

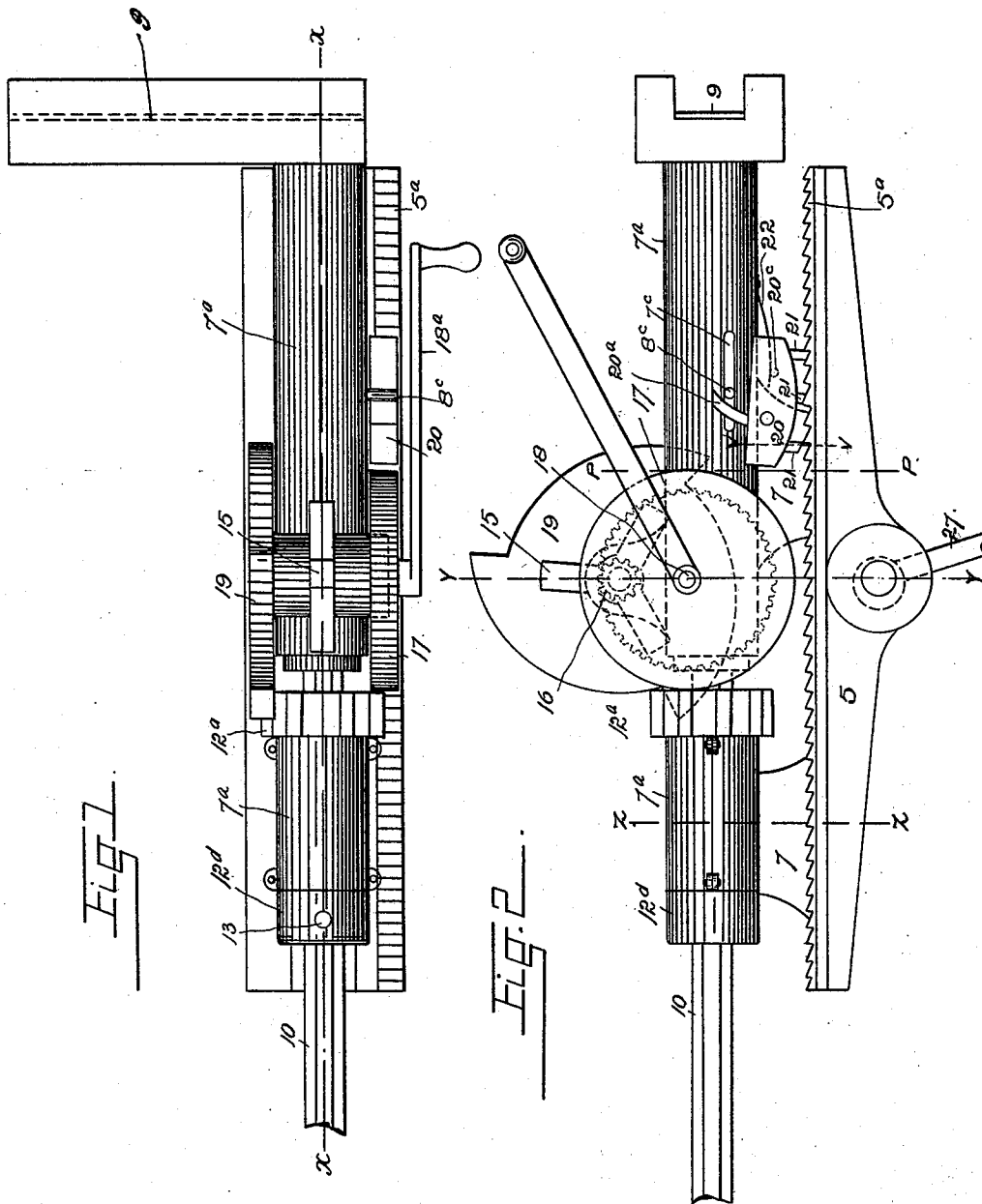
(No Model.)

2 Sheets—Sheet 1.

T. W. CHAPMAN.
HAND ROCK DRILL.

No. 543,293.

Patented July 23, 1895.



WITNESSES:

J. J. Olander
Chas. E. Dawson

INVENTOR

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(No Model.)

