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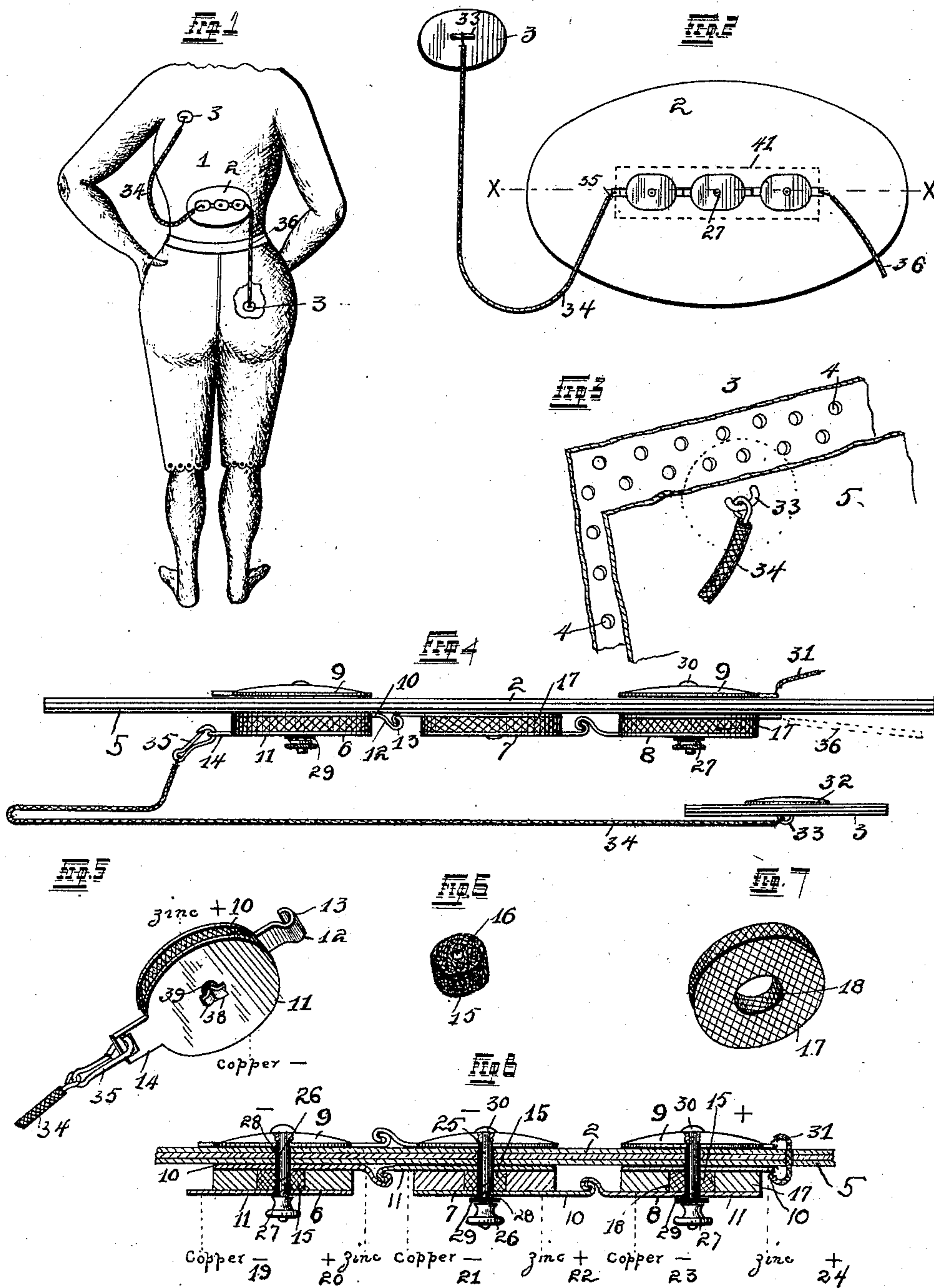
2 Sheets—Sheet 1.

F. A. BARRET.

ELECTRO GALVANIC ADHESIVE PLASTER.

No. 496,244.

Patented Apr. 25, 1893.



WITNESSES

Alfred A. Eichen

Herbert S. Robinson.

INVENTOR

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(No Model.)

