W. S. HADAWAY, Jr.

TERMINAL FOR ELECTRIC APPARATUS.

APPLICATION FILED AUG. 4, 1914.

1,154,626. Patented Sept. 28, 1915.

Fig. 1,

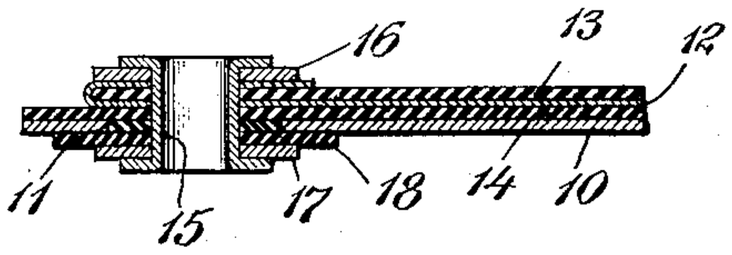


Fig. 2,

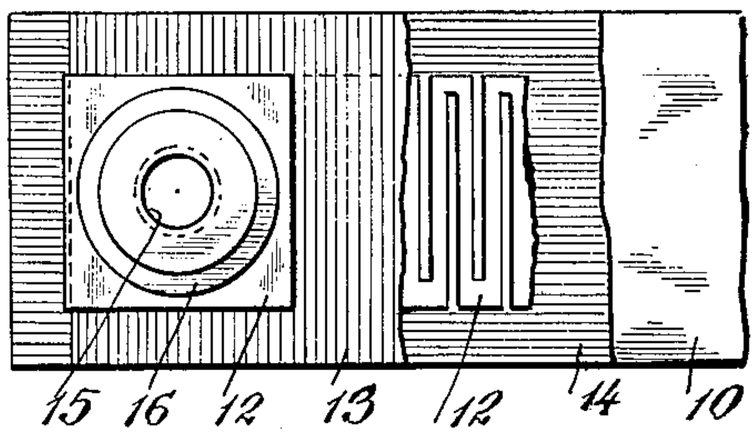


Fig. 3,

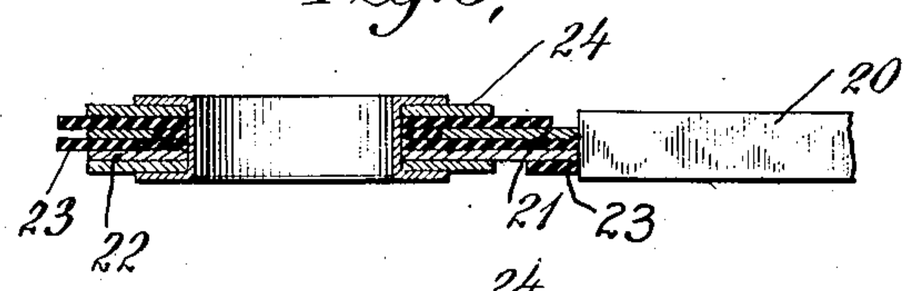


