No. 669,052. Patented Feb. 26, 1901.

G. WERBER.

ATTACHMENT FOR STATIC ELECTRICAL MACHINES.

(Application filed Apr. 24, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1

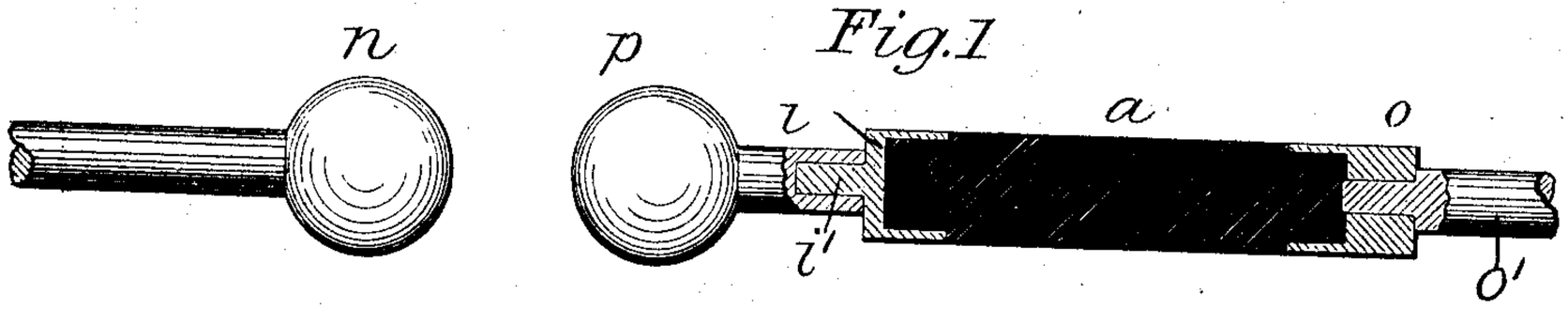


Fig. 2

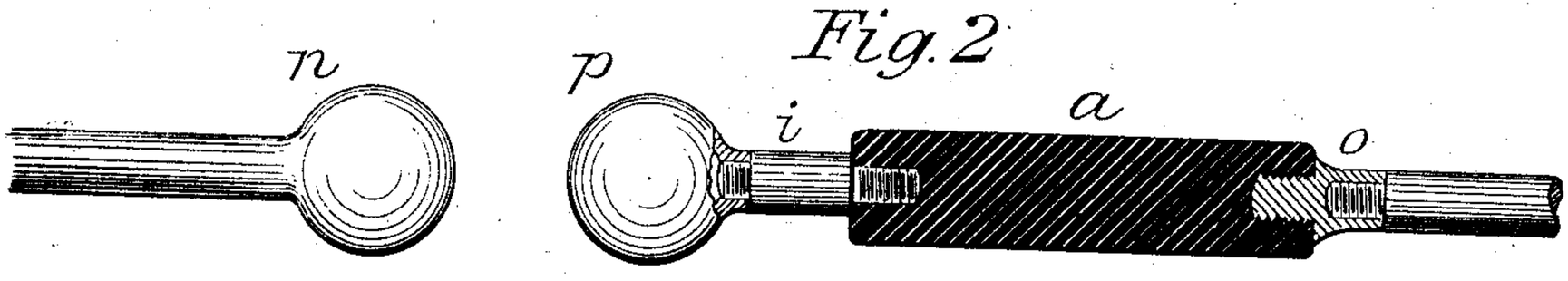
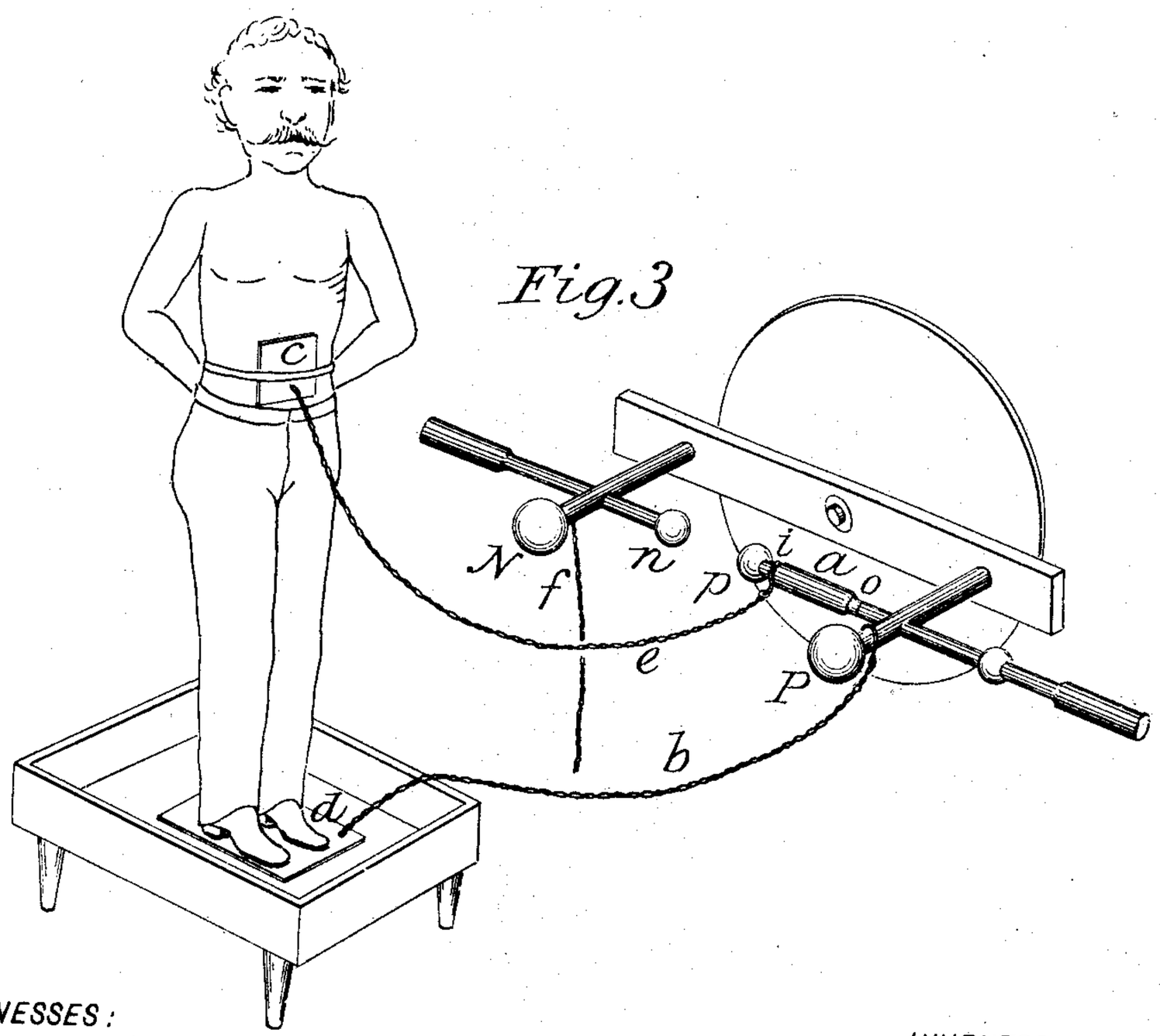


Fig. 3



WITNESSES:

Wms. Welch

H. H. Cook

INVENTOR

Gustavus Werber.

No. 669,052. Patented Feb. 26, 1901.

