

(No Model.)

J. EMIG.
RATCHET DRILL.

No. 539,423.

Patented May 21, 1895.

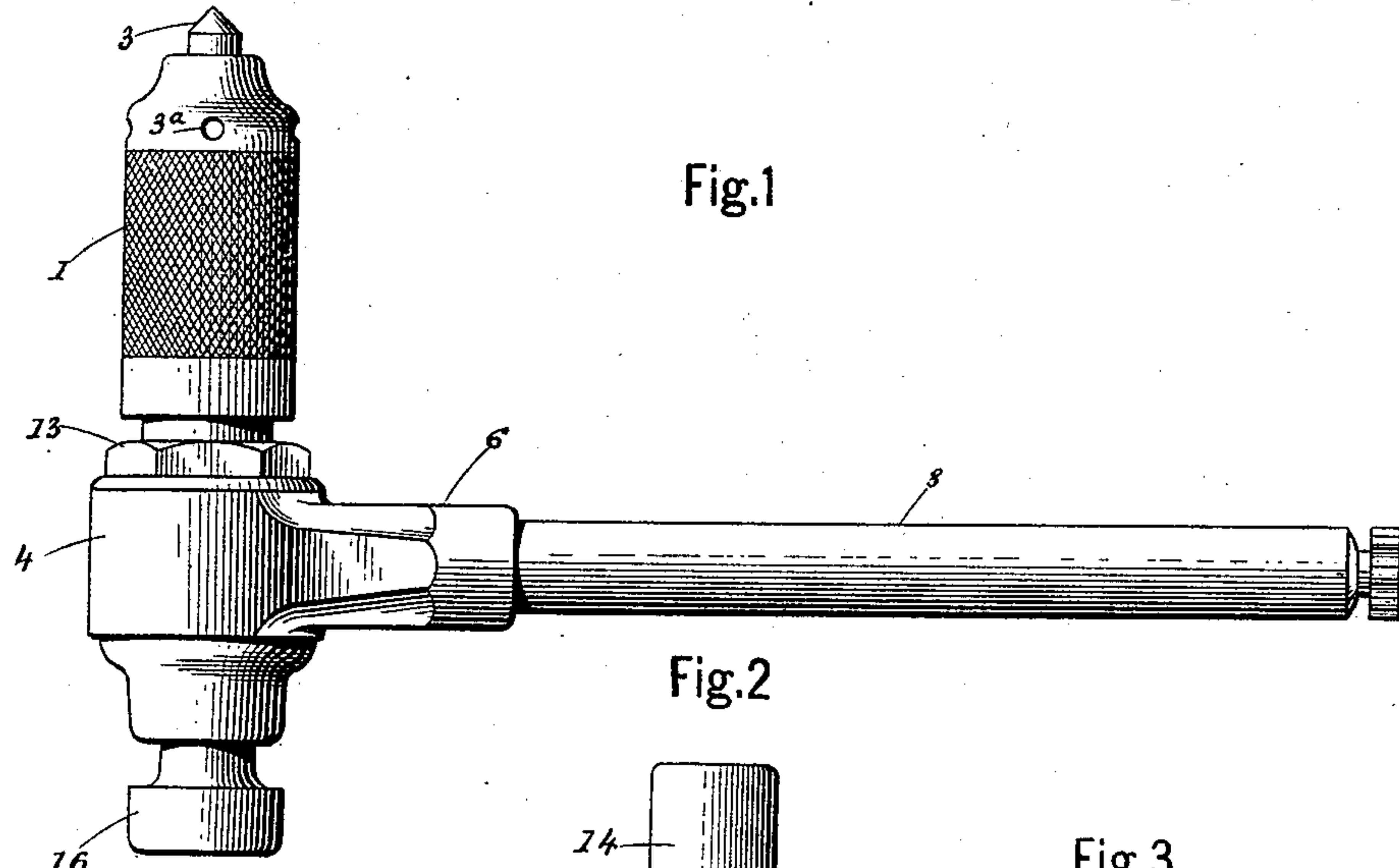


Fig. 1

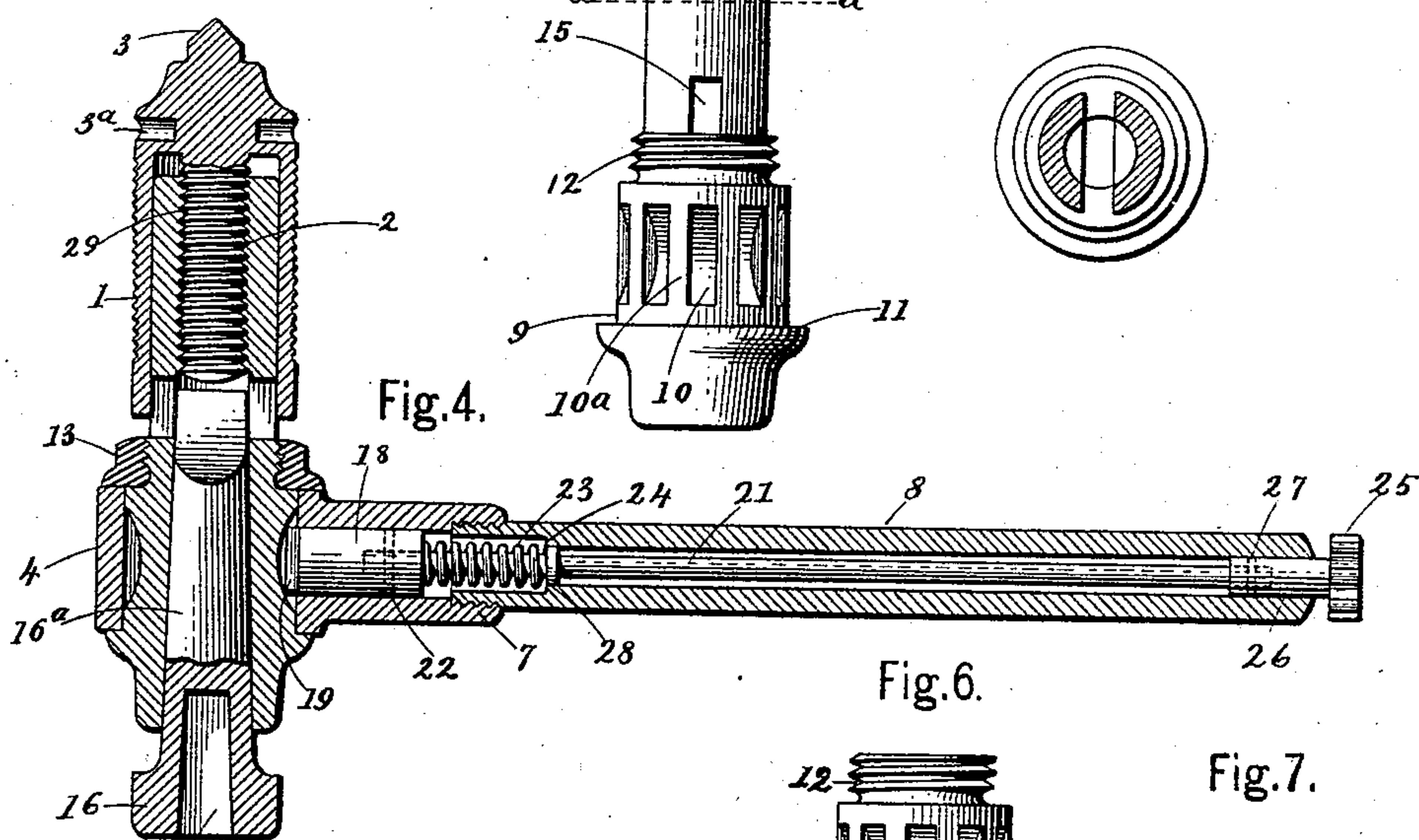


