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(54) **Outlet tube for dish and linen washing maschines**

Abflussrohr für Geschirr und Bettwäsche-Waschmaschinen

Tube de sortie pour machines à laver le linge et la vaisselle

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to an outlet tube for washing machines in general, in particular dish and linen washing machines.

[0002] As is known, a washing machine, for example a dish washing machine, comprises a water conveying tube for conveying the machine water to a drain, which drain may comprise either a sink siphon or trap assembly, or a wall hole connected to a hydraulic or water drain system.

[0003] Document EP 2 422 679 A2 discloses a water outlet tube having a valve device comprising a cylindrical support element having a central through hole and a plurality of further through holes radially arranged around the central through hole, wherein in said central through hole an umbrella valve is fixedly arranged.

[0004] Water is conveyed through a water conveying pump included in the washing machine.

[0005] Because of the outlet tube length, and depending on its arrangement path through the machine to the drain, a negative pressure may be generated in the outlet tube and accordingly the pump is caused to operate in a vacuum or a negative pressure condition.

[0006] Such a mode of operation of the pump greatly reduces its life.

[0007] Moreover, the pump is subjected to operating failures and noise and, as the outlet tube remains in a water-free condition for a time, a disagreeable smell is frequently generated.

[0008] Accordingly, it is necessary to prevent a negative pressure condition from being generated in the outlet tube.

SUMMARY OF THE INVENTION

[0009] Accordingly, the aim of the present invention is to provide a dish and linen washing machine outlet tube for overcoming the above mentioned problems and drawbacks.

[0010] Within the scope of the above mentioned aim, a main object of the invention is to provide such an outlet tube which comprises a small number of component pieces and which, moreover, is advantageous from a mere economic standpoint.

[0011] Another object of the present invention is to provide such a washing machine outlet tube which, owing to its specifically designed structure, is very reliable and safe in operation.

[0012] The above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by an outlet tube for dish and linen washing machines comprising the features of claim 1. Further preferred embodiments of the invention are claimed in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of the invention, which is illustrated, by way of an indicative but not limitative example, in the accompanying drawings, where:

Figure 1 is an elevation view showing the outlet tube according to the present invention in a use condition thereof;

Figure 2 is a perspective view of the outlet tube;

Figure 3 is a further exploded perspective view of a zone of the outlet tube wherein is arranged the umbrella valve;

Figure 4 is a further perspective view showing an umbrella or poppet valve in an assembled condition;

Figure 5 is a cross sectional view of a zone of the outlet tube wherein is arranged a poppet or umbrella valve, shown in a normal mode of operation thereof; and

Figure 6 is a cross sectional view similar to Figure 5 but showing the umbrella valve in an outlet tube compensating operating step.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] With reference to the number references of the above mentioned figures, the outlet tube for washing machines, such as dish and linen washing machines, according to the present invention, and generally indicated by the reference number 1, comprises a corrugated hollow body 2 having a first end portion including a fitting 3 designed for connection to an outlet 4 of a washing machine 5 including a water discharging or unloading pump 6.

[0015] Said corrugated body 2 comprises a second end portion including a fitting 7 for connection to a drain 8, which drain may comprise a sink siphon or trap assembly or a wall outlet, as in the example shown in Figure 1.

[0016] According to the present invention, said corrugated body 2 comprises a smooth zone 9 for engaging therein a valve device, generally indicated by the reference number 10.

[0017] Said valve device 10 comprises a silicone umbrella valve 11, including a projecting lug 12 engaged in a central hole 13 formed in a support element 14 of said valve.

[0018] Said support element 14 comprises moreover a plurality of holes 15 which are radially arranged about the central hole 13.

[0019] The support element 14 comprises a cylindric body open on a side thereof wherein is housed the surface 16 of the umbrella membrane, thereby properly holding the latter.

[0020] The support element 14 and umbrella valve 11 are housed in an insert 17 including an end piece 18 which is removably engaged in a through hole 19 formed in the smooth zone 9 of the corrugated body 2.

[0021] Said insert 17, umbrella valve 11 and support element 14 may be disassembled from one another and from the corrugated body 2.

[0022] The washing machine outlet tube according to the present invention operates as follows.

[0023] In a normal operation condition, shown in Figure 5, the membrane 16 of the umbrella valve 11, because of the outlet water pressure, shuts off or covers the radial holes 15 thereby preventing water flowing in the corrugated body 2 from outflowing.

[0024] If a negative pressure is formed in said corrugated body 2, then the environment pressure will press the membrane 16 so as to move said membrane 16 away from the radial holes 15 to allow environmental pressure air to enter the corrugated body 2 thereby compensating the inner pressure of the outlet tube.

