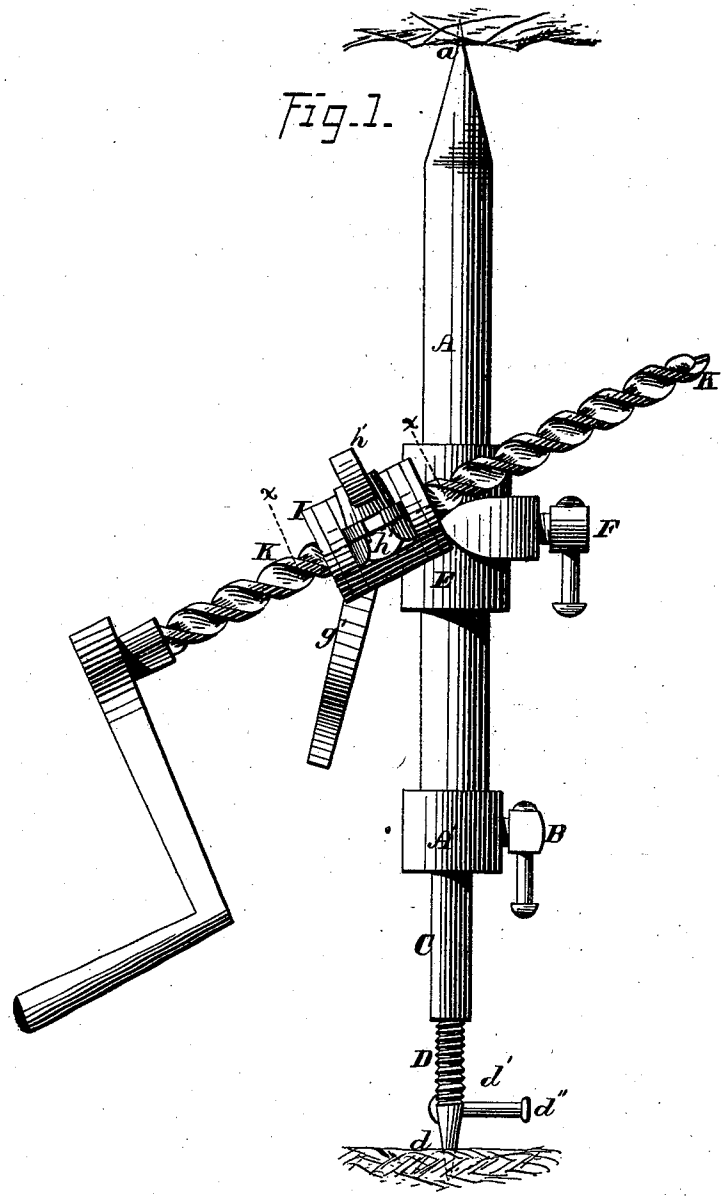
3 Sheets—Sheet 1.

N. BALL & W. OWEN.

ROCK AND COAL DRILLING-MACHINE.

No. 172,949. Patented Feb. 1, 1876.

Fig. 1.



WITNESSES:

Jas. E. Hutchinson.

John R. Young

INVENTORS.

Nathan Ball and Wm Owen, by

Prindle and Longhem Attys.