Fig. 2

Fig. 3

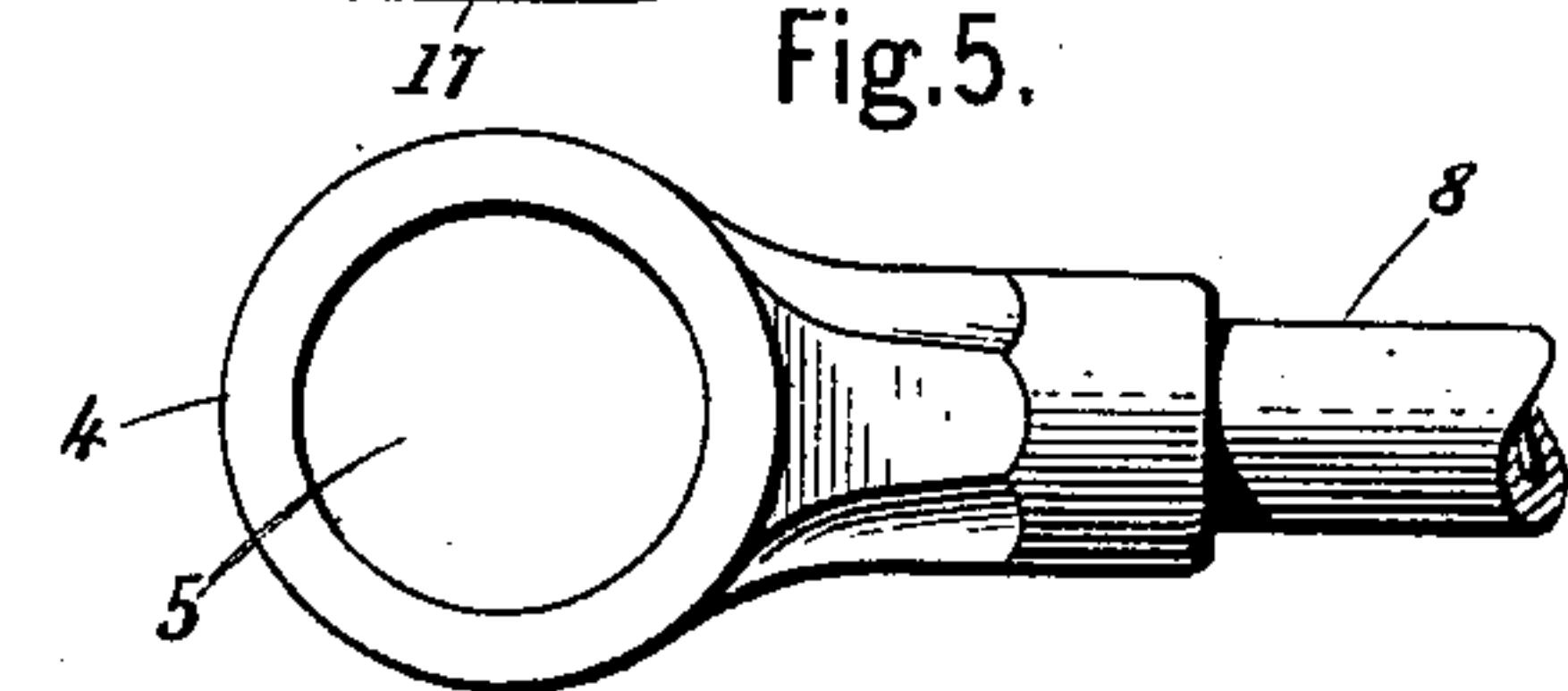


Fig. 4.

Fig. 5.

