliance through a suspension system. In a laundry washing machine, washing/drying machine or clothes dryer, this system typically comprises a set of springs and dampers to keep the tub assembly suspended and to damp the oscillations generated during the operation of the household appliance.

[0005] The transport of the household appliance from the production site to the user may cause stresses on the oscillating assembly due to the inertial actions which propagate from the cabinet to the oscillating assembly through the suspension system when the household appliance is moved. Such stresses may cause an uncontrolled motion of the oscillating assembly inside the cabinet, resulting in possible damage to the household appliance in the event that, during the transport, the oscillating assembly is left free to oscillate inside the cabinet. It is therefore necessary to keep the tub assembly rigidly constrained to the cabinet until the household appliance has arrived at its final destination.

[0006] For this purpose, a securing system between the oscillating assembly and the rear panel of the household appliance is typically used. Such a system comprises a set of securing devices, typically a set of three securing devices. Each securing device comprises a spacer device and a screw which is inserted in the spacer device and then screwed in the rear portion of the oscillating assembly of the laundry washing machine, washing/drying machine or clothes dryer (e.g. see: document EP-A-1491675). In plastic tubs the screw is a self-tapping screw, whereas in steel tubs there is a female thread in the rear flange of the tub. While the securing device is anchored to the oscillating assembly by tightening the screw in the rear portion of the oscillating assembly, on the opposite side it is anchored to the cabinet of the household appliance by the action exerted between the spacer and the rear panel of the household appliance due to the tightening force applied to the screw.

[0007] According to the current state of the art, the spacer device passing through a suitable hole obtained on the rear panel of the household appliance comprises two components: a tubular component made of an inelastic material, preferably plastic, through which the screw shank is inserted, which is used to keep the tub and the cabinet separated at an appropriate distance, and a discoidal component made of an elastic material, preferably rubber, of which front annular surface contacts the screw head, with the possible interposition of a washer, and whose rear annular surface contacts the rear panel of the laundry washing machine, washing/drying machine or clothes dryer. Under the action of the tightening force applied by screwing in the screw, the discoidal elastic component is deformed and adheres to the rear panel of the cabinet, thereby ensuring a proper connection between the securing device and the cabinet of the household appliance.

[0008] According to the state of the art, both of the above components of the spacer device are removably connected to each other by means of a joint wherein a portion of the tubular component is inserted into a portion of the discoidal component.

[0009] When the oscillating assembly is released by removing the screw, the spacer device according to the state of the art may suffer the drawback of not allowing the tubular component to be extracted from within the household appliance, which consequently remains trapped between the rear flange of the tub and the inner wall of the rear panel of the laundry washing machine, washing/drying machine or clothes dryer. Said tubular component is therefore subject to vibration during the operation of the household appliance and may even be hit by the oscillating assembly: this gives rise to inconveniences for the user of the household appliance, in that said tubular component, in the above-described conditions, becomes a source of noise, thus jeopardizing the user's comfort.

[0010] Moreover, said tubular component may subsequently fall down on the bottom of the household appliance during its operation; if detected by the user, this fact may give the user the wrong impression that there has been a failure inside the household appliance.

[0011] The object of the present invention is to solve the above problems through an innovative spacer device adapted to be used in a securing device to be applied to a machine, in particular a laundry washing machine, washing/drying machine or clothes dryer, for securing the oscillating assembly to the cabinet of the machine, and capable of ensuring a higher level of comfort to the user than any prior-art spacer device.

[0012] The spacer device adapted to attain said object has the features described in the annexed claims, which form an integral part of the present description.

[0013] The present invention will become apparent, together with its further advantages, from the following de-

tailed description and from the annexed drawings, which are supplied by way of non-limiting example, wherein:

Fig.1 shows schematically a spacer device according to the present invention, and
Fig.2 shows schematically a sectional view of a spacer device according to the present invention, obtained by sectioning the spacer device according to a plane passing through its axis.

[0014] The spacer device being the subject of the present invention is adapted to be used in a device for securing a first element to a second element of a machine, preferably said first element being the cabinet of a laundry washing machine, washing/drying machine or clothes dryer and said second element being the oscillating assembly of a laundry washing machine, washing/drying machine or clothes dryer.

