June 16, 1925. 1,542,319

R. McD. PYLES.

ROTARY JAR

Original Filed Dec. 10, 1920

Fig. 1

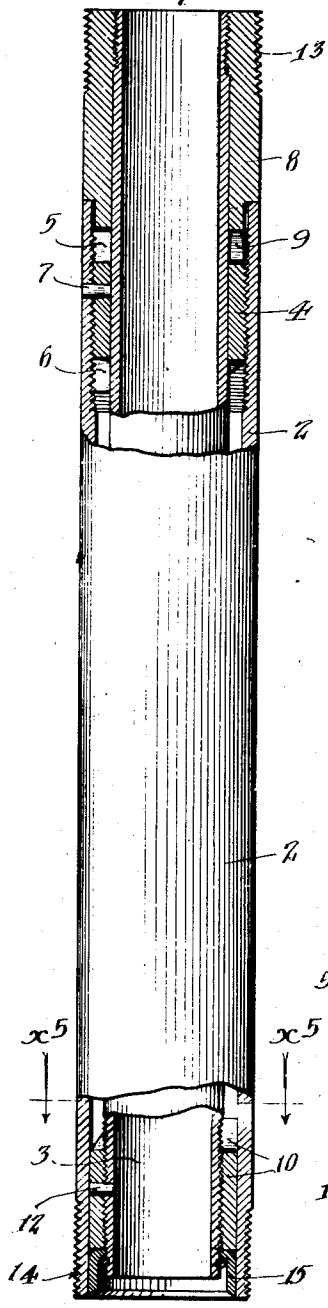


Fig. 2

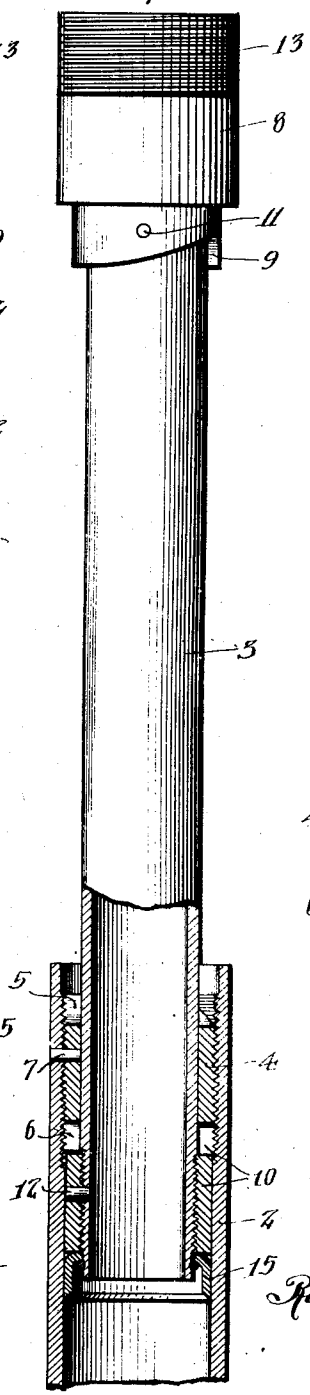


Fig. 3

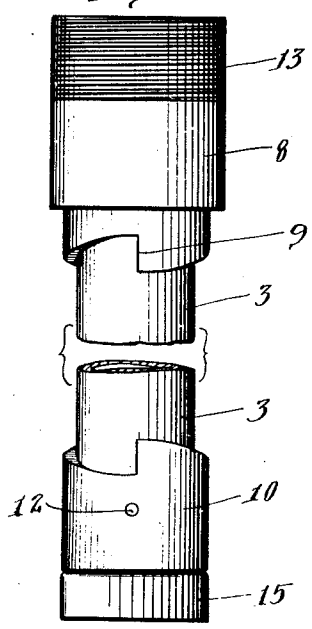


Fig. 4

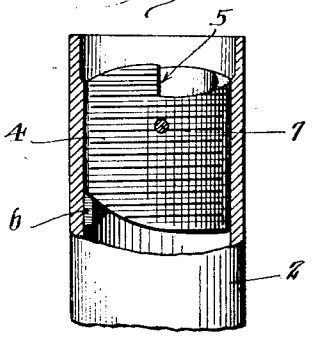
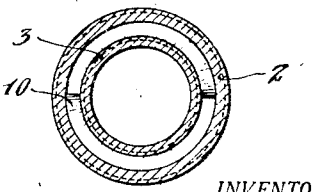


Fig. 5



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UNITED STATES PATENT OFFICE.

ROBERT McDONALD PYLES, OF LONG BEACH, CALIFORNIA.

ROTARY JAR.

Application filed December 10, 1920, Serial No. 429,635. Renewed November 11, 1924.

To all whom it may concern:

Be it known that I, ROBERT McDONALD PYLES, a citizen of the United States, residing at Long Beach, in the county of Los Angeles and State of California, have invented a new and useful Rotary Jar, of which the following is a specification.

My invention relates to a device to be employed with the rotary method of drilling oil or artesian wells and particularly comprises the provision of a jar adapted for use with the rotary method of drilling. In the drilling of oil or artesian wells it is not uncommon for the tools or apparatus being employed in operation to become jammed or wedged in the hole. With the standard or reciprocating method of drilling it has been the practice for some time to employ a device comprising two links as an aid in freeing the apparatus so jammed or wedged. In the art such devices have become known as jars and their operation has been termed jarring.

