

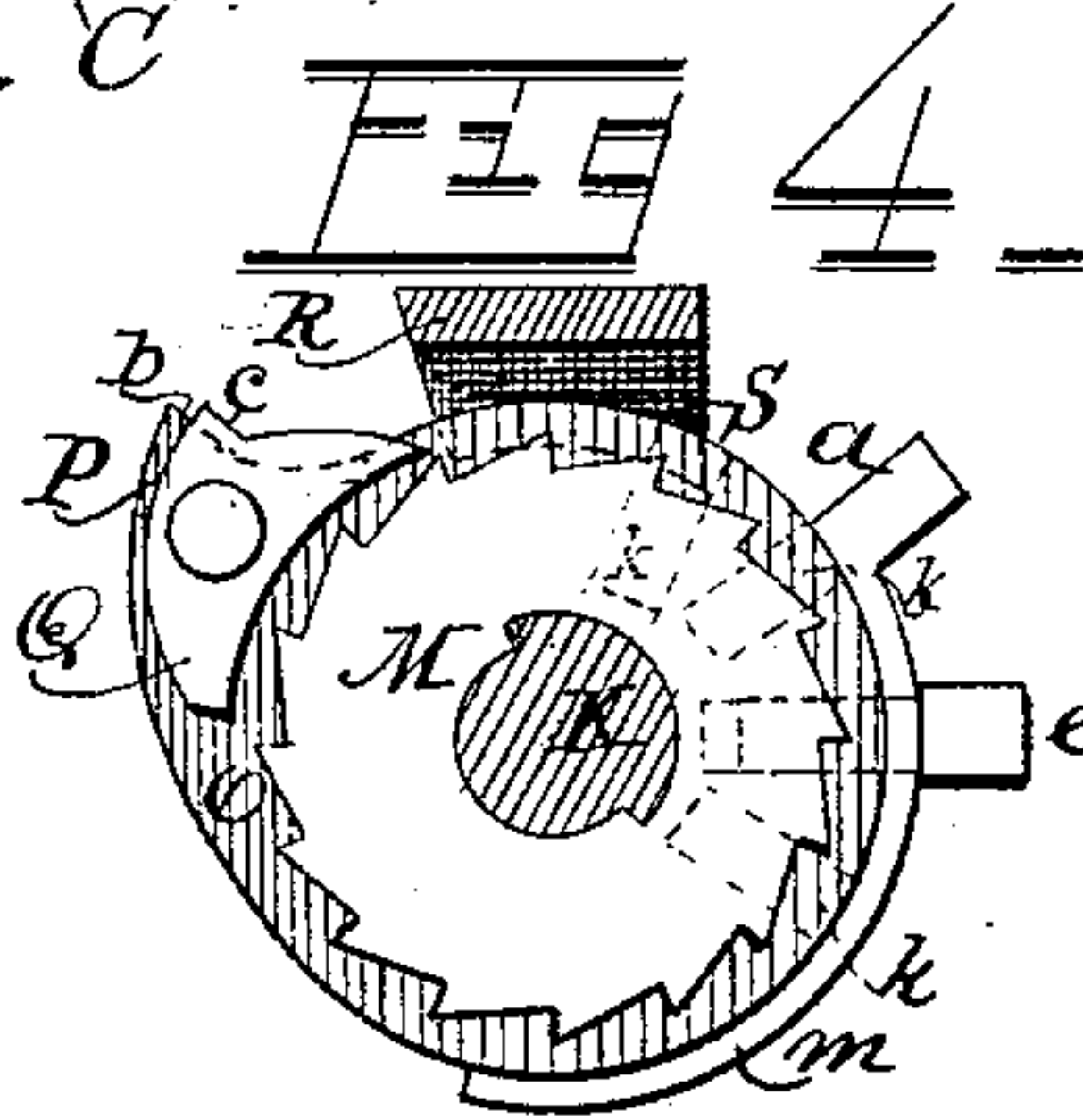
