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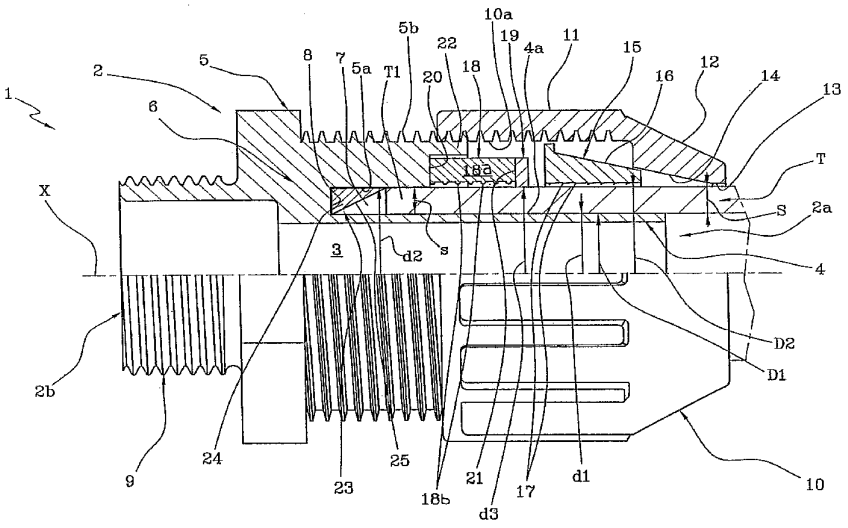
(54) **Title:** DEVICE FOR CONNECTING FLEXIBLE HOSES



(57) **Abstract:** A device for connecting flexible hoses comprises a connecting member (2) having a tubular element (4) that can be inserted into a flexible hose (T) . The tubular element (4) and a radially external threaded cylindrical member (5) together delimit an annular seat (7) designed to accommodate an end (T1) of the flexible hose (T) . A threaded ring (10) can be screwed onto the cylindrical member (5) and accommodates a split bush (15) having a working surface (16) engaged with a working surface (14) of the ring (10) . By turning the threaded ring (10) , the split bush (15) can be moved between a position where it is axially spaced from the threaded cylindrical member (5) and a position where it is axially close to the threaded cylindrical member (5) and where an interposed seal (18) between the cylindrical member (5) and the bush (15) adopts a radially inwardly deformed condition such as to tighten it around the flexible hose (T) .

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Description

Device for connecting flexible hoses

Technical Field

This invention relates to a device for connecting flexible hoses.

In particular, this invention is applicable to the field of flexible hoses for conveying fluids.

Background Art

As is known, there are specific standards and regulations that specify the dimensions and tolerances of the inside diameters of flexible hoses available on the market. There are, however, no such standards or regulations to specify hose outside diameters, whose dimensions and tolerances are at manufacturers' discretion and depend on the material used to make the hose and on the performance required of it. Thus, the wall thickness of different hoses with the same inside diameter usually varies between 2 mm and 6mm according to the maximum operating pressure of the hose. The wall thickness determines the size of the outside diameter.

Further, the outside surface of the hose is hardly ever smooth but is reinforced with polymer or metal coil or mesh, making it irregular.

To enable hoses with different outside diameters to be connected, prior art devices comprise a hollow cylindrical element, known as hose adapter, whose nominal diameter is slightly greater than the inside diameter of the hose. The adapter is pressed into one end of the hose and secured in place by a metal clamp placed around the end of the hose and tightened. The metal clamp can accommodate hoses with different outside diameters. The outside surface of the adapter usually has annular barb features that penetrate the hose and provide a watertight seal and, in conjunction with the clamp, a mechanical seal, too.

The disadvantage of these prior art devices is that they cannot withstand high pressure which causes the hose to slip off

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the adapter and breaks the end of the hose itself.

Moreover, since the adapter has to be pressed hard into the hose in order to guarantee a good seal, fitting and removal are not very practical.

Quick connect fittings for garden hoses with specific outside diameters are also known but these will not accept larger diameters without breaking. These quick-connect fittings, like the devices with the clamps, grip the inside of the hose and have tooth-like features that are tightened on the hose with the aid of a ring nut that performs the same function as the clamp.

Flexible hoses can also be connected to each other by sealing which is, however, an expensive method used only in industry and which, obviously, do not allow the two hose ends to be separated again.

The Applicant has found that the devices of the type described above can be improved in several respects, especially as regards the tightness of their grip on the flexible hose.

Object of the Invention

It is an object of the present invention to substantially overcome or at least ameliorate one or more of the disadvantages of the prior art, or to at least provide a useful alternative.

Disclosure of the Invention

There is disclosed herein a device for connecting flexible hoses comprising:

a connecting member having a radially internal tubular element that can be inserted into a flexible hose and a radially external threaded cylindrical member, the tubular element and the threaded cylindrical member together delimiting an annular seat designed to accommodate an end of the flexible hose;

a threaded ring that can be screwed onto the threaded cylindrical member;

a bush positioned radially inside the ring nut and having a working surface engaged with a corresponding working surface of the ring;

a seal placed around the tubular element and interposed between the threaded cylindrical member and the split bush;

the bush, the seal and the tubular element together delimiting an annular passage for inserting the end of the flexible hose into the annular seat;

the bush being movable by turning the ring nut between a position where it is axially spaced from the threaded cylindrical member and a position where it is axially

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close to the threaded cylindrical member whose seal is pushed by the bush to adopt a radially inwardly deformed condition such as to tighten it around the flexible hose;

wherein the bush is split and the device further comprises a seal packing ring interposed between the split bush and the seal and generated by revolving about a longitudinal axis of the device a surface that does not intersect the axis itself and that has a wedge-shaped radial section, the seal being shaped to partially accommodate the seal packing ring, the seal packing ring exerting an inward radial thrust and an outward radial thrust on the seal.

This invention in an aspect provides a device for connecting flexible hoses that will accept flexible hoses with different outside diameters and can guarantee a tight grip that withstands high pressure.

The invention in an aspect provides a flexible hose connecting device that can be fitted and/or removed quickly and easily.

Brief Description of the Drawings

Other technical characteristics and advantages will become more apparent from the detailed description of a preferred non-restricting embodiment of a device for connecting flexible hoses according to the present invention.

The description is set out below with reference to the

accompanying drawings which are provided solely for purposes of illustration without restricting the scope of the invention and in which:

Figure 1 is a partial longitudinal section illustrating a device for connecting flexible hoses according to the present invention in a first operating configuration;

Figure 2 shows the device of Figure 1 in a second operating configuration;

Figure 3 shows the device of Figure 1 in a third operating configuration;

Figure 4 shows a first alternative embodiment of the device according to the invention in the second operating configuration of Figure 2;

Figure 5 shows the device of Figure 4 in the third operating configuration of Figure 3;

Figure 6 shows a second alternative embodiment of the device according to the invention in the second operating configuration of Figure 2;

Figure 7 shows the device of Figure 6 in the third operating configuration of Figure 3;

Figure 8 shows a third alternative embodiment of the device according to the invention in the second operating configuration of Figure 2;

Figure 8a shows an enlarged detail from Figure 8;

Figure 8b shows another embodiment of the detail of Figure 8a;

Figure 9 shows the device of Figure 8 in the third operating configuration of Figure 3;

Figure 9a shows an enlarged detail from Figure 9; and

Figure 9b shows another embodiment of the detail of Figure 9a.

