March 16, 1926. 1,577,244

J. S. BROWN

ROTARY DRILL BIT

Filed June 7, 1923

Fig. 1.

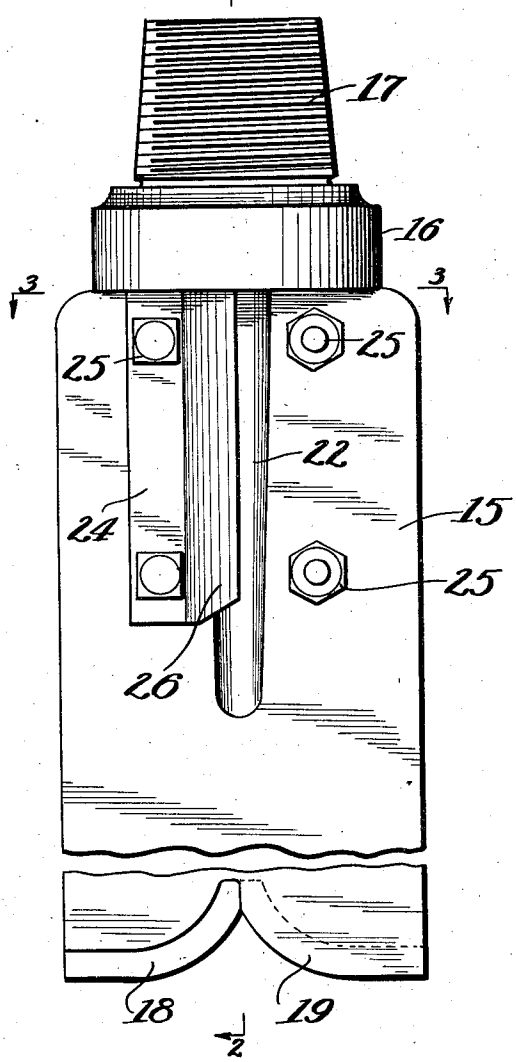


Fig. 2.

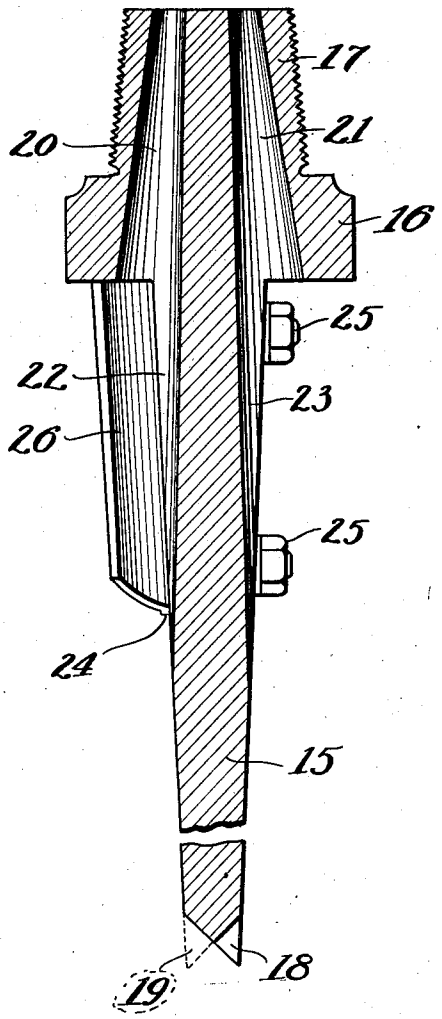
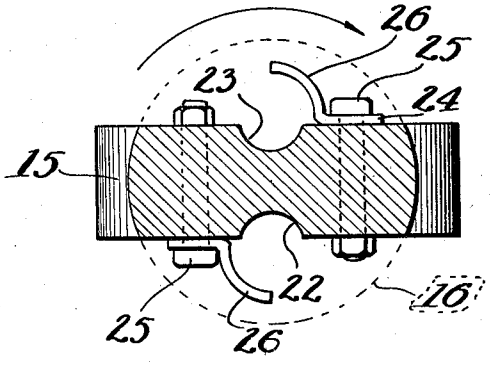


Fig. 3.



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UNITED STATES PATENT OFFICE.

JACOB S. BROWN, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-HALF TO WALTER F. EICHENHOFER, OF LOS ANGELES, CALIFORNIA.

ROTARY DRILL BIT.

Application filed June 7, 1923. Serial No. 643,929.

To all whom it may concern:

Be it known that I, JACOB S. BROWN, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Rotary Drill Bits, of which the following is a specification.

