T. E. BARNUM.

RESISTANCE UNIT.

APPLICATION FILED MAY 11, 1914.

1,226,627.

Patented May 22, 1917.

Fig. 1.

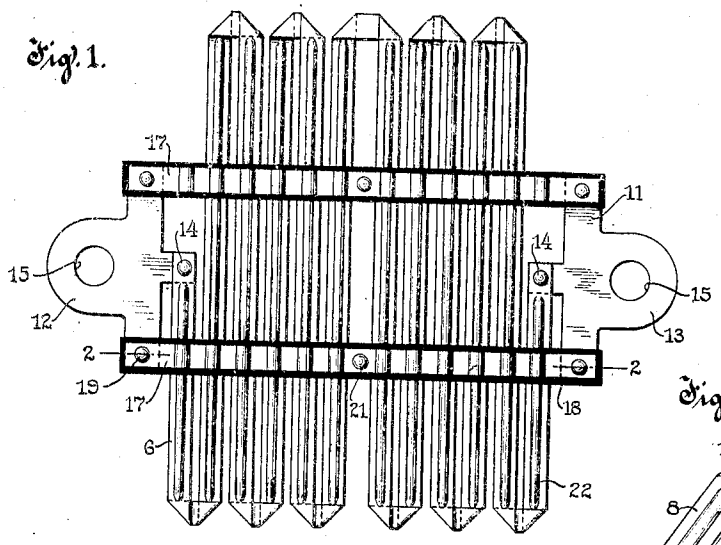


Fig. 3.

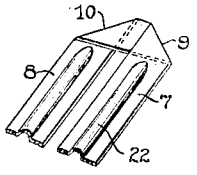


Fig. 2.

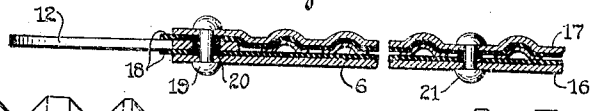


Fig. 4.

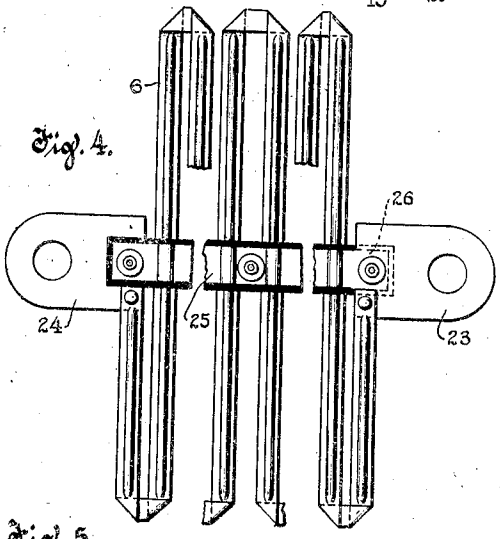


Fig. 6.

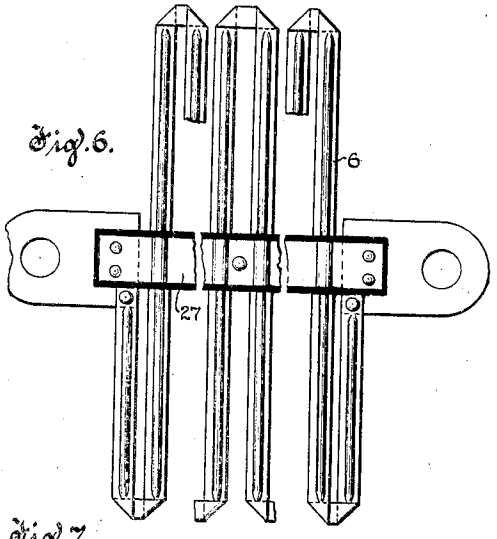


Fig. 5.

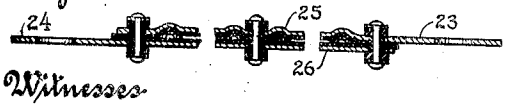


Fig. 7.



Witnesses.

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UNITED STATES PATENT OFFICE.

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RESISTANCE UNIT.

1,226,627. Specification of Letters Patent. Patented May 22, 1917.

Application filed May 11, 1914. Serial No. 837,832.

To all whom it may concern:

Be it known that I, THOMAS E. BARNUM, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Resistance Units, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

This invention relates to improvements in electrical resistance units and more particularly to those of the so-called grid type.

Units of this shape have, in practice, met with great favor and have been used very extensively. The use of this type of unit has, however, been greatly curtailed by reason of the low resistance properties of the cast metal heretofore used therefor to maintain the cost of manufacture within a practical limit. As an alternative for cast grids it has been proposed to form the grids of sheet metal stampings but this method of construction is open to numerous objections, notably undue expense and waste of material. Moreover, such a method of construction requires the manufacture of the resistance material in sheets or plates of relatively large size which is also open to obvious objections.

The present invention overcomes these difficulties and provides a strong, durable and compact unit which may be made of relatively high resistance material and manufactured at a reasonable cost.

In order to more fully disclose the nature and advantages of the invention several embodiments thereof have been illustrated in the accompanying drawing and will now be described.

In the accompanying drawing,

Figure 1 is an elevation of a unit of the preferred construction;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a detail perspective view;

Figs. 4 and 5 are views similar to Figs. 1 and 2 of a modified unit; and,

Figs. 6 and 7 are similar views of another modification.

