(No Model.) 2 Sheets—Sheet 1.

A. J. SHAW

RHEOSTAT.

No. 527,730. Patented Oct. 16, 1894.

Fig. 1.

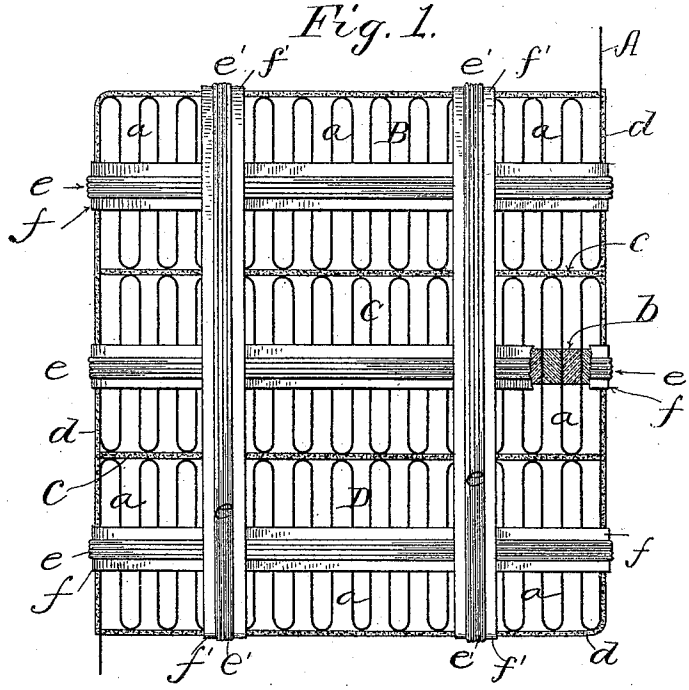
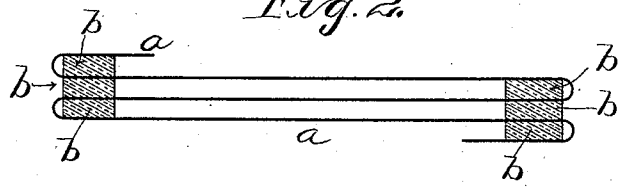


Fig. 2.



WITNESSES:
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ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

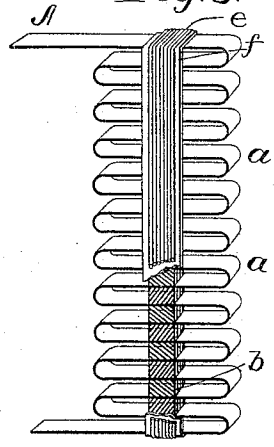


Fig. 5.

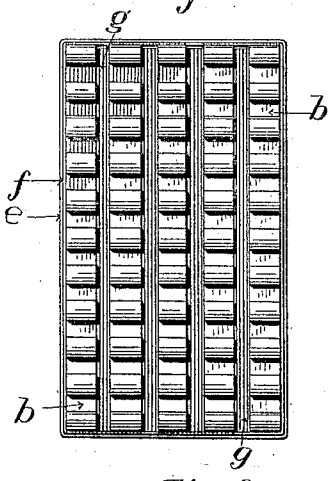


Fig. 7.

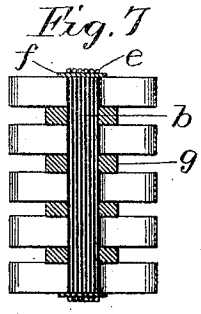


Fig. 4.

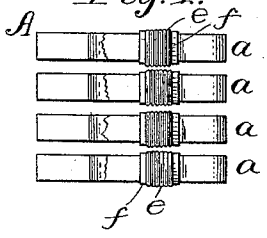


Fig. 6.

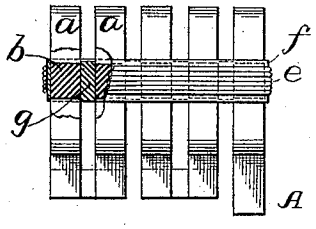


Fig. 9.

