

A. M. CURTIS.
CONSTRUCTION OF REACTANCE COILS.
APPLICATION FILED AUG. 16, 1917.

1,367,734.

Patented Feb. 8, 1921.
2 SHEETS—SHEET 1.

Fig. 1.

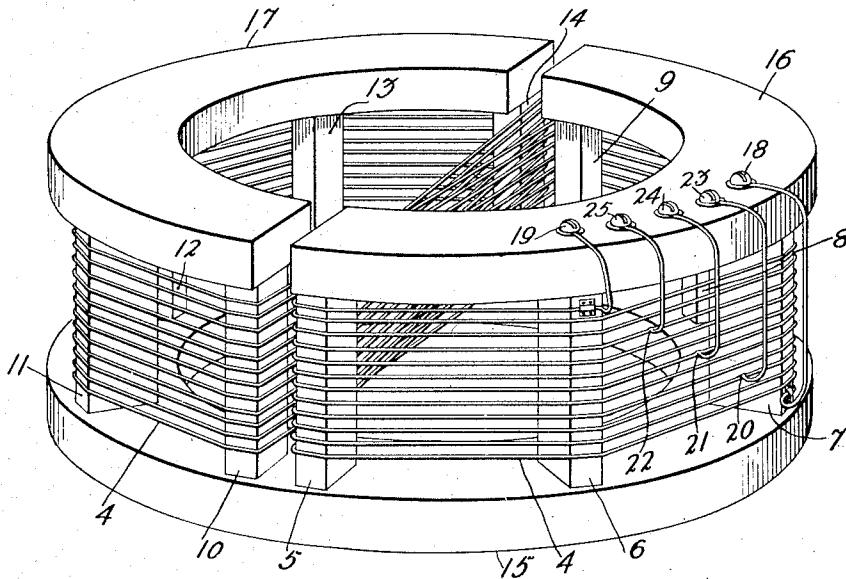
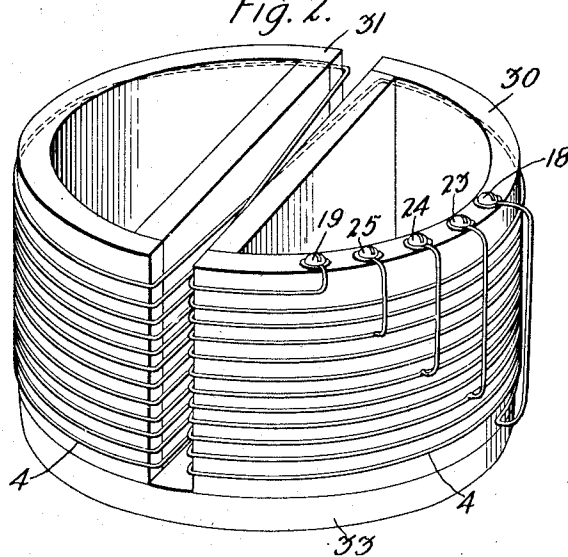


Fig. 2.



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Fig. 3

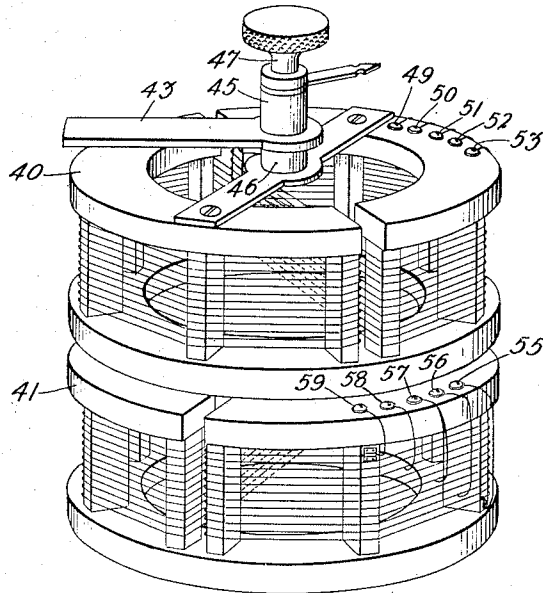
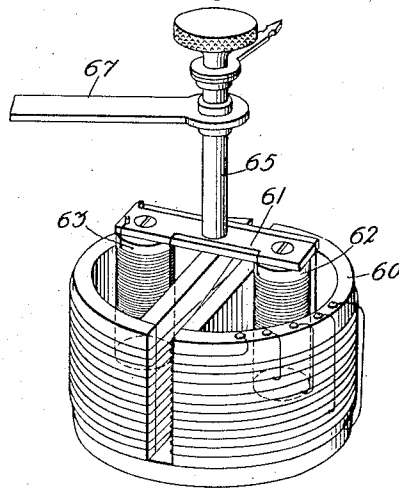


Fig. 4.



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UNITED STATES PATENT OFFICE.

AUSTEN M. CURTIS, OF BROOKLYN, NEW YORK, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

CONSTRUCTION OF REACTANCE-COILS.

1,367,734.

Specification of Letters Patent.

Patented Feb. 8, 1921.

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To all whom it may concern:

Be it known that I, AUSTEN M. CURTIS, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in the Construction of Reactance-Coils, of which the following is a full, clear, concise, and exact description.

This invention relates to improvements in the construction of reactance coils.