Referring more specifically to Fig. 1, the resistor comprises a continuous strip or ribbon 6 of resistance material reflexed flatwise into grid form, any preferred resistance material being employed. The flatwise reflexing of the material is preferably accomplished by folding the strip or ribbon at the desired points, as best illustrated in Fig. 3, which shows the end of one convolution 7—8. As here illustrated the formation of the convolution is accomplished by first folding the strip at 9 to extend at right angles to the member 7 and then again folding the strip at 10 to parallel the parts 7 and 8. Also, as here shown the fold 9 is preferably made beneath the member 7 and the fold 10 above the member 8. The formation of the grid is thus rendered very simple, requiring only two straight line folds of the material at the end of each convolution. The convolutions, may, of course, be made of any desired lengths and likewise may be spaced as desired.

The grid thus formed is preferably mounted in a supporting and clamping frame 11. As shown, this frame comprises two end members 12 and 13 suitable for use as supporting terminals for the grid. The members 12 and 13 are shown as connected to opposite ends of the resistance strip by rivets 14 and are provided with perforated lugs 15 to receive suitable supporting rods. On one side, the members 12 and 13 are connected by spaced bars 16 and on the opposite side by correspondingly located bars 17, one of which is illustrated in Fig. 2. Each pair of bars 16—17 receives the resistance grid therebetween and an insulating strip 18 is interposed between each bar and the grid. Further, the strips 18 are extended to insulate the bars from the terminal members and when the parts are assembled, the bars 16 and 17 are secured to the terminal members as by means of rivets 19 having their shanks surrounded by insulating sleeves 20. The resistance grid is thereby clamped between the two pairs of bars 16—17, thus providing support for each convolution at two spaced points. Also, the two pairs of bars 16 and 17 are also preferably provided at intermediate points with additional rivets 21 to more effectively clamp the resistance grid therebetween. Without these additional rivets the bars might bow and spread under heat thereby releasing their grip on the grid. The frame 11 may, of course, be constructed of any suitable material and may obviously be so constructed as to be exceedingly strong and durable. To further increase the rigidity of the unit the convolutions thereof are

preferably pressed to produce thereon longitudinal beads or ribs 22. These beads or ribs are preferably formed after the reflexing of the strip and they have been found to give the requisite rigidity even where very thin material is employed.

Where the convolutions are beaded, as described, the clamping strips 17 on the beaded side of the grid are preferably shaped to conform to said beads as shown in Fig. 2. The strip 16 may be flat as illustrated or may be made to conform to the opposite surface of the grid, if desired.

The resistance grid shown in Figs. 4 and 5 is the same as that shown in Fig. 1 but is provided with a modified form of support. In this instance, the terminal members 23 and 24 are provided with integral extensions 25 and 26 respectively. The free end of each of these extensions is riveted or otherwise suitably secured to the opposite terminal member and thus the two extensions form a clamp for the resistance grid similar to one of the pairs of bars 16 and 17 of Fig. 1. Each of the extensions is insulated from the grid in the manner above set forth and is likewise insulated from the opposite terminal.

The construction shown in Figs. 6 and 7 is very similar to that shown in Fig. 4 but in this instance the two clamping and supporting bars 27 and 28 are separate from the terminals. The two bars are each insulated from the resistance and from both terminals and are riveted to the terminals in a manner similar to that above described.

What I claim as new and desire to secure by Letters Patent is:

1. A resistance unit including a relatively thin and flexible resistor strip folded into flat convoluted form and lineal supporting members therefor extending transversely of the convolutions of said strip and on opposite sides thereof to clamp said convolutions therebetween.

2. A resistance unit including a relatively thin and flexible resistor strip folded into flat convoluted form and supporting means for said resistor strip clamping the convolutions thereof lineally and transversely.

3. A resistance unit including a relatively thin resistor strip reflexed into flat convoluted form and beaded longitudinally of its convolutions and lineal clamping members for said resistor extending transversely of its convolutions, one of said members having a surface conforming with the beaded surface of said resistor strip.

4. A resistance unit including a relatively thin and flexible resistor strip reflexed into grid form, terminal lugs secured to the ends of said resistor strip and lineal clamping members for said resistor strip secured at their ends to said lugs, said members being insulated from said resistor strip and both of said lugs.

5. A resistance unit including a relatively thin and flexible resistor strip reflexed into flat convoluted form, a plurality of pairs of lineal clamping members for the convolutions of said resistor strip extending transversely of said convolutions and insulated therefrom and terminal lugs for said resistor strip fixed to the ends of said clamping members and insulated from all of the same.

6. In a resistance, a flexible strip of resistance material reflexed into a series of convolutions, terminals therefor and members connecting said terminals and clamping the convolution of said strip therebetween.

7. In a resistance, a strip of resistance material reflexed into grid form, terminal members therefor to support the same, and means reinforcing said reflexed strip between said terminals.

8. In a resistance unit, a flat strip of resistance material folded flatwise at intervals into a series of convolutions, members extending transversely of said convolutions to reinforce and support said strip and terminals for said strip carried by said members.

9. In a resistance unit, a flat strip of resistance material folded at intervals into a series of convolutions and a reinforcing and supporting frame for said strip including terminal lugs and a plurality of members gripping said convolutions at a plurality of spaced points on each.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

THOMAS E. BARNUM.

Witnesses:
TEKLA BAST,
L. A. WATSON.