

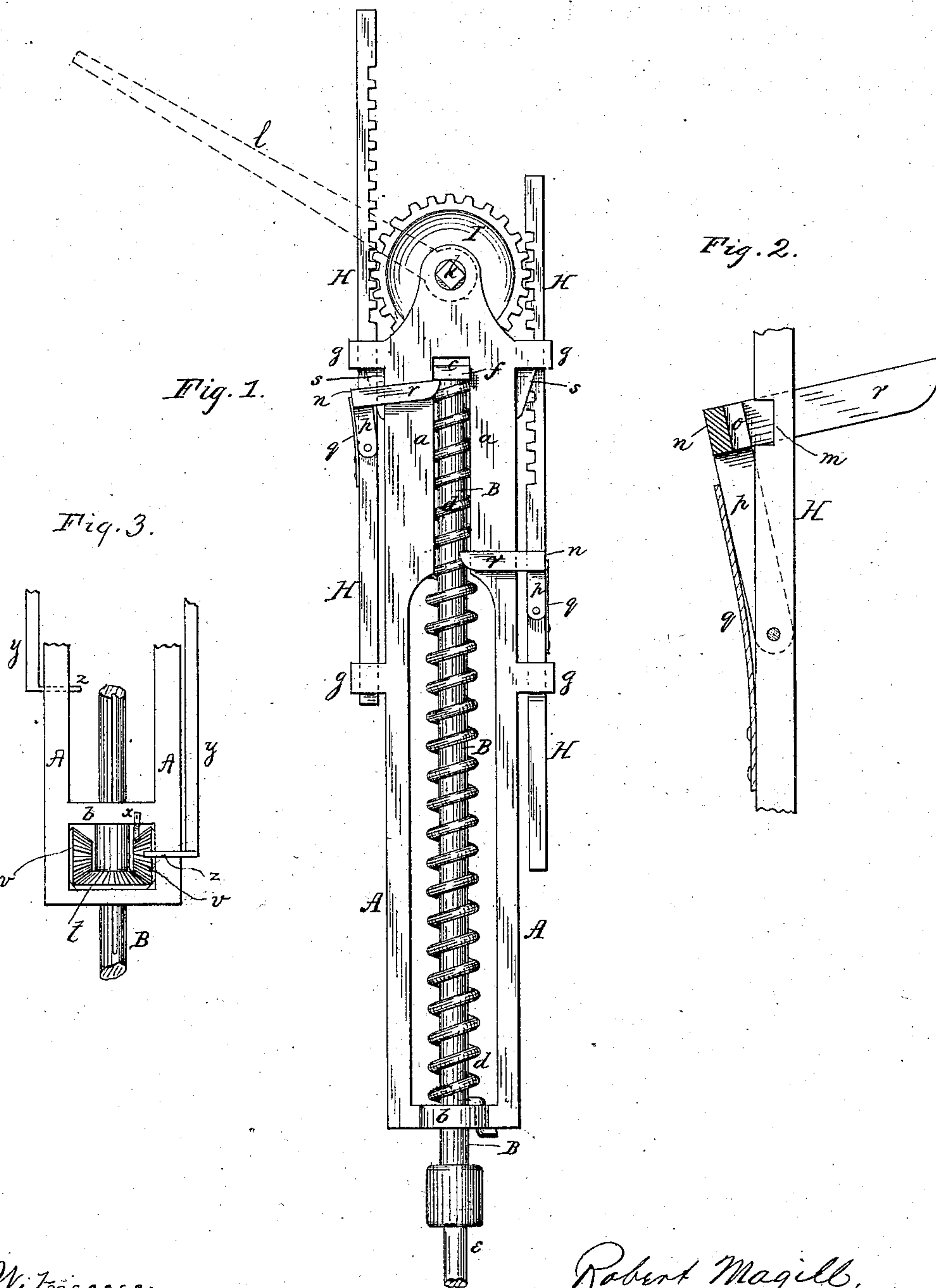
(No Model.)

R. MAGILL.

HAND ROCK DRILLING MACHINE.

No. 292,665.

Patented Jan. 29, 1884.



Witnesses:-
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UNITED STATES PATENT OFFICE.

ROBERT MAGILL, OF PITTSBURG, PENNSYLVANIA.

HAND ROCK-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 292,665, dated January 29, 1884.

Application filed May 29, 1883. (No model.)

To all whom it may concern:

Be it known that I, ROBERT MAGILL, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Hand Rock-Drilling Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, in which—

Figure 1 is a side elevation of my improved drilling-machine. Figs. 2 and 3 are detail views.

This invention relates to the construction of hand rock-drills of that class in which the blow of the drill is obtained by distending or compressing a spring attached to or bearing on the drill-rod, and then releasing the spring and drill-rod from engagement.

The invention consists in the combinations and arrangements of parts, substantially as hereinafter fully described and claimed.

A designates a frame or housing, having the parallel slides *a a* and bottom *b*, the latter perforated to receive and guide the drill-rod B, whose upper end is guided by means of cross-head *c*, fitting the slides *a a*, as shown.

