Oct. 4, 1932. R. A. CONNOR ET AL 1,880,821

COIL

Filed June 23, 1930

Fig. 1.

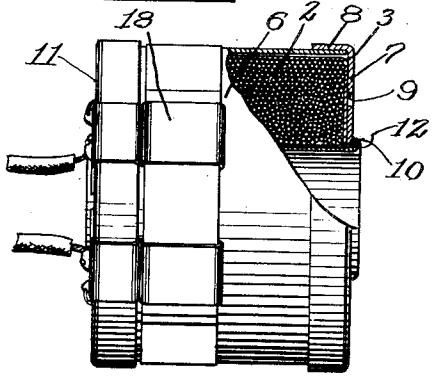


Fig. 2.

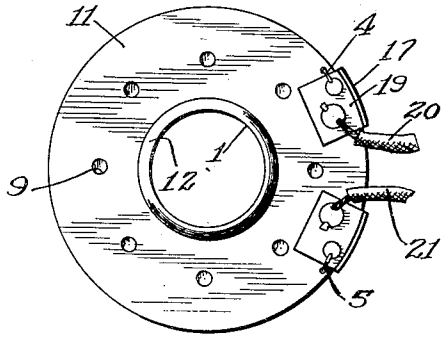


Fig. 3.

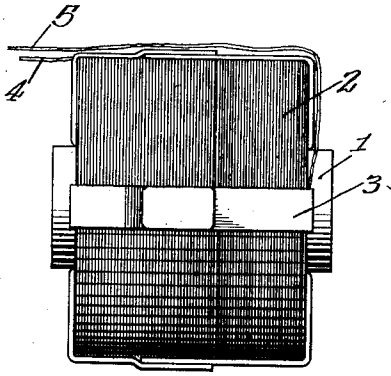


Fig. 4.

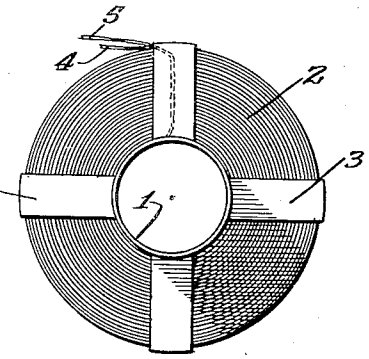
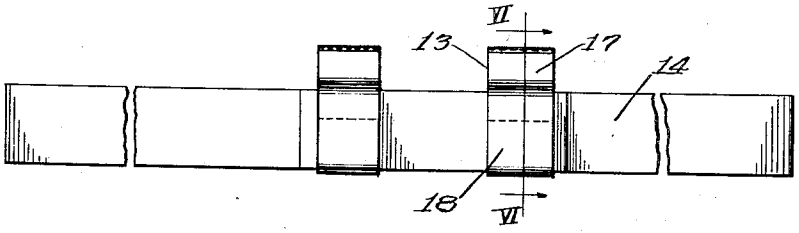


Fig. 5.



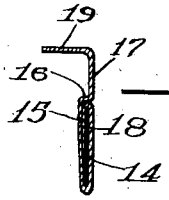


Fig. 6.

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UNITED STATES PATENT OFFICE

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COIL

Application filed June 23, 1930. Serial No. 462,960.

This invention relates to electric coils and concerns itself primarily with improvements in the construction thereof.

In the past, it has been the practice of radio manufacturers to wind in their own factor the coils which are required for the various devices. Since the characteristics of most of these devices necessitate the use of coils having a winding of very fine wire, it was soon evident that there were many disadvantages resulting from this practice, and that it would be more economical to purchase standard coils from a coil manufacturer.

This change, therefore, makes it incumbent upon the coil manufacturer to furnish a coil having exceptional mechanical strength, a coil which may be shipped and subjected to rather rough handling without injuring the fine wire which composes the winding thereof; and, moreover, a coil which is easily adapted to meet the varied conditions of mounting in the devices with which the same may be used.

This last requirement is of particular importance in the case of radio loud speakers, as some speakers are so designed as to make it very desirable that the terminals and terminal connections should be made at the side of the coil; whereas, in other speakers, end connections are to be preferred, for example, where the coil is set into a well in which there is but very little clearance between the coil and the well wall.

