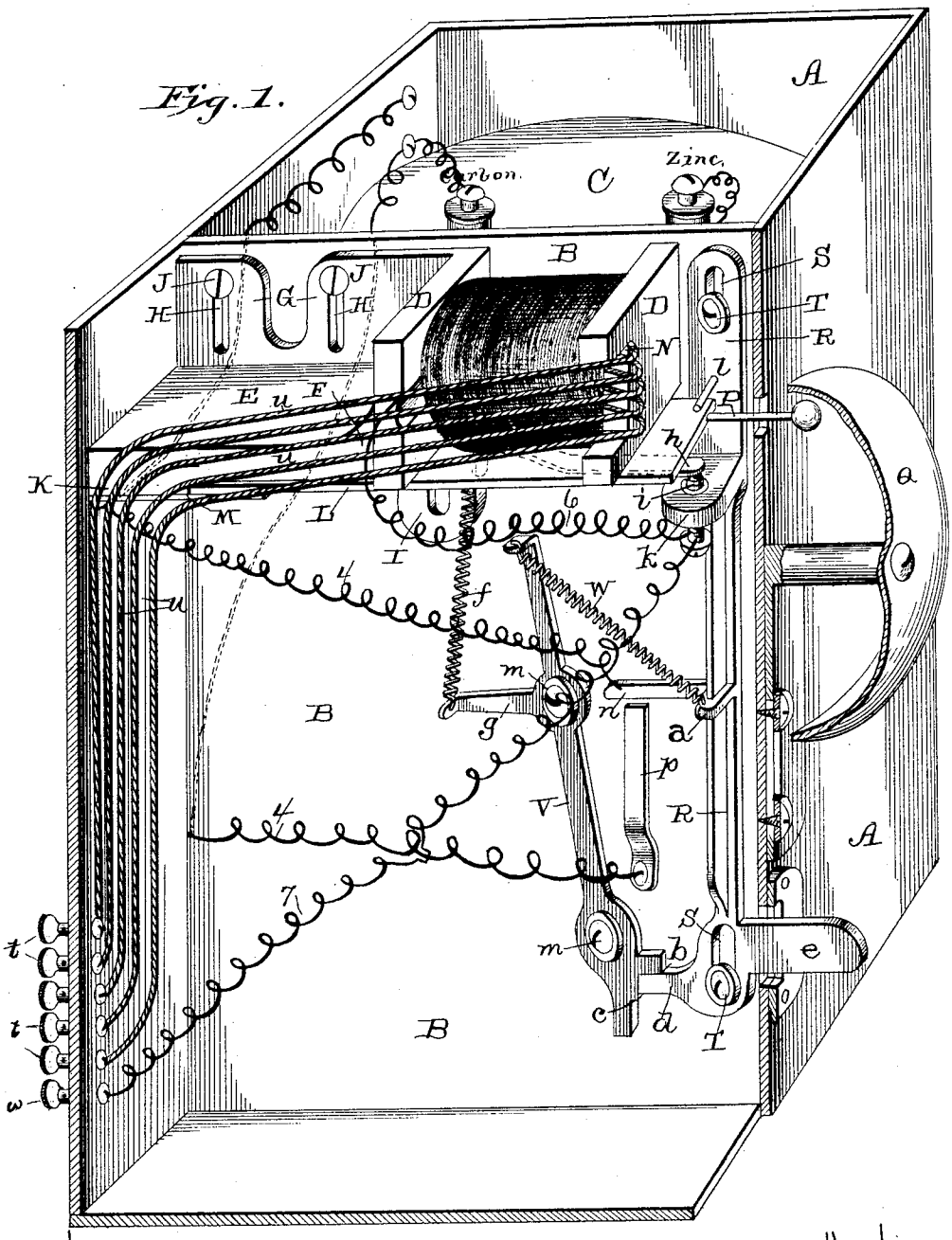
(No Model.) 2 Sheets—Sheet 1.

L. G. WOOLLEY.

ELECTRICAL APPARATUS.

