(No Model.) 2 Sheets—Sheet 1.

W. H. DIXON.

ROCK DRILL.

No. 536,173. Patented Mar. 19, 1895.

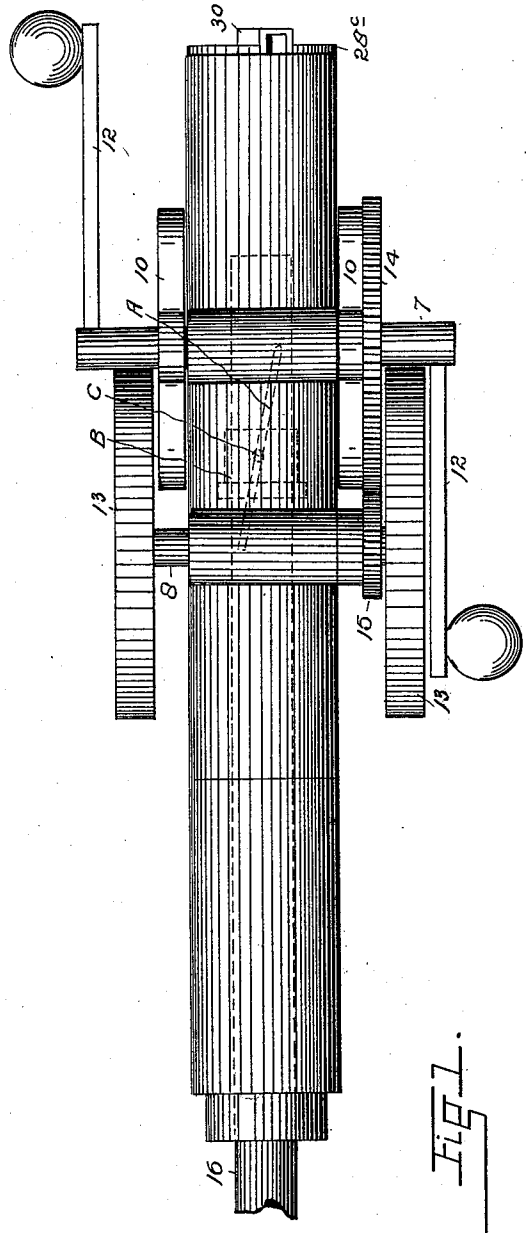

Fig. 1.

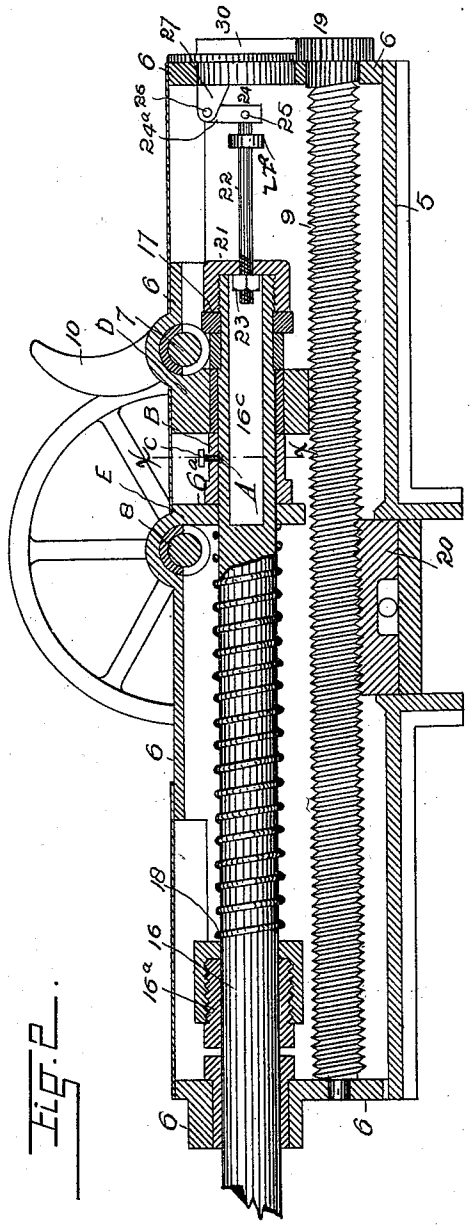

Fig. 2.

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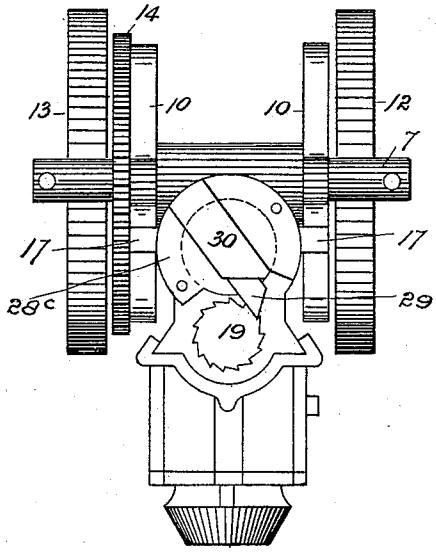
(No Model.) 2 Sheets—Sheet 2.

