

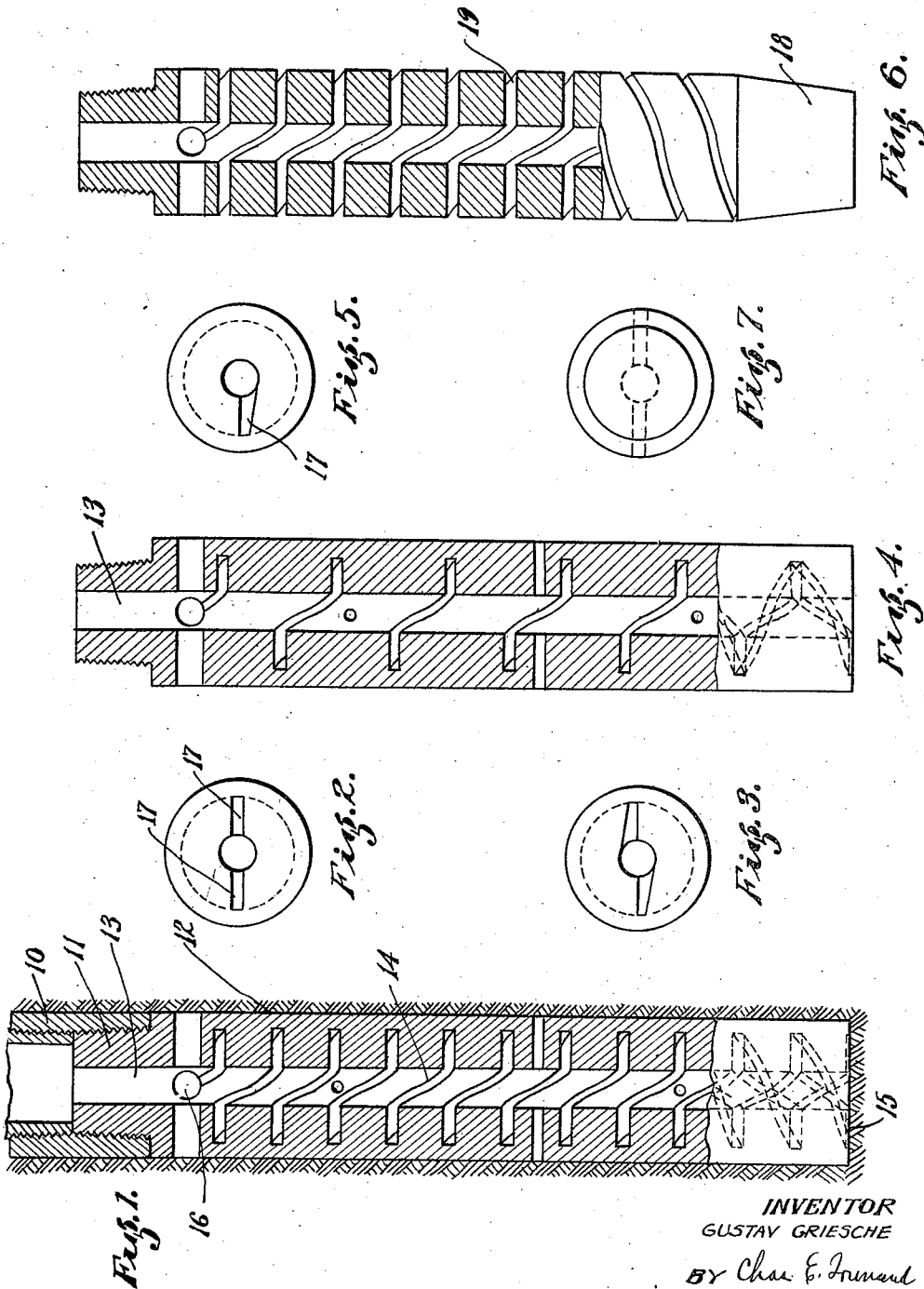
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G. GRIESCHE

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ROCK DRILL

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UNITED STATES PATENT OFFICE.

GUSTAV GRIESCHE, OF BERKELEY, CALIFORNIA.

ROCK DRILL.

Application filed August 23, 1921. Serial No. 494,661.

To all whom it may concern:

Be it known that I, GUSTAV GRIESCHE, a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented new and useful Improvements in Rock Drills, of which the following is a specification.

This invention relates to well boring tools, and particularly pertains to a rotary drill bit.

It is the principal object of the present invention to provide a rotary drill bit especially adapted for use in boring wells, which bit is designed to utilize abrasive material, by which the cutting action is produced, said tool being simple in construction and continuous in its operation.

The present invention contemplates the use of a drill bit substantially cylindrical in shape, and having passageways longitudinally and interiorly thereof, which passageways communicate with outlet openings in the lower flat end of the tool through which abrasive material may be forced.

The invention is illustrated by way of example in the accompanying drawings, in which:

Figure 1 is a view in vertical section and elevation through one form of the drill bit with which the present invention is concerned, further showing its mounting.

Fig. 2 is a view in end elevation showing the cutting face of the bit disclosed in Fig. 1.

Fig. 3 is a view in end elevation showing another form of the cutting face.

Fig. 4 is a view in longitudinal section through a modified form of the bit in which a single outlet opening is provided in the cutting face.

Fig. 5 is a view in end elevation showing the bit disclosed in Fig. 4.

