

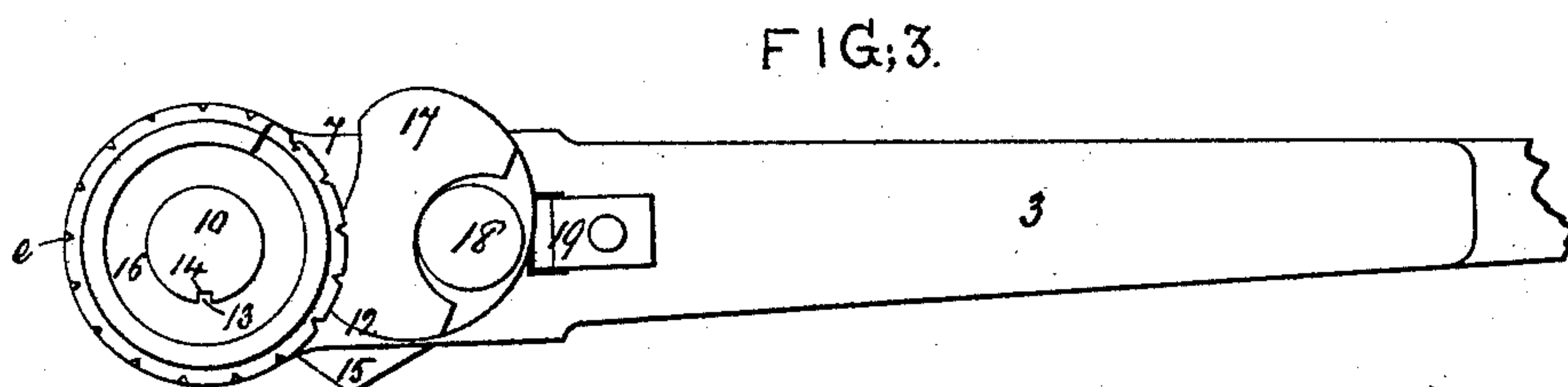