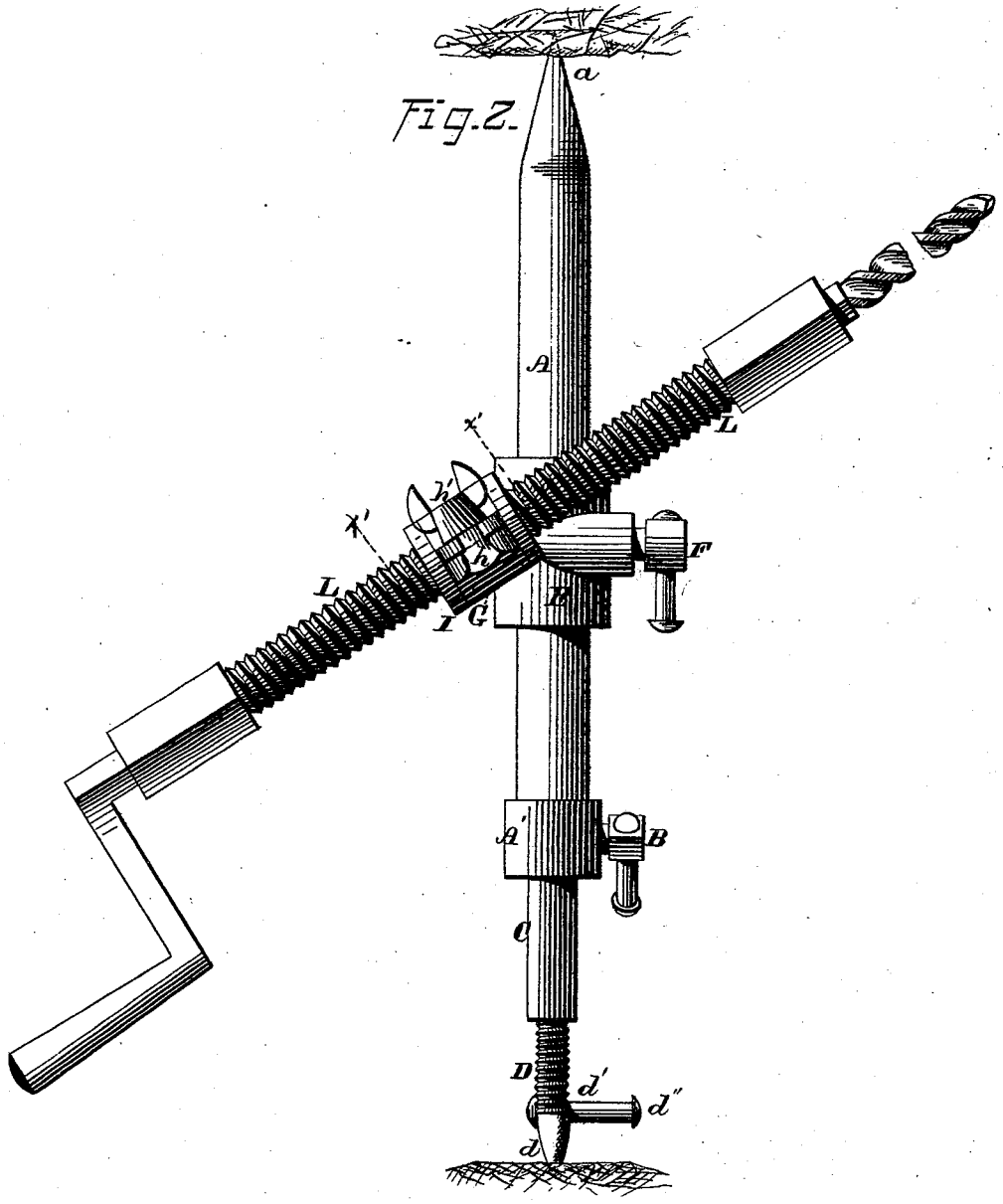
3 Sheets—Sheet 2.

N. BALL & W. OWEN.

ROCK AND COAL DRILLING-MACHINE.

No. 172,949. Patented Feb. 1, 1876.

Fig. 2.



WITNESSES:

Jas. E. Hutchenson.

John R. Young

INVENTORS.

Nathan Ball and Wm Owen, by

Prindle and Low their Attys.

3 Sheets—Sheet 3.

N. BALL & W. OWEN.

ROCK AND COAL DRILLING-MACHINE.

No. 172,949. Patented Feb. 1, 1876.

Fig. 3.

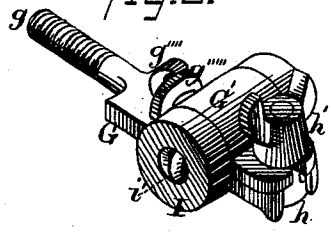


Fig. 4.