2 Sheets—Sheet 2.

T. W. CHAPMAN.
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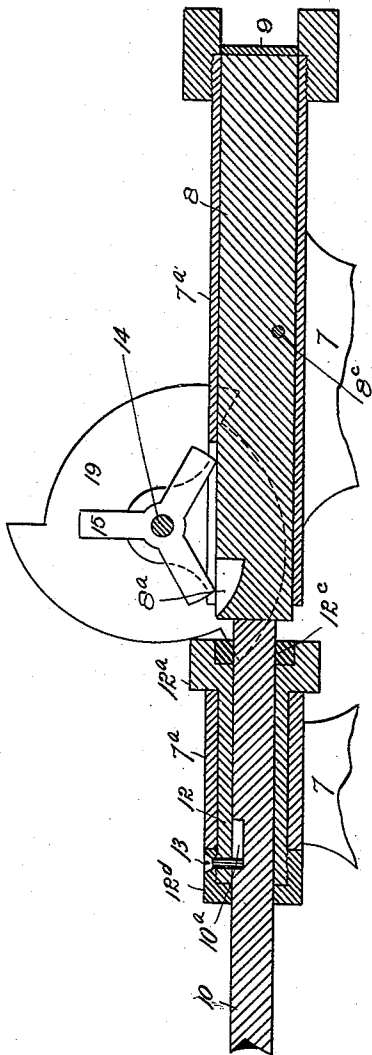


FIG. 3.



FIG. 7.

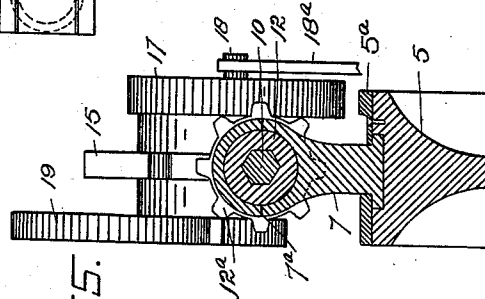
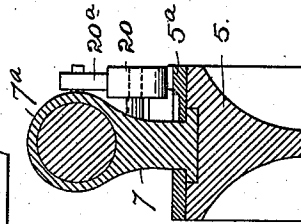


FIG. 6.

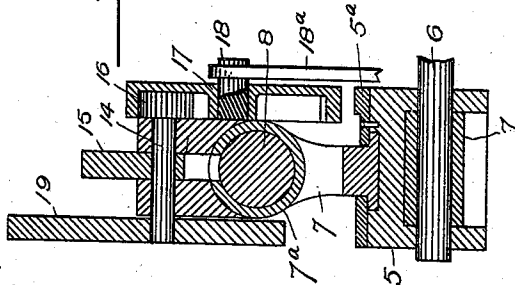


FIG. 4.

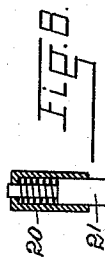


FIG. 8.

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UNITED STATES PATENT OFFICE.

THERON W. CHAPMAN, OF LAKEWOOD, COLORADO.

HAND ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 543,293, dated July 23, 1895.

Application filed September 17, 1894. Serial No. 523,211. (No model.)

To all whom it may concern:

Be it known that I, THERON W. CHAPMAN, a citizen of the United States of America, residing at Lakewood, in the county of Jefferson 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 figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in rock-drills of the class designed for hand use; and the invention consists of the features 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 of the same. Fig. 3 is a section taken on the line *x x*, Fig. 1. Fig. 4 is a section taken on the line *y y*, Fig. 2. Fig. 5 is a section taken on the line *z z*, Fig. 2, looking toward the right. Fig. 6 is a section taken on the line *p p*, Fig. 2. Fig. 7 is a detail view of the spring and spring-holder. Fig. 8 is a section taken on the line *v v*, Fig. 2, the parts being enlarged.

Similar reference characters indicating corresponding parts in the views, let the numeral 5 designate the track mounted on the pin or shaft 6 and locked thereon by the cam-lever 27. To this track is slidably attached the frame 7, having the tubular casing 7^a mounted thereon. In this casing is located the reciprocating hammer 8, bearing against the leaf-spring 9 at its rear extremity, while its forward extremity is adapted to engage the rear end of the drill-bit 10, which protrudes through the chuck 12 a suitable distance. The rear extremity of the chuck is provided with a toothed collar 12^a and is recessed to receive an elastic cushion 12^c to receive the striking end of the hammer and break the force of the blow in case the drill should slip through the chuck far enough to leave the latter exposed to the hammer. The forward end of the chuck is provided with a screw-cap 12^d, in which is

inserted a screw 13, which enters a groove 10^a formed in the drill, thus locking the chuck and drill together for purposes of rotation.

Journaled in the movable frame 7, above the tubular casing 7^a, is a shaft 14, to the center of which is made fast a sort of spider 15, composed of a hub and short radial arms, which, as the shaft is rotated, successively engage a notch or offset 8^a formed in the hammer and force the latter backward against the spring 9, which imparts to the hammer the forward movement as soon as the latter is released by the spider-arm. The casing 7^a is slotted to receive the spider-arms. To one end of the shaft 14 is made fast a pinion 16, which meshes with the interiorly-cogged rim of a large gear 17, made fast on the short crank-shaft 18, journaled in the movable frame and carrying a crank 18^a. To the extremity of shaft 14, opposite the pinion, is made fast a triple-faced cam 19, adapted to engage the teeth of sprocket 12 and impart to the chuck and drill-bit the partial rotation while the hammer is making the backward stroke.

