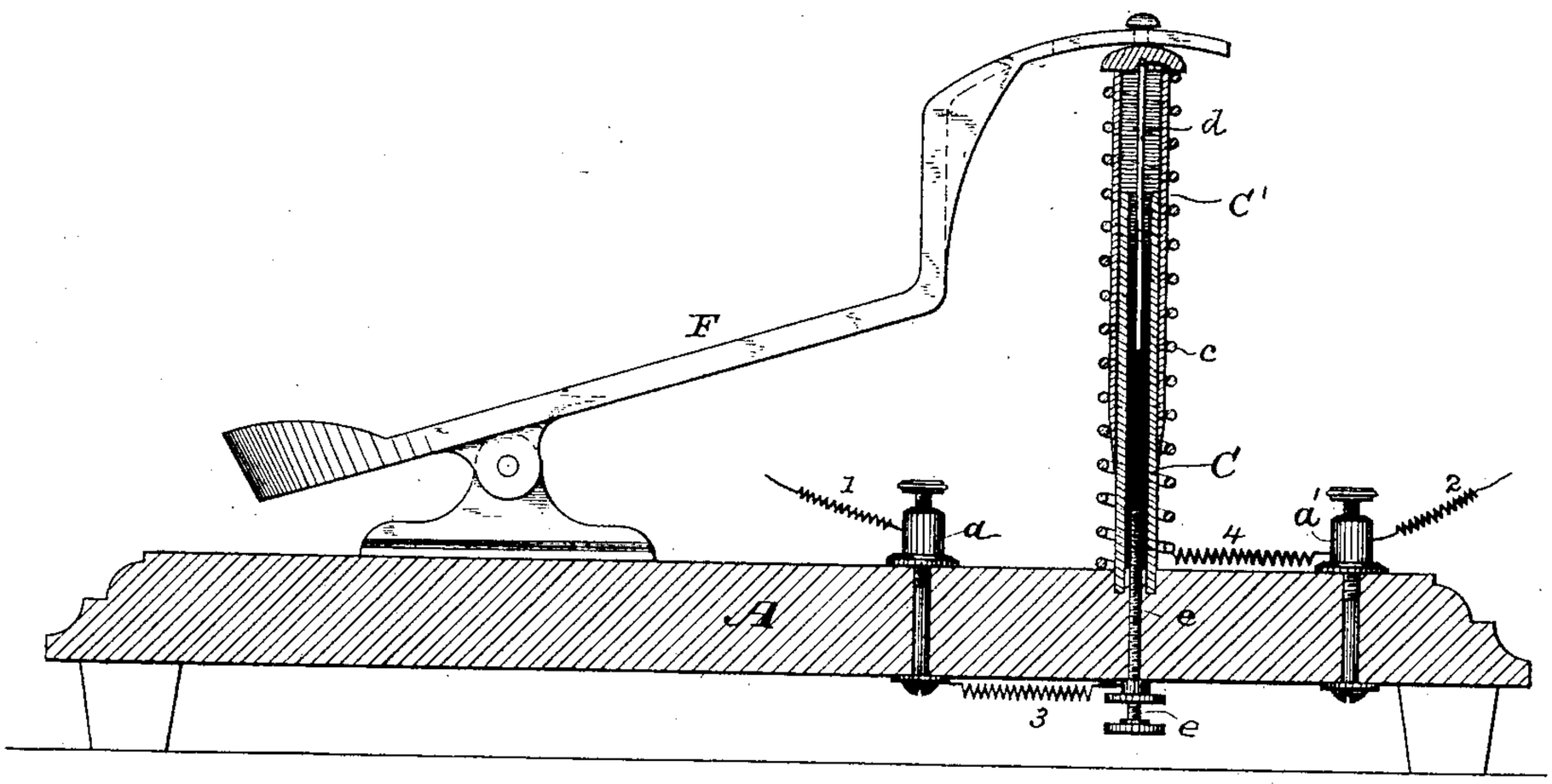
(No Model.)

E. T. STARR.

RHEOSTAT.

No. 266,910. Patented Oct. 31, 1882.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ELI T. STARR, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILLIAM J. PEYTON, OF WASHINGTON, D. C.

RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 266,910, dated October 31, 1882.

Application filed September 4, 1882. (No model.) Patented in England July 13, 1882, No. 3,330.

To all whom it may concern:

Be it known that I, ELI T. STARR, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Rheostats or Resistance Devices for Electric Circuits, of which the following is a specification, my said improvements having been patented in England July 13, 1882, as No. 3,330.

