

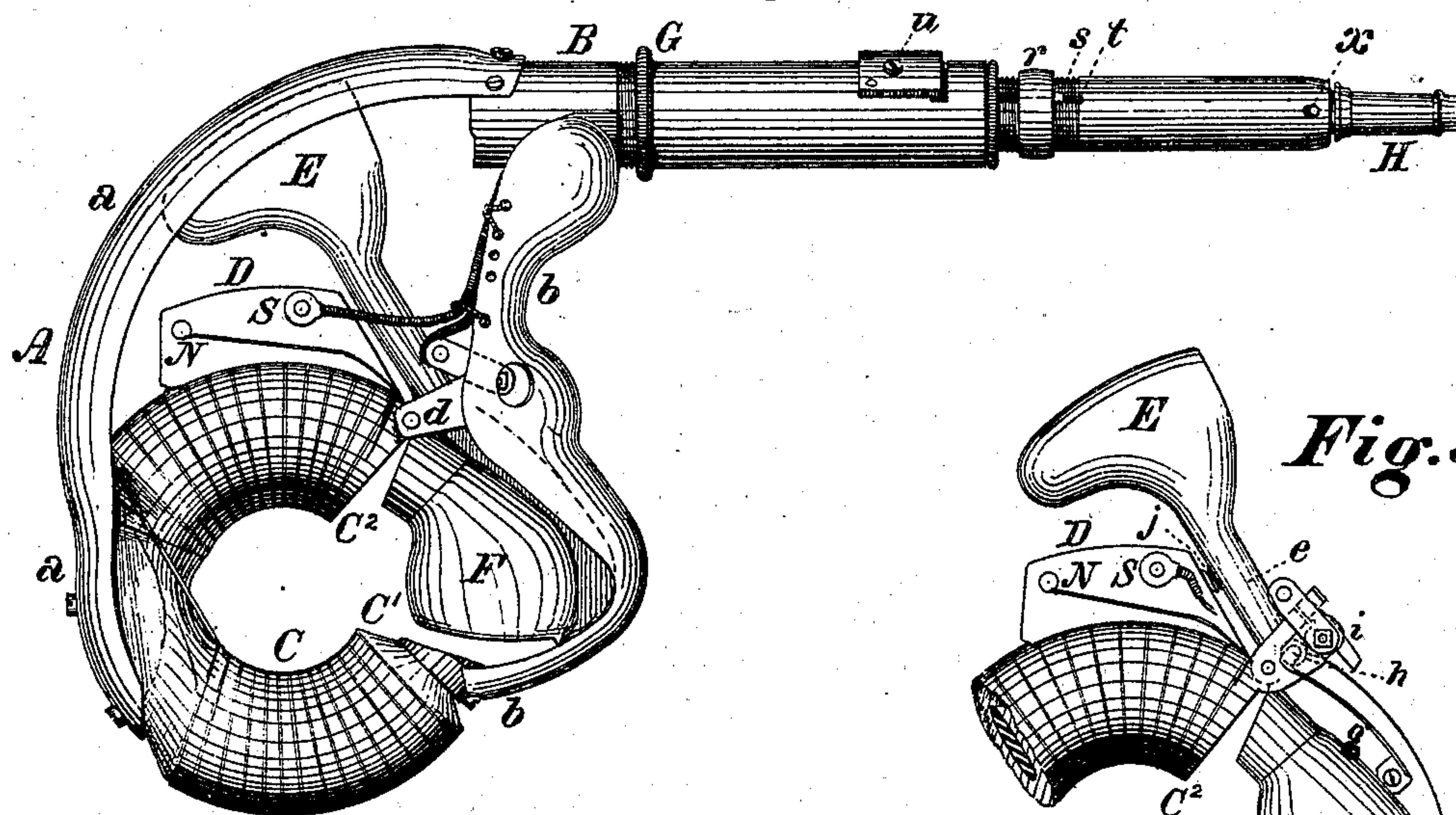
G. F. GREEN.

ELECTRO MAGNETIC DENTAL PLUGGERS.

