

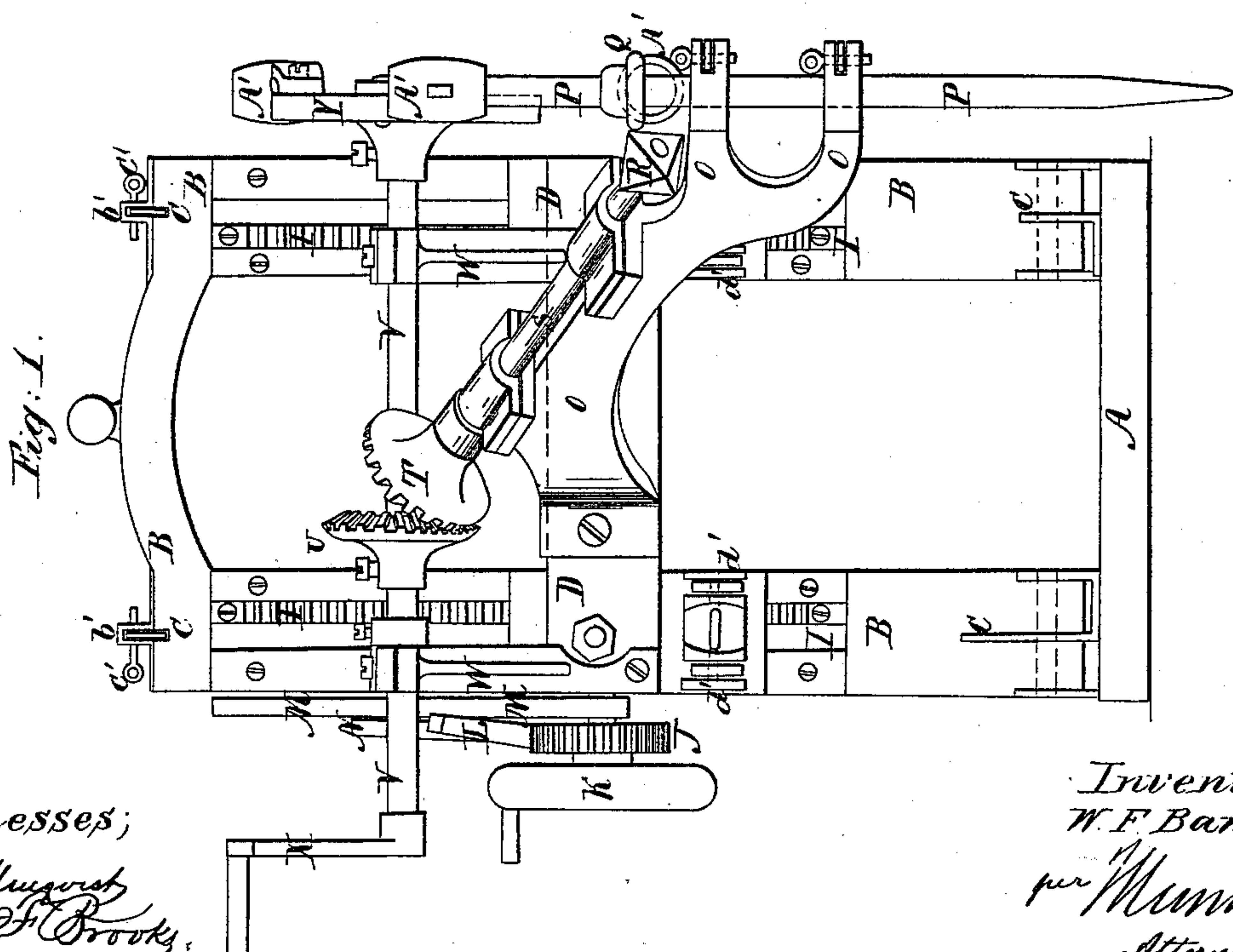
