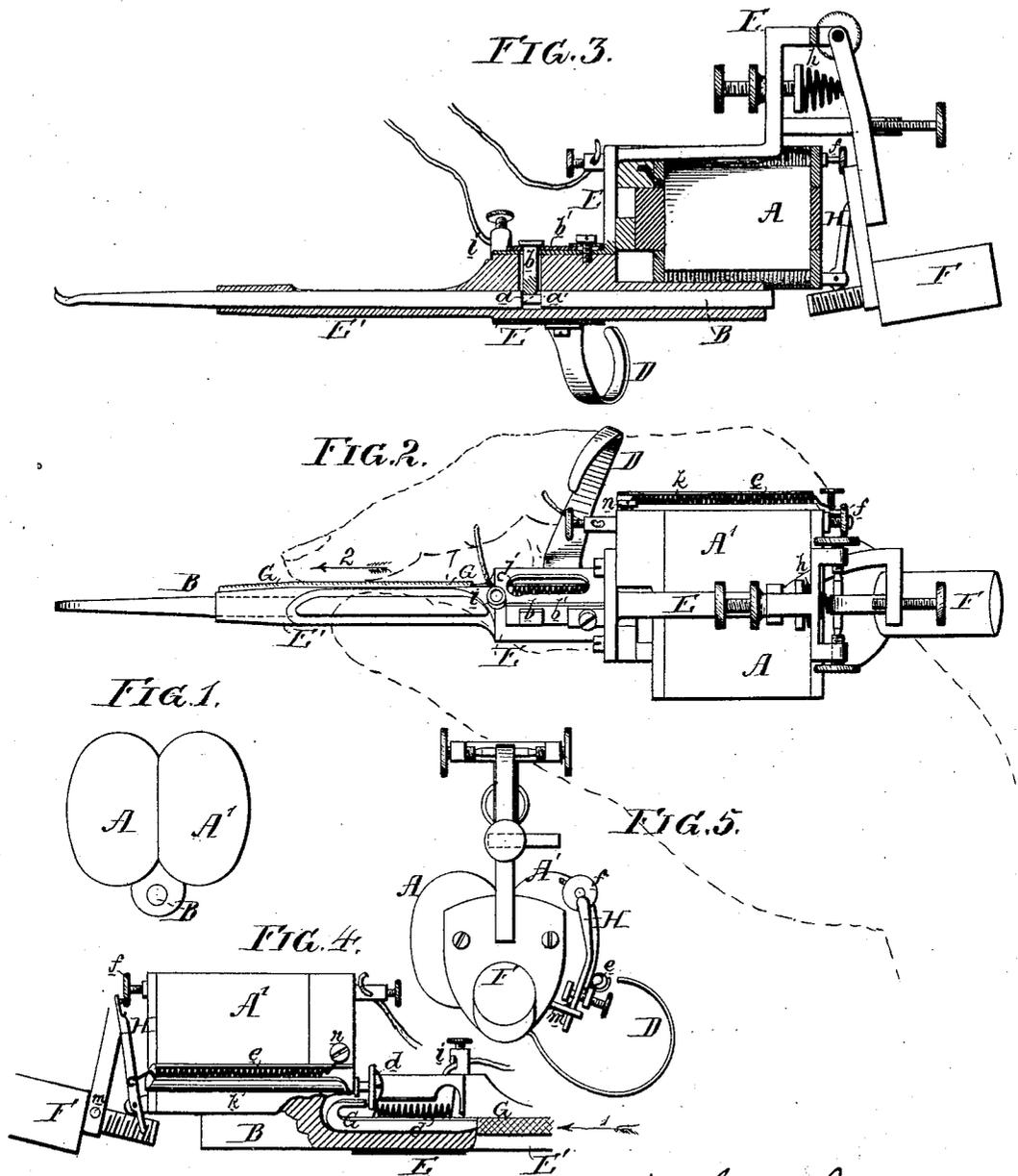


W. G. A. BONWILL.

ELECTRO-MAGNETIC DENTAL-PLUGGER.

No. 170,045.

Patented Nov. 16, 1875.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM G. A. BONWILL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN ELECTRO-MAGNETIC DENTAL PLUGGERS.

Specification forming part of Letters Patent No. **170,045**, dated November 16, 1875; application filed July 21, 1873.

To all whom it may concern:

Be it known that I, WILLIAM G. A. BONWILL, of Philadelphia, Pennsylvania, have invented an Electrical Tooth-Filling Instrument, of which the following is a specification:

My invention relates to improvements in dental instruments designed to be operated by electricity, the objects of my improvements being to render the instrument compact, to adapt it to the hand of the operator, and to facilitate the securing and the removal of the operating-tool, and to regulate the action of the mallet. These objects I attain by arranging the insulated coils A and A' closely together, with the tool B at one side of or beneath the same, and a guard, D, at the same side; by providing the instrument with a guard or handle, D, by which it may be held in a proper position for operation in either the right or left hand, as shown in the plan view, Figure 2; by so combining the tool B with an adjustable beveled pin, *b*, that it can be readily removed and replaced, and adjusted from and toward the mallet, as shown in the section, Fig. 3; and by certain improvements in the circuit-breakers, fully described hereafter, whereby the instrument is rendered more durable, and its operation much facilitated.

A succession of blows, more or less rapid, is imparted to the tool B, which is held against the filling by a mallet, F, forming the armature of a magnet inclosed within two adjacent coils, A and A', the circuit being completed at one point by the hand of the operator, and being automatically broken at another point by the mallet, which, when attracted toward the magnet, and just before or at the moment of striking the blow, breaks the circuit, and is then suddenly drawn back by its spring *h*, the circuit being automatically completed by a spring-lever, H, when the mallet will be again attracted and strike another blow, and will in like manner again break the circuit and spring back, and so on as long as the operator completes the circuit at the opposite point.

