United States Patent [19]

Roslin

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[54] INDUCTOR BOBBIN WITH TERMINALS

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[21] Appl. No.: **210,441**

[52] **U.S. Cl.** **336/192**, 336/198

[51] **Int. Cl.** **H01f 15/10**

[58] **Field of Search** 336/198, 192, 208, 336/65

[56] **References Cited**

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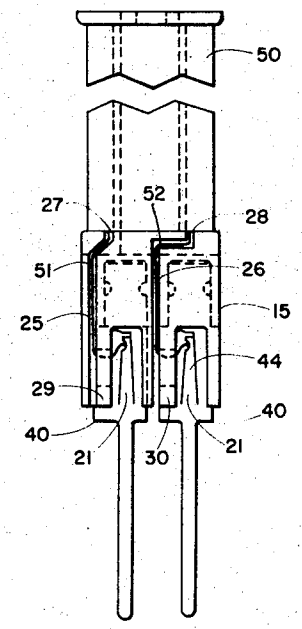
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Primary Examiner—E. A. Goldberg
Attorney—Sidney T. Jelly

[57] **ABSTRACT**

Coil winding form in which the flange at one end of the body portion has an extension. In the arrangement described the extension extends away from the body portion, but in line with it. Slots in the end of the extension remote from the body portion receive terminals which are pushed in and gripped by the slot sides. Grooves are formed up the flange face and along the surface of the extension, the ends of the grooves adjacent to the terminal slots connected to these slots by transverse passages. In position the tab of each terminal can extend upward from the slot, clear of the surface of the extension for soldering of the wire lead from the coil. On pushing the tap down the wire is not stretched as it passed along the grooves, through the transverse passages to the slots adjacent the position for attachment to the tab. No stresses are caused in the wire, nor is it pushed against the turns of wire in the coil.

