Dec. 31, 1957 C. D. GRABER 2,818,292

ROCK DRILL

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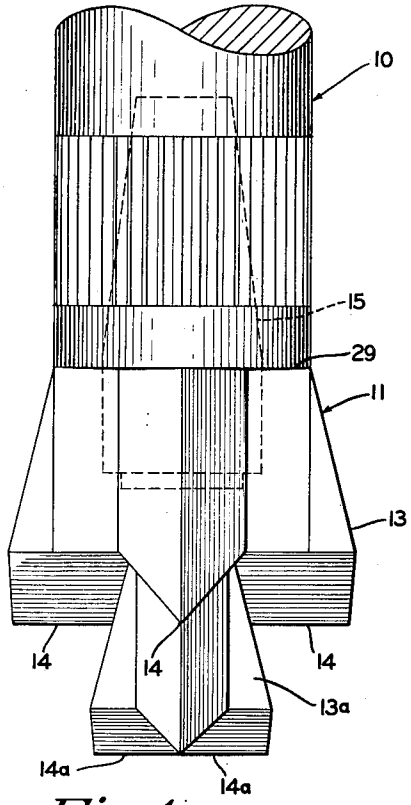


Fig. 1

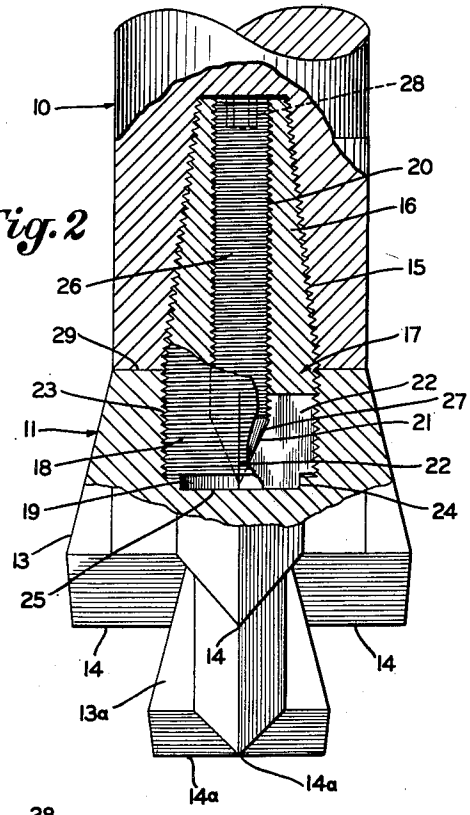


Fig. 2

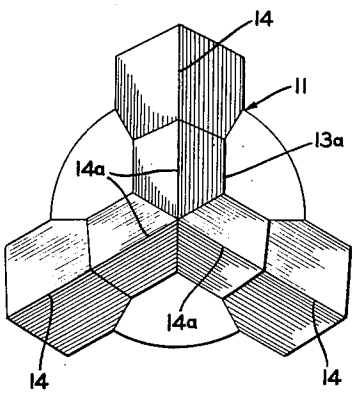


Fig. 3

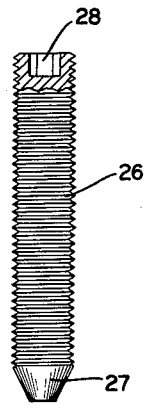


Fig. 5

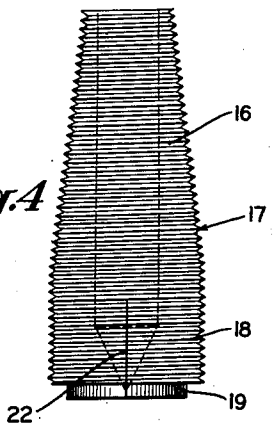


Fig. 4

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ROCK DRILL

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3 Claims. (Cl. 287—125)

The invention relates to rock drills of the type comprising a drill rod or stem and a bit detachably connected thereto, and more particularly to means for coupling the drill bit to the stem.

An object of the invention is to provide means for coupling the drill bit to the stem in such a manner that it will not work loose during operation.

Another object is to provide such coupling means comprising a continuously threaded stud received in threaded sockets in the drill bit and stem, the portion of the stud received in the stem being tapered.

A further object is to provide such a device in which the threaded stud has an unthreaded pilot portion received in the bore of the drill bit or point.

A still further object is the provision of means whereby the pilot portion of the stud has a tight fit in the sides and bottom of the bore in the drill bit or point.

Another object is to provide such a device in which the pilot end portion of the threaded stud is split and means is provided for expanding the same into the bore in the drill bit or point.

A further object is to provide such a construction in which the threaded stud has a threaded axial bore terminating in an unthreaded tapered end within the split portion of the stud to receive a threaded expanding pin having a tapered, unthreaded end portion for expanding the split pilot portion of the stud.

The above objects together with others which will be apparent from the drawing and following description, or which may be later pointed out, may be attained by constructing the improved rock drill in the manner hereinafter described in detail and illustrated in the accompanying drawing, in which:

Fig. 1 is a side elevation of a drill bit and the adjacent end portion of the stem with coupling means embodying the invention;

Fig. 2 a longitudinal, sectional view through the stem and adjacent portion of the drill bit, showing the manner in which the pilot portion of the coupling stud is expanded within the bore of the drill bit or point;

Fig. 3 an end elevation of the drill bit;

Fig. 4 a detached, side elevation of the coupling stud; and,

Fig. 5 a detached, side elevation, with parts broken away, of the expanding pin.

Referring now more particularly to the construction illustrated, in which similar numerals refer to similar parts throughout, a portion of a stem or drill rod is indicated at **10** and the drill bit or point is indicated generally at **11**.