My invention relates to variable-resistance devices for governing more especially the action of electro-magnetic motors employed for driving light machinery—such as sewing-machines, lathes, &c.—whereby the speed and power of the machine or machines being driven may be readily controlled by the operator. Various forms of devices have heretofore been suggested for this purpose, but none, so far as I am aware, save that patented to me July 4, 1882, as No. 260,623, are as simple and efficient as is desirable.

The object of my present invention is to provide an improved variable-resistance circuit-controlling device, which is simple, inexpensive, and exceedingly efficient.

The subject-matter claimed is particularly pointed out at the close of the specification.

Some of my improvements may be used without the others and in connection with electric circuits not including electro-magnetic motors.

The accompanying drawing illustrates my said improvements as organized in the best way now known to me, the figure being a sectional elevation through the variable-resistance device.

A base or stand, A, is provided with binding-screws *a a'* for connecting the circuit-wires 1 2, which lead to and from a battery or other generator of electricity, said circuit including an electro-magnetic motor, if such is used. Said binding-screws are in electrical connection, by wires 3 4, respectively, with the variable-resistance device, so as to constitute said device a part of the circuit. Said variable-resistance device consists of a vessel preferably composed of two telescoping or expansible and contractible sections, C C', (said sections being also preferably of non-conducting material, such as glass or hard rubber,) held apart by a coiled spring, *c*, the lower or base section, C, being firmly mounted upon the base-board, and forming a cup or cell to contain a fluid offering comparatively high resistance to the passage of an electric current. A conducting wire or rod, *d*, projects from or is carried by the upper sliding section, C', of said vessel, so as to enter the fluid in the base-section C, and the depth to which this wire or conductor is made to enter the fluid controls the resistance to be offered to the passage of the electric current, and consequently the action of the current upon the electric motor included in the circuit. The wire 3 is connected with a binding-screw, *e*, the upper end of which, in this example, enters slightly into the fluid, so as to be in electrical connection therewith and constitute a conductor, while the wire 4 is connected with the wire or conductor *d*, in this instance, by way of the reacting spring *c*. The section C' of the fluid-containing vessel stands in its normal position at its greatest height relatively to the base-section C, with the end of the conductor *d* at its greatest distance from the end of the conducting-screw *e*, and when in this position the maximum resistance is offered to the passage of the electric current through the resistance device. A treadle, F, pivoted upon the base-board A, is connected at its front or toe end with the upper end of the sliding section C' of the fluid-containing vessel, and the connection is preferably made by a slot and pin, as fully shown and described in my aforesaid patent, whereby upon depressing the treadle to vary the resistance of the circuit the vessel-section C', carrying the conductor *d*, moves down upon the fixed vessel-section without lateral movement. The connection between the treadle and vessel, in other words, is a sliding or yielding one, and such a connection may be made in various ways. Pressure upon the treadle by the foot of the operator causes the conductor *d* to move into the resistance-fluid and approach nearer to the end of the screw or conductor *e*. The nearer said conductor *d* approaches the conductor *e* the less resistance there is offered to the passage of the current, as will be obvious. The resistance in the circuit can consequently be varied as required, and to the slightest degree, simply by pressure of the foot, without breaking the

circuit. As soon as the pressure is removed the spring *c* retracts the conductor *d*, and at the same time elevates the toe end of the treadle, ready for a new depression, which is to vary the resistance offered to the passage of the current.

It will be understood, of course, that the upper section, C′, of the fluid-containing vessel need not be a closed section, although the construction shown is in most cases preferable. A spring (not necessary to be shown) may also be used under the treadle and disconnected from the fluid-vessel, either as auxiliary to or in place of the spring *c*. I have deemed it unnecessary to show these changes in the drawing, as they and other changes may readily be made by a skillful mechanician, and would not constitute a departure from my invention.

I have thus described, as constructed in the best way now known to me, a resistance device organized for use with a treadle or pivoted lever, by which the resistance of an electric circuit may be varied by causing the approach and recession of a conductor relatively to another conductor, said conductors being in contact with an intermediate medium offering higher resistance to the passage of the current than said conductors.

I claim herein as of my invention—

1. The combination, substantially as hereinbefore set forth, with an electric circuit, of the variable-resistance device consisting of the vessel containing a resistance-fluid and the conductors in contact with said fluid, one of said conductors being movable in the fluid toward and from the other, the treadle to govern the approach of said conductors relatively to each other, and a spring to return said treadle to its normal position when the pressure thereon is removed.

2. The combination, substantially as hereinbefore set forth, of the expansible and contractible vessel, the sections of which are each provided with a conductor, the spring to normally maintain said sections distended, and the resistance-fluid contained within said vessel, in which said conductors are in contact.

In testimony whereof I have hereunto subscribed my name this 19th day of July, A. D. 1882.

ELI T. STARR.

Witnesses:
E. EUGENE STARR,
WM. J. PEYTON.