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 APPARATUS FOR MEDICAL TREATMENT BY ELECTRICITY.
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1,290,628.

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Fig. 4.

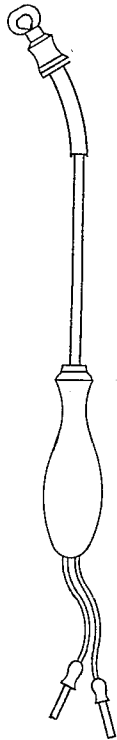


Fig. 1.

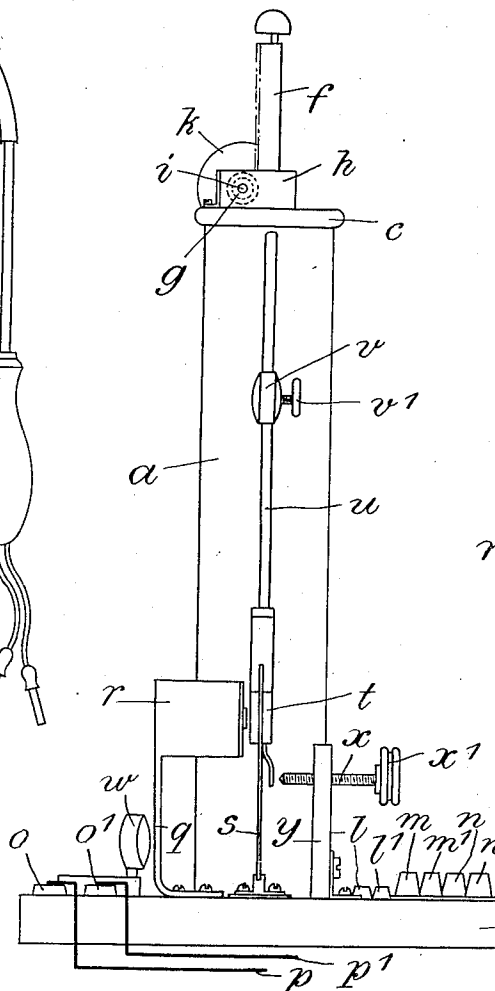


Fig. 3.

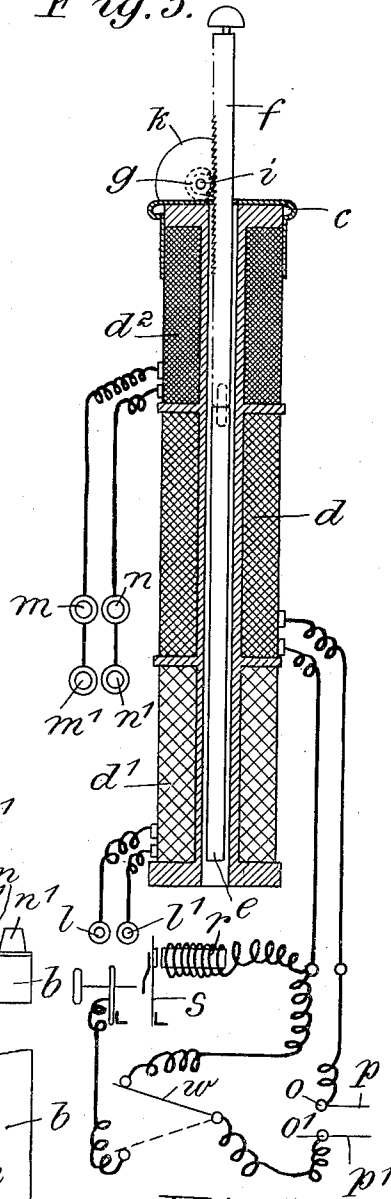


Fig. 2.

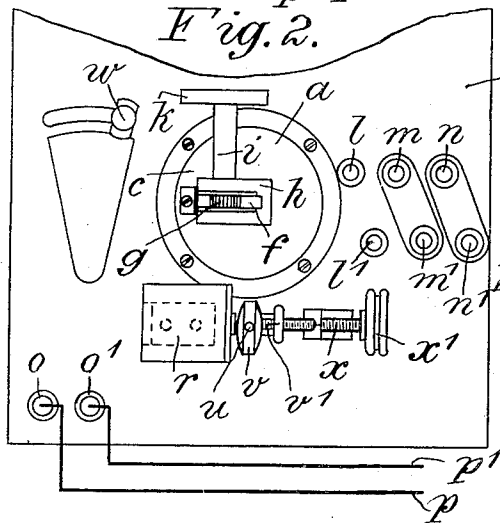
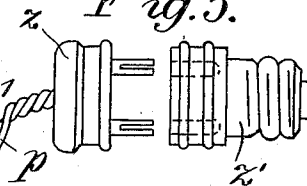


Fig. 5.