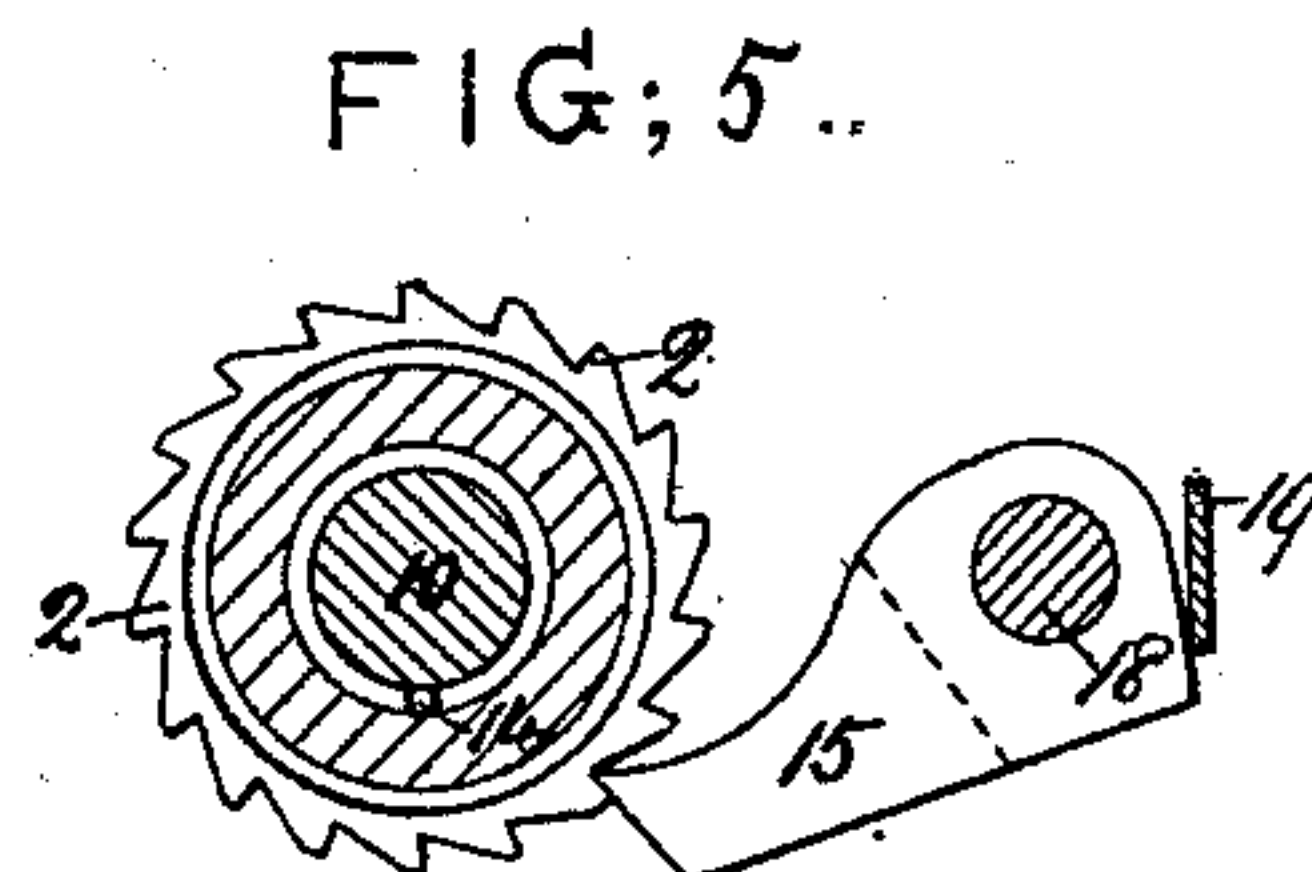
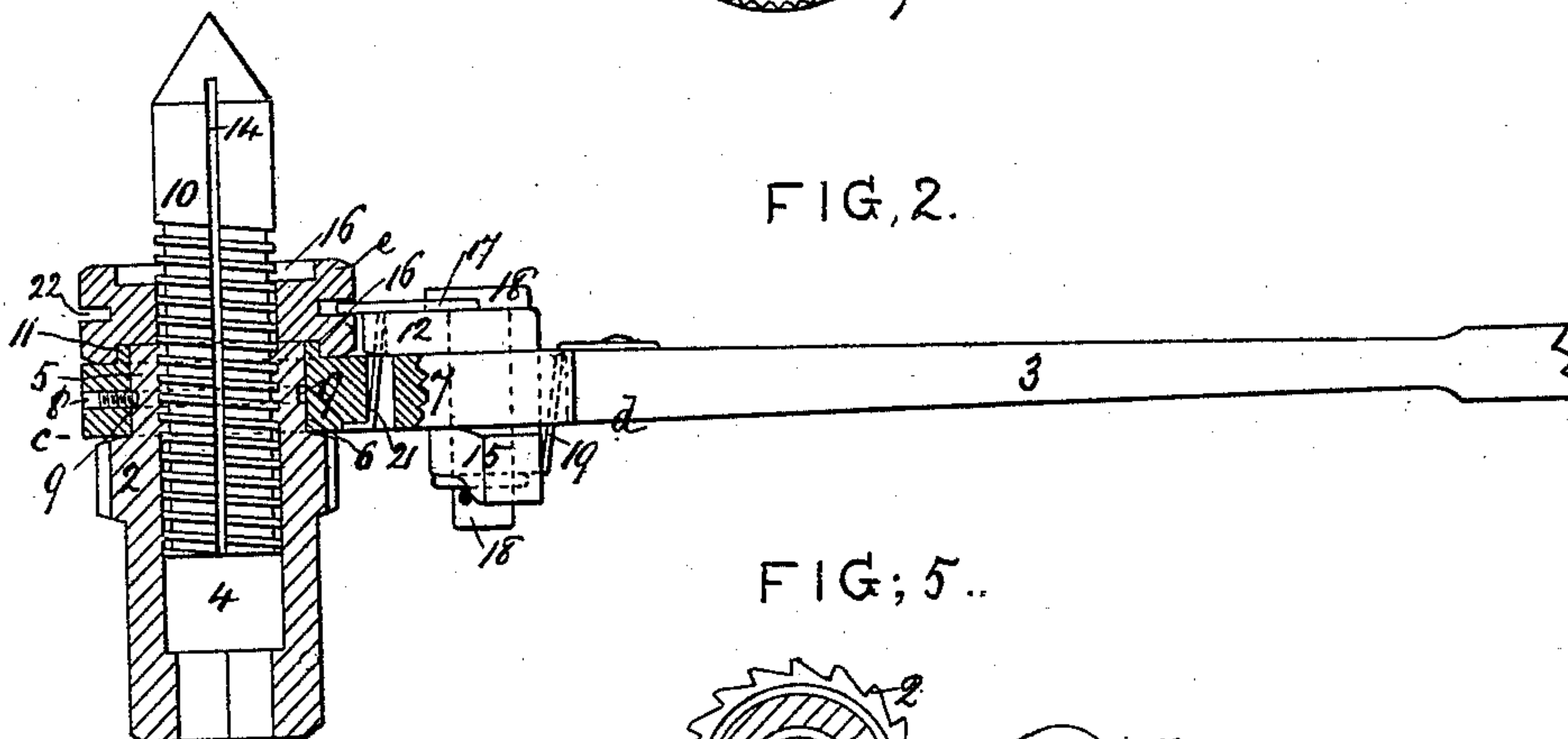
