

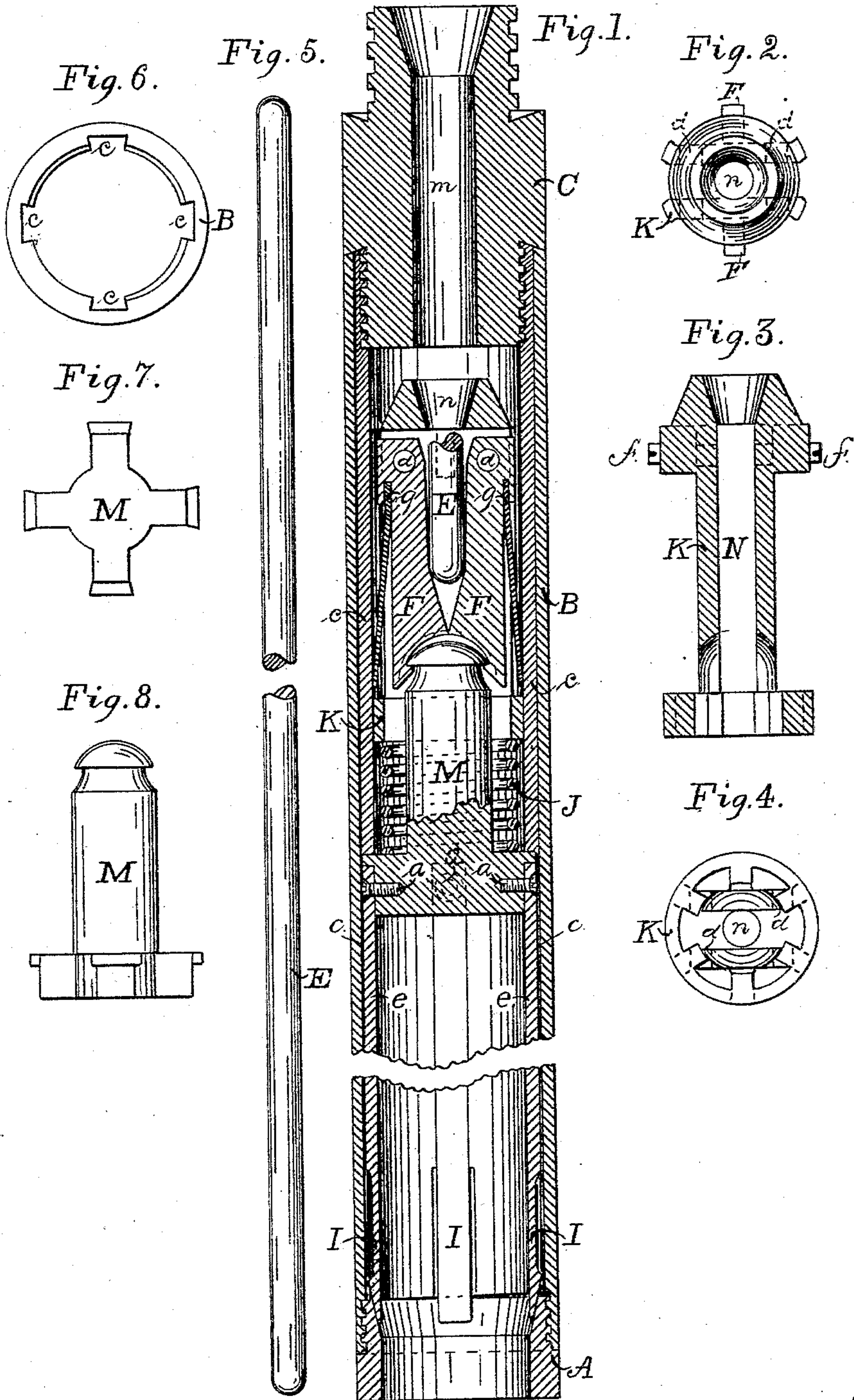
(No Model.)

A. BALL.

CORE BREAKER AND LIFTER FOR ANNULAR ROCK DRILLS.

No. 315,889.

Patented Apr. 14, 1885.



WITNESSES

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# UNITED STATES PATENT OFFICE.

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## CORE BREAKER AND LIFTER FOR ANNULAR ROCK-DRILLS.

SPECIFICATION forming part of Letters Patent No. 315,889, dated April 14, 1885.

Application filed December 20, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT BALL, of Claremont, in the county of Sullivan and State of New Hampshire, have invented a new and  
5 Improved Core Breaker and Lifter for Annular Rock-Drills; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention relates to an apparatus for securing the cores produced in prospecting or drilling with diamond annular drills, and is another way of obtaining the results explained  
15 in my two applications (Cases A and B) of the same date, and intended to be filed simultaneously herewith.

My invention employs breaking, grasping, and lifting spring-wedges, which are driven  
20 into engagement with the core by the force of a spring unlocked by the impact of a drop-rod, or by the impact alone of a drop-rod, or of both combined, the wedges referred to being secured to or a part of wedge-arms, which arms traverse in recesses sunken in the  
25 sides of the core-barrel, so as to project therein as little as possible. This way of using or attaching the spring-wedges can be used in connection with any one of the breaking, grasping, and lifting wedges described in my  
30 applications (Cases A and B) of even date herewith, and my drop-bar can also be used in combination with any of my devices described in such applications for connecting  
35 said wedges with the plunger-pin.

In order to better understand this invention, reference should be had to the accompanying drawings, in which—

Figure 1 is a central vertical sectional view of  
40 my improvements contained in a tube or core-barrel and in position as boring progresses. Fig. 2 is a top view of the cylinder K, (shown in section in Fig. 1.) Figs. 3 and 4 are respectively sectional and bottom views of the same.  
45 Fig. 5 is a view of the drop-rod, (shown also in part in Fig. 1.) Fig. 6 shows a vertical cross-section of the core-barrel, showing the grooves for the wedge-arms; Fig. 7, a bottom view of the plunger-pin, and Fig. 8 a side  
50 view of the same.

