(No Model.) 2 Sheets—Sheet 1.

M. C. JACKSON.

ROCK DRILL.

No. 604,152. Patented May 17, 1898.

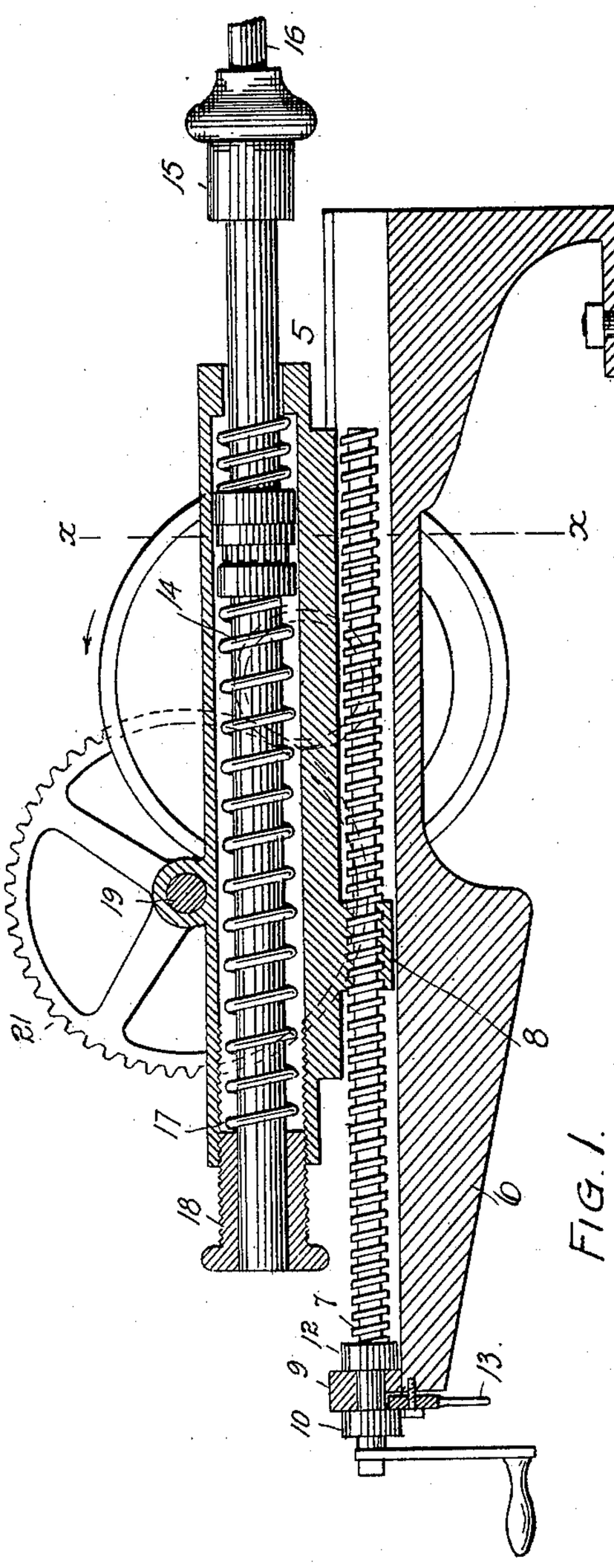

FIG. 1.

