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C. PFANSTIEHL

RADIO FREQUENCY TRANSFORMER

Filed July 17, 1925

2 Sheets-Sheet 1

Fig. 1.

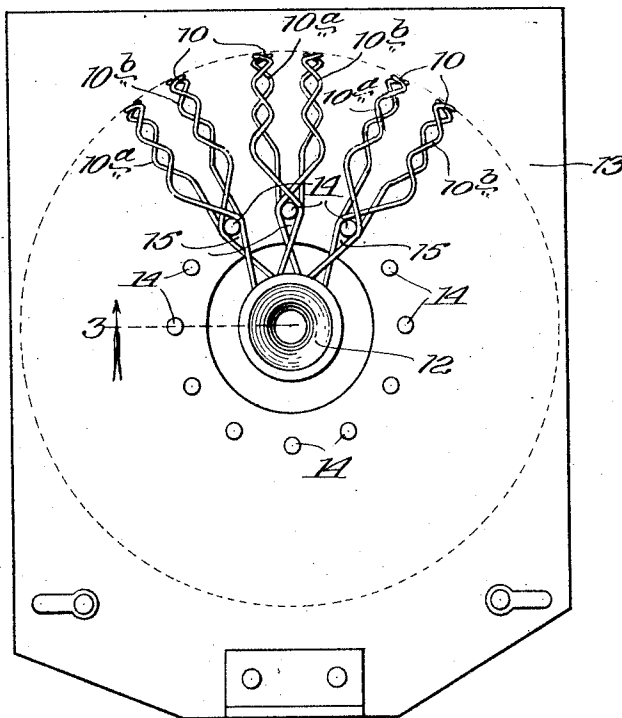


Fig. 2.

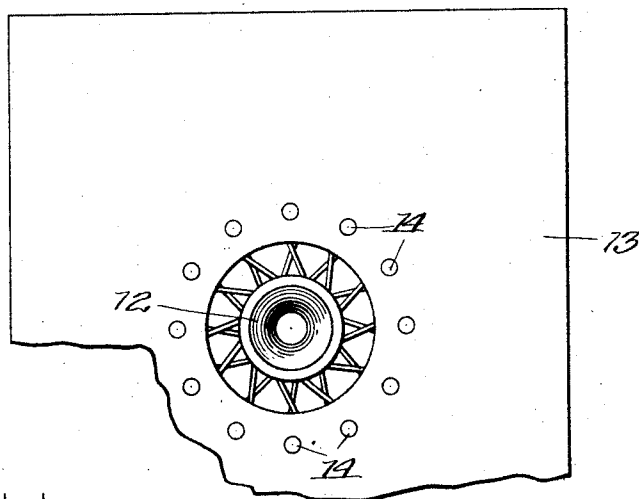
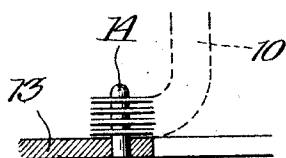


Fig. 3.



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UNITED STATES PATENT OFFICE.

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RADIOFREQUENCY TRANSFORMER.

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This invention relates to radio-frequency transformers of the toroidal type and is fully described in the following specification and shown in the accompanying drawings, in which—

Figure 1 is a front elevation of the transformer embodying the invention;

Fig. 2 is a similar view of the supporting means with the coil units removed;

Fig. 3 is a partial section on the line 3 of Fig. 1, showing the coil on its supporting pin;

Fig. 4 is a diagrammatic transverse section through the coil;

Fig. 5 is a developed view of the preferred form of one of the coil units;

Fig. 6 is a similar view of a modified form of the same; and

Fig. 7 is a diagrammatic view similar to Fig. 1, showing the wiring diagram of the coil units assembled in a coil.

The embodiment illustrated comprises a coil of the toroidal or "doughnut", type herein, as shown in Figs. 1 and 4. Each coil is made up of a series of coil units 10, each coil unit having an open center 11 and the coils arranged about a common center and so wired as to simultaneously send electromagnetic impulses through the coils in the same direction. Owing to its nearly closed formation, electro-magnetic lines of force generated within the coil will have little tendency to stray beyond the confines of the coil.

Each coil unit 10, as shown in Figs. 4 and 5, is made up by winding a suitable insulated wire about a core (not shown) the shape of the center 11 and having a series of pins over which the wire is wound back and forth, passing over one pin, under the next, and over the next, etc.

In order to get as uniform a distribution of these wires about the outer edge of the coil as may be possible, the wire in its passage about the coil is carried first about the Y-shaped branch 10^a, the next time around about 10^b, the next around about 10^a, etc., with a result that the outer portion of each coil unit is made somewhat fan-shaped, as shown in Figs. 1 and 5. Thus, the relatively straight center portion 10^c is left quite flat so as to occupy relatively little space at the center of the completed coil, as shown in Fig. 1, while the Y-shaped branches 10^a and 10^b are spread out so as

to be uniformly distributed about the outer periphery through the coil, as shown in Fig. 1.

For convenience in mounting, the coils 10, twelve in number, one for each pin 14, are placed about a central spool 12 which, if desired, may be secured to the plate 13, or other object, on which the coil is to be mounted. Ends 14, as shown in Figs. 1 and 3 are secured in the plate 13 and fit snugly into openings 15 in the coils 10.

In Fig. 7 is shown a diagram of connections in which the primary coil 16 is connected to binding posts, or the like, 17 and 18. The secondary coils 19, 20, 21, 22 and 23 are alternately connected across from one side of the transformer to the other so as to bring the last coil 24 as far as possible from the primary coil 16 so that the potential generated in the secondary shall be highest at the binding post 25 which is connected to the grid of the audion tube while the binding post 26 connected to one end of the coil 19 will have the lowