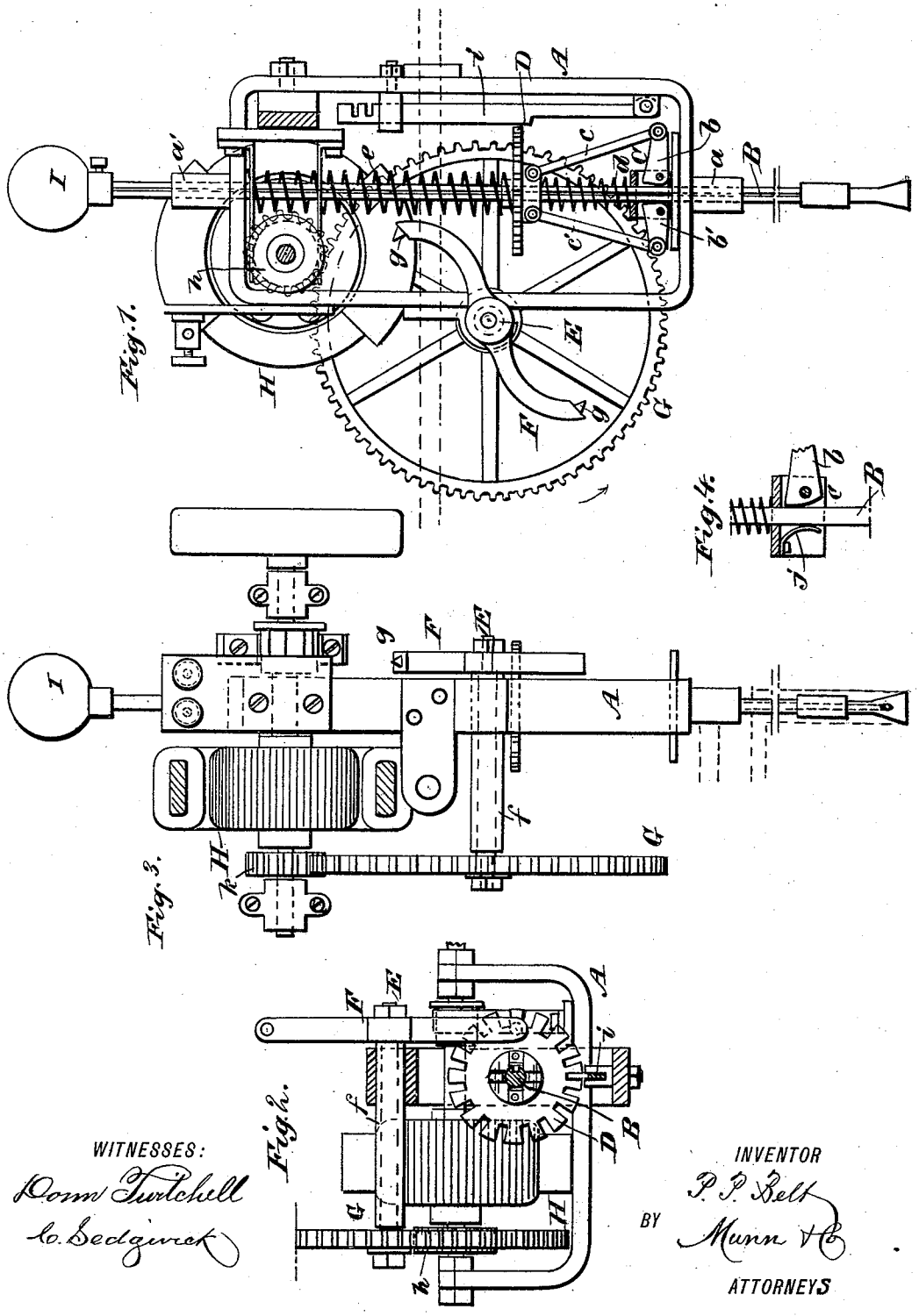
(No Model.)

P. P. BELT.

ROCK DRILL.

No. 479,615. Patented July 26, 1892.



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PERLEY P. BELT, OF WACO, TEXAS, ASSIGNOR TO FRANK OSBORN, OF TWIN LAKES, COLORADO.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 479,615, dated July 26, 1892.

Application filed October 8, 1891. Serial No. 408,138. (No model.)

To all whom it may concern:

Be it known that I, PERLEY P. BELT, of Waco, in the county of McLennan and State of Texas, have invented a new and Improved Rock-Drill, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a side elevation of my improved rock-drill. Fig. 2 is a plan view. Fig. 3 is an end elevation, partly in section; and Fig. 4 is a detail view of a modified form of the clutch mechanism.

Similar letters of reference indicate corresponding parts in all the views.

The object of my invention is to construct a simple and efficient rock-drill in which the forward feeding and rotating of the drill are accomplished automatically.

My invention consists in the construction and arrangement of parts, as will be hereinafter fully described and claimed.

In the center of the rectangular frame A are formed guides *a a'*, for receiving the drill-rod B. On the drill-rod is placed the U-shaped plate C, in which are pivoted upon opposite sides of the rod the clutch-levers *b b'*, the said levers having faces which are substantially at right angles to each other, the shorter faces adjoining the drill-rod serving to engage the said rod when the outer ends of the clutch-levers are raised.