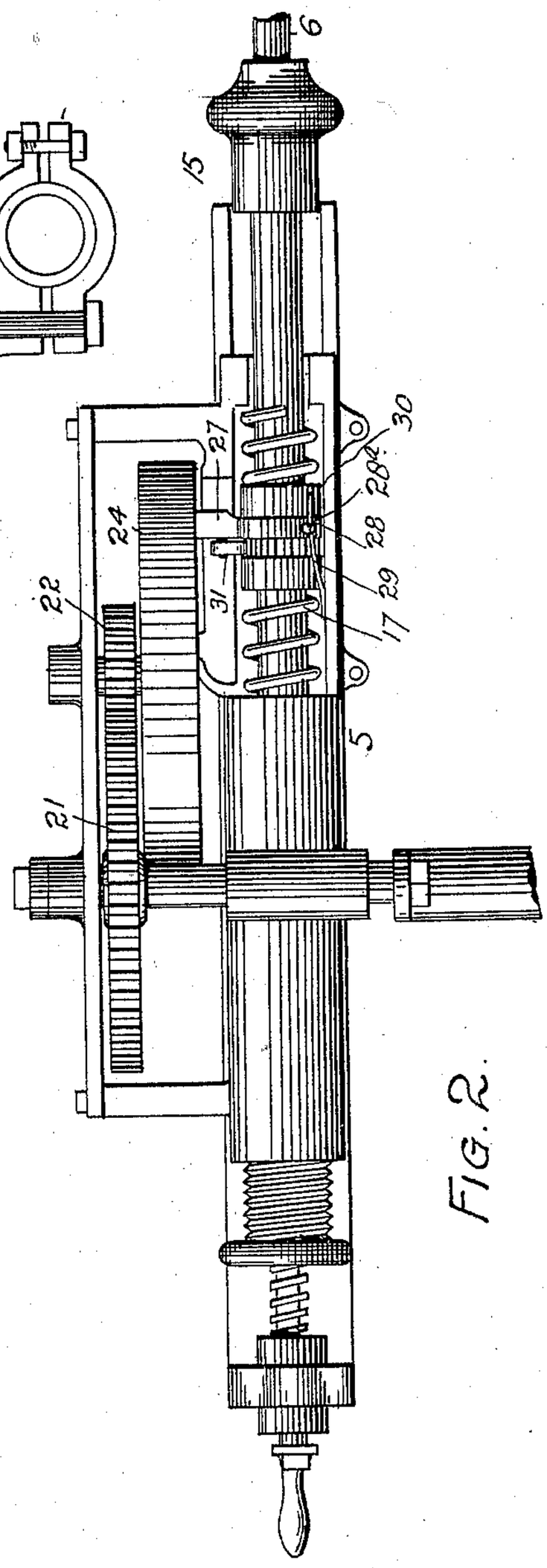

FIG. 2.

Witnesses
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Edith Hinsworth.

Inventor
M. C. Jackson
By his Attorney
W. W. Brien

(No Model.) 2 Sheets—Sheet 2.

M. C. JACKSON.

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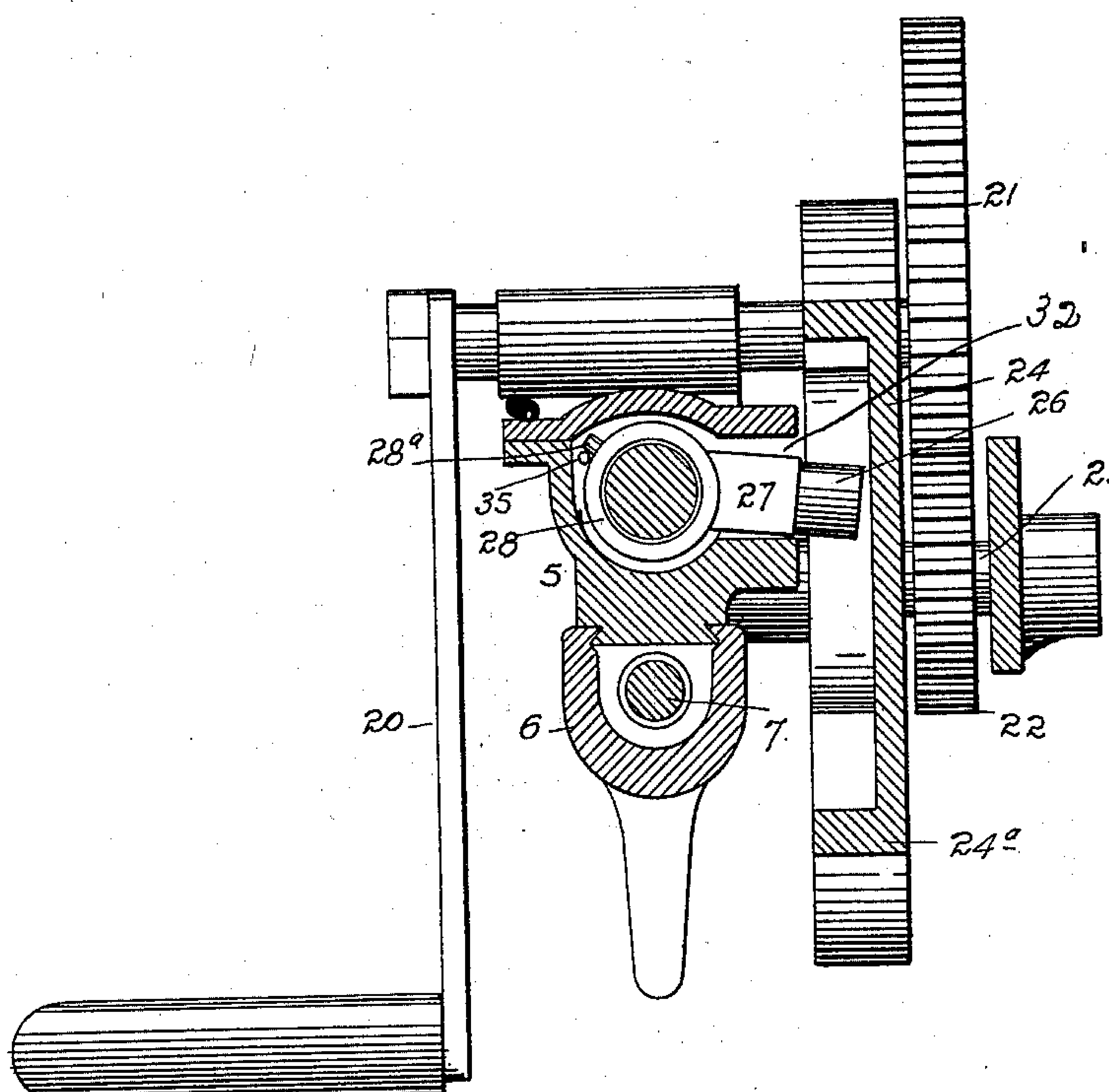

