

W. H. DIXON.
ROCK DRILL.

No. 536,172.

Patented Mar. 19, 1895.

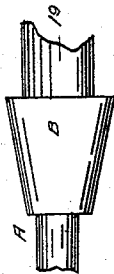
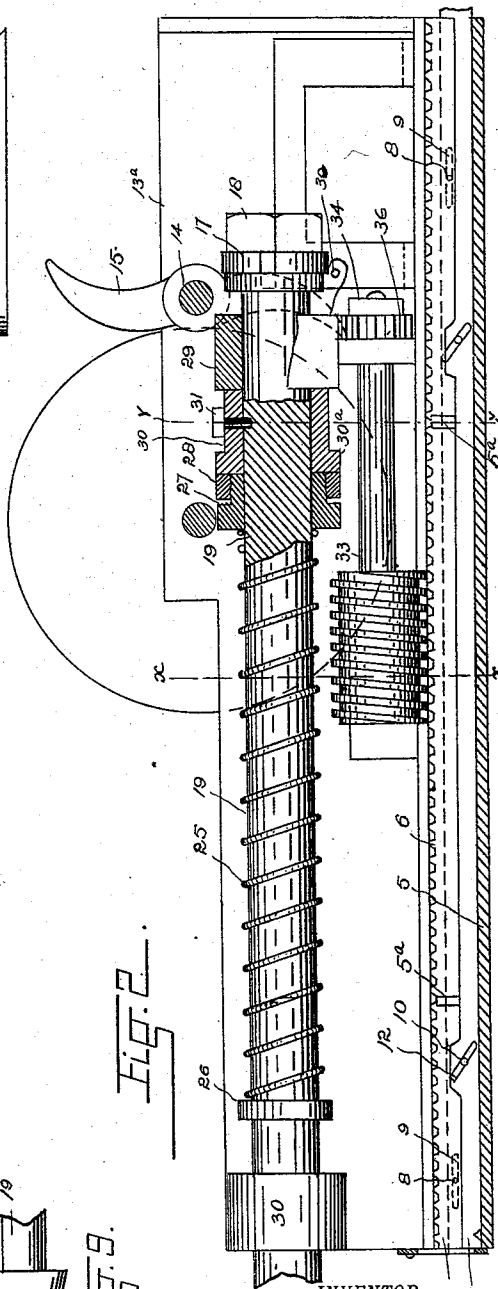


Fig. 9.