[0015] The present invention is based on the general idea of using, for the above-described fastening, an enbloc spacer device instead of spacer elements having two or more components, such as those known in the prior art. Said enbloc spacer device may be, according to a preferred embodiment of the invention, a multimaterial element advantageously obtained by rubber-to-plastic overmoulding.

[0016] Figs. 1 and 2 show a spacer device 1 which represents a possible preferred embodiment of the present invention, yet being supplied merely as an explanatory, non-limiting example.

[0017] Spacer device 1 is an enbloc element, as it has a rubber portion 9 which, being overmoulded between a first plastic portion 20 and a second plastic portion 6, forms a single body together with said plastic portions.

[0018] Spacer device 1 is adapted to ensure that the oscillating assembly and the cabinet of the household appliance on which said spacer 1 is mounted remain adequately apart, to allow the screw which secures the oscillating assembly to the rear panel of the laundry washing machine, washing/drying machine or clothes dryer to be inserted through it, and to ensure that said screw is anchored to the rear panel of the machine.

[0019] Spacer device 1 is made up of a tubular portion, essentially consisting of second portion 6, and a discoidal head portion, essentially consisting of first portion 20: a cavity 8 is obtained inside spacer device 1 for the insertion of the securing screw. In the illustrated example, rubber portion 9 is tubular in shape on the side contacting plastic portion 6 and discoidal in shape on the side contacting plastic portion 20, though the present invention has no restrictions in this respect. First portion 20 and second portion 6 are substantially coaxial; cavity 8 is formed by holes made in portions 6, 9 and 20, said holes being substantially coaxial to one another and to said portions.

[0020] The length of the tubular portion is preferably equal to the distance between the oscillating assembly and the rear panel of the household appliance whereto said spacer 1 is applied, so that an outermost annular surface 4 of said tubular portion contacts the rear flange of the tub and has an outer diameter corresponding to the diameter of the hole being present in the rear panel of the laundry washing machine, washing/drying machine or clothes dryer, which is used for housing the spacer device, and an inner diameter which allows the securing screw to be inserted and retained through cavity 8. The head portion has an outer diameter being preferably larger than the diameter of the hole being present in the rear panel of the laundry washing machine, washing/drying machine or clothes dryer, which is used for housing the spacer device, so that an outermost annular surface 5 appropriately contacts the rear surface of the rear panel of the machine, in particular its area surrounding said hole, and an inner diameter corresponding to the inner diameter of the tubular portion; in the illustrated example, a rubber layer placed on the annular surface 5 is adapted to contain said machine surface directly and is integral with portion 9.

[0021] Spacer device 1 is applied to the laundry washing machine, washing/drying machine or clothes dryer at the end of the production line. Following the application of spacer 1, the securing screw is installed. The screw is inserted into cavity 8 of spacer device 1, the head of said screw contacting surface 3 of spacer device 1 and the positioning of said screw being possibly facilitated through centring means 7 consisting of, for instance, profiles extending from surface 3 to the axis of spacer 1, and is then screwed in the rear flange of the tub of the laundry washing machine, washing/drying machine or clothes dryer. Centring means 7 are adapted to keep the axis of cavity 8 of spacer device 1 almost coinciding with the axis of the screw. One or more washers may be interposed between the securing screw and spacer device 1. When said securing screw is screwed in the rear flange, rubber portion 9 of spacer device 1 is deformed under the action of the tightening force, thereby exerting pressure against the rear panel of the household appliance so as to anchor the oscillating assembly to the cabinet of the household appliance and to ensure a connection being stable enough to stand the stresses generated as the laundry washing machine, washing/drying machine or clothes dryer is transported from production site to the user. In fact, the rubber portion is used to ensure, when a tightening force is applied through a screw, a stable connection between the cabinet of the laundry washing machine, washing/drying machine or clothes dryer and the spacer device.

[0022] Spacer device 1 is then removed from the laundry washing machine, washing/drying machine or clothes dryer when it has reached the user. For this purpose, it is necessary to unscrew the securing screw and then extract spacer 1 which, being an enbloc element, is thus entirely removed, thereby eliminating the inherent drawbacks of the prior art, wherein when removing the securing device between the oscillating assembly and the cabinet of the household appliance it was not possible

to extract the tubular component, which remained inside the household appliance and could become a source of noise during the operation of the household appliance.

