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(54) **THREAD PROTECTOR ASSEMBLY COMPRISING AN OPEN THREAD PROTECTOR AND AN ENGAGEABLE CLOSING CAP**

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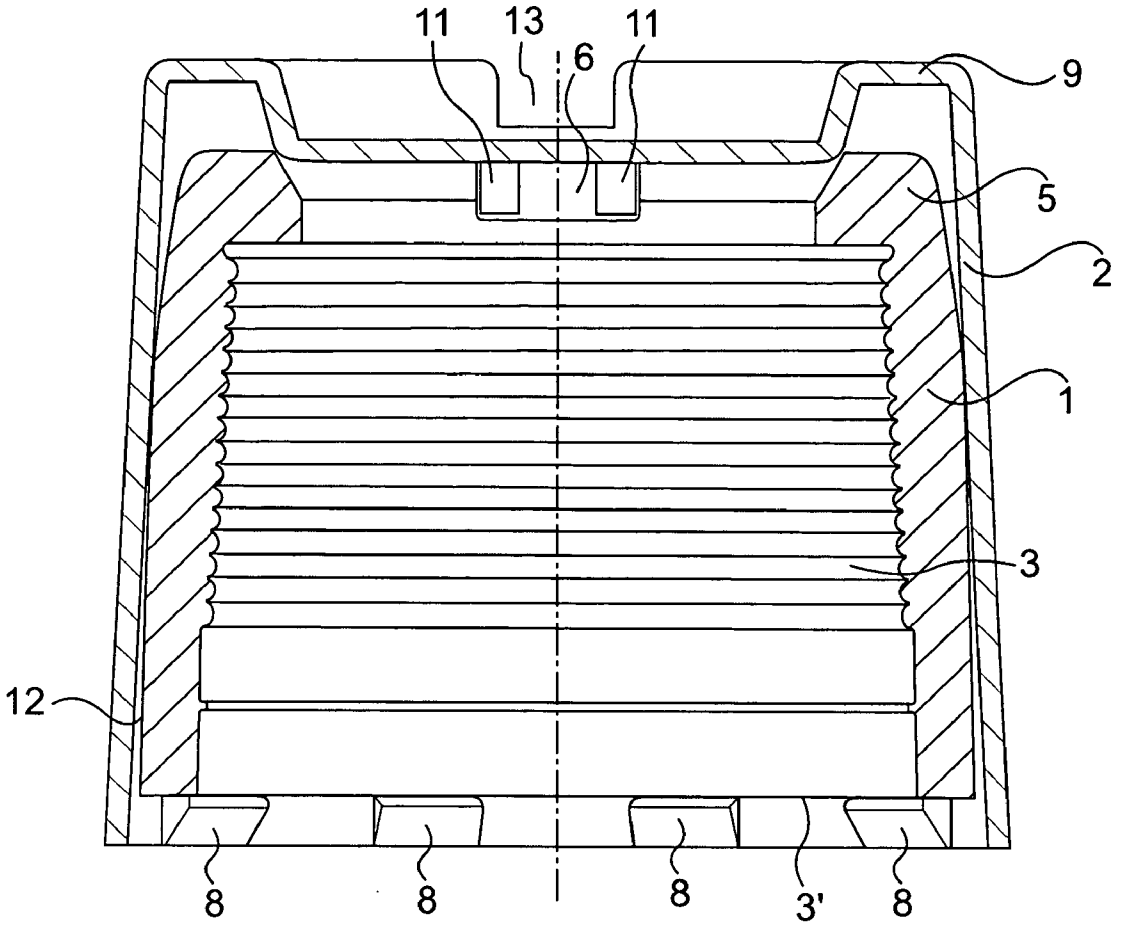
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(57) **ABSTRACT**

A thread protector assembly for protecting threads on the exterior end of a pipe as well as the interior. The assembly comprises an open protector and a closing cap that defines a completely closed plug that is engageable from above to cover over the open protector. The open protector has an internal thread and a bumper at an upper end with cutouts for applying a torque. The closing cap also has cutouts and internal ribs to engage the cutouts on the open protector and transmit torque to the open protector.