Fig. 4,

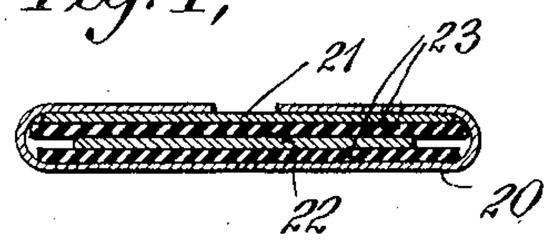


Fig. 5,

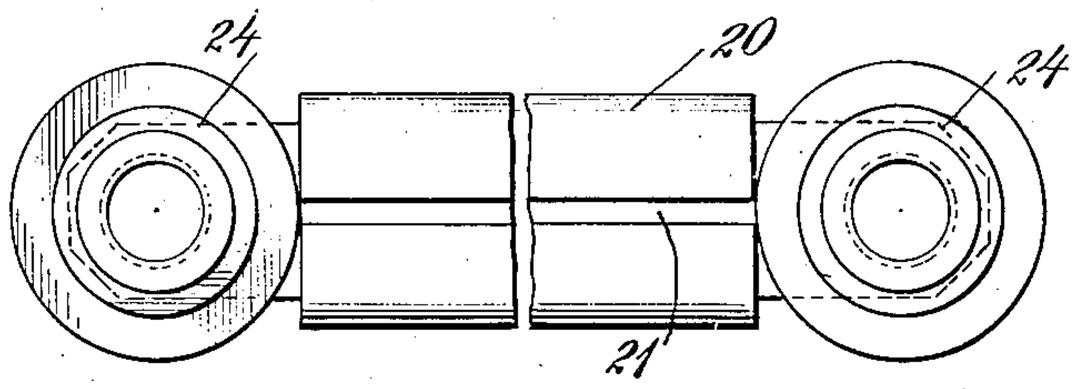


Fig. 6,

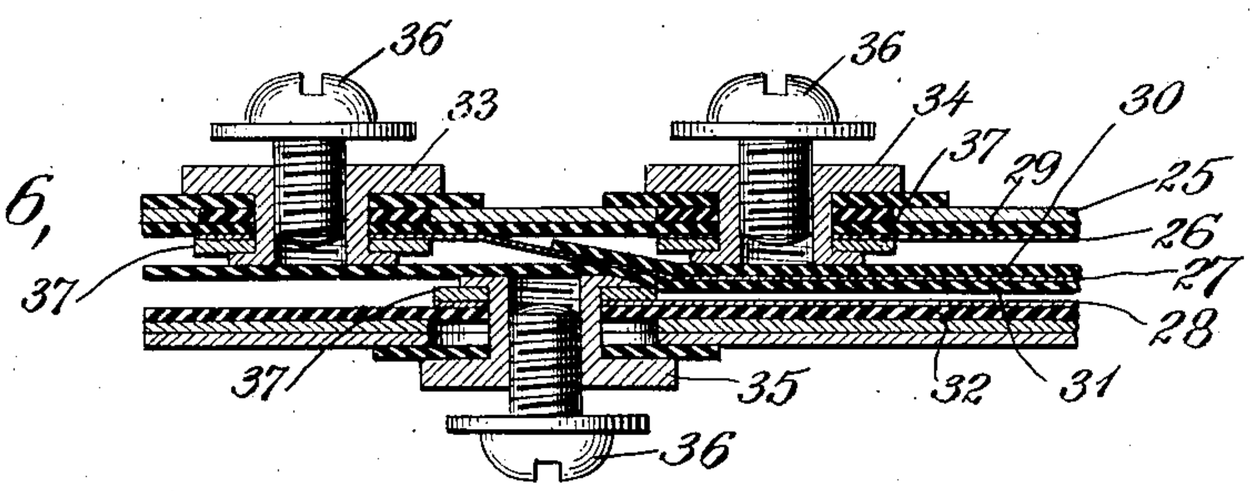


Fig. 7,

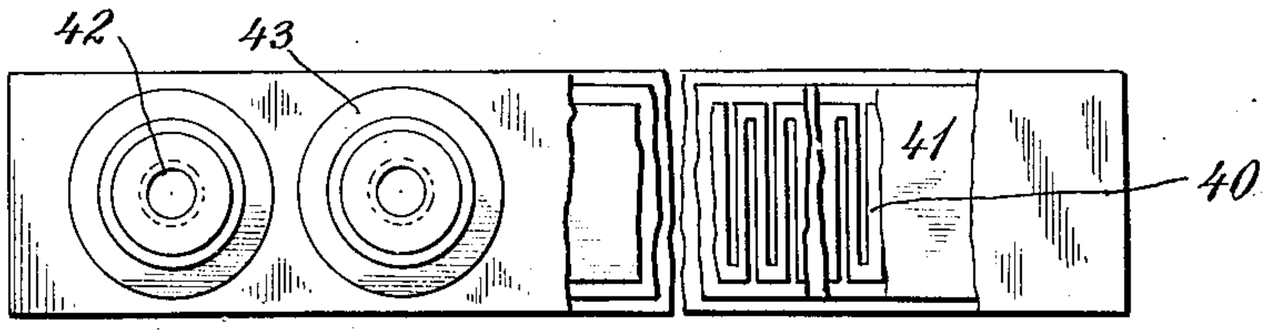
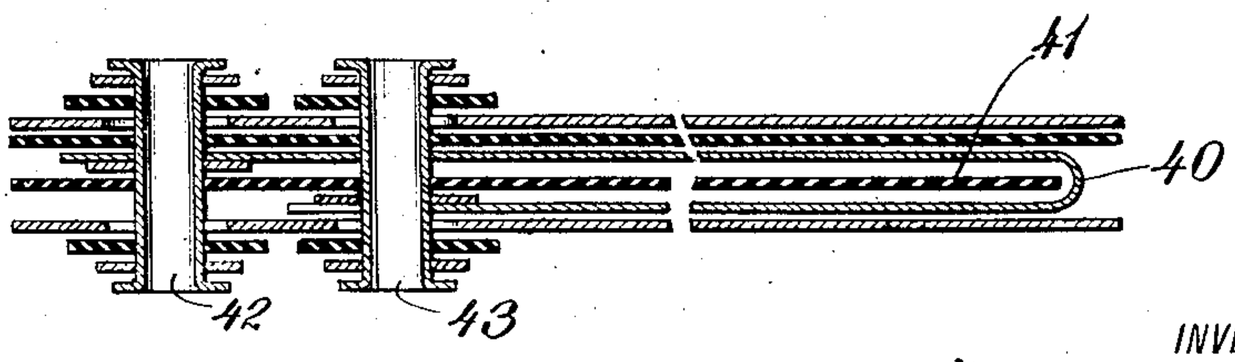