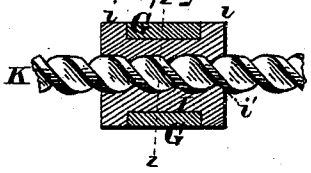


Fig. 5.

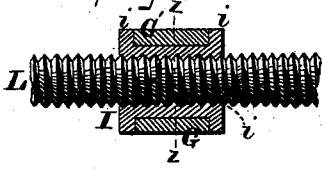
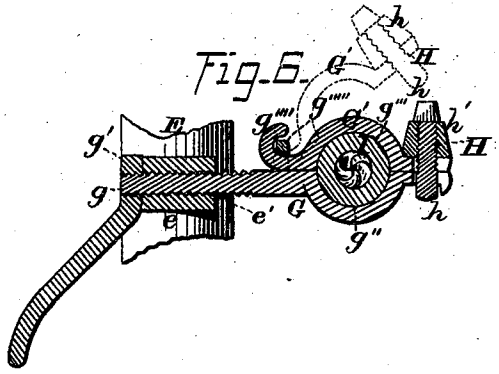


Fig. 6.



WITNESSES:

Jas. E. Hutchinson.

John R. Young

INVENTORS.

Nathan Ball and Wm Owen, by

Pindle and Pindle Attys.

UNITED STATES PATENT OFFICE.

NATHAN BALL AND WILLIAM OWEN, OF SHARON, PENNSYLVANIA.

IMPROVEMENT IN ROCK AND COAL DRILLING MACHINES.

Specification forming part of Letters Patent No. **172,949**, dated February 1, 1876; application filed January 3, 1876.

To all whom it may concern:

Be it known that we, NATHAN BALL and WM. OWEN, of Sharon, in the county of Mercer and in the State of Pennsylvania, have invented certain new and useful Improvements in Rock and Coal Drilling Machines; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings making a part of this specification, in which—

Figure 1 is a side elevation of our improved device adjusted to position for use. Fig. 2 is a like view of the central portion of the same, showing the bar employed for slow drilling. Fig. 3 is a perspective view of the adjustable head employed for carrying the drill-bars. Figs. 4 and 5 are sections upon lines *x x* and *x' x'*, respectively, of Figs. 1 and 2, the drill-bars being turned to a horizontal position; and Fig. 6 is a vertical section upon lines *z z* of Figs. 4 and 5.

Letters of like name and kind refer to like parts in each of the figures.

The design of our invention is to increase the efficiency and ease of adjustment and operation of apparatus employed for drilling rock, coal, &c.; and it consists, principally, in the construction of the longitudinal extensible standard employed for supporting the drilling mechanism, substantially as is hereinafter specified. It consists, further, in the construction of the adjustable head employed for sustaining the drilling-bar in position for operation, substantially as is hereinafter shown. It consists, finally, in the means employed for feeding the drill forward, substantially as is hereinafter set forth.

In the annexed drawings, A represents a metal pipe closed at one end, and having said end *a* flattened and sharpened in a manner similar to the cutting end of a cold-chisel. The opposite end of said pipe is open, and is surrounded by a collar, A', through which passes, radially from the outside, a set-screw, B. Within the pipe A is fitted a second pipe, C, which loosely fills the interior of the former, is capable of being passed longitudinally into or withdrawn from the same, and, when thus adjusted to position, may be secured by causing the set-screw B to press firmly upon its periphery. The interior of the smaller pipe C is threaded, and within the same is fitted a bar, D, which is threaded exteriorly, and loosely fills said interior. The lower end *d* of said bar D is pointed, and at a short distance above the same is provided a transverse opening, *d'*, through which passes a rod, *d''*, that is loosely fitted to said opening, so as to enable it to be easily moved lengthwise, and has its ends enlarged to prevent withdrawal.

