(No Model.)

3 Sheets—Sheet 1.

S. HUSSEY.

ROCK DRILL.

No. 330,981. Patented Nov. 24, 1885.

Fig. 1.

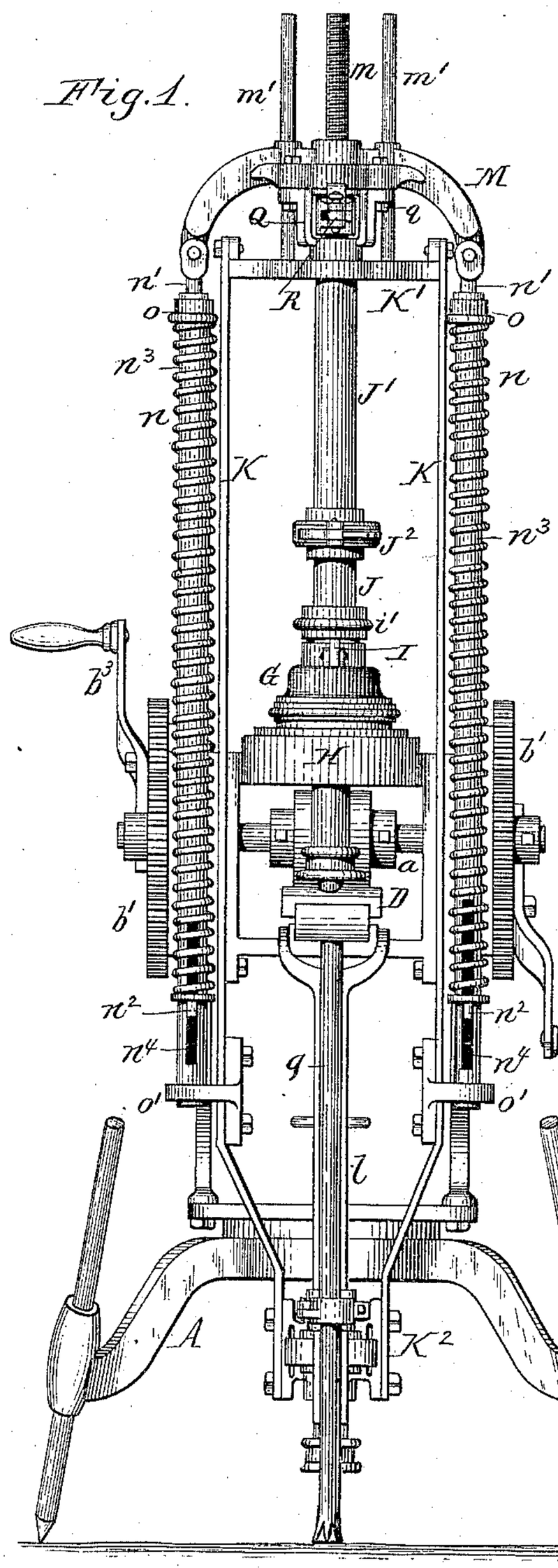


Fig. 3.

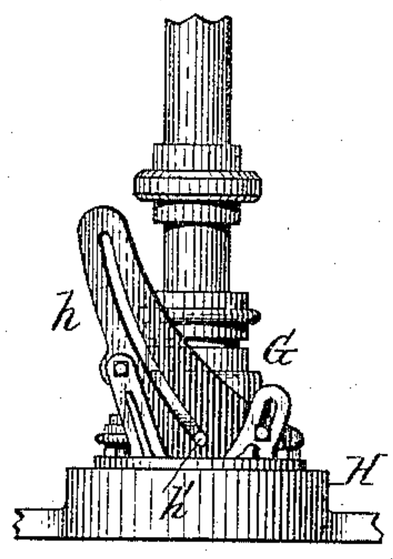


Fig. 2.

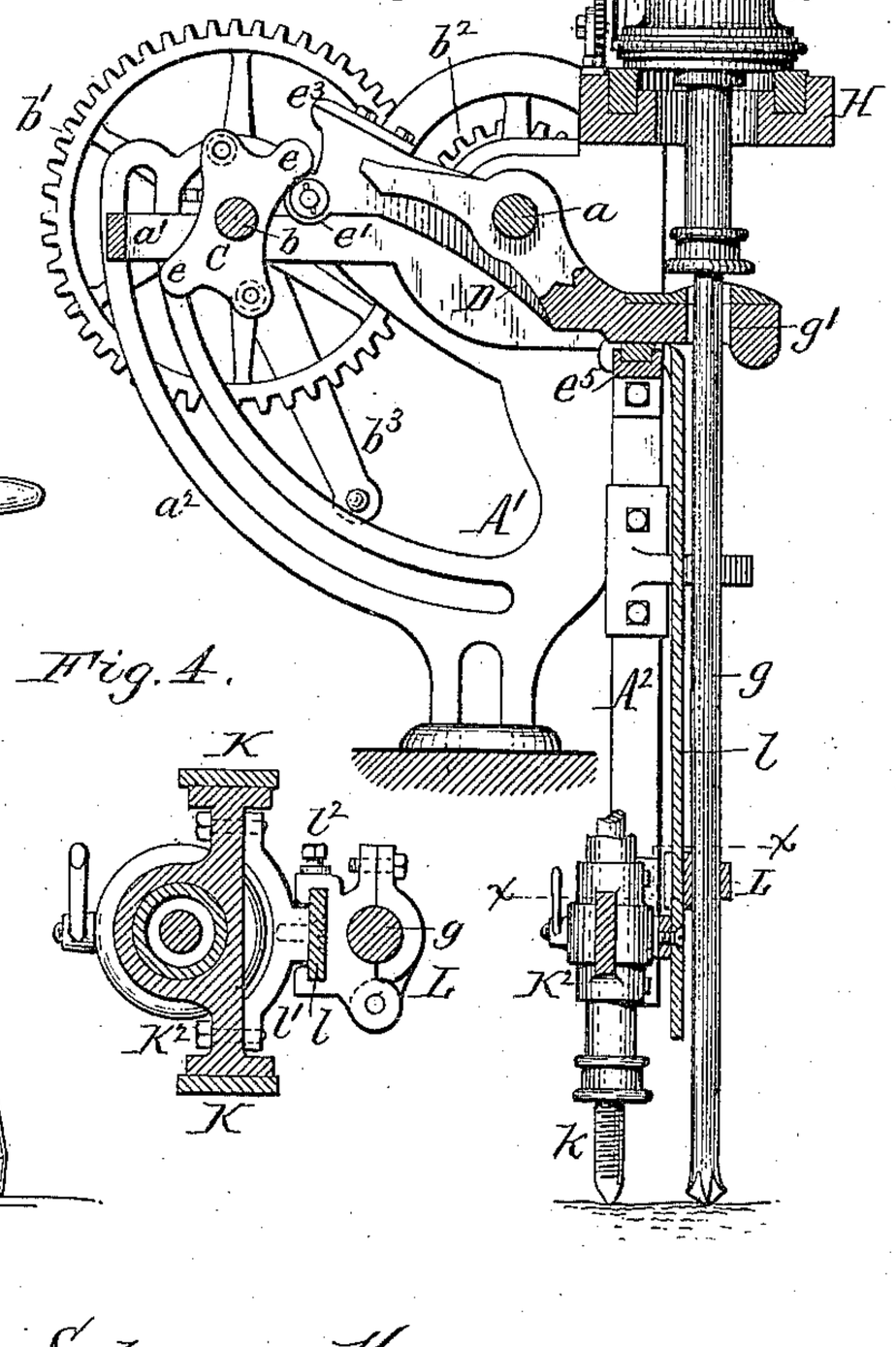


Fig. 4.

Theo. L. Popp.
Geo. E. Peterman.
} Witnesses.

Sylvanus Hussey, Inventor.
By Wilhelm & Bonner.
Attorneys.

(No Model.)

3 Sheets—Sheet 2.

S. HUSSEY.

ROCK DRILL.

No. 330,981. Patented Nov. 24, 1885.

Fig. 5.