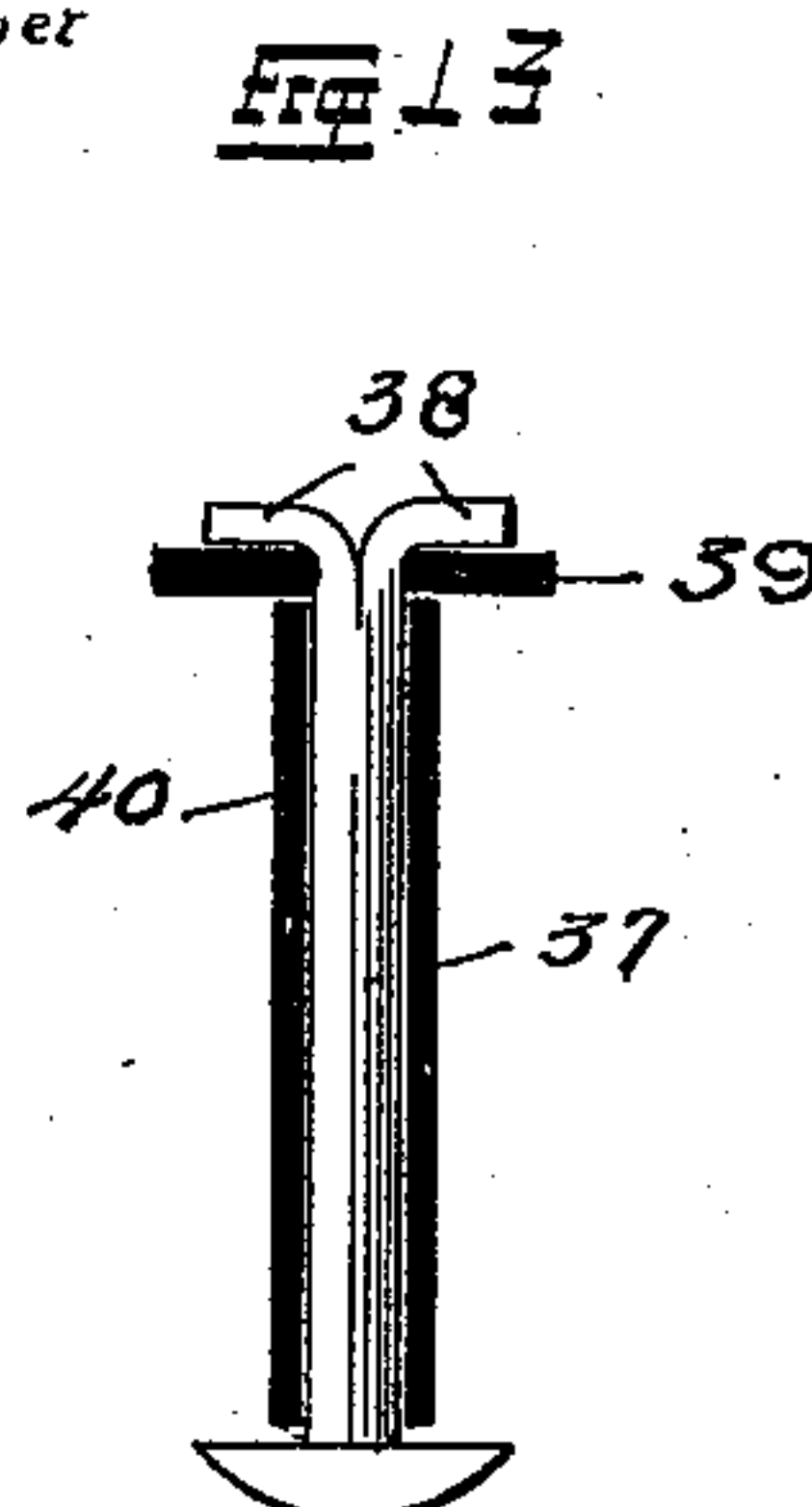
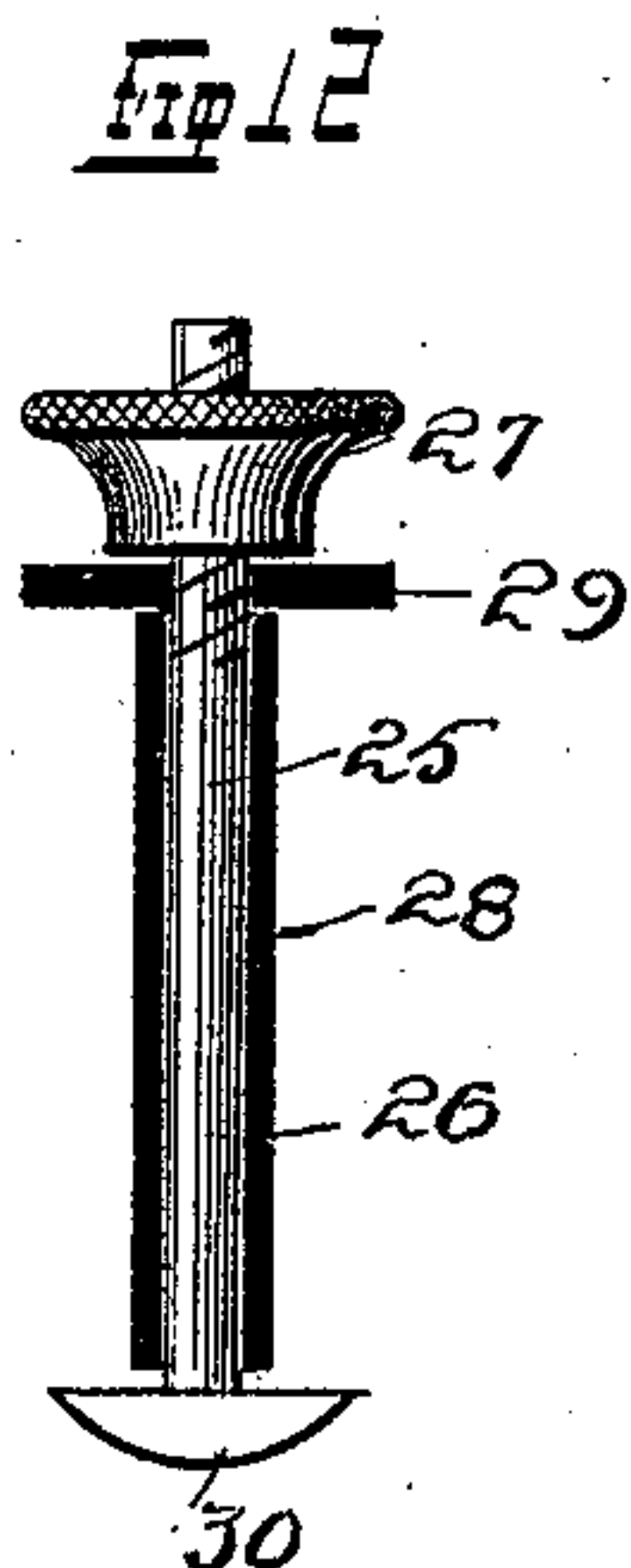
