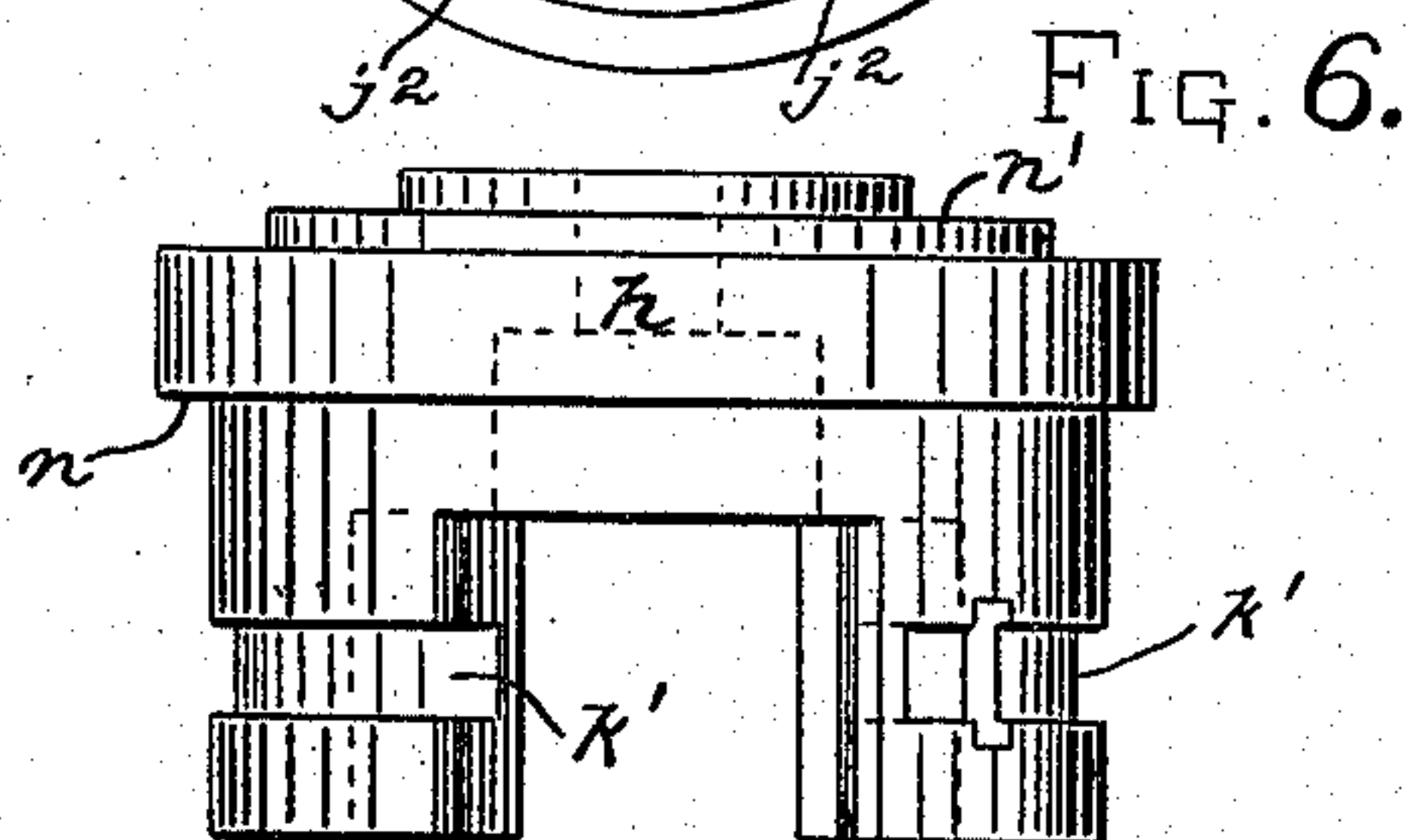
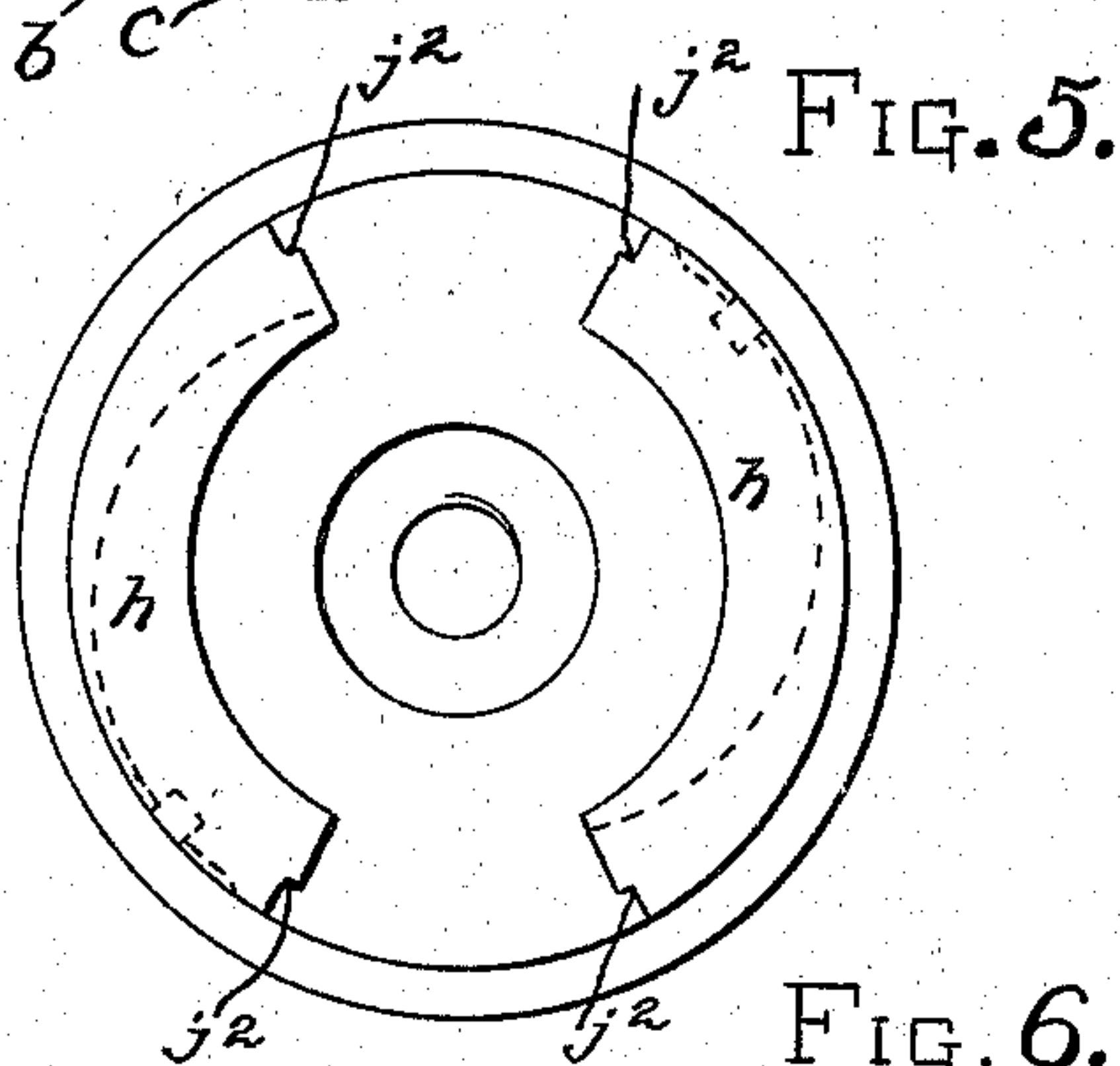