No. 482,668. Patented Sept. 13, 1892.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

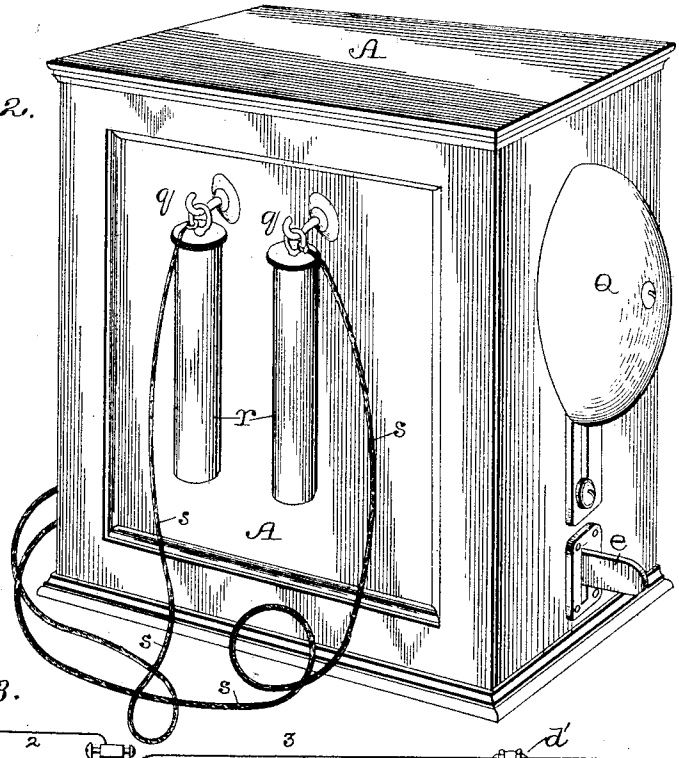


Fig. 4.

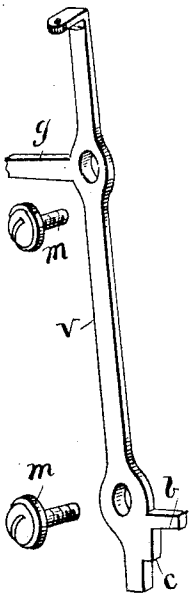
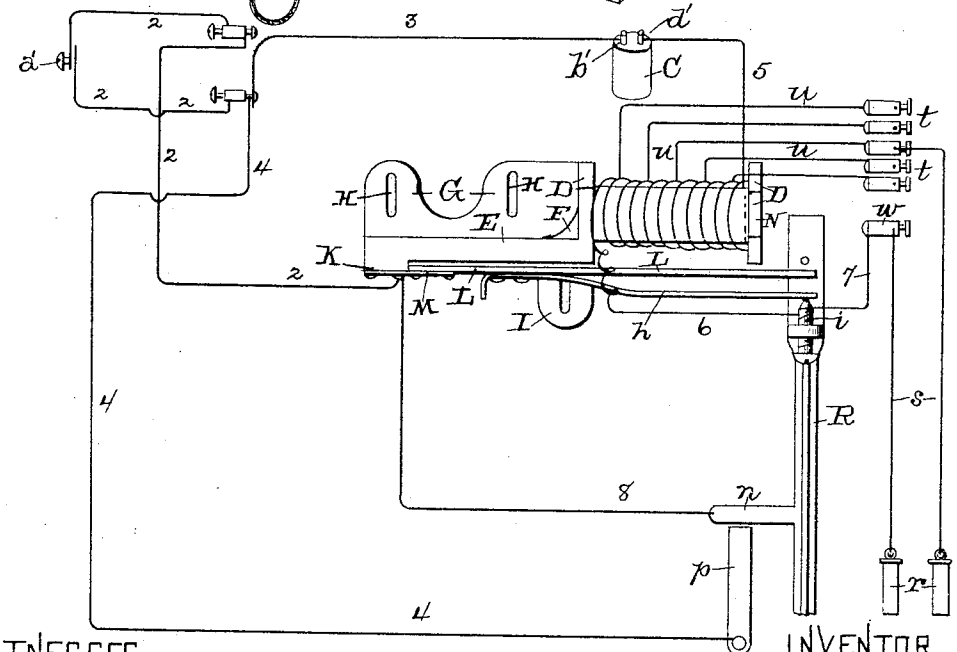


Fig. 3.



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UNITED STATES PATENT OFFICE.

LEONIDAS G. WOOLLEY, OF GRAND RAPIDS, MICHIGAN.

ELECTRICAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 482,668, dated September 13, 1892.

Application filed June 6, 1892. Serial No. 435,745. (No model.)

To all whom it may concern:

Be it known that I, LEONIDAS G. WOOLLEY, of Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Electrical Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in electrical apparatus; and it consists in the arrangement and construction of parts, which will be fully described hereinafter, and particularly referred to in the claims.

The primary object of my invention is to provide an electrical apparatus constructed and arranged as hereinafter described, whereby the current is available for sounding an alarm, while at the same time the current can be used for medical purposes by simply moving a shifting bar and circuit-closer, which also shifts the rheotome to prevent a clapper carried thereby from ringing a bell and increases the distance between the rheotome and magnet-core, whereby the force is lessened and the noise made by the rheotome decreased and softened while being used for medical purposes.

