(No Model.) 2 Sheets—Sheet 1.

G. MONRATH & W. M. GIBBONS.

ELECTRO THERAPEUTIC APPLIANCE.

No. 434,024. Patented Aug. 12, 1890.

Fig. 1.

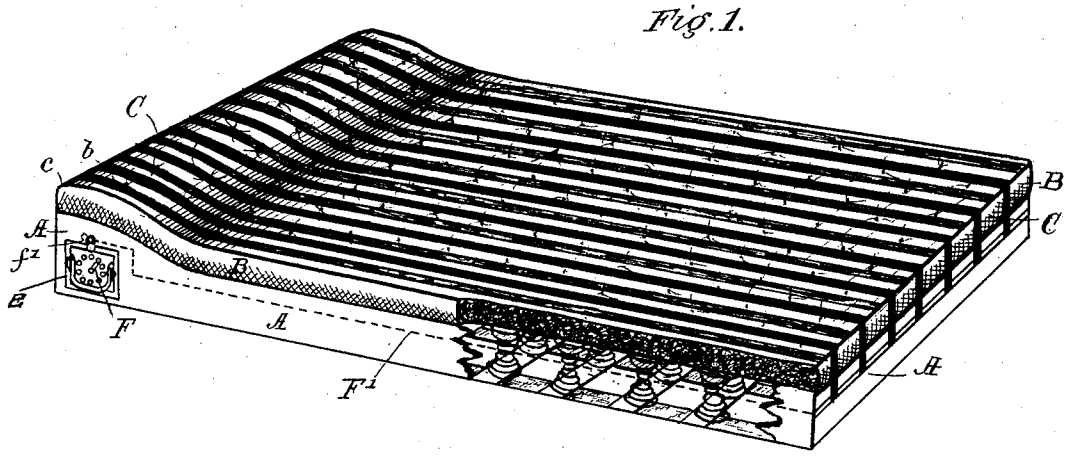


Fig. 2.

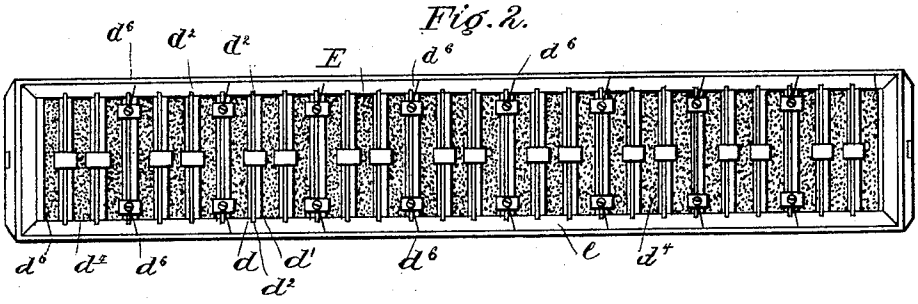


Fig. 3.

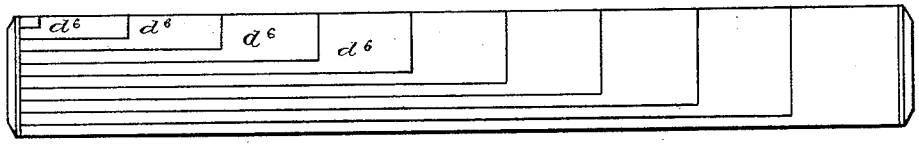


Fig. 4.

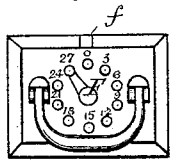
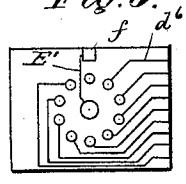


Fig. 5.



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(No Model.) 2 Sheets—Sheet 2.

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ELECTRO THERAPEUTIC APPLIANCE.

