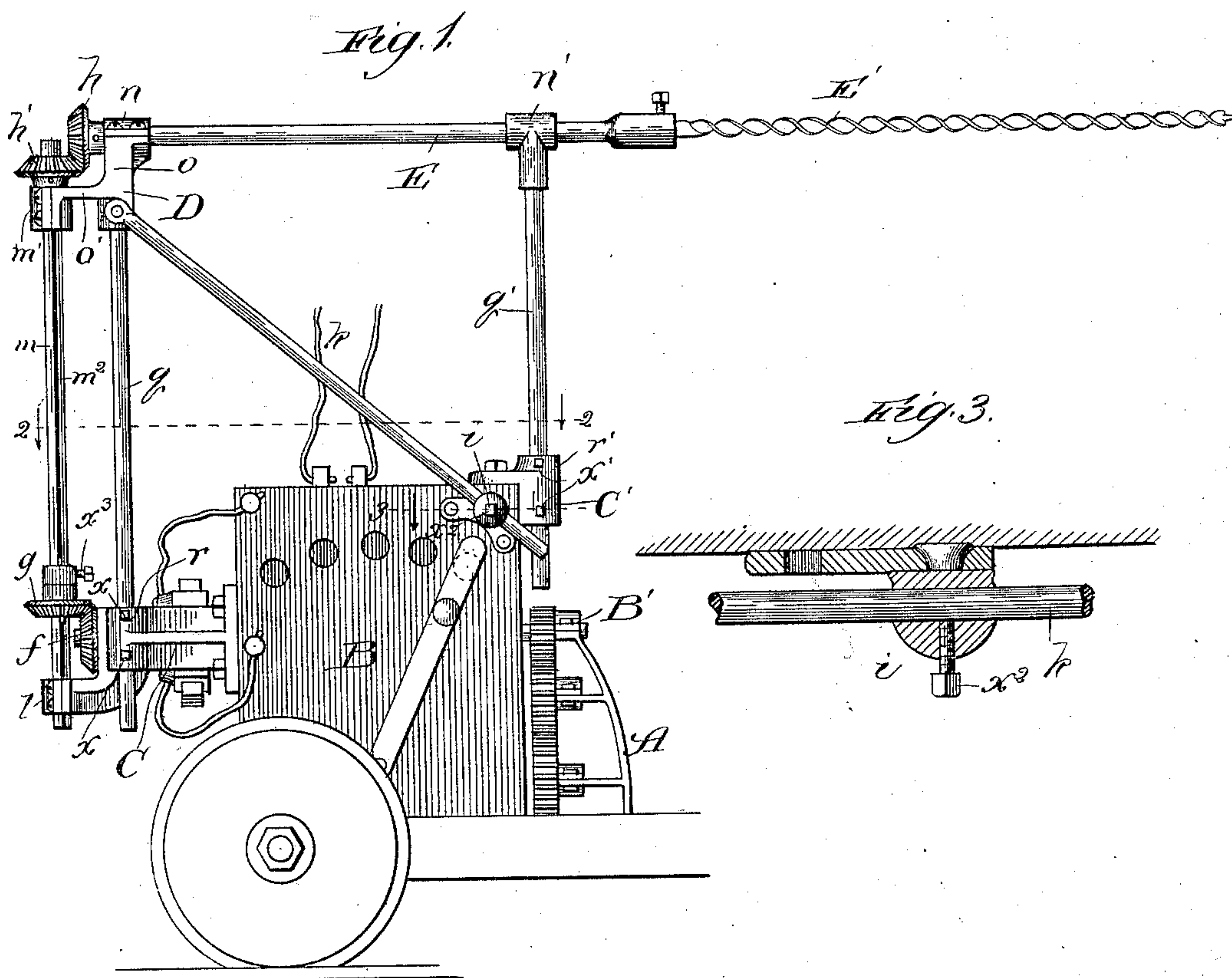


(No Model.)

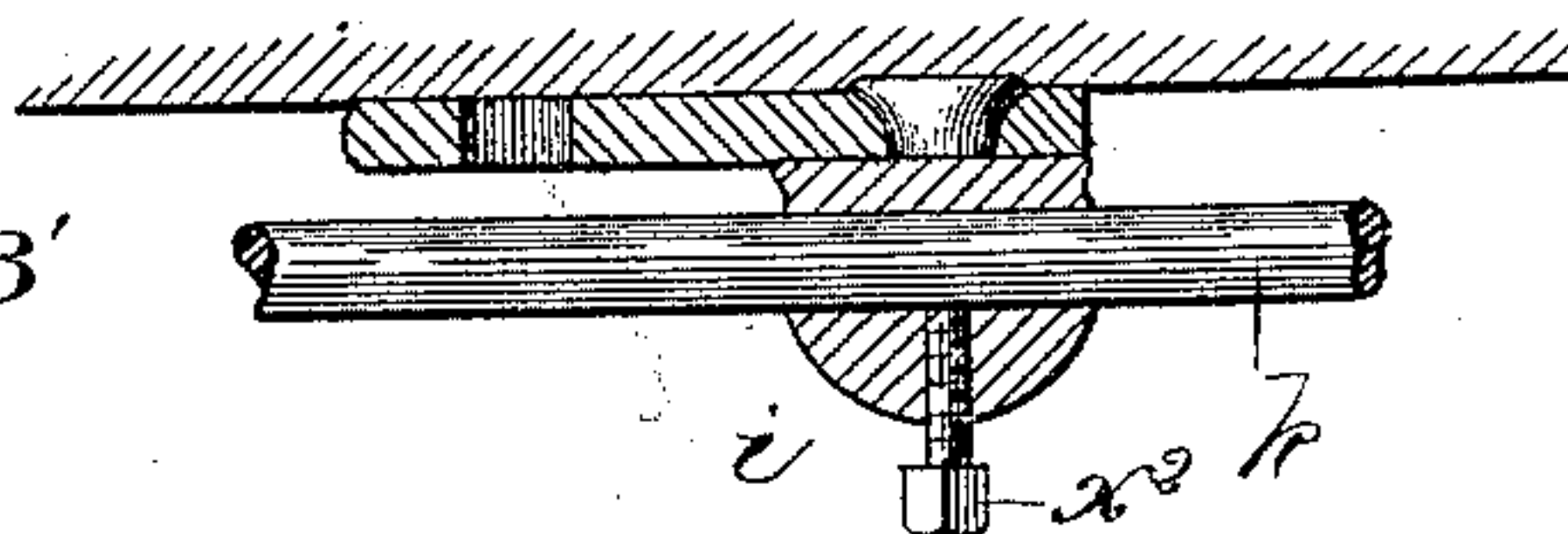
F. BAIN.  
MINING MACHINE.

No. 433,612.

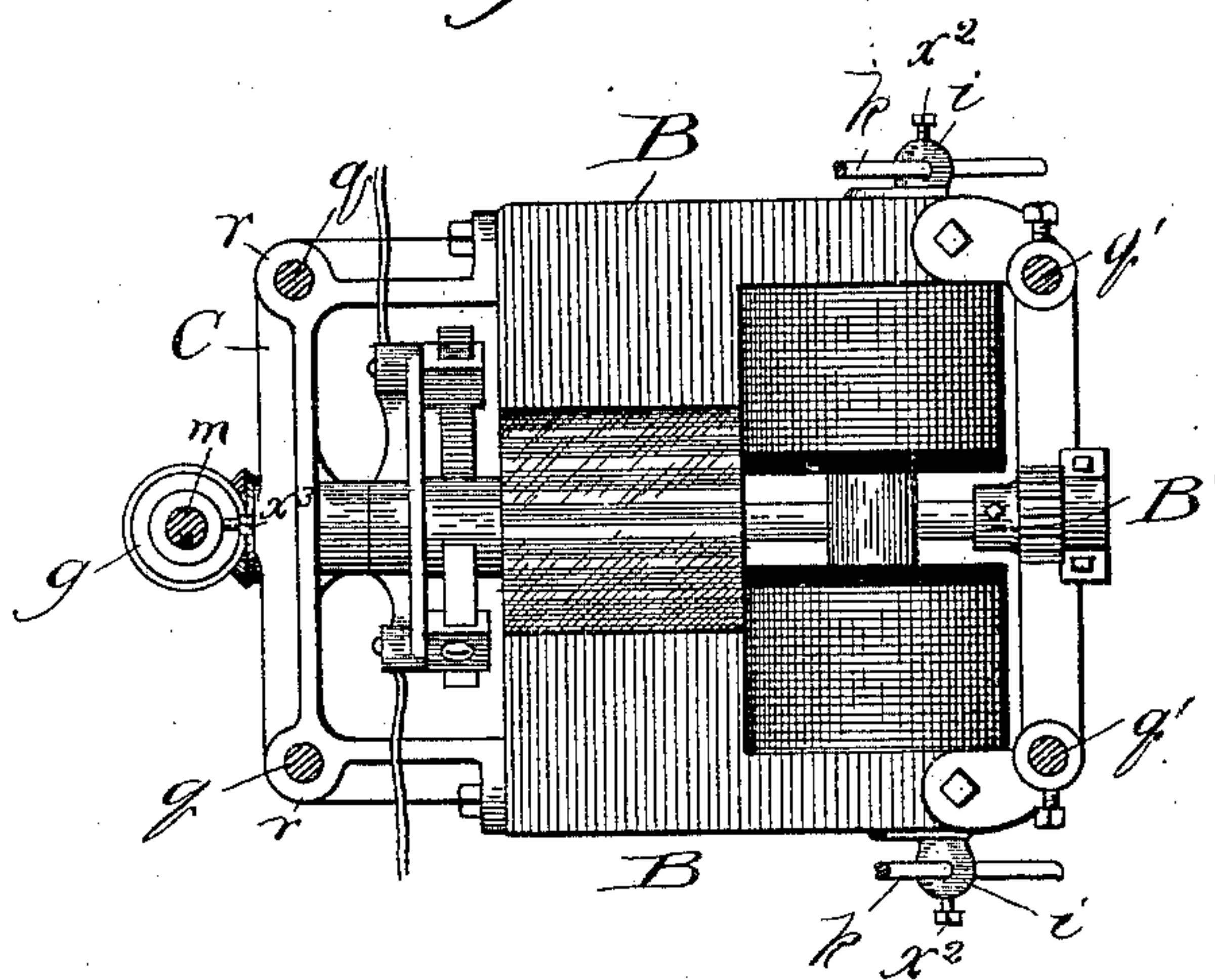
Patented Aug. 5, 1890.



*Fig. 3.*



*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

FORÉE BAIN, OF CHICAGO, ILLINOIS.

## MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 433,612, dated August 5, 1890.

Application filed February 17, 1890. Serial No. 340,801. (No model.)

*To all whom it may concern:*

Be it known that I, FORÉE BAIN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have  
5 invented a new and useful Improvement in Mining-Machines, of which the following is a specification.

My invention relates to an improvement in the class of mining-machines especially used  
10 in coal-mining for the purpose of performing the so-called "undercutting" operation, consisting in forming an elongated opening or openings near the base of the wall of mineral, thereby to undermine it and facilitate the dislodgment by blasting. Generally  
15 stated, a machine of the class referred to involves a stationary frame supporting a longitudinally-movable frame, the latter carrying at its forward end the cutting mechanism  
20 and toward its rear end the motor, preferably electric, suitably geared to the cutting mechanism to actuate it and to the movable frame to effect its advancement as the cutters penetrate the wall of mineral and its withdrawal  
25 after the cut has been made to the desired depth. An improved machine of the class referred to for producing the undercutting operation is shown and described in detail in my application for Letters Patent, Serial No.  
30 340,799, filed concurrently herewith on the 17th day of February, 1890, and so much of the said machine as is necessary to permit proper representation of the construction and manner of operation of the improvement upon  
35 which the present application for Letters Patent is founded is illustrated in the accompanying drawings. I do not, however, for any reason wish to be understood as limiting the use of my present improvement to the construction of mining-machine in connection  
40 with which I have stated it to be shown in the drawings; but, on the contrary, I wish to be understood as claiming it in connection with any mining-machine involving the general construction hereinbefore outlined.

The object of my improvement is to provide an undercutting mining-machine of the class referred to with means actuated by the same power that operates the cutters and by  
50 preference simultaneously with the latter for producing the blasting-hole.

To this end my invention consists in the general construction of my improved device; and it also consists in details of construction and combination of parts hereinafter de- 55 scribed and claimed.

In the drawings, Figure 1 shows my improvement in side elevation applied to an undercutting mining-machine, of which only the rear portion is presented in side elevation. 60 Fig. 2 is a sectional view taken on the line 2 of Fig. 1 and viewed in the direction of the arrows; and Fig. 3, a section taken on the line 3 of Fig. 1, viewed in the direction of the arrow and enlarged. 65

