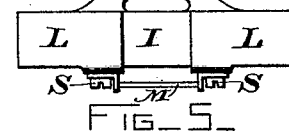
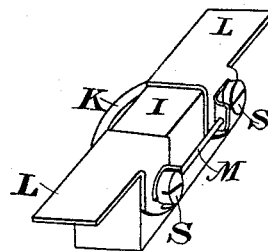
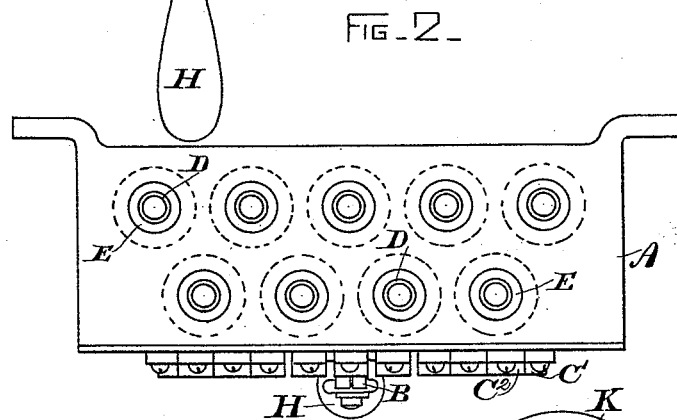
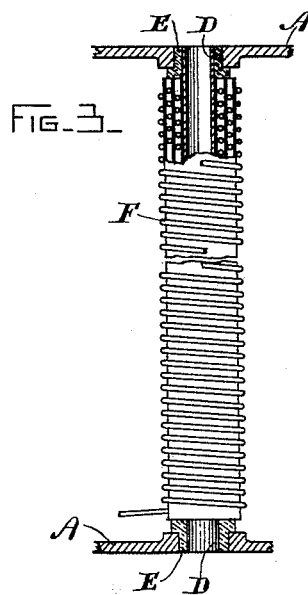
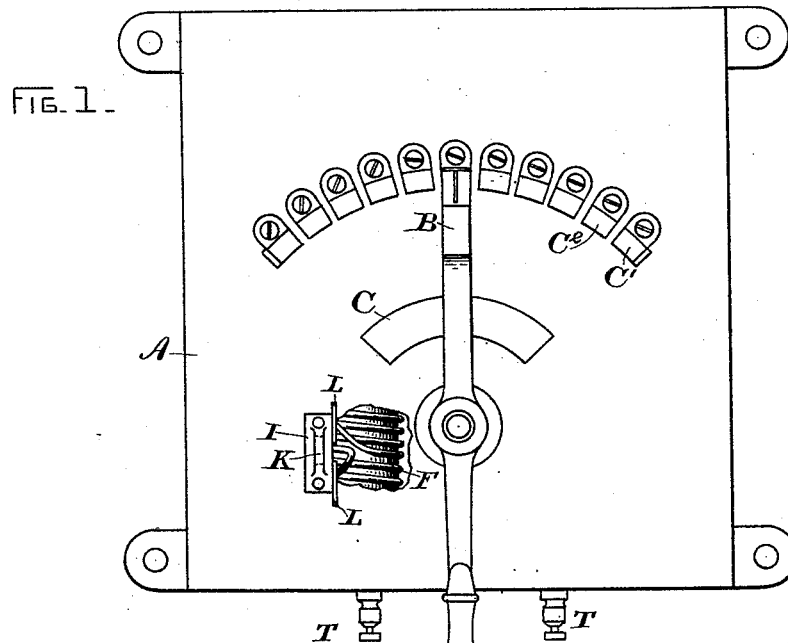


(No Model.)

A. B. HERRICK.  
RHEOSTAT.

No. 524,382.

Patented Aug. 14, 1894.



WITNESSES.  
A. F. Macdonald.  
J. Johnson.

FIG. 4.

INVENTOR-  
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# UNITED STATES PATENT OFFICE.

ALBERT B. HERRICK, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE  
GENERAL ELECTRIC COMPANY, OF BOSTON, MASSACHUSETTS.

## RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 524,382, dated August 14, 1894.

Application filed May 22, 1893. Serial No. 475,021. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT B. HERRICK, a citizen of the United States, residing at Schenectady, in the county of Schenectady 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 and has for its object to provide a fire-proof rheostat of ample capacity, not subject to disarrangement by jolting or vibration and from which the heat generated by the coils may be easily carried off; and it also consists of a special arrangement of a fuse, which limits the amount of heat which may be generated in the box, and of certain details of construction all more fully pointed out hereinafter.

