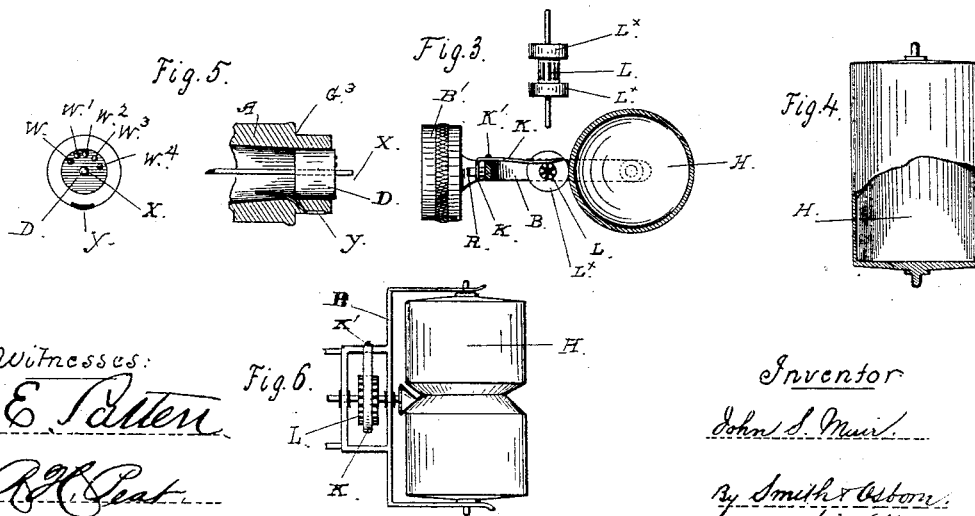
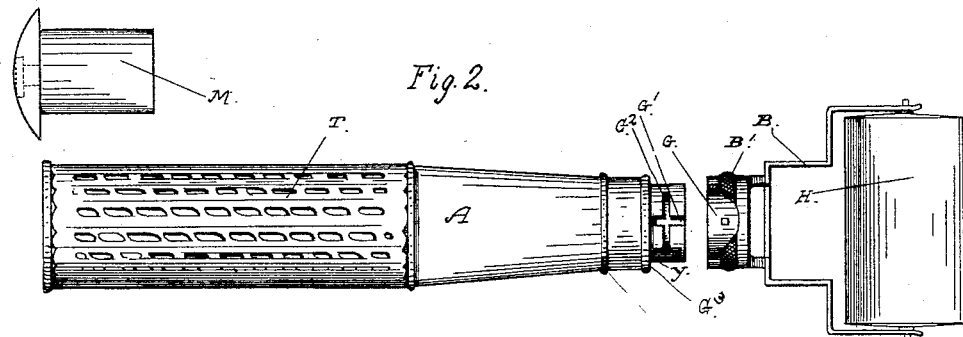
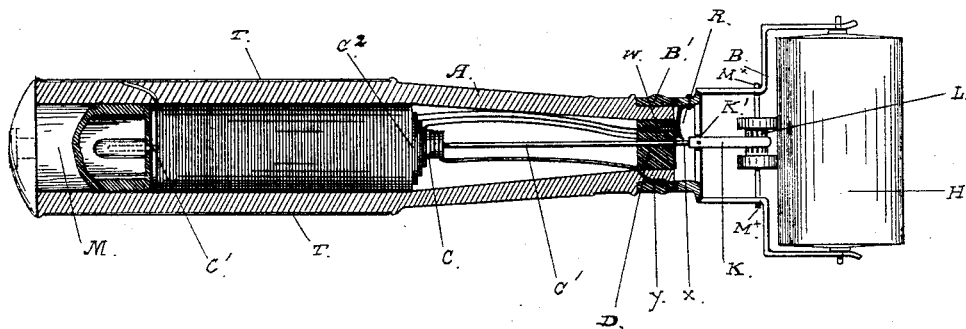


J. S. MUIR.

Patented July 24, 1888.

Fig. 1.



Witnesses:

E. Peters

R. H. Teat

*Inventor*

John S. Muir.

By Smith & Osborn.  
his attes.

# UNITED STATES PATENT OFFICE.

JOHN S. MUIR, OF SAN FRANCISCO, CALIFORNIA.

## ELECTRO-MEDICAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 386,754, dated July 24, 1888.

Application filed January 23, 1888. Serial No. 261,682. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN S. MUIR, a citizen of the United States, residing in the city and county of San Francisco, and State of California, have invented certain new and useful Improvements in Electro-Medical Apparatus; and I do hereby declare that the following is a full, clear, and exact description of my said invention, reference being had to the drawings that accompany and form part of this specification.

My invention relates to improvements in electro-medical apparatus of the kind that is embraced in the Letters Patent of the United States which were granted and issued to me on the 13th day of December, 1887, No. 374,747.

These improvements consist in making the handle and the frame of the rolling electrode separable for convenience of packing in small compass; also, in placing the battery and induction-coil entirely within the handle and having the rolling electrode and the circuit-breaker mounted on a separate frame or part that can be detached from the handle; also, in an improved construction of "shunt" for varying the intensity of the current.