INVENTOR

INVENTOR
W. H. Dixon

BY

ATTORNEY

~~WITNESSES:~~

~~G. J. D. Blount~~
Chas. E. Dawson

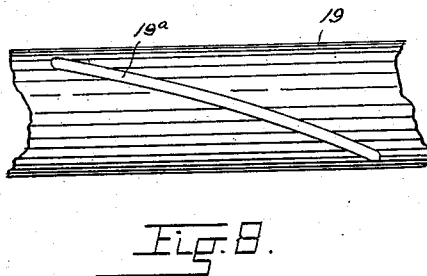
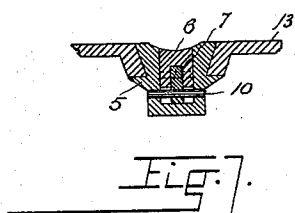
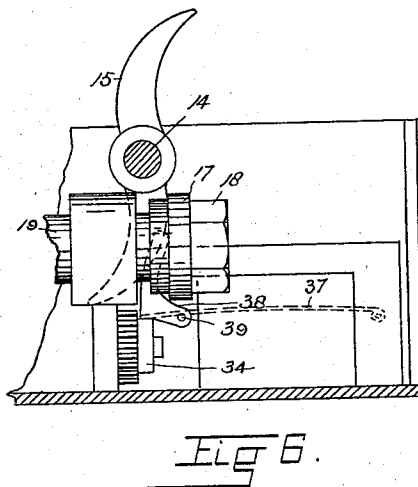
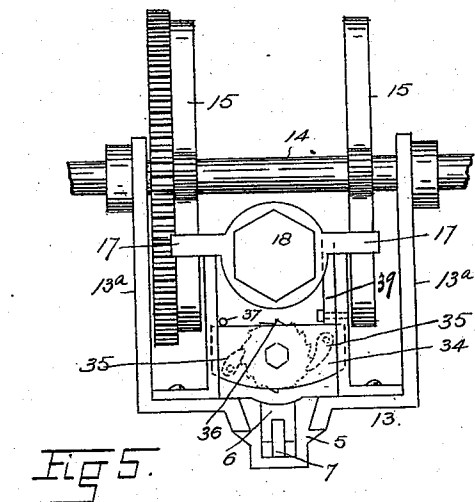
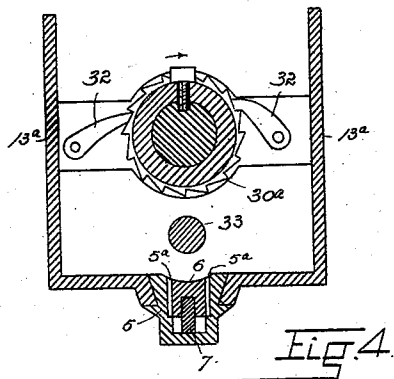
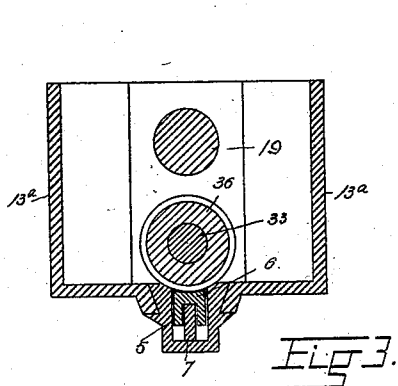
(No Model.)

3 Sheets—Sheet 2.

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WITNESSES:

J. J. O'Connell
Chas. C. Dawson

INVENTOR
W. H. Dixon

BY *A. J. Brien*
ATTORNEY

(No Model.)

3 Sheets—Sheet 3.

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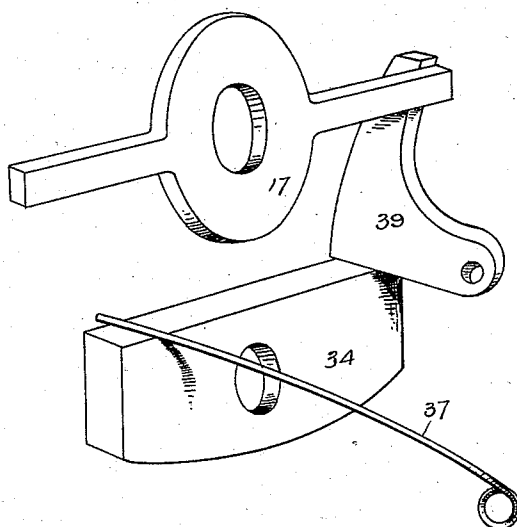


Fig. 10.

WITNESSES.

G. J. Delandett
Chas. E. Dawson

INVENTOR

W. H. Dixon.

BY

Alfred B. Brier
ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM H. DIXON, OF DENVER, COLORADO, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF ELEVEN-SIXTEENTHS TO CHARLES E. GARTMAN AND FRANK A. JOSLIN, OF SAME PLACE.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 536,172, dated March 19, 1895.

Application filed May 21, 1894. Serial No. 511,887. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. DIXON, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Rock-Drills; and I do declare the following to be a full, clear, and exact description of the invention, such as it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures and letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in rock drills, specially designed for hand use, but which may be operated by any suitable power.

