W. Weaver,

Stone Drill,

No. 66,756. Patented July 16, 1867.

Fig. 1.

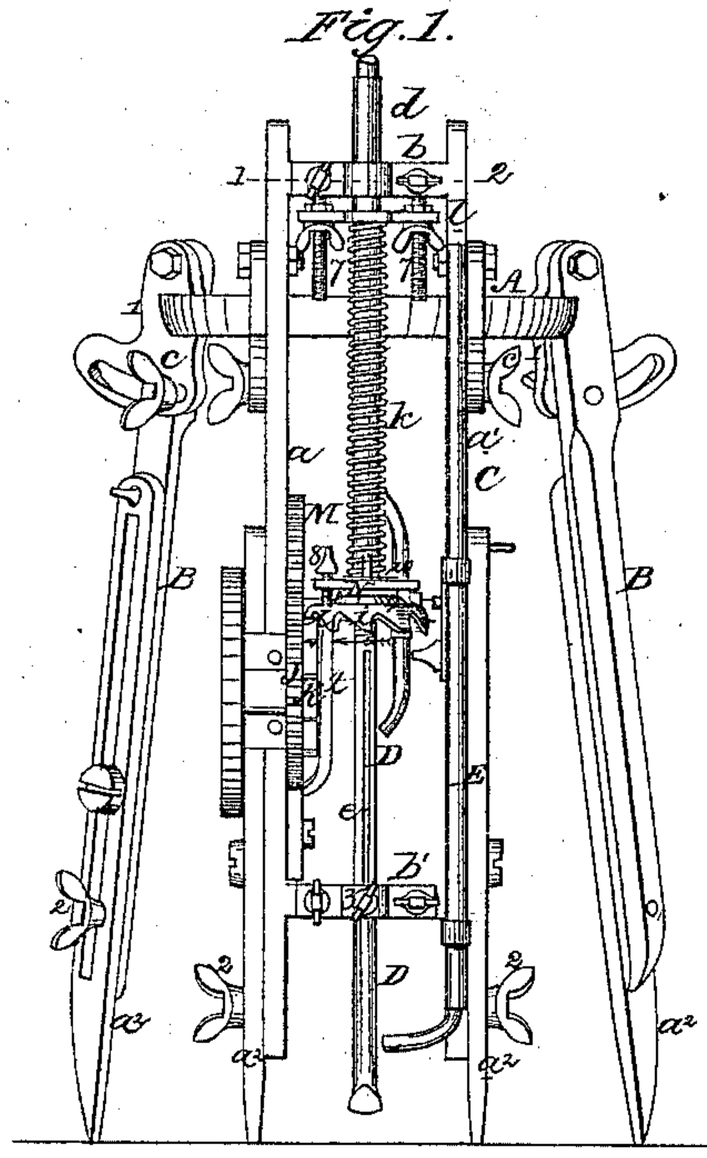


Fig. 2.