FIG. 3.

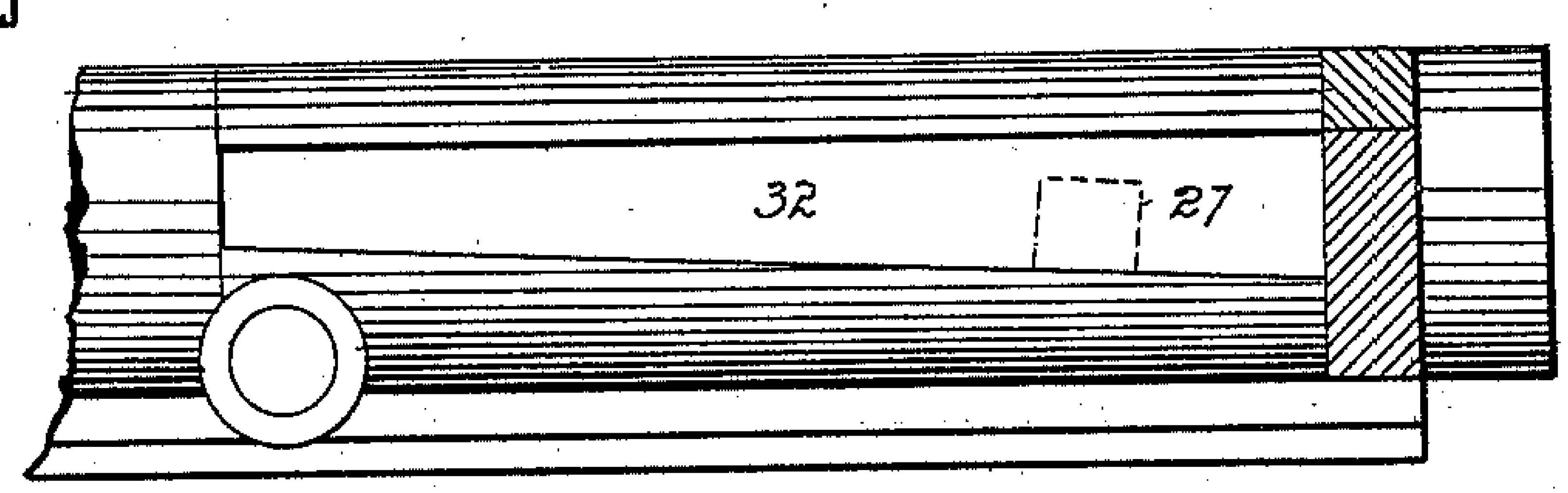

FIG. 4.

