

March 13, 1928.

1,662,771

G. H. WHITTINGHAM

RESISTANCE UNIT

Filed May 8, 1926

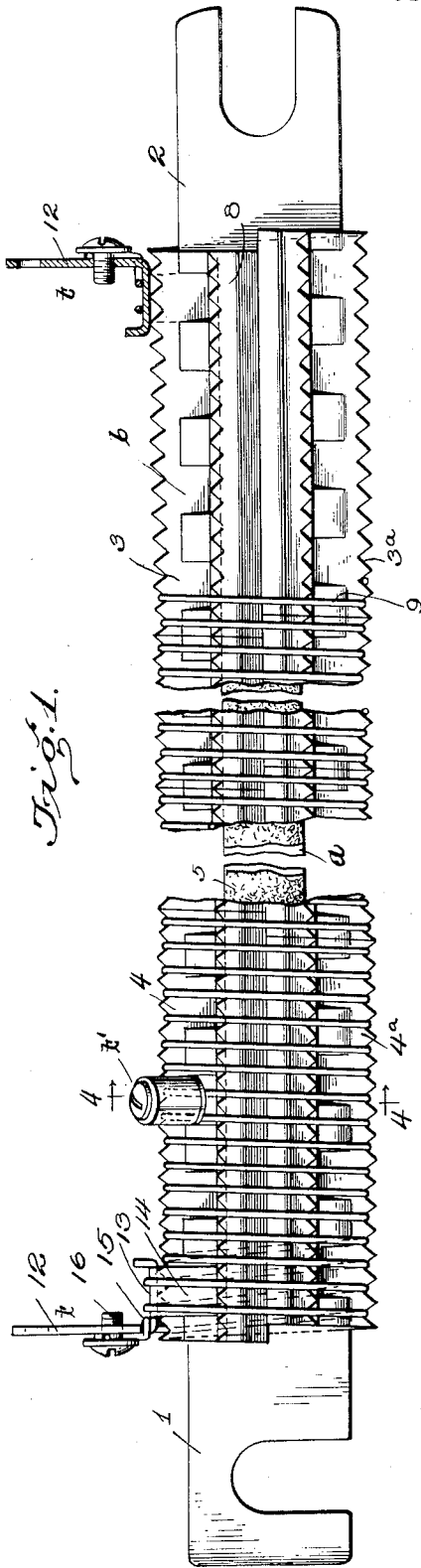


Fig. 2.

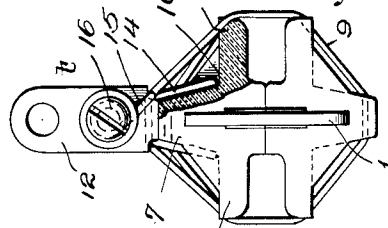


Fig. 3.

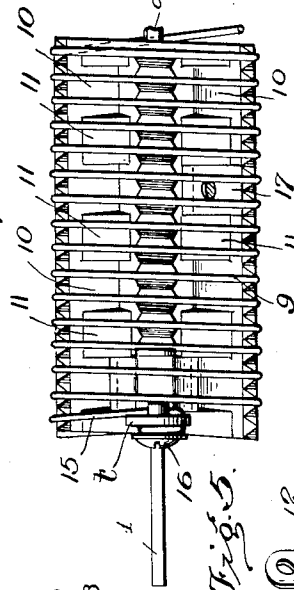


Fig. 5.

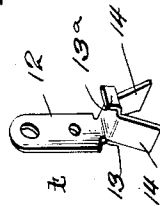


Fig. 4.

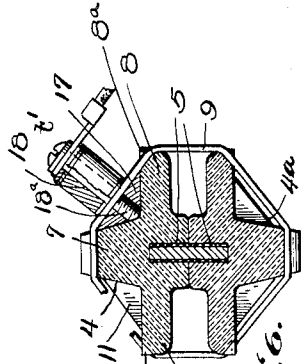
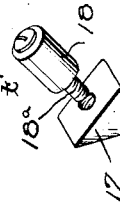


Fig. 6.



Inventor

G. H. Whittingham

Robert Watson
Attorney

UNITED STATES PATENT OFFICE.

GEORGE H. WHITTINGHAM, OF BALTIMORE, MARYLAND, ASSIGNOR TO MONITOR CONTROLLER COMPANY, OF BALTIMORE, MARYLAND, A CORPORATION OF MARYLAND.

RESISTANCE UNIT.

Application filed May 8, 1926. Serial No. 107,613.

This invention relates to resistance units composed of wire coils wound on bodies of refractory material, such as porcelain. Porcelain is desirable as a support for the windings, because of its high heat-resisting and insulating properties; but difficulty is encountered in satisfactorily securing terminals and other connectors to the porcelain because of its hard and brittle character.

The purpose of the present invention is to provide a resistance unit in which the terminals and other connectors can be secured at any desired points on the unit, the securing means being the coil itself. In carrying out the invention, I provide a metal supporting bar, having an insulating covering composed of refractory material, this covering having coil-supporting toothed ribs extending longitudinally of the bar and having spaced pockets between the ribs. The terminals or other connecting devices are formed with parts adapted to fit interchangeably in these pockets, and the resistance coil, wound over the toothed ribs and pockets, serves as a means for holding the connectors in place upon the covering.

In the accompanying drawing,

Fig. 1 is a side elevation of a resistance unit, partly in section and partly broken away;

Fig. 2 is an end elevation of the same, looking from left to right in Fig. 1, the insulating covering being partly in section;

Fig. 3 is a top plan view of the left hand end portion of the unit shown in Fig. 1, with the wires partly removed;

Fig. 4 is a section on the line 4—4 of Fig. 1;

Fig. 5 is a perspective view of one of the terminals shown in Fig. 1; and

Fig. 6 is a similar view of the tap shown in Fig. 1.

Referring to the drawing, *a* represents a flat metal supporting bar, having heads 1 and 2 at its ends which are wider than the bar, and the bar, between the heads, has a covering *b* of refractory material, preferably porcelain. This covering is composed of a plurality of relatively short pieces of porcelain, all alike in size and form. Thus, in Fig. 1, two pieces 3 and 4 are shown on the upper half of the bar and similar pieces 3^a and 4^a are shown on the lower half of the bar. Each piece of porcelain has a slot or

channel 5, as shown in Fig. 4, and these slots fit over the bar, as shown in said figure, so that the opposing sections, as 4 and 4^a, cover the bar and interlock with it. Each section has several ribs 6, 7, and 8, with teeth 6^a, 7^a, and 8^a, between which the wire coil 9 is wound. In the channeled portions of the insulators, between the ribs, are formed angular pockets 10, spaced short distances apart longitudinally of the bar. The intervening parts 11, between the pockets, join the adjacent ribs and strengthen the ribs. The wire 9 is wound over the ribs, between the teeth, and spans the channels which afford room for the circulation of air around the wire.

With wire wound units of this character, in which refractory material is used as an insulator, difficulty is experienced in securing connectors, such as terminals and taps, to the unit, because of the hard and brittle nature of the material. To overcome this difficulty, I provide the pockets in the insulator, and the connectors are provided with bases which fit into these pockets, and these bases are held within the pockets by the coil which is wound about the insulator. Thus, the unit shown in Fig. 1 is provided with two terminals *t*, each consisting of a sheet metal strip having a body portion 12, to which the wires may be connected, a foot 13, turned over at right angles to the part 12, and two forked arms 14, inclined downwardly from opposite sides of the foot and fitting into the pockets 10 at opposite sides of the rib 7. The foot 13 is shown with an upwardly turned end 13^a, as a convenience for retaining the wires when the coil is wound, but this end may be omitted. When the coil is to be wound, a terminal is placed on the insulator, as shown in the drawing, with its foot portion resting on a rib and the forked arms extending into the adjacent pockets, the terminal thus straddling the rib. The coil is then wound on to the unit and over the foot of the terminal, thus binding the terminal to the insulator. The foot is preferably long enough so that at least two turns of the coil will bear upon the foot. The other terminal is applied in the same manner. The forked arms are of substantially the same width as the pockets, and the terminals are prevented from twisting or turning by the walls of the pockets. The