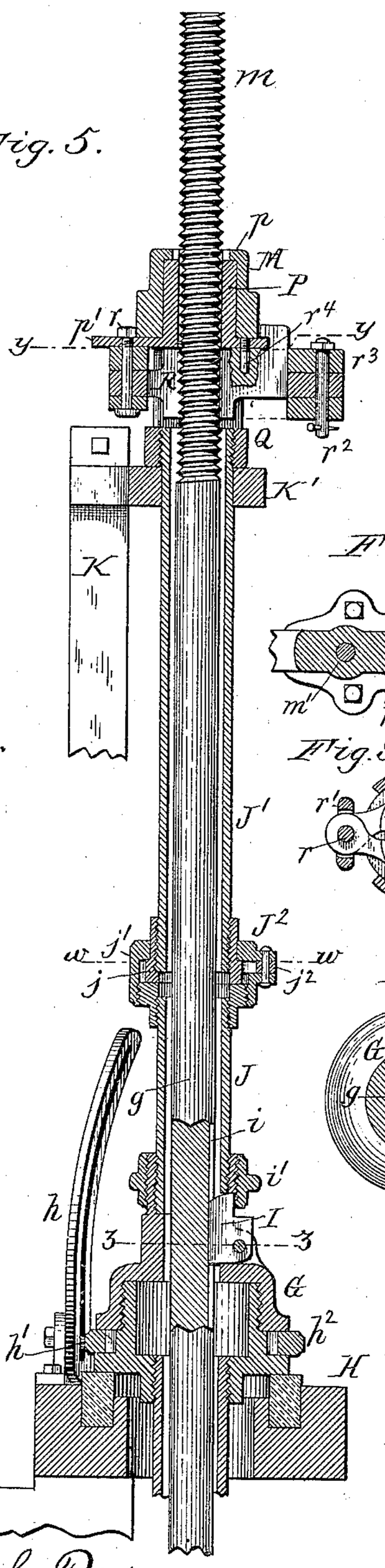


Fig. 6.

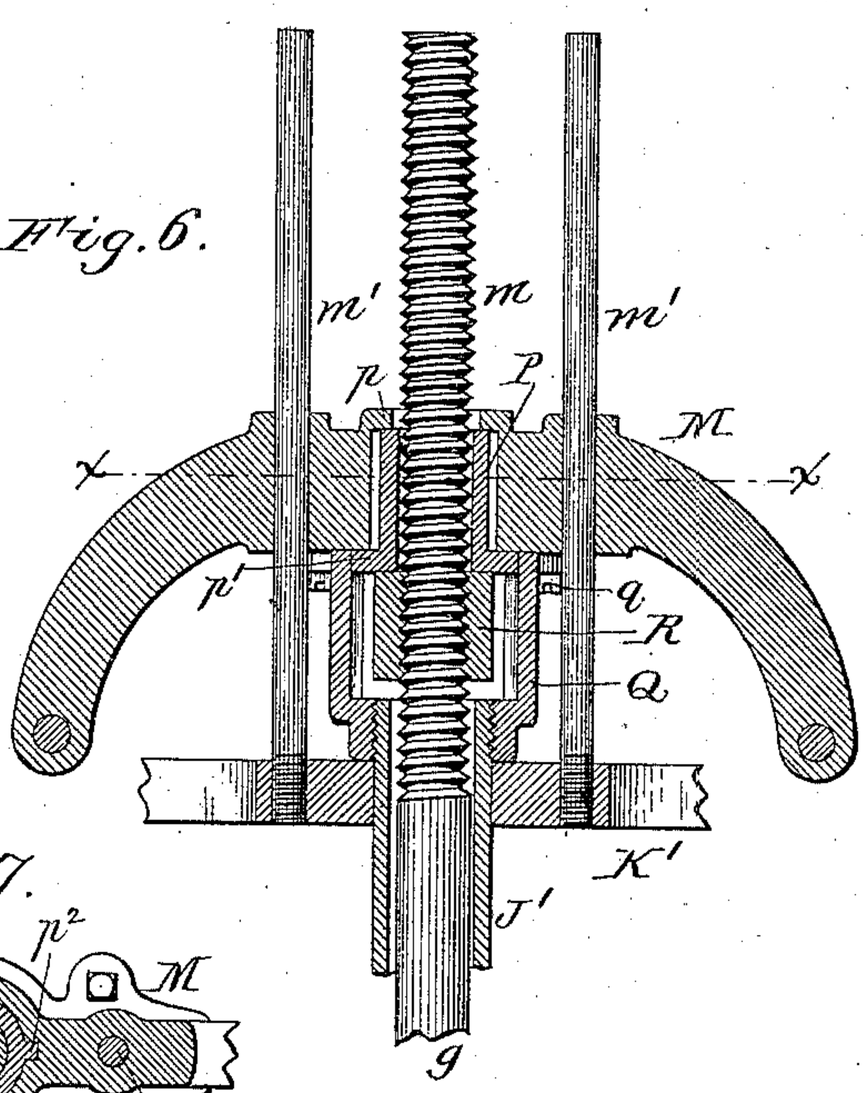


Fig. 7.

