No. 649,488. Patented May 15, 1900.

# F. SCHRADER.

## DRILL BIT.

(Application filed Jan. 4, 1900.)

(No Model.)

Fig. 1.

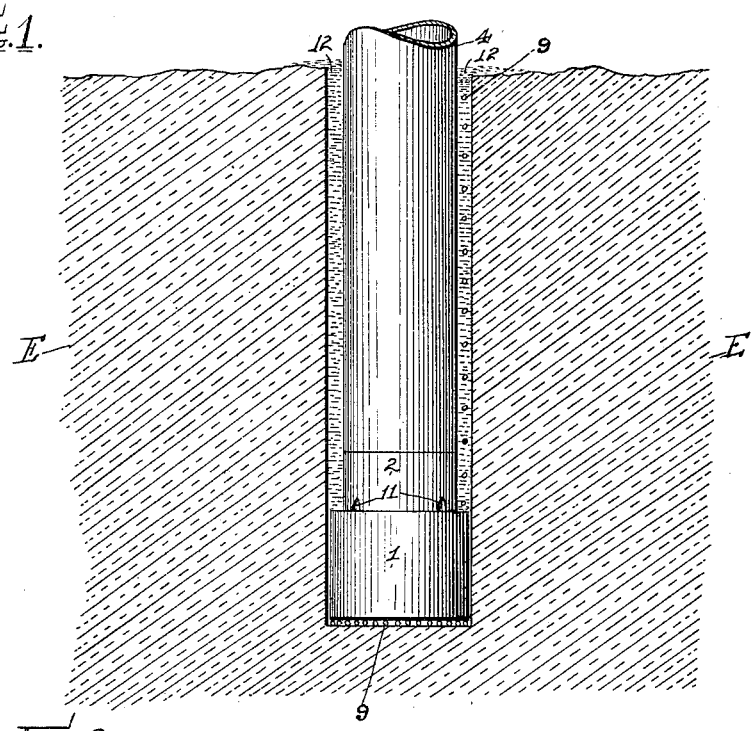



Fig. 2.

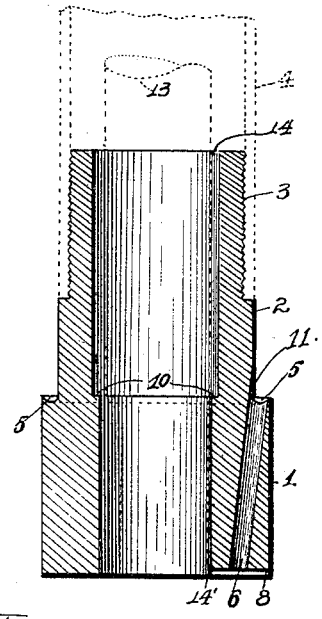



Fig. 3.

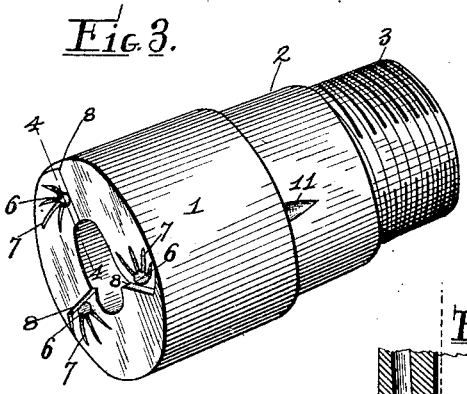
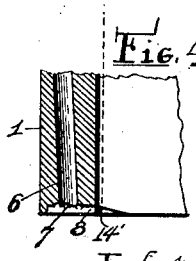



Fig. 4.




Witnesses
G. L. Bufy.
M. Boyd.

Inventor.
Frederick Schrader
By Emil Starck Atty.

# UNITED STATES PATENT OFFICE.

FREDERICK SCHRADER, OF ST. LOUIS, MISSOURI.

## DRILL-BIT.

SPECIFICATION forming part of Letters Patent No. 649,488, dated May 15, 1900.

Application filed January 4, 1900. Serial No. 353. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK SCHRADER, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Drill-Bits, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in self-feeding drill-bits; and it consists in the novel arrangement and combination of parts more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of my bit, showing its manner of application to a section of earth or rock E. Fig. 2 is a middle vertical section of the bit. Fig. 3 is a perspective view of the bit, and Fig. 4 is a sectional detail on line 4 4 of Fig. 3.

