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April 27, 1926. 1,582,683

F. T. HARMON

RADIO COIL AND PROCESS OF MAKING SAME

Filed March 19, 1925

Fig. 2

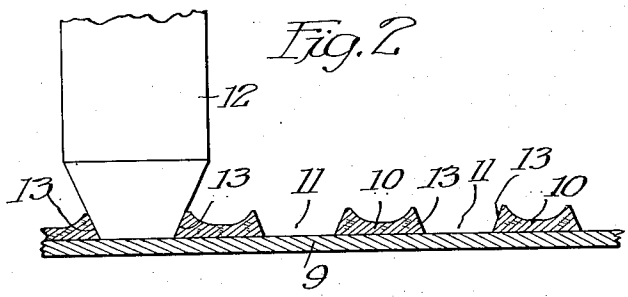


Fig. 1

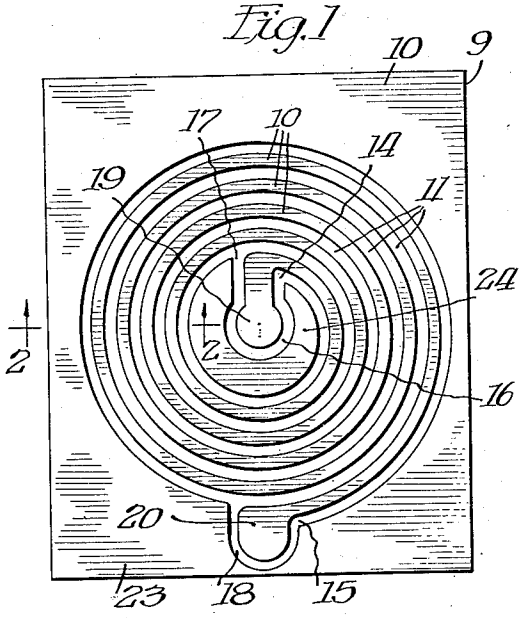


Fig. 3

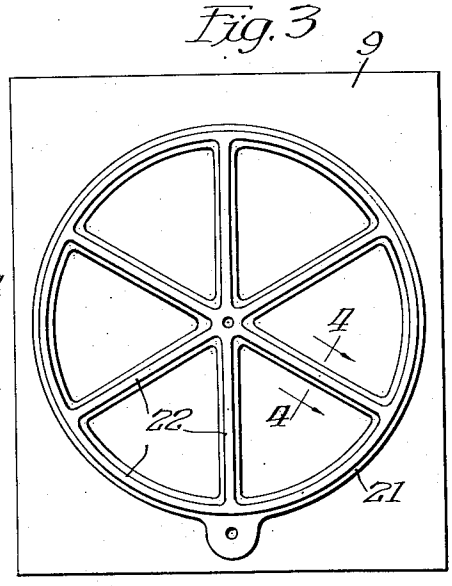
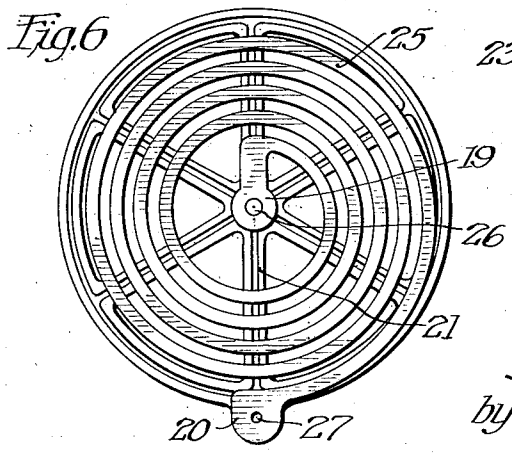


Fig. 6



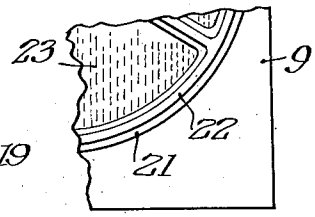
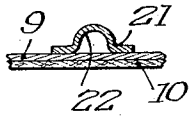


Fig. 5

Fig. 4



Inventor:
Francis T. Harmon,
by Fisher, Towle, Clapp & Sears
Attys.

Patented Apr. 27, 1926. 1,582,683

UNITED STATES PATENT OFFICE.

FRANCIS T. HARMON, OF CHICAGO, ILLINOIS.

RADIOCOIL AND PROCESS OF MAKING SAME.

Application filed March 19, 1925. Serial No. 16,619.

To all whom it may concern:

Be it known that I, FRANCIS T. HARMON, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Radiocoils and Processes of Making Same, of which the following is a specification.

This invention relates to radio coils and method of making the same but more particularly to coils of the "pan-cake" type in which the wire is wound in a flat spiral, and has for its primary object to provide an improved coil of this class and a simple, economical and efficient method of producing the same.

Further important objects of this invention are to provide a coil having low loss and capacity and high inductance. The many other objects and advantages of my invention will be better understood by reference to the following specification when considered in connection with the accompanying drawing illustrating a selected embodiment thereof, in which:—

Fig. 1 is a front plan view of a partially completed coil.

Fig. 2 is an enlarged transverse section on the line 2—2 of Fig. 1.

Fig. 3 is a rear plan view of the coil shown in Fig. 1 after a reinforcing spider has been attached thereto.

Fig. 4 is an enlarged transverse section on the line 4—4 of Fig. 3.