1 Claim, 9 Drawing Figures



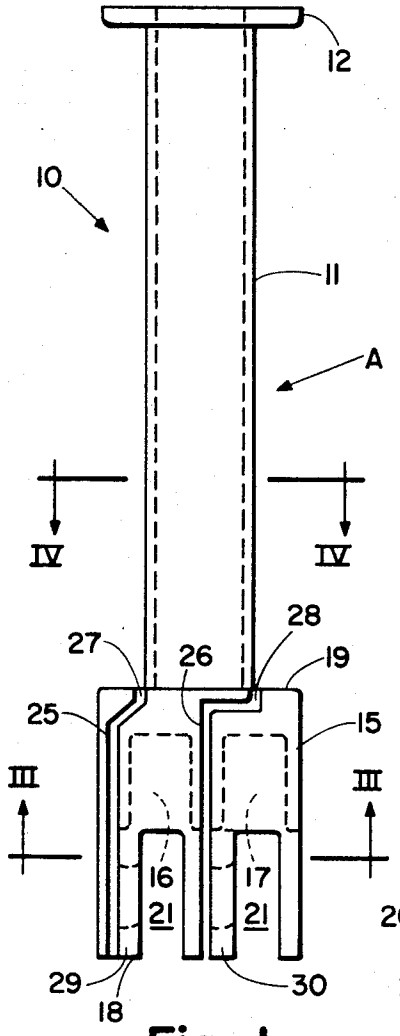


Fig. 1

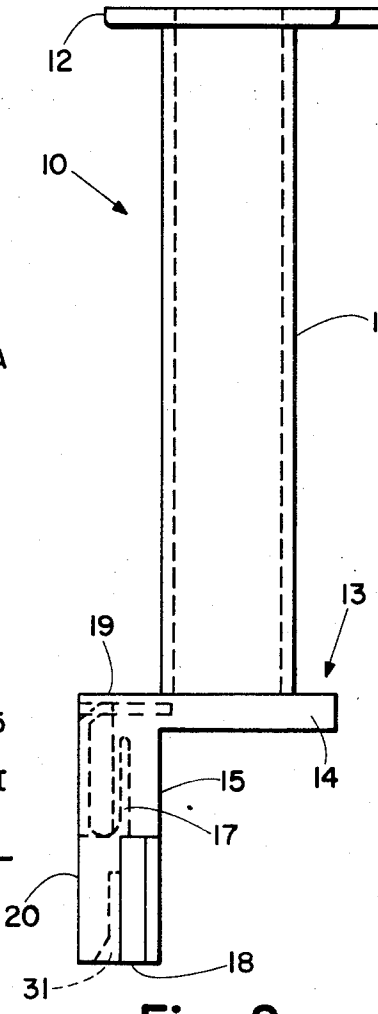


Fig. 2

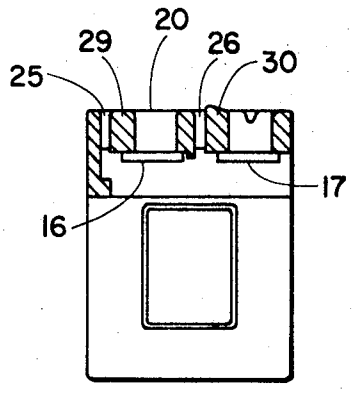


Fig. 3

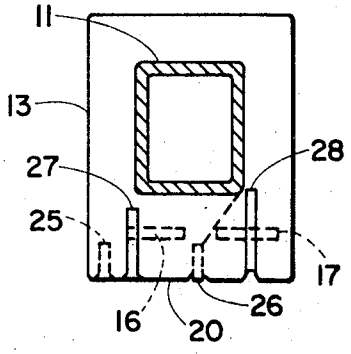


Fig. 4

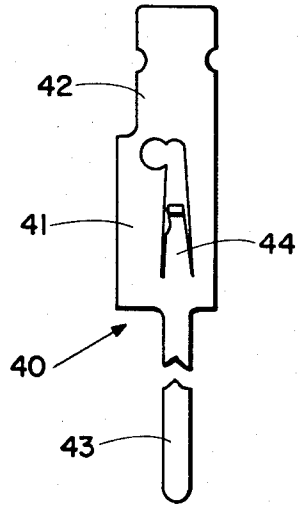


Fig. 5

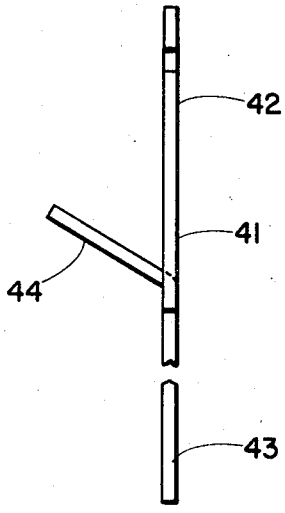


Fig. 6

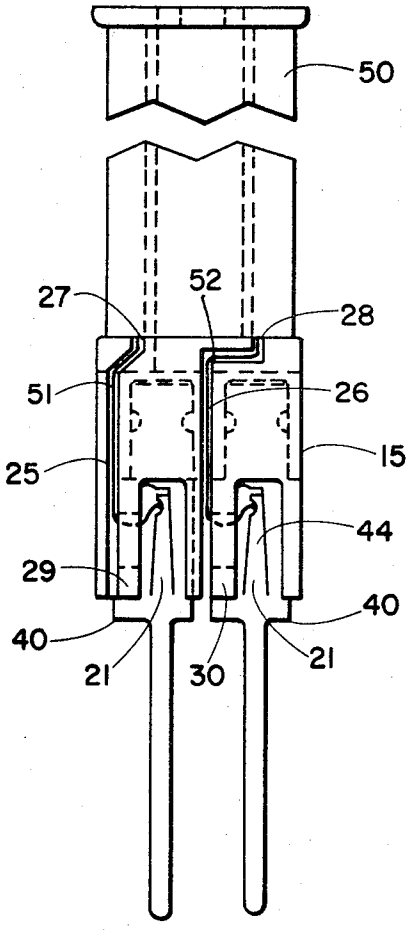


Fig. 7

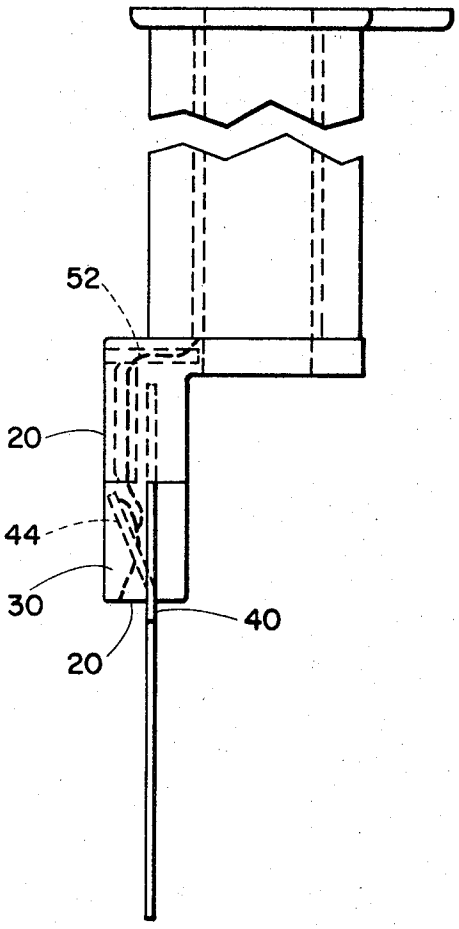


Fig. 8

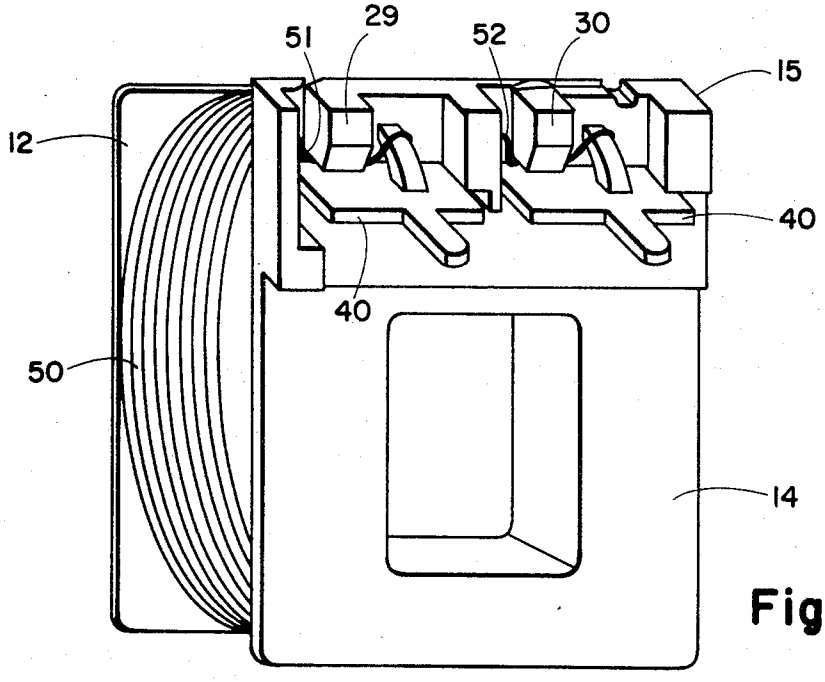


Fig. 9

INDUCTOR BOBBIN WITH TERMINALS

This invention relates to coil winding forms, and in particular to the arrangement for passing the wire of the coil to terminals in the form.

In the manufacture of coils, the ends of the wire of the coil are usually brought out and attached, as by soldering, to tabs on terminals which are inserted in slots formed in one end of the form. The terminal tabs are preferably positioned below the surface of the form when in use to avoid the possibility of electrical shorting and also damage to the tabs. For convenience in making the connections to the tabs they usually extend beyond the surface of the form when the terminals are inserted in the form. After attachment of the wires to the tabs, the tabs are bent down to be below the surface of the form. This bending of the tabs often results in stressing of the wires, leading to breakage. While some slack can be provided in the wires, it is difficult to ensure that the desired amount is provided. Excess wire is liable to be vulnerable and can be easily broken. The wires may be pushed back against the winding layers of the coil, which may cause shorting. Any attempt to provide additional insulation at this position complicates the procedure of winding, increasing costs.