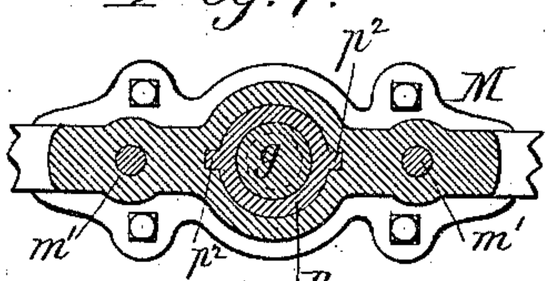


Fig. 9.

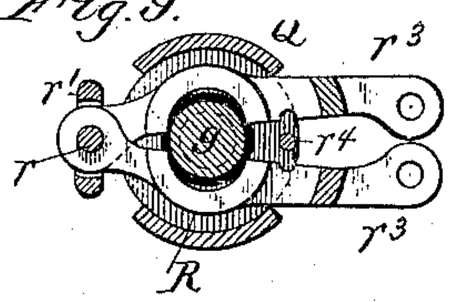


Fig. 8.

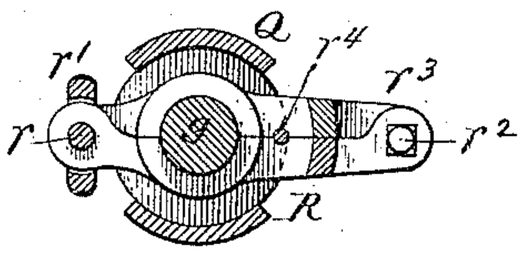


Fig. 10.

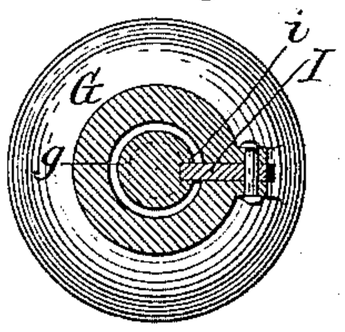


Fig. 11.

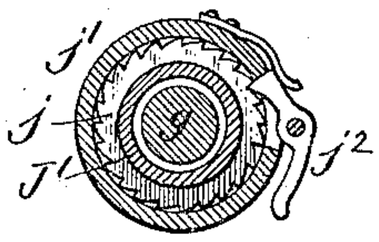
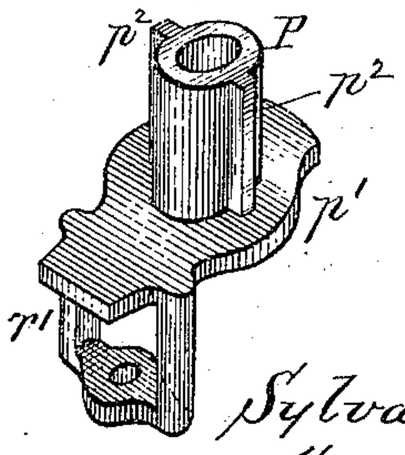


Fig. 12.



Witnesses.
Geo. L. Popp.
Geo. E. Pitman.

Inventor:
Sylvanus Hussey
By Wilhelm & Bonner.
Attorneys.

(No Model.)

3 Sheets—Sheet 3.

S. HUSSEY.

ROCK DRILL.

No. 330,981. Patented Nov. 24, 1885.

Fig. 13.