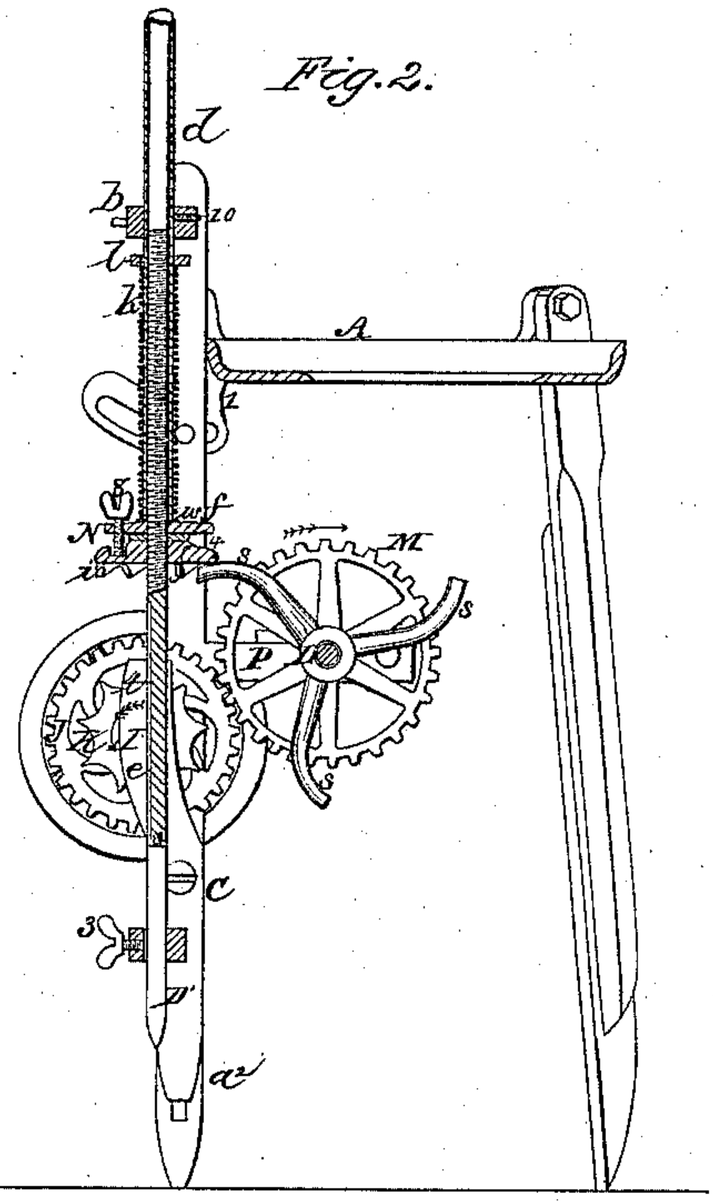


Fig. 4.

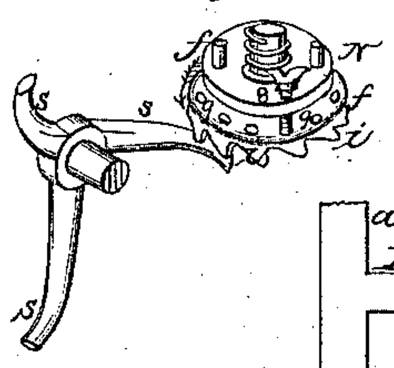


Fig. 3.

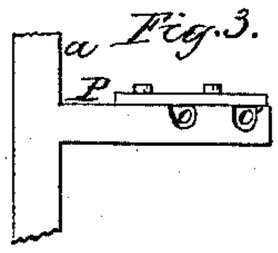


Fig. 5.

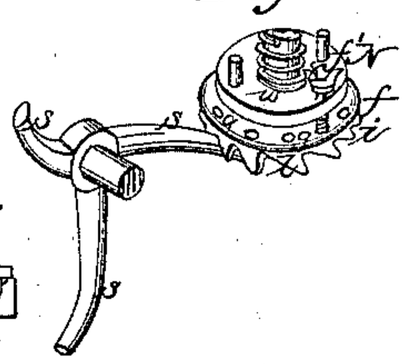


Fig. 6.

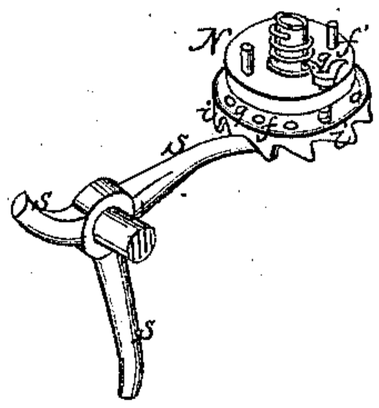
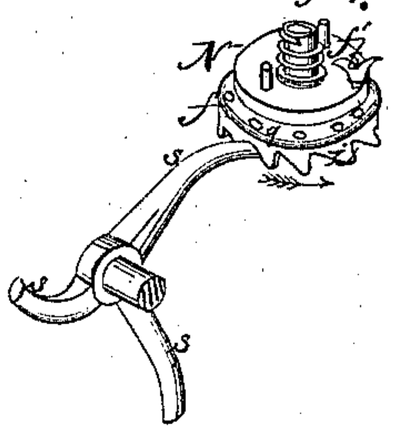


Fig. 7.



