2 Sheets—Sheet 1.

W. H. RICHARDS.

Ratchet-Drill.

No. 197,896. Patented Dec. 4, 1877

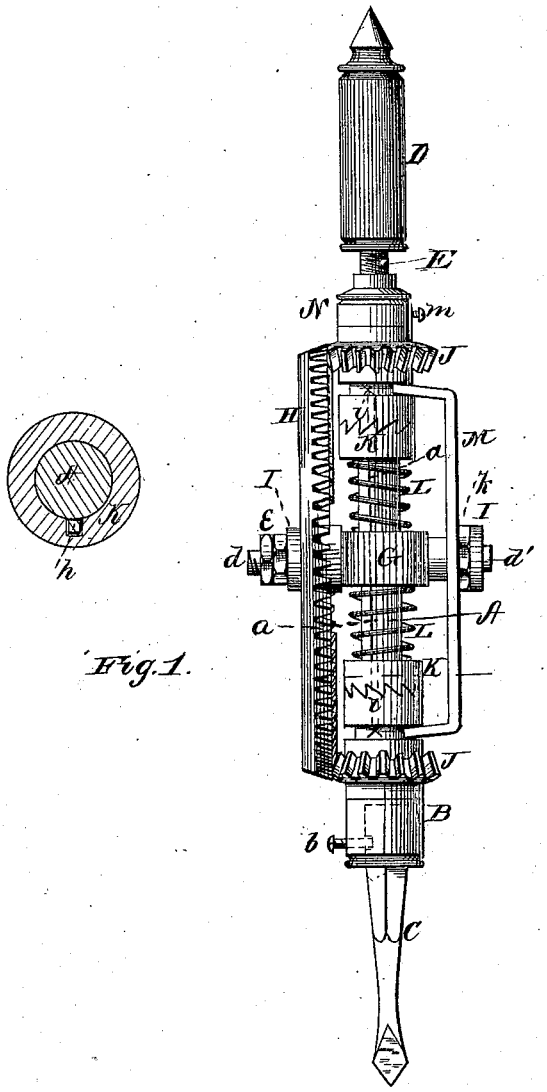

Fig. 1.

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2 Sheets—Sheet 2.

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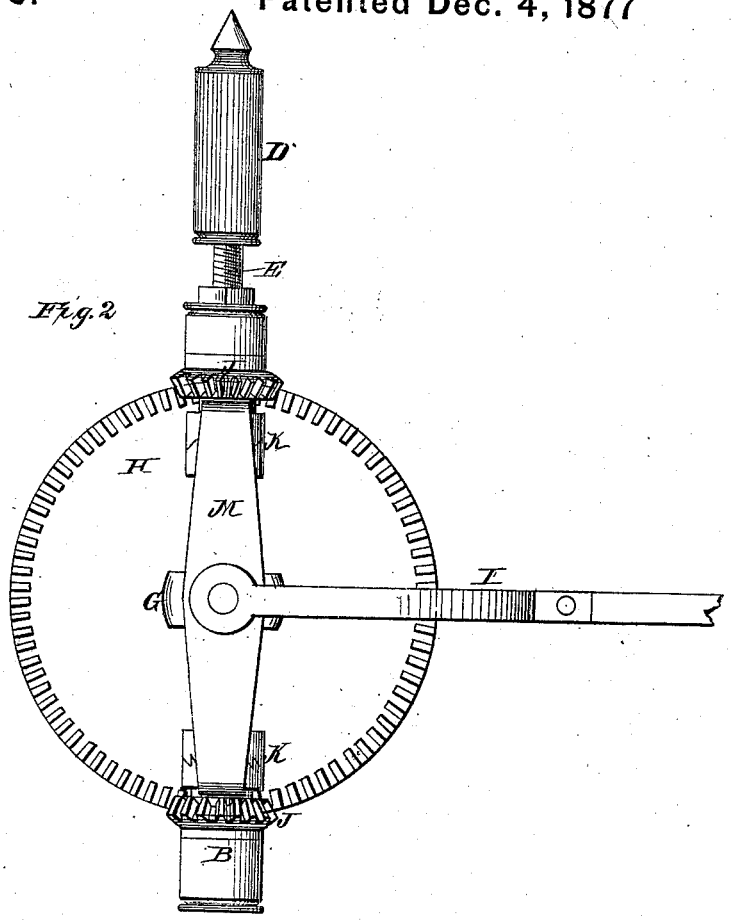
Fig. 2



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UNITED STATES PATENT OFFICE.

