

(No Model.)

A. J. SHAW.
RHEOSTAT.

No. 515,304.

Patented Feb. 20, 1894.

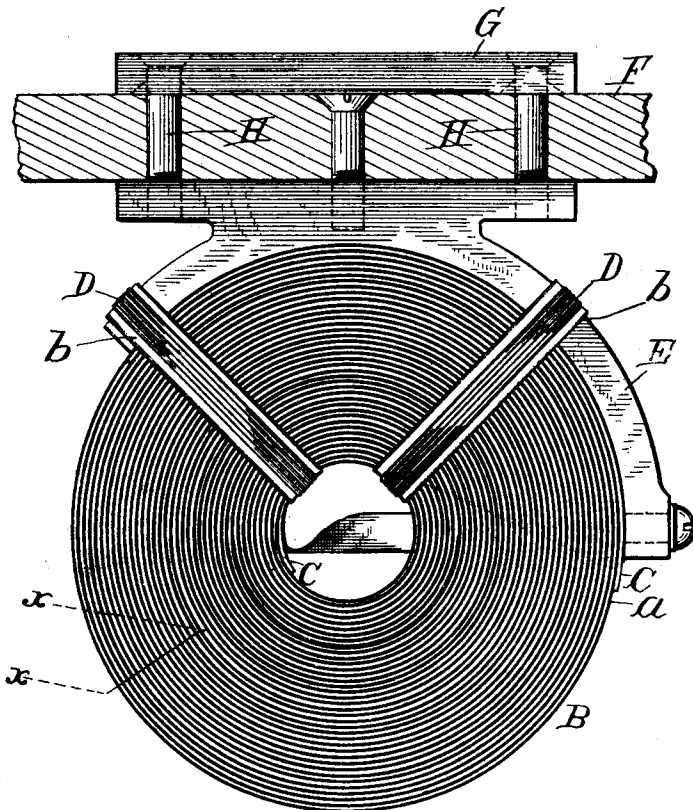


Fig. 1.

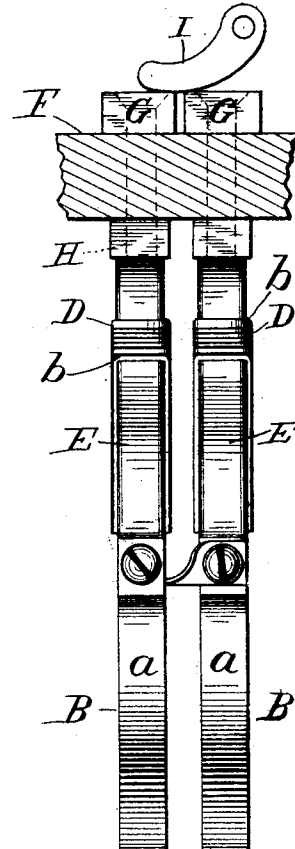


Fig. 2.



Fig. 3.



Fig. 4.

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SPECIFICATION forming part of Letters Patent No. 515,304, dated February 20, 1894.

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To all whom it may concern:

Be it known that I, ALTON J. SHAW, a citizen of the United States, residing at Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Rheostats, of which the following is a specification.

This invention pertains to resistances for use in electrical work, and is intended to provide a resistance card or section capable of use singly or in a group or series, and suited for powerful currents.

Figure 1 is a side elevation of a card or section, showing its supporting devices and contact block; Fig. 2, a view showing a convenient mode of coupling or joining sections; Fig. 3, a section on the line $x-x$ of Fig. 1; and Fig. 4, a view illustrating a modification.