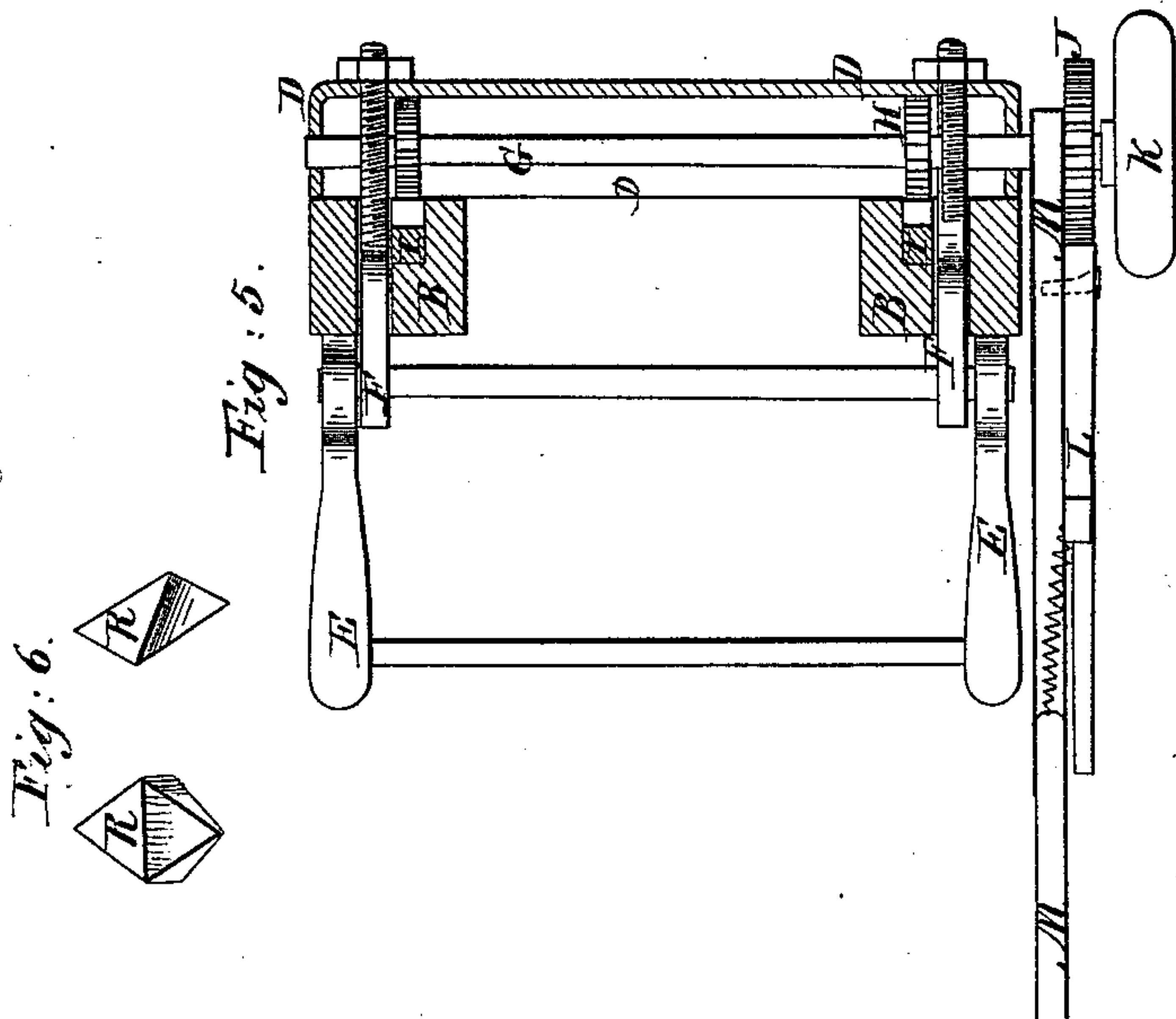
Sheet 1-2 Sheets.

