J. B. STRAUSS & C. L. BROWN.

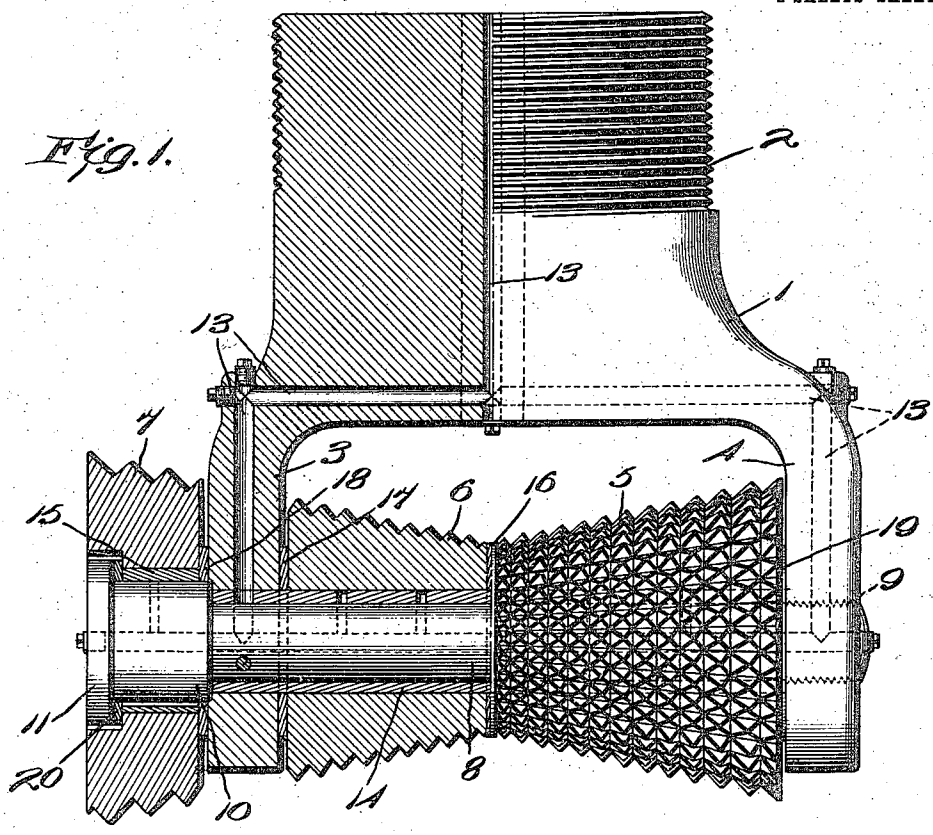
ROTARY ROCK DRILL.

APPLICATION FILED JAN. 31, 1912.

1,045,756. Patented Nov. 26, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