[0025] It should be apparent that the umbrella valve 11 will be automatically closed as the pressure in said corrugated body will increase to exceed the environment outer pressure.

[0026] Thus, the umbrella valve applied to the inventive outlet tube prevents said tube from being fully emptied in a washing machine discharging operation step, since said umbrella valve will be opened to allow environment pressure air to enter the outlet tube.

[0027] It has been found that the invention fully achieves the intended aim and objects.

[0028] In fact, the invention has provided a washing machine outlet tube allowing the washing machine pump to operate in an optimum operating condition, thereby increasing the operation life of the pump, and preventing a negative pressure from forming in the outlet tube.

[0029] It should be apparent that the outlet tube may also be designed as a smooth tube instead of a corrugated one as in the shown and disclosed exemplary embodiment.

[0030] It should be also apparent that the outlet tube according to the present invention could also be used for any desired types of dish and/or linen washing machines.

[0031] Advantageously, the inventive outlet tube may also be mounted on existing washing machines, in replacement of conventional existing outlet tubes, without the need of modifying the hydraulic fittings and other apparatus.

[0032] A further advantage of the outlet tube according to the present invention is that it may be easily serviced, since the valve device 10 may be easily disassembled from the corrugated body and moreover the whole device may also be easily disassembled to its individual components, for cleaning or optionally replacing the latter.

[0033] In practicing the invention, the used materials, as well as the contingent size and shapes can be any, depending on requirements.

Claims

1. A water outlet tube (1) including a corrugated hollow body (2), having a first end fitting (3) for connection to a water outlet of a dish and linen washing machine (5) including a water discharging pump (6) and a second end fitting (7) for connection to a valve drain, wherein a length of said tube is arrangeable outside a casing of said washing machine and that said corrugated body (2) comprises, at a middle portion thereof outside said casing of said washing machine, a non-corrugated flat zone (9) including a through hole (19) to the environmental air in which is removably engaged a valve device (10), said valve device including an insert having an end portion (17) with an outer conical surface narrowing to the upper end, a middle annular portion and a bottom end portion (18) having an outer conical surface narrowing to the lower end, wherein the bottom end portion is adapted to be engaged in said through hole (19), with a bottom surface of said middle annular portion abutting against a peripheral portion of said through hole (19), a hollow cylindric support element (14) having a central through hole (13) and a plurality of further through holes (15) radially arranged around said central hole (13), an umbrella valve (11) slidably arranged in said support element (14) and having an umbrella valve membrane (16) that can close the plurality of holes (15) of said cylindric support element (14) on the upper side of cylindric support element (14), and an umbrella valve lug (12) integral with said membrane (16) and slideably engaged in said central through hole (13), wherein said cylindrical support element (14) and said umbrella valve (11) are housed in said insert and wherein said membrane (16) and lug (12) form an integral upward and downward slidable pressure driven assembly which is automatically driven from a water path opening position to a water path closing position as a pressure in said corrugated body (2) exceeds an outside environment pressure and wherein said insert, umbrella membrane (11) an support element (14) are arranged to be quickly and easily disassembled and reassembled again on said middle portion of said non -corrugated flat zone (9) of said outlet tube (1).

2. An outlet tube, according to claim 1, **characterized in that** said plurality of radially extending holes (15) allow air to be fed to said outlet tube.

3. An outlet tube, according to claim 1, **characterized in that** said umbrella valve membrane (16) is made of silicone.

