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54 **Vice for the assembly of union terminals for flexible pipes.**

57 The invention concerns the realization of a vice for the assembly of union terminals for flexible pipes, having a shrinking bush (15), comprising a body (2) forced by an anterior flange (6) and by a posterior flange (7) connected to each other by means of tie rods (8); a handle (19) for grasping the body (2), said handle (19) being connected to the posterior flange (7); a pusher device (3) consisting of a cylindrical body (18) having a radial slit (25), where the flexible pipe (13) to be coupled with the union is lodged; at least one maneuver handle (20); a couple of pushing ring nuts (4,5), each having a radial notch

(23,24) and being placed anteriorly and posteriorly to the body (2), whereby the cylindrical body (18) of the pusher device (3) and the tubular body (1) of the posterior flange (7) are coupled together by means of threads (17,16) so as to realize the clamping of a flexible pipe (13) placed inside the radial notch (24) of the anterior pushing ring nut (4) of the body (2) of the vice, said clamping being ensured by a shrinking bush (15) which couples with the pipe (13) and the terminal (14) when the pusher device (3) is screwed on the tubular body (11).

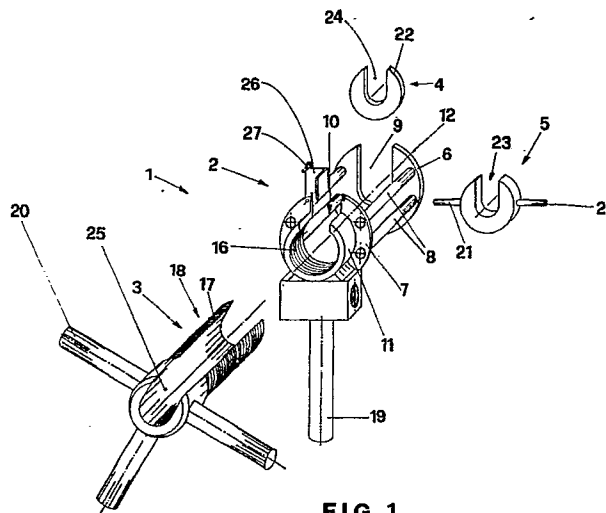


FIG. 1

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DESCRIPTION

The invention discloses the realization of a vice suited for the assembly of union terminals for flexible pipes.

It is known that in the thermo-hydraulic field special pliers are used for the assembly and the contemporary clamping of union terminals for flexible pipes by means of a bush.

A known and widely-used type of assembly pliers is constituted by a body supported by a base, on which a couple of jaws is mounted, between which the flexible pipe and the pipe fitting are placed. By means of a hydraulic or mechanic pressure device, the jaws of the pliers force the flexible pipe against the union terminal, thanks to the interposition of a bush which ensures the clamping. One of the disadvantages of the known pliers of this type is their big dimensions, so that they can only be used in fixed installations and for the connection of flexible pipes to pipe fittings before the pipes are installed. In other words, their big dimensions and also their considerable weight make the use of these pliers impossible for the connection of pipe fittings to already installed flexible pipes.

In order to overcome said disadvantages and to make the work easier to those plumbers who connect pipe fittings to already installed flexible pipes, portable assembly pliers have been realized, which, thanks to their limited weight and small dimensions, can be easily used to connect union terminals to already installed pipes.

Also said portable manual pliers present some disadvantages, the main of which is that the pressure jaws, between which the shrinking bush and the union terminal which must be inserted one into the other to connect the pipes are clamped, work as projecting parts and, consequently, during the clamping the pressure is unstable and not co-axial.

From what has been said another disadvantage follows, i.e. the fragility of the pliers.

In order to overcome this disadvantage, portable manual pliers have been realized with bigger dimensions, but to the detriment of weight and size and, therefore, they are less easily-handled. Not the least disadvantage is that the lever device, through which the jaws clamp the union terminal to the pipe, requires a considerable effort on the operator's part, particularly if the flexible pipes, the union terminals and the bushes to be connected to one another have considerable diameters.

The present invention proposes to overcome the above-mentioned disadvantages by disclosing the vice according to the invention. The main purpose of the present invention, in fact, is the realization of a portable and manual vice which, besides ensuring the assembly of union terminals to flexible

pipes by means of a shrinking bush, also presents pressure flanges which are completely guided during the clamping stroke, so that the elements are perfectly co-axial during the connection.