Fig. 6 is a view in vertical section through another form of the invention.

Fig. 7 is a view in end elevation showing the bit disclosed in Fig. 6.

Referring more particularly to the drawings, 10 indicates a drill stem, the lower end of which is interiorly threaded to receive the threaded shank 11 of a drill bit 12. By reference to the drawing it will be seen that the drill bit may be formed with a variety of passageways. However, it is intended that in all instances a central passageway

13 will extend longitudinally of the bit, said passageway communicating with helical passageways arranged longitudinally of the bit and inclosed thereby. In the form of the invention shown in Fig. 1 a pair of helical grooves 14 are formed within the body of the drill bit and radiate from the central passageway 13. The lower ends of the grooves will terminate at the cutting face 15 of the tool and will be disposed diametrically opposite each other as more clearly shown in Fig. 2. These grooves and the central passageway 13 are provided to receive water or other liquid and abrasive material, such as gritty, granular substance which would operate between the cutting face of the tool and the material being drilled to gradually erode the material. It will be understood that the liquid and abrasive material will be forced downwardly through the tool under the pressure established by the head of liquid and material in the drill stem 10.

In order to prevent violent action at the lower end of the drill stem a plurality of radially extending openings 16 are formed at intervals along the length of the drill stem, said openings permitting a portion of the liquid to by-pass from the tool without being forced from the lower end thereof. This will form a counter-pressure around the tool and at the same time will relieve the pressure which would normally be exerted against the bottom of the bore at the cutting face of the tool.

It will be understood that the outlet openings 17 which will occur on the flat cutting face might be of various designs, as, for example, the design shown in Fig. 3, in which instance a slight clearance will occur at the back of the openings.

Reference being had to Figs. 4 and 5, it will be seen that a cutting tool is provided which is practically identical with the one previously described, although in this instance but one helical passageway is formed. This passageway communicates with the central opening 13 and of course only provides a single outlet opening 17 in the cutting face of the tool.

In Figs. 6 and 7 another form of the invention is disclosed which differs principally from the forms previously described in that the lower end of the passageway 13 is closed

by a frusto-conical member 18 and furthermore in that a plurality of outlet openings 19 extend through the wall of the tool to establish communication with the central bore.

In operation of the present invention a boring tool is first provided, constructed along the general lines, as shown by way of example in the accompanying drawings, and previously described. These tools are in all instances substantially cylindrical and have the central bore 13 therethrough with one or more abrasive circulating passageways 14 and the counter-pressure openings 16. The tool may then be placed in drilling position at the lower end of a drill stem 10 and thereafter rotated. Abrasive material and liquid, such as water, will be fed down the stem through the central bore 13 and into the helical passageways 14. The major portion of this material will be forced from the outlet openings 17 in the flat cutting face of the tool. Attention is directed to the fact that the cutting face 15 is disposed at right angles to the longitudinal axis of the tool and that it represents a flat surface, substantially equal to the diameter of the tool body. As the tool rotates the abrasive material will act between the cutting face and the lower end of the bore to gradually erode the material, forcing it up along the sides of the tool and causing it to form a part of the wall of the bore. At the same time a flow of liquid will be brought about through the openings 16. This flow will to a certain extent relieve the pressure of the liquid and prevent an excessive disturbance at the lower end of the drill bit, and as the major portion of the liquid will pass out through openings 16 this liquid will act to clear the bore and assist in plastering the walls thereof.

It will thus be seen that the device here disclosed is decidedly simple in construction, that it will be self-sharpening, and will act to rigidly and continuously perform its intended operation.

While I have shown the preferred form of my invention as now known to me, it will be understood that various changes may be made in the combination, construction and arrangement of parts by those skilled in the art, without departing from the spirit of the invention, as claimed.

Having thus described my invention, what

I claim and desire to secure by Letters Patent is:

1. A boring tool comprising a substantially cylindrical bit, a longitudinal bore therethrough, and a plurality of internal helical threads within the bit, communicating with the cutting face thereof and radiating from the longitudinal bore of the bit.

2. A rotating rock drill with internal threads within the body of the rock drill to deliver abrasive material to the bottom of the well.

3. A rotating rock drill with one or more internal threads radiating from the center.

4. A rotating rock drill having a longitudinal opening formed therethrough from which one or more threads radiate to distribute abrasive material between the drill and well bottom, said drill having a flat cutting face.

5. A rotating rock drill with one or more internal threads radiating from the center of drill, having one or more openings on the sides of drill to deliver the main supply of water near the top of drill to discharge the cuttings but not abrasive material, and the lower openings only large enough to supply water to the bottom of drill but not large enough to wash out the abrasive material from the bottom of well.

6. A boring tool having a flat cutting face with one or more openings occurring therein and internal helical threads formed within the tool to communicate with said openings and through which abrasive material may be fed.

7. A rotating rock drill having a longitudinal opening formed therethrough from which radiates one or more threads, said drill having a flat cutting surface with openings in communication with said threads whereby abrasive material may be distributed between the cutting face and the bottom of the well.

8. A rotating rock drill having a longitudinal opening formed therethrough from which radiates one or more internal threads, said drill having a flat cutting face to the area of the cross section of the drill, said face having openings in communication with said threads whereby abrasive material may be fed between the cutting face and the well bottom.

GUSTAV GRIESCHE.