Detailed Description of the Preferred Embodiments of the Invention

With reference to the accompanying drawings, the numeral 1 denotes in its entirety a device according to the invention, for connecting flexible hoses "T".

Specifically, the device 1 is used for connecting flexible

hoses "T", for example, hoses made of rubber or polyurethane for conveying fluids under pressure. Preferably, but not exclusively, the device 1 is applicable to flexible hoses "T" made of plasticized PVC with polyester mesh reinforcing, rigid shockproof PVC reinforcing or with reinforcing of plain and harmonic steel or of a vulcanized polyethylene material such as Santoprene® thermoplastic rubber.

The device 1 comprises a connecting member 2 that delimits an internal conduit 3. The conduit 3 extends along a longitudinal axis "X" between a first end 2a and a second end 2b of the connecting member 2.

The connecting member 2 comprises a radially internal tubular element 4 that can be inserted into an end T_1 of a flexible hose T and a radially external threaded cylindrical member 5. The radially internal tubular element 4 terminates at the first end 2a of the connecting member 2 that is designed to accommodate the flexible hose "T", while the radially external threaded cylindrical member 5 coaxially surrounds the tubular element 4 and is radially spaced from the latter.

The threaded cylindrical member 5 extends for only a part of the length of the tubular element 4, starting from an annular connecting portion 6 that joins the threaded cylindrical member 5 to the tubular element 4 itself.

The tubular element 4 has an outside diameter "d_1" that is substantially equal to the nominal inside diameter "D_1" of the hose "T" which the device 1 has to be coupled with and a smooth outside surface 4a, free of protrusions or other features so that the tubular element 4 can be inserted easily into the hose "T".

The tubular element 4 and the radially external threaded cylindrical member 5 together delimit an annular seat 7 designed to accommodate the end T_1 of the tubular element 4. The annular seat 7 opens onto the first end 2a of the connecting member 2 and is delimited by an inside surface 5a of the threaded cylindrical member 5, by the outside surface 4a of the tubular element 4 and by an end surface 8 that lies in a plane transversal to the longitudinal axis "X" and forms part of the annular connecting portion 6.

In the preferred but non-limiting embodiments illustrated, the second end 2b of the connecting member 2, opposite the first end 2a, terminates with a threaded portion 9 that enables connection to another component such as, for example, a tap, a shutoff valve, a nozzle or another hose that differs in diameter. Depending on requirements, however, the second end 2b might have different shapes from the one illustrated.

Advantageously, the annular seat 7 has a radial thickness "s", given by the difference between the inside diameter "d_2" of the threaded cylindrical member 5 and the outside diameter "d_1" of the tubular element 4 and equal to the maximum thickness "S" of the flexible hoses "T" with nominal inside diameter "D_1" equal to the outside diameter "d_1" of the tubular element 4. The radial thickness "s" of the annular seat 7 is preferably between 1.5mm and 10mm. This enables the device 1 to accept flexible hoses "T" of different sizes, all having a predetermined nominal inside diameter "D_1" but different outside diameters "D_2" according, for example, to the material each hose "T" is made of and/or the pressure it is designed to withstand.

The device 1 also comprises a ring nut 10 through which the hose "T" is made to pass and which can be screwed onto the threaded cylindrical member 5. Specifically, as shown in the accompanying drawings, the ring nut 10 has an internal thread 10a that couples with an external thread 5b made on a diametrically external surface of the threaded cylindrical member 5. The ring nut 10 has a cylindrical portion 11 having the internal thread 10a and an end portion 12, preferably tapered, terminating with an opening 13 whose diameter is greater than or equal to the inside diameter "d_2" of the threaded cylindrical member 5. The end portion 12 has an inside working surface 14 that converges towards the opening 13 and terminates preferably at the opening 13.

The ring nut 10 houses a split bush 15 consisting, as is known, of a ring with a slit in it to give it elastic properties enabling it to reduce its diameter when subjected to an external force tending to move its opposite ends closer together.

The split bush 15 is positioned around both the radially internal tubular element 4 and the hose "T" when the latter is

fitted over the tubular element 4 itself and has a working surface 16 that can engage the working surface 14 of the ring nut 10.

Looking in more detail, an inside portion of the split bush 15 can be engaged with the hose "T" and advantageously has barbed teeth 17 designed to hold the hose "T" in place. The working surface 16 of the bush 15 is a truncated cone shaped outside surface that lies on and slides against the inside working surface 14, also shaped like a truncated cone, of the ring nut 10.

By turning the ring nut 10, the split bush 15 can be moved between a position where it is axially spaced from the threaded cylindrical member 5 and a position where it is axially close to the threaded cylindrical member 5.

More specifically, as shown by comparing Figures 1 and 2, when the ring nut 10 is screwed onto the threaded cylindrical member 5 and moves closer to the member 5 itself, the inside working surface 14 of the ring nut 10 first slides over the outside truncated cone shaped surface 16 of the bush 15 producing a radial force acting on the surface 16 in such a way that the barbed teeth 17 of the bush 15 grip the hose "T", whatever the outside diameter "D_2" of the hose "T" is. Once the bush 15 is firmly attached to the hose "T", its inside working surface 14 pushes it axially causing the bush 15 to move a little way towards the threaded cylindrical member 5. The tubular element 4 inserted into the hose "T" prevents the later from being squeezed out of shape by the tightening action of the split bush 15.

The device 1 also comprises a seal 18 placed around the tubular element 4 and axially interposed between the threaded cylindrical member 5 and the split bush 15. The split bush 15, the seal 18 and the tubular element 4 together delimit an annular passage for inserting the end "T_1" of the flexible hose "T" into the annular seat 7.

Moreover, advantageously, in the position where the ring nut 10 and the bush 15 are axially close to the threaded cylindrical member 5, the seal 18 is pushed by the split bush 15 to adopt a radially inwardly deformed condition such as to tighten it around the flexible hose "T", thereby guaranteeing a secure sealed connection between the device 1 and the hose "T". The tightness of

the seal 18 is also provided by a plurality of annular barbs 18b located on a radially inside portion of the seal 18 itself designed to come into contact with the hose "T".

