A. J. MERSHON.
Rock-Drilling Machine.

No. 207,885. Patented Sept. 10, 1878.

Fig. 2.

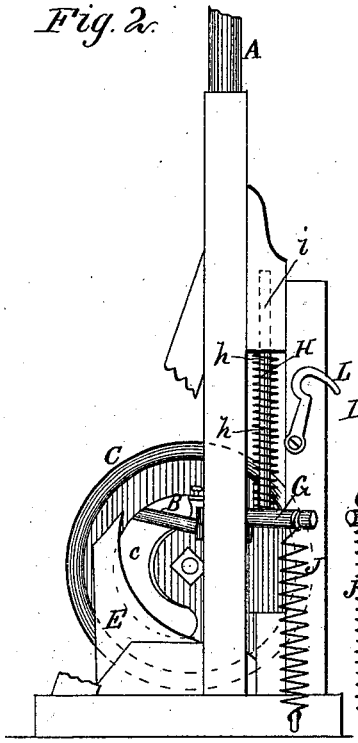


Fig. 1.

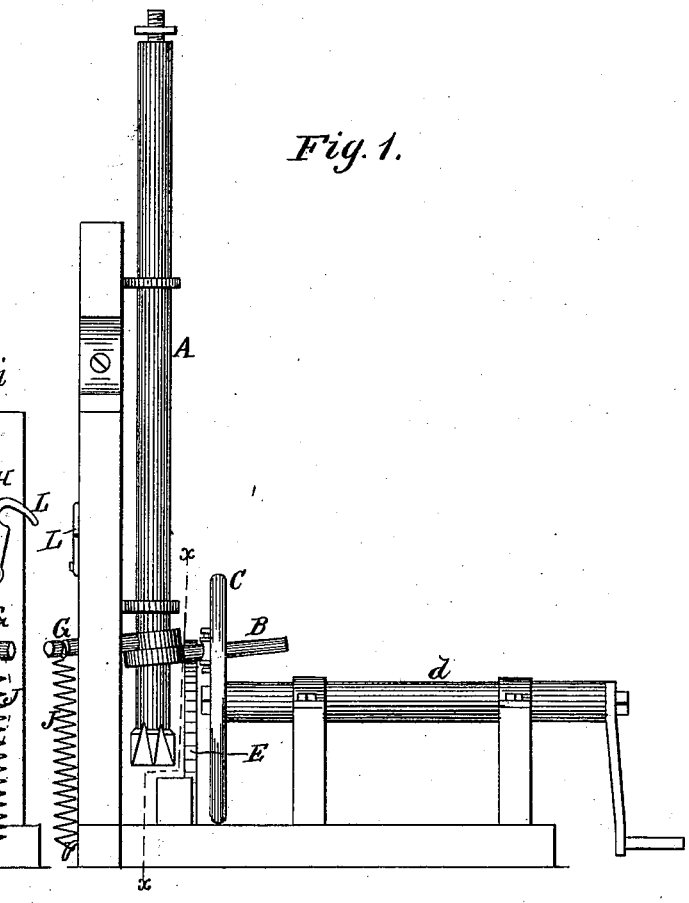
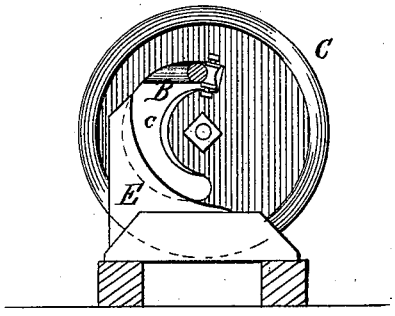


Fig. 3.



WITNESSES:
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UNITED STATES PATENT OFFICE.

AARON J. MERSHON, OF WARSAW, INDIANA.

IMPROVEMENT IN ROCK-DRILLING MACHINES.

Specification forming part of Letters Patent No. **207,885**, dated September 10, 1878; application filed July 22, 1878.

To all whom it may concern:

Be it known that I, AARON J. MERSHON, of Warsaw, in the county of Kosciusko and State of Indiana, have invented a new and useful Improvement in Rock-Drilling Machines, of which the following is a specification:

This invention relates to certain improvements on the rock-drilling machine for which Letters Patent No. 190,232 were granted to me under date of May 1, 1877. In the machine described in said patent the drill-shaft is operated by means of a revolving disk-wheel provided with a curved slot, in which works one end of an arm, the other end of which is provided with an eye, through which the drill-shaft works loosely. As the disk-wheel revolves the arm binds on the drill-shaft and raises it, and as the revolution of the shaft carries the arm beyond the center said arm drops and allows the drill-shaft to fall of its own weight.

