

Jan. 25, 1927.

K. FUKUYAMA

1,615,508

ELECTROTHERAPEUTIC APPARATUS

Filed May 9, 1925

2 Sheets-Sheet 1

Fig. 1.

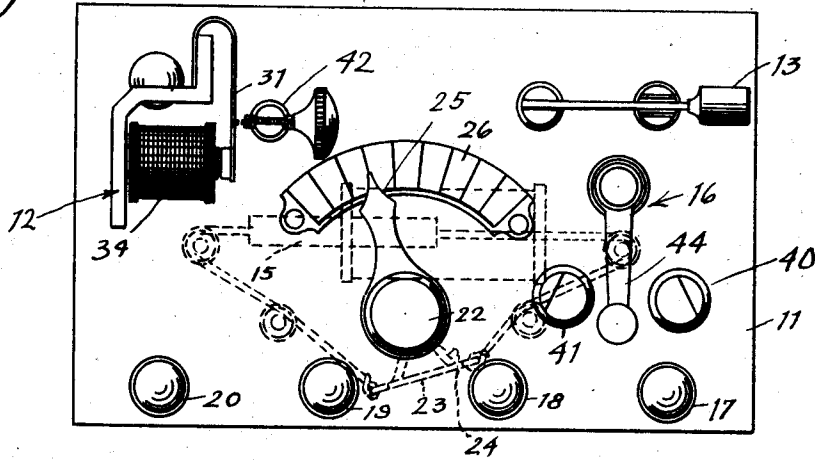
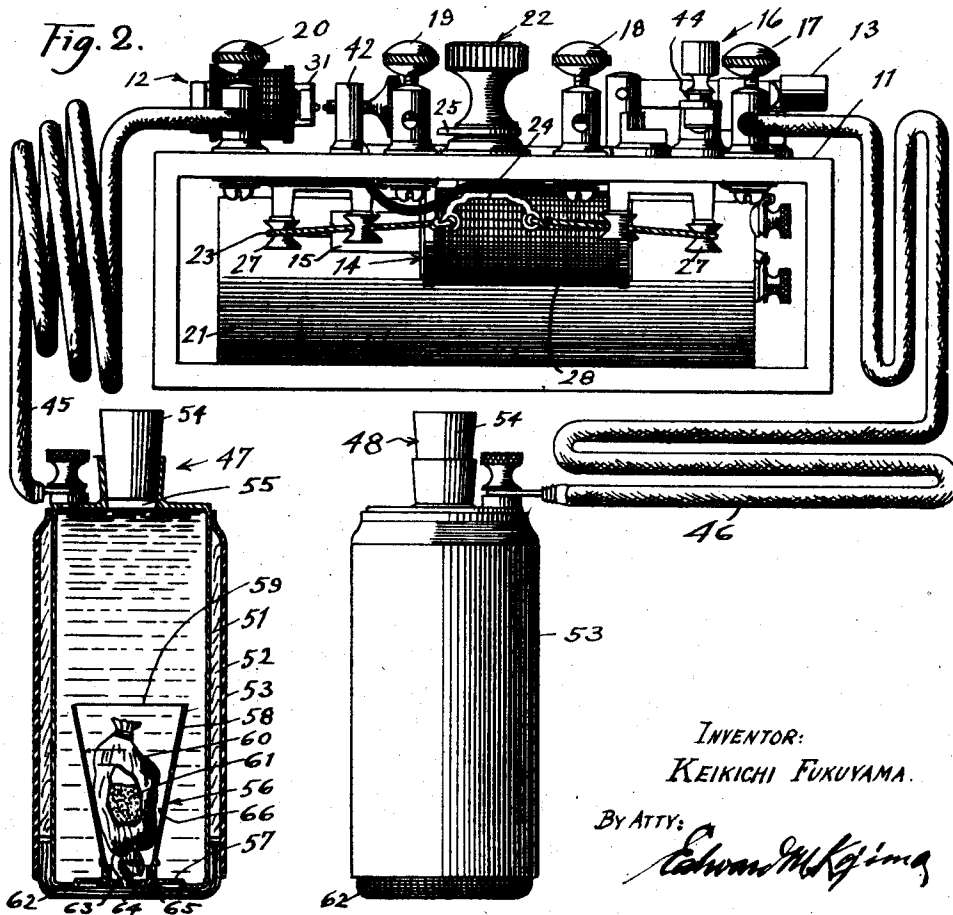


Fig. 2.



