637569

AUSTRALIA P/00/002

Patents Act

PATENT REQUEST : PETTY PATENT

I, being the person identified below as the Applicant and Nominated Person, request the grant of a patent to me for an invention described in the accompanying Petty complete specification.

[70 & 71] APPLICANT AND NOMINATED PERSON:
ROBERT DAVID ROLLINS, a British subject

ADDRESS:
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[54] INVENTION TITLE:
"Cable Capping Arrangement"

[72] NAME OF ACTUAL INVENTOR:
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Drawing number recommended to accompany the abstract: Fig. 2

Dated this 25th day of February 1993

ROBERT DAVID ROLLINS

by: HK Hodgkinson

His Patent Attorney

S 035675 240293

AUSTRALIA
Patents Act 1990

NOTICE OF ENTITLEMENT

TO GRANT OF A PATENT, PETTY PATENT, OR PATENT OF ADDITION

*I/We, ROBERT DAVID ROLLINS, a British subject

of 38 Milsop Street, Bexley, New South Wales, 2207, Australia

being the applicant(s) in respect of an Application **No
for an invention entitled: "Cable Capping Arrangement"

state the following:

The person(s) nominated for the grant of the patent:

1. is/are the actual inventor(s) of the invention
~~or~~
~~has/have entitlement from the actual inventor(s)~~
~~and the facts upon which the person(s) nominated is/are entitled to make the application are as follows:~~

2. ~~**(a)~~ ~~is/are the applicant(s) of the provisional application(s) listed on the~~ patent request form
~~or~~
has/have ~~entitlement~~ to make a request under Section 113 in relation to the provisional application(s) listed on the patent request form by virtue of:

~~**(b) is/are the applicant(s) of the basic application(s) listed on the patent~~ request form/declaration under Article 8 of the PCT
or
has/have entitlement from the applicant(s) of the basic application(s) listed on the patent request form/declaration under Article 8 of the PCT by virtue of:

and the basic application(s) listed on the request form/declaration made under Article 8 of the PCT is/are the first application(s) made in ~~a convention country in respect of the invention.~~

***3 ~~is/are the applicant(s)/Patentee(s) of the original application(s)/ patent(s)~~
~~or~~
~~has/have entitlement to make a request under Section 113 of the Act in relation to the original application(s) / patent(s) by virtue of:~~

**4 ~~is/are the depositor(s) of the deposit(s) as listed hereafter~~
~~or~~
~~has/have entitlement from the depositor(s) of the deposit(s) as listed hereafter by virtue of:~~

~~Deposit list:~~

* Signed at Sydney this 22nd day of February 19 93

.....

R. D. Rollins

Robert David Rollins

Status: .....

** ~~I/We,~~
~~the applicant/patentee for application/patent~~
~~No. authorise~~
~~to apply for a patent of addition for an improvement in or modification of the main invention.~~

~~Signed at this day of 19~~

~~.....~~

~~.....~~

~~Status: .....~~

* If completed in the name of a company, to be executed by authorised person
** Delete where inapplicable
*** Delete if not a divisional application

H.R. HODGKINSON & CO
Patent Attorneys
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AU9333778

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(54) Title
CABLE CAPPING ARRANGEMENT

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(57) Claim

1. A capping means for oil filled cables, which cables include a conductor core and a plurality of substantially concentric layers extending thereabout, said layers including a layer of substantially corrugated metal sheathing; including cap means adapted to fit over, and engage with, so as to substantially enclose an exposed end of said cable; said cap means being provided with an internal annular thread to facilitate a meshing and substantially screw thread engagement between the inner annular thread of said cap means and the corrugated formation of said layer of corrugated metal sheathing, so as to thus engage said cap means over and relative to said exposed end of said cable.

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ORIGINAL

COMPLETE SPECIFICATION

PETTY PATENT

Invention Title: "Cable Capping Arrangement"

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

BACKGROUND OF THE PRESENT INVENTION

This invention relates to a cable capping arrangement which provides substantial advantages over cable capping arrangements used and known up until this time.

In particular, the present invention relates to capping means for oil filled and cooled cables. Such oil filled cables are well known and it is particularly important with such cables that they be maintained under pressure and that oil is present in the cables. Capping means are known which are applied to oil filled cables, for example during storage and/or to repair breakages or to cap cables during repairs. However, capping means known up until this time have substantial disadvantages associated therewith.

In particular, when there is a breakage or leak in an oil filled cable, substantial time and expense is required within which to repair or at least temporarily cap such cables. As indicated above, it is important that such oil filled cables have oil present at all times, and thus it is important that such cables be maintained under pressure. Thus, if there is a breakage or damage occurs in such a cable, it is essential that the cable be repaired and capped (so as to maintain the presence of oil and pressure) as a matter of urgency. If oil and pressure are not maintained in the cable, then the cable may well have to be replaced which is particularly time consuming and expensive. In the capping arrangements known up until this time, and given the fact that oil is required to be present in the cable at all times, substantial amounts of oil often pass through broken ends of cables, leaks and the like, before capping takes place. This oil is wasted and given that it is a relatively expensive commodity, this is an expensive exercise. Further, given the arrangements used up until this time, when there is a break in, or damage caused to, a cable, time must be taken to excavate an area around

the damaged or broken cable, so that repairmen and/or tradesmen can work on the cables to apply capping according to known techniques. Such excavation can often take time and can be expensive. While such excavation is taking place, oil is being continually lost from the cable which is adding to the expense of the exercise. Further, once excavation has been completed, repairmen or tradesmen enter the excavation to work on the broken or damaged cable. This requires that the ends of the broken cable or cables be stripped back to aluminium sheathing and that the aluminium sheathing then be prepared by being cleaned and having layers of metal applied thereto, so as to form a platform. The aluminium sheathing of electrical cable used up until this time is of an elongate corrugated form and it is necessary that the corrugated aluminium sheathing be exposed and then cleaned and brushed, such as with wire brushes, so that layers of metal can be applied thereto to form a metal platform. This metal platform allows for a known capping arrangement to fit over and enclose the end of the exposed or broken cable. This is then secured to and about the platform and end of the cable, by hot metal.

This procedure is time consuming and expensive, bearing in mind that during the preparation for the capping oil has been passing through the cable which oil has been lost. This is expensive. Further, the time required to excavate round the broken or damaged cable and to thereafter prepare the ends of the cables for capping is time consuming and expensive in so far as both equipment and labour are concerned.

It is an object of this invention to go at least some way towards overcoming or at least minimising the problems outlined above.

Other objects of this invention will become apparent from the following description.

BRIEF SUMMARY OF THE PRESENT INVENTION

According to one aspect of this invention there is provided a capping means for oil filled cables, which cables include a conductor core and a plurality of substantially concentric layers extending thereabout, including a layer of corrugated metal sheathing; including cap means adapted to fit over, and engage with so as to substantially enclose an exposed end of said cable; said cap means being provided with an internal annular thread to facilitate a substantially screw thread meshing and engagement between said cap means and said corrugated metal sheathing, so as to thus engage said cap means over and relative to said exposed end of said cable.

According to a further aspect of this invention there is provided a capping arrangement for oil filled cables, which cables include an electrical core and a plurality of concentric layers extending thereabout, including a corrugated metal layer of sheathing; cap means being provided and including an intermediate cap having a main body portion and a tail portion defining a bore substantially closed at one end and open at the other end; at least one hole being provided in said substantially closed end; an inner annular surface of said bore at least adjacent said open end, being formed or provided with a thread; said tail portion being provided with an external screw thread; said cap means further including an end cap which defines a bore having an open end and a closed end; an internal annular screw thread being provided at or adjacent said open end; pressure/oil nipple means being provided in said closed end of the end cap; the arrangement being such that the open end of said intermediate cap is placed over an exposed end of said corrugated metal sheathing, so that the thread on the inner annular surface thereof screw threadably meshes and engages with said corrugated sheathing, such that the intermediate cap is able to be screw threaded onto and along said

corrugated sheathing to engage therewith and substantially enclose an exposed end of said cable; said end cap thereafter being screw threadably engaged with the screw thread of the tail portion of said intermediate cap to substantially enclose said exposed end of cable.

BRIEF DESCRIPTION OF ACCOMPANYING DRAWINGS

This invention will now be described by way of example only and with reference to the accompanying drawings wherein:

Fig. 1 is a partial sectional view of a length of oil filled cable according to one form of the present invention, and

Fig. 2 is a partially exploded view of an arrangement according to one form of the present invention

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE PRESENT INVENTION

This invention will now be described by way of example only and with reference to the accompanying drawings, but it should be appreciated that modifications and improvements may be made to the invention without departing from the scope or spirit thereof.

As referred to hereinbefore, many problems have been associated with the capping of exposed ends of cables, and in particular oil filled cables as used up until this time. Such arrangements have been time consuming and expensive. The present invention sets out to provide a straightforward and efficient means for capping oil filled electrical cables which overcomes, or at least substantially minimises, some of the problems, time and expense associated with capping means and methods used up until this time.

By way of example only we refer to Fig. 1 of the accompanying drawings which shows a partially sectional view of a length of oil filled electrical cable 1 such as used in association with the present invention. Such cables 1 are expensive and always require the presence of oil so that it is important that the cables be capped under pressure and that oil be present at all time. As will be appreciated from the description of the prior art arrangements (and the disadvantages associated therewith), it is important that such electrical cables, when broken or damaged, be capped as soon as possible. This minimises the loss of oil and thereafter maintains the cable and oil under pressure until such time as further repairs, rejointing, reconnection and the like can occur.

In Fig. 1 of the accompanying drawings it will be seen that there is a central oil duct 2 which is constructed of a stainless steel. About the duct is the electrical conductor or core 3. Extending about the conductor or core is one or more layers of insulating material 4 such as for example paper. Extending about the insulating paper layer(s) 4 is an elongate layer of corrugated aluminium sheathing 5 which is in turn covered by a layer of bitumen and PVC sheathing 6.

In known arrangements used up until this time, when exposed ends of damaged cables are to be capped, the PVC sheathing 6 is pulled back or removed to expose a length of aluminium sheathing 5 which must then be treated with appropriate solvents to remove the bitumen and coating. Thereafter the aluminium is brushed with a wire brush to be completely cleaned and various metals are applied thereto so as to build up a flat outer surface or platform, to which an appropriate cap can be attached by hot metal and the like. As indicated, these steps are time consuming and expensive.

It is also necessary with prior art arrangements to excavate substantially about the broken or damaged cable so that workmen or tradesmen can enter and work about the exposed ends of the cable to prepare them for capping. This excavation is time consuming and expensive. It should also be kept in mind that during such a capping procedure, oil must pass through the cable to maintain the cable in the appropriate condition. Thus, such oil is often being lost during this period and such oil loss is expensive.

The present invention overcomes or minimises these problems by providing a cap which can engage directly onto an exposed corrugated aluminium sheathing, in a minimum period of time, and with a minimum of expense, relative to the time and expense involved with known capping arrangements. Thus, in the present invention where a broken or damaged cable is located, the ends are immediately located and exposed, avoiding or minimising the need for extensive excavation. Once the damaged or broken cable is exposed, the PVC sheathing 6 can be removed or torn back to expose a length or section of the corrugated aluminium sheathing 5. Capping means are then taken (as will be described hereinafter) and are screw threaded directly onto the corrugated aluminium sheathing 5 to immediately enclose and cap the exposed end of the damaged or broken cable. It will of course be appreciated that due to the corrugated formation of the aluminium sheathing 6, such sheathing has an integral external thread. This is a substantial advance and improvement over the methods and means up until this time and especially saves substantial amounts of time. In saving such time, substantial amounts of labour and money are saved. Further, given the fact that such capping can occur in a relatively short period of time (once the break or damage to the cable has been located), substantial amounts of lost oil are avoided and thus costs of a substantial nature are saved.

I will now refer by way of example only to Fig. 2 of the accompanying drawings which illustrates a preferred form of the present invention.

Once a broken or damaged cable has been located, the end thereof is located and PVC sheathing 6 removed to expose the corrugated end of the aluminium sheathing 5. Capping means are then applied to the aluminium sheathing.

In the form of the invention shown in the accompanying drawings, the capping means include an intermediate cap 10 and an end cap 11.

The intermediate cap 10 preferably is formed of an appropriate metal material and includes a first body portion 12 and a tail portion 14 of a lesser or reduced diameter. The main body portion 12 is preferably formed so that it can be tightened with a wrench or the like, and has an open ended bore 15 which extends through to the end of the tail portion 14, where one or more holes 16 extend therethrough. These will be described hereinafter. At the inner end of the tail portion 14 there is an appropriate washer or layer resilient material 17. The outer annular surface of the tail portion 14 is at least partially provided with a screw thread 14A.

The inner annular surface of the bore 15 of the intermediate cap 10 is provided with an internal annular thread 18 which is a thread that correspond to, and allows meshing and screw threaded engagement with, the threaded or corrugated outer annular surface of the corrugated aluminium sheathing 5 of the cable.

An end cap 11 is also provided, formed of an appropriate metal material which is a substantially hollow member being open at one end 20 and closed at the other end 21. At the open end 20 of the end cap an internal annular screw thread

23 is provided, being a thread which is adapted to mesh and screw threadably engage with the outer annular screw thread 14A of the tail portion 14 of the intermediate cap 10. The end cap 11 can be a capping member, as commonly used in capping at present (and as secured in position with hot metal), save that it is provided with an internal screw thread 23.

In use, the intermediate cap 10 is engaged over and screw threadably engaged and meshed with the corrugated or threaded aluminium sheathing 5 of the cable until the exposed end of the sheathing comes to rest against the washer padding or resilient material 17 on the inner end surface of the tail portion 14 of the intermediate cap. This is tightened in position by a spanner, wrench or the like. Thereafter, the end cap 11 is placed over the tail portion 14 of the intermediate cap and is screw threaded into position and secured in position. Oil from the cable will pass through the one or more holes or bores 16 in the closed end of the intermediate cap into the end cap.

The end cap 11 is preferably provided with one or more pressure/oil nipples/valve means 30 which can be opened and closed. These are opened to allow the release of pressure and once oil starts flowing therethrough (to indicate that oil is flowing through and is present in the cable that is being capped), the nipple members 30 can be closed again to thus contain the oil in the capped cable.

The invention allows for the capping means to be applied directly to the exposed end of a cable without the substantial time and expense involved in excavating and preparing ends of the cable for capping. It further substantially minimises the loss of oil and thus substantially minimises the costs involved in such capping operations.

The present invention envisages that rather than having an intermediate cap 10 and an end cap 11, there can be a single cap member (similar, for example, to the end cap 11) which can be provided with an internal thread corresponding substantially to the thread or corrugation of the aluminium sheathing 5 (to allow for meshing and screw thread engagement therewith) which can be applied directly to the aluminium sheathing. Such a cap would be provided with pressure/oil nipple/valve means (such as nipples/valves 30 provided in the end cap 11 shown in Fig. 2 of the accompanying drawings).

The form of the invention shown with reference to Fig. 2 of the accompanying drawings does however have advantages in that the tail portion 14 of the intermediate cap can be of a regular size so as to engage with common end caps (such as 11), while the main body portion 12 and bore 15 of the intermediate cap 10 can be of varying sizes, for example to accommodate varying diameters of corrugated aluminium sheathing 5. As will be appreciated, various sizes and diameters of aluminium sheathing 5 can be associated with varying forms of cable.

While the invention has been described by way of example, with reference to capping broken cables, the invention has equal application in the capping of cables for other purposes. For example, where cables are being stored and it is required that the presence and pressure of oil be maintained during such storage.

It should be appreciated that the present invention provides a substantial advance in the capping of electrical cables and in particular oil filled electrical cables. It should also be appreciated that modifications and improvements may be made to the invention without departing from the scope thereof, as defined by the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS

1. A capping means for oil filled cables, which cables include a conductor core and a plurality of substantially concentric layers extending thereabout, said layers including a layer of substantially corrugated metal sheathing; including cap means adapted to fit over, and engage with, so as to substantially enclose an exposed end of said cable; said cap means being provided with an internal annular thread to facilitate a meshing and substantially screw thread engagement between the inner annular thread of said cap means and the corrugated formation of said layer of corrugated metal sheathing, so as to thus engage said cap means over and relative to said exposed end of said cable.

2. A capping means as claimed in claim 1, wherein said cap means includes an intermediate cap defining a bore substantially closed at one end and open at the other end; at least one hole being provided in said substantially closed end; an inner annular surface of said bore, being formed or provided with a thread; at or adjacent said open end; said intermediate cap further including a tail portion of reduced diameter, and at least part of which is provided with an external screw thread; said cap means further including an end cap which defines a bore having an open end and a closed end; an internal annular screw thread being provided at or adjacent said open end; the arrangement being such that the open end of said intermediate cap is placed over an exposed section of said corrugated metal sheathing, so that the thread on the inner annular surface thereof meshes and screw threadably engages with said corrugated sheathing, such that the intermediate cap is able to be screw threaded along said corrugated sheathing to engage therewith and substantially enclose an exposed end of said cable; said end cap thereafter being screw threadably engaged with the screw thread of the tail portion of said intermediate cap.

3. A capping means as claimed in claim 2, wherein pressure/oil nipple means are provided in the closed end of said end cap.

Dated this 25th day of February 1993

ROBERT DAVID ROLLINS

by: HR Holgate

His Patent Attorney

1-93

ABSTRACT

A capping arrangement for exposed ends of oil filled electrical cables is provided. Cap means are provided and are adapted to fit over and engage with, so as to substantially cover an exposed end of such an oil filled electrical cable. The cap means is provided or formed with an internal thread which is adapted to mesh and engage with an exposed section of a corrugated metal sheath of said oil filled electrical cable, so as to effectively cap said cable.

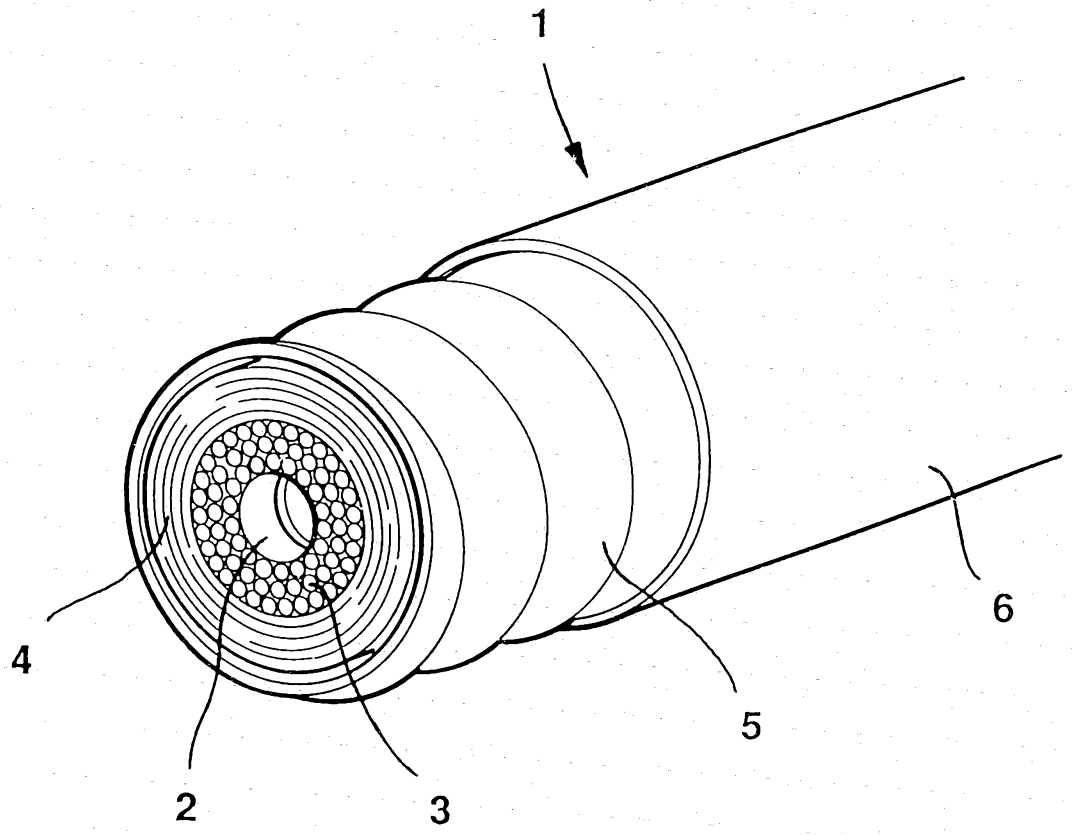

FIGURE 1

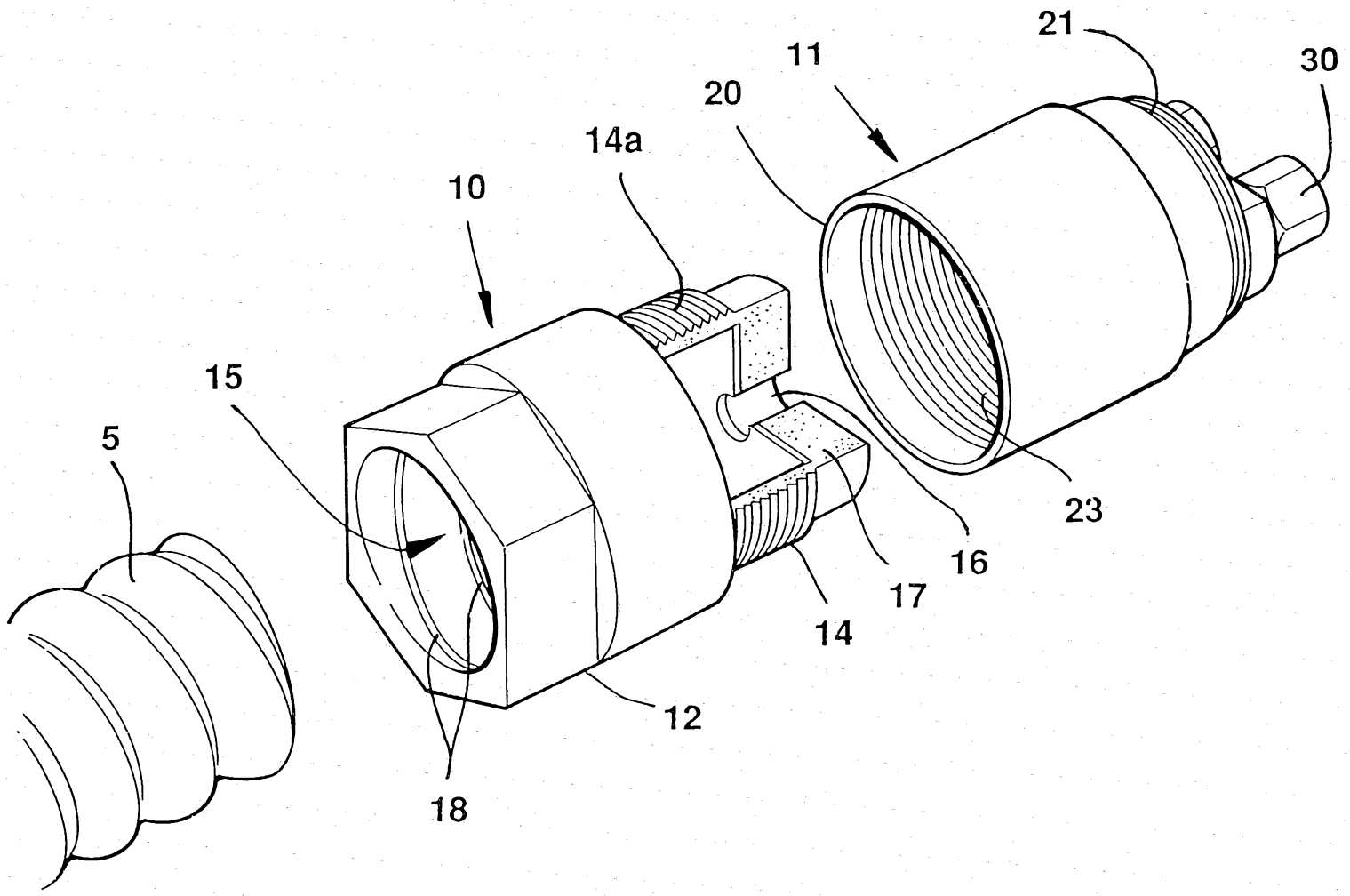

FIGURE 2