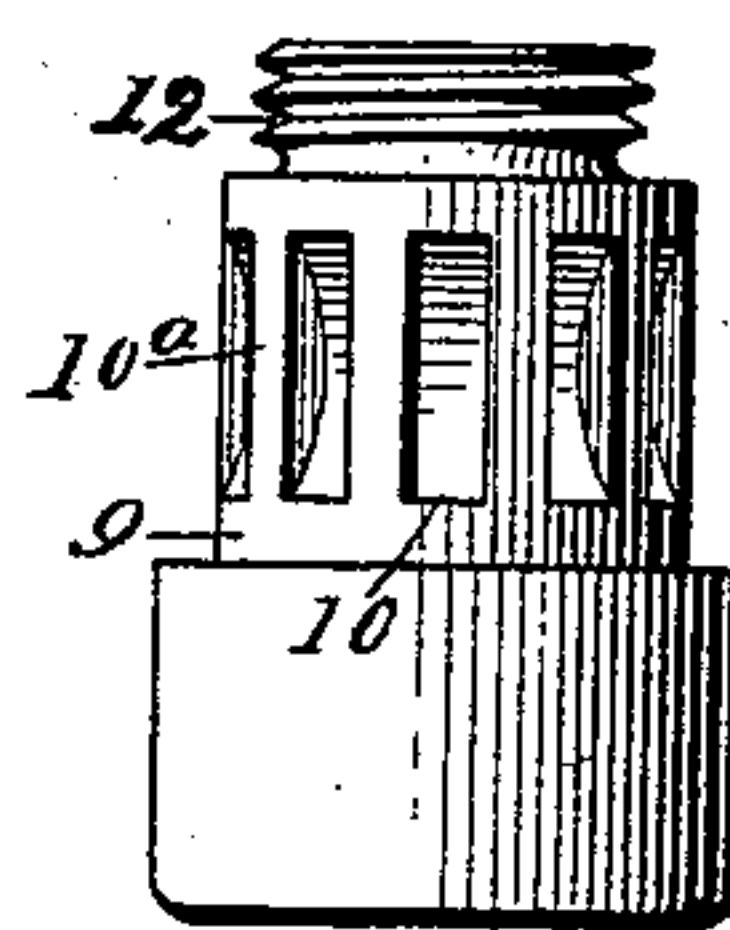
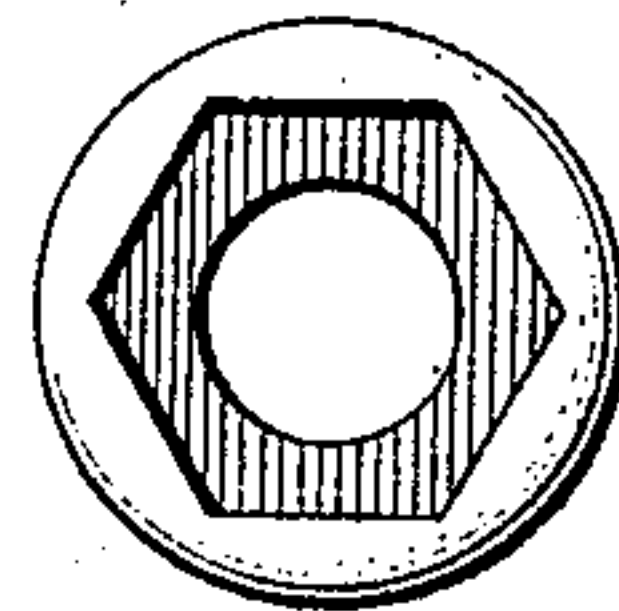


Fig. 6.

Fig. 7.



Witnesses:

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RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 539,423, dated May 21, 1895.

Application filed April 10, 1894. Serial No. 507,030. (No model.)

To all whom it may concern:

Be it known that I, JACOB EMIG, a citizen of the United States, residing in Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Ratchet-Drills, of which the following is a specification.

My invention relates to certain improvements in the construction of ratchet drills by which their operation is rendered more convenient and effective, all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a ratchet-drill made in accordance with my invention. Fig. 2 is a detached side elevation of the socketed portion of the drill-socket holder. Fig. 3 is a horizontal section on or about line *a a*, Fig. 2. Fig. 4 represents a vertical longitudinal central section through a completed drill, cutting centrally through all parts except a portion of the drill-socket, the removable pawl, and its several parts. Fig. 5 is a top view of the drill-head and a portion of the handle. Fig. 6 represents a side elevation of a socketed wrench portion adapted to be used and operated with this ratchet-drill. Fig. 7 is an under side end view of the same.

Referring to said drawings, the operating sleeve 1, is provided with an interior screw threaded portion 2, which is rigidly secured to the inside of the sleeve 1, by being driven tightly in place through an opening in the top of the sleeve. At the top on the outside, is the usual center or hardened steel point 3, which is formed in one piece with the screw 2, but it may be made separate and secured to it in any well known way. Near the top of the sleeve is a series of radially arranged holes 3^a whereby a small bar may be used to turn it when necessary.

The drill head 4, is provided with the usual opening 5, adapted to receive the drill socket, and a hollow portion 6, projecting from one side of the same and having a screw threaded portion 7, adapted to receive the end of the handle 8, which is rigidly secured to it substantially as shown in Fig. 4.

The socketed portion of the drill is provided with a body portion 9, having a series

of depressions 10, forming ratchet teeth 10^a. Below the teeth is a shoulder 11, and above them is a screw portion 12, adapted to receive the nut 13, to hold the drill-head and socket portion in place. The portion 14, extending above the screw portion is adapted to fit and pass easily into the case 1. The sides of the depressions 10, are both alike and extend straight inward toward the center of the socket portion. The teeth 10^a, therefore are of substantially the same thickness throughout their length.

Just above the screw portion 12, is a rectangular transverse opening 15, which leaves a rectangular opening at the bottom of the tapering drill socket to receive the flattened end of the drill socket shank and thereby prevent it from turning.