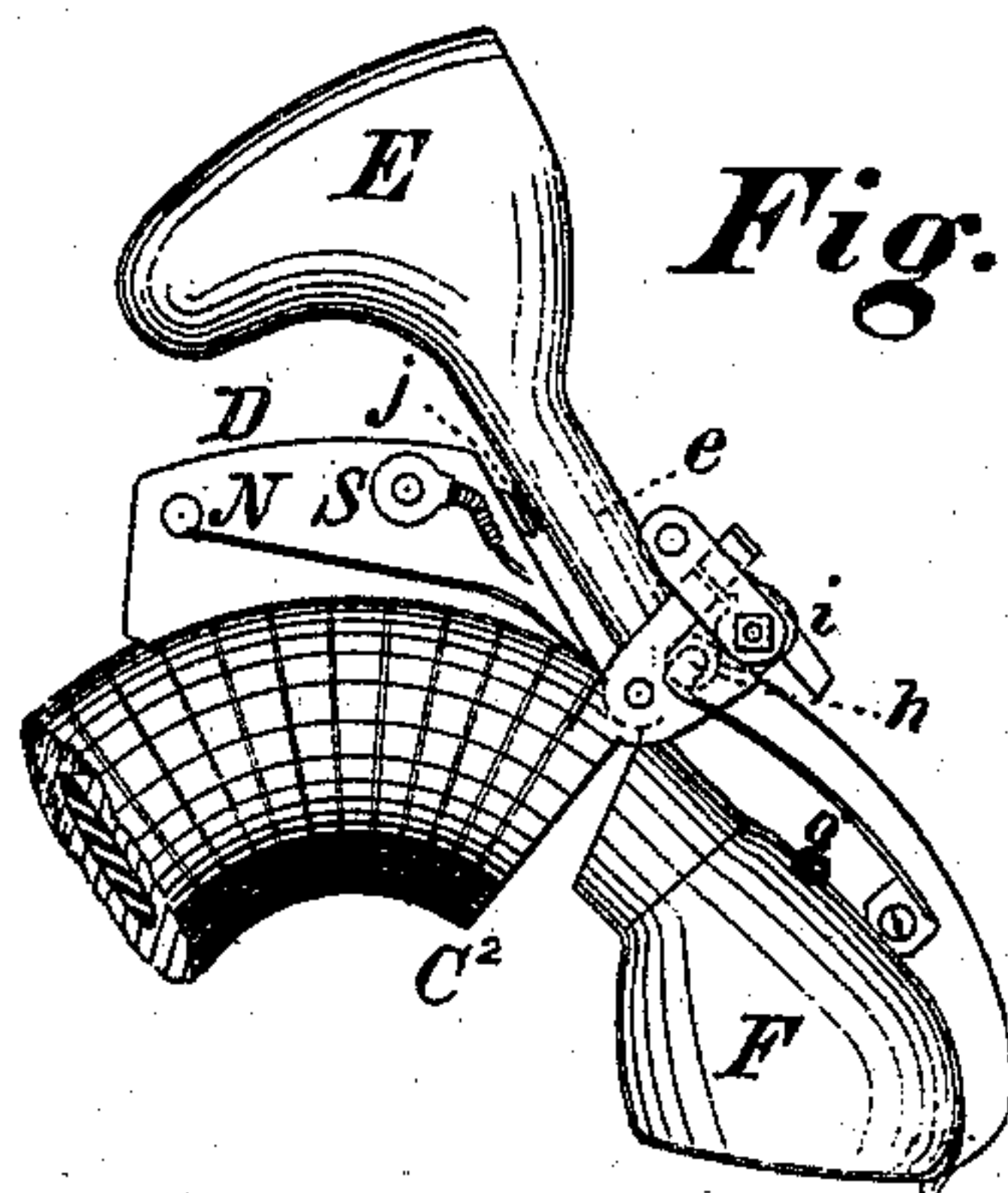
No. 171,119.

Patented Dec. 14, 1875.

