Oct. 24, 1950 E. F. MARIK 2,526,888

HEATED FORMING TOOL

Filed May 6, 1949

FIG. 1

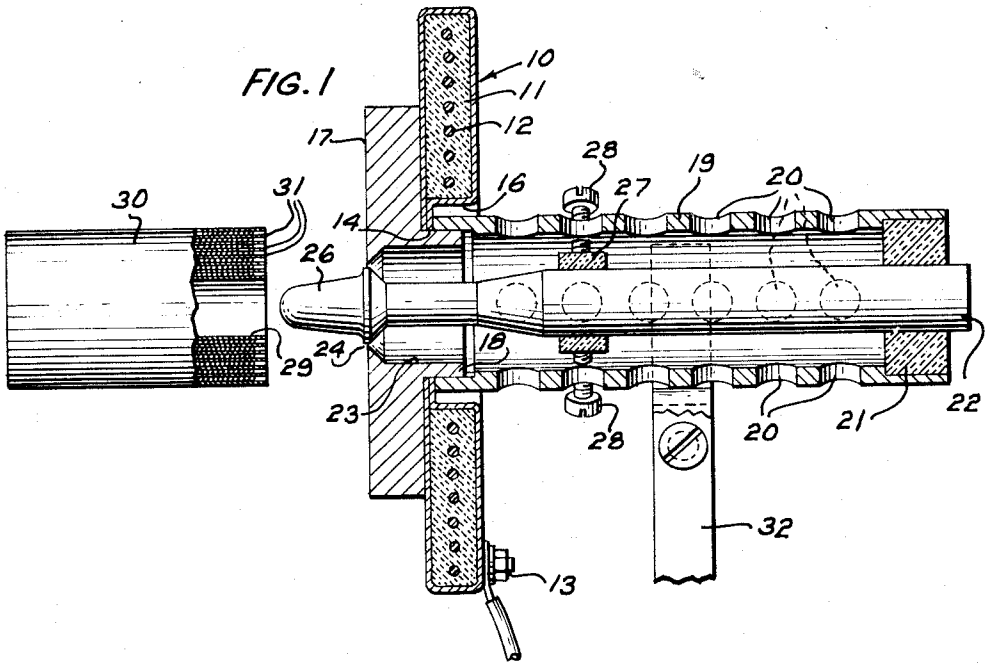


FIG. 3

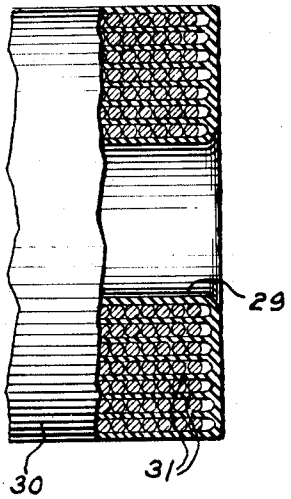
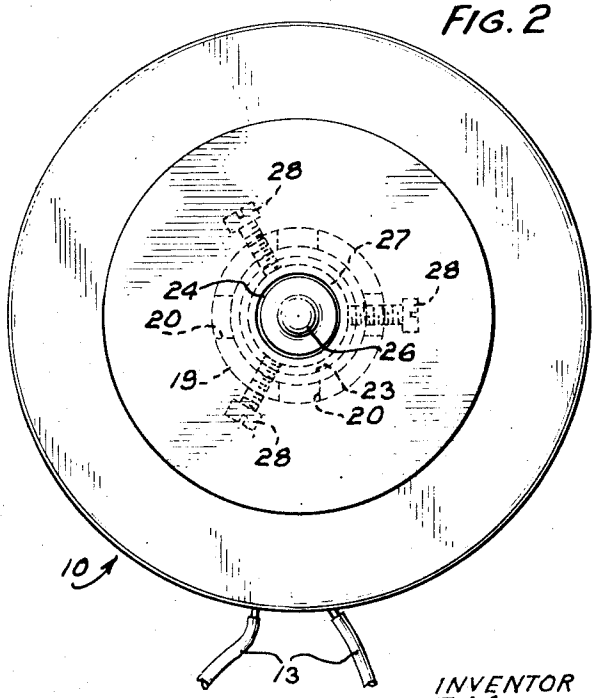


FIG. 2



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HEATED FORMING TOOL

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6 Claims. (Cl. 219—19)

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This invention relates to heated forming tools and more particularly to an electrically heated tool for sealing the ends of fusible interleaving material surrounding a central aperture of an electrical coil and simultaneously flaring an end of such aperture.

The primary object of this invention is to provide a simple and efficient tool for effecting the simultaneous sealing and flaring of the end portion and central aperture, respectively, of an electrical coil.

