United States Patent [19]

Williams

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[54] **ANTI-CORROSION PIPE PROTECTOR**

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[52] **U.S. Cl.** ..... **403/344;** 308/4 A

[51] **Int. Cl.²** **F16L 58/00**

[58] **Field of Search** ..... 403/223, 224, 291, 344; 308/4 A, 4 B

[56] **References Cited**

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Primary Examiner—Werner H. Schroeder
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[57] **ABSTRACT**

A flexible flap is carried by a drill pipe protector in such a manner as to protect the pipe, inwardly of protector terminals, against corrosion. Also, the exterior of the protector is tapered to deflect corrosive mud away from the pipe and the flap ends.

9 Claims, 4 Drawing Figures

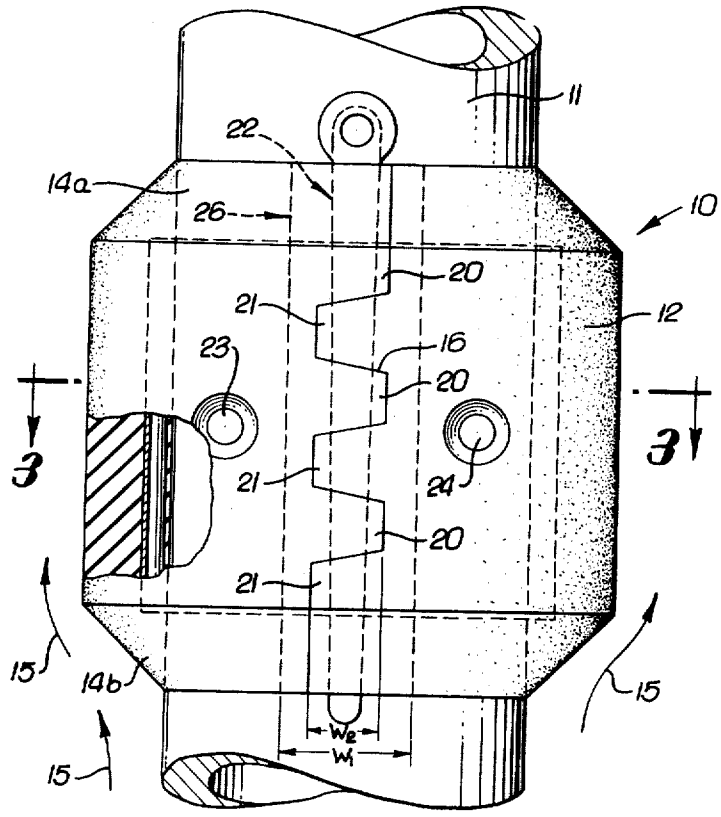


FIG. 2.

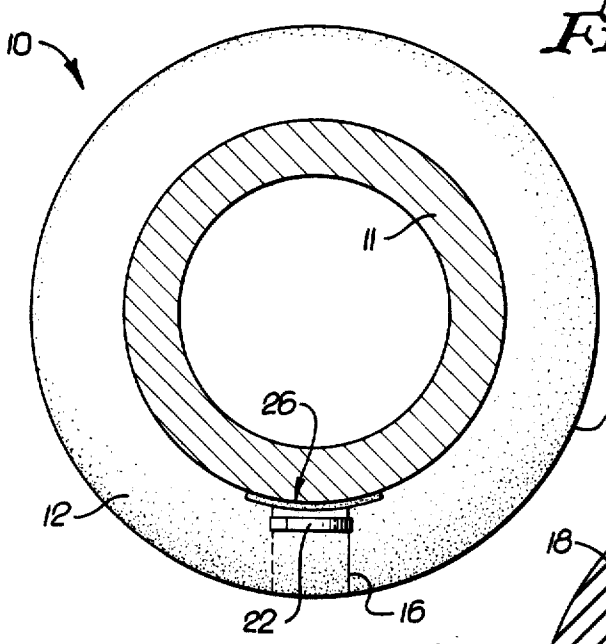


FIG. 3.

