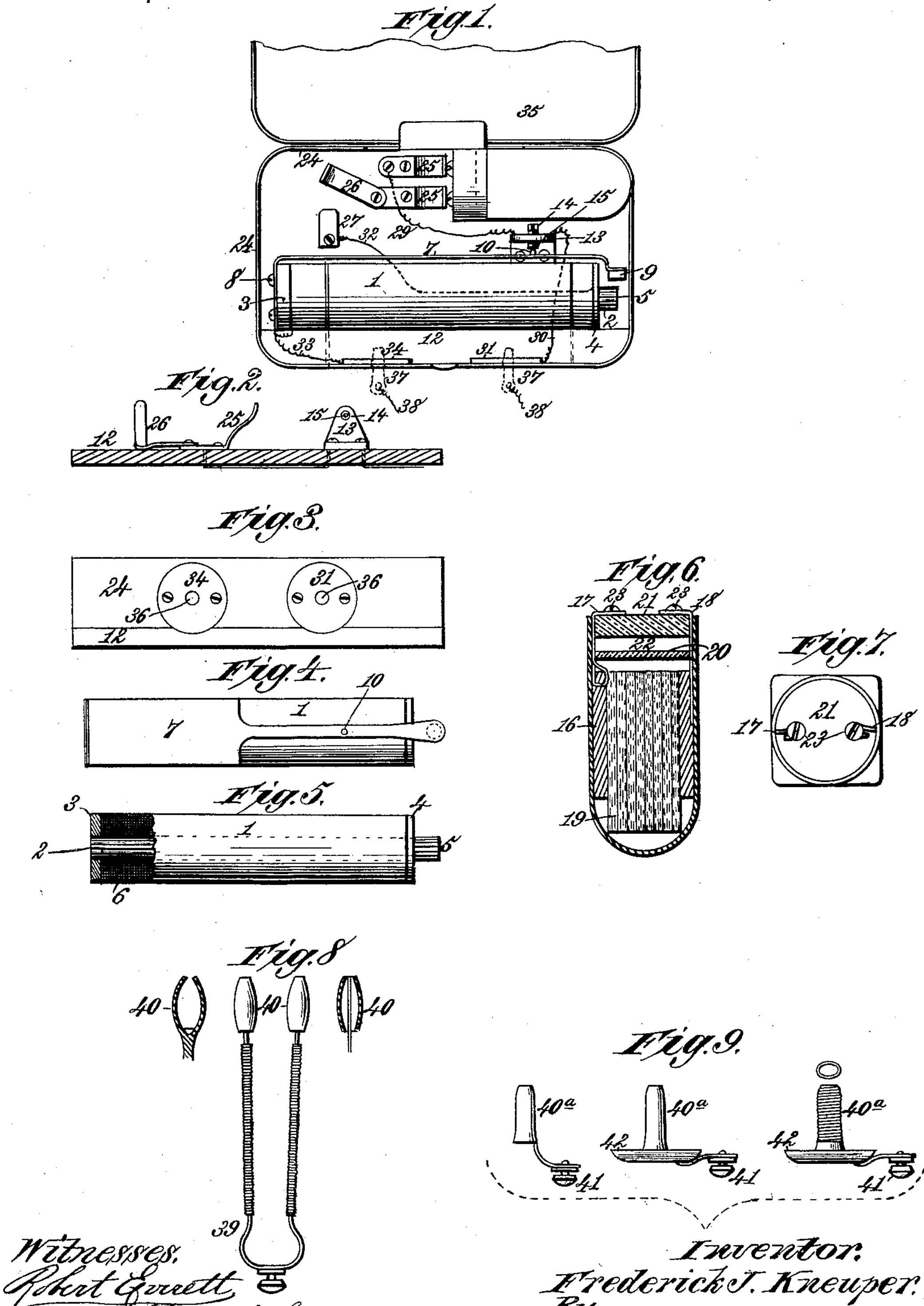
(No Model.)

F. J. KNEUPER.

ELECTRO THERAPEUTIC APPARATUS.

No. 417,923. Patented Dec. 24, 1889.



Witnesses:
Robert Everett,
W. H. Hutchins

Inventor:
Frederick J. Kneuper.
By James L. Norris
Atty.

UNITED STATES PATENT OFFICE.

FREDERICK J. KNEUPER, OF NEW YORK, N. Y., ASSIGNOR TO EMILIE LOUISE KNEUPER AND CHARLES G. WILLING, OF SAME PLACE.

ELECTRO-THERAPEUTIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 417,923, dated December 24, 1889.

Application filed January 19, 1889. Serial No. 296,865. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK J. KNEUPER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Electro-Therapeutic Apparatus, of which the following is a specification.

