May 15, 1923. 1,455,640

J. J. McNAMARA

ROCK DRILL

Filed Aug. 20, 1920

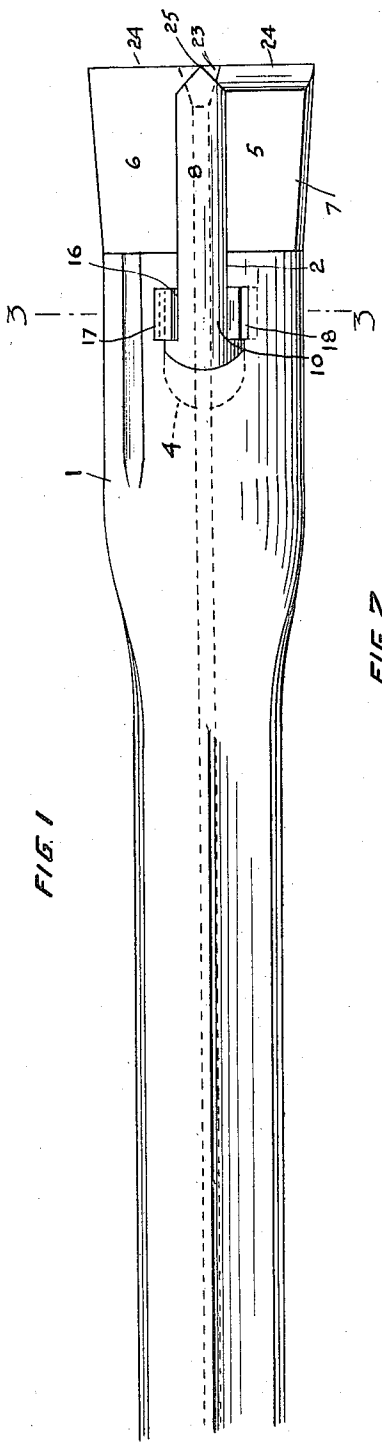


FIG. 1

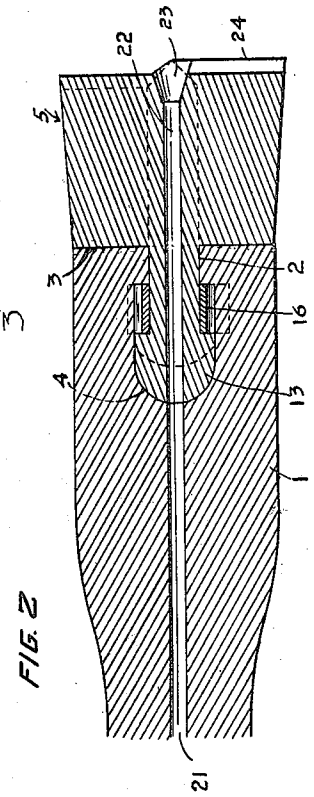


FIG. 2

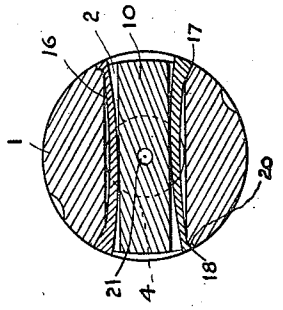


FIG. 3

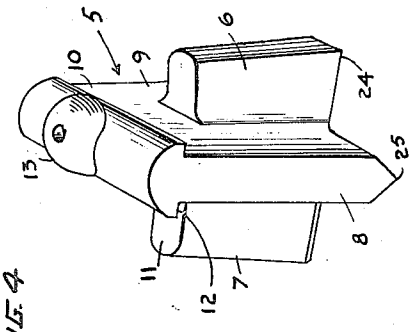


FIG. 4

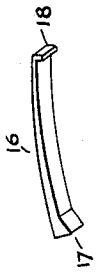


FIG. 5

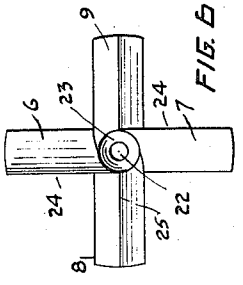


FIG. 6

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UNITED STATES PATENT OFFICE.