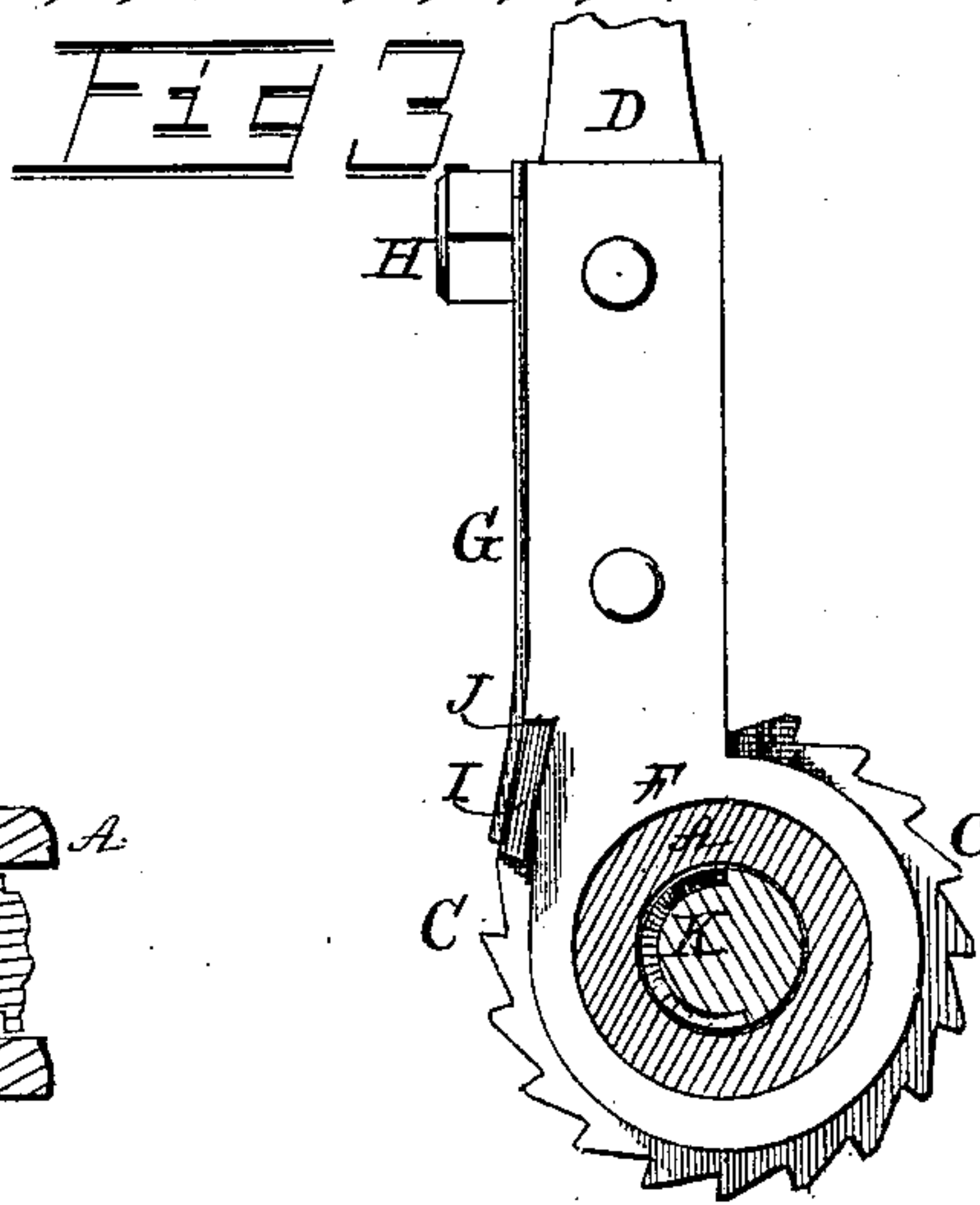