For practical purposes it is important that such devices be compact, unliable to disarrangement through sudden movement, jar or concussion, and capable of ready application, removal, and renewal. Metallic wires and bars, carbon bars or rods, carbonaceous powder, separated metal disks, and numerous other contrivances have been employed with varying success; but practical experience has shown that most of the contrivances so far introduced have developed serious drawbacks which have greatly impaired their usefulness. The serious consequences liable to result from failure of or injury to a rheostat used with electric railway motors, hoisting machinery, and the like, renders it essential that every precaution be taken to render them efficient and reliable. With these ends in view, I form a flat spiral coil of hoop or band iron, or metallic tape, with an intervening layer of insulating enamel, which serves also as a binder.

Or, instead of metallic tape or ribbon, I may employ a series of wires laid side by side, and wound as one band, with the insulating material interposed between succeeding coils, and closely enveloping the strands of wire.

The construction will be readily understood upon reference to the drawings, wherein a indicates a metallic band, of one continuous piece, as in Figs. 1 and 2, or of a series of strands of uniform length laid side by side as in Fig. 4,—the single or compound band

being wound into a flat spiral B, with an insulating body C of enamel between the coils.

In practice I find it expedient to form the coils with a central opening, as shown in Fig. 1, for the double purpose of permitting the passage of air, and facilitating the leading off of the inner end of the coil to form the necessary connection. The winding is conveniently performed upon spools or bobbins, which should be grooved or channeled to permit the insertion or passage of binding wires or bands between the spool and the coil or spiral, before the latter is removed from the spool. These bands are represented at D in the drawings, and are shown as passing about the coil and also about a supporting block E, fashioned to conform to the outer coil of the spiral. The bands D thus serve to bind the spiral and retain it in compact form, and also to secure it firmly to the sustaining block E. A mica or asbestos strip b , or other suitable insulation, separates the binding wires or bands D from the spiral B and from the block E. Further to insure insulation and better to bind the whole together, the card thus formed may be dipped into a bath of enamel, the enamel being subsequently baked or otherwise hardened. This will be found quite advantageous, because the enamel envelope binds all together and also protects the binding wires or bands D, which latter serve to hold the spiral in shape, even if the enamel be broken or dislodged by blow or pressure.

In connecting two or more spirals to form a rheostat, I employ a suitable board, slab or support F, which may be of slate, vulcanized fiber, or other non-conducting material, or of conducting material carefully insulated from the parts which it carries. Upon one side or face of this slab or support I arrange a series of contact blocks G, one for each spiral or section B, and I connect each block G with the supporting block D of its spiral or section B by means of screws H, or equivalent fastenings, passing through the contact block, and slab and engaging with the supporting block D, as shown in Figs. 1 and 2.

A movable contact brush I, connected with one part of the circuit wire serves to make electrical contact with one or another block

G, and thus with its spiral coil or section, while the inner end of each coil is electrically connected with the outer fold of the next, or with the block D to which it is attached, as shown in Fig. 2.

The construction thus set forth is simple and cheap, and gives good results.

Having thus described my invention, what I claim is—

- 10 1. A resistance body or card consisting of a conducting band wound into a flat spiral, the folds of the spiral separated one from another by a layer of enamel, substantially as described and shown.
- 15 2. A resistance card or body, consisting of a conducting strip or band wound into a spiral, the folds of the spiral being insulated from one another by an interposed layer of enamel, and the center of the spiral being left open,
- 20 substantially as described and shown.
3. A resistance card or body comprising a band *a* of conducting material, wound into a spiral, an insulating body interposed between

the coils of band *a*, a supporting block D, and bands wrapped about the spiral and the block 25 and serving to bind them together.

4. In combination with supporting slab or plate F, contact blocks G, spirals B, and supporting blocks E, fastenings H, passing through slab F and serving to connect the 30 contact blocks and supporting blocks, the several coils being connected substantially as shown and described.

5. A resistance card or body, composed of a conducting strip or band wound into spiral 35 form, each fold or layer of the spiral being completely enveloped in and firmly united to the adjoining folds or layers by enamel, substantially as set forth.

In witness whereof I hereunto set my hand 40 in the presence of two witnesses.

ALTON J. SHAW.

Witnesses:

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