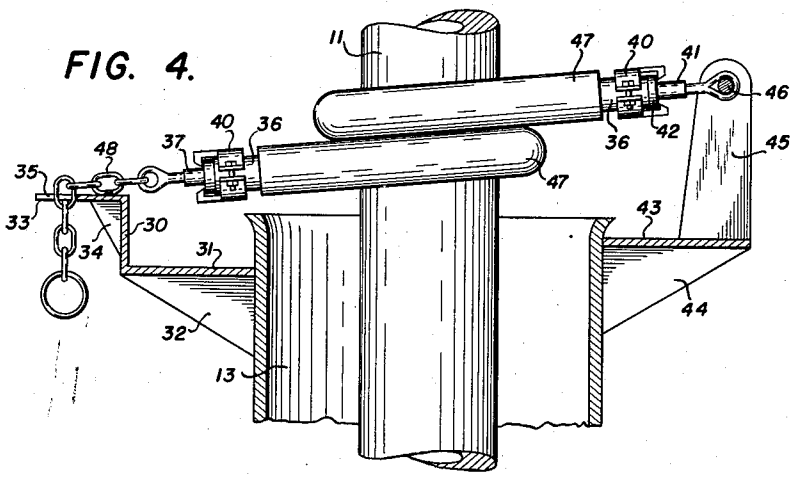
Jan. 12, 1954 N. A. NELSON 2,665,444

DEVICE FOR WIPING PIPE

Filed Sept. 8, 1950

FIG. 4.



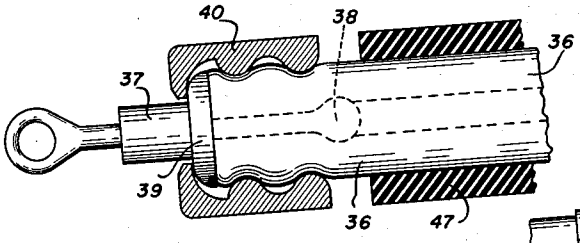


FIG. 5.

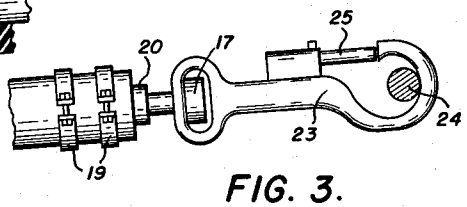


FIG. 3.

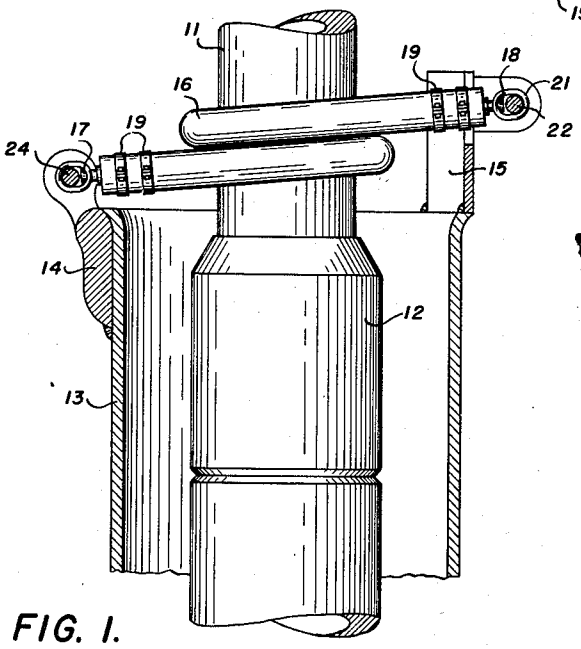


FIG. 1.

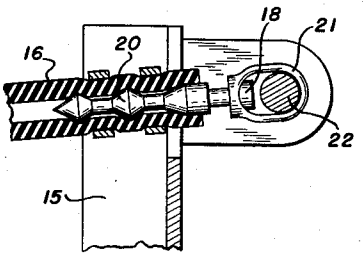


FIG. 2.

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DEVICE FOR WIPING PIPE

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Application September 8, 1950, Serial No. 183,699

16 Claims. (Cl. 15—210)

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The present invention is directed to apparatus for wiping pipe and other cylindrical surfaces.

The present invention embodies a deformable longitudinal member defining a cylindrical surface which is adapted to embrace the periphery of pipe and the like cylindrical surfaces. The deformable longitudinal member is attached at first and second ends to swivels and the swivels on the first and second ends of said deformable longitudinal member are adapted to be attached to swivel supporting means which maintain said longitudinal member in operative relationship to the periphery of pipe and like cylindrical surfaces when said member is wrapped thereabout.

