Oct. 7, 1924. 1,510,871

C. S. SWAIM

ROTARY DRILL BIT

Filed Dec. 9, 1922

Fig. 1.

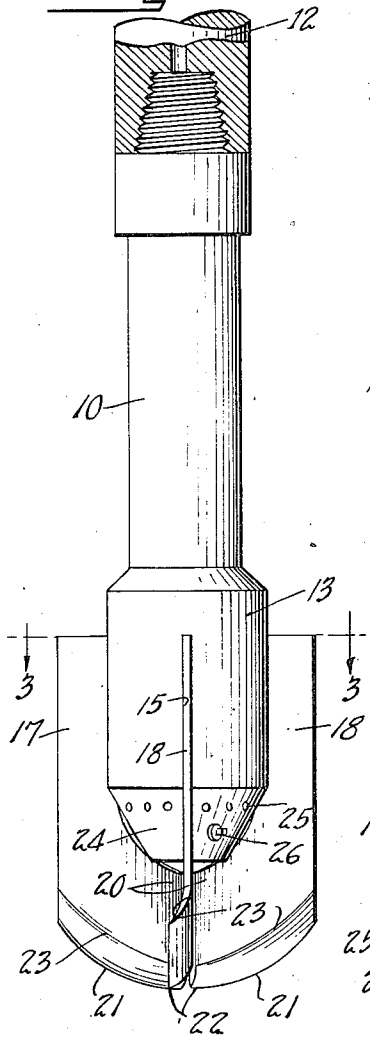


Fig. 4.

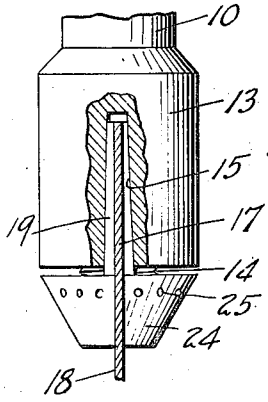


Fig. 5.

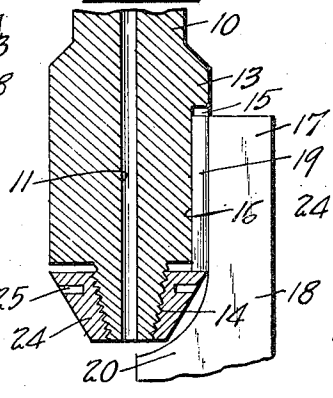
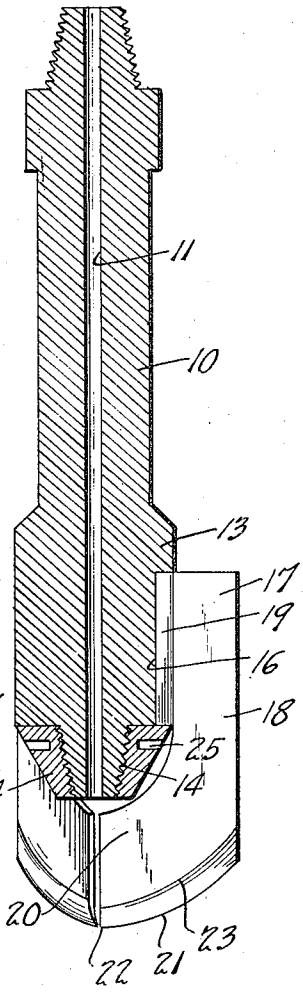


Fig. 2.



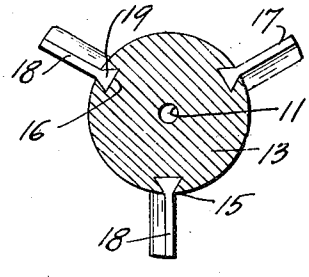


Fig. 3.

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Patented Oct. 7, 1924. 1,510,871

UNITED STATES PATENT OFFICE.

CHARLES S. SWAIM, OF LONG BEACH, CALIFORNIA.

ROTARY-DRILL BIT.

Application filed December 9, 1922. Serial No. 605,880.

To all whom it may concern:

Be it known that I, CHARLES S. SWAIM, a citizen of the United States, residing at Long Beach, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Rotary-Drill Bits, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in bits for rotary drills and an important object of the invention is to provide a device of this character embodying a stem and a plurality of blades, the blades being detachably secured to the stem so that they may be readily removed to permit sharpening thereof.

A further object of the invention is to provide a device of this character having the blades detachably connected with the stem and a locking member for the blades for holding the same in position within the stem which is protected by the blades to prevent destruction thereof by contact with the ground.

These and other objects I attain by the construction and arrangement shown in the accompanying drawings wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein like reference characters designate like parts throughout.

In the drawings:—

Figure 1 is a side elevation of a bit constructed in accordance with my invention;

Figure 2 is a vertical sectional view therethrough;

Figure 3 is a section on the line 3—3 of Figure 1;

Figure 4 is a fragmentary side elevation, parts being broken away showing a preferred construction; and

Figure 5 is a vertical sectional view taken through the type of bit shown in Figure 4.