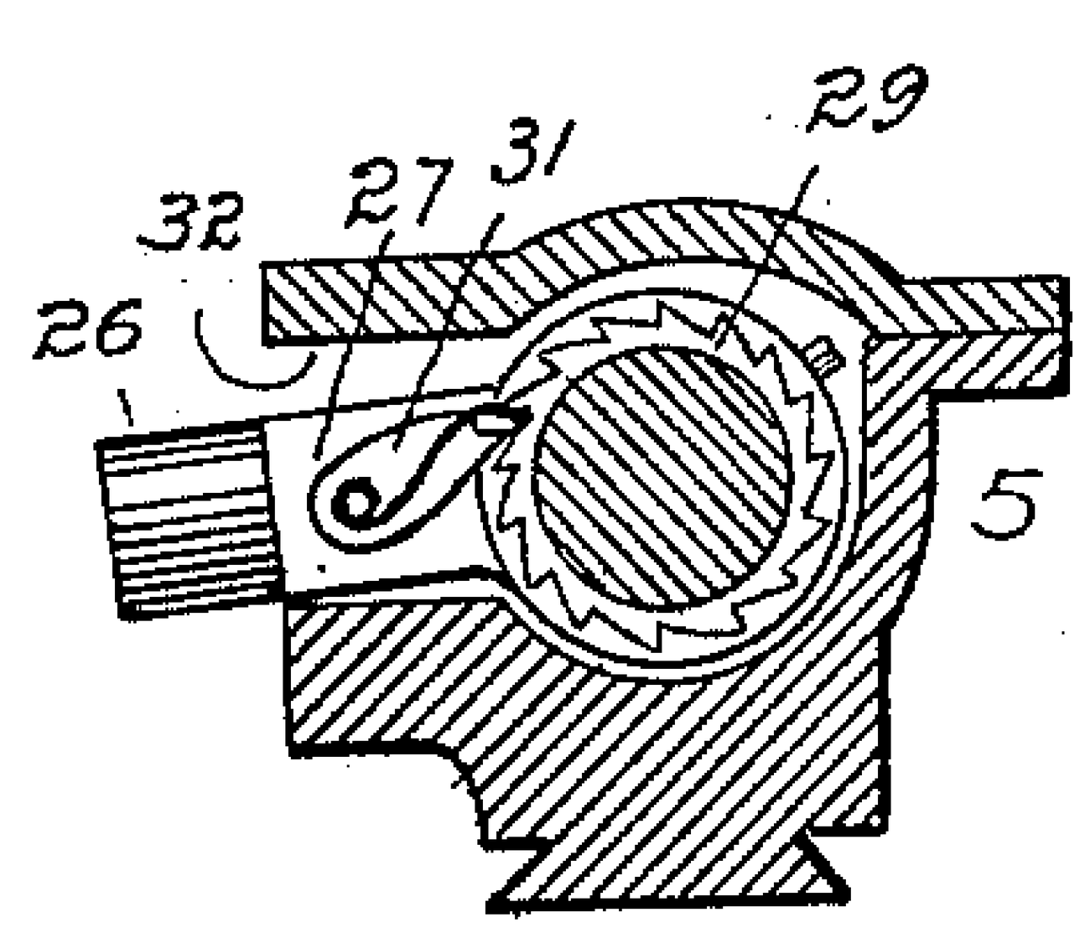

FIG. 5.

