

[54] **UNITARY INSULATION AND TERMINATION MEMBER**

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[51] Int. Cl. **H02f 27/30**

[58] Field of Search **336/192, 198, 208, 209; 29/602, 605, 624, 628, 621; 339/217; 174/138 F**

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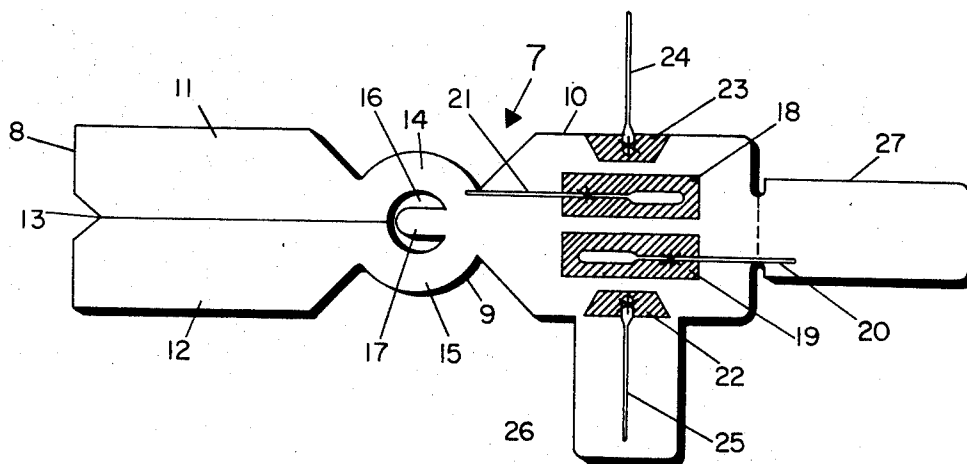
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[57] **ABSTRACT**

An improved means for providing coil wire terminations in electrical coils used in relays and the like, which utilizes a unitary insulation member carrying electrically conductive terminal means and captivating cinches which secure the winding terminations and portions of the insulation without need of adhesive tapes, yarns or other additional assembly securing elements.