Another purpose of the present invention is the realization of a vice which does not easily break and which is therefore more reliable than the portable manual vices of the known type, though it is lighter and smaller.

Not the least purpose of the present invention is the realization of a vice which also ensures the assembly of union terminals with considerable diameters with little effort on the operator's part. The above mentioned purposes and others which will be better understood hereafter are reached by the realization of a vice for the assembly of union terminals for flexible pipes with a shrinking bush which, according to the claims, comprises:

- a body formed by an anterior flange being co-axial with and facing a tubular-shaped posterior flange, these flanges being connected to one another by means of tie rods and each flange presenting a radial slit;
- at least one handle for grasping the body, said handle being connected to the posterior flange;
- a pusher device consisting of a cylindrical body, lengthwise presenting a radial slit, in which the flexible pipe to be connected to the pipe fitting is lodged;
- at least one maneuver handle fixed to the pusher device;
- preferably a couple of pushing ring nuts, each presenting a radial notch, whereby the anterior pushing ring nut is applied to the anterior flange, and the posterior pushing ring nut is placed on the anterior part of the cylindrical body of the pusher device, and is characterized in that the cylindrical body of the pusher device and the tubular body of the posterior flange are coupled together by means of threads and realize the clamping of a flexible pipe to a union terminal, the latter being arranged inside the radial notch of the anterior pushing ring nut, said clamping being ensured by a shrinking bush placed co-axially with the flexible pipe and in front of the posterior pushing ring nut, when the pusher device is screwed on the tubular body of the posterior flange and co-axially forces the shrinking bush on to the union terminal.

According to a preferred embodiment of the invention, the vice is characterized by an anterior pushing ring nut applied to the anterior flange, and by a posterior pushing ring nut applied in front of the cylindrical body of the pusher device. Each ring nut presents a radial slit in which the union terminal

with the ring nut and the already connected pipe is arranged in the anterior ring nut, and the flexible pipe is arranged in the posterior ring nut. A series of couples of pushing ring nuts, each ring nut presenting radial slits of different measures, is supplied together with the vice according to the invention, so as to make it suited for the assembly of flexible pipes and union terminals with various diameters.

Advantageously, the vice according to the invention is more easy-handled, less fragile and requires little effort on the operator's part for the execution of the connections. All these factors encourage the use of the vice according to the invention for the execution of joints. Moreover, the joints are better performed.

All above-mentioned purposes and advantages will become apparent from the description of a preferred form of embodiment. However, it should be understood that the detailed description, while indicating a preferred embodiment of the invention, is given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description and from the drawings, wherein:

- Fig. 1 shows an axonometric exploded view of the vice according to the invention;
- Fig. 2 shows a top view of the vice according to the invention, within which a flexible pipe, a shrinking bush and a union terminal already inserted in another pipe are arranged, according to the configuration previous to the assembly;
- Fig. 3 shows the vice of Fig. 2 after the assembly of the union terminal to the pipe through the shrinking bush is completed.

As can be observed in Fig. 1 the vice according to the invention, indicated as a whole with 1, is composed of a body indicated as a whole with 2, of a mobile pusher device, indicated as a whole with 3, and of a couple of anterior and posterior pushing ring nuts 4, 5 which, when the assembly of the vice is completed, are placed inside the body 2, as can be seen in Fig. 2 and 3, and as will be described hereafter.

As far as the body 2 is concerned, it can be observed that it is composed of a couple of flanges co-axial with and facing one another, more precisely of an anterior flange 6 and a posterior flange 7 connected to each other by means of horizontal tie rods. The anterior flange 6 presents a radial slit 9 and, similarly, the posterior flange 7 presents a radial slit 10, these flanges being aligned according to the longitudinal axis 12 of the body 2, thus permitting the housing within the body 2 of the flexible pipe of the union terminal to which it is connected.

In particular, in Figs 2 and 3 it can be observed that the pipe 13, the union terminal 14 and the shrinking bush 15 are placed co-axially with the longitudinal axis 12 of the vice itself within the body 2.

Furthermore, as can be observed in Fig. 1, the posterior flange 7 presents a tubular body 11 co-axial with the longitudinal axis of the body 2, said tubular body presenting at its top an opening co-incident with the radial slit 10 of the posterior flange 7. Moreover internally, the tubular body 11 presents a thread 16 which couples with a thread 17 which is external to the external cylindrical body 18 which constitutes the pusher device 3.

