April 11, 1967 D. L. VAN ERDEN 3,314,032

ELECTRICAL COIL ASSEMBLY

Filed Sept. 8, 1964

FIG. 1

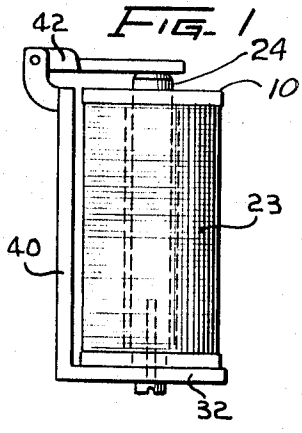


FIG. 2

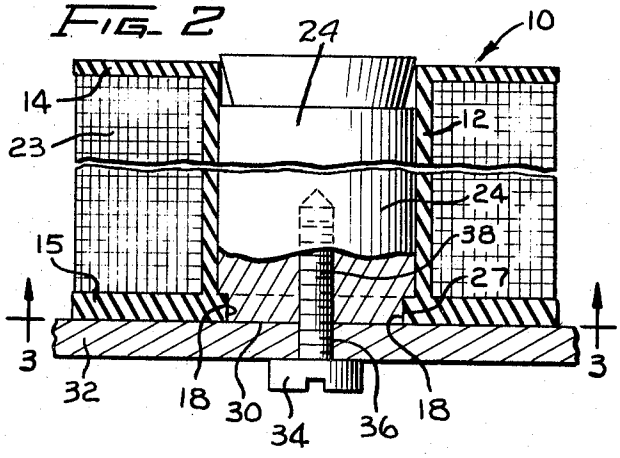


FIG. 3

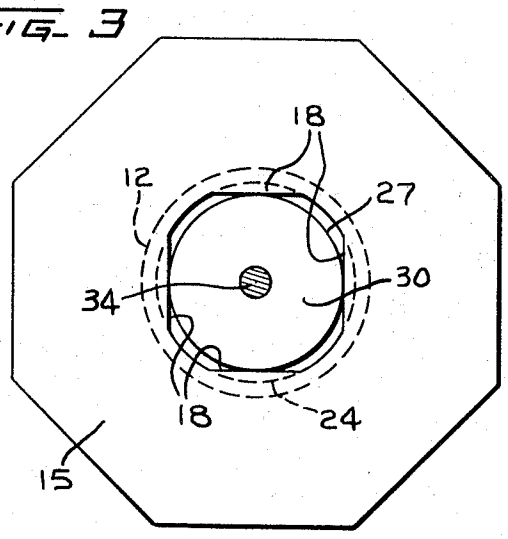


FIG. 4

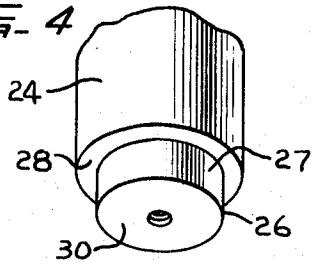


FIG. 5

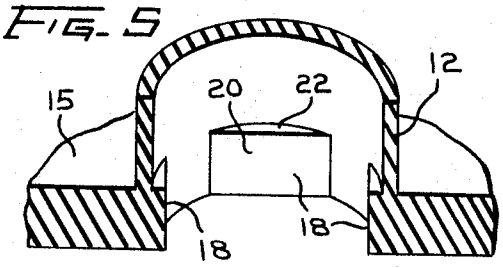


FIG. 6

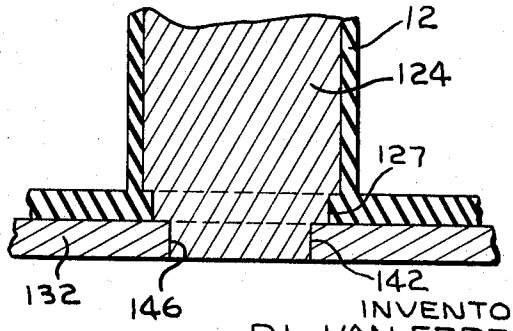
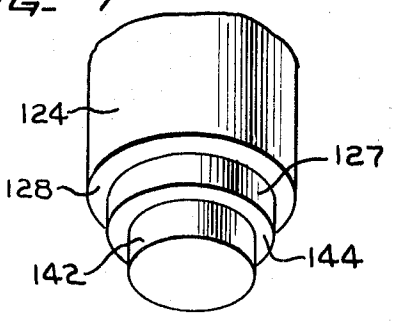


