

T. J. MURPHY.
ROCK DRILL.

No. 534,371.

Patented Feb. 19, 1895.

Fig. 1.

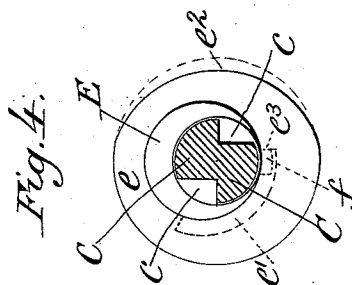
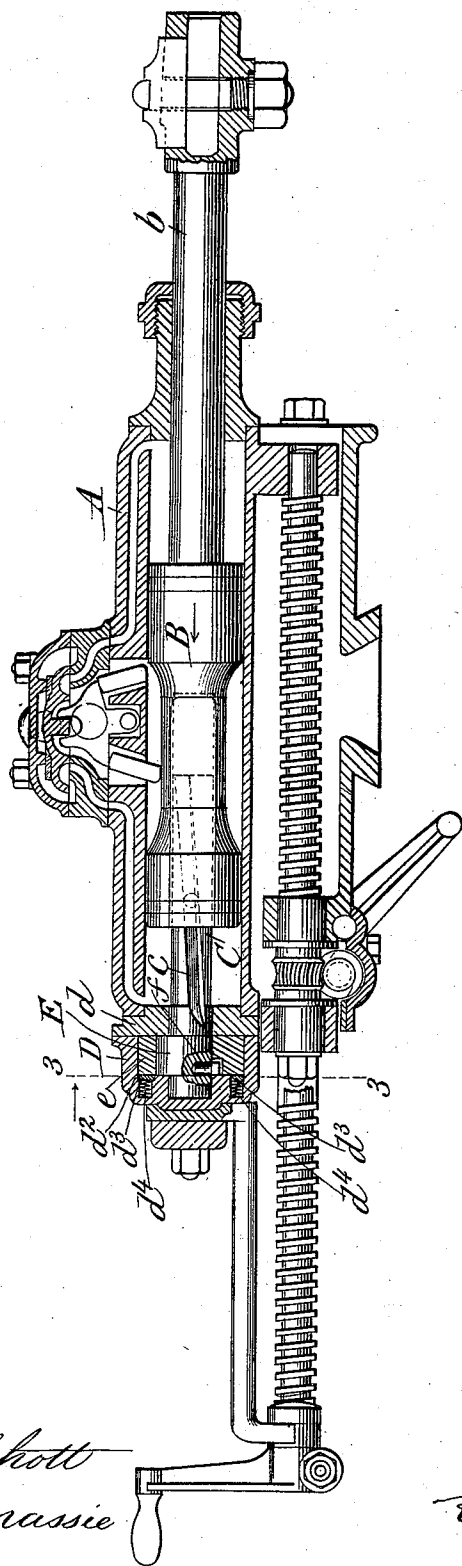


Fig. 2.

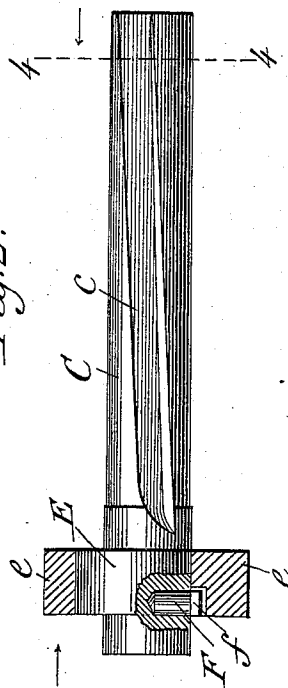
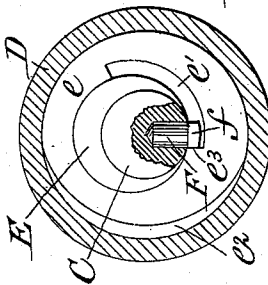


Fig. 3.



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Thomas J. Murphy
by "Max Bengt" his attorney.