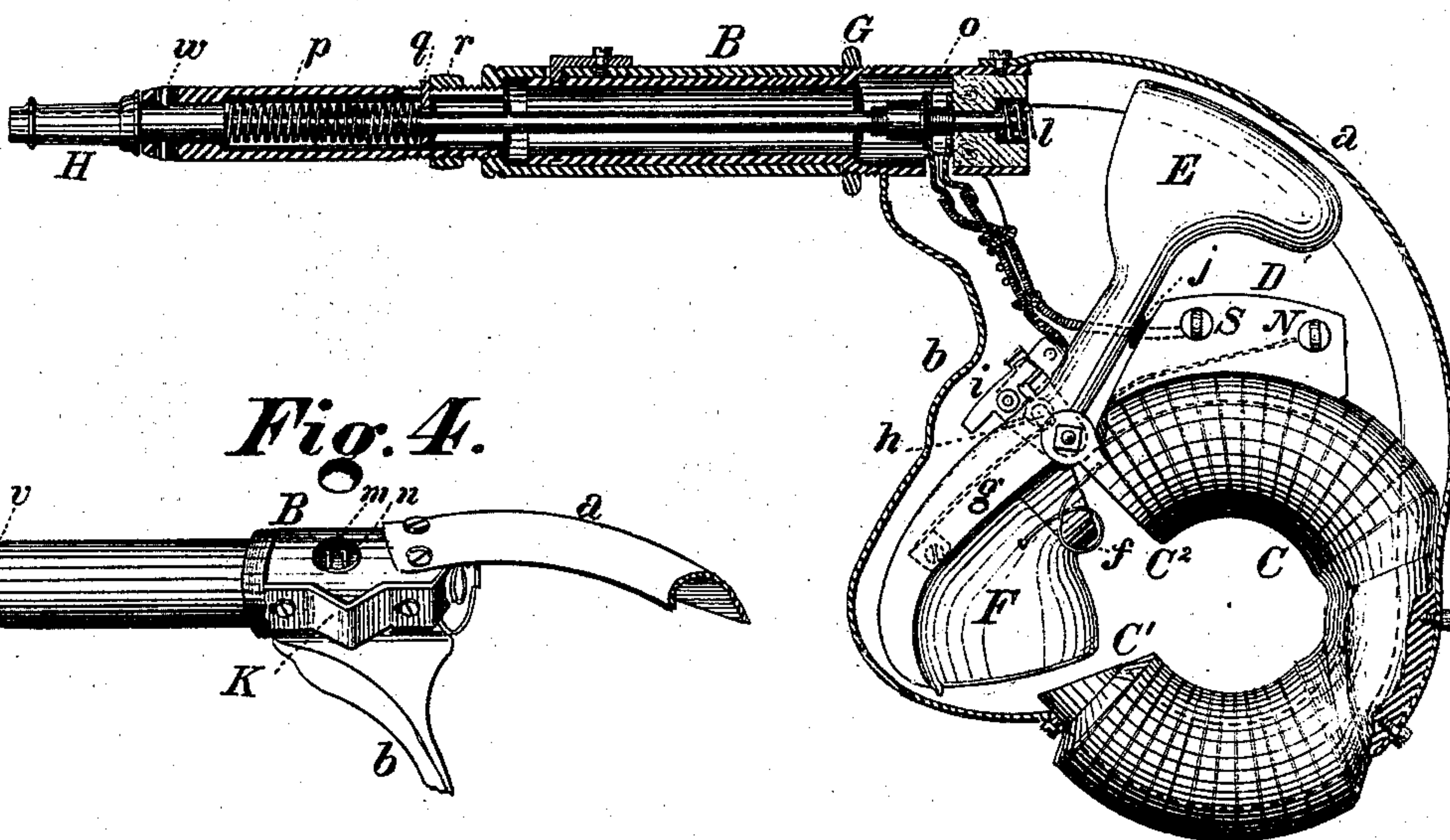
*Fig. 1*



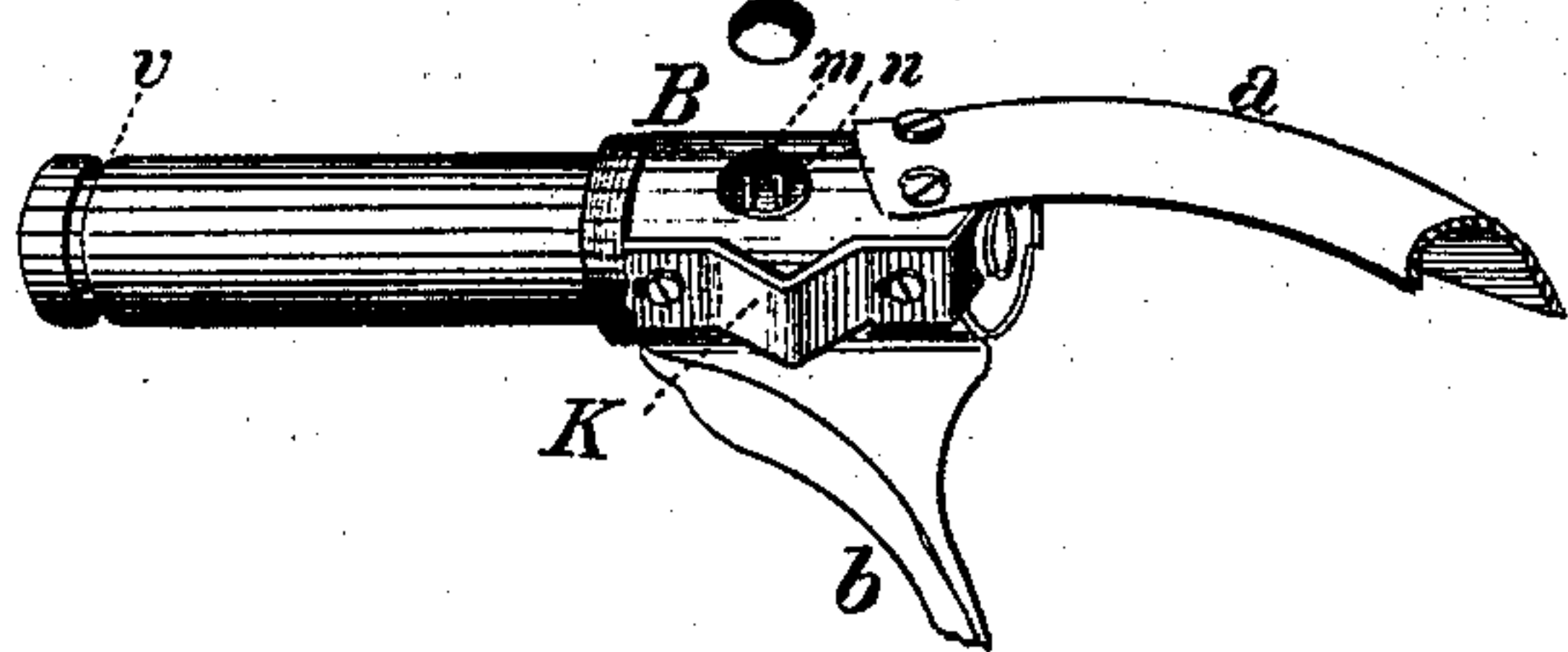
*Fig. 3.*



*Fig. 2.*



*Fig. 4.*



*Witnesses.*

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by his Atty  
Wm. Baldwin*



# UNITED STATES PATENT OFFICE.

GEORGE F. GREEN, OF KALAMAZOO, MICHIGAN, ASSIGNOR TO SAMUEL S. WHITE, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN ELECTRO-MAGNETIC DENTAL PLUGGERS.

Specification forming part of Letters Patent No. 171,119, dated December 14, 1875; application filed August 5, 1873.

### CASE F.

*To all whom it may concern:*

Be it known that I, GEORGE F. GREEN, of Kalamazoo, Michigan, have invented certain Improvements in Electro-Magnetic Dental Mallet Pluggers, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved instrument; Fig. 2, a vertical longitudinal section through the same; and Figs. 3 and 4 are views, showing details.