The body 2 of the vice presents a handle 19 in the lower part of the posterior flange 7; similarly, the pusher device 3 presents maneuver handles 20 at the unthreaded end; said handles allow the pusher device to be rotated inside the tubular body of the posterior flange 7.

Fig. 1 also shows that the posterior ring nut 5 is an integrant part of the vice according to the invention. As can also be seen in Figs 2 and 3, the posterior ring nut 5 is placed in front of the threaded cylindrical body 18 of the pusher device 3 and is supported by the horizontal tie rods 8, between which its stakes 21 are inserted in. Said stakes 21 allow the posterior ring nut 5 to move horizontally on the longitudinal axis 12 when the pusher device 3 is screwed on the tubular body 11. It is useful to specify that it is necessary to insert the posterior ring nut 5 to avoid the pusher device transmitting a twisting moment to the bush 15 during the screwing phase, which would happen if the anterior part of the threaded cylindrical body 18 of the pusher device 3 directly bucks with the bush 15 itself in the clamping phase. Fig. 1 also shows another ring nut, more precisely the anterior ring nut 4 which, as can be observed in Figs 2 and 3, presents a U-shaped profile 22 which allows the anterior ring nut to be inserted in the radial slit 9 made in the anterior flange 6.

Figs 2 and 3 also show that the posterior pushing ring nut 5 bucks with the shrinking bush 15 which is co-axial with the flexible pipe 13 and which presents a radial notch 23 which permits the housing of the flexible pipe 13 itself. Similarly, the anterior ring nut 4 presents a radial notch 24 which permits the housing of the union terminal 14, already connected to another pipe 40. A plurality of couples of posterior and anterior ring nuts 5, 4 is an integrant part of the vice, each couple presenting radial notches 23 and 24 with different widths and suited for flexible pipes 13, union terminals 14 and shrinking bushes 15 having different diameters.

The procedure for the assembly of the union terminal to the flexible pipe lies in inserting the anterior pushing ring nut 4 in the radial slit 9 of the

anterior flange 6. In the radial notch 24 of the anterior pushing ring nut the terminal 14 is lodged and, similarly, the posterior pushing ring nut 5 is lodged in front of the pusher device 3 and supported by the horizontal tie rods on which the stakes 21 are leaned, said posterior pushing ring nut presenting a radial notch 23 too, suited to receive the flexible pipe 13 or another union profile.

It can be observed that the flexible pipe may have any length, since it is placed inside the radial slit 25 co-axially made in the pusher device. Before placing the flexible pipe 13 in the pusher device 3 and in the notch 23 of the posterior ring nut 5, the shrinking bush 15 must previously be inserted. When the flexible pipe 13 is placed in the co-axial slit 25 of the pusher device 3, it is fit to the union terminal 14, thus assuming the configuration indicated in Fig. 2.

The operations for clamping the union terminal 14 to the flexible pipe 13 are given hereinafter.

In order to put these operation into practice, the mobile element 26, which is applied on top of the posterior flange 7, must be previously lowered, the function of the mobile element being to close the radial slit 10 of the posterior flange 7 itself to prevent the threading 17 of the pusher device 3 from meeting a gap during the screwing of the pusher device 3 in correspondence with the radial slit 10 itself, such gap being able to cause oscillations in the screwing of the pusher device itself.

Therefore, after the mobile element, which, as can be observed in Figs 2 and 3, is fixed to the posterior flange 7 by means of the screw 27, has being shut, the pusher device 3 is screwed by rotating it by means of the maneuver handles 20. The pusher device 3 co-axially pushes the posterior pushing ring nut 5, which, in turn, co-axially forces the bush 15 on to the unit terminal 14. Said terminal remains still inside the radial notch 24 made in the anterior ring nut 4, since its neck 28 leans against the anterior pushing ring nut 4 itself. The rotation and, consequently, the advancement of the pusher device 3 comes to a stop when the bottom of the bush 15 leans against the neck 28 of the union terminal 14. At this point the stability of the connection through the forcing of the bush 15 is realized. By lifting the mobile element 26 the joint can be extracted from the vice.

According to what has been described, it is understood that the vice according to the invention fulfills all mentioned purposes. In fact, the main purpose is fulfilled, i.e. the realization of a more reliable and less fragile vice than the portable manual vices of the known type.

