

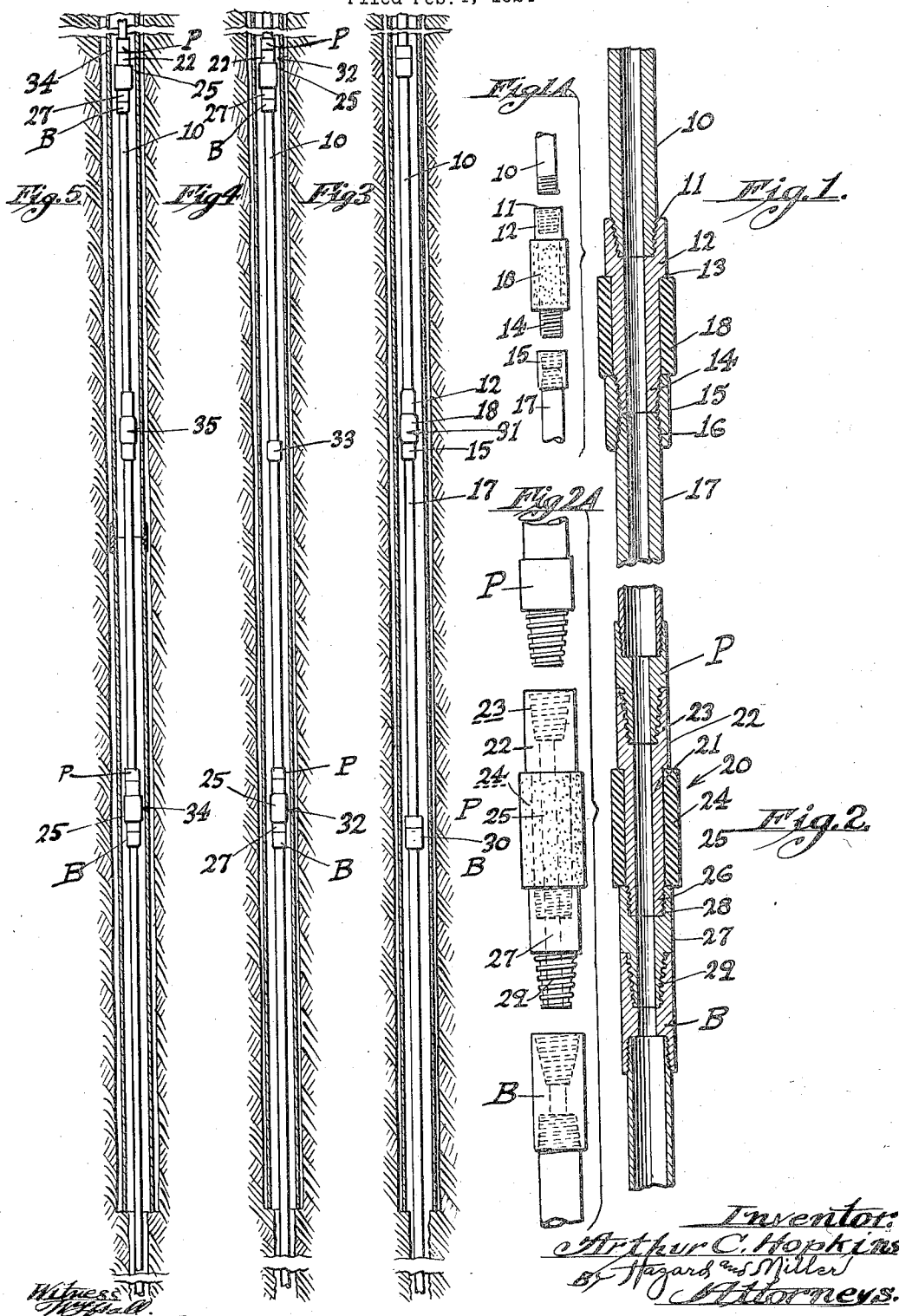
March 1, 1927.

1,619,728

A. C. HOPKINS

CUSHION JOINT FOR ROTARY DRILL PIPES

Filed Feb. 4, 1924



Patented Mar. 1, 1927.

1,619,728

UNITED STATES PATENT OFFICE.

ARTHUR C. HOPKINS, OF COMPTON, CALIFORNIA, ASSIGNOR TO U. S. TOOL CO., A CORPORATION OF CALIFORNIA.

CUSHION JOINT FOR ROTARY DRILL PIPES.

Application filed February 4, 1924. Serial No. 690,507.

This invention relates to rotary drill pipes, and more particularly it relates to cushion joints for such pipes.

In drilling deep wells, such, for example, those having a depth of the order of 3000 feet, a metallic casing, comprising tubes secured end to end, is provided to prevent the caving in of the strata bordering the well. In hydraulic rotary drilling of such wells, a string of connected metallic drill pipes rotates within the casing. When the string becomes very long, it is so flexible that its rotary motion causes it to whip against the casing and wear holes through it where the couplings and tool joints contact with it.

It is therefore an object of my invention to provide cushions, which are preferably made of rubber, on the drill pipes at suitable intervals and at suitable positions to practically eliminate the wear on the casing.

In employing cushions I prefer to position them at the pipe joints and in order to accomplish this successfully I use a novel form of joint.

It is therefore another object of my invention to provide a special form of pipe connection and construction which may be used in combination with a cushion.

