Feb. 9, 1926. 1,572,047

W. S. SHEPHARD

INDUCTANCE COIL FOR USE IN WIRELESS TELEGRAPHY AND TELEPHONY

Filed August 25, 1925

Fig. 1.

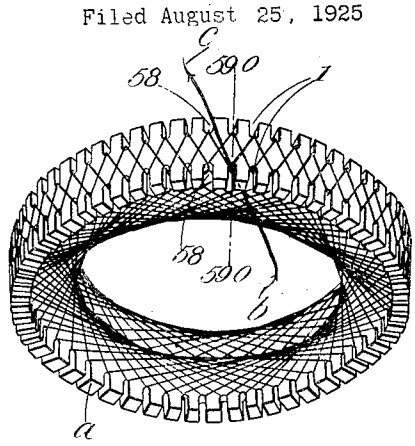


Fig. 2.

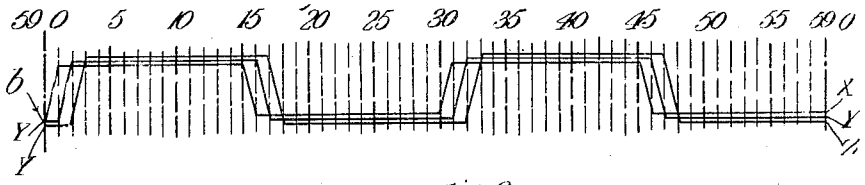


Fig. 3.

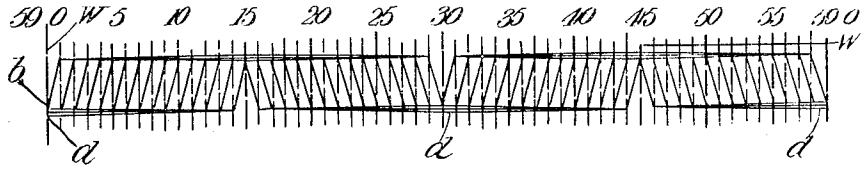


Fig. 4.

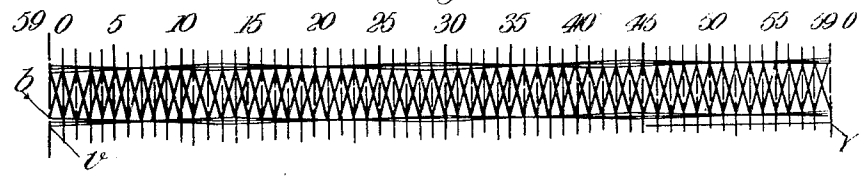
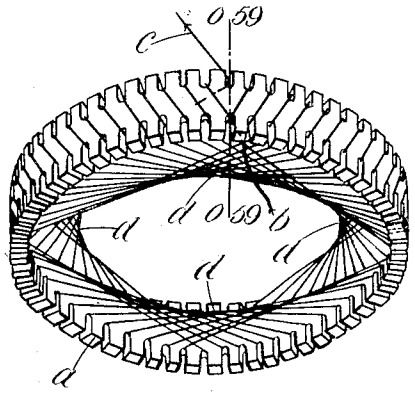


Fig. 5.



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UNITED STATES PATENT OFFICE.

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INDUCTANCE COIL FOR USE IN WIRELESS TELEGRAPHY AND TELEPHONY.

Application filed August 25, 1925. Serial No. 52,377.

To all whom it may concern:

Be it known that I, WALTER STEPHEN SHEPHARD, of 33 Tantallon Road, Balham, London, S. W. 12., England, a British subject, have invented certain new and useful Improvements in Inductance Coils for Use in Wireless Telegraphy and Telephony, of which the following is a specification.

This invention relates to inductance or tuning coils of the kind adapted to be mounted for use, as so called "plug-in" coils particularly with wireless telephonic receiving apparatus, and has for its object to provide an improved form of winding which enables a coil of very low self-capacity to be produced.

In accordance with the invention the covered wire of which such an inductance coil is wound, passes in such a manner, in and out of the individual slots or notches of two series of slots or notches, one series in each end of a ring or like former (hereinafter referred to as a ring) of insulating material (of short axial length in comparison with its diameter or transverse dimension), that said wire, at any given part of the winding, passes out through a slot in one end of the ring, around for a part turn, or straight across from end to end of the outside of the ring, then passes in through a slot in the opposite end of the latter, thence for another part turn chord-like across the ring, out through another slot in the same end of the latter, again around for a part turn, or straight across from end to end of the outside of the ring, in through a slot in the opposite end of the latter, chord-like across the ring to another slot in the same end and so on, never passing in any way interiorly from end to end of the ring producing a coil of U-shaped cross section, the portion of the winding outside the ring forming the bottom or web of the U.

The lengths of the parts of a turn traversed by the wire around the outside of the former are preferably less, but may be greater, then the lengths of the parts of a turn traversed by said wire chord-like across the former, between any two slots through which the wire passes in succession.

If desired, the distance traversed by the wire, chord-like across the former and/or around for a part turn, or straight across from end to end of the outside of said former, may vary in different layers, or even in the winding of a coil of not more than one complete layer, or in any one or more of the individual layers of the winding of a multi-layer coil.

One form of inductance coil constructed according to the invention is illustrated in the accompanying drawings, of which Figure 1 is a perspective view of a one-layer coil, Figures 2, 3 and 4 are diagrammatic developments of the surface of the former showing the winding at various stages, whilst Figure 5 is another perspective view showing the appearance of the coil when one half-layer has been wound on the former.

