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THREAD PROTECTOR

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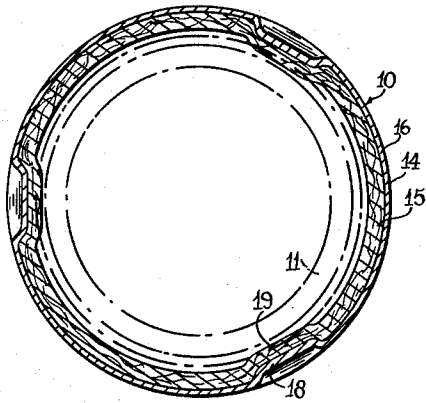


Fig. 3

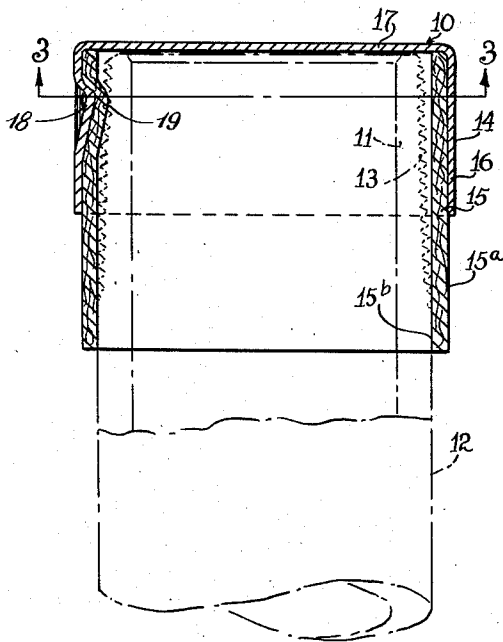


Fig. 2

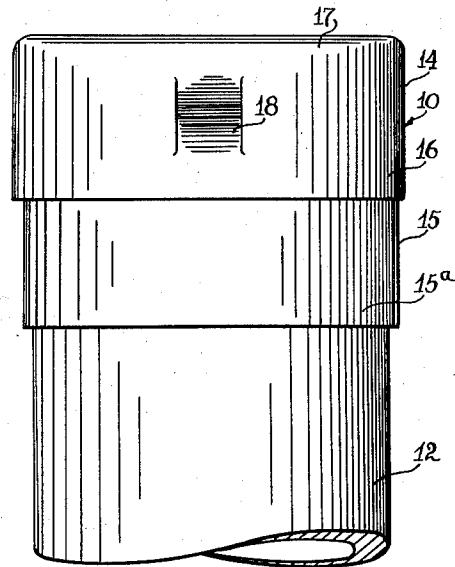


Fig. 1

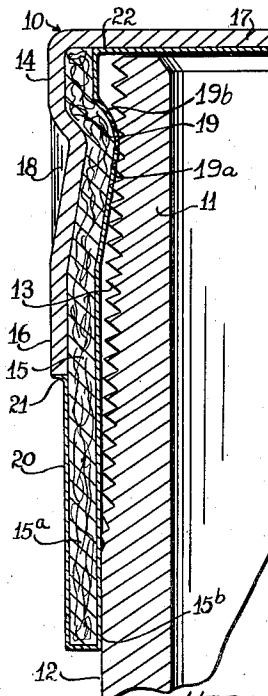


Fig. 4

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## THREAD PROTECTOR

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4 Claims. (Cl. 138—96)

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This invention relates to protectors for threaded pipe-ends and the like and, as one of its objects, aims to provide an improved device of this kind which can be economically produced and which will protect the threaded end of the member on which it is intended to be used, in a more complete and satisfactory manner than has been done heretofore.

Another object of this invention is to provide an improved thread protector which can be readily applied to or removed from the threaded end of a pipe or the like but which, nevertheless, is not likely to be jarred loose and will protect the threads without coming into metallic contact therewith.

A further object of the present invention is to provide an improved thread protector of this character in which a metal shell has a non-metallic liner therein for engagement with the threads of a pipe-end or the like and wherein the liner is made of a waterproofed fibrous material and forms a seal with portions of the pipe-end so as to exclude water and other foreign matter from the threads.

Still another object of this invention is to provide an improved thread protector of the character mentioned, which is especially suitable for pipe-ends or the like having a relatively long threaded portion and wherein the fibrous liner extends a substantial distance beyond the metal shell for protecting the threaded portion and has a coating or waterproofing material thereon.

Other objects and advantages of the invention will be apparent from the following description when taken in conjunction with the accompanying drawing in which

Fig. 1 is an elevational view of a pipe end having the improved thread protector thereon;

Fig. 2 is a longitudinal sectional view taken through the protector;

Fig. 3 is a transverse sectional view of the protector taken on line 3—3 of Fig. 2; and

Fig. 4 is a partial longitudinal sectional view on a larger scale, further illustrating the construction of the protector and the cooperation of the protector with the threaded member.

