

Sept. 25, 1934.

H. C. NORLEY

1,974,540

DRILL

Filed Jan. 13, 1934

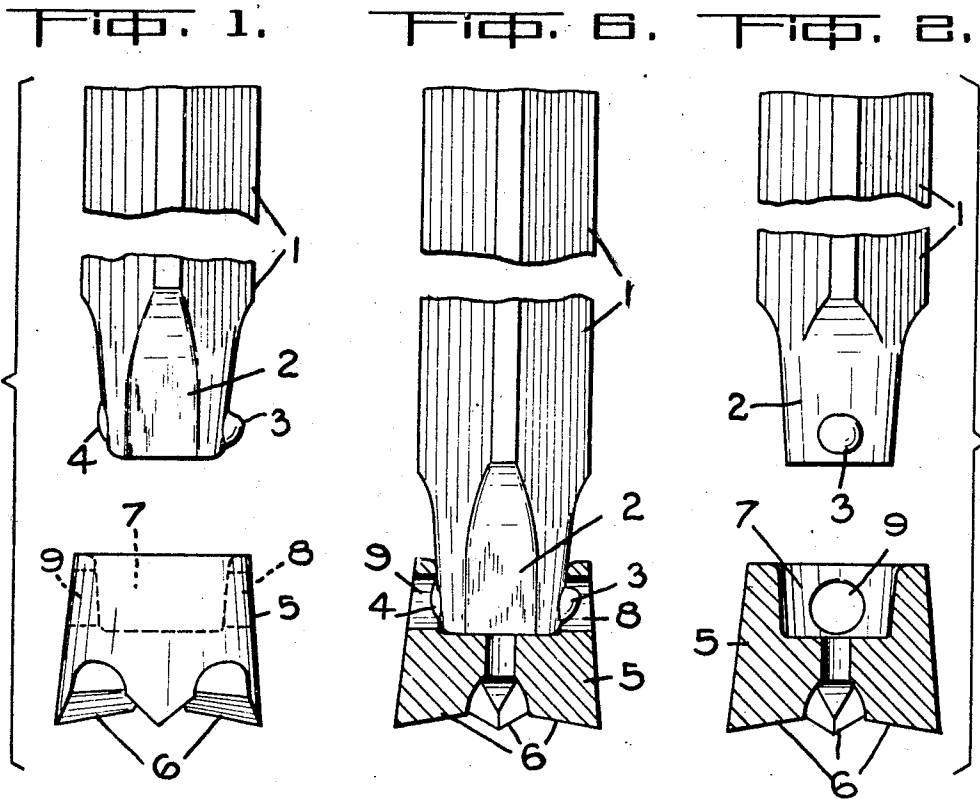


Fig. 5.

Fig. 3.

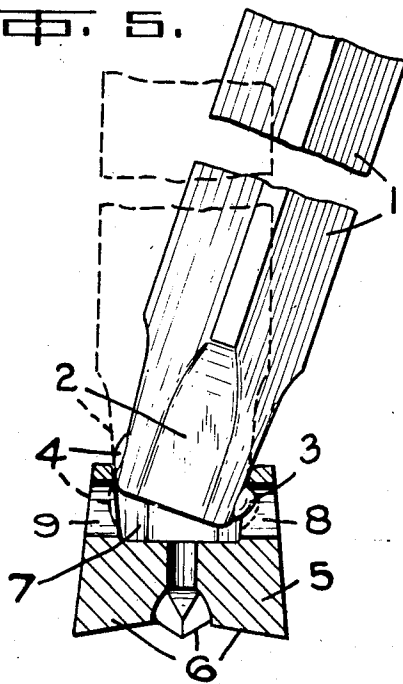
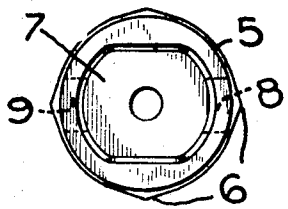
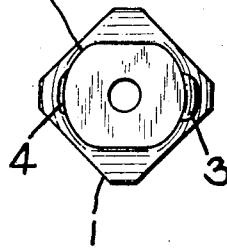


Fig. 4.



