(No Model.) 2 Sheets—Sheet 1.

J. W. HAZELL.

COIN OPERATED INDUCTION COIL.

No. 385,927. Patented July 10, 1888.

Fig. 2.

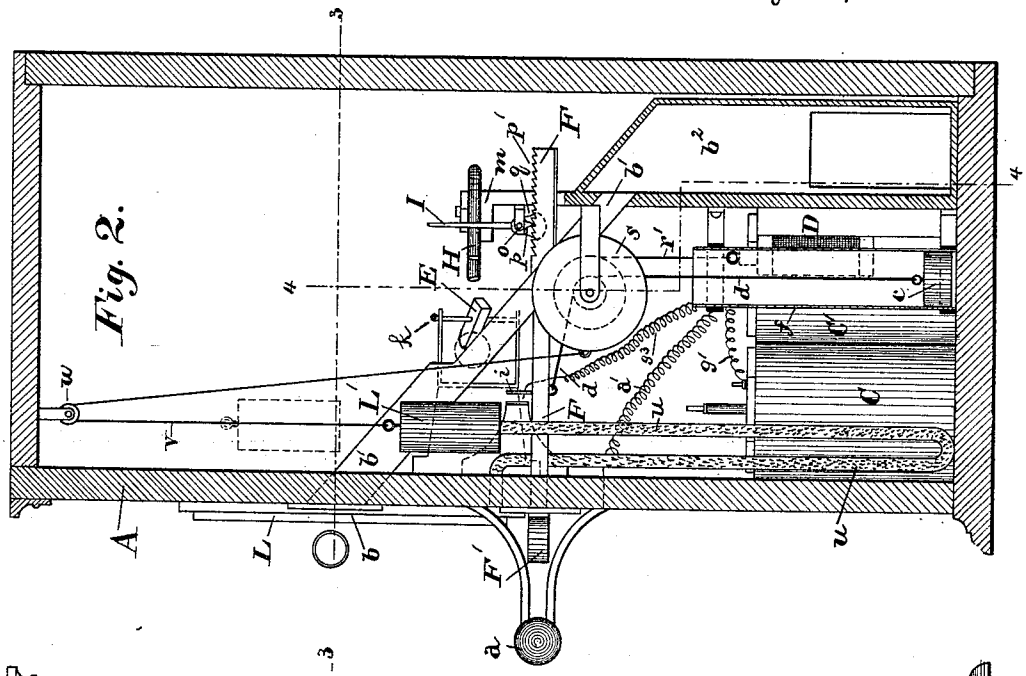
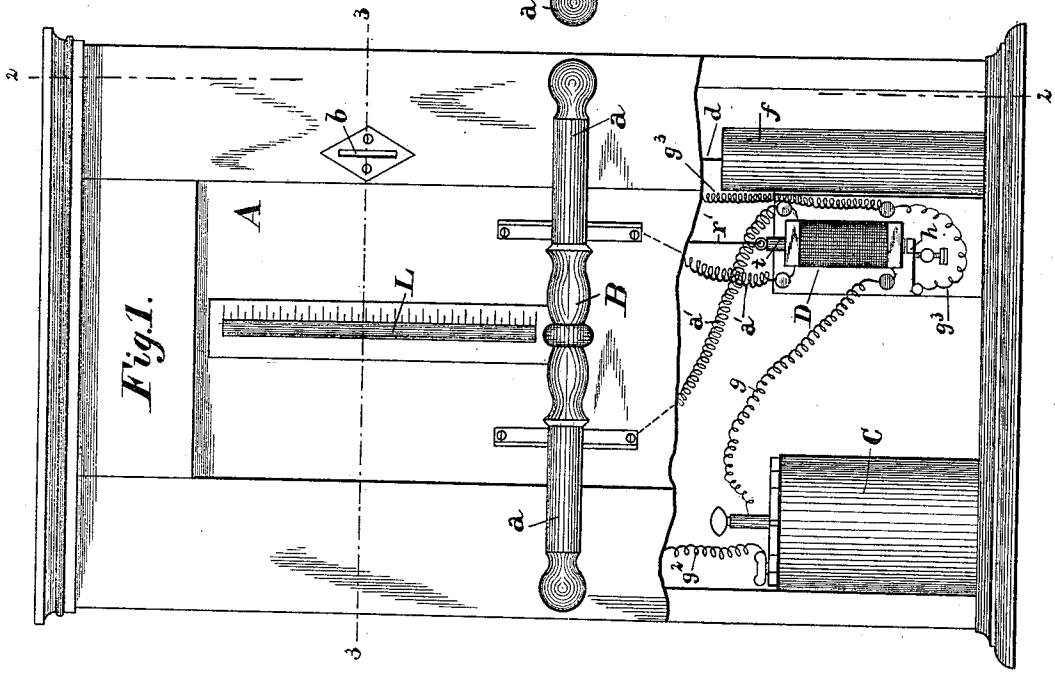


Fig. 1.