4. A dish or linen washing machine including an outlet tube according to claim 1.

Patentansprüche

1. Wasserablaufschlauch (1), aufweisend einen gewellten Hohlkörper (2), aufweisend einen ersten Endanschlussstutzen (3) für eine Verbindung mit einem Wasserauslass einer Geschirr- or Wäsche-Waschmaschine (5), die eine Laugenpumpe (6) aufweist, und einen zweiten Endanschlussstutzen (7) für eine Verbindung mit einem Ventilablauf, wobei ein Stück des Rohrs außerhalb eines Gehäuses der Waschmaschine anordenbar ist und dass der gewellte Körper (2) an einem Mittelabschnitt außerhalb des Gehäuses der Waschmaschine einen nicht gewellten flachen Bereich (9) umfasst, der ein Durchgangsloch (19) zur Umgebungsluft aufweist, in das entfernbar eine Ventilvorrichtung (10) eingreift, wobei die Ventilvorrichtung aufweist: einen Einsatz, der einen Endabschnitt (17) mit einer konischen Außenfläche, die sich zum oberen Ende hin verschmälert, einen ringförmigen Mittelabschnitt und einen unteren Endabschnitt (18), der eine konische Außenfläche aufweist, die sich zum unteren Ende hin verschmälert, aufweist, wobei der untere Endabschnitt dazu ausgelegt ist, in das Durchgangsloch (19) einzugreifen, wobei eine untere Fläche des ringförmigen Mittelabschnitts an einem Randabschnitt des Durchgangslochs (19) anliegt, ein hohles zylindrisches Tragelement (14), das ein mittiges Durchgangsloch (13) und mehrere weitere Durchgangslöcher (15), die radial um das mittige Loch (13) herum angeordnet sind, aufweist, ein Schirmventil (11), das verschiebbar in dem Tragelement (14) angeordnet ist und eine Schirmventilmembran (16) aufweist, welche die mehreren Löcher (15) des zylindrischen Tragelements (14) auf der Oberseite des zylindrischen Tragelements (14) verschließen kann, und eine Schirmventilnase (12), die einstückig mit der Membran (16) ausgebildet ist und verschiebbar in das mittige Durchgangsloch (13) eingreift, wobei das zylindrische Tragelement (14) und das Schirmventil (11) in dem Einsatz untergebracht sind und wobei die Membran (16) und die Nase (12) eine einstückige aufwärts und abwärts verschiebbare druckbetriebene Baugruppe ausbilden, die automatisch aus einer Wasserpfadöffnungsstellung in eine Wasserpfadschließstellung gedrückt wird, wenn ein Druck in dem gewellten Körper (2) einen äußeren Umgebungsdruck übersteigt, und wobei der Einsatz, die Schirmmembran (11) und das Tragelement (14) dazu angeordnet sind, rasch und leicht abgebaut und wieder am Mittelabschnitt des nicht gewellten flachen Bereichs (9) des Ablaufschlauchs (1) angebaut zu werden.

2. Ablaufschlauch nach Anspruch 1, **dadurch gekennzeichnet, dass** die mehreren sich radial erstreckenden Löcher (15) gestatteten, dass dem Ablaufschlauch Luft zugeführt wird.

3. Ablaufschlauch nach Anspruch 1, **dadurch gekennzeichnet, dass** die Schirmventilmembran (16) aus Silicon hergestellt ist.

4. Geschirr- oder Bettwäsche-Waschmaschine, die ein Ablaufschlauch nach Anspruch 1 aufweist.

Revendications

1. Tube de sortie d'eau (1) comprenant un corps creux ondulé (2) ayant un premier raccord d'extrémité (3) pour le raccordement à une sortie d'eau d'une machine à laver la vaisselle ou le linge (5) comprenant une pompe d'évacuation d'eau (6) et un deuxième raccord d'extrémité (7) pour le raccordement à une vidange à soupape, dans lequel une longueur dudit tube peut être disposée à l'extérieur d'une carcasse de ladite machine à laver et ledit corps ondulé (2) comprenant, au niveau d'une partie du milieu de celui-ci à l'extérieur de ladite carcasse de ladite machine à laver, une zone plate non ondulée (9) comprenant un trou traversant (19) vers l'air environnant dans lequel un dispositif de soupape (10) est en prise de façon amovible, ledit dispositif de soupape comprenant une insertion ayant une partie d'extrémité (17) avec une surface extérieure conique rétrécissant vers l'extrémité supérieure, une partie du milieu annulaire et une partie d'extrémité inférieure (18) ayant une surface extérieure conique rétrécissant vers l'extrémité inférieure, dans lequel la partie d'extrémité inférieure est adaptée pour être en prise dans ledit trou traversant (19) avec une surface inférieure de ladite partie du milieu annulaire butant contre une partie périphérique dudit trou traversant (19), un élément de support cylindrique creux (14) ayant un trou traversant central (13) et une pluralité d'autres trous traversants (15) disposés radialement autour dudit trou central (13), une soupape en parapluie (11) disposée de façon coulissante dans ledit élément de support (14) et ayant une membrane de soupape en parapluie (16) pouvant fermer la pluralité des trous (15) dudit élément de support cylindrique (14) sur le côté supérieur de l'élément de support cylindrique (14),
et un ergot de soupape en parapluie (12) d'un seul tenant avec ladite membrane (16) et en prise de façon coulissante dans ledit trou traversant central (13), dans lequel ledit élément de support cylindrique (14) et ladite soupape en parapluie (11) sont logés dans ladite insertion et dans lequel ladite membrane (16) et ledit ergot (12) forment un assemblage commandé par pression pouvant coulisser vers le haut et le bas, lequel est commandé automatiquement d'une position d'ouverture de voie d'eau à une position de fermeture de voie d'eau lorsqu'une pression dans ledit corps ondulé (2) dépasse une pression de l'environnement extérieur et dans lequel ladite inser-

tion, ladite membrane de soupape en parapluie (11) et ledit élément de support (14) sont étudiés pour être rapidement et facilement démontés et de nouveau remontés sur ladite partie du milieu de ladite zone plate non ondulée (9) dudit tube de sortie (1).