A is the undercutting-machine, which may involve the construction set forth in my aforesaid concurrent application or any other of the known constructions in which are employed a stationary frame supporting a longi- 70 tudinally-sliding frame provided at its forward end with the cutting mechanism, a motor B on the sliding frame near its rear end having its driving-shaft B' suitably geared to the cutting mechanism to actuate the latter and to the sliding frame-moving mechanism. The motor B is preferably an electric motor, such as and operated like other electric motors on undercutting-machines of the class referred to. From the rear side of the 80 motor extends a frame C, having at each of its outer lateral ends a socket *r*. In the sockets *r* are supported, as by adjusting-screws *x*, posts *q*, to extend vertically to a desired height, and carrying at their upper 85 ends a bracket D, having at the center of its vertical portion *o* a journal-bearing *n*, for a horizontal spindle E, and at the center of its rear horizontal portion *o'* an upper bearing *m'* for a vertical rotary shaft *m*, journaled 90 at its lower end in a bearing *l*, supported to extend outward from the center of the frame C. The spindle E toward its forward end is supported in a bearing *n'* on the upper ends of posts *q'*, adjustably supported, as by the 95 set-screws *x'*, in sockets *r'* at the ends of a bracket or frame C', secured to the front end of the motor. Stay-rods *k* are pivoted at one end to the opposite ends of the bracket D, and are adjustably held toward their oppo- 100 site ends, as by set-screws *x<sup>2</sup>*, in sockets *i*, swiveled in suitable supports at the opposite



sides near the upper portion of the front of the motor. The spindle E, which is adapted to hold a drill E', as shown, is provided at its rear end with a beveled gear-wheel *h*, meshing with a similar wheel *h'*, secured to the upper end of the vertical rotary shaft *m*. The shaft *m* is provided with a feather-way *m*<sup>2</sup>, and with a beveled gear-wheel *g*, adjustable to any position lengthwise of the shaft and there held, as by the set-screw *x*<sup>3</sup>, and meshing with a beveled gear-wheel *f* on the rear end of the motor-shaft B'. Thus with the parts in the relative positions illustrated, when the motor B is in operation, and preferably while performing its work of actuating the movable frame and the cutters thereon, the shaft B', through the gears *f*, *g*, *h'*, and *h*, is revolving the drill-spindle E, thereby causing the drill E' to produce a hole for the blasting purpose.

This drilling may be performed at different heights, owing to the adjustable construction of the parts supporting the drill E' permitting the latter to operate at different elevations. The primary purpose, however, of constructing the drill and its spindle E to be so adjustable is that it need never be removed from the machine to permit the latter to be moved through openings or doorways, as are common in mines, only little more than high enough to allow the machine without the upper drill mechanism to be passed through them in moving the machine about. Accordingly, when necessity for moving the machine arises, on loosening the set-screws *x*, *x'*, *x*<sup>2</sup>, and *x*<sup>3</sup> the drill-spindle E will drop sufficiently far to avoid obstruction by itself and its supporting mechanism in moving the machine through the low openings between chambers in the mine, the stay-rods *k* being thus permitted to extend readily through the swiveled sockets *i*. When it is desired to again use the overhead drill, the parts are readily raised and held at the desired positions by properly adjusting the set-screws.

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

1. In combination with an undercutting mining-machine, an overhead rotary drill supported on the machine and geared to the driving-power of the undercutting mechan-

ism to be rotated thereby and vertically adjustable with reference to its support and maintainable in and during adjustment in operative connection with the driving-power, substantially as described.

2. In combination with an undercutting mining-machine, a motor B for actuating the cutting mechanism, posts *q* and *q'*, adjustably supported in sockets, and a rotary drill-spindle E for a rotary drill E', journaled in bearings supported on the upper ends of the said posts and geared to the driving-shaft of the motor to be rotated thereby with the undercutting mechanism, substantially as described.

3. In combination with an undercutting mining-machine provided with a motor B for actuating its cutting mechanism, frames C and C' on opposite sides of the motor, posts *q* and *q'*, adjustably supported in sockets on the said frames, stay-rods *k*, connecting the posts *q* with the motor and adjustable with the vertical adjustment of the posts *q*, and a drill-spindle E for a drill E', journaled in bearings supported on the upper ends of the posts *q* and *q'* and geared to the driving-shaft of the motor, substantially as described.

4. In combination with an undercutting mining-machine provided with a motor B for actuating its cutting mechanism, frames C and C' on opposite sides of the motor, posts *q* and *q'*, adjustably supported in sockets on the said frames, swivel-sockets *i* on the motor, stay-rods *k*, pivotally connected with the posts *q* near their upper ends and passing through and adjustably secured in the said swivel-sockets, a drill-spindle E for a drill E', journaled in bearings supported on the upper ends of the said posts and provided with a beveled gear-wheel *h*, a vertical rotary feathered shaft *m*, having a beveled gear-wheel *h'* at its upper end meshing with the wheel *h*, and toward its opposite end a similar gear-wheel *g*, adjustably supported in position and meshing with a beveled gear-wheel *f* on the motor-shaft B', the whole being constructed and arranged to operate substantially as described.

FORÉE BAIN.

In presence of—

J. W. DYRENFORTH,  
M. J. FROST.