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John E. Morris.

INVENTOR:

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(No Model.) 2 Sheets—Sheet 2.

J. W. HAZELL.

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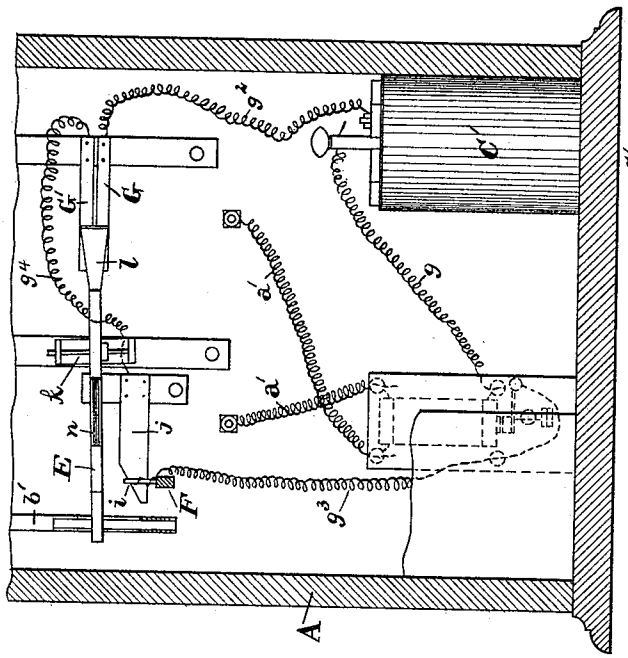

Fig. 4.

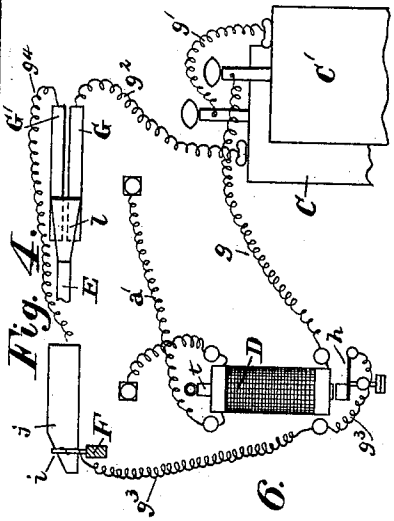

Fig. 6.

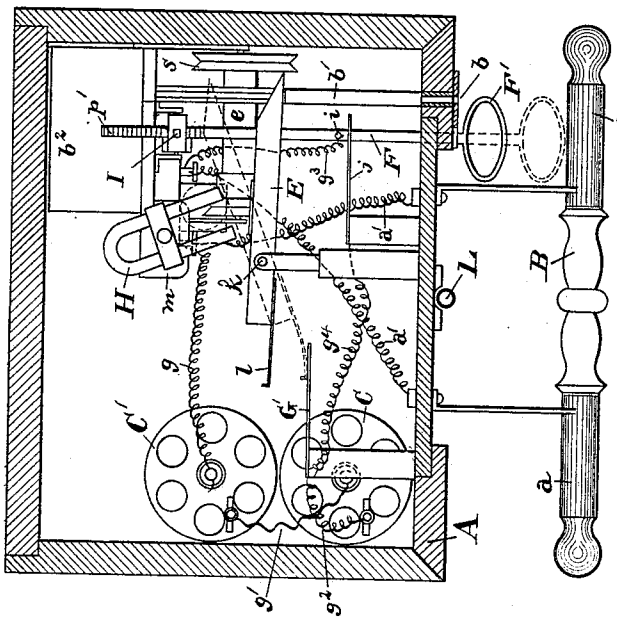

Fig. 3.

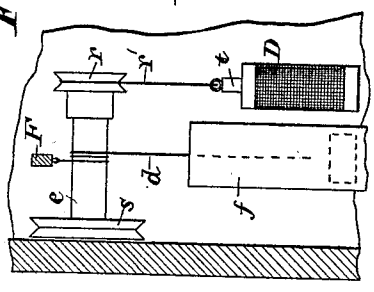

Fig. 5.