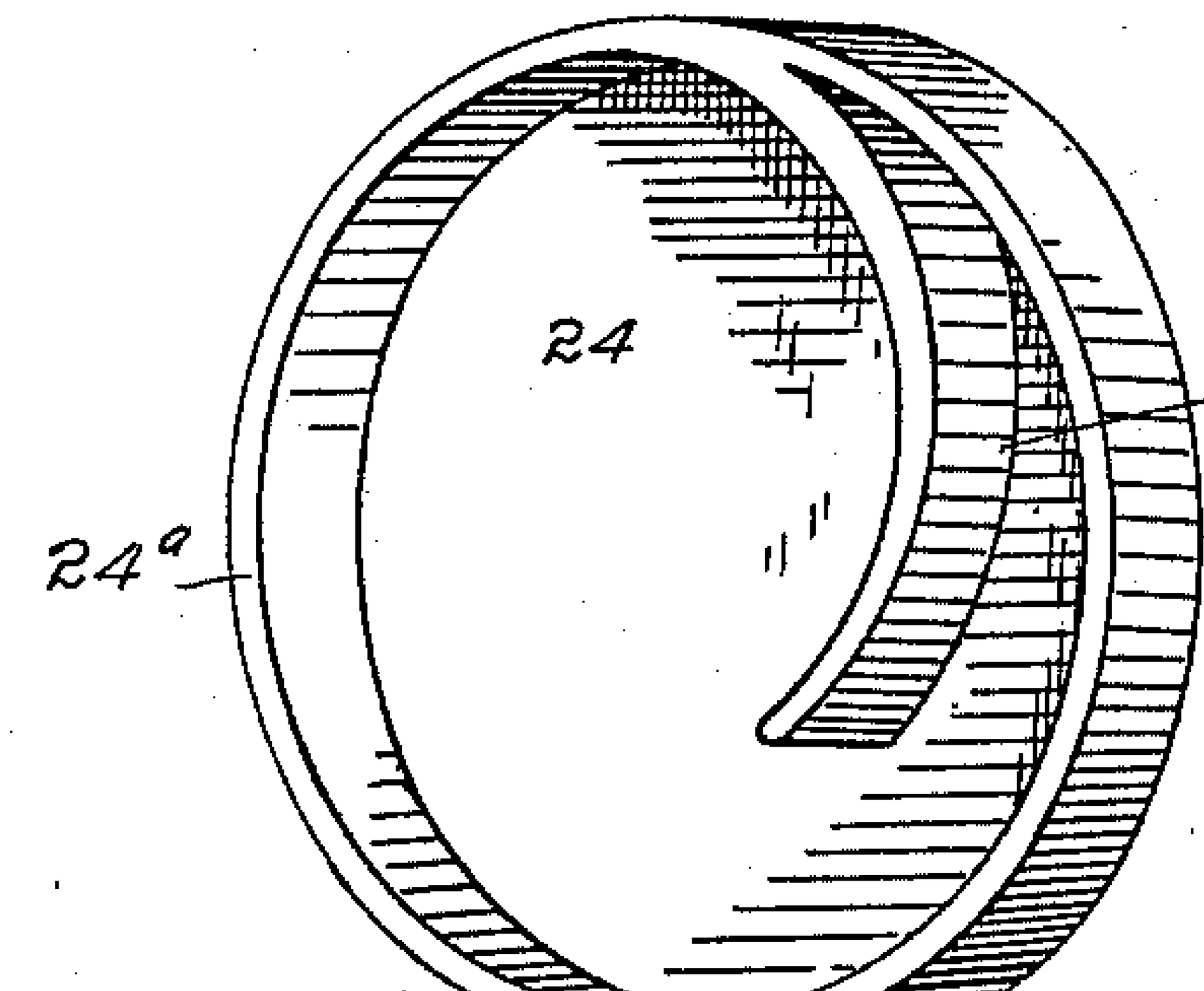

FIG. 6.

