July 16, 1946. E. R. MANN 2,404,185

PROCESS OF MAKING INDUCTANCE COILS

Filed Nov. 11, 1943

Fig. 1

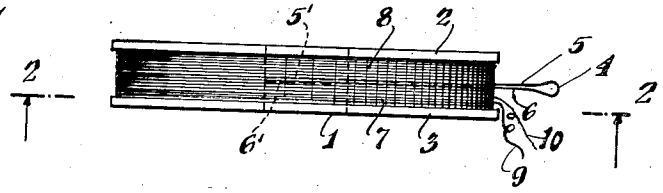


Fig. 2

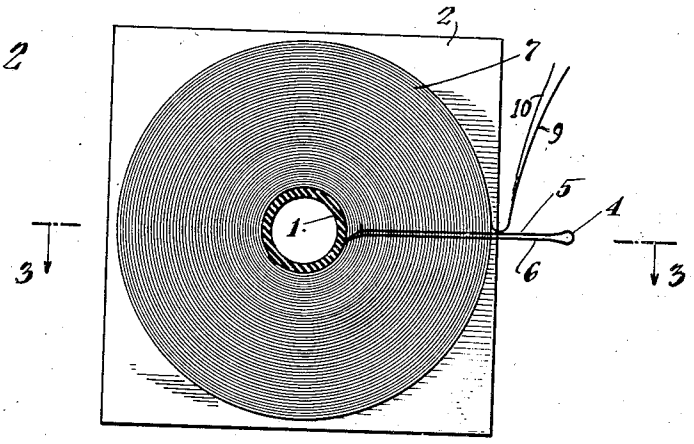
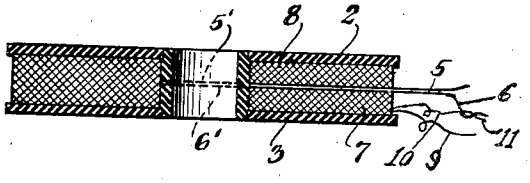


Fig. 3



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PROCESS OF MAKING INDUCTANCE COILS

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6 Claims. (Cl. 29—155.57)

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This invention relates to an inductance coil that is particularly adapted for use in testing metals. It is so constructed and proportioned that it can be so located that it surrounds the metal under test, or the metal pieces being tested can be passed through the opening along the axis of the coil.

In carrying out the invention the coil is so wound that its diameter is large in proportion to its axial length and the diameter of the axial opening preferably ranges from about ¼ of the diameter of the coil to about ¾ of the diameter of the coil.

The coil is so wound that the midpoint of the winding can be readily grounded. The winding is such that the outermost layer of the winding serves as an electrostatic shield for the coil. The terminals may, for example, be connected so that the coil is the inductance in a tuned circuit which constitutes the tank circuit of a vacuum tube oscillator.

The invention may be understood from the description in connection with the accompanying drawing, in which:

Fig. 1 is a plan view of the coil as wound;

Fig. 2 is a section along the line 2—2 of Fig. 1; and

Fig. 3 is a section along the line 3—3 of Fig. 2.

In the drawing, reference character 1 indicates a short hollow mandrel of rigid insulating material to the ends of which parallel square plates or sides 2 and 3 of similar material are attached.

The insulating wire that is to be wound upon the mandrel to form the inductance coil is cut to the required length and is in one piece. It is folded at the middle point 4 and the folded portions 5 and 6 are placed radially of the mandrel 1 between the plates 2 and 3. The two halves of the wire are then wound around the mandrel 1, as indicated in dotted lines 5′ and 6′, by turning the mandrel 1 and sides 2 and 3 and permitting the portions 5 and 6 of the wire to turn with them. In other words, the free unwound portions of the wires are kept side by side and the mandrel 1 is turned carrying the loop 4 around so that the two halves of the wire form layers on the mandrel 1 to the desired depth.

This process is continued until the desired number of turns or length of wire has been wound on the mandrel 1 to give the inductance desired. The free ends of the wire are indicated at 9 and 10. The wire is then cut at the middle of the loop 4, and the end portion 6 of one-half of the winding with the insulation removed therefrom is connected to the similarly treated end portion

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10 of the other half of the winding. These ends are well connected electrically, as by twisting the wires together, as shown at 11, and soldering. The coil may be grounded at the exact center by connecting the twisted portion 11 to ground.

The portions 5 to 6 and 9 to 10 of the wire are exact duplicates, so that the two halves of the coil have exactly the same inductance. They are therefore particularly suitable to be used as the inductance in the tank circuit of a push-pull oscillator with the loop 11 grounded.

The following is given as a specific example of the invention:

100 feet of No. 30 B & W gauge wire was folded at the middle to form a loop and was wound on a spool of rigid insulating material about $\frac{1}{16}$ of an inch thick, consisting of a cylinder 1 about one inch in diameter and ⅜ inch long with a wall thickness of $\frac{1}{16}$ inch. Square plates about two inches along each edge of the same material were attached to the ends of the cylinder to complete the spool. The wire was folded at the middle and the folded portion was placed midway between the plates with the folded loop extending radially slightly beyond the edges of the plates. The spool was turned while the loop was caused to turn with it, thus winding the two portions of the wire on the mandrel simultaneously until the wire had been wound up with the loop extending radially beyond the periphery of the windings. The loop was cut, and the cut end of one coil was connected to the outer end of the other coil to provide a suitable point to be grounded. The remaining ends were thus available for connecting the coil in a circuit.

What is claimed is:

1. The process of making an induction coil, which comprises forming a loop in an insulated wire, locating the looped portion substantially radially on a spool, and winding the two portions of the wire extending from the loop simultaneously.

2. The process of making an induction coil, which comprises forming a loop in an insulated wire, locating the looped portion substantially radially on a spool, and winding the two portions of the wire extending from the loop simultaneously in a succession of layers.

3. The process of making an induction coil, which comprises forming a loop in an insulated wire, locating the looped portion substantially radially on a spool, and winding the two portions of the wire extending from the loop simultaneously in a succession of layers terminating radially short of the beginning of said loop.

4. The process of making an induction coil, which comprises forming a loop in an insulated wire, locating the looped portion substantially radially on a spool, winding two coils of the wire simultaneously by beginning the winding near the loop, cutting the loop, and connecting the cut end of one coil to the other end of the other one.

5. The process of making an inductance coil, which comprises folding a wire, locating the folded portion substantially radially of a mandrel, winding the two halves of said wire around said mandrel by turning said mandrel and permitting said folded portion to turn with said mandrel.

6. The process of making an inductance coil, which comprises folding a wire, locating the folded portion substantially radially of a mandrel, winding the two halves of said wire around said mandrel by turning said mandrel, permitting said folded portion to turn with said mandrel, and cutting said folded portion and connecting one end thereby formed to the outer end of the other half of the winding.

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