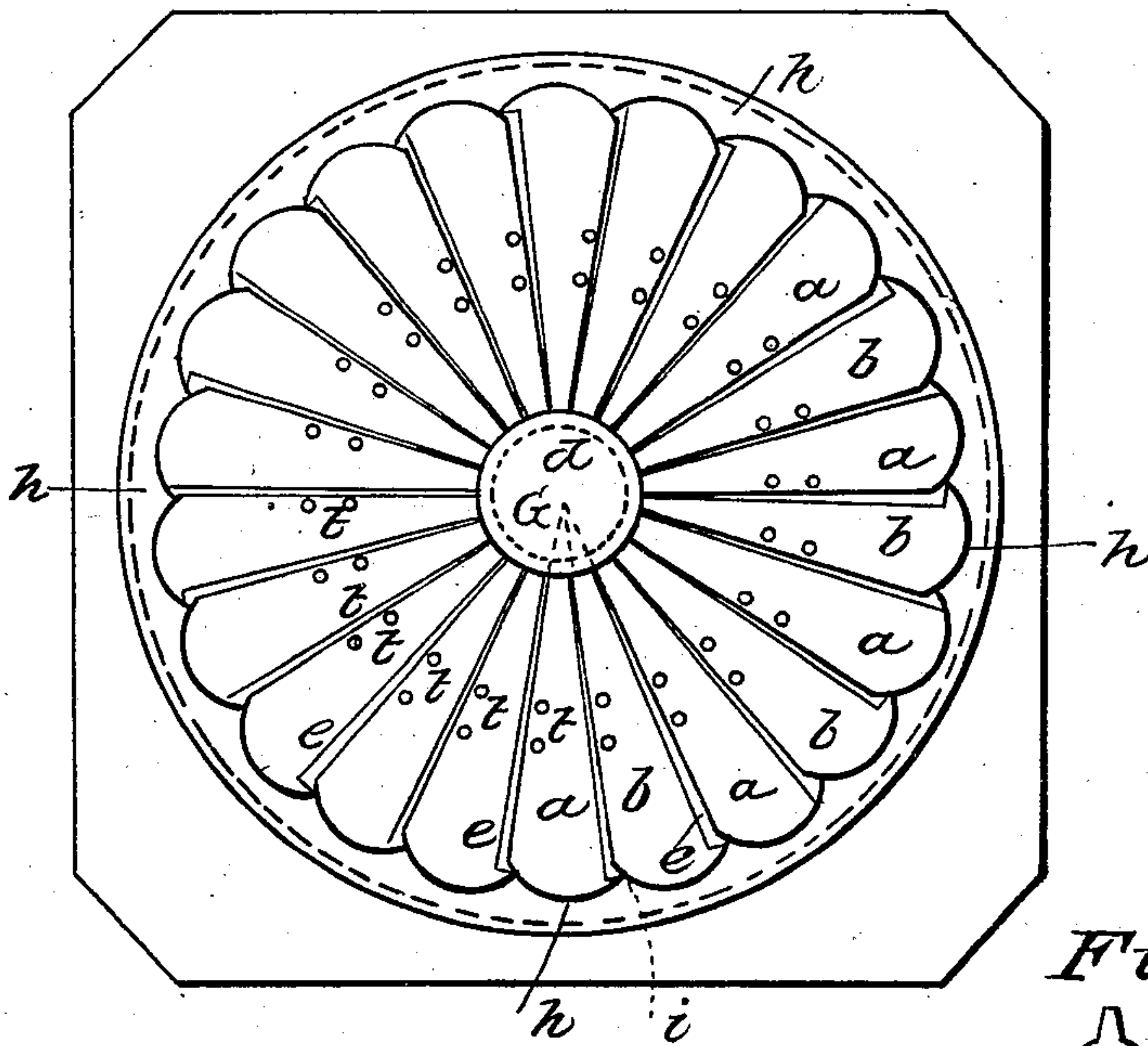


A. C. GARRATT.  
Medical Battery.

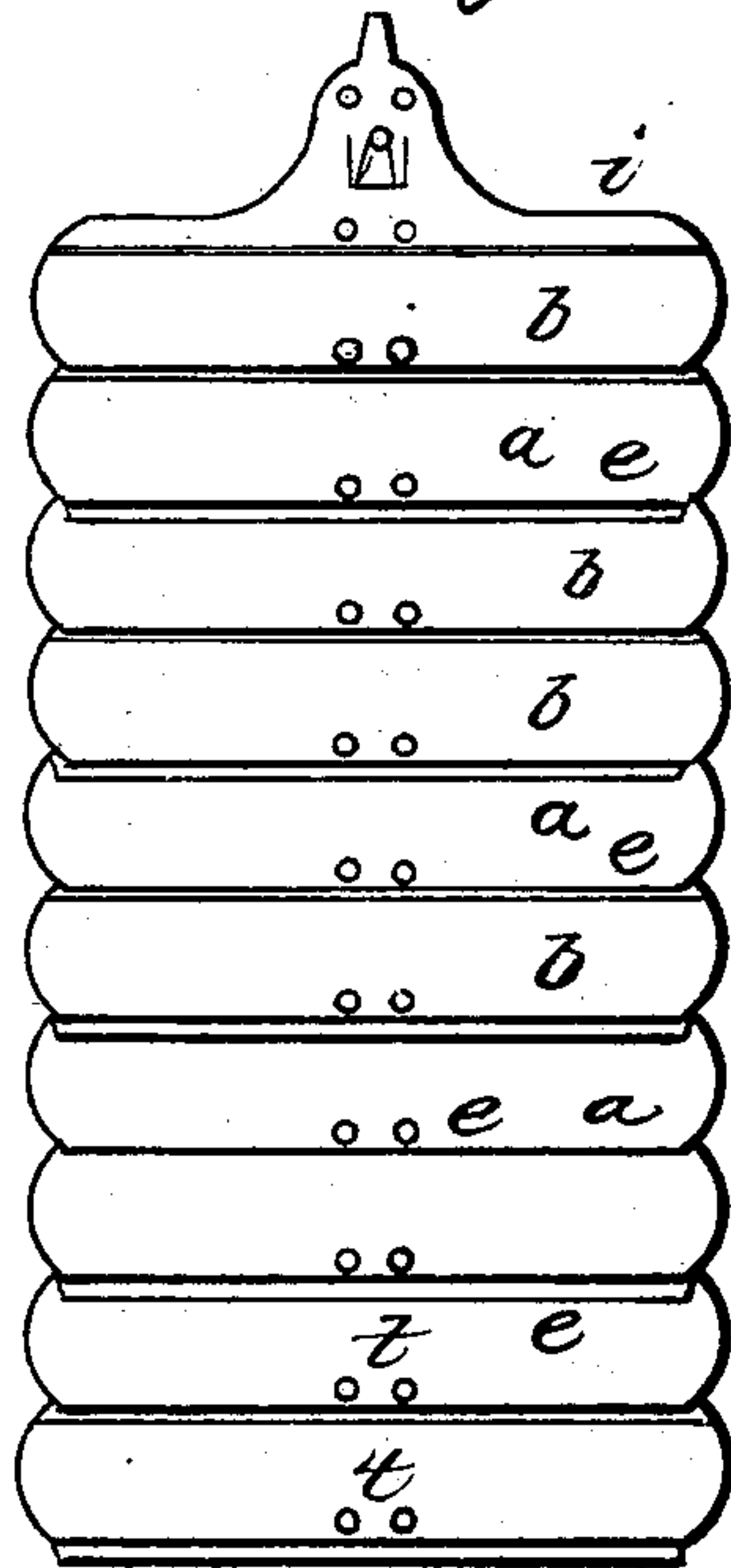
No. 85,300.

Patented Dec 29, 1868.

