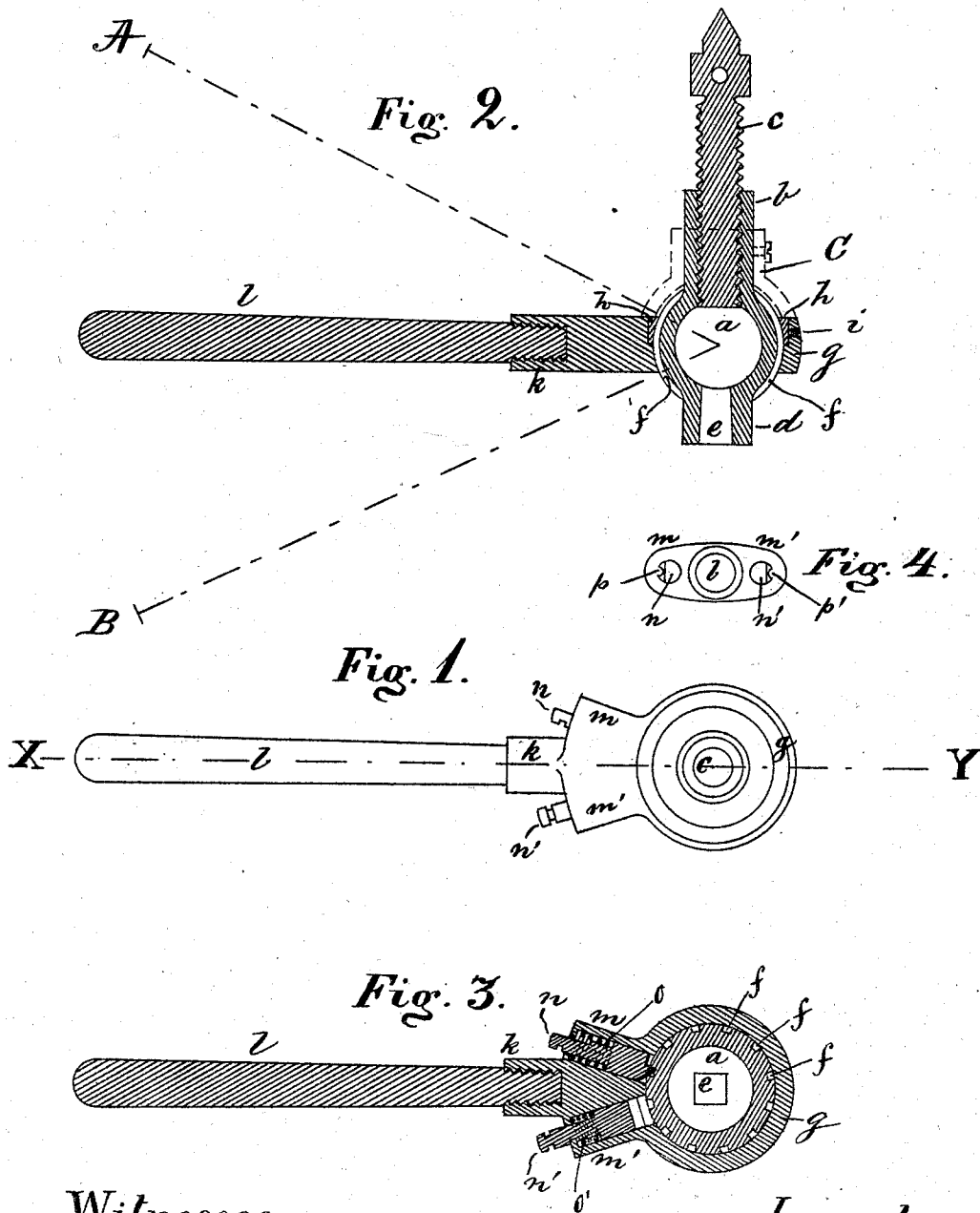


B. GALLAGHER.
Ratchet Drills.

No. 137,432.

Patented April 1, 1873.



Witnesses:
John H. Heard.
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UNITED STATES PATENT OFFICE.

BERNARD GALLAGHER, OF ST. JOHN, CANADA.

IMPROVEMENT IN RATCHET-DRILLS.

Specification forming part of Letters Patent No. **137,432**, dated April 1, 1873; application filed December 30, 1872.

