March 29, 1966 G. L. COLLINS 3,243,750

METHOD OF WINDING TOROIDS AND TOROIDS PRODUCED THEREBY

Filed March 2, 1961

FIG. 1.

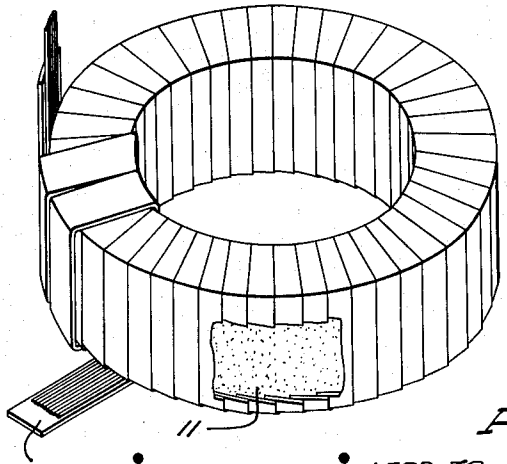


FIG. 2.

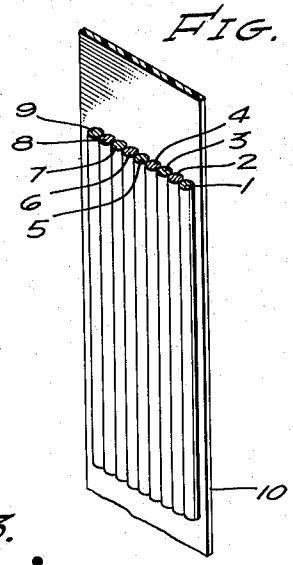


FIG. 3.

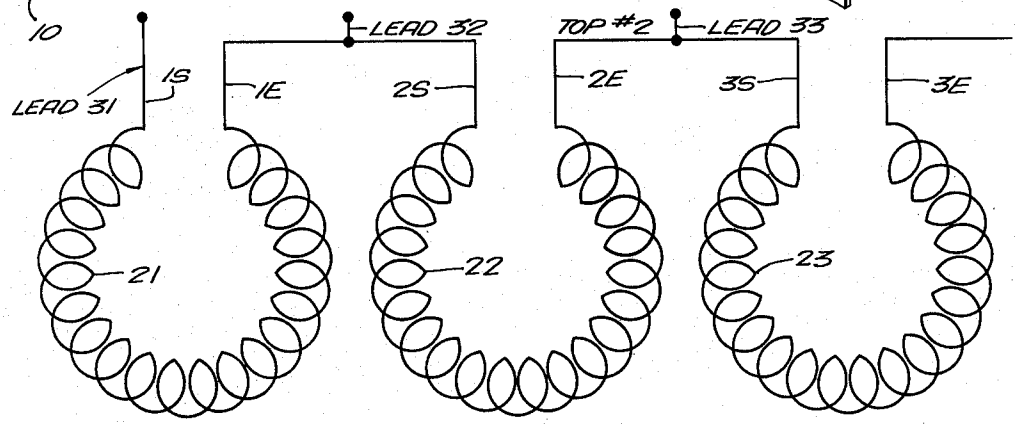


FIG. 4.

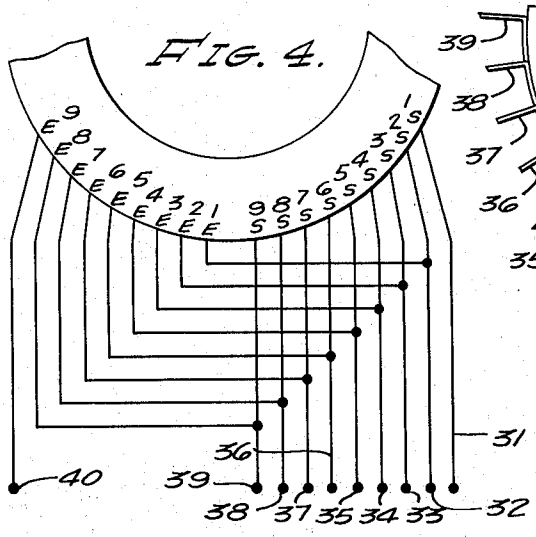
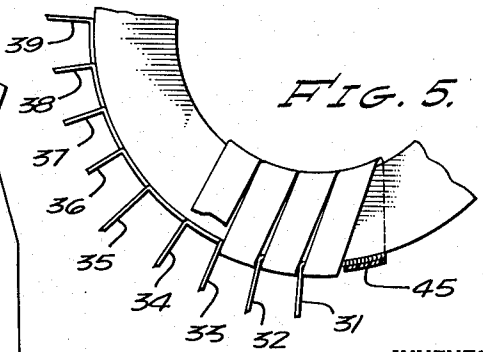


FIG. 5.



