Sept. 16, 1924. 1,508,443

W. G. CHRISTIAN

DRILL BIT

Filed Jan. 29, 1923

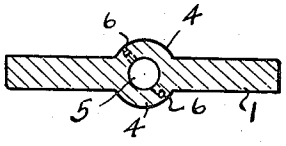


Fig. 4.

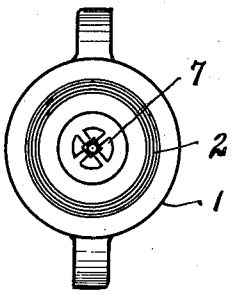


Fig. 5.

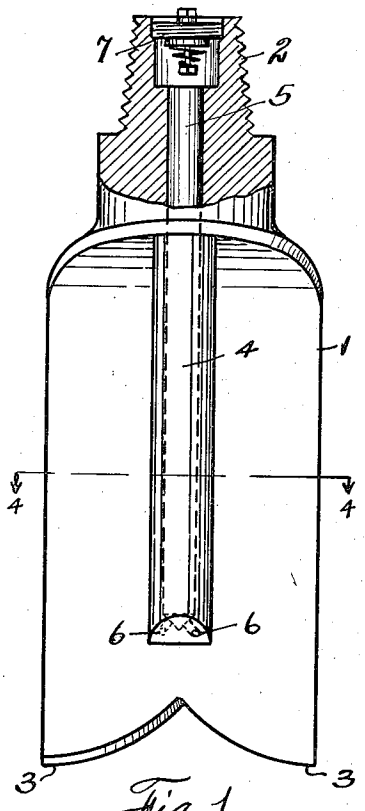


Fig. 1.

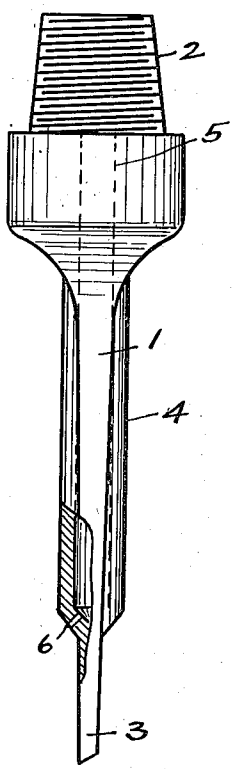


Fig. 2.

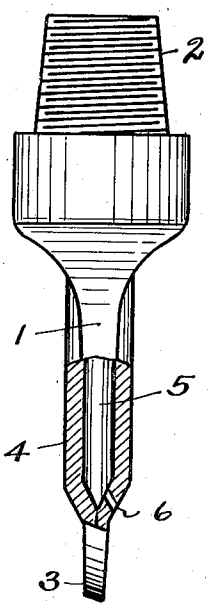


Fig. 3

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UNITED STATES PATENT OFFICE.

WALTON G. CHRISTIAN, OF HOUSTON, TEXAS.

DRILL BIT.

Application filed January 29, 1923. Serial No. 615,573.

To all whom it may concern:

Be it known that I, WALTON G. CHRISTIAN, 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 Drill Bits, of which the following is a specification.

This invention relates to new and useful improvements in a drill bit.

One object of the invention is to provide a drill bit of the character described which is formed with an elongated flat blade having a substantially cylindrical center, said cylindrical portion extending axially relative to said blade and being provided with a single water course from the upper end of the bit shank down through said cylindrical portion, said water course terminating at its lower end in suitable discharge ports through which water may be discharged on opposite sides of the blade toward the cutting points of the bit.

Another object of the invention is to provide a bit of the character described which is of such formation that it may be sharpened from time to time as it wears away, thus renewed for reuse and the life of the bit thus materially lengthened.

A still further object of the invention is to provide a bit for drilling wells having a relatively large centrally located water course, extending from the upper end thereof downwardly and terminating in restricted ports through which water may be cast on opposite sides of the blades or cutters forming part of the bit.

A further feature of the invention resides in the provision of a bit of the character described having a single central water course extending down along the axial line of the bit blade and terminating in discharge ports at its lower end, the upper end of said water course being protected by a back pressure valve which will prevent the inflow of water or mud through said ports thus preventing the clogging of the water course or ports.

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 side view of the bit.

Figure 2 is an edge view thereof shown partly in section.

Figure 3 is an edge view of the bit after it has become partly worn away and has been sharpened for reuse, shown partly in section.

Figure 4 is a cross sectional view taken on the line 4—4 of Figure 1 and,

Figure 5 is an upper end view of the bit.

In the drawings the numeral 1 designates the body of the bit whose upper end is reduced and formed into an outwardly threaded neck 2 for the attachment of the drill stem.