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APPARATUS FOR MEDICAL TREATMENT BY ELECTRICITY.

1,290,628.

Specification of Letters Patent.

Patented Jan. 7, 1919.

Application filed September 15, 1916. Serial No. 120,215.

To all whom it may concern:

Be it known that I, LOUIS MAYOR, professor, a citizen of Switzerland, residing at Château de Montagny s/Lutry, in the Confederation of Switzerland, have invented certain new and useful Improvements in Apparatus for Medical Treatment by Electricity, of which the following is a specification.

This invention relates to an apparatus for medical treatment by electricity and preferably comprises conductors leading from any source of electricity, for example a lighting main, to a transformer having a primary winding and secondary windings. One of the secondary windings is arranged so as to light a small lamp for endoscopic work, and the other is arranged for the production of a very weak current of high voltage. The transformer is employed in combination with an electrical device for interrupting the current and regulating the time of the interruptions, and the interrupter is provided with a switch for cutting it in and out so that currents either of a sinusoidal or of a faradic nature, the interruptions of which are determined at will, may be obtained for the electrical treatment of the body.

In the accompanying drawing:

Figure 1 is an elevation illustrating my invention,

Fig. 2 is a plan of the same,

Fig. 3 is a diagram of the connections of the coils and various conductors, and

Figs. 4 and 5 are respectively an elevation of the lamp for endoscopic work and a view of the contact plug of the apparatus for connecting it to the current supply.

In the drawing, *a* designates a metallic tube suitably fixed to a base *b* and surmounted by a cap *c*.

Inside the tube *a* is located a transformer consisting of three superposed coils *d*, *d*¹, *d*². The central coil *d* is wound with wire of medium thickness and carries the primary current, while the lower coil *d*¹ is of thick wire, and the upper coil *d*² of fine wire, and carry secondary or induced currents.

A plunger *e* of soft iron is fixed to a rack *f*, made of brass or any other non-magnetic material and with which a pinion *g* gears. The latter is mounted in a box *h* on an axle *i* at the end of which there is a collar *k*, operated by hand, so that the induction in one or the other of the coils *d*¹ and *d*² to be varied, by raising or lowering the rack *f* to the required position.

The primary current is supplied to the apparatus by means of wires *p* and *p*¹ connected between a contact plug *z* (Fig. 5) and the terminals *o* and *o*¹ which are in connection with the coil *d*.

The coil *d*¹ is provided with terminals *l* and *l*¹, which permit of its connection to a small lamp, see Fig. 4, for endoscopic work, this lamp being provided with wires terminating in contact plugs which may be connected to these terminals. The coil *d*² is provided with a double plug having terminals *m*, *m*¹, *n*, *n*¹ enabling this coil to be connected to electrodes which are to be applied to two different parts of the body of the patient undergoing electrical treatment, for example to his hands and feet. These electrodes may be of various forms but are not shown in the drawing as they form no part of the present invention. They also however are provided with wires terminating in contact plugs, which are connected respectively in the terminals *m* and *m*¹, *n* and *n*¹.

The apparatus is moreover provided with an electrical device to periodically interrupt the current for producing rhythmic impulses. This device is inserted in the primary circuit, and consists of an electromagnet *r*, mounted on a support *q* fixed on the base *b*, together with an oscillating rod *u* supported by a spring *s* and having a soft iron head *t*. The rod *u* is fitted with a weight *v* having a set screw *v*¹ so that the weight may be set and secured in any desired position. A screw *x*, turned by a head *x*¹ in a standard *y* fixed on the base *b* permits the oscillations of the rod *u* to be regulated. A switch *w* makes it possible to cut the interrupter device into or out of the primary circuit.