Witnesses

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WILLIAM WEAVER, OF PHŒNIXVILLE, PENNSYLVANIA.

Letters Patent No. 66,756, *dated July* 16, 1867.

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, WILLIAM WEAVER, of Phœnixville, Chester county, Pennsylvania, have invented an Improved Rock-Drilling Machine; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention consists of certain mechanism, constructed and operated as fully described hereafter, for drilling holes in rocks.

In order to enable ethers skilled in the art to make and use my invention, I will now proceed to describe its construction and operation, reference being had to the accompanying drawing, which forms a part of this specification, and in which—

Figure 1 is a front elevation of my improved rock-drilling machine.

Figure 2, a sectional elevation.

Figure 3, a detached view of part of the machine; and

Figures 4 to 7 inclusive, perspective views showing the operation of parts of the machine.

A is a platform, to projections 1 1 at the edges of which are hinged legs B B, and a frame, C, the latter consisting of two parallel side strips *a* a^1, connected at the opposite ends by cross-pieces *b* *b'*. The frame C and legs B swing freely on the pins by which they are jointed to the projections 1, and each may be secured, after adjustment, by a set-screw, *c*, which passes through a curved slot in the projection 1 into the adjacent leg or frame. A bar, a^2, is so connected to each leg, and to each of the strips *a* a^1, that it may be adjusted on the leg or strip, a set-screw, 2, which passes into the leg or strip through a slot in the bar, serving to secure the latter in its position after adjustment. Through the cross-piece *b* passes a tube, *d*, into a longitudinal recess, in which projects a pin, 10, in the cross-piece, so that while the tube may slide freely in the cross-piece, it cannot turn in the same, and through this tube, and through the cross-piece *b'*, passes a rod, D, on a screw-thread, in the centre of which turns a nut, N. In the rod D, below the screw-thread on the same, is a groove, *e*, and in the cross-piece *b'* turns a screw, 3, the point of which is adapted to the groove *e*. The nut N consists of two disks, *f f'*, and an intervening washer, 4, of rubber or its equivalent, a set-screw, 8, which passes through the upper disk into one of a number of openings, 9, in the lower disk, preventing the disks after adjustment from turning independently of each other. To the lower end of the rod D is secured a rock-drill, D', and to the frame C is secured an adjustable tube, E, for containing water, the said tube being bent towards the drill at its lower end, and furnished with a suitable faucet. At the lower edge of the nut N are a number of teeth or projections, *i*, which are inclined on one side and straight on the other, as shown in the drawing. At the lower end of the tube *d* is a flange, *s*, and round the tube is coiled a spring, *k*, the latter being confined between the flange *w* and a plate, *l*, which is adjustable on rods 7 7, projecting from the under side of the cross-piece *b*. In bearings secured to the side strip *a* turns a shaft, I, on which are two cog-wheels or pinions, J and K, the latter being adapted to the teeth or projections on the disk *f*. A plate, *t*, which is secured to the inner side of the strip *a*, projects a short distance above the pinions K for a purpose described hereafter. From the rear side of the frame C project two arms, P P, in each of which are two openings, *o* *o'*, adapted for the reception of a shaft, L, and to the latter is secured a cog-wheel, M, the teeth of which are adapted to those of the pinion J. From the shaft L project three arms, *s* *s* *s*. each of which is curved at the outer end and bent to one side as shown in the drawing.