2. Tube de sortie selon la revendication 1, **caractérisé en ce que** ladite pluralité de trous s'étendant radialement (15) permet que de l'air alimente ledit tube de sortie.

3. Tube de sortie selon la revendication 1, **caractérisé en ce que** ladite membrane de soupape en parapluie (16) est constituée de silicone.

4. Machine à laver la vaisselle ou le linge comprenant un tube de sortie selon la revendication 1.

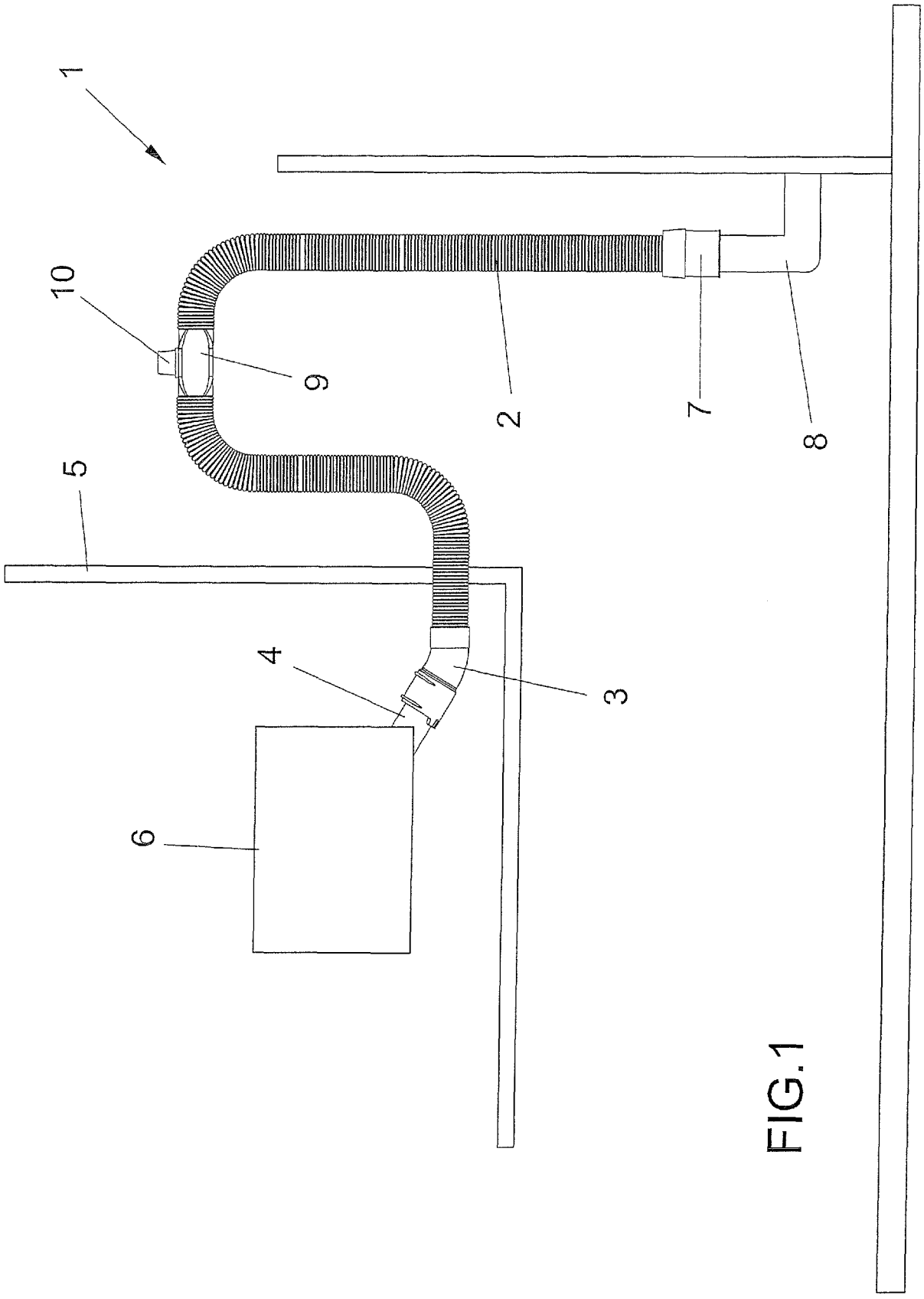


FIG.1

