

Jan. 7, 1964

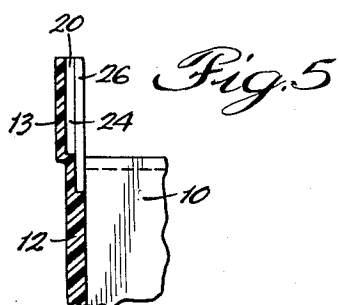
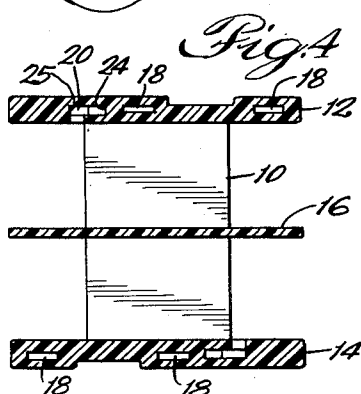
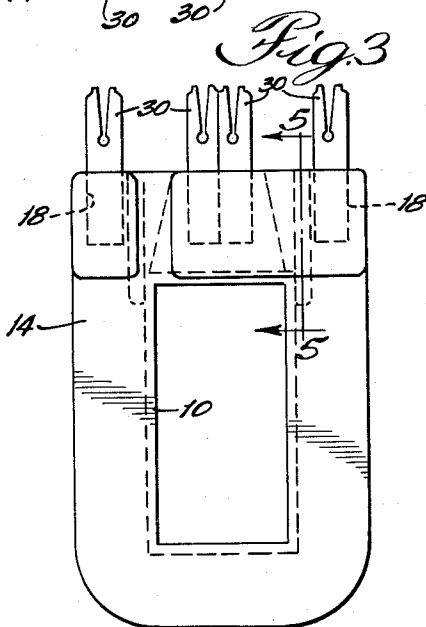
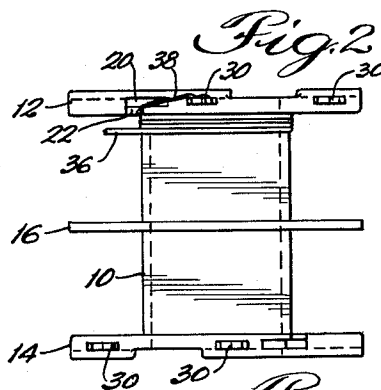
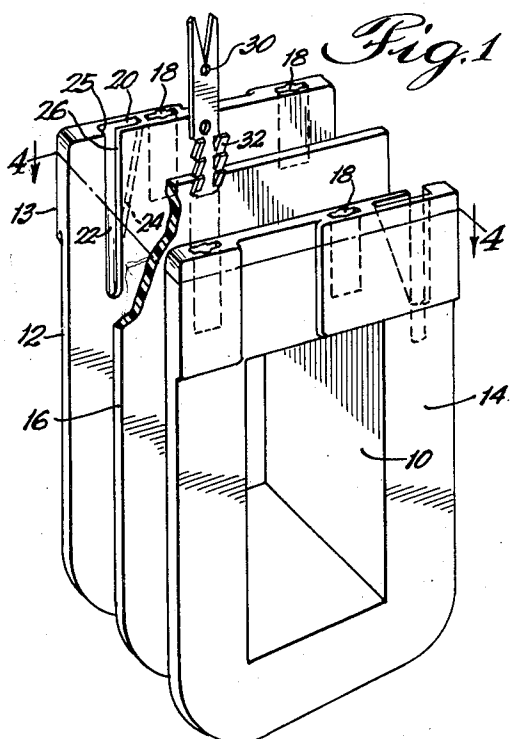
P. C. MUSZYNSKI ETAL