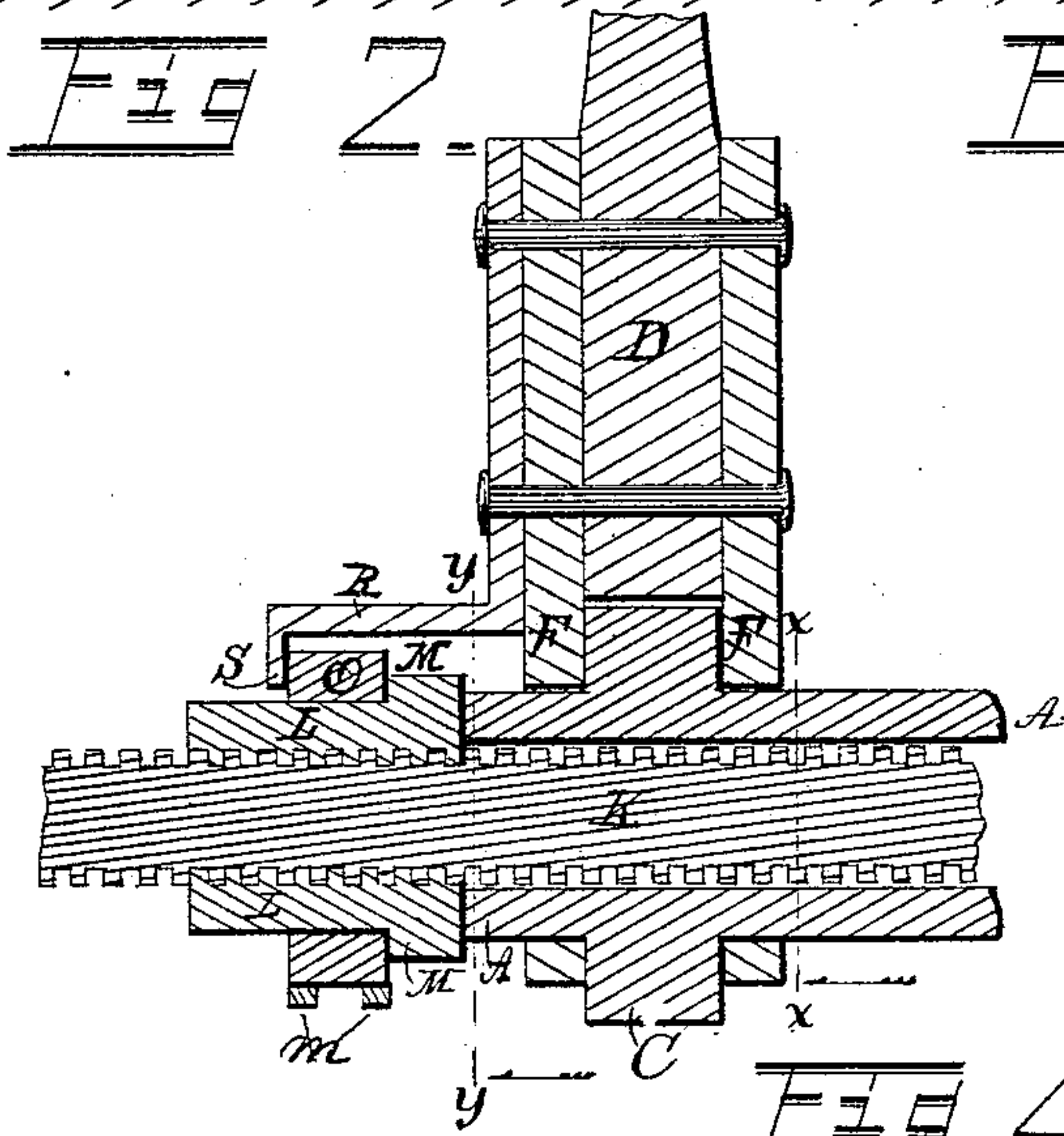