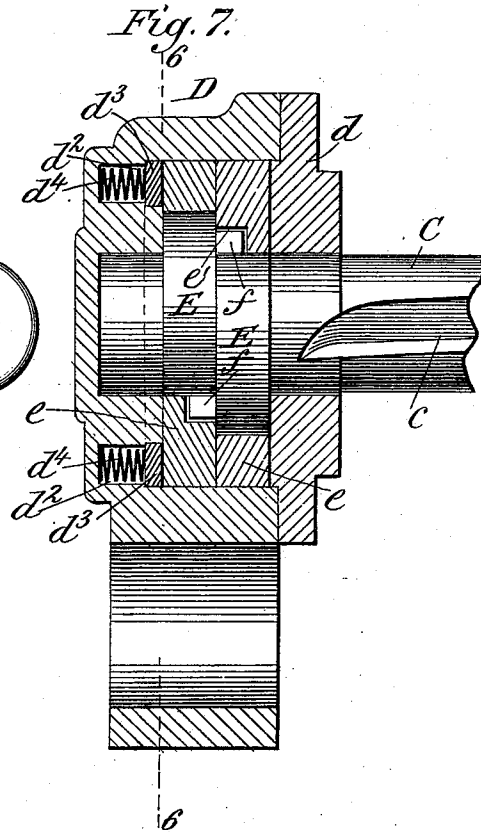
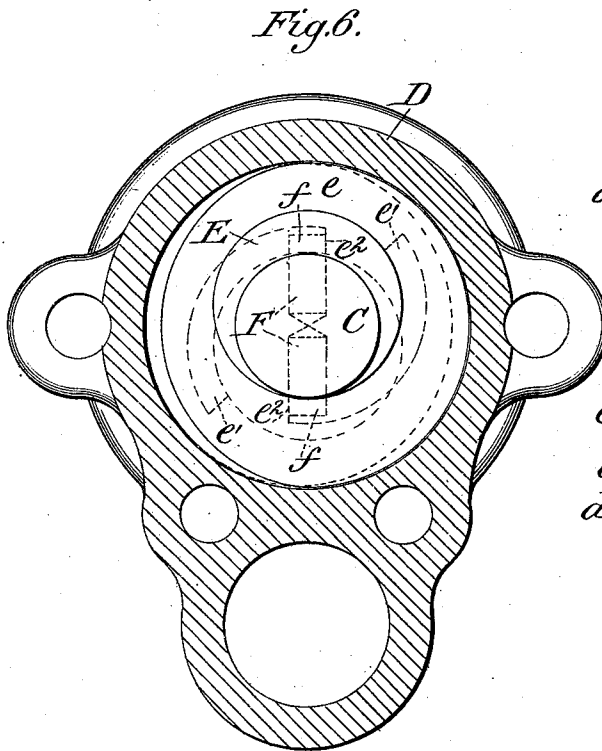
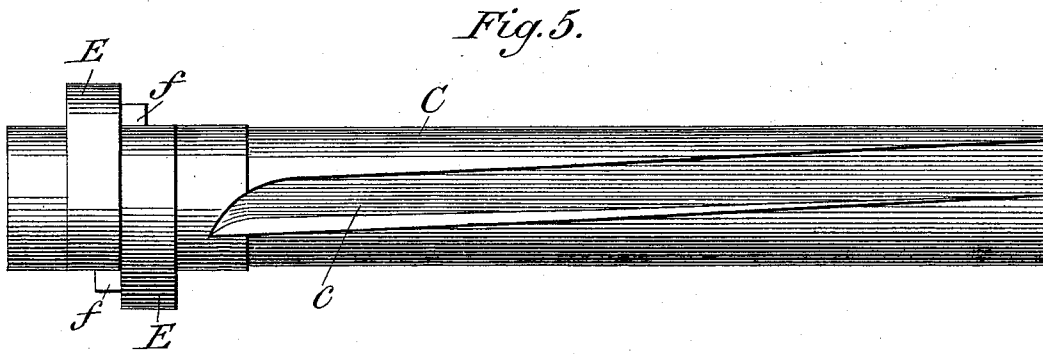
(No Model.)

2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE

THOMAS J. MURPHY, OF NEW YORK, N. Y.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 534,371, dated February 19, 1895.

Application filed December 29, 1894. Serial No. 533,278. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. MURPHY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Rock-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.

My invention relates to improvements in rock drills, and particularly to an improvement in means for producing an intermittent rotation of a drill stock or other device.