3,117,294

BOBBIN WITH INSULATED LEAD-IN MEANS

Filed Sept. 8, 1959

2 Sheets-Sheet 1



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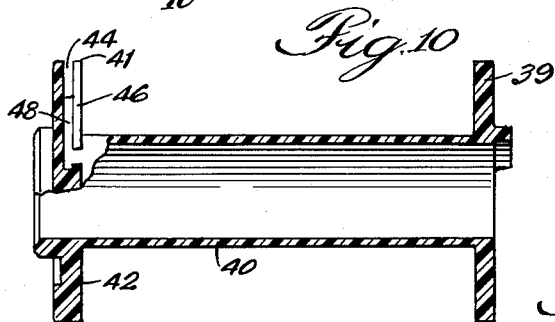
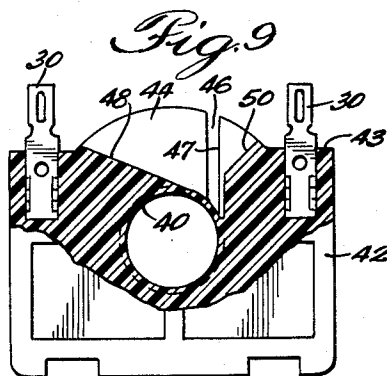
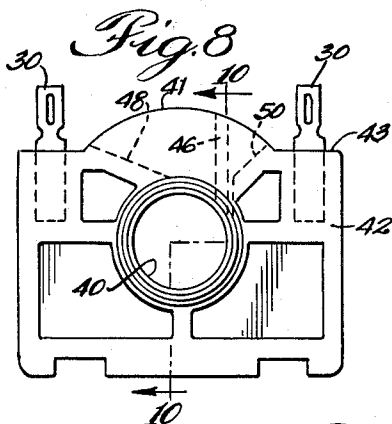
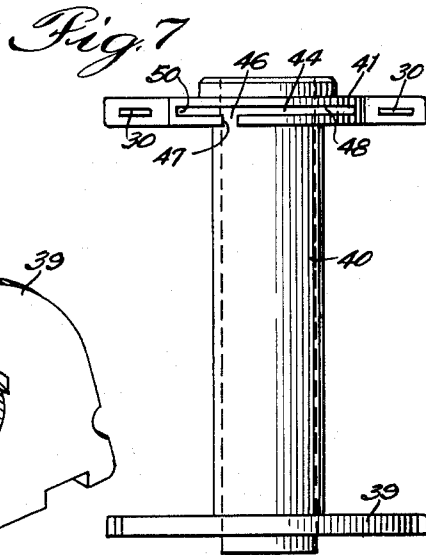
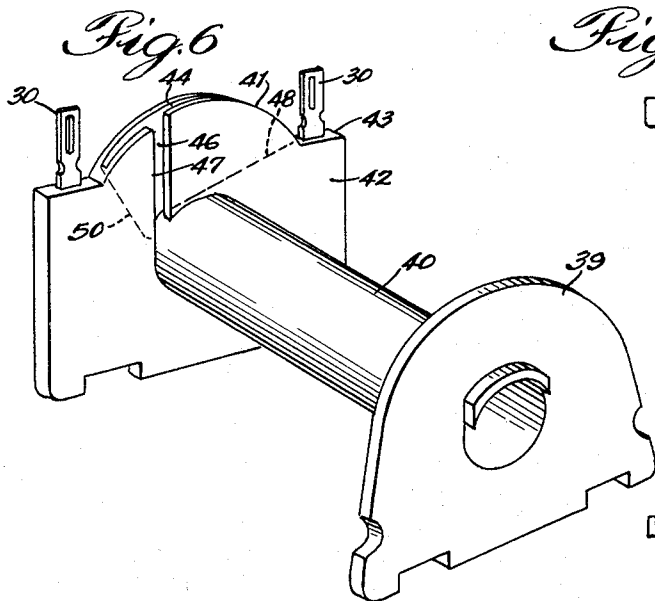
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BOBBIN WITH INSULATED LEAD-IN MEANS

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2 Sheets-Sheet 2



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1

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BOBBIN WITH INSULATED LEAD-IN MEANS

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4 Claims. (Cl. 336-192)

This invention relates to a molded insulating bobbin which finds particular use in the manufacture of electrical coils. Such coils consist of a multiplicity of enameled wire windings about the bobbin. The bobbin resembles a spool or reel and is made from a plastic insulating material. The inner end of the wire, that is, the end adjacent the core or tube of the bobbin, and the outer end of the wire extending from the last winding are soldered to appropriate terminals comprising part of the electrical assembly or circuit of which the coil is a part.