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UNITED STATES PATENT OFFICE.

JOSEPH W. HAZELL, OF BALTIMORE, MARYLAND.

COIN-OPERATED INDUCTION-COIL.

SPECIFICATION forming part of Letters Patent No. 385,927, dated July 10 1888.

Application filed January 25, 1888. Serial No. 261,882. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH WM. HAZELL, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Coin-Operated Induction-Coils, of which the following is a specification.

My invention relates to an apparatus for administering a series of electric shocks for therapeutic or experimental purposes.

The invention has for its object to provide mechanism so combined with an induction-coil and a battery or batteries that the circuit will remain normally broken or in an inoperative condition, and will be established by depositing a coin and moving a circuit-closer.

Apparatus have been heretofore constructed in which coins dropped into a conductor are arrested before reaching the receptacle in such manner that they serve in some cases as a portion of a circuit completed by and through them, and in other cases to close and hold an electric switch in the primary circuit of an induction-coil, the release of the coin being finally effected after the operation of the apparatus by various contrivances designed for the purpose.

My invention comprehends a system in which the complicated mechanisms for arresting and releasing the coin are wholly dispensed with, and the coin permitted while pursuing its forward course to act upon and close a switch, which remains closed without further action or assistance on the part of the coin. It also contemplates the closing of the circuit and the bringing of the coil into action by a manual device independent of the electrodes or handles, both of which are made stationary.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the apparatus. A portion of the case-front is broken away near the bottom to expose certain parts to view. Fig. 2 is a vertical section on the line 2 2, being a view of the interior parts seen by removal of one side of the case. Fig. 3 is a horizontal section on the line 3 3. Fig. 4 is a vertical section on the line 4 4, Fig. 2, showing a rear view of certain parts looking toward the front. Fig. 5 is a view of the roller, its pulley, and the cords connected therewith. Fig. 6 is a diagram illustrating the circuit-wires connecting the parts.

The letter A designates the case which incloses the apparatus; B, a bar permanently secured on the front of the case. The center of this bar is wood, or some poor conductor, while the two ends *a* are metal and are in electric connection by means of the wires *a'* with the induction-coil, and constitute the positive and negative electrodes. Two battery cells, C C', in the present instance, and an induction-coil, D, are employed, which are connected together through the mechanism hereinafter described in detail.

The apparatus may be worked with one battery.

The handle-electrodes *a* are brought into the circuit by the circuit-closing lever E and circuit-closer bar F. The circuit-closing lever E is actuated by depositing a coin—such as a United States nickel five-cent piece—in the slit-opening *b* in the wall of the case, from which a chute, *b'*, inclines to a receptacle, *b²*, for the coins. The circuit-closer bar F projects through the wall of the case and on the outside has a handle, F', and thereby the hand of the person who is to receive the shock may move the said bar endwise. This bar, besides closing the circuit, regulates the intensity of the electric current and raises and lowers the reservoir, as hereinafter explained. In the present instance the said bar F is moved horizontally by being pulled out by the person's hand. When released, it retracts automatically by the action of a weight, *c*, and a cord, *d*, which connects the bar and weight. The cord from its point of connection with the bar F passes in a nearly horizontal direction to the roller *e*, once around said roller, and then vertically down to the weight *c*, which occupies and moves up and down in a vertical cylinder, *f*. This cylinder may contain air or some fluid—such as oil—through which the weight may move, the oil serving to check and prevent the too sudden descent of the weight, and thereby secure the operation of the parts with moderate speed and without concussion. The circuit-closing bar F has a pin, *i*, projecting from one side.

A wire, *g*, passes from one cell of the battery C' to the primary wire of the induction-

coil D. Another wire, g', leads from the said battery-cell C′ to the other cell, C, and a wire, g^2, from the latter cell to the first plate, G, of the commutator. A wire, g^3, leads from the armature h (or automatic circuit-breaker) to the pin i on the circuit-closing bar. The circuit remains normally broken between the conducting-plates and the pin i. A circuit-connection is provided between the second plate, G′, and the said pin i. This connection embraces a spring-plate, j, fastened at one end rigidly by pins and free at the other end. The free end projects across the circuit-closing bar F, and is in position to be pressed by the pin i when the said bar F is moved endwise in one direction—for instance, when pulled out by the handle F′. A wire, g^4, connects the spring-plate j with the second plate, G′, of the commutator. The circuit-closing lever E is made of non-conducting material and is suitably pivoted at k. One end is provided with a metallic plate, l, which comes in contact with both the first and second plates, G G′, of the circuit-closer, and there establishes electric connection. The other end of the circuit closing lever projects immediately over the chute b'. The top of the chute is open and the end of the switch-lever is in position to be struck by a coin that passes down the chute. The coin deposited in the opening b will thus shift the lever E from the position shown in Fig. 3 and cause its end plate, l, to make the connection, as described, between the two conducting-plates.