The tool is placed at one side of or beneath the coils, which I arrange close together, as shown in the diagram, Fig. 1, thus reducing the bulk of the instrument considerably. The main object of this arrangement is to enable the oper-

ator to hold the tool in the same position as he would the ordinary instruments, the guard D being arranged at one side of and below the tool, the rear end of which, therefore, rests in the hollow between the thumb and forefinger, the latter extending forward parallel to the stem. By this means the automatic tool may be manipulated as readily as the usual hand-tools. I also reduce the size of the coils and the weight of the mallet, and yet obtain as sharp or a sharper blow with the same battery; for the striking portion of the mallet, owing to the position of the tool, is extended over the coils, which enables me to obtain a longer leverage, and to strike with the end instead of with the side of the weighted portion of the mallet. (See Fig. 3.) This lightness is also of advantage when soft blows in very quick succession are to be struck.

If desired, the coils may be brought still closer together by flattening their inner adjoining sides to a greater extent than is shown in the drawing.

Another important feature of my present invention is the disposition of the frame E, handle E', guard D, and mallet F, in respect to the coils and tool, the arrangement being such as to so lower the center of gravity in the working position of the instrument as to enable it to rest solidly upon the operator's hand, as shown in Figs. 2 and 3. The hooked guard or handle D serves to determine the position of and to retain the instrument in the hand, and much facilitates its operation, the index-finger being passed through the same, if the instrument be held in the right hand, as shown in Fig. 2, while if it be held in the left hand the thumb is passed through the said guard. The latter may be in the form of a ring; but I prefer that it should be hooked. The said guard may also, if desired, be rendered adjustable upon the instrument.

It will be observed that the handle E', instead of being provided with flanges, as heretofore, is cylindrical, this also facilitating the grasping and holding of the instrument by either hand.

The tool B is adapted to an opening in the handle E' and frame E, through which it can be freely passed, a spring stud or pin, *b*, yield-

ing to permit its passage, and serving as a retainer for the same, the said pin having an abrupt edge upon one side adapted to a shoulder, *a*, of the tool, and thus preventing the latter from being forced back upon the mallet beyond the proper point, while the opposite edge of the said pin, which is adapted to the shoulder *a'* of the tool, is beveled, as shown in Fig. 3, so as to retain the said tool in position under ordinary circumstances, but so that it will yield, and permit the withdrawal of the same by a slight effort. The pin *b* is secured to a plate, *b'*, rendered adjustable from and toward the mallet upon the frame E, this adjustment of the plate and pin effecting also sufficient adjustment of the tool to take up the effects of wear, and rendering any adjustment of the parts of the mallet unnecessary, the latter being rigid and non-adjustable throughout. The current passes from the stud *i*, through a spring, *j*, Fig. 4, to a slide, G, which the said spring has a constant tendency to force in the direction of the arrow 1, and from the said slide through an adjustable screw, *d*, casing *k*, and spring *e* to a lever, H, the latter being maintained in contact with a screw, *f*, through which the current passes to the coils, by the said spring *e*.

A hard-rubber or other non-conducting projection, *m*, on the mallet acts directly upon the short arm of the lever H, when the mallet descends, and thus forces the same back from the screw *f*, and breaks the circuit.

The several parts are so arranged in respect to each other that the circuit is not broken by the mallet until the latter has almost or quite struck the blow, the full power of the mallet being thus obtained, and ample time being afforded for its recoil before the circuit is again completed by the lever H.

One end of the spring *e* to which the lever H is connected, is wound upon a screw, *n*, by turning which the power of the said spring can be increased or diminished, as desired, and consequently the rapidity of the recoil of the lever H, and the rapidity of the blows of the mallet, can be regulated by means of the said spring, as desired.

The screw *f* is adjustable, so that the effects of wear can be readily taken up by means of the same, and the bearings, both of the lever H and the mallet, are also rendered adjustable for the same purpose, and to prevent oxidation of the bearings of the lever the current is not passed through the same, but di-

rectly to the long arm of the lever through the spring *e*.

It will be observed, on reference to Fig. 4, that when the instrument is not in use the circuit is broken by the slide G, which is forced away from the adjustable screw *d* by the spring *j*; but in the act of forcing the tool against a filling or other object the pressure of the index-finger or thumb upon the roughened portion of the said slide naturally forces the same in the direction of the arrow, Fig. 2, and thus completes the circuit without special effort on the part of the operator.

My improved instrument, although especially adapted for tooth-filling, can be applied in the arts generally, wherever power by electricity is needed or can be used for actuating a hammer.

I do not claim a magneto-electric dental instrument in which the tool is operated by a vibrating mallet, nor the combination with such an instrument of an automatic circuit-breaker; but

I claim as my invention—

1. An electric dental instrument, in which the insulated coils A A' are arranged close together, with the tool B between and at one side, and the guard D upon the same side, and extending beyond the tool, all as and for the purpose set forth.

2. The combination, with the instrument, of a guard or handle, D, by which the said instrument may be held in a proper position for operation in either the right or left hand, substantially as herein described.

3. The combination of the socket, open at both ends, the tool B filling the socket, and having shoulders *a a'*, and a spring-retaining pin beveled at one edge, as and for the purpose set forth.

4. The retaining-pin *b*, secured to and rendered adjustable upon the frame, with a plate, *b'*, from and toward the mallet F, substantially as and for the purpose specified.

5. The combination, with the said lever H, of a spring, *e*, the power of which can be increased or diminished as required, and through which the current is caused to pass, as specified.

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

Witnesses: WM. G. A. BONWILL.
WM. A. STEEL,
HARRY SMITH.