In coil constructions of this kind it is essential that the windings be insulated from each other. Occasionally if the insulating enamel is disturbed and a short does take place, it is not serious so long as the short is between adjacent windings. In such case only one or a few turns are shorted out. But where a short occurs between one of the outer windings and an initial winding, the usefulness of the coil is substantially destroyed because all of the intervening windings are shorted out. It will be appreciated that the inner end of the initial winding adjacent the tube of the bobbin must be brought out from the tube to effect the necessary terminal connection. This is conveniently done by laying the inner end adjacent the inner surface of the bobbin flange. Successive windings in each layer then build up against this inner end. If a short does result it is likely to be serious because the inner end connects immediately to the very first winding.

Heretofore it has been proposed to insulate the inner end of the coil wire from all successive windings by providing an opening or slot through the flange of the bobbin to permit bringing the inner end of the wire through the flange to the outside. Thus, the bobbin flange completely insulates the wire from the windings which, of course, are on the inside of the flange. But such a construction exposes the inner end of the wire to other components in the circuit or in the electronic assembly adjacent to the coil.

The primary object of this invention is to provide an improved bobbin construction in which the lead comprising the inner end of the coil is effectively insulated from all of the windings about the bobbin as well as from adjacent components.

Another object is to provide a bobbin of this construction which may be integrally molded from thermoplastic resin in a practical way.

Another object is to provide a bobbin having a flange containing a wire-insulating pocket for effectively insulating a wire disposed therein, said pocket having an access opening extending tangentially from the tube portion of the bobbin to the periphery of the flange.

A further object is to provide a bobbin of this kind which has an integral terminal lug embedded in the flange containing the wire insulating pocket.

These and other objects of this invention will become apparent from the following description when read in connection with the accompanying drawing, wherein:

FIGURE 1 is a perspective view of a double bobbin

2

having a rectangular core and a pair of flanges constructed in accordance with the invention;

FIGURE 2 is a plan view of the bobbin of FIGURE 1;

FIGURE 3 is an end elevation of the bobbin shown in FIGURE 1;

FIGURE 4 is a sectional view taken along the line 4-4 of FIGURE 1;

FIGURE 5 is a sectional view taken along the line 5-5 of FIGURE 3;

FIGURE 6 shows an alternative form of the invention having a pocket of modified construction and flanges which differ somewhat in configuration from the standard flanges of the construction of FIGURE 1;

FIGURE 7 is a plan view of the bobbin structure shown in FIGURE 6;

FIGURE 8 is an end elevation of the left end of the bobbin as shown in FIGURE 6;

FIGURE 9 is a view similar to FIGURE 8 wherein a portion of the outer wall of the flange has been cut away to show the interior of the pocket; and

FIGURE 10 is a sectional view taken along the line 10-10 of FIGURE 8.

FIGURES 1 through 5 show a bobbin construction which is capable of accommodating two different coil windings. It has a hollow tube member 10 which is rectangular in cross section and a plurality of flanges which are molded integrally with the core and are disposed at right angles to the axis of the core. The "tube" may be solid instead of hollow, and as this term is used in the appended claims, it is intended to cover both types. The flanges are indicated in the drawing by the numerals 12, 14 and 16. Flanges 12 and 14 are substantially identical and are molded with pockets 20 therein in accordance with the invention. Only flange 12 will be described in detail. Flange 16 is disposed intermediate the two outer flanges 12 and 14 and serves to separate the coils of wire that are wound on either side thereof.

