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REPLACEABLE BIT ROCK DRILL

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7 Claims. (Cl. 255-64)

The invention relates to a replaceable bit rock drill, as described in the present specification and illustrated in the accompanying drawing which forms a part of the same.

The invention consists essentially in the relative features of bit and jaws in regard to effect of the impact at the point of contact as pointed out in the claims for novelty following a description in detail of the correlated parts making up this invention.

The objects of the invention are to construct a new form of replaceable bit and shank for rock drills that will not plug when dropped into a muddy hole, or when used for drilling in soft ground and that will transmit the impact from the machine to the striking faces of the shank and bit and thence to the cutting edge of the bit, rather than straight from the machine to the cutting edge of the bit as is usually done, thus giving the bit which is loosely held and light, great freedom of movement which results in the bit drilling a slightly larger hole than would be the case with the usual solid construction, which consequently enables the bit to turn very easily and will facilitate the work of the miners and others in drilling operations by enabling them to renew their drill points at the work instead of turning the cumbersome bars into the blacksmith's shop thus eliminating the necessity of the carriage of heavy steel bars and the expense of shaping them; to furnish replaceable bits efficiently tempered and of good cutting steel which can be inserted in shanks of tougher steel or other metal thereby increasing the value of the bits for the work in hand which will effect great economy in the employment of labor and in the consumption of material; to give prospectors a simple and light drilling outfit that can be readily transported and materially lighten the pack; and generally to provide a drill simple to manufacture and durable for hand or machine use.

In the drawing, Figure 1 is a side elevational view of the replaceable bit inserted in the shank.

Figure 2 is a front elevational view of the replaceable bit inserted in the shank showing the bit in one position therein.

Fig. 2A is a similar view to Fig. 2 showing the bit in the shank in the position it assumes upon impact with the bottom of the hole being bored.

Figure 3 is a plan view of the replaceable bit as applied to the shank.

Figure 4 is a fragmentary elevational view of the end of a shank.

Figure 5 is a cross sectional view of the shank taken on the lines 5-5 in Figure 4.

Figure 6 is an enlarged perspective view of one of the replaceable bits.

Like numerals of reference indicate corresponding parts in the various figures.

Referring to the drawing, the shank is indicated by the numeral 10 and is formed either of the drill steel itself if it is of large enough diameter or with the upset stock 11 of a large enough diameter to provide sufficient strength across the base wall 12 from which project the jaws 13 and 14, the jaws 13 and 14 being chamfered on the outside at 15 and 16 and radiused on the inside end to the narrow end faces 17 and 18 adapted to be over-hung by a bit. The walls 19 and 20 of the jaws converge from the fillets 21 and 22 in the corners to constitute a dovetail slot for receiving a correspondingly shaped portion of the bit 25 and in each case form a radius running into from either side the inner impact wall 23 which bevels into the water passage 24 through the drill steel and thereby insuring a free flow of water to the cutting edges of the replaceable bit 25.

The replaceable bit 25 is of spearhead shape in cross section and thus over-hangs the end faces 17 and 18 and the striking surface 26 is softer than the impact wall 23 of the base wall 12 thereby taking all the wear and upsetting due to the bit being softer than the shank and in that way the shank will outlast many bits.

The bit 25 has the radius 27 larger than the corresponding radius of the shank and is formed of the converging walls 28 and 29 which form a dovetail portion on the bit adapted to be received into the dovetail slot in the shank which are adapted to nearly correspond with the converged walls 19 and 20 of the jaws 13 and 14, the difference between the two being that the walls 28 and 29 converge faster than the others, thereby ensuring the bit being held by the base of the jaws 13 and 14, rather than up at the end of them, the converging walls 28 and 29 of the bit merging into the shoulder portions 30 and 31 which merge in the bevelled walls 32 and 33 terminating in the cutting edge 34.

It will therefore be noted that the differences in radii of the replaceable bit and the jaws of the shank materially lessen the surface contact and thereby provide clearances where the metal of the bit, due to the impacts on the striking surface, will tend to flow rather than expand sideways against the jaws, thus causing strain, binding and breakage.

The length of the striking surface of the bit is smaller than the diameter of the upset stock

which is for the purpose of enabling the expansion of the bit lengthwise when it is upset at the base so that the increased length will not protrude past the side and form a shoulder which would make it difficult to extract the used bit.

In the operation of the invention, a hole is first drilled in the rock with an ordinary starter for about three inches, the replaceable bit is then simply slid in between the jaws of the upset stock and is prevented from slipping out endways by the converged walls of the jaws and sideways by the fingers until the steel is in the hole, when the hole prevents the bit from coming out from between the jaws and the steel is then ready for drilling purposes.

The dovetail portion of the bit 25 is permitted a limited longitudinal movement in the dovetail slot in the shank as will be seen upon reference to Figs. 2 and 2A, and thus in operation the bit gives a tapping action due to the loose connection which is particularly effective in drilling the hole.

When the bit has been worn out through use it is simply slid out of position and scrapped and a new bit inserted.

This bit will drill faster, further and last longer than the standard cross bit.

What I claim is:

1. A replaceable bit rock drill comprising a holder for a replaceable bit having traverse jaws converging towards their extremities from a striking surface removed from said jaws by grooves, said striking surface being pierced by the central bore of the holder, and a bit having a cutting edge supported by a shank flaring outwardly to the base and slidably fitting between said jaws and said striking surface, and the shank of said bit continuing beyond the extremity of the jaws of the holder without increasing in size and then flaring outwardly to support said cutting edge and without contact with the extremity of said jaws.

2. In a replaceable bit rock drill, a holder and bit together forming a loose dovetail joint, the

bit having free lateral movement for shaping the hole and a limited longitudinal movement, said longitudinal movement contributing to a direct impact by the striking base of the tenon cut, at each stroke of said holder distinct from the origin of the stroke and to a swaging action on the bit, said striking base extending through fillets into the converging side walls of the cut at either side of the cooling fluid inlet.

3. In a replaceable bit rock drill, a shank having a longitudinal dovetail slot at its end, a bit having a cutting edge and a longitudinal dovetail portion removably received into the dovetail slot in the shank end such that the dovetail portion on the bit is permitted a limited longitudinal movement in the dovetail slot in the shank end.

4. A construction as claimed in claim 3 wherein the dovetail slot in the shank extends to its wall and the dovetail portion of the bit is permitted free lateral movement in such slot.

5. The combination with a shank and a detachable bit therefor, of a loose connection therebetween such that the bit is permitted a limited longitudinal movement and in addition free lateral movement in the shank.

6. The combination with a shank having a longitudinal dovetail slot in the end thereof defined by converging side walls and a transverse bit impact surface, of a detachable bit having a cutting edge and a longitudinal dovetail portion inserted into the dovetail slot in the shank and defined by diverging walls and a transverse upper surface adapted to engage the said impact surface in the slot of the shank, said dovetail portion of the bit being permitted a limited longitudinal movement in the dovetail slot of the shank.

7. The construction claimed in claim 6 wherein the dovetail portion of the bit is permitted free lateral movement in the dovetail slot in the shank.

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