The object of my invention, broadly considered, is to produce a simple and more durable construction for locking the rifle-bar or similar part during one stroke of the piston, drill stock or like device, and for releasing the said rifle bar or similar part during the opposite stroke of the said piston, drill stock or like device, whereby the latter is allowed to move longitudinally without rotating.

My invention consists, broadly, in the combination, with a rifled or spirally-threaded bar and correspondingly threaded or rifled reciprocatory piston or plunger, of an eccentric or cam device and strap located in a chamber and arranged to be rotated by the action of the piston and rifle bar at one stroke of the piston, and to hold said rifle bar against rotation during the opposite stroke of the piston.

The invention consists, also, in employing a pair of eccentrics or cam devices for the same purposes as above set out, whereby the strain is equalized, as will be more fully explained hereinafter.

The invention consists, further, in the features, details of construction and combination of parts which will first be described in connection with the accompanying drawings and then particularly pointed out in the claims.

In the drawings—Figure 1 is a longitudinal section of a rock drill provided with a locking device embodying my invention. Fig. 2 is a detail elevation, partly in section, of the rifle bar, eccentric, and strap. Fig. 3 is an end view, partly in section, of the same, looking in the direction of arrow 3, Fig. 2. Fig. 4 is a section on the line 4—4, looking in the di-

rection of the arrow. Figs. 5, 6 and 7 are detail views of a modified form of my invention.

Referring to the drawings, A is a pressure cylinder provided with induction and education ports and valve of any suitable construction or arrangement, within which cylinder is located a piston, B, connected to and arranged to reciprocate a drill stock, *b*, which projects through the cylinder in the usual manner. The piston is threaded internally or otherwise adapted for engagement with the spirals, *c*, on a rifle bar, C, which is revolutely held in a bearing, *d*, which forms part of a head, D, which closes one end of the cylinder.

Within the hollow head is located the eccentric locking device, which may be constructed in various ways. For instance, in Figs. 1 to 4, I have shown an eccentric device constructed as follows: To the end of the rifle bar, C, which projects into the interior of the head, D, is fixed an eccentric or cam, E, surrounded by an eccentric strap, *e*, which is of the same diameter as the interior of the head, D, and is preferably provided with a segmental recess, *e'*, to receive the head, *f*, of a pin, F, fixed in or integral with the cam, E, and rifle bar, C.

The cam, E, may be made integral with the rifle bar, C, or may be secured to it in any suitable way.

The eccentric strap or ring, *e*, is preferably cut away at one side, *e²*, but may be completely circular in outline, if desired.

The head, D, is preferably provided with an annular recess, *d²*, within which is placed an annular packing ring, *d³*, arranged to bear against the end face of the eccentric strap or ring, *e*, and held in close contact therewith by springs, *d⁴*.

The end of the rifle bar is preferably extended beyond the cam or eccentric, E, and is journaled in the head, D, as will be plain from the drawings.

The operation of the mechanism thus far described is as follows: The piston, B, is reciprocated in the usual manner by the admission of steam to each end of the cylinder alternately. When the piston moves downward, so as to force the drill against the stone to be drilled, the rifle bar is rotated in the usual manner, through the medium of the

spiral threads or rifle grooves or other device in the piston and bar. This rotation of the rifle bar causes the rotation of the eccentric or cam E, whereby pin, F, which contacts with the shoulder, e^3 , at one end of the segmental recess, e' , forces the ring or strap, e , to move around orbitally in the same direction with the rifle bar. When the piston moves upward, so as to raise the drill from the stone, the first tendency of such upward movement is to rotate the rifle bar in a direction opposite to that produced by the downward movement of the piston, as before described. This tendency of the rifle bar to rotate tends to rotate the cam or eccentric, E, and, since the head, f , of the pin, F, is free to move in the segmental recess, e' , without carrying the strap or ring, e , around with it, the eccentric tends to crowd the ring, e , against the inner face of the head whereby its own rotation is prevented and also that of the rifle bar. This action results, then, in causing the piston to rotate on the rifle bar, whereby the drill stock and drill are also rotated. The downward movement of the piston releases the locking device, as before described, and allows the rifle bar to rotate, whereby the piston is permitted to move longitudinally downward without rotating.

