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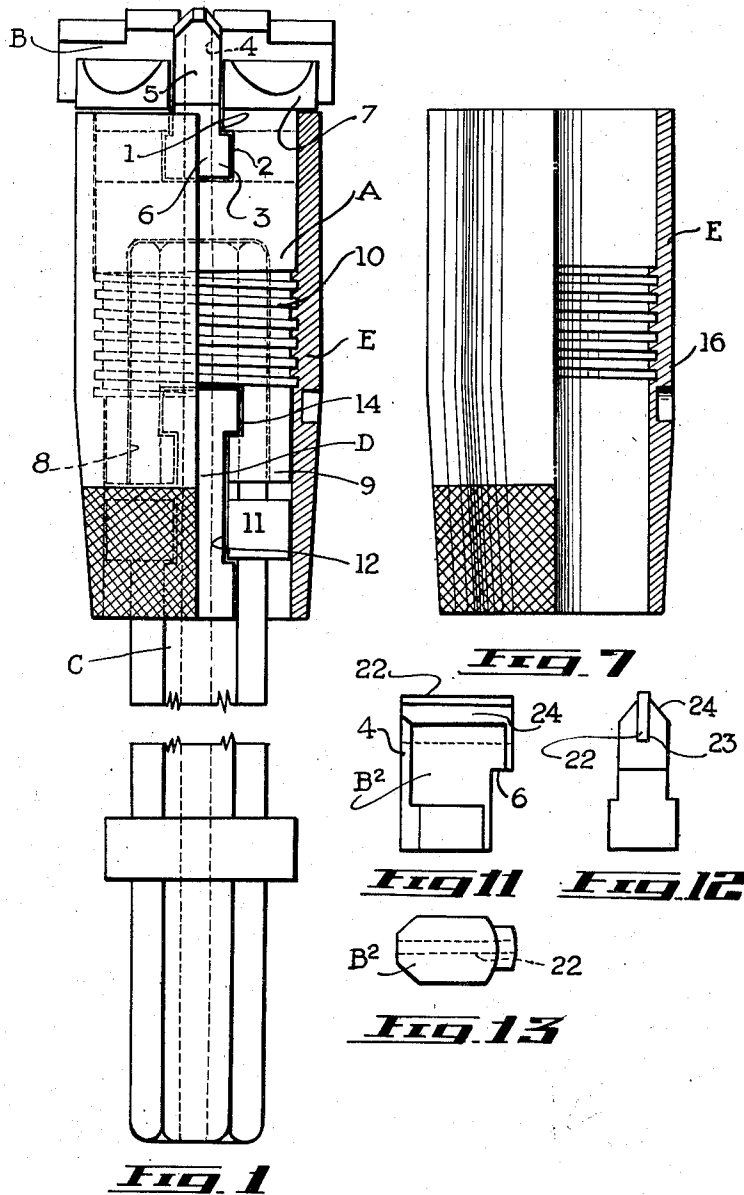
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2,649,284