Another object of this invention is to so construct and arrange the shifting bar and circuit-closer in relation to the rheotome that the movement thereof will not affect or change the relative distance between the rheotome and a contact-point carried by the shifting bar when the said bar is moved to adapt the apparatus for either medical purposes or for signaling.

A further object of this invention is in the specific construction of the several parts for the purposes hereinafter specified.

In the accompanying drawings, Figure 1 is a perspective view of my invention, one side of the case being broken away and the top removed to exhibit the operating mechanism. Fig. 2 is a perspective view of the invention ready for operation. Fig. 3 is a diagram of the electrical circuits. Fig. 4 is a detached view of the bar V, showing the screw-openings larger than the screws *m*, which pass through them, to permit an adjustment of the said bar.

A indicates a casing having a vertical partition B, which divides the same into two chambers, one for a battery C and the other for the operating mechanism, to be described farther on.

Secured to the partition B is a magnet composed of a core, as usual, and this core has cast integral with its opposite ends the pole-pieces D, and projecting from the inner pole-piece is an extension E, having a thickened portion F adjacent to the said inner pole-piece. Extending vertically from the inner edge of this extension are flanges or ears G, provided with vertical slots H and with a depending ear I, also having a vertical slot. Passing through these slots are the clamping-screws J, by means of which the said magnet is capable of a vertical movement in relation to the other mechanism for a purpose hereinafter specified. This extension E has a transverse shoulder K at its outer end about the thickness of the armature L, which latter has its adjacent end secured thereto by means of a flexible plate M, that allows the opposite end of the armature to freely vibrate. One object of making the magnet with the extension E and the thickened portion F is to have an accumulation of metal at the inner end of the magnet, so that the magnetism thereof is concentrated at the outer pole thereof for operating with greater power upon the free vibrating end of the armature. Another object is to extend therefrom the slotted ears G and I for adjustably securing the magnet to the partition B, as before stated. It will also be noticed that one side of the outer pole-piece of the magnet is cut out or slotted, as at N, for convenience in passing out the loops of the magnet-coils as they are being wound upon the core. The free end of the armature L projects a short distance beyond the outer end of the magnet, as illustrated, and has connected thereto a rod P, that extends through the case A and which carries a clapper at its outer end. Adjustably supported against the outer side of the casing is a bell Q, with one edge inclosing the said clapper and adjacent thereto to be struck by the clapper when the apparatus is being used as a signal.

A shifting bar R is placed near the free end

of the rheotome and supported and sliding at substantially right angles thereto. This bar is provided with the vertical slots S at each end, through which the supporting-screws T loosely pass into the partition B. For the purpose of allowing the lower end of the bar R a free lateral as well as a free endwise movement the lower slot S is made wider than the diameter of the screw and a washer placed between the head of the screw and the said bar. Secured to the partition B, inside of the said shifting bar R, is a bar V, to the upper end of which one end of a spring W is connected, its opposite end being attached to a lug *a* upon the shifting bar. The lower end of this bar V is provided with the two horizontal shoulders *b c*, with which an inwardly-extending projection *d* at the lower end of the shifting bar engages. Projecting outward from the shifting bar R through a slot in the casing is an operating arm or handle *e*, by means of which the shifting bar is manipulated, as described hereinafter. A spring *f* has its lower end connected with an arm *g* of the bar V and its upper end connected with the armature L for holding the said armature normally away from the magnet. The spring circuit breaker and closer *h* has one end secured to the under side of the armature and its opposite end normally resting against a contact-point *i* under the tension of the said spring *f*. This contact is in the form of a screw, which passes through a lug *k* upon the shifting bar R, and from which it is electrically insulated by means of a non-conducting bushing in the usual way.

Projecting outward from the upper end of the shifting bar R is a pin or projection *l*, which engages the upper end of the armature L and limits the upward movement thereof in relation to the magnet, as will be plainly seen. By means of the adjusting-contact *i* upon the shifting bar it will be seen that the stroke of the free end of the armature can be regulated at will. The bar V is secured firmly to the partition B by means of the clamping-screws *m*, which pass through the same into the partition. In order to enable the said bar to be adjusted vertically and laterally, the openings made therein through which the screws *m* pass are made considerably larger than the diameter of the screws, as shown in Fig. 4, and washers are placed between the beads thereof and the said bar. The object of making this bar adjustable is to regulate the upward movement of the shifting bar, which is held by it, and thereby regulate the relation of the armature L to the magnet, since the upward movement of the armature is limited by the pin or projection *l* of the shifting bar. An arm *n* extends inward from the bar R, and when the bar is moved down it engages a spring-contact *p* for closing the circuit within which both are placed, as will be fully set forth presently. The spring W exerts both an inward and upward pull upon the lower end of the shifting bar R, so that when the said bar is depressed by means of the operating-arm *e* it is automatically drawn in under the shoulder *c* and contact made through the arm *n* and spring-contact *p*, thereby closing the inner or therapeutic circuit within which they are placed.

