Feb. 1, 1949. L. F. ABEL 2,460,481

DRILL PIPE CLEANER

Filed May 27, 1947

Fig. 1.

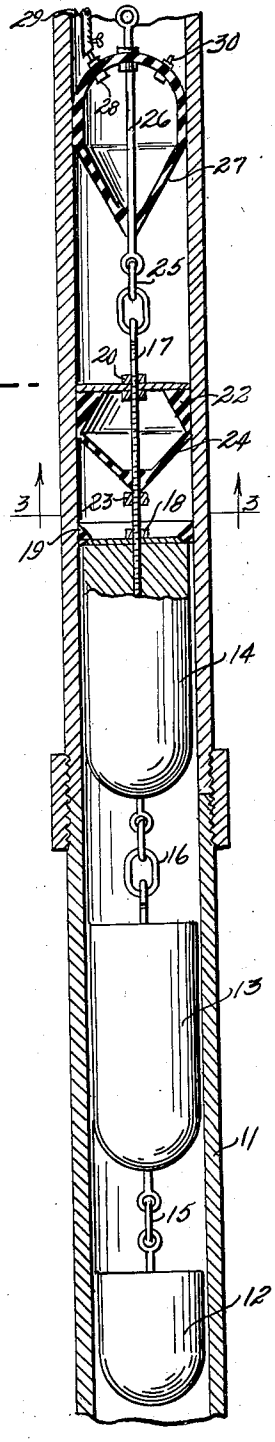


Fig. 2.

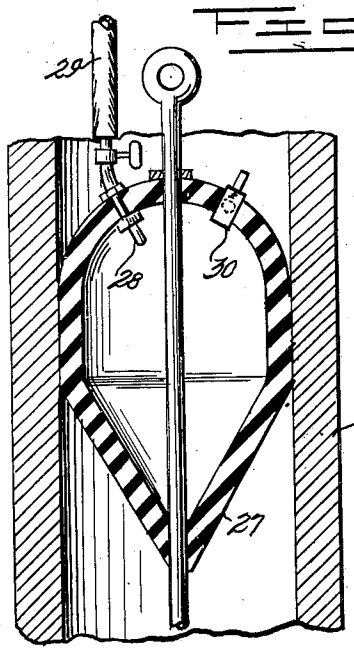
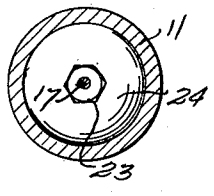


Fig. 3.



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DRILL PIPE CLEANER

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3 Claims. (Cl. 166—18)

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This invention relates to drill pipe cleaning devices, and more particularly to a device for cleaning mud and other debris from the inside of a string of drill pipe when the pipe is to be withdrawn from a drill hole.

A main object of the invention is to provide a novel and improved drill pipe cleaner which is very simple in construction, easy to use and efficient in operation.

A further object of the invention is to provide an improved cleaning device for drill pipes which is adapted to be inserted in the upper end of the pipe string and which is arranged to force mud and debris downwardly out of the pipe so that the pipe may be readily withdrawn from the drill hole, said device involving only a few simple and inexpensive parts which are easy to assemble and are rugged in construction.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a vertical cross-sectional view of a drill pipe in which is positioned a cleaning device according to the present invention.

Figure 2 is an enlarged cross-sectional view of an inflatable bag member employed in the cleaning device of Figure 1.

Figure 3 is a cross-sectional view taken on line 3—3 of Figure 1.

Referring to the drawings, 11 designates a drill pipe of conventional construction employed in earth boring or drilling by the rotary method. In order to facilitate the withdrawal of the pipe and to prevent mud from spilling out on the drill rig floor when the drill pipe is disconnected adjacent said floor or drawn out of the drill hole, a cleaning device is inserted in the pipe comprising a series of weighted plungers 12, 13 and 14 of lead or other heavy material, connected together by links 15 and 16. Threaded axially into the top end of the top plunger 14 is an eye bolt 17. Secured on said top end by a nut 18 threaded on bolt 17 is an upwardly concave cup-shaped resilient member 19 of rubber or similar material which engages the inner wall surface of pipe 11 with squeegee action. Secured on said bolt above cup member 19 by nuts 20 and 21 is a downwardly concave resilient cup member 22 of rubber or the like of somewhat heavier construction than cup member 19. A rigid cone-shaped member 24 is supported on bolt 17 below cup member 22 in inverted position and its rim is pressed against the bottom rim of cup member 22 by an adjusting nut 23, whereby cup-shaped

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member 22 is squeezed outwardly and engages the inner surface of pipe 11 with adjustable squeegee action.

Secured to eye bolt 17 by a link 25 is a rod member 26 formed with eye loops at both ends. Secured to the top eye loop of rod member 26 is a flexible cable, not shown. Rod member 26 carries an inflatable bag member 27 of rubber or similar resilient material. Secured to the top wall portion of bag member 27 is an air intake fitting 28 connected by a flexible hose 29 to a suitable air pump or source of air pressure. Also mounted in said top wall portion of the bag member is a relief valve 30 which opens and allows air to escape from the bag when the pressure therein exceeds a predetermined value. The air in bag 27 expands said bag so that the bag exerts substantial lateral pressure on the inner wall surface of pipe 11 over a substantial area, and provides a thorough cleaning action on said inner surface as the bag descends in the pipe responsive to the gravitational bias exerted thereon by the weighted plungers 12, 13 and 14. The combined action of squeegee members 19, 22 and bag 27 serves to clear the interior of pipe 11 of substantially all solid and liquid material as the pipe is withdrawn from the drill hole.

The lower cup member 19 is substantially yieldable so that it may freely pass the pipe joints as the device descends in the pipe. Cone member 24 serves as a guide means and protective guard for the rim of the upper cup member 22 in passing the pipe joints. The bottom of bag member 27 is sharply tapered downwardly so that the bag may pass downwardly with respect to said pipe joints in a smooth and unobstructed manner.

While a specific embodiment of a cleaning device for drill pipe has been disclosed in the foregoing description it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore it is intended that no limitations be placed on the invention other than as defined by the scope of the appended claims.

What is claimed is:

1. A drill pipe cleaning device comprising a weighted plunger member adapted to be inserted in a drill pipe, an inflatable bag member, means for securing the bottom end of the bag member to the top end of the plunger member substantially axially of both members, means in the top wall of said bag member for inflating the bag member, and a relief valve in said bag member for preventing the pressure in the bag member from rising above a predetermined value,

the bottom end of the bag member being downwardly tapered.

2. A drill pipe cleaning device comprising a weighted plunger adapted to be inserted in a drill pipe, a downwardly concave resilient cup member adapted to engage the inner surface of the pipe, means for securing said cup member to the top end of said plunger, said means including an inverted rigid cone member pressing upwardly at its rim on the bottom rim of the cup member, an inflatable bag member, means for securing said bag member to the cup member in upwardly spaced relation thereto, and means for maintaining the pressure in said bag member below a predetermined value.

3. A drill pipe cleaning device comprising a weighted plunger adapted to be inserted in a drill pipe, a downwardly concave resilient cup member adapted to engage the inner surface of the pipe, means for axially securing said cup member to the top end of said plunger, said means

comprising an axial eye bolt secured to said top end, means for fastening the cup member to said eye bolt and an inverted rigid cone carried by said eye bolt and pressing upwardly at its rim on the bottom rim of the cup member, an inflatable bag, means for axially securing the bottom end of said bag to the top end of said eye bolt, the bottom end of the bag being downwardly tapered, means for inflating the bag, and a relief valve in the bag for preventing a rise in pressure therein beyond a predetermined value.

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