Above the clutch-levers and upon the rod B is placed a radially-slotted tappet-plate D, which is provided with a feather extending into a longitudinal groove in the rod B. The plate D is provided with ears, to which are pivoted the links *c c'*, connected with the clutch-levers *b b'*.

On the drill-rod B, between the tappet-plate D and the clutch mechanism, is placed a spiral spring *d*, and between the plate D and the opposite end of the frame A is placed a spiral spring *e*, the said spring *e* having sufficient strength to give the drill-rod B its forward movement.

The U-shaped plate C is provided with a feather, which enters a longitudinal groove in the drill-rod B, thus permitting the said plate and the mechanism carried thereby to move freely in a longitudinal direction without turning on the drill-rod.

In a sleeve *f*, secured to the side of the frame A, is journaled a shaft E, carrying at one end an S-shaped cam F, furnished with conical projections *g* at opposite ends, which engage the radial slots on the tappet-plate D. The opposite end of the shaft E is furnished with a spur-wheel G. The shaft E may be rotated in any convenient way; but I prefer to drive it by means of an electric motor H, secured to the frame A and having on its armature-shaft a pinion *h*, which engages the spur-wheel G on the shaft E. The electric motor H is of the usual construction and will therefore need no special description. It is preferably made water-proof throughout, so that its operation will not be affected by exposure to the dripping and dampness of mines. To increase the momentum of the drill-rod B, a weight I is secured to the end thereof when necessary. As the shaft E is revolved in the direction indicated by the arrow, the cam F is brought into engagement with the tappet-plate D, moving the plate against the pressure of the spring *e*, at the same time raising the outer ends of the clutch-levers *b b'* and bringing them into engagement with the drill-rod. After such engagement the further movement of the plate D carries the drill-rod backward against the pressure of the spring *e*. When one of the conical projections *g* engages the groove of the tappet-plate, it causes the plate to turn through a part of a revolution and when the tappet-plate slides off from the cam the spring *e* pushes the plate D and rod B forward until the U-shaped clutch-plate C strikes the end of the frame A, when the clutch is released from the rod B and the said rod moves forward by its own momentum. This operation is repeated for each contact of the cam F with the tappet-plate.

When it is desired to cause the drill to work several times in the same place without being turned, the guide *i*, which is pivoted to the frame A, is swung over into engagement with one of the radial slots of the plate D. Arranged in this way the engagement of the

cam with the radially-slotted plate can only lift the plate and the drill-rod without turning it and release it, so that it falls, causing the drill to strike in the place from which it was lifted. The conical ends of the cam, instead of causing the plate D to rotate by entering the slots thereof, slip out of the slots and escape from the periphery of the plate.

In the modification shown in Fig. 4 only one clutch-lever *b* is used, a spring *j* being placed upon the opposite side of the drill-rod B in lieu of the other clutch-lever.

To render the drill self-clearing, I make the drill-rod and drill-bit tubular, as shown, and force air or water through them, causing the ejection of the chips and dust.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a rock-drill, the combination of the drill-rod, a tappet-plate placed loosely on the drill-rod, clutch mechanism connected with the tappet-plate for engaging the drill-rod, a spring for impelling the drill-rod, a cam provided with conical ends for lifting the tappet-plate, and the guide *i*, substantially as specified.

2. In a rock-drill, the combination, with a frame and a drill-rod sliding and rotating freely in the frame, of a tappet-plate having a slotted edge and sliding freely on the drill-rod and held from turning thereon, a friction-clutch carried by the said tappet-plate to raise the drill-rod, a vertically-extending guide-bar adapted to engage the slotted edge of the tappet-plate and prevent it from rotating during its entire throw, and a rotary tappet, the arms of which engage the lower side of the plate to raise it and also to rotate it when the guide-bar is out of engagement therewith, substantially as set forth.

3. A rock-drill comprising a frame, a drill-rod turning and sliding freely therein, a tappet-plate sliding freely on the rod and held against turning thereon, a plate C beneath the tappet-plate, and through which the drill-rod freely passes, a clutch-lever pivoted to the plate C to engage the drill-rod, a link *c*, connecting the clutch-lever and tappet-plate, a spring on the rod between the two plates, a spring on the rod between the upper part of the frame and upper side of the tappet-plate, a vertically-extending guide-bar pivoted at its lower end to the frame to swing inward into engagement with the slotted edge of the tappet-plate and extending upward as far as the upward throw of the tappet-plate, and a rotary tappet, the arms of which engage the under side of the tappet-plate, substantially as set forth.

4. In a rock-drill, the combination of a revoluble drill-rod B, a radially-slotted tappet-plate D, a clutch mechanism C, attached to the tappet-plate, the guide *i*, and the cam F, provided with the conical ends *g*, substantially as specified.

5. In a rock-drill, the combination, with the drill-rod B, of the radially-slotted tappet-plate D, clutch-levers *b b'*, connected with the tappet-plate, the spring *d*, and the cam, provided with conical ends *g*, for lifting the tappet-plate, substantially as specified.

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Witnesses:
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