The supporting means may include a cylindrical housing which may be attached to the casing of a borehole below the rotary table and the blowout preventers. For example, a bell nipple may be modified by attaching thereto swivel supporting means, one of which is preferably spaced above the second of said supporting means.

The present invention will be further described by reference to the drawing in which:

Fig. 1 is an elevational view in partial section of apparatus of the present invention in operational relationship to a drill pipe;

Fig. 2 is a detailed showing of the arrangement of the swivel;

Fig. 3 is a detailed view of releasable attaching means for the swivel;

Fig. 4 is a view of another embodiment of my invention illustrating a releasable attaching means and a modified longitudinal member and clamp therefor; and

Fig. 5 is a detailed view of the clamping means of Fig. 4.

Referring now to the drawing, and particularly to Figs. 1–3, numeral 11 designates a drill pipe arranged in a borehole and which is connected to other sections thereof, not shown, by a tool joint 12 of the conventional type. Attached to a well casing, not shown, is a bell nipple 13 embodying a cylindrical housing arranged in spaced relationship to drill pipe 11 and tool joint 12, as shown. The cylindrical housing of bell nipple 13 has attached to it a first swivel supporting means 14 and a second swivel supporting means 15. It will be noted that swivel supporting means 14 is spaced slightly above the top of bell nipple 13 and offset therefrom while swivel supporting means 15 is spaced above swivel supporting means 14.

A deformable longitudinal member which is

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cylindrical in cross-section 16 is attached by swivels 17 and 18, respectively, to swivel supporting means 14 and 15. The deformable longitudinal member 16 is attached to swivels 17 and 18 by clamps 19 which embrace or circumscribe the longitudinal member 16 and the irregularly shaped members 20 which form part of swivels 17 and 18. Thus the deformable longitudinal member 16 surrounds or embraces the irregularly shaped member 20 which may be inserted therein and the clamps 19 cause a tight fit to be made with swivels 17 and 18.

Referring now to Fig. 2 which shows a detail of the means of attaching longitudinal member 16 to one of the supporting members, for example, 15, the swivel 18 is arranged in a link 21 which is attached to a pin 22 carried by the swivel supporting means 15.

The swivel supporting means 14 may be connected to member 16 similarly to swivel supporting means 15 but preferably one of the swivel supporting means is connected to the longitudinal member 16 by releasable means, such as shown in Fig. 3. For purposes of illustration, it may be assumed that swivel 17 connected to longitudinal means 16 is releasably attached to swivel supporting means 14 by a hook member 23 which embraces and surrounds pin 24 of supporting means 14. Hook 23 is provided with a spring latch 25 to allow the longitudinal member 16 to be attached releasably to swivel supporting means 14.

It is to be understood, of course, that both swivels 17 and 18 may be releasably attached to swivel supporting means 14 and 15 as has been described. It is to be understood further that other means for attaching swivels may be suitably employed.

The deformable member 16 should be constructed to be circular in cross-section and should be constructed of a deformable material, such as natural or synthetic rubber, or the deformable member 16 may suitably be a resilient metallic cable, circular in cross-section, constructed of metallic material, such as used in making metallic watch bands. On the other hand, the resilient metallic cable may suitably be a metallic cable having a covering of natural or synthetic rubber or other deformable materials.

It is to be understood that the swivel supporting means 14 and 15 may vary in vertical distance one from the other. It is desirable, however, to have the swivel supporting means 14 and 15 spaced vertically at least the distance of twice the diameter of the longitudinal mem-

ber 16. Furthermore, it is to be understood that the housing 13 in the shape of a bell nipple forming the mounting for supporting means 14 and 15 may be replaced by other housing means spaced away from the drill pipe 11 and the tool joint 12. The supporting means 14 and 15 may suitably be vertical rods arranged adjacent the drill pipe 11 and tool joint 12 rigidly attached to a supporting member of the derrick or the swivel supporting means 14 and 15 may be attached horizontally to the derrick substructure.

The apparatus of the present invention as illustrated by Figs. 1–3 operates in the following manner:

The longitudinal member 16 may have one end, such as that carrying swivel 18, rigidly attached to swivel supporting means 15 and the other end releasably attached to swivel supporting means 14. With the drill pipe 11 in the borehole, the longitudinal member 16 is wrapped around the drill pipe, as shown in Fig. 1, and the swivel 17 attached by suitable means, such as shown in Fig. 3, to swivel supportng means 14.

As the pipe is pulled up out of the hole the deformable member 16 rolls on the pipe surface and wipes the mud off the pipe in a wringer-type action. The characteristics of the deformable member and the particular arrangement of the present invention permit an initial tension to be applied to the wiper to allow the drilling mud to be wiped therefrom.