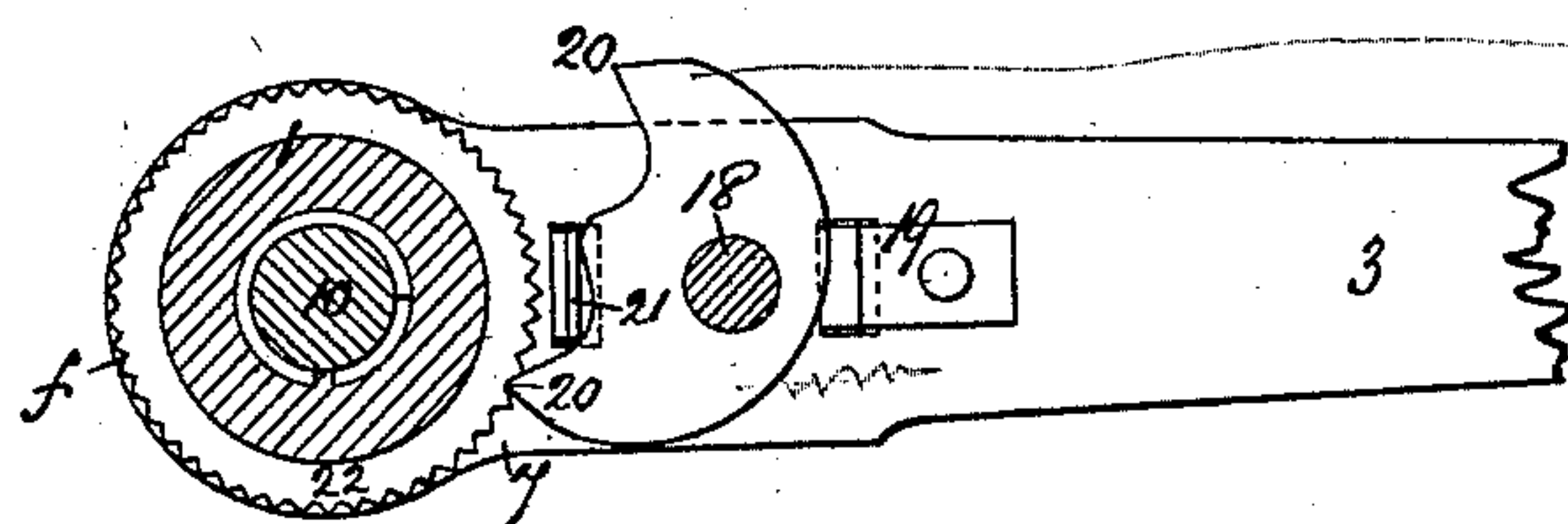
