

L. Andrews,
Expanding Rock Drill.
No 61,134. Patented Jan. 15, 1867.

Fig. 5

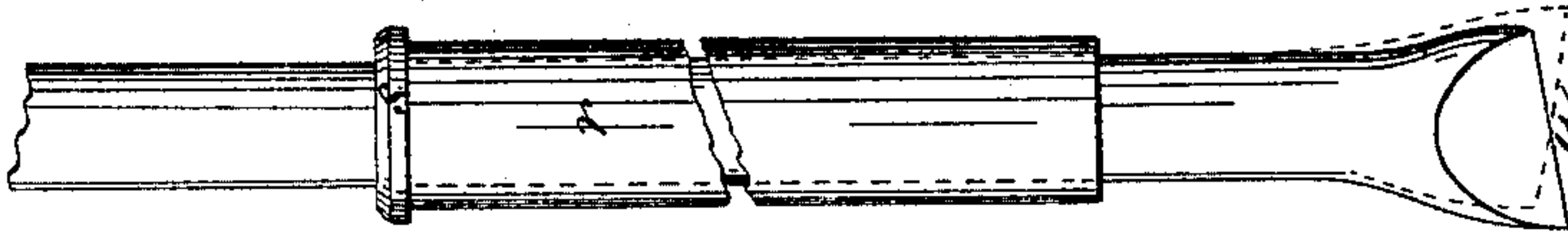


Fig. 4

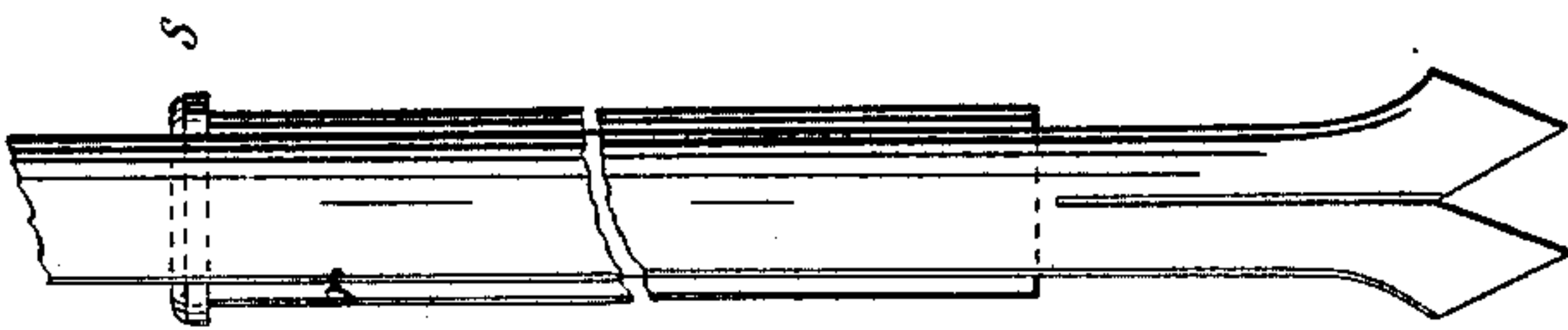


Fig. 3

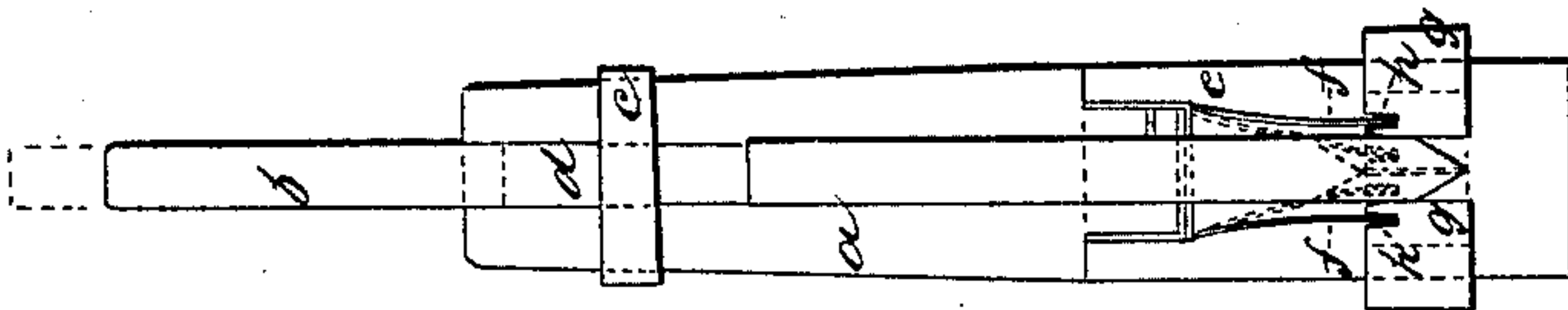
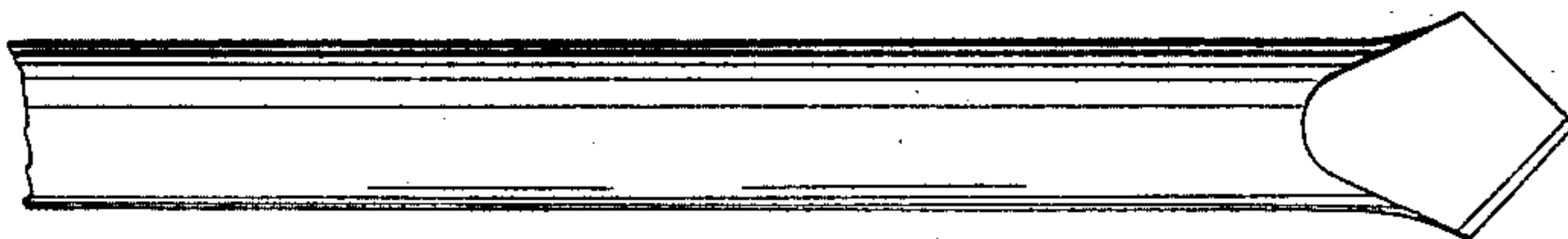


Fig. 2



Fig. 1



Witnesses.

Ira Andrews

Henry C. Houston

Inventor

Leonard Andrews
By his attorney, of record
William Henry Clifford

United States Patent Office.

LEONARD ANDREWS, OF BIDDEFORD, MAINE.

Letters Patent No. 61,134, dated January 15, 1867.

IMPROVED DRILL.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, LEONARD ANDREWS, of Biddeford, in the county of York, and State of Maine, have invented certain new and useful improvements in Drills; and I hereby declare the following to be a full, clear, and exact description thereof, which will enable others to make and use my invention, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 shows a view of an ordinary drill.

Figure 2, a view in perspective of one of the horizontal cutters.

Figure 3, a vertical section of one part of my improved drill, which is employed to enlarge a hole or bore laterally and horizontally.

Figure 4, a vertical section of the tube and drill used to continue vertically the enlarged bore made by the apparatus shown in fig. 3.

Figure 5 is a side view of fig. 4.

The object of my invention is to produce a drill by the use of which, when and after a bore has been made for some distance into the rock and stone, by the ordinary means, for the purpose of blasting, it can be enlarged or increased in diameter, and thus continued to the desired depth of the enlarged size. By thus being enabled to shape the bore and to increase it at its lower part, or after it has been made for some distance into the rock, much greater effects can be accomplished by the same amount of powder or blasting substance than when the hole is of the same size throughout.

My improved drill is composed of two parts, or is employed in the form of two drills, subserving different purposes.