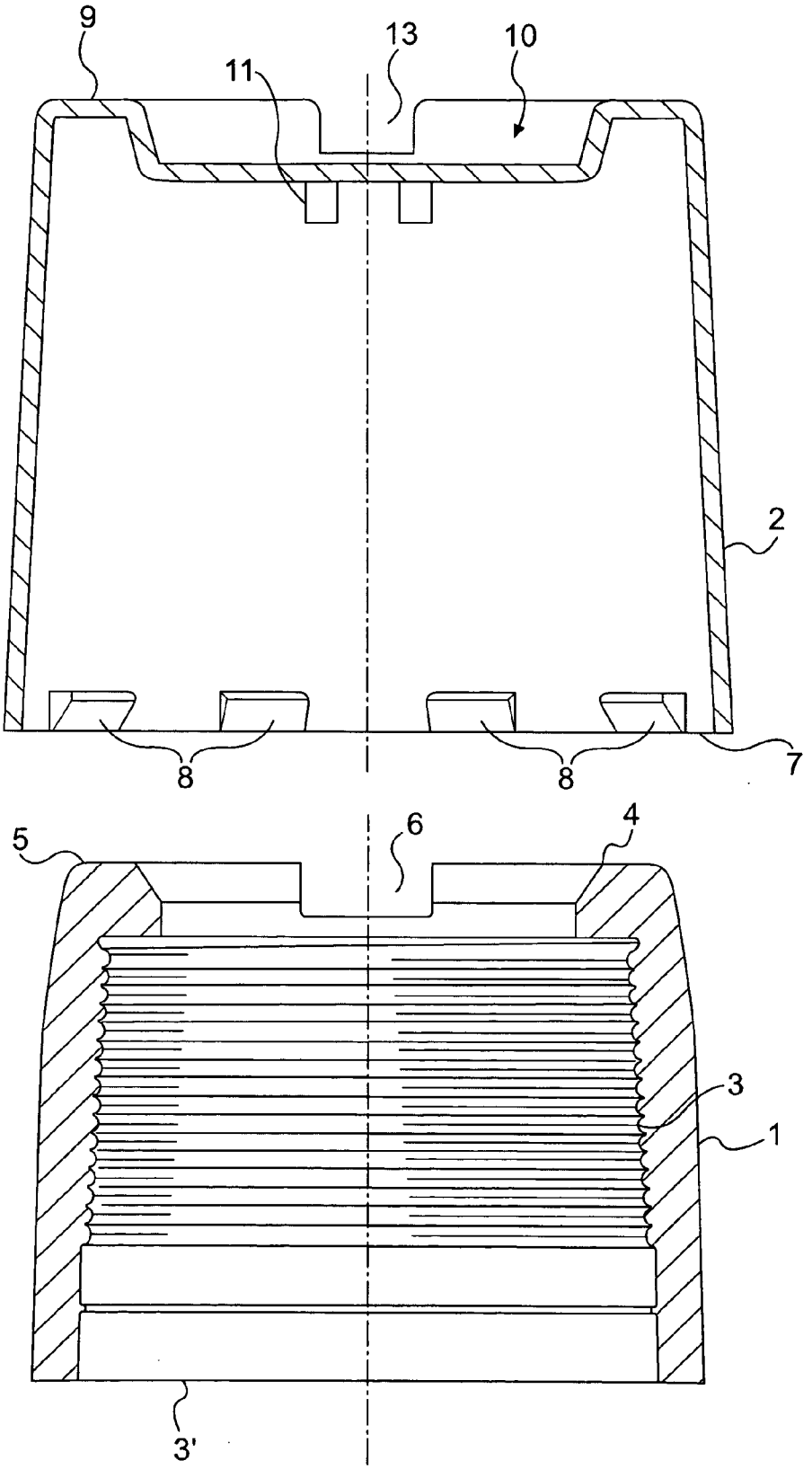



FIG. 1

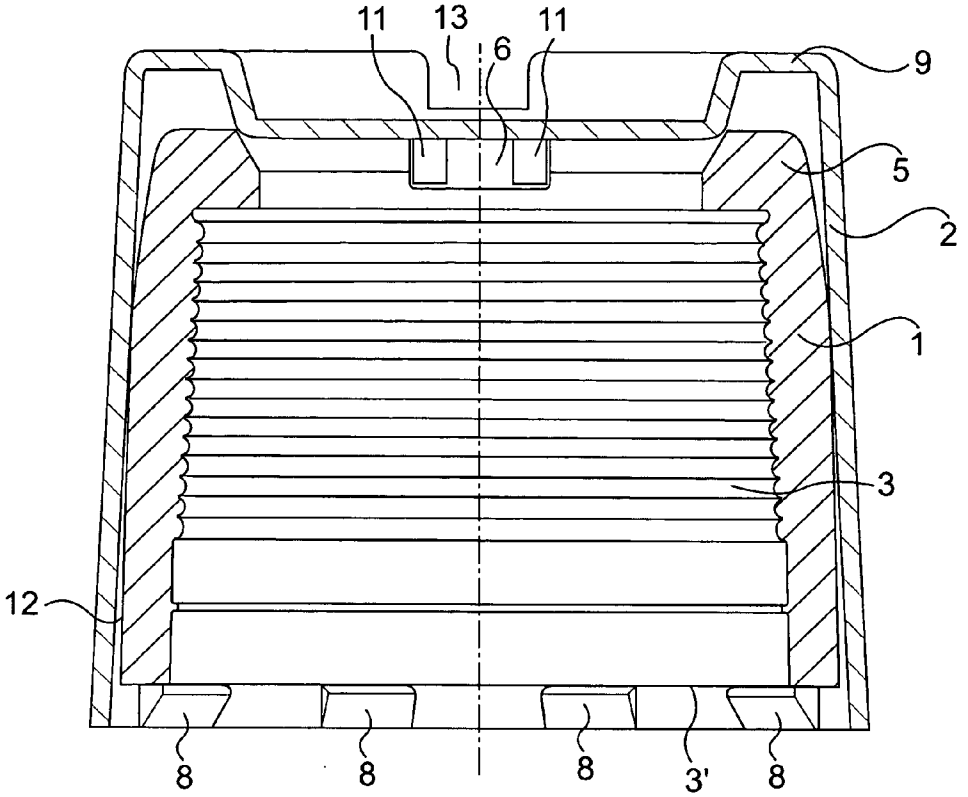



FIG. 2

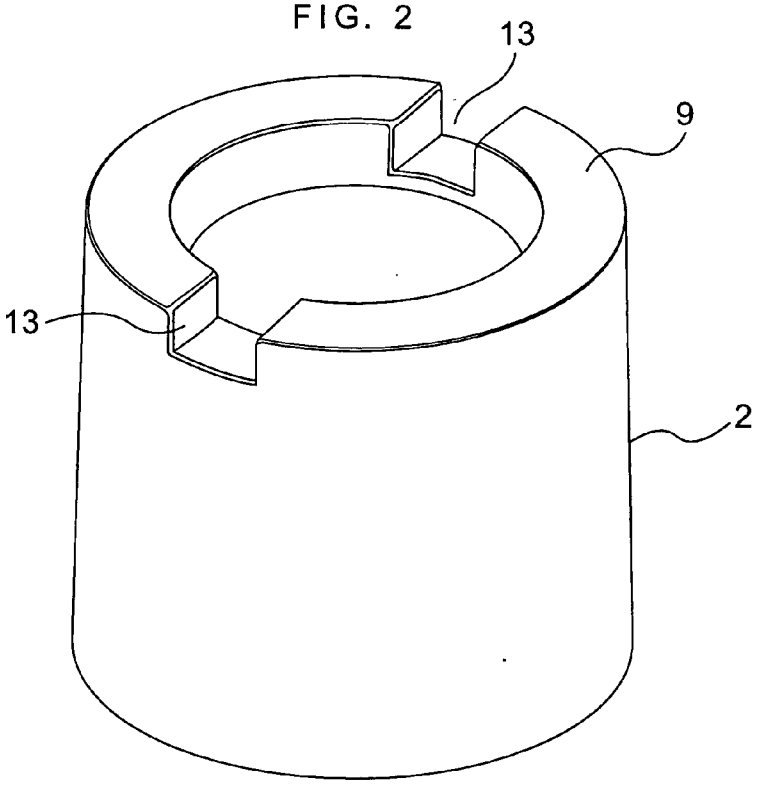



FIG. 3

# THREAD PROTECTOR ASSEMBLY COMPRISING AN OPEN THREAD PROTECTOR AND AN ENGAGEABLE CLOSING CAP

## BACKGROUND OF INVENTION

[0001] 1. Field of the Invention

[0002] An assembly for protecting threads on the end of a pipe as well as allowing access to the interior that comprises an open thread protector (**1**) which has an internal thread (**3**) and in an external periphery of its upper end (**4**) a protective bumper (**5**) on which there are cutouts (**6**) for applying a torque. A closing cap (**2**) acts as a completely closed plug and has a number of latches (**8**) located in the internal periphery of its lower end (**7**), which will deform to engage axially under the lower end (**3'**) of the open thread protector (**1**). A stopper plug (**9**) is formed on the external periphery of the closing cap upper end (**10**), which also includes cutouts for applying a torque (**13**) and internal ribs (**11**) to transmit torque to the cutouts (**6**) on the open protector. The inner radius of the closing cap (**2**) engages just slightly against the largest outer radius of open thread protector (**1**).

