June 21, 1932. R. A. CONNOR 1,863,713

COIL AND METHOD OF MAKING SAME

Filed May 1, 1930

Fig. 1

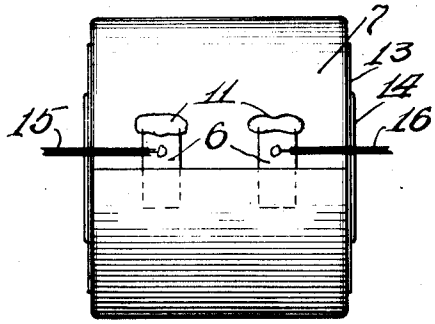


Fig. 2

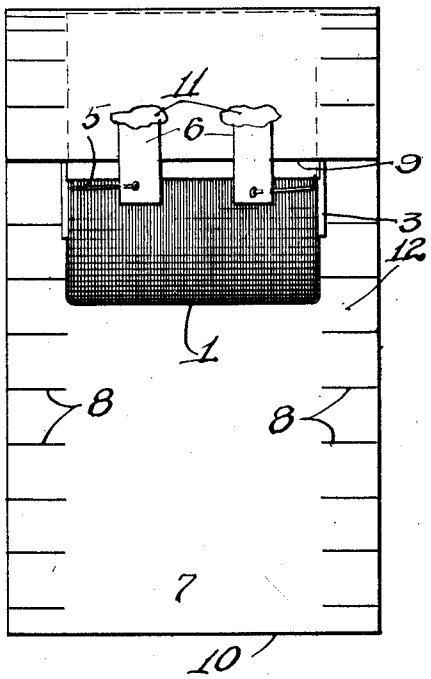


Fig. 3

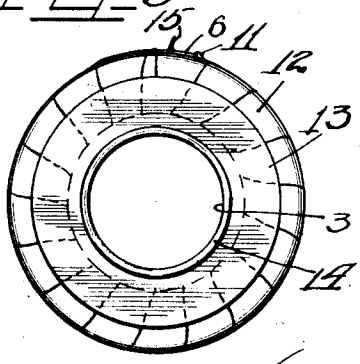


Fig. 4

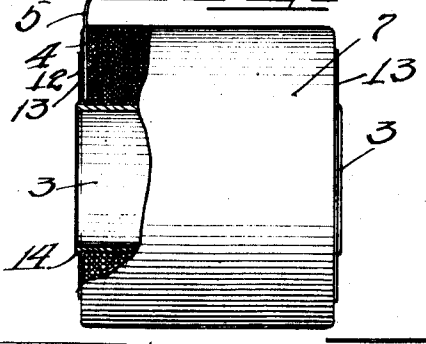


Fig. 5

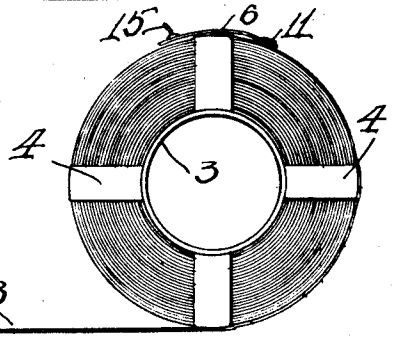
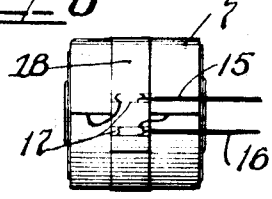


Fig. 6



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UNITED STATES PATENT OFFICE

ROBERT A. CONNOR, OF FORT WAYNE, INDIANA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NATIONAL ELECTRIC PRODUCTS CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY

COIL AND METHOD OF MAKING SAME

Application filed May 1, 1930. Serial No. 448,876.

This invention relates in general to coils for use in electrical devices, and more particularly to an improved method for constructing the same.

It is an object of this invention to provide a coil structure, which is simple in design, which may be constructed economically, and which will at the same time have mechanical characteristics of a very desirable nature.

It is a further object of this invention to provide a coil having a structure which is particularly adapted for rendering the coil water-proof.

It is also an object of this invention to provide an improved terminal connection to which terminal leads may be easily connected, if desired.

The invention comprises the novel structure and combination of parts hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawing, which illustrates a preferred form of this invention, and in which similar reference numerals refer to similar features in the different views:

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

Figure 2 is a plan view of a coil showing a covering partly applied to the outer surface thereof;

Figure 3 is an end elevational view showing the manner of folding the covering over the ends of the coil;

Figure 4 is an elevational view of the coil having a cut-away portion showing the manner of bringing out the connection to the inner turns thereof;

Figure 5 is an end elevational view of the coil showing the covering partly applied thereto; and

Figure 6 is an elevational view showing a modified method of making the terminal connections to the coil.

As shown on the drawing:

As illustrative of this invention, there is shown in Figure 1 a completed coil which embraces the features of this invention. A coil 1 is provided which may be of any construction, but should preferably be a coil such as described in applicant's co-pending application Serial No. 414,396, filed December 16, 1929. In general, this coil consists of a plurality of turns of conductor wound upon a tubular core 3 which may be of fibre or other suitable material. Fabric strips 4 are placed between the inner turns of the conductor and the tubular core, the ends of these strips being carried radially and outwardly over the ends of the coil and overlapped upon the outer surface thereof. The inner connection to the coil is made by means of a conductor 5 which is carried outwardly beneath one of the strips 4. This connection and the manner of bringing the same to the outside of the coil is more fully described in the aforementioned co-pending application.