INSERTED TOOTH ROCK DRILL

Filed Feb. 12, 1949

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

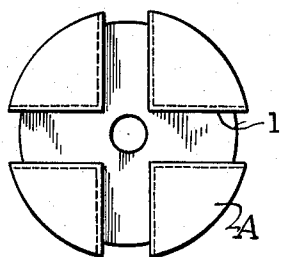


Fig. 3

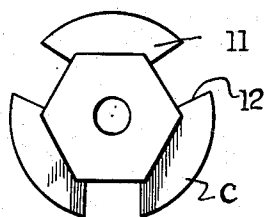


Fig. 6

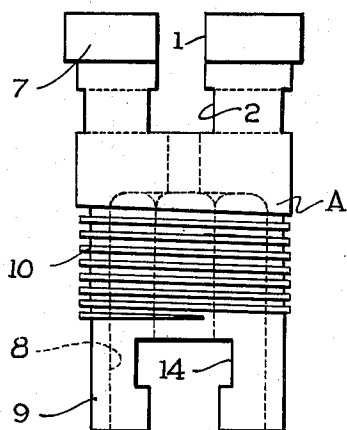


Fig. 2

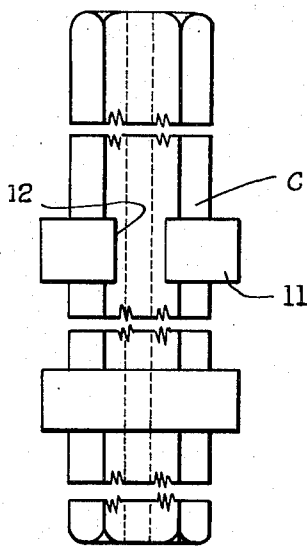


Fig. 5

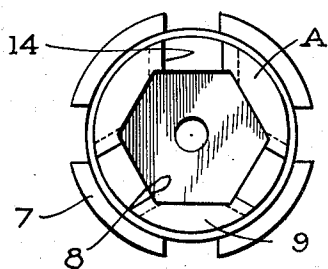


Fig. 4

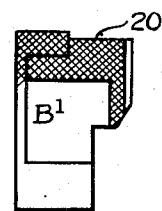


Fig. 9

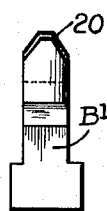


Fig. 10

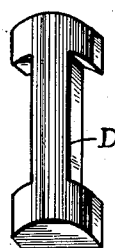


Fig. 8

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INSERTED TOOTH ROCK DRILL

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Application February 12, 1949, Serial No. 75,983

3 Claims. (Cl. 255—64)

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My present invention relates to new and useful improvements in an inserted tooth rock drill and particularly to one having a non-binding and quickly detachable drill head.

An object of the invention is to provide a novel design of and durably constructed drill head that is readily removable at all times from the drill rod.

A further object of the invention is to provide a quick change connection between the drill head and rod that will not seize or bind and permit of easy separation without use of special equipment or tools.

A further object of the invention is to provide an improved rock drill having replaceable teeth that are inter-changeable and preferably inserted radially in the head.

A further object of the invention is to provide a rock drill with replaceable teeth having either super-hard cutting surfaces or inserted super-hard nibs by which the usefulness of the teeth may be prolonged.

A still further object of the invention is to provide a safe, simple and reliable means for securing the teeth in proper position in the head against accidental radial, lateral or longitudinal displacement and yet permit of their ready removal when required, the teeth-securing means serving also if desired to retain the operative connection between the drill head and shaft.

To the accomplishment of these and related objects as shall become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts as shall be hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the claims hereunto appended.

The invention will be best understood and can be more clearly described when reference is had to the drawings forming a part of this disclosure wherein like characters indicate like parts throughout the several views.

In the drawings:

Figure 1 is an assembly elevation of the drill, partly broken away and shown in section;

Figures 2, 3 and 4 are elevation, top and bottom plan views respectively of the drill head;

Figure 5 is an elevation of the head-receiving end of the drill shaft;

Figure 6 is a plan view of the shaft end;

Figure 7 is an elevation, with part shown in section, of the coupling sleeve;

Figure 8 is a perspective of one of the coupling fingers;

Figures 9 and 10 are side and end elevations of a surface-hardened tooth; and

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Figures 11, 12 and 13 are side and end elevations and bottom plan view respectively of a modified form of tooth.

The need to reduce hard rock drilling costs has led to this further improvement in rock drills, which is but a continuation of the development of a drill head with replaceable special cutting teeth as disclosed in my pending applications Serial #661,536, filed April 12, 1946, now abandoned, and Serial #25,287, filed May 6, 1948, now Patent No. 2,595,962.

In its present form the drill head A is designed to receive replaceable teeth B in its outer end and the end of a drill rod C in its inner end, having couplers D to prevent their relative rotative movement and/or their longitudinal separation, and is provided with a covering sleeve E that serves to prevent radial displacement of both the teeth B and couplers D.

It will be noted that the sleeve E may be but partially unscrewed to permit of changing the teeth B without disturbing the coupling of the head A and rod C and also that the sleeve may be completely unscrewed and slipped along the rod, clear of the head to uncouple the head and shaft whilst the teeth are held in place in the head by the operator's hand, the coupling fingers can then be replaced in the head and the sleeve screwed back into place to retain the assembled parts against accidental separation or loss while disconnected from a rod.

Of particular advantage in this drill head is the specific rod coupling employed that will not bind or tighten in operation—as often occurs in removable drill heads when attached to the rod by thread, cam or taper—thus avoiding much loss of time and damage to the parts.