In Figs. 5, 6 and 7, I have illustrated a modified form of my invention, wherein two eccentrics with their straps and pins are employed as a locking device, these eccentrics and straps being oppositely arranged so that when one locks against one side of the interior of the head, D, the other eccentric will lock against the other side, thus relieving the strain on the bearings of the rifle bar, since one eccentric will be pushing outward in a direction opposite to the other, and, the reactions being opposite, will tend to neutralize each other, and thus not exert any strain on the end of the rifle bar, except the shearing action due to the fact that the two eccentrics do not lie in the same plane, this shearing action being small compared with the strength of the rifle bar, and hence doing no injury.

As before stated, the eccentric straps, e , may be either entirely circular in outline, or may have a portion removed, as at e^2 , the object of which is to enable that part alone of the ring opposite the eccentric center to grip or bind against the interior of the head, whereas, if the said ring or strap were not so cut away, the ring or strap would be first brought in contact with the interior surface of the head along that side and the friction would not probably be enough to immediately hold the eccentric from further rotation, whereas, when cut away, as described, the ring or strap will bind against the interior of the head at the place where the ring is widest and thus insure sufficient friction to immediately lock the cam and rifle bar.

By my construction, I avoid the use of ratchets and pawls, as usually employed, and the danger of breakage, which regularly accom-

panies their use. Furthermore, since the pawls must withstand a great strain, it becomes necessary to cut them out of the best tool steel, which renders their manufacture costly and their breakage a great loss. This is avoided by my construction, wherein the parts may be made large enough to withstand the greatest shocks to which they are subjected, without unusual specific strength. Moreover, when pawls and a ratchet wheel or similar devices are employed, a certain amount of clearance space is necessary to allow the pawls to play freely. This space is filled by the compressed air or steam at every downward stroke and, as this air or steam is exhausted during the opposite stroke of the piston, the said air or steam is wasted. Therefore, the larger the clearance space, the greater the waste of power, and it is one of the principal advantages of my construction that the amount of clearance space is very small and hence the waste of power is practically a minimum.

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

1. The combination, with a rifle bar, a reciprocating piston engaging the rifling of the rifle bar, an eccentric device secured to the bar, a hollow head within which the eccentric device is located, and means interposed between the eccentric device and wall of the head, whereby the eccentric device is prevented from rotating during one stroke of the piston and is permitted to turn during the other stroke of the piston, substantially as set forth.

2. The combination, with a rotatable eccentric device, and a hollow head within which the eccentric device is located, of mechanism interposed between the eccentric device and the wall of the head, and means for locking the eccentric device to said mechanism during the rotation of the eccentric device in one direction, substantially as set forth.

3. The combination, with a rotatable eccentric device, a hollow head within which the eccentric device is located, and a strap surrounding the eccentric device and arranged to be forced against the wall of the head by the rotation of the eccentric device within the strap, of mechanism for compelling the strap to move orbitally with the eccentric device, substantially as set forth.

4. The combination, with a rotatable eccentric device, and a hollow head within which the eccentric device is located, of a strap interposed between the eccentric device and wall of the head and provided with a recess, and a pin secured to the eccentric device, and projecting into the recess in the strap, substantially as set forth.

5. The combination, with a rifle bar, a piston reciprocating on and arranged to engage the rifling in the same, and an eccentric fixed on the rifle bar, of a hollow head within which the eccentric is located, a strap provided with

a segmental recess and interposed between the eccentric and the wall of the head, and a pin secured to the eccentric and projecting into the segmental recess, substantially as set forth.

6. The combination, with a plurality of eccentric devices, of a strap for each eccentric, a hollow head within which the straps and eccentrics are contained, and a pin carried by each eccentric and arranged to engage their respective straps, substantially as set forth.

7. The combination, with a pair of oppositely arranged eccentrics, a hollow head within which the eccentrics are located, and a bar attached to both eccentrics, of a strap interposed between each eccentric and the

wall of the head, and means for locking the eccentrics and straps during the rotation of the eccentrics in one direction, substantially as set forth.

8. The combination, with a rotatable eccentric, of a strap surrounding the eccentric, a hollow head within which the eccentric and strap are located, and a spring-pressed packing ring bearing against one face of the strap, substantially as set forth.

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

THOMAS J. MURPHY.

Witnesses:

LUCIEN SANIAL,
JOSEPH COHN.