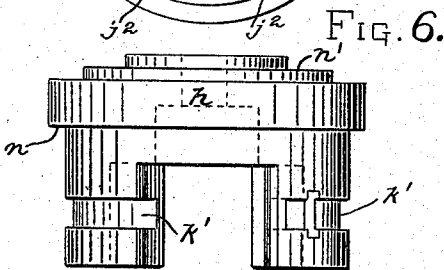
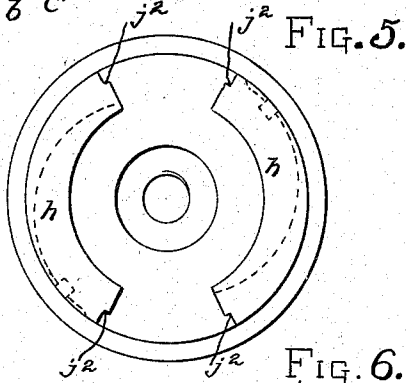
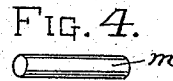
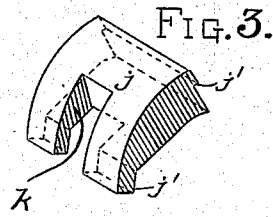
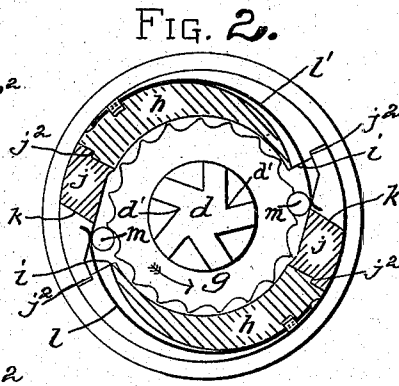
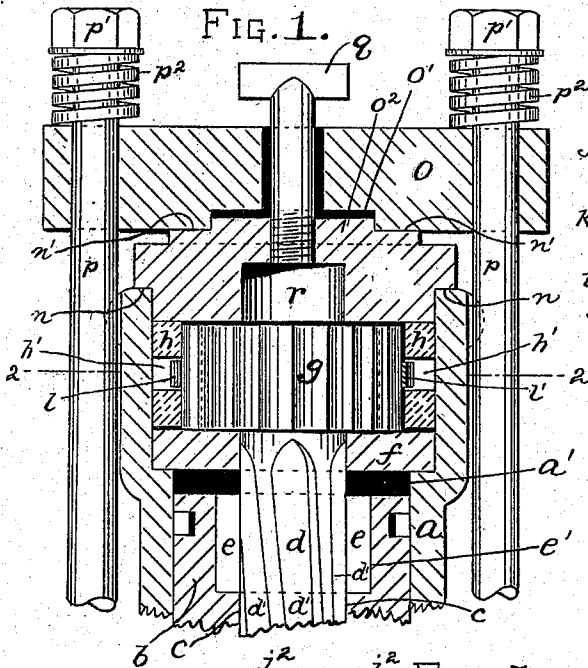


(No Model.)

T. OFFICER.
ROCK DRILL.

No. 580,461.

Patented Apr. 13, 1897.



WITNESSES:

Coastal Farmer
Robert C. Totten

INVENTOR.
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UNITED STATES PATENT OFFICE.

THOMAS OFFICER, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR TO
THE SULLIVAN MACHINERY COMPANY, OF SAME PLACE AND CHI-
CAGO, ILLINOIS.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 580,461, dated April 13, 1897.

Application filed August 12, 1896. Serial No. 602,498. (No model.)

To all whom it may concern:

Be it known that I, THOMAS OFFICER, a resident of Claremont, in the county of Sullivan and State of New Hampshire, have invented a new and useful Improvement in Rock-Drills; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to rock-drills.

The special form of rock-drill to which my invention is applicable is that in which a cylinder is employed with a piston operating therein and a spiral rifle-bar working in a nut in the piston, together with mechanism at one end of said rifle-bar for permitting of the rotation of the rifle-bar upon the descent of the piston, but holding said rifle-bar from rotation upon the upward stroke of the piston, whereby the piston itself is turned on the upward stroke.

The present invention relates to a new and improved form of mechanism for holding the rifle-bar during the upward stroke of the piston and for releasing said mechanism in case the drill-bit should be prevented from turning.

My invention comprises certain new features in this form of mechanism, all of which will be fully hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a vertical section of the upper portion of a rock-drill to which my invention is applicable. Fig. 2 is a section on the line 2 2, Fig. 1. Fig. 3 is a perspective view of one of the inclined blocks. Fig. 4 is a view of one of the rollers. Fig. 5 is a bottom view of the friction-head, and Fig. 6 is a side view of same.

Like letters indicate like parts in each of the figures.

As the form of rock-drill to which my invention is applicable is so well-known, I have not deemed it necessary to illustrate the valve mechanism and the lower part of the apparatus, as there are different forms of valve mechanism which may be used, and such valve mechanism forms no part of my invention.

The letter *a* represents the upper portion

of a suitable cylinder having the piston-chamber *a'* therein, together with valve-controlled ports (not shown) for admitting steam to the ends of said piston-chamber. Within the piston-chamber *a'* is the piston *b*, whose piston-rod extends down therefrom, and which has attached thereto a suitable drill-bit. The piston *b* has the cavity *c* formed therein, adapted to receive the rifle-bar *d*. This rifle-bar has the spiral grooves *d'* formed therein, said grooves engaging with the rifle-bar nut *e*, secured within a recess *e'* at the upper end of said piston. The upper end of the rifle-bar *d* passes through an opening in the division-collar *f*, and on the upper end of said rifle-bar is the ratchet-head *g*.

