

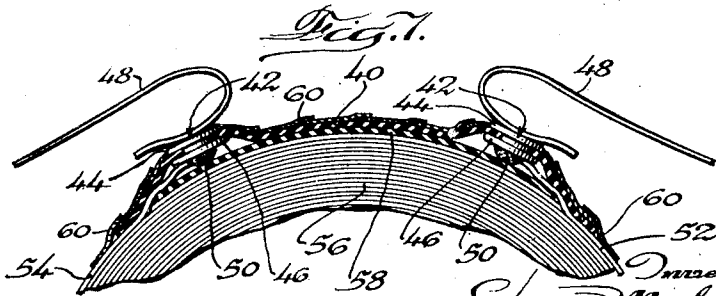
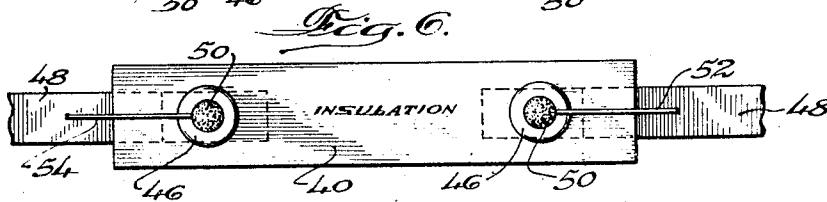
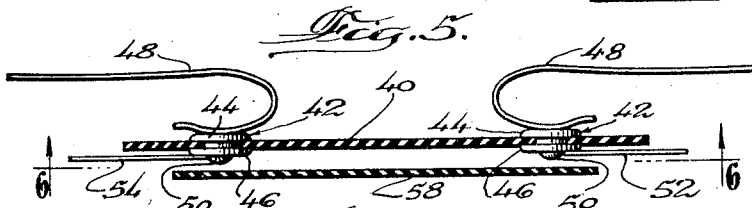
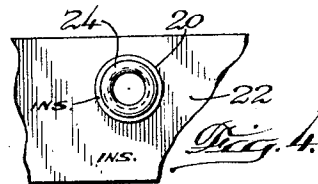
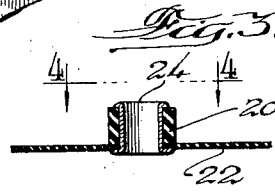
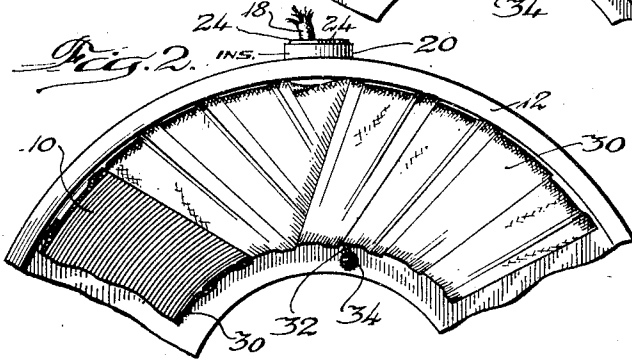
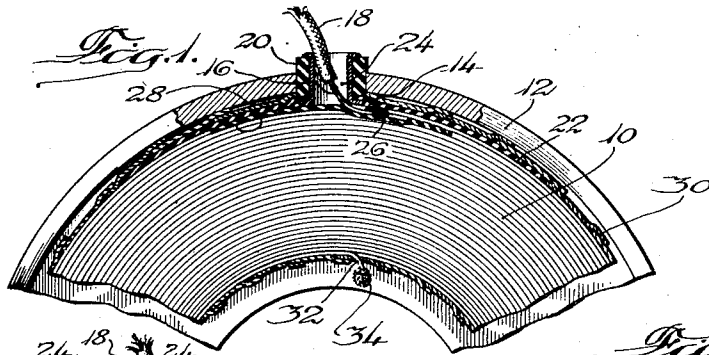
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COIL CONSTRUCTION

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COIL CONSTRUCTION

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4 Claims. (Cl. 175-21)

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My invention relates to coil constructions and more particularly to the construction of small electric coils.

In the construction of small electric coils and their assembly as part of electric apparatus, it is usually necessary to connect one or both ends of the coil to a lead wire or wires which serve to establish electrical communication between the coil and other parts of the apparatus. The connection between the coil and lead wires is frequently required to withstand considerable pull or vibration and must be of such a nature as not to injure the insulation on the wire of which the coil is composed. Furthermore, these connections must be inexpensive and capable of being rapidly made, since this type of electrical apparatus is manufactured in large quantities by mass production methods and cost is a major item in this highly competitive field.