It will be noted that the flange 12 has an upper portion 13 which is thicker than the rest of the flange. In this thicker portion 13 near the top thereof is provided an undercut pocket 20 which is adapted to receive the inner end of a coil of wire wound on the tube. The pocket 20 is flat, generally triangular in shape and has one vertical side wall 25 and another angular side wall 24 which joins the wall 25 at the apex of the triangle which is coincident with the surface, or slightly below the surface, of the tube. In this particular construction, since the tube is rectangular in shape, the apex of the pocket joints the tube at one of the edges or corners of the rectangle. As a result, the initial coil of wire will pass from the tube directly into the pocket without bending.

The pocket 20 extends through the top edge of the thicker portion 13 of flange 12 and is substantially parallel to the faces thereof. Access to the pocket is provided by means of a vertical slot or opening 22 which is cut through the inner wall of the flange 12 tangent to the tube 10. It should be noted that the side walls 25 and 26 defining the slot-like opening 22 are parallel to each other and normal to the plane of the pocket 20. By making the side walls of the access opening parallel with the axis of the bobbin, the wire which is disposed in the pocket 20 is immediately separated from the space inside the inner surface of the flange 12. If the side walls of the access opening were angular with respect to the axis of the bobbin there would be more opportunity for the

3

wire to become exposed to windings around the tube. It will be apparent from the foregoing that the pocket 20 is of right-triangular shape with one leg of the right-triangle projecting laterally through the inside surface of the flange to provide the access opening 22.

In FIGURE 2 we have shown several coils of wire 36 wound on the tube 10 of the bobbin with the inner end 38 thereof tucked in the pocket 20. Since the pocket 20 extends down to the very surface of the tube, the inner end 38 of the wire coil does not rise above the first layer of windings on the tube. Thus, if the end 38 of the wire is tucked in the pocket against the angular surface 24 thereof, there is no opportunity for this end to come in contact with subsequent windings which lie adjacent the inner surface of the flange 12. It will be appreciated that the plastic forming the outside wall of the pocket and the outside surface of the flange 12 effectively separates the wire end 38 from any components which might be mounted adjacent the coil in an electronic assembly.

The flanges 12 and 14 are each provided with a pair of openings 18 extending through the top edges thereof for receiving terminal lugs 30. The lugs have arrow-like barbs 32 projecting from the faces of the lower end thereof which permit the lug to be forced down into the opening 18 which is slightly smaller than the lug. Once the lug has been seated in the opening 18, the barbs 32 prevent it from pulling out. Although we have described the flange 12 in some detail, it will be appreciated that the flange 14 is of substantially identical construction. The only difference between the two flanges happens to be the relative location of the lugs 30 and the pocket 20. Flange 14 in this regard is a mirror image of flange 12. The terminals in flange 14 accommodate the coil on the right side of the central flange 16 while the terminals in flange 12 accommodate the coil wound to the left of the central flange 16. In each case the lug immediately adjacent the pocket 20 is used for the inner end 38 of the wire coil while the other lug is used for the outer end of the coil of wire.

Where the end of the wire is to be soldered to another wire, a plastic lug may be molded integrally with the flange to serve as an anchor for the coil lead. In each case the lead is merely wound around the lug.

The bobbin may be molded from a resinous material such as nylon, polystyrene, Bakelite, polyethylene or similar material which has good dielectric properties and is readily molded under heat and pressure. Thermoplastic resins are preferred.

Referring now to the construction shown in FIGURES 6 through 10, the tube 40 and the flanges disposed at right angles thereto and identified by the numerals 42 and 39 are of irregular configuration. The shape is dictated by the use to which the coil is to be put. The upper portion 41 of the flange 42 is arcuate and concentric with the tube 40. Except for this projecting arcuate portion 41, the flange 42 is substantially rectangular and has a pair of flat edges 43 on either side of the arc in which the barbed lugs 30 are embedded. The pocket 44 in which the inner end of the coil of wire is to be placed is generally arcuate or fan-shaped and is accessible through the opening 46 cut through the inner wall of the flange 42. The side walls 48 and 50 of the pocket 44 are tangential to the tube 40 and radiate towards the lugs 30. Both the access slot 46 and the pocket 44 terminate at their lower ends in contact with the surface of the tube 40. Thus, the inner end of the first coil of wire wound on the bobbin can be directed through the access opening 46 into the pocket 44 and connected with either of the terminals 30 by winding or soldering. In one case the wire would lie against the wall 50 and in the other case against the wall 48 of the pocket. One of the side walls 47 of the access opening 46 is tangent to the tube 40 so that the inner end of the initial coil of wire may be conveniently tucked in the pocket 44 without having to bend it.