When it is desired to use the apparatus as a signal or alarm, the shifting bar is pulled outward slightly by means of the operating arm or handle *e* and out of engagement with the shoulder *c*, and it is automatically drawn upward by means of the spring W, thus carrying the arm *n* out of engagement with the contact *p* and breaking the inner or therapeutic circuit and leaving the signaling-circuit ready for operation.

Projecting from the case, preferably the front, are the two hooks *q*, which support the electrodes *r* when they are not in use, as illustrated in Fig. 2. These electrodes are connected by means of the flexible conductors *s* to the binding-posts *t*, to which the loops *u* have their ends connected. I use only a primary circuit, and the coils thereof are wound around the core of the magnet and formed into the loops *u*. It will be readily understood that the power of the current received at the electrodes is in proportion to the number of loops included in the said circuit, and this is regulated by attaching one of the electrodes to any desired binding-post *t*, thus bringing into the circuit one or several of the loops. One of the electrodes is always connected to the binding-post *w*, which binding-post is connected by means of the wires 6 and 7 with one terminal of the helix. While I use only a primary circuit, yet the current received at the electrodes is an induced current for the reason that the shock is only felt when the primary circuit is broken. It will be noticed that the shifting bar R has a movement at right angles to the rheotome, the object of which is to move the rheotome downward and away from the magnet when the apparatus is being used for medical purposes by depressing the shifting bar and without affecting or changing in any manner the distance between the spring-contact *h* and the contact-point *i*. This arrangement always maintains the same relative position of the rheotome and contact *i*, whether the apparatus is being used for signaling or as a therapeutic apparatus, thus avoiding any necessity for adjusting the parts when they are shifted and always insuring a perfect working thereof in either position.

In Fig. 3 I show a diagram of the circuits, of which there are two. One I term an "outer" circuit for signaling and the other an "inner" or "box" circuit for therapeutic purposes. Taking the outer circuit, starting from the pole *b'* of the battery, the current passes through the wire 3 and the wires 2 to the rheotome, through the rheotome and the contact *i* to the wire 6, through the magnet-coils and the wire 5 to the opposite pole of the battery, thus completing the circuit. In this outer

circuit is a manual circuit-closer a', which is normally open. This closer is here shown in the form of a push-button to be placed at a door or upon a desk for the purpose of sounding an alarm when it is operated.

It will be understood that several circuit-closers may be used and that the kind or number of circuit-closers within this outer circuit forms no part of my present invention, for it will be understood that they can be varied at will without departing from the spirit of my invention. When the shifting bar R is depressed, the inner or box circuit is made from the pole b' of the battery through the wire 3 and the wire 4 to the spring-contact p, through the arm n and wire 8 to the rheotome, thence through the rheotome to the contact i, and through the wire 6 and the magnet-coil to the wire 5, connected with the other pole of the battery. This inner circuit is alternately closed and broken by the rheotome, and each time the circuit is broken the magnet-core discharges its magnetism and an induced current is set up in the wire helix surrounding it through either one of the loops u, the electrodes, the binding-post w, and the wires 6 and 7.

It will be seen that from the above described and illustrated mechanism I produce an electrical apparatus which is adapted to be used as a therapeutic or signaling apparatus which is very desirable to have in a house, the same being simple, cheap, and reliable in operation.

Having thus described my invention, I claim—

1. An electrical apparatus comprising a coil or helix, two circuits, a vibrating rheotome within both circuits, a shifting bar carrying a contact-point within both circuits and engaging the said rheotome, a second contact-point carried by the said shifting bar for closing and opening one of said circuits, and electrodes connected with the said helix or coil, substantially as specified.

2. An electrical apparatus comprising a coil or helix, two circuits, a vibrating rheotome within both circuits, a shifting bar carrying a contact-point which is within both circuits, the said contact-point engaging the said rheotome, the shifting bar limiting the upward movement of the rheotome and itself moving substantially at right angles to the said rheotome, and electrodes connected to the said coil or helix, substantially as described.