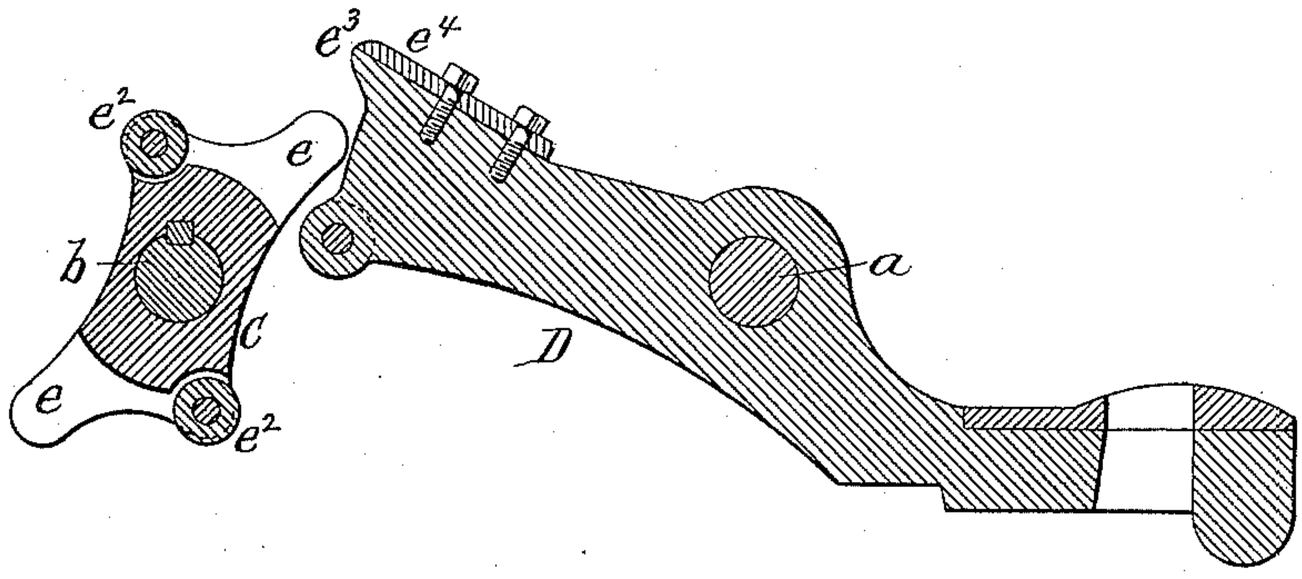


Fig. 14.

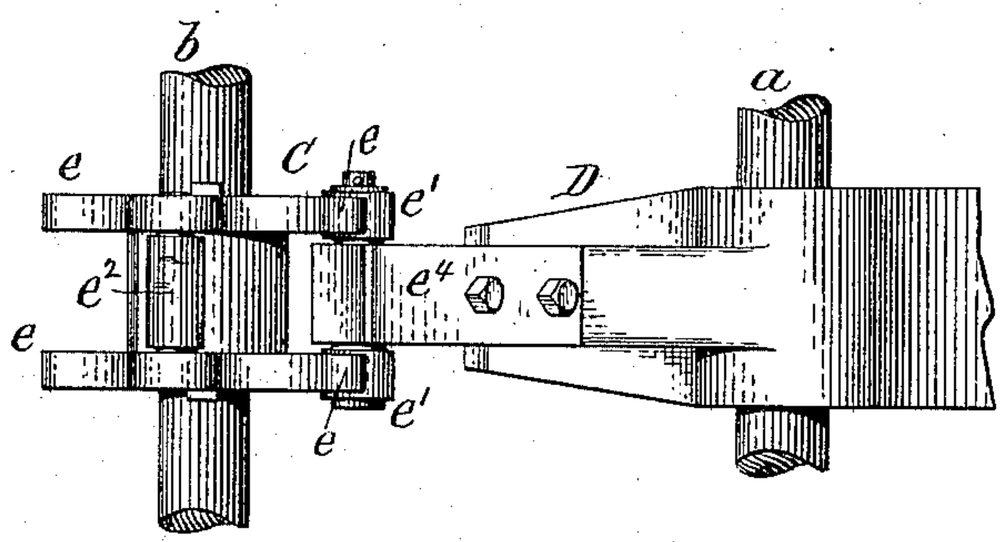
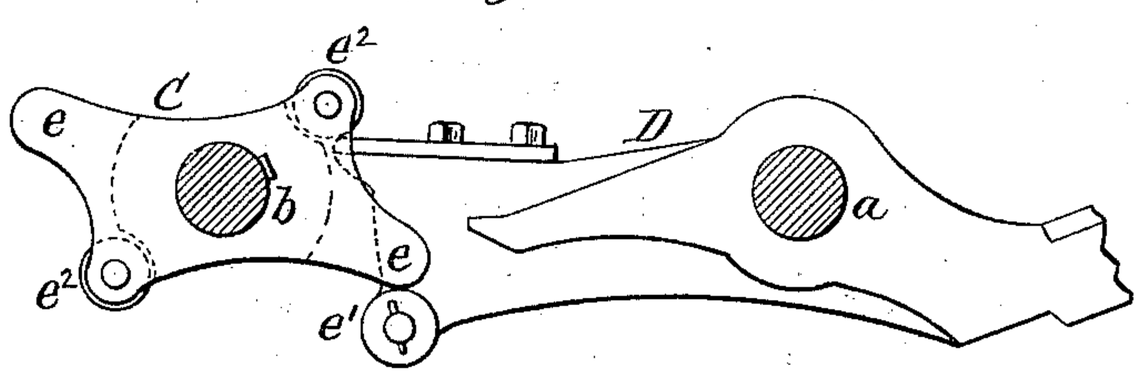


Fig. 15.