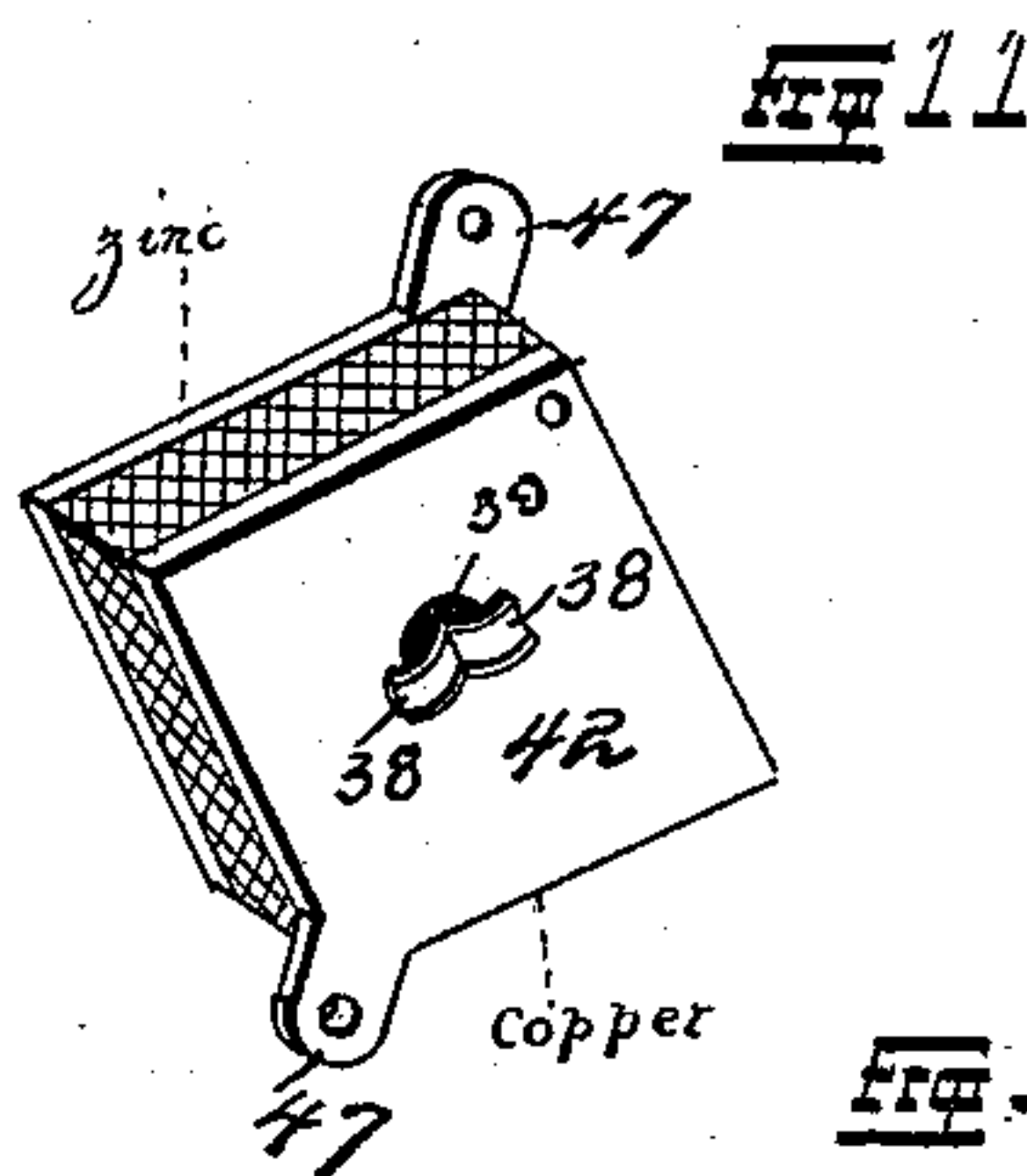