Having provided a coil of the type just described, metal strips 6 having a small hole extending therethrough are provided. Each of the coil ends is inserted upwardly through the hole in one of these metal strips, bent over and brazed thereto, said brazing being upon the upper surface of the strip. Obviously, these strips may be provided without a hole, in which case the coil ends may be brazed across the face thereof. The metal strips connected in this manner are then arranged so that they will extend longitudinally of the coil circumference, as shown in Figure 2, and a strip of fabric 7 having a plurality of incisions 8 along each lateral edge is wound around the coil. In starting to wind the strip 7 around the coil 1, leading edge 9 should be inserted between the metal strip 6 and the coil proper. The coil is then completely encircled by the strip 7 and the trailing edge 10 lapped over the leading edge 9, the overlapping portions being secured together by means of glue, although it is contemplated that any other well known means may be used. The projecting ends of the metal strips are then secured to the outer surface of the strip 7 by means of an adhesive gum 11 or the like. The flaps 12 which project beyond the ends of the coil are bent over and successively overlapped, as shown in Figure 3, said flaps being secured by adhesive or other means. The ends of the coil are thereby completely covered

except for a small portion thereof which is adjacent the core. In order to entirely cover the coil ends, another member or end ring 13 is provided having a central aperture which closely fits over the end of the tubular core. This end ring, which may be of fabric or other suitable material, is glued or otherwise secured to the exposed surface of the overlapped flaps and the end of the tubular core is bent outwardly to form a bead 14 which lies against said ring. Having the coil thus enclosed, terminal conductors 15 and 16 are, if desired, brazed to the exposed portions of the terminal strips. The entire coil is then dipped or painted with an impregnating compound which will render the same waterproof.

As a modification of the above mentioned structure it is also contemplated that the metal strips 6 may be omitted, in which case the coil ends are brought out between the overlapped ends of the strip 7, as shown in Figure 6. When this construction is used, terminal connections are provided for by clamping metal bands 17 around a strip of fabric 18 having adhesive upon its under side for securing the same to the outer side of the coil covering as formed by the strip 7. In its application to the coil the fabric strip extends circumferentially thereof, the metal bands being arranged so as to have a position near the projecting coil ends. Each coil end is brazed to one of said metal strips, and if terminal conductors are desired, they may be soldered to the respective metal bands 17.

This invention, therefore, provides a simple coil structure having desirable mechanical characteristics, said structure permitting the coil to be economically manufactured. Also, a coil structure is provided which seals the coil and permits the same to be easily waterproofed. Improved coil terminal connections are provided to which terminal leads may be easily connected, if desired.

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

I claim as my invention:

1. A coil structure comprising a coil having a tubular core, a covering extending around the circumference of said coil and lapped over the ends thereof, and an annular plate secured over said lapped portion having a central aperture for receiving the end of the core therethrough, the ends of said core being turned back against said plate to form a bead.

2. A coil structure comprising a coil having a tubular core, a covering extending around the circumference of said coil and lapped over the ends thereof, an annular plate secured over said lapped portion having a central aperture for receiving the end of the core therethrough, the ends of said core being turned back against said plate to form a bead, and means whereby the coil ends are secured externally of said covering.

3. As an article of manufacture, a coil, a fabric strip extending around said coil, the ends thereof being overlapped, lateral portions of said strips being bent over the ends of said coil, a metallic terminal strip having an end extending between the overlapped ends of said fabric strip and connected to an end of said coil, the projecting end of said metallic strip being secured to the outer surface of said fabric strip, and a terminal lead secured to said projecting end.

4. A method for constructing a waterproof magnet coil which consists in providing a strip of fabric having lateral incisions therein, winding said strip around said coil and overlapping the ends thereof, inserting one end of a terminal strip between said overlapped ends at a point inwardly spaced from the lateral edges of the strip thus wound on the coil and connecting a coil end thereto, securing the projecting end of said terminal strip to the outer surface of said strip of fabric, bending the lateral edges of said fabric strip around the ends of said coil, and securing a fabric ring over that portion of the fabric strip which covers the ends of the coil.

5. A method for constructing a waterproof magnet coil which consists in providing a strip of fabric having lateral flaps, winding said strip around said coil and overlapping the ends thereof, the coil ends being brought out between said overlapped ends, bending said flaps around the ends of the coil and securing the same, and then securing a fabric ring over said flaps.

6. A coil structure comprising a circumferentially wound cover member, a member extending over each end of the coil, and flaps on one of said members adapted for securing to the other of said members.

7. In a coil structure, a strip of fabric extending circumferentially around said coil, flaps formed upon the lateral edges of said strip by spaced incisions, said flaps extending beyond the ends of said coil a sufficient amount to cover the same when bent downwardly, and a ring associated with the flaps at each end of the coil.

8. A method of constructing a magnet coil which consists in providing a strip of fabric having lateral flaps, winding said strip around the coil and overlapping the ends thereof, the coil ends being brought out between said overlapped ends, bending said flaps around the ends of the coil and securing the same, and then securing an anchor member to said flaps.

9. A method for constructing a magnet coil which consists in providing a strip of fabric having lateral incisions, winding said

strip around said coil and overlapping the ends thereof, inserting the end of a terminal strip between said overlapped ends and connecting a coil end thereto, securing the projecting end of said terminal strip to the outer surface of said strip of fabric, bending the lateral edges of said fabric strip around the ends of said coil and securing an anchor member to that portion of the fabric strip which covers the ends of the coil.

10. In a coil structure, a strip of material circumferentially wound around said coil to form a casing, a tubular core for said coil, and ring shaped plate members extending outwardly from the ends of said core over the ends of said coil, said end members being secured to the lateral margins of said strip, whereby said strip, end members and core completely enclose the coil.

11. A coil structure comprising a circumferentially wound cover member, a member extending over each end of the coil, certain of said members having deflected portions forming flanges for interconnecting said members.

In testimony whereof I have hereunto subscribed my name at Chicago, Cook County, Illinois.

ROBERT A. CONNOR.