My improved drill consists of the features, arrangements and combinations hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a top or plan view of the machine. Fig. 2 is a side elevation partly in section. Fig. 3 is a vertical cross-section taken on the line $x-x$, Fig. 2. Fig. 4 is a cross-section taken on the line $y-y$, Fig. 2. Fig. 5 is a rear end view of the machine. Fig. 6 is a fragmentary side elevation partly in section, of the rear part of the machine. Fig. 7 is a vertical cross-section taken through the stationary track, the rack bar, and the movable frame mounted on the track. Fig. 8 is a fragmentary view of the ram, illustrating the spiral groove. Fig. 9 is a section of the ram, drill and chuck. Fig. 10 is a perspective view of the cross-head, rocker-plate, lever and spring connected in operative relation.

Similar reference characters indicating corresponding parts or elements in these views, let the numeral 5 designate the stationary frame or track carrying the adjustable rack bar 6 provided with a longitudinal key 7 movably attached to the bar by means of pins 8 made fast to one part and engaging slots 9

formed in the other part, said slots extending parallel with the plane of the machine. The rack bar 6 is grooved from the under side to receive the movable key. The key projects below the bar, however, and is movably attached to the track 5 by means of pins 10 passing through slots formed in the key and apertures formed in the track, which is longitudinally grooved to receive the rack bar and its key. The pins 10 fit in the apertures of the track, and the slots 12 of the key are inclined to the plane of the machine. Hence, by moving the key back and forth, the rack bar is raised and lowered. The rack bar is locked from longitudinal movement in the grooved track by stationary projections formed on the bar and engaging recesses formed in the track. This adjustment is for the purpose of connecting and disconnecting the cogged face of the track with the feed screw as hereinafter explained. The movable frame 13 is slidably attached to the track by a dove tailed connection, as shown in the drawings. Journaled in the vertical sides 13^a of the movable frame, is the shaft 14 carrying the double cam 15.

As shown in the drawings, the cam shaft is provided with cranks 16 for hand use. It is evident, however, that by attaching a pulley to this shaft, it may be operated by other power. As the shaft 14 is rotated, its cams engage a cross head 17 attached to the rear extremity of the ram 19 by a nut 18. This ram is slidably mounted on the movable frame in boxes or bearings 28, 29 and 30 made fast to said frame. The ram is surrounded by a coil spring 25 one extremity of which bears against a collar 26 on the ram, while the opposite extremity engages a collar 27 attached to the bearing 28 of the movable frame. Between the collar 27 and the bearing 29 is a ratchet collar 30^d through which the ram passes, and which is connected with the ram by means of a screw 31 which passes through a threaded aperture formed in the collar, and projects into a spiral groove 19^a formed in the ram. The ratchet zone 30^a of the collar is engaged by pawls 32 pivoted on the bearing box

28. The pawls are located on opposite sides of the ratchet, and are so disposed that they allow the ratchet collar to move around the ram in one direction only. By means of this construction, I obtain the partial rotation between strokes necessary in a machine of this class.

Located directly below the ram, and suitably journaled in the movable frame, is the feed screw 33 adapted to engage the cogged face of the rack bar 6. To the rear extremity of the feed screw, is pivoted a rocker plate 34 carrying dogs 35 engaging a ratchet disk 36 made fast to the stem of the feed screw. The dogs engage the ratchet disk, and are oppositely disposed, whereby they permit the screw to move in one direction and lock it from movement in the opposite direction. One arm of the rocker plate is engaged by a spring 37, and the opposite arm by a lever 38 fulcrumed at 39. This lever projects into the path of the cross-head 17, and as the ram moves forward, the cross-head engages and actuates the lever which presses downward on the engaging arm of the rocker plate, and gives the feed screw a partial rotation, since the dogs carried by the plate engage the ratchet of the screw. As the screw is rotated, the frame 13 is carried forward to harmonize with the progress made by the drill. By this construction, the feed or forward movement of the frame is automatically regulated. If the frame gets ahead of the drill, the former will wait until the latter has made sufficient progress to bring the cross-head to engagement with the lever 38 which actuates the rocker plate as hereinbefore described.

