

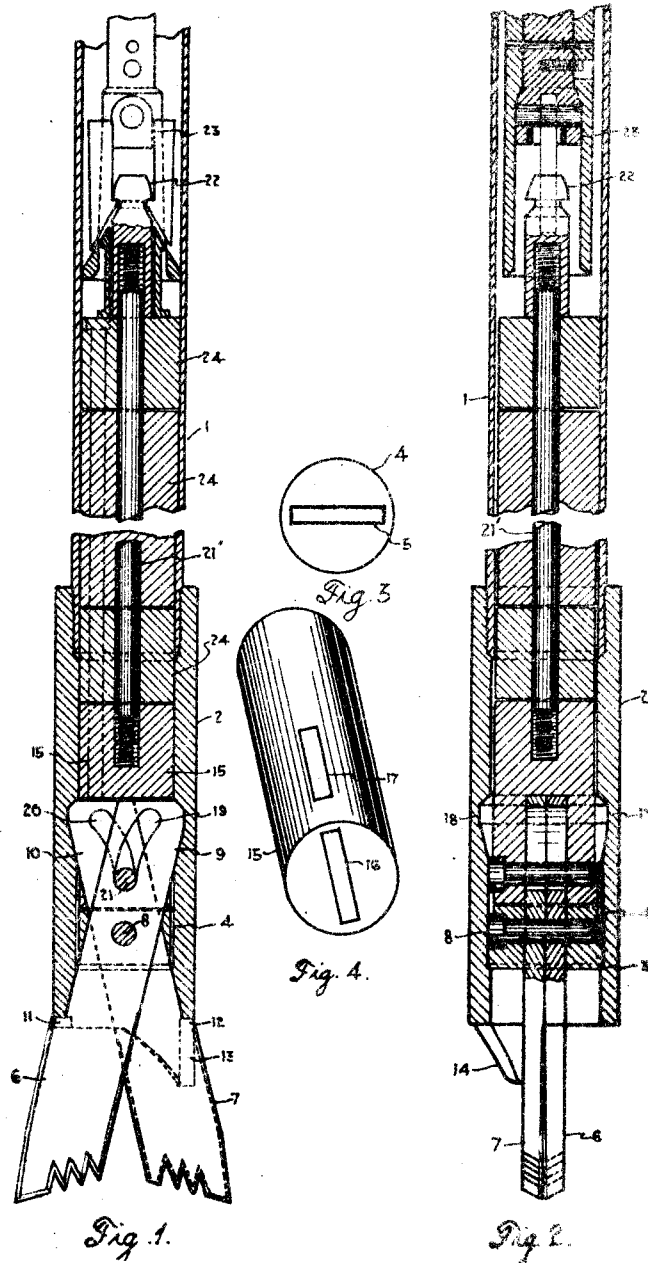
R. P. O'BRIEN.

DRILL.

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1,058,013.

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ROBERT P. O'BRIEN, OF HOUSTON, TEXAS.

DRILL.

1,058,013.

Specification of Letters Patent.

Patented Apr. 1, 1913.

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To all whom it may concern:

Be it known that I, ROBERT P. O'BRIEN, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented certain new and useful Improvements in Drills, of which the following is a specification.

My invention relates to new and useful improvements in drills.

The object of the invention is to provide a drill which is adapted to be used for boring deep wells with rotaries and which is so constructed that it may be readily removed from and replaced on the drill pipe, without removing said pipe from the well.

With the above and other objects in view, the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawings, wherein—

Figure 1 is a sectional side elevation of the drill showing the same secured to a drill stem, which is shown in section, and also showing a fishing tool engaged over the head of the drill rod. Fig. 2 is an edge view of the drill and also showing the drill stem in section. Fig. 3 is a plan view of the block in which the drill bits are fulcrumed, and Fig. 4 is a side elevation of the bit operating block.

Referring now more particularly to the drawings, wherein like numerals of reference designate similar parts in each of the figures, the numeral 1 refers to a drill stem such as is used ordinarily in rotary drilling and which is rotated by the ordinary rotary, (not shown.) To the lower end of this stem is screwed a tubular bushing 2, the lower end of the bore of which is slightly reduced, forming an annular shoulder 3 which is designed to limit the downward movement of the fulcrum block 4. This block 4 has a vertically extending slot 5 through which the bits 6 and 7 extend and a pin 8 extends through said block and the shanks of said bits upon which the bits are pivoted. The bits are toothed at their lower or cutting ends and are elongated into upwardly extending shanks 9 and 10, the shanks being offset relative to the bits proper, so as to form shoulders 11 and 12 upon which the lower end of the bushing rests when said bits are in position for service. The lower end of the bushing 2 is

provided with two downwardly extending braces 13 and 14 arranged behind the respective bits 6 and 7 and bracing thereagainst for the purpose of strengthening said bits.