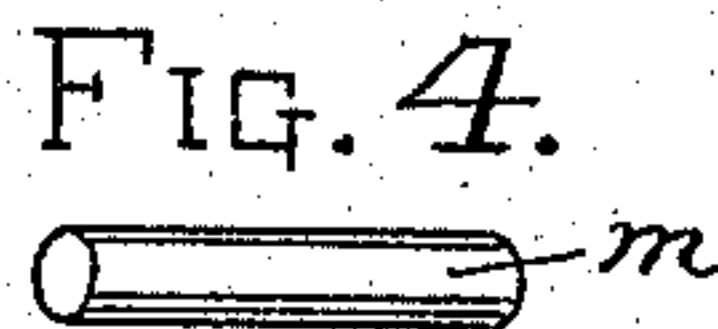
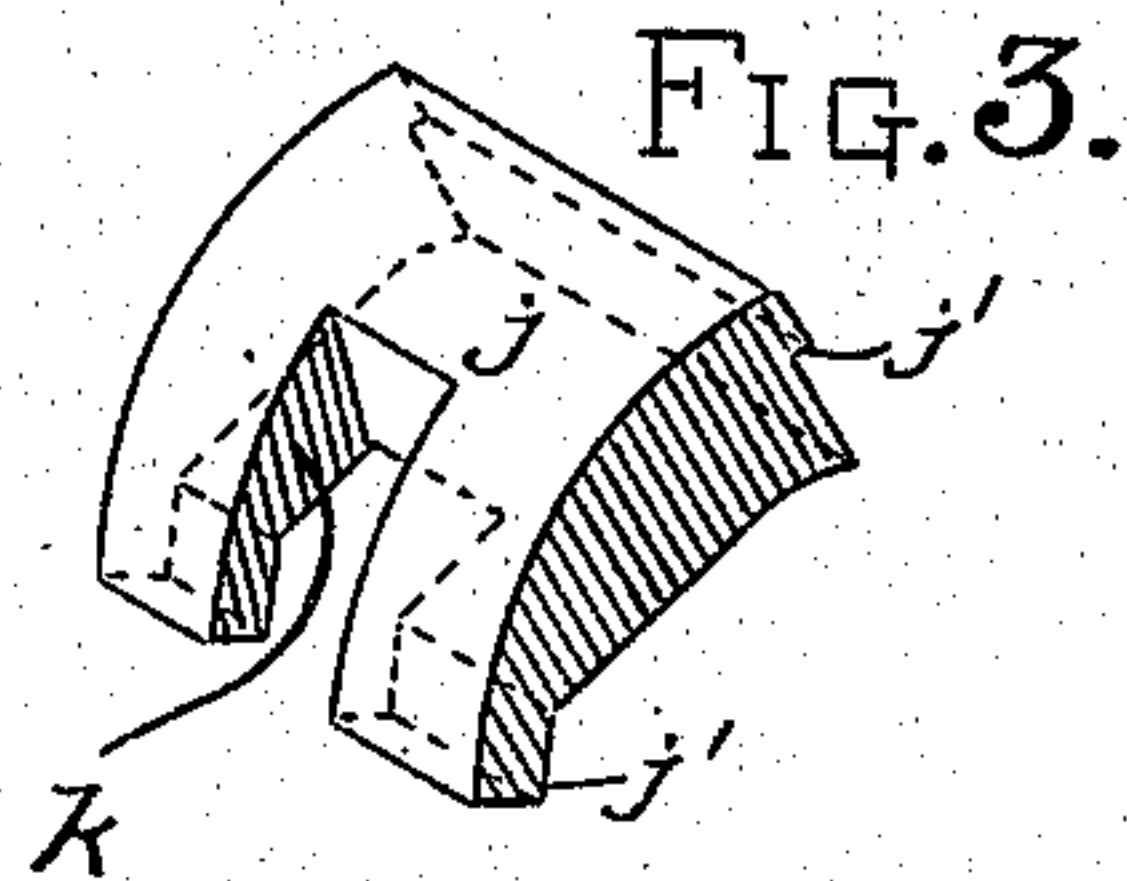
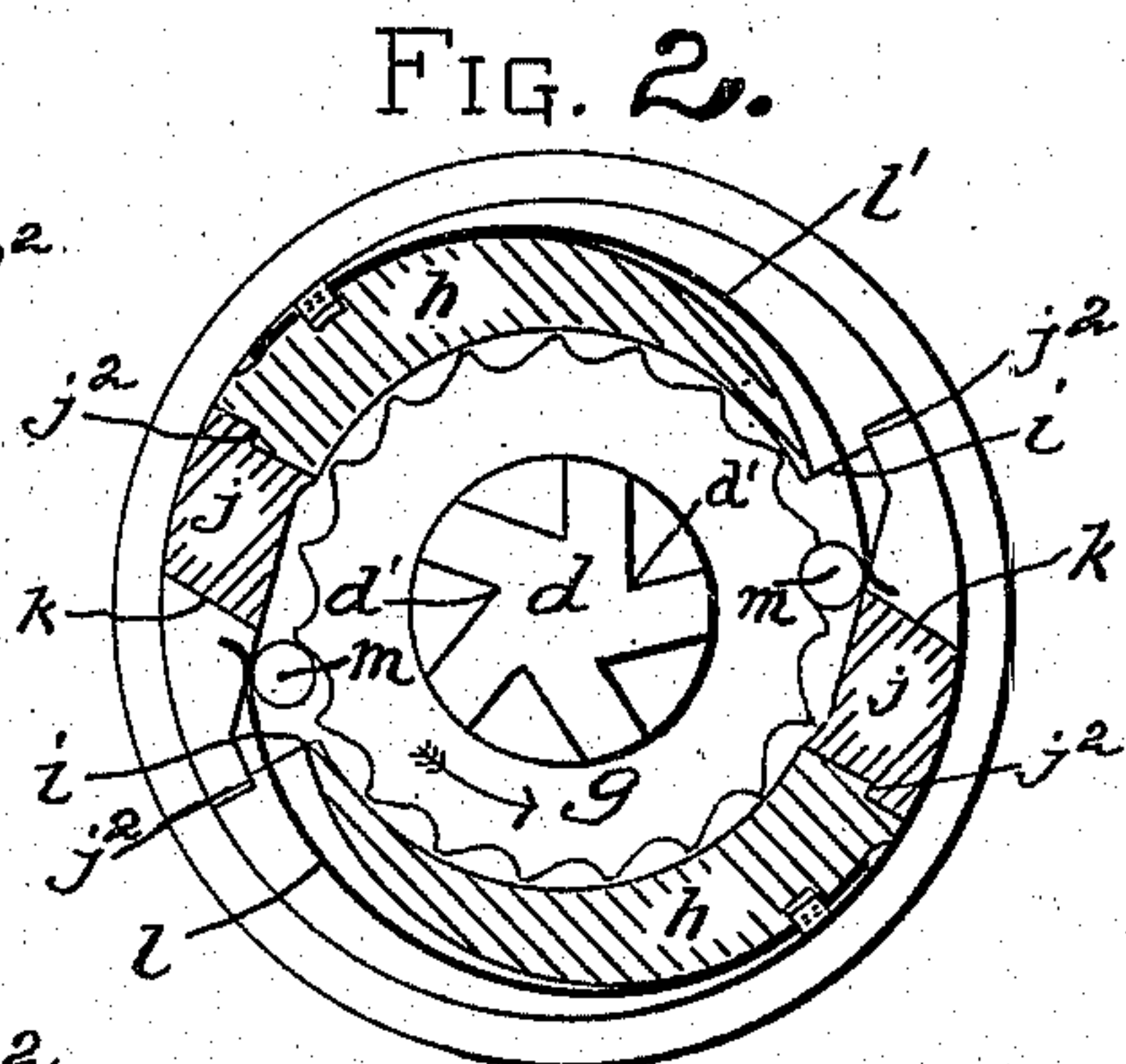