[0023] It is therefore apparent that the spacer device according to the invention offers, compared to the prior art, the advantage of a more comfortable use of the household appliance whereto said spacer device is applied.

[0024] In addition to the above main advantage, the spacer device according to a preferred embodiment of the invention also offers, compared to the prior art, the further advantage of allowing the spacer to be removed more easily. In said preferred embodiment, in fact, the head portion of spacer device 1 is associated with ergonomic grip means 2A and 2B which can be easily held and used to apply the force needed to extract spacer device 1. This avoids the inconvenience caused by the prior art to the person removing the securing device, who was required to make a great effort to remove the device.

[0025] The present invention has been described with particular reference to a specific embodiment example, but it is clear that many changes are possible for those skilled in the art without departing from the scope defined by the annexed claims.

Claims

1. Spacer device (1) of a type adapted to be used in a device for securing a first element of a machine to a second element of said machine, in particular said first element being the cabinet of a laundry washing machine, washing/drying machine or clothes dryer and said second element being the oscillating assembly of said laundry washing machine, washing/drying machine or clothes dryer, **characterized in that** it is a multimaterial enbloc device.

2. Spacer device (1) according to claim 1, **characterized in that** it is made of rubber-to-plastic overmoulding.

3. Spacer device (1) according to claim 1 or 2, wherein a rubber portion is so positioned as to ensure, when a tightening force is applied, a stable connection between said first element of said machine and said spacer device (1), said tightening force being preferably applied through a securing screw.

4. Spacer device (1) according to any previous claim, **characterized by** comprising a first portion (20), preferably made of plastic, being substantially discoidal in shape, and a second portion (6), preferably made of plastic, being substantially tubular in shape, said first portion (20) and said second portion (6) being preferably substantially coaxial.

5. Spacer device (1) according to claim 4, **characterized by** comprising also a third portion (9), preferably made of rubber, interposed between said first portion (20) and said second portion (6), said third portion (9) being preferably substantially discoidal in shape on the side of said first portion (20) and being preferably substantially tubular in shape on the side of said second portion (6).

6. Spacer device (1) according to any previous claim, **characterized by** comprising a cavity (8) for a securing screw, said cavity (8) being preferably obtained in said first portion (20) and in said second portion (6) and in said third portion (9).

7. Spacer device (1) according to claim 6, **characterized by** comprising centring means (7), said centring means (7) being in particular adapted to keep the axis of said cavity (8) substantially coinciding with the axis of a securing screw, said centring means (7) being preferably present at least in or on said first portion (20).

8. Spacer device (1) according to any one of claims 4 to 7, wherein said first portion (20) comprises grip means (2A, 2B), said grip means (2A, 2B) being in particular adapted to facilitate the extraction of said spacer device (1) from said machine.

Patentansprüche

1. Distanzvorrichtung (1) eines Typs, der angepasst ist, um in einer Vorrichtung zum Sichern eines ersten Elements einer Maschine an einem zweiten Element der Maschine verwendet zu werden, wobei insbesondere das erste Element das Gehäuse einer Waschmaschine, einer Wasch-/Trockenmaschine oder eines Wäschetrockners ist und das zweite Element die schwingende Baugruppe der Waschmaschine, der Wasch-/Trockenmaschine oder des Wäschetrockners ist, **dadurch gekennzeichnet, dass** sie eine Multimaterial-Gesamtvorrichtung darstellt.

2. Distanzvorrichtung (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** sie durch die Überformung von Gummi auf Kunststoff gebildet ist.

3. Distanzvorrichtung (1) nach Anspruch 1 oder 2, wobei ein Gummiabschnitt so positioniert ist, um eine stabile Verbindung zwischen dem ersten Element der Maschine und der Distanzvorrichtung (1) sicherzustellen, wenn eine festziehende Kraft angewendet wird, wobei die festziehende Kraft vorzugsweise durch eine Sicherungsschraube angewendet wird.

4. Distanzvorrichtung (1) nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie einen ersten Abschnitt (20) einschließt, der vor-

zugsweise aus Kunststoff gefertigt ist, welche im Wesentlichen eine scheibenförmige Form aufweist, und einen zweiten Abschnitt (6), der vorzugsweise aus Kunststoff gefertigt ist, welcher im Wesentlichen eine röhrenförmige Form aufweist, wobei der erste Abschnitt (20) und der zweite Abschnitt (6) vorzugsweise im Wesentlichen einen koaxialen Zustand aufweisen.