It will be observed that the number of faces on the cam 19 must correspond with the number of arms with which the spider 15 is provided, and that the faces of the cam and arms of the spider are so located relatively that the face shall not engage the sprocket of the drill-chuck until the spider-arm has carried the hammer backward and relieved the drill from the pressure thereof.

To the frame 7, and located intermediate the casing 7^a and the track 5, is pivoted a keeper 20 carrying vertically-movable spring-actuated dogs 21, which engage a toothed rack 5^a attached to the track 5. Attached to the keeper 20 and projecting upward therefrom is an arm 20^a, which lies in the path of a lug 8^c formed on the hammer and protruding through a slot 7^c formed in the casing 7^a. To one side of the keeper, and to the rear of the pivot, is also attached a lug 20^c engaged by a leaf-spring 22, whereby the forward part of the keeper is normally thrown upward ready to ride over the toothed rack when the lug 8^c of the hammer engages the arm 20^a of the keeper.

From the foregoing description the operation of the machine will be readily understood. The crank-shaft 18 being rotated, the

gear 17 engages the pinion 16 on the shaft 14 and imparts motion to the spider 15 and the cam 19. The arms of the spider engage the offset 8^a of the hammer and force the latter backward against the spring 9, which, in turn, drives the hammer forward and causes it to deliver a forcible blow upon the rear extremity of the drill-bit 10. While the hammer is making each backward movement, a boss of the cam 19 engages a tooth of the sprocket 12^a and gives the chuck and drill-bit a partial rotation. As the drill advances into the rock the sliding frame 7 with its attachment is carried forward by virtue of the engagement of the lug 8^a on the hammer with the arm 20^a of the keeper, the dogs of the keeper being so constructed and arranged that they allow the keeper to slide forward over the toothed rack 5^a, but lock it against backward movement.

Feed mechanism comprising a keeper carrying dogs engaging a toothed rack, said mechanism being actuated by a reciprocating hammer, is shown but not broadly claimed in my simultaneously-pending application, Serial No. 523,212, filed September 17, 1894, and allowed November 20, 1894.

Having thus described my invention, what I claim is—

1. In a rock drill, the combination with the track, of the frame movably mounted thereon and carrying a tubular casing, the spring-actuated hammer located in the casing, the shaft journaled in the movable frame and carrying a spider having arms adapted to engage the hammer and force it backward against the spring, and suitable feed mechanism composed of a keeper pivoted on the frame and carrying a dog engaging the toothed rack of the track, said keeper having an arm lying in the path of a projection on the hammer, and a spring engaging a lug on the keeper, substantially as described.

2. In a rock drill, the combination with the track, of the movable frame mounted thereon and carrying a tubular casing, a hammer located in said casing, a leaf-spring engaging the rear extremity of the hammer, the chuck located in the casing and carrying the drill-bit in line with the hammer, the chuck being provided with a toothed collar, a shaft journaled in the frame above the tubular casing, a spider made fast on the shaft and engaging the hammer, a cam provided with faces corresponding with the number of the spider's

arms, said cam being adapted to engage the toothed collar of the chuck, and feed mechanism composed of a keeper pivoted on the frame and carrying dog engaging the toothed rack of the track, said keeper being actuated by the hammer, and a spring engaging a lug on the keeper, substantially as described.

3. In a rock drill, the combination of the track, the movable frame mounted thereon and carrying the tubular casing, the hammer located in said casing, a leaf-spring having one extremity made fast to a suitable holder attached to the movable frame, while the opposite extremity of the spring lies in the path of the hammer, a shaft journaled in the frame above the tubular casing, a spider centrally located on said shaft and carrying arms adapted to engage an off-set in the hammer, a pinion made fast on the spider shaft, a crank shaft journaled in the frame, a gear having an interiorly cogged rim engaging the pinion, the chuck carrying the drill-bit lying in the path of the hammer, and suitable feed mechanism composed of a keeper pivoted on the frame and carrying dogs engaging the toothed rack of the track, said keeper having an arm lying in the path of a projection on the hammer, and a spring engaging a lug on the keeper, substantially as described.

4. In a rock drill, the combination of the track having a toothed rack, the movable frame mounted on the track and having the tubular casing, the hammer located in said casing, the leaf-spring engaging one end of the hammer, the rotating spider adapted to force the hammer against the spring, a pinion carried by the spider shaft, a gear mounted on the crank shaft and engaging the pinion, the chuck carrying the drill-bit lying in the path of the hammer, said chuck having a toothed collar mounted thereon, a cam mounted on the spider shaft and adapted to engage the toothed wheel, a keeper pivoted on the frame and carrying dogs engaging the toothed rack of the track, said keeper having an arm lying in the path of a projection on the hammer, and a spring engaging a lug on the keeper, substantially as described.

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

THERON W. CHAPMAN.

Witnesses:

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G. J. ROLLANDET.