Aug. 21, 1923. 1,465,546

H. P. DONLE

INDUCTANCE

Filed Feb. 11, 1921

Fig. 1.

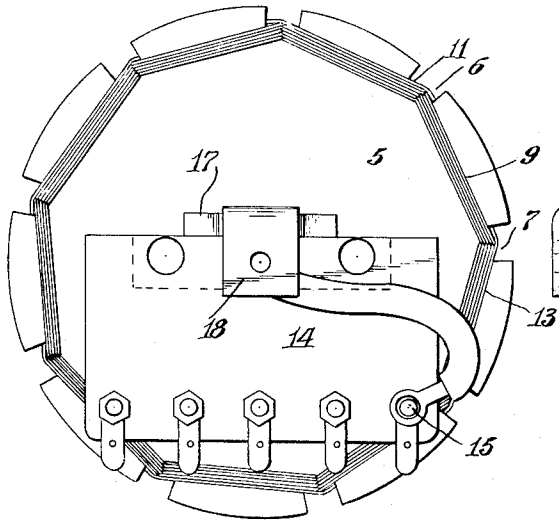


Fig. 2.

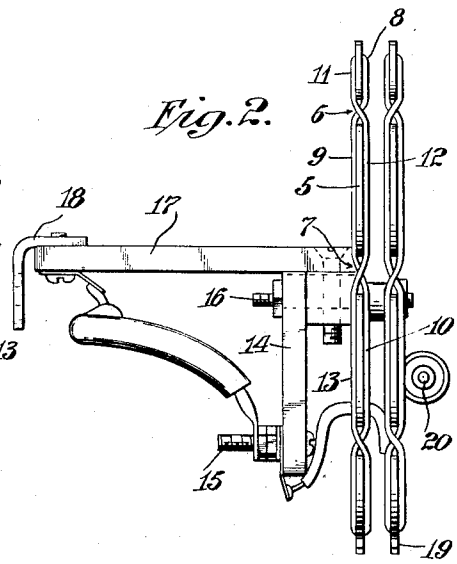


Fig. 3.

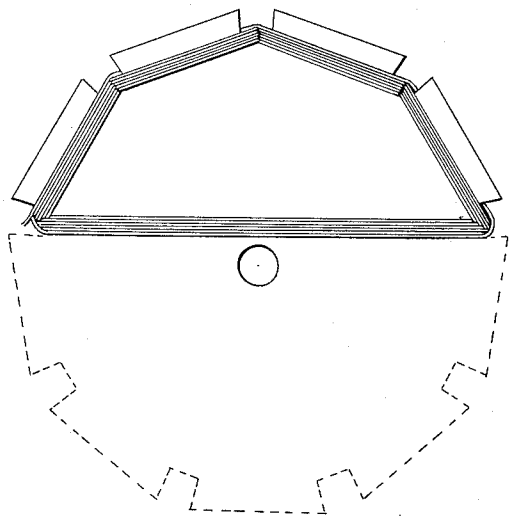
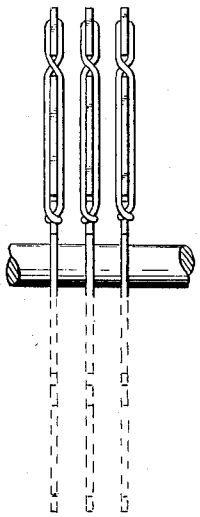


Fig. 4.



Attest:

O. Mitchell

by

Inventor:

H. P. Donle

Whitley & Allyn Attys

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UNITED STATES PATENT OFFICE.

HAROLD POTTER DONLE, OF MERIDEN, CONNECTICUT, ASSIGNOR TO THE CONNECTICUT TELEPHONE & ELECTRIC COMPANY, INCORPORATED, OF MERIDEN, CONNECTICUT, A CORPORATION OF CONNECTICUT.

INDUCTANCE.

Application filed February 11, 1921. Serial No. 444,213.

To all whom it may concern:

Be it known that I, HAROLD P. DONLE, a citizen of the United States of America, residing at Meriden, Connecticut, have invented a new and useful Inductance, of which the following is a specification.

My invention relates particularly to a construction for use in radio signalling work. For radio frequency circuits a thin disc-like winding is for many reasons a desirable type. Spiral windings, one turn thick have been used and have many advantages largely of a mechanical nature, but the disadvantage of high distributed capacity and difficult to construct. To overcome these difficulties, I have constructed a simple and inexpensive form of inductance, the preferred form of which comprises a disc of insulating material having peripheral slots with a single length of wire woven back and forth through these slots. These slots are preferably narrow compared to the distance between the slots and the wire in adjacent turns runs parallel over a large portion of each turn.

Figs. 1 and 2 are front and edge views respectively of one construction embodying the improvements of my invention and showing two discs.

Fig. 3 is a front view of another form of construction embodying my invention, and Fig. 4 is an edge view showing three discs.

The insulating disc or plate 5 may be formed of fibre, formica or other suitable insulating material having an odd number of broad flat arms 4 and slots, such as 6 and 7 around the outer edge. The shape of this disc and the number of slots is immaterial.

A single length of wire is wound back and forth through these slots beginning at the inner ends of the slots and working outwardly so that adjacent lengths of wire in a given turn lie on opposite sides of the disc and the corresponding lengths of wire in the next layer lie on opposite sides of the disc, the lengths of adjacent layers crossing each other at more or less abrupt angles in the slots. For instance, the length 8 of wire is on one side of the disc, the length 9 is on the opposite side and the length 10 is on the side with length 8. In the next layer, the length 11 is opposite 8, 12 is opposite 9, and 13 is opposite 10, with the wire crossing abruptly in the slots 6 and 7. By this construction, we are able to secure a considerably lower distributed capacity than is possible with an ordinary flat spiral and without materially reducing its inductance or increasing its resistance. It is, therefore, possible to concentrate the inductance in a very thin and convenient form having a low distributed capacity, a low resistance and at the same time a considerable inductance.

In the form shown in Figs. 1 and 2, an insulating plate 14 is provided which carries a number of binding posts 15 and 16 for the terminals of the coils and for connection to such intermediate portions of the wire as may be desirable. Another plate 17 is shown at right angles to plate 14 and carrying a terminal 18. In this particular construction the disc 19 is mounted with the disc 5 and may have a terminal 20 on the back. It should be understood however that this is merely one embodiment of the invention.

It should be understood that this method of winding is also adapted for forms other than circular coils. For instance, in Fig. 3, I have shown a semi-circular type of coil. Obviously, two of these coils may be wound on the same disc. By using two of these duplex semi-circular coils, one coil being free to rotate on its axis with relation to the other, it is possible to alter the total inductance of the circuit. By using three discs, each carrying two windings in series, a convenient form of variometer may be provided.

By my invention, it is possible to considerably increase the range of frequency over which the coil may be used.

I claim:—

1. An inductance coil, comprising a single coil of wire wound spirally but zig zag from side to side of a central plane, adjacent sections of successive layers being substantially parallel to each other but on opposite sides of said plane, the central portion of each section being straight throughout a substantial length.

2. An inductance coil, comprising a single coil of wire wound spirally but crossing zig zag from side to side of a central plane, adjacent sections of successive layers being substantially straight and parallel to each other for substantial lengths midway between the points of crossing.

3. An inductance coil, comprising a flat disc of insulating material having flat sided

arms and slots at intervals around its periphery, and a coil of wire wound spirally back and forth through said slots, successive layers crossing in the slots with abrupt bends at the edges of the arms.

4. An inductance coil, comprising a flat disc of insulating material having narrow slots at intervals around its periphery, and a coil of wire wound in lengths back and forth through said slots, successive layers crossing in the slots with abrupt bends at the edges of the slots and adjacent lengths of successive layers being parallel and on opposite sides of said discs.

5. An inductance coil, comprising a disc of insulating material having arms and slots at intervals said slots being narrower than said arms and a single length of wire wound in a spiral back and forth on said arms through said slots and affording a low distributed capacity and a low resistance.

6. An inductance coil, comprising a single length of wire wound spirally but crossing zig zag from side to side of a central plane, the portions of the wire which lie on opposite faces of the coil being substantially straight between the points of crossing, all of the portions between two adjacent radial lines of crossing being substantially parallel to each other and to the central plane, whereby the coil is of low distributed capacity.

7. An inductance device comprising a disk having insulating arms radiating therefrom of materially greater width than thickness, and a spirally-wound conductor alternating on opposite sides of adjacent arms.

8. In an inductance device, a single spirally-wound conductor having successive sections of successive layers intermittently offset and parallel to opposite sides of a central plane, and an insulating support therefor.

9. In an inductance device of low distributed capacity, a conducting wire wound in a spiral and zigzag course with alternate parallel sections on opposite sides of a central plane.

10. In an inductance device, an uneven number of flat radiating insulating arms of greater width than thickness and with spaces between arms narrower than said arms and a spirally-wound conductor interwoven with the arms.

11. In an inductance device, a conducting wire wound in a spiral and zigzag course with alternate straight parallel sections on opposite sides of a central plane, adjacent spiral convolutions being supported one on the other at intervals.

12. In an inductance device, a plurality of flat radiating arms with spaces between the arms, the widths of the arms being substantially greater than the widths of the spaces, and a conductor spirally interwoven with said arms and crossing in said spaces.

13. An inductance device comprising a disc having tapered arms and a conductor spirally interwoven therewith.

14. An inductance device comprising tapered supporting members and a conductor wound zig zag back and forth on opposite sides of said members.

15. An inductance device comprising flat arms broader at the outer ends than at the inner ends and a conductor interwoven therewith.

16. An inductance comprising a plurality of concentric turns of wire, each turn consisting of a plurality of straight lengths and connecting cross lengths, the straight lengths being arranged in parallel planes, adjacent straight lengths of each turn being arranged on opposite sides of a central plane and adjacent turns crossing each other at progressively increasing radii.

17. A thin polygonal inductance comprising a conductor wound zig-zag from side to side of a central plane, each turn consisting of substantially straight lengths in parallel planes connected by cross lengths.

HAROLD POTTER DONLE.