Inventor
H. C. NORLEY

By *J. C. M. Feltner*
Attorney

UNITED STATES PATENT OFFICE

1,974,540

DRILL

Harry Charles Norley, North Bay, Ontario,
Canada, assignor to Canadian Atlas Steels
Limited, Welland, Ontario, Canada, a company
of Canada

Application January 13, 1934, Serial No. 706,455

8 Claims. (Cl. 255-64)

My invention relates to improvements in drills, particularly intended for use in rock drilling and of the detachable bit type, and the object of the invention is to devise a drill in which the bit can be readily and quickly attached to and detached from the shank without the necessity of employing other than the ordinary tools usually at the hand of the miner.

A further object is to construct such a drill in which the connection between the bit and the shank will be a rigid and positive one and there will be no liability of the bit becoming inadvertently detached and being left in the hole bored when withdrawing the drill therefrom.

A still further object is to devise a detachable connection between bit and shank characterized by there being no slackness or play between these two parts so that rotative movement imparted to the shank will be positively transmitted to the connected bit.

With the above and other objects in view which will hereinafter appear, my invention consists, in its preferred embodiment, of the construction and arrangement all as hereinafter more particularly described and illustrated in the accompanying drawing in which:—

Fig. 1 represents a side view of the drill showing the shank and bit detached from each other.

Fig. 2 is a similar view taken at right angles to Fig. 1, the bit being shown in section.

Fig. 3 is a plan view of the bit.

Fig. 4 is an inverted plan view of the bit engaging end of the shank.

Fig. 5 is a side view of the shank, showing it in the initial position it assumes in connecting it to the bit, the latter being shown in section, and

Fig. 6 is a side view of the drill showing the shank and bit in the connected position, the bit being illustrated in section.

Like characters of reference indicate corresponding parts in the different views.

My shank 1 preferably comprises a bit engaging end 2 tapering towards its extremity, the cross-section of the tapered end being of generally elliptical form with two opposed flat surfaces (clearly illustrated in Fig. 4).

A lateral projection 3 protrudes outwardly from the periphery of the tapered shank end 2, and preferably diametrically opposite to such projection a protuberance 4 protrudes outwardly from such periphery. As will be seen from the drawing the protuberance 4 is not so pronounced as the projection 3. Both projection and protuberance may be located in close proximity to the extremity of the bit engaging end 2 and on the

rounded portions of the periphery thereof. The peripheral edge of such extremity may be suitably rounded.

My detachable bit 5 with cutters 6 is provided with a shank receiving socket 7 extending down from its top, said socket wall being substantially correspondingly tapered to the taper of the bit engaging end of the shank and of such dimensions that when the shank end is fully received into the socket it will be a driving fit therein.

A lateral orifice 8 extends from the outer periphery of the bit through the wall of the socket 7 and is adapted to receive the projection 3 when the shank end is inserted into the socket, and the orifice 8 is preferably of greater height than the height of the projection so as to permit vertical movement of the projection therein when the shank is driven down into the socket. This orifice may well be circular and the cross-section of the projection elliptical (see Fig. 2).

A similar orifice 9 is provided through the wall of the socket 7 diametrically opposite the orifice 8 and both may conceivably be of the same size as would occur if the bit were drilled transversely. Such orifice 9 is adapted to receive the protuberance 4 and is of such size relatively thereto that the latter will be permitted a certain amount of longitudinal movement therein in driving home the shank into the socket.

The lip of the socket 7 may be rounded as illustrated to facilitate the insertion of the shank as hereinafter described.

In applying the bit to the shank it is disposed so that its longitudinal axis is at an angle to the longitudinal axis of the shank and the bit engaging end 2 of the latter is inserted into the socket 7, the projection 3 being hooked or partially inserted into the orifice 8 (see Fig. 5). Then by swinging the bit relatively to the shank or vice versa until these two parts become disposed so that their longitudinal axes are coincident, the bit engaging end of the shank will be fully received into the socket with the projection 3 and protuberance 4 disposed respectively in the orifices 8 and 9. Finally by moving either part relatively to the other longitudinally a wedging action ensues between the tapered shank end and the tapered socket thus constituting a positive and firm connection between these two parts with the result that the bit will be positively rotated as the shank is rotated.