In radio telephony, radio telegraphy and in other systems where high frequency oscillations are employed, it is often desirable to employ an inductance coil which has no external field, and which, consequently, does not affect, and is not affected by, apparatus in its immediate neighborhood. Heretofore in such cases, toroidal coils have usually been employed, but there are decided objections to their use at any but relatively low frequencies, such as 30,000 cycles per second, or less. If a large inductance is desired in the shape of a toroidal coil, it is necessary either to wind it in several layers, or else make the coil inconveniently large in diameter. But if the coil is wound in more than one layer, its resistance increases very rapidly with the frequency on account of the large distributed capacity and eddy current losses.

In accordance with this invention, these objections are avoided by having the conductor wound on a structure composed of two semi-cylindrical forms, and it is preferable that the wire be wound alternately on the two portions. The external fields of force of the two halves will be in opposite directions so that the resultant external field is substantially zero, and the coils may be properly called astatic. Such a coil may be so positioned that it does not affect and is not affected by apparatus in its immediate neighborhood.

This invention will be better understood by reference to the following detailed description, taken in connection with the accompanying drawings, in which Figure 1 represents a reactance coil wound in accordance with the method disclosed in this invention; and Fig. 2 represents a modification of the form on which the conductor is wound. In Fig. 3 is illustrated a variometer, the two coils of which are wound in accordance with this invention. Fig. 4 illus-

trates a variometer in which only one of the coils is wound in accordance with this invention.

In Fig. 1, the structure on which the wire 4 is wound consists of a plurality of posts or upright pieces 5 to 14, inclusive, composed of a suitable insulating material, such as wood, set in a baseboard 15. The top piece is divided into two parts 16 and 17 for convenience in winding the wire around the frame. Beginning with the terminal 19, the wire is alternately wrapped around posts 5 to 9, inclusive, and 10 to 14, inclusive, until the other terminal 18 is reached. Taps are provided at various points, such as at 20, 21 and 22, which are connected to the terminals 23, 24 and 25, respectively. With such an arrangement, if it is desired to use less than all the wire, say just the amount between terminal 18 and terminal 23, it is apparent that there will be substantially the same amount of wire used on the two halves of the coil so that the external field will still be practically zero,—an important consideration in radio work where high frequency oscillations are employed.

In Fig. 2 the wire 4 is shown wound on a modified form composed of the two semi-cylindrical forms 30 and 31, suitably mounted on a baseboard 33. As in Fig. 1, the wire is wound alternately on the two halves.

Fig. 3 shows two coils 40 and 41 of the type illustrated in Fig. 1, the coil 40 being supported in a suitable manner above the coil 41 by the supporting arm 43, which rests between the two collars 45 and 46 in such a manner that the coil 40 may be revolved about its vertical axis by the spindle 47. When these coils 40 and 41 are connected in series or in parallel with each other, maximum self-induction will be obtained when those halves of the two coils carrying the current in the same direction are superimposed; when halves carrying current in opposite directions are superimposed, the self-induction will be a minimum. By means of a plurality of taps 49–53 inclusive, and taps 55–59 inclusive, any desired amount of wire on each coil may be employed.

It may often be found desirable to employ a variometer of the form shown in Fig. 4 in which only the coil 60 is wound so as to have a low external field. Herein it is shown in the form of Fig. 2. The second

coil 61 of the variometer is shown wound in any suitable manner upon two cylinders 62 and 63. The spindle 65 is so constructed that it will slide through the supporting arm 67 in order that the cylinders 62 and 63 may be lifted clear of the coil 60 and their positions reversed with respect to the halves of the latter coil.

It is obvious that various other modifications may be made in the supporting structure for the above described reactance coils, without in any wise departing from the spirit of this invention. It is evident that the coils may be composed of any desired number of turns of wire, and that the wire may be tapped permanently or otherwise at a suitable number of points to enable a variation of the value of the inductance to be obtained.

What is claimed is:

1. A reactance coil composed of a conductor wound alternately and in opposite directions in the two halves of the coil to form complete turns substantially the shape of the figure 8 whereby the external field of said coil is reduced to a low value.

2. A reactance coil composed of a conductor, and a suitable supporting frame upon which said conductor is wound, said frame being divided substantially into halves and said conductor being wound alternately on said halves and in opposite directions to form complete turns substantially the shape of the figure 8.

3. A reactance coil composed of a conductor, and a frame upon which said conductor is wound, said frame being longitudinally divided into halves and said conductor being

wound alternately on said halves and in opposite directions.

4. A reactance coil composed of a conductor, a substantially cylindrical frame upon which said conductor is wound, said frame being longitudinally divided into halves, said conductor being wound alternately on said halves and in opposite directions, and means for varying the value of said inductance.

5. A variometer consisting of two coils superimposed on each other, one of said coils being composed of a conductor wound alternately and in opposite directions in the two halves of the coil whereby the external field of said coil is reduced to a low value.

6. A variometer consisting of two coils superimposed on each other, one of said coils being composed of a conductor and a suitable supporting frame upon which said conductor is wound, said frame being longitudinally divided into halves and said conductor being wound alternately on said halves and in opposite directions.

7. A variometer consisting of two coils superimposed on each other, each of said coils being composed of a conductor and a suitable supporting frame upon which said conductor is wound, said frame being divided substantially into halves, and said conductor being wound alternately on said halves and in opposite directions.

In witness whereof, I hereunto subscribe my name this 11th day of August A. D., 1917.

AUSTEN M. CURTIS.