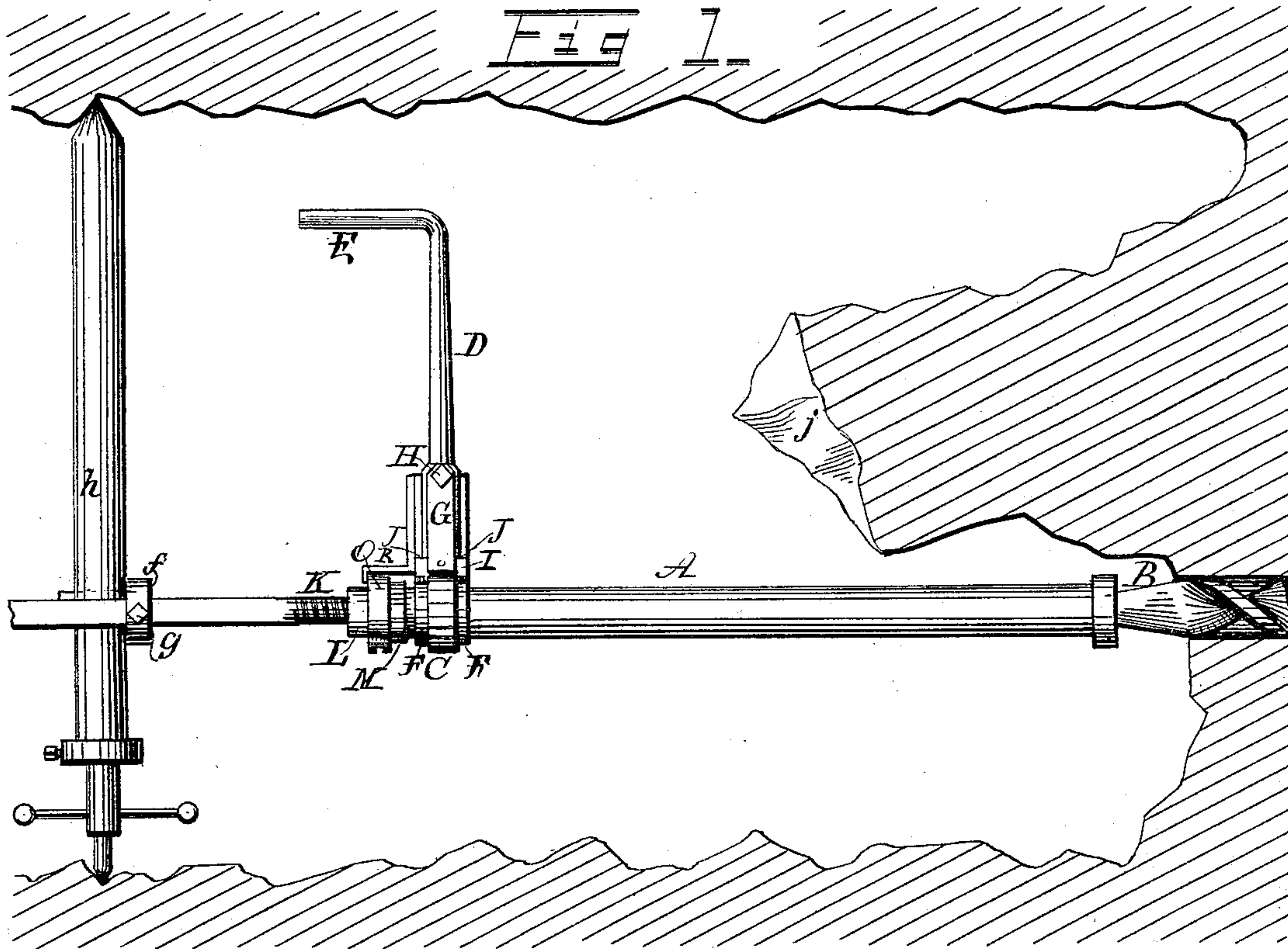
(No Model.)

