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Description

The present invention relates to hose reel assemblies especially, though not exclusively, of the kind which are installed in buildings for fire-fighting purposes. An aim of the invention is to provide an assembly which is constructed for ease of maintenance e.g. in case of need for attention to, or replacement of, a seal or seals between the stationary and rotating parts of the assembly. Prior art assemblies are known for example from DE-U-8800529.

In one aspect the invention accordingly resides in a hose reel assembly comprising: a rotatable drum to carry a hose wound thereon; a generally tubular, cantilevered support member extending axially within the hub of the drum and bearing the latter for rotation; a rotary joint assembly comprising a fixed conduit member mounted coaxially within said support member and having an inlet port at one end, and a rotatable conduit member sealingly journalled to the fixed conduit member and terminating in an outlet port; first conduit means detachably connected to said inlet port for leading liquid into the joint assembly; and second conduit means borne by the drum and detachably connected to said outlet port for leading said liquid from the joint assembly into the hose; the drum having an access opening through that end of its hub remote from said inlet port; all constructed and arranged such that with the first and second conduit means detached from said inlet and outlet port respectively the rotary joint assembly can be withdrawn as a unit from the support member through said access opening without removal of the drum from said support member.

The rotatable conduit member of the rotary joint assembly is preferably demountably retained to the fixed conduit member by releasable fastening means which are accessible for release when the rotary joint assembly is removed from the support member as aforesaid.

In a preferred class of embodiments the hose reel assembly also comprises a rotation-responsive valve which is adapted to turn on a supply of liquid to the hose automatically as hose is drawn off the drum and the latter consequently rotates. Such valve may comprise a valve member mounted coaxially within the rotary joint assembly and normally engaging a seat in said rotatable conduit member to shut off flow through the latter; and means responsive to rotation of the rotatable conduit member relative to the fixed conduit member for withdrawing said valve member from said seat.

The invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a vertical section through one embodiment of a fire-fighting hose reel assembly constructed in accordance with the invention;

Figure 2 is a part sectional end view of the assembly of Figure 1;

Figure 3 is a vertical section, to an enlarged scale, through the rotary joint assembly of the reel when equipped also with a rotation-responsive valve; and

Figures 4 and 5 are respective horizontal sections through two further embodiments of hose reel assembly in accordance with the invention.

Referring to Figure 1, the illustrated hose reel assembly is mounted on a steel support tube 1 bolted at one end to a building wall 2. The drum comprises a moulded plastics (e.g. polypropylene) hub structure 3 and two steel side plates 4 defining between them an annular space 5 within which the hose (not shown) will be wound. The hub moulding 3 has two brass bearing inserts 6 by which it is journalled on the support tube 1, and is retained on its support by a profiled circlip 7 (see also Figure 2). The end of the hub remote from the wall 2 is normally closed by a snap-on cover plate 8.

Mounted non-rotatably within the support tube 1 is a generally tubular conduit member 9 of moulded plastics (e.g. polyacetal). At its inner end this member has a radially-directed inlet port 10 into which is threaded the union 11 of a flexible water feed pipe 12. The union 11 passes through a hole 13 in the wall of the support tube 1 and thus serves also to locate the member 9 in relation to the tube 1. At its opposite end the member 9 receives a rotatable conduit member or elbow 14 of similar material, the members 9 and 14 forming a rotary joint assembly through which water is led from the feed pipe 12 to the hose. The elbow 14 is rotatably sealed to the conduit member 9 by an O-ring 15 and is retained therein by a pair of pins 16 driven through cross-bores in the conduit member and engaging in an annular groove 17 formed in the outside surface of the elbow. At its opposite end the elbow 14 terminates in a radial outlet spigot 18 which is connected to an elbowed hose connector 19 fixed to the hub (see also Figure 2). This connection is secured by a sleeve 20 which can slide up and down on the spigot 18 and over the end of the connector 19 and is coupled into a radial socket 21 moulded in the hub e.g. by a bayonet or screw action; O-rings 22 are provided around the adjacent ends of the spigot 18 and connector 19 to seal against the inside of the sleeve 20.

The O-ring 15 is the sole sealing element between the stationary (9) and rotating (14) parts of the waterway between the inlet pipe 12 and hose connector 19. In the event that access is required to that seal for maintenance or replacement the rotary joint assembly 9/14 can be extracted from the reel by the following simple procedure. Having disconnected the water supply to the feed pipe 12 the latter is twisted to disconnect it from the inlet port 10. The cover plate 8 is removed allowing manual access to the sleeve 20

which is then disconnected from the socket 21 and slid down on the spigot 18. The joint assembly 9/14 can then simply be pulled as a single unit from the support pipe 1, through the open end of the hub 3. Once out of the reel, the two parts 9 and 14 of this unit can if desired be separated by removal of the pins 16, to provide access to the seal 15. Re-assembly, with the same or a replacement joint assembly 9/14, is the reverse of the above procedure.