Witnesses.
Theo. L. Popps.
Geo. E. Pituanc.

Sylvanus Hussey Inventor.
By Wilhelm & Bonner.
Attorneys.

UNITED STATES PATENT OFFICE.

SYLVANUS HUSSEY, OF BUFFALO, NEW YORK.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 330,981, dated November 24, 1885.

Application filed November 26, 1884. Serial No. 148,883. (No model.)

To all whom it may concern:

Be it known that I, SYLVANUS HUSSEY, of the city of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Rock-Drills, of which the following is a specification.

This invention relates to that class of rock-drills which are operated by hand, and has for its object to improve the devices whereby the drill-bar is fed, actuated, and guided.

My invention consists to these ends of the improvements which will be hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, consisting of three sheets, Figure 1 represents a front elevation of my improved drill. Fig. 2 is a sectional side elevation of the same. Fig. 3 is a side elevation of the clutch-head. Fig. 4 is a horizontal section, on an enlarged scale, in line *x x*, Fig. 2. Fig. 5 is a sectional elevation, on an enlarged scale, of the feed mechanism. Fig. 6 is a sectional elevation of the upper portion of the feed mechanism at right angles to Fig. 5. Fig. 7 is a horizontal section in line *x x*, Fig. 6. Fig. 8 is a horizontal section in line *y y*, Fig. 5. Fig. 9 is a similar view showing the screw-nut opened. Fig. 10 is a horizontal section in line *z z*, Fig. 5. Fig. 11 is a horizontal section in line *w w*, Fig. 5. Fig. 12 is a detached perspective view of the upper drill-bar guide. Fig. 13 is a longitudinal section of the actuating mechanism. Fig. 14 is a top plan view of the same. Fig. 15 is a side elevation of the same.

Like letters of reference refer to like parts in the several figures.

A represents the tripod-base, and A′ the main frame attached to the same by a vertical pivot in a well-known manner.

A^2 represents the swinging frame, hung upon the horizontal shaft *a*, and made adjustable thereon by arms *a′* and segments a^2, in a well-known manner. The shaft *a* is supported in bearings formed in the frame A′.

b represents the driving-shaft, supported in bearings secured to the swinging frame A^2, and *b′* b^2 are the gear-wheels whereby motion is transmitted from the fly-wheel shaft *b* to the shaft *a*, the former being provided with hand-cranks b^3.

C represents the actuating-plates, secured to the shaft *b*, and each composed of two similar parts arranged on diametrically-opposite sides of the shaft.

D is the actuating or lifting lever, hung loosely on the shaft *a*, and projecting with its rear end within reach of the plates C. The two parts of the latter are arranged so far apart that the rotation of the plates will depress the rear arm of the lever D, and upon releasing the lever allow the lever to return to its normal position before the next portion of the plates engages the lever.

e e are projecting arms or horns formed on the plates C to engage with rollers *e′ e′*, attached to the sides of the rear arm of the lever D.

e^2 is a roller attached to the plates C, and engaging against a tooth, e^3, formed on the rear arm of the lever D, in rear of the rollers *e′*. The plates C are arranged side by side on the shaft *b* and straddle the lever D, and the roller e^2 is arranged between the two plates C. Each of the two similar parts of the plates C is provided with arms *e e* and a roller, e^2, so that one revolution of the plates will cause two downward movements of the rear arm of the lever D. The rollers e^2 are arranged nearer the center of the shaft *b* than the working-surfaces of the horns or arms *e*, so that the operative length of the arms *e* is greater than the operative length of the arms formed by the rollers e^2. By this means the first portion of the compressing movement of the springs applied to the drill-bar is made somewhat faster than the last portion of such movement, and the leverage with which this movement is transmitted to the springs from the driving-shaft to the drill-bar through the lifting-lever D is correspondingly greater in the last portion of the movement, during which the springs are already partially compressed and require a greater force to further compress them. The roller e^2 engages with the tooth e^3 before the arms *e* release the rollers *e′*, as represented in Fig. 15, and the roller e^2 releases the lever and permits the latter to return to its normal position before the arms *e e* of the next following portions of the plates arrive in the position in which they engage with the rollers *e′*. By this means the gear-teeth formerly employed by me on the plates and lever, and described in my pending application for Patent No. 119,112, filed January 29, 1884, are dispensed with, and the danger of an improper meshing

of these teeth and consequent breakage of the parts is thereby avoided. The back of the tooth e^3 is constructed of a removable steel plate, e^4, which can be renewed when worn. The lever D is supported in its normal position by a cushioned cross-piece, e^5, secured to the swinging frame A^2.

g represents the drill-bar, and G the clutch-head through which the drill-bar passes, and which is provided with a downwardly-extending sleeve, which rests upon the front arm of the lever D, the latter being provided with an opening, *g'*, through which the drill-rod passes.

