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1,641,321

J. R. CUBLEY

ROTARY DRILL BIT

Filed Jan. 12, 1923

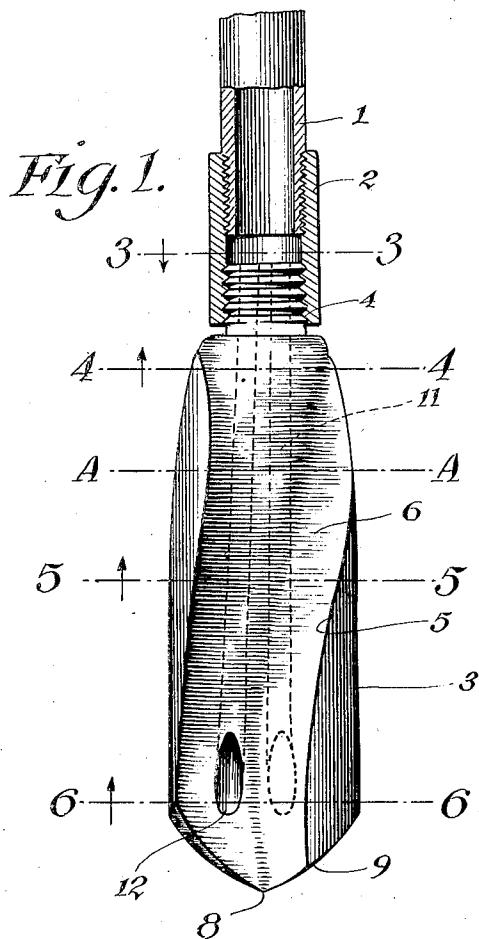


Fig. 3.

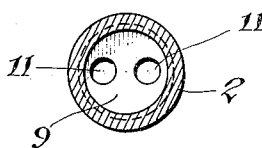


Fig. 4.

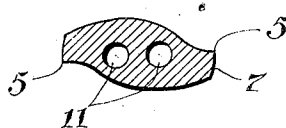


Fig. 6.

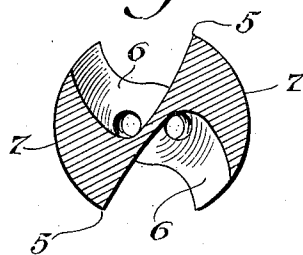


Fig. 5.

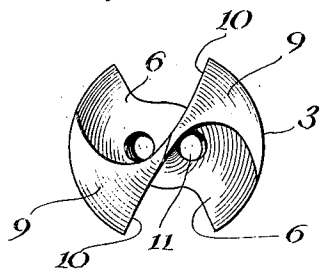
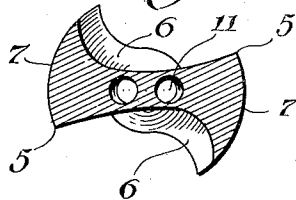


Fig. 2.

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ROTARY DRILL BIT.

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My invention relates to rotary drill bits for oil wells and the like, and has for its object to provide such a bit which will cut through hard formations, such as rock, and also through the softer formations with equal facility; thereby eliminating the need for changing drill bits from time to time as different formations are reached in the boring operation.

10. Another object of the invention resides in positioning the water outlets adjacent the lower end of the bit in order that the descending water will not interfere with the cuttings as they move upwardly through the channels of the bit.

- 15 A further object of the invention is the provision of a rotary drill bit in which the channels of the bit increase in cross section toward the top of the bit in order to avoid congestion of the cuttings and permitting their free passage up through the channels.

- 20 In securing drill bits to the coupling it is always necessary to strike some heavy blows against the upper portion of the bit in order that the latter may be securely locked in place. Drill bits of usual construction are invariably damaged by this hammering, due to the fact that a portion of the material of the bit is swaged over the channels at their upper ends, thereby partly closing the channels and preventing the ready upward flow of the cuttings. It is an object of the present invention to overcome this difficulty by gradually increasing the cross sectional area of the channels toward the top of the bit.

- 25 Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of the drill bit, showing the drill coupling in section.