To distribute the thrust exerted by the bush 15 evenly on the seal 18 and to prevent the seal 18 from being forced into the slit in the bush 15, there is a seal packing ring 19 between the bush 15 and the seal 18 itself. The seal packing ring 19 is preferably rigid and has an inside diameter "d_3" that is substantially the same as the outside diameter "D_2" of the hose "T" which coincides with the inside diameter "d_2" of the threaded cylindrical member 5. The seal packing ring 19 and the split bush 15 engage each other in a plane perpendicular to the longitudinal axis "X".

The seal 18 is attached to the threaded cylindrical member 5 preferably by co-moulding. Similarly, the seal packing ring 19 is attached to the seal 18 preferably by co-moulding.

The threaded cylindrical member 5 has an annular engagement portion 20 which the seal 18 is joined to or abuts against. The seal packing ring 19 has an annular engagement portion 21 which the seal 18 is joined to or abuts against. The seal packing ring 19 is placed around the tubular element 4; the split bush, 15, the seal packing ring 19 and the seal 18 delimiting, with the tubular element 4, an annular passage for inserting the end T_1 of the flexible hose T into the annular seat. The split bush 15 thus acts suitably on the seal packing ring 19 which deforms the seal 18.

In the embodiment illustrated in Figures 1, 2 and 3, the annular engagement portion 20 of the threaded cylindrical member 5 and the annular engagement portion 21 of the ring 19 lie in planes perpendicular to the longitudinal axis "X" of the device 1 and are thus defined by respective circular crown surfaces.

When the split bush 15 is in the axially spaced position away from the threaded cylindrical member 5 (Figure 1), the seal 18 is not subjected to any axial load and is not deformed. In the non-deformed state, the seal 18 illustrated in Figures 1, 2 and 3 is a solid defined by the volume between two straight cylindrical surfaces coaxial with the axis "X" and whose base is defined by a circular crown. This solid comprises a radial section 18a. The

radial section 18a is substantially rectangular (Figure 1). Further, the non-deformed state shown in Figure 1, the seal 18 may even be radially spaced from the hose "T" to enable the latter to be easily inserted into the seat 7.

The axial compression of the seal 18 by the bush 15 causes the section 18a to bend towards the longitudinal axis "X" and to tighten around the hose T". The smaller the outside diameter "D_2" of the hose "T", the more the seal 18 is deformed, as may be observed by comparing Figures 2 and 3.

To prevent the section 18a from bending in the opposite direction, away from the hose "T", the threaded cylindrical member 5 has a protrusion 22 coaxial with the seal 18. The protrusion 22 extends around the seal 18 and thus creates a stop that prevents the seal 18 from bellying away from the hose "T". Alternatively, in an embodiment that is not illustrated, the seal 18 has a pre-deformed shape curving towards the longitudinal axis "X". For example, the section 18a of the seal 18, even when no load is applied to it, is curved towards the longitudinal axis "X".

Figures 4 and 5 show a first alternative embodiment of the device 1, where the annular engagement portion 21 of the ring 19 has the shape of a truncated cone converging towards the longitudinal axis "X" of the device 1, starting from the seal 18 towards the split bush 15. The section 18a of the seal 18 thus has a trapezoidal shape whose oblique side is associated with the inclined side of the ring 19. In fact the seal 18 is shaped to match the truncated cone of the annular engagement portion 21 of the ring 19. The annular engagement portion 20 of the threaded cylindrical member 5 has the same shape it has in the embodiment illustrated in Figures 1, 2 and 3.

The convergence of the annular engagement portion 21 of the ring 19 facilitates the inward thrusting and deformation action of the seal 18 when the bush 15 is in the close-up position.

If the hose "T" has an outside diameter "D_2" equal to the maximum diameter that can be accepted by the device 1, the seal is deformed to the minimum extent (Figure 4). If, on the other hand, the outside diameter "D_2" of the hose "T" is smaller than the maximum diameter that can be accepted by the device 1 (Figure 5),

the seal is deformed to a larger extent and ensures a tight grip on the hose "T".

In the second alternative embodiment shown in Figures 6 and 7, the annular engagement portion 21 of the ring 19 is the same as that in the embodiment illustrated in Figures 1, 2 and 3, while the annular engagement portion 20 of the threaded cylindrical member 5 has the shape of a truncated cone that converges towards the longitudinal "X" of the device 1, away from the split bush 15 and towards the threaded cylindrical member 5. The section 18a of the seal 18 thus has a trapezoidal shape whose oblique side is associated with the inclined side of the threaded cylindrical member 5. In fact, the seal 18 is shaped to match the truncated cone of the annular engagement portion 20 of the threaded cylindrical member 5.

In the same way as in the first alternative embodiment, the convergence of the annular engagement portion 20 of the threaded cylindrical member 5 makes it possible to push and deform the seal 18 inwards when the bush 15 is in the close-up position. If the hose "T" has an outside diameter "D_2" equal to the maximum diameter that can be accepted by the device 1, the seal 18 is deformed to the minimum extent (Figure 6). If, on the other hand, the outside diameter "D_2" of the hose "T" is smaller than the maximum diameter that can be accepted by the device 1 (Figure 7), the seal is deformed to a larger extent and ensures a tight grip on the hose "T".

In a third configuration illustrated in Figure 8 the seal 18 is shaped to partially accommodate the ring 19. The section 18a of the seal 18 is thus shaped like the letter "C". This section 18a consists of two elements connected by a transversal element positioned in a substantially radial direction. When the seal 18 is not subjected to any load, the two elements are substantially parallel while the outside of the transversal element abuts against the annular engagement portion 20 of the threaded cylindrical member 5. The ring 19 is generated by revolving about the axis "X" a surface that does not intersect the axis "X" itself and that has a wedge-shaped radial section, the ring 19 exerting an inward radial thrust and an outward radial thrust on the seal

18.

The contact surfaces 21 between the ring 19 and the seal 18 define, in a radial section, converging lines whose extensions preferably intersect with the longitudinal axis "X".

If the hose "T" has an outside diameter "D_2" equal to the maximum diameter that can be accepted by the device 1, the seal is deformed to the minimum extent (Figure 8). If, on the other hand, the outside diameter "D_2" of the hose "T" is smaller than the maximum diameter that can be accepted by the device 1 (Figure 9), the seal is deformed to a larger extent and ensures a tight grip on the hose "T".

The embodiments illustrated in Figures 8b and 9b are variants of those illustrated in Figures 8a and 9a, respectively, and have the seal 18 co-moulded with the threaded cylindrical member 5. The seal 18 in these variants advantageously consists of a mere appendage which, when acted upon by the ring 19, guarantees a tight fit over the hose T.

To further improve the watertight seal and make it more independent of the mechanical grip so as to facilitate application on the hose "T", the device 1 also comprises spacer means 23 located in the annular seat 7 and used to keep the end "T_1" of the hose "T" spaced from the end surface 8 of the annular seat 7 when the split bush 15 is axially away from the threaded cylindrical member 5, that is to say, before screwing on the ring nut 10.

