

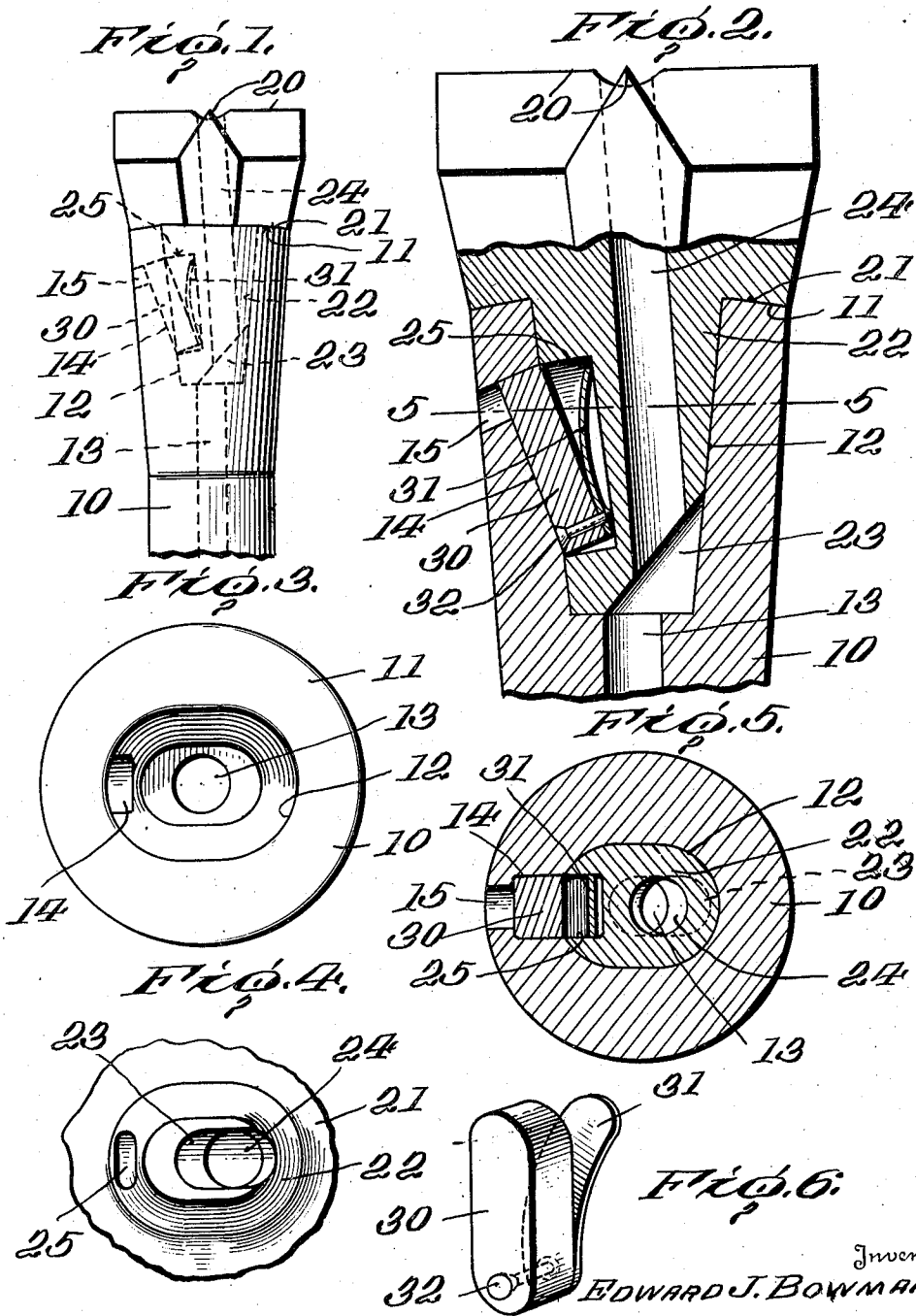
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ROCK DRILL

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ROCK DRILL

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4 Claims. (Cl. 255—64)

This invention relates to improvements in rock drills, and is more particularly concerned with a structure comprising a drill steel or stem member with a removable drill bit member.

