

No. 607,337.

Patented July 12, 1898.

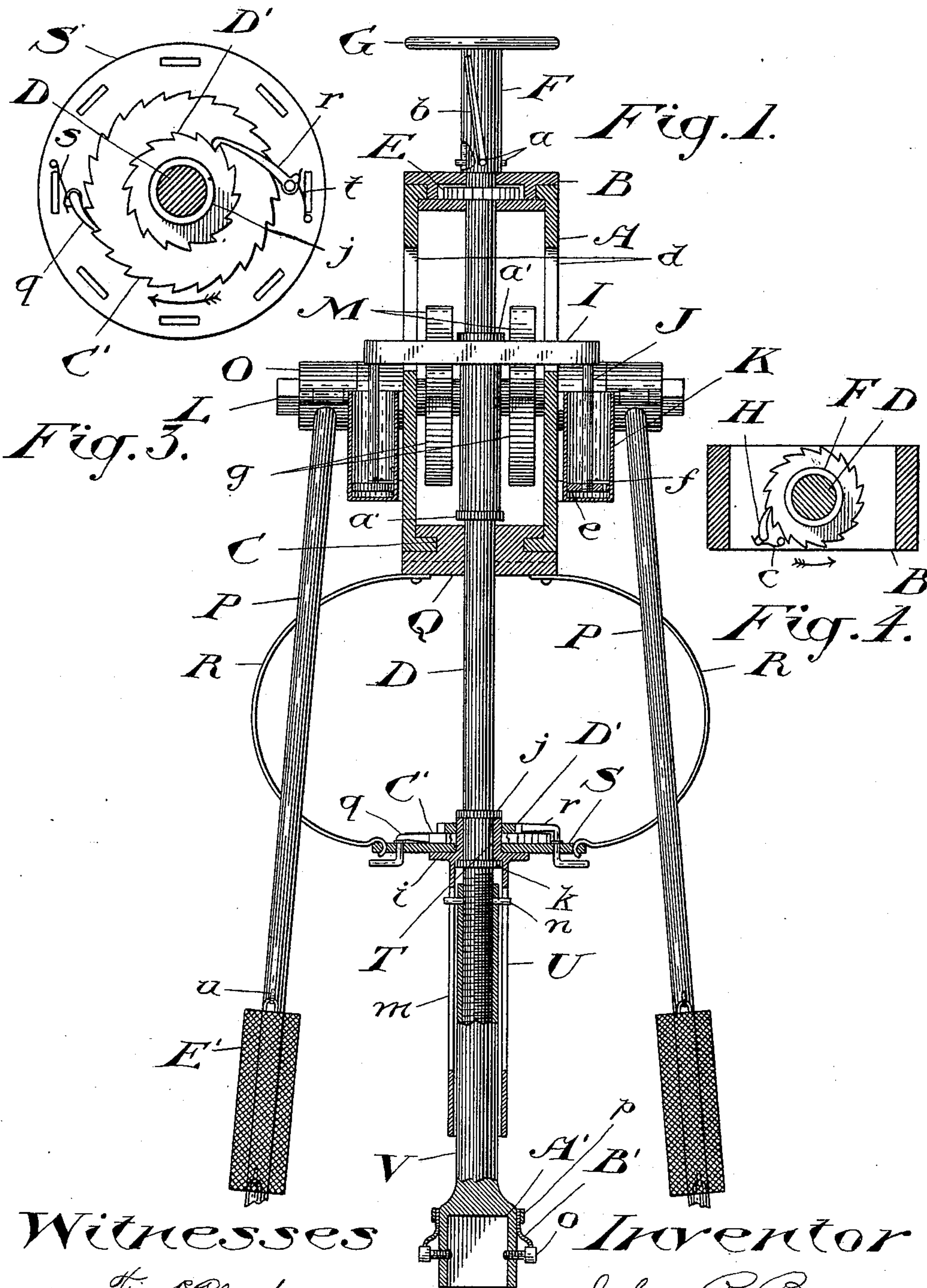
J. R. BROWN.

ROCK DRILL.