JOHN J. McNAMARA, OF MOUNTAIN RANCH, CALIFORNIA.

ROCK DRILL.

Application filed August 20, 1920. Serial No. 405,202.

To all whom it may concern:

Be it known that I, JOHN J. McNAMARA, a citizen of the United States, residing at Mountain Ranch, in the county of Calaveras and State of California, have invented new and useful Improvements in Rock Drills, of which the following is a specification.

The primary object of this invention is to provide a strong durable and efficient rock drill which is constructed so as to securely, evenly and rigidly hold the bit in position whereby possibility of the bit working loose in the head and dropping out of the head into the bore are prevented.

An object of the invention is to provide a novel bit and drill head construction wherein these parts cooperate to prevent undesirable movement of the bit relative to the head and the bit is made substantially as rigid as it would be if an integral part of the head and may be readily and easily removed from and attached to the head.

A further object is to provide new and effective means for holding the bit in the head, said holding means being constructed to withstand vibration and shocks without working loose and being capable of being easily driven into place or removed from the head.

The invention possesses other advantages and features some of which, with the foregoing will be set forth at length in the following description where I shall outline in full that form of the invention which I have selected for illustration in the drawings accompanying and forming a part of the present specification. In said drawings I have shown one form of the construction of my invention, but it is to be understood that I do not limit myself to such form since the invention as expressed in the claims may be embodied in a plurality of forms.

Figure 1 is a side elevation of the rock drill of this invention.

Figure 2 is a fragmentary longitudinal sectional view of the drill.

Figure 3 is a sectional view taken on line 3—3 of Figure 1.

Figure 4 is a perspective view of the bit.

Figure 5 is a perspective view of one of the wedges.

Figure 6 is a top plan view of the bit.

Referring to the present embodiment of the invention as illustrated in detail in the drawings, the drill comprises a cylindrical drill head 1 provided in its lower end with a transverse slot 2 opening on the sides and lower end of the head. The slot is undercut to provide shoulders 3 on opposite sides of the lower end thereof. In the upper end of the slot and centrally of the head, there is provided a socket 4 opening into the slot.

The bit 5 comprises crossed wings 6, 7, 8 and 9, there being four wings, all integral with one another and extending at right angles to each other. The wings 8 and 9 extend above the wings 6 and 7 and provide a shank 10, whereas the upper ends of the wings 6 and 7 provide inclined shoulders 11 on opposite sides of the shank. The upper edges of the shank 10 are enlarged laterally providing flanges 12 extending on opposite sides thereof. Centrally of the enlargement, there is provided a projection 13 of semi-spherical outline. The lower ends of the wings are provided with cutting edges 14 of an arrangement which shall be later described.

In assembling the drill, the shank 10 of the bit is inserted sideways into the slot 2 in the head 1 and when the projection 13 which is disposed centrally of the longitudinal or vertical axis of the bit is brought into alinement with the socket 4, the bit is pushed inwardly so that the projection will snugly engage in the socket and the inner end of the shank will engage with the inner end of the recess or slot 2, both as shown in Figures 1 and 2 of the drawings. When the bit is thus positioned, the shoulders 11 on the inner ends of the wings 6 and 7 abut the head 1. With the parts thus assembled, the bit is in firm contact with the head and the head and bit contact with one another throughout sufficient area to insure rigidity of connection of the bit with the head.

