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**(12) PATENT ABRIDGMENT      (11) Document No. AU-B-79808/87**  
**(19) AUSTRALIAN PATENT OFFICE      (10) Acceptance No. 609064**

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(54) Title  
HOSE COUPLING

International Patent Classification(s)  
(51)<sup>4</sup> F16L 033/20      F16L 033/22

(21) Application No. : 79808/87

(22) Application Date : 15.10.87

(30) Priority Data

(31) Number	(32) Date	(33) Country
3635036	15.10.86	DE FEDERAL REPUBLIC OF GERMANY
3725897	05.08.87	DE FEDERAL REPUBLIC OF GERMANY

(43) Publication Date : 21.04.88

(44) Publication Date of Accepted Application : 26.04.91

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(56) Prior Art Documents  
US 4537427  
US 4431218

(57) Claim

1. A hose coupling component comprising:-

an insert sleeve having a first portion adapted for insertion into a hose;

a pressure sleeve adapted to be disposed concentrically around said first portion of said insert sleeve for retaining a hose therebetween;

a second portion of said insert sleeve which defines a peripheral surface for sliding engagement with a complementary surface of said pressure sleeve or of a matching coupling component;

complementary rib means and groove means on the interior of said pressure sleeve and the exterior of said insert sleeve, which rib means and groove means are engageable to secure the pressure sleeve and insert sleeve against substantial relative axial displacement; and

means on the pressure sleeve for positively coupling the pressure sleeve to said matching coupling component.

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(10) 609064

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8. A hose coupling component according to any one of claims 1 to 6 wherein said pressure sleeve is adapted to concentrically receive the matching coupling component, and includes one or more transverse passages to seat a coupling element for securing the pressure sleeve to the matching coupling component.

9. A hose coupling component according to claim 8 wherein the coupling element comprises a U-shaped coupling clamp.

11. A hose coupling according to any preceding claim comprising a hose coupling component according to any preceding claim, and a further coupling component having a second peripheral surface to engage said first-mentioned peripheral surface of the second portion of said insert sleeve.

COMMONWEALTH OF AUSTRALIA

PATENT ACT 1952

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE

609064

CLASS

INT. CLASS

Application Number:  
Lodged:

Complete Specification Lodged:  
Accepted:  
Published:

Priority:

Related Art:

This document contains the  
amendments made under  
Section 49 and is correct for  
printing.

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COMPLETE SPECIFICATION FOR THE INVENTION ENTITLED:

"HOSE COUPLING"

The following statement is a full description of this invention,  
including the best method of performing it known to me :-

This invention relates to a hose coupling. Hose couplings of the kind specified and having insert connections are known, for example, for DIN 20043. These  
5 prior art hose couplings having insert connections have the disadvantage that their stability is inadequate to withstand either the prevailing pressures on the line or external mechanical loadings. More particularly, prior art hose couplings having insert connections frequently  
10 rupture under pulsating surges, such as often occur in high pressure lines. Weak places include the coupling clamp, but also the place where the pressure sleeve engages with the socket. Another unsatisfactory aspect is the buckling strength of prior art hose couplings  
15 having insert connections. When hose couplings are used under ground, rocks often drop onto the coupling or somebody accidentally steps on the coupling. Under such loads known insert couplings often break.

20 An object of the invention is therefore to provide a hose coupling being stable enough to withstand both increased external mechanical loadings, pulsating surges transmitted by the medium in the line, and high internal pressure.

25 The invention accordingly provides a hose coupling component which includes an insert sleeve having a first portion adapted for insertion into a hose and a second portion which defines a peripheral surface for engagement  
30 with a complementary surface of a matching coupling component. A pressure sleeve is adapted to be disposed concentrically around the first portion of the insert sleeve for retaining a hose therebetween. Complementary rib means and groove means are provided on the interior  
35 of the pressure sleeve and the exterior of the insert sleeve. These rib means and groove means are engageable



to secure the pressure sleeve and insert sleeve against substantial relative axial displacement. Means is provided on the pressure sleeve for positively coupling the pressure sleeve to the matching coupling component.

5

In a preferred embodiment, the rib means and the groove means respectively comprise an internal annular rib on the pressure sleeve and a complementary annular groove on the external surface of the insert sleeve.