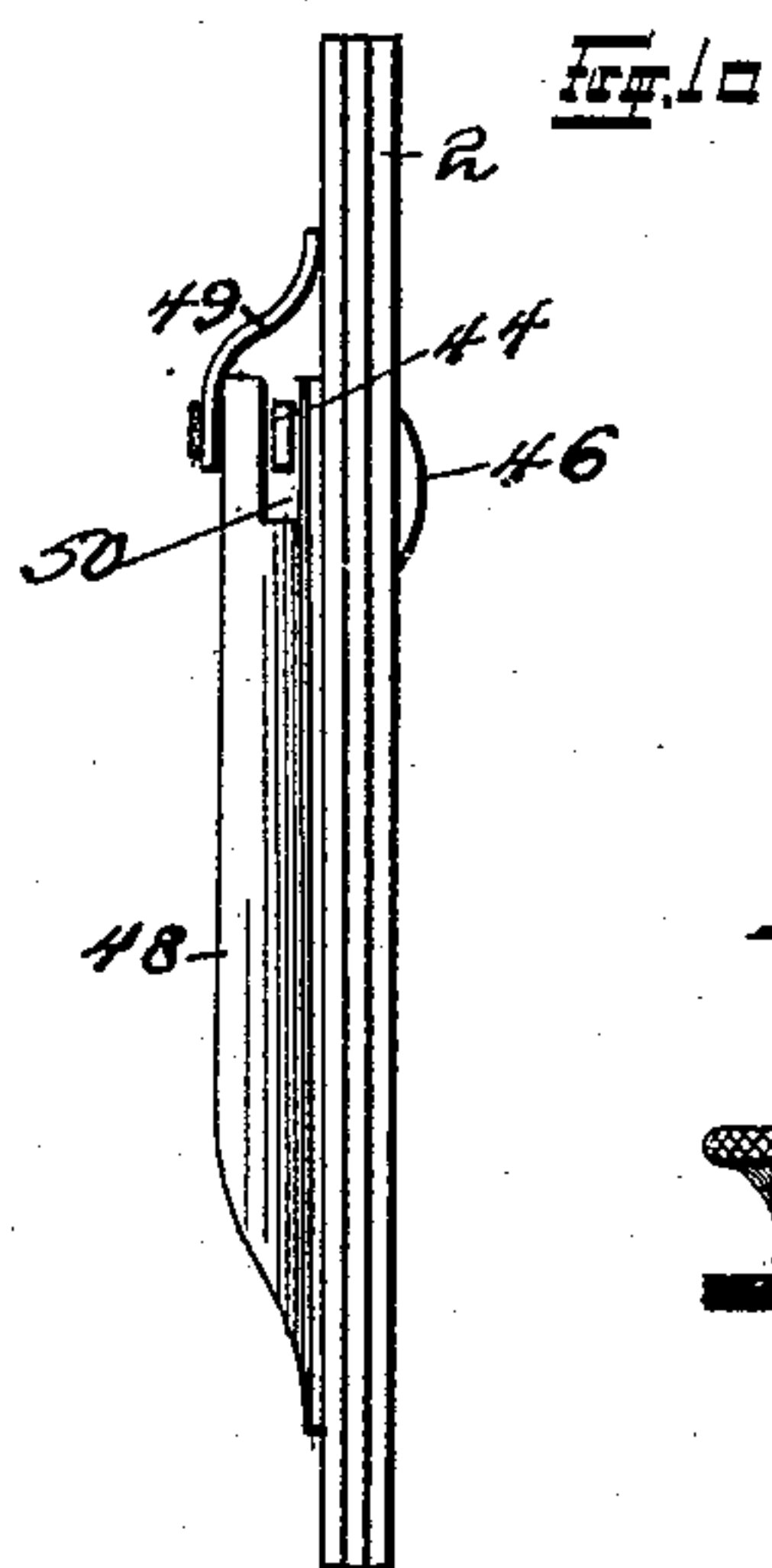
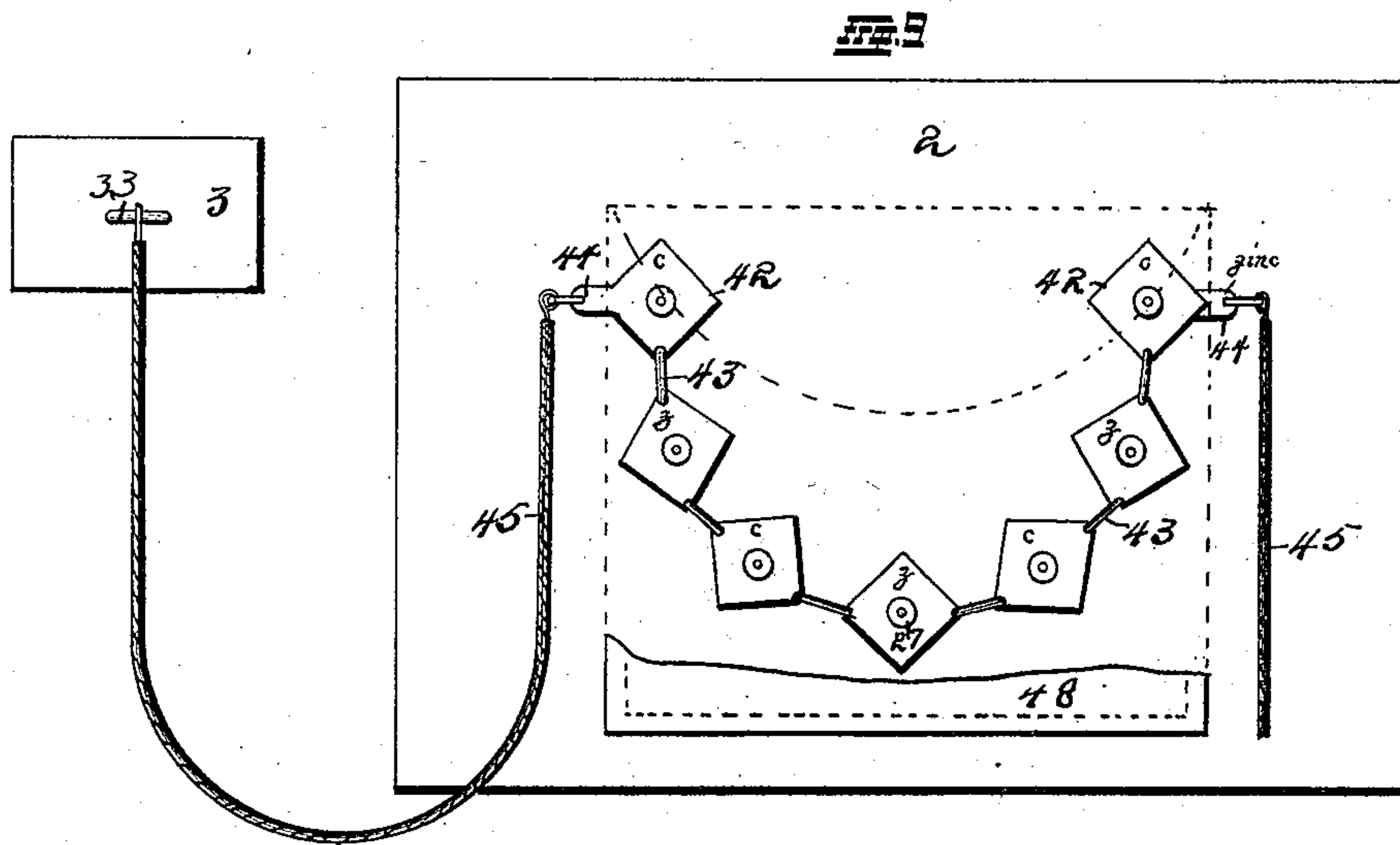
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Inventor