G. W. NIXON.

RATCHET MINING DRILL.

No. 338,863.

Patented Mar. 30, 1886.



Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE W. NIXON, OF ROCKWOOD, ASSIGNOR OF ONE-HALF TO WILLIAM M. NIXON, OF CHATTANOOGA, TENNESSEE.

RATCHET MINING-DRILL.

SPECIFICATION forming part of Letters Patent No. 338,863, dated March 30, 1886.

Application filed February 15, 1886. Serial No. 191,932. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. NIXON, a citizen of the United States, residing at Rockwood, in the county of Roane and State of Tennessee, have invented certain new and useful Improvements in Mining Ratchet-Drills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to that class of machines which are used for drilling holes by hand-power in rocks, in coal, in ore, and other hard material for mining purposes.

The object of the invention is to produce a drilling-machine to be operated by a reciprocating movement of a hand-lever, so as to revolve the drill and to feed it forward at the will of the operator.

To this end my invention consists in the construction and combination of parts forming a mining ratchet-drill, hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of my ratchet-drill in service in a horizontal shaft of a mine. Fig. 2 is a vertical section of a portion of the same machine. Fig. 3 is a horizontal section on the line *x x*, Fig. 2; and Fig. 4 is a horizontal section on the line *y y*, Fig. 2.

A represents the body of the machine, consisting of a metallic pipe or tube provided with a socket at its lower end to receive and hold the shank of the bit B, or drill proper.

C is a ratchet-wheel rigidly fixed upon the body A.

D is a lever having a handle, E, bent to a line parallel with the body A for convenience in operating it, and provided with ears F, which are fitted with a revolving bearing or journaled upon the body A, at the sides of the ratchet-wheel C, whereby the lever is prevented from moving longitudinally upon the body A.

G is a spring secured upon the lever by a screw, H.

I is a block attached rigidly to the said spring and fitted at one edge to engage the teeth of the ratchet-wheel C, successively, and fitted at its other or opposite edge to bear

with sliding contact upon a shoulder, J, of the lever D. When in operation, the lever is revolved backward, the block I drags over the teeth of the wheel, but when the lever is revolved forward the block is forced by the spring G into engagement with a tooth, thereby revolving the body A and the drill B held therein, to do the work of drilling. The block I may be hardened steel, while its shank, the spring G, may be of any springy material, because it has nothing to do but to press the block toward the wheel. All the force applied to the wheel through the block is supported by the shoulder J.

K is the feed-screw fitted to slide freely within the body A.

L is a nut threaded upon the screw K, and having a ratchet-wheel, M, adjacent to the body A, and a cylindrical portion, N, smaller than the said wheel M.

O is a collar fitted to revolve upon the cylindrical portion N, against the wheel M, and provided with a radial projection, P, upon the side of which a pawl, Q, is pivoted to engage the teeth of the ratchet-wheel M.

R is an arm of the lever D, extending longitudinally over the collar O, and having an inward radial projection, S, to bear loosely against the outer face of the collar, whereby the collar is retained in its place upon the nut, holding the said nut to its revolving bearing against the end of the body A, and retaining the screw K in the body. If the screw K be turned backward out of the nut, the latter will be freed from the body, and the collar O may be removed from the nut. The collar O is provided with two radial shoulders, *a* and *b*, the latter being one face of the projection P in the path of the arm R. The pawl Q is also provided with a shoulder or radial arm, *c*, in the path of the arm R, and adapted to be struck by the arm R in the forward movement of the lever D, just before the arm R strikes the shoulder *b*. By this means the pawl is first forced into engagement with the ratchet-wheel M. Then the collar is revolved forward by continuing the movement of the lever, carrying with it the nut L, which revolves on the screw and pushes against the end of the body A, to advance or feed the drill into the work. At the backward stroke of the lever, the arm

R strikes the shoulder *a*, carrying backward the collar O and pawl Q, to engage one or more teeth of the feed-wheel. Then the forward movement of the lever advances the feed-wheel, as before stated.