Referring now to Figs. 4 and 5, numeral 13 designates a bell nipple as in Figs. 1 to 3 having a swivel supporting means 30 attached thereto. Swivel supporting means 30 includes a bracket 31 with brace 32 and including a fork arrangement 33 which is also braced with a brace 34. Fork arrangement 33 defines a slot 35 through which the swivel is attached in a manner to be described.

Deformable longitudinal member 36 is attached to a swivel 37 which is provided with a bulbous stinger 38. The swivel 37 defines a shoulder 39 which is attached thereto. A conventional type hose clamp 40 fits over the deformable longitudinal member 36 into which the stinger 38 is inserted and the hose clamp 40 which clamps over the deformable longitudinal member 36 fits over the shoulder 39 thus causing a tight fit between the ball bearing swivel 37 and the deformable longitudinal member 36. The other end of the deformable longitudinal member 36 is attached to a similar ball bearing swivel 41 which is provided with a shoulder 42 over which clamp 40 is arranged. Swivel 41 is similarly provided with a bulbous nose stinger 38 which is inserted in member 36. The swivel 41 is attached to a bracket member 43 having a support 44, bracket means 43 being attached to bell nipple 13. Upstanding supports 45 are provided with a pin 46 which attaches the swivel 41 to the upstanding members 45.

The deformable longitudinal member 36 may be suitably provided with a second deformable member 47 which may be a tubular deformable member which fits around the deformable member 36; for example, when the deformable member 36 is constructed of rubber, a rubber hose of larger inside diameter may be fitted over the deformable member 36. Thus when the deformable member 36 is in tension the deformable member 47 may roll freely thereon and provide a wiping action for a pipe coming out of the borehole when the deformable members 36 and 47 are wrapped therearound as illustrated.

Attached to the swivel 37 is a link chain 48 which is releasably attached through slot 35 to fork 33; thus, for example, when it is desirable to use the device of the present invention, as embodied in this figure, on different size pipe, it is possible to lengthen or decrease the effective length of the apparatus by hooking the chain 48 by different links in the slot 35. The manner of attaching the chain 48 in the slot 35 is very simple, a link of the chain being turned at right angles to the link passing through the slot 35, thus effectively hooking the chain at that point.

The device of Figs. 4 and 5 operates in a similar manner to the embodiment of Figs. 1 to 3, the only difference being that the deformable members 36 and 47 both can rotate freely, exerting a wiping action on the pipe as it comes out of the hole. A further difference is the means of attaching the deformable means 36 to the swivel. When it is desired to employ the apparatus of the present invention, the longitudinal member 36 either carrying or not carrying an additional longitudinal member 47 may be wrapped around a stand of pipe, such as 11, in a borehole and the chain 48 clamped at the desired point in slot 35. As the pipe is pulled out of the hole a rolling or wringer action is exerted thereon and the pipe is freed of mud.

The device as illustrated in Fig. 4 was used on about 3000 feet of 5-inch drill pipe in a borehole in the Gulf Coast of Texas and satisfactorily removed mud therefrom.

In order to illustrate the invention further, a 1-inch diameter rubber cable was equipped with harness-type swivels on each end. Ropes were attached to each of the swivels and the rubber cable was then wrapped around a 5-inch drill pipe being pulled out of a borehole in an oil well being drilled in the Texas Gulf Coast. A rolling action of the rubber cable was effected and satisfactory wiping of mud from the pipe resulted.

The invention described and claimed herein has the following noteworthy advantages over pipe wipers currently employed. The improved apparatus provides maximum view of the borehole so that the mud level in the annulus between the drill pipe and the casing can be observed. The improved apparatus including the longitudinal member can be quickly and simply inserted or removed without damaging it. Another advantage is that the rolling action of the longitudinal member results in a minimum of wear and, furthermore, wear is additionally minimized since the improved apparatus is not in contact with the bottom of the rotary bushing. The effective wiping area may also be changed by anchoring the free end of the longitudinal member at different points and by different means on the housing than that which has been described above.

The nature and objects of the present invention having been fully described and illustrated, what I desire to claim as new and useful and to secure by Letters Patent is:

1. Apparatus for wiping pipe and other cylindrical surfaces which comprises, in combination, a deformable longitudinal member defining a cylindrical surface adapted to embrace rotatably the periphery of pipe and other cylindrical surfaces, swivels attached to first and second ends of said member and first and second fixed supporting means for said swivels, said first supporting means being spaced above and a distance

apart from the second supporting means, said swivels being movably attached to said supporting means, and said supporting means being adapted to maintain said member in operative relationship to the periphery of pipe and other cylindrical surfaces when said member is wrapped therearound and to allow only limited vertical movement of said member with respect to said supporting means.