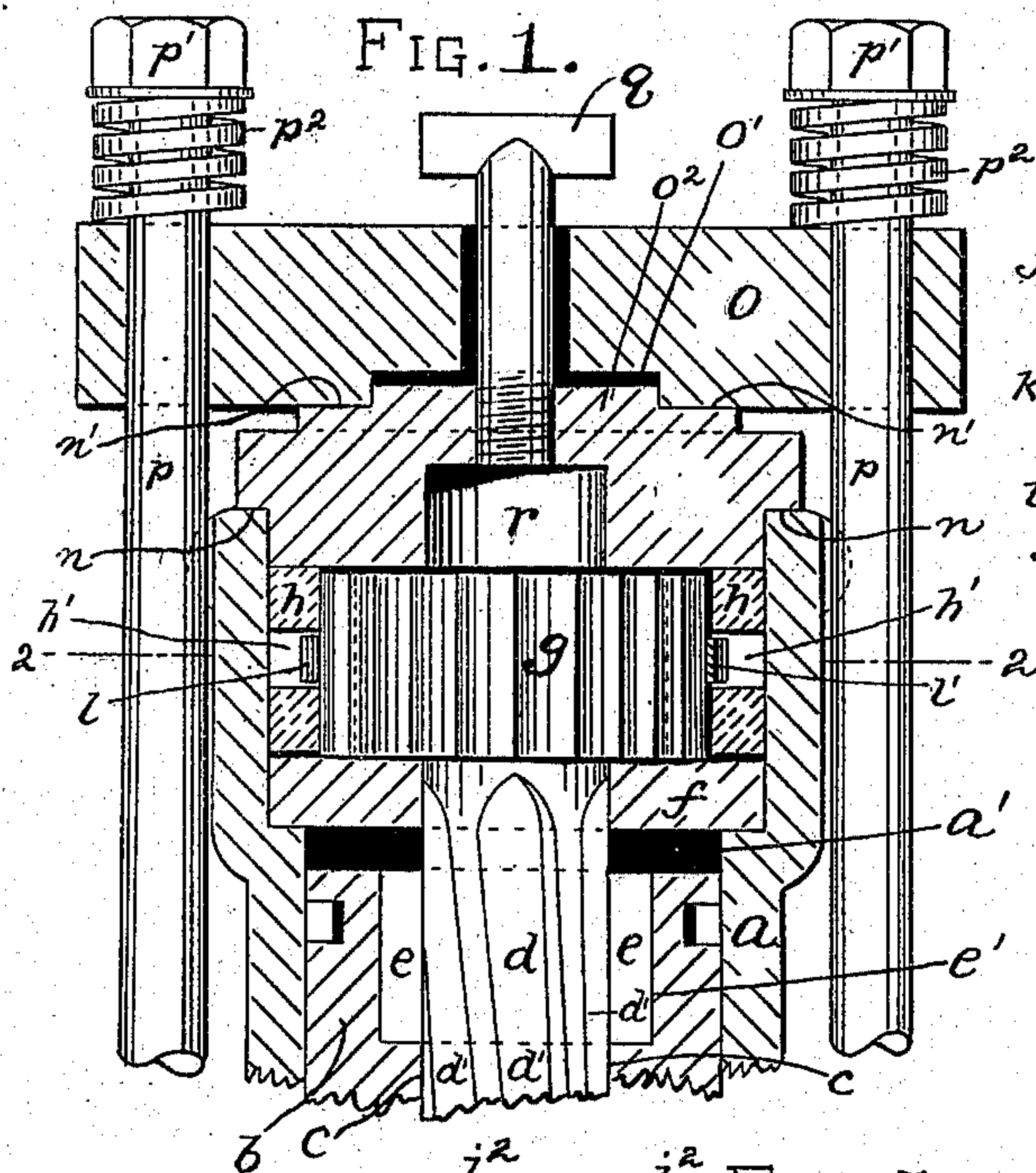