9 Claims, 4 Drawing Figures



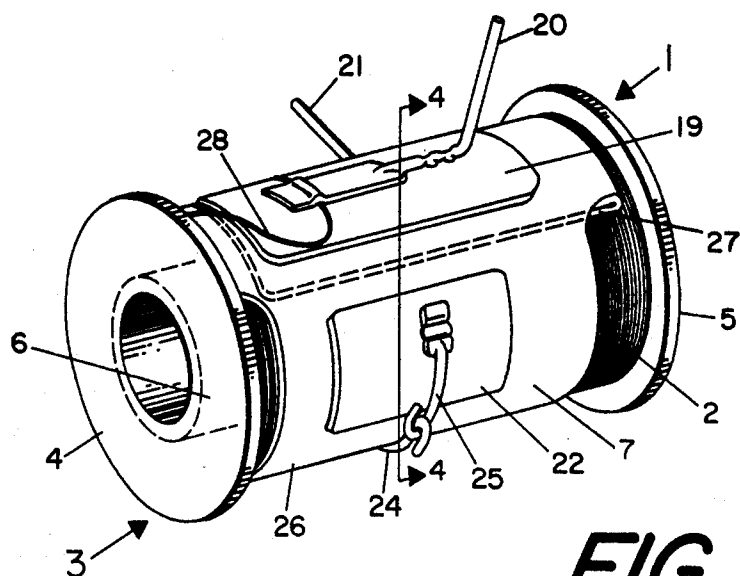


FIG. 1

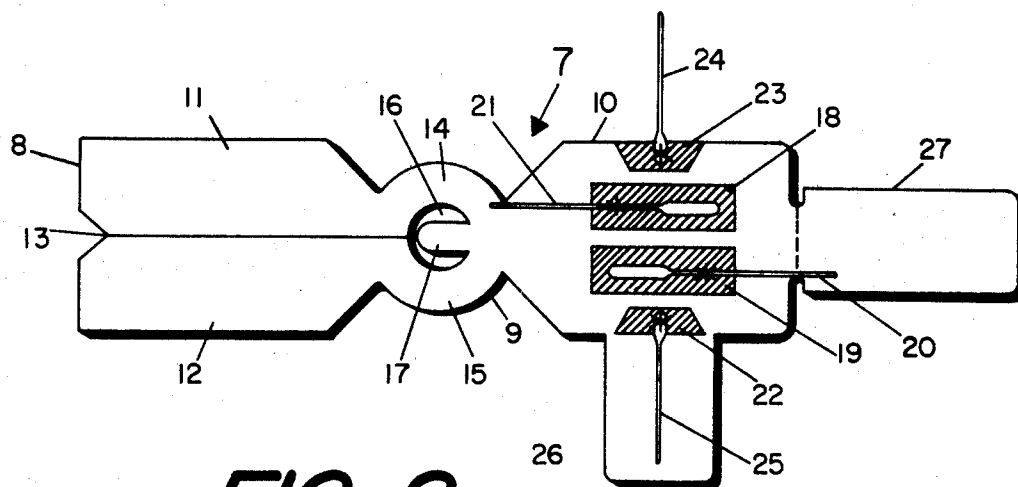


FIG. 2

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FIG. 3

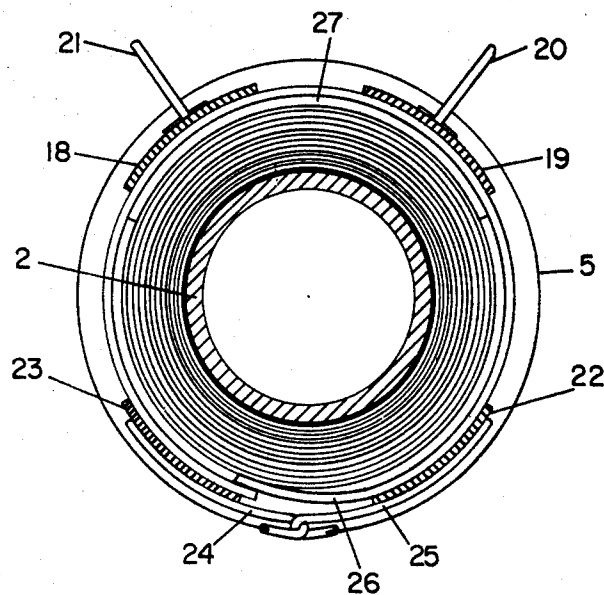
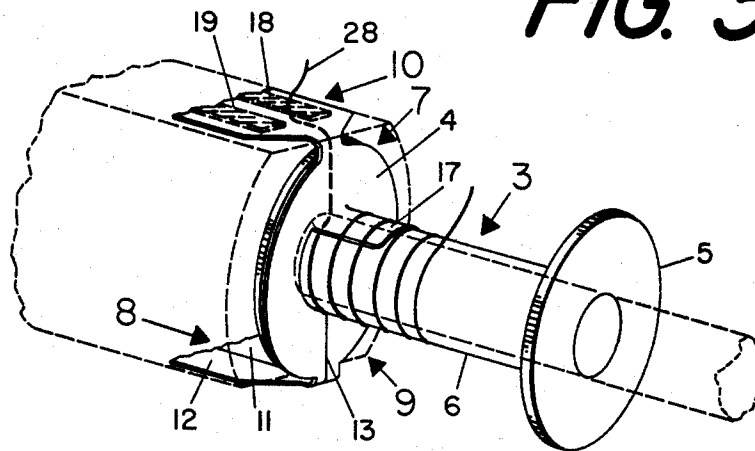


FIG. 4

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UNITARY INSULATION AND TERMINATION MEMBER

BACKGROUND OF THE INVENTION

The present invention relates to new and improved coil insulation and termination assemblies and more particularly, to a unitary insulation and termination member as used in relay coil packages.