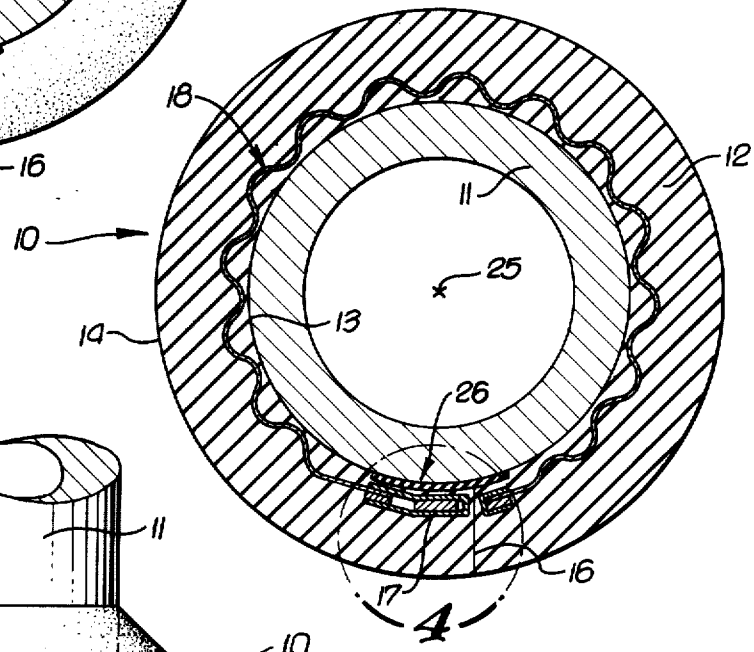


FIG. 1.

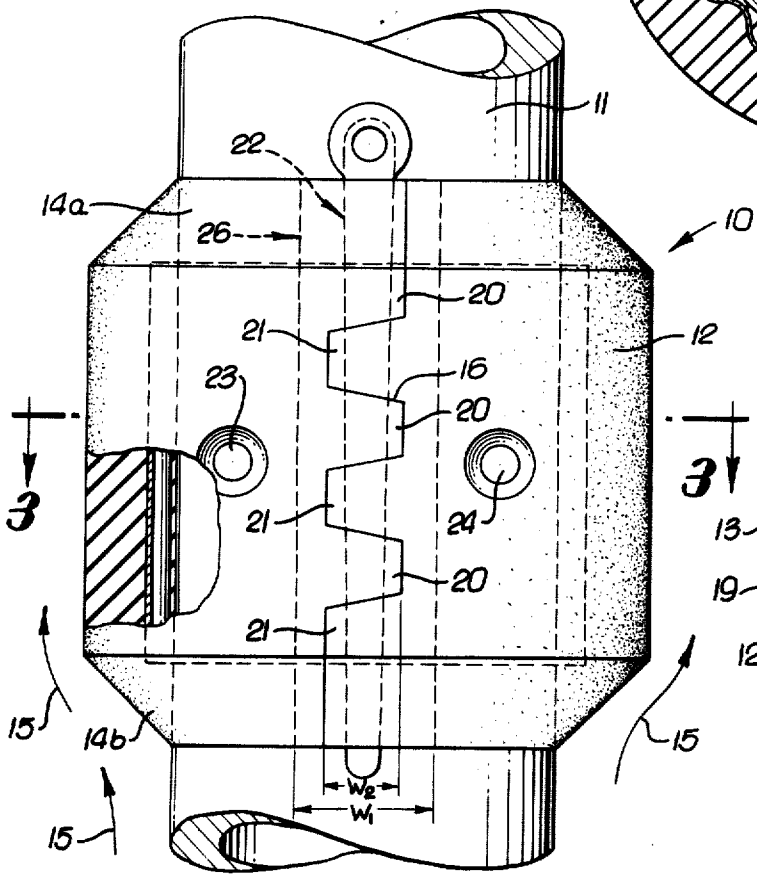
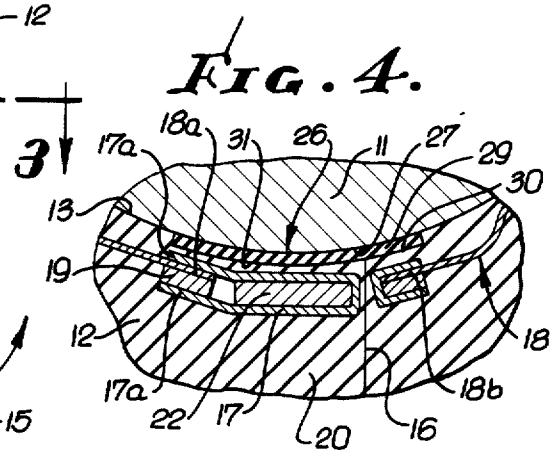


FIG. 4.