With the rotary method of drilling as distinguished from the standard or reciprocatory method, so far as I am aware, no apparatus or device will be found in the art for jarring. It is not uncommon with the rotary method of drilling to meet with a jamming or wedging of the drill string similar to that experienced with the standard method of drilling. The principal object of my invention is to provide means for jarring adapted for use with the rotary method of drilling.

Such a device, to be practical for use with the rotary method of drilling, must maintain a rotatable connection between the string above and below the device. Further, such a device should not interrupt the tubular passage formed by the rotary drill pipe.

A further object of my invention is to provide a rotary jar of the kind described which will be economical in manufacture and durable and safe in operation.

In the following specification and in the accompanying drawings I have disclosed a preferred mechanical embodiment of my invention.

In the drawings:

Figure 1 is a vertical elevation partly in section of a rotary jar embodying my invention, wherein the parts are illustrated with the drive member telescoped to the lower limit within the driven member.

Fig. 2 is a vertical elevation of the device illustrated in Fig. 1, but with the drive member withdrawn from the driven member to the uppermost limit.

Fig. 3 is a vertical elevation taken at right angles to Fig. 2 of the spaced clutch elements carried by the drive member.

Fig. 4 is a fragmentary section of the uppermost end of the driven member illustrated in Figs. 1 and 2, illustrating the cooperating clutch members mounted within the upper end of the driven member.

Fig. 5 is a horizontal section taken on the line indicated by x^5—x^5.

Referring to the drawings 2 indicates a driven member preferably taking the form of a section of pipe. A drive member 3 is formed preferably of a section of pipe of smaller diameter than the pipe 2; the member 3 being telescopically slidable within the member 2.

The driven member 2 is preferably inwardly threaded at its upper end to receive and support a threaded sleeve 4. The sleeve 4 is provided at its upper end with a clutch element 5 and at its lower end with a clutch element 6. The sleeve 4 is keyed in position to the driven member 2 preferably by a stud 7.

The drive member 3 is provided at its upper end with a head 8 and clutch element 9 adapted to cooperate with the clutch element 5 on the sleeve 4. At its lower end the drive member 3 is provided with a clutch element 10 adapted to cooperate with the clutch element 6. In practice the head 8 and clutch element 10 are preferably screw threaded upon the drive member 3 and are keyed thereto by means of studs 11 and 12 respectively.

The device is assembled by inserting the upper end of the drive member 3 (with the head 8 removed) through the driven member 2, from the lower end thereof upward, until the upper end of the drive member 3 projects above the upper end of the driven member 2, whereupon the head 8 is threaded and keyed in position. In operation the device is positioned at any desired point in a string of drill pipe, by means of a collar screw threaded upon the threads 13 formed on the head 8 and by means of a second collar threaded upon the screw threads 14 formed at the lower end of the driven member 2. In this position the device will comprise a portion of the drive string and the tube-like structure of the

members 2 and 3 will maintain the circulation channel or passage extending throughout the string. The gasket or washer 15 is mounted on the lower end of the drive member 3 within the driven member 2 to insure that any liquid passing through the circulation channel will not escape at the union between the members 2 and 3.

In case the string equipped with this device should become wedged or jammed the device enables the string to be released by jarring. For example, the portion of the string below the device may be jarred down by elevating the portion of the string above the device until the drive member 3 has been withdrawn until it projects above the driven member 2 as illustrated in Fig. 2. The upper portion of the string may then be released or run downwardly with great rapidity and the portion of the string below the device will be jarred violently upon the clutch element 9 striking the clutch element 5. To jar up, the portion of the string above the device is lowered until the drive member 3 is telescoped completely within the driven member 2 as illustrated in Fig. 1. If the portion of the string above the device be thereupon raised rapidly the striking of the clutch element 10 upon the clutch element 6 will produce a violent upward jarring of the portion of the string below the device. By repeating either the jarring up or jarring down as the case may be, the portion of the string below the device will be ultimately loosened.

The spaced clutch elements 9 and 10 and the cooperating clutch elements 5 and 6 provide means for maintaining the rotatable connection between the drive and driven members. For example, if the parts of the device be in the position illustrated in Fig. 1, the rotatable connection will be maintained by the clutch element 9 engaging the clutch element 5 and if the parts be in the position illustrated in Fig. 2 the rotatable connection will be maintained through the clutch elements 10 and 6. Preferably the clutch elements have the form of ratchets as it is only necessary to maintain the rotatable connection in one direction of rotation in rotary drilling.

While I have heretofore set forth a preferred mechanical embodiment of my invention, the latter is in no manner limited to the illustrated mechanical details of construction, and my invention contemplates a variation of form by the substitution of mechanical equivalents.

I claim:

A rotary jar comprising a tubular drive section, and a tubular driven section telescopically united for relative longitudinal movement, an abutment on one section having opposite clutch surfaces, opposed abutments on the other section having clutch surfaces for alternate cooperation with the clutch surfaces of said first named abutment, said opposed abutments being relatively spaced to permit longitudinal sliding of one section upon the other to forcefully dash the cooperating clutch surfaces together on opposite strokes of the drive section and the cooperating clutch surfaces being formed to intermesh to establish rotary connection of the two sections at opposite ends of the longitudinal stroke of the drive section.

Signed at Los Angeles, California this 2d day of December 1920.

ROBERT McDONALD PYLES.

Witnesses:
LEONARD S. LYON,
L. BELLE WEAVER.