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Fig. 3

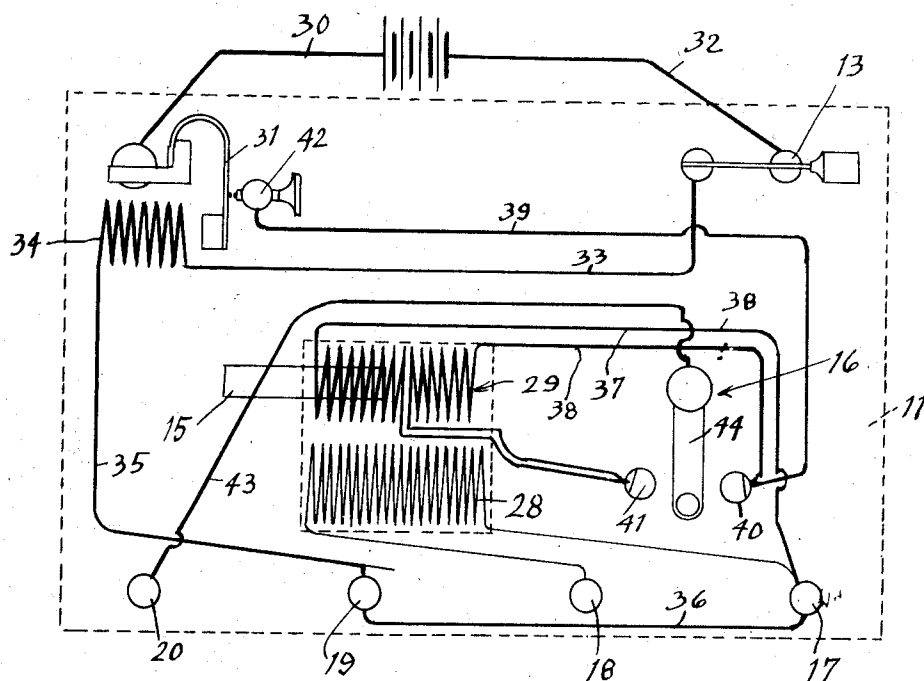
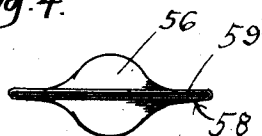


Fig. 4.



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ELECTROTHERAPEUTIC APPARATUS.

Application filed May 9, 1925. Serial No. 29,185.

This invention relates to certain novel and useful improvements in electro-therapeutic apparatus, and has for its objects to provide a compact and portable electro-inductive device and thermo-electrodes in combination therewith, which may be charged with varying degrees of current, and in which the electric current may be applied in combination with heat, and switch and adjusting mechanism whereby the desired results will be attained.

The several features of my invention, and the various advantages resulting from their use conjointly or otherwise will be apparent from the following detail description and appended claim. While the drawings illustrate a preferred embodiment of the invention, it is to be understood that changes, alterations, and modifications, that may fall within the scope of the claim, may be resorted to if desired.

In the annexed drawings: Figure 1 is a top-plan view of the switch board and battery casing, employed in my improved apparatus. Fig. 2 is a side elevation of the apparatus, showing the electrodes connected with the switch-board. Fig. 3 is a diagram of the electric elements and the connecting wiring therefor. Fig. 4 is an end view showing the percolating slot in the upper end of the inner casing.

Referring to the drawings, the switch-board 11, has mounted thereon, an interrupter 12, a cut-out switch 13, an induction coil 14, having an adjustable magnetic core 15, an adjusting switch 16, and binding posts 17, 18, 19 and 20. A battery 21, which may be a dry cell, generates the primary electric current. The magnetic core 15 is adjusted by means of the core adjuster 22, through cords 23, connected to the lever arm 24, fixed to the adjuster 22, the adjuster having a pointer 25, and associated therewith, a dial 26, by which the core may be moved into and out of the field of the induction coil 14. The cords 23, pass over the pulleys 27, and, by turning the adjuster 22, the core 15 may be shifted to increase or decrease the strength of the induced current delivered to the binding posts.