Resting upon the division-collar *f* is the friction-head *h*, said head having the recess *h'*, adapted to receive the ratchet-head *g*. The friction-head *h* has the seats *i* at the lower end thereof, within which the inclined blocks *j* are adapted to fit, said inclined blocks having shoulders *j'*, adapted to engage with corresponding shoulders *j''* in the head *h*, whereby said blocks are held from working in should they become worn. These blocks *j* have the grooves *k* formed therein, so that when said blocks are in position said grooves coincide with the eccentric groove *k'*, formed around the lower portion of the head *h*. Secured within the eccentric groove *k'* are the springs *l l'*, the ends of said springs *l l'* entering the grooves *k* in the inclined blocks *j*. These springs *l l'* normally press the rollers *m* into contact with the teeth of the ratchet-head *g*, whereby said ratchet-head is permitted to turn in one direction, but is prevented from turning in the opposite direction by said rollers *m*, as will more fully hereinafter appear. The outer faces of the inclined blocks *j'* are in contact with the inner walls at the upper end of the cylinder *a*.

The head *h* has the annular shoulder *n*, which rests upon the upper end of the cylinder *a*. The said head *h* has also a shoulder *n'* at the upper end thereof, and resting upon said shoulder is the yoke *o*. Passing through the yoke *o* are the side rods *p*, with the nuts *p'* at the upper end thereof, and springs *p''* interposed between said nuts and said yoke *o*. The lower ends of the side rods *p* extend

down through the lower head of the cylinder.
(Not shown.)

The yoke *o* is countersunk at *o'* to receive the projection *o''* of the head *h* in order to keep
5 the yoke central.

By the employment of the rods *p* and the springs *p'* the yoke *o* is forced down onto the head *h* and holds the steam-pressure in the cylinder. The head being ground onto the
10 end of the cylinder at *n* makes a steam-tight joint and does away with packing.

The oil-plug *q* passes down through the yoke *o* and is secured onto the head *h*, whereby oil may be admitted to the oil-chamber *r*,
15 formed within the head *h*.

When my improved rock-drill is in operation, as the piston *b* descends the rifle-bar *d* will turn in the direction indicated by the arrow in Fig. 2. On the upward stroke, however, of the piston *b* the rifle-bar is prevented
20 from turning by means of the rollers *m*, which are forced into contact with the inclined faces of the inclined blocks *j*. The rifle-bar being held against rotation in this way, upon the
25 descent of the piston the piston and the rifle-bar nut *e* will be compelled to turn. In case, however, the drill-bit should be held from turning in the rock for any reason, and it is impossible for it to turn, then sufficient pressure
30 will be exerted to move the head *h*, whereby the strain on the drill is removed and the piston ascends without injury to the drill parts.

By the employment of the herein-described
35 mechanism I obtain greater frictional contact, as the head is held between the yoke and the upper end of the cylinder, while at the same time the rollers, on being forced to the inclined blocks, force said blocks outwardly against the
40 inside of the cylinder, making additional friction to that on end of cylinder and on yoke to hold the ratchet from turning when the piston is being turned, and the head, together with the inclined blocks, will only slide when the
45 piston turns harder than it should or is caught so that it cannot turn.

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

1. In a rock-drill, the combination with a
50 suitable cylinder having a reciprocating piston

therein, of a spiral rifle-bar engaging said piston, a ratchet-head on said rifle-bar, a friction-head interposed between said cylinder and a yoke above, inclined blocks fitting in
55 said head and engaging the inner walls of said cylinder, rollers engaging said blocks and the teeth of said ratchet-head, and springs acting on said rollers, substantially as set forth.

2. In a rock-drill, the combination with a suitable cylinder having a reciprocating piston therein, of a spiral rifle-bar engaging said
60 piston, a ratchet-head on said rifle-bar, a friction-head interposed between said cylinder and a yoke above, said friction-head having an eccentric groove formed therein, inclined
65 blocks fitting in seats in said friction-head and having grooves coinciding with said eccentric groove, rollers engaging said blocks and the teeth of said ratchet-head, and springs
70 in said grooves engaging said rollers, substantially as set forth.

3. In a rock-drill, the combination with a suitable cylinder having a reciprocating piston therein, of a spiral rifle-bar engaging said
75 piston, a ratchet-head on said rifle-bar, a friction-head having a recess therein adapted to receive said ratchet-head, said friction-head being interposed between the upper end of the cylinder and a yoke above; and pawl mechanism on said friction-head adapted to engage
80 the teeth of said ratchet-head, substantially as set forth.

4. In a rock-drill, the combination with a suitable cylinder having a reciprocating piston therein, of a spiral rifle-bar engaging said
85 piston, a ratchet-head on said rifle-bar, a friction-head having a recess therein to receive said ratchet-head, said friction-head being interposed between the upper end of said cylinder and a yoke above, pawl mechanism on
90 said friction-head adapted to engage the teeth of said ratchet-head, said friction-head having an oil-chamber therein and a passage leading thereto, substantially as set forth.

In testimony whereof I, the said THOMAS
OFFICER, have hereunto set my hand.

THOMAS OFFICER.

Witnesses:

H. W. PARKER,
E. J. TENNEY.