More detailed reference will now be made to the drawing in describing the improved thread protector 10 which is here shown as applied to the threaded end 11 of a pipe or conduit member 12. As indicated above the protector 10 is especially suitable for use on a pipe-end or the like having a relatively long threaded portion and the threaded portion 11 of the pipe 12 is accordingly shown in the drawing as being such a rela-

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tively long portion. This relatively long portion having the thread 13 thereon is here shown as being a tapered portion although the protector 10 can also be used on substantially straight threaded portions.

The protector 10 comprises a hollow metal shell 14 and a non-metallic liner 15 engaging in the shell and extending coaxially thereof. The metal shell 14 has a substantially cylindrical sleeve portion 16 which is open at one end thereof and at its other end is provided with an integral transverse wall portion 17 extending substantially normal to the axis of the sleeve portion. The end wall can have an opening therein or can be imperforate as here shown. The shell 14 can be constructed by any suitable manufacturing operation such as by drawing or stamping the same from sheet metal of appropriate thickness.

The non-metallic liner 15 may be formed of paper or other fibrous material and comprises a relatively stiff substantially cylindrical sleeve which extends coaxially of the metal shell 14 and engages in the sleeve portion 16 thereof. This non-metallic liner may be obtained by cutting a section of appropriate length from fibrous or paper tubing of appropriate diameter and wall thickness. In the protector 10 the liner 15 extends for substantially the full length of the metal sleeve portion 16 and a portion 15a of the liner extends outside the metal sleeve portion for a substantial distance, depending upon the length of the threaded portion to be covered and protected. In this instance the projecting portion 15a of the liner is approximately as long as the metal sleeve portion 16 and, in all cases, should not only be long enough to cover all of the threads but should also extend beyond the threads and overlap the adjacent unthreaded portion of the pipe 12. This overlap is important because at this point a tight annular engagement is obtained which assists in retaining the protector on the pipe and also forms a continuous annular seal or closure as indicated at 15b which prevents water and other foreign matter from entering between the pipe and liner and damaging the thread 13.

The liner 15 is assembled into the metal shell 14 by inserting one end of the liner into the sleeve portion 16 so as to extend for substantially the full length of the latter. The sleeve portion 16 is then indented or deflected inwardly at circumferentially spaced points, as shown in the drawing, to provide the indented areas 18 which have been pressed into the liner 15. These indented areas provide an interengagement be-

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tween the metal sleeve portion 16 and the non-metallic liner 15 by which the liner is held against withdrawal from the metal sleeve portion and is locked to the metal shell for rotation therewith. At corresponding circumferentially spaced points the liner is deflected inwardly by the indentations 18 thus providing internal projections or areas 19 on the liner which provide spaced points of engagement with the thread 13 of the pipe-end 11 when the protector is applied thereto. These internal projections 19 will accommodate themselves to any taper angle on the pipe and by their annularly spaced engagement with the pipe-end they center the metal shell 14 thereon.

The paper or fibrous tube from which the non-metallic liner 15 is formed should preferably be initially treated or impregnated with a waterproofing material such as paraffin, asphalt or any other material suitable for this purpose. After the liner 15 has been assembled into the sleeve portion 16 of metal shell 14 as above explained, the liner is provided with an external coating or layer 20 of waterproofing material as shown in Fig. 4. This external coating may be a layer of paraffin, asphalt or any other material suitable for this purpose. This external coating 20 may be applied to the liner 15 in any suitable way such as by dipping the open end of the protector 10 into a bath of the waterproofing material and spraying or squirting some of the bath inside of the liner and metal shell.

Fig. 4 of the drawing shows the protector 10 after the external coating 20 of waterproofing material has been applied and, as will be seen from this view, this coating extends continuously over the outer surface of the projecting portion 15a of the liner and also extends around the free end of the liner and over the entire inner surface of the liner as well as the inner surface of the transverse wall 17 of the metal shell. The coating 20 on the inner surface of the liner cooperates with the unthreaded portion of the pipe so as to assist in forming the important annular seal 15b at this point and renders this seal capable of excluding water and other damaging liquid or matter. The coating also cooperates with the open end or edge of the metal sleeve portion 16 to form an annular seal at this point as is indicated at 21 for preventing rain or other liquid from soaking into the protector between the metal shell and the non-metallic liner 15. Likewise, the coating material 20 forms a similar annular seal between the liner and the transverse wall 17 as is indicated at 22.