W. F. Banks.

# Rock Drill

N<sup>o</sup> 93,947.

*Patented Aug. 24, 1869.*

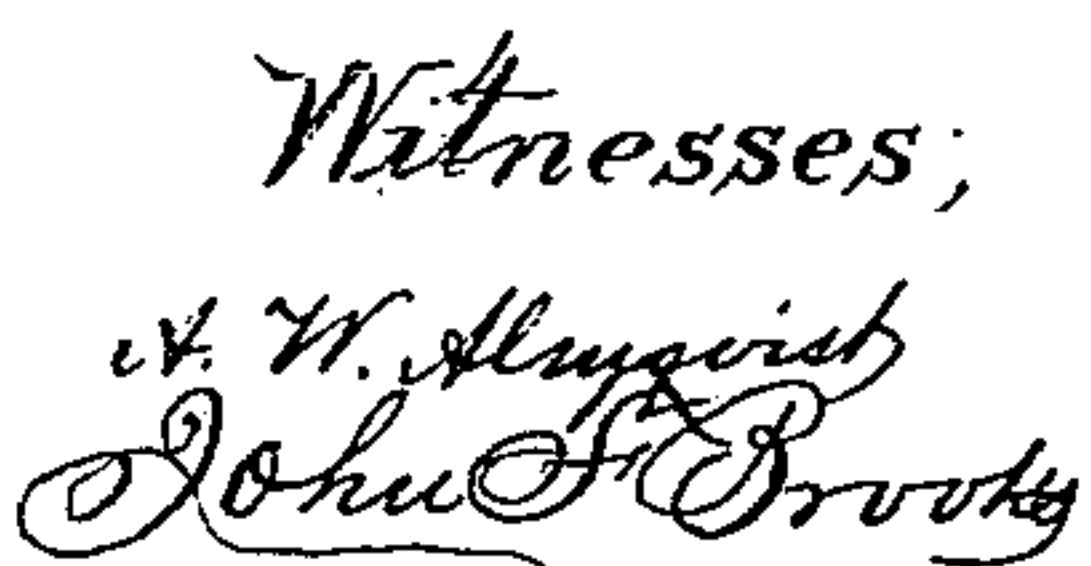


Witnesses;  
A. W. Augustus  
John F. Brooks.

Inventor;  
W. F. Banks  
per *M. M. H.*  
Attorneys

# Rock Drill

N<sup>o</sup> 93,947.



Inventor,  
W. F. Banks  
per *Wm. H.*  
Attorneys



# United States Patent Office.

WILLIAM F. BANKS, OF BROOKFIELD, CONNECTICUT.

Letters Patent No. 93,947, dated August 24, 1869.

## IMPROVED ROCK-DRILLING APPARATUS.

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 F. BANKS, of Brookfield, in the county of Fairfield, and State of Connecticut, have invented a new and useful Improvement in Rock-Drillers; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, Sheet I, is a front view of my improved driller.

Figure 2, Sheet I, is a side view of the same.

Figure 3, Sheet II, is a detail side view of a portion of the same.

Figure 4, Sheet II, is a detail sectional view of a part of the same.

Figure 5, Sheet II, is a detail horizontal section of a part of the same, taken through the line  $x x$ , fig. 3.

Figure 6 are detail views of the device for rotating the drill.

Similar letters of reference indicate corresponding parts.

My invention has for its object to furnish an improved machine for drilling rock, which shall be simple in construction, easily operated, and effective in operation, and which shall be so constructed and arranged that the holes may be drilled at any desired angle; and

It consists in the construction and combination of various parts of the machine, as hereinafter more fully described.

A is the base-frame of the machine, to one end of which is hinged the lower end of the upright frame B, as shown in figs. 1, 2, and 3, so that the said upright frame B may be adjusted in any desired position to give the desired angle to the drill.

C are curved arms, the lower ends of which are rigidly secured to the end of the base-frame A, and the upper ends of which pass through keepers,  $b'$ , attached to the top of the frame B, where they are adjustably secured in place by pins,  $c'$ , passed through holes in said keepers  $b'$ , and through one or the other of the holes in the arms C, according to the angle at which the rock is to be drilled.

D is a cap, or hollow bar, which slides up and down upon the forward side of the upright frame B, and which is secured in place at any desired elevation by the lever-cams E, which are pivoted to the eye-bolts F, which pass through longitudinal slots in the side-bars of the frame B, and the forward ends of which are secured to the bar or cap D.

The friction of the cap or bar D, when moving up and down, is diminished by friction-wheels,  $d'$ , pivoted to a downwardly-projecting flange, formed upon the said cap or bar, as shown in figs. 1, 2, and 3.

G is a shaft, which passes longitudinally through

the cavity of the bar or cap D, and works in bearings in said cap or bar.