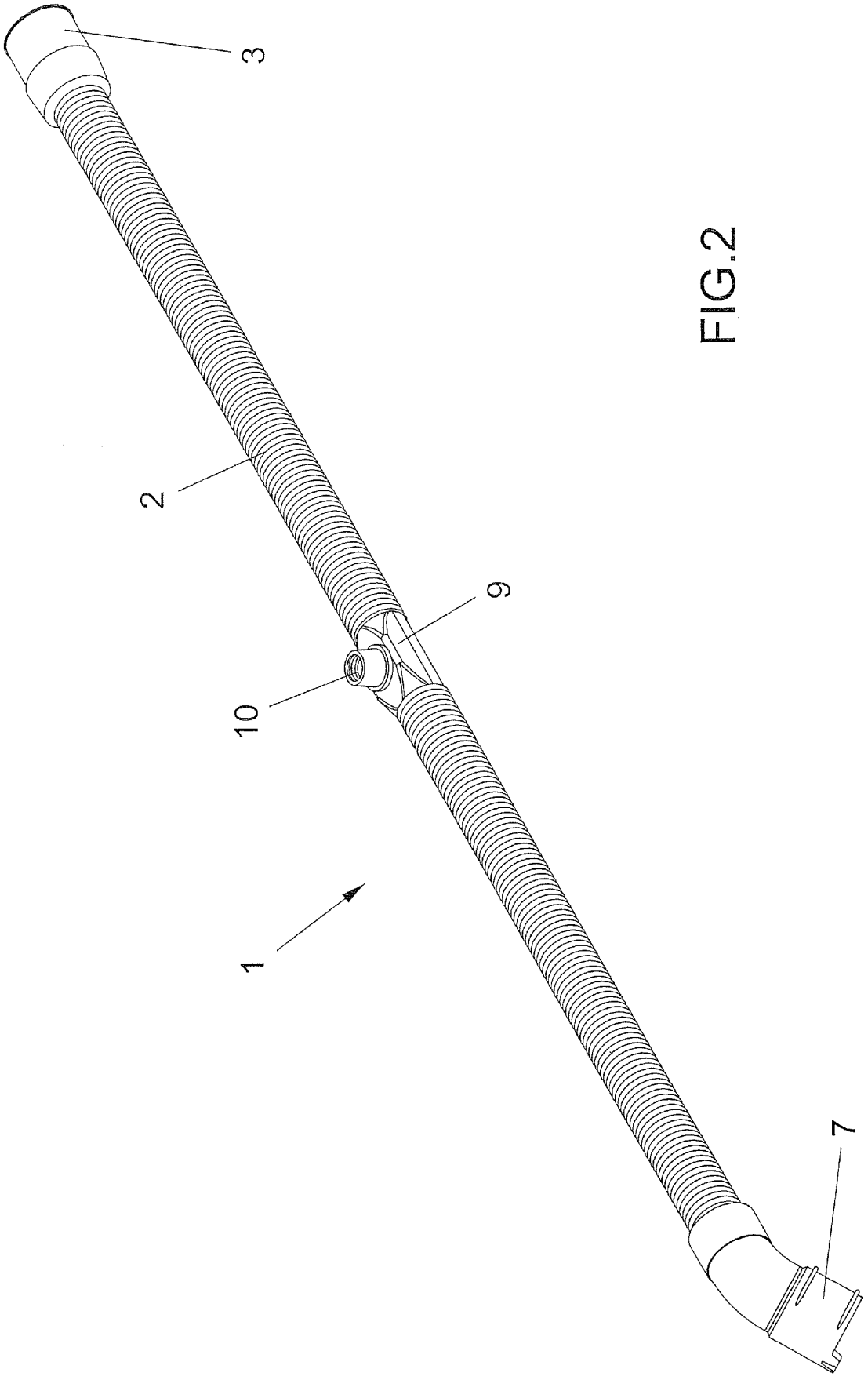


FIG.2

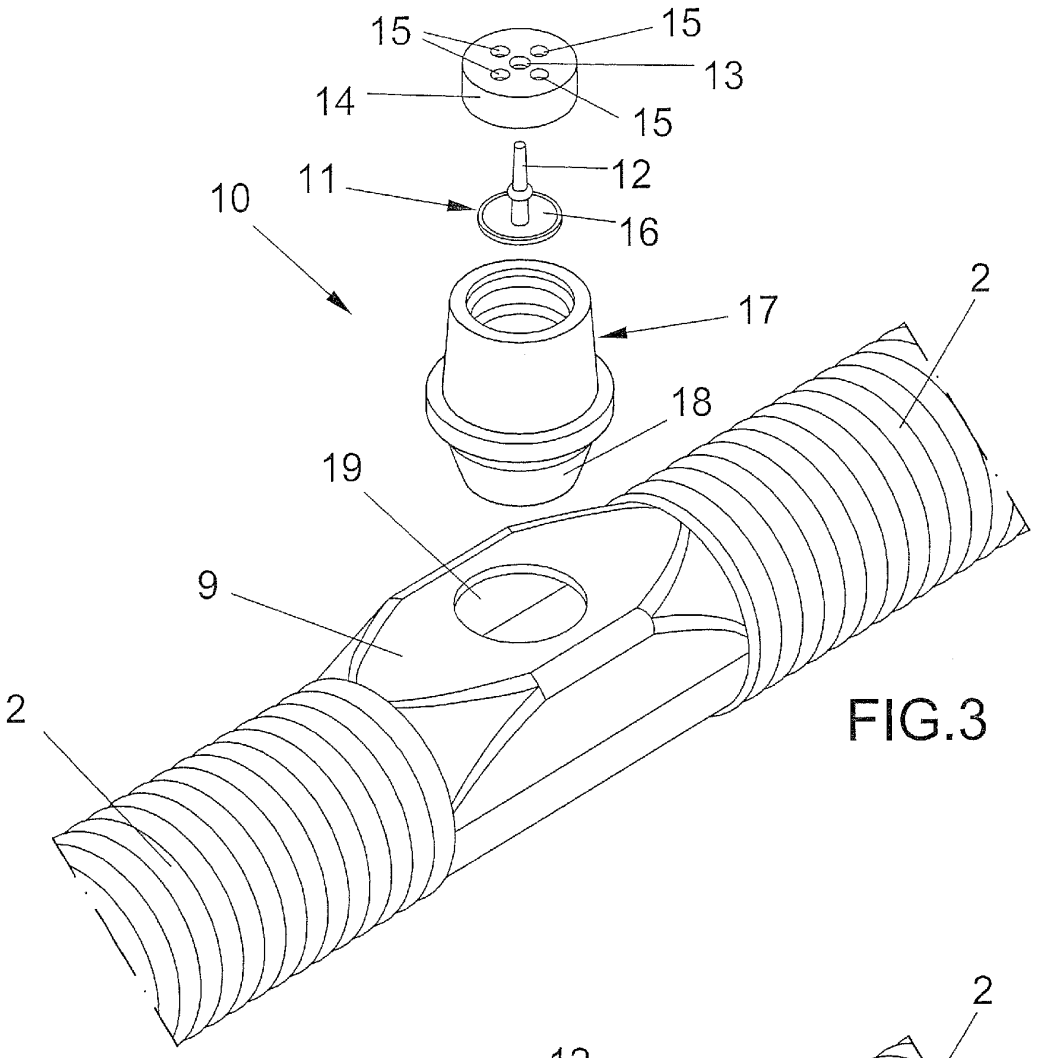


FIG.3

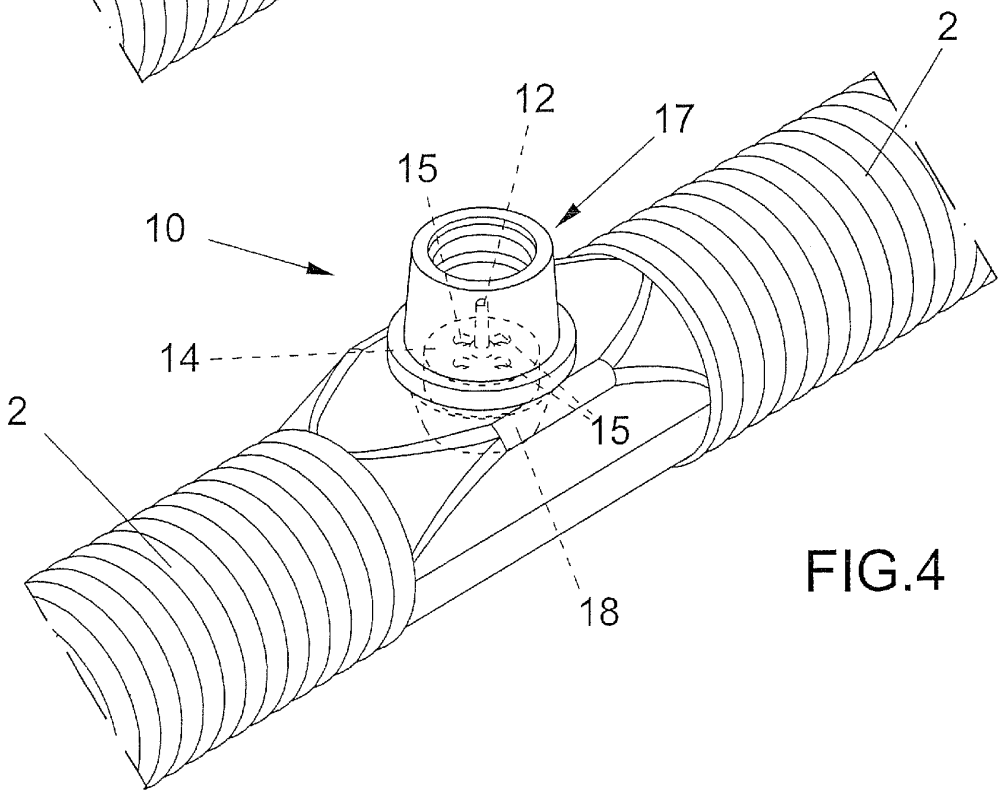


FIG.4

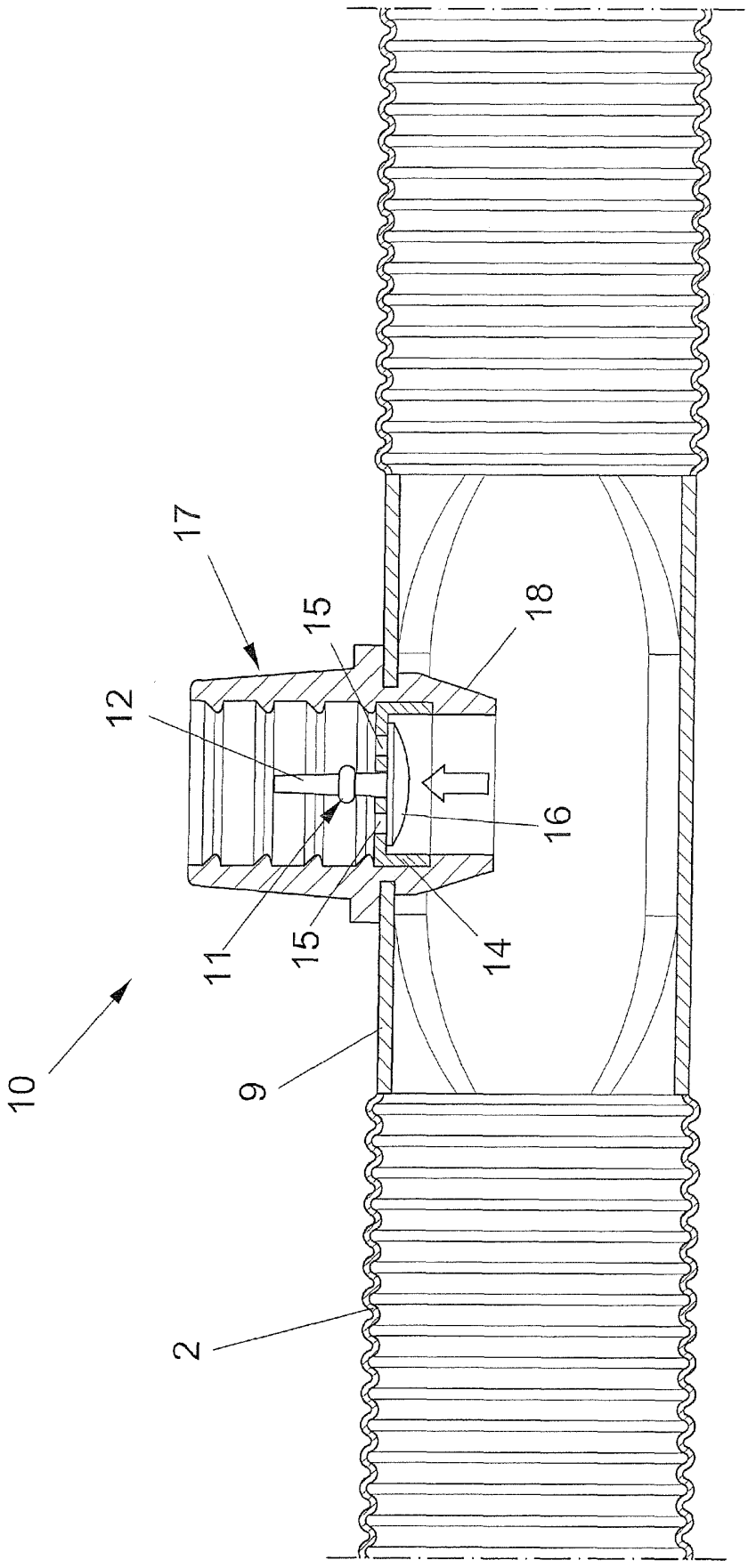