In fact, it has been seen from the detailed description that the anterior and posterior flanges 6 and 7 are fixed to the body 2 of the vice and that the pusher device 3, which realizes the clamping of

the union terminal, is perfectly guided during its stroke by the threads 17 and 16 through which it is coupled with the posterior flange 7. This implies a perfect concentricity between the pusher device 3 and the body 2 of the vice during the clamping stroke, thus ensuring a constant concentricity of the applied load and, consequently, a perfect concentricity of the flexible pipe and of the ring nut with the union terminal.

Furthermore, since the pusher device 3 is coupled with the vice 2 by means of threads, the advancement of the pusher device 3 itself does not require too much effort, because it is known that a considerable co-axial effort can be produced by means of threads, though applying a rather limited twisting moment. This is all to the operator's advantage, especially when he must use the vice with already installed flexible pipes and union terminals in uneasy conditions.

Moreover, the fact that the pusher device 3 is connected with the vice 2 by means of threads, makes it possible to reach more or less considerable co-axial advancements of the pusher device 3 itself depending on the required utilization of the vice, at a parity of the rotation of the pusher device 3 and opportunely varying the pitch of the threads.

During the manufacturing process various changes can be made on the vice according to the invention, concerning, for instance, the dimensions. It is, however, understood, that said changes will still be included within the scope of the present invention.

Claims

1. A vice for the assembly of union terminals for flexible pipes with a shrinking bush, comprising:
 - a body (2) formed by an anterior flange (6) co-axial with and facing a posterior flange (7) having a tubular body (11), said flanges being connected to one another by means of tie rods (8) and each flange presenting a radial slit (9,10);
 - at least one handle (19) for grasping the body (2), said handle being connected with the posterior flange (7);
 - a pusher device (3) consisting of a cylindrical body (18) lengthwise presenting a radial slit (25), where the flexible pipe to be connected with the union is placed;
 - at least one maneuver handle (20) fixed to the pusher device (3);
 - a couple of pushing ring nuts (4,5) each having a radial slit (24,23), the anterior pushing ring nut (4) facing the anterior flange (6) and the posterior pushing ring nut (5) facing the cylindrical body (18) of

the pusher device (3), characterized in that the cylindrical body (18) of the pusher device (3) and the tubular body (11) of the posterior flange (7) are connected to each other by means of threads (17,16), thus contributing to the clamping of a flexible pipe (13) with a union terminal (14) arranged inside the radial slit (24) of the anterior pushing ring nut (4) of the body of the vice, said clamping being assured by a bush (15) placed co-axially with the flexible pipe (13) and in front of the posterior pushing ring nut (5) and coupling with the pipe and the terminal (14) when the pusher device (3) is screwed on the tubular body (11) of the posterior flange (7).

2. A vice according to claim 1), characterized in that the anterior pushing ring nut (4) presents a U-shaped peripheral profile (22) which couples with the lateral walls of the anterior flange (6) when the ring nut is inserted in the radial slit (9) of the anterior flange (6).
3. A vice according to claim 1), characterized in that the posterior pushing ring nut (5) presents horizontal stakes (21) which are supported by the tie rods (8) of the body (2) when the ring nut (5) is placed on the anterior part of the cylindrical body (18) of the pusher device (3).
4. A vice according to claim 1), characterized in that a mobile element (26) for shutting the radial slit (10) made on the posterior flange (7) is hinged to said posterior flange (7).