Arranged within the bushing 2 and above the block 4 is a bit operating block 15. The lower end of this block is provided with a vertically extending slot 16 into which the upper ends of the bit shanks 9 and 10 extend and this block is provided on each side with laterally extending slots 17, 17 through which the outer edges of the shanks 9 and 10 project when the bit is in position for use. The projecting portions of said shanks rest in a recess 18, which extends around the inner wall of the bushing 2.

Extending through the block 15 and also through arcuate slots 19 and 20 in the bit shanks is the pin 21. The slots 19 and 20 are curved in opposite directions so that as the block 15 is moved upwardly the pin 21 will slide along in the slots 19 and 20 and force the upper ends of the shanks in a coinciding position, which will in turn exert a similar effect upon the bits 6 and 7, and the upper ends of said shanks will be disengaged from the recesses 18, 18 and the shoulders 11 and 12 of the bits 6 and 7 will be disengaged from the lower end of the bushing 2, and when the block 15 is forced downwardly, the pin 21 will exert an opposite effect and force the upper ends of the shanks into the recesses 18, 18 and cause the shoulders 11 and 12 to engage underneath the lower end of bushing 2.

Into the upper end of the block 15 I have screwed a shaft 21' whose upper end carries a head 22. When it is desired to remove the bit from the drill stem, a fishing tool 23 of any well known construction, is engaged over the head 22 and an upward pull exerted thereon through a suitable cable, (not shown.) This upward pull operates to elevate the block 15 and the pin 21, carried thereby, and to disengage the bits from the bushing, as hereinbefore described and the drill may then be withdrawn through the casing without removing said casing, and as is obvious, the drill may be lowered in the casing and secured in position in the bushing in the manner hereinbefore set forth.

Surrounding the shaft 21' and resting upon the block 15 is a plurality of weights

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24 which operate to hold the pin 21 at the lower end of the slots 19 and 20 and thus secure the bits in position for service.

In order to remove the bits now in common use from the drill pipe, it is necessary to withdraw the entire pipe from the bore, but a bit of the construction herein described and illustrated in the drawings accompanying this specification may be withdrawn from or secured on to the drill pipe while the same is suspended in the bore and a bit of this character may thus be removed and replaced in much shorter time and with less labor than would be the case in removing and replacing bits of this character now in common use.

What I claim is:—

1. A device of the character described including a suitable bushing and a bit support therein, a plurality of bits pivotally mounted in said support and arranged to engage with the lower end of said bushing and means engaging with said bits for disengaging the same from said bushing.

2. A device of the character described including a bushing and a bit support therein, a plurality of bits pivotally mounted in said support and engaging against the lower end of the bushing and locked against vertical movement therein, a means connected to said bits for disengaging said bits whereby they may be elevated vertically through said bushing.

3. A device of the character described including a suitable bushing and a bit support therein, a plurality of bits arranged to lock against said bushing, shanks carried by said bits and pivotally secured to said support and a vertically movable mechanism secured to said shanks and arranged to disengage the bits from the bushing as said mechanism is moved upwardly.

4. A device of the character described composed of a suitable bushing, a vertically movable bit support carried therein, a plurality of bits secured against vertical movement by the lower end of the bushing, elongated shanks integral with the bits and pivotally secured to said support, each of said shanks being provided with an arcuate slot, a block into which said shanks extend and a pin extending through said block and extending through the slots in said bit shanks, a means for elevating said block whereby said bits are disengaged from said bushing and withdrawn within the same.

5. A device of the character described composed of a suitable bushing having an

annular recess around the inner wall thereof, a vertically movable bit support carried therein, an annular shoulder near the lower end of the said bushing and projecting inwardly therefrom upon which said support normally rests, a plurality of bits, provided with shoulders, arranged to engage against the lower end of said bushing, elongated shanks integral with the bits and pivoted to said support, each of said shanks being provided with an arcuate slot, said slots diverging from each other, a block into which said shanks extend, said block being provided with lateral slots through which the outer edges of the shanks project into the recess in the inner wall of said bushing when said bits are in position for use, a pin extending through said block and also through the slots in said shanks, and a rod secured to said block for elevating the same whereby said pin is moved upwardly in the arcuate slots and the bits disengaged from said bushing and withdrawn within the same.

6. A device of the character described composed of a suitable bushing having an annular recess around the inner wall thereof, a vertically movable bit support carried therein, an annular shoulder near the lower end of the said bushing and projecting inwardly therefrom upon which said support normally rests, a plurality of bits, provided with shoulders, arranged to engage against the lower end of said bushing, braces integral with said bushing and extending downwardly therefrom and bracing against said bits, elongated shanks integral with the bits and pivoted to said support, each of said shanks being provided with an arcuate slot, said slots diverging from each other, a block into which said shanks extend, said block being provided with lateral slots through which the outer edges of the shanks project into the recess in the inner wall of said bushing when said bits are in position for use, a pin extending through said block and also through the slots in said shanks, and a rod secured to said block for elevating the same, whereby said pin is moved upwardly in the arcuate slots and the bits disengaged from said bushing and withdrawn within the same.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT P. O'BRIEN.

Witnesses:

MAY MONTGOMERY,
H. R. DECKER.