A powerful coiled spring, *d*, has its upper end fastened to the cross-head *c* or drill-rod B, and its lower end is anchored to the frame A in any suitable manner. By this construction, if the rod B is forced upwardly, it distends the spring *d*, and upon release of spring *d* pulls the rod downwardly with great force, and causes the drill-bit *e*, set in the lower end of rod B, to strike violently into the rock or other material under operation. The cross-head *c* has toes *f* projecting to the front and rear, respectively.

Fitting to move freely in suitable guides, *g*, on the two sides of frame A, are the two similar bars H, having their inner faces provided with toothed racks, as shown, which mesh at opposite ends, of a diameter with the pinion I, whose shaft *k* is journaled in frame A, as shown, and is provided with removable hand-lever *l* for operation. By oscillating the lever *l* the pinion I causes the two rack-bars H to

move in opposite directions and to reciprocate, so that when one rack-bar is at its highest point the other will be at its lowest, and vice versa. Each of the bars H has a recess, *m*, formed in its outside, as shown. A cross-bar, *n*, having an internal notch, *o*, adapting it to interlock with recess *m*, is pivoted by means of lugs *p* on the outside of each of the bars H, the lugs *p* preferably extending downwardly. A plate-spring, *q*, on the bar H normally presses the cross-bar *n* into recess *m* on bar H, but allows the bar *n* to be pushed out of said recess readily. At each end of bars *n* a trigger-arm, *r*, rigidly attached to or a part thereof, extends inwardly, so as to project across the path of the cross-head toes *f*. Thus each of the bars *n* has two trigger-arms, *r*, embracing the frame A.

Upon each side of frame A, at a point at or near the highest travel of the bars *n*, are constructed the inclines *s*, projecting in the path of bars *n*, so that when the latter move upwardly they mount the inclines and the trigger-arms *r* are drawn out of the path of the toes *f*. The apparatus is placed together with one rack-bar at the highest point, (which is as shown in drawings,) and the other at the lowest. The latter is then in such position that its trigger-arms *r* extend under the toes *f* of cross-head *c*. By now oscillating the lever *l* the cross-head is lifted by the rising rack-bar, and the other rack-bar descends, its trigger-arms *r* swinging aside to pass the ascending cross-head toes *f*. The latter rises with the rack-bar, and the bar *n* of the latter finally mounts the incline *s*, and its trigger-arms *r* are drawn out from under the toes *f*, whereupon the spring *d* acts and violently impels the drill-rod downwardly. Upon now moving the lever *l* in the opposite direction the same operations are repeated by the other rack-bar, and so on, thus effecting a powerful blow of the drill at every oscillation of the hand-lever.

To permit the rotation of the drill, the rod B is so fitted to cross-head *c* as to revolve therein. Such can be done by the well-known arrangement of collar or pins. Rod B may be tubular or solid, as circumstances may dictate. If hollow, the drill-bit may be long, and then can be clamped at different lengths, to

adapt it to deep or shallow drilling. By replacing the bit *e* by a hammer-head the apparatus may be used in connection with the ordinary hand-drill, in that case the apparatus 5 taking the place of the usual laborious striking with a sledge.

To effect the progressive rotation of the drill-rod and bit while in operation, I place a pinion, *t*, on the drill-rod B, below frame A, 10 and on the sides of said frame I set the wheels *v*, meshing with pinion *t*. One of the wheels *v* is fitted with a locking-pawl, *x*, to prevent return movement. The bars H are elongated or provided with extensions *y*, each carrying 15 a spring-dog, *z*, arranged to strike one of the teeth of wheels *v* every time the bar H is depressed and push it a slight distance—say one tooth. By this means the drill-rod and bit are partially rotated after every blow.

20 I have shown the bars H as outside the frame A; but they may be arranged inside and the pinion I reduced accordingly in diameter. Such reduction would limit the throw of the bars H too much, and to avoid such 25 consequences I would adopt the common mechanical expedient of multiple gearing—*i. e.*, apply the lever *l* to the shaft of a large pinion which would engage (out of the line of bars H) with the pinion I.

30 I claim as my invention—

1. In a drilling apparatus, the combination

of the oscillatory pinion I, lever *l* on the shaft thereof, rack-bars H, engaging with said pinion, and spring-actuated drill-rod B, said bars H being provided with means for engaging 35 the rod B and automatically releasing the same, substantially as described.

2. The combination of oscillatory pinion I, reciprocating rack-bars H, engaging therewith, frame A, having guides *g* for said rack-bars, spring-triggers *p n r*, drill-rod B, spring 40 *d*, and cross-head *c*, having toes *f*, said triggers adapted to engage the cross-head in their upward movement and yield in the downward movement, substantially as described. 45

3. The reciprocating bar H, having recess *m*, in combination with the cross-bar *n*, having notch *o*, lugs *p*, and arms *r*, and spring *q*, and the drill-rod B, having cross-head *c*, and toes *f* in the path of said arms *r*, substantially 50 as described.

4. The combination, with drill-rod B, having toes *f*, of reciprocating bars H, having spring trigger-arms *r*, and frame A, provided with inclines *s*, substantially as described. 55

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

ROBERT MAGILL.

Witnesses:

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