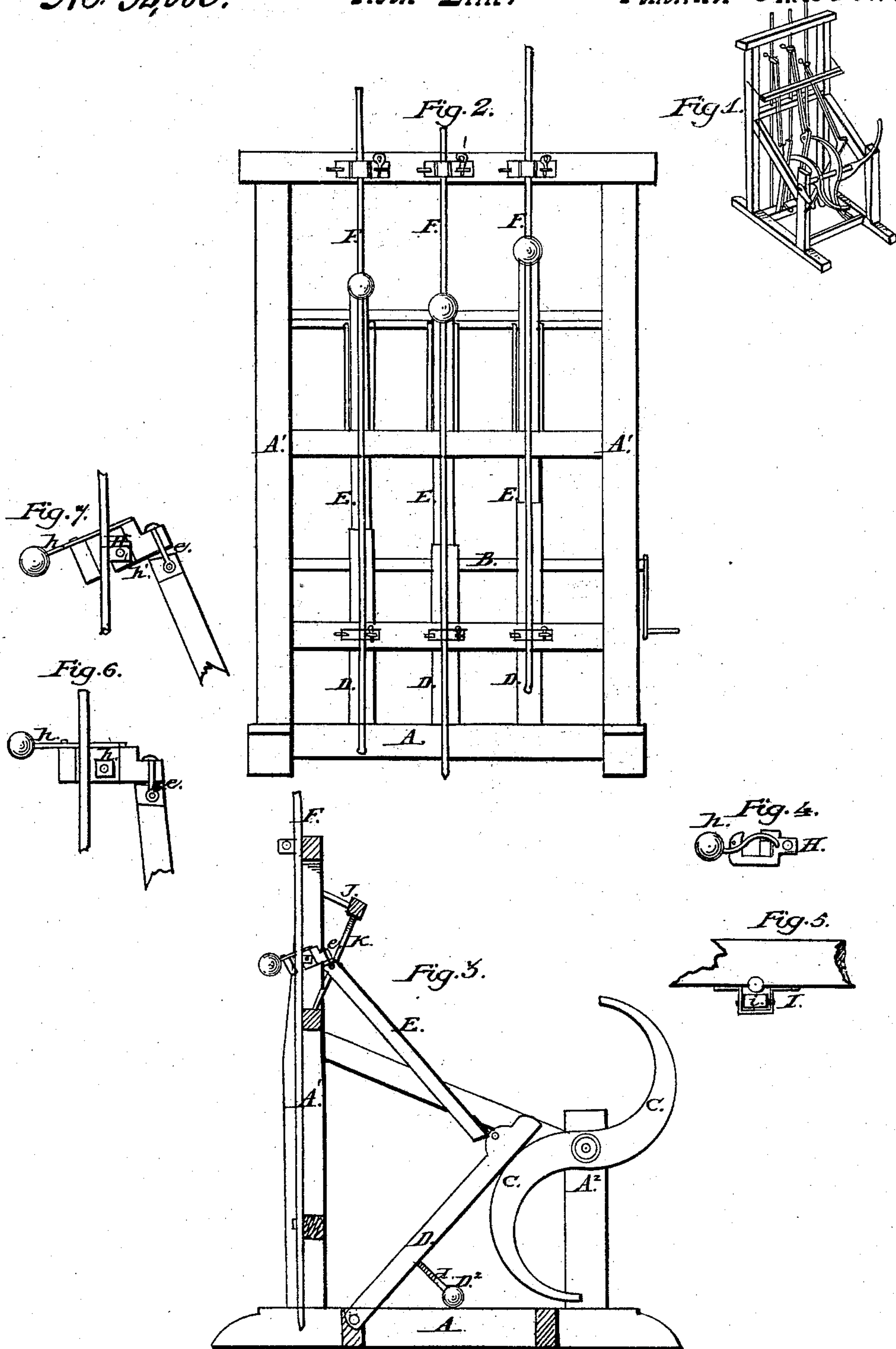


*N. F. Bradish,*

*No. 92005.*

*Rock Drill.*

*Patented June 29, 1869.*



*Witnesses:*  
*Fred Thomas.*  
*C. F. Brown.*

*Inventor:*  
*N. F. Bradish*  
*per J. W. Beadle*  
*attorney*



# United States Patent Office.

N. P. BRADISH, OF JERSEYVILLE, ILLINOIS.

Letters Patent No. 92,005, dated June 29, 1869; antedated June 18, 1869.

## IMPROVED ROCK-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, N. P. BRADISH, of Jerseyville, in the county of Jersey, and State of Illinois, have invented a new and improved Rock-Drill; 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.

This invention relates to certain improvements in machines for drilling rocks; and consists principally in certain novel devices for holding and raising the drills, and also in sundry details of construction, all of which will be fully described hereinafter.