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UNITED STATES PATENT OFFICE.

FREDERICK A. BARRET, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-FOURTH
TO JACOB LIPPE, OF SAME PLACE.

ELECTRO-GALVANIC ADHESIVE PLASTER.

SPECIFICATION forming part of Letters Patent No. 496,244, dated April 25, 1893.

Application filed September 28, 1892. Serial No. 447,095. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK A. BARRET, of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Electro-Galvanic Adhesive Plasters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to improvements in electro-galvanic batteries in conjunction with adhesive plasters, for facilitating the cure of certain diseases and ailments, well known to the medical profession and which for the main part, necessitate a means for quickening the circulation of the blood.

My improvement relates especially to "electro-galvanic adhesive plaster," and consists in the peculiar construction and combination of parts as will be more fully hereinafter described and set forth in the claims.

It is a generally accepted fact among knowing persons, that the application of an exciting current to diseased or weak portions of the human anatomy causes the tissues to become built up and strengthened. Necessarily the facilities for producing an exciting current, without inconveniencing the party to whom it is applied, are limited and in developing this line of remedies, numerous designs of belts, foot-pads, and so forth, have been designed, and it is generally believed that the galvanic current produced by such batteries as are used, is not strong enough to pass through a limb or even to exercise a dynamic action upon the nervous system, because the electro-motive force of such sources of generation, is so low that the intensity of the current will not in any wise materially invigorate the action of the human organism. Certain portions of the body are not adapted for the application of electricity from a belt or other source of energy, and therefore in developing my ideas I have made use of an adhesive plaster, which, of course, has an effect of its own and which will aid the effect of the current rather than lessen it. The plasters may be different in form and effect, and the desired result of their application will of course be determined by the person govern-

ing the matter. In the use of my improved apparatus, even for a short time, the patient is not compelled to undergo the influences of strong and rapidly diminishing currents, because the power is constantly exerted and this feature renders the current agreeable, and enables the most sensitive person to bear the action without any inconvenience. The ready removal of the batteries, from the plasters, renders the device especially valuable in diseases of long standing, as it is thereby possible for the patient to fill the batteries with exciting fluid, whenever the same becomes interrupted in its action. By the use of my improvement, different portions of the body can be affected at the same time and by the use of the same plaster and battery, as will be more fully hereinafter described. The causes necessitating the use of artificial means for increasing the rapidity of circulation, are well known to the medical profession and therefore need not be enumerated here.

In the drawings: Figure 1 represents a person with my complete invention applied to several portions of the body. Fig. 2 is a front or plan view of my complete invention showing the plaster with all of the parts of my invention connected therewith. Fig. 3 is a perspective view of a plaster with an electrode attached thereto, the same being used as an auxiliary appliance in conjunction with and forming a part of my improvements. Fig. 4 is a side view of my complete invention as shown in Fig. 2. Fig. 5 is a perspective view of one of the cells or batteries made use of in carrying out my invention. Fig. 6 is a perspective view of a core made of fibrous absorbent asbestos, the same being used in the manufacture of my device. Fig. 7 is a perspective view of a rim or pad of absorbent material, preferably felt, used in conjunction with the asbestos core shown in Fig. 6. Fig. 8 is a longitudinal transverse sectional view taken on a line $x x$ in Fig. 2. Fig. 9 is a modification view of the complete device shown in Fig. 2, with portions of a protecting covering for the batteries, broken away. Fig. 10 is an end view of the complete device as shown in Fig. 9 without parts of the covering removed.

Fig. 11 is a perspective view of one of the batteries made use of in the modified construction, and showing the same completed with a split head insulated rivet. Fig. 12 is an elevation of one of the insulated rivets, showing the same with a thumb-nut upon its head, and the insulation in section. Fig. 13 is a view similar to Fig. 12 except that the rivet is a split one.

Referring to the drawings: 1 indicates the body of a person having applied to a certain part thereof, an adhesive plaster 2, with an auxiliary plaster 3 electrically connected with said plaster 2. The plaster 2 is preferably what is commonly termed a "porous" plaster and therefore has its medicated parts, provided with numerous small perforations 4, the function of which is well known. As is usual the plaster has three layers, and upon the outside or protecting layer 5 of said plaster 2, and arranged approximately in the center of same, are cells or batteries 6, 7, and 8. In this connection I will only state the batteries are electrically connected together in the proper manner, but will specify the connections further on in the description.

The batteries 6, 7 and 8 are located upon the exterior side of the plaster, when the same is applied, and in order that the current generated in said batteries 6, 7 and 8 will affect the desired parts, I have provided contact plates or electrodes such as 9, which are located upon the inner side of the plaster and therefore adjacent the skin when the plaster is in position. The electrodes 9 are preferably two in number, but can be increased to a greater number in case greater effective surface is desired, and different connections with the exciters made. The batteries 6, 7 and 8, consist of zinc or positive plates 10 and negative copper plates 11. Each of said plates 10 and 11 are provided with projecting ears or lugs 12, which are in the shape or form of interlocking hooks such as 13. In some instances, however, I may provide one of two opposing lugs 12 with a hook and the other lug with a slot, as shown at 14, to receive said hook.

In my practical experiments I have found that asbestos fibers or "mineral wool" constitute one of the best absorbents, and therefore in the line of my improvements, I have made use of a core 15 made of this same material and formed in the shape of a circle, with a perforation 16 running transversely through its center to allow of the location of a rivet hereinafter described. Unless this same fibrous material is properly confined, it will disintegrate and to prevent this action, I make use of a collar or rim 17 provided with a large central opening 18 for the reception of the fiber core 15, said rim 17 being made of some absorbent material such as felt in order to assist the function of the fibrous core 15. The above described rim 17 with the core 15 in position in the perforation 18, is adapted to be placed between the positive and nega-

tive plates 10 and 11 and the function of said construction is the absorbing and retaining of any of the exciting fluids such as acidulated water, vinegar, acetic acid, and so forth, and as neither one of the absorbent materials are electrical conductors, it is impossible for a short circuit to be established between the positive and negative plates 10 and 11.

The action of the exciting fluid absorbed and retained by the felt 17 and asbestos 15, upon the plates is well known and need not be detailed herein, except to say that such a means for producing the exciting current, is made available by the excitable elements of the fluids.