H is the cushioned ring or annular frame, which limits the downward movement of the clutch-head.

h represents the curved feed-guide, secured to the frame H, and *h'* the pin secured to the ratchet-ring h^2 of the clutch-head, and engaging in the curved guide to turn the clutch-head forward for feeding the drill. These parts are constructed in a well-known manner, and as shown and described in my Letters Patent No. 232,609, granted September 28, 1880.

i represents a longitudinal groove formed in the drill-bar *g*, and I is a feather attached to the upper portion of the clutch-head G and projecting into the groove *i*, whereby the drill-bar is compelled to turn with the upper portion of the clutch-head. The feather I is pivoted in a recess in the upper portion of the clutch-head, so that it can be swung out of the groove when it is desired to lift the drill-bar so high that the lower end of the groove *i* passes by the feather I. The feather I is secured in its normal position, in which it projects into the groove *i*, by a lock-nut, *i'*, which works on the threaded upper portion of the clutch-head G, and engages over the back of the feather I, as represented in Fig. 5. Upon raising this lock-nut the feather can be swung out of the groove.

J represents a tube secured to the upper end of the clutch-head G and inclosing the drill-bar, and J' is a similar tube forming an upward continuation of the tube J, and connected therewith by a ratchet-coupling, J^2. The latter consists of a ratchet-rim, *j*, secured to the upper tube, J', and a casing, *j'*, which is secured to the lower tube, J, and provided with a pawl, j^2, so arranged with reference to the ratchet-teeth that it permits the lower tube, J, to turn with the clutch-head in the direction in which it causes the drill-bar to be fed downward, but prevents the lower tube and clutch-head from turning in an opposite direction. This ratchet-coupling therefore permits of the feed-motion of the drill-bar and prevents the latter from turning back upon striking a hard piece of rock.

K K represent two upright side bars secured to both sides of the swinging frame A^2, and connected at their upper ends by a cross-bar, K', and at their lower ends by a cross-head, K^2. The latter is provided with an adjustable foot, *k*.

l is an upright bar secured with its bifurcated upper end to the cross-piece e^5 of the swinging frame A^2, and with its lower end to a bridge-piece, *l'*, secured to the front side of the cross-head K^2.

L is a divided sleeve in which the lower portion of the drill-rod is guided, and which is secured to the upright bar *l* by a set-screw, l^2, so as to be vertically adjustable on the same.

m represents the feed-screw, formed on the upper portion of the drill-bar, and *m' m'* represent two vertical guide-bars secured with their lower ends in the cross-bar K', on opposite sides of the drill-bar.

M represents a cross-head mounted on the guide-bars *m'*, to slide thereon, and having its ends connected with springs *n* by rods *n'*, attached with their upper ends to the cross-head M, and carrying at their lower ends cross-pieces n^2, which bear against the springs. The latter surround tubes n^3, through which the rods *n'* pass, and which are provided near their lower ends with vertical slots n^4, through which the cross-pieces n^2 play. The upper ends of the springs bear against collars *o* on the tubes n^3, and the lower ends of the latter are secured to brackets *o'*, attached to the side bars, K, of the frame.

P represents a guide-sleeve, which surrounds the threaded portion *m* of the drill-bar, and is seated in a central opening in the cross-head M, the latter being provided with a flange, *p*, which bears upon the sleeve P, and the sleeve being provided with a flange, *p'*, upon which the cross-head bears. The sleeve P is provided with upright ribs or feathers p^2, which fit in grooves in the cross-head M and prevent the sleeve from turning in the same.

Q represents an open frame, which is secured to the upper end of the tube J', and secured to the under side of the cross-head M by bolts *q*.