FIG. 7



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United States Patent Office 3,314,032 Patented Apr. 11, 1967

3,314,032

ELECTRICAL COIL ASSEMBLY

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Filed Sept. 8, 1964, Ser. No. 394,954
4 Claims. (Cl. 336—198)

This invention relates to an electrical coil assembly, and more particularly to a mounting for an electrical coil.

An object of the invention is to provide an improved electrical coil assembly.

Another object of the invention is to provide an improved mounting structure for supporting an electrical coil.

A coil mounting structure illustrating certain aspects of the invention may include a molded dielectric bobbin having a cylindrical tubular hub on which the coil is wound and which is provided with a plurality of lugs extending inwardly from the inner surface of the hub adjacent one end thereof. A soft-iron cylindrical core is positioned within the bobbin hub and has a rabbeted end portion providing a section of reduced diameter which is disposed between the lugs of the bobbin and forms an annular shoulder on the core that rests on the lugs of the bobbin. The end surface of the core is flush with the end surface of the bobbin and both surfaces abut a soft iron pole piece. The threaded shank of a headed machine screw passes through an aperture in the pole piece and engages a threaded aperture in the core to attach the core and the bobbin securely to the pole piece.

In a second embodiment of the invention, the core is modified to provide a second cylindrical section of smaller diameter which extends beyond the first reduced end section of the core and is pressed into an aperture in the pole piece and is securely held thereby to effect the attachment of the core and the bobbin to the pole piece.

Other objects, advantages and novel aspects of the invention will become apparent upon consideration of the following detailed description, in conjunction with the accompanying drawings, in which:

FIG. 1 is a side elevational view of an electrical coil structure illustrating one embodiment of the invention;

FIG. 2 is an enlarged fragmentary vertical sectional view of the coil structure;

FIG. 3 is an end view of the bobbin and core portion of the induction coil structure looking in the direction indicated by the arrows 3—3 on FIG. 2;

FIG. 4 is a fragmentary perspective view of the rabbeted end of the core;

FIG. 5 is a fragmentary perspective view of the coil bobbin showing the lugs formed on the inner portion thereof;

FIG. 6 is an enlarged fragmentary vertical sectional view of a portion of a coil structure disclosing another embodiment of the invention; and

FIG. 7 is a fragmentary perspective view of an end portion of the core shown in FIG. 6.

Referring to the drawings, one embodiment of the invention as disclosed in FIGS. 1–5 comprises a molded bobbin **10** having a cylindrical tubular hub **12** and heads **14** and **15** at opposite ends thereof. Extending radially inwardly from the inner surface of one end of the tubular hub **12** adjacent the head **15** thereof are four lugs **18** which are disposed in angularly spaced relation to each other and are provided with flat surfaces **20** extending parallel to the axis of the hub and transversely disposed shoulder-forming surfaces **22**.

The partially square and circular opening through the hub **12** between the projecting lugs **18** permits the placement of a plurality of the bobbins on an arbor having a similar cross-sectional contour for the simultaneous winding of coils **23** onto the bobbin in a coil winding machine.

A cylindrical core **24** of soft iron is positioned within the tubular hub **12** of the bobbin with the upper portion thereof extending slightly beyond the bobbin. The lower end portion of the core **24** is rabbeted at **26** (FIG. 4) to provide a section **27** of reduced diameter and an annular shoulder **28**. The shoulder **28** of the core rests on the surfaces **22** of the lugs **18** and the reduced section **27** of the core fits between the lugs with the bottom surface **30** of the core substantially flush with the lower end surface of the bobbin **10**.