The battery 21 is connected by a wire 30, with movable armature 31, of the interrupter. The opposite pole of the battery is connected by wire 32, with switch 13. Wire 33 connects switch 16 and primary coil 34, of the

interrupter. Wire 35 connects coil 34 and binding post 19, connected by wire 36, with binding post 17. Wire 37 connects binding post 17 and primary winding 29, of the induction coil 14. Wire 38 connects primary winding 29, with contact member 40, of switch 16, and wire 39 connects contact member 40 with member 42, of the interrupter. Contact member 41, of switch 16, is connected to the primary winding 29, of the induction coil, at an intermediate point. A wire 43, connects movable lever 44, of switch 16, with binding post 20. The secondary coil 28, of the induction coil, is connected to binding posts 17 and 18.

The electrical conductors 45 and 46, to which are attached the electrodes 47 and 48, respectively, are adapted to be detachably secured to any of the binding posts 17, 18, 19 and 20, the electrodes being provided, respectively, with binding posts 49 and 50, for securing said conductors.

As the electrodes are of similar construction, but one will be described in detail. The electrode 47, consists of a tubular container 51, forming the body thereof, and covered with a heat insulating jacket 52, preferably of paper fabric, and in turn covered by an exterior jacket 53, preferably of rubber. For refilling, the container 51, has a plug 54, inserted in opening 55. An inner casing 56, fixed to the bottom 57, projects upwardly with its upper end 58, terminating in a narrow slit 59, through which a liquid content may percolate slowly to the interior of member 56, which further contains a cloth fabric bag 60, containing a medicated powder 61, or similar therapeutic agent.

The contact element 62, consisting preferably of felt fabric, is retained in position by jacket 53. A wick 63, extends through aperture 64, in cap 65, which forms a closure for chamber 66 in member 56. The liquid within the chamber 66, permeates the wick and thereby is conveyed to the pad 62.

In use, the electrodes are first filled with hot water, and then the bag containing a powder is inserted in chamber 66, and the cap 65 is placed in position with the wick extending therethrough, and then the pad is placed in position.

Assuming the electrodes to be prepared for use, and the current to be on and actuating the interrupter, then, if switch 16 be in neutral position, a strong secondary cur-

rent is generated in coil 28 and is delivered to binding posts 18, and either 17 or 19. If lever 44 be shifted to contact with member 40, a medium power current is obtained by connecting the electrodes with binding posts 18 and 20. In this case, the current generated in coil 28, must also pass through the primary winding 29, lever 44 and wire 45, to binding post 20. To connect lever 44 with member 41, as may be seen, places only a portion of the primary coil in active circuit, and therefore, the current obtained from binding posts 18 and 20 is medium strong. For a weak current, lever 44 is placed in contact with member 40, and the electrodes 47 and 48 are connected to binding posts 17 and 20, and the current delivered is that produced by primary winding 29, passing through wire 38 to contact member 40, thence to lever 44, thence to wire 43 and to binding post 20. The opposite pole of the winding is connected to binding post 17.

From the foregoing description and drawings, it may be seen that I have provided an improved switch board in connection with an induction coil and switch devices for obtaining a stronger or weaker current as may be desired, and in connection therewith, electrodes adapted to contain a quantity of hot or cold water as may be desired, and an arrangement whereby the liquid is also applied in connection with the electric current, and conjointly with the application of heat and of massage treatment.

The electrodes are of sufficient capacity to hold a quantity of fluid, and therefore will the better retain the heat for a longer time. Furthermore, the simultaneous application of the electric current, and of the moisture insures that the current will be uniform and

continuous, for the contact pads are constantly moist.

The device is not limited to the use of water, but other liquids may be employed, as desired, and the liquid contents may be of a different temperature in each electrode.

What is claimed is:

In combination, a battery adapted for generating a primary current, a switch board, an induction coil having a primary coil and a secondary winding mounted on the switch board, a series of binding posts mounted on the switch board, an adjustable magnetic core for the induction coil, means for adjusting the magnetic core in and out relative to the magnetic field and the primary winding, including a core adjuster member, a lever arm fixed to the core adjuster member, pulleys mounted on the base, and cords passing over the pulleys and connecting the lever arm and opposite ends of the magnetic core, a switch member having connection with the said primary winding at an intermediate point whereby a portion of the primary winding may be cut out, an interrupter for the induction coil mounted on the switch board, wiring connecting the several elements mounted on the switch board whereby the strength of the current delivered to the binding posts may be varied in strength, electrodes connected to the binding posts and adapted for application of the induced current to the person, means for applying heat in connection with the electric current, and means for applying moisture conjointly with the application of heat and electricity.

In testimony whereof, I hereunto affix my signature.

KEIKICHI FUKUYAMA.