5. Distanzvorrichtung (1) nach Anspruch 4, **gekennzeichnet durch** das Umfassen auch eines dritten Abschnitts (9), der vorzugsweise aus Gummi gefertigt ist, der zwischen dem ersten Abschnitt (20) und dem zweiten Abschnitt (6) eingerichtet ist, wobei der dritte Abschnitt (9) vorzugsweise im Wesentlichen eine scheibenförmige Form auf der Seite des ersten Abschnitts (20) aufweist und vorzugsweise im Wesentlichen eine röhrenförmige Form auf der Seite des zweiten Abschnitts (6) aufweist.

6. Distanzvorrichtung (1) nach einem der vorhergehenden Ansprüche, **gekennzeichnet durch** das Umfassen eines Hohlraums (8) für eine Sicherungsschraube, wobei der Hohlraum (8) vorzugsweise in dem ersten Abschnitt (20) und in dem zweiten Abschnitt (6) und in dem dritten Abschnitt (9) besteht.

7. Distanzvorrichtung (1) nach Anspruch 6, **gekennzeichnet durch** das Umfassen eines Zentriermittels (7), wobei das Zentriermittel (7) insbesondere angepasst ist, um die Achse des Hohlraums (8) im Wesentlichen übereinstimmend mit der Achse einer Sicherungsschraube zu halten, wobei das Zentriermittel (7) vorzugsweise zumindest in oder auf dem ersten Abschnitt (20) vorhanden ist.

8. Distanzvorrichtung (1) nach einem der Ansprüche 4 bis 7, wobei der erste Abschnitt (20) Greifermittel (2 A, 2 B) umfasst, wobei die Greifermittel (2 A, 2 B) insbesondere angepasst sind, um das Herausziehen der Distanzvorrichtung (1) von der Maschine zu vereinfachen.

Revendications

1. Espaceur (1) d'un type conçu pour être utilisé dans un dispositif permettant de fixer un premier élément d'une machine à un second élément de ladite machine, en particulier ledit premier élément étant l'armoire d'un lave-linge de blanchisserie, d'un lave-linge/sèche-linge, ou d'une machine à sécher le linge, et ledit second élément étant l'ensemble oscillant dudit lave-linge de blanchisserie, dudit lave-linge/sèche-linge ou de ladite machine à sécher le linge, **caractérisé en ce qu'**il s'agit d'un dispositif monobloc multimatériaux.

2. Espaceur (1) selon la revendication 1, **caractérisé en ce qu'**il est constitué d'un surmoulage caoutchouc-plastique.

3. Espaceur (1) selon la revendication 1 ou 2, dans lequel une partie en caoutchouc est positionnée de manière à garantir, lorsqu'une force de serrage est appliquée, un raccordement stable entre ledit premier élément de ladite machine et ledit espaceur (1), ladite force de serrage étant de préférence appliquée par l'intermédiaire d'une vis de fixation.

4. Espaceur (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il comprend une première partie (20), de préférence constituée de plastique, ayant une forme sensiblement discoïdale, et une deuxième partie (6), de préférence constituée de plastique, ayant une forme sensiblement tubulaire, ladite première partie (20) et ladite deuxième partie (6) étant de préférence sensiblement coaxiales.

5. Espaceur (1) selon la revendication 4, **caractérisé en ce qu'**il comprend également une troisième partie (9), de préférence constituée de caoutchouc, intercalée entre ladite première partie (20) et ladite deuxième partie (6), ladite troisième partie (9) ayant de préférence une forme sensiblement discoïdale sur le côté de ladite première partie (20) et ayant une forme de préférence sensiblement tubulaire sur le côté de ladite deuxième partie (6).

6. Espaceur (1) selon l'une quelconque des revendications précédentes, **caractérisé en ce qu'**il comprend une cavité (8) pour une vis de fixation, ladite cavité (8) étant obtenue de préférence dans ladite première partie (20), et dans ladite deuxième partie (6) ainsi que dans ladite troisième partie (9).