(Application filed Apr. 5, 1897.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

Fred Clarke
W. J. McMillan

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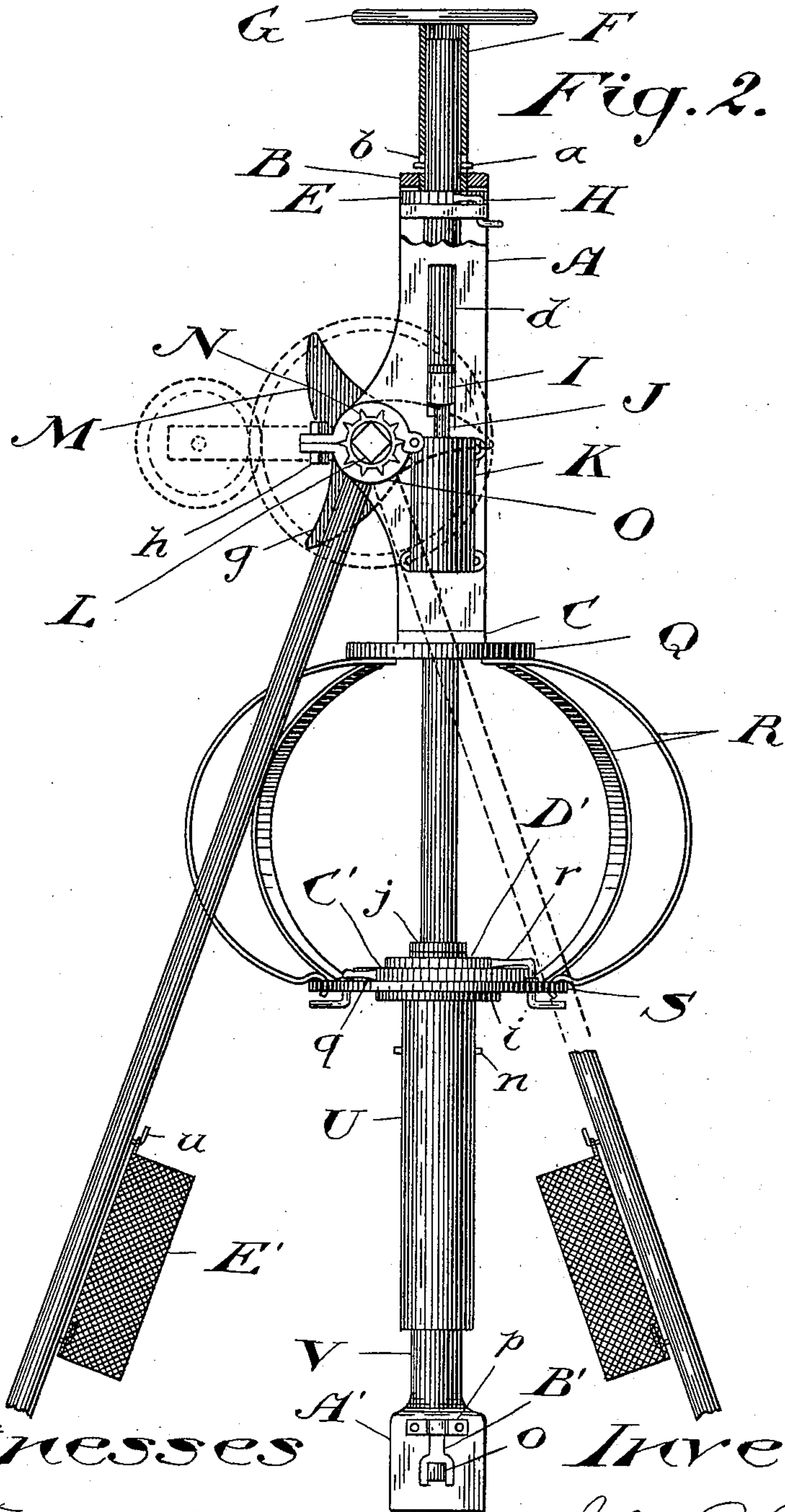
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Witnesses

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UNITED STATES PATENT OFFICE.

JOHN R. BROWN, OF HARRISON HOT SPRINGS, CANADA.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 607,337, dated July 12, 1898.

Application filed April 5, 1897. Serial No. 630,834. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. BROWN, mine-operator, of Harrison Hot Springs, in the county of New Westminster, Province of British Columbia, Canada, have invented a certain new and Improved Rock-Drill, of which the following is a specification.