5 One of the features of the present invention is the provision of a simple structure for interconnecting the steel and bit, which is inexpensive in material and labor of manufacture and assembly or disassembly.

10 Another feature of the present invention is the provision of a drill steel and a drill bit which provide a continuous channel for water or like flushing liquid, together with means for locking the steel and bit together so that the assembly operates under both compression and tension for the advancement and withdrawal of the bit.

15 A particular feature of the invention is the provision of a simple structure which can be readily assembled by the miner, even in total darkness; and can similarly be easily separated for replacement of the drill bit.

20 With these and other features as objects in view, as will appear in the course of the following specification and claims, an illustrative form of practicing the invention is shown on the accompanying drawing, in which:

25 Fig. 1 is a side elevation of an end portion of a drill steel or stem with a drill bit mounted thereon.

30 Fig. 2 is a similar view, on a larger scale, with parts shown in diametrical section.

Fig. 3 is an end elevation of the drill steel.

Fig. 4 is an end elevation of the plug portion of the illustrated drill bit.

35 Fig. 5 is a sectional view of the assembly, substantially on line 5—5 of Fig. 2.

Fig. 6 is a perspective view of the locking element.

40 In the drawing, the main portion 10 of the drill steel or stem may be of any desired length. It is customary in the trade to provide the miner with a set of steels of different lengths from say two feet up to a length exceeding the depth of the deepest hole to be drilled: it will be understood that integral or jointed steels may be employed in a manner well known in the art.

45 According to the illustrated form of the present invention, the bit end of the steel 10 is slightly tapered and provides a socket surrounded by an annular end surface 11 which preferably is convex. As shown in Figs. 3 and 5, the socket preferably has its wall 12 oval in cross-section, and tapering convergently from the outer end of the socket to the bottom of the socket space, to prevent rotation of the bit and steel relatively to one

another about their common axis. Further, the drill steel is illustrated as hollow, being provided with a channel 13 for the flow of water or other rinsing liquid.

5 The drill steel is provided with a recess extending from the socket space and having an outer wall 14 which inclines away from the wall of the socket. An externally open hole 15 passes through the socket structure and communicates with the recess, this communication in the illustrated form being shown as provided at the upper end of the recess.

10 The drill bit is provided with the usual cutting edges 20, formed by a plurality of ribs which are formed with surfaces 21 for engagement with the surface 11 of the drill steel for transmitting compression shocks during the operation of the drilling. The drill bit also has an integral plug portion 22 which is of a cross-section and shape to closely fit the socket space of the drill steel, this fit being made particularly accurate at the smaller end of the plug. The plug is cut away at its smaller end by an inclined groove 23 extending, so to speak, across one corner of the structure, being located along the major axis plane of the oval shape of the plug, whereby to provide free communication for liquid from the channel 13 of the drill steel into the channel 24 of the drill bit. It will be noted that the channel 24 is illustratively located at an angle to the axis, so that it extends from the center of the cutting edges 20 angularly to its opening into the groove 23.

15 The plug on the drill bit is provided with a cavity 25, which is of a shape and size to closely receive the locking element described hereinafter. This recess is likewise located symmetrically with respect to the major axis plane of the plug, so that the inclined position of the channel 24 and the presence of the plug recess 25 do not constitute a harmful weakening of the plug structure.

20 As shown in Figs. 2 and 6, the locking element may have a compression member 30 formed of material resistant to compression, and preferably being rounded at its ends. A spring blade 31 is secured to one end of the locking element by a rivet 32, being at the end which will be adjacent the smaller end of the plug during assembly.

25 The operation of assembling a drill steel with a drill bit is simple. A locking element is inserted in the recess 25 of the drill bit plug, and guided by the hand until the plug has passed into the socket space of the drill steel. The oval section assures that the recess 25 will align with the corresponding recess in the socket, or else locking can not be effected. As the drill head is pressed or

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driven home into the socket, the converging walls of the socket guide the locking element into the recess 25, with a stressing of the spring 31. Ultimately, the locking block 30 comes opposite the recess in the socket to such an extent that the spring 31 causes it to move into the position shown in Fig. 2.