To all whom it may concern:

Be it known that I, BERNARD GALLAGHER, of St. John, New Brunswick, in the Dominion of Canada, have invented certain new and useful Improvements in Ratchet-Drills, of which the following is a specification:

My invention relates to improvements in ratchet-drills, consisting in the employment of a grooved or toothed ball that is made to move loosely in a suitable ring, to which the handle is attached. The said ring is provided with two chambers, in which a right-and-left-handed pawl is made to engage into the grooves on the grooved sphere or ball, by which arrangement the handle may be operated in any suitable inclination to the center line of the drill, as may be required in many places where there is no space for operating the said handle in a plane at right angle to the center line of the drill.

On the drawing, Figure 1 is a ground plan of my invention. Fig. 2 is a central longitudinal section over the line *x y*, shown in Fig. 1. Fig. 3 is a horizontal section over the center line of the handle and ball, and Fig. 4 is a rear view of the handle and the pawl-chambers.

Similar letters refer to similar parts wherever they occur on the drawing.

a on the drawing is the ball, provided in its upper part with a hub, *b*, that is tapped for the reception of the presser-screw *c*, as shown. The lower part of the said ball *a* is provided with a hub, *d*, having a square hole made therein for the insertion of the drill in the usual manner. The ball *a* is provided on its outside with suitable grooves *f f f*, running parallel with the center line of the screw *c*, as shown. The grooves *f f f* are made symmetrical in section, so that a right or left handed pawl may engage therein to equal advantage. The ball *a* is supported in an easy-fitting ring, *g*, in which it may revolve without much friction. A detachable annular ring, *h*, is fitted in a recess in the upper or under side of the ring *g*, as shown in Fig. 2, for the purpose of inserting the ball *a* in the ring *g*, and also for the purpose of retaining it there in its proper place. The annular ring *h* is attached to the ring *g* by means of one or more set-screws, *i*, as shown. To the projecting hub *k* of the ring *g* is secured the handle *l*, by which the drill is

operated in the usual manner. On each side of the hub *k* is made a cylindrical chamber, *m*, in which the pawls *n n'* are guided.

In Fig. 3 the right-hand pawl *n* is represented as engaged with the grooved ball *b*, whereas the left-hand pawl *n'* is shown as being disengaged from the said ball *a*.

The pawls are held in contact with the ball *a* by means of coiled springs *o o'* that surround the stem of each pawl and press against a recess made thereon and on the top of the chambers *m m'*, as fully shown in Fig. 3. The outer projecting ends of the pawls *n n'* are flattened off on one side, as fully shown in Fig. 4, and the extreme ends of the chambers *m m'* are each provided with a projecting semicircular lip, *p p'*, by which arrangement the pawls *n n'* are allowed to move partially around their axes, so as to adjust themselves automatically to the ball *a*, according to the plane in which the handle *l* is operated. The lips *p p'* also serve for another purpose—namely, to keep any desired pawl disengaged from the grooved ball *a*. For this purpose a cut or recess is made on each of the pawl-stems equal to the thickness of the lips *p p'*, and all that is needed for the purpose of disengaging one of the pawls is to draw it out a little and turn it part of a revolution, when the lip *p* locks into the said notch or recess on the pawl-stem, and holds it locked in that position for any length of time, as may be desired.

As will be understood from this, I do not use but one pawl at a time, and consequently have one pawl engaged with the ball *a*, and the other disengaged therefrom at the same time; but the reason why I employ two pawls, *n n'*, is so that the ball *a* may be turned to the right or left, according to the nature and position of the hole that is to be drilled.

Dotted lines A B on Fig. 2 indicate the extreme upper and lower inclinations that the handle *l* can be operated from a horizontal position.

By the construction of my improved ratchet-drill, in a manner as herein described, I am able to drill holes in metal in places where it would be impossible to drill with the ordinary ratchet-drills, where the inclination of the handle to the feed-screw is always kept the same; but as it is convenient for ordinary drilling

to keep the handle at a right angle to the feed or presser screw, I place a tube, C, shown in dotted lines on Fig. 2, over the hub *b*, and attach it temporarily thereto by means of set-screws or similar means. The base of the tube C embraces the upper part of the ball *a* and rests on the ring *g*, as shown.

When the tube C is used it also serves for the purpose of a protector for the ball *a*, so that no dust or dirt can fall thereon and clog it.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. The combination of the symmetrically-grooved ball *a*, ring *g*, the two piston-pawls *n n'*, and the springs *o o'*, when all are combined, constructed, and arranged substantially as herein shown and described.

2. In combination with the ball *a*, hub *b*, and ring *g*, the guide C or its equivalent, for the purpose and in a manner as set forth.

BERNARD GALLAGHER.

Witnesses:

ALBAN ANDRÉN,
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