G. WERBER.

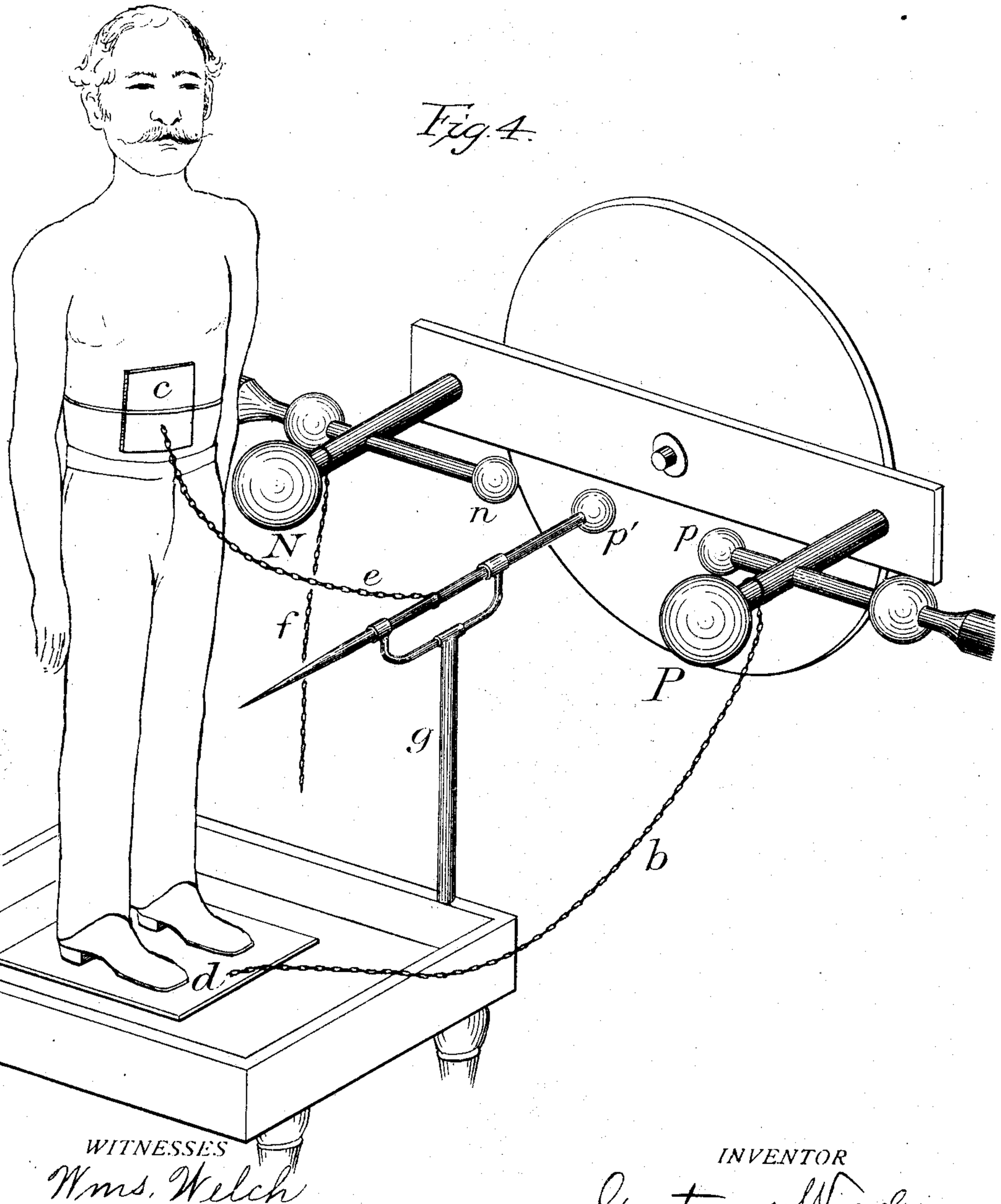
ATTACHMENT FOR STATIC ELECTRICAL MACHINES.

(Application filed Apr. 24, 1900.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 4.



WITNESSES

Wms. Welch

F. L. Middleton

INVENTOR

Gustavus Werber

UNITED STATES PATENT OFFICE.

GUSTAVUS WERBER, OF WASHINGTON, DISTRICT OF COLUMBIA.

ATTACHMENT FOR STATIC ELECTRICAL MACHINES.

SPECIFICATION forming part of Letters Patent No. 669,052, dated February 26, 1901.

Application filed April 24, 1900. Serial No. 14,181. (No model.)

To all whom it may concern:

Be it known that I, GUSTAVUS WERBER, a citizen of the United States, residing at 507 Fourth street northwest, Washington, District of Columbia, have invented a new and useful Improvement to be Applied to the Static Electrical Machine, of which the following is a specification.

My improvement consists of a section of some insulating material to be interposed in the discharge-rod of either the positive or negative pole of the machine as the positive or negative connection may be desired in the treatment, the other pole being grounded. The negative pole being the one commonly grounded I show the device in use connected with the positive pole, and in this position I will describe its use; and I do hereby declare that the following is a full, clear, and exact description of my improvement, such as will enable others skilled in the art to which it appertains to make and use the same.