In another embodiment, the rotary joint assembly 9/14 also includes an automatic valve to turn on the water supply from pipe 12 to the hose as the latter is drawn off the drum, the components of which are shown to an enlarged scale in Figure 3.

With reference to Figure 3, a tubular valve member 23 is mounted in the upstream end of elbow 14, being borne slidably but non-rotatably relative thereto by a series of webs 24 on the valve member engaging in axial grooves 25 in the wall of the member 14. At its downstream end the valve member carries an annular sealing washer 26 retained by a screw 27, which normally engages a seat 28 formed in the elbow 14 to shut off water flow to its outlet spigot 18, under the combined action of upstream water pressure and a spring 29. The valve member can, however, be unseated to permit water flow to the spigot 18, and thence to the hose, by the following rotation-responsive mechanism.

At its upstream end the member 23 has a portion formed with an external screw thread 30. Behind this member is a control member in the form of a thrust nut 31 which is borne slidably but non-rotatably in the fixed conduit member 9 by a series of webs 32 on the nut engaging in axial grooves 33 in the wall of the member 9. The central portion of the nut 31 is formed with an internal screw thread 34 complementary to the thread 30 of the valve member 23 and in the illustrated shut-off condition of the valve this nut is biased axially by the spring 29, via a washer 35, to the position in which its thread will run onto the thread of the valve member as soon as relative rotation between the components in the correct sense occurs.

In use, as hose is drawn off the drum the elbow 14 together with valve member 23 is of course caused to rotate relative to the stationary conduit member 9, (clockwise as viewed in Figure 2). This rotation is in the sense which causes engagement of the thread 34 of the nut 31 with the thread 30 of the valve member 23. The nut 31 is therefore caused to slide axially within the conduit member 9 in the downstream direction as the rotating thread 30 of the valve member draws the thread 34 of the nut over it. These threads are preferably multistart and of relatively coarse pitch so that after approximately one complete turn of the drum the nut 31 has moved to the position in which it comes up against the upstream end face 36 of the rotating elbow 14. As the drum and elbow continue to rotate the valve member 23 is now pulled

through the nut 31, upstream away from its seat 28, thus permitting water flow around the washer 29 (from slots 37 in its tubular wall), and into the hose. After approximately three more turns of the drum the valve is fully open and the thread 30 of the valve member runs off the thread 34 of the thrust nut, at this stage the upstream end face 38 of the valve member having come into abutment with the spring-biased washer 35. Further rotation of the drum and elbow 14 as more hose is drawn off is, of course, permitted, but will cause no further axial movement of the valve member as the ends of the threads will simply continue to run idly over each other.

As noted above, in this condition of the mechanism the valve member 23 is now in abutment with the washer 35 to which the axial bias of spring 29 is applied, so that its thread 30 can re-engage the thread 34 of the nut 31 as soon as relative rotation in the reverse sense occurs. After use, therefore, as the hose is rewound the reverse rotation of the valve member causes its thread 30 to be drawn back through the thread 34 of the nut 31 to re-seat the valve member and shut off water flow to the hose once more, and after a total of approximately four turns of the drum the mechanism is returned to the condition shown in Figure 3, with the thread 30 run off and idling over the opposite end of the thread 34.

If access for servicing of the valve components is required, this is easily accomplished by removing the unit 9/14 and separating the elbow from the stationary conduit member as previously described in relation to the valveless embodiment.

Figures 4 and 5 show two further embodiments in which the construction of the reel assembly is the same as described above but in which it is mounted differently. Thus in Figure 4 the support tube 1 is bolted to an arm 39 carried on a vertical-axis pivot 40 by a bracket 41 fixed to the wall 2, so that the reel can be swung away from the wall to permit hose to be drawn off at any desired angle thereto. In Figure 5 the support tube 1 is bolted to an arm 42 carried on a vertical-axis pivot 43 by a bracket 44 fixed within a recess 45 in the wall 2, so that the reel can be swung out of the recess 45 and permit hose to be drawn off at virtually any angle.