ANTI-CORROSION PIPE PROTECTOR

BACKGROUND OF THE INVENTION

This invention relates generally to well pipe protectors, and more specifically concerns the corrosion protection of pipe extend about which protectors extend.

Drill pipe protectors, tension connected about drill pipe, are useful in preventing abrasive engagement between the pipe and well casing. It is found, however, that the pipe extent about which protectors extend tends to become undesirably corroded. Such corrosion can be traced to the corrosive content of drilling mud or fluid circulating within the well annulus during drilling; and it is further localized inwardly of the loop protector terminals which receive the key to lock the protector about the pipe. No way was known to prevent such corrosion prior to the present invention.

SUMMARY OF THE INVENTION

It is a major object of the invention to provide method and apparatus to solve the above corrosion problem in a simple and effective manner. Basically, the method employs a flexible flap in association with the split protector sleeve having loop terminals to be drawn into alignment and interconnected as by key, and includes the steps:

a. placing the flap at the inner side of the protector sleeve and proximate the split, and

b. applying the protector about the pipe and drawing the terminals into alignment in such manner as to compress the flap between the pipe and circularly spaced sleeve extents at opposite sides of the split.

As will be seen, the flap typically extends throughout the length of the sleeve or body and is permanently connected to only one inner edge portion of the body in such manner as to sealingly engage another inner edge portion of the body (at the opposite side of the split) in response to clamping of the protector about the pipe; the flap typically consists of a corrosion resistant material; and the flap is carried so as not to interfere with closing together of the terminals, as will be described.

Another aspect of the invention concerns the provision of frust-conical outer walls at the ends of the body which taper inwardly into close proximity to the body inner wall, thereby to deflect corrosive mud away from the flap ends and the pipe.

These and other objects and advantages of the invention, as well as the details of an illustrative embodiment, will be more fully understood from the following description and drawings in which:

DRAWING DESCRIPTION

FIG. 1 is an elevation;

FIG. 2 is a top plan view of the FIG. 1 protector;

FIG. 3 is a section on lines 3—3 of FIG. 1; and

FIG. 4 is a fragmentary section on lines 4—4 of FIG. 3.

DETAILED DESCRIPTION

In the drawings, a split protector **10** is shown laterally applied about drill pipe **11**, and latched in position. The protector comprises an annular, axially split, sleeve-like C-shaped body **12** consisting of elastomeric material such as natural or synthetic rubber. Body **12** has inner and outer sides **13** and **14**, the outer side tapering frusto-conically at opposite end surfaces **14***a* and **14***b*

toward and into close proximity to the inner side **13**, for deflecting corrosive drilling mud away from the pipe extent enveloped by the body; that is to say, either end of the body presented toward the oncoming flow will achieve such deflection, so that mud will not tend to gather at the annular zone adjacent the pipe and the end of the body. Note mud flow arrows **15** in FIG. **1**.

Latch terminals are carried on the body to be drawn together in interfitting relation for retention proximate the zig-zag split **16** formed by the body, after application of the body about the pipe. Merely as illustrative, the latch terminals may be defined by metallic loops **17** certain of which are attached to one end **18***a* of a C-shaped metal band or clamp **18** embedded in the body, alternate other loops being attached to the opposite end **18***b* of the clamp band **18**. Fasteners or other means may attach the loop ends **17***a* to the band end, and to a spacer block **19** provided between the loop ends. Body material embedding the loops, is shown at **20** and **21** in FIG. **1**, material **20** embedding the loops attached to band end **18***a*, and material **21** embedding the loops attached to band end **18***b*. When the loops are brought into axial alignment, a corrosion resistant retainer pin **22** is inserted endwise through the loops to retain the protector about the pipe. Such alignment may be effected by manipulation of tongs, the jaws of which are receivable into openings **23** and **24** formed in the body, as is known.