[0003] 2. Brief Description of the Prior Art

[0004] Thread protectors protect threads on the end of a pipe and its interior. The present invention relates to an assembly that includes an open protector and an engageable closing cap at the top that allows it to protect the thread of a pipe during the various steps of the fabrication process, such as for example the passage of a drift, internal visual inspection, hydraulic testing and lacquering; also during its subsequent handling and transport.

[0005] Documents U.S. Pat. No. 6,196,270 and U.S. Pat. No. 6,367,508 show known devices for protecting threads on the end of a pipe that include a base portion from which there extends from one side axially a threaded box whose thread couples with the thread at the end of the tube, and on the other side an annular bumper that also extends axially from the base in the direction opposite the box. Such protectors are made from a non-metallic raw material such as high-density polyethylene. The annular bumper has an internal taper such that the internal portion is conical and can also include an external taper that extends from its middle part.

[0006] Generally, known protectors currently are either of the open end type to allow workers to carry out maneuvering techniques and analysis during manufacture of the pipes; or of the closed type such as those cited above, which are used to replace the open handling protectors for the pipe when shipped to an end user. Using first an open handling protector and another that is closed for shipping involves greater raw material use for the same result, as well as an lengthening of the manufacturing time for the pipes, because it requires changing from the open protector, required for a hydraulic test and passage of a chuck, to a closed type protector for shipping.

## SUMMARY OF THE INVENTION

[0007] The invention solves the problems described above through an assembly that combines both structures, that is, an open type protector and a closed type protector. This is done through utilizing a threaded open type protector which can be covered by a completely closed plug that acts as an engageable closing cap. An easy placement of the plug optimizes manufacturing times, and can be done at the same time. The assembly is of low wall thickness and the use of raw materials is minimized. It also involves less generation of dangerous residues from the typical grease needed to apply and switch from an open protector. The open protector has dimensions that are optimized to allow maximum plant productivity during processing. The completely closed plug which acts as an engageable closing cap adds resistance to front and side impact. The protector assembly is also totally recyclable, when it is formed of a material such as polyethylene polyprophylene, or polyamide. The assembly either can be re-used if it is in good shape upon removal or the plastic can be recycled to make a new protector. Any type of thread or pipe can be used depending on customer requirements.

[0008] The assembly of the closing cap on the open threaded protector must comply with customer specifications as well as with ISO rule 11960 Appendix I: "Thread Protector Design Validation Requirements".

[0009] The object of this invention then is a protector set for the threaded end of a pipe and of its interior that comprises:

[0010] an open thread protector which has an internal thread and in an external periphery of its upper end a protective bumper on which there are cutouts for applying a torque; and a closing cap acts as a completely closed plug and has a number of latches located in the internal periphery of its lower end which will deform to engage axially under a lower end of the open thread protector; and

[0011] a stopper plug formed on the external periphery of the closing cap upper end, which also includes cutouts for applying a torque and internal ribs to transmit torque to cutouts on the open protector, wherein the inner radius of the completely closed plug engages only slightly against the outer radius of open thread protector.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. **1** is an cross-section, front explosion view of a closing cap positioned above an open thread protector according to the invention; and

[0013] FIG. **2** is a cross-sectional front view of an assembly, according to the invention; and

[0014] FIG. **3** is an exterior, front perspective view of a closing cap assembled over the open thread protector.

## DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

[0015] Said assembly is made up of an open thread protector **1** and a closing cap **2**. Said open thread protector **1** includes an internal thread **3** that can be coupled to the external thread of a pipe (not illustrated), and a protective bumper **5** on the exterior periphery of its upper end **4**, on which there are a number of cutouts for the protector's torque **6**.

[0016] FIG. **1** illustrates in explosion view how the assembly for protecting threads is to be attached to the end of a pipe (not illustrated). An open thread protector (**1**) has an internal thread (**3**) and in an external periphery of its upper end (**4**) that defines both a protective bumper (**5**) and cutouts

(**6**) for applying a tightening or removing torque, so as to apply or remove the open thread connector from the pipe end. The open thread protector (**1**) as well as the closing cap (**2**) preferably are manufactured from a non-metallic material, such as polyethylene, polypropylene or polyamide.