Claims

1. A hose reel assembly comprising: a rotatable drum (3/4) to carry a hose wound thereon; a generally tubular, cantilevered support member (1) extending axially within the hub (3) of the drum and bearing the latter for rotation; a rotary joint assembly comprising a fixed conduit member (9) mounted coaxially within said support member (1) and having an inlet port (10) at one end, and a rotatable conduit member (14) sealingly jour-

nalled to the fixed conduit member (9) and terminating in an outlet port (18); first conduit means (12) detachably connected to said inlet port (10) for leading liquid into the joint assembly; and second conduit means (19) borne by the drum (3/4) and detachably connected to said outlet port (18) for leading said liquid from the joint assembly into the hose; the drum (3/4) having an access opening (8) through that end of its hub (3) remote from said inlet port (10); Characterised in that with the first (12) and second (19) conduit means detached from said inlet (10) and outlet (18) port respectively the rotary joint assembly (9/14) can be withdrawn as a unit from the support member (1) through said access opening (8) without removal of the drum (3/4) from said support member (1).

2. A hose reel assembly according to claim 1 characterised in that said rotatable conduit member (14) is in the form of an elbow member with said outlet port (18) directed generally radially to the axis of rotation.
3. A hose reel assembly according to claim 1 or claim 2 characterised in that said rotatable conduit member (14) is demountably retained to the fixed conduit member (9) by releasable fastening means (16) which are accessible for release when the rotary joint assembly (9/14) is removed from the support member (1) as aforesaid.
4. A hose reel assembly according to any preceding claim characterised by a rotation-responsive valve (23-38) which is adapted to turn on a supply of liquid to the hose automatically as hose is drawn off the drum (3/4) and the latter consequently rotates.
5. A hose reel assembly according to claim 4 characterised in that said valve comprises a valve member (23) mounted coaxially within the rotary joint assembly (9/14) and normally engaging a seat (28) in said rotatable conduit member (14) to shut off flow through the latter; and means (31) responsive to rotation of the rotatable conduit member (14) relative to the fixed conduit member (9) for withdrawing said valve member (23) from said seat (28).
6. A hose reel assembly according to claim 5 characterised in that said valve member (23) is borne slidably but non-rotatably with respect to said rotatable conduit member (14) and has a screw threaded portion (30) at its end remote from said seat (28); the valve further comprising a control member (31) borne slidably but non-rotatably with respect to said fixed conduit member (9) and

having a screwthreaded portion (34) complementary to the screwthreaded portion (30) of the valve member (23); whereby initial rotation of the rotatable conduit member (14) relative to the fixed conduit (9) member causes said control member (31) to be drawn axially towards the valve member (23) by the interengagement of said screw threaded portions (30/34) until the control member (31) engages an abutment (36) whereafter further said rotation of the rotatable conduit member (14) causes the valve member (23) to be drawn axially away from said seat (28) towards the control member (31).

Revendications

1. Ensemble à rouleau de tube souple, comprenant un tambour rotatif (3-4) destiné à porter un tube souple enroulé sur lui, un organe (1) de support de forme générale tubulaire et monté en porte-à-faux, disposé axialement dans le moyeu (3) du tambour et portant celui-ci afin qu'il tourne, un ensemble à joint rotatif comprenant un organe fixe (9) de conduit monté coaxialement dans l'organe de support (1) et ayant un orifice d'entrée (10) à une première extrémité, et un organe rotatif (14) de conduit tourillonnant de manière étanche sur l'organe fixe de conduit (9) et aboutissant à un orifice de sortie (18), un premier conduit (12) raccordé de façon amovible à l'orifice d'entrée (10) afin qu'il conduise un liquide à l'ensemble à joint rotatif, et un second conduit (19) porté par le tambour (3-4) et raccordé de façon amovible à l'orifice de sortie (18) afin qu'il conduise le liquide de l'ensemble à joint rotatif dans le tube souple, le tambour (3-4) ayant une ouverture d'accès (8) par l'extrémité de son moyeu (3) qui est distante de l'orifice d'entrée (10), caractérisé en ce que, lorsque le premier (12) et le second (19) conduit sont séparés de l'orifice d'entrée (10) et de sortie (18) respectivement, l'ensemble à joint rotatif (9-14) peut être retiré comme un tout de l'organe de support (1) par l'ouverture d'accès (8) sans enlèvement du tambour (3-4) de l'organe de support (1).
2. Ensemble à rouleau de tube souple selon la revendication 1, caractérisé en ce que l'organe rotatif (14) de conduit est sous forme d'un coude ayant l'orifice de sortie (18) dirigé en direction générale radiale vers l'axe de rotation.
3. Ensemble à rouleau de tube souple selon la revendication 1 ou 2, caractérisé en ce que l'organe rotatif (14) du conduit est retenu de façon amovible sur l'organe fixe (9) du conduit par un dispositif amovible (16) de fixation qui est accessible

afin qu'il soit libéré lorsque l'ensemble à joint rotatif (9-14) est retiré de l'organe de support (1) de la manière précitée.