FIG.5

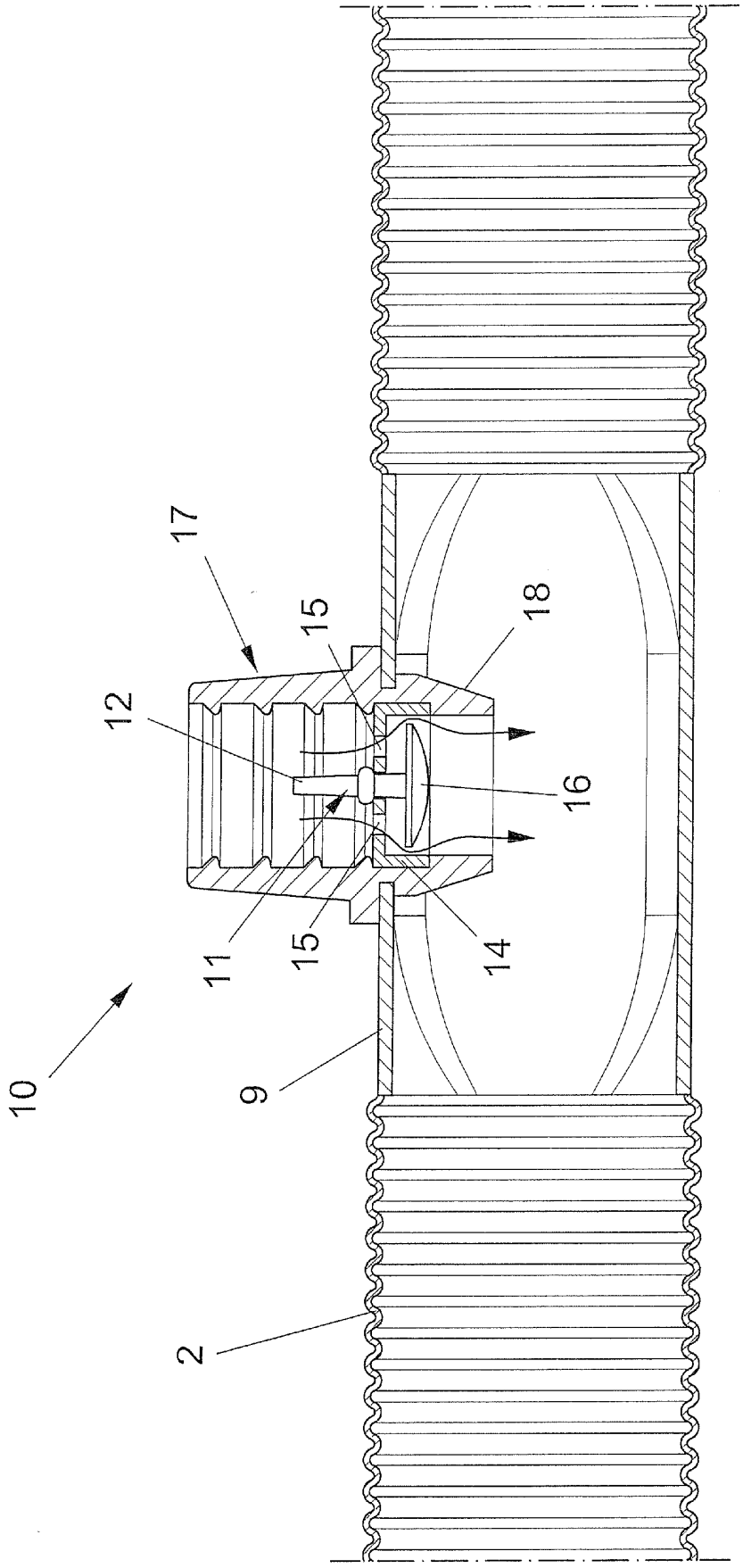


FIG.6

REFERENCES CITED IN THE DESCRIPTION

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