The object of my invention is to devise a simple and effective portable hand or power percussion-drill; and it consists, essentially, of a drill in which the striking power is obtained by means of springs and vacuum-cylinders, the retraction of the drill-bar being effected by the rotation of a cam-shaft to which power may be applied.

My invention further consists in such details of construction as are hereinafter more specifically described and then definitely claimed.

Figure 1 is a front sectional elevation of my machine. Fig. 2 is a side elevation of the same. Fig. 3 is a plan view of the lower spring holding-plate and ratchet-wheels. Fig. 4 is a plan view of the upper ratchet-wheel used in rotating the drill.

In the drawings like letters of reference indicate corresponding parts in the different figures.

A is the frame of the drill, provided with the heads B and C, through which the drill-bar D passes. The upper head B is either formed in two parts, as shown, or has a space formed therein to receive the ratchet-wheel E, which is rigidly connected to the sleeve F, extending upwardly through the top of the head. This sleeve is provided with a hand-wheel G, by means of which it may be rotated.

a a are pins inserted in the drill-bar D and adapted to fit the diagonally-cut slots *b* in the sleeve F.

H is a pawl adapted to engage with the ratchet-wheel E and held in contact therewith by means of a spring *c*.

I is a tappet embracing the drill-bar D between the collars *a'*. This tappet extends through the slots *d* in the sides of the frame and has piston-rods J secured to each end. These piston-rods are provided with piston-heads *e*, adapted to fit the interior of the vacuum-cylinders K, which are suitably se-

cured to the sides of the frame. Small valves *f* of any suitable construction are preferably provided in these piston-rods to permit of the escape of any air which may pass below the piston.

L is a shaft suitably journaled in the frame of the drill. This shaft carries the pair of cams M M, each preferably provided with three cam projections *g*, so shaped and located as to lift and then let fall the tappet I and the drill-bar to which it is connected. The bearings of the shaft L are extended outwardly on each side in the form of corrugated cylinders N, around which may be clamped the hinged and corrugated sleeves O.

P are the legs supporting the drill, which are rigidly connected with the sleeves O. The construction of the sleeves O enables the drill to be set at any desired angle for work, it being merely necessary to remove the bolt *h*, throw back the upper portion of the sleeve upon its hinge, and shift the position of the corrugated cylinders N in the lower part of the sleeves, after which the sleeves may be closed and reclamped.

The ends of the shaft L are preferably adapted to receive crank-handles, so that one man may apply power to the shaft at each side. If one man be desirous of using the drill alone, the gearing indicated in dotted lines in Fig. 2 may be attached and the speed of the drill correspondingly reduced.

Q is a spring holding-plate connected to or forming part of the lower head C. R are a series of thin steel springs connected to this plate and engaging at their lower ends with the plate S. This plate rests upon the flange *i* of the sleeve T, surrounding the drill-bar D, between the collars *j k*.

U is a sleeve extending downwardly from the flange *i* and provided with slots *m*.

V is the drill-holder, screwed upon the end of the drill-bar, as shown. This drill-holder has pins *n* extending therefrom through the slots *m*. The lower end of the drill-holder has a socket A' formed therein to receive the drills. This socket is provided with one or more pinch-bolts *o*.

B' are spring-plates slotted to embrace the heads of the bolts *o*. The shanks of these plates are slidingly held by the guides *p*, so.

that the spring-plates may be slid up to leave the pinch-bolts free to be turned when attaching or detaching the drill.

C' is a ratchet-wheel rigidly connected to the sleeve T. D' is a ratchet-wheel, also connected to the sleeve T, but having its teeth set in the opposite direction, as seen in Fig. 3. The pawls *q* and *r* engage, respectively, with these ratchet-wheels and are normally held in contact therewith by the springs *s* and *t*.

E' are ballast-baskets suitably supported on hooks *u* on the legs of the drill.

It will be noticed that the springs normally holding the pawls H, *q*, and *r* in engagement with their respective ratchet-wheels press against small projections on the back of each pawl and that the springs and projections are so shaped and located that each pawl may be swung out of engagement with its ratchet-wheel and so held by the pressure of the spring.