Thus, when the ring nut 10 is screwed on, the split bush 15 closes around the hose "T", clamping it with its teeth 17 and driving it towards the end surface 8 of the seat 7. If the hose "T" were already in contact with the end surface 8, this movement would not be possible and would limit the radial movement of the bush 15 and the deformation of the seal 18, which would reduce the effectiveness of the seal provided by the device 1. The spacer means 23 are therefore designed to stop the hose "T" when the tubular element 4 is manually inserted (Figure 1) but, thanks to the force applied when the ring nut 10 is screwed on, they permit a slight deformation of the end "T_1" of the hose "T" in such a way that it can move further into the seat 7 once the split bush 15 has securely gripped the hose "T" (Figures 2 and 3).

The spacer means 23 preferably comprise a plurality of tabs 24, only one of which is visible in the accompanying drawings, having engagement portions 25 that converge on the longitudinal axis "X" of the device 1 towards the end surface 8. Each of the tabs 24 extends in a respective radial plane containing the longitudinal axis "X" of the device 1 and may have a shape, for example triangular or trapezoidal, extending between the end surface 8 of the annular seat 7 and the inside surface 5a of the threaded cylindrical member 5. Advantageously, one side of the tab 24 converges on the longitudinal axis "X" towards the split bush 15 so as to facilitate the insertion and deformation of the hose T, as explained in more detail below.

As illustrated, for example in Figures 1 to 7, each tab 24 has the shape of a right-angled triangle with the short sides associated with the walls and the hypotenuse extending between the inside surface 5a of the threaded cylindrical member 5 and the corner delimited by the end surface 8 and the outside surface 4a of the tubular element 4, so as to define one of the engagement portions 25. In Figures 8 and 9 the tabs 24 are shaped not like a triangle but like a right-angled trapezium.

When the split bush 15 is in the axially spaced position away from the threaded cylindrical member 5 (Figure 1), the end "T_1" of the hose "T" simply rests against the tabs 24. The pushing action of the bush 15 forces the end "T_1" of the hose "T", thus deforming it, between the engagement portion 25 of each tab 24 and the outside surface 4a of the tubular element 4 (Figures 2-9). Advantageously, as shown in the accompanying drawings, the engagement portions 25 converging on the longitudinal axis "X" permit the deformation of hoses "T" that differ in thickness "S". The longitudinal deformation of the hose T is the same as the longitudinal deformation of the seal 18, as in the embodiments illustrated in Figures 2 to 7. In the embodiment illustrated in Figures 8 and 9, on the other hand, the longitudinal deformation of the hose T is a function of the penetration of the ring 19 into the seal 18.

In the embodiment illustrated in Figures 8 and 9, the trapezoidal tab 24 can also come into contact with thin hoses

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(which are also those that are more difficult to deform) at a predetermined distance from the end annular engagement portion 20 of the threaded cylindrical member 5. This predetermined distance must be sufficient to allow the hose to be further inserted into the member 5 when the ring nut is screwed on in such a way as to push the ring 19 into the seal 18.

In use, with reference only to Figures 1, 2 and 3 for the sake of simplicity, with the ring 10 spaced from the connecting member 2 and without removing the device 1, the end "T_1" of the hose "T" is inserted through the opening 13 in the ring nut 10, through the split bush 15 and through the seal 18 and, without being forced, can be slid over the smooth tubular element 4 until it abuts against the tabs 24 (Figure 1).

Next, the ring nut 10 is screwed onto the connecting member 2 and causes the split bush 15 to close around the hose "T". Continuing to screw on the ring nut 10 causes the split bush 15 and the hose "T" now attached to it to advance further towards the end surface 8 of the seat 7 until the end of the hose "T" is caught and deformed under the tabs 24. At the same time, the bush 15 compresses and deforms the seal 18 causing it to adhere to the hose "T" itself (Figure 2).

If the wall of the hose "T" is thin (Figure 3), equal grip and tightness are guaranteed by the fact that the ring nut 10 and the split bush 15 can be advanced further towards the connecting member 5 and by the fact that the split bush 15 and the seal 18 can be closed further in around the hose "T" .

The operating principle described above is the same in the first and second alternative embodiments illustrated in Figures 4 and 5 and in Figures 6 and 7, respectively.

First and foremost, the device according to at least a preferred embodiment of the invention makes it possible to connect hoses that convey fluids under pressure and guarantees tightness at a pressure as high as 16 BAR.

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Further, the device according to at least a preferred embodiment of the invention will accept flexible hoses of different sizes, that is to say, hoses with the same inside diameter but different thickness and therefore different outside diameters.

The device at least a preferred embodiment also guarantees a tight connection between hoses with irregular outside surfaces.

Lastly, the device according to at least a preferred embodiment of the invention is easy to fit and remove.

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The claims defining the invention are as follows:-

1. A device for connecting flexible hoses comprising:

a connecting member having a radially internal tubular element that can be inserted into a flexible hose and a radially external threaded cylindrical member, the tubular element and the threaded cylindrical member together delimiting an annular seat designed to accommodate an end of the flexible hose;

a threaded ring that can be screwed onto the threaded cylindrical member;

a bush positioned radially inside the ring nut and having a working surface engaged with a corresponding working surface of the ring;

a seal placed around the tubular element and interposed between the threaded cylindrical member and the split bush;

the bush, the seal and the tubular element together delimiting an annular passage for inserting the end of the flexible hose into the annular seat;

the bush being movable by turning the ring nut between a position where it is axially spaced from the threaded cylindrical member and a position where it is axially close to the threaded cylindrical member whose seal is pushed by the bush to adopt a radially inwardly deformed condition such as to tighten it around the flexible hose;

wherein the bush is split and the device further comprises a seal packing ring interposed between the split bush and the seal and generated by revolving about a longitudinal axis of the device a surface that does not intersect the axis itself and that has a wedge-shaped radial section, the seal being shaped to partially accommodate the seal packing ring, the seal packing ring exerting an inward radial thrust and an outward radial thrust on the seal.

2. The device according to claim 1, wherein the annular seat is delimited by an inside surface of the threaded cylindrical member, by an outside surface of the tubular element and by an end surface transversal to the longitudinal axis of the device; spacer means being located in the annular seat in order to keep the end of the flexible hose spaced from the end surface at least when the split bush is in the axially spaced position away from the threaded cylindrical member.

3. The device according to claim 2, wherein the spacer means comprise a plurality of tabs having respective engagement portions that converge on the longitudinal axis towards the end surface.

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4. The device according to claim 3, wherein each of the tabs extends between the end surface of the annular seat and the inside surface of the threaded cylindrical member.

5. The device according to claim 3, wherein each of the tabs extends in a plane containing the longitudinal axis of the device.

6. The device according to any one of the foregoing claims, wherein the annular seat has a radial thickness which is between 1.5mm and 10mm.