The drill head A is a barrel of special shock resistant steel with a pair of slots 1 cut in the outer end, intersecting at the centre at right angles. These slots are widened at their base 2, as inverted T's. Four teeth B are inserted in these radially disposed slots having widened, inverted T-like bottoms 3. The teeth are mitered at their inner ends 4 that meet where the accommodating slots come together. The outer ends 5 of the teeth that are of such length as to project beyond the circumference of the barrel-like head A are stepped inwards at their heels 6 to lie flush with the surface of the barrel; besides an exterior flange 7 at its outer slotted end, the barrel-like head A has a central bore or socket 8 extended axially into its lower end that thus assumes the form of a skirt 9. Exteriorly this skirt part is of slightly lesser diameter than the upper slotted portion of the barrel body and just

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below the point where the diameter of the barrel is reduced, it is exteriorly threaded as shown at 10. Interiorly the socket 8 is forged to the desired cross-sectional shape such as hexagon, quarter, octagon or the like to correspond with the size and shape of drill rod to be used.

The drill rod C, of a diameter and shape to fit the socket 8 has an external flange or ring 11 spaced in from its end a distance substantially equal to the depth of the socket, said ring being broken at three circumferentially spaced intervals 12 as seen in Figures 5 and 6. Registering with the breaks 12 in the rod flange 11 are slots 14 through the skirt 9 widened at the top in T-form. It is into the pockets formed by these respectively registering sets of T slots 14 and the breaks 12 in the rod ring 11, when the rod is inserted in the socket 8 of the head, that the I-shaped coupling fingers D are placed, holding the rod and head against longitudinal separation. Preferably these coupling fingers are of a thickness and arcuate contour on their outer faces to lie flush with and continue the exterior circumferential contour of the drill head skirt 9.

An enveloping, assembly-retaining sleeve E interiorly threaded as at 15 and of slightly greater interior diameter above the threading, slides on over the lower skirt end of the head A and screws securely thereon to abut or bind against the lower edge of the top flange 7 and overlie the inwardly stepped heels 6 of the radially inserted teeth B at its upper end and the circumferentially spaced coupling fingers D at its lower end.

The modified form of tooth B¹ shown in side and outer end elevations respectively in Figures 9 and 10 has its top cutting bevelled ridge stepped as the teeth seen in Figure 1, but in addition it has its projecting cutting surfaces covered with a super-hard material 20 to further extend the life thereof by resisting wear and tear.

Another variation is seen in the tooth B² illustrated in Figures 11, 12 and 13 wherein a thin blade-like nib 22 is set in a deep narrow groove 23 running longitudinally in the centre of the bevelled cutting top 24 of the tooth and forged therein. When making teeth to carry forged in nibs of this nature, I have found it desirable on occasions to widen the top of the tooth to give it greater substance or body in view of the grooving thereof, as indicated in broken dotted outline in Figure 12.

From the foregoing description taken in connection with the accompanying drawings, it will be manifest that an inserted tooth rock drill is provided that will fulfil all the necessary requirements of such a device, but as many changes could be made in the above description and many apparently widely different embodiments of the invention may be constructed within the scope of the appended claims, without departing from the spirit or scope thereof, it is intended that all matters contained in the said accompanying specification and drawings shall be interpreted as illustrative and not in a limitative or restrictive sense.

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What is claimed as new is:

1. A rock drill comprising, in combination with a drill rod having an external ring near one end with a circumferentially break therein, a drill head having cutting teeth in one end and an exteriorly threaded axial rod-receiving socket in the other end, and said socket end having a lateral T-shaped pocket registering with the break in the ring on said drill rod; an I-shaped coupling member disposed in the break in the ring on said rod and the pocket in the socket end of said head; and a threaded sleeve on the socket end of said head overlying and preventing the lateral displacement of said coupling member.

2. A rock drill comprising in combination a separable head and drill rod, said head having a drill rod-receiving socket in one end and such socket end of said head and said rod having registering lateral recesses therein, laterally exposed I-shaped coupling fingers in the respective registering recesses in said rod and said head holding said rod and head against longitudinal separation; and a sleeve releasably carried by said head and circumferentially overlying said coupling fingers thereby holding said coupling fingers against lateral separation from said head and rod.

3. A rock drill comprising a head having a pair of intersecting slots in one end and an exteriorly threaded axial socket in the other, said socket end having circumferentially spaced T-shaped recesses in the exterior surface thereof; radially replaceable teeth in the slotted end of said head; a drill rod slidably inserted in the socket end of said head and having circumferentially spaced notches longitudinally registrable with the recesses in said head; I-shaped coupling fingers disposed laterally in the recesses in said drill head and the notches in said drill rod; and an interiorly threaded assembly-retaining sleeve on said head circumferentially overlying said coupling fingers and the outer ends of said teeth and releasably holding both said teeth and said coupling fingers against displacement.

ORLANDO ARTHUR LETTIS.

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