Referring to the accompanying drawings, Figure 1 is a view of the instrument in longitudinal section. Fig. 2 is a view of the parts of the instrument separated from one another, the battery being drawn out of the handle. Fig. 3 is a view of the circuit-interrupter and rolling electrode in section, and of the interrupter-wheel. Fig. 4 is a view of the electrode removed from its frame. Fig. 5 shows the terminals of the primary coil and of the shunt at the handle end that sets into the socket of the frame. Fig. 6 illustrates another construction of interrupter.

Similar letters of reference indicate like parts in all the figures.

In the present construction of my instrument I place the battery inside the handle and at the rear end and bring the terminals of the induction-coil out to the opposite side, where the rolling electrode is attached. The frame is detachable from the handle, and is locked in position by means of a pin on the inside of its collar and a locking-slot on the end of the handle.

A is the handle, B the frame, and B' the

collar fitting over the end of the handle. G is the pin inside the collar, and G' G<sup>2</sup> are the locking-slots for the pin.

When the parts are put together, the pin entering the slot G' comes in line with the cross-slot G as the collar is pressed down against the shoulder G<sup>2</sup> on the handle, and by turning the handle in the collar the pin sets into the cross-slot and locks the parts together. The terminals of the coil are brought into electrical connection with the frame B as the parts are thus joined together.

C is the primary coil, and C' is the point of connection to one pole of the battery M.

X is one terminal of the primary coil, and Y is the other terminal, which is carried from the pole of the battery M through the handle.

The conductor C' may be the core of the primary coil. Its end forms the terminal X and is carried through the insulating-block D to take against the contact spring K, that is attached to the frame at K'. The other terminal, Y, is in electrical contact with the frame B at the collar. The interrupter L completes the circuit from the primary coil through the frame B to the rolling electrode H, as the contact-spring K is the conductor from X to the wheel L. The spindle of the wheel has bearings at M\* in the frame. In the construction of interrupter shown in Fig. 6 the wheel-spindle requires to be insulated in the frame, for the contact-spring is attached directly to the frame, while the spindle connects with the terminal X. As arranged in Fig. 1, the contact-spring is insulated at K' from the frame. I prefer the construction of interrupter represented in Figs. 1 and 3 on account of its greater simplicity. The part L of the wheel is composed of alternate contact-points and breaks, as seen in the detail view, Fig. 3, and on either side of this surface a driving-surface, L', of greater diameter to run against the periphery of the rolling electrode. These drivers may be made of rubber. In the modification, Fig. 6, beveled drivers are employed, because the electrode from which the motion is taken revolves at a right angle to the axis of the interrupter to be driven. In either case the interrupter is operated from the rotation of the electrode H as the instrument is used. The terminal points or shunts of the second-

ary coil C<sup>2</sup> are carried out through the insulating-block D in the end of the handle, as seen at W W' W<sup>2</sup>, &c., where they make contact with the spring R on the frame. The op-

5 posite terminal of the secondary coil is in electric connection with the cylindrical electrode T on the handle.

Different degrees of intensity in the current are obtained by carrying out terminals in this  
10 manner from successive layers of the secondary coil, the same as in my former instrument already patented; but instead of bringing out the ends of the wires at the side of the handle I now place these terminal points in the end  
15 of the handle that sets through the socket of the frame. The contact-spring R is fixed in position to bear against one point at a time, and the contact-points W W', &c., are so arranged that by turning the handle in the socket  
20 a greater or less distance any one of the points can be set to the contact-spring. By setting the spring R in this manner from one point to another a greater length of secondary coil can be brought into circuit to produce a stronger  
25 current. The intensity of the instrument is thus varied by simply turning the handle in the socket of the frame. By this construction I bring all the parts of the switch inside the frame and leave the handle smooth and with-  
30 out projecting parts. There is no liability to shift the switch accidentally when using the instrument.

Having thus fully described my invention, what I claim, and desire to secure by Letters  
35 Patent, is—

1. In an instrument of the character described, the combination of the case or handle in which is mounted an induction-coil and a battery, and the frame B, adapted to carry a  
40 rolling electrode, and having a circuit-interrupter also mounted on it, the terminals of the induction-coil being brought out at the end

of the handle and suitably exposed to make electrical connection with the circuit-interrupter and the electrode H, as hereinbefore 45 described.

2. In an instrument of the character described, the combination, with the frame B, having a rolling electrode mounted in it for rotation, as described, of the detachable handle 50 containing an induction-coil and a battery and having the terminals of the same brought out to the end where the handle sets into the frame, substantially as described.

3. In an instrument of the character described, the circuit-interrupter consisting of the wheel L and the contact-spring K, in electrical connection with the frame B and the primary coil, and driving mechanism, substantially as described, which connects the inter- 55 rupter-wheel with the rolling electrode to operate the same from the motion of the electrode, as set forth.

4. In an instrument of the character described, the combination of the handle or part 65 carrying an induction-coil and a battery, and having a surface-electrode, and the frame or other part having a rolling electrode and a circuit-interrupter mounted on it, the said parts being separable, substantially as de- 70 scribed.

5. The combination of the rolling electrode in circuit, as described, and the circuit-interrupter having driving wheels or surfaces which are adapted to run against the rolling electrode 75 to be driven by the rotation thereof, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

JOHN S. MUIR. [L. S.]

Witnesses:

CHAS. E. KELLY,  
C. W. M. SMITH.