The three cells 6, 7 and 8 are connected in series that is, the copper-plate 19 of the cell 6 forms a terminal outlet, while the zinc plate 20 is connected with the copper plate 21 of the cell 7, whose zinc plate 22 is connected with the copper plate 23 of the cell 8, thus necessitating the zinc plate 24 of cell 8 constituting the positive terminal of the series.

The electrical connection between the batteries and the electrodes 9 is made by the use of what I term insulated rivets 25 which consist of an ordinary screw-threaded rivet bolt 26 with a thumb nut 27 adapted to be operated on the screw threads thereof.

In order to insulate the rivet I use a piece of insulation tubing which is cut into desired lengths, said length being controlled by the thickness of the cells and plaster, said tubings 28 being adapted to fit over the bolt 26 and have an insulation washer 29, located between its outer end, and the inner surface of the thumb nut 27.

The insulation tubings 28 and washers 29 are made from any of the well known insulating materials, such as rubber, vulcanite, and so forth.

The perforation in the center of the electrodes 9, is not of a diameter sufficient to admit the insulating tubings 28 therein, and therefore the bolt head 30 has an electrical contact with said electrodes 9. For instance, if it were desired to establish an electrical connection between the copper plate 19 of the cell 6 and the electrode 9, the washer 29 is removed, as shown in Fig. 8, thus bringing the nut 27 into contact with the plate 19, and therefore allowing a circuit connecting the electrode 9 with the copper 19.

In order to establish an energizing current, it is necessary to complete the same by electrically connecting the zinc plate 24 of the cell 8 with its respective electrode, and this is done by the use of an electrical connector 31 which connects the zinc plate 24 with the electrode 9, the rivet meanwhile being insulated from both plates of the battery.

It is necessary to make use of the electrode opposite to the cell 7, without neutralizing the effect of the other electrodes 9. This is accomplished by connecting said electrode with either of the terminal electrodes, while at the same time it must remain insulated from the

other remaining electrode, in order to affect the completion of the circuit and the passage of the current.

The auxiliary plaster 3 is provided with an electrode 32 upon its inner adhesive surface, said electrode 32 having a staple 33 upon its rear surface and extending through the plasters 3. An insulated wire 34 is secured in said staple and provided upon its opposite end with a snap hook 35.

In Fig. 4 I have shown the above described construction as attached to the copper plate 19 of the cell 6 and also showing in dotted lines a similar construction 36 which is adapted to be removably attached by means of its hook, to the zinc plate 24 of the cell 8.

When it is desired to use either one of the plasters 3, the cell to which the plaster is temporarily secured has its electrode electrically disconnected. This is done, in the case of the cell 6, by making use of the insulating washer 29, and in the case of cell 8, by removing the wire 31, and placing it in the position shown in Fig. 4. The wire of this plaster 3 (shown in dotted lines at 36, Fig. 4) is then in electrical communication with the cell 8. When it is desired to use both the plasters 3, the electrodes of both cells 6 and 8 are electrically disconnected in the manner described. This arrangement is made use of in case it is desired to affect different portions of the body.

The cell shown in Fig. 5 which is similar to the cell 6 removed from the plaster, has an outwardly projecting lug into which the hook 35 of the wire 34 is adapted to engage. In this same construction a modified form of rivet is made use of and the difference lies in the splitting of a portion of the length of the bolt 37 and in order to secure the plates together over the absorbent material, the split ears 38 are bent down in a horizontal position over the washers 39, which is made of insulating material, and which is located at the end of an insulating tubing 40 (Fig. 13) as is the case in the other construction shown.

In Fig. 2 is shown in dotted lines a bag or protector 41 which is adapted to envelop the battery cells and prevent the exciting liquid contained therein from soiling the clothes and also prevents the evaporation of the fluid.

In Fig. 9 I have shown a modified construction which consists of rectangular shaped cells 42 having their opposite plates properly connected by links 43 to form a series connection and the two opposite plates of the terminal batteries being provided with projecting lugs 44 to which are attached wires 45 leading to auxiliary plasters 3 as hereinbefore described.

In this construction it is only necessary to provide electrodes 46 for the two terminal batteries, the connection between such electrodes 46 and the batteries being made by the rivets hereinbefore shown and described.

If it is desired to apply the current by means of the auxiliary plasters 3, one or both

of said electrodes 46 are disconnected from the cells, by the insertion of the insulating washer underneath the heads of said rivets.

In Fig. 11 the plates of the cell are shown with projecting ears 47 by means of which the cells are connected together by wires or rivets, in preference to the use of the links 43, shown in Fig. 9. A protecting covering or sack 48 is provided for this construction by making the same substantially in the form of an envelope, with the batteries located interior of the same and the flap 49 adapted to button over the main portion of the envelope, as shown in Fig. 10, with openings 50 left in each end of said envelope 48 through which the ears 44 project.

The shape, number and relative position and arrangement of the battery cells in my improved device, is immaterial as long as the proper electrical connections are made, and any arrangement of the same differing from those herein shown do not materially affect the idea and function of my invention.