A pole piece **32** of soft iron abuts the end surface **30** of the core **24** and the end surface of the bobbin **10** and is secured to the core by a headed screw **34**. The threaded shank of the screw passes through an aperture **36** in the pole piece and engages a threaded hole **38** in the core and secures the core **24** to the pole piece **32**, and the core **24** in turn secures the bobbin **12** and the coil **23** to the pole piece. The pole piece **32** selected for purposes of disclosure and as viewed in FIG. 1 is L-shaped and has a portion **40** disposed parallel to the axis of the coil **23** and the core **24**. An armature **42** is pivoted to the pole piece and cooperates therewith and with the core to form a path for the magnetic flux of the coil **23** when the coil is energized.

In the modified embodiment of the invention as disclosed in FIGS. 6 and 7, the core **124** has a reduced end section **127** and a shoulder **128** similar to the section **27** and the shoulder **28** of the core **24**, and in addition thereto, the core **124** has a section **142** of a further reduced diameter extending from the section **127** and providing an annular shoulder **144**. The pole piece **132** has an aperture **146** of a diameter slightly less than that of the core section **142** for receiving it. After the coil is wound onto the bobbin and the core **124** placed within the bobbin, the assembled core and bobbin are placed on the core piece **122** and the section **142** of the core is pressed into the aperture **146** with the shoulder **144** of the core engaging the face of the pole piece to effect the securement of the core **124**, the bobbin **10**, and the pole piece in assembled relation to each other.

Although the pole piece is disclosed as L-shaped it will be understood that it may be flat to support a pair of coils in parallel side-by-side relation to each other, or otherwise formed in accordance with the design of the desired coil assembly.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of this 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 coil mounting comprising:

a bobbin for supporting a coil and having a cylindrical tubular hub with outwardly projecting heads at opposite ends thereof and with a plurality of lugs extending inwardly from the inner surface of the hub at one end thereof, said lugs having surfaces disposed substantially parallel to the axis of the hub and having shoulder forming surfaces disposed transversely of the axis;

a pole piece abutting said one end of said bobbin;

a cylindrical core fitting within said hub and having a a reduced end portion fitting between said lugs and providing an end surface in substantial alignment with the end surface of said bobbin and providing shoulders in overlying and abutitng engagement with said shoulder forming surfaces of the lugs; and

means for securing said core and said pole piece to each other.

2. A coil mounting which comprises:

a bobbin having a tubular hub for supporting a coil and provided with lugs extending inwardly from the inner surface of said hub adjacent one end thereof;

a pole piece abutting said one end of said hub and having an aperture therethrough; and

a core movable into said tubular hub and having a longitudinal first section conforming to and fitting within a portion of said hub and provided with shoulders disposed transversely of the axis of the core in abutting relation to said lugs, said core having a reduced second section extending longitudinally from said first section and fitting between said lugs and provided with a shoulder portion abutting said pole piece, said core having a further reduced third section extending longitudinally from said second section and fitting within said aperture of said pole piece and secured thereby to said pole piece.

3. A coil mounting comprising:

a bobbin having a tubular hub with at least one lug extending inwardly from the inner surface of the hub at one end thereof and provided with a shoulder forming surface disposed transversely of the axis of said hub;

a pole piece abutting said one end of said hub;

a core movable axially into said hub and having a first section conforming to and disposed in a portion of said hub and provided with surfaces disposed transversely of the axis of said core in engagement with said lug and having a reduced second section extending axially from said first section to the end of said core and laterally of said lug and provided with an end surface in abutting engagement with said pole piece; and

means for securing said core to said pole piece.

4. A coil supporting structure comprising:

a support having a flat surface;

a bobbin having a tubular hub with one end thereof engagable with said flat surface of said support and provided with at least one lug extending inwardly from the inner surfaces of said hub adjacent said one end thereof;

a magnetic core movable axially into said tubular hub and having a longitudinal first portion conforming to and fitting within a major portion of said hub and provided with a shoulder at one end thereof disposed transversely of the axis of said core and said hub in abutting relation to said lug and having a reduced second portion extending longitudinally from said first portion to the end of said core and laterally of and adjacent to said lug and entirely within said hub and provided with an end surface in substantial alignment with said one end of said hub; and

means for securing said core to said support.

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