Fig. 8,



WITNESSES

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UNITED STATES PATENT OFFICE.

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TERMINAL FOR ELECTRIC APPARATUS.

1,154,626. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed August 4, 1914. Serial No. 854,932.

To all whom it may concern:

Be it known that I, WILLIAM S. HADAWAY, Jr., a citizen of the United States of America, and a resident of New Rochelle, Westchester county, and State of New York, have invented certain new and useful Improvements in Terminals for Electric Apparatus, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

My invention relates to circuit terminal devices for electric apparatus, and has for one of its objects to provide a simple compact and durable device of this character, which shall be especially adapted for use with flat resistance or heater units.

Other objects and advantages of my invention will be set forth hereinafter, and in order that my invention may be thoroughly understood, I will now proceed to describe the same in the following specification, and then point out the novel features thereof in appended claims.

Referring to the drawings: Figure 1 is a longitudinal section of a portion of a resistance or heater unit provided with a terminal structure arranged and constructed in accordance with my invention. A plan view of the same terminal structure is shown in Fig. 2. Fig. 3 is a view corresponding to Fig. 1, of a modified structure which also embodies my invention, this same structure being shown in transverse section in Fig. 4 and in plan in Fig. 5. Fig. 6 shows a still further modification of my invention and is a longitudinal section of the terminal portion of a heating device, a plurality of terminals being employed to obtain more than one heat. Figs. 7 and 8 are respectively a plan view with certain of the parts broken away to show the interior and a longitudinal section of still another modification of my invention.

Circuit terminals as hitherto constructed have been a source of greater or less difficulty and particularly such as have been used with relatively small and flat resistance or heater units, because they were relatively cumbersome and interfered with the ready introduction of the unit into a narrow opening which would have been ample except for the space taken up by the terminal. The terminal of my present invention not only occupies a very small amount of space and is practically flush with the surface of the heater with which it is employed, but it is also capable of being readily and firmly secured in position.

Referring first to Figs. 1 and 2 of the drawings, the structure here shown comprises a reinforcing plate or bar 10 of metal which is provided with an aperture or hole 11 near one end, a resistance ribbon 12, which is preferably slotted to provide a zigzag path for the electric current as shown in Fig. 2, insulating strips 13 and 14, and a terminal. The insulating strip 14 is interposed between the resistance ribbon 12 and the supporting strip or bar 10, the strips 13 and 14 being located on the respective sides of the ribbon. The end of the resistance ribbon adjacent to the terminal is bent back over the end of the insulating strip 13, as clearly shown in Fig. 1. A suitable hole is provided in the body and end portions of the resistance ribbon and in the insulating strips to receive a hollow rivet 15 of which the terminal is comprised. The ends of this rivet are expanded over metal washers 16 and 17 and an insulating washer 18 separates the washer 17 from the metal supporting strip 10. The metal washer 16 is forced into contact with the overturned end of the resistance ribbon 12. By this means the hollow rivet 15 is in electrical contact with the resistance ribbon and constitutes a circuit terminal. At the same time the rivet serves as a means for rigidly clamping the parts together although it is electrically separated from the supporting strip 10. The strip 10 is intended to be representative of any suitable metal jacket or armor and may be formed as those shown in the other figures of the drawings and more fully described hereinafter.