Referring now more particularly to the drawings, the numeral 10 indicates a drill stem having a central bore 11 extending entirely therethrough and adapted at one end for engagement with a drill pipe 12 of a rotary drilling outfit. The lower end of the stem is enlarged, as indicated at 13, and this enlargement terminates in a reduced and preferably tapered threaded portion 14. The enlargement is provided with longitudinally extending channels 15 which are of greater width at their bases, indicated at 16, than at the point where they open through the sides of the enlargement, being preferably in the form of a dove-tail. Any suitable number of the channels 15 may be provided, in the present instance three thereof being disclosed. These channels open through the lower end of the enlargement and are adapted for the reception of correspondingly shaped inner edges of the shanks 17 of blades 18 so that the blades may be entered in the channels and when so entered will be extended radially from the stem, the channel engaging portions of the blades being indicated at 19. The channel engaging portions are of substantially the same length as the length of the channels so that when they are fully entered in the channels the lower ends thereof will substantially coincide with the lower end of the stem, and more particularly with the lower end of the enlargement 13 thereof. The blade shank extends below the lower end of the enlargement 13 and has its lower end provided with an inward extension 20 so that when the blades are all in position in the stem, these extensions approach and nearly engage one another in spaced relation to the bottom of the enlargement 13. These extensions form the blade proper and have their lower ends arcuately curved, as at 21, and have their lowest points at the inner lower end of the extension, as indicated at 22. The lower ends of the extensions are angled forwardly in the direction of rotation from a point spaced slightly above the lower edge thereof, as at 23.

The formation of the extensions 20 provides between the lower end of the enlargement 13 and the upper ends of the extensions a space for the reception of a locking member 24 for maintaining the blades in position. This locking member as herein shown comprises a frusto-conical member having a tapered threaded bore for coaction with the tapered screw-threaded extension 14 of the stem 10, and is provided in the side walls thereof with openings 25 in which a bar or the like may be inserted between the blades to rotate the same. This locking member when threaded upon the extension 14 and firmly seated against the lower end of the enlargement 13, locks the blades 18 in position within the channels 15, and the locking member, it will be noted, is effectually protected by the blades. The lower

end of the locking member is open so as to permit fluid passing through the bore 11 of the stem to pass out and about the blades to wash cut rock, dirt and the like upwardly out of the path of the blades. The locking member 24 is preferably provided with some means for preventing rotation thereof when in applied position, as a set screw 26 for extending through the wall thereof to engage in the extension 14. This locking member 24 serves to prevent accidental loss of the blades during raising or lowering of the bit in the well. It will be obvious that when the bit, and more particularly the blades thereof, are at rest upon the bottom of the well and these blades have superimposed thereon the weight of the drilling string or pipe, it will be impossible for the blades to move downwardly in their grooves. Accordingly, any tendency of the locking member 24 to unscrew or release from the bottom of the stem during the drilling operation is prevented and accordingly the positioning of the locking member so as to prevent loss of the blades during withdrawal of the bit from the well is assured.

It will be obvious that the blades of a cutter constructed in accordance with the foregoing may be readily applied to the stem or removed therefrom for sharpening and that lighter or heavier blades suitable to the type of bore being made may be substituted as desired. It will likewise be obvious that many changes are possible in the construction of the same without in any manner departing from the spirit of my invention, for example, the channels 15 may be tapered from the lower end to the upper ends thereof so that the blades when started by the tap of a hammer may be readily removed therefrom. In this type of construction I prefer that the channel engaging portions 19 of the shanks 17 of the blades be made of such construction that they project slightly beyond the lower end of the enlargement 13 to be engaged and held in position by the locking member 24. This construction will permit adjustment of the blades to compensate for wear of the walls of the channel and the channel engaging portions 19 and insure a tight fit between the blades and stem at all times.

I claim:—

1. In a rotary drilling tool, a stem provided in its side with longitudinal extending channels opening through the lower end thereof, blades having shanks engaged in said channels, and a locking member engaged with the lower end of the stem and maintaining said blades in position in said channels, the blades being provided at their lower ends with portions extending inwardly beneath the locking member and having their inner edges approximating one another, said portions limiting downward movement of the locking member upon the stem when the stem is supported by the blades.

2. In a rotary drilling bit, a stem provided in the side wall thereof with grooves opening through the lower end thereof, said grooves being substantially dove-tail shaped in cross section and tapering longitudinally toward the upper ends thereof, blades having their cutting faces arranged below the stem and having shanks provided at their inner edges with correspondingly shaped portions for engagement in said grooves, and a locking member engageable with the lower end of the stem and adapted to abut the lower ends of said groove engaging portions to maintain the same in position within the grooves.

3. In a rotary drilling bit, a stem provided in the side wall thereof with grooves opening through the lower end thereof. blades having shank portions engaged in said grooves, a threaded extension on said stem at the lower end thereof, a locking member having threaded engagement with the extension and abutting the shank portions of the blades to shift the same longitudinally of the grooves, and extensions on said blades limiting downward movement of the locking member on the extension when the stem is supported by the blade.

In testimony whereof I hereunto affix my signature.

CHARLES S. SWAIM.