Fig. 5 is a fragmentary rear plan view, illustrating a step in the manufacture of the coil, and

Fig. 6 is a front plan view of the completed coil.

The construction and characteristics of my improved radio coil will be best understood by considering the method of making the same, and reference may be had to the drawing in which the various steps are illustrated. I use a sheet as 9 of copper of the required gauge, generally from .001 to .02 inches, but preferably about .004 inches, and upon one face of this sheet I apply a coating of resist as 10, or any suitable composition such as asphaltum which will resist the action of etching fluids.

A spiral groove as 11 is next cut in the resist and this may be accomplished in a variety of ways but I prefer to mount the sheet in a lathe and perform the cutting by means of a tool as 12 held in the cross-slide of the usual saddle (not shown). The groove should extend through the resist and expose the metal of the sheet. The tool is preferably a heated copper stylus or soldering iron having its operating end shaped as indicated in Fig. 2. This tool bakes the edges 13 of the resist bordering the groove and firmly cements the same to the sheet. In the form of the coil illustrated in Fig. 1 the tool is first applied to the sheet substantially at the point designated 14 (Fig. 1), and the grooving of the resist by this tool continues until the tool has advanced sufficiently to provide the desired number of convolutions as to 15. A groove as 16, in the resist extending from the inner termination 14 of the groove 11 to and connecting with the next outer convolution of the spiral as at 17, may be cut by a manually operated tool or in any other convenient manner. A similar groove as 18 connects the outer end of the spiral groove 11 with the next convolution. These form terminal tabs as 19 and 20 on the finished coil, as will be presently described.

I next cement upon the back of the sheet 9 a reinforcing spider, as 21, of celluloid, mica, or other suitable material by means of a celluloid solution or other form of adhesive which is non-soluble in benzol. This spider may be formed in any suitable manner but I prefer to provide the same with a reinforcing rib as 22.

The next step is the applying of a coating of resist, preferably translucent, to the exposed portions of the back of the copper sheet within the spider, as indicated by shading at 23 (Fig. 5). The sheet is now etched by nitric acid or other suitable etching fluid and this removes the metal which is not protected by the resist. As soon as this etching fluid has cut through the metal of the sheet the grooves appear translucent. The portion 23 of the plate outside the outer convolution of the spiral groove and the central portion 24 have at this time become detached from the coil 25 formed by the unetched portions of the plate between the spiral grooves and may be lifted therefrom. The coating of resist is now removed with benzol, leaving the coil mounted upon the spider 21 as indicated in Fig. 6. Perforations, as 26 and 27, may be provided in the terminal tabs 19 and 20, respectively, to enable wiring to be conveniently connected thereto.

It will be evident from the foregoing de-

scription that my coil is simple and economical to produce. The finished coil is neat in appearance and the convolutions are uniformly spaced. This coil is in the form of a metal tape or flat strip wound in a flat spiral with the convolutions arranged edge to edge and maintained in spaced relation by the reinforcing spider.

I claim as my invention:

1. The method of making radio coils which consists in applying to a sheet of metal a coating of chemical resisting material, removing the coating material from portions of said sheet, and subjecting the sheet to etching fluid to remove the exposed portions thereof.

2. The method of making radio coils which consists in applying to a sheet of metal a coating of chemical resisting material, grooving the coating to expose portions of said sheet, and subjecting the sheet to etching fluid to remove the exposed portions thereof.

3. The method of making radio coils which consists in applying to a sheet of copper a coating of resist, spirally grooving the coating on one face of said sheet to expose a spiral portion of said sheet, and subjecting the sheet to etching fluid to remove the portion thereof exposed by said grooving.

4. The method of making radio coils which consists in applying to one face of a sheet of copper a coating of resist, attaching upon the opposite face a reinforcing member, coating said opposite face with resist, cutting a spiral groove through the resist on the first mentioned face to expose portions of the sheet, and subjecting the sheet to etching fluid to remove the portions thereof exposed by said groove.

5. The method of making radio coils which consists in applying to one face of a sheet of copper a coating of resist, attaching upon the opposite face a reinforcing member, coating said opposite face with resist, cutting a groove through the resist on the first mentioned face to expose portions of the sheet, subjecting the sheet to etching fluid to remove the portions thereof exposed by said groove, and removing the resist from the remaining portions.

6. The method of making radio coils which consists in applying to one face of a sheet of copper a coating of resist, cutting a substantially spiral groove through the layer of resist to expose the face of the sheet therebeneath, attaching a reinforcing spider upon the opposite face of said sheet, applying a coating of resist to said opposite face, subjecting the sheet to etching fluid to remove the metal exposed by said grooving, and removing the resist from the remaining portions of the sheet.

7. The method of making radio coils which consists in applying to a sheet of metal a coating of resist, placing the coated sheet in a lathe and cutting a spiral groove through the layer of resist on one face thereof, and subjecting the sheet to etching fluid to remove the metal of the sheet directly beneath said groove.

8. The method of making radio coils which consists in etching portions of a sheet of conducting material to form a spiral slot therein.

9. The method of making radio coils which consists in applying to one face of a sheet of copper a coating of resist, cutting a substantially spiral groove through the coating material with a hot tool, securing a reinforcing spider upon the opposite face of said sheet, coating said opposite face with resist, subjecting the sheet to etching fluid to remove the metal directly beneath said groove, and removing the resist from the remaining portions of the sheet with a suitable solvent.

FRANCIS T. HARMON.