My invention relates to dental mallet pluggers of that class (originated by me) in which electro-magnetism constitutes the sole motor.

I construct a frame, A, in the general form of a pistol-stock, so that it may be conveniently held in the hand, the two bars *a* and *b*, which constitute part of this frame, being concaved and curved, so as to afford bearing-surfaces for the support, and enlarged spaces for the operation, of the moving parts. These bars are connected at their upper ends to a barrel or tube, B, which is held horizontally in a relation similar to that of the barrel of a pistol. A circular or horseshoe-shaped magnet, C, is fastened by its closed end or center to the inside of the stock-bar *a*, so as to stand on its edge, thus presenting both of its poles in a vertical position toward the front of the stock. The lower end of the stock-bar *b* is secured to the lower pole C<sup>1</sup> of the magnet, and to the barrel B. The bars *a b* and the magnet thus compose the frame.

Upon the upper part of the magnet I form a flange or projection, D, on which I fix eyes *n s*, and to these eyes I connect the wires of the battery.

On the upper pole C<sup>2</sup> of the magnet I form lugs, through which pivots are passed to support the mallet E, which swings on these pivots, as shown in the drawings. An ear, *d*, on the stock-bar *b* coincides with the lugs, and, the pivot-bolt passing through this ear, gives an additional point of bracing for the frame.

The mallet consists of a shaft or handle, *e*, the upper end of which is provided with a hammer-head of suitable weight, the lower

end carrying the armature F, and is further weighted, so as to exactly counterbalance the hammer-head; and thus insure a blow of equal force in whatever position the instrument may be held, the armature vibrating between the poles of the magnet, while the hammer plays upon the inner end of the spindle which carries the tool, as will presently be further described. A spring, *f*, is connected with the mallet-shaft, and tends to hold the armature away from the magnet.

I have devised for this instrument an automatic circuit-breaker, the construction and operation of which is as follows:

I attach a spring, *g*, to the shaft of the mallet, near the armature, and extend this spring forward toward the hammer, mounting on its free end a wheel, *h*, which will be most conveniently located about opposite the pivot of the mallet.

I secure upon the inside of the stock a circuit-breaker block, *i*, arranging it and defining the length of the spring *g*, so that the wheel *h* will alternately traverse the inclined surfaces as the head of the mallet vibrates. The block is thus vibrated by the spring *g*, and one end of it comes in contact with a wire connected to the eyes *n s*.

Whenever this contact occurs the circuit is closed, the armature is brought toward the magnet, and the hammer strikes; then the wheel *h* on the spring *g*, passing the point of the breaker-block *i*, throws it away from the wire, and breaks the circuit.

Inasmuch as the spring *f* will constantly tend to press the armature away from the magnet, and the hammer-head away from the barrel B, it will be seen that the normal position of this spring *f* will be such as to constantly press the block *i* against the wire, or, in other words, the spring *g* will tend to maintain a closed circuit.

A spiral spring in the flange *j* on the magnet serves to cushion the hammer-shaft as it flies back, preventing the shaft from striking the flange.

At one side of the barrel B I place a sliding plate, K, which has a lip bent over upon



the end of the barrel, so that it is interposed between the hammer and the end of the barrel. By moving this plate in or out the lip is brought nearer to or farther from the base of the barrel, and the blow of the hammer is more or less received upon the lip, which thus acts as a brake to regulate the extent to which the force of the blow is delivered upon the spindle of the plugging-tool.

I provide a screw-gage, *G*, around the barrel *B*, by means of which the position of the lip and the force of the blow may be adjusted, as seen in Fig. 2. I also, by preference, interpose a coiled spring, *e*, in the end of the barrel *B*, between the end of the spindle and the hammer-head, to assist, by its resilience, in throwing the hammer-head back when the circuit is broken.