My invention relates to rotary bits for well drilling apparatus of that character having ducts to allow the circulation of relatively thin mud from the drill pipe to the blades of the bit. In bits of this character two or more ducts are provided, and these ducts are of uniform diameter and disposed in parallelism with each other. It has been found that bits of this character are unsuccessful because after relatively short use the ducts become clogged with particles of mud thus discontinuing the circulation of the liquid or mud to the bit blades, and with the ultimate destruction of the blades.

It is a purpose of my invention to provide a rotary bit having ducts which are so shaped and arranged one with respect to the other, to preclude the possibility of them becoming clogged and to thus insure the positive circulation of liquid to the bit blades.

It is also a purpose of my invention to provide a bit having shields arranged to relieve the pressure of liquid at the discharge ends of the ducts and to direct the liquid into intimate relation with respect to the cutting edges of the blades.

Although I have herein shown and described only one form of rotary bit embodying my invention, it is to be understood that various changes and modifications may be made herein without departing from the spirit of the invention and the spirit and scope of the appended claims.

In the accompanying drawings—

Figure 1 is a view showing a side elevation of one form of bit embodying my invention.

Figure 2 is a vertical sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 1.

Referring specifically to the drawings in which similar reference characters refer to similar parts, my invention, in its present embodiment, comprises a substantially flat body 15 of suitable width, thickness, and length, having its upper end formed with a head including an annular shoulder 16 and a connecting nipple 17, the latter being threaded to provide a connection between the bit and a drill pipe. The lower end of the body 15 is formed with fishtail blades 18 and 19 having their cutting edges reversely disposed and offset in the usual manner.

As clearly shown in Fig. 2, the shoulder 16 and the nipple 17 are formed integral, and ducts 20 and 21 are formed in these elements which increase in diameter from the upper ends to the lower ends so that their longitudinal axes are disposed in converging relation to each other. The lower ends of the ducts are in direct communication with longitudinally extending grooves 22 and 23 which, as clearly shown in Fig. 3, are of semi-circular form and in effect constitute a continuation of the ducts. As shown in Fig. 2, the grooves gradually decrease in depth from their upper ends to their lower ends, and their lower ends terminate at a point above the blades 18 and 19 and in vertical alignment with the meeting ends of the blades.

As shown in Figs. 1 and 3, shields are arranged at opposite sides of the body 15, and each shield includes a flat portion 24 through which extends a bolt 25 for securing the shields as a unit to the body, and a curved portion 26 arranged to partly overlie the corresponding groove 25 or 23. It will be noted that the shield for one groove is disposed in reverse relation with respect to the shield of the other groove so that when the bit is rotated in the direction of the arrow in Fig. 3, the shields serve to protect the grooves.

In practice, the bit is connected to the lower end of the drill pipe through the medium of the nipple 17 so that when mud is supplied to the drill pipe, it will be conducted to the blades of the bit through the ducts 20 and 21. As the liquid leaves the lower ends of the ducts, it enters the grooves 22 and 23, and under the protection of the shields is directed downwardly into intimate relation with respect to the blades 18 and 19. The arrangement of the shields is such that during rotation of the bit, the possibility of rock or other solid matter being deposited within the grooves 22 and 23, is positively prevented so that in conjunc-

tion with the tapering grooves, the circulation of liquid to the bit blades is, at all times, insured.

In actual practice, should a solid particle of mud enter either duct 20 or 21 the force of liquid above the mud will serve to eject the particle from the duct because of the increasing diameter of the duct. It will thus be seen that any particle of solid matter which is capable of entering the duct is also capable of being ejected therefrom thus preventing clogging of the duct.

What I claim is:

1. A drill bit having liquid conveying ducts therein increasing in cross sectional area from their upper ends to their lower ends, grooves communicating at their upper ends with the lower ends of the ducts, and shields attached along corresponding sides of the grooves and open at the opposite sides and arranged in overlying relation to the grooves.

2. A rotary bit comprising a relatively flat body, blades formed on the lower end of the body, a head formed on the upper end of the body, ducts formed in the head and increasing in cross sectional area from their upper ends to their lower ends, and grooves formed in opposite sides of the body and constituting a continuation of said ducts, said grooves decreasing in depth from their upper ends to their lower ends, and shields secured to the body and in partly overlying relation with respect to the grooves for the purpose described.

3. A drill bit having liquid conveying ducts through the head and grooves leading downwardly from the lower ends of the ducts in the side faces of the drill body, and shields attached along corresponding sides of the grooves and open at the opposite sides and arranged in over-lying relation to the grooves.

In testimony whereof I have signed my name to this specification.

JACOB S. BROWN.