July 10, 1934. W. W. WILLIAMS 1,965,998

WELL CASING PROTECTOR

Filed Aug. 29, 1928

Fig. 1.

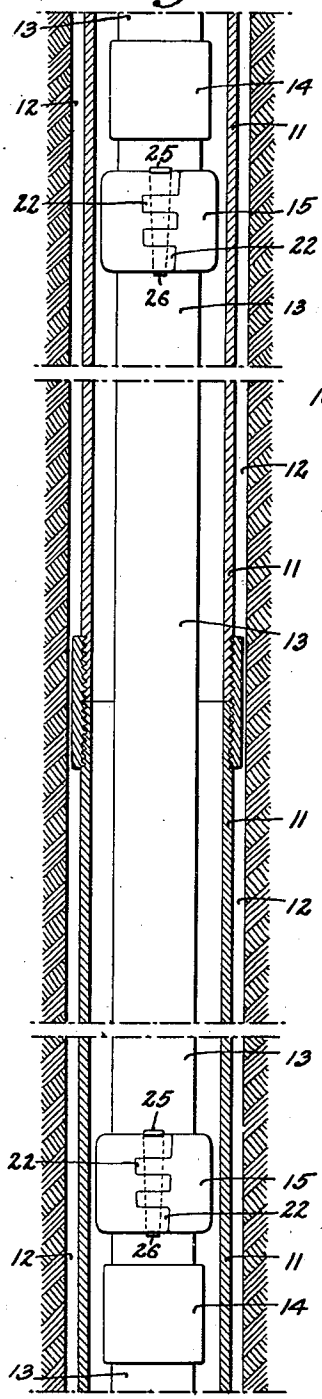


Fig. 2.

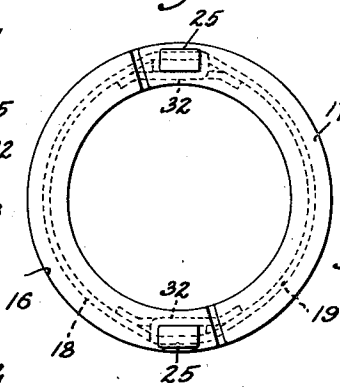


Fig. 3.

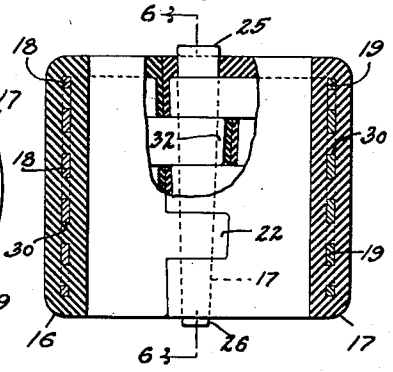


Fig. 4.

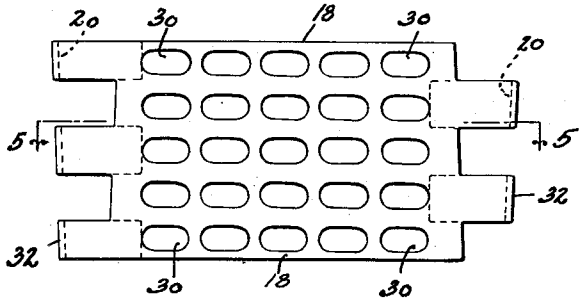


Fig. 5.

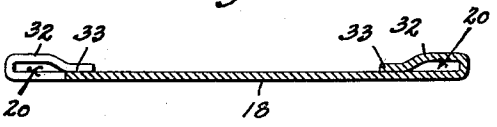
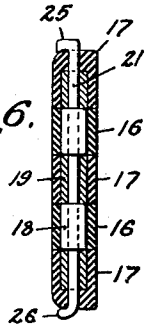


Fig. 6.



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UNITED STATES PATENT OFFICE

1,965,998

WELL CASING PROTECTOR

Willis Waugh Williams, Los Angeles, Calif., assignor of one-third to John B. Elliott, and one-third to Richard Young, both of Los Angeles, Calif.

Application August 29, 1928, Serial No. 302,757

5 Claims. (Cl. 308—4)

My invention relates in general to the art of drilling oil wells by the rotary method of drilling, being more specifically a device forming a protector or guard placed upon a drill string for the purpose of protecting the casing and the drill string from undue wear resulting from engagement therebetween during the rotation movement of the drill string in the casing.

It is a well known fact among those familiar with the art to which this invention relates that oil wells or wells of any nature, due to the variations in the formations through which they penetrate, do not follow a vertical course, but have a tendency to deviate from the vertical, making many curves and irregularities in the path which the casing follows. Due to this fact, the drill string which operates within the casing is necessarily brought into engagement with the inner surface of the casing at various irregular points, and due to its constant rotation and oscillation thereagainst has a tendency to wear and weaken the casing, in many cases resulting in the perforation or collapse of the casing at these points.