W. H. DIXON.

ROCK DRILL.

No. 536,173. Patented Mar. 19, 1895.

Fig. 3.



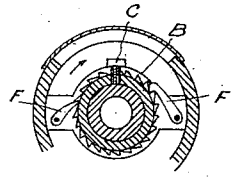
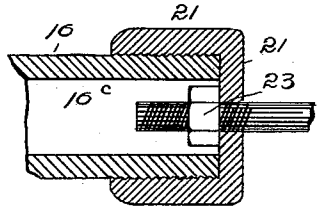


Fig. 8.



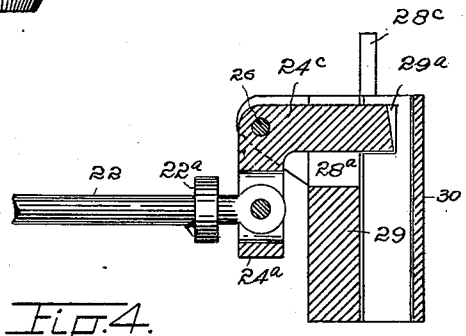


Fig. 4.

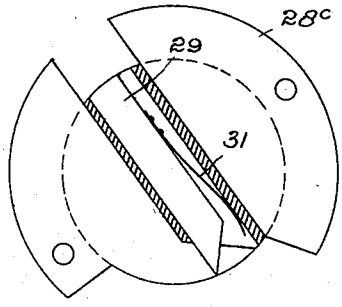


Fig. 5.

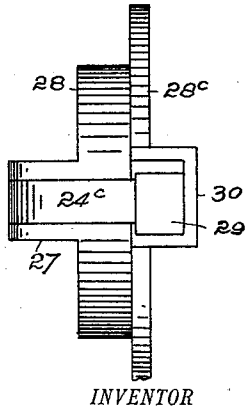


Fig. 6.

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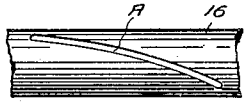

Fig. 7.

INVENTOR

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UNITED STATES PATENT OFFICE.

WILLIAM H. DIXON, OF DENVER, COLORADO, ASSIGNOR OF ELEVEN-SIXTEENTHS TO FRANK A. JOSLIN AND JOHN E. GARTMAN, OF SAME PLACE.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 536,173, dated March 19, 1895.

Application filed August 25, 1894. Serial No. 521,313. (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 will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures 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 other power.

My object is to provide a machine of this class which shall be simple in construction, economical in cost, reliable, durable and efficient in use.

To this end, the invention 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 drill. Fig. 2 is a vertical longitudinal section thereof. Fig. 3 is a rear end elevation of the machine. Fig. 4 is a longitudinal section illustrating the mechanism for operating the feed screw, and showing its connection with the ram. Fig. 5 is a rear view, partly in section, of the feed screw operating mechanism. Fig. 6 is a top view of the same. Fig. 7 is a fragmentary view of the ram, illustrating the spiral groove. Fig. 8 is a cross-section taken on the line x—x, Fig. 2.

Similar reference characters indicating corresponding parts in these views, let the numeral 5 designate the stationary track or frame supporting the movable casing 6 in which are journaled the shafts 7 and 8. The feed screw 9 is also journaled in the movable casing. The shaft 7 carries the double cams 10, and to its extremities are attached the hand cranks 12. To the outer extremities of the shaft 8 are attached the fly wheels 13. The shaft 7 carries a large gear 14 meshing with a small gear 15 carried by the shaft 8. Slidingly mounted on the movable frame is the reciprocating ram 16 carrying the drill-bit (not shown). To the rear part of this ram is attached a cross-head 17 which lies in the path of the rotating cams 10. The cams engage the cross-head and impart to the ram the backward stroke. The forward movement of the ram is given by a coil spring 18 which engages a collar 6^a on the casing at one extremity, and a stop 16^a on the ram at the opposite extremity. This stop comprises a nut screwed upon a collar made fast to the ram. The function of the nut is to regulate the tension of the spring 18. To the rear extremity of the feed screw, and located outside of the casing 6, is attached a fast ratchet disk 19.