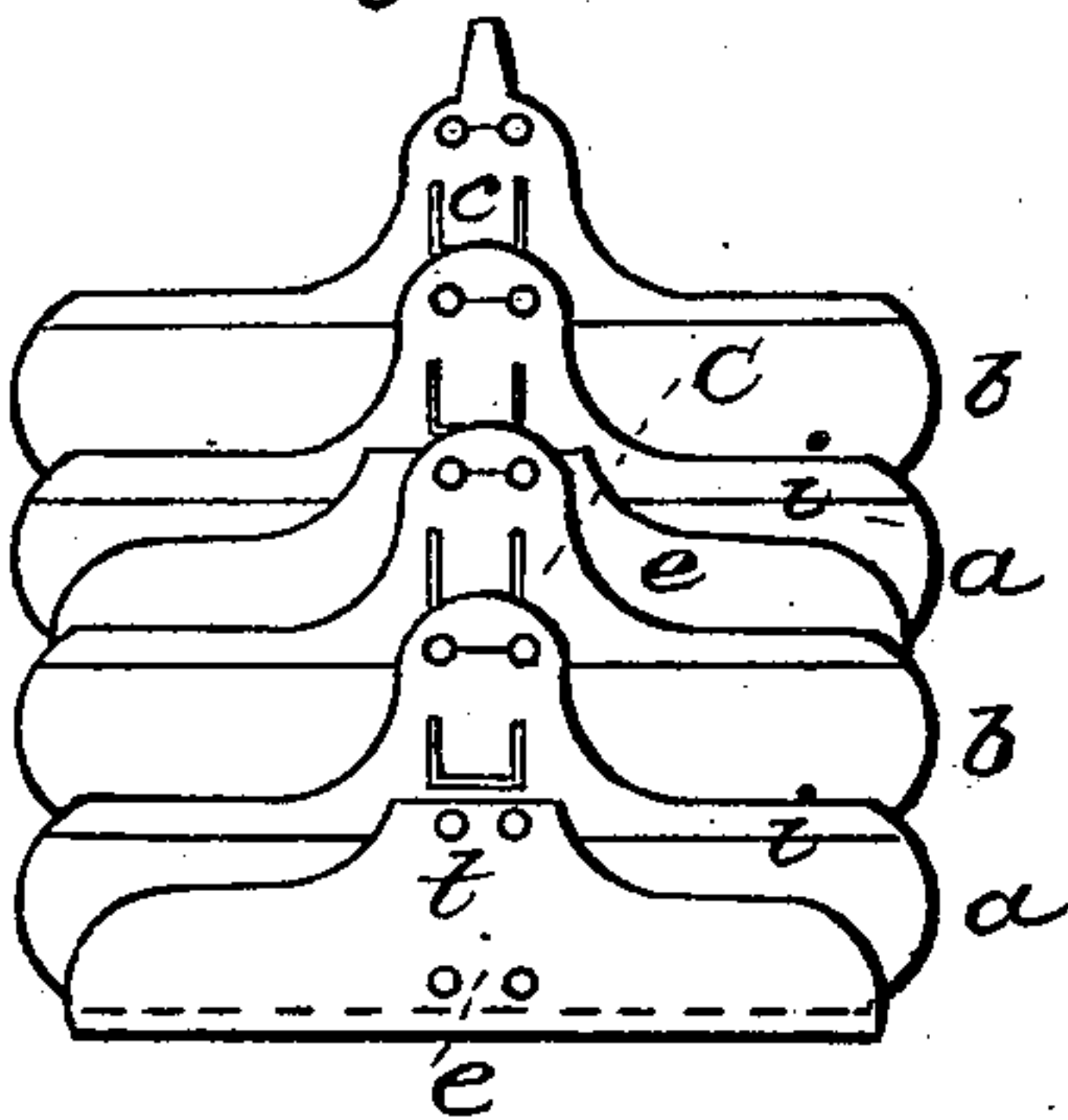
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses.  
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# United States Patent Office.

ALFRED C. GARRATT, OF BOSTON, MASSACHUSETTS.

*Letters Patent No. 85,300, dated December 29, 1868.*

## IMPROVEMENT IN VOLTAIC PILE FOR MEDICAL PURPOSES.

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that I, ALFRED C. GARRATT, of Boston, county of Suffolk, and State of Massachusetts, have invented certain Improvements in Voltaic Batteries, to be used upon the body in the treatment of disease, which I call "An Improved Humboldt Medical Battery;" and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 represents a complete battery, of circular form.

Figure 2 represents a section of a straight battery.

Figure 3 represents the back of the straight plates, and manner of connecting them.

It has long been a question among electricians as to a convenient method of applying electricity locally, as cases frequently occur in medical practice when it would be of great benefit if a constant primary current of electricity could be applied to the part of the body diseased, and members of the medical profession have been at a loss to secure the proper means of locally applying this primary current for continuous gentle action, so much desired.