The construction set forth in this specification may be considered as an improvement on the device shown and described in my previous application, Serial No. 501,744, filed February 27, and bearing the same title.

The drill bit or tool A is inserted in a chuck B, made fast to the forward extremity of the ram, or that at the left in Figs. 1 and 2.

The chief features of this invention which distinguish it from that of my previous application, relate to the means for producing the partial rotation of the ram between strokes, and the means employed for actuating the movable frame.

From the foregoing description, the operation of the improved machine will be readily understood. As the cam shaft is rotated and the ram drawn backward, the ratchet collar 30, 30^a is turned in the direction indicated by the arrow. (See Fig. 4.) Now, as soon as the ram is released, it is thrown forward by the recoil of the spring 25, and is given a partial rotation in the direction indicated by the arrow in Fig. 4. As the ram moves forward, it has a tendency to reverse the movement of the ratchet collar imparted by the backward stroke, but as the pawls lock the ratchet against movement in the reverse direction, the ram must turn as stated instead of the ratchet.

As the drill moves into the rock, the cross-head 17 engages the lever 38, which presses one end of the rocker plate 34 downward, turns the ratchet 36 through the medium of the pawl 35, gives the feed screw 36 a partial rotation and imparts to the frame 13 a corresponding forward movement.

After a hole has been drilled, or whenever it is necessary to reverse or draw the movable frame backward, the longitudinal key 7 is drawn backward, and the rack bar lowered sufficiently to disengage the feed screw.

Having thus described my invention, what I claim is—

1. In a rock drill, the combination with the reciprocating ram, the feed screw and the rack bar, of means for actuating the feed screw consisting of a ratchet fast on the screw shaft, a rocker plate apertured to receive the screw shaft which forms its pivot, said plate projecting on both sides of the shaft and carrying a dog engaging the ratchet, a bell crank lever having one arm engaging the rocker plate on one side of the shaft, a spring engaging the rocker plate on the other side of the shaft, and a cross-head carried by the ram and adapted to engage the other arm of the lever which lies in its path, substantially as described.

2. In a rock drill, the combination with the track and frame movably attached thereto, of the reciprocating ram, the feed screw journaled in the movable frame, a cogged rack attached to the track and engaged by the feed screw, a ratchet made fast on the feed screw, a rocker plate apertured to receive the feed screw shaft which forms its pivot, said plate projecting on both sides of the shaft and carrying a dog located to one side of the shaft and adapted to engage the ratchet, and means whereby the feed screw is actuated, said means consisting of a bell crank lever fulcrumed on the movable frame and having one arm engaging the rocker plate on one side of the shaft, a spring engaging said plate on the other side of the shaft, and a cross-head fast on the ram and adapted to engage the other arm of the lever, substantially as described.

3. In a rock drill, the combination with the stationary track, of the movable frame mounted thereon, the reciprocating ram mounted on the movable frame and provided with a spiral groove, a rotating cam for moving the ram in one direction, the spring for moving it in the opposite direction, a ratchet collar surrounding the ram, a device passing through the collar and projecting into the spiral groove of the ram, said ratchet being locked from longitudinal movement, and from rotation in one direction, a rack bar attached to the track, the feed screw engaging the rack bar, a ratchet fast on the feed screw, a rocker plate apertured to receive the feed screw which forms its pivot or fulcrum, a dog carried by the rocker plate, said dog being located to one side of the feed screw and adapted to engage

the ratchet, a bell crank lever having one arm
engaging the rocker plate on the dog-side of
the feed screw or shaft, a spring engaging
said plate on the other side of the screw-shaft,
5 and a cross-head fast on the ram and adapted
to engage the other arm of the bell crank lever,
substantially as described.

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

WILLIAM H. DIXON.

Witnesses:

G. J. ROLLANDET,
CHAS. E. DAWSON.