In accordance with the above object, there is provided an apparatus designed for sealing the protruding ends of heat-fusible interleaving sheets wound between layers of windings of an electrical coil which has been wound on a mandrel to have a central aperture and simultaneously flaring the wall of such aperture at one end thereof for facilitating the latter insertion of the coil core. In the apparatus, there is provided an annular heated plate which is fixed to and coaxial with one end of a perforated tube having a flaring tool support fixed to its opposite end and extending through the entire tube and heated plate to carry a flaring tool in position to project beyond the annular heating plate but out of contact therewith. Thus the heated plate may be heated to a relatively high temperature and the heat from the plate will be conducted through the tube to the tool support and finally back at a lower temperature to the tip of the flaring tool due to the dissipation of heat at the tube and tool support. By simply pressing one end of a coil against the exposed annular surface of the heated plate, the flaring tool will enter the central aperture of the coil, the interleaving heat-fusible sheets will be fused to each other and simultaneously a flared entrance to the central core aperture of the coil will be formed to insure a free entrance of the core.

A complete understanding of the invention will be had by reference to the following detailed description taken in conjunction with the accompanying drawing, in which

Fig. 1 is a central, longitudinal section, partly in elevation, of an electrically heated tool embodying the features of the invention and showing a coil, in partial longitudinal section, about to be associated with the tool for treatment thereby;

Fig. 2 is an end view of the left end of the tool shown in Fig. 1; and

Fig. 3 is a view of the coil similar to that shown in Fig. 1, on an enlarged scale, but after treatment by the tool.

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Referring now to the drawing in detail and particularly to Fig. 1, an electrical heating member is indicated in general at 10, which comprises an annular encased pressed or molded disk 11 of suitable heat-conducting material having embedded therein a resistance element 12, the heating member 10 supporting terminals 13 connected to opposite ends of the resistance element for supplying current from a suitable source of current to heat the element. The heating member 10 is formed with a central aperture 14, which is of enlarged diameter, indicated at 16, for the greater portion of its length extending inwardly from the right face of the disk. Secured by a heat-resistant cement or otherwise against the left face (Fig. 1) of the member 10 to absorb heat therefrom is a metallic annular heating plate 17 having a reduced central portion 18, the diameter of which closely fits the smaller diameter of the aperture 14 in the heating member 10. Extending freely into the enlarged diameter 16 of the aperture 14 in the heating member 10, at its right side, is a horizontally extending tube 19, provided with a slightly enlarged inner diameter at its left end, which is closely fitted in attached relation to the outer diameter of the reduced portion 18 of the plate 17. It will be observed that the enlarged diameter 16 of the central aperture 14 in the heating member 10 serves to space the peripheral surface of the tube 19 therefrom for an appreciable length of the central aperture 14 in the heating member 10, thus minimizing the conduction of heat from the member 10 to the tube 19. The tube 19 is formed with a plurality of perforations 20 in order to ventilate its interior.

At its right end, the tube 19 is also provided with a slightly enlarged inner diameter, in which is closely fitted, in attached relation, a collar 21 of thermal insulating material, in the aperture of which is closely fitted the right end of a shouldered flaring tool shank portion 22, which extends toward the left and through a central aperture 23 of the annular heating plate 17, but without contacting the heating plate. As indicated at 24, the aperture 23 of the heating plate 17 is tapered inwardly toward the outer face of the heating plate so that it will closely surround the flaring tool shank portion 22 in this area. This arrangement insures that the entire annular end face of a coil will be subjected to the fusing heat from the heating plate and thus prevent unfused areas of the coil end face. Attached to or formed on the

outer or left end of the flaring tool shank portion 22 is a flaring tip 26. Surrounding the flaring tool shank portion 22, adjacent its inner or right end, is a collar 27 of thermal insulating material, which is engaged at three equally spaced points about its periphery by adjustable screws 28, which are threaded through the wall of the tube 19. By manipulating the screws 28, the flaring tip 26 may be maintained concentric with but spaced from the central aperture 23 of the heating plate 17 to minimize the transfer of heat from the plate to the flaring tip. The flaring tip 26 is arranged for entrance into a central core-receiving aperture 29 of a coil 30 (Figs. 1 and 3) simultaneously with the operation of pressing the coil end face against the outer face of the heating plate 17, during which extending ends of interleaving sheets 31 of heat-fusible material are fused and sealed. The supporting and spacing of the flaring tool shank portion 22 by means of the insulating collars 21 and 27 and screws 28, together with the ventilation of the tube 19 by means of its perforations 20 and the spacing of the tube from the heating member 18 adjacent its attachment to the heating plate 17 serves to effectively dissipate a great amount of heat from being conducted to the flaring tip 26 from the heating member 18 so that, while the heating plate 17 will be heated to a relatively high temperature, the flaring tip will be heated to a desired but much lower temperature. The tube 19 intermediate its length, and from which is supported the heating member 18, heating plate 17 and flaring tool shank portion 22, is fixed to a forked bracket 32, shown fragmentarily, which may be mounted on a work bench or other support.

In using the sealing and flaring tool and assuming that the plate 17 has been heated to a desired temperature, a coil 30, with the fusible interleaving sheets 31 extending from an end face, is simply moved toward the flaring tip 26 with the central core-receiving aperture 29 of the coil aligned with the tip and pressed into engagement with the outer exposed surface of the heating plate, thus simultaneously fusing or sealing the ends of the interleaving sheets 31 to each other and providing a suitable flare to the end of the aperture of the coil for receiving the coil core.