The invention will first be described in connection with the drawing, and then pointed out in the claim.

In the accompanying drawing, Figure 1 is a side view of a drilling-machine embodying my improvements. Fig. 2 is an end view of the same. Fig 3 is a transverse vertical section taken in the line *x x* of Fig. 1.

Similar letters of reference indicate corresponding parts.

The drill-shaft A, lifting-arm B, disk-wheel C, and horizontal shaft *d* are of the same general description as the corresponding parts shown in my patent of May 1, 1877, aforesaid, and arranged in a similar manner in a frame-work of the same general character.

To the sills of the frame which supports the working parts, at a point between the disk-wheel C and the drill-shaft A, is an upright plate, E, one edge of which is curved in the form of an arc of a circle very nearly corresponding with that described by the slot *c* in the disk-wheel. This curved edge serves as a guide for the arm B, to prevent it from being disengaged from the slot *c* when from any cause the arm may be made so short as to render it liable to fly out of said slot.

G represents an arm similar to the arm B, being provided at one end with an eye, through which the drill-shaft A works freely. About midway of its length, on the upper side, rests the lower end of a spiral spring, H, the upper end of which bears against an abutment, *i*, attached to the standard of the frame-work. This spring H acts by expansion, with a tendency to push downward on the arm G and drive the drill-shaft with a force greater than that of its own weight. The spring H is provided with a rod, *h*, for guiding it and preventing lateral vibration, which rod works in a socket in the abutment *i* when the spring is compressed by the lifting of the drill-shaft, as hereinafter described.

To the outer end of the arm G is attached one end of a spring, J, the other end of which is attached to the lower portion of the frame-work. This spring acts by compression, with a tendency to pull downward on the arm G and co-operate with the spring H to increase the descending force of the drill-shaft A.

To one of the upright end pieces of the frame-work is attached a hook, L, arranged to hook under the arm G when desired and to swing out of the way when not in use.

The apparatus constructed as above described operates as follows: When the disk-wheel C revolves the lifting-arm B binds on the drill-shaft A and lifts it, in the same manner as in the machine described in my patent of May 1, 1877, aforesaid. In addition thereto the eye portion of the arm B bears under the eye portion of the arm G, causing it to rise with the drill-shaft A and to compress the spring H and expand the spring J. When the revolution of the disk-wheel brings the arm B to the highest point and begins to carry it beyond the center, said arm B leaves the arm G inclined sufficiently from a horizontal line, with its eye portion higher than its outer end, to cause it to bind on the drill-shaft, with a tendency to pull it downward by the combined action of the springs H and J. As soon as the arm B passes the center and drops in the slot of the disk-wheel, the drill-shaft descends suddenly and with great force, being aided therein by the combined action of the springs H and J.

When it is desired to withdraw the drilling-tool from the well or bore the arm G is raised to its highest position, and the hook L is hooked under its outer end, so as to hold it

slightly inclined, with its eye portion lower than its outer end. In this position it is ready to bind on the drill-shaft, with a tendency to pull upward on it. The disk-wheel being now rotated the drill-shaft is lifted as before; but, instead of dropping when the arm B passes beyond the center, the shaft A is arrested by the binding of the arm G upon it, and is held until again raised by the arm B on another revolution of the wheel C. Thus at each revolution of said wheel the shaft A is raised a certain distance out of the well or bore.

If desired, the shaft *d* may be provided with gearing for transmitting motion to it, instead of having the power applied directly to it.

In large machines for heavy drilling, instead of employing the arm G to arrest the descent of the drill-shaft when it is being withdrawn from the well or bore, as above described, another device may be employed, consisting of a frame provided with two steel plates hinged thereto, so as to swing toward and away from each other. The contiguous edges of the plates are provided with semicircular recesses, which, when brought together, form a circle slightly smaller than the diameter of the drill-shaft A. When the machine is drilling the plates are swung outward away from each other, and the shaft A works in the frame to which they are attached without touching them. When the shaft is to be withdrawn the plates are swung toward each other, so as to bear against the shaft and bind on its surface with sufficient force to prevent it from descending, while at the same time it is free to ascend when raised by the action of the disk-wheel C and lifting-arm B.

In cases where the shaft *d* receives its motion through gearing, instead of directly, as above referred to, said gearing may also be arranged to drive an emery-wheel for the purpose of sharpening the drilling-tools.

I am aware that it is not new to use a spring that encircles the stem which carries one of the gripers for giving greater force to the drill; but

What I claim as my invention is—

The combination, with the disk-wheel C and lifting-arm B, of the guide-plate E, substantially as shown and described, for the purpose specified.

AARON J. MERSHON.

Witnesses:
MARSH H. PARKS,
FRANK HUTT.