An object of my invention is to provide a new and improved coil construction which is inexpensive to manufacture and may be quickly assembled.

Another object of my invention is to provide a new and improved coil construction which affords greater flexibility in the connections between the coil and lead wires in electrical communication therewith.

Another object of my invention is to provide a new and improved coil construction which provides a stronger connection between the coil and a lead wire and which prevents any uninsulated part of the lead wire from projecting beyond the coil assembly.

Another object of my invention is to provide a new and improved insulator assembly which may be readily applied to conventional electric coils.

Another object of my invention is to provide a new and improved insulator.

Other objects and advantages will become apparent as the description proceeds.

In the drawings:

Fig. 1 is a partial, sectional view through a coil construction embodying a preferred form of my invention;

Fig. 2 is a side elevation of the construction shown in Fig. 1 with a part of the insulating tape removed, better to illustrate details of construction;

Fig. 3 is a sectional view of the insulator used in Fig. 1;

Fig. 4 is a partial plan view of the insulator of Fig. 3;

Fig. 5 is an enlarged, sectional view of an in-

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ulator assembly embodying a second form of my invention;

Fig. 6 is a sectional view of the assembly of Fig. 5 and is taken in the plane of the line 6-6 of that figure; and

Fig. 7 is a view similar to Fig. 1, but showing a coil construction incorporating the insulator assembly of Figs. 5 and 6.

The embodiment of my invention shown in Figs. 1 to 4, inclusive, comprises an electric coil 10 composed of many individual turns of insulated wire. The coil 10 is illustrated as being enclosed, or partially enclosed, in a metal housing 12 which forms a support for the coil and protects the coil against injury. This housing may be of any suitable construction and may form part of any suitable or usual kind of electrical apparatus. The wire of which the coil 10 is formed has an end 14 soldered or otherwise secured to the exposed end 16 of an insulated lead wire 18. The lead wire 18 is insulated from the housing 12 by an insulating ring 20 attached to a rectangular insulating strip 22 by a metal eyelet 24 and particular attention is directed to the fact that the insulation of the lead wire 18 extends down into the eyelet 24 so that no part of the uninsulated end 16 of the lead wire is exposed and the end of the insulation is protected against injury by the eyelet 24 and insulating ring 20.

The insulating strip 22, eyelet 24 and insulating ring 20 form an insulator of novel construction, which may be easily assembled as a part of the coil construction and which provides a great flexibility in the connection between the coil and lead wire. In the embodiment of Fig. 1, the soldered connection 26 between the coil and lead wire is located between the insulating strip 22 and a complementary insulating strip 28 which protects the wire of the individual turns of the coil against the soldered connection 26 and inner end of the eyelet 24, so that this connection and eyelet can not come in contact with and damage the relatively thin insulation on the wire of these turns. While it is preferable to provide the complementary insulating strip 28, this strip may be eliminated if desired. Both the insulating strip 28 and the insulating strip 22 may be formed of paper or any other suitable material which preferably is sufficiently flexible to assume the curvature of any particular coil to which such insulating strips may be applied.

The soldered connection 26 between the coil end 14 and end 16 of the lead wire is shown in Fig. 1 as being located at one side of the eyelet 24

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whereby a pull on the lead wire does not exert a direct pull on the soldered connection 26. This connection 26 may be located at any distance to one side of the eyelet 24 within the limits of the particular insulating strips 22 and 28 used in that particular coil construction and this latitude in the positioning of the connection 26 materially increases the utility and adaptability of my novel coil construction.

The coil 10 and insulator assembly are wrapped in an insulating tape 30 which leaves only the insulating ring 20 and eyelet 24 exposed. This tape 30 provides an additional insulation between the coil and housing 12 and affords a unitary article which may be handled or shipped independently of any housing or other support. The coil 10 has a second end 32 which projects through the tape 30 and which is illustrated in Fig. 1 as being soldered at 34 to the housing 12. The soldered connection 34 is, of course, made at the time the coil 10 is placed in the housing 12 and the projecting end 32 does not prevent the taped coil and insulator assembly incorporated therein from being sold, shipped or handled as an article of commerce independently of the housing 12.

