(No Model.)

H. E. WAITE.

RHEOSTAT.

No. 459,800. Patented Sept. 22, 1891.

Fig. 1.

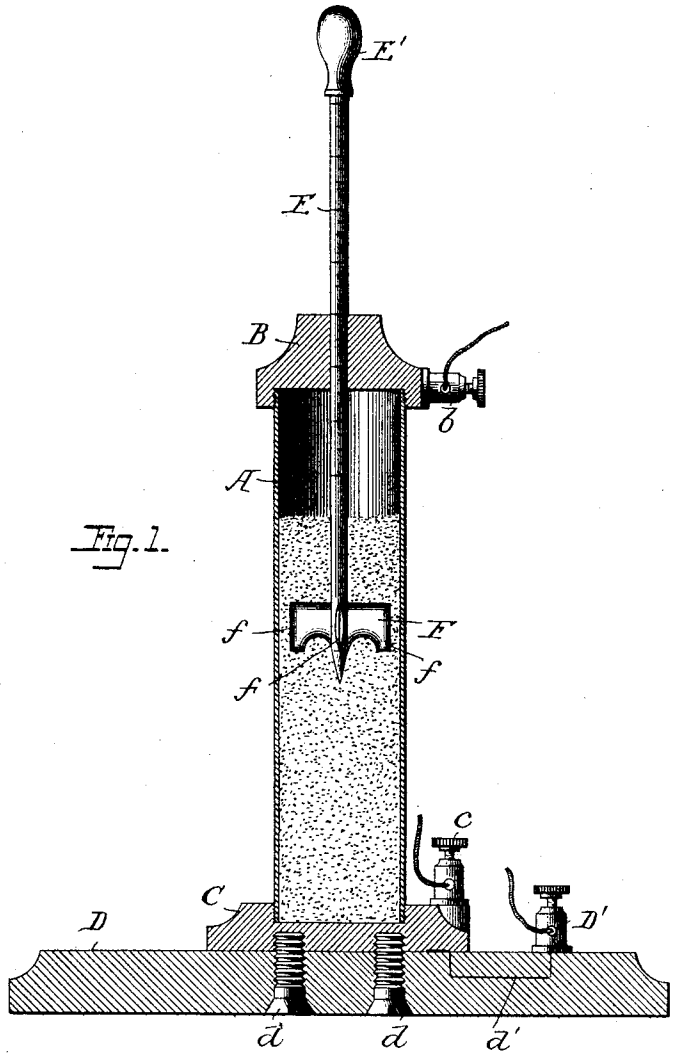
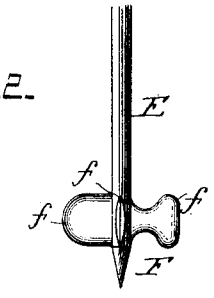


Fig. 2.



WITNESSES

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RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 459,800, dated September 22, 1891.

Application filed December 23, 1890. Serial No. 375,570. (No model.)

To all whom it may concern:

Be it known that I, HENRY E. WAITE, a citizen of the United States, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Rheostats, of which the following is a specification.

My invention relates to rheostats or variable resistance devices which are adapted to be used in connection with electric circuits generally, but which are adapted more especially to be used in electro-medical therapeutics, and it has for its object to provide an exceedingly simple, cheap, and effective device by which the resistance offered to the passage of electric current can be readily and easily varied without causing breaks or interruptions of the currents or other disturbances which would be likely to produce an undesirable shock upon the patients; and to these ends my invention consists in a rheostat constructed and arranged substantially as hereinafter set forth.

In the accompanying drawings, Figure 1 is a sectional view illustrating the preferred embodiment of my invention, and Fig. 2 is a detail.

It is well known in the art of electro-medical therapeutics that a resistance device which is capable of controlling the electric circuit and that is not liable to deterioration from use or standing is a want long desired and not satisfactorily supplied. It is quite common to use liquid rheostats for this purpose, and they present certain favorable features, but are liable to deterioration, owing to evaporation, oxidation, or corroding of the parts. Attempts have been made to overcome these disadvantages by the use of powdered resistance material; but in these the material becomes packed and the relative resistance to the current varies greatly under various conditions, so that reliance cannot be placed thereon. It is one of the objects of my invention to overcome these objections and at the same time to produce an exceedingly cheap rheostat.

In carrying out my invention I provide a tube or cylinder A, which is preferably of glass or other non-conducting material, rubber being used in some instances. Attached to the ends of this tube are caps B C, which may be applied thereto in any desirable manner, so as to be securely held in position. One cap, as C, may be permanently secured by cement, screw-threads, or otherwise, while the other cap B is preferably detachably secured. Each of these caps is provided with a binding-post *b c*, to which the terminals of the circuits may be connected. Sometimes, however, it is preferable to make a more permanent structure, and in that case I attach one of the caps, as C, to some suitable base or support, as D, to which it may be secured by screws *d* or otherwise, and under these conditions I find it convenient to secure the binding-post D′ to the base instead of to the cap, and connect it to the cap by a conductor *d′*.

Fitted to slide through an opening in one of the caps, as B, is a plunger-rod E, preferably having an insulated handle E′. Attached to the other end of this plunger-rod is a plunger F, and while this may be of various shapes and forms it is essential that the arms or blades *f* be of such shape that they will readily move through the resistance material without liability of compacting the same, and to this end I make the blades with sharp edges, so that they will readily penetrate and move through the mass of resistance material without pressing materially thereon.

In Fig. 2 I have shown two forms of blades or projections *f* which I have found to be effective. The tube is filled or partially filled with some resistance medium, preferably powdered or granulated carbon or plumbago; but the particular material used is not essential, the essential feature being that it shall be in such form that the plunger will readily move through the mass without materially packing the same, and at the same time it should offer sufficient resistance to the passage of electric current while lying in a loose condition. With this material and with a plunger constructed substantially as indicated the latter can be moved freely up and down, so as to vary the resistance to the current, and at the same time the gravity or density of the material will remain practically constant, so that a given quantity will offer substantially the same resistance to the current under all conditions. This enables me to graduate the plunger-rod, so that it can be adjusted in the cap and the resistance varied in accordance

with the adjustment. The plunger, being provided with blades or extensions having sharp edges or points, will move up and down through this resistance material and keep it constantly stirred up and in its non-compressed condition, and when the resistance is desired to be entirely cut off the plunger may be pressed down so that its end comes in contact with the cap C on the opposite end.

It will thus be seen that the rheostat is exceedingly simple and overcomes the objections to the rheostat as ordinarily constructed.

It will be understood, of course, that while I have shown the simplest form of construction, the shape and details of construction may be varied without departing from the essential features of my invention.

What I claim is—

A rheostat consisting of a body of non-conducting material, supporting at its ends caps of conducting material and containing a mass of powdered or granulated conducting material, a plunger-rod sliding in one of the caps, and a plunger having vertical laterally-projecting blades, so as to readily pass through the conducting material without compacting the same, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY E. WAITE.

Witnesses:

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