(No Model.)

T. OFFICER.
ROCK DRILL.

No. 580,461.

Patented Apr. 13, 1897.



WITNESSES:

Walter Farniss
Robert C. Totten

INVENTOR.
Thomas Officer
By Kay & Totten
ATTORNEYS.

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 resi-
dent of Claremont, in the county of Sullivan
and State of New Hampshire, have invented a
5 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
10 invention is applicable is that in which a cyl-
inder 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
15 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 pis-
ton, whereby the piston itself is turned on
the upward stroke.

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

My invention comprises certain new fea-
tures 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
30 and use my invention, I will describe the
same more fully, referring to the accompany-
ing drawings, in which—

Figure 1 is a vertical section of the upper
portion of a rock-drill to which my invention
35 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
40 of same.

Like letters indicate like parts in each of
the figures.

As the form of rock-drill to which my in-
vention is applicable is so well-known, I have
45 not deemed it necessary to illustrate the valve
mechanism and the lower part of the appa-
ratus, as there are different forms of valve
mechanism which may be used, and such
valve mechanism forms no part of my inven-
50 tion.

The letter *a* represents the upper portion

of a suitable cylinder having the piston-cham-
ber *a'* therein, together with valve-controlled
ports (not shown) for admitting steam to the
ends of said piston-chamber. Within the 55
piston-chamber *a'* is the piston *b*, whose pis-
ton-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- 60
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 di- 65
vision-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*. 70
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 hav-
ing shoulders *j'*, adapted to engage with cor-
responding shoulders *j''* in the head *h*, whereby 75
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 80
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 85
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 roll-
ers *m*, as will more fully hereinafter appear. 90
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 cylin- 95
der *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''*, 100
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, how-
20 ever, of the piston *b* the rifle-bar is prevented 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 pres-
30 sure 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 pis-

ton 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 said head and engaging the inner walls of said
55 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 pis-
60 ton 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, 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 in said grooves engaging said rollers, substan-
70 tially 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.