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Fig 6

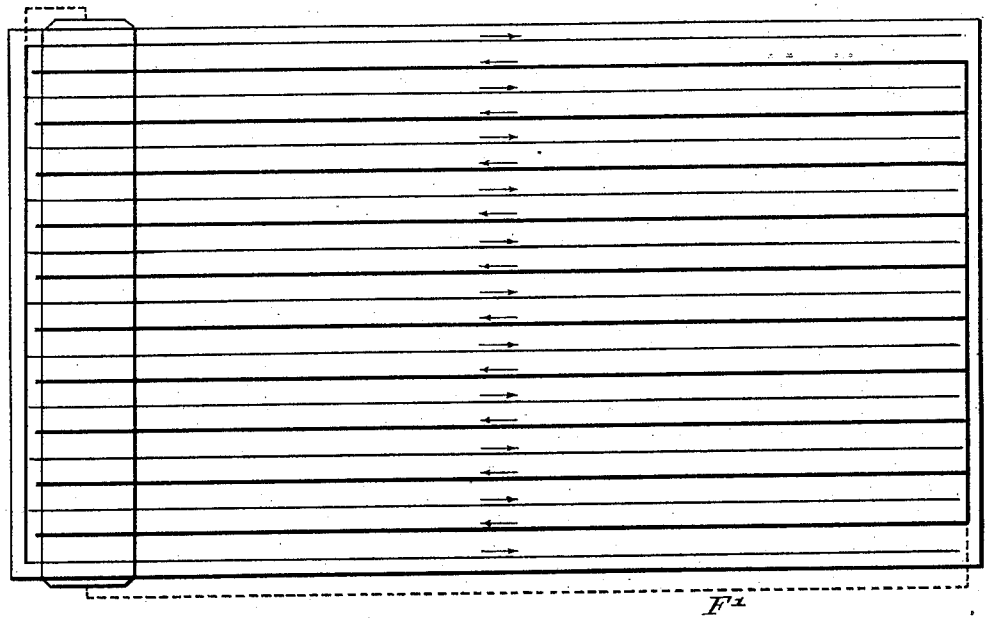


Fig. 8

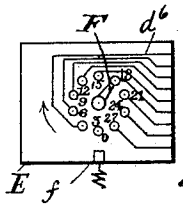


Fig. 7

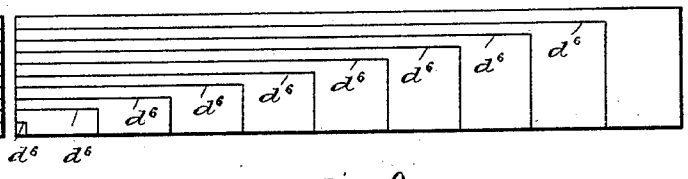


Fig. 9

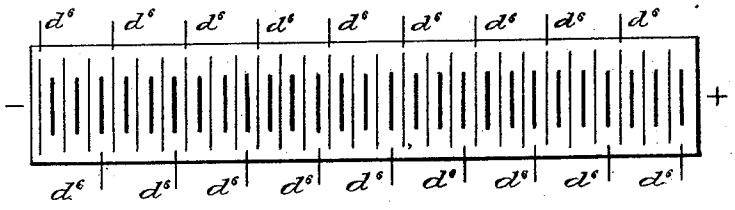


Fig. 10

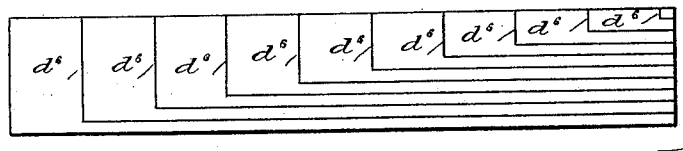
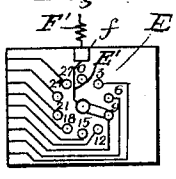


Fig. 11



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GUSTAV MONRATH AND WILLIAM M. GIBBONS, OF CHICAGO, ILLINOIS, ASSIGNORS, BY DIRECT AND MESNE ASSIGNMENTS, TO SAID GIBBONS AND CHARLES C. BATESON, OF SAME PLACE.