To meet these and other requirements, this invention has as an object the provision of a coil which is simple in design and economical to manufacture, and which has very desirable mechanical characteristics.

It is a further object of this invention to provide a coil having an improved outer covering which may be easily applied thereto, and which will effectively protect the winding thereof.

It is also an object of this invention to provide a coil having improved terminals which will not interfere with the mounting of the coil, and which will permit of the terminal leads being connected in divers positions, depending upon the manner in which the coil is mounted.

Other and further important objects of this invention will be apparent from the disclosures in the accompanying drawing and hereinafter more fully described.

The invention, in a preferred form, is illustrated on the drawing and hereinafter more fully described.

On the drawing:

Figure 1 is an elevational view of a coil which embodies the features of this invention;

Figure 2 is an end elevational view of the coil showing the manner in which the terminal connections are made;

Figure 3 is an elevational view of the coil winding before the cover is applied thereto;

Figure 4 is an end elevational view of the coil winding shown in Figure 3;

Figure 5 is a plan view showing the details of the coil terminals; and

Figure 6 is a sectional view showing the manner in which the terminals are secured to a fastening means, taken substantially on line VI—VI of Figure 5.

As shown on the drawing:

As illustrative of this invention, there is shown in Figure 1 a coil structure which embraces the features of this invention. Broadly considered, this structure comprises the usual elements of a coil, an outer covering therefor and coil terminals.

The coil consists of a tubular core 1 having a plurality of turns of wire 2 wound thereon. The winding thus formed is mechanically braced by a plurality of fabric strips 3 extending longitudinally of the core between the core and the inner turns of the coil, said strips being of sufficient length to project from each end of the coil. These strips are carried radially and outwardly

over the end turns of the coil and overlapped upon the outer surface thereof. The ends of the wire forming the coil winding are represented by the numerals 4 and 5, the former being the connection to the inner turns of the coil and the latter being the connection to the outer turns of the coil. The core 1 should be of such a length that when the winding is placed thereon, the ends of the core will project past the end turns thereof, as shown in Figure 3.

The covering for the coil is formed by a cylindrical body member 6 constructed of a fabric material, which forms the wall of a cup-shaped container having a bottom member 7 secured thereto by a peripheral flange 8 which extends over the end of said body member. A plurality of small apertures 9 are provided in the bottom of this container for a purpose which will be explained later, as well as a large central aperture 10 for receiving a projecting end of the core 1. The coil shown in Figure 3 of the drawing is now placed in the cup-shaped container with the inserted end of the core 1 projecting through the aperture 10 in the bottom thereof. A top or cover member 11 which is similar to the bottom member 7 is placed over the other end of the cup-shaped container, the other end of the projecting core extending through a central aperture the same as in the case of the bottom member 7. The ends of the core which are now projecting through the central apertures of the top and bottom of the container are turned back against the outer surface thereof, thereby forming a bead 12 which holds the top and bottom members against the end turns of the coil and the ends of the body member 6.

The coil terminals are formed by means of metal pads 13 which are spaced at intervals along a strip of fabric material 14 having adhesive upon the under side thereof. These pads may be secured to the strip of fabric in any manner desired, the illustrated method, however, being by wrapping the end portion of a strip of metal around the fabric strip and clamping together the turns so formed. The inner turn 15, shown in Figure 6, is provided with an offset portion 16 which brings a portion 17 of the strip into the plane of the outer turn 18. The portion 17 terminates in a right-angle portion 19. The terminals are secured to the tubular member 6 by placing the fabric strip 14 circumferentially thereabout, overlapping the ends of said strip and securing in place by the adhesive on the under side thereof. The portion 17 fits over the flanged portion of the container top, and the right-angle portion 19 lies against the top which now forms one end of the coil covering. The coil ends 4 and 5 are brazed to the portions 19 of the respective terminal pads, and terminal connections 20 and 21 respectively are also soldered to the same portions. As an alternative to this arrangement, the terminal connections may be made to the portions 18 of the terminal pads, when it is more advantageous to have said connections at the side of the coil rather than at the end.