Owing to the connection between the shank and the bit being of necessity a very tight one, it will be apparent that the operation of swinging the bit relatively to the shank and finally

moving the two parts longitudinally would be achieved by tapping or hammering the bit onto the shank or vice versa, as would likewise be the operation of removing the same therefrom which is carried out the reverse way to which it is attached.

In the drilling operation, in driving the hole to be bored, there is no tendency for the bit to become disconnected from the shank but in withdrawing the drill from the hole such tendency is very marked in detachable bit drills and this is entirely overcome in the case of my drill primarily by the projection 3 in the orifice 8 preventing the bit becoming disconnected from the shank. This is also supplemented by the protuberance 4 in the orifice 9. This latter feature may, however, in some cases be dispensed with and a drill may be provided with only the projection 3 to effect such result as described in my prior application Serial No. 580,421, (now Patent No. 1,870,135).

Although I have described the female part of the connection as being in the bit and the male part on the shank, it is obvious that these two parts might be reversedly disposed.

What I claim as my invention is:—

1. In a drill, the combination with a shank portion and a detachable bit portion, of a non-rotative connection between the two portions comprising a tongue on one portion inserted into a socket in the other portion, said tongue and socket coacting with each other and so formed that relative rotative movement therebetween is prevented, a lateral projection on the tongue insertable into an orifice in the socket wall, said tongue portion being initially applied to the socket portion with their longitudinal axes at an angle to each other and the lateral projection partially engaged in the orifice and such tongue portion being then swung relatively to the socket portion until the longitudinal axes of the portions are coincident wherein the lateral projection fully enters the orifice and constitutes means for preventing displacement of the bit portion from the shank portion.

2. In a drill as claimed in claim 1 wherein the orifice is of such size as to permit vertical movement of the projection therein upon the shank and bit portions being subsequently driven together.

3. In a drill, the combination with a shank portion and a detachable bit portion, of a non-rotative connection between the two portions comprising a tongue on the shank portion inserted into a socket in the detachable bit portion, said tongue and socket coacting with each other and so formed that relative rotative movement therebetween is prevented, a lateral projection on the shank adapted to be partially inserted into an orifice in the socket wall upon the shank being applied to the bit portion with its longitudinal axis at an angle to the longitudinal axis thereof, and said lateral projection fully entering the orifice upon the shank being swung so that its longitudinal axis is coincident with the longitudinal axis of the bit.

4. In a drill as claimed in claim 3 wherein the orifice in the socket wall is of such size as to permit vertical movement of the projection therein upon the shank and bit portions being subsequently driven together.

5. In a drill as claimed in claim 3 wherein the shank portion has opposed flattened faces and the socket wall has correspondingly opposed flattened faces adapted to coact therewith upon the shank portion being applied to the bit portion.

6. In a drill as claimed in claim 3 wherein the tongue on the shank is tapered and adapted to coact with the socket in the detachable bit which is correspondingly tapered, a wedge action connection between the shank and bit being thereby constituted.

7. In a drill as claimed in claim 3 wherein the socket wall has an additional orifice therein, and a protuberance on the shank adapted to enter said orifice upon the shank and bit portions being applied to each other with their longitudinal axes coincident.

8. In a drill as claimed in claim 3 wherein the socket wall has an additional orifice therein, and a protuberance on the shank adapted to enter said orifice upon the shank and bit portions being applied to each other with their longitudinal axes coincident, said projection and said protuberance on the shank being diametrically opposed to each other and the two orifices in the wall of the socket being diametrically opposed to each other.

HARRY CHARLES NORLEY.

55

60

65

70

75

80

85

90

95

100

105

110

115

120

125

130

135

140

145

150