

Sept. 17, 1940.

C. S. PENFIELD ET AL

2,215,377

MUD WIPER

Filed May 2, 1939

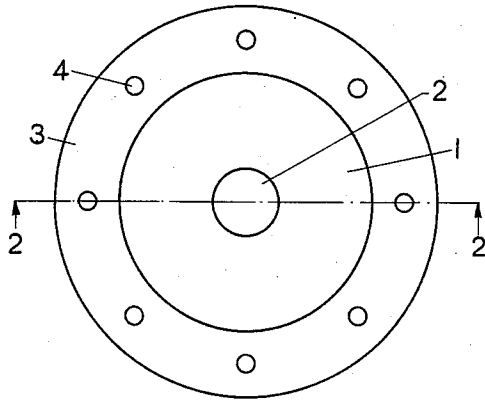


Fig. 1

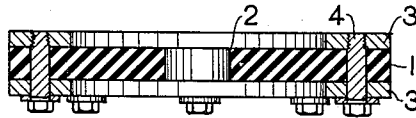


Fig. 2

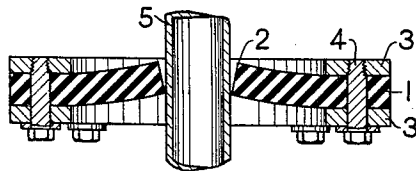


Fig. 3

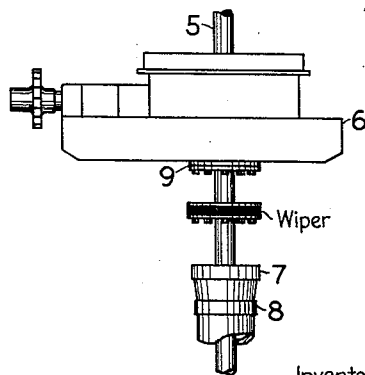


Fig. 4

Inventors: Charles S. Penfield
Urban Morgan Warren

By their Attorney: *[Signature]*

UNITED STATES PATENT OFFICE

2,215,377

MUD WIPER

Charles S. Penfield and Urban Morgan Warren,
Bakersfield, Calif., assignors to Shell Development Company, San Francisco, Calif., a corporation of Delaware

Application May 2, 1939, Serial No. 271,384

3 Claims. (Cl. 255—1)

This invention relates to wiping devices for removing fluid adhering to tubing as it is withdrawn from the well and pertains more particularly to wiping devices for removing mud fluid adhering to the tubing, or drill pipe.

Many devices have been proposed and are commercially available which remove oil adhering to the tubing and are commonly known as oil-savers. These generally are constructed similar to a stuffing box and consists of a relatively bulky housing clamped to the casing or casing-head and containing several packing sections, such as rubber blocks shaped to fit the tubing, and held rigidly against the tubing to strip the oil therefrom.

For removing oil from the tubing or cable, these oil-savers can be used satisfactorily. However, they are inapplicable for removing mud from a tubing being withdrawn from a well containing a drilling mud. When used for the latter purpose, the rubber packers are quickly torn away and disintegrated due to a lack of the oil film to act as a lubricant between the rubber packers and the tubing and due to the solid particles from the mud fluid wedging therebetween. Further, the wear and tear on the rubber packer is aggravated by the rigidity of the oil-saver installation.

Due to these disadvantages and the cumbersome in handling, replacing, and adjusting these oil-savers, it has been general practice to remove mud from the tubing by spraying a stream of water on the pipe as it is withdrawn from the well. However, the water stream system has the obvious disadvantage of diluting the drilling mud by the addition of the wash water.

It is therefore, an object of this invention to provide a simple mud wiping device adapted to ride on the drill pipe, which device can be easily and inexpensively installed.

Other objects and advantages of the invention will become apparent during the course of the following description taken in reference to the drawing wherein:

Figure 1 is a plan view of the mud wiper.

Figure 2 is a cross-sectional view along line 2—2 of Figure 1.

Figure 3 is the same view as Figure 2, showing the device in wiping position (slightly exaggerated for clearness of detail) about a section of drill pipe.

Figure 4 is a view in elevation showing the mud wiper installed between the rotary table and blow-out preventer.