7. The device according to any one of the foregoing claims, wherein the seal packing ring is placed around the tubular element, the split bush, the seal packing ring and the seal delimiting, with the tubular element, an annular passage for inserting the end of the flexible hose into the annular seat, the split bush thus acting on the seal packing ring and deforming the seal.

8. The device according to any one of the foregoing claims, wherein the contact surfaces between the ring and the seal define, in a radial section, converging lines whose extensions intersect with the longitudinal axis.

9. The device according to any one of the foregoing claims, wherein a radial section of the seal is C-shaped.

10. The device according to any one of the foregoing claims, wherein the threaded cylindrical member has a portion that engages the seal and is perpendicular to a longitudinal axis of the device.

11. The device according to any one of the foregoing claims, wherein the threaded cylindrical member has a portion that engages the seal and converges on the longitudinal axis of the device away from the split bush in such a way as to push the seal inwards when the bush is moved towards the close-up position.

12. The device according to any one of the foregoing claims, wherein the seal has a predeformed shape towards a longitudinal axis of the device.

13. The device according to any one of the foregoing claims, wherein the split bush has barbed teeth on a portion of it that can be associated with the flexible hose.

14. The device according to any one of the foregoing claims, wherein the tubular element has a smooth outside surface.

15. The device according to any one of the foregoing claims, wherein the seal is attached to the threaded cylindrical member.

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16. The device according to any one of the foregoing claims, wherein the seal is co-moulded with the threaded cylindrical member.

17. The device according to any one of the foregoing claims, wherein the seal has a plurality of annular barbs located on a radially inside portion of the seal itself designed to come into contact with the hose.

18. A device for connecting flexible hoses, substantially as herein described with reference to the accompanying drawings.

Dated 12 October, 2010

Bucchi S.r.l.

Patent Attorneys for the Applicant/Nominated Person

SPRUSON & FERGUSON

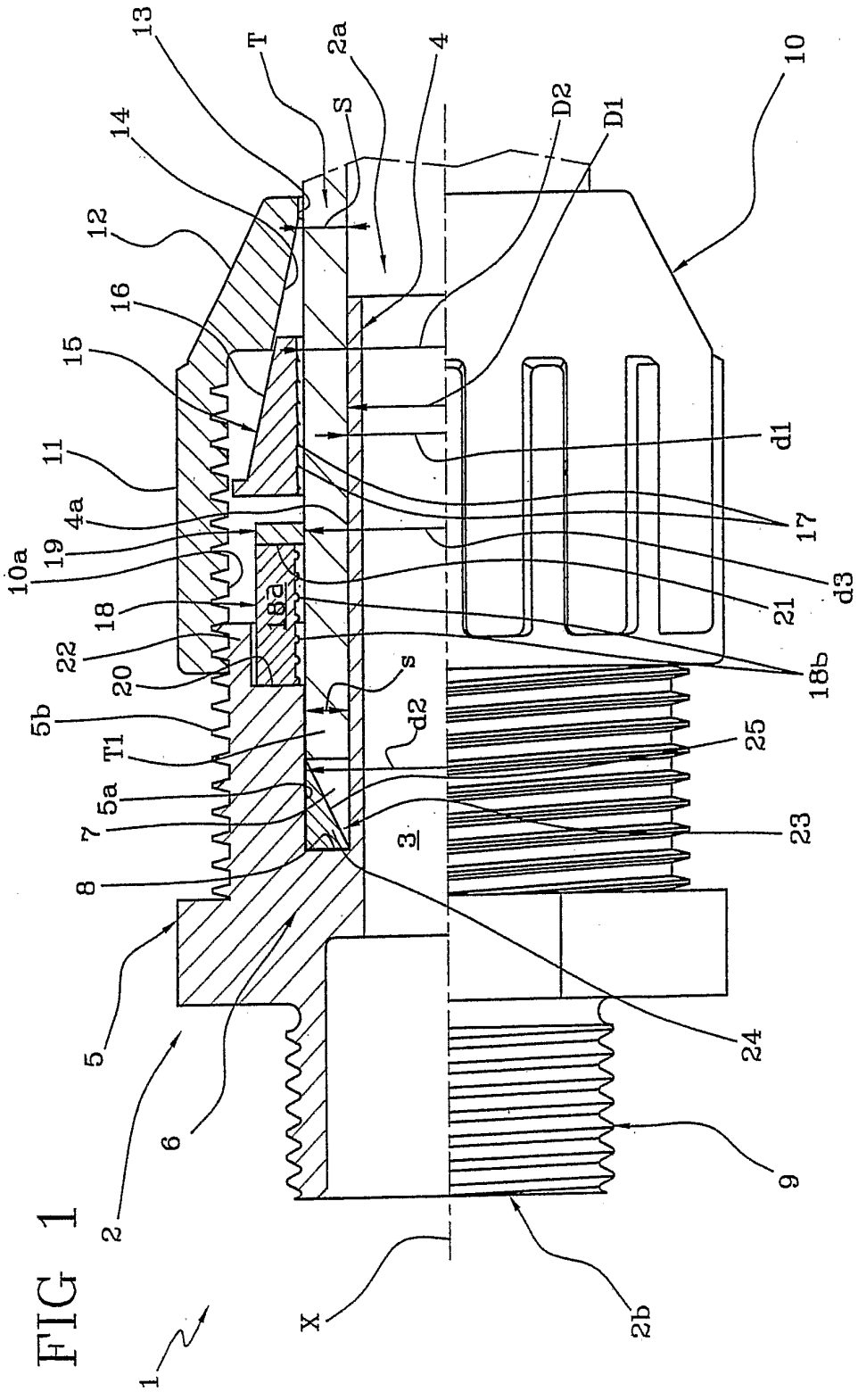
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FIG 1

FIG 2

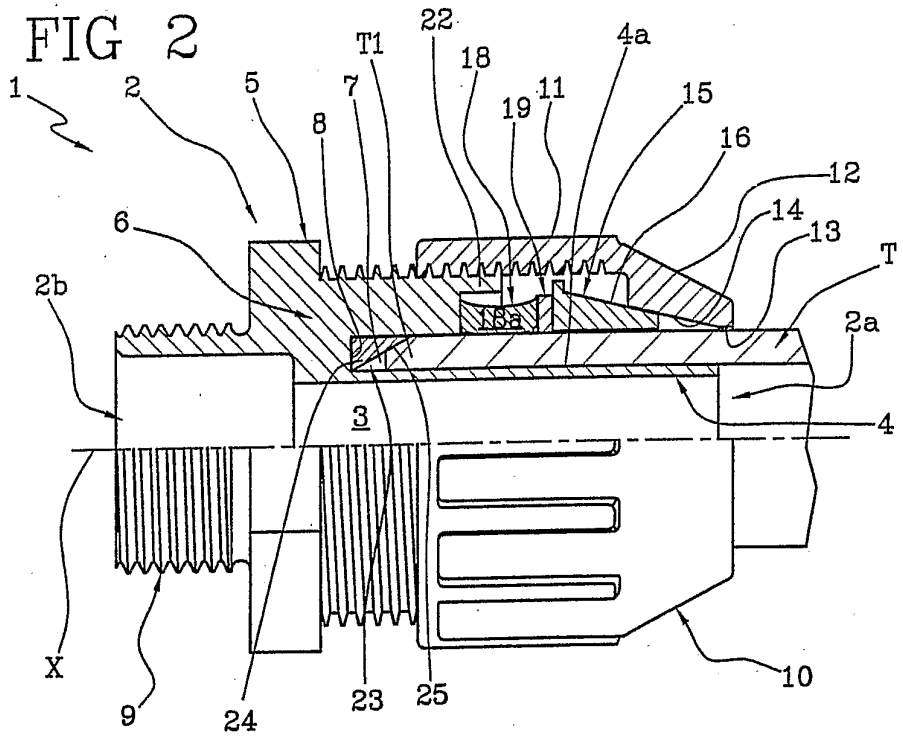
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FIG 3