Heretofore, relay coil packages have utilized numerous pieces of insulation material to insure proper physical positioning and satisfactory electrical operation of the relay coil. These components are generally interconnected by the use of various adhesives, tapes, or yarns during a coil assembly operation which, when done manually, takes a considerable amount of time. While the use of numerous components and interconnecting tapes or adhesives may have been acceptable for use with large size relay coil designs, the newer coil designs, with their very small over-all dimensions, cannot utilize such elements because they would be far too bulky to be incorporated in small coil designs. Furthermore, manual assembly of these small coil packages becomes an extremely meticulous and tedious process.

SUMMARY OF THE INVENTION

Accordingly, it is the object of the present invention to provide a unitary coil insulation and termination member which may be utilized advantageously in both large and small relay coil package designs.

It is a further object of the present invention to provide a unitary coil insulation and termination member which may be easily assembled by an operator during the relay coil package assembly operation.

Briefly stated, in accordance with one aspect of the present invention, there is provided a relay coil package in which a coil is held upon a coil support means by a unitary coil insulation and termination member. The unitary coil insulation and termination member has a first, second, and third segment or portion. The first segment has a split portion for accepting the coil support means while the second segment has both means to mount the unitary coil insulation and termination member to the coil support means and means to anchor the member with respect to the coil support means projecting therefrom. The third segment includes terminal means for connection to the coil and means to retain and conform the unitary coil insulation and termination member about the coil.

BRIEF DESCRIPTION OF THE DRAWINGS

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as the present invention, it is believed that the invention will be better understood from the following description, taken in connection with the accompanying drawings in which:

FIG. 1 is an isometric view of the assembled relay coil package;

FIG. 2 is a top view of the unitary coil insulation and termination member;

FIG. 3 is an isometric view of the unitary coil insulation and termination member with the coil support means situated therein; and

FIG. 4 is a sectional view taken along line 4—4 in FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, and more particularly to FIG. 1, in accordance with the present invention, a relay coil package 1 includes a coil 2, means to support the coil, such as a spool 3, having a first end plate 4, a second end plate 5, a middle section 6, and a unitary coil insulation and termination member 7, which secures the coil to the coil support means. The member comprises a flexible sheet of insulating material.

As is best illustrated in FIG. 2, the unitary coil insulation and termination member comprises a first segment 8, a second

segment 9, and a third segment 10. The first segment is formed with two leg portions, 11 and 12, which form a split 13 therebetween for accepting the middle portion 6 of the coil support means. Each of the legs of the first segment respectively extends to a common boundary with corresponding symmetrical portions 14 and 15 of the second segment of the coil insulation and termination member. The symmetrical portions 14 and 15 together define an opening 16 therein for receiving the middle portion 6 of the coil support means. An anchoring means 17, such as a tab member, extends from the second portion and prevents movement of the unitary coil insulation and termination member with respect to the coil support means when the coil is wound about the middle section of the coil support means. The second segment of the coil insulation and termination assembly at its other extremity extends to a common boundary with a third segment which both extends transversely from the second segment and is positioned asymmetrically thereto. Electrical conductive pads 18 and 19, which connect to terminal wires 20 and 21, are situated thereon. Also situated on the third segment are conductive pads 22 and 23, which connect to lead or cinch wires 24 and 25. The lead wires are twisted together to retain and conform the unitary coil insulation and termination member about the coil when the coil relay package is assembled. Extending transversely from the third segment is a fourth electrical insulating tab 26 which, when the relay coil package is assembled, extends from pad 22 toward the oppositely situated pad 23 to provide protection for the coil as lead wires 24 and 25 are twisted together. A fifth electrical insulating segment 27 appropriately may be included within the unitary coil insulation and termination member. If it is desired to include a fifth segment, such segment extends longitudinally from the third segment of the unitary coil insulation and termination member and provides increased insulation between the underside of pads 18, 19, 22 and 23 and the wound coil 2.