In fig. 3 is shown a hollow tube or cylinder, open at the upper end and closed at the lower. At the lower end, however, and near the bottom of the tube, are made two apertures from the outside of the tube, into and communicating with the longitudinal hollow of the tube. These two apertures form together a hole diametrically through the tube and through the hollow thereof. Into these two apertures are placed drills, cutters, or knives, with their edges outward, and, when not pressed out by the means hereinafter described, intended to project no further than the outside or periphery of the tube or cylinder, or to be even with its outside. In the hollow of the tube is placed a rod or bar, made at its lower end wedge-shape. This moves up and down in the hollow of the tube. Near the top of the tube a cross-bar is inserted, passing through spaces in the tube and through a slot in the bar. The slot is long enough to allow the bar to move up and down sufficiently, and yet to prevent its being wholly withdrawn from the tube, so that the tube can be withdrawn from the hole in the rock by means of this bar. A short distance above the bottom of the hollow of the tube is set a ring, through which the bar slides up and down, and from the ring extend downward two spring-arms which fit into niches or grooves in the tops of the horizontal drills or cutters.

a shows the tube; *b* the rod or bar; *c* the cross-bar; *d* the slot in the rod or bar *b*; *e* the ring, with the springs *ff*; *g g* the horizontal cutters; *h* the grooves in the same into which the springs fit.

The operation of these devices is as follows: When a hole is drilled by a common drill to the depth desired before using my improvement, then withdraw the drill and sink into the hole the tube and parts shown in fig. 3. Raise the bar *b* as far as the slot *d* will allow; the cutters *g g* will then be drawn within the tube *a*; then, by striking on the rod *b*, as when drilling with the ordinary tool, the cutters will be forced outwardly and commence their incision into the sides of the bottom of the hole first made by the common drill. By continuing this, and turning the tube around so as to bring the cutters to all parts of the interior surface of the hole, it will be enlarged to the extent of the projection of the cutters *g g* beyond the outside of the tube *a*, thus forming a circular chamber within the rock, and enlarged beyond the diameter of the hole made by the drill first used, as, for instance, such a drill as seen in fig. 1. The horizontal cutters at the top of their edges of contact with each other are cut away somewhat, so as to flare a little, thus easier to admit the wedge-shaped end of the rod by which they are, at each blow, forced asunder. When the chamber has been thus excavated or cut by the part shown in fig. 3, the same is then withdrawn. Into the hole is then inserted the drill shown in figs. 4 and 5. This consists, first, of a double-edged drill, (shown in section at fig. 4.) This drill is split up for some distance in the stock so that the two cutters or edges slide by each other as indicated in fig. 5, and the cutters are con-

siderably wider than the stock of the drill, (see fig. 5.) Over the drill slides a tube, *r*, (see figs. 4 and 5.) The tube is used to bring together the flaring ends of the drill so that it may be inserted into the upper and smaller part of the hole, or that part made by the common drill, (fig. 1.) When thus inserted the tube *r* is withdrawn and the two cutters or edges of the split drill allowed to expand in the chamber before described and cut by the devices shown in fig. 3. The tube *r* has a collar, *s*, for convenience of attaching a rod or any convenient means for its withdrawal. This split or double drill is then used like an ordinary one, by striking upon the upper or outer end and turning it around in the hand after each blow. But the operation of it within and on the bottom of the chamber is quite different. The edges of the two cutters of this drill are inclined or chamfered off, (see *u*, fig. 5,) so that at each blow upon its upper end these expand as well as cut, thus continuing the hole or chamber in the rock at the enlarged size, and perhaps having a slight tendency to enlarge it still more. The inclined edges of the cutters throw them apart at every blow of the hammer. Thus the chamber is continued to the desired depth. When the chamber is finished the tube *r* is once more pushed down over the double drill, the two parts thus forced together, and the drill may then be withdrawn from the hole in the rock. Figs. 1, 3, and 5 are of course intended to represent drills of the same size or diameter. By thus being enabled to drill a blasting-hole larger at the bottom than at the mouth the effect of the blasting material is immensely increased. The powder or other substance used is introduced in the ordinary way. The use of the ring and the two springs in the tube *a* is to draw within the tube the two horizontal cutters after they have been forced out by the rod in the tube.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the tube *a*, rod *b*, ring and springs *e f f*, horizontal cutters *g g*, as and for the purposes set forth.
2. The combination of the double drill, (fig. 5,) constructed as described, with the tube *r*, as and for the purposes specified.

LEONARD ANDREWS.

Witnesses:

WILLIAM HENRY CLIFFORD,
HENRY C. HOUSTON.