It is the purpose of my present invention to provide a simple and effective galvanic battery of such minute size that it may conveniently be carried in the waistcoat or other pocket, said battery containing the necessary elements or electrodes and electrolyte, with the appliances for transmitting through an external circuit an interrupted current, traversing conductors which are adapted to be placed upon different parts of the body for the therapeutic treatment of various nervous and local diseases.

It is my purpose, also, to arrange the several parts of the battery, the external circuit, the interrupter, the switch, and other parts within a simple, compact, and convenient casing or box having openings for the admission of the conductors, the entire invention being an improvement upon the United States Letters Patent granted me November 8, 1887, No. 372,808.

The invention consists in the several novel features of construction and new combinations of parts hereinafter fully set forth, and then specifically set forth in the claims.

Referring to the accompanying drawings, Figure 1 is a plan view of the complete apparatus. Fig. 2 is a detail section of the base of the battery-case. Fig. 3 is a front or edge elevation of the projecting edges of the base-piece. Fig. 4 is a detail plan view of the induction-coil and interrupter. Fig. 5 is a detail plan view, partly in section, of the induction-coil. Fig. 6 is a central vertical section of the battery cell or jar. Fig. 7 is a top or plan view of the same. Fig. 8 is a view of a nasal electrode. Fig. 9 is a view of an ear-electrode.

In the said drawings, the reference-numeral 1 denotes the coil, consisting of a core composed of a bundle of soft-iron wires 2, insulated from one another either by varnish or by external layers of oxide obtained by tempering. Upon one end of this core is slipped a disk 3, of soft iron, while upon the other end is placed a disk 4, of any suitable non-magnetic metal—such as brass—said disk 4 having a central perforation or orifice, through which and beyond which an end 5 of the core projects. The bobbin thus formed is insulated by winding it with paper strips and varnishing, and is then wound with a coil 6, of fine silk insulated copper wire. As the current passing through is quite weak, the attractive power of the core is strengthened by combining the soft-iron disk 3 with the interrupter 7, which is fastened to the disk by screws 8. The interrupter is composed of a flat steel spring tapered from the middle portion, with its free end bent over the edge of the disk 4. Upon this end is mounted a soft-iron button 9, which lies in suitable proximity to the projecting end 5 of the core. A platinum contact 10 is soldered or otherwise mounted on the interrupter at a little distance from the vibrating end.

The coil, with a suitable insulating inclosing jacket of ordinary construction, is mounted on a base 12, of wood, hard rubber, vulcanite, or any suitable material. It may be fastened by straps in the usual manner, the arrangement being such that the interrupter shall lie along one side of the coil and vibrate in a plane parallel with the base 12. Rising from the latter is a bracket 13, in which is mounted a threaded pin 14, having a platinum point 15, which makes contact with the platinum piece 10. The pin 14 has a slotted head, by which it may be turned in the bracket to advance or retract it relatively to the interrupter.

The battery-cell consists of a glass jar rectangular in cross-section. Within the jar is placed a rectangular strip of zinc 16, and a similar strip of chloride of silver forms the other and positive pole-plate. A piece of silver wire 17 is attached to the positive plate in any ordinary manner, whereby a good contact is obtained, one way being to twist the wire to press it closely against the plate. A copper wire 18, which may be nickel-plated, if desired, is soldered to the zinc plate, and both wires are well insulated

by a layer of wax, paraffine, or similar substance. Between the pole-plates are inserted a number of thick sheets 19 of blotting-paper or other absorbent, saturated with a nearly-concentrated solution of muriate of ammonia or chloride of zinc, and a sufficient number of absorbent sheets are used to require a moderate compression in order to enable the cell to contain them. This compression also separates the pole-plates and retains them in position and in contact with the absorbent sheets. A paraffined blotting-paper disk 20 is laid in the top of the cell, and the mouth is closed by a paraffined cork 21, a chamber or space 22 being left between the cork and the disk 20. The wires pass between the disk 20 and stopper 21 and the wall of the cell and terminate in two ordinary small brass screws 23, mounted on the stopper. The base 12 is preferably rounded at its corner, and has a surrounding wall 24. The battery-cell is laid in one angle of this wall, its base, which may be rounded, fitting substantially in the rounded angle of the wall 24. In this position its binding-screws 23 make contact with two elastic conducting brackets or contacts 25, mounted on the base 12. On the base of one of the brackets is pivotally mounted a switch 26, which may be turned into electrical contact with a contact-plate 27 upon the base 12. To one of the spring-contacts 25 is connected a wire 29, leading to the bracket 13, and the latter is connected by a wire 30 to a conductor-plate 31, mounted on the wall 24 of the base 12. One terminal of the coil is connected by a wire 32 with the plate 27. The other terminal connects with the soft-iron disk, and the latter is connected by a wire 33 to a conductor-plate 34, similar to 31. A suitable cover 35 is hinged on the wall 24 or otherwise connected therewith. Openings 36 are made in the wall 24 and through the disks or conductors 34 31 to admit pins 37, to which are connected the cables or wires 38, by which the current is conveyed to different parts of the body.

