

(No Model.)

A. BALL.
CORE CATCHER AND BREAKER.

No. 374,819.

Patented Dec. 13, 1887.

Fig. 2.

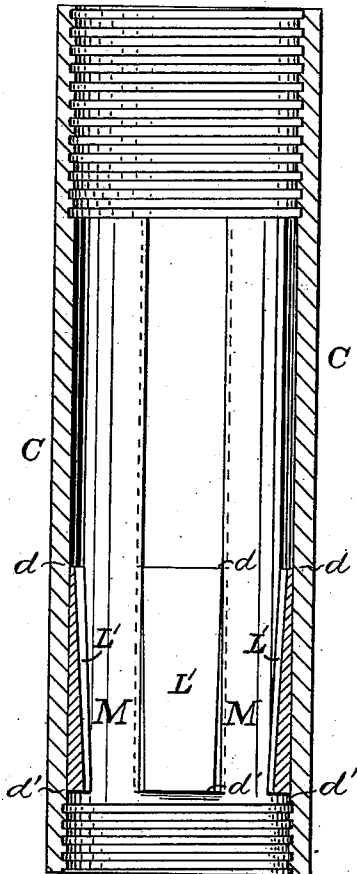


Fig. 1.

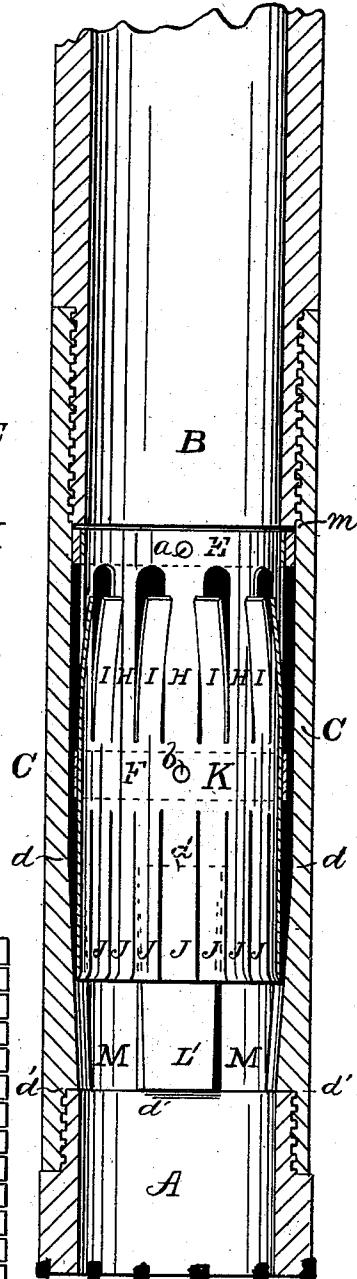


Fig. 5.

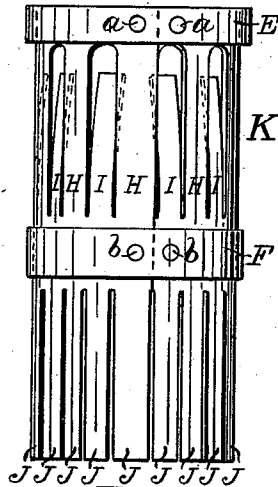


Fig. 4.

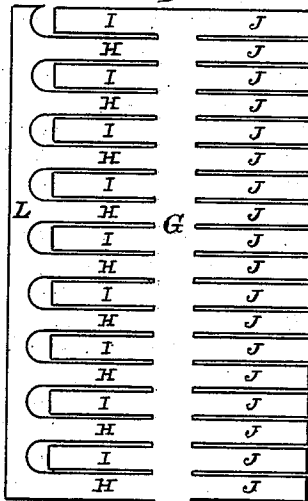
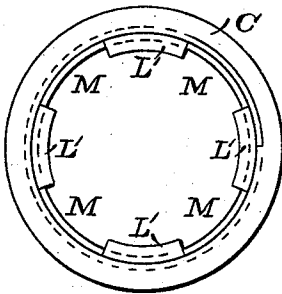


Fig. 3.



WITNESSES
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UNITED STATES PATENT OFFICE.

ALBERT BALL, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO THE
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CORE CATCHER AND BREAKER.

SPECIFICATION forming part of Letters Patent No. 374,819, dated December 13, 1887.

Application filed May 9, 1887. Serial No. 237,554. (No model.)

To all whom it may concern:

Be it known that I, ALBERT BALL, a citizen of the United States, residing at Claremont, in the county of Sullivan and State of New Hampshire, have invented certain new and useful Improvements in Core Catchers and Breakers; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in core-catchers and core-breakers for use with diamond and other rotary drills for boring rock, &c.; and my object is to produce a device which will not only catch the core during the progress of drilling and retain the same without clogging the drilling-tube, but which shall also serve to grasp the previously unbroken core and pull the same apart when the drilling is stopped and the drilling-tube is drawn up, and which shall at the same time be light, strong, and economically made.