4. Ensemble à rouleau de tube souple selon l'une quelconque des revendications précédentes, caractérisé par une soupape (23-38) commandée par la rotation et qui est destinée à faire communiquer une alimentation en liquide avec le tube souple automatiquement lorsque celui-ci est retiré du tambour (3-4) et lorsque ce dernier tourne en conséquence. 5
5. Ensemble à rouleau de tube souple selon la revendication 4, caractérisé en ce que la soupape comporte un obturateur (23) monté coaxialement dans l'ensemble à joint rotatif (9-14) et coopérant normalement avec un siège (28) placé sur l'organe rotatif (14) de conduit afin qu'il interrompe la circulation dans celui-ci, et un dispositif (31) commandé par la rotation de l'organe rotatif (14) de conduit par rapport à l'organe fixe (9) de conduit afin que l'obturateur (23) soit écarté du siège (28). 10 15 20
6. Ensemble à rouleau de tube souple selon la revendication 5, caractérisé en ce que l'obturateur (23) est supporté par l'organe rotatif (14) de conduit afin qu'il puisse coulisser mais qu'il ne puisse pas tourner et possède une partie filetée (30) à son extrémité distante du siège (28), la soupape comprenant en outre un organe de commande (31) supporté sur l'organe fixe (9) de conduit de manière qu'il puisse coulisser mais qu'il ne puisse pas tourner et ayant une partie taraudée (34) complémentaire de la partie filetée (30) de l'obturateur (23), la rotation initiale de l'organe rotatif (14) de conduit par rapport à l'organe fixe (9) de conduit provoquant un déplacement axial de l'organe de commande (31) vers l'obturateur (23) par coopération des parties filetée et taraudée (30-34) jusqu'à ce que l'organe de commande (31) soit contre une butée (36), et une rotation supplémentaire de l'organe rotatif (14) de conduit provoque alors un déplacement axial de l'obturateur (23) à distance du siège (28) vers l'organe de commande (31). 25 30 35 40 45

Patentansprüche

1. Schlauchspulenordnung, beinhaltend: eine drehbare Trommel (3/4) zur Lagerung eines darauf aufzuwickelnden Schlauches; ein im wesentlichen röhrenförmiges, freitragendes Halterungsteil (1), welches sich axial innerhalb der Nabe (3) der Trommel erstreckt und diese drehbar lagert; eine Drehverbindungsanordnung, umfassend ein 55

fixiertes Rohrleitungsteil (9), welches coaxial innerhalb des Halterungsteils (1) angebracht ist und an einem Ende einen Einlaßstutzen (10) aufweist sowie ein drehbares Rohrleitungsteil (14), welches abdichtend und drehbar auf dem fixierten Rohrleitungsteil (9) gelagert ist und in einem Auslaßstutzen (18) mündet; eine erste Rohrleitung (12), welche zur Zufuhr von Flüssigkeit in die Drehverbindungsanordnung lösbar mit dem Einlaßstutzen (10) verbunden ist; eine zweite an der Trommel (3/4) angeordnete Rohrleitung (19), welche zur Leitung dieser Flüssigkeit von der Drehverbindungsanordnung in den Schlauch lösbar mit dem Auslaßstutzen (18) verbunden ist; wobei die Trommel (3/4) eine Zugangsöffnung (8) durch das vom Einlaßstutzen (10) entfernte Ende ihrer Nabe (3) aufweist; dadurch gekennzeichnet, daß bei vom Einlaßstutzen (10) gelöster erster Rohrleitung (12) und vom Auslaßstutzen (18) gelöster zweiter Rohrleitung (19) die Drehverbindungsanordnung (9/14) als Einheit durch diese Zugangsöffnung (8) vom Halterungsteil (1) abgezogen werden kann, ohne die Trommel (3/4) vom Halterungsteil (1) zu entfernen.