The ultimate object of the improvement is to divert the whole current generated by the static electrical machine from the track it would necessarily take in the present construction of the machine in using the so-called "Morton" wave or interrupted current. This current is called by the name of Dr. Morton, of New York, who first called attention to its advantages and made its use popular in medicine, and as it is used at present consists in leaking only a fractional part of the current from the pole with which attachment is made and conducting it to the patient, from which it is dissipated to the surrounding atmosphere, and the greater part of the current is discharged through the machine to the ground by means of sparks playing between the terminal balls of the discharge-rods, each spark causing an "interruption," the impulse of which is conveyed also to the patient and increases the tonic and alterative effects of the current. Using the illustration in Fig. 3 in the drawings submitted, but omitting my improvement shown at *a*, a part of the current is leaked from P by *b* and conducted to the patient at *d*, and thence to the atmosphere, the remainder of the current being discharged in sparks from *p* to *n* and thence to the ground through *f*. My improvement shown at *a* turns the whole output of the machine into the human body or other object interposed in the track of the current around the insulated section of the discharge-rod, and from the body it is reconducted to the extremity of the discharge-rod of the pole to which attached, and the increased tonic and alterative effects are produced, as heretofore, by discharging it in sparks through the opposite pole to the ground. Experience with the use of the current by both methods has demonstrated that with the use of my improvement—

I. That the entire output of the machine is utilized as a working current instead of a small fractional part of it at present utilized in the so-called "Morton interrupted or wave current."

II. That all the current is caused to pass through that part of the body or other object interposed between the electrodes delivering and re-collecting the current to be dissipated by sparks and before the intrapolar interruptions are made.

III. That the voltage of the working current is therefore much greater than when only a fractional part of the current is available, as in the present use of the interrupted current. This will obviously increase the effectiveness of machines and will check the necessity felt in the past for building machines constantly larger and larger in size.

IV. That the tonic and alterative effects produced by the interruptions of the current are exerted most vigorously at the point of exit of the current from the body instead of at the point of entrance, as formerly, and may be diffused or intensified by increasing or diminishing the size of the electrode re-collecting the current from the body or in the material used in its construction.

V. That by my method the interrupted current is for the first time used under perfect control and can be made to pass from the center to the periphery, or vice versa, or in any direction at the will of the operator by the position of the electrodes and that a decided advantage is secured in producing general effects and in localizing the effects on any particular organ or organs of the body.

VI. That using the whole volume as I have described the current will produce better results with a less number of seances and of

shorter duration, resulting in economy of expense to the patient and time to the operator.

I attain these results by the mechanism illustrated in the accompanying drawings, in which—

Figures 1 and 2 show vertical sections of two forms of the improvement. Fig. 3 is a perspective view illustrating the use of the invention. Fig. 4 is a perspective view of a modified arrangement.

In Fig. 3 the insulating-section is shown in position at *a b*, the conductor which transfers the whole current to the patient at *d*, from which it traverses the lower extremities, pelvis, and abdomen to *c*, where it is collected by an electrode, reconducted through *e* to the extremity of the same pole at *i*, and discharged from *p* to *n* by sparks, causing "interruptions."