The lower end of the bit is formed with oppositely beveled cutting blades 3, 3. The bit 1 is flat and of substantially uniform thickness. Along its central or axial line the body is formed cylindrical as at 4, said cylindrical portion being formed integrally with the rest of the body and extending from the shank down near the cutting blades 3. This formation materially strengthens the blade along the axial or central line and prevents it from splitting or twisting off. There is a water course 5 extending from the upper end of the shank down through said cylindrical portion to the lower end thereof. On opposite sides of the body the lower end of the cylindrical portion 4 has the discharge ports 6, 6 through which the water is cast onto the opposite sides of the bit and these ports are deflected toward the respective cutting points 3, 3 so as to throw the water onto said cutting points, all of which is illustrated in Figure 1. The water is forced to the cutting points of the bit under considerable hydraulic pressure so as to carry away the cuttings of the bit. The upper end of the bore 5 is enlarged and in said enlarged portion there is a back pressure valve 7 of conventional construction which permits the water to flow down through said water course 5 from the drill stem, but prevents any back

flow of fluid up through said water course so that mud or other clogging material can not enter into and plug up the discharge ports 6. This valve mechanism is not indispensable, but may be used if desired. As the blades wear away and the bit requires sharpening the lower end of the cylindrical portion 4 may be flattened to conform to the contour of the rest of the bit and new discharge ports 6 punched therein and the blades 3, 3 may then be reformed and sharpened and practically a new bit produced. This process may be repeated as often as required until the body of the bit is entirely worn away.

The central water course 5 may be extended any desired distance downwardly through the bit, but at its lower end terminates in restricted outlet ports 6, as above described through which the water is discharged on opposite sides of the blade. In many cases the valve 7 will not be used, and as the bit descends through the mud or mud laden water, the water course 5 may become plugged up, but the pressure from the pump when drilling starts will force this plugging material out through the ports 6, and when one of said ports is open, the pump pressure while somewhat relieved, is still sufficient, on account of the short length of the ports, to clean out the other one. By the pump pressure, the water course 5 will necessarily be cleansed out in order to relieve one of the ports, and the other port will also be readily unstopped by the pressure. It often happens that when the independent water courses are used, and they become clogged up, the pump pressure will force the clogging material out through one of said water courses, and the pressure will thereby be relieved to such an extent that the other water courses will remain clogged, and water will be supplied to only one side of the bit.

What I claim is:—

1. A drill bit including an elongated flat relatively thin body, having a centrally located vertical rib on each side formed integrally therewith, and whose lower end is formed with cutting blades, said bit having a single water course which extends from the upper end thereof and continues down within said ribs near the lower end thereof, the lower ends of the ribs being provided with water ports through which water may be discharged on opposite sides of said body the upper end of said water course being enlarged and a back pressure valve located in said enlarged portion.

2. A drill bit including an elongated flat body, a reinforcing vertical rib on opposite sides of said body, said ribs being formed integrally with the body and forming an axial cylindrical section for the body which extends from the bit shank to near the lower end of the bit, cutting blades into which the lower end of said bit is formed, said bit having a vertical water course the upper end of which is enlarged leading from the upper end thereof down through said cylindrical section, said water course at its lower end terminating in restricted diverging discharge ports through which water is discharged on opposite sides of the body toward the respective cutting blades and a back pressure valve located in said enlarged portion.

3. A drill bit including an elongated flat body, a reinforcing vertical rib on opposite sides of said body, said ribs being formed integrally with the body and forming an axial cylindrical section for the body which extends from the bit shank to near the lower end of the bit, cutting blades into which the lower end of said bit is formed, said bit having a vertical water course the upper end of which is enlarged leading from the upper end thereof down through said cylindrical section, said water course at its lower end terminating in restricted diverging discharge ports through which water is discharged on opposite sides of the body toward the respective cutting blades, and a back pressure valve controlling said water course said back pressure valve being located at the upper end of said water course in said bit.

4. A drill bit including an elongated flat body having a centrally located vertical cylindrical portion formed integrally with the body, said bit having a single water course leading from the upper end thereof down through said cylindrical portion and terminating in restricted discharge ports which lead from the lower end thereof and through which water may be discharged on opposite sides of said body and a back pressure valve located in the head of said bit.

5. A drill bit of the fish-tail type including an elongated flat body having a centrally located vertical cylindrical portion formed integrally with the body extending from the lower end of the shank to near the lower end of said bit, said bit having a single water course leading from the upper end thereof down through said cylindrical portion and terminating in restricted discharge ports which lead from the lower end thereof and through which water may be discharged on opposite sides of said body, and a back pressure valve located in said shank controlling said passageway.

6. A drill bit including a shank, a flat blade integral with the shank, lengthwise centrally located oppositely disposed ribs, one on each side of said blade, cutting members carried by the lower end of the blade, said bit having a single relatively large unobstructed water course, leading from its

upper end downwardly therethrough between said ribs and terminating near its lower end in restricted discharge parts which lead through the lower ends of the respective ribs and discharge water on opposite sides of said cutting members.

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

WALTON G. CHRISTIAN.

Witnesses:
W. H. DUNLAY,
E. V. HARDWAY.