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2 Claims. (Cl. 336—150)

The present invention relates to the coil winding art and has particular usefulness in the manufacture of a tapped toroidal coil wherein it is desired that each section of the winding between taps thereon have and provide substantially identical electrical and magnetic properties.

In the manufacture of certain tapped coils such as, for example, a tapped coil wound on a toroidal-shaped core structure, it is desirable that each section between taps have the same electrical resistance, the same electrostatic capacitance, and produce substantially the same magnetic effect in the core when a current traverses the winding so that the tapped coil may be used as, for example, a potential divider dividing the potential applied thereto evenly between taps or, for example, as an inductance unit wherein the inductance measured between different taps is substantially the same.

The present invention has as one of its objects the provision of new means and techniques whereby these indicated desirable results are accomplished in a simple, inexpensive manner which when practiced assures obtainance of these results.

Briefly, as exemplified herein, a plurality of wires are first mounted in side-by-side relationship on a flexible strip of insulating material; the strip is then wound around the core, after which opposite ends of adjacent wires are interconnected at junction points defining the taps of the coil.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. This invention itself, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best understood by reference to the following description taken in connection with the accompanying drawings in which:

FIGURE 1 is a perspective view illustrating a toroidal coil structure during one stage in its manufacture and shows a portion of the winding broken away to show the toroidal core.

FIGURE 2 illustrates a portion of the wire-mounting flexible strip which is wound around the core.

FIGURES 3 and 4 illustrate the manner in which opposite ends of adjacent wires in FIGURES 1 and 2 are interconnected.

FIGURE 5 illustrates a portion of the finished structure.

Referring to the drawings, the structure appears to be best described by the manner in which it is fabricated.

Initially a plurality of nine-enamel-covered wires **1–9** are mounted or affixed to an elongated strip **10** of insulating material as, for example, of pressure-sensitive Mylar, by gluing or by direct bonding with the enamel-covered wires **1–9** using heat and/or pressure in the process, the wires being insulated from each other by their enamel coating.

The strip **10** with the wires thus affixed thereto is wound around the toroidal core **11** which is illustrated as being generally square in cross section, the result being that the wires are wound simultaneously as a group with the

spacing between wires corresponding to the same turn being always of the same equal spacing. The strip **10** may be wound either such that opposite sides thereof abut or are spaced from each other or overlap somewhat and, of course, the strip **10** may be wound either as a single layer on the core **11** or in multilayers.

It will thus be seen that a single winding of tape **10** results in winding of a plurality of coils as illustrated in FIGURE 3 wherein the coil **21** corresponds to wound wire **1**, coil **22** corresponds to wire **2** and coil **23** corresponds to wire **3**. For convenience of reference and explanation, adjacent ends of the wires on the starting end of strip **10**, i.e. that end of strip **10** which is first wound on the core, are characterized by the letter S, denoting start; and the other ends of the same wires are characterized by the letter E, denoting end.

The starting end **1S** of wire **1** constitutes one end of the finished winding and is designated also as lead **31**. The ending end **1E** of wire **1** and the starting end **2S** of wire **2** are interconnected and define a first tap to which lead **32** is connected, the same being, for example, an extension of either wire end **1E** or wire end **2S**. Likewise, the ending wire end **2E** is connected to the starting wire end **3S** to define a second tap to which the lead wire **33** is connected. In like manner the other starting and ending ends of the other wires are interconnected to provide taps which are connected to corresponding leads **34, 35, 36, 37, 38** and **39**. The tenth lead **40** corresponds to the wire end **9E**.

These various leads **31–40**, also being enamel-covered wire for insulation purposes, may be uniformly spaced and secured around the outer periphery of the assembly by insulating tape **45** wound so that successive ones of such leads extend through small openings between adjacent turns of the finishing and securing tape **45**.

While the particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

I claim:

1. In the method of forming a tapped coil of wire on a ring-shaped core, the steps including mounting a plurality of wires on an elongated narrow flexible strip of nonmagnetic insulating material with such wires being spaced from each other and extending generally parallel to each other and longitudinally of said strip, said strip being much narrower than the circumference of said ring-shaped core, spirally winding said strip with said wires thereon generally radially around said ring-shaped core with said wires between said strip and said ring-shaped core such that adjacent turns of said strip are spaced circumferentially around said core with said strip covering said wires, and interconnecting individual different ends of different ones of said wires in a series circuit such that each wire produces an additive magnetic field in said ring-shaped core when current flows in said series circuit.

2. A tapped coil on a ring-shaped core, including a ring-shaped core, a narrow elongated strip of nonmagnetic insulating material, a plurality of parallel extending wires mounted longitudinally on and under said strip, said strip being much narrower than the circumference of said ring-shaped core and being spirally disposed around said core such that adjacent turns of said strip are spaced circumferentially around said core member, and in-

dividual different ends of different ones of said wires being interconnected in a series circuit such that each wire produces an additive magnetic field in said ring-shaped core member when current flows through said series circuit.

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