From the foregoing it will be seen that normally the battery-circuit, which includes the primary wire of the induction-coil, is broken at two points—first, between the plates G G′, and, second, between the pin i and plate j.

When the apparatus is to be used, a coin is first deposited in the opening b, and in descending therethrough by gravity toward the receptacle b^2 its upper exposed edge encounters the lever E with sufficient momentum to move the lever backward out of its path, thereby causing the plate l at the opposite end of the lever to close the circuit between the plates G G′. The coin continues its course without interruption past the lever to the receptacle, the circuit remaining closed without further assistance from or dependence upon the coin. After the circuit has been thus closed at the first point, the bar F is drawn outward in an endwise direction until its pin i, encountering the plate G, completes the battery-circuit, so that the induction-coil is set in operation. In this condition of the apparatus a person grasping the two handles or electrodes a will receive a series of shocks by reason of the inducing or secondary circuit from the induction-coil.

In order to retain the circuit-closing lever E in that position where its end plate, l, establishes connection between the two plates of the commutator, a permanent magnet, H, is employed to hold the lever. This magnet is fixed to a suitable support, m, and the wood switch-lever has on one side a metal plate, n, on which the said magnet acts. When a coin shifts the circuit-closing lever E, the metal plate n will come in contact with the magnet H, which will hold it so that its end plate, l, will remain in connection with the said two plates G G′.

To automatically effect the release of the circuit-closing lever E from the magnet and effect the reopening of the circuit between the plates G G′, a trip-arm, I, is provided, as shown in Figs. 2 and 3. This arm is supported by a pivot, o, and has a vertical position at one side of the magnet. The arm I tilts in a vertical plane. Below the pivot the arm has a point, p, which engages with teeth p' on the side of the circuit-closing bar F. The arm also has below the pivot a weight, q, which keeps the arm upright. The teeth p' on the bar have one side slanting and the other side vertical, from which it results that in pulling out the circuit-closing bar F the teeth p' will slip past the said point p on the arm; but when the weight c and cord d move said bar F inward (or retract it) the teeth will so engage said point on the lower part of the arm as to tilt the arm and cause the upper part to move forward, and thereby push the lever E away or release it from the magnet H and move it to that position where, as before stated, it will be struck by a coin passing down the chute.

The roller e, over which the weight-cord d passes, has two pulleys—a small one, r, and a larger one, s. A cord, r', made fast to the small pulley connects with the movable central core, t, of the induction-coil D. The core consists of a bundle of wires or a rod of soft iron—such as is commonly used in connection with induction-coils—to vary the strength of the inducing-current. It will thus be seen that when the bar F is pulled out (more or less) the roller e will be correspondingly turned or partly turned, and the said cord r' will raise or remove the movable section t of the induction-coil D, the power of which is thereby increased. The drawing out of the bar F therefore (more or less) regulates the intensity of the electric current, and the person whose hands are on the electrodes may receive a current of greater or less intensity, according to the extent of movement given to the bar F.

I employ a graduated glass tube, L, a reservoir, L′, to contain liquid, and a flexible tube, u, connecting the said glass tube and reservoir, for the purpose of indicating the strength of the electric current as the same is intensified by moving the bar F.

The indicator-tube L is on the front of the case A, and the reservoir L′ and flexible tube u are within the case. The reservoir is suspended by a cord, v, attached to its top, and which passes up to a pulley, w, at the upper part of the case, and thence down to the aforesaid large pulley s on the roller e. By this means the reservoir will be raised or lowered as the roller turns. Of course the liquid in the reservoir L′ and glass tube L will main-

tain the same level at the ends of the two columns—that is to say, the liquid will rise in the glass tube to the same height that it has in the reservoir. When the reservoir is raised, the liquid will rise in the tube, and vice versa.

From the foregoing it will be understood that as the bar F is pulled out (more or less) the roller *e* will be turned, the electric current intensified, and the liquid-reservoir elevated correspondingly, whereupon the position of the liquid in the glass tube L will indicate the strength of the current.

The description above given will make plain that the apparatus will give the electric shock or current only after a coin has been deposited in it, as specified, and that after each use by one person the apparatus will automatically break circuit and resume its normal inoperative condition.