The rate of feed may be controlled in two ways: First, if the space in which the lever swings in the mine is narrow, so as to limit its arc of motion, the operator may make a number of short strokes to and fro, thus in drilling hard material revolving the drill as long as he pleases before he moves the lever far enough forward to operate the feed-works, and, secondly, when there is plenty of room for a long stroke of the lever, he may move the shoulder *a*, which has a slotted segment, *m*, to be secured at any point circumferentially on the collar O by the set-screw *e*, to leave space between the shoulders *a* and *b* for more or less motion of the lever to be given without operating the feed-works. Thus it is evident that the regular reciprocations of the hand-lever may operate the feed-screw nut at every stroke, or, at the will of the operator, the feeding may be effected at any time when required. The feeding is done by the same movement that operates the drill, without any effort on the part of the operator. If the set-screw *e* were provided with a series of holes, *k*, in the collar O, it would be an equivalent to the circumferentially-adjustable shoulder *a*, the arm R being allowed, in its backward movement, to strike directly against the screw so adjusted. The feed-screw K may rest its rear end directly against a rock in the mine, or against a timber fixed therein, or it may be sustained by a dog, *f*, adjustably fixed on it by a set-screw, *g*, the dog being adapted to hook over a cross-bar, *h*, as in my Patent No. 325,564, or upon some other brace set in the mine.

By locating the hand lever at the rear end of the body A, I enable the operator to work it conveniently, even though the drill is inserted into a narrow place, and there are projecting rocks, like *j*, which frequently occur, and would be in the way of the lever if it were located near the drill-shank.

By the construction herein described I secure great strength and durability of parts, simplicity and ease of operation, and economy in the cost of the machine.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, in a ratchet drill, of a tubular body having a socket in one end, a ratchet-wheel fixed upon the body near its other end, a lever having ears journaled upon the said body, one ear at each side of the ratchet-wheel, a spring secured at one end upon the lever, a block secured upon the other end of the spring in position to engage one edge with the teeth of the said ratchet-wheel, and a shoulder of the said lever in position for the other edge of the said block to rest on when engaging the wheel, substantially as shown and described.

2. The combination of a tubular body having a drill-socket at one end, a feed-screw fitted to slide freely in the other end, a nut threaded upon the feed-screw to bear against the rear end of the said body and provided with a ratchet-wheel adjacent to the body and having a reduced cylindrical portion along the opposite end of the nut, a collar fitted loosely upon the said cylindrical portion and having two radial shoulders on its edge, a pawl pivoted to one side of the collar to engage the said ratchet-wheel, and a ratchet-lever fitted to revolve on the aforesaid tubular body, having an arm extending longitudinally over the said collar between the shoulders thereof, substantially as shown and described.

3. The combination of the body A, the wheel C, fixed thereon, the feed-screw K, fitted to slide freely in the body, the nut L, threaded upon the feed-screw and provided with a ratchet-wheel, M, the collar O, fitted to revolve upon the nut L, and provided with shoulders *a* and *b*, the pawl Q, pivoted upon the collar to engage the said ratchet-wheel M, the lever D, having ears F, bearing upon the body A at the sides of the wheel C, and the arm R, extending over the wheel M, and the collar O, between the shoulders *a* and *b*, the said arm being provided with a radial inward projection, S, to bear against the side of the collar O, opposite to the body A, substantially as shown and described, whereby the said feed-screw, nut, and collar are retained with the body A, as set forth.

4. The combination of the tubular body A, the lever D, fitted to revolve thereon, and provided with the arm R, the screw K, fitted to slide in the body, the nut L, threaded upon the screw to bear against the end of the body and having a ratchet-wheel, M, and cylindrical portion N, the collar O, fitted upon the portion N, against the wheel M, and provided with the shoulders *a* and *b*, the pawl Q, provided with the radial arm *c*, the aforesaid arm R being fitted to first strike the arm *c* and then the shoulder *b*, substantially as shown and described.

5. The combination, with the lever of a ratchet-drill provided with the arm R, of the feed-screw K, the nut L, threaded thereon and provided with a ratchet-wheel, M, and the cylindrical portion N, the collar O, fitted upon the said cylindrical portion and provided with the radial shoulders *a* and *b*, in the path of the aforesaid arm R, and means, substantially as described, for adjusting the shoulder *a* circumferentially upon the collar O, as and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

GEO. W. NIXON.

Witnesses:

F. M. UNDERWOOD,
G. R. HAMBY.