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2231

APPLICATION FOR A STANDARD PATENT
OR A STANDARD PATENT OF ADDITION

LODGEMENT UNIT
RECEIVED \$ 65

Insert full name(s) of applicant(s)

(71) I/We WALTER JOHN BRUCE MONCKTON

Insert address(es) of applicant(s)

of 1 CROMWELL ST. COOMA 2630

Insert title of invention

(54) hereby apply for the grant of a standard patent patent of addition for an invention entitled

A SOLVENT WELDED CONNECTOR FOR P.V.C PIPE

(tick appropriate box)

which is described in the accompanying provisional complete specification.

Insert name of actual inventor

(72) The actual inventor (s) of the said invention is/are WALTER JOHN BRUCE MONCKTON

DAVIES & COLLISON, MELBOURNE

Insert address for service of notices in Australia

(74) My/our address for service is 1 CROMWELL ST. COOMA 2630

Attorney Code.....



*THESE SECTIONS ARE ONLY TO BE COMPLETED WHERE APPLICABLE

for Convention cases only

(ONLY TO BE USED IN THE CASE OF A CONVENTION APPLICATION)

ADDRESS FOR SERVICE
ALTERED

Details of basic application (s) -

(31) Number of basic application

(33) Name of Convention country in which basic application was filed ISO Code

(32) Date of basic application

for Divisional applications only

(ONLY TO BE USED IN THE CASE OF A FURTHER APPLICATION MADE BY VIRTUE OF SECTION 51)

(62) Number of original application

Person by whom made

for Patents of addition only

(ONLY TO BE USED IN THE CASE OF AN APPLICATION FOR A PATENT OF ADDITION)

I request that the patent may be granted as a patent of addition to the patent applied for on

(61) Application No. Patent No.

in the name of

I request that the term of the patent of addition be the same as that for the main invention or so much of the term of the patent for the main invention as is unexpired.

Insert day, month and year form signed

Dated this Twelfth day of January 1989

APPLICATION ACCEPTED AND AMENDMENTS

Signature of applicant or Australian attorney

TO BE FILED 9-11-90

W. J. Bruce Monckton
(Signature)

CO00318

12/01/89

THE COMMISSIONER OF PATENTS

COMMONWEALTH OF AUSTRALIA
PATENTS ACT 1952
DECLARATION IN SUPPORT OF CONVENTION OR
NON-CONVENTION APPLICATION FOR A PATENT

Insert title of invention.

In support of the Application made for a patent for an invention
entitled: "PIPE CONNECTORS"

Insert full name(s) and address(es)
of declarant(s) being the applic-
ant(s) or person(s) authorized to
sign on behalf of an applicant
company.

I
~~We~~ WALTER JOHN BRUCE MONCKTON,
of 1 Cromwell Street,
COOMA, N.S.W. 2630

Cross out whichever of paragraphs
1(a) or 1(b) does not apply

1(a) relates to application made
by individual(s)

1(b) relates to application made
by company; insert name of
applicant company.

do solemnly and sincerely declare as follows :-

1. (a) I am the applicant..... for the patent
~~We are~~

~~or (b) I am authorized by~~

Cross out whichever of paragraphs
2(a) or 2(b) does not apply

2(a) relates to application made
by inventor(s)

2(b) relates to application made
by company(s) or person(s) who
are not inventor(s); insert full
name(s) and address(es) of inven-
tors.

~~the applicant..... for the patent to make this declaration on~~ ^{its} ~~their~~ behalf.

2. (a) I am the actual inventor..... of the invention,
~~We are~~

~~or (b)~~

State manner in which applicant(s)
derive title from inventor(s)

~~is~~
~~are~~ the actual inventor..... of the invention and the facts upon which the applicant.....
~~is~~
~~are~~ entitled to make the application are as follows :-

Cross out paragraphs 3 and 4
for non-convention applications.
For convention applications,
insert basic country(s) followed
by date(s) and basic applicant(s).

3. The basic application..... as defined by Section 141 of the Act ^{was} ~~were~~ made
in on the
by
in on the
by
in on the
by

4. The basic application..... referred to in paragraph 3 of this Declaration ^{was} ~~were~~
the first application..... made in a Convention country in respect of the invention the subject
of the application

Insert place and date of signature.

Declared at COOMA, N.S.W. this Seventh day of December 1989

Signature of declarant(s) (no
attestation required)

W. J. Bruce Monckton

Note: Initial all alterations.

(12) PATENT ABRIDGMENT (11) Document No. AU-B-47034/89
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(54) Title
PIPE CONNECTORS

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(56) Prior Art Documents
AU 24441/71 74.53
US 4548428
GB 1434117

(57) Claim

1. Apparatus for connecting together the ends of two axially-aligned pipes, said apparatus comprising:
 - (a) a pair of half-sleeves, each dimensioned to fit around substantially half of the outer curved surfaces of the ends of the pipes, whereby said pair of half-sleeves forms an inner sleeve of a connector, said inner sleeve having (i) a bore which is substantially equal to, but fractionally less than, the outer diameter of the pipes, and (ii) a tapered outer surface;
 - (b) an outer sleeve formed as single article, said outer sleeve having (i) a tapered bore, the angle of taper of which is substantially equal to the angle of taper of the outer surface of the inner sleeve,

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(10) 606540

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and (ii) a threaded region at one end of the outer sleeve, said one end being the end of the outer sleeve where the bore has its maximum diameter; and

- (c) an annular nut, adapted to be threaded over the threaded end region of the outer sleeve, said annular nut having an inwardly projecting annular flange at one end thereof, said annular flange defining a circular aperture which has a diameter greater than the diameter of one of said pipe ends but less than the maximum diameter of the bore of the outer sleeve.

606540
FORM 10

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952-1962

COMPLETE SPECIFICATION

(Original)

FOR OFFICE USE:

Class Int. Class

Application Number:
Lodged:

Complete Specification Lodged:
Accepted:
Published:

Priority:

Related Art:

Name of Applicant: WALTER JOHN BRUCE MONCKTON

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Complete Specification for the invention entitled:

"PIPE CONNECTORS"

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

Technical field

This invention concerns pipe joining. More particularly, it concerns the "bridging" or coupling of ends of a pair of pipes, or the two ends of a
5 broken or fractured pipe. The invention uses a pair of half-sleeves which, when held together, form a sleeve having (i) an internal diameter substantially equal to the outside diameter of the pipe ends to be coupled and (ii) a tapered external surface. The
10 sleeve thus formed is retained in position by an outer sleeve having a bore which is tapered to match the taper of the inner sleeve.

Background to the invention

A large number of pipe coupling arrangements have
15 been proposed in the past. Among the most successful are the "Milne joint" (in which a washer is compressed until it bears against a pipe), the "barrel union" (in which an O-ring has pressure applied to it to seal the connection between the pipe
20 ends), and the "slip-fix" coupling (which also relies upon the pressure applied to an O-ring to establish the seal between the coupled pipe ends). Other proposals which have not been successful (in that they are not available on the Australian market) are
25 featured in the specifications of UK patent No 1,357,412, UK patent application No 8415399 (publication No GB-2166825A, the invention of which was conceived primarily for connecting the ends of hoses), US patent No 4,095,826, US patent
30 No 3,667,782 and US patent No 4,548,428.

All of these prior art connectors are either incapable of withstanding high pressures, or are very expensive to produce and thus are not economically viable connectors. Few of these pipe connection
5 arrangements could be used to join the ends of a broken pipe when the pipe which has fractured is fixed in position (for example, by being buried underground) and there is no prospect of axial movement of the two lengths of pipe.

10 Disclosure of the present invention

The prime object of the present invention is to provide a low cost apparatus for pipe end connection, which can be used to connect the ends of pipes, including the ends of a broken pipe which is fixed in
15 position and there is no prospect of axial movement of the pipe ends relative to each other, and which provides a joint which is capable of withstanding high pressures without failing.

This objective is achieved by providing a coupling
20 unit which includes a pair of half-sleeves which can be placed adjacent to each other to form a sleeve with a uniform bore and with a tapered outer surface. The bore of this sleeve formed from the half-sleeves is substantially equal in diameter to (but
25 fractionally less in diameter than) the outer diameter of the ends of the pipes to be joined. This sleeve is held in position around the pipe joint by a single-piece outer sleeve which has a tapered bore, the angle of the taper of which is substantially

equal to the taper angle of the inner sleeve formed from the half-sleeves just described. Normally the outer surface of the outer sleeve will have a uniform diameter, but this is not essential. A threaded end 5 of the outer sleeve enables a nut to be used to force the tapered two-piece sleeve into the outer sleeve, and thus force the two-piece inner sleeve against the pipe or pipes while an adhesive, applied to the contacting surfaces of the pipe ends and the inner 10 half-sleeves, cures and forms a good bond between these components.

Thus, according to the present invention, there is provided apparatus for connecting together the ends of two axially-aligned pipes, said apparatus 15 comprising:

- (a) a pair of half-sleeves, each dimensioned to fit around substantially half of the outer curved surfaces of the ends of the pipes, whereby said pair of half-sleeves forms an inner sleeve of a 20 connector, said inner sleeve having (i) a bore which is substantially equal to, but fractionally less than, the outer diameter of the pipes, and (ii) a tapered outer surface;
- (b) an outer sleeve formed as single article, said 25 outer sleeve having (i) a tapered bore, the angle of taper of which is substantially equal to the angle of taper of the outer surface of the inner sleeve, and (ii) a threaded region at

one end of the outer sleeve, said one end being the end of the outer sleeve where the bore has its maximum diameter; and

- 5 (c) an annular nut, adapted to be threaded over the threaded end region of the outer sleeve, said annular nut having an inwardly projecting annular flange at one end thereof, said annular flange defining a circular aperture which has a diameter greater than the diameter of one of
10 said pipe ends but less than the maximum diameter of the bore of the outer sleeve.

Preferably, each half-sleeve has an inwardly projecting rib, or at least one inwardly directed projection, at substantially its mid-point, to
15 provide a location means for the ends of the pipes within the inner sleeve.

The way in which the present invention is used to join a pair of pipe ends, and the benefits of the present invention, will be more readily appreciated
20 from the following description of embodiments of the present invention. In this description, reference will be made to the accompanying drawings.

Brief description of the drawings

Figure 1 is an exploded view of the components of a
25 preferred embodiment of the present invention.

Figure 2 is a sectional view at A-A of the components of Figure 1.

Figure 3 is a sectional view at B-B of the components of Figure 1.

Figure 4 is a sectional view through a completed joint made with a non-preferred embodiment of the present invention.

Figure 5 is a sectional view through a pipe joint made with the preferred form of the present invention.

Figure 6 is a sectional view through a pipe joint made using the present invention when the pipes that are joined have different diameters.

Detailed description of the illustrated embodiments

The present invention has features which are similar to the pipe connector described in the specification of UK patent No 1,434,117, which is believed to be the closest prior art to the present invention. The pipe connector described in that specification has a pair of part-cylindrical shells which have a tapered or conical outer shape, and thus equate with the half-sleeves of the present invention. The pipe connector of that specification also has an outer sleeve with a conical or tapered bore, that can be pushed over the inner sleeve formed, about the ends of two axially-aligned pipes, by the part-cylindrical half shells. In use, the half shells are coated with adhesive on both sides. The coated half shells are placed over the pipe ends and the outer sleeve, which

previously has been positioned around one of the pipes, is pushed over the coated outer surface of the half shells, to hold them together and in contact with the pipe ends.

5 Unfortunately, only manual pressure can be applied to the pipe joint in this manner, and it is difficult for a person using that type of joint to hold the components together, without slipping, until the adhesive sets. If each half shell is coated with a
10 contact adhesive, then it is almost impossible to push the outer sleeve over the inner sleeve formed by the half shells without contact - and immediate bonding together - of the adjacent surfaces. Thus the arrangement described in the specification of UK
15 patent No 1,434,117 cannot be used to establish a pipe joint which is capable of withstanding even moderate pressures within the joined piping.

In contrast, the present invention enables the surfaces to be bonded together to be clamped against
20 each other while the adhesive sets, thus enabling reliable pipe joints, which are able to withstand high pressures, to be established.

The present invention is particularly useful in the situation where an existing PVC pipe has been broken
25 and the pipe ends at the break in the pipe cannot be moved axially away from, or towards, each other. Such a situation is found in many pipe installations - including an underground installation of a PVC

pipe. Normally, in such a case, the first step in using the present invention to join the broken ends of the pipe will be to trim the ends so that the end apertures of the pipe are substantially circular 5 (that is, the end edges of the pipe are substantially at right angles to the pipe axis). Subsequently steps will now be described with reference to the drawings.

Before the pipe joint is effected, the outer sleeve 10 10 of the present invention is positioned around one pipe end 20 and the nut 11 of the present invention is positioned around the other pipe end 21. As shown particularly in Figure 1, the nut 11 has an inwardly extending annular flange 12, the inner edge of which 15 defines a circular aperture 13. The diameter of the circular aperture 13 is greater than - but only slightly greater than - the outer diameter of the pipe end 21. Preferably the outer surface of the nut 11 is provided with raised ribs 14 or similar means 20 to facilitate the gripping and rotation of the nut.

The internal thread 15 of the nut 11 is complementary to the thread on the externally threaded end portion 10A of the outer sleeve 10. The bore of the outer sleeve 10 is tapered (or frusto-conical) with the 25 largest bore diameter being at the end of the sleeve which has the threaded portion 10A. In the illustrated forms of the outer sleeve 10, the outer surface of the sleeve 10 is a right cylindrical surface, but the outer surface may have any suitable

shape, and may be provided with ridges or ribs, projections or flat regions to facilitate gripping of the outer sleeve.

To effect the joining of the pipe ends, the 5 half-sleeves 16 and 17 are coated with an adhesive and are held against the curved outer surfaces of the pipe ends to form an almost complete sleeve joining the pipe ends. Each half-sleeve has an essentially right cylindrical inner surface 18 and a tapered 10 outer surface. The angle of taper of the outer surface of each half-sleeve matches the angle of taper of the bore of the outer sleeve 10.

In the preferred embodiment of the present invention, each half-sleeve is provided with an inwardly 15 extending ridge or rib 19 of rectangular cross-section. This rib 19 - which may be replaced by one or more inwardly extending projections - acts as a locating stop for a pipe end 20 or 21. As will be apparent from Figure 4, the rib 19 or its 20 equivalent is not an essential feature of the present invention. If present, the rib or ridge 19 (or an equivalent projection) will be abutted by each pipe end when the pipes are joined. However, when 25 coupling together the ends of a broken pipe which cannot be moved axially, the gap between the pipe ends (after they have been trimmed) may be greater than the width of the rib or ridge 19. In that case, only one pipe end will abut against an edge of the rib 19.

After the adhesive-coated half-sleeves 16 and 17 have been positioned around the pipe ends, the outer sleeve is moved over them until the surface of the bore of the outer sleeve comes into contact with the 5 outer surfaces of the half-sleeves. At this point, the "thick" ends of the half-sleeves will be projecting a short distance beyond the threaded end 10A of the outer sleeve 10. The nut 11 is then screwed on to the threaded end 10A until the annular 10 flange 12 of the nut comes into contact with the ends of the half sleeves 16 and 17. Further rotation of the nut 11 forces the outer sleeve and the half sleeves into intimate contact, and clamps them together (see Figure 4). They are clamped in this 15 manner until the adhesive has cured and the pipe ends, the inner half-sleeves and the outer sleeve are bonded to each other. It will be normal practice to leave the nut 11 in the position in which it has clamped the pipe connection components together.

20 If pipes of differing outer diameter are to be connected, a variation of the embodiment described above is required. That variation is illustrated in Figure 6. It comprises a stepped inner cylindrical surface of each half sleeve. The "step" or change in 25 diameter will normally be at the inwardly projecting ridge or rib 19, although that is not essential. In all other respects, the joining together of the pipes will involve the same sequence of events described above.

A number of PVC (polyvinylchloride) pipes have been joined together using prototypes of the present invention fabricated from a polycarbonate plastics material. Each of those pipe connections were tested
5 in the Hydraulics Laboratory of the Snowy Mountains Hydroelectricity Authority in Cooma, Australia. Each joint withstood a pressure of 500 p.s.i. (the maximum pressure that could be applied) without failing.

For comparison, two pairs of PVC pipes were joined
10 using the invention of UK patent No 1,434,117. Tests with those joints were performed at the laboratory of Hardie Iplex Pty Ltd in Sydney, Australia. Each joint failed when a low gas pressure was applied to the interior of the joined pipes.

15 Thus it is clear that the present invention does not constitute apparatus for effecting a routine, common connection of PVC piping, but is apparatus for making a specialised repair and alteration joint, anywhere within an existing pipeline, whether or not axial
20 movement of the pipe ends being joined is possible. The joint so created has a final strength equal to, or greater than, that of the unbroken pipeline.

Although the present invention has been used so successfully on PVC piping, it may also be used to
25 connect together pipes which have been made from another material, and pipes of different materials.

The components of the connector of the present invention may be fabricated from any suitable material, including metal (not preferred) and polycarbonate plastics materials.

5 A particular advantage of the present invention is that it can be used with the nut first positioned about either of the pipe ends, and the outer sleeve positioned on the other pipe end. The choice of which pipe end is surrounded for which component is
10 often arbitrary. However, in situations where access to the pipe ends is difficult, such as in the case of a broken pipe in cramped locations, the ability to put either component around either pipe end can be most beneficial.

15 A non-preferred variation of the present invention, which is mentioned here for the sake of completeness, is the use of three (or four, or more) part-sleeves to construct the inner sleeve of the pipe joint, instead of two half-sleeves. Each part-sleeve would
20 cover the appropriate portion only of the pipe ends.

It will be appreciated that although specific (and exemplary) embodiments of the present invention have been illustrated in the drawings and have been described above, variations from those embodiments,
25 which have not been foreshadowed in the above description, are possible without departing from the present inventive concept.

The claims defining the invention are as follows:

1. Apparatus for connecting together the ends of two axially-aligned pipes, said apparatus comprising:
 - (a) a pair of half-sleeves, each dimensioned to fit around substantially half of the outer curved surfaces of the ends of the pipes, whereby said pair of half-sleeves forms an inner sleeve of a connector, said inner sleeve having (i) a bore which is substantially equal to, but fractionally less than, the outer diameter of the pipes, and (ii) a tapered outer surface;
 - (b) an outer sleeve formed as single article, said outer sleeve having (i) a tapered bore, the angle of taper of which is substantially equal to the angle of taper of the outer surface of the inner sleeve, and (ii) a threaded region at one end of the outer sleeve, said one end being the end of the outer sleeve where the bore has its maximum diameter; and
 - (c) an annular nut, adapted to be threaded over the threaded end region of the outer sleeve, said annular nut having an inwardly projecting annular flange at one end thereof, said annular flange defining a circular aperture which has a diameter

greater than the diameter of one of said pipe ends but less than the maximum diameter of the bore of the outer sleeve.

2. Apparatus as defined in claim 1 in which each half-sleeve has an inwardly projecting rib at substantially its mid-point, to provide a location means for the ends of the pipes within the inner sleeve.
3. Apparatus as defined in claim 1, in which each half-sleeve has at least one projection from the inner surface thereof, at substantially its mid-point, to provide locating means for the ends of the pipes within the inner sleeve.
4. Apparatus as defined in claim 1, in which said two axially-aligned pipes have different outer diameters, and the radius of curvature of the inner surface of each half-sleeve changes from a value substantially equal to the radius of the outer surface of one of said pipes to a value substantially equal to the radius of the outer surface of the other of said pipes at substantially the mid-point of the half-sleeve.
5. Apparatus as defined in claim 4, in which each half-sleeve has an inwardly projecting rib at the change of radius of curvature of the inner surface of the half-sleeve.

6. Apparatus as defined in claim 2 or claim 5, in which said rib is rectangular in cross-section.
7. Apparatus as defined in any preceding claim, in which said nut is provided with a plurality of ribs projecting from its outer lateral surface, to facilitate the manual rotation of the nut.
8. Apparatus as defined in any preceding claim, in which the outer lateral surface of the outer sleeve is provided with ribs or flat regions or protrusions therefrom to facilitate the gripping thereof.
9. Apparatus as defined in any preceding claim, in which at least one of said pipes is fabricated from a polyvinylchloride material.
10. Apparatus for connecting together the ends of two axially-aligned pipes, substantially as hereinbefore described with reference to the accompanying drawings.

Dated this twenty-first day of December 1989

WALTER JOHN BRUCE MONCKTON

by his Patent Attorneys
Davies & Collison

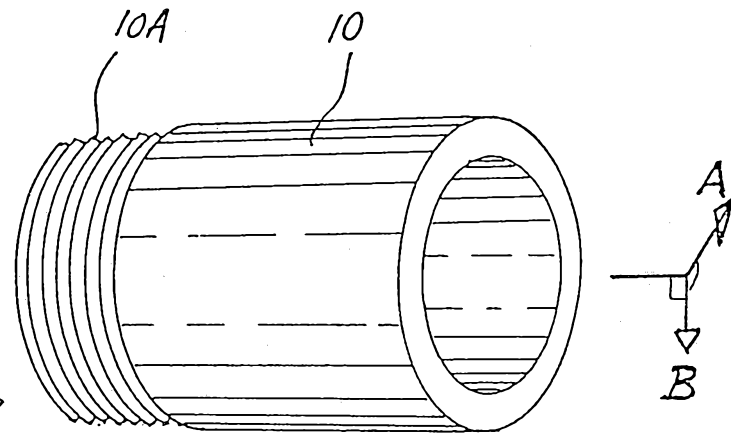
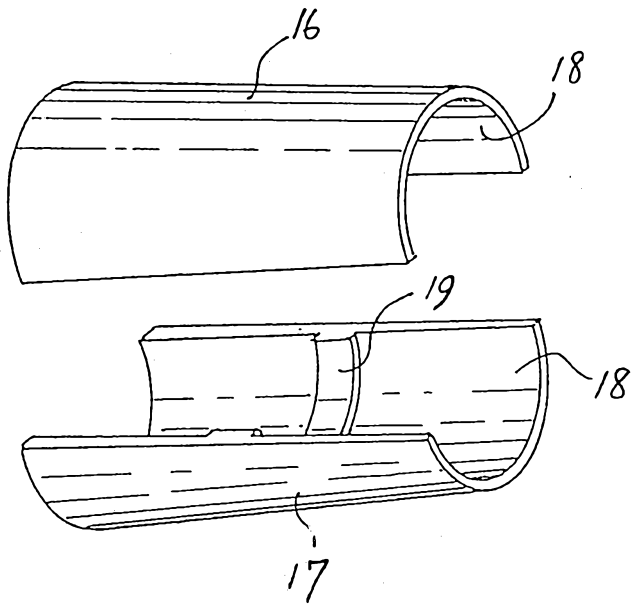
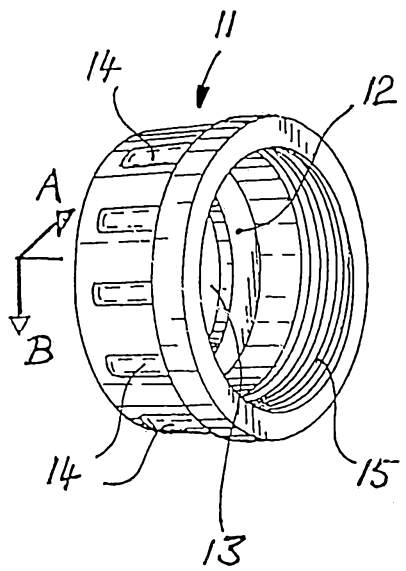


FIG. 1.

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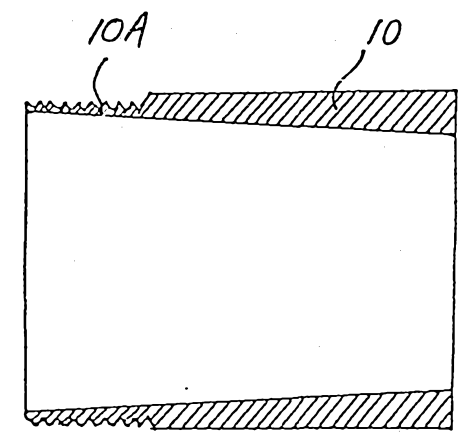
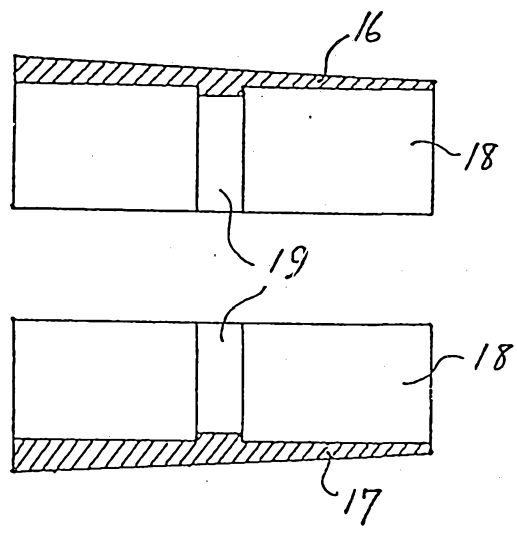
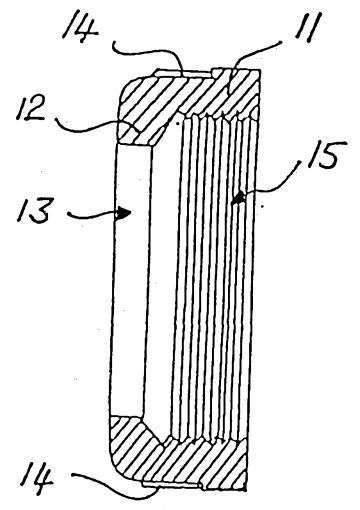


FIG. 2.

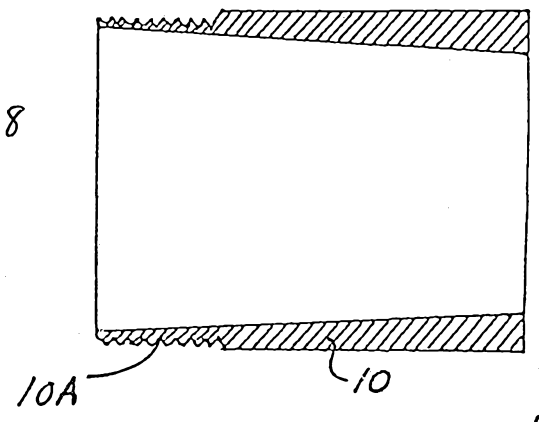
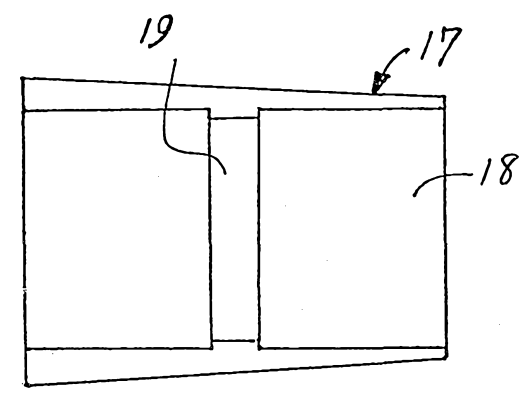
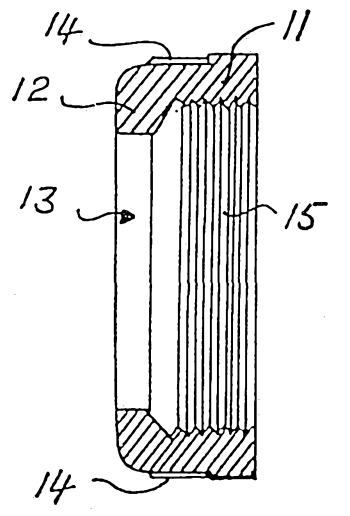
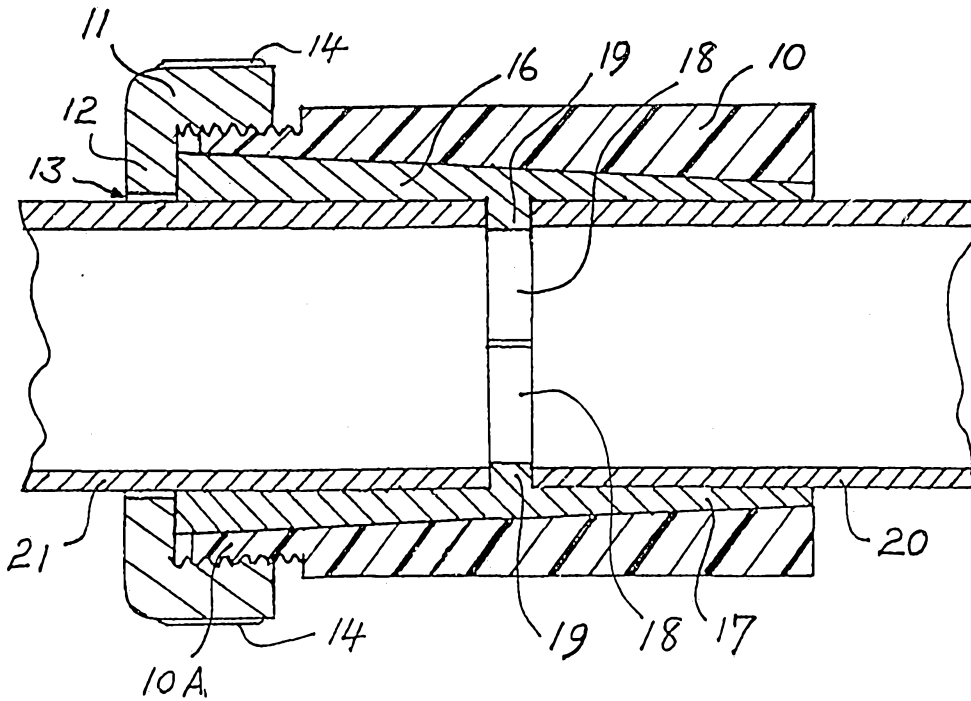
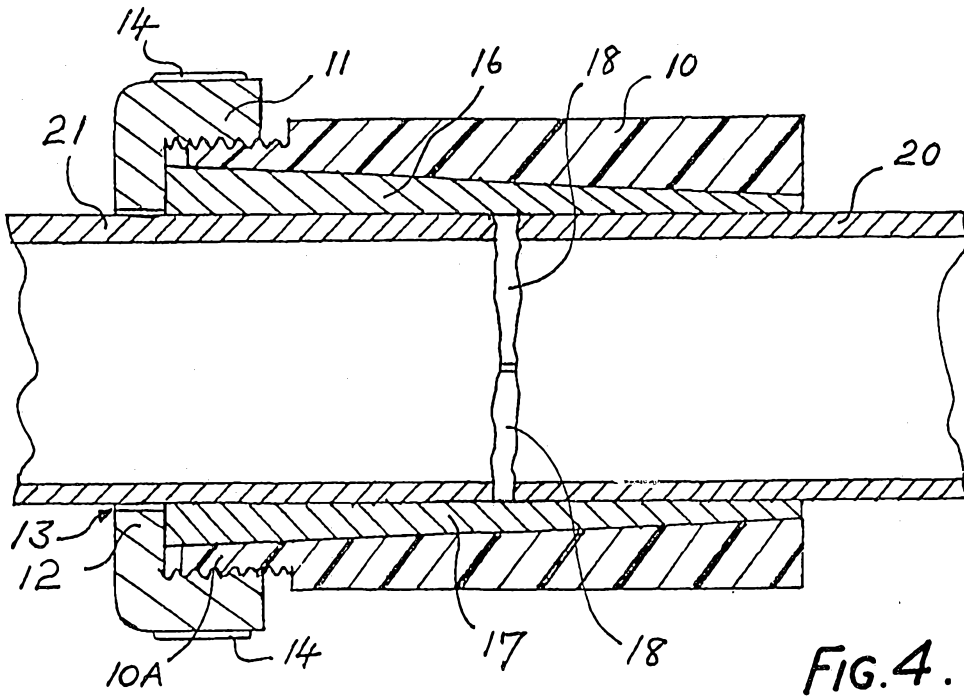


FIG. 3.

47034/90



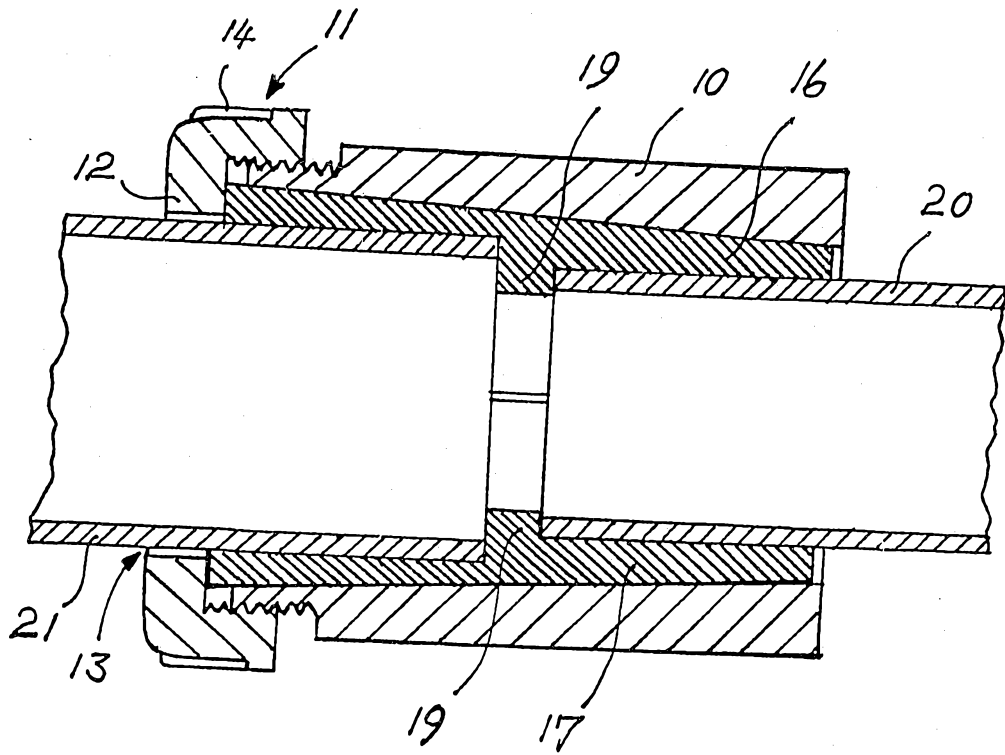


FIG. 6