turns or convolutions of the coil which pass over the feet of the terminals electrically connect the latter with the wire. The end convolutions 15 of the coil also pass over the feet of the terminals and are bent around the upright portions 12 and secured to the latter by clamping screws 16.

The pockets, spaced short distances apart, throughout the length of the insulator, are provided in order that taps may be connected to the coil at any desired points in its length. One of these taps is shown at *t'*. In winding the coil, a nut 17, formed to fit into any one of the pockets, is placed in a pocket, at a point on the coil where it may be desired to connect a tap wire, and the wire is wound over this nut. The pockets are arranged with respect to the teeth of the ribs 7 so that two convolutions of the coil will extend over each pocket. After the wire has been wound, the threaded end 18 of a binding post 18 is inserted between the convolutions which pass over the nut 17 and into the nut, and when this binding post is screwed down into the nut, the two convolutions of wire will be gripped between the nut and the binding post. Thus, a good electrical connection will be made between the coil and the binding post and the latter will be held firmly in position on the unit. Any desired number of taps may be thus connected to the coil. The taps and terminals are shown in the drawing mounted on the upper half of the insulator but they may be connected to the lower half, if desired, as the lower parts of the insulator are the same as the upper parts.

What I claim is:

1. A resistance unit comprising a metal supporting bar, an insulating covering thereon composed of refractory material, said covering having coil supporting toothed ribs extending longitudinally of the bar and pockets between the ribs, a connector having a part fitting within one of said pockets, and a wire coil wound about said covering and over said part.

2. A resistance unit comprising a metal supporting bar, an insulating covering thereon composed of refractory material, said covering having coil supporting toothed ribs extending longitudinally of the bar and having a series of pockets between adjacent ribs, a connector having a part adapted to

fit interchangeably in said pockets and fitting within one of said pockets, and a wire coil wound over said ribs and part.

3. A resistance unit comprising a metal supporting bar, an insulating covering thereon composed of refractory material, said covering having coil supporting toothed ribs extending longitudinally of the bar and having a series of angular pockets between adjacent ribs, a connector having an angular part adapted to fit interchangeably in said pockets and fitting within one of said pockets, and a wire coil wound over said ribs and part.

4. A resistance unit comprising a metal supporting bar, an insulating covering thereon composed of refractory material, said covering having a plurality of toothed ribs and intervening channels extending longitudinally of the bar, a connector having a base resting on one of said ribs and forked arms projecting from the base into the adjacent channels, and a wire coil wound around said ribs and said base and securing the connector to the covering.

5. A resistance unit comprising a metal supporting bar, an insulating covering thereon composed of refractory material, said covering having a plurality of toothed ribs and intervening channels extending longitudinally of the bar and having pockets spaced apart in said channels, a connector having a base resting on one of said ribs and having forked arms projecting into adjacent pockets, and a wire coil wound around said ribs and said base and securing the connector to the covering.

6. A resistance unit comprising a metal supporting bar, an insulating covering thereon composed of refractory material, said covering having a plurality of toothed ribs and a series of spaced pockets extending longitudinally of the covering between adjacent ribs, a connector comprising a base and a binding post, the former adapted to fit interchangeably in said pockets, and fitting in one of said pockets, a wire coil wound over said ribs, pockets and base, and said binding post having a threaded connection with said base and clamping the latter to the coil.

In testimony whereof I hereunto affix my signature.

GEORGE H. WHITTINGHAM.