[**0017**] As shown by the cross-sectional assembly view of in FIG. **2**, the closing cap (**2**) when in place over the open thread protector (**10** acts as a removable closing cap. Latches (**8**) located in the internal periphery of its lower end (**7**), will deform to engage axially under the lower end (**3'**) of the open thread protector (**1**). A stopper plug (**9**) to close off the interior of the pipe is formed on the external periphery of the closing cap upper end (**10**), which also includes cutouts for applying a torque (**13**), with a wrench or the like. Internal ribs (**11**) on the closing cap will transmit any applied torque to the cutouts (**6**) on the open protector. The inner radius of the closing cap (**2**) engages against the outer radius of open thread protector (**1**).

[**0018**] Initial placement of the thread protector assembly can be by a clean and precise axial blow from by a solid instrument such as a wooden mallet or metal hammer. This clean blow initially places closing cap **2** over the open protector **1**, because from there it can be easily displaced. This is so because the only thing that makes friction on the open protector **1** is the number of mechanical latches **8** of the closing cap **2**. In principle, it is not necessary that the open protector **1** and the closing cap **2** be aligned to initiate placement. A gap **12** is generated between the internal diameter of the closing cap **2** and the external diameter of the open protector **1**. During assembly of the unit, it is relatively easy to rotate the closing cap **2** and to move it slightly forward to re-seat it and couple it with the inner protector torque cutouts **6**. In case the assembly is not properly aligned, it is possible to rotate it slightly and force it forward in such a way that it assembles normally. Once the unit is assembled on the end thread of a pipe, it is very difficult to remove it. Pipes are in contact with each other during handling, and while the gap **12** presents some risk of a small radial displacement of the closing cap **2** with respect to the open protector **1**, if some of the latches **8** are out of contact with the lower edge of the open protector **1**. If such radial displacement occurs, that still will not cause a release of the plug **2**, since a major contact is verified up to 180° of any radial displacement.

[**0019**] FIG. **3** is an exterior, front perspective view of a closing cap assembled over the open thread protector. The protective bumper **9** and the torque cutouts **13** can be seen on the upper surface of the closing cap **2**. The internal ribs **11** underneath are protected and inside the radius of the closing cap **2**, which only slightly engages a part of the outside of the open thread protector **1**, and the ribs can be rotated to engage inside the open, inner protector torque cutouts **6**.

[**0020**] In general, the wall thicknesses used for the protector assembly will be determined as in the prior art. In the illustrated embodiment, lateral walls with a thickness of at least 2 mm are preferred for the open protector **1** and closing cap **2** in order to resist lateral impact, and a thickness or spacing of at least 8 mm between the protective bumpers **5** and **9** in order to resist frontal impact.

[**0021**] While a preferred embodiment of the invention has been shown and described, the invention is to be limited solely by the scope of the appended claims.

We claim:

**1**. An assembly for protecting threads on the end of a pipe and allowing access to the interior thereof, comprising:

an open thread protector (**1**) having an internal thread (**3**) and an external periphery proximate an upper end (**4**) that comprises a protective bumper (**5**) and cutouts (**6**) for applying a torque to the protector; and

a closing cap (**2**) which is adapted to engage over and upon the open thread protector and comprises a number of latches (**8**) located proximate an internal periphery of its lower end (**7**), that are adapted to deform to engage axially under a lower end (**3'**) of the open thread protector (**1**) when the inner surface of the closing cap (**2**) slightly engages against the outer surface of open thread protector (**1**); and

the closing cap upper end (**10**) further comprises cutouts on its external periphery for applying a torque (**13**) to internal ribs (**11**) that are inside the outer radius of the open thread protector and are adapted to transmit torque to the cutouts (**6**) on the open protector.

**2**. An assembly according to claim 1, characterized in that the open thread protector (**1**) and closing cap (**2**) are made from a non-metallic material, such as polyethylene, polypropylene or polyamide and the closing cap acts as a completely closed plug when inserted over the open thread protector.

**3**. An assembly according to claim 1, characterized in that latches (**8**) are equally spaced around the internal periphery of lower end (**7**).

**4**. An assembly according to claim 1, characterized in that between internal surface of the closing cap (**2**) and the external surface of the open protector (**1**) a clearance space (**12**) is defined upon assembly that allows relative rotation between said open protector (**1**) and said closing cap (**2**).

**5**. An assembly according to claim 1, characterized in that a lateral wall of the closing cap (**2**) has a wall thickness of less than or equal to 2 mm to resist lateral impact, and a protective spacing of bumper (**9**) is less than or equal to 8 mm to resist any lateral, 45° or frontal impact.

**6**. An assembly according to claim 1, characterized in that said internal thread (**3**) is adapted to be axially coupled over the external thread of a pipe end.

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