It is to be understood that the above-described arrangements are merely illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A tool for fusing the ends of heat-fusible material wound between layers of windings in an electrical coil and simultaneously therewith flaring an end of the central core-receiving aperture of the coil comprising an annular heating element, a perforated tube fixed to said element along its central opening and coaxial therewith, a flaring tool support mounted within said tube and supported at the end thereof removed from the annular element by a surrounding collar of thermal insulating material fitted within the base of said tube, said support, at its outer end, being spaced from said heating element, and a flaring tool on the outer end of said support spaced from and extending through the opening of the heating element for engagement with the central aperture of a coil, the interleaving material of which is to be fused.

2. A tool for fusing the ends of heat-fusible material wound between layers of windings in an electrical coil and simultaneously therewith flaring an end of the central core-receiving aperture of the coil comprising an apertured heating member, a perforated hollow member attached at one end to said heating member and coaxial with the aperture thereof, and a flaring tool supported within said hollow member at its inner end by a collar of thermal insulating material to the opposite end of said hollow member and extending at its outer end through the aperture of said heating member and out of contact therewith arranged for entrance into the central aperture of the coil to flare the coil aperture simultaneously with the fusing of the interleaving material of the coil by contact with the heating member.

3. A tool for fusing the ends of heat-fusible material wound between layers of windings in an electrical coil and simultaneously therewith flaring an end of the central core-receiving aperture of the coil comprising an electrical heating element encased in an annular member, terminals mounted on said member for supplying current to said heating element, an annular heating plate contacting one side face of said member to be heated thereby, a perforated tube attached at one end to said plate and coaxial with the aperture thereof, and a flaring tool concentrically arranged within and supported at its inner end by a collar of thermal insulating material to the opposite end of said tube and extending at its outer end through the aperture of said plate and out of contact therewith arranged for entrance into the central aperture of the coil to flare the coil aperture simultaneously with the fusing of the interleaving material of the coil by contact with the heating plate.

4. A tool for fusing the ends of heat-fusible material wound between layers of windings in an electrical coil and simultaneously therewith flaring an end of the central core-receiving aperture of the coil comprising an annular member enclosing an electrical resistance heating element, terminals mounted on said member for supplying current to said heating element, an annular heating plate in heat-conducting contact at one side face with an opposed face of said member for heating thereby, a tube perforated to ventilate the interior thereof attached at one end to said plate and coaxial with the aperture thereof, a heat-dissipating member concentrically arranged within and attached at its inner end by a collar of thermal insulating material to the opposite end of said tube and at its outer end within the aperture of said plate and out of contact therewith, and a flaring tool on the outer end of said heat-dissipating member arranged for entrance into the central aperture of the coil to flare the coil aperture simultaneously with the fusing of the interleaving material of the coil by contact with the heating plate.

5. A tool for fusing the ends of heat-fusible material wound between layers of windings in an electrical coil and simultaneously therewith flaring an end of the central core-receiving aperture of the coil comprising an annular heating member, a tube perforated to ventilate the interior thereof attached at one end to said heating member and coaxial with the aperture thereof, a heat-dissipating member concentrically arranged within and attached at its inner end by a collar of thermal insulating material to the opposite end of said tube, the outer end of said heat-dissipating member projecting through the aper-

ture of said heating member and completely spaced therefrom and terminating in a flared portion arranged for entrance into the central aperture of the coil to flare the coil aperture simultaneously with the fusing of the interleaving material of the coil by contact with the heating element, and means attached to said tube for supporting the same.

6. A tool for fusing the ends of heat-fusible material wound between layers of windings in an electrical coil and simultaneously therewith flaring an end of the central core-receiving aperture of the coil comprising an annular heating element, a perforated tube attached to said element at its central opening and coaxial therewith, a flaring tool support mounted within said tube and supported thereon at the end thereof removed from the annular element, a collar of thermal insulating material surrounding and supporting said end of the flaring tool support within the tube, the opposite end of said support closely surrounding the wall of the central aperture of said heating member and completely spaced therefrom and terminating in a flared portion arranged for entrance into the central aperture of the coil to flare the coil aperture simultaneously with the fusing of the interleaving material of the coil by contact with the heating element, and means attached to said tube for supporting the same.

6. A tool for fusing the ends of heat-fusible material wound between layers of windings in an electrical coil and simultaneously therewith flaring an end of the central core-receiving aperture of the coil comprising an annular heating element, a perforated tube attached to said element at its central opening and coaxial therewith, a flaring tool support mounted within said tube and supported thereon at the end thereof removed from the annular element, a collar of thermal insulating material surrounding and supporting said end of the flaring tool support within the tube, the opposite end of said support closely surrounding the wall of the central aperture of the heating element, a second collar of thermal insulating material surrounding said flaring tool support intermediate its length and spaced from the tube, a flaring tool on the outer end of said support for engagement with the central aperture of a coil, the interleaving material of which is to be fused, and members adjustably mounted in the wall of the tube and engageable with said second collar for maintaining the outer end of the flaring tool support concentric with the central aperture of the heating element.

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