In what would be about the nipple of the pistol-barrel *B* I insert what I call pads *m n*, for closing and breaking the circuit, by simple pressure upon the point of the instrument. The barrel *B* is tapered gradually from the breech to the muzzle, and in this casing, and protruding through the muzzle, I insert the spindle *H*, the outer end of which is socketed to receive the plugging-tool, while its inner end extends back, and protrudes through the breech, and receives the blow of the hammer, as already described.

Toward the lower end of the spindle I fix on it a collar, *O*, which bears against the upper plate of the pads, above referred to. These pads consist of two metallic pieces, of uniform configuration, one end of each having in it a hole, through which the spindle *H* passes. These pieces have shanks or tongues which are bent downward, and separated at the points by means of any suitable non-conductor.

I have used pasteboard between the two metallic pieces, and wrapped thread around the pieces (with the pasteboard between) to insulate these two pads, and yet keep them on each side of the insulator, close together.

I insert these pads in the barrel about the nipple, as above stated, so that the perforated ends of the pads shall lie across the barrel, parallel with each other, while their shanks extend through the casing, and afford points of attachment for wires, which are to be connected with the battery and with the circuit-breaker block, already described. (See Fig. 2.)

Now, as the spindle *H* passes through the perforated ends of these pads, and as it carries the tool on its upper or outer end, it is manifest that any pressure upon the end of the plugging-tool will compress the perforated ends of the pads together, until they come in contact, whereupon the circuit is closed. (through the other ends of the pads and the wires connected therewith,) and the hammer will strike as long as the spindle thus presses on the pads. Whenever the pressure on the spindle is removed, the pads will spring

apart again with the forward movement of the spindle, and break the circuit, stopping the blows of the hammer.

I provide for the graduation of the pressure required to press the pads together, as it will be desirable to have this pressure greater at one time than at another, by putting a coiled spring, *p*, within the barrel at its upper end, and below this spring a shoulder, *q*, which may be moved up toward the spring by means of the screw-band *r* moving the studs *s*, which is fixed in the shoulder, and projects through the slot *t* in the casing, and as the spring is thus compressed the resistance of the point of the plugging-tool will be increased.

In case it is desirable, this pressure may be made such as to prevent the closing of the circuit, and admit of the temporary use of the instrument as a hand-plugger.

It is also desirable to have the plugging-tool turned so as to bring its point or edge to bear in different positions upon the tooth, and I provide for this by making the upper section of the barrel *B* to turn loosely on the lower section, and permit this change of position of the tool by locking the two sections together, by means of a flanged plate or simple pin passing through the outer casing, and taking into a groove, *v*, on the end of the inner section, so as to allow the one to rotate within the other.

The spindle *H* is held in the casing by a pin, *w*, passing through an elongated hole, *x*, which admits of the spindle being driven forward, and retracted a sufficient distance, and yet causes it to turn with the casing.

Some of the devices herein shown and described are claimed in other applications of mine filed simultaneously herewith, and are not, therefore, claimed herein.

I claim—

1. The frame *A*, composed of the stock-bars *a b*, the barrel *B*, and the electro-magnet *C*, substantially as described.
2. The combination, with the magnet *C*, of the armature, connected with the mallet, to serve as a counter-balance thereto, and pivoted upon the magnet, and vibrating between its poles, substantially as described.
3. The combination of the frame *A*, the barrel *B*, the casing, and the reciprocating spindle *H*, substantially as described.
4. The combination of the frame, the barrel, the casing, the spindle, the mallet, the armature, and the magnet, substantially as and for the purposes described.
5. The combination of the hammer-head, the combined counter-weight and armature, the mallet-shaft, and the magnet, substantially as described.
6. The cushioning-slide *k*, in combination with the hammer and spindle, substantially as described.
7. The combination, with the fixed barrel *B*, of the rotating section of the casing and

the pistol-stock-shaped case A, substantially as and for the purpose described.

8. The combination of the mallet and armature, connected directly together, as set forth, whereby the armature forms the counter-balance for the mallet, for the purpose specified.

In testimony whereof I have hereunto subscribed my name.

GEORGE F. GREEN.

Witnesses:

LEVI TEAL,  
WM. E. MORGAN.