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HYDRAULIC ROTARY DRILL STEM

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Fig. 1.

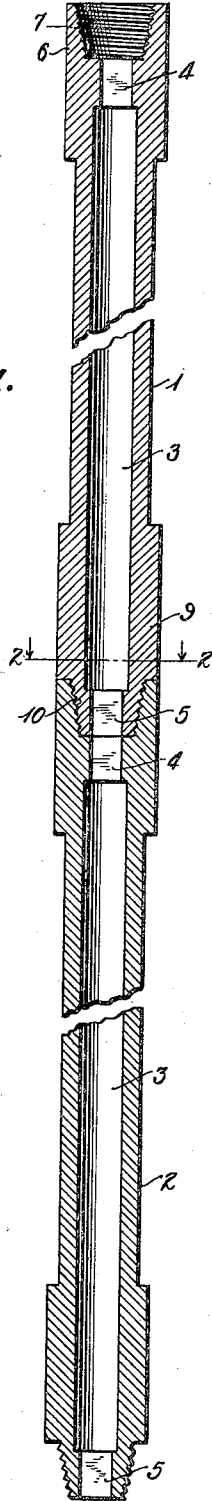
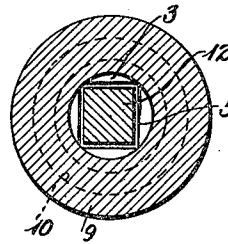


Fig. 2.



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HYDRAULIC ROTARY DRILL STEM.

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The invention relates to improvements in drill stems for use in connection with hydraulic rotary drills generally employed in the drilling of oil wells and the like.

5 In drills of this character the drill stem usually consists of a plurality of complementary pipe sections threaded together. In the operation of the hydraulic rotary drill this drill is generally rotated in a clockwise direction. Frequently the bit or pipe becomes 10 wedged in the well and the pipe is twisted in two. In such cases it is frequently necessary to rotate the stem in a counter clockwise direction to relieve its engagement with the 15 walls of the well before the stem can be withdrawn. In prior art practices this counter clockwise rotation of the stem has frequently resulted in a separation of the threaded sections constituting the stem causing portions 20 of the stem to be left in the hole or well, the removal of which is a serious and expensive problem.

The present invention relates to a drill stem which may be rotated with ease in either a 25 clockwise or counter clockwise direction without any danger of unthreading the sections of the drill stem.

With the foregoing conception in mind the invention primarily consists in providing each 30 drill stem section at each end thereof with a square or other irregularly formed opening capable of receiving a similarly formed turning tool which is inserted in the drill stem so that when either this tool or the drill 35 stem is moved in a counter clockwise direction or in a direction opposite to the lead of the threads coupling said sections, the stem may be revolved without separating the connected sections. It will be understood that 40 these drill stems are formed with circular water feeding openings, and in my invention the openings intermediate the ends of each drill stem section are circular, while such openings at the ends of each section are square or 45 of some other irregular shape.

In the accompanying drawings,

Figure 1 represents a sectional view through a pair of connected drill stem sections.

50 Figure 2 represents a horizontal section view taken on the line 2-2 of Figure 1, showing the longitudinal polygonal locking tool 12 in place.

Referring now more particularly to the 55 drawings wherein like reference characters indicate corresponding parts, the numerals 1

and 2 designate a pair of connected drill stem sections which are generally of a length of 22 feet or more. A drill collar constructed in accordance with this invention carries 60 the drilling bit. The drill stem is, of course, at times of a length upwards of several thousand feet, depending upon the depth of the well. When a well is of such a depth the desired number of stem sections are employed. 65 Each stem section has an intermediate or central aperture 3 which is preferably round and through which water or other liquid passes to the drill. In the past the central openings 3 in these sections have been uniformly round 70 throughout the length of these sections. The central opening 3 in each stem section near each end is provided with rectangular openings 4 and 5. These openings may be oblong or any other irregular shape, but cannot 75 be circular. The drill stem section 1 is formed with a box end 6 threaded at 7 to receive the pin end of an adjacent section. Each section is likewise formed with a pin end 9 provided with threads 10, both the pin end and 80 box end of each section being tapered. It will be apparent from this description that the section may be freely united by screwing the pin end of one section into the box end of an adjacent section. The threads have a 85 right end lead because in operation the stem is rotated clockwise for the purpose of revolving or rotating the drill in the well or hole.

It frequently happens that the drill or some parts of the apparatus become jammed or 90 wedged in the well or hole, and in fact the drill stem is often twisted in two. In cases of this character it is necessary to rotate the drill stem in a counter clockwise direction to release any binding that may be occurring between the drill, the stem and the walls of the 95 hole or well before the stem can be withdrawn. With right hand threads such a rotation has frequently caused the drill stem sections to separate when using the prior art 100 devices. Should such a condition be encountered, however, when using a drill stem and drill constructed in accordance with this invention a square or rectangular tool 12 as 105 shown in Figure 2 is inserted in the hollow drill stem. This tool is of a shape conforming to the shape of the square openings 4 and 5 at each end of each drill section. When the tool is inserted in the drill stem and the drill stem then rotated counter clockwise it naturally 110 backs off the drill stem and the drill without in any way causing a counter clock-

wise rotation of adjacent drill stem sections because said sections are locked and all move together. This counter clockwise rotation is continued until the drill and the stem are so disengaged from the walls of the well that the stem can be freely removed. It is apparent that this rotation may be effected without danger of disengaging any section of the stem from an adjacent section thereof.

10 Having thus described my invention, what I claim is:

1. A drill stem comprising a plurality of hollow rotary drill stem sections adapted to be associated together in end to end aligned relation, screw means for securing the adjacent ends of said sections together for rotation in unison in one direction, the adjacent ends of said sections being formed with registering axially aligned passages of non-circular contour, said passages being adapted for reception of a locking tool passed axially through the several sections of the drill stem, whereby to lock any desired number of said sections together for rotation in unison in the opposite direction.

2. A drill stem comprising a plurality of hollow rotary drill stem sections adapted to be associated together in end to end aligned relation, screw means for securing the adja-

cent ends of said sections together for rotation in unison in one direction, the adjacent ends of said sections being formed with registering axially aligned passages of non-circular contour, and the non-circular passages of each pair of adjacent ends being arranged in registering relation, whereby a locking tool may be passed axially through the several sections of the drill stem for locking any desired number of said sections together for unitary rotation in any direction.

3. A drill stem comprising a plurality of hollow rotary drill stem sections having a threaded joint connection one with the other, the threads of the several joints being correspondingly directed whereby said drill stem may be rotated in one direction without unscrewing said sections, the adjacent ends at each joint being provided with non-circular passages in registration and the passages of the several joints being arranged in registration, whereby a non-circular locking element may be inserted axially through said drill stem for the purpose of locking any desired number of said sections together for rotation in either direction.

In testimony whereof I affix my signature.

EARL A. REED.