3. An electrical apparatus comprising an electro-magnet, the coil thereof being formed into a loop or loops, a vibrating rheotome therefor carrying a clapper, a shifting bar moving at substantially right angles to the said rheotome and engaging with both the circuit-breaker and armature thereof, an outer and inner circuit, the said shifting bar being within both circuits and carrying a contact for breaking and closing the said inner circuit, and electrodes connected to the said coil, substantially as specified.

4. An electrical apparatus comprising an electrical source, an electro-magnet, the coil thereof being formed into one or more loops, a vibrating rheotome, a sliding shifting bar engaging both the armature and circuit closer and breaker of the rheotome, the said bar being supported and sliding substantially at right angles to the rheotome, a stop with which the said shifting bar engages for holding it in its shifted position, an inner and outer circuit connected with the said shifting bar, the said bar having a contact for closing and opening the inner circuit, and electrodes connected with the said magnet-coils, substantially as specified.

5. An electrical apparatus comprising an electro-magnet, a vibrating rheotome, a shifting bar engaging the said rheotome, the bar being at right angles to the rheotome, having longitudinal slots, and an operating arm or handle, supporting-screws passing through the said slots, a stop engaging the said shifting bar for holding it in its shifted position, and the circuits formed substantially as described, whereby the shifting of the bar opens or closes one circuit and shifts the rheotome, substantially as described.

6. An electrical apparatus comprising an electro-magnet, a vibrating rheotome, a shifting bar engaging said rheotome, the bar being substantially at right angles to the rheotome and having a longitudinal and lateral movement at its lower end, the bar being provided with a projection, stops with which the projection engages, one stop being nearer the rheotome than the other, an operating-handle, a spring for holding the bar projection in engagement with the stop, and the circuits formed substantially as described, whereby the shifting of the bar opens or closes one circuit and shifts the rheotome, substantially as set forth.

7. An electrical apparatus comprising an electro-magnet, a vibrating rheotome, a sliding shifting bar engaging the said rheotome, the bar having a longitudinal and lateral movement at its lower end, an operating-handle, stops for the said projection, one nearer the rheotome than the other, and a spring for normally holding the bar toward the rheotome and also toward the said stops, and the circuits formed substantially as described, whereby the shifting of the bar shifts the rheotome and breaks or closes one of the circuits, substantially as specified.

8. An electrical apparatus comprising an electro-magnet, a vibrating rheotome therefor, a shifting bar substantially at right angles to the rheotome and which engages the rheotome for shifting it, the said magnet having an adjustment longitudinal of the said bar for the purpose specified, and the circuits formed substantially as described, whereby the shifting of the bar shifts the rheotome and closes or opens one of the circuits, substantially as specified.

9. An electrical apparatus comprising an

electro-magnet, a vibrating rheotome therefor, a longitudinally-sliding shifting bar substantially at right angles to the said rheotome and engaging therewith, stops for the bar, the said magnet and stops each having an adjustment longitudinal of the said bar, as specified, and the circuits formed substantially as described.

10. An electrical apparatus comprising an electro-magnet, a vibrating rheotome therefor, a longitudinally-sliding shifting bar substantially at right angles thereto, engaging the said rheotome, a stop-bar having stops at its lower ends for the said shifting bar and extending upward, a spring secured to the said stop-bar and the rheotome, a spring also secured to the said stop-bar and the shifting bar, all operating as described, and the circuits formed substantially as set forth.

11. An electrical apparatus comprising an electro-magnet having transverse slotted supporting-ears, a rheotome, a longitudinally-sliding shifting bar engaging the said rheotome, and the circuits formed substantially as specified, whereby the magnet is adjustable in relation to the shifting bar, substantially as described.

12. An electrical apparatus comprising an electro-magnet having a securing projection at one pole-piece, a vibrating rheotome having one end secured to the said projection and its free end overlapping the other pole, whereby the magnetism of the magnet is concentrated at the pole adjacent to the free end of the rheotome, a circuit, and contact-points, substantially as set forth.

13. An electrical apparatus comprising a battery, a magnet having only a primary coil which is itself formed into loops for the purpose specified, a vibrating rheotome, two circuits formed through the said coil, a shifting bar engaging the free end of the rheotome and within both the circuits, a contact upon the sliding bar for closing and breaking one circuit, and electrodes connected with the said magnet-coil and the said loops, substantially as specified.

14. An electrical apparatus comprising a coil or helix, two circuits, a vibrating rheotome within both circuits, a shifting bar carrying a contact-point within both circuits and engaging the said rheotome, and a second contact-point carried by the said shifting bar for closing and opening one of the said circuits, substantially as specified.

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

LEONIDAS G. WOOLLEY.

Witnesses:
ALLEN S. PATTISON,
J. M. NESBIT.