While I prefer to retain the details of construction herein shown, it is manifest that they may be modified within the range of mechanical skill provided a mode of operation substantially such as herein described is retained.

One of the essential features of my invention resides in the arrangement of the circuit-closing device in such manner as to be operated by a coin passing thereby without stoppage of the coin, and obviously the precise form of apparatus herein shown is not essential to this action.

What I claim is—

1. The combination, substantially as described and shown, of a coin-chute provided with an opening through which the falling coin is exposed and a circuit-closing device located adjacent to said opening in position to be acted upon by the descending coin and free to move under the influence of the coin beyond the path of the latter, as described, whereby the coin is enabled to effect the closing of the circuit without having its movement arrested for that purpose.

2. The coin-chute having an opening through which the falling coin is exposed, in combination with a circuit-closing lever, E, arranged, as described, to be acted upon and moved by the coin out of its path, and a magnet to hold the lever after being thus moved, whereby the coin is enabled without stopping to close the circuit and the circuit retained in closed condition by the magnet without assistance from the coin.

3. In an apparatus for administering electricity, an induction-coil, two electrodes connected with the secondary wire of the induction-coil, a battery and conductors connecting the same with the primary wire of the induction-coil, a normally-open circuit-closing device, E, in the battery-circuit, a coin-chute provided with an opening through which the falling coin may act upon said circuit-closing device without being arrested thereby, a second and normally-open circuit-closing device also mounted in the battery-circuit, and a manual device, F, adjacent to one of the electrodes, for operating the last-named circuit-closer, whereby the battery-circuit is closed at one point by the moving coin and thereafter completed at another point by the manual device.

4. In an apparatus for administering electricity, the induction-coil, the battery and conductors connecting the same with the primary wire of an induction-coil, the electrodes connecting with the secondary wire of the induction-coil, the lever E, for closing the battery-circuit at one point, the coin-chute provided with an opening through which the coin without stopping acts upon said lever, circuit-closing devices *i j*, also in the battery-circuit, the manual operating-bar F, for closing the circuit at *i j*, the trip I, actuated by the bar F and acting in turn upon the lever E, and the means for automatically retracting the bar F when released, whereby the coin is enabled to close the battery-circuit at one point and the manual bar enabled to complete said circuit at a different point and thereby bring the induction-coil into action, and, finally, the bar F caused to reopen the battery-circuit at both points when released.

5. The induction-coil and its movable core *t*, the battery connected to the primary wire of said coil, the electrodes connected with the secondary wire of the coil, the transparent indicator-tube, the flexible tube connected thereto, the vertically-movable reservoir *b'*, connected with the flexible tube, and the fluid therein, in combination with the manual bar F and connections, substantially as shown, from said bar to the reservoir and the core *t*, respectively, whereby said bar is enabled in moving endwise to vary the intensity of the secondary current and to indicate said variation by raising and lowering the fluid in the indicator-tube.

6. The combination, in an apparatus for administering electric shocks, of an electric generator and circuit-wires therefrom, a circuit-closing bar, F, a circuit-closer, E, a coin-chute provided with an opening through which the moving coin may act upon the circuit-closer E, a magnet to hold the circuit-closer E, and a trip, I, actuated by the circuit-closing bar to release the circuit-closer E from the magnet.

7. The combination, substantially as described, of an electric generator, an induction-coil whose primary wire is connected with said generator, two stationary electrodes connected with the secondary wire of said coil, a normally-open circuit-closing device, E, controlling the generator-circuit, the coin-chute provided with an opening and located in suitable relation to the circuit-closer to admit of the falling coin moving the circuit-closer without being stopped thereby, a second and normally-open circuit-closer, F, also located in the generator-circuit, and a manual device for operating the last-named circuit-closer, located adjacent to one of the electrodes and movable independently thereof, whereby the coin pursuing an uninterrupted course to its receptacle is enabled to close the circuit at one point and

the attendant enabled to close it at a second point without movement of the electrodes.

8. The combination, in an apparatus for administering electricity, of an electric generator, an induction-coil whose primary wire is in circuit with the battery, an endwise-moving bar, F, controlling said battery-circuit, a glass indicator-tube, a liquid-reservoir, a flexible tube connecting the glass tube and reservoir, and a cord, *d*, suspending said reservoir and connected with the movable bar, for the purpose set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

JOSEPH W. HAZELL.

Witnesses:

JNO. T. MADDOX,

FERDINAND C. DUGAN.