This coil structure is now impregnated with a compound which will flow through the small apertures 9 to the parts inside the covering, thereby sealing the coil within the covering and making a very strong mechanical structure. After impregnating, an end plate in the form of a ring, not shown on the drawing, may be secured over each end of the coil covering, thereby producing a structure having a more finished and workmanlike appearance. The end plate on the terminal end of the coil structure also serves to hold the right-angle portion 19 of the terminal against the top.

This invention, therefore, provides a coil structure of simple design which may be economically manufactured; which has exceptional mechanical characteristics; which has the coil winding protected by a cover which is easily applied thereto; and which is provided with terminals that will not interfere with the mounting of the coil and will permit the terminal leads to be connected in divers positions consistent with the manner in which the coil is mounted.

We are aware that numerous details of construction may be varied through a wide range without departing from the spirit of this invention, and we, therefore, do not purpose limiting the patent granted otherwise than necessitated by the prior art.

We claim as our invention:

1. A coil structure comprising a container having openings therein, a coil in said container, a band of insulating material extending circumferentially around said container and secured thereto, and spaced metal strips carried by said band, said strips extending over an end of said container and connected to the coil leads.

2. In a magnet coil, a terminal structure comprising a circumferential band of insulating material secured to said coil, spaced metallic strips carried by said band for forming terminal connections for said coil.

3. As an article of manufacture, a coil terminal comprising a strip of insulating material, spaced metallic pads carried by said strip, and means for securing the ends of said strip together.

4. As an article of manufacture, a coil terminal comprising a strip of adhesive fibrous material, and metallic pads clamped to said strip at spaced intervals.

5. As an article of manufacture, a coil terminal comprising a strip of adhesive fibrous material, metallic pads at spaced intervals along said strip and extending transversely

thereof, and means for securing said pads to said strip.

6. A coil structure comprising a coil having a tubular core, a casing extending circumferentially around said coil, a cap over each end of said casing having an aperture for receiving an end of the core therethrough, each end of the core being turned back against its associated cap to form a bead for securing the same against removal from said casing, a band of insulating material around said casing and secured thereto, and spaced metallic strips carried by said band, said strips extending over one of said caps and connected to the coil leads.

7. A coil structure comprising a coil having a tubular core, a container for receiving said coil and core, the bottom of said container having a central aperture for receiving one end of said core, which end is beaded over to hold the coil in the container, a cover for said container having a central aperture for receiving the other end of said core which is beaded over to hold the cover against removal from the container, metallic straps secured to the container and bent over said cover to assist in holding the same against removal from the container, and connections from the coil ends to said straps.

8. A coil structure comprising a coil having a tubular core, a container for receiving said coil and core, the bottom of said container having a central aperture for receiving one end of said core, which end is beaded over to hold the coil in the container, a cover for said container having a central aperture for receiving the other end of said core which is beaded over to hold the cover against removal from the container, metallic straps secured to the container and bent over said cover to assist in holding the same against removal from the container, and connections from the coil ends to said straps, the bottom of said container and cover having openings for admitting impregnating material to the interior of said container.

9. A coil structure comprising a tubular core, a cap over each end of the coil, each of said caps having a central aperture in registration with an open end of said core, and a deflected peripheral margin forming a flange extending inwardly over the coil, means interconnecting said core and caps, a fibrous member circumferentially surrounding said coil, the lateral edges of said member overlapping the flanges of said caps, a strip of insulating material extending circumferentially around said coil, and metallic pads connected to said strip, said pads being connected to the coil leads to form coil terminals.

10. A coil structure comprising a tubular core, a cap over each end of the coil, each of said caps having a central aperture in registration with an open end of said core, and a deflected peripheral margin forming a flange extending inwardly over the coil, means for retaining said caps against axial movement relative to said core, a fibrous member circumferentially surrounding said coil, the lateral edges of said member overlapping the flanges of said caps, a strip of insulating member extending circumferentially around said coil, and metallic pads connected to said strip, said pads being connected to the coil leads to form coil terminals.

In testimony whereof, we have hereunto subscribed our names at Fort Wayne, Allen County, Indiana.

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GEORGE A. JACOBS.