The present invention provides for the connection of the lead wires from the coil to tabs on the terminals in such a way that when the tabs are pushed down the lead wires are not stressed although slack does not have to be provided. Also the lead wires are not pushed or otherwise caused to move against the winding layers of the coil. The lead wires are positioned in grooves formed in an extension of the form, which extension also has slots in which the terminals are positioned. The grooves are so formed that as the tabs are bent down the wires also flex, remaining in the grooves.

Thus, in accordance with the invention a coil winding form having a body portion for reception of the windings and end flanges, has one of the flanges formed to provide for reception of terminals and lead wires. The flange has an extension, extending away from the body portion with an outer end, an inner end face extending radially from the body portion and a surface extending between the outer end and the inner end face. Slots extend axially in the extension from the outer end for the reception of terminals. Axial grooves in the surface extend from the inner end face to the outer end and further grooves extend radially in the inner end face connecting with the axial grooves. Tabs on the terminals can extend beyond the surface through radial extensions of the slots. The lead wires are lead from the coil up along the radial grooves, along the axial grooves toward the outer end of the extension and then round and back in the slots to the tabs. After connection of the wires to the tabs, the tabs can be bent down and the lead wires only need to flex —no extra length of lead wire is necessary to permit bending of the tabs without stressing the wires.

The invention will be understood by the following description of an embodiment, by way of example only, in conjunction with the accompanying drawings, in which:

FIG. 1 is a plan view of a form in accordance with the invention;

FIG. 2 is a side view of the form of FIG. 1, in the direction of arrow A;

FIG. 3 is a cross-section on the line III—III of FIG. 1;

FIG. 4 is a cross-section on the line IV—IV of FIG. 1;

FIGS. 5 and 6 are plan and side views respectively of a terminal for insertion in the form of FIGS. 1 to 4, to an enlarged scale;

FIGS. 7 and 8 are plan and side views respectively of a completed coil; and

FIG. 9 is a perspective view on the end of a completed coil.

As seen in FIGS. 1 to 4, a coil form 10 comprises a body portion 11 on which are wound the wire windings. Flanges are provided at each end of the body portion 11, the flange at one end 12, being of relatively thin planar formation, the flange at the other end 13, having a relatively thick flange portion 14, and an axial extension 15. The axial extension extends in a direction away from the body portion 11 and is offset from the axis of the form.

Formed in the extension 15 are two slots 16 and 17. Terminals, as illustrated in FIGS. 5 and 6 for example, are received in the slots 16 and 17. The extension 15 has an outer end 18, an inner end face 19 and a surface 20. The slots 16 and 17 extend from the outer end 18 toward the inner end face 19, stopping a short distance therefrom. For part of the distance from the outer end 18 the slots 16 and 17 extend through to the surface 20 as indicated at 21. The purpose of this will be described later.

Also formed in the extension 15, are two sets of grooves. A first set of grooves 25 and 26 extends axially in the surface 20 from the outer end 18 to the inner end face 19. A second set of grooves 27 and 28 extend in the inner end face 19, extending from the surface of the body portion 11 to connect with the ends of the first set of grooves 25 and 26 respectively. The end portions of the first set of grooves 25 and 26 may be inclined or otherwise shaped to connect with the second set of grooves 27 and 28 as shown in FIG. 1.

Each groove of the first set is intended to cooperate with a particular one of the slots 16 and 17. Thus groove 25 cooperates with slot 16 and groove 26 cooperates with slot 17.

Grooves 25 and 26 are separated from the slots 16 and 17 by thin webs of material 29 and 30 respectively. At the outer ends of the grooves 25 and 26, that is at the ends adjacent the outer end 18 of the extension 15, the webs 29 and 30 are partly cut away a short distance down from the surface 20. This can be seen in FIG. 2, the transverse passage between slot 17 and groove 26 being indicated at 31.

