

(No Model.)

W. H. LYTLE.

MINING DRILL AND METHOD OF FORMING POWDER CHAMBERS IN
ROCK, &c.

No. 299,991.

Patented June 10, 1884.

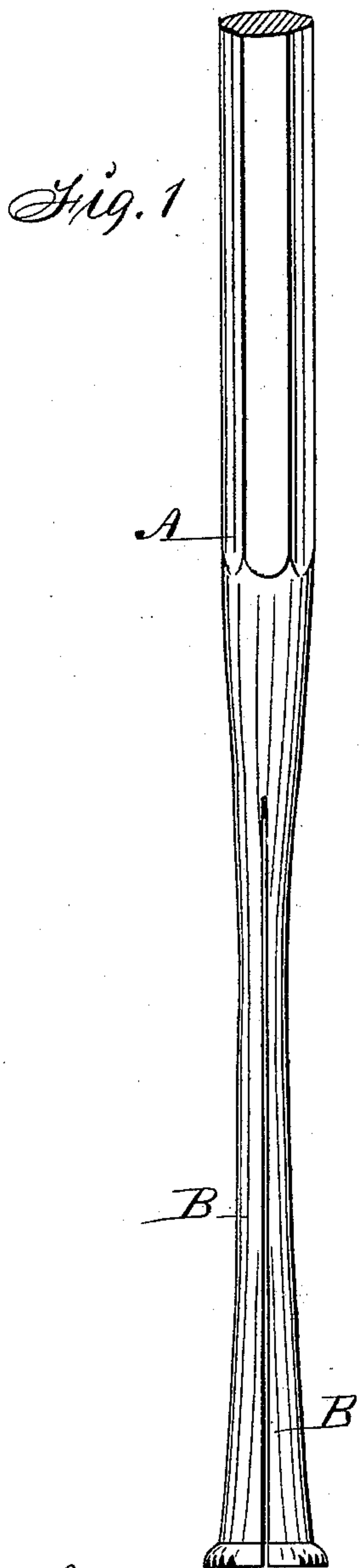
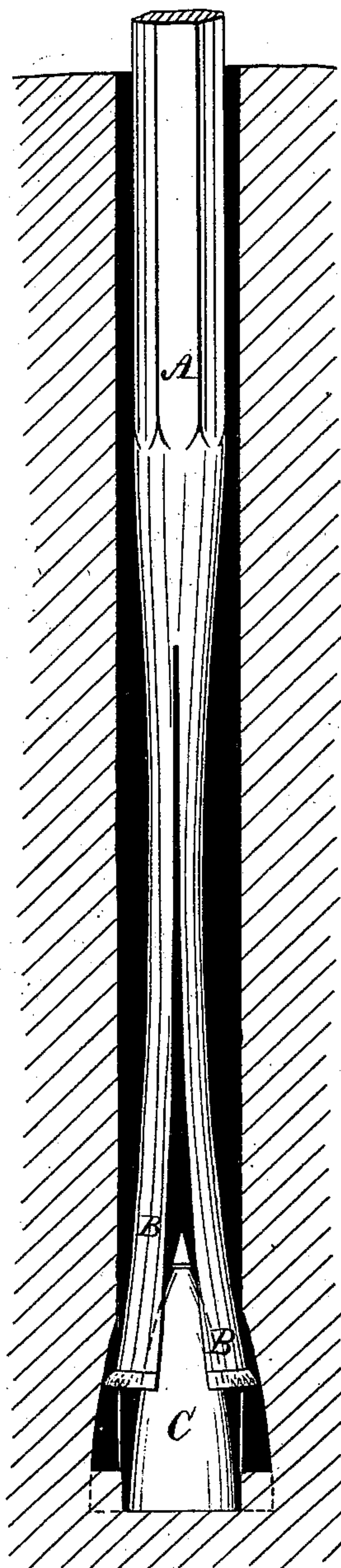


Fig. 2



Fig. 3



Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM H. LYTLE, OF MONTEZUMA, COLORADO.

MINING-DRILL AND METHOD OF FORMING POWDER-CHAMBERS IN ROCK, &c.

SPECIFICATION forming part of Letters Patent No. 299,991, dated June 10, 1884.