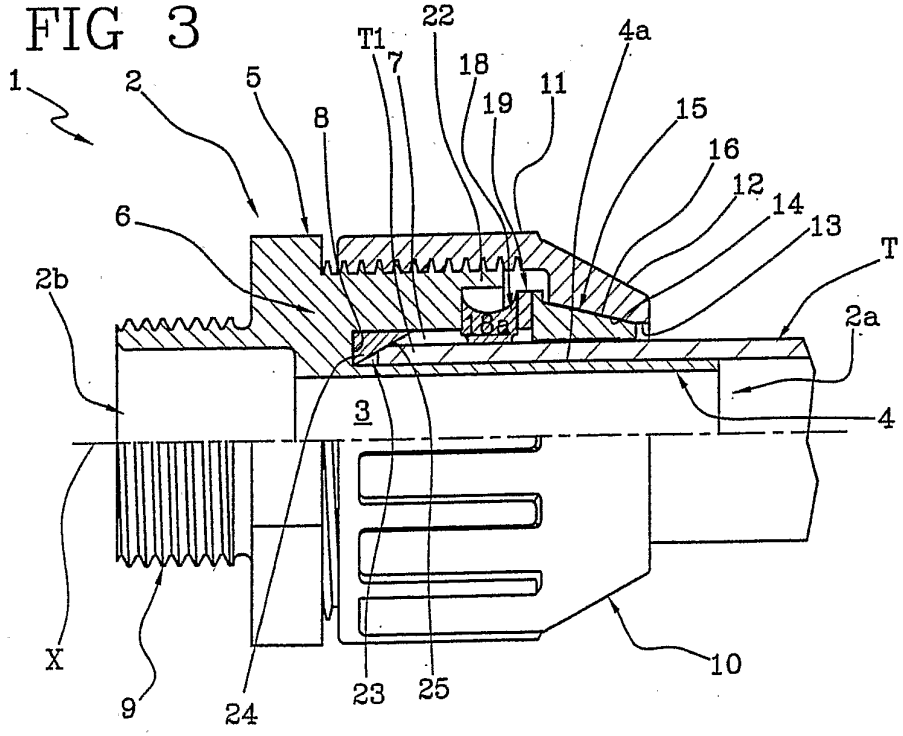
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FIG 4

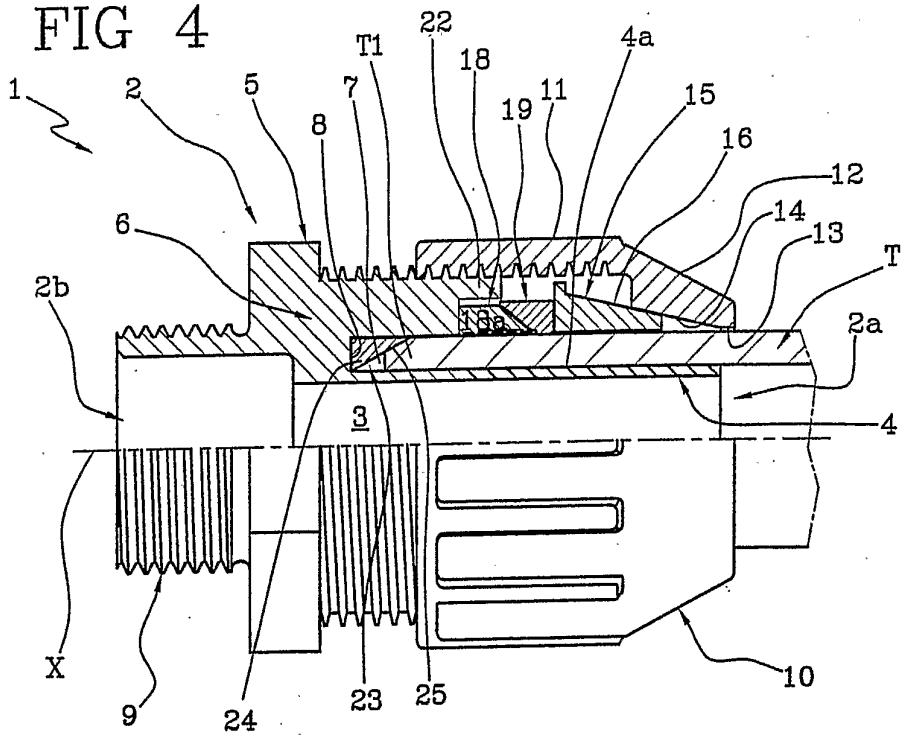
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FIG 5

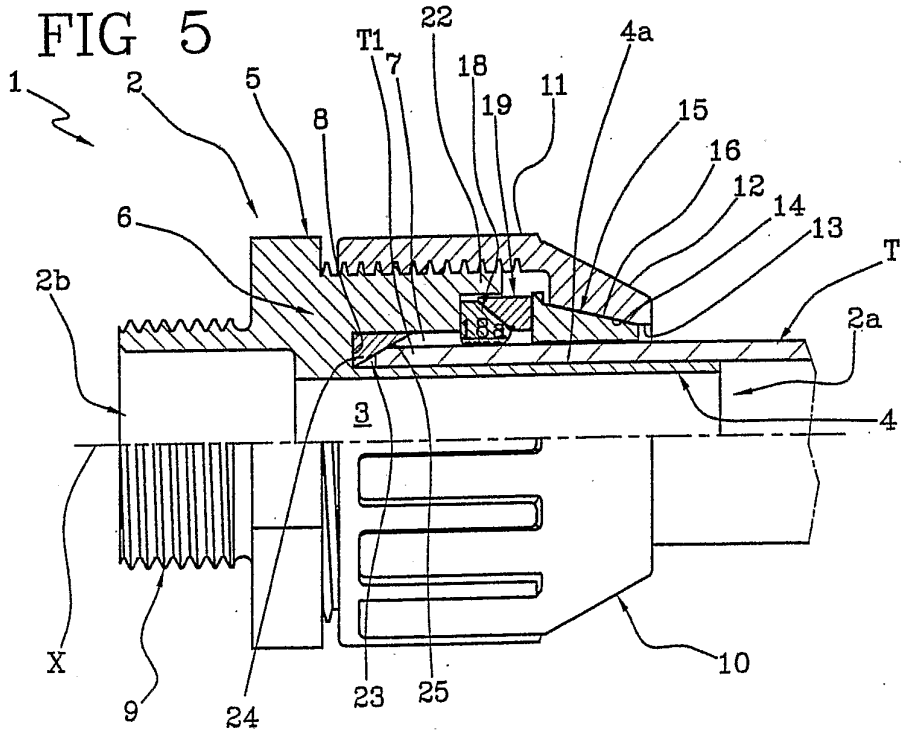
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FIG 6

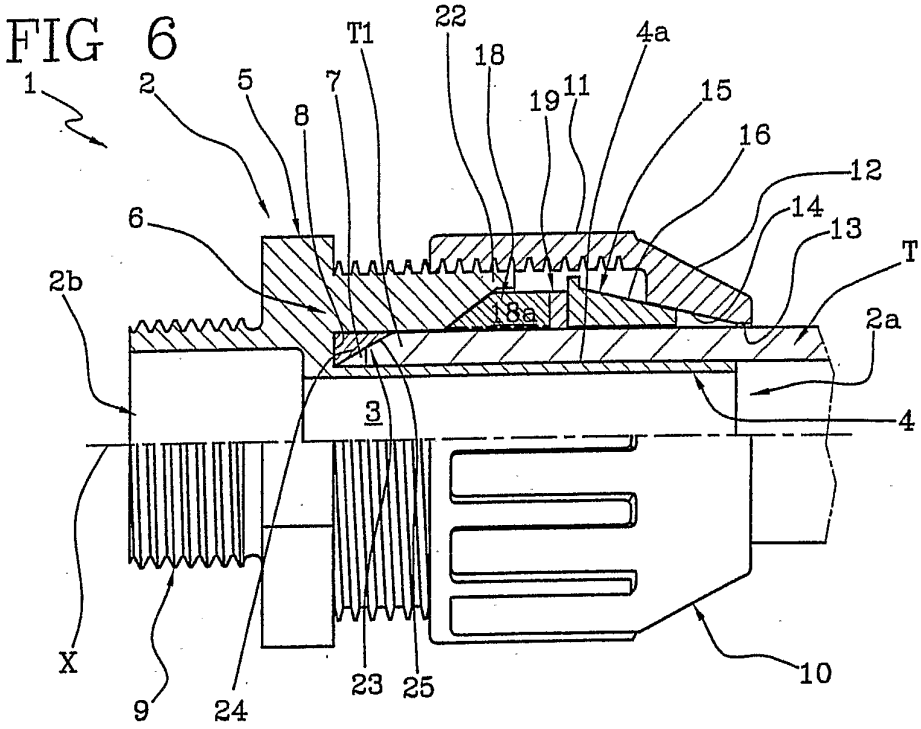
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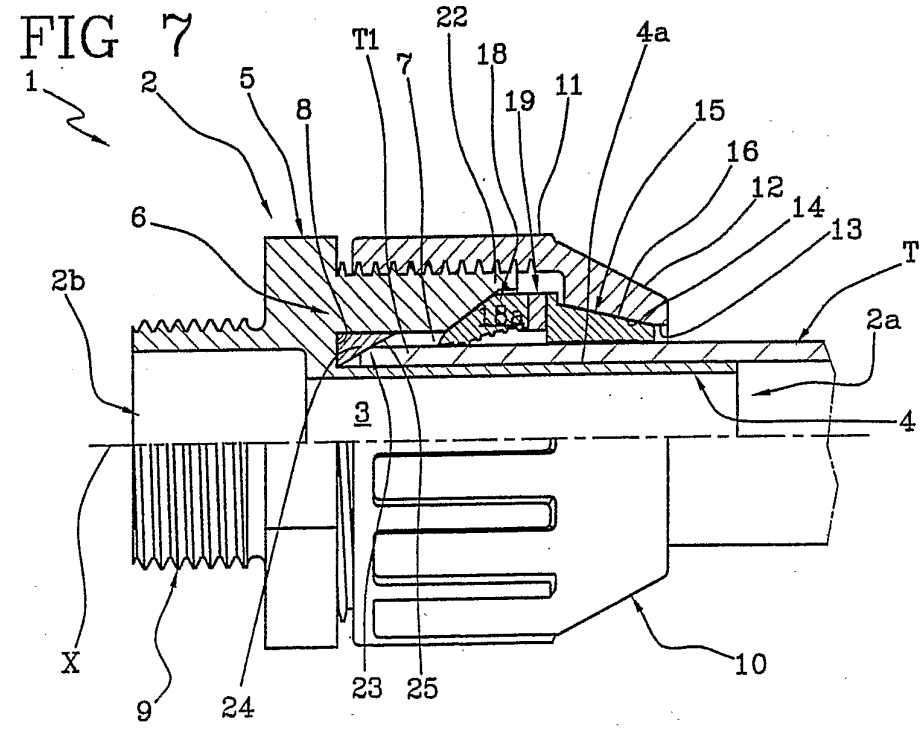
FIG 7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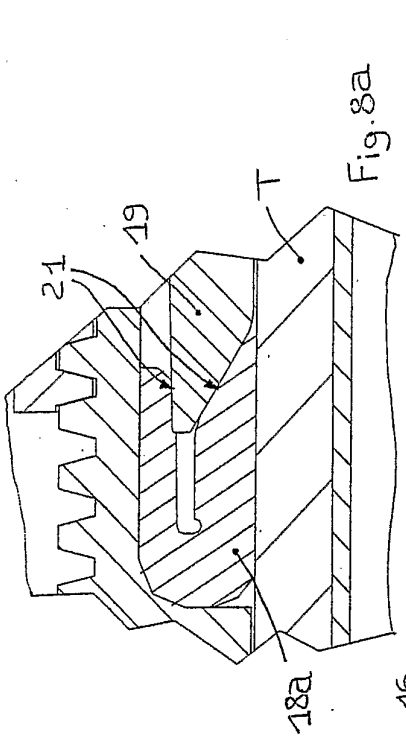

Fig.8a

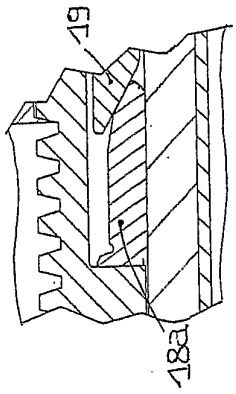

Fig.8b

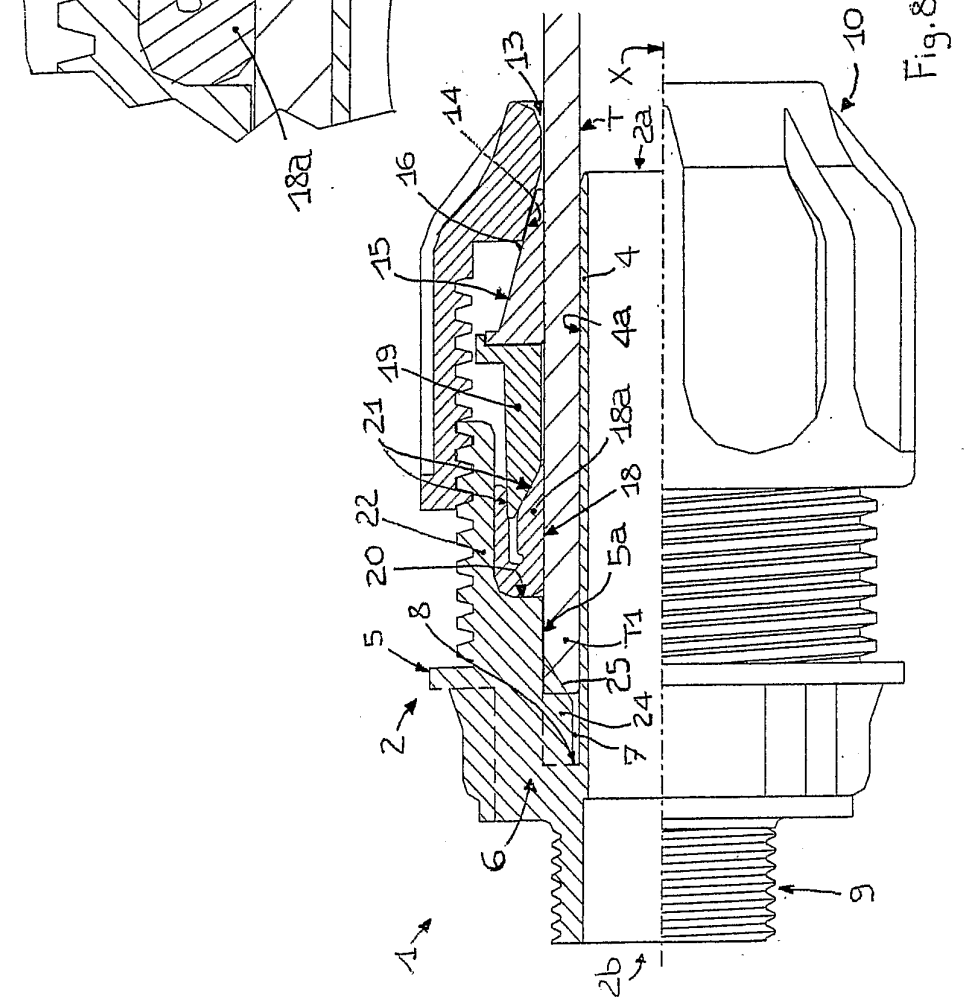

Fig.8

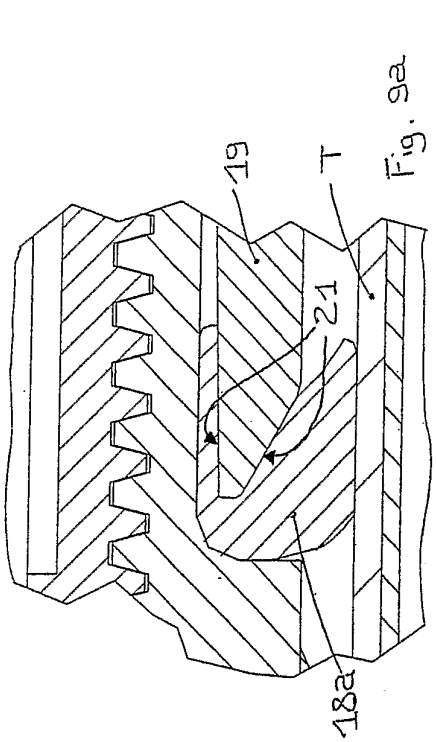

Fig. 9a

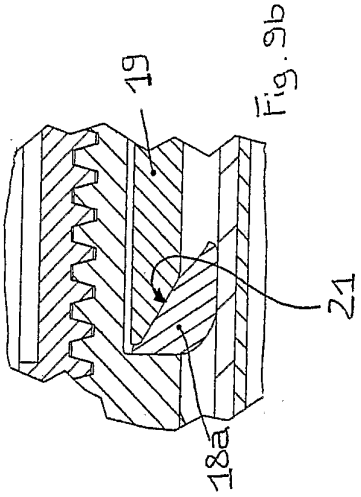

Fig. 9b

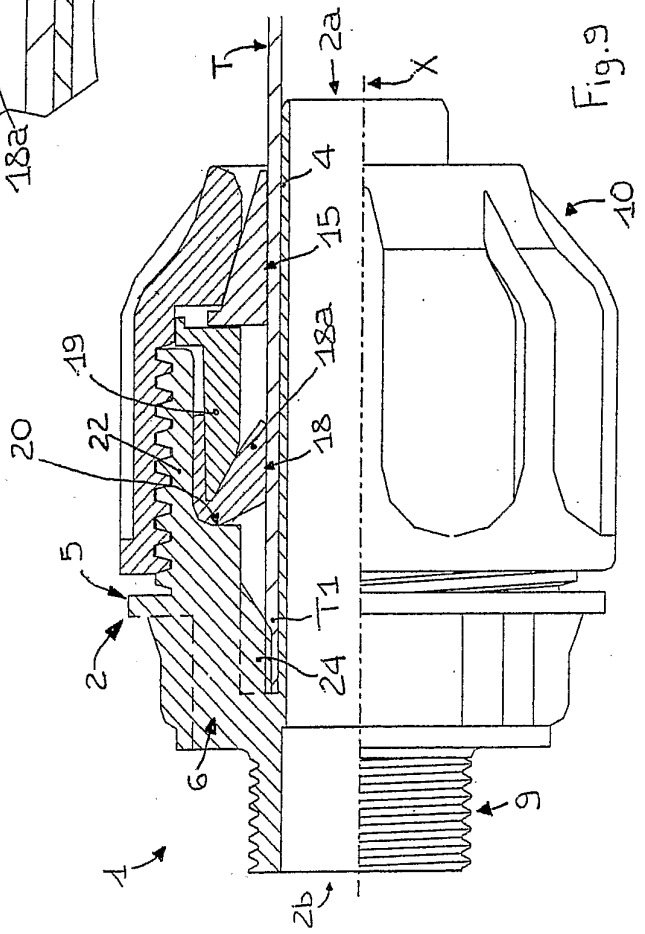

Fig. 9