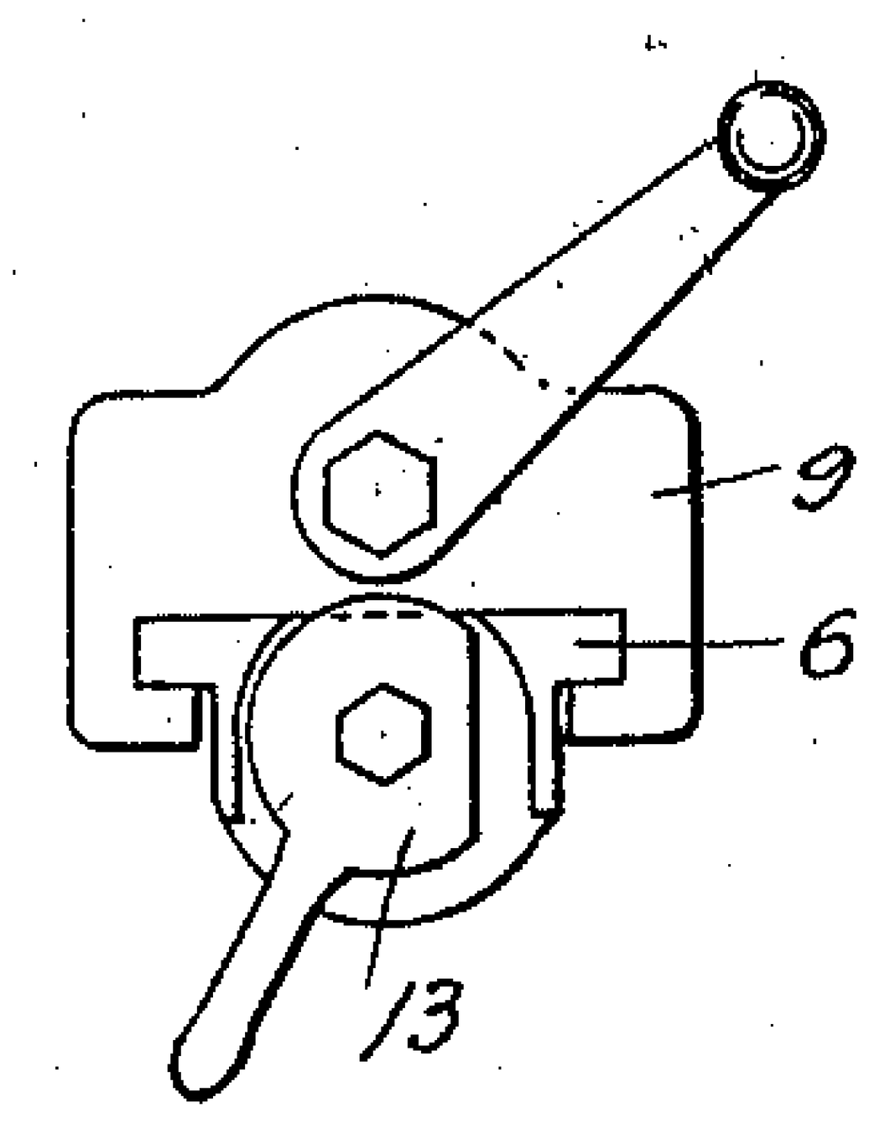

FIG. 7

Witnesses
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Inventor
M. C. Jackson.
By his Attorney
[signature]

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UNITED STATES PATENT OFFICE.

MANETHO C. JACKSON, OF DENVER, COLORADO, ASSIGNOR OF ONE-HALF TO HENRY DURELL CRIPPEN, OF SAME PLACE.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 604,152, dated May 17, 1898.

Application filed August 16, 1897. Serial No. 648,443. (No model.)

To all whom it may concern:

Be it known that I, MANETHO C. JACKSON, 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 figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in rock-drills, and though specially designed for hand use it must be understood that the machine may be operated by any 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; and to these ends 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 vertical longitudinal section taken through my improved drill. Fig. 2 is a top or plan view of the same, a portion of the casing being removed to show the mechanism within. Fig. 3 is a vertical cross-section taken through the machine on the line *x x*, Fig. 1, looking toward the left. Fig. 4 is a fragmentary section taken through the drill-casing and illustrating a detail of construction. Fig. 5 is a cross-section taken through the casing, illustrating the means for turning the drill shaft or bar. Fig. 6 is a perspective view of a cam-wheel. Fig. 7 is a rear end view of the drill.

Similar reference characters indicating corresponding parts in the views, let the numeral 5 designate the drill-casing, slidingly mounted upon the bed or track 6. The bottom of this casing is provided with dovetailed grooves engaging counterpart tongues formed on the bed. Hence the casing is securely held on the track against displacement. The casing is adjusted longitudinally on the track at will by means of a feed-screw 7, engaging a nut 8, formed on the bottom of the casing. The rear extremity of the feed-screw is journaled in a shoe 9, which is located between two collars 10 and 12, fast on the screw. The shoe is grooved to fit the rear extremity 6^a of the track, which is T-shaped. The shoe is normally locked on the track by a cam 13, pivoted on the track and adapted when properly adjusted (see Fig. 7) to engage a segmental shoulder on the shoe. When the shoe 9 is thus locked on the bed or track, the turning of the screw moves the casing back and forth on the track by virtue of the engagement of the screw with the nut 8 on the casing. If, however, it is desired to remove the casing from the bed or slide it thereon without turning the screw, the cam is adjusted so that its flat side lies adjacent the segmental shoulder on the shoe. In this case the shoe is released, and the turning of the screw will simply cause it to move back and forth in the nut without shifting the casing.