The novelty of my invention consists in the doing without wedges in the core-breaker, and is composed of a cylinder preferably made of sheet-steel, having at its upper end a series of spring-catches with some or all of their free ends bent inward, and having its lower end serrated into pliable prongs, so that the diameter of the serrated lower end of the cylinder may be reduced. I attain these objects by the mechanism illustrated in the accompanying drawings, wherein similar letters refer to similar parts.

Figure 1 is a vertical central section through a core-barrel and drilling-head, and with the core catcher and breaker in position in its "shell" between the same. Fig. 2 is a vertical central section through the shell. Fig. 3 is a bottom end view of the shell. Fig. 4 is a blank (shown on a slightly-reduced scale) as punched from a sheet of steel and ready to roll up for a catcher and breaker. Fig. 5 is an external longitudinal view of the core catcher and breaker.

A is a diamond-armed drill-head.

B is a section of the lowest length of the drill-rod, commonly known as the "core-barrel."

C is a short section of tubing to receive the core catcher and breaker between the drill-head and core-barrel, known as the "core-lifter shell," and is made of a larger inside diameter than both the core-barrel and head, and so that there is an internal shoulder formed above the core catcher and breaker.

The blank G (shown in Fig. 4) is punched from a sheet of steel, and has on one side in the direction of its length a series of parallel fingers, I, with alternate uncut spaces H and with the top L uncut, and has its other side serrated, so as to leave an open space between each two of the fingers J, which form the base of the core-breaker when finished. There is a central space or belt uncut. This blank G is converted into a cylinder by bringing the two ends together, and is then securely held in that shape by rings E F, (see Fig. 5,) to which it is securely pinned by rivets *a b*. E is of larger diameter than F, to allow of free passage of water outside of it.

Instead of using two rings, one single wide ring can be used, if preferred.

The fingers I are bent inward to form spring-catches, and then the steel is properly tempered.

The core-lifter shell C is made by boring from a piece of metal rod or tube, with an inside screw-joint at both ends to receive the core-barrel and drill-head, respectively, and is bored with an inside diameter larger than both of the latter, and large enough to freely receive the finished core catcher and breaker. At the lower end dovetailed grooves are then cut longitudinally, into which are driven and secured metal inclines L', as shown in Figs. 2 and 3, which, when in place, present toward the interior of the shell-surfaces, tapering inward and downward, so that while at the line *d d* the diameter of their inside circle is but slightly greater than that of the shell at the line of junction with the core-head *d' d'*, this diameter is substantially that of the drill-head. The spaces between these inclines M (see Fig. 3) allow free passage for the water, &c. Instead of first cutting grooves and then inserting these inclines, it is obvious that the finished result can be accomplished by leaving the necessary metal uncut in drilling, and sub-

sequently splining or grooving out the passage-ways. The shell, as shown in Fig. 1, is represented as if made in this way.

The device works as follows: It is in place, as at Fig. 1. In the process of drilling down, the core-breaker is ordinarily not touched by the core until the latter reaches the spring-catches II, between which it is forced, expanding them outward. The grasp of these springs holds the core-breaker still with the core, allowing the shell to revolve freely around it.

As fast as the core is cut, the top of the ring E impinges against the shoulder formed by the core-barrel, (see *m*, Fig. 1,) and is pushed down over the core and kept back in its place until it is desired to break and pull up the core; but all the while the springs II firmly grasp the core. When the rod is pulled up, the surface of the inclines L' is drawn up over the straight prongs J J, and gradually forces some of them in upon the core until the friction is so great that the core is pulled apart.

The springs I can be made of any necessary resistance with reference to the strength of the core to be broken, and the number of these springs can be increased.

One great advantage of my device is the avoidance of the frictional wear on the core which is caused by the use of wedge-shaped core-breakers generally used, which are left free to come into contact with the core.

Instead of there being four inclined surfaces, L', as shown in the drawings, it is obvious there can be any desired number of them, or the incline can be unbroken by water-spaces. Instead of being constructed of sheet-steel, it is obvious that a similar device to the one shown could be made by boring out of a solid bar or out of a tubing, though more expensive and not so strong. I desire to disclaim as to this

so much of what I have above shown as is claimed in my former application on which Letters Patent No. 314,777 were issued March 31, 1885; but

What I claim herein as my invention, and desire to secure by Letters Patent, is as follows:

1. A core catcher and breaker composed of a thin metal cylinder having its lower end serrated to form spring-fingers, in combination with a receiving-shell having the inside wall of its lower end made tapering at several points to force the spring-fingers in upon the core when the rod is pulled up, substantially as described and shown.

2. A core catcher and breaker composed of a cylinder and with spring-clutches at or near its top, and made with its lower part serrated, in combination with a receiving-shell having near its lower end parts of its inside wall made tapering, substantially as shown.

3. As an article of manufacture, a core catcher and breaker made by punching a blank from sheet-steel so as to leave one side serrated and the other side with springs I and upright piece H, and joining the edges in a cylinder and strengthening the same with rings and tempering, substantially as described.

4. A cylindrical core catcher and breaker having a serrated lower end to form spring-fingers J, in combination with the receiving-shell C, provided with inclines L', secured in dovetail grooves of the shell, substantially as and for the purposes set forth.

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

ALBERT BALL.

Witnesses:

GEORGE O. BALL,
FRANK A. BALL.