The parts thus constructed and combined form the standard or frame upon which the operative mechanism is supported, and said standard is secured in position as follows: The bar D is screwed nearly into the tube C, and the latter adjusted longitudinally within the tube A until the distance from the point *a* to the point *d* is a little less than the space between the roof and floor of the mine. The standard is now placed in a vertical position, with its point *d* resting upon the floor, after which the bar D is turned downward until the chisel-point *a* is caused to engage with the roof, and said standard is firmly fixed in position.

Fitted to or upon the tube A is a head, E, which has the form shown in Fig. 1, is capable of being moved lengthwise of said tube, and when adjusted to position may be secured therein by means of a set-screw, F, that passes radially inward through one side of said head.

Upon the side of the head E opposite to the set-screw F is a boss, *e*, within which is an opening, *e'*, that has a line at a right angle to the line of the standard, and receives and contains a correspondingly-shaped bolt, *g*, that forms part of and extends horizontally outward from a bar, G, the rear end of the latter forming a shoulder, which bears against one end of said boss, while upon the outer threaded end of said bolt is placed a nut, *g'*, which bears against the opposite end of said boss and confines said bolt in position.

From the boss *e* the bar G extends horizontally outward for a short distance, thence downward, forward, and upward in a curve, and terminates in a short horizontal portion which has the same line as its rear portion, the result of such construction being the formation of a semicircular bearing, *g''*.

Upon the bearing-bar G is placed a cap, G', which has a correspondingly-shaped bearing, *g'''*, and at its rear end terminates in an up-

ward and forward curved hook, g'''', that fits into an eye, g''''', which is formed upon the contiguous portion of the upper side of said bar G, said hook and eye operating to maintain the position of the rear end of said cap.

The front ends of the bar G and cap G′ are each provided with an open slot, which corresponds to and receives a bolt, H, that, at its lower end, has a head, *h*, and upon its upper threaded end has a wing-nut, *h′*. By means of said bolt said cap may be clamped in position with any degree of firmness.

Within the bearing g'' and g''' is fitted a sleeve, I, which is provided at each end with a collar, *i*, that insures its longitudinal position, and interiorly has an axial opening, *i′*, which is threaded to receive a twist-drill, K, (shown in Fig. 1,) or has a finer thread, that corresponds to a screw-bar, L. (Seen in Fig. 2.)

In use the cap G′ operates as a brake, and by its pressure upon the sleeve I retards the motion of said sleeve, and causes the drill or drill-bar to feed forward with greater or less rapidity, as said pressure is increased or diminished.

For easy drilling, the drill is passed directly through the bearing-sleeve and feeds forward rapidly, but when less speed is necessary the drill-bar is employed, and said drill placed in a socket at its end.

To change the inclination of the drill, the nut g' is loosened, so as to permit the bolt *g* to turn within its bearing e', after which, said drill being adjusted to angle, said nut is tightened until said parts are once more firmly locked in relative positions.

The vertical or circumferential position of the head E is secured by means of the set-screw F, so that by loosening the latter any required change of position of said head and the drill may be made.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. The drill-standard composed of the pipe A, provided with the chisel-shaped end *a* and the collar A′, the pipe C, fitted into the former and having its interior threaded, the bar D, threaded exteriorly, fitted into said pipe C, and provided with the pointed end *d* and rod *d″*, and the set-screw B, passing through said collar A′ and bearing upon said pipe C, said parts being combined to operate in the manner and for the purpose specified.

2. The head E, provided with the boss *e*, the set-screw F, and the bearing-bar G, having the rear end *g* swiveled within said boss, all combined to operate in the manner and for the purpose substantially as shown.

3. In combination with the twisted drill K or threaded bar L, the sleeve I and compressible bearing G and G′, substantially as and for the purpose set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 6th day of November, 1875.

NATHAN BALL.
WM. OWEN.

Witnesses:
ABNER APPLEGATE,
EDGAR MCCONNELL.