2. Schlauchspulenordnung nach Anspruch 1, dadurch gekennzeichnet, daß das drehbare Rohrleitungsteil (14) die Form eines Kniestücks aufweist und dessen Auslaßstutzen (18) im wesentlichen radial zur Rotationsachse ausgerichtet ist.
3. Schlauchspulenordnung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß das drehbare Rohrleitungsteil (14) durch eine lösbare Befestigungsvorrichtung (16), welche zugänglich und lösbar ist, wenn die Drehverbindungsanordnung (9/14) wie oben beschrieben vom Halterungsteil (1) entfernt ist, lösbar mit dem fixierten Rohrleitungsteil (9) verbunden ist.
4. Schlauchspulenordnung nach einem der voranstehenden Ansprüche, dadurch gekennzeichnet, daß sie ein auf Drehung ansprechendes Ventil (23-38) umfaßt, welches automatisch die Flüssigkeitszufuhr zum Schlauch einschaltet, wenn dieser von der Trommel (3/4) gezogen wird und sich die Trommel daher dreht.
5. Schlauchspulenordnung nach Anspruch 4, dadurch gekennzeichnet, daß das Ventil ein coaxial innerhalb der Drehverbindungsanordnung (9/ 14) angebrachtes Ventilstück (23) umfaßt, welches normalerweise in Wirkverbindung mit einem Ventilsitz (28) in dem drehbaren Rohrleitungsteil (24) ist und so den Durchfluß durch dieses blockiert; sowie eine Vorrichtung (31) zum Zurückziehen des Ventilstücks (23) von diesem Ventilsitz (28), welche auf Drehung des drehba-

ren Rohrleitungsteils (14) bezüglich des fixierten Rohrleitungsteils (9) anspricht.

6. Schlauchspulenanordnung nach Anspruch 5, dadurch gekennzeichnet, daß das Ventilstück (23) gleitend, aber drehfest bezüglich des drehbaren Rohrleitungsteils (14) gelagert ist und an seinem dem Ventilsitz (28) entfernten Ende ein Außengewinde (30) aufweist; das Ventil zusätzlich eine Kontrollvorrichtung (31) umfaßt, welche gleitend, aber drehfest bezüglich des fixierten Rohrleitungsteils (9) gelagert ist und einen dem Außengewinde (30) des Ventilstücks (23) komplementären Gewindebereich (34) aufweist; wodurch eine anfängliche Drehung des drehbaren Rohrleitungsteils (14) relativ zum fixierten Rohrleitungsteil (9) durch die wechselseitige Verbindung der Gewindebereiche (30/34) zu einer axialen Bewegung der Kontrollvorrichtung (31) in Richtung des Ventilstücks führt bis die Kontrollvorrichtung (31) an einem Anschlag (36) anliegt, wonach weitere Drehung des drehbaren Rohrleitungsteils (14) zur axialen Bewegung des Ventilstücks (23) weg von dem Ventilsitz (28) und in Richtung der Kontrollvorrichtung (31) führt.

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Fig. 1.