There have been various attempts to so construct a battery for local application, as to secure the proper electrical current, but so far the attempts have been without satisfactory results.

The object of my invention is to produce an electro-physiological battery, which can be applied to any part of the human body, which battery, by the action of the natural perspiration from the skin upon the dissimilar metals comprising my battery, as an exciting-fluid, shall generate a constant and efficient primary current of electricity.

I accomplish my purpose by arranging pairs of plates of dissimilar metals, after the principles incorporated in Letters Patent granted me by the United States, December 31, 1867, and July 7, 1868, upon any durable and flexible non-conducting base, and insulating the plates from this base, and insulating the pairs of plates from the next pair, by any good insulator, like rubber cloth. These plates may be of any convenient shape, but the shapes given in the drawings are well adapted for the purposes to which I put my apparatus.

In the drawings, *a* represents zinc plates, and *b* copper plates, or copper rolled with silver, or any suitable metal dissimilar to zinc. The plates are made of rolled metal, and of a proper thickness, say one-fortieth of an inch. The zinc plate and the copper plate are soldered together at *c*, thus making a pair of plates of dissimilar metals. These pairs are then attached by thread *t* to a durable and flexible non-conducting base, in such a manner that the different metals shall be alternate. Each pair is insulated from the next pair by inserting a strip of rubber cloth, *e*, or any good insulating-material, between each pair and the next.

I arrange these pairs in a circle, as shown in fig. 1, or I may arrange them so as to make a straight battery, as shown in fig. 2, or I may arrange them in any suitable shape, as may be required for any particular local application.

These pairs are insulated from the base *h*, by soft rubber or other insulator, and they are connected in such a manner as not to fluctuate the electric current, and at the same time the connection is completely insulated, so as to be neat and flexible.

In the circular battery I place, over the centre, a piece of rubber cloth, *d*, or its equivalent, the use of which is to insulate the ends of the plates from the body, and give free action to the electrical current.

My improved Humboldt medical battery is to be applied directly to the skin, and thus worn, so that the living limb or body of the patient acts as the vehicle for supplying the spaces between the pairs over the insulator *e* and the metals, with an exciting-liquid, which is the natural perspiration from the body. The spaces between the different plates and pairs are preserved by the peculiar flange on the plates themselves, shown at *i*, and by the insulations.

The first Humboldt battery, known as such to science, and described in my work on medical electricity, edition of Ticknor & Fields, 1860, page 113, of which I was the originator, and which I gave to the world, is not so complete as I could wish, and I have therefore interested myself, by great pains and expense, to produce my improved Humboldt medical battery, which is an electro-physiological battery; and the convenience and usefulness of this cheap, durable, and least troublesome of all galvanic arrangements, and its peculiar adaptation, under frequently-occurring circumstances, for the treatment of different cases, must give it a more prominent place, among practical and reliable electro-therapeutics, than that gained by my original invention, for the present improved arrangement and structure secures far greater and more uniform efficiency. If the friction of the body upon the surface of the plates does not keep them sufficiently bright, they can easily be rubbed with a piece of wash-leather or any suitable material.

I am well aware of the nature of "Pulvermacher's chain," a German invention, and I do not claim any arrangement analogous to it. I am also aware of the nature and claim of Thomas Hall's patent, of February 7, 1865, for "voltaic soles," and I disclaim his arrangement of lapping plates of dissimilar metals, as there is no current in an apparatus constructed after his alleged invention, as no compound primary current can be produced without a series of complete elements; in fact, scientific demonstration with the galvanometer proves Hall's "voltaic sole" to have no electrical current as a whole, while a battery constructed according to my invention can easily be proved to possess all the qualities I claim for it.



Having thus fully described my improvement,  
What I claim as my invention, and desire to secure  
by Letters Patent, is—

An electro-physiological battery, constructed by ar-  
ranging a series of pairs of dissimilar metal plates, as  
elements completely insulated from each other, and  
from the base, as described, and the plates of each pair  
firmly connected, as shown, all arranged upon a flexible

non-conducting base, as and for the purposes described  
in this specification.

In testimony whereof, I have signed my name to this  
specification, in the presence of two subscribing wit-  
nesses.

Witnesses:                   ALFRED C. GARRATT.  
                                CARROLL D. WRIGHT,  
                                A. F. BUTTERWORTH.