The plasters are preferably made in elliptical form in order that they will adhere more quickly and firmly to the body, and in the development of this idea I also preferably make the electrodes and batteries of similar form in order that they will assist the plaster in its function.

I will now proceed to describe the operation and also to trace the current through the various parts and connections. It is unnecessary for me to say anything in reference to the action of certain exciting liquids upon the elementary holes of the batteries, because such influences are well known as to their action and effect. The connection of the cells in series increases the efficiency and electromotive force of the current by augmenting and reaugmenting the strength of same with the connection of each additional cell. We will first suppose that the plaster is to be applied upon the body at what is considered a very weak portion of the human system, namely the small part of the back. In this case if the application is only to be made at this place, the auxiliary attachments 3 are left off and the connection from the cells made direct with the electrodes 9. This is done from the cell 6 by the removal of the washer as shown in Fig. 8, the contact or connection being made from the thumb-nut 27 to the bolt 26 and into the electrode 9. The cell 7 is entirely insulated from the electrode 9, but said electrode 9 is electrically connected with the electrode of the cell 6. The connection of the electrode 9 with the cell 8 is made by use of the loop 31 which connects the positive plate of said cell 8 with the electrode and as the electrode 9 of the cell 6 is connected with the minus plate of said cell 6, the completion of an electrical circuit is made. In case it is desired to transmit the electricity to different points of the body distant from where the plaster is located, one or both of the auxiliary plasters 3 can be made

use of. We will first suppose that it is desired to affect a certain portion of the back. The washer 29 is placed between the thumb-nut 27 and the plate 19 upon the bolt 26, thus
 5 insulating the electrode 9 from said cell 6. The hook 35 is then attached to the lug 14 and the current passes through the wire 34 into the electrode 32 which is held in contact with the body by the plasters 3. If it is de-
 10 sired to transfer the remaining poles to effect another portion of the body, the wire 31 is disconnected from the zinc plate 24, and the auxiliary attachment 36 applied thereto, in which case, the electrodes 9 have no effect
 15 upon the surface in which they are in contact but the entire current passes into both of the auxiliary attachments. The necessity of disconnecting the electrodes 9 will be seen from the fact that the resistance in the wires con-
 20 necting with the auxiliary electrodes 32 would be so much greater than that of the adjacent electrodes 9, that the current would preferably seek its outlet in said electrodes 9.

My improved electro-galvanic apparatus
 25 may be applied to any of the plasters which are now used in medicinal practice such as caprine plasters for irritation, or opium and belladonna plasters for soothing the diseased parts.

30 As before stated, the affect of energizing currents upon diseased or weak portions of the body, is material and in attempting the perfection of appliances for treatment in such cases, I have tried to embody features
 35 which alone recommend themselves.

The advantages are readily seen: The extreme simpleness of construction and operation, the certainty of its effect, and its cheapness and durability of manufacture.

40 Having fully described my invention, what I claim is—

1. In an electro-galvanic adhesive plaster, the combination, with the plaster proper, of a battery consisting of a series of cells ar-
 45 ranged at the back of the plaster, a series of electrodes arranged upon the face of the latter, and means for electrically connecting two or more of the electrodes with the battery and with each other, and for disconnecting the
 50 same; substantially as set forth.

2. In an electro-galvanic adhesive plaster,

the combination, with a battery, and electrodes, of means for electrically connecting or disconnecting a portion of said electrodes; substantially as set forth. 55

3. In an electro-galvanic adhesive plaster, the combination, with the plaster proper provided with electrodes 9, and auxiliary plasters provided with electrodes 32, of a battery, comprising a series of cells, wires connecting
 60 the electrodes 32 with the poles of said battery, bolts 26 passing through the electrodes 9 and the battery cells, said bolts being in contact with said electrodes and insulated from said cells, nuts 27 mounted on the free
 65 ends of the bolts 26, and removable insulating washers 29 adapted to be disposed under said nuts and insulate the same from the respective cells; substantially as and for the purpose set forth. 70

4. In an electro-galvanic adhesive plaster, the combination, with the plaster proper, of a battery consisting of a series of reversely-arranged cells, said cells each comprising a positive and a negative plate provided with re-
 75 versely-projecting lugs 12, the opposing lugs 12 being electrically coupled together, and a porous filling separating said plates; substantially as set forth.

5. In an electro-galvanic adhesive plaster, 80 the combination, with the plaster proper, of a battery consisting of a series of cells each comprising a positive and negative plate, and a porous filling, said cells being alternately reversed, whereby the opposing plates adapt-
 85 ed to be coupled together are brought into longitudinal alignment; substantially as set forth.

6. In an electro-galvanic adhesive plaster, the combination, with the plaster proper, of a
 90 battery consisting of a series of cells, each comprising positive and negative plates, and a porous filling located between said plates and consisting of an asbestos core, and a porous protective ring surrounding said core; 95 substantially as set forth.

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

FREDERICK A. BARRET.

Witnesses:

HERBERT S. ROBINSON,
 E. E. LONGAN.