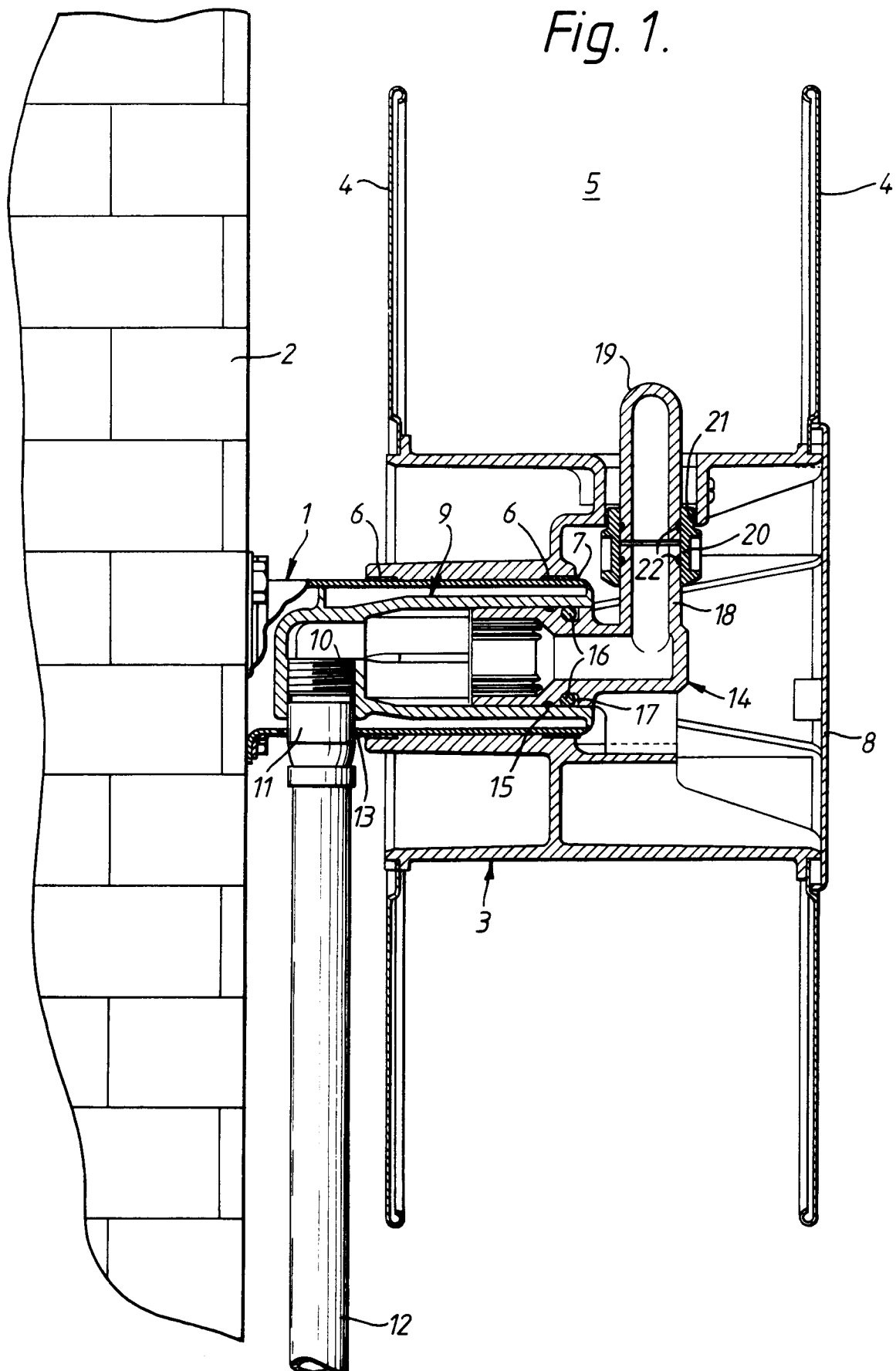


Fig. 2.