To the shaft G are attached two gear-wheels, H, the teeth of which mesh into the teeth of the racks I, attached to the slotted side-bars of the frame B, as shown in figs. 1, 4, and 5, so that the cap or bar D, and its attachments, may be raised and lowered by revolving the shaft G.

To one end of the shaft G are attached a ratchet-wheel, J, and a hand or crank-wheel, K.

L is a lever-pawl, which takes hold of the teeth of the ratchet-wheel J, and which is pivoted to the lever M, the forward end of which rides upon the shaft G, at the side of the gear-wheel J, said shaft passing through a hole in the end of the said lever.

The outer end of the lever-pawl L is connected to the lever M by a coiled spring,  $m'$ , by the tension of which the forward end of said pawl is held forward against the teeth of the ratchet-wheel J.

N is a trip-lever, which is pivoted to the side of the lever M, in such a position that its forward end may rest against the under side of the outer end of the lever-pawl L, so that by pressing upon the trip-lever N, the forward end of the pawl-lever L may be withdrawn from the ratchet-wheel J, allowing the shaft G and its attachments to descend, so that by means of the levers and pawl M N L, the shaft G and its attachments may be raised and lowered at will.

O is an arm, attached to the middle part of the bar or cap D, and projecting at an angle of about forty-five degrees ( $45^\circ$ ). The arm O is made of such a length that its outer end may be outside of the base-frame A.

The outer end of the arm O is made branched, and in the ends of the said branches are formed bearings or sockets for the drill P, one part of said bearings or sockets being made movable, and being hinged to the other part, so that the drill may be conveniently inserted and removed, when desired.

Upon the outer end of the movable part of the bearings or sockets is formed a tenon, which enters a slot in the end of the other or stationary part, where it is secured in place by means of a pin, as shown in figs. 1 and 2.

To the upper part of the drill P is secured a collar, Q, made of rubber, or other suitable material, against which works the angular block R, which I prefer to make octohedral in form, to raise and partially rotate the drill P after each stroke. The block R should be so formed as to slightly raise and rotate, and release the drill after each stroke, leaving it each time in a new position.

The block R is attached to the end of a shaft, S, which works in bearings attached to the arm O, and to the upper end of which is attached a bevel-gear



wheel, T, the teeth of which mesh into the teeth of the bevel-gear wheel U, attached to the shaft V.

The shaft V revolves in bearings in the arms W, attached to the bar or cap D, and to one of its ends is attached a crank, X, by means of which power is applied to the machine.

To the other end of the shaft V is attached a wheel or disk, Y, to the outer side of which are pivoted one or more arms, Z, having hammers, A', proportioned in size to the size of the drill, attached to their outer ends.

Upon the inner ends of the arms Z are formed steps, z', which, when the hammers A' slide from the drill-head, strike against rubber blocks, B', attached to the side of the disk Y, to diminish the jar from the dropping of the said hammers.

The spring-blocks or stops B' also receive and support the arms and hammers as they are being raised again into the striking-position, as shown in fig. 2, to prevent them from moving in too far toward the centre of the said disk Y.

Having thus described my invention,

I claim as new, and desire to secure by Letters Patent—

1. The arrangement of the inclined arm O, inclined shaft S, block R, gearing T U, shaft N, disk Y, ham-

mers A', sliding bar D, drill I, and hinged frame B, as herein described, for the purpose specified.

2. The combination of the lever M, lever-pawl L, trip-lever N, ratchet-wheel J, crank or hand-wheel K, shaft G, gear-wheels H, rack-bars I, sliding bar or cap D, eye-bolts F, and lever-clamps E with each other and with the slotted hinged frame B, substantially as herein shown and described, and for the purpose set forth.

3. The lever-cams E, in combination with the sliding frame D and hinged frame B, to hold the drill and its operating-mechanism at any desired height upon the frame B, as herein shown and described.

4. Rotating the drill P, by means of the collar Q, attached to said drill, and the angular block R, operated from the driving-shaft V by the gear-wheels U T and shaft S, to which said angular block is attached, substantially as herein shown and described.

5. The combination of the hammers A', arms Z z', spring-stops B', and disk or wheel Y with the shaft V, supported from the sliding bar or cap D, substantially as herein shown and described, and for the purpose set forth.

Witnesses:

WILLIAM F. BANKS.

PHILO C. MENDIN,  
D. S. BRISTOLL.