16 represents the ordinary removable drill socket. It is provided with a tapering shank 16^a, and with the usual square hole 17, (see Fig. 4,) adapted to receive the square shank of a drill. Within the part 6, is a short cylindrical bar 18, having a flat pawl tooth 19, adapted to fit between the teeth, or in the openings 10. One side of the tooth 19, is beveled off in the usual way so that the front side only will catch against and push a tooth in operating with the device. The beveled side allows the pawl while being moved backward over the teeth 10^a, to be forced up as the beveled side passes over a tooth, and when being moved in the opposite direction, or forward; the flat side of the pawl tooth catches the flat sides of the teeth and operates the device, so that by reciprocating the handle 8, an intermittent rotary motion will be given to the drill in one direction.

From the construction above described, it is obvious that the action of the drill can be easily reversed and should it become necessary at any time to cause the socketed portion, or the drill holder, to rotate in a reverse direction all that is necessary to do is to pull the milled knob 25, out until stopped by the end of the handle 8, which limits its movement in that direction, thereby removing the end of the pawl from between the teeth 10^a, and then give it a one half turn around and allow the spring 23 to force it back in between the teeth again. The flat side of the pawl

will now operate against the opposite sides of the teeth and thereby reverse the action of the drill when the handle 8, is reciprocated in the same manner as before.

5 A small rod, 21, is secured by a pin 22, to the pawl bar 18, and is provided with a spiral spring 23, interposed between the bar 18 and a shoulder 24, within the handle 8, and at the opposite end is a milled knob 25, having a
10 shank 26, which fits the opening through the handle. The shank 26, is secured to the rod 21, by a pin 27. A small washer 28, keeps the rod 21, central within the handle.

In Figs. 6 and 7, I have shown a socketed
15 wrench portion adapted to fit and be secured in the drill head so as to be operated the same as the socketed drill portion, having the same parts 9, depressions 10, and ratchet teeth 10^a, and nut 13.

20 The operation will be readily understood from the drawings and foregoing description.

The screw portion 2, screws down into the screw threaded opening 29, through the portion 14, (see Figs. 2 and 4) and is unscrewed
25 in the usual way to force the drill forward while drilling with it in the ordinary way.

It often happens that the socketed drill holder shank 16^a, gets stuck tight in the tapering opening in which it is fitted so that it
30 cannot be pulled out by hand. In this case all that is necessary to do is to turn the sleeve portion 1, until the end of the screw 2, touches the end of the shank 16^a, which easily pushes it out or loosens it from the socket. This construction is important, because it imparts to
35 the sleeve or feed nut two offices—first, for feeding the drill forward, and, second, for ejecting the drill socket when required, and it avoids the use of a hammer or other objectionable means for forcing the drill holder out
40 of the socket.

When it becomes necessary to put in some other holder, or a socketed wrench similar to that shown in Fig. 6, for instance, all that is
45 required is to take off the nut 13, then remove the drill-holder from the head and in-

sert the socket wrench and secure it in place by the nut 13, which is adapted to fit on the screw portion 12. Shown in said Fig. 6.

It will be noticed that the pawl cylinder 18, 50 is pivoted loosely to the rod 21, so that the handle 8, can be bent considerably out of true and still the device will be operative, which is an important advantage in this construction. 55

I claim as my invention—

1. In a ratchet drill, an operating sleeve or feed nut 1, having an interior portion 2, extending from the inner top side of said sleeve (to which it is rigidly secured) down near to 60 the bottom of the same and provided with an outside screw thread in combination with a socketed drill holder having a longitudinal screw threaded opening adapted to receive the screw threaded portion 2, and extending 65 through and communicating with the socketed portion, means for keeping the drill head and socketed portion together, and a tapering drill holder adapted to fit the tapering socket portion and extend up within reach of 70 the lower end of the screw threaded portion 2, when nearly down to its lowest point, whereby the screw force of the feed nut may be used to eject the drill holder substantially as described. 75

2. In a ratchet drill, the combination with an operating handle having a central longitudinal opening through it, of a pawl cylinder 18, inclosed in a space limiting its longitudinal movement, a rod 21, of smaller diameter secured loosely to the pawl cylinder, a spiral spring on said rod interposed between the pawl cylinder and a shoulder within the handle, and a milled knob secured to the outer end of the rod 21, whereby the operation of 85 the drill may be reversed and it will be operative even if the handle 8, should be bent out of shape, substantially as described.

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Witnesses:

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