The drill bit or point **11** may be of the general shape best shown in Figs. 1 and 2, being flared downwardly and outwardly from the stem as indicated at **13** and provided with a plurality of cutting edges **14**.

If desired, a reduced central extension **13***a* may be formed upon the lower end of the drill bit or point and provided with the cutting edges **14***a*. However, it should be understood that the particular shape of the drill bit or point may vary, the invention residing in the coupling means for coupling the drill bit or point to the stem rather than in the specific shape of the drill bit per se.

The stem or rod **11** has an upwardly tapered, axial, threaded socket **15** in its lower end to receive the threaded, conical portion **16** of the coupling stud which is indicated generally at **17**.

The lower portion **18** of the stud is straight or cylindrical and terminates at its lower end in a reduced unthreaded pilot portion **19** having a flat lower end. With the exception of this pilot portion **19**, the stud **17** is threaded continuously throughout its length.

A threaded, axial bore **20** extends from the upper end of the stud **17** to a point near the lower end thereof, terminating at its lower end in the tapered, unthreaded portion **21**. The lower, straight portion **18** of the stud, including the pilot portion **19** thereof, is provided with one or more radial slots, as indicated at **22**, extending from the central bore in the stud through the periphery thereof.

A threaded, axial bore **23** is provided in the upper end portion of the drill bit or point **11**, terminating at its lower end in the reduced unthreaded portion **24**, shaped to receive the threaded, cylindrical lower portion **18** of the stud **17** and the reduced unthreaded pilot portion **19** thereof, respectively.

In assembling the drill bit or point upon the stem, the cylindrical lower portion **18** of the stud **17** is screwed into the threaded bore **23** in the drill bit or point, the unthreaded reduced pilot portion **19** of the stud being in close contact with the flat bottom wall **25** of the bore, as best shown in Fig. 2.

The threaded expanding pin **26** is then screwed down into the axial bore **20** of the coupling stud **17**, the unthreaded, frusto-conical lower end **27** thereof being received in the unthreaded conical lower end **21** of the bore so as to expand the split lower portion **18** of the stud tightly into the threaded socket **23** of the drill bit or point.

This expanding pin is in the form on an Allen head screw, having the hexagonal socket **28** in its upper end to receive an Allen head screw driver for manipulating the same.

It will be seen that after this expanding pin has been tightly screwed into place within the coupling stud **17**, the lower portion **18** of the stud **17** will be fitted tightly within the socket **23** in the drill bit or point so that there can be no relative movement of the drill bit and stud either longitudinally or laterally.

The stem **10** is then screwed tightly onto the tapered upper end portion **16** of the coupling stud, the lower flat end of the stem tightly contacting the upper flat end of the drill bit or point as at **29**.

The drill bit or point will thus be tightly coupled to the stem, thus eliminating any possibility of either end or side movement of the drill bit or point relative to the coupling stud, preventing the drill bit from working either sideways or endways on the threads.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention or discovery, the construction, the operation, and use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful construction, and reasonable mechanical equivalents thereof obvious to

art, are set forth in the appended

ing a stem having a conical threaded
reof, a coupling stud having a conical
d in the conical socket in the stem
d portion having a flat end, said stud
hreaded throughout the conical por-
cal portion, the cylindrical portion of
radially, a separable drill bit having
ket therein provided with a flat inner
e cylindrical portion of the stud with
tud in contact with the flat end wall
being an axial threaded bore in the
a tapered unthreaded end within the
ion of the stud, and a threaded ex-
aid threaded axial bore and having a
aded end portion for expanding said
ion of the stud within the threaded
t, said threads having a slight enough
itudinal force will not produce rela-
hreaded coupling parts.

ing a stem having a conical threaded
reof, a coupling stud having a conical
d in the conical socket in the stem
d portion terminating in a reduced un-
on having a flat end, said stud being
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a separable drill bit having a threaded
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th a flat inner end wall receiving the
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on thereof located in said unthreaded
said socket with the flat end of the
the flat end wall of the socket, there
ded bore in the stud terminating in a

tapered unthreaded end within the split cylindrical portion of the stud, and a threaded expanding pin within said threaded axial bore and having a frusto-conical unthreaded end portion for expanding said split cylindrical portion of the stud within the threaded socket in the drill bit, said threads having a slight enough pitch so that a longitudinal force will not produce relative rotation of the threaded coupling parts.

3. A drill comprising a stem having a conical threaded socket in an end thereof, a coupling stud having a conical end portion received in the conical socket in the stem and a cylindrical end portion terminating in an unthreaded reduced pilot portion, the stud being continuously threaded throughout the conical portion and the cylindrical portion, the cylindrical portion of the stud being split radially, a separable drill bit having a threaded axial socket therein terminating in an unthreaded reduced portion provided with a flat inner end wall receiving the cylindrical portion of the stud with the reduced pilot portion of the stud located in the reduced portion of the socket and the flat end of said pilot portion in contact with the flat end wall of the socket, and means for expanding the split cylindrical portion of the stud within the threaded socket in the drill bit, said threads having a slight enough pitch so that a longitudinal force will not produce relative rotation of the threaded coupling parts.

References Cited in the file of this patent

UNITED STATES PATENTS

104,576	Good	June 21, 1870
1,054,181	Davenport	Feb. 25, 1913
1,879,856	Peterson	Sept. 27, 1932
2,005,498	Hart	June 18, 1935
2,463,859	Engstrom	Mar. 8, 1949
2,569,275	Baker	Sept. 25, 1951
2,608,103	Shonnard et al.	Aug. 26, 1952