Application filed July 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. LYTLE, of Montezuma, in the county of Summit and State of Colorado, have invented an Improved Mining-Drill and Method of Forming Powder-Chambers in Rocks, &c., of which the following is a specification.

My object is to facilitate mining operations and to save time, labor, and expense in quarrying mineral-bearing rock and hard natural formations of all kinds by the blasting process; and my invention consists in constructing a drill and drill-expander, and also in the method of using the two distinct parts, as hereinafter fully set forth, in such a manner that the drill can be used to make a straight bore of equal diameter its entire length, and also used in cooperation with the expander to enlarge the diameter of the bore at its bottom, to form a chamber for the reception of powder, dynamite, or other explosive material.

Figure 1 of my accompanying drawings is a view of my improved drill, and Fig. 2 of my drill-expander. Fig. 3 shows the drill and expander in the bottom of a bore in a rock and in position as required for practical use in forming a chamber therewith. Jointly considered, these figures clearly illustrate the construction and operation of my complete invention.

A represents a drill-stock, that may vary in size and weight as desired. It is made of steel and split at its bottom, to produce two flexible cutters, B, that are semicircular in their cross-section, and adapted to admit a wedge or tapering point, or the vertex of a solid cone, to extend upward between them. Their ends and bottom surfaces are provided with sharp teeth by filing transverse grooves therein, or in any suitable way, so as to make them bite and chip and bore into a rock in the manner common to reciprocating rock-drills.

C is my drill-expander, in the form of a solid metal cone, that is adapted in size to enter between the two elastic and semicircular cutters and to spread them apart.

d is an annular shoulder near the vertex of the cone, and adapted to engage the jaws of a spring-clasp or grappling-tool, for the purpose of being lifted from the bottom of a bore and

chamber formed therein by means of the cone or drill-expander.

In the practical use of my flexible duplex drill and drill-expander thus constructed I bore a hole in a rock to any depth desired by imparting a reciprocating rectilinear motion to the drill and to the shaft to which it is attached, and also intermittent rotary motion by hand or by any suitable drill-operating machinery, and when a straight bore of uniform diameter is thus made by means of my flexible and expansible cutters (or any other form of drill) I lift the drill out of the bore and drop my solid cone-shaped drill-expander into the bore in such a manner that its broad base will rest upon the solid rock and its vertex extend upward in the center of the bore. I then place my flexible duplex drill in the bore and continue the reciprocating and intermittent rotary motions. At each downward motion of the cutters their inside concave surfaces will come in contact with the cone-shaped expander before their teeth or cutting-edges will come in contact with the rock, and consequently they will be spread apart and in an abnormal position when they strike the wall of the bore and cut the rock as required to increase the diameter of the bore and to form a chamber in the bottom of a bore, as the cutters continue at each blow to slip farther downward over the cone, which performs the function of a wedge in separating the two flexible cutters.

By means of such drills and drill-expanders of different sizes it is obvious that bores and chambers of various sizes can be readily and advantageously produced by the method described, to diminish the cost of quarrying by blasting, and for all the purposes for which bores and subterranean chambers in solid strata may be utilized.

I am aware that cones have been attached to and carried with drill-heads having reamers or cutters hinged or riveted thereto, and that a detached cone has been fixed in a socket formed in the bottom of a bore for the purpose of spreading hinged cutters (when rotated and pressed down) and forming a cavity at the bottom of the bore; but an expansible rock-drill formed complete in one piece and adapted to drill a bore from the surface of a rock, and

also to enlarge that bore at its bottom, and my method of placing a cone loosely upon the bottom of the bore and then continuing the operation of my reciprocating expansible drill, is novel and greatly advantageous.

I claim as my invention—

1. An expansible rock-drill consisting of a solid or tubular shank or stock and two or more flexible cutters provided with teeth or sharp edges across their bottoms, and adapted to be operated independently to make a bore in a rock, and also in combination with a wedge or cone shaped expander to enlarge the diameter of a bore, in the manner and for the purposes set forth.

2. The above-described method of forming a powder-chamber in a rock or a subterranean chamber in any solid strata in the earth, which mode or method consists in first sinking a bore of equal diameter, and then withdrawing the drill and placing a wedge or cone shaped drill-expander loosely upon the bottom of the bore, and operating a reciprocating drill having flexible or expansible points or cutters over and around the cone-shaped expander, substantially as shown and specified.

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Witnesses:

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