The drill bit and drill steel are now locked together so that the plug closes the socket space and seals the same so that the water or rinsing liquid is compelled to travel to the cutting edges: while the shocks of compression during drilling are received between surfaces 11, 21 and also against the small end surface of the plug.

The drill steel can be withdrawn by pulling upon it. The end wall of the recess in the socket member then presses against the locking block 30 and the latter in turn presses against the end wall of recess 25 in the plug, so that the block operates in compression and assures that the drill bit can be pulled from the hole. This is essential in the particular art, as the loss of the drill bit usually means that a second hole must be drilled.

The assembly can be dismounted easily by inserting a driving pin or like device into the hole 15 so as to push the locking block 30 against the spring 31 until this block is located wholly within the recess 25. The drill bit can now be removed and a new one substituted.

It will be seen that the invention provides a means of connecting two separable members of a drill assembly, which are illustrated as a drill steel or stem and a drill bit. This assembly is connected by a locking element which cooperates with the two members to secure them so that the assembly has the two members joined end to end for transmitting axial movement in both directions and for transmitting rotative movement in both directions.

It is obvious that the invention may be modified in many ways within the scope of the appended claims.

I claim:

1. A drill assembly comprising a hollow drill stem having a socket at its end, a hollow drill bit having a plug fitting said socket, said socket and plug being oval in cross-section, the channel in said plug opening at the end of the plug adjacent one end of the major axis at such end of the plug, recesses in said socket and plug, the said recess in the plug being located in the side wall thereof at the other end of the major axis of said cross-section, and a locking element adapted to be contained in the plug recess while the plug is being introduced into the socket and engaging between one wall of the plug recess and one wall of the socket recess upon completion of the assembly whereby to serve for transmitting a pull upon the drill stem to the drill bit.

2. A rock drill assembly comprising a drill stem member having a socket, a drill bit member hav-

ing a plug, said plug and socket having recesses which are in alignment when the plug is in the socket, and a locking element adapted to be located in one recess while the plug is being introduced into the socket and to partly enter a recess of the other member upon completion of the assembly so that a pull upon the drill stem member is transmitted through said element to the drill bit, said stem member having an axial bore communicating with the abutting surface at the bottom of the socket, the plug being cut away at the free end at a point remote from the plug recess, said bit member having an angularly directed bore leading from the working face through the plug and past the plug recess to said cut-away portion and communicating thereby with the stem member bore.

3. A rock drill assembly comprising a drill stem member having a socket, a drill bit member having a plug, said plug and socket having recesses which are in alignment when the plug is in the socket, and a rockable locking element adapted to be located in the plug recess while the plug is being introduced into the socket and to rock away from the axis of the plug so that its end adjacent the end of the socket enters the socket recess upon completion of the assembly, whereby a pull upon the drill stem member may be transmitted through said element to the drill bit, said locking element including a block operated in compression during a pull upon the drill stem for removing a drill bit, and a blade spring fixed at the end of the block which is remote from the end of the socket and located between the locking block and a wall of the plug recess and bearing against the latter wall, said stem member having an opening therethrough communicating with the socket in alignment with said first end of the locking member.

4. A drill assembly comprising a hollow drill stem having a socket at its end, a hollow drill bit having a plug fitting said socket, said socket and plug being oval in cross-section, the channel in the plug opening at the end of the plug adjacent one end of the major axis at the end of the plug engaged in the socket, oblong axially extending recesses in said socket and plug which are in alignment when assembly is completed, the said recess in the plug being located in the side wall thereof at the other end of the major axis of the cross-section, a locking element comprising a block conforming to and adapted to be contained in said plug recess while the plug is being introduced into the socket, and a blade spring secured to said locking element and engaged with the wall of the plug recess and effective to rock the block at its end adjacent the end of the drill stem into the socket recess upon completion of the assembly whereby to serve for transmitting a pull upon the drill stem to the drill bit.

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