When the machine is set for work, so as to be self-feeding, the pawls H and *q* are engaged with their respective ratchets. Each time that the drill-bar is raised by the action of the cams upon the tappet I the pins *a*, moving in the diagonal slots *d*, cause the drill-bar to move through an eighth of a revolution, the sleeve being held from revolving by the pawl H. When the drill-bar drops, the pin, moving down the slot, turns the sleeve, the pawl offering no resistance to its revolution. Thus the drill-rod still retains the position to which it has been turned. As the pawl Q, engaging with the ratchet-wheel C', holds the sleeve T from turning and also the attached sleeve U, the drill-holder V will not rotate, being held by the pins *n*, which engage with slots *m*. As the threaded end of the drill-bar has been revolved in the drill-holder an eighth of a turn the drill-holder will be moved downwardly, giving the necessary amount of feed ready for the next stroke. When it is desired to withdraw the drill-holder and drill after the boring of a hole, the pawl *r* may be engaged with the ratchet-wheel D', and the sleeve U thus held from revolving, while the reverse motion is given to the drill-bar to withdraw the drill-holder. When no automatic extension of the drill-holder is desired, the pawl *q* may be thrown out of engagement with the ratchet-wheel C', when the sleeve U will revolve with the drill-bar, and no extension of the drill-holder will be made.

To obtain the best results with my drill by hand-power, one man is required to apply his power at each end of the shaft L. The drill-bar is raised by the action of the cams and driven downward against the rock by the pressure of the springs R and by the suction of the vacuum created by the piston-heads *e* in the vacuum-cylinders K. Thus two men will easily make ninety strokes per minute, the strokes varying in force from one hundred and fifty to three hundred pounds, according

to the tension of the springs and the size of the vacuum-cylinders.

If it be desired to use my drill with electric or other power, the strength of the springs and the size of the vacuum-cylinders will be greatly increased and a very effective drill thus obtained.

If desired, columns may be attached to the drill for use in drifts or shafts, being connected to the frame of the machine instead of the legs shown. These legs might also be made adjustable on the frame of the machine in other ways than that shown and equally as good results obtained.

From the above description it will be seen that I have devised a very convenient and portable drill which will much more effectually utilize the power of two men than the old method of using a drill and sledge-hammer.

What I claim as my invention is—

1. In a drill, a frame and drill-bar movably supported therein in combination with a shaft journaled in the said frame; cams carried by the said shaft and adapted to raise the drill-bar; springs adapted to return the drill-bar to its original position; a sleeve surrounding a suitable portion of the drill-bar and provided with one or more diagonal slots; a ratchet-wheel suitably supported and connected to said sleeve, a spring-actuated pawl upon the frame engaging with said ratchet-wheel; one or more pins projecting from the drill-bar in the slots in the said sleeve, and a hand-wheel connected with said sleeve, substantially as and for the purpose specified.

2. In a drill, a frame and drill-bar movably supported therein a tappet connected with the drill-bar; and pistons connected to the ends of the tappet, in combination with a shaft journaled in the said frame; cams carried by the said shaft and adapted to raise the said tappet, vacuum-cylinders in which the said pistons play, a vacuum being formed below the pistons when the drill-bar is raised, which tends to return the drill-bar to its original position; a sleeve surrounding a suitable portion of the drill-bar and provided with one or more diagonal slots; a ratchet-wheel suitably supported and connected to said sleeve; a spring-actuated pawl upon the frame engaging with said ratchet-wheel; one or more pins projecting from the drill-bar in the slots in the said sleeve, and a hand-wheel connected with said sleeve, substantially as and for the purpose specified.

3. In a drill, a frame with slotted sides; a drill-bar movably supported therein, and provided with collars, and a tappet passing through the slots and embracing the said drill-bar between the collars; in combination with a shaft journaled in the said frame; cams carried by the said shaft and adapted to raise the said tappet and drill-bar; means for returning the said drill-bar to its normal position; a sleeve surrounding a suitable portion of the drill-bar and provided with one or more diagonal slots; a ratchet-wheel suitably sup-

ported and connected to the said sleeve; a spring-actuated pawl upon the frame engaging with said ratchet-wheel, one or more pins projecting from the drill-bar into the slots in the sleeve whereby the said drill-bar is automatically fed, and a hand-wheel connected with said sleeve arranged to regulate the feed of said drill-rod independent of the automatic feeding device, substantially as and for the purpose specified.