7. Espaceur (1) selon la revendication 6, **caractérisé en ce qu'**il comprend un moyen de centrage (7), ledit moyen de centrage (7) étant conçu en particulier pour faire en sorte que, à tout moment, l'axe de ladite cavité (8) coïncide sensiblement avec l'axe d'une vis de fixation, ledit moyen de centrage (7) étant de préférence présent au moins dans ou sur ladite première partie (20).

8. Espaceur (1) selon l'une quelconque des revendications 4 à 7, dans lequel ladite première partie (20) comprend un moyen de préhension (2A, 2B), ledit moyen de préhension (2A, 2B) étant en particulier conçu pour faciliter l'extraction dudit espaceur (1) par rapport à ladite machine.

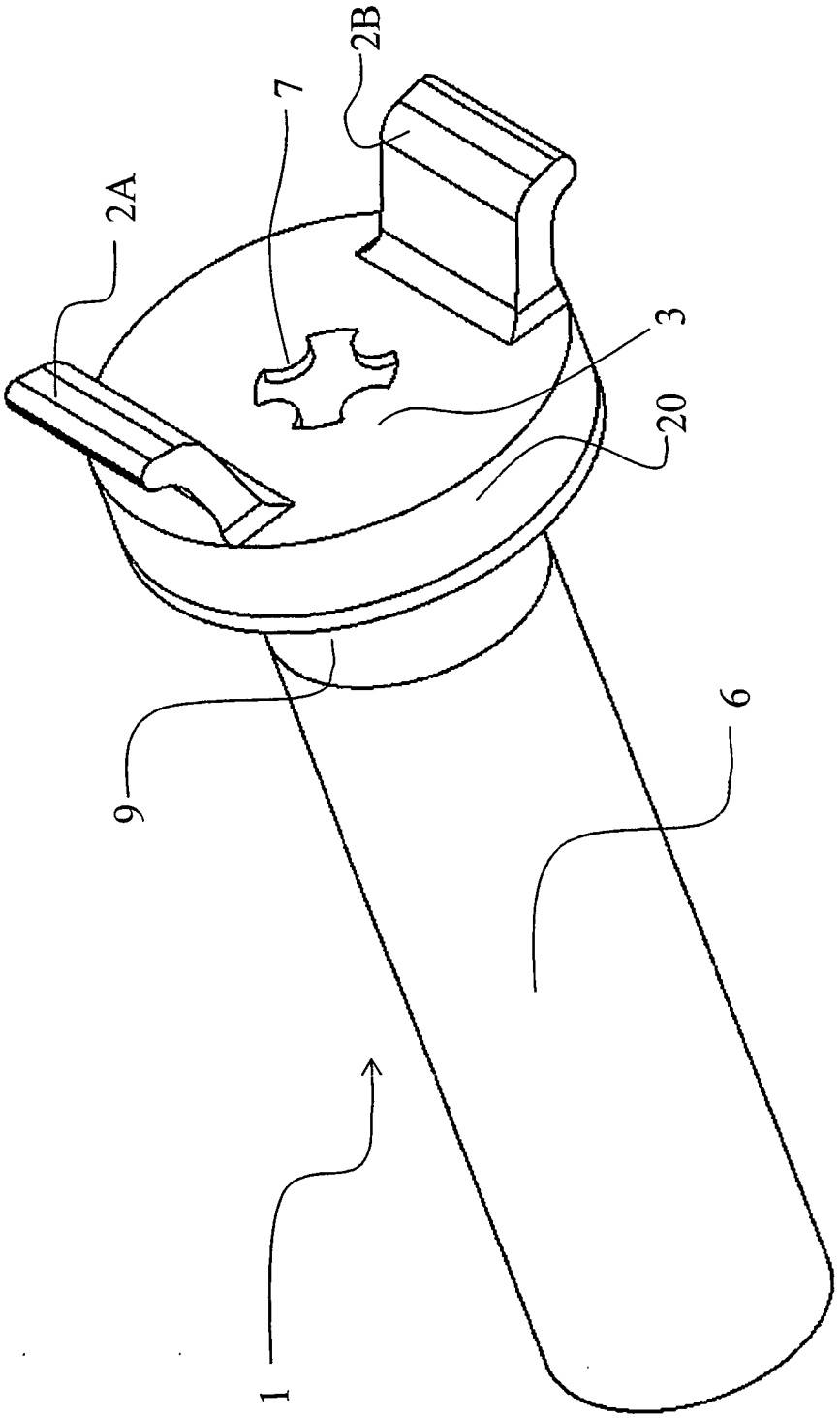

Fig.1

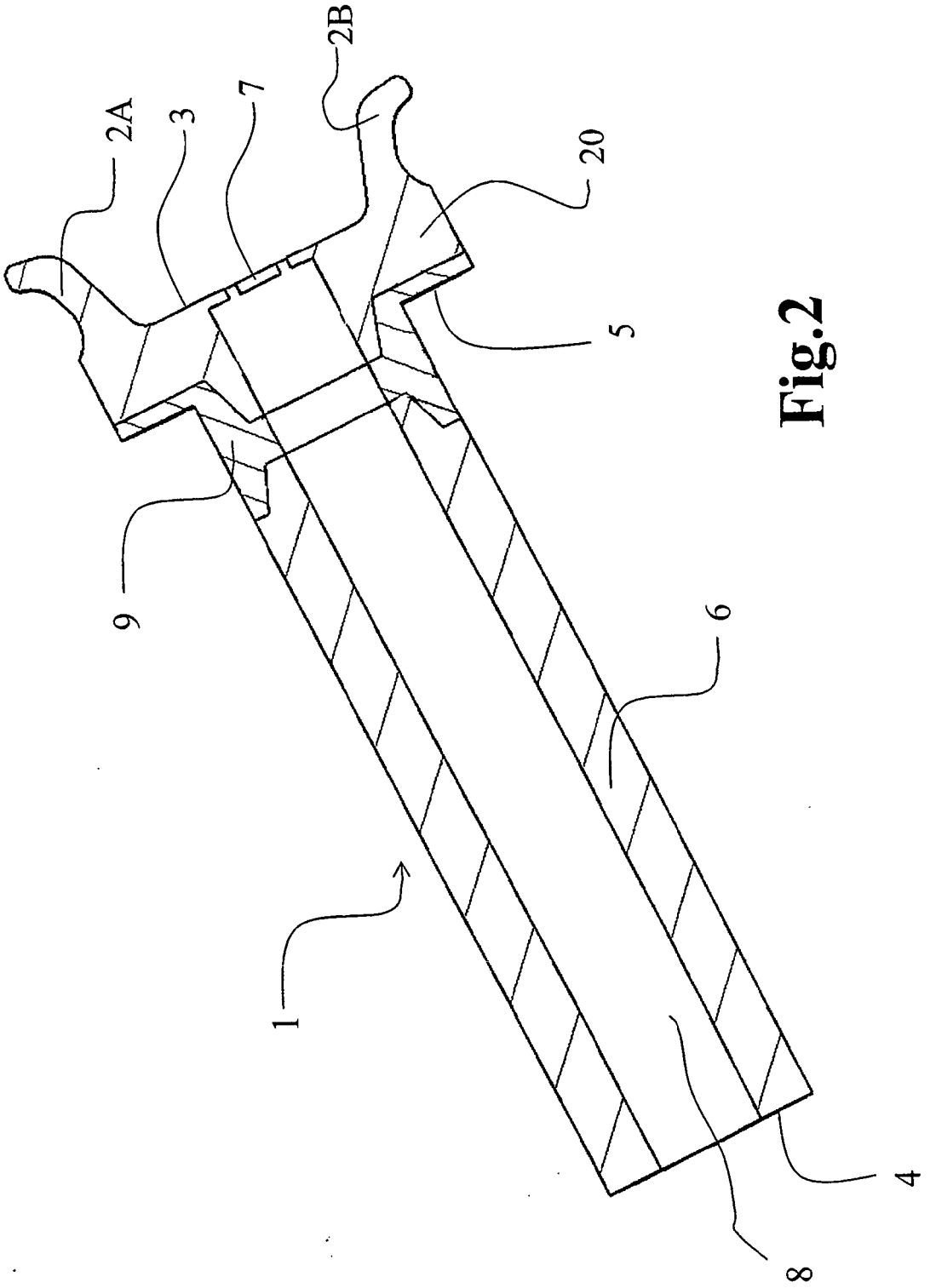

Fig.2

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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