Various types of protectors and guides have been developed for obviating the wear of the casing and drill pipe, one form being the subject of an application for patent filed by me on the 9th day of April, 1928, Serial No. 268,746, in which the protector is made of non-metallic substance such as rubber composition or the like reinforced by metal, and my present invention is an improved form over that disclosed in my prior application above referred to.

The principal object of my present invention is to produce a protector of the class described of simple form and construction in which the rubber composition bodies of which the protector is formed overlap at the joints.

It is a further object of my invention to provide an improved protector of the class described with clamping means having a wedge action whereby the protector is prevented from sliding on the drill pipe.

Referring to the drawing which is for illustration purposes only,

Figure 1 is a vertical sectional view of a portion of an oil well showing a portion of a drill string therein in elevation.

Figure 2 is a plan view of one of the protectors embodying a form of my invention.

Figure 3 is a vertical sectional view of the protector shown in Figure 2.

Figure 4 is a face view of one of the reinforcing members.

Figure 5 is a sectional plan view on line 5—5 of Figure 4; and

Figure 6 is a vertical sectional view on line 6—6 of Figure 3.

More particularly describing the form of my invention shown in the drawing, 11 designates a well casing in a well 12, and 13 designates a drill string consisting of lengths of drill pipe connected by means of couplings 14.

Mounted on the drill pipe between the couplings are casing protecting collars 15 which it is understood may be placed at any desired location on the pipe between the couplings 14. Each casing protecting collar consists of two semi-cylindrical segments 16 and 17 formed of rubber composition molded about reinforcing metallic members 18 and 19, the outer ends of the reinforcing members being formed with clamping fingers or loops indicated at 20, each provided with tapered openings to receive a correspondingly tapered locking pin 21.

In the present form of my invention the rubber composition of the segments 16 and 17 extends around the clamping fingers 20 of the reinforcing member thereby forming interlocking members 22 on the rubber body which interlock as shown in Figure 1 so that the outer surface of the collar when assembled is provided with a substantially uninterrupted surface. With this form of collar no extended wearing edges are exposed but a substantially uninterrupted circular face of the collar forms the wearing surface presented to the casing.

The collars may be placed at any desired position on the drill pipe and clamped firmly to the pipe by the insertion of pins 21 which, being of tapered form in engagement with the tapered openings in the fingers 20, draw the two segments of the collars together about the pipe.

The pins 21 are each provided with a flange or head 25 which engages the upper face of the collar, the pins being of sufficient length to permit the ends to be bent over as indicated at 26 in Figure 6. It will be understood that the collars may be readily removed from the drill pipe by straightening the bent end 26 and placing a suitable tool under the head 25 by means of which the pin may be driven out of the fingers 20.

The reinforcing members 18 and 19 are preferably formed of sheet metal provided with a plurality of openings or perforations 30 therein through which the rubber composition is molded, thereby firmly securing the reinforcement in place, and it will be noted from Figure 5 that

the reinforcing member is of sufficient thickness to be non-flexible.

The interlocking fingers 20 are formed on the reinforcing member by stamping co-operating projections 32 and bending these projections back on the body of the metal as indicated at 33 in Figure 5 and fastening the inner ends of such projections in any suitable manner as by spot welding.

What I claim is:

1. A casing protector comprising a non-metallic collar adapted to surround a drill string, a reinforcing metal plate imbedded in said collar, clamping fingers formed on said plate imbedded in said collar and a tapered locking pin in said fingers.

2. A casing protector comprising a non-metallic collar adapted to surround a drill string, a reinforcing metal plate imbedded in said collar, clamping fingers formed on said plate imbedded in said collar and a tapered locking pin in said fingers, said plate having openings extending therethrough through which the material of said collar extends.

3. A casing protector comprising two semi-cylindrical segments adapted to surround a drill pipe, each segment consisting of a reinforcing member, outwardly extending fingers on said reinforcing members, the fingers on one segment being arranged to interengage the fingers on the other segment, and having corresponding tapered openings therein, a non-metallic body molded on each reinforcing member extending around the fingers thereon, and a locking pin extending through the openings in the interengaging fingers.

4. A casing protector adapted to surround a drill pipe comprising semi-cylindrical non-metallic segments, interengaging members formed on said segments having coincident pin receiving openings therein, a locking pin extending through said openings, and a metallic reinforcing member in each segment, said reinforcing member having fingers thereon extending into said interengaging members to form said pin receiving openings.

5. A casing protector comprising: a non-metallic collar adapted to surround a drill string; a reinforcing metal plate embedded in said collar; clamping fingers formed on said plate embedded in said collar; and locking means adapted to co-operate with said fingers.

WILLIS WAUGH WILLIAMS.