The holding means of the invention comprises two similar clips 16 made of bowed spring metal. Upon the ends of the clips there are provided enlarged wedge-shaped portions 17 and shoulders 18, the wedge portions 17 being wider than the shoulders 18 are long. The shank 10 is of less width than the slot 2 and when in position in the head, provides a space on opposite sides thereof, sufficient to accommodate the clips, as shown particularly in Figure 3. The clips are inserted in the spaces between the walls of the slot and the sides of the shank, with the convex sides of the clips in engagement with opposite sides of the shank. It is necessary to drive the clips in place with an instru-

ment inasmuch as they are bowed and must spring in order to be fitted in place. The smaller ends 18 of the clips are driven in first and when the wedges are home, the shoulders 18 abut the outer sides of the head, hooking over the edges of the slot 2, as shown in Figure 3 and the wedge ends 17 wedge against the corresponding sides of the slots on the opposite sides of the head and slot. Preferably, the head is cut away or grooved vertically so as to provide inwardly off-set shoulders 20 for engagement with the shoulders 18. By this arrangement, the ends of the clips are spaced inwardly from the outer surface of the head and are not apt to be broken off by engagement with the sides of the bore. By reason of the projection 13 fitting in the socket 4, the bit is held more rigid and centrally in the head. The spring action of the clips 16 takes up the vibration transmitted to the bit equally, and effects a rigid and secure holding of the bit in place. Should the clips break or work out of the head, the bit is prevented from dropping out of the head by reason of the shoulders 3 engaging the flanges 12 on the shank 10. This arrangement eliminates the possibility of losing the bit in the bore.

The head 1 and bit 5 are provided with the customary alining water passage 21 and 22. The outlet end of the passage 22 is enlarged and made substantially cone-shaped as at 23, the greatest diameter of this enlarged portion being five-eighths of an inch. By providing this substantially conical opening through the lower end of the bit, the cutting edges of the wings are relieved of the cutting function at the center of the bit. This will cause the cutting edges to cut around this five-eighths inch space at the center of the base of the bore so that in cutting, a cone-like projection will be formed at the center of the base of the bore and as the cutting progresses around this projection, said projection will "chip off." As this eliminates the necessity of cutting at the center of the base of the bore, the bit will cut more rapidly into the bore.

The cutting edges are of special arrangement so as to facilitate the drilling action. Preferably, the wings 6 and 7 of the bit are provided with off-set cutting edges 24 as shown in Figure 6, whereas the cutting edges of the wings 8 and 9 aline and are along the center of the lower side of the wings as shown at 25 in Figure 6. The cutting edges 24 will provide radial cuts in the bore and by having the other cutting edges off-set, these latter edges will make cuts cross-wise of the radial cuts so that a chipping action is effected with the result that the drilling action is greatly facilitated and need not be carried out to such an extent that the rock be pulverized during the drilling thereof. It will thus be seen that two of the cutting edges are radial to the center of the bit and in line with one another, whereas the other two are off-set and are not radial to the center of the bit.

I claim:—

1. A rock drill comprising a drill head having a slot in one end thereof, a drill bit having a shank extended into the slot and a bowed spring member between the shank and a wall of the slot in contact intermediate of its ends with the shank and at its end with the side edges of the slot.

2. A rock drill comprising a drill head having a slot in one end, a drill bit having a shank extending into said slot, and bowed spring members mounted on opposite sides of the shank between the shank and the opposed walls of the slot.

3. A rock drill comprising a drill head having a slot in one end, a drill bit having a shank extending into said slot, and bowed spring wedge members mounted on opposite sides of the shank between the shank and the opposed walls of the slot and shoulders on the ends of said members lockingly engaging the head and the side edges of the slot.

4. In a rock drill, a bit comprising a plurality of integral wings having cutting edges on their lower ends, certain of said wings being extended to provide a shank and the other wings terminating at their inner ends short of the inner end of the shank on opposite sides thereof, a drill head having a slot in one end receiving said shank, said slot having shoulders at its lower end, lateral flanges on the inner end of the shank arranged to co-operate with the shoulders to prevent endwise withdrawal of the shank and members interposed between and engaging the flanges and shoulders.

JOHN J. McNAMARA.