ELECTRO-THERAPEUTIC APPLIANCE.

SPECIFICATION forming part of Letters Patent No. 434,024, dated August 12, 1890.

Application filed December 3, 1887. Serial No. 256,922. (No model.)

To all whom it may concern:

Be it known that we, GUSTAV MONRATH, a Danish subject, residing at Chicago, in the county of Cook and State of Illinois, and WILLIAM M. GIBBONS, a citizen of the United States, also residing at said city, in the county and State aforesaid, have invented certain new and useful Improvements in Electro-Therapeutical Appliances, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

Our invention relates generally to electro-medical apparatus wherein a constant current of electricity is employed in the treatment of muscular and nervous diseases or other physiological irregularities, but more particularly to the construction and operative arrangement of apparatus employed for such purposes, whereby improved and highly-efficacious means are provided for therapeutically employing the electrical current. To this end the invention consists in the matters hereinafter set forth, and pointed out in the appended claims.

The prominent features of the invention are fully shown in the accompanying drawings, which illustrate one of the many forms of construction and arrangement of which it is capable, it being preliminarily noted that it is our purpose to employ our invention in the form of a mattress, as a pillow, chair, or the like, as a bed-covering, articles of wearing-apparel, &c.

In the accompanying drawings, Figure 1 is a perspective view substantially illustrating the manner in which our invention would be embodied in the form of a mattress. Fig. 2 is a top plan view of the form of electric battery which we desirably employ in connection with the mattress. Fig. 3 is a view intended to illustrate in side elevation the distribution of the wires from the cells of the said battery to the contact-points located at one end of the battery-box. Fig. 4 is an outside elevation of one end of the battery-box, showing the contact-points and switch-lever. Fig. 5 is an inside elevation of the said end of the battery-box, showing the said contact-points, the manner of connecting the said wires therewith, and the wire-connection between the switch-lever and the contact through which the circuit is completed between the battery and the mattress, the switch-lever being removed from its working position. Fig. 6 is a diagrammatic view illustrating the circuit from the battery through the conductors in the top of the mattress. Fig. 7 is a view intended to illustrate in side elevation the distribution of the wires from the cells of the battery to the contact-points located at the end of the battery-box opposite to the end thereof shown in Fig. 3. Fig. 8 is a view, mainly diagrammatic, of the end of the battery-box opposite to the end shown in Figs. 4 and 5, showing the contact-points, the manner of connecting the wires from the cells of the battery therewith, the switch-lever, and contact, through which the circuit is completed between said lever and the conductors of the mattress, the said lever being shown in operative position. Fig. 9 is a diagrammatic view of the multiple-cell battery, which we desirably employ in conjunction with the mattress. Figs. 10 and 11 are side and end views, respectively, intended to further illustrate the manner of running the wires from the battery to the contact-points located at the end of the battery-box shown in Figs. 4 and 5, and the circuit, as described, between said contact-points through the switch-lever with the contact through which electrical connection is made with the conductors of the mattress.

Referring by letter to the several figures of the drawings, in which like letters indicate like parts, A indicates the frame of a mattress constructed on the ordinary spring-mattress principle, the upper portion B, formed mainly of wool, cotton, or other suitable material, being covered with a textile fabric C,