Located within the casing 5 is the reciprocating drill shaft or bar 14, to whose protruding forward extremity is attached the chuck 15, carrying the drill tool or bit 16. This shaft 14 is provided with a shoulder 14^a, against which bears one extremity of a strong coil-spring 17, which surrounds the drill-shaft. The opposite or rear extremity of this spring is engaged by an exteriorly-threaded tension-nut 18, which is screwed into the rear open end of the casing, the latter being threaded for the purpose. The tension of the spring may be regulated at will by adjusting this nut.

Exteriorly journaled on the top of the casing 5 is a transverse shaft 19, to one extremity of which is made fast the operating-handle 20. To the opposite extremity of this shaft is secured a gear-wheel 21, meshing with a pinion 22, fast on a shaft 23, journaled in the casing. On the shaft 23 is also made fast a fly-wheel 24, having an annular flange 24^a on one side. Formed integral with the flange 24^a of the fly-wheel and projecting inwardly therefrom is a curved cam 25, adapted to engage an antifriction-roller 26, journaled on the outer extremity of a lug 27, formed integral with a loose collar 28, surrounding the drill-shaft, and located between two collars 29 and 30, fast on the said shaft. These fast

collars maintain the loose collar in its proper relative position on the shaft. Hence it is evident that while the collar 28 may turn freely on the drill-shaft it is locked against longitudinal movement. The exterior periphery of the collar 29 is provided with ratchet-teeth, which are engaged by a dog 31, pivotally mounted on one side of the lug 27. This lug projects into and moves in a path or guideway 32, formed in the side of the casing adjacent the fly-wheel. This guideway 32 is open on the fly-wheel side, allowing the roller 26 to project into the path of the cam 25 on the fly-wheel. The vertical depth of the way 32 is considerably greater than the thickness of the lug 27, thus allowing the latter sufficient oscillatory movement therein to turn the drill-shaft through the instrumentality of the dog 31 and the ratchet-collar 29. The bottom or lower side of the guideway 32 is inclined. (See Fig. 4.)

The drill is operated by turning the handle 20, which imparts motion to the gear-wheel 21 and thence through the medium of the pinion 22 to the fly-wheel 24, which rotates in the direction indicated by the arrow. (See Fig. 1.) As the fly-wheel rotates the cam 25 engages the roller 26, which normally lies close to the inner periphery of the flange 24^a. During each rotation of the wheel 24 the roller 26 travels in engagement with the cam 25 from the flange 24^a to the extremity of the cam, which then releases the roller. During this movement of the roller the drill-shaft is driven backward against the power-spring 17, which is pressed until the cam releases the roller, when the recoil of the spring drives the drill-shaft forward, causing the drilling tool or bit to strike the rock. During the backward movement of the drill-shaft the lug 27 is raised in its guideway 32 until it engages the upper wall of said way. This movement of the lug gives the drill-shaft a partial rotation through the instrumentality of the dog 31 on the lug and the ratchet-collar 29 on the shaft. As the drill-shaft moves forward, the roller 26 having been released by the cam, the lug is allowed to fall, which it does, gradually moving downward as it follows the inclined lower surface of the guideway. To insure the downward movement of the lug or make said movement positive under all circumstances, as well when the drill occupies an upright position as when it lies in a horizontal plane, a spring 35 is employed. This spring engages a lug 28^a, formed on the collar 28. The spring, which is attached to the casing, is placed under tension by the partial rotation of the said collar with the drill-shaft. Hence as soon as the cam releases the roller 29 the recoil of the spring 35 returns the collar 28 to its normal position. As the collar 28 moves backward or in the opposite direction the dog 31 slips over several teeth of the ratchet-collar and is ready to repeat the operation of turning the drill-shaft at every reciprocation of the latter.