WILLIAM H. RICHARDS, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN RATCHET-DRILLS.

Specification forming part of Letters Patent No. **197,896**, dated December 4, 1877; application filed October 20, 1877.

To all whom it may concern:

Be it known that I, WILLIAM H. RICHARDS, of Pittsburg, in the county of Allegheny and in the State of Pennsylvania, have invented certain new and useful Improvements in Ratchet-Drills; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The nature of my invention consists in the construction and arrangement of a ratchet-drill, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, in which—

Figure 1 is a side view, and Fig. 2 a plan view of my invention.

A represents the center shaft, provided with a longitudinal groove, *a*, forming a key-seat. At one end this shaft has socketed to it a head, B, for the reception of the tools C, which are secured therein by a set-screw, *b*. At the other end of the shaft is formed the temper or feed screw E, on which is placed the covering-point D, the moving whereof produces the pressure of the tool on the wook.

All the other parts of the mechanism are pivoted, and held on the body of the main shaft A.

At the center is a short cross-shaft, G, through an enlargement upon which the shaft A passes. The cross-shaft G is provided with a journal, *d*, at one end, on which the main bevel-wheel H moves, and is held by lock-nuts E.

Attached to the wheel H is the operating arm or handle I, the vibration of which causes the wheel to move forward and back. An arm of the handle I has its bearing on the other end of the shaft G, at *d'*.

Upon the shaft A, and geared in the wheel H, are two bevel-pinions, J J, which revolve freely on the shaft A, one at each end. The hub of each pinion J is provided with a circumferential guide-groove, X, and with ratchet crab-teeth *i*. These teeth on the two pinions are inclined in opposite directions, and facing corresponding clutches K K, held by sliding keys *h*, working in the slot *a*, to the main shaft A. The movement of the crabs or clutches K K is regulated by means of spiral springs L L, which, when either pinion is moving in the reverse direction, allow the teeth to pass, but as soon as the pinion turns to work, causes the clutch to advance, the teeth to engage, and thus revolve the shaft A, in an almost continuous rotation in one direction. The springs L L surround the main shaft A and bear against opposite sides of the cross-shaft G.

M is a guide-bar having its extremities working in the grooves *x x* on the hubs of the pinions J J, and thus holding said pinions in correct mesh with the driving-wheel H. This guide-bar is held stationary on the end *d'* of the shaft G by an oblong center-hole, *y*, to which said end is fitted and held securely thereto by a nut, *k*.

One pinion is placed close against the head B, and a collar, N, is placed on the other end of the shaft A, against the other pinion, and this collar fastened by a set-screw, *m*, thus completing the machine.

The vibrating of the handle causes the pinions J J to revolve alternately in opposite directions, one working upon the shaft A, while the arm is going down, the other while the arm is going up, and the springs and crabs alternately relieving themselves as the motion is reversed.

The arrangement of parts, as herein described, is applicable to many other purposes besides drilling.

I am aware that it is not new in mechanical movements to convert a reciprocating or vibrating motion into a continuous rotary motion by means of a vibrating lever and cog-wheel operating upon pinions with ratchets interposed between such pinions and the central shaft; and I do not, therefore, claim such, broadly, as being my invention.

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

1. The guide-bar M, in combination with the cross-shaft G, main shaft A, and pinions J J, having circumferential grooves *x x* in their

hubs, substantially as and for the purposes herein set forth.

2. The combination of the center shaft A, having longitudinal groove *a* and feed-screw E, the head B, movable covering-point D, cross-shaft G, with journals *d d'*, main wheel H, with handle I, pinions J, with grooves *x* and teeth *i*, the clutches K, springs L, guide-bar M, and collar N, all constructed and arranged, substantially as and for the purposes herein set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 9th day of October, 1877.

WILLIAM H. RICHARDS.

Witnesses:

J. B. GEYSER,

W. H. PORTER.