Referring to the Figures 1 and 2 of the drawing a thin, preferably circular sheet or disc 1 of

rubber is centrally pierced with a hole 2, the diameter of which is preferably less than the outside diameter of the tubing or drill pipe to be wiped. The rubber disc 1 is held between two rigid, e. g. steel, brass or similar metal, rings or ring plates 3, clamped together adjacent the circumference of said disc 1 by any suitable means. Thus, for example, the two ring plates 3 may be bolted together by means of bolts 4 as shown in the drawing. The clamping surface of said rings or plates 3, is relatively narrow in order to permit free movement of the flexible disc 1 in a direction perpendicular to the face of the disc. The thin disc 1 may likewise be made of an elastic material other than rubber such as canvas, rubberized canvas, etc. and has an optimum thickness of about one inch.

In placing the disc in service it is slipped over the drill pipe as the drill pipe string is suspended by slips in the rotary table; the drill pipe is picked up by the elevators, the slips and rotary table bushings removed and the mud wiper forced downward on the drill pipe to a position just below the rotary table. After the bushings have been reinstalled in the rotary table, the mud wiper is ready to operate. This arrangement is shown in Fig. 4, wherein 6 is the rotary table, 7 is the blowout preventer, 8 is the drilling riser, and 9 indicates the bushings in the rotary table. As the drill pipe is raised, upward movement of the wiper with the drill string is blocked by the rotary table bushings and the pressure of the flexed rubber disc is exerted against the drill pipe as shown in Figure 3 and which removes the fluid mud from the outside of the drill pipe. Due to the thin, flexible nature of the wiper, no binding between the rubber and the tubing or pipe can take place as in an oil saver which has large rubber faces forced against the surface of the pipe. Due to a coning action (shown in Figure 3) of the rubber disc forming a small contact face between the wiper and the tubing, the present device permits rapid and substantially complete removal of mud adhering to the drill pipe without danger of binding or jamming of the solid content of the mud fluid between the contact faces and subsequent tearing and disintegration of the elastic wiper.

By the use of the mud wiper herein described, many advantages are obtained. Among others, the performance has been found to be decidedly more satisfactory than the previously used water stream method for mud removal as its operation is entirely automatic and its use eliminates the dilution of the mud fluid through addition of

wash water. Further, the device is simple, compact, easily installed and inexpensive.

It is to be understood that the use of the two steel ring plates 4, which serve to stiffen the assembly and assist in holding the device in position below the rotary table, may be dispensed with while retaining a good portion of the merits of the invention. Likewise, various changes in the size and shape of the different parts, as well as modifications and alterations, may be made within the scope of the appended claims.

We claim as our invention:

1. A wiping device for removing mud adhering to the tubing being withdrawn from a well containing drilling mud, said device comprising a relatively thin flexible disc of elastic material, and means for freely supporting said disc by friction in a slightly conical wiping position about said tubing, said means comprising a central perforation of a diameter slightly smaller than that of said tubing, allowing said disc to fit tightly about said tubing, and two relatively heavy metallic rings clamped together about the circumference of said disc, said circumference being substantially greater than that of the central perforation.

2. A wiping device adapted to be freely mounted between the head of the casing and the rotary table on tubing being withdrawn from a well containing drilling mud, said device comprising

a disc of elastic material and means to support said disc by friction on said tubing in a normally slightly conical wiping position, said means comprising a central perforation in said disc adapted to grip said tubing, and a relatively heavy metallic frame clamped about the circumference of said disc, the path of free travel of said device during tubing manipulating operations being limited in one direction by said casing head and in the other direction by said rotary table.

3. A wiping device for removing mud adhering to the tubing being withdrawn from a well containing drilling mud, said device comprising a relatively thin flexible disc of elastic material, and means for freely supporting said disc by friction in a slightly conical wiping position about said tubing, said means comprising a central perforation of a diameter slightly smaller than that of said tubing, allowing said disc to fit tightly about said tubing, and a relatively heavy metallic annular frame fixedly carried by said perforated disc near the outer circumference of said perforated disc, the inner circumference of said annular frame being substantially greater than the circumference of the central perforation of the disc.

CHARLES S. PENFIELD.
URBAN MORGAN WARREN.