As is best illustrated in FIG. 3, to assemble the relay coil package, the middle portion 6 of the coil holding means 3 is placed through the slit 13 of the first segment of the unitary coil insulation and termination member and received within opening 16 of the second segment. The first and third segments of the coil insulation and termination member are bent back over the end plate 4 of the coil support means to help stabilize the package during subsequent assembly operations. The anchoring means, such as tab 17, is bent perpendicular to the unitary member 7 and placed substantially in contact with the middle portion 6 of the coil support means. The coil wire is then wound about the middle portion of the coil support means. The first several turns of the coil wire around the middle portion of the coil support means retain the anchoring means 17 in the desired position and prevent the unitary member 7 from moving during subsequent assembly operations. The starting lead 28 (shown in FIG. 3) and the terminating lead (which, for clarity, is not shown in any of the drawings) of the coil are made long enough so that they may ultimately be connected to corresponding terminal wires 20 and 21 of the unitary coil insulation and termination member. After the coil wire has been fully wound about the middle portion of the spool, the bent part of the first segment 8 of the unitary coil insulation and termination member, which extends past the outer diameter of the first end plate 4 of the coil support means, is cut away. When the coil insulation and termination member is utilized with small relay coil designs, the bent part of the first segment 8 would not be removed until subsequent assembly operations were completed so as to aid the anchoring means in preventing movement of the member 7. The terminal wires 20 and 21 and lead wires 24 and 25 are then welded to their corresponding pads. Once the terminal and lead wires are attached to their respective pads, the third segment 10 of the unitary coil insulation and termination member is bent into contact with the outer periphery of the wound coil. If the fifth insulating segment 27 is used, it would be bent under the pads of the third segment to increase the insulation between the coil and the back of the pads prior to the

time when the third segment was bent over the wound coil. The third segment is then made to substantially conform to the outer periphery of the wound coil and fourth insulating tab 26 is positioned under the coil toward oppositely placed pad 23. Once the third segment is substantially conforming to the outer periphery of the wound coil, as is best seen in FIGS. 3 and 4, the lead or cinch wires 24 and 25 are crossed, applying tension along the axis of each wire, then twisted together to maintain the unitary coil by a cinching action insulation and termination member in position about the coil. While a single twist is suitable for retaining the unitary coil insulation and termination assembly about a small relay coil, several twists of wire or even a suitable clamp could be utilized with a larger relay coil package. The terminal leads are then welded to the start and terminating wires of the coil to provide the connection from the coil to the terminal leads. The entire package may then be further insulated by depositing an overcoat finish over the assembly, by any known and suitable means, and a chemical stripper is applied to the portions of the terminal wires which are external to the coil assembly to remove any insulation which may have been deposited thereon.

While the invention has been described with particular reference to the construction shown in the drawings, it is understood that further modification may be made without departing from the true spirit and scope of the invention, which is defined by the claims appended hereto.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. An arrangement for interconnecting wires from a coil carried upon a flanged coil support and external connections comprising a member formed of flexible sheet insulating material, said member comprising first, second and third portions, said second portion containing an opening enclosed by said flexible sheet insulating material with said first and second portions containing a normally closed slit extending from said first portion into said second portion and to said opening, said slit adapted to be opened during passage of the member over the coil support so as to position the second portion of said member adjacent to the flanged portion of the coil support with the support located within said opening, said third portion adapted to be laid over the coil after it has been wound on said support and including electrically conductive pads with terminal means providing a conductive region for interconnecting said coil wires and external connections.

2. An arrangement according to claim 1 wherein said second portion includes a projecting portion for securing said member from rotary movement with respect to said coil support when wire is wound over said projection and coil support form.

3. An arrangement as defined in claim 1 further comprising a pair of electrically conductive pads mounted on opposite sides of said terminal means and electrically isolated therefrom, cinch wires electrically bonded to said electrically conductive pads, said member further comprising a fourth portion formed of insulating material extending laterally from said third portion and adjacent one of said electrically conductive pads, said fourth portion adapted for underlaying at least a part of said third portion when said member is mounted on said coil support, said cinch wires being formed of twistable conductive material for securing by a cinching action the third portion to said coil support, said fourth portion providing electrical insulation between said coil wound on said coil support and said cinch wires in their securing position.