As shown, the coil comprises a former *a* consisting of a short cylindrical ring of insulating material formed at each end with a series of slots 0—59, corresponding slots (*i. e.*, 1—1, 2—2, etc.) in each series being exactly opposite one another.

The method winding is as follows:—

The covered wire employed is passed, from within the former *a*, out through the slot 59/*o* in one end of the ring, across the outside of the latter and in through the slot 1 in its opposite end, chord-like across the ring and out through the slot 15 in the same end of the latter, across the outside of the ring and in through the slot 16 in its opposite end, and so on. This procedure will be clearly understood from a consideration of Figure 2 of the drawings which shows, diagrammatically, a development of the former *a* with the first three turns of the winding in place, the ends of the first, second and third turns being indicated respectively at X, Y and at Z.

The development shown in Figure 3 and the perspective view in Figure 5 of the drawings, illustrate the appearance of the winding and how, and through which slots, pass the inner and outer ends *b* and *c* respectively thereof, at the completion of one half layer. It will be observed that the thickening indicated at *d*, *d* . . . in Figure 3 corresponds with the crossing of the turns of the winding, also indicated at *d*, *d* . . . in Figure 5 of the drawings.

Figure 1 is a perspective view, and Figure 4 a development, illustrating the appearance of the winding, and how, and through which slots, pass the inner and outer ends, *a* and *b* thereof, respectively, at the completion of one layer (*i. e.*, two half-layers). In this case, it is to be observed that the layer is built up of two exactly similar, but oppositely arranged, half-layers, the one (corresponding with that of Figure 3) shown in

thin lines in Figure 4 and the other in thick lines.

It is desirable that in practice the ring or former *a* shall be as thin as possible, and also, shall be perforated radially between the two series of slots as much as is possible, compatible with sufficiently great mechanical strength, in order that the amount of insulating material in the immediate proximity of the inductance winding may be reduced as far as possible. In the drawings, the ring is shown of substantial thickness and without radial perforations, for the sake of clearness.

In the case of coils having more than one layer, the successive layers may each be wound on to the former directly on top of the immediately preceding layer, but preferably a separating strip of insulating material of suitable length is wrapped circumferentially around the former on the top of each layer before the next is wound. It is desirable that this strip be perforated also. It will be evident that by employing a former *a* having sufficiently deep slots, and by using separating strips of suitable widths, the parts of successive layers which correspond with the lateral limbs of the U may be separated from one another, in addition to the separation of the parts of successive layers corresponding with the bottom of the U.

An inductance coil constructed in accordance with this invention may be mounted for use in any known or convenient manner, and if desired the winding may be tapped at suitable points and switching means may be provided, preferably mounted on the coil or on its mounting, so that any desired fraction, or the whole, of the inductance winding may be utilized at will (also in any known or convenient manner).

Inductance coils constructed in the manner described above, are very robust, have little appreciable self-capacity and are, at the same time, compact and therefore very suitable for use with "plug-in" mountings.

I claim:—

1. An inductance coil of the kind set forth, the covered wire of the winding of which passes in such a manner, in and out of the individual slots of two series of slots, one series in each end of a ring-like former of insulating material and of short axial length in comparison with its transverse dimension and having slotted ends, that said wire, at any given part of the winding, passes out through a slot in one end of the former, then across the outside of the former, then passes in through a slot in the opposite end of the former, thence for a part turn in a radial plane chord-like across the former, out through another slot in the same end of the former, then again across the outside of the former, in through a slot in the opposite end of the former, for another part turn in a radial plane chord-like across the former to another slot in the same end, and so on, never passing in any way interiorly from end to end of the former.

2. An inductance coil of the kind set forth, the covered wire of the winding of which passes in such a manner, in and out of the individual slots of two series of slots, one series in each end of a ring-like former of insulating material and of short axial length in comparison with its transverse dimension, that said wire at any given part of the winding, passes out through a slot in one end of the former, then across the outside of the former for a part turn, then passes in through a slot in the opposite end of the former, thence for another part turn in a radial plane chord-like across the former, out through another slot in the same end of the former, then again across the outside of the former for a part turn, in through a slot in the opposite end of the former, chord-like across the former in a radial plane to another slot in the same end, and so on, never passing in any way interiorly from end to end of the former, and producing a coil of U-shaped cross section of which the portion of the winding outside the former forms the bottom of the U.

3. An inductance coil of the type set forth, as claimed in claim 1, wherein the length of wire which traverses the outside of the former differs from that which traverses chord-like across the former, between any two slots through which the wire passes in succession.

4. An inductance coil of the type set forth, as claimed in claim 2, wherein the length of wire which traverses the outside of the former differs from that which traverses chord-like across the former, between any two slots through which the wire passes in succession.

5. An inductance coil of the type set forth, as claimed in claim 1, wherein the length of wire which traverses the outside of the former between any two slots through which the wire passes in succession is variable throughout the winding of the coil.

6. An inductance coil of the type set forth, as claimed in claim 1, wherein the length of wire which traverses chord-like across the former between any two slots through which the wire passes in succession is variable throughout the winding of the coil.

7. An inductance coil of the type set forth, as claimed in claim 1, wherein the length of wire which traverses the outside and the length which traverses chord-like across the inside of the former between any two slots through which the wire passes in succession are variable throughout the winding of the coil.

WALTER STEPHEN SHEPHARD.