The action of these batteries is well understood. From the positive pole of the battery the current passes, by way of spring-contacts 25, switch 26, plate 27, and wire 32, through the coil, then by way of disk 3, interrupter 7, contact-pin 14, bracket 13, wire 29, spring-contact 25 back to the negative pole. This direct current induces magnetism in the core, attracting the button 9 and breaking the circuit, thus producing a constant vibration of the interrupter and in the same time the extra current. The cables 38 terminate in electrodes especially constructed for the respective organs upon which the current is to act. These being brought into direct contact are self-retaining, so that the patient may pursue his usual occupation without trouble or inconvenience. The battery-casing when closed may be carried in the waistcoat-pocket or elsewhere, the cables being so disposed as to be out of sight.

The nasal electrode which I have adapted to this battery is shown in Fig. 8. It consists of a bifurcated support 39, having upon its free ends the electrodes 40, each consisting of an elongated shell slightly oval in longitudinal section and open at both ends to permit the passage of air. The conducting wires may be conveniently wound upon the arms of the support.

The ear-electrode shown in Fig. 9 is a simple tube 40^a, having a projection with a binding-post 41 mounted thereon. I may, however, attach a shell 42 upon the outer end of the tube, in which case the projection is mounted on said shell. The ear-channel tube shown in Fig. 9 is flexible, to enable it to follow the course of the ear-opening, and it may be made of closely-coiled wire, as shown, although other constructions may be used, the purpose being to render the tube flexible enough to enable it to follow the curve of the ear-passage.

When the battery is in condition for operation, the circuits are as follows: from the negative pole to the battery through the screw 23, by way of contact 25, switch 26, plate 27, wire 32, through the coil, and thence through the spring 7, contact 10, bracket 13, and wire 29 back to the other pole of the battery, the induced magnetism of the core attracting the button 9. This circuit offering the least resistance to the passage of the current, it is evident that in the inappreciable interval between the break at the point 10 and the make caused by the contact of the button 9 and projecting end 5 of the core the circuit will be as follows: from spring-contact 25, switch 26, plate 27, wire 32, coil 6, disk 3, wire 33, plate 34, cable 38, through the body of the patient, and back by the other cable 38, and plate 31, wire 30, bracket 13, wire 29, and spring-contact 25 back to the other pole of the battery. Thus the direct current is alternately diverted over the two separate circuits described, one of which is composed, in part, of the body of the patient, or that particular part of the body to which the treatment is directed.

What I claim is—

1. In a pocket-battery for therapeutic purposes, a coil having a core consisting of a series of independent parallel soft-iron wires insulated from each other and having a soft-iron disk at one end and a non-magnetic disk at the other end, the extremities of said wires projecting through the non-magnetic disk and beyond the outer face thereof, substantially as described.

2. In a pocket-battery for therapeutic use, a coil having a core composed of a series of independent parallel soft-iron wires insulated from each other and having a non-magnetic disk at one end and a soft-iron disk in magnetic contact with the other end, in combination with an interrupter formed of a steel spring mounted at one end upon the soft-iron disk, its body lying parallel with the axis of

the coil and its free end having a soft-iron button in proximity to the projecting ends of the core-wires, substantially as described.

3. In a pocket-battery, the combination, with a coil having a core composed of straight soft-iron wires, having a disk of soft-iron riveted to one end and a non-magnetic disk to the other end, of an interrupter mounted by one end on the disk of soft iron, extended parallel with the coil, and having a soft-iron button on the free end in proximity to the projecting ends of the core-wires, a rectangular battery-cell of glass, having pole-pieces of zinc and chloride of silver separated by strips of absorbent material under pressure between the plates and saturated with the electrolyte, said cell being closed by a paraffined cork having binding-posts connected to the pole-pieces, spring-contacts mounted in a casing and against which the binding-posts abut when the battery-cell is in place, a contact adjustable in a bracket in said casing, and a suitable switch and electrical connections, the whole being arranged within a suitable casing having a suitable cover and an insulating-base provided with conductor-plates to which the cables are attached, substantially as described.

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

FR. J. KNEUPER.

Witnesses:
EY. TEN EYCK,
JOHN G. FOLSOM.