Band **18** may have serpentine configuration, circularly about the axis **25**, as is seen in FIG. **3**; however, other forms of bands may be employed.

In accordance with an important aspect of the invention, a protective flap is carried by the body to protectively overlap the side of the pipe **11** inwardly of the loop shaped terminals in response to drawing together of the latter. One such flap is shown at **26** located inwardly of the space **27** at the inner side of the terminals in FIG. **3**. That space tends to trap, or collect corrosive mud which would result in destructive local corrosion of the pipe **11**, in the absence of the flap, the mud gaining access to space **27** as for example via split **16**. The flap may, for example, consist of a corrosion resistant material such as Buna N rubber, or plastic.

The flap **26** extends axially throughout the major axial length of the body, for example from end-to-end as seen in FIG. **1**, whereby the pipe is fully protected inwardly of the zig-zag split which also runs the length of the body; in addition, the flap bridges the split, having a projected width "W_1" greater than the maximum overall projected width "W_2" of the split, as is clear from FIG. **1**. Further, a portion **29** of the flap is preferably carried by and sealingly connected to an inner edge portion **30** of the body recessed or stepped radially outwardly relative to inner side **13**, the seal or connection extending the length of the flap; and, the carriage of the flap by edge portion **30** is such as to facilitate sealing engagement of substantially the remainder of the flap against another inner edge portion **31** of the body which is also recessed or stepped radially outwardly relative to inner side **13**. Edge portions are at circularly opposite sides of the split **16**, and the radial depths of the recesses associated with the edge portions are equal or approximately equal to the flap thickness, whereby the flap is held or sealed tightly against the pipe in response to tensioned closure of the protector onto a pipe. Prior to such closure, the flexible flap extend freely projecting from recessed edge extent **30** may ex-

tend into the pipe space within the body, i.e., spaced inwardly from the projector body, so as not to extend into the space between the terminals to be drawn together as described.

In use, drilling mud cannot again access to the pipe wall, since the flap seals off against inner edge surfaces or portions **30** and **31** along the length of the protector and at opposite sides of the zig-zag split **16.**

I claim:

1. In a well pipe protector,

a. a C-shaped body defining a zig-zag split,

b. terminals on the body to be drawn together in interfitting relation for retention proximate said split after application of the body about the pipe, and

c. a protective flap carried by said body and having freely projecting inwardly and outwardly flexible extent to protectively overlap the side of the pipe inwardly of said terminals and to fully bridge said zig-zag split at the inner side thereof in response to said drawing together of the terminals.

2. The protector of claim **1** wherein said split extends lengthwise of said body, and said flap extends lengthwise throughout the major length of the body.

3. The protector of claim **2** wherein said body has an inner wall and circumferentially spaced inner edge portions adapted to be drawn toward one another in response to said drawing together of the terminals, the flap carried by only one of the edge portions and so as to sealingly engage the other inner edge portion at the inner side thereof, said inner edge portions being recessed radially outwardly relative to a cylinder defined by said body inner wall upon application of the body about the pipe.

4. The protector of claim **3** wherein the flap consists of a corrosion resistant material.

5. The protector of claim **3** wherein the flap normally extends freely into the space within the body inwardly of said edge portions, thereby to be deflected outwardly by the pipe into engagement with the other outwardly recessed edge portion of the body in response to said drawing together of the ternimals.

6. The protector of claim **3** including the pipe about which the body extends, the flap engaging the pipe and deflected thereby into engagement with the other edge portion of the body.

7. The protector of claim **6** wherein the flap also extends lengthwise throughout the major length of the body, and bridges the split which has zig-zag configuration.

8. The protector of claim **2** wherein the body has inner and outer sides, the outer side of the body tapering frusto-conically toward and into close proximity to said inner side at opposite ends of the body for deflecting mud away from the body inner wall.

9. The protector of claim **1** wherein the body consists of non-metallic material, there being a C-shaped metal clamp embedded in the body, said terminals integral with the clamp.

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