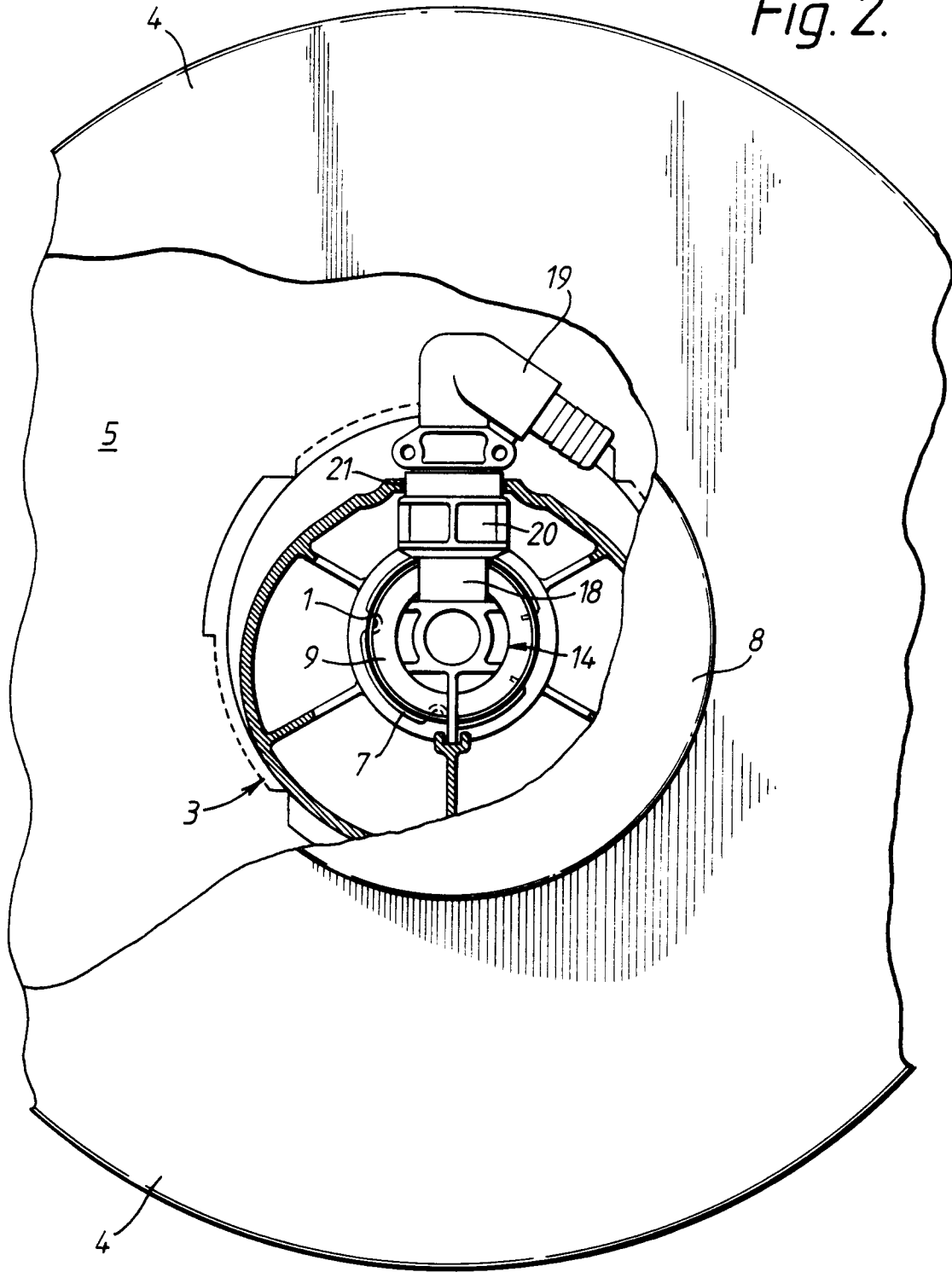


Fig. 3.

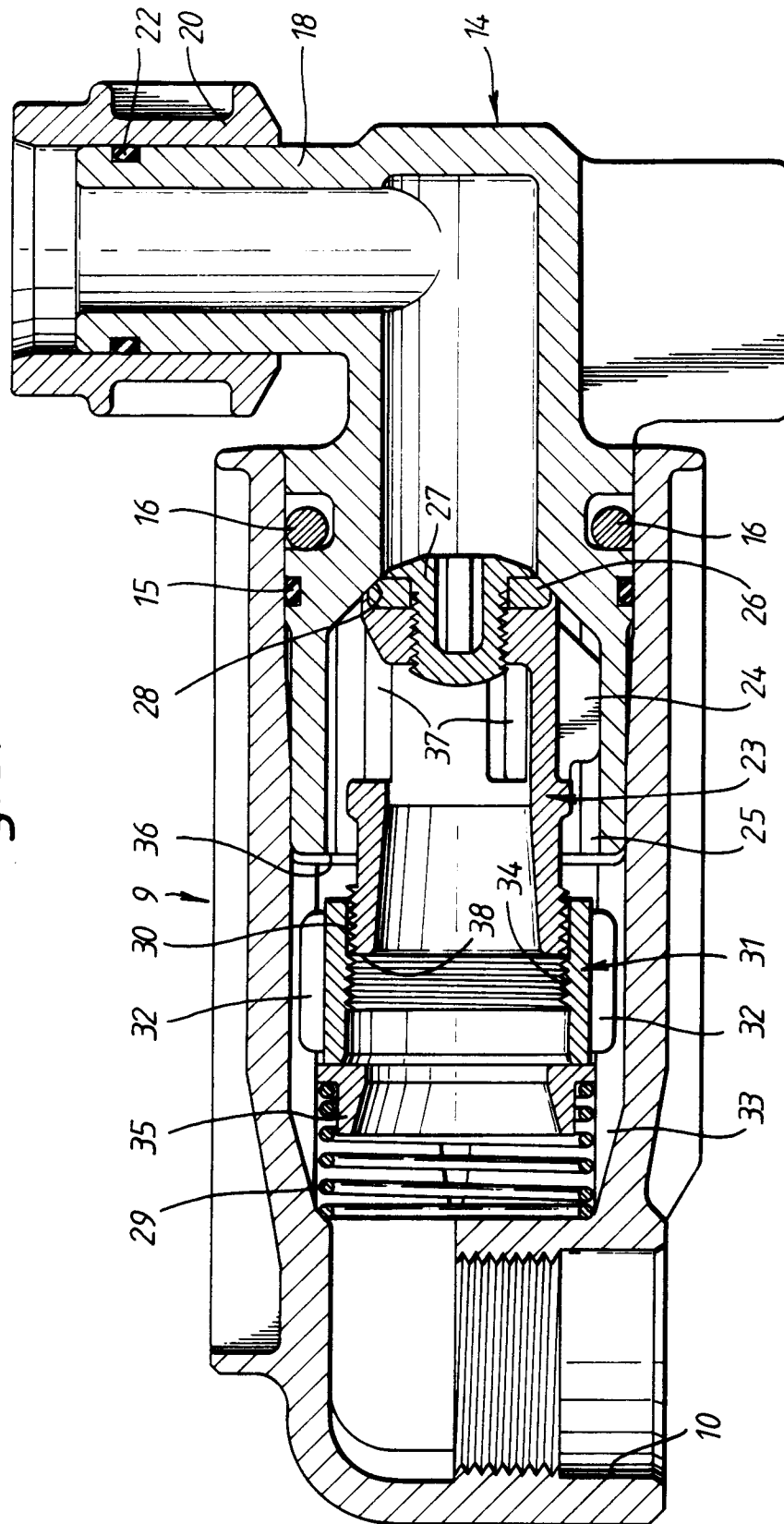


Fig. 4.