It will be appreciated that it is a very simple matter

4

to place the wire in the pocket since the pocket is accessible from the top or peripheral edge of the flange. If the inner coil of wire is laid against the face 50 of the pocket 44, it is soldered to the lug 30 on the left side of the flange 42. The other lug 30 then is used for making the connection from the outer end of the coil of wire after the winding has been completed.

The bobbin construction of the invention can be used in a multiple construction such as a transformer. The primary coil is wound next to the tube and the insulated pocket is used as an insulating passage to bring out the leads. The secondary winding is placed over the primary and one insulated pocket would be used to start the secondary, but the end lead of the secondary is fastened directly to a lug.

Although we have shown several forms of the invention it will be appreciated that it is capable of other modifications without departing from the true spirit of the invention. It is, therefore, our invention to cover by the appended claims other modifications which may reasonably be included within their scope.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A bobbin made from insulating material comprising a tube and a flange extending outwardly from the tube, said flange having an inner surface, an outer surface and a peripheral edge extending laterally between said surfaces, a flat pocket disposed between said inner and outer surfaces substantially parallel therewith and extending from said tube to and through said peripheral edges, said pocket being completely closed at said outer surface, and a narrow elongated opening through said inside surface coextensive with said pocket to provide access to said pocket, whereby a wire disposed within said pocket is insulated laterally by the insulating material from which said inner and outer flange surfaces are formed.

2. A molded bobbin made from insulating material comprising a tube and a flange extending outwardly from the tube, said flange having an inner surface, an outer surface and a peripheral edge extending laterally between said surfaces, a flat pocket disposed between said inner and outer surfaces substantially parallel therewith and extending from said tube to and through said peripheral edge, said pocket being completely closed at said outer surface and of progressively increasing width being a minimum at the end adjacent the tube and a maximum at said peripheral edge, and a narrow elongated opening through said inside surface coextensive with said pocket and tangent said tube to provide access to said pocket, whereby a wire disposed within said pocket is insulated laterally by the insulating material from which said inner and outer flange surfaces are formed.

3. A molded bobbin made from insulating material comprising a tube and a flange extending outwardly from the tube, said flange having an inner surface, an outer surface and a peripheral edge extending laterally between said surfaces, a flat pocket disposed between said inner and outer surfaces substantially parallel therewith and extending from said tube to and through said peripheral edge, said pocket being completely closed at said outer surface and of progressively increasing width being a minimum at the end adjacent the tube and a maximum at said peripheral edge, a conductive terminal lug mounted on said flange adjacent said pocket, and a narrow elongated opening through said inside surface coextensive with said pocket to provide access to said pocket, whereby a wire disposed within said pocket in running from said tube to said lug is insulated laterally by the insulating material from which said inner and outer flange surfaces are formed.

4. A bobbin integrally molded from an electrically insulating resin comprising a tube, a first and a second flange extending from said tube and forming a winding space therebetween, said first flange having an inner surface, an outer surface and a peripheral edge extending laterally be-

5

tween said surfaces, a flat pocket disposed between said inner and outer surfaces substantially parallel therewith and extending from said tube to and through said peripheral edge, a narrow elongated opening through said inside surface extending tangentially outwardly from said tube to said peripheral edge to provide access to said pocket, said pocket being completely closed at said outer surface, a conductive terminal lug mounted on said first flange adjacent said pocket, and a continuous length of wire coiled about said tube in multiple layers, the inner end of said wire in the layer adjacent said tube passing through said access opening at the inner end of said opening, into said pocket, out past said peripheral edge, and connecting to said lug.

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6

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