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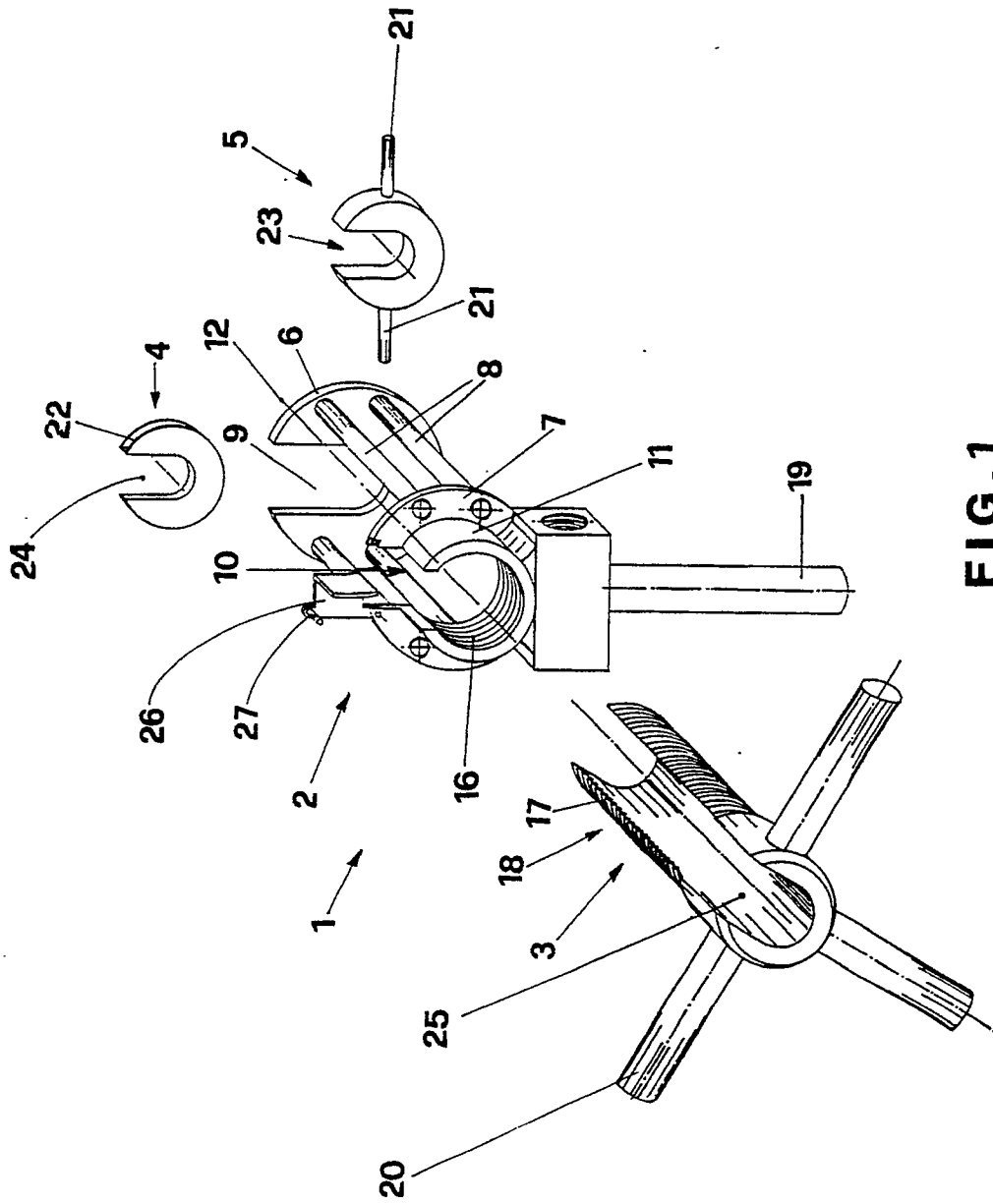


