

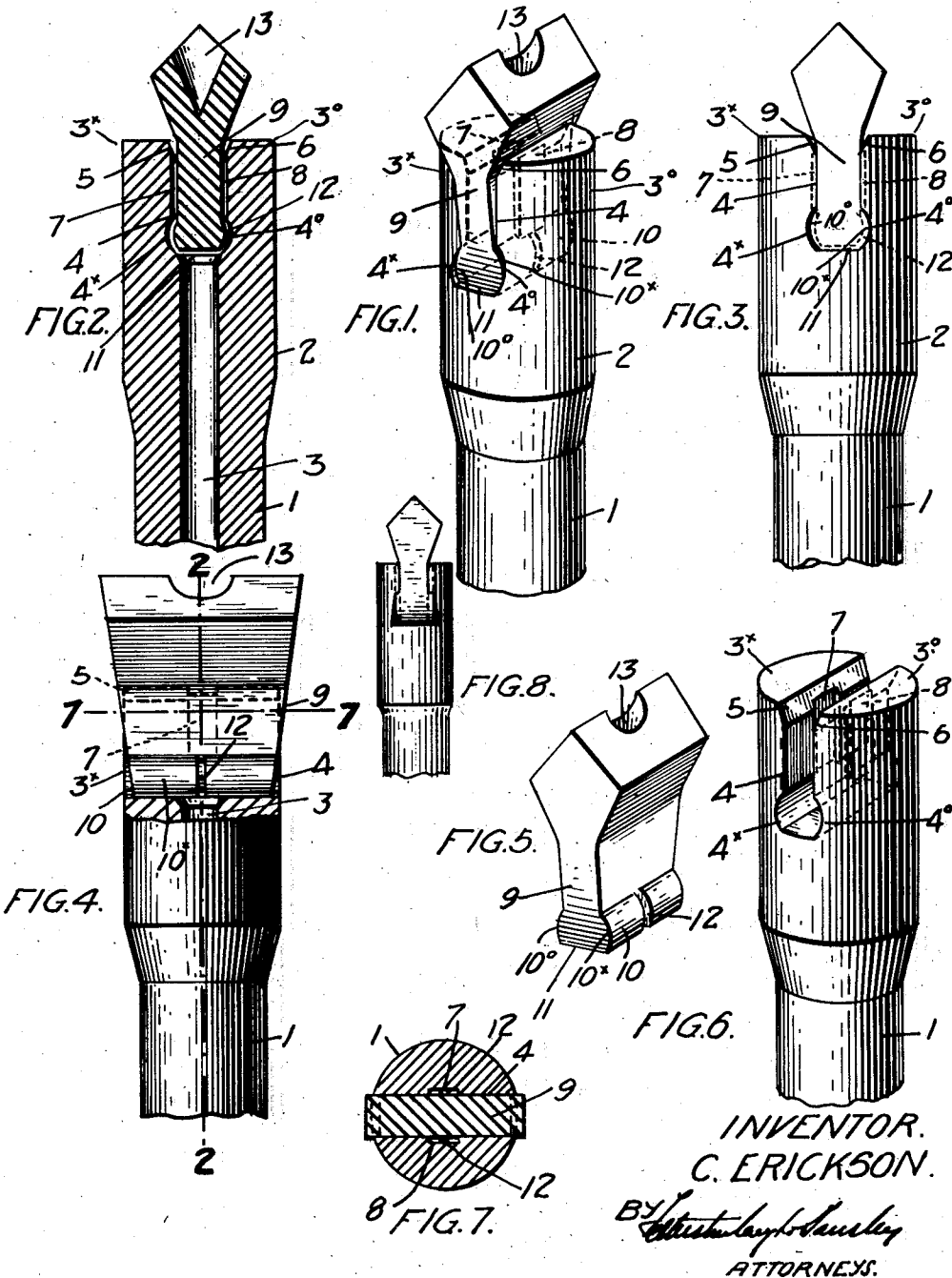
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DRILL SHANK AND BIT

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UNITED STATES PATENT OFFICE

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DRILL SHANK AND BIT

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My invention relates to improvements in drill shanks and bits, and the objects of the invention are to prevent mud and small particles of rock entering the water duct and becoming packed therein during the operation of the bit thus preventing its proper operation, to keep the bit automatically in line that is centered in the drill hole during boring, to permit of the easy withdrawal of the bit with the shank when the drill is withdrawn from the bore hole, to overcome the difficulty of forcing a two point bit by eliminating the centre hole passing therethrough and enabling the employment of a type of bit of much lighter stock and, consequently, reducing the cost of removal, and the use of a bit which is easy and cheap to make, also to provide a bit which may be assembled and disassembled without the use of tools, and it consists essentially of the arrangement and construction of parts as hereinafter more particularly explained.

Fig. 1 is a perspective view of the operating and of a drill shank and bit connected thereto.

Fig. 2 is a transverse longitudinal sectional view through the shank and bit on the line 2—2 Fig. 4.