To the central part of the stationary track or frame 5 is attached a threaded segmental block or nut 20 which the feed screw engages. The rear portion of the ram is hollow as shown at 16^c. To the hollow open end of the ram is attached an apertured screw cap 21 which engages the cross-head 17 on one side. Through the aperture in the cap 21 is passed the threaded extremity of a rod 22 which enters the hollow end of the ram. To this inner extremity of the rod is attached a nut 23 adapted to engage the inner surface of the cap. This nut forms a stop against the removal of the rod from the hollow end of the ram. The rear extremity of the rod 22 is removably attached to an arm 24^a of a bell crank lever 24 as shown at 25. The lever 24 is fulcrumed at 26 in a forked lug 27 formed integral with a disk 28 which closes an opening in the rear end of the casing 6. This disk is slotted as shown at 28^a to receive the arm 44^c of the bell crank lever. The free extremity of this arm enters a recess 29^a formed in a reciprocating dog 29 located in an open ended keeper 30 formed integral with the disk 28. This disk is provided with a flange 28^c apertured to receive fastening devices, as screws, which enter apertures formed in the casing 6 and hold the disk in position. The dog 29 is provided with a leaf-spring 31 attached thereto and bearing against the wall of the keeper. The lower extremity of the

dog 29 engages the ratchet 19 fast on the rear extremity of the feed screw, as heretofore explained.

From the foregoing description, the operation of the mechanism, as thus far described, will be readily understood. The shaft 7 being rotated by the use of the hand cranks 12, the cams 10 engage the cross-head 17 and carry the ram 16 backward, placing the coil spring 18 under tension. As soon as the cams release the ram, the recoil of the spring drives the ram forward and forces the drill against the rock. As the drill moves into the rock through the instrumentality of the reciprocating ram, the cap 21 engages the nut 23 and pulls upon the rod 22. This forward movement of the rod actuates the bell crank lever 24, and gives the dog 29 the downward movement, actuates the ratchet disk 19, and consequently, the feed screw 9, thus carrying the movable frame 6 forward. As the ram moves backward, the lever 24 and the dog 29 are returned to their normal positions by the engagement of the rear end of the ram with a collar 22^a attached to the rear part of the rod 22. The partial rotation of the ram between strokes is accomplished through the instrumentality of a spiral groove A formed in the ram, and a loose ratchet collar B surrounding the ram and attached thereto by a screw C which passes through an aperture in the collar and projects into the spiral groove A′. The collar B is locked against longitudinal movement on the ram by means of two parts, D and E, attached to the movable casing. The collar is also locked against rotation in one direction by means of two pawls F attached to part E and engaging the ratchet zone of the collar B in such a manner as to perform the function stated. As the ram moves forward to deliver the blow, the ratchet collar is given a partial turn on the ram since the pawls F permit the collar to turn in the direction indicated by the arrow in Fig. 8; while when the ram makes the return or reverse movement, it is given a partial rotation to the extent of the pitch of the spiral groove A, and by virtue of the engagement of the screw C with said groove, it will be observed that the collar is locked from rotary movement in the direction which it otherwise would be carried, by the backward movement of the ram. Hence, as the collar cannot move, the ram turns in the collar to an extent determined by the pitch of the groove A and the length of the stroke, or the distance which the ram travels while making the backward stroke, the groove of the ram being in engagement with the screw C of the collar B. It will thus be observed that as the ram makes one stroke of its reciprocation, the collar A is given a partial turn, while the ram has no rotary movement; also that while the ram is making the reverse stroke of its reciprocation, it makes a partial rotary movement within the collar A which remains stationary.

Having thus described my invention, what I claim is—

1. In a rock drill, the combination with the feed screw and ratchet disk, of the ram having a hollow rear extremity, and provided with a cap a rod having one extremity entering the hollow end of the ram and provided with a stop adapted to engage the cap, a lever suitably fulcrumed and movably connected with the other extremity of the rod, and a dog actuated by the lever and engaging the ratchet of the feed screw, substantially as described.

2. In a rock drill the combination with the movable frame, the feed screw and the ratchet, of the ram having its rear extremity hollow and provided with a cap, the connecting rod projecting into the hollow end of the ram and provided with a stop adapted to engage the cap, the disk attached to the movable frame, the bell crank lever fulcrumed on the disk, and the dog recessed to receive one arm of the lever, said dog being adapted to engage the ratchet of the feed screw, substantially as described.

3. In a rock drill, the combination with the feed screw, the fast ratchet and the movable frame in which the screw is journaled, of the disk attached to said frame, the bell crank lever fulcrumed on the disk, the reciprocating dog located in a keeper formed on or attached to the disk and recessed to receive one end of the lever, a rod attached to one arm of the lever, and the ram having the hollow rear portion which receives the other end of the rod, the hollow end of the ram having a cap and the rod having a stop located within the hollow part of the ram and adapted to engage the cap, 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.