An important advantage of the present construction is that it is not necessary to construct the metal shell 14 with its sleeve portion 16 of a length to completely cover the threaded portion of the pipe because sufficient protection for the inner end of the threaded portion of the pipe will be provided by the non-metallic liner 15. If the sleeve of the metal shell were to be made as long or longer than the threaded portion to be protected, the metal shell would be of an increased weight and the cost of manufacture would be correspondingly increased. Since the liner 15 is formed of paper or other inexpensive fibrous material it can be extended in length considerably beyond the end of the metal sleeve portion 16 without increasing the cost of manufacture of the protector any great amount.

It has been my observation that during the shipping and handling of pipe or the like having thread protectors thereon, most of the blows are received on or adjacent the extreme end of

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the pipe. Fewer and less damaging blows are received by the threads located inwardly from the extreme end of the pipe, but nevertheless, it is necessary to provide a covering for such inwardly located threads to protect them from blows and from rain or other foreign matter. In my improved protector 10 the metal shell 14 will cover the extreme end of the pipe and will receive and absorb the more numerous and severe blows mentioned above. By providing the extended liner portion 15a having the solidified waterproofing coating 20 thereon, the threads lying inwardly of the metal shell will be covered and amply protected against blows and sealed against the entry of rain and other foreign matter.

The protector 10 can be applied to the threaded pipe-end 11 by slipping the protector in telescoping relation over the pipe-end as far as possible by a simple coaxial movement, that is until the internal projections 19 engage the thread 13, and then screwing the protector onto the pipe by relative rotation therebetween. During this relative rotary movement the thread 13 of the pipe will cut a corresponding thread groove in the internal projections 19. This will cause the protector to be screwed fully and firmly onto the pipe with the inner end of the liner wedged or pushed tightly onto the adjacent unthreaded portion of the pipe. In this fully applied position of the protector, as shown in the drawing, the projecting portion 15a of the liner 14 will fully cover and protect the threads which are not covered by the metal sleeve portion 16 and the tight closure and seal 15b will be established and maintained. When the protector is to be removed from the pipe a reverse relative rotation between the pipe and protector causes the latter to be backed part way off the threaded section. After a sufficient number of revolutions the internal projections 19 will be sufficiently disengaged from the thread 13 to permit the protector to be completely removed from the pipe end by a simple relative axial movement.

As shown in the drawing, the internal projections 19 of the liner 15 are elongated axially of the protector 10 and each has a relatively long, gradually sloping portion 19a extending in an inward axial direction from the high point or apex of the projection and a relatively short, steeply sloping portion 19b extending axially in the opposite direction or outwardly from such high point or apex. These inwardly extending gradually sloping portions 19a enable the projections 19 to more readily adapt themselves to the taper angle of the threaded portion of the particular pipe-end to which the protector is applied and, since they are of a length to extend across and engage several thread ridges, they will provide strong holding engagement for retaining the protector on the threaded pipe-end. These gradually sloping portions 19a also serve the important function of enabling the protector to be more easily applied to the threaded portion of the pipe and, in some cases, make it possible to satisfactorily apply the protector to a threaded pipe-end by only a simple straight axial movement instead of by screwing the protector onto the pipe-end. Any tendency for the protector to be accidentally pushed axially off the threaded pipe-end will cause the steeply sloping portions 19b to scrape over the thread ridges and, since the steep slope of these portions prevent them from readily passing over the thread ridges, these portions will effectively resist such

accidental outward or loosening movement of the protector.

From the foregoing description and the accompanying drawing it will now be readily understood that the present invention provides an improved protector for threaded pipe-ends and the like which can be economically manufactured and which can be readily applied to and removed from the pipe-ends to be protected. It will also be seen that by the use of a fibrous liner of a length considerably greater than that of the metal shell it is possible to provide full protection for a pipe-end having a relatively long threaded section without incurring the additional cost which would be involved if the protector were constructed with a metal sleeve of a length to fully cover the threaded section. Additionally it will be seen that the improved construction provides a protector which will fit various different tapers and that in applying the protector to a pipe-end, thread grooves will readily be cut in the liner and that the liner or free end of the liner will be firmly pushed over the adjacent unthreaded portion to form a tight closure and seal.

Although the improved thread protector of the present invention has been illustrated and described herein in considerable detail it will be understood, of course, that the invention is not to be regarded as being limited correspondingly in scope but includes all changes and modifications coming within the spirit of the invention and the scope of the appended claims.