The apparatus operates as follows: Assuming the contact plug *z* (Fig. 5) to be connected to an alternating current supply by being inserted in a socket *z*¹ Fig. 5, the current passes to the apparatus by the wires *p* and *p*¹ which will have been previously connected to the terminals *o*, *o*¹ and will pass from the latter to the middle coil *d* (which is wound with wire of medium thickness) without passing through the interrupter device which, as is seen from Fig. 3, is cut out by the change-over switch *w* when in the full line position.

The plunger *e* of soft iron, being in the position indicated by Fig. 3, that is to say at the inner end of its travel, will develop by

induction a secondary current in the coil d' (which is wound with thick wire) and this current will be utilized for lighting the small lamp for endoscopic work after the contact plugs of which have been plugged in the terminals l and l' .

If on the other hand the soft iron plunger e is at the outer end of its travel, that is to say inserted between the coils d and d^2 , it will develop by induction in the latter, which is wound with very fine wire, a weak current of high voltage, which is received by the contact plugs of the electrodes that are applied to the patient under treatment, which contact plugs are connected in the terminals m and m' , n and n' of the double plug connected to the coil d^2 .

The currents induced in the coils d and d^2 will have a voltage more or less high depending upon the position of the soft iron plunger e within their cores, and may consequently be regulated at will by the collar k , moving the rack f . In this way a sinusoidal current is obtained.

Let us assume that the apparatus is connected to a source of alternating current, and the plunger e is at the outer end of its travel, with the switch w in its dotted line position so as to connect the interrupter device in the primary circuit; then a secondary faradic current is obtained at the terminals m and m' , and n and n' the interruptions in which are adjustable at will by adjusting to position the weight v along the rod u . In this way it is possible to give to the patient electrical shocks at regular and more or less wide intervals.

Now assuming the contact plug z to be attached to a source of direct current, and the switch w to be placed in the dotted line position in Fig. 3, the current reaching the terminals o and o' through the wires p and p' will pass through the interrupter device, the oscillations of which may be regulated, and will thus arrive in the form of an interrupted current at the coil d , which according to the position of the soft iron plunger e will develop by induction in the coils d' and d^2 the secondary currents required.

I claim as my invention:

1. An electro-medical apparatus comprising a transformer having an adjustable core, an electro-magnet in the primary circuit of the transformer and being provided with a swinging armature, means for regulating the extent of travel of the armature of the electro-magnet and means for regulating the period of travel of the said armature.

2. An electro-medical apparatus comprising a transformer, an adjustable core for the same, an electro-magnet in the primary circuit of the transformer and being provided

with a swinging armature actuated by the electro-magnet, means for regulating the extent of travel of the swinging armature, means for regulating the period of travel of the swinging armature, and means for cutting the electro-magnet entirely out of the primary circuit of the transformer.

3. An electro-medical apparatus comprising a transformer, an adjustable core for the same, an electro-magnet in the primary circuit of the transformer, a swinging armature actuated by the electro-magnet, an oscillating rod connected to the armature, means for regulating the extent of travel of the armature, means on the oscillating rod for regulating the period of travel of the same and the armature, and means for cutting the electro-magnet entirely out of the primary circuit of the transformer.

4. An electro-medical apparatus comprising a primary coil, a secondary coil, a core adjustable to position within the said coils, an electro-magnet, an armature for the same, an oscillating rod upon which the armature is mounted, means for regulating the distance of the travel of the oscillating rod, and means on the oscillating rod for determining the time of the oscillations of the said oscillating rod.

5. An electro-medical apparatus comprising a primary coil, a secondary coil, a core for said coils, means for adjusting the core to position within said coils, an electro-magnet, an armature for the same, an oscillating rod upon which the said armature is mounted, a weight adjustable to position on the rod, an adjustable thumb-screw for determining the extent of the oscillations of the said rod, and means for cutting in and out the said electro-magnet in the circuit of said primary coil.

6. An electro-medical apparatus comprising a primary coil, means for connecting the same in an electric circuit, a secondary coil, terminals connected to the same, a core for said coils, means for adjusting the core to position within said coils, an electro-magnet, an armature for the same, an oscillating rod upon which the said armature is mounted, a weight adjustable to position on the rod, an adjustable thumb-screw for determining the extent of the oscillations of the said rod, and a switch for cutting in and out the said electro-magnet in the circuit of the primary coil.

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

LOUIS MAYOR.

Witnesses:

LOUIS H. MUNIER,

Dr. ROD. DE WURSTAUERS.