2. Apparatus in accordance with claim 1 in which the deformable member is a natural rubber cable.

3. Apparatus in accordance with claim 1 in which the deformable member is a synthetic rubber cable.

4. Apparatus in accordance with claim 1 in which the deformable member is a resilient metallic cable.

5. Apparatus for wiping pipe and other cylindrical surfaces which comprises, in combination, a deformable longitudinal member defining a cylindrical surface adapted to embrace rotatably the periphery of pipe and other cylindrical surfaces, swivels attached to first and second ends of said member, first and second fixed supporting means for said swivels said first supporting means being spaced above and a distance apart from the second supporting means, said swivels being movably attached to said supporting means and said supporting means being adapted to maintain said member in operative relationship to the periphery of pipe and other cylindrical surfaces when said member is wrapped therearound and to allow only limited vertical movement of said member with respect to said supporting means, and releasable means on at least one of said swivels for releasably attaching said swivel to said supporting means.

6. Pipe wiping apparatus comprising, in combination, a housing adapted to be arranged in fixed relationship to a stand pipe in a borehole, a deformable longitudinal member defining a cylindrical surface adapted to embrace rotatably the periphery of said pipe and having a first and a second swivel attached, respectively, to first and second ends thereof, first and second swivel supporting means rigidly mounted on said housing, said first supporting means being spaced above and a distance apart from the second supporting means, and attaching means movably connecting said swivels to said swivel supporting means to allow only limited vertical movement of said member with respect to said housing.

7. Apparatus in accordance with claim 6 in which the deformable member is a natural rubber cable.

8. Apparatus in accordance with claim 6 in which the deformable member is a synthetic rubber cable.

9. Apparatus in accordance with claim 6 in which the deformable member is a resilient metallic cable.

10. Pipe wiping apparatus comprising, in combination, a housing adapted to be arranged in fixed relationship to a stand of pipe in a borehole, a deformable longitudinal member defining a cylindrical surface adapted to embrace rotatably the periphery of said pipe and having a first and a second swivel attached to a first and a second end of said member, first and second swivel supporting means rigidly mounted on said housing, said first swivel supporting means being spaced above said second swivel supporting means a distance at least equivalent to twice the diameter of said longitudinal

member and also spaced a distance apart from said second swivel supporting means, and attaching means movably connecting said swivels to said swivel supporting means to allow only limited vertical movement of said member with respect to said housing.

11. Pipe wiping apparatus comprising, in combination, a cylindrical housing adapted to be arranged in fixed relationship to a stand of pipe in a borehole and adapted to be attached to a well casing therein, a rubber cable cylindrical in cross section adapted to embrace the periphery of said pipe and rotate thereon, a first and a second swivel attached, respectively, to first and second ends of said cable, first and second swivel supporting means rigidly mounted on said housing, said first swivel supporting means being spaced above said second swivel supporting means a distance at least equivalent to twice the diameter of said rubber cable and also spaced a distance apart from said second swivel supporting means, and attaching members movably connecting said swivels to said swivel supporting means to allow only limited vertical movement of said member with respect to said housing.

12. Apparatus in accordance with claim 11 in which at least one of said attaching members releasably connects one of said swivels to one of said swivel supporting means.

13. Pipe wiping apparatus comprising, in combination, a housing adapted to be arranged in fixed relationship to a stand of pipe in a borehole and adapted to be attached to a well casing arranged therein, a first deformable longitudinal member cylindrical in cross section adapted to embrace the periphery of said pipe and to rotate thereon, a first and a second swivel attached, respectively, to first and second ends of said first member, first and second swivel supporting means, the first swivel supporting means being spaced above and a distance apart from the second swivel supporting means and rigidly mounted on said housing, a second deformable longitudinal member cylindrical in cross section embracing rotatably said first member, first attaching means movably connecting said first swivel to said first supporting means and second attaching means movably connecting said second swivel to said second supporting means, said attaching means allowing only limited vertical movement of said members with respect to said housing and said swivels allowing said members to rotate when said second member is in contact with said pipe.

14. Apparatus in accordance with claim 13 in which at least one of said attaching means releasably connects one of said swivels to one of said supporting means.

15. Apparatus in accordance with claim 13 in which at least one of said attaching means is a chain and at least one of said supporting means defines a slot to receive said chain.

16. Apparatus in accordance with claim 10 in which at least one of said attaching means is a spring latched hook.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
428,799	Breul	May 27, 1890
478,824	Shostak	July 12, 1892
2,014,293	Riley	Sept. 10, 1935
2,392,490	Maruri	Jan. 8, 1946
2,480,371	Kalhoefer	Aug. 30, 1949