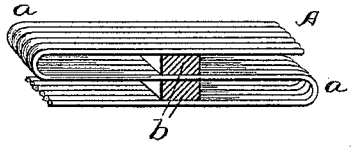
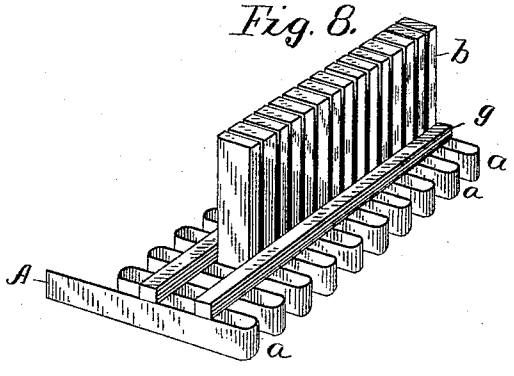


Fig. 8.



Witnesses
C. B. Bull.
C. C. Burdine.

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Alvin J. Shaw,
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UNITED STATES PATENT OFFICE.

ALTON J. SHAW, OF MUSKEGON, MICHIGAN.

RHEOSTAT.

SPECIFICATION forming part of Letters Patent No. 527,730, dated October 16, 1894.

Application filed March 15, 1894. Serial No. 503,725. (No model.)

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.

My invention relates to electrical-resistance devices, and consists essentially in a resistance card, block or device, formed of a considerable length of metallic band, tape or ribbon, folded back and forth, the folds being separated by non-conducting spacing blocks, whereby free circulation of air is permitted and undue heating is prevented. This general plan of construction admits of considerable variation in embodiment, and in the accompanying drawings I have illustrated several variations or modifications of the idea, all embracing this feature.

Figure 1 is a side elevation of a single card or section made up of a continuous strip of metal folded back and forth in short lengths, the folded band being in turn doubled upon itself to form three main folds or subsections. Fig. 2 is a sectional view showing the spacing blocks near the ends of the respective short lengths or folds. Fig. 3 is a perspective view, partly in section, showing a single section of the folded band with spacing blocks at the midlength of the folds, and with an individual binding; Fig. 4, an end view of a group of sections constructed after the manner of Fig. 3; Fig. 5, a side or face elevation, and Fig. 6, an end or a top elevation of a compound block made up of a series of folded strips having a binding common to all; Fig. 7, a sectional view, and Fig. 8, a perspective view illustrating another and slightly different way of building up a compound block or section similar in general appearance to that shown in Figs. 5 and 6; and Fig. 9, a view showing a band composed of several wires.

In constructing my improved resistance, I provide a strip A, of metal, preferably iron, of width and thickness suited to carry safely the heaviest current for which the device is liable to be employed, and I fold this strip back and forth in longer or shorter folds *a*, making the bends preferably of semi-circular form in order to prevent breakage or weakening of the metal, and to avoid the formation of sharp angles or points, which tend to facilitate leakage or escape of current. The bends should be sufficiently large or open to separate the folds one from another, and thereby afford adequate space for circulation of air, and sufficient distance to preclude the short-circuiting of the current through its leaping across from fold to fold. Such short-circuiting would not be likely to occur, however, under any ordinary conditions because the drop is so slight in the length of any one fold as to reduce such tendency to the minimum.

In order to maintain proper separation of the folds *a a*, I introduce between them insulating blocks or strips *b*, which should cover but a small portion or small portions of the folds, and offer as little obstruction as practicable to the circulation of air.

The insulating blocks or strips may be of vulcanized fiber, porcelain, asbestos, mica or any well known non-conductor; but it is deemed advisable to employ an incombustible material, to preclude destruction or injury in case of obstruction of the current at any point in the circuit. Asbestos and mica or "micanite" are admirably suited to the purpose.