In the drawings—

Figure 1 represents a perspective view of my improved machine;

Figure 2, a front elevation;

Figure 3, a sectional elevation; and

Figures 4, 5, and 6, views of parts detached.

To enable those skilled in the art to which my invention appertains, to make and use the same, I will now proceed to describe its construction and operation.

A A represent the base of the machine, from which rise the standards A' A', suitably connected by cross-pieces, as shown.

B represents a shaft, turning in bearings in standards A', upon which are located the double cams C C. These cams vary in number according to the size of the machine.

They are secured to the shaft by means of a set-screw or other suitable fastening, and are bevelled upon their outer faces from the centre to the sides.

Motion is communicated to the shaft by means of a crank or other suitable connection.

D D represent arms, hinged at their lower ends to the front cross-beam D', which are connected at their upper ends to the arms E E, by means of the ball-and-socket joint e.

The arms D are grooved upon that side which comes in contact with the cams C, in such manner as to correspond with the faces of the latter.

D<sup>2</sup> D<sup>2</sup> represent balls or weights attached to rods d, extending at right angles from the arms D.

By means of this arrangement, the latter are over-balanced, and are caused to fall naturally against the cams when free to move.

The arms E E extend upward, and are loosely attached to the drills F F by means of the clasp H.

This clasp is nearly square in shape, and has but three sides, the fourth being closed, when the drill is in place, by means of the bent and weighted rod h, which is swung around the drill, and sprung into place behind the drill on top of the clasp.

Within the clasp is a bar, k, which is square in form, but is provided with round journals, so that it may at all times freely revolve.

The clasp H is connected to the arms E by means of a universal joint.

The drills F F are retained in place by means of the straps I I, which latter are secured by means of the staples and pins, as clearly shown in fig. 2. These straps are so arranged as to permit the drills to move freely in a vertical direction.

The upper straps are provided with rollers, as shown in fig. 5, which are intended for the purpose of reducing the friction produced by the upward thrust of the arms E E.

J represents a frame, attached to standards A', and extending out from them at a suitable angle, in which are placed the guide-rods K K, between which move the bars E E.

It will be observed that the cams C C are set upon the shaft B in different lines, so that the arms D D are not all acted upon at once, but at different times, by which arrangement greater steadiness of motion is secured.

The arms of these cams are also twisted a little to one side, the purpose of which will be explained hereafter.

From this description, the operation of my improved machine will be fully understood.

Motion having been communicated to the shaft B, the cams C are caused to revolve, which, striking against the arms D, force the latter forward. This movement necessarily forces the arms E in an upward direction, and they carry with them the drills F F, which are securely held by the clasp H. As the arms E approach the vertical position, the clasp relaxes its hold, and the drill falls. As soon as the end of the cam passes by the end of arm D, the latter instantly falls back to the inner end of the opposite cam, and commences a new movement. This instantaneous movement is secured by means of the weights D<sup>1</sup> D<sup>1</sup>.

The operation of the clasp H is as follows:

As the arm E is moving upward, the drill is clamped between the lower edge of the clasp and the bar k, as clearly shown in fig. 3, and is thus lifted. As soon, however, as the arm E approaches a vertical position, the clasp H necessarily assumes a horizontal one, and the drill is left free to fall. This change of position of the clasp is clearly shown in fig. 4. The point e' of the arm E, pressing against the clasp, forces it suddenly upward, and its hold is consequently relaxed.

In order that the drills may work effectively, it is essential that they should turn slightly before each fall. This is accomplished by twisting the cams slightly out of line, and causing them to unite with the arms D, by means of the bevelled and grooved surfaces, as described.

By this construction, before the cams leave the arms D, they force them slightly to one side. This movement necessarily causes the lower end of arms E also to be moved in that direction, (the ball-and-socket



joint allowing such freedom of motion,) but as the centre of arms E is held by the guide-rods K K, it follows of course that the upper end must be hoisted in the opposite direction, by which means the drill is slightly turned just before it falls.

When desired, the drills may be easily removed by unloosing the straps.

Having thus fully described my invention,

What I claim, and desire to secure by Letters Patent of the United States, is—

1. The cams C C, constructed and arranged as described, in combination with grooved arms D and arm E, constructed and arranged as described, for the purpose set forth.

2. The arms D and E, when connected by means of

the ball-and-socket joint, as and for the purpose set forth.

3. The clasp H, tooth-arm *h*, and bar *h'*, when constructed as described, and operated as and for the purpose set forth.

4. The drilling-machine described, consisting of the cams C, arms D E, clasp H, drills F, and frame I, the whole being constructed, combined, and arranged in the manner and for the purpose set forth.

This specification signed and witnessed, this 17th day of September, 1868.

N. P. BRADISH.

Witnesses:

H. KRUMPANTZKY,  
GEO. W. WARE.