10

A peripheral seal may be provided on the aforementioned peripheral surface of the insert sleeve.

15 In an embodiment, the positive coupling means may comprise a flange which is adapted to be received within an enlarged bore portion of the matching coupling component. The pressure sleeve may be adapted to concentrically receive the matching coupling component and may include one or more transverse passages to seat a  
20 coupling element for securing the pressure sleeve to the matching coupling component. The coupling element may comprise, for example a U-shaped coupling clamp.

25 The invention also extends to a hose coupling comprising a hose coupling component as described above, and a further coupling component having a second peripheral surface to engage the first-mentioned peripheral surface of the second portion of the insert sleeve.

30

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

35 Fig. 1 is a longitudinal section through an embodiment of hose coupling including a coupling component according to the invention;



Fig. 2 is a cross-section, taking along the line A-B in Fig. 1;

Fig. 3 shows the original shape of the pressure sleeve;

5 Fig. 4 is a longitudinal section through another embodiment of the hose coupling;

Fig. 5 shows the initial state of the pressure sleeve;

10 Fig. 6 is a longitudinal section through another embodiment of the hose coupling half;

Fig. 7 is a longitudinal section through a corresponding nipple as an intermediate member to the other hose coupling half (not shown);

15 Fig. 8 shows the connection of the members illustrated in Figs. 6 and 7;

Fig. 9 is a longitudinal section through another embodiment of one hose coupling half;

Fig. 10 shows the correspondingly constructed nipple and

20 Fig. 11 the connection of the two members illustrated in Figs. 9 and 10;

Fig. 12 is a longitudinal section through another embodiment;

Fig. 13 shows the nipple corresponding to Fig. 12;

25 Fig. 14 is a longitudinal section of the connection of the members illustrated in Figs. 12 and 13;

Fig. 15 shows another embodiment of a hose coupling half and

Fig. 16 shows the associated nipple;

30 Fig. 17 is a longitudinal section of the connection of the members illustrated in Figs. 15 and 16;

Fig. 18 is a longitudinal section through another possible embodiment of a hose coupling half having the features of the invention; and

35 Figs. 19-22 show alternative embodiments of hose couplings having modified nipples as intermediate



members, to which the opposite hose coupling half is applied.

5 The hose coupling depicted in Figs. 1 to 3 includes  
a hose coupling component 30 according to a first  
embodiment of the invention and a matching coupling  
component 32. Component 30 includes an insert sleeve 31  
having an externally uneven and relatively thin first  
portion 2 adapted for insertion into a hose 1, and a  
10 pressure sleeve 11 adapted to be disposed concentrically  
around the first portion 2 of insert sleeve 31 for  
retaining hose 1. Hose 1 is compressed between the  
pressure sleeve and the insert sleeve, the latter being  
provided with internal ribbing to further facilitate a  
15 firm grip.

Insert sleeve 31 includes a second relatively  
thicker walled portion 3, including an end part 4 which  
projects from the pressure sleeve for receipt by an  
20 intermediate enlarged bore portion 7 of matching  
component 32. Component 32 is generally in the form of a  
socket and includes a still more enlarged bore portion 35  
which receives pressure sleeve 11.

25 End part 4 has a slightly tapered end and defines a  
cylindrical surface 36 for sliding engagement with the  
internal peripheral surface 38 of enlarged bore portion  
7. An annular seal 6 in a groove 5 in end part 4 of  
insert sleeve 31 seals the gap between peripheral surface  
30 36 and bore surface 38. A shallow annular shoulder 37 on  
the portion 3 of insert sleeve 31 abuts the end surface  
of enlarged bore portion 35 and thereby ensures a gap 10  
between end part 4 and the end surface 9 of bore portion  
7. By virtue of gap 10, the pressure medium flowing  
35 through the hose coupling exerts a force on both ends of  
insert sleeve 31. These oppositely directed forces



balance so that the insert sleeve 31 is mounted in the hose coupling substantially free from axially directed forces.

5        The shape of pressure sleeve 11 in its initial state prior to application to the coupling is shown in Fig. 3. It will be seen that the outer end is expanded outwardly about the second portion 3 of sleeve insert 31. This outer end is provided with an integral annular flange 14  
10 of outer diameter, when in situ, substantially equal to the internal diameter of enlarged bore portion 35. The pressure sleeve is coupled to component 32 by a U-shaped coupling clamp 15 fitted behind flange 14 through a pair of complementary transverse passages 16 in coupling  
15 component 32, dimensioned to firmly seat clamp 15. It will be seen that clamp 15 fixes flange 14 between the front face of the clamp and the end surface of enlarged bore portion 35.

20        For securing pressure sleeve 11 to insert sleeve 31, an integral internal rib 12 on the pressure sleeve engages a complementary annular groove 13 formed in the insert sleeve adjacent the rear of second portion 3. The engagement between rib 12 and groove 13 is effective to  
25 secure the two sleeves against substantial relative axial displacement, and is positive in both directions so as to resist axial separation forces in either direction.

Various further embodiments of coupling and coupling  
30 component are shown in Figs. 4 to 22, in which like parts are indicated by like reference numerals. The embodiment of Figs. 4 and 5 entails similar general engagements between the parts but, in this case, the coupling component 32 is in male relationship to both insert  
35 sleeve 31 and pressure sleeve 11, instead of being a socket to both as in the embodiment of Figs. 1 to 3.





Thus, coupling component 32 has an end part 4a with peripheral seal 6 received within an enlarged bore portion 7a of second or outer portion 3 of insert sleeve 31. Furthermore, pressure sleeve 11 is stepped about  
5 both outer portion 3 of the insert sleeve and an integral annular flange 14a of the component 32, and the U-shaped coupling clamp 15 projects through transverse passages 16 intersecting an enlarged bore portion 35a of pressure sleeve 11. Again, the outer diameter of flange 14a is  
10 substantially equal to the internal diameter of enlarged bore portion 35a. It will be seen from Fig. 5 that, again, pressure sleeve 11 has a slightly different shape prior to application to the coupling, which shape is expanded radially outwardly during application.

15 The embodiment of Figs. 6 to 8 differs from those of Figs. 1 and 4 in that the interengaged peripheral sealing surfaces 36,38 are tapered, and in that the means of securing the pressure sleeve 11 and component 32 is quite  
20 different. More particularly, a flared end portion 18 of pressure sleeve 11 has an internal annular lip 22 which seats in a complementary annular groove 21 on the external surface of component 32. As illustrated in Fig. 8, this seating is effected by so relating the external  
25 surface of component 32 in the internal surface of flared portion 18 that the latter is deformed inwardly to bring lip 22 into groove 21.

The embodiment of Figs. 9 to 11 is similar to that  
30 of Figs. 6 to 8 except that the engaging peripheral surfaces 36,38 are generally cylindrical rather than tapered. Figs. 12 to 14 depict a variation of the embodiment of Figs. 9 to 11 in which the component 32 and pressure sleeve 11 are secured by threaded engagement  
35 between an internal thread on an enlarged end socket portion 18 of sleeve 11 and an externally threaded end



portion 32a of component 32. Portion 32a contains the enlarged bore portion 7 defining surface 38. The embodiment of Figs. 15 to 17 is a similar modification of that of Figs. 6 to 8.

5

In the embodiment of Fig. 18, the peripheral surface 36 of end portion 4 with annular seal 6 does not extend into the matching coupling component (not shown) but instead engages a complementary internal peripheral surface 38a of an enlarged bore portion of the pressure sleeve 11. It will be noted that the internal rib 12 and groove 13 are still present, and that the pressure sleeve 11 has an externally threaded end portion 23 for engaging an internally threaded socket portion of the other coupling component (not shown).

Figs. 19 to 22 respectively show, on the right, a fragmentary view of the coupling components of Figs. 6, 9, 12 and 15, in an arrangement in which the matching coupling component is a fitting nipple bearing with a union nut via which a connection is made to a further complementary hose coupling component (not shown).



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A hose coupling component comprising:-

an insert sleeve having a first portion adapted for insertion into a hose;

a pressure sleeve adapted to be disposed concentrically around said first portion of said insert sleeve for retaining a hose therebetween;

a second portion of said insert sleeve which defines a peripheral surface for sliding engagement with a complementary surface of said pressure sleeve or of a matching coupling component;

complementary rib means and groove means on the interior of said pressure sleeve and the exterior of said insert sleeve, which rib means and groove means are engageable to secure the pressure sleeve and insert sleeve against substantial relative axial displacement; and

means on the pressure sleeve for positively coupling the pressure sleeve to said matching coupling component.

2. A hose coupling component according to claim 1 wherein said rib means and groove means respectively comprise an internal annular rib on the pressure sleeve and a complementary annular groove on the external surface of the insert sleeve.

3. A hose coupling component according to claim 1 or 2 wherein said peripheral surface is an external cylindrical or conical surface of said second portion of the insert sleeve, for receipt by the matching coupling component.

4. A hose coupling component according to claim 3 wherein said external peripheral surface includes an annular shoulder for abutting a complementary shoulder on



said matching coupling component, whereby to define a peripheral gap at the end of the insert sleeve within an enlarged bore portion of said matching coupling component.

5. A hose coupling component according to claim 1 or 2 wherein said peripheral surface is an internal surface defined by an enlarged bore portion in said second portion of the insert sleeve.

6. A hose coupling component according to any preceding claim further comprising a peripheral seal in said peripheral surface.

7. A hose coupling component according to any preceding claim wherein said positive coupling means comprises a flange which is adapted to be received within an enlarged bore portion of the matching coupling component.

8. A hose coupling component according to any one of claims 1 to 6 wherein said pressure sleeve is adapted to concentrically receive the matching coupling component, and includes one or more transverse passages to seat a coupling element for securing the pressure sleeve to the matching coupling component.

9. A hose coupling component according to claim 8 wherein the coupling element comprises a U-shaped coupling clamp.

10. A hose coupling component according to any preceding claim wherein said positive coupling means comprises an internal thread on an enlarged bore portion of said pressure sleeve.

11. A hose coupling according to any preceding claim



comprising a hose coupling component according to any preceding claim, and a further coupling component having a second peripheral surface to engage said first-mentioned peripheral surface of the second portion of said insert sleeve.

12. A hose coupling according to claim 11 wherein said further coupling component comprises a socket with a stepped bore, including an enlarged bore portion defining said second peripheral surface.

13. A hose coupling according to claims 7 and 12, wherein said flange is external and the external diameter of said flange is substantially equal to the internal diameter of the enlarged bore portion.

14. A hose coupling according to claims 7 and 12 wherein said flange is internal, and said matching component has an external groove to receive the flange.

15. A hose coupling or hose coupling component substantially as hereinbefore described with reference to the drawings.

DATED this 15th day of January 1991.

KARL WEINHOLD

By His Patent Attorneys

DAVIES & COLLISON





Fig.7

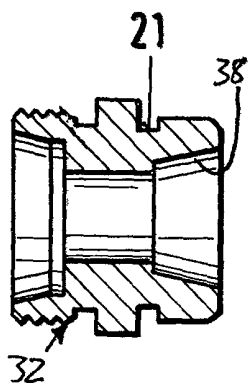


Fig.6

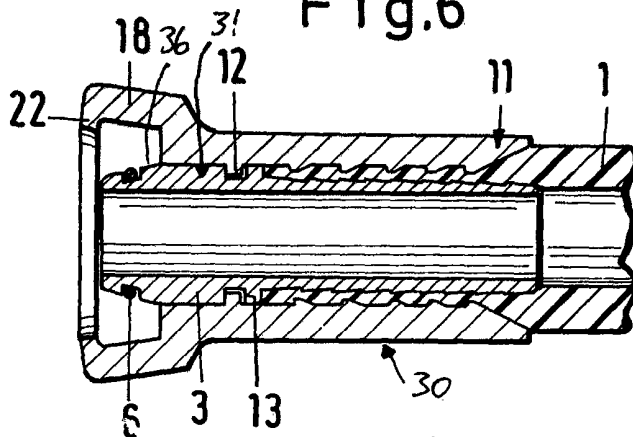


Fig.8

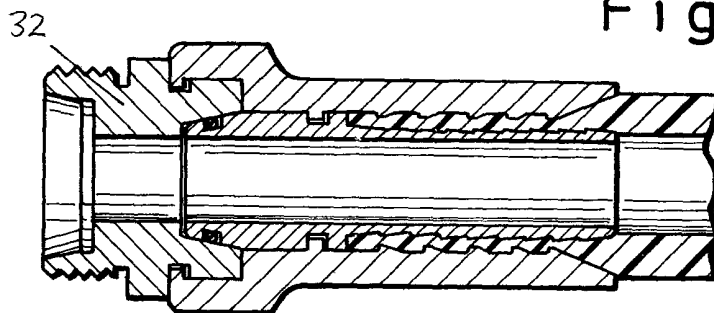


Fig.10

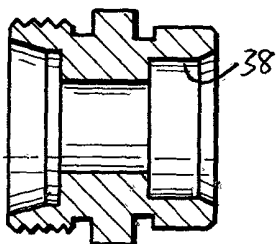


Fig.9

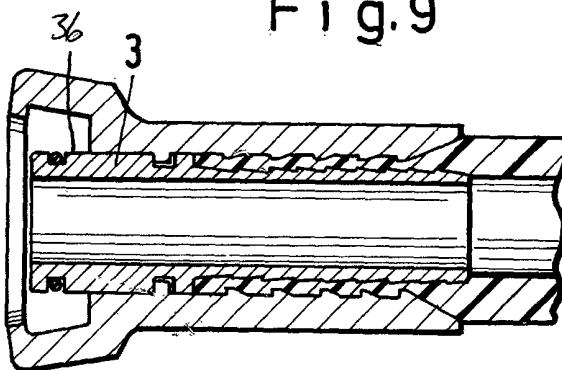


Fig.11

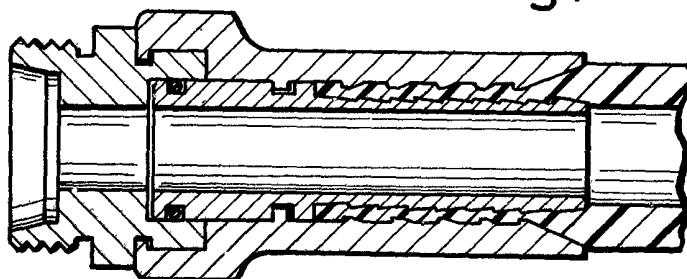


Fig.13

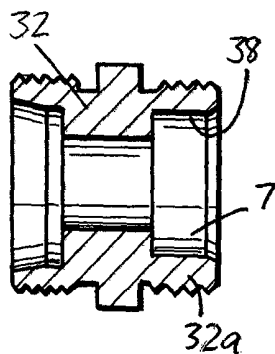


Fig.12

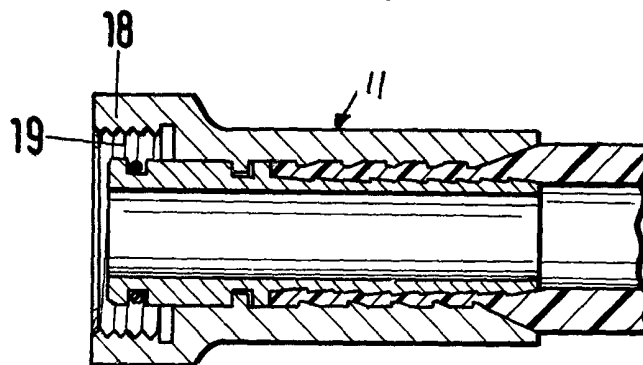


Fig.14

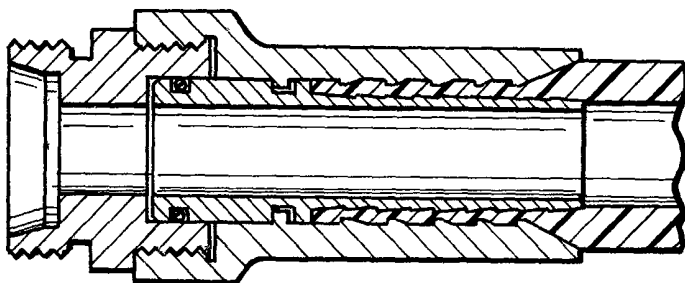


Fig.16

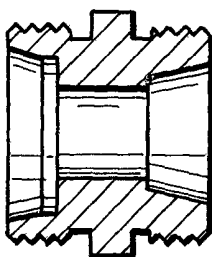


Fig.15

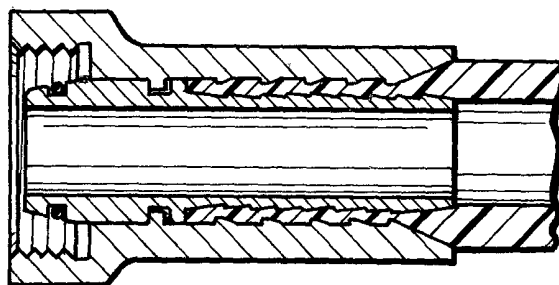
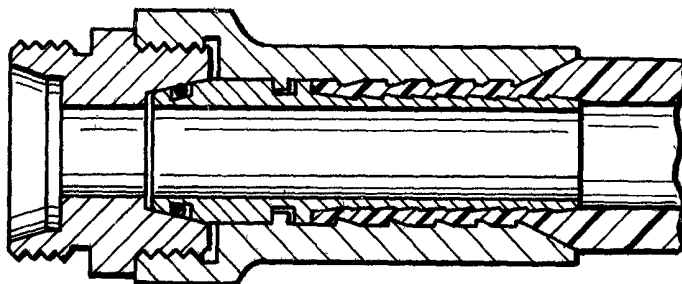


Fig.17





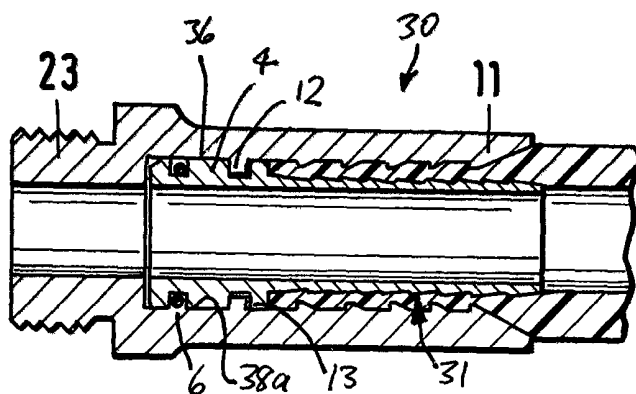


Fig.18

Fig.19

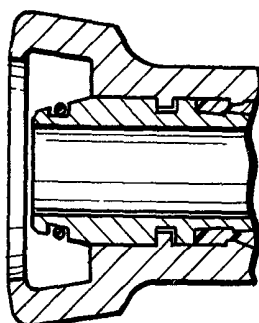
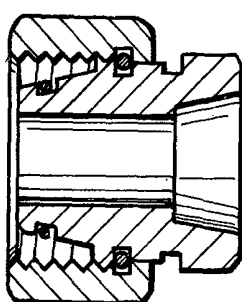
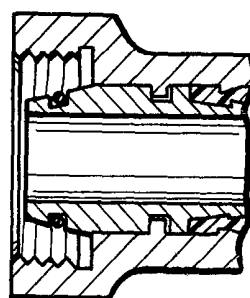
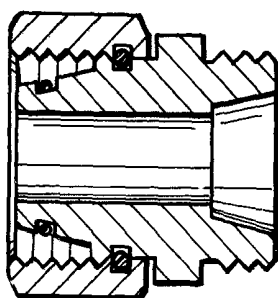


Fig.20

Fig.21

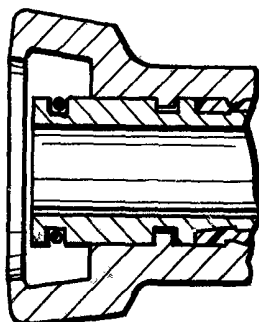
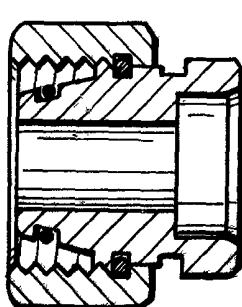
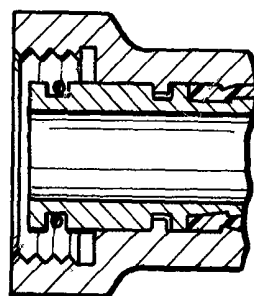
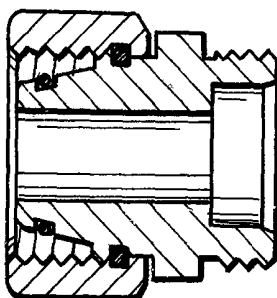


Fig.22