The parts of the machine being in the position shown in fig. 1, (the point of the drill being embedded in the rock,) a rotary motion in the direction of its arrow is imparted to the shaft I, when the operation of the machine will be as follows: The straight portion of one of the arms *s* will first be brought against the inclined side of one of the projections *i* on the nut N, and will turn the latter in the direction of its arrow, (fig. 4,) until the straight edge of the next projection is brought against the arm, as shown in fig. 5. The cutting-edge of the drill, fitting in the incision made by it in the rock, prevents the rod D from turning with the nut. As soon as the nut ceases to turn, it will be elevated with the rod D, until the arm *s* passes from contact with the nut, when the rod, by the action of the spring and its own weight, will descend, the edge of the drill being brought smartly against and penetrating the rock. While the drill is being elevated, the curved portion of the arms *s* passes in contact with and bears against the side of one of the projections *i*, and thus causes the nut to be

turned, the rod (which is now removed from contact with the rock) turning with the nut, so that when the rod descends, the drill will strike a different part of the rock from that first cut, the extent to which the drill is turned in its upward motion depending upon the curvature of the arm *s*. The contact of the spring *k* with the rod is prevented by the tube *d*, the flange *w* at the lower end of which also prevents the contact of the nut N and spring, so that the action of the latter in recovering its position will not turn back the nut as the rod descends. The revolution of the nut while the drill is in contact with the rock serves to carry the nut upwards on the rod, so that, as the operation of the machine continues, and as the drill sinks deeper in the rock, the nut will be maintained in the same relative position to the shaft L and its arms. When the rock is soft and the drill penetrates deeply at each stroke, it is necessary, in order for the nut to be elevated to the required extent, that it should turn freely; when, however, the rock is hard, and the drill descends but slightly at each stroke, the motion of the nut should be limited, in order that it may not be moved upwards out of reach of the arms *s*. The extent of the motion of the nut N at each stroke of the drill may be readily regulated by adjusting the disks *f f'* to or from each other, as when the disks are brought close together against the rubber washer, the latter will cause them to bear with such force against the screw-threads, that when the nut is turned the rod will be carried round with the same, the extent of the motion of the rod being limited by the amount of pressure on the disks and the force with which the drill bears on the rock. It will, therefore, be apparent that as the disks are brought closer together, the friction upon the rod is increased, and the extent to which the nut is turned independently of the rod, and the extent of its elevation on the latter at each stroke of the drill, are decreased. When the drill is to be raised, the shaft L is removed from the openings *o*, and is placed in the openings *o'*, so that its arms cannot strike the nut N, the set-screw 3 is turned, so that its point is introduced into the slot *e* in the rod, (which is thus prevented from revolving,) and the nut N is lowered until it rests on the bar *t*, and the teeth or projections *i* engage with the teeth of the wheel X. A rotary motion is now imparted to the shaft I, so that the nut N is caused to rotate in the direction of its arrow, (fig. 1,) when the rod D will be quickly elevated. As the water passes from the pipe E into the bore, it converts the drillings into a semi-fluid mass, which is thrown out from the bore by the action of the drill itself. When the weight of the machine is not sufficient to impart the necessary stability, weights may be placed upon the platform A, and by adjusting the legs B, frame C, and bars a^2, the machine may be brought to the position required to drill a hole at any desired angle. By adjusting the plate *b*, the spring *k* may be compressed or released, so as to increase or diminish the force of the blow.

Without confining myself to the precise construction and arrangement of parts herein described, I claim as my invention, and desire to secure by Letters Patent—

1. The drill-rod D, nut N, and spring *k*, bearing on the nut, in combination with the within-described devices, or their equivalents, for first turning the nut on the drill-rod, and then elevating and turning both together, the whole being constructed and operating substantially as and for the purpose specified.

2. The drill-rod D, nut N, with its projections *i*, in combination with the shaft L and its peculiarly-bent arms *s s*, the whole being arranged and operating substantially as and for the purpose described.

3. The tube *d*, arranged in respect to the rod D and nut N, substantially as and for the purpose set forth.

4. The nut N, consisting of two adjustable disks, *f f'*, an intervening elastic washer, *e*, and set-screw 8, or its equivalent.

5. The adjustable plate *l*, or its equivalent, in combination with the spring *k*, for the purpose described.

6. The combination of the frame C, platform A, legs B, and bars a^2, the whole being constructed and arranged for adjustment, substantially as set forth.

7. The groove *e* in the rod D, and set-screw 3, combined and operating substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM WEAVER.

Witnesses:

CHARLES E. FOSTER,

JOHN WHITE.