In the different drawings like letters refer to corresponding parts.

A represents the drill-head, attached by usual screw-threads to the last length of the drill-pipe B, (usually called the "core-barrel.")  
55 The inside of the drill-head is preferably made with a bevel to receive the points of spring breaking-wedges I I I. These wedges are at the end and may be a part of the wedge-arms *e e*, which are adapted to work in the slots *c c*  
60 in the core-barrel. These slots are preferably made with a dovetail, as shown in Fig. 6. The wedge-arms are secured to the end of the plunger-pin M by screws or rivets *a a a*. These wedge-arms, when in position, are at a  
65 little distance from the core, between which and such arms and the interior of the core-barrel there is always a clear open space for the passage of water, and the spring-wedges are also entirely clear of and removed from the  
70 core, except when operated to grasp it, as will be explained. It is obvious that these wedge-arms and wedges can be of any number, as may be preferred. The plunger-pin M, to whose lower end the wedge-arms *e e* are se-  
75 cured, is cut away at the bottom, as shown in Fig. 7, for the convenient passage of water, and is cylindrical in body and grooved at the top, so that it may be conveniently grasped and held by the latches F F, which in turn  
80 are pivoted to the cylinder K and pressed into engagement by springs *g g*. These latches are arranged at a little distance apart, and have beveled inner surfaces, as shown in Fig. 1.

J is a coiled spring held under tension between the bottom of the cylinder K and the lower part of the plunger-pin M.

K is a cylinder placed within the core-barrel and extending from the top of spring J to, or nearly to, the top of the core-barrel, and is  
90 secured in a central position within said core-barrel by screws *f f*.

The water-passage from the rod-coupling C is shown by the letter *m*, and is conical at the upper end thereof to give easier entrance, and  
95 the similar passage, N, through the cylinder K, is also conical at its upper end for the same purpose.

E denotes the drop-rod, cylindrical in form, with one or both ends rounded. When at work 100



drilling, the wedges are held up out of the way of the core by the grooved end of the plunger-pin M being grasped and held by the spring-latches F F.

5 When it is desired to stop drilling and to pull up the core, the drop-rod E is put into the water-way and falls by its own weight (or is carried by the force of the water) until it comes into contact with the latches F F, which  
10 it opens, and allows the spring J to be released and its force to be transferred to the wedges I I I.

In case it is desired to do without a spring J, the weight of the drop-rod can be adapted  
15 to give sufficient blow to the end of the plunger-pin (after unlatching it) to drive the wedges, or this spring may be so adjusted as to strength that the wedges may be driven by the combined force of the spring after it is re-  
20 leased and the impact of the drop-rod. When the wedges are driven forward, as described, they grasp the core and either break it or it is broken in the act of drawing up the tubes, in either case the wedges holding the core safely  
25 and preventing its fall from the core-barrel.

I disclaim in this application the combination, with an annular drill-head and core barrel, of core grasping and lifting wedges connected with the interior thereof, with a clear  
30 open space at all parts between said wedges and the exterior of the core; also, the combination, with such head and core-barrel, of wedges, the head, the plunger-pin, and the latches; also, the combination, with such head  
35 and core-barrel, of the cylinder H, the wedges, the head, the plunger-pin, the bolt L, and the latches; also, the combination, with such head and core-barrel, of the cylinder K, the spring, the plunger-pin, the latches, the head, and  
40 wedges; also, the combination, with such head and core-barrel, of the plunger-pin, the valve, the latches, the spring, the head, and the wedges, and the combination, with such head and core-barrel, of the ball, the valve, the latches, the  
45 plunger-pin, the spring, and the head, as set out in my application No. 150,851, filed December 20, 1884, for improvements in core breakers and lifters for annular rock-drills; also, the combination of the ball, the valve, the latches,

the plunger-pin, and the wedges, and the 50 combination of the ball, the valve, the latches, the plunger-pin, the head, and the wedges, set out in my application No. 150,852, filed December 20, 1884, for improvements in core  
55 breakers and lifters for annular rock-drills.

Having thus described my invention, what I claim as my invention, and desire to secure by Letters Patent, is as follows:

1. In the core-barrel of an annular drill, the channels *c*, in combination with the long 60 wedge-arms *ee*, carrying wedges I I, substantially as described.

2. The combination, with an annular drill-rod and core-barrel, of the plunger-pin M, the latches F F, engaging with said plunger-pin, 65 and breaking and lifting wedges connected thereto, and the drop-rod E, adapted by contact to separate said latches and disengage them from said plunger-pin, substantially as  
70 and for the purposes set forth.

3. The combination, with an annular drill-rod and core-barrel, of the drop-rod E, the plunger-pin M, the latches F F, engaging with said plunger-pin, and breaking and lifting  
75 wedges connected thereto, the spring J, operating said plunger-pin, whereby the drop-rod by contact separates said latches and disengages the plunger-pin, which is operated by the spring, substantially as and for the pur-  
80 poses set forth.

4. The combination, with an annular drill-rod and core-barrel, of the drop-rod E, the plunger-pin M, the latches F F, engaging with said plunger-pin, the spring J, operating said  
85 plunger-pin, and the breaking and lifting wedges I I, connected with said plunger-pin, whereby the drop-rod separates the latches, disengages the plunger-pin whose spring operates said plunger-pin and the connected  
90 wedges, substantially as and for the purposes described.

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

ALBERT BALL.

Witnesses:

JOHN R. SHAW,  
FRANK A. BALL.