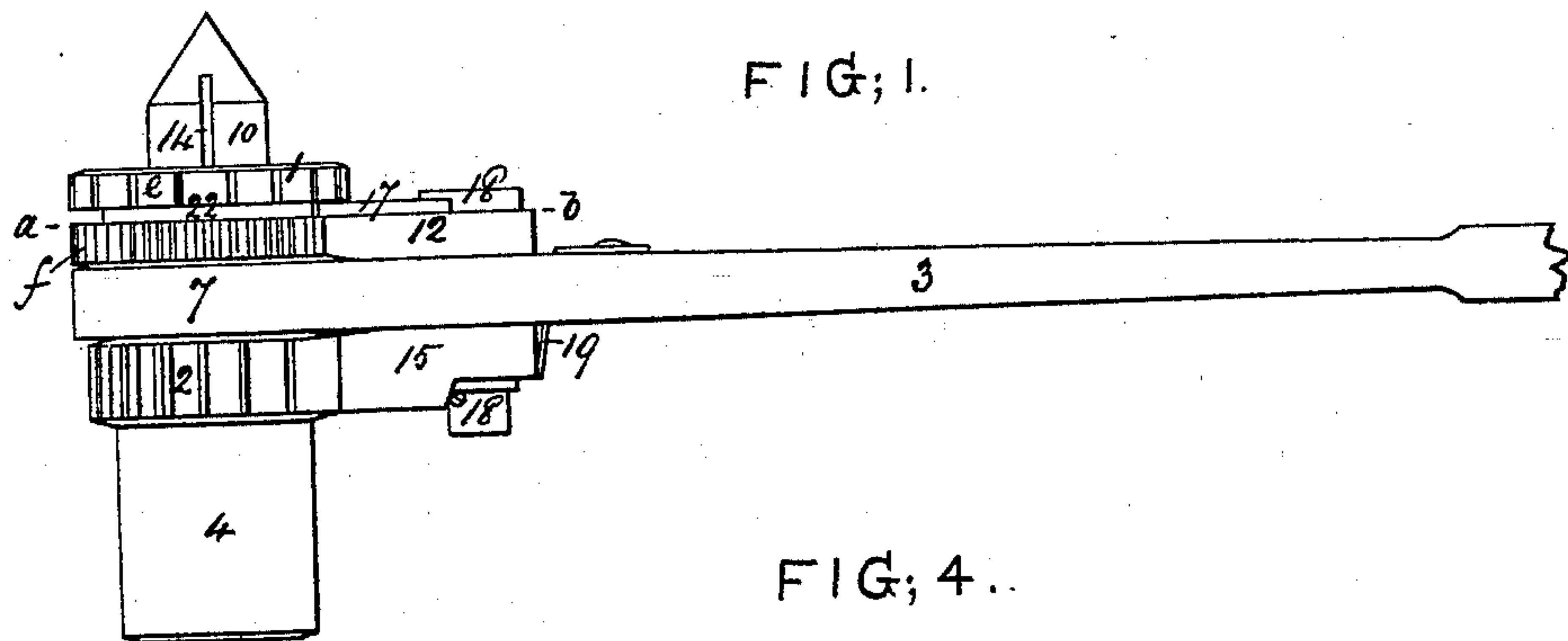
(No Model.)