4. In a drill, a frame; a drill-bar movably supported therein; and means for reciprocating the drill-bar; in combination with a sleeve surrounding a suitable portion of the drill-bar, and provided with one or more diagonal slots; a ratchet-wheel suitably supported and connected to the said sleeve; a spring-actuated pawl upon the frame adapted to engage with the said ratchet-wheel; one or more pins projecting from the drill-bar into the slots in the sleeve; a drill-holder screwed upon the end of the drill-bar; a sleeve suitably supported about the said holder and held from turning; pins connected to the holder and adapted to engage with slots in the said sleeve whereby the said drill-bar is automatically fed, and a hand-wheel connected with said sleeve arranged to regulate the feed of said drill-rod independent of the automatic feeding device, substantially as and for the purpose specified.

5. In a drill, a frame; a drill-bar movably supported therein; and means for reciprocating the drill-bar; in combination with a sleeve surrounding a suitable portion of the drill-bar and provided with one or more diagonal slots; a ratchet-wheel suitably supported and connected to the said sleeve; a spring-actuated pawl upon the frame adapted to engage with the said ratchet-wheel; one or more pins projecting from the drill-bar into the slots in the sleeve; a drill-holder screwed upon the end of the drill-bar; a plate supported from the frame of the drill so as to be capable of a reciprocating motion only with the drill-bar; a sleeve suitably supported about the said drill-holder; a ratchet-wheel rigidly connected to the said sleeve; a spring-actuated pawl upon the said plate adapted to engage with the said ratchet-wheel; and pins connected to the holder and adapted to engage with slots in the said sleeve, substantially as and for the purpose specified.

6. In a drill, a frame; a drill-bar movably supported therein; and means for reciprocating the drill-bar; in combination with a sleeve surrounding a suitable portion of the drill-bar, and provided with one or more diagonal slots; a ratchet-wheel suitably supported and connected to the said sleeve; a spring-actuated pawl upon the frame adapted to engage with the said ratchet-wheel; one or more pins projecting from the drill-bar into the slots in the sleeve; a drill-holder screwed upon the end of the drill-bar; a plate supported from the frame of the drill so as to be capable of a reciprocating motion only with the drill-

bar; a sleeve suitably supported about the said drill-holder; two ratchet-wheels rigidly connected to the said sleeve with their teeth set in opposite directions; two spring-actuated pawls upon the said plate adapted to engage with the said ratchet-wheels; and one or more pins connected to the holder and adapted to engage with slots in the said sleeve, substantially as and for the purpose specified.

7. In a drill, a frame with slotted sides; a drill-bar movably supported therein; and provided with collars; and a tappet passing through the slots and embracing the said drill-bar between the collars; in combination with a shaft journaled in the said frame; cams carried by the said shaft and adapted to raise the said tappet and drill-bar; means for returning the said drill-bar to its normal position; a sleeve surrounding a suitable portion of the drill-bar and provided with one or more diagonal slots; a ratchet-wheel suitably supported and connected to the said sleeve; a spring-actuated pawl upon the frame engaging with said ratchet-wheel; one or more pins projecting from the drill-bar into the slots in the sleeve; a drill-holder screwed upon the end of the drill-bar; a sleeve suitably supported about the said holder and held from turning, and one or more pins connected to the holder and adapted to engage with slots in the said sleeve, substantially as and for the purpose specified.

8. In a drill, a frame with slotted sides; a drill-bar movably supported therein, and provided with collars; and a tappet passing through the slots and embracing the said drill-bar between the collars; in combination with a shaft journaled in the said frame; cams carried by the said shaft and adapted to raise the said tappet and drill-bar; means for returning the said drill-bar to its normal position; a sleeve surrounding a suitable portion of the drill-bar and provided with one or more diagonal slots; a ratchet-wheel suitably supported and connected to the said sleeve; a spring-actuated pawl upon the frame engaging with said ratchet-wheel; and one or more pins projecting from the drill-bar into the slots in the sleeve; a drill-holder screwed upon the end of the drill-bar; a plate supported from the frame of the drill so as to be capable of a reciprocating motion only with the drill-bar; a sleeve suitably supported about the said drill-holder; a ratchet-wheel rigidly connected to the said sleeve; a spring-actuated pawl upon the said plate adapted to engage with the said ratchet-wheel; and one or more pins connected to the holder and adapted to engage with slots in the said sleeve, substantially as and for the purpose specified.