Figure 2 is an end view of the bit.

Figure 3 is a horizontal section taken on line 3—3 of Figure 1.

Figure 4 is a horizontal section taken on line 4—4 of Figure 1.

Figure 5 is a horizontal section taken on line 5—5 of Figure 1, and

Figure 6 is a horizontal section taken on line 6—6 of Figure 1.

Referring to the drawings more in detail, the numeral 1 indicates the shaft of the drill outfit and 2 the coupling by which the drill bit 3 is connected to the shaft 1.

The drill bit 3 is formed with a neck or shank 4, which is threaded to receive the

coupling 2. Extending downwardly from the neck 4 is the head of the drill bit which is formed with two spiral cutting edges 5, which form therebetween the channels 6. The flukes or webs 7 on which the cutting edges 5 are formed are so proportioned and arranged that the cross sectional area of the channels 6 is uniform up to the point A (Figure 1) and from thereon gradually increases towards the top of the bit so as to provide sufficient space for the passage of the cuttings which rise therethrough and pass upwardly through the hole being bored. Furthermore, the maximum diameter of the bit head is uniform from the bottom up to the line A—A, and from this point upward the maximum diameter of the head gradually decreases. It may be here stated that in attaching drill bits to the shaft it is necessary to hammer the bit at its upper end in order to properly lock the same in relation to the shaft. In ordinary drill bits such hammering swages over a portion of the material of the bit and thereby partly closes the channels through which the cuttings pass. By having the cross sectional area of the channels increased as above described this defect is avoided in the present construction. The lower end of the bit is formed with a centering point 8 which is formed by the flukes 7 and by cutting back the facets or supporting heels 9 to an angle of about 45° with the horizontal. These facets 9 are, of course, sharpened on their forward edges and provide the initial cutting edges 10.

Extending downwardly through the body of the drill bit 3 are a plurality of water passages 11. These passages open into the channels 6 at a point adjacent the lower end of the bit, as indicated at 12. It is of paramount importance that the water be directed to the point of action of the bit without interfering with the ascent of the cuttings, and it is for this reason that the openings 12 are placed as near the lower end of the bit as possible.

Due to wear on the bit during action and during sharpening, the head is gradually shortened and the lower end would in time reach and pass the openings 12. To avoid this I have so positioned the passages 11 that there is a relatively thin wall between the base of each channel 6 and its passage 11. As the length of the head is shortened as above described, a portion of the thin wall separating the channel and passage may be

cut away, thereby raising the water exit 12 to the desired extent.

From the foregoing description when taken in connection with the accompanying drawings it will be observed that I have provided a bit which may be used in connection with either hard or soft formations, and also one which permits of a free exit of the cuttings at all times.

10 In accordance with the patent statutes, I have described what I now believe to be the best embodiment of the invention, but I do not wish to be understood thereby as limiting myself or the scope of the invention, as 15 many changes and modifications may be made without departing from the spirit of the invention; all such I aim to include in the scope of the appended claims.

What I claim as new and desire to secure 20 by Letters Patent is:

1. A drill bit including a head portion and a shank, said head portion provided with a single channel on either side thereof, said channels extending substantially longitudi- 25 nally of the head, flukes forming said channels, the sides of the flukes forming the walls of the channels being helical surfaces with

constantly increasing outward flare until merging into substantial coincidence with the channel bottoms, at the top of the head. 30 thereby increasing the cross-sectional area of the channels.

2. A drill bit including a head portion and a shank, said head portion provided with a single channel on either side thereof, said 35 channels extending substantially longitudinally of the head, flukes forming said channels, the sides of the flukes forming the walls of the channels being helical surfaces with constantly increasing outward flare until 40 merging into substantial coincidence with the channel bottoms at the top of the head, thereby increasing the cross-sectional area of the channels, said head portion further provided with longitudinal passages adjacent 45 the center line of the body portion thereof and opening into said channels adjacent the point of the bit, the wall between said passages and channels being relatively thin, whereby as the head is shortened through use 50 the position of the passage openings may be raised accordingly.

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