R represents a divided screw-nut arranged within the open frame Q to engage with the feed-screw *m*, and pivoted to the guide-sleeve P by a vertical bolt, *r*, which is secured in a bearing, *r'*, depending from the under side of the flange *p'*. Both parts of the screw-nut R are pivoted to the flange *p'* by the same bolt *r*, so that the nut can be opened or closed, as represented in Figs. 8 and 9. The two parts of the nut are secured together, when the nut is closed, by a bolt, r^2, passing through arms r^3 formed on the parts of the nut.

r^4 is a stop-pin secured to the under side of the flange *p'*, between the two arms r^3, so as to arrest the latter in closing the nut when the two parts of the nut have reached the proper position. The contiguous sides of the arms r^3 are provided with notches or recesses to make room for said stop-pin.

When the drill-bar has been fed down to the end of the feed-screw, and it is desired to raise the drill-bar to its highest position, this is quickly accomplished upon opening the nut R. The sleeve P guides the feed-screw *m* in

its vertical movements, and forms a reliable support for the screw-nut R.

Upon rotating the driving-plates C the arms *e* thereof first depress the rear end of the lever D and raise its front end, which latter strikes against the lower end of the sleeve of the clutch-head G, raising the latter, as well as the tubes J J′ and the cross-head M, whereby the springs *n* are compressed. The roller e^2 of the drive-plates next depresses the lever D and finishes the compression of the spring. As soon as the roller e^2 releases the springs *n*, the reaction of the springs *n* forces the drill-bar down by means of the cross-head N and connecting parts, returning the lever D to its former position, in which it is ready to be again operated upon by the driving-plates. The vertical motion of the drill-bar produces the feed in a well-known manner.

As hereinbefore stated, the driving mechanism claimed herein differs from that shown in my former application, No. 119,112, and the feed mechanism is also different, while the springs are arranged in a similar manner on tubular supports, which is, however, not claimed in this application.

I claim as my invention—

1. The combination, with the drill-bar and clutch-head, of the actuating-lever D, provided with starting-rollers *e′* and a tooth, e^3, the space between said rollers and tooth being unobstructed, and driving-plates C, having starting-arms *e* and a releasing-roller, e^2, the space between said arms and roller being also unobstructed, whereby the lever D is turned in the same direction by the successive engagement of the arms *e* with the rollers *e′* and of the roller e^2 with the tooth e^3, and then released and permitted to return to its former position, substantially as set forth.

2. The combination, with the drill-bar and clutch-head and springs, of the actuating-lever D, provided with starting rollers *e′* and a tooth, e^3, and the rotating driving-plates C, having starting-arms *e* and a releasing-roller, e^2, the roller e^2 being arranged nearer the center of rotation of the driving-plates than the working-surfaces of the starting-arms *e*, whereby the leverage with which the springs are compressed is increased during the last portion of the compressing movement, substantially as set forth.

3. The combination, with the drill-bar *g*, provided with the feed-screw *m*, and the drill-frame, of the clutch-head G, secured to the tube J, a screw-nut, R, connected with the tube J′ and held against turning, and a ratchet-coupling, J^2, connecting the tubes J J′, which latter are moved with the clutch-head and drill-bar, substantially as set forth.

4. The combination, with the drill-bar *g*, provided with a longitudinal groove, *i*, of the clutch-head G and a feather, I, pivoted to the clutch-head G, whereby the feather can be disengaged from the groove, substantially as set forth.

5. The combination, with the drill-bar *g*, provided with a longitudinal groove, *i*, of the clutch-head G, feather I, pivoted to said clutch-head, and a lock-nut, *i′*, whereby the feather is secured in place, substantially as set forth.

6. The combination, with the drill-bar provided with a feed-screw, *m*, of the cross-head M, springs *n*, connected therewith, the guide-sleeve P, seated in said cross-head, and the divided nut R, pivoted to said sleeve, substantially as set forth.

7. The combination, with the drill-bar provided with a feed-screw, *m*, of the cross-head M, springs *n*, connected therewith, the guide-sleeve P, seated in said cross-head, the divided nut R, pivoted to the sleeve P, the tube J′, attached to said cross-head, the clutch-head G, attached to the tube J, and the ratchet-coupling J^2, connecting the tubes J J′, substantially as set forth.

8. The combination, with the drill-bar and the swinging frame A^2, provided with side bars, K K, connected at their lower ends by a cross-head, K^2, of the upright bar *l*, secured to the cross-head K^2, and the guide-sleeve L, adjustably secured to the bar *l* and adapted to guide the drill-bar, substantially as set forth.

Witness my hand this 20th day of November, 1884.

SYLVANUS HUSSEY.

Witnesses:

JNO. J. BONNER,

C. F. GEYER.