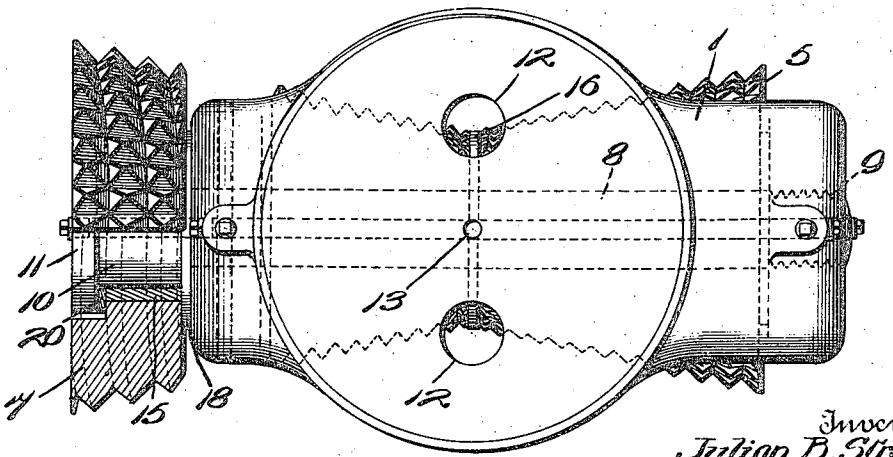


Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

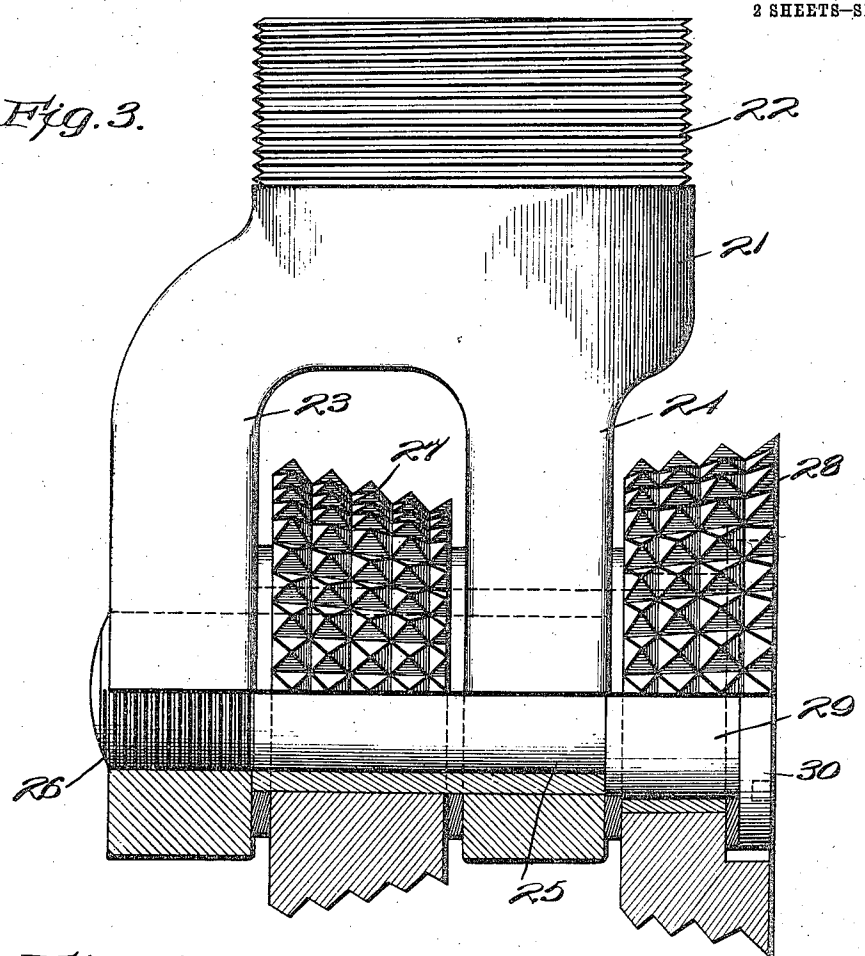
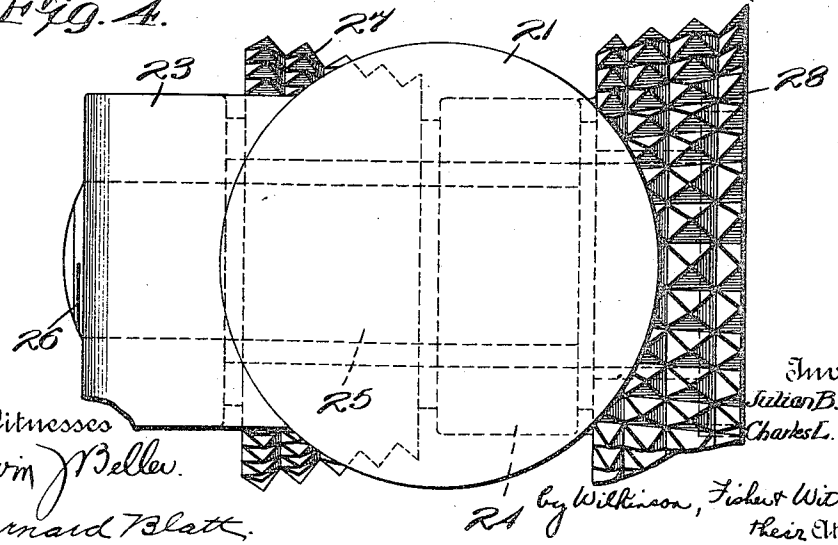


Fig. 4.



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UNITED STATES PATENT OFFICE.

JULIAN B. STRAUSS AND CHARLES L. BROWN, OF NEW ORLEANS, LOUISIANA.

ROTARY ROCK-DRILL.

1,045,756. Specification of Letters Patent. Patented Nov. 26, 1912.

Application filed January 31, 1912. Serial No. 674,625.

To all whom it may concern:

Be it known that we, JULIAN B. STRAUSS and CHARLES L. BROWN, citizens of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented certain new and useful Improvements in Rotary Rock-Drills; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improved drills for rock, stone, coal or ore, and it consists in the constructions, combinations and arrangements herein described and claimed.

An object of our invention is to provide a strong and durable drill adapted to operate efficiently under all practical conditions.