With the foregoing objects in view, together with such other objects and advantages as may subsequently appear, my invention consists in the construction and arrangement of parts hereinafter described and claimed and illustrated in the accompanying drawings, in which:—

Figure 1 is a central longitudinal section through a section of drill pipe showing a cushion-retaining member interposed between the standard coupling and a length of drill pipe.

Fig. 1^A is a view showing the parts in Fig. 1 disassembled.

Fig. 2 is a section similar to Fig. 1, showing a cushion-retaining member interposed between the pin and the box of a standard tool joint.

Fig. 2^A is a view of the parts shown in Fig. 2 disassembled.

Fig. 3 is a central longitudinal section of a well casing enclosing a string of pipe sections, two of which are connected by the device illustrated in Fig. 1.

Fig. 4 is a central longitudinal section of a well casing enclosing a string of pipes,

two of which are connected by the device illustrated in Fig. 2.

Fig. 5 is a central longitudinal section of a well casing and a string of pipes therein held together by the devices illustrated in Figs. 1 and 2.

Referring to Fig. 1 for a more detailed description of one form of my invention, the numeral 10 indicates part of a rotary drill pipe length or section, the lower end of which is provided with male threads 11 adapted to engage a threaded recess formed in the upper end of a tubular member 12. The member 12 is reduced in diameter in its lower portion, forming a shoulder or offset 13 and is threaded at its lower end portion 14 which engages the upper part of a standard coupling 15, the lower part of which engages a threaded upper end portion 16 of a pipe 17.

A cushion 18 encircles part of the reduced portion of the member 12, the upper edge of the cushion abutting against the shoulder 13 and the lower edge of the cushion abutting against the upper edge of the coupling 15.

In Fig. 2, a cushion-retaining tubular member 20 is interposed between a pin P and a box B of a standard tool joint.

The cushion-retaining member is comparatively short, usually about 18 to 20 inches long, and comprises a body portion 21 having a head 22 provided with a female thread 23 adapted to receive the male thread of the tool joint pin P, the head portion being of the same diameter as that of the body portion of the pin while a reduced portion 24 is utilized to receive a cushion 25 and terminates with a male thread 26.

In order to hold the cushion on the portion 21 and connect with the box of the tool joint, another tubular member 27 is provided having a female threaded portion 28 at one end adapted to engage the male thread 26 while the other end is provided with a male thread 29 adapted to engage the thread of the tool joint box B.

It will be understood that after the cushion has been placed on the portion 21 of the member 20, the members 20 and 27 are then screwed tightly together and thus form a unit that will not separate when the sections of pipe together with the pin and box are being disassembled.

While unscrewing the sections of drill

pipe, the cushion-retaining member may optionally be unscrewed from the box, leaving the pin and section of pipe in the head 22, or the pin may be unscrewed from the head, leaving the cushion-retaining member in the box; hence it will be seen that it is not necessary to completely disengage the member 20 (as shown in Fig. 2^A), the threaded ends 23 and 26 being provided to accommodate the standard pin and box.

The cushions referred to are preferably made of rubber or resilient material and are of a larger diameter than that of the box and pin or couplings but small enough to allow the insertion of an over shot or fishing tool.

From the construction, it will be seen that the cushions of my invention effectively prevent the coupling and tool joints of the drill pipe from wearing openings in the casing and may be used in connection with the standard couplings or tool joints without making any alteration in same.

In Fig. 3, the usual tool joint is shown at 30, while at 31 the form of connection, with cushion, shown in Fig. 1 is illustrated.

In Fig. 4, the form of connection shown in Fig. 2 is illustrated as being used at 32, while at 33 the usual form of connection employing a coupling is illustrated.

In Fig. 5, 34 and 35 illustrate respectively, the use of the form of connections shown in Figs. 2 and 1.

While I have herein described one form of my invention, modifications thereof may be devised without departing from the spirit thereof, and it is to be understood that such modifications come within the scope of this invention.

What is claimed is:—

1. A string of rotary drill pipe in a hydraulic rotary well drilling apparatus, comprising a plurality of pipe sections, couplings uniting said sections at different points along the string, and resilient cushions mounted on and held by said couplings.

2. A string of rotary drill pipe in a hydraulic rotary well drilling apparatus, comprising a plurality of pipe sections, couplings uniting said sections, and resilient cushions mounted on the couplings and held by engagement with the members thereof.

3. In a rotary drill pipe, a cushion-retaining member having a threaded male end portion and a cushion encircling said member and partially embedded in the periphery thereof, and a tubular member threaded to the cushion-retaining member, one end of said cushion being held against a shoulder formed in the cushion-retaining member, and the other end of said cushion abutting against the end of the tubular member.

4. In a rotary drill pipe, a cushion-retaining member having a threaded male end portion and a cushion encircling said member and partially embedded in the periphery thereof and a coupling threaded to the male end portion of said member, one end of said cushion being held against a shoulder formed in the cushion-retaining member and the other end of said cushion abutting against an end of said coupling.

5. In a rotary drill pipe, a cushion-retaining member having an external shoulder formed thereon, a tubular member attachable to said cushion-retaining member and providing a second shoulder thereon, a cushion disposed between said shoulders, and additional tubular members for connecting said tubular member and cushion-retaining member to adjacent end of pipe sections.

6. In a rotary drill pipe, a tubular section having an external shoulder thereon, a resilient cushion encircling said section and positioned against said shoulder, and a second tubular section threaded upon said section and tightened against said cushion for maintaining the cushion upon the first mentioned section against rotation thereon.

In testimony whereof I have signed my name to this specification.

ARTHUR C. HOPKINS.