The present invention has relation to that class of drills known as "shot-drills," which are substituted for the well-known diamond drills and the object of the present improvement is to construct a drill or bit which shall be self-feeding, the metallic shot being automatically conveyed through a channel formed in the head of the bit, to the base of the latter, where it will be in position to grind or bore the rock operated upon.

In detail the device may be described as follows:

Referring to the drawings, 1 represents the cylindrical head of the bit, 2 the upper reduced extension thereof, and 3 the screw-threaded coupling end by means of which the bit can be secured to the first pipe-section 4, as is well understood. The shoulder formed at the base of the portion 2 is shaped into the form of an annular trough or depression 5, with the base of which communicate a series of channels or conduits 6, inclined in such manner as to bring their lower or discharge ends to the middle of the basal surface of the head 1. From the lower or delivery end of each conduit lead a series of radiating and tapering guide-grooves 7 for a purpose to presently appear. The surface at the converging ends of the grooves 7 tends slightly upward toward the channel 6, leaving a slight shoulder 8 on the opposite side of the delivery end of such channel, as is fully apparent from the drawings. The shot 9 is introduced through the annular space formed between the walls of the hole, formed as a result of the boring, and the outer wall of the pipe 4, the shot gravitating downward and landing in the depression or trough 5, from which it passes down through the conduits 6 under the base of the bit or head 1. Viewing the bit in Figs. 1 and 3, the same will be turned in a horizontal plane from left to right, the shot being guided under the circumstances by the radiating grooves 7, the shoulders 8 serving as a starting-point for the several shot as they emerge from the delivery end of the conduit 6. By this arrangement the shot is absolutely guided to and along the base of the head 1. The shoulders 8 are not absolutely necessary and, if desirable, may be omitted and a series of guide-grooves formed at the delivery end of each conduit 6, radiating in the opposite direction, in which case the bit could be turned in either direction—that is, from left to right, as described, or from right to left.

Formed in the interior of the head 1 at a point opposite the trough 5 is a shoulder 10, this shoulder determining the size of the cross-section of the core of the rock delivered by the drill. To facilitate the delivery of the shot into the conduits 6 from the trough 5, (it being understood that the shot is rough and not always absolutely spherical,) the wall of the part 2 is scooped out into suitable tapering recesses 11, directly over the upper or receiving ends of the conduits 6.

As is well understood, the slush-waters 12 are driven up to the surface through the space between the pipe and wall of the hole bored, the wash-water being pumped into the pipe 4 and forcing its way down through the space 14 14′ formed between the core 13 and the inner walls of the pipe and bit.

It is apparent that the present device is susceptible of changes and modifications without departing from the spirit of my invention.

Having described my invention, what I claim is—

1. In a drill-bit, a cylindrical head, a reduced extension therefor, an annular trough formed between the head and extension, a series of conduits leading from the base of the trough and located between the inner and

outer peripheral walls of the head, and having their delivery ends disposed along the basal surface of the head, substantially as set forth.

2. In a drill-bit, a cylindrical head, a reduced extension therefor, an annular trough formed between the head and extension, a series of conduits leading from the base of the trough and located between the inner and outer peripheral walls of the head, and inclined so as to bring their delivery ends to approximately the middle of the basal surface of the head, substantially as set forth.

3. A hollow drill-bit comprising a cylindrical head, a reduced extension therefor, means for coupling the extension to a pipe-section, an annular trough formed between the head and extension, a series of conduits leading from the base of the trough to the basal surface of the head, a series of guide-grooves formed along the base of the head and converging at the delivery end of each conduit, for guiding the shot fed to the bit, substantially as set forth.

4. A drill-bit comprising a hollow cylindrical head, a series of conduits formed therein and leading to the center of the basal surface of the head, a series of guide-grooves formed in the base of the head and converging at the delivery end of each conduit, a shoulder formed in the basal surface of the head opposite the guide-grooves and adjacent to the discharge end of each conduit, the upper end of each conduit having a recess leading thereto for better guiding the shot into the conduit, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK SCHRADER.

Witnesses:

EMIL STAREK,

G. L. BELFRY.