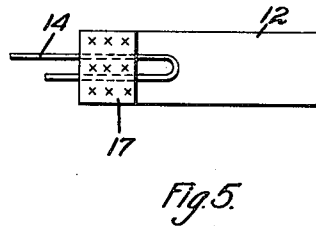
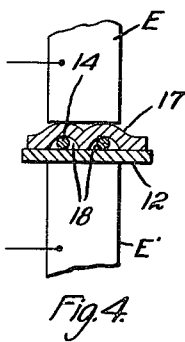
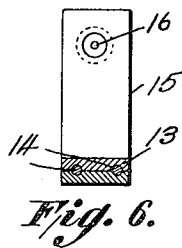
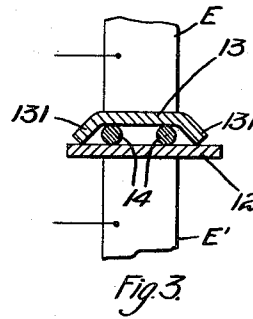
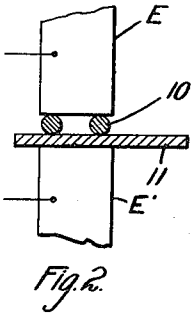
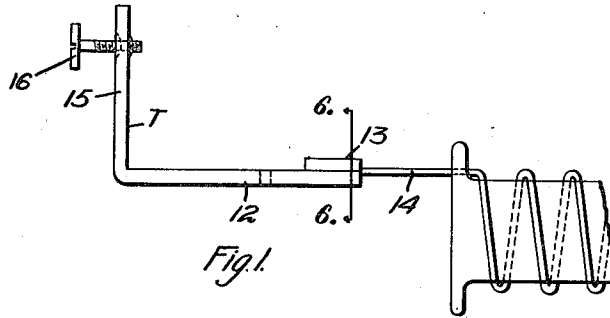


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 TERMINAL STRUCTURE AND METHOD OF MAKING THE SAME.
 APPLICATION FILED MAR. 13, 1918.

1,390,596.

Patented Sept. 13, 1921.



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TERMINAL STRUCTURE AND METHOD OF MAKING THE SAME.

1,390,596.

Specification of Letters Patent. Patented Sept. 13, 1921.

Application filed March 13, 1918. Serial No. 222,164.

To all whom it may concern:

Be it known that I, FRANK THORNTON, JR., a citizen of the United States, and a resident of Wilksburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Terminal Structures and Methods of Making the Same, of which the following is a specification.

My invention relates to a terminal structure and the method of making the same,—the terminal structure being one that is particularly adapted for use on electrical heating devices, such as electric ranges, hot plates, etc., although its use is not restricted to such devices.

The principal object of the invention is to provide a satisfactory method of securing the end of a nickel-chromium resistance coil to a terminal block or binding post. Heretofore, terminal members have been brazed to a nickel-chromium resistance wire and, in certain instances, a narrow nichrome ribbon has been spot-welded to a terminal plate. However, these methods of securing wires to terminal members have not proved wholly satisfactory.

I have discovered that a very satisfactory union may be secured between a nickel-chromium resistance wire and its terminal member by placing the wire between the terminal plate and a second plate and welding the two plates together by applying pressure and a heating electric current, thereby forming a clamp, with the nickel-chromium wire gripped between the two plates of the clamp.

The above and other objects and the novel features of the invention will be apparent from the following description taken in connection with the drawing, in which Figure 1 is a view illustrating a terminal structure embodying my invention, also showing a part of a resistance coil; Fig. 2 is a view illustrating a spot-welding method that is now employed to some extent; Fig. 3 is a view illustrating the method employed in forming the terminal structure; Fig. 4 is a view also illustrating a method embodying my invention, but showing another form of clamping plate that may be employed; Fig. 5 is a plan view of a part of the completed terminal structure, and Fig. 6 is a view in

cross-section of a finished terminal taken on the line VI—VI of Fig. 1.

Referring to the drawing, Fig. 2 illustrates a method heretofore employed in spot-welding ribbons or wires 10 of nickel-chromium alloy to a terminal plate 11 by pressure and heating electric current applied by the electrodes E and E'. The difficulty of spot-welding such alloys is due to two characteristics of this material, viz.: its high specific resistance causes an exceedingly rapid rise in temperature while the current is flowing through the wire, in case the operation is performed in the manner illustrated in Fig. 2, and, the surface resistance, due to the oxid on the nickel-chromium resistance material, causes local overheating and arching under these conditions, so that it is very difficult to avoid burning the nickel-chromium wire away if the current is allowed to pass through it.

In order to avoid the foregoing difficulties, I form a clamp, as illustrated in Fig. 3, one member 12 of which constitutes a portion of the terminal plate or binding post and the other member 13 of which is so shaped as to provide flanges 131 at its edges to space the intermediate part from the opposing face of the terminal plate a sufficient distance to permit the insertion of the resistance conductor or conductors 14 in the said space. With the parts in the position shown in Fig. 3, heating electric current and pressure are simultaneously applied by the electrodes E and E' whereby the two plates 12 and 13 are welded together to constitute a clamp for gripping the nickel-chromium wire. The flanges 131 are in electrical contact with the terminal plate 12 so that, in performing the operation, little, if any of the heating current passes through the wire or wires 14.

As illustrated in Fig. 1, the terminal plate 12 constitutes one arm of a right-angle terminal member T, the other arm 15 of which is provided with the usual, or any preferred, binding screw 16, whereby an electric-current-supply wire may be connected to it. The two plates 12 and 13 that constitute the clamp are preferably of iron or other suitable weldable material.

In order to assure more perfect welding and to simplify the operation somewhat, the

second clamping plate may have substantially the form indicated at 17 in Fig. 4, in which the face that is adjacent the terminal plate 12 is grooved, as at 18, to receive the nickel-chromium conductor or conductors. The plate 17 also has greater areas of electrical contact with the terminal plate 12 and, as in the former construction, the heating electric current applied by the electrodes E and E' passes through the areas of contact at the sides of the wire or wires, causing the metal of the clamps to become heated to a welding temperature, and the pressure of the electrodes forces them together while they are in a soft condition. The wires or conductors are thus clamped between the welded plates and in intimate contact therewith over a sufficient extent of surface to effectively transmit the normal current used in the operation of the heater.

In Fig. 5 is shown a terminal structure in which the conductor 14 has the shape of a hook, the crosses indicating the points welded.

In view of the fact that the heater wire does not carry the welding current, my method may be employed in securing any form of refractory resistance material to its terminal plate or member, the only requirement being that the metals comprising the parts of the terminal clamp shall be of a material that may be welded.

Numerous changes and applications that

are within the spirit of my invention may occur to those skilled in the art and, therefore, I do not wish my invention to be limited to the exact construction here disclosed but only by the scope of the appended claims.

I claim as my invention:

1. A terminal structure for electric heating devices comprising two plates, one of which is provided with means for securing a line wire thereto, and a conductor of resistance material having a portion at the end thereof clamped between said plates, said plates being electrically welded together along their edges.

2. A terminal structure for electric heating devices comprising two plates, and a conductor composed of a nickel-chromium alloy having a portion of its end clamped between said plates, said plates being welded together along their edges on opposite sides of said conductor.

3. A terminal structure for electric heating devices comprising two plates, and a conductor of resistance material having a hook-shaped end clamped between said plates, said plates being welded together at points between and on the outer sides of the parts of said hook-shaped end.

In testimony whereof I have hereunto subscribed my name this 27th day of February, 1918.

FRANK THORNTON, JR.