The form, size and arrangement of the resistance block, card or device will vary more or less according to the contemplated place of use. Where only a comparatively shallow or narrow space is available, the band may be folded as in Fig. 1; that is to say, there may be several main portions B, C, and D, each composed of short folds *a*, and all lying in a common plane. When this form of card is adopted, there will be the insulating spacing blocks *b*, for the small folds *a a;* and there will also be insulating strips *c* between the main sections or portions B, C, and D, and by preference there will be an outside insulating strip or strips *d*, serving to protect the exposed outer faces.

To bind all parts firmly together I employ wires or other flexible bands *e*, passing around the folds *a* at right angles to the latter, directly over and in line with the spacing blocks *b*, which latter prevent the binding wires or bands from pressing the folds *a* into contact with one another, yet enable the bands to be drawn tight. If the binding bands be made

of wire or conducting material, without an insulating sheath or covering, insulating strips *f* will be laid across the edges of the folds *a*, as in Fig. 1, between them and the binding.

Where several sections are arranged in one plane, as in Fig. 1, it will be advisable to employ a second set of binding bands *e'*, and insulating strips *f'*, at right angles to the bands *e*, as illustrated in said figure.

If the folds *a* be of any considerable length, the spacing blocks *b* may be placed near each bend, as in Fig. 2, or at such intermediate points as deemed expedient, the binding wires or bands being correspondingly located, to avoid pressing the folds into surface contact.

In Fig. 3 I have represented a single section folded in the same manner as the several connected sections B, C and D of Fig. 1, and provided with similar binding and insulating strips *e* and *f*.

In Fig. 4 I have shown several such sections arranged side by side, each complete in itself. The sections thus constructed may be coupled or connected in any desired order or manner, and may be combined with a series of contact blocks and a movable arm or contact device, whereby any one or more of the sections may be brought into or cut out of circuit, in the ordinary way.

In Figs. 5 and 6 there is represented a resistance block or device, composed of five sections connected in series, the binding *e* and insulating strip *f* being common to all, and additional insulating strips *g* being placed between proximate sections, as shown. Under this arrangement the insulating and spacing blocks *b* and strips *g* are arranged in a common plane, and the binding *e* and insulating strip *f* are wound around or in line with the spacing blocks and strips.

Instead of employing separate spacing blocks *b* for each section, I may adopt the construction illustrated in Figs. 7 and 8, where the blocks *b* are represented as extending across the several sections, and the strips *g* are duplicated in order to pass on both sides of the blocks *b*.

Fig. 8 illustrates a simple and convenient way of assembling the several sections, the blocks or short strips *b* being inserted between the folds *a* of the first section, then the strips *g* being placed in position upon the first section, after which the next section may be placed in position and followed by another pair of strips *g*, and so on until the last section is in place, after which the binding will be applied.

It will be noted that the leading features of construction running through the several modifications are, the open or separated folds, the spacing blocks for maintaining such separation, and the binding applied around the whole structure, or about the separate sections thereof.

While no advantage would result from such variation, it is apparent that the binding might be applied slightly out of line with the spacing blocks; but the arrangement shown is deemed best in all respects.

Instead of a flat band or tape in one piece, a series of wires laid side by side may be used to form the band, as illustrated in Fig. 9.

Having thus described my invention, what I claim is—

1. A resistance card comprising the following elements in combination: a band of metal folded back and forth; short insulating blocks interposed between the folds and serving to separate the latter to permit free passage of air; and binding bands passing about the folded metal band and serving to retain the whole in compact form.

2. A resistance card consisting of a metallic band folded back and forth in short lengths in two or more groups; insulating blocks between the groups and between the folds of each group, and binding bands passing about the groups and serving to hold the same in a compact body.

3. A resistance card or body consisting of a band or tape of metal folded in short lengths; insulating blocks interposed between the folds, and binding bands passed about the folds in line with the insulating blocks and insulated from the folds.

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

ALTON J. SHAW.

Witnesses:
J. G. EMERY, Jr.,
T. C. AKIN.