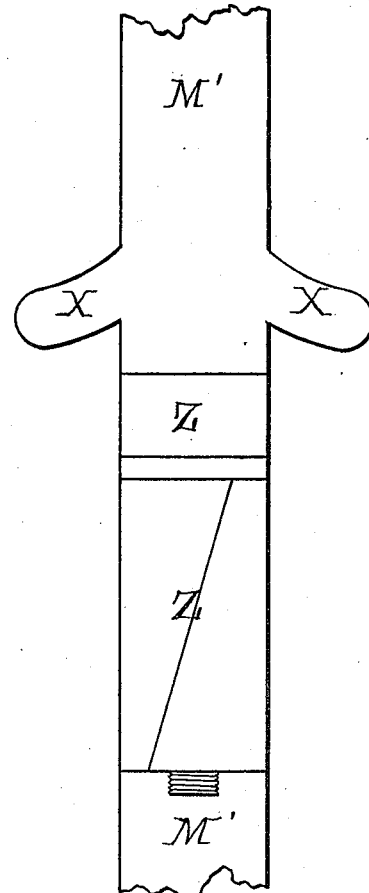
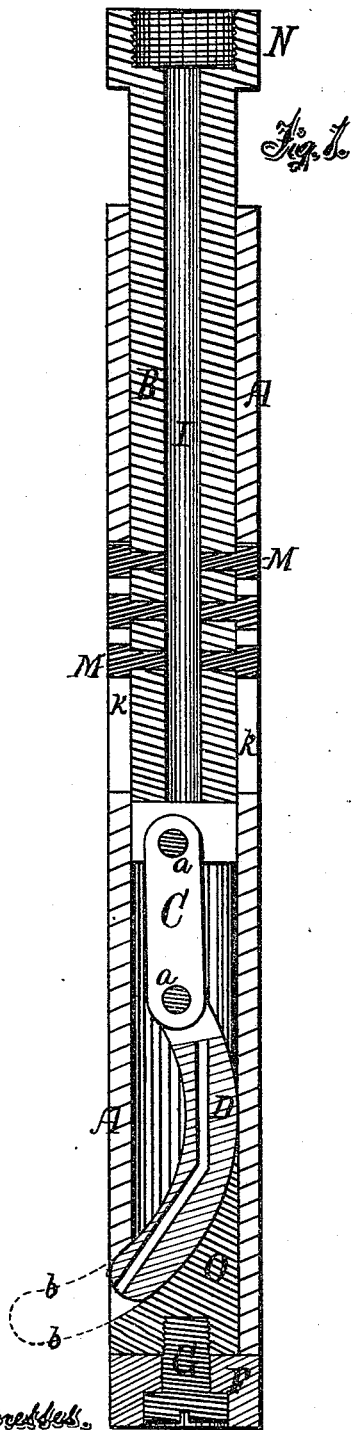


G. FRISBEE.  
Process of Blasting.

No. 164,082.

Patented June 8, 1875.



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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN PROCESSES OF BLASTING.

Specification forming part of Letters Patent No. 164,082, dated June 8, 1875; application filed November 23, 1874.

*To all whom it may concern:*

Be it known that I, GIDEON FRISBEE, of Reading, in the county of Berks and State of Pennsylvania, have invented a new and useful Means of Enlarging the Bore of Long Blast-Holes at any desired point; and I do hereby declare the following to be a full, clear, and precise description of the same, which will enable those skilled in the art to which my process appertains to use it, reference being had to the accompanying drawings, which form part of this specification, and in which—

Figure 1 is a longitudinal section of the expanding bit used to enlarge the hole; and Fig. 2, a longitudinal section of a portion of the long hole M', together with the expanded recess or enlargement of the hole, X, produced by the bit aforesaid, the blasting-plug described in my Patent No. 147,253 being shown inserted.

My invention consists of a means of enlarging the bore of long blast-holes at any desired point by the employment of a continuously-rotating diamond expanding bit (whereof hereafter) in connection with a blasting-plug; a plug such as is described in my Patent No. 147,253 being best fitted for the purpose.

In operation my process is as follows: The long hole is first bored to a depth of one or two hundred feet, as desired; then, at the point at which it is desired to explode the charge, a blasting-plug such as is described in my Patent No. 147,253 is inserted, and down to and upon this plug is inserted an expanding bit, such as is hereinafter described, which cuts an annular groove around the hole, such as is shown in section by X X, Fig. 2. The chamber once cut, the bit is removed and the charge inserted, filling up the chamber completely, tamped and fired, and the process repeated as desired.

The advantage is an immense gain of sectional area for the explosive to act against, insuring a most effective and square blast.

For the better information of the public I will proceed to describe the construction of such a bit as I find convenient to bore the chamber, reference being had to Fig. 1 of the drawing.

A is a hollow cylinder or casing of metal.

B is an inner rod, fitting closely within A, and having a lengthwise movement therein. N is a coupling at the upper extremity of B, whereby B is attached to the rod of the drill. Running throughout the rod B is a hole or water-passage, I. Cut or formed upon the cylinder A are one or more slots, k, parallel to its axis. Passing through the rod B, or attached to it, are one or more rivets, plugs, or studs, M, projecting into the slots k of the cylinder A, and serving to prevent any rotation of the rod B within the cylinder, but forcing rod and cylinder to rotate together; serving also to control the thrust or lengthwise motion of the rod to the length of the slots themselves. D is the bit—a curved bar of metal of the form shown—carrying upon its outer end the cutting-diamonds. It is completely perforated by a hole, H, which serves, in connection with the passage I in the rod B, to afford continuous communication for water with the cutting-surface. The bit is connected, by a link-coupling, C, to the rod B, the connection being the pivots a a, and rigid in construction. The lower end of the casing A is formed with an interior solid incline, O, of the same curvature as the bit, and upon and against which the bit slides and bears as pressure is brought upon it by the feed or otherwise. The cutting end of the bit passes, when caused to project, through an opening, e, in the casing A. F is a loose collar, connected with the casing A by the screw-pin G, which, resting upon the blasting-plug Z, forms a bearing-surface for the casing, upon which it rotates easily.

In operation, after the long hole M' is bored, the plug Z is inserted until its outer end is at the point where it is desired to enlarge the hole; then the expanding bit, hereinbefore described, is inserted (attached to the rods of a drilling-machine) until the collar F rests upon the plug. Water is then introduced from the drill-rods, the drilling-machine is started, rotating the entire device described, and the feed is applied, which, forcing down upon the rod B, forces down upon the connecting-link C, the connecting-link in turn forces down upon the curved bar D, which, by virtue of its curvature and the directing influence of the incline O, presses out laterally

upon the rock, in the direction of the dotted lines *b b*, cutting as it rotates an annular groove or chamber in the rock, of the form of which *X X* of Fig. 2 is the section. The extent to which the bit can project is controlled by the length of the slots *k* in the casing *A*, controlling as they do the thrust of the rod *B*. Then, when it is desired to remove the drill, the feed is reversed, and the bit being thereby retracted into the casing, the entire tool can be withdrawn.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

The process of blasting rock by inserting a plug in a common long hole-bore at any desired point, and enlarging the hole at that point, to form a chamber for holding explosive, by means of an expanding bit placed and operated upon the plug, substantially as described.

GIDEON FRISBEE.

Witnesses:

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