The cross-sectional view of Fig. 4 illustrates one form of metal armor comprising a sheet metal strip 20 which is folded over a strip 21 so that the two constitute a jacket or sheath within which is located a resistance ribbon 22 and insulating strips 23 therefor. As shown in Figs. 3 and 5 it is not essential that the strip 20 which forms a part of the jacket, be extended beyond the terminal device. The reinforcing strip 21 will be sufficient to support the terminal. The end of the resistance ribbon is not necessarily overturned and may merely be perforated and placed in contact with a metal washer such as the washer 24 in Fig. 3.

Particularly in electric heating apparatus, it is frequently necessary to provide a

plurality of terminals at the same end of the device and one arrangement showing three terminals is shown in Fig. 6 and another arrangement showing two terminals is shown in Figs. 7 and 8. Referring first to the structure of Fig. 6, the metal armor or jacket 25 incloses three conducting strips 26—27—28 which are separated from each other and from the casing by insulating strips 29—30—31—32. A pair of terminals 33—34 are secured to and insulated from the sheet metal armor 25 at one side while a third terminal 35 is secured to and insulated from the armor on the opposite side. The resistance ribbon 26 is connected to the terminal 34; the ribbon 27 to the terminal 33; and the ribbon 28 to the terminal 35. Each of the terminals in this arrangement is slightly different from the hollow rivet of the previous figures and may be more specifically described as a flanged sleeve which is internally threaded to receive a terminal screw 36. At the end opposite the flange the sleeve is riveted over a washer 37 clamping the parts, to which it is secured, together.

My improved terminal structure lends itself particularly well for use as shown in Figs. 7 and 8, where the resistance unit comprises a strip of conducting ribbon 40 which is folded back on itself over a central insulating strip 41, its ends constituting the terminals of the device and being respectively connected to hollow terminal rivets 42—43. These rivets are each similar to the rivet 15 of Fig. 1 and need not be described in detail.

In order to distinguish the insulating parts from the conducting parts and from the metal casing, the structures are necessarily very much enlarged as shown in the drawings, particularly as to their thickness, but actually the thickness of each of the parts is very small so that the whole device when completed is relatively thin and the terminal portion is substantially flush with the walls of the device.

The terminal structures of my invention are not restricted for use with ribbon type resistance elements and may for example, be used with those of the zigzag wire type, the overwound strip type, etc.

Variations in size and arrangement of parts may be effected within the spirit and scope of my invention, and I intend that only such limitations be imposed as are indicated in appended claims.

What I claim is:

1. A terminal structure comprising a flat conducting ribbon having a perforated overturned end, an insulating strip on each side of the conducting ribbon, a sheet metal armor surrounding the insulation and having an aperture opposite the perforated end of the ribbon, and a hollow terminal rivet extending through the overturned end of the ribbon and through the aperture in the armor, insulated from the armor and adapted to hold the parts in position.

2. A terminal structure comprising a conductor having a perforated end, insulation on each side of the conductor, a sheet metal armor surrounding the insulation and having an aperture opposite the perforated end of the conductor, and a hollow terminal rivet extending loosely through the aperture in the armor and arranged to clamp the parts in position and make electrical contact with the conductor.

3. A terminal structure comprising a perforated conductor, a perforated reinforcing member, insulation between the conducting member and the reinforcing member, and a terminal rivet extending through the perforated members, clamping the parts together and in electrical contact only with the conductor.

4. A terminal structure comprising a conducting member, a reinforcing metal member, a flanged internally-threaded sleeve extending through the reinforcing and conducting members and insulated from the reinforcing member, and a terminal screw extending into the sleeve, said sleeve being riveted over on one end to make electrical contact with the conductor and clamp the parts together.

5. A terminal structure comprising a flat conductor having a perforated over-turned end, a reinforcing metal member having an aperture registering with the perforations of the conductor, and insulated from the conductor, and a terminal rivet in close contact with the conductor and extending loosely through the aperture in the reinforcing member and insulated therefrom.

6. A terminal structure comprising a conductor having an over-turned end, a reinforcing metal member insulated from the conductor and a rivet firmly clamping the over-turned end of the conductor to the reinforcing member and constituting a circuit terminal, said terminal rivet being insulated from the said member.

In witness whereof, I have hereunto set my hand in the presence of two subscribing witnesses, this 31st day of July, 1914.

WILLIAM S. HADAWAY, Jr.

Witnesses:
F. Graves,
E. Cohen.