A further object of our invention is to provide an improved rotary drill adapted to be automatically maintained centered in the drilled hole and to cut equally over all portions of the base of said hole.

In the accompanying drawings, forming a part of this application, and in which similar reference symbols indicate corresponding parts in the several views;—Figure 1 is a side elevation, with the left-hand half in section on an axial plane of the drill, illustrating one embodiment of our invention; Fig. 2 is a plan of the construction shown in Fig. 1, with the extreme left-hand frusto-conical cutter partially in section; Fig. 3 is a side elevation, partially in section, illustrating a modification; and Fig. 4 is a plan of the construction shown in Fig. 3.

Referring to the drawings, 1 indicates the head of a rotary drill provided with threads 2 for attachment to a drill rod, or other suitable actuating member; said head being provided with fork arms 3 and 4 spaced at different distances from the axis of the drill.

A series of frusto-conical cutters 5, 6 and 7 are rotatably mounted on a spindle 8 rigidly mounted in the arms 3 and 4 perpendicularly to the axis of the drill; said spindle being shown threaded at 9 into the arm 4 and provided with an enlarged head 10 abutting against the arm 3 to provide a journal for the cutter 7 and terminating in a radial flange 11 for confining said cutter in position.

The drill head is provided with passages 12 for the efficient introduction of wash-out water toward the center of the drilled hole, and with ducts 13 for conducting a suitable lubricant to the bushings 14 and 15 of the rotatably-mounted cutters; the bushing 14 is rigidly secured to the arm 3 in any well known manner, as by a key, and the bushing 15 is similarly secured to the enlarged journal 10 of the cutter 7. Under certain practical conditions, it is advantageous to provide said bushings with rings of graphite, Babbitt metal, or other anti-friction material. Wear washers 16, 17, 18 and 19 are confined between said several cutters and the fork arms, and a similar washer 20 is shown between the cutter 7 and retaining flange 11.

As shown in the drawings, the several cutters comprise unequal frusta of equal, right, circular cones so arranged that the cutting diameters increase proportional to the distance from the axis of the drill; whereby said cutters are adapted to drill a hole having a conical base which tends to automatically maintain the drill centered.

The frusto-conical cutters 5 and 6 are provided peripherally with annular series of pyramidal teeth which are arranged asymmetrically to the axis of the drill on said respective cutters; whereby the teeth of each cutter will track between those of the other and cut clear spaces for the non-cutting portions of the latter. The outer cutter 7 is provided with similar series of cutting teeth arranged spirally thereon, for working the broken material toward the center of the drilled hole in advantageous position for removal by the wash-out water introduced through the passages 12. If desired, the pyramidal teeth on the cutters 5 and 6 may also be arranged spirally for working all of the material toward the center of the drilled hole.

Figs. 3 and 4 illustrate a modification in which the drill head 21 is provided with a threaded portion 22 for attachment to a drill rod, and with fork arms 23 and 24 spaced unequally from the axis of the drill.

A spindle 25 is rigidly secured in said arms, as by a threaded portion 26, and rotatably supports two frusto-conical cutters 27 and 28 similar to those previously described; said spindle being provided with an enlargement 29 engaging the arm 24 to provide a journal for the cutter 28 and terminating in a radial flange 30 for confining said cutter in position.

We claim:—

1. In a drill, the combination of a drill

head provided with fork arms spaced at different distances on diametrically opposite sides of the drill axis, a spindle mounted in said arms perpendicularly to the drill axis, and a series of cutters mounted for independent rotation on said spindle and extending axially at different distances from the drill axis for tracking with said unequally spaced arms upon rotation of the drill head.

2. In a drill, the combination of a drill head provided with fork arms spaced at different distances on diametrically opposite sides of the drill axis, a spindle mounted in said arms perpendicularly to the drill axis, and a series of cutters mounted for independent rotation on said spindle and provided peripherally with pyramidal teeth arranged asymmetrically to the drill axis on said several cutters, said several cutters extending axially at different distances from the drill axis for tracking with said unequally spaced arms upon rotation of the drill head.

3. In a drill, the combination of a drill head provided with fork arms spaced at different distances on diametrically opposite sides of the drill axis, a spindle rigidly secured in one arm and provided with an enlarged head abutting against the outer face of the other arm, frusto-conical cutters mounted on said spindle and enlarged head and having diameters increasing at all points proportional to the distances of such points from the drill axis, and a radial flange on said enlarged head for confining said cutter thereon.

In testimony whereof, we affix our signatures, in presence of two witnesses.

JULIAN B. STRAUSS.
CHARLES L. BROWN.

Witnesses:
W. K. De Pass,
F. C. Backstrom.