C. T. COLEBROOK.

RATCHET DRILL.

No. 285,733.

Patented Sept. 25, 1883.



WITNESSES.

Charles Aubrey Day
Gerard Burton

INVENTOR.

Amos Thomas Colebrook
Per Joshua Rose attorney.

UNITED STATES PATENT OFFICE.

CEMER THOMAS COLEBROOK, OF ISLINGTON, COUNTY OF MIDDLESEX,
ENGLAND, ASSIGNOR TO HIMSELF, AND JOSHUA ROSE, OF NEW
YORK, N. Y.

RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 285,733, dated September 25, 1882.

Application filed June 1, 1882. (No model.) Patented in England February 22, 1882, No. 971.

To all whom it may concern:

Be it known that I, CEMER THOMAS COLEBROOK, of Islington, in the county of Middlesex, England, a citizen of the Kingdom of Great Britain and Ireland, have invented certain Improvements in Ratchet-Braces, of which the following is a specification.

This invention has reference to that class of automatic or self-feeding ratchet-braces in which the automatic feeding of the drill up to its work is effected by a differential arrangement of gearing, which is so arranged and combined as that in the forward stroke of the usual handle or lever the feeding-wheel or ratchet has more or less of a start of the drill-turning wheel or ratchet, and thus advances the usual screw and feeds the drill up to its work before the drill is turned to effect the required drilling.

The object of my invention is to provide a self-feeding ratchet-brace in which the mechanism employed to automatically feed the drill may also be employed to release it from pressing against the end of the hole being drilled, and thus enable its easy removal from the hole.

The object of my invention is, further, to provide a ratchet-brace with a feed-ratchet having two sets of ratchet-teeth differently spaced around its circumference, so that by reversing it end for end the rate of drill-feed per stroke of lever-handle may be changed.

The object of my invention is, further, to provide a self-feeding ratchet-brace in which the feed is automatically actuated while the drill is at rest, and does not occur while the drill is under cutting duty.

These advantages I obtain by an improved arrangement of the parts of such ratchet-braces, whereby I am enabled to obtain great practical advantages as regards simplicity of construction, economy of time in adjusting the device, in advancing the feed-screw and setting it up to its work before starting the drilling, and of running the screw in after it has been worked out, and of separately or conjointly actuating the feeding or drill-turning gearing, and of reducing the friction, so that the feed-gearing acts with the same certainty in drilling small holes as in drilling large holes, these being advantages which are not attainable in such self-feeding drills as they have hitherto been made.

The improved ratchet-brace is illustrated on the accompanying drawings in Figures 1 to 5, of which Fig. 1 represents a side elevation; Fig. 2, a longitudinal section; Fig. 3, a plan view; Fig. 4, a sectional plan through *a b*, showing the quick-feeding rim of the feeding-ratchet and its reversible or double-acting pawl, and which is also common to the slow-feeding rim of this ratchet; and Fig. 5, a sectional plan through *c d* of the drill-turning ratchet and its pawl.

According to my present invention I arrange the feeding wheel or ratchet 1 and the drill-turning wheel or ratchet 2 on opposite sides of the usual handle or lever, 3, the ratchet 2 being preferably made in one piece with the stock or body 4 of the brace, and with an annular extension or collar, 5, which rises within a corresponding cylindrical opening, 6, made through the head 7 of the handle 3, and within which opening it has freedom of rotation, being prevented only from endwise movement or from falling out by a screw-pin, 8, inserted through the head 7 of the handle into an annular groove, 9, around the outer surface of the collar 5, the internal surface of which is formed to accommodate a left-handed screw, 10.

The upper face of the head 7 of the handle is formed with an annular projecting ring, 11, concentric with the collar 5, which terminates flush with the upper surface of the ring 11, which is intended for giving an extended bearing to the collar 5, and for reducing the friction of the feeding-ratchet 1 upon the screw 10 by taking the thrust of the feeding-pawl 12.

The feeding-ratchet 1 is, as above stated, arranged on the upper or opposite side of the handle 3 to the drill-turning ratchet 2, and it is made cylindrical internally, and snugly fits and surrounds the screw 10, which I make left-handed, the screw engaging with and projecting, from within the said screwed collar or extension 5 of the drill-body 4, up through the ratchet 1, which is made with an inner projection, 13, which engages with a longitudinal slot, 14, in the screw 10, so that it cannot rotate about the screw, but causes the same to rotate with it when being actuated or turned by the handle and its pawl 12, and so that it will allow of the screw being advanced longitudinally through it without being correspond-

ingly moved. The upper and under faces of the ratchet 1 are each made with an annular recess, 16, corresponding with and fitting around the said ring 11 on the upper face of the head of the handle.

A feature of especial utility in my improved arrangement and combination of mechanism is in the provision of independent pawls 12 15 for the feeding and drill-turning ratchets 1 2, and which can be so thrown out of gear as that the ratchets can be independently actuated by the handle, or to allow of the feed-screw 10 being rapidly run in by turning the feeding-ratchet by hand, or can be so thrown into gear with their respective ratchets as that both the ratchets can be simultaneously actuated in the same forward movement of the handle, the feeding-ratchet having, of course, more or less of a start of the drill-turning ratchet, as is usual in other ratchet-braces of this nature.