9. In a drill, a frame with slotted sides; a drill-bar movably supported therein, and provided with collars; and a tappet passing through the slots and embracing the said drill-bar between the collars; in combination with a shaft journaled in the said frame; cams carried by the said shaft and adapted to raise

the said tappet and drill-bar; means for re-
turning the said drill-bar to its normal posi-
tion; a sleeve surrounding a suitable portion
of the drill-bar and provided with one or
5 more diagonal slots; a ratchet-wheel suitably
supported and connected to the said sleeve;
a spring-actuated pawl upon the frame en-
gaging with said ratchet-wheel; one or more
pins projecting from the drill-bar into the
10 slots in the sleeve; a drill-holder screwed
upon the end of the drill-bar; a plate sup-
ported from the frame of the drill so as to be
capable of a reciprocating motion only with
the drill-bar; a sleeve suitably supported
15 about the said holder; two ratchet-wheels
rigidly connected to the said sleeve with their
teeth set in opposite directions; two spring-
actuated pawls upon the said plate adapted
to engage with the said ratchet-wheels; one
20 or more pins connected to the holder and
adapted to engage with slots in the said sleeve,
substantially as and for the purpose specified.

10. In a drill, a frame with slotted sides; a
drill-bar movably supported therein and pro-
25 vided with collars; and a tappet passing
through the slots and embracing the said drill-
bar between the collars; in combination with
a shaft journaled in the said frame; cams
carried by the said shaft and adapted to raise
30 the said tappet and drill-bar; a sleeve sur-
rounding a suitable portion of the drill-bar
and provided with one or more diagonal slots;
a ratchet-wheel suitably supported and con-
nected to the said sleeve; a spring-actuated
35 pawl upon the frame engaging with said
ratchet-wheel; one or more pins projecting
from the drill-bar into the slots in the sleeve;
a drill-holder screwed upon the end of the
drill-bar; a plate connected by springs with
40 the frame of the drill and with the drill-bar
so as to tend to return the drill-bar to its ex-
tended position after it has been raised, with-
out interfering with its rotation; a sleeve suit-
ably supported about the said drill-holder; a
45 ratchet-wheel rigidly connected to the said
sleeve; a spring-actuated pawl upon the said
plate adapted to engage with the said ratchet-
wheel; one or more pins connected to the drill-
holder and adapted to engage with slots in the
50 said sleeve, substantially as and for the pur-
pose specified.

11. In a drill, a frame with slotted sides; a
drill-bar movably supported therein and pro-
vided with collars; and a tappet passing
through the slots and embracing the said 55
drill-bar between the collars, in combination
with a shaft journaled in the said frame;
cams carried by the said shaft and adapted
to raise the said tappet and drill-bar; pistons
connected to the tappet; vacuum-cylinders 60
in which the said pistons play; a sleeve sur-
rounding a suitable portion of the drill-bar
and provided with one or more diagonal slots;
a ratchet-wheel suitably supported and con-
nected to the said sleeve; a spring-actuated 65
pawl upon the frame engaging with said
ratchet-wheel; one or more pins projecting
from the drill-bar into the slots in the sleeve;
a drill-holder screwed upon the end of the
drill-bar; a plate connected by springs with 70
the frame of the drill and with the drill-bar
so as to tend to return the drill-bar to its ex-
tended position after it has been raised, with-
out interfering with its rotation; a sleeve
suitably supported about the said drill- 75
holder; a ratchet-wheel rigidly connected to
the said sleeve; a spring-actuated pawl upon
the said plate adapted to engage with the said
ratchet-wheel; and one or more pins connect-
ed to the drill-holder and adapted to engage 80
with slots in the said sleeve, substantially as
and for the purpose specified.

12. In a drill, the combination with a frame,
of a portion thereof having corrugated pro-
jections formed thereon, legs for said drill, 85
split sleeves connected with said legs and ar-
ranged around said corrugated portions, and
hinges and clamps provided for said split
sleeves arranged to secure sleeves to said cor-
rugated portions, substantially as described. 90

13. In a drill, a drill-holder provided with
a socket, and a pinch-bolt in said socket for
clamping the drill therein, a guide also se-
cured to said socket, and a Y-shaped spring-
plate embracing the bolt-head and having its 95
stem passing under said guide, substantially
as shown and described.

Victoria, February 11, 1897.

JOHN R. BROWN.

In presence of--

G. H. BARNARD,
H. A. TURNER.