It has been the practice to make rheostats, or starting boxes, as they are sometimes called, of coils of iron wire adapted to be connected in series by a suitable switch, providing a method of adjusting the amount of resistance in the circuit. The form of such a box is shown in the patent of S. Bergmann, No. 398,121, dated February 19, 1889; therein spirals of iron wire are shown, the wire passing through an iron plate at each end and being insulated therefrom by a porcelain bushing. This form of rheostat is, however, only adapted to stationary motors, inasmuch as any jolting or vibration tends to throw the coils into contact at different parts of their length, thus short-circuiting the resistance and making it unreliable, as well as apt to endanger the armature which it is designed to protect, and cause its own eventual destruction by sparking. It is also objectionable on account of the size necessary to accommodate a sufficient amount of resistance to render it operative. By my invention I obviate these objections. I wind the spirals upon a tube, from which I insulate them; a greater or less amount of wire as desired may be wrapped upon one tube where the coils are insulated and closely wound, thus reducing the size of the box.

In the accompanying drawings hereunto annexed and hereby made a part of this specification, Figure 1 is a plan view and Fig. 2 an end elevation of my improved rheostat. Fig. 3 is an elevation partly in section of one of

the coils, showing the method of placing it upon the tube. Figs. 4 and 5 are respectively a perspective and a side elevation of the manner of attaching the fuse.

A is the inclosing box, provided with openings in each end in which are inserted the tubes D D, &c., preferably of iron, this metal possessing the highest heat constant of all known metals and being therefore able to absorb a greater amount of heat (without perceptibly raising its temperature) than any other substance with which I am acquainted.

Referring to Fig. 3, E E are bushings of porcelain or other fire-proof insulating material separating the tube D from the iron casing A. Upon the tube D is wrapped in continuous spiral the iron wire F, separated from the tube by sheets of fire-proof insulating material such as asbestos or mica. As illustrated in the upper portion of Fig. 3, there are several layers or coils of wire superposed upon the tube; but by reason of the rigidity of the construction which I adopt it is possible to wind each turn of the wire closer to its neighbors than has been the custom hitherto and I thus accommodate a greater amount of wire in the same length of tube than heretofore. Upon the outside of the box I provide a starting switch of any usual construction, such as the one illustrated; where C is one of the contact plates, C', C'', &c., are the terminal plates connected to the coils and B is the brush-carrying arm making contact in the usual manner and operated by the handle H.

T T are the terminals to which the circuit wires are attached.

Referring to Figs. 4 and 5, I have illustrated a fuse block or clip, which may be employed with my improved rheostat. I is the body of the block, L L are contact pieces screwed thereto, which are connected by the fuse M, the contact pieces and fuse being secured to the block by the screws S S; the block is also provided with a handle K by which it may be conveniently removed, and is secured to the case A in any convenient manner. It is of course immaterial upon what part of the apparatus the fuse block is located, and I have shown it in Fig. 1 located so that the continuity of one of the spirals is interrupted

to pass the current through it; but it may be located at any convenient place on the box. It is to be borne in mind however that the size of the fuse M is such as to admit of the  
5 passage of the greatest current which the wire in the rheostat would ever allow to pass; the fuse being designed to protect the apparatus against an excess of heat and not against an excess of current, which could not operate to  
10 harm it, and it is therefore of importance that it should be so located in the box as to subject it to all the heat generated by the different coils, its position being otherwise unimportant, although I preferably locate it in one  
15 of the coils last in circuit, which sometimes will carry almost the entire current delivered to the motors. Its current-carrying capacity is thus equal to or greater than that of the resistance wire.  
20 The tubes are held in position, as will be observed, by the frame of the box itself; and act to conduct away any excess of heat in the coils, as they furnish a large radiating surface which is continuously cooled by the current of air set up by convection through the  
25 tubes. The insulating material upon the

tubes acts as an elastic cushion serving to take up the strain of the wire and insure its even wrapping.

Having thus described my invention, what I claim as new, and wish to protect by Letters Patent of the United States, is—

1. In a rheostat, a fuse included in the circuit of current-carrying capacity greater than that of the resistance wire and adapted to  
35 break the circuit when the heat of the box is excessive.

2. In a rheostat, a series of coils of resistance wire wound upon tubes, a plurality of coils being superposed upon each tube and  
40 insulated from the tube and from each other, the tubes being carried in a frame and insulated therefrom, and one of the coils being provided with a fuse of greater current-carrying capacity than the wire of the coil.

In witness whereof I have hereunto set my hand this 19th day of May, 1893.

ALBERT B. HERRICK.

Witnesses:

JAMES BURKE,  
FRED BATHURST.