The arrangement of grooves 27 and 28; 25 and 26; slots 16 and 17 and transverse passages 31 is such that wires from a coil wound on the main body portion 11 can be fed along the grooves 27 and 28; 25 and 26 toward the outer end 20. The wires are then passed transversely through passages 31 to emerge up through the portions 21 of the slots 16 and 17.

FIGS. 5 and 6 illustrate one form of terminal suitable for use with the form. A terminal, indicated generally at 40, has a main body portion 41, a forward end portion 42 and a rearward portion 43. The forward portion 42 is of a cross-section such that it is a tight push fit into one of the slots 16 and 17 of the form 10. The body portion 41 has a connection tab 44 punched out and the lead wires, from the coil, after passing along the various grooves in the form 10, are soldered to the tabs 44 of the two terminals in the form. The rearward end

portion 43 of each terminal is adapted for connection of the complete device, for example by wire wrapping of leads thereto. The tabs 44 of each terminal are bent out, as in FIGS. 5 and 6, when the terminals are inserted in the slots 16 and 17. The tabs 44 project up through the portions 21 of the slots, thereby being well positioned for attachment of the lead wires from the coil, as by soldering.

FIGS. 7 and 8 illustrate a completed coil. The windings of the coil are wound onto the body of the form, as seen at 50. The terminals 40, are pushed into position, by being inserted in the slots 16 and 17 of the extension 15. The lead wires 51 and 52 from the coil 50 are fed up the grooves 27 and 28, along the grooves 25 and 26, down under the end portions of the webs 29 and 30, through the transverse passages 31, with the end being brought up and out through the cut away portions 21. The wires are soldered to the tabs 44, after which the tabs are pushed down to lie below the surface 20.

In conventional devices, bending down of the tabs stresses the lead wires, unless some slack is left, as the wires are caused to follow a longer path when the tab is pushed down than when the tab is up. If, to avoid this, some slack is deliberately provided, unless this slack is of just the right amount, either the wire will still be stressed, or some slack wire may project outside the periphery of the device, with possible damage to the wire.

With the present invention, the wire leads 51 and 52 are first led along path extending alongside the terminals and are then bent round and back, the wires passing under the outer portion of the ribs 29 and 30, that is the portions adjacent the outer end 18 of the extension 15. After attachment to the tabs 44, the tabs can be bent down and this, in effect shortens the paths for the lead wires 51 and 52. However the wires do not rise up as they are held down by the ribs 29 and 30, the slack being accommodated in the transverse passages 31. Thus no stress is placed on the lead wires, nor do they extend beyond the periphery of the device. The paths of the lead wires can be readily seen in FIG. 9, which is a perspective view on the outer end of a completed coil.

Although the embodiment described has two flanges, 12 and 14, the invention can be applied to a form having a flange at only one end, corresponding to flange 14. Also, while the extension 15 has been described and illustrated as extending substantially axially, that is normal to the plane of the flange 14, it is possible for the extension to extend in the same plane as the flange or parallel to such plane.

What is claimed is:

1. A coil winding form comprising a tabular body portion and a flange at one end of the body portion, an extension on said flange, said extension extending in a direction of, and parallel to the axis of said body portion and offset from said axis, said extension including an outer end remote from the body portion and an upper surface extending from the body portion to the said outer end; slots extending in an axial direction into the extension from said outer end parallel to said upper surface; grooves formed in said upper surface of said extension and extending axially from said body portion to said outer end alongside and parallel to said slots; and transverse passages extending between said grooves and said slots at said outer end of said extension; a terminal positioned in each of said slots and extending parallel to said axis of said body portion, each terminal having a tab thereon, the tab hingedly connected to the terminal, the connection between the tab and the terminal adjacent the outer end of the extension, each tab extending in a direction toward said body portion, the tabs adapted to extend beyond said upper surface from said slots and bendable to a retracted position within said extension below said upper surface; leads extending from a coil on said body portion to said tabs and soldered thereto through continuous enclosed paths defined by said slots, grooves and passages, said leads flexing at said transverse passages on bending of said tabs to the retracted position, without stressing the leads.

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