The pawl 15, for actuating the drill-turning ratchet 2, is centered upon a pin, 18, projecting through the under side of the handle 3, and its centered end or other convenient part adjacent thereto is flattened or so otherwise shaped as that it can be held by a spring, 19, as may be desired, in either one of two positions, one of which is when it is in gear with the ratchet 2 (see Figs. 1 and 5) and the other of which is when moved out of gear therewith, (see Fig. 2;) or the pawl may be otherwise suitably held in such positions.

The pawl 12, for actuating the feeding-ratchet 1, is double-acting, and is concavely shaped toward the ratchet 1, and is eccentrically centered upon its pin 18 in relation to the ratchet 1, so that either one of its acting edges 20 can be turned into gear with the ratchet, the teeth of which are preferably V-shaped, to admit of being actuated in either direction, and thus this ratchet can be turned either by the forward or by the backward stroke of the handle for running the screw out or in, respectively, or can be so placed as that neither of its acting edges gears with the said ratchet, when, as hereinbefore referred to, the feed-screw can be rapidly run in by turning the feeding-ratchet by hand to allow of the speedy removal of the tool from the work, or can be rapidly run out by hand in setting the tool up to its work. This pawl is suitably shaped at or near its center of motion, as shown in Fig. 4, so that it can be held by a spring, 21, in any one of the above three positions.

According to the invention now being described, I also obtain the advantages of a changeable feed, as the feeding-ratchet 1 is formed with two rims of teeth, *e f*, with an intermediary annular recess, 22, separating them. This provision increases the utility of the tool, as it provides a readily-accessible means of at once changing the rate of feed, the two rims *e f* being formed with different numbers of teeth, neither being similar to that of the drill-turning ratchet 2; and it is a material feature

of this part of my present improvements that the rim *e*, intended for effecting the slow feeding, should have a less number of teeth than the turning-ratchet 2; and in order that the advantages of this arrangement as regards the even and regular feeding of the drill may be most completely attained, I find it to be of advantage that the difference in the numbers of teeth of the slow-feeding rim *e* and of the drill-turning ratchet 2 should be as few as possible, unity being sufficient, and that the difference in the numbers of teeth of the quick-feeding rim *f* and of the ratchet 2 should be as great as practically convenient. Thus when the feeding-pawl 12 is placed in its position of inaction the double-feeding ratchet 1 can be at once slid up the screw 10, and replaced thereon in an inverted position, with the other rim of teeth in the position in which it will be actuated by the pawl 12.

According to a modification which only differs from the invention already described in that the feeding-ratchet is made with but one rim of teeth, all the advantages hereinbefore referred to are attained, except the facility of changing the average rate of feed.

In both the invention and the modification the feeding-pawl 12 is made with an upper projecting wing, 17, which lies over the upper edge of the single-feeding ratchet, or between the toothed rims of the double-feeding ratchet, so that the ratchet will be held between the head of the handle and the said wing 17, and will not be liable to get out of position.

Having now fully described my said invention, what I desire to claim and secure by Letters Patent in self-feeding ratchet-braces is—

1. In a ratchet-brace, the combination of a reversible feed-ratchet, 1, with a reversible pawl, 12, and feed-screw 10, for the purpose of giving a changeable rate of feed in either direction, substantially as set forth.

2. In a ratchet-brace, the combination of a reversible feed-ratchet, 1, the feed-pawl 12, the lever handle 3, the drill-turning pawl 15, and the ratchet 2, substantially as and for the purpose specified.

3. The annular flange 11 on the upper face of the lever-handle for extending the bearing of the extension or collar of the drill-turning ratchet, in combination with a feeding-ratchet having recess 16 in its face for receiving said flange, thus reducing the friction of the feeding-ratchet upon the screw by engaging in the recess 16 and taking the thrust of the feeding-pawl 12, substantially as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CEMER THOMAS COLEBROOK.

Witnesses:

CHARLES AUBREY DAY,
Patent Agent, 321 High Holborn, W. C.

GERARD BENTON,
19 St. Mary Hill, E. C.