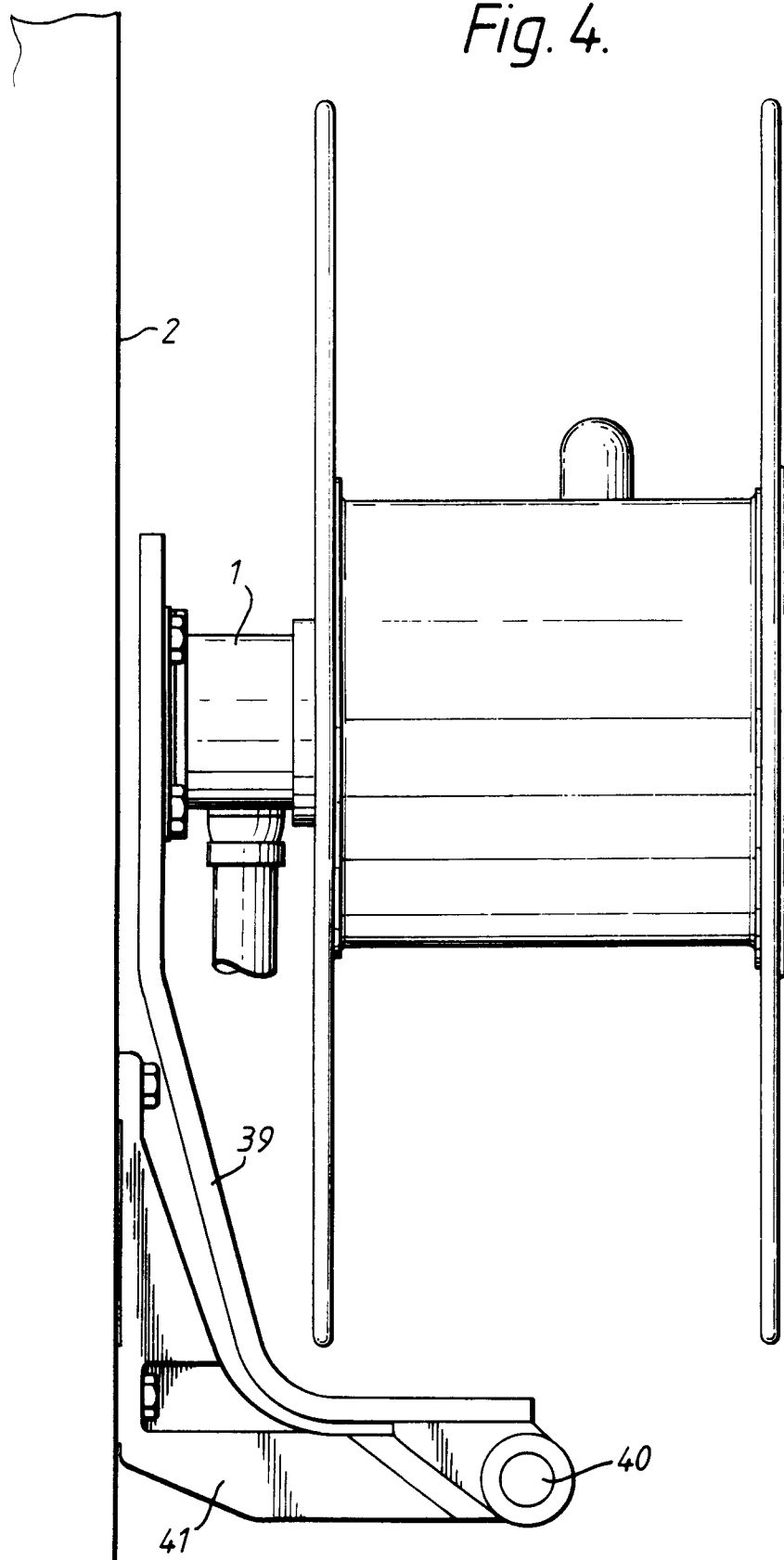


Fig. 5.