In Figs. 5, 6 and 7, however, I have illustrated a second form of my invention which is especially adapted for an arrangement in which a separate lead is connected to each end of the coil. In this embodiment of my invention I provide an insulator comprising a strip 40 of insulating paper, or other suitable and preferably flexible insulating material. Secured to this strip 40 are a pair of contacts 42. Each contact has a pair of flanges 44 and 46 lying on opposite sides of the strip 40 and securing the contact thereto. The exposed part of each contact is flat and adapted to be engaged by a resilient lead 48 mounted on any suitable support and effective to maintain proper electrical communication with this contact 42 under all operating conditions of the coil and its associated mechanism. The inner end of each contact has a rounded central portion 50 and is adapted to have soldered thereto one of the ends 52 or 54 of a coil 56.

An insulating strip 58 is interposed between the contacts 42 and the body of the coil 56 so that these contacts and the soldered connections between these contacts and the ends of the coil can not injure the insulation on the wire of the individual turns forming the body of the coil. The coil 56 and insulating strips 40 and 58 are wrapped with an insulating tape or binding 60 which forms a unitary assembly of these parts and leaves only the flat outer ends of the contacts exposed so that these contacts can be engaged by the resilient leads 48 or by any other suitable conductors.

It will be apparent from the foregoing description, taken in connection with the accompanying drawing, that the insulators and insulating strips of both forms of my invention are inexpensive and may be readily assembled with the coil to form a unitary article of commerce by simply enclosing the insulating strips in the wrapping ordinarily applied to electric coils of this general type. No particular or unusual skill is required in assembling either form of my novel coil construction and a feature of my invention lies in the ease with which this assembly may be effected by mass production methods.

While I have illustrated and described in detail only two embodiments of my invention, it is to be understood that my invention is not limited

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to the particular details shown and described but may assume numerous other forms and that my invention includes all the modifications, variations and equivalents coming within the appended claims.

I claim:

1. A coil construction for electrical apparatus of the class described, comprising in combination a coil formed of many turns of insulated wire, said wire having exposed ends, a sheet of flexible insulating material separating one of said ends from said turns, a lead wire attached to said last-named end, an insulating strip of flexible material overlying said connection, a metal eyelet attached to said strip and surrounding said lead wire, a ring of insulating material clamped between one end of said eyelet and the insulating strip to which said eyelet is attached, said lead wire passing through said eyelet and having insulation terminating therein whereby said eyelet protects an end of said insulation, a metal housing enclosing said coil and having an opening receiving said eyelet and ring, said ring serving to insulate said eyelet from said housing, and a binding of insulating tape between said coil and housing, said binding securing said sheet and strip to said coil to form a unitary assembly thereof.

2. A coil construction for electrical apparatus of the class described, comprising in combination a coil formed of many turns of insulated wire, said wire having exposed ends, a sheet of insulating material separating one of said ends from said turns, a lead wire attached to said last-named end, an insulating strip overlying said connection, a metal eyelet attached to said strip and surrounding said lead wire, a ring of insulating material clamped between one end of said eyelet and the insulating strip to which said eyelet is attached, said lead wire passing through said eyelet and having insulation terminating therein whereby said eyelet protects an end of said insulation, a metal housing enclosing said coil and having an opening receiving said eyelet and ring, said ring serving to insulate said eyelet from said housing, and a connection between said housing and the other end of said coil.

3. A coil construction for electrical apparatus of the class described, comprising in combination a coil formed of many turns of insulated wire, said wire having exposed ends, a sheet of flexible insulating material separating one of said ends from said turns, a lead wire attached to said last-named end, an insulating strip of flexible material overlying said connection, a metal eyelet attached to said last-named strip and surrounding said lead wire, a ring of insulating material clamped between one end of said eyelet and the insulating strip to which said eyelet is attached, said lead wire passing through said eyelet and having insulation terminating therein whereby said eyelet protects an end of said insulation, a metal housing enclosing said coil and having an opening receiving said eyelet and ring, said ring serving to insulate said eyelet from said housing, and a connection between said housing and the other end of said coil.

4. A coil construction for electrical apparatus of the class described, comprising in combination a coil formed of many turns of insulated wire, said wire having exposed ends, a strip of flexible insulating material separating one of said ends from said turns, a lead wire attached to said last-named end, an insulating strip of flexible material overlying said connection, a metal eyelet attached to said last-named strip and surround-

ing said lead wire, a ring of insulating material clamped between one end of said eyelet and the insulating strip to which said eyelet is attached, said lead wire passing through said eyelet and having insulation terminating therein whereby said eyelet protects an end of said insulation, and an insulating wrapping enclosing said coil and strips and forming a unitary assembly thereof, said eyelet and ring projecting through said wrapping.

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