4. An arrangement as defined in claim 3 further comprising a fifth portion extending longitudinally from said third portion and flexible enough to be folded under said third portion to provide added insulation under said terminal means of said third portion.

5. A unitary insulation and termination arrangement as defined in claim 1 wherein said second portion opening is in the form of a substantially arcuate opening such as to insure close conformance to the shape of the coil support form and said slit extends from said opening to the end of said first portion.

6. A method of interconnecting wires from a coil carried on a flanged coil support and external connections employing a flexible sheet insulation member wherein said member comprises first, second and third portions, said second portion being intermediate said first and third portions and containing an opening for mounting said member on said coil support, said first and second portions containing a slit extending from said first portion into said second portion and to said opening to facilitate passage of the member so as to position the second portion of the member adjacent to the flanged portion of the coil support and on the coil support form, said third portion including electrically conductive terminal means for connection to said coil wires and external connections, comprising sliding the second portion of said member with the aid of said first portion through the slit and opening onto the coil support and adjacent to said flanged portion of the coil support, draping the first and third portions over the flanged portion of said coil support away from the area in which wire is to be wound on the coil support, winding wire on the coil support to provide a coil, folding said third portion back onto the wound coil, electrically connecting said wire of said coil, the external connection and said electrically conductive terminal means together.

7. A method of interconnecting wires from a coil carried on a flanged coil support and external connections employing a flexible sheet insulation member wherein said member comprises first, second and third portions, said second portion being intermediate said first and third portions and containing an opening for mounting said member on said coil support, said first and second portions containing a slit extending from said first portion into said second portion and to said opening to facilitate passage of the member so as to position the second portion of the member adjacent to the flanged portion of the coil support and on the coil support form, said third portion including electrically conductive terminal means for connection to said coil wires and external connections, said second portion including a projecting portion for securing said member from rotary movement with respect to said coil support, said third portion including electrically conductive terminal-like means mounted on each side of said terminal means, said member further including a fourth portion extending laterally from said third portion, comprising sliding the second portion of said member adjacent said flanged portion of the coil support through the slit and opening onto the coil support such that the projecting portion of said second portion lies along the axis of the coil support, draping the first and third portions over the flanged portion of said coil support away from the area in which wire is to be wound on the coil support, winding wire on the coil support to provide a coil, folding said third portion back onto the wound coil, electrically connecting said wire of said coil, the external connection and said electrically conductive terminal means together, electrically connecting cinch wires to said electrically conductive terminal-like means, wrapping said fourth portion around said wound coil and interlocking said cinch wires together to secure the third portion to said wound coil.

8. A method for interconnecting wires from a coil carried on a flanged coil bobbin to external connections comprising sliding a portion of said coil bobbin through an opening contained in one portion of a flexible sheet of insulation material which carries electrically conductive terminal means, winding wire on the coil bobbin to provide a coil, spreading another portion of said insulation material onto the wound coil, and electrically connecting said wire of said coil to said electrically conductive terminal means which provide physically stronger electrical extensions of said coil wire.

9. A method for interconnecting wires from a coil carried on a flanged coil bobbin to external connections employing a flexible sheet of insulation material which includes a first portion having a slitted opening, a second portion supporting separate electrically conductive terminal means and electrically conductive pads, and a third portion comprising sliding a portion of said coil bobbin through said opening and positioning said material near one end of said bobbin, winding wire on

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said coil bobbin to provide a coil, spreading said second portion of said insulation material onto the surface of the wound coil with the terminal means and pads positioned externally away from said coil, conductively connecting said wire of said coil to said electrically conductive terminal means, conductively connecting cinch wires to said pads, wrapping said third

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portion of said material around said wound coil and interlocking said cinch wires together around said wrapped portion of material to secure said insulation material to said wound coil.

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