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L. H. THOMAS

2,665,364

ELECTRICALLY HEATED TOOL

Filed April 16, 1951

FIG.1.

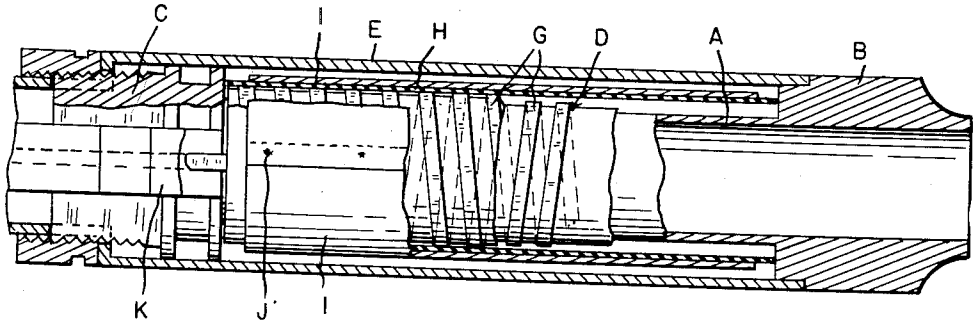


FIG.2.

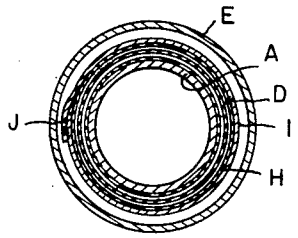
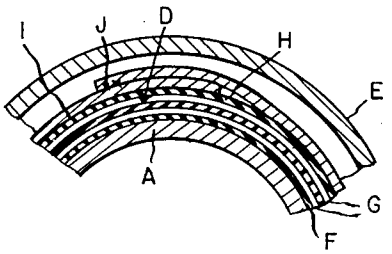


FIG.3.



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ELECTRICALLY HEATED TOOL

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2 Claims. (Cl. 219—22)

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The invention relates to electrically heated tools of that type in which the shank of the tool proper engages a socket member which is surrounded by an electrical heating unit, which in turn is surrounded by an outer casing connected to a handle. It is usual in the construction of the electrical heating units to employ mica as an insulating material for the resistor element which is arranged between the same and the socket and externally between the resistor and the outer casing. Mica while having high dielectric properties in a cold state becomes slightly conductive when heated to the temperature of the resistor, so that there is a small current leakage (in milliamperes) between the resistor and the tool. Where, as is sometimes the case, a number of tools are simultaneously operating upon the same work, the leakage is cumulative and may be sufficient to be highly objectionable. In each tool the leakage is proportional to the extent of area of the electrically charged element in contact with the insulator sheet and the conductive element on the opposite side thereof. Thus it is not only the leakage between the resistor and the socket member within the same but also the external leakage between the resistor and the member for clamping the unit to the socket, which latter as usually constructed is electrically connected to the tool.

It is the object of the invention to obtain a construction which minimizes the amount of current leakage between the heating element and the tool while in operation.

It is a further object to obtain a construction in which the unit is firmly clamped to the socket by means easily applied and which is disconnected electrically from any other portion of the structure.

With these objects in view the invention consists in the construction as hereinafter set forth.

In the drawings:

Fig. 1 is a central longitudinal section partly in elevation through the socket member and the heating element of an electrically heated tool;

Fig. 2 is a cross section thereof; and

Fig. 3 is an enlarged portion of Fig. 2 showing the welded joint of the wrapper.

While my improved construction of tool may be used for any purpose, I will specifically illustrate and describe the same as intended for use as a soldering iron. As shown A is a cylindrical socket member adapted to receive the shank of a soldering iron tip (not shown). This socket is provided at its forward and rear ends with head portions, respectively, B and C between

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which is arranged an electrical heating unit D and with an outer casing E surrounding said unit and heads. As above stated the heating unit is formed by a mica insulator sheet F wound about the outer surface of the cylinder with a resistor element G, preferably a ribbon helically wound upon the insulation in one or a plurality of layers also insulated by mica sheets. It is desirable to bind the element firmly against the socket for good thermal conductivity, and this has sometimes been accomplished by winding wire around the outer insulating sheet and securing the ends thereof to the heads. With such a construction current leakage will occur not only between the resistor and the socket within the same but also between the resistor and the surrounding clamping means, so that the total volume of leakage is substantially double that directly between the resistor and the socket. Furthermore this method of securing the unit to the socket is one involving considerable labor and expense.

To simplify the construction, reduce the cost of manufacture and eliminate this double leakage I have devised the following construction. After winding the resistor upon the mica cover of the socket in one or a plurality of layers, an outer sheet of mica insulation H is wound about these layers. Upon this is placed a wrapper I of sheet metal and preferably of a non-corrodable material such as stainless steel. The wrapper is formed from a blank of sufficient length so that when bent into annular form its longitudinal edges will slightly overlap each other when the wrapper is tightly wound to apply radial compression to the unit. The contact edges are then secured to each other by spot welding as indicated at J to hold them from separation and releasing the pressure upon the unit. The axial length of the wrapper is less than the space between the heads B and C so as to be spaced from the latter while the mica insulation extends the whole distance between said heads. Thus the wrapper will be insulated from the heads B and C and also from the outer casing E, which is radially spaced therefrom and any current leakage between the resistor and the wrapper can only place a charge on the latter with no conductive element between the same and the conductive parts of the tool. The result is a diminished volume of current leakage from the resistor to the tool tip in contact with the work, which is highly desirable. Also the cost of applying the wrapper is less than that of the usual clamping means.

The heating unit is provided with suitable electrical connections to the resistor extending to the handle and the flexible service conductors, but as these form no part of the instant construction they are not illustrated. I have, however, shown an insulator block K secured in a recess in the rear head C and through which the electrical terminals pass.

What I claim as my invention is:

1. In an electrically heated tool, a socket for receiving the shank of the tool proper and having radially extending heads at opposite ends thereof, an electrical heating unit surrounding said socket between and spaced from said heads, sheet mica insulating material for said unit extending the full distance between said heads, a sheet metal wrapper of substantially the length of said sheet insulating material surrounding and clamping said unit on said socket, the opposite axially extending edge portions thereof being welded to each other and the ends spaced slightly from said heads, and an external casing mounted on said heads spaced from said wrapper to be insulated therefrom.

2. The construction as in claim 1 in which the heating unit is formed in a plurality of layers, each having inner and outer mica sheet insulation, and a helically wound resistor element therebetween, all of said layers being clamped and pressed radially against said socket by said wrapper and retained by the weld.

LAURENCE H. THOMAS.

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