composed of cotton, silk, or other flexible material, designated as *c*, suitable for non-conducting purposes, with which is interwoven or otherwise conveniently arranged at suitable distances laterally apart conducting-filaments *b*, as of copper wire, which are desirably of as limited diameter as will afford the greatest flexibility and enable the operative employment of the same. The upper end of the mattress-frame is provided with a removable multiple-cell electro-galvanic battery E, the poles of which are connected with said conductors *b*, and being provided with a suitable switch is operative to increase or decrease, as may be desired, the sum of the current which flows therefrom through said conductors. The said battery is desirably composed, as shown, of twenty-seven cells, but in practice the same may be increased or decreased in number, as may be deemed most advantageous. Each cell is composed of a sheet of zinc *d* and a plate of carbon *d'*, separated by a glass or wood plate d^2, which snugly recesses in the side plates or walls *e* of the battery-box, which for convenience and economy of construction is preferably composed of wood. The space between each carbon and zinc plate is filled with wood saw-dust d^4, or other suitable saturable material suitable for the required purpose, which is saturated with a solution of sal-ammoniac or other equivalent chemical voltaic factor. Connection between the electrodes is made in any well-known operative manner. Each end of the said battery-box is provided with nine contact-points, each of which has connection through a wire d^6 with three elements of the battery. Each end of the said box is likewise provided with a switch-lever F, which has suitable electrical connection with the conductors *b* of the mattress through contacts *f f'* and a conductor E'. The relative arrangement of the said contact-points and the switch-lever is such with reference to the elements of the battery and the conductors *b* of the mattress that as contact is made between said lever and said points in a direction from zero toward the increasing numbers which indicate said contact-points, a greater number of elements of the battery are thrown into circuit, amplifying the strength of the current, and vice versa, as the lever is moved in a contrary direction, the battery being fully cut out when the lever is caused to engage with the point indicated as zero, which obviously has no connections with the battery.

The operative contact-points at the respective ends of the battery-box are connected with the positive and negative poles of the battery—that is to say, the contact-points at one end are connected with the positive, and the contact-points at the other end are connected with the negative-poles, of respective series of cells, the conductors *b* being alternately connected with the conductors F', which connect, respectively, with said contact-points.

The main purpose which we have in view in providing contact-points and switching devices at each end of the battery-box is to enable the perfect control of the current operatively from either side of the mattress.

The contact *f'*, which connects with the conductor F', is arranged and adapted to subserve two purposes—to wit, forming a swinging latch (see Fig. 1) which secures the battery-box in position within the mattress-frame, also enabling its removal, and a contact which completes the circuit between the battery and the conductors of the mattress.

The operation of the apparatus thus described is as follows: The current being regulated by means of either one of the said contact-points and the switch-lever, passes from the battery to the conductors *b*, traversing the same, as indicated by the arrows shown in Fig. 6, to the source of energy. A subject for treatment being placed upon the mattress and making contact with certain of the conductors *b*, electrically connected with the opposite poles of the battery, the current is established through the body of the subject or through a member thereof, as the case may be. While it is generally desirable that actual contact should be made with the said conductors *b*, such contact is not always essential to efficacious treatment.

While we have adopted, as shown in the accompanying illustrations, a very simple and desirable form of battery for employment in conjunction with the form of mattress herewith shown, which form of battery we should also preferably employ with our appliance when in the form of a pillow, chair, or the like, it is obvious that other forms of current-supply may be employed effectively without departing from the spirit and scope of our invention. We therefore do not limit ourselves to the details of construction and arrangement shown and described, except as is set forth in the appended claims; but all appliances embracing the principles embodied in the construction and operative arrangement herein shown and described are deemed to be within the intent and scope of our invention.

What we claim as new, and desire to secure by Letters Patent, is—

1. As a new article of manufacture for electro-therapeutical purposes, a fabric composed of cotton, silk, or other material suitable for non-conducting purposes, provided with conductors of electricity *b*, interwoven or otherwise suitably arranged in connection therewith, the said conductors being alternately connected with conductors adapted to be connected, respectively, with the opposite poles of a battery, substantially as described.

2. The combination, with a fabric composed in the main of non-conducting material pro-

vided with conductors *b*, interwoven or otherwise operatively arranged in conjunction therewith, the conductors F′, to which the conductors *b* are alternately connected, of a multiple battery, the cells of which are arranged, as described, in series, which series are connected with contact-points adapted to be switched into connection with said conductors *b* by a suitable switch for the purpose of amplifying the strength of currents admitted to said conductors, substantially as and for the purpose set forth.

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WILLIAM M. GIBBONS.

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