Fig. 3 is a side elevation of the shank and bit.

Fig. 4 is a side elevation of the shank and bit looking at right angles to the view shown in Fig. 3, one of the horns of the shank being broken away to clearly illustrate the bit construction.

Fig. 5 is a perspective detail of the bit removed from the shank.

Fig. 6 is a perspective detail of the shank with the bit removed.

Fig. 7 is a sectional plan view on line 7—7 Fig. 4.

Fig. 8 shows an alternative structure.

In the drawing like characters of reference indicate corresponding parts in each figure.

1 is a drill shank, the end portion of which is upset as indicated at 2 to provide a large enough diameter to give sufficient strength to that portion of the shank with which the bit is engaged and to leave sufficient clearance between the drill hole and the main body of

the shank. The opposite portion of the shank is large enough to ensure sufficient strength to hold the bit without breaking and is also long enough to stop the drill from creeping to one side when the bit enters a soft layer of rock at an angle, the upset portion being of such a length as will guide the bit until the bit is wholly within the softer rock or vice versa.

The shank 1 is provided with a central water duct 3 terminating at the base of the transverse bit receiving slot 4 forming opposing tongues 3^x and 3^o. The slot 4 extends diametrically across the shank end and is provided at its inner end or base with an enlargement formed by transverse concaved grooves 4^x and 4^o formed in the sides of the slot at each side of the base thereof. The outer ends of the sides of the slot are chamfered off as indicated at 5 and 6 for a purpose which will hereinafter appear.

7 and 8 are shallow grooves formed in the side walls of the slot 4 extending from the chamfered portions 5 and 6 to the concaved portions 4^x and 4^o. 9 is a drill bit provided with an enlarged inner end 10 fitting the enlarged portion of the slot 4, the convexed walls 10^x and 10^o of such enlargement being slightly of a greater radius than the opposing walls formed by the concaved portions 4^x and 4^o of the slot 4. This is for the purpose of allowing clearance to take care of the increased width of the bulge on the bit due to the hammering action on the striking face 11 of the enlargement 10. The enlargement 10 is also provided centrally with a surrounding narrow but deep groove 12 which registers with the inner ends of the grooves 7 and 8 formed in the sides of the slot 4.

The outer end of the water duct 3 is counter sunk where it finishes at the striking surface 11 to ensure of a free flow of water to the grooves 12 around the base of the bit and further so that the repeated hammering of the shank on the bit at this point will not burr the edges of the duct over. The striking surface of the shank at the lower end of the slot 4 is made harder than the striking surface of the bit to ensure that all the

wear and upsetting due to hammering will take place on the bit which may be readily renewed from time to time. The faces of the bit 9 which, when the bit is assembled, are at each end of the slot 4 inclined inwardly as clearly indicated in Fig. 4 so as to extend within the ends of the slot 4 and will not protrude therefrom even when expanded due to the hammering action and thereby produce projections which would prevent easy withdrawal of the bit from the drill hole.

In order to assemble the bit all it is necessary to do is slip it laterally into engagement with the slot 4. The water passes, during operation, through the duct 3 into the grooves 12 so as to pass around the enlargement 10 into the shallow grooves 7 and 8 passing to the extremity of the shank and passing around the bit head into the drill hole. By this means it will be readily seen that any mud or small particles of rock located in the drill hole when the drill is inserted will not readily pass into the water duct 3 and thereby will not readily become packed when the water and air are turned on thereby putting the drill out of commission.

In order to keep the drill centered, I provide a conical recess 13 extending from the cutting edge of the bit into the central portion thereof which, during the operation of the bit, will leave a core of rock material uncut which will project up into the tapered recess 13 and thereby hold the bit centrally positioned.

In the alternative structure illustrated in Fig. 8 the groove in the shank and the bit enlargement are formed dovetailed.

By chamfering off the edges of the slot as at 5 and 6 the head of the bit is prevented from engaging the walls of the slot when driven down by continuous hammering thereby increasing the life of the bit.

From this description it will be seen that I have devised a very simple construction of drill shank and bit whereby the blocking of the central water duct is prevented, in which the drill bit will be automatically kept centered during its operation, in which the bit may be easily withdrawn without obstruction, in which the central orifice through the bit is eliminated so that a two point bit may be readily forged and thus enabling the use of a bit of a lighter stock consequently reducing the cost of renewal and the cost of manufacture, and also providing a bit which may be assembled or disassembled without the use of tools.

What I claim as my invention is:

The combination with a drill shank having a main water duct extending longitudinally therethrough and a diametric slot in the operating end thereof having a substantially cylindrical enlargement at its inner end and having channels formed in the walls

of the slot and extending from the enlargement to the operating end of the shank, of a bit fitting the slot and having a substantially cylindrical enlargement fitting the enlargement of the slot, and a deep narrow groove extending around the sides and bottom of the enlargement into which the water from the main duct is fed to discharge into and through the channels of the shank.

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