A coil-spring 36 is located between the collar 30 on the drill-shaft and an interior shoulder formed at the forward extremity of the casing. This spring acts as a cushion to prevent the drill-shaft from coming in direct contact with the casing during its forward movement. It must be understood, however, that I do not limit myself to a coil-spring for the purpose stated, as any other suitable substance may be employed to perform the said function.

Having thus described my invention, what I claim is—

1. In a rock-drill, the combination of the bed-plate, the casing slidingly mounted thereon, a transverse shaft journaled on the casing, a gear-wheel fast on said shaft, another shaft journaled on the casing, a pinion fast on the last-named shaft and meshing with the said gear-wheel, a fly-wheel fast on the pinion-shaft and provided with a cam, the drill-shaft located in the casing, a power-spring engaging said shaft, a loose collar mounted on the drill-shaft and provided with a lug projecting into the path of the cam on the fly-wheel whereby as the last-named wheel is rotated the cam engages the said lug, draws the shaft backward and releases it, the forward movement being effected by the power-spring, a dog mounted on said lug, and a ratchet-collar fast on the drill-shaft and engaged by said dog, the casing being provided with a longitudinal guideway for the lug on the loose collar, the depth of said guideway being sufficient to allow the said projection to oscillate therein for the purpose of turning the drill-shaft.

2. In a rock-drill, the combination with the casing, the reciprocating shaft and the power-spring, of a loose collar mounted on the drill-shaft and provided with a lateral projection, a dog mounted on said projection, a ratchet-collar fast on the drill-shaft and engaged by said dog, the casing being provided with a longitudinal guideway for the projection on the loose collar, the depth of the said guideway being sufficient to allow the said projection to oscillate therein for the purpose of turning the drill-shaft, a rotary cam mounted on the drill-casing and engaging the projection on the loose collar which projection lies in the path of the cam, and suitable means for rotating the cam.

3. In a rock-drill, the combination with the casing and the reciprocating shaft, of a collar loosely mounted on said shaft and reciprocating therewith, said collar being provided with a projection, the casing being grooved to form a guideway for this projection, which is allowed to oscillate therein to a limited extent for the purpose of turning the drill-shaft, a spring engaging said collar and normally holding it on the bottom of the said guideway, a dog carried by said projection, a ratchet-collar fast on the drill-shaft and engaged by said dog, and a rotary cam mounted on the casing and engaging the projection on the collar.

4. In a rock-drill, the combination with the casing and the reciprocating shaft, of a loose collar mounted on said shaft and reciprocating therewith, said collar being provided with a lateral projection, the casing having a guideway formed therein for said projection in which the latter is allowed a limited oscillatory movement for the purpose of rotating the drill-shaft, the bottom of the guideway being inclined, a spring engaging a projection on the loose collar whereby the said projection is normally held in the bottom of said guideway, and a rotary cam engaging the outer extremity of said projection which is provided with an antifriction-roller.

5. In a rock-drill, the combination of the guide bed or track, the casing slidingly mounted thereon and provided with a nut, a shoe detachably mounted on the rear extremity of the guide-bed, the feed-screw being journaled in said shoe, and a cam pivotally mounted on the guide-bed and adapted to lock the shoe thereon.

6. In a rock-drill, the combination of the bed-plate, the casing slidingly mounted thereon and provided with a threaded opening in its rear extremity, a transverse shaft journaled on the casing, a gear-wheel fast on said shaft, another shaft journaled on the casing, a pinion fast on the last-named shaft and meshing with the said gear-wheel, a fly-wheel fast on the pinion-shaft and provided with a cam, the drill-shaft located in the casing, a power-spring engaging said shaft, a tension-nut screwed into the threaded opening in the rear extremity of the casing, said nut engaging said power-spring, a loose collar mounted on the drill-shaft and provided with a lug projecting into the path of the cam on the fly-wheel, whereby as the last-named wheel is rotated, the cam engages the said lug, draws the shaft backward and releases it, the forward movement being effected by the power-spring, a dog mounted on said lug, and a ratchet-collar fast on the drill-shaft and engaged by said dog, the casing being provided with a longitudinal guideway for the lug on the loose collar, the depth of said guideway being sufficient to allow the said projection to oscillate therein for the purpose of turning the drill-shaft.

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

MANETHO C. JACKSON.

Witnesses:
G. J. ROLLANDET,
A. J. O'BRIEN.