The improvement is shown in vertical section in Figs. 1 and 2, *o* to *p*, inclusive. The improvement consists of a straight rod of ebonite, glass, or other insulating material as may be preferred. (Shown in Fig. 1 at *a*.) To this ebonite rod is fitted at each extremity a piece of metal, as a thimble or cap, the thimble having a recess for receiving the rod *o'*, while the thimble *i* at the other end has a projection *i'*, engaging a socket in a portion carried by the ball. *p* shows the terminal ball of metal similar to the one used at *n* in the construction of the machine and provided with a shoulder *i* a half-inch or so in length to afford ample facility for the attachment of the terminal end of the conductor transferring the current around the insulation *a*. This shoulder is finished with a female thread to connect with *i*. Fig. 2 shows also a vertical section of the improvement of a different construction, and which I prefer, as it will prevent multiplication of parts, in that it may be finished so as to be used in connection with the terminal rod and ball of the discharge-rod with which the machine is provided. *a* shows the section of ebonite, to each end of which a metal tip is secured at *i* and *o*. These tips are joined to the ebonite *a* by a male thread fitting into a female thread in the rubber or merely held firmly in position by a spring-joint or other suitable means. The edges of these tips or shoulders do not project above the free border of the ebonite, thus reducing the length of the insulating-section to the minimum. The metal tip of the proximal end *o* is merely long enough to form a durable connection with the sliding rod in a workmanlike manner, or it may be omitted altogether and the ebonite fitted to receive the male thread with which the rod of the sliding pole is usually finished. The tip on the distal end *i* extends a half-inch or so from the ebonite to afford greater facility for the attachment of terminal end of conductor delivering the current at this point and is finished with a male thread to fit the female thread cut in the shoulder of the ball furnished with the machine. To further prevent multiplication of parts, the insulating-section may also be used for the usual insulating extremity of one of the discharge-rods, as the extremity of the pole grounded will for the time not require such insulation, and to secure uniformity both insulating extremities of the discharge-rods may be made alike. In size the insulating-rod need be only thick enough to make the connections in a workmanlike manner and only long enough to effectually prevent a leak across the insulating-section, and the length required will vary with the diameters of the circular plates used in the construction of the machine.

In the form shown in Fig. 4 I mount the sparking-pole *p'* upon an insulated rod *g*, which is situated sufficiently far from the main pole *p* to prevent the current passing directly thereto. From the main pole the electric connection *b* passes to the electrode *d*, conveying the current to the object to be electrically treated, while the return connection runs from the electrode *c*, re-collecting the current to the sparking-pole *p'*. The points of conveyance to and re-collecting the current from the body, as shown in the cut, are the feet and abdomen, respectively. From *p'* the sparks pass to the pole *n* in the wave or interrupted current in the manner above described.

Fig. 3 shows the improvement *a* attached to the machine and the connections made with the electrodes introducing the current at the feet through *d* and re-collecting it from the abdomen through the electrode *c*, whence it is reconducted by *e* to *i* and discharged by sparks through *n* to the ground. When the current is taken in at the feet, the stand-rod answers for the connection from P to *d*. When it is taken in at any other point through an electrode held in position by a bandage, a cable made of insulated wires ordinarily used by electricians for wiring and inclosed in a soft-rubber tube should be used both for conducting the current to the body and for reconducting it to the machine. The body end of the cables should be finished with a screw-thread and tap to secure it the more firmly to the binding-post on the electrode, and thereby effectually avoiding accidents. Electrodes to be made to conform to any portion of the body are constructed of block-tin, thin sheet-lead, or other flexible metal of any shape or size, according to the part to which applied and effect desired. Application of electrodes directly to the skin gives the minimum of shock to the part from the interruptions. Interposing layers of cloth or using wooden electrodes increases the irritant effect in causing the current to leave the body in small sparks. The wires composing the cable are merely to be hooked over the metal parts of the machine to which attached.

What I claim as my improvement, and desire to secure by Letters Patent, is—

1. A discharge-rod for one of the poles of a static electrical machine embodying an end

ball of conducting material and a rod of non-conducting material attached thereto, substantially as described.

2. In a static electric machine the combination with one of the poles, of an insulated terminal therefor, substantially as described.

3. In a static electric machine, the combination with one of the poles, of an insulated terminal thereon, and electric connections whereby an object to be treated may be electrically connected to said pole and terminal, substantially as described.

4. In a static electrical machine a discharge-rod for one of the poles embodying a discharge-ball of metal, and a section of non-conducting material attached thereto, means for electrically connecting the pole with an electrode and means for electrically connecting the ball with a second electrode substantially as described.

5. In combination with a static electrical machine an electrode electrically connected to one of the poles, means for insulating that pole from its discharge-terminal and electrical connection between the discharge-terminal and a second electrode, substantially as described.

6. A discharge-rod for one of the poles of a static electrical machine consisting of a section of conducting material, a section of non-conducting material attached thereto and the discharge-ball attached to the end of the section of non-conducting material substantially as described.

7. In combination, in a static electric machine, a pair of poles, a terminal, and electrical connections from one of said poles and the terminal to the object to be treated, said terminal and pole having an insulating medium between them substantially as described.

GUSTAVUS WERBER.

Witnesses:
W. B. ACKER,
OSWELL R. EVE.