FIG. 1

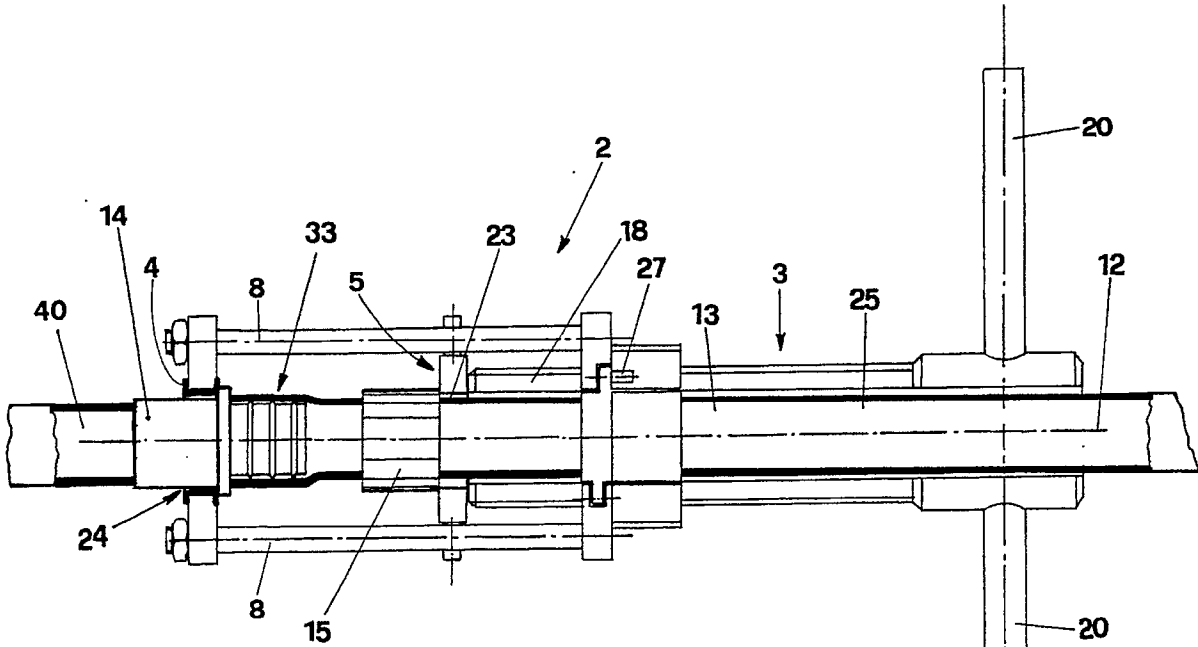


FIG. 2

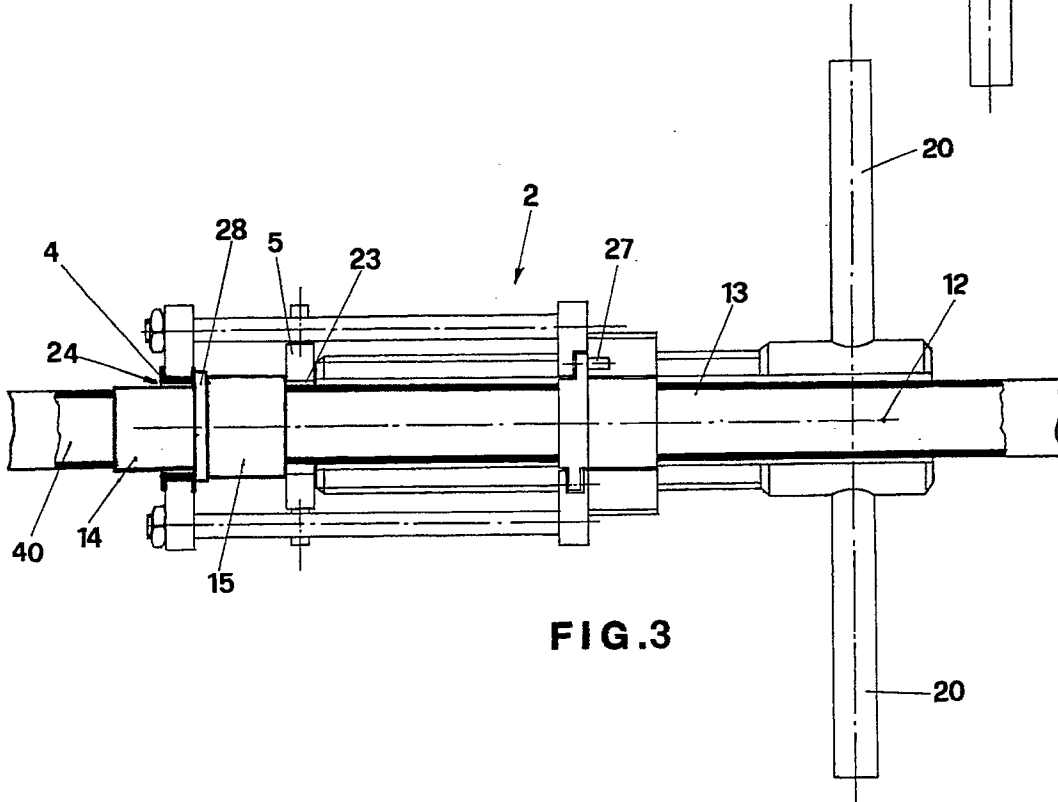


FIG. 3



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DOCUMENTS CONSIDERED TO BE RELEVANT			EP 91102231.7
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	<u>EP - A1 - 0 191 728</u> (BERNARDINI) * Totality * --	1	B 25 B 27/10 F 16 L 33/00 F 16 L 55/00
A	<u>DE - B - 1 924 225</u> (SUPERFLEXIT LTD.) * Totality * ----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5) B 25 B 27/00 F 16 L 33/00 F 16 L 55/00
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 23-04-1991	Examiner SCHUGANICH
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