Having thus described my invention, I claim:

1. A thread protector for a threaded pipe-end or the like having a tapered relatively long threaded portion and an adjacent cylindrical unthreaded portion, comprising a metal shell having a substantially cylindrical sleeve portion which is open at its inner end and is provided at its outer end with an integral transverse wall portion, said sleeve portion being shorter in length than said threaded portion, and a substantially cylindrical liner of fibrous material in said sleeve portion and extending for substantially the full length of the latter, said liner being of a length such that it projects out of said sleeve portion for a distance sufficient to cover all of the threads of the pipe-end lying beyond the sleeve portion of the metal shell and to grippingly overlap said adjacent cylindrical unthreaded portion, said sleeve portion having circumferentially spaced areas indented into said liner and said liner having corresponding circumferentially spaced internal projections engageable with the threads of said pipe-end, said circumferentially spaced areas and internal projections of said sleeve portion and liner being located adjacent the outer end of the protector so as to center said outer end on the tapered threaded portion of said pipe-end while the inner end of the liner grippingly engages said unthreaded portion.

2. A thread protector for a threaded pipe-end or the like having a tapered relatively long threaded portion and an adjacent cylindrical unthreaded portion, comprising a metal shell having a substantially cylindrical sleeve portion which is open at its inner end and is provided at its outer end with an integral transverse wall portion, said sleeve portion being shorter in length than said threaded portion, a substantially cylindrical liner in said sleeve portion and extending for substantially the full length of the latter, said liner being formed of fibrous material impregnated with waterproofing substance and being of a length such

that it projects out of said sleeve portion for a distance sufficient to cover all of the threads of the pipe-end lying beyond the sleeve portion of the metal shell and to grippingly overlap said adjacent cylindrical unthreaded portion, said sleeve portion having circumferentially spaced areas indented into said liner and said liner having corresponding circumferentially spaced internal projections engageable with the threads of said pipe-end, and an outer layer of waterproofing material adhering to said liner and forming a seal between the liner and metal shell and also between the liner and said threaded and unthreaded portions of the pipe-end when the protector is applied thereto, said circumferentially spaced areas and internal projections of said sleeve portion and liner being located adjacent the outer end of the protector so as to center said outer end on the tapered threaded portion of said pipe-end while the inner end of the liner grippingly engages said unthreaded portion.

3. A thread protector for a threaded pipe-end or the like having a tapered relatively long threaded portion and an adjacent cylindrical unthreaded portion, comprising a metal shell having a substantially cylindrical sleeve portion which is open at its inner end and is provided at its outer end with an integral transverse wall portion, said sleeve portion being shorter in length than said threaded portion, and a substantially cylindrical liner of fibrous material in said sleeve portion and extending for substantially the full length of the latter, said liner being of a length such that it projects out of said sleeve portion for a distance sufficient to cover all of the threads of the pipe-end lying beyond the sleeve portion of the metal shell and to grippingly overlap said adjacent cylindrical unthreaded portion, said sleeve portion having circumferentially spaced lugs indented into said liner and providing an interlock between said metal shell and liner and said liner having corresponding circumferentially spaced axially extending internal projections engageable with the threads of said pipe-end, said projections having axially enlarging tapered portions extending toward the outer and inner ends respectively of said liner and of which the outwardly extending tapered portion has a relatively steep slope taper and the inwardly extending tapered portion has a gradually sloping taper and is of a length to extend across several thread ridges of said pipe-end, said circumferentially spaced lugs and internal projections of said sleeve portion and liner being located adjacent the outer end of the protector so as to center said outer end on the tapered threaded portion of said pipe-end while the inner end of the liner grippingly engages said unthreaded portion.

4. A thread protector for a threaded pipe-end or the like having a tapered relatively long threaded portion and an adjacent cylindrical unthreaded portion, comprising a metal shell having a substantially cylindrical sleeve portion which is open at its inner end and is provided at its outer end with an integral transverse wall portion, said sleeve portion being shorter in length than said threaded portion, a substantially cylindrical liner in said sleeve portion and extending for substantially the full length of the latter, said liner being formed of fibrous material impregnated with waterproofing substance and being of a length such that it projects out of said sleeve portion for a distance sufficient to cover all of the threads of the pipe-end lying beyond the sleeve portion of the metal shell and to grippingly overlap said

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adjacent cylindrical unthreaded portion, said sleeve portion having circumferentially spaced lugs indented into said liner and providing an interlock between said metal shell and liner and said liner having corresponding circumferentially spaced axially extending internal projections engageable with the threads of said pipe-end, said projections having axially enlarging tapered portions extending toward the outer and inner ends respectively of said liner and of which the outwardly extending tapered portion has a relatively steep slope taper and the inwardly extending tapered portion has a gradually sloping taper and is of a length to extend across several thread ridges of said pipe-end, and an outer layer of waterproofing material adhering to said liner and forming a seal between the liner and metal shell and also between the liner and said threaded and unthreaded portions of the pipe-end when the protector is applied thereto, said circumferen-

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tially spaced lugs and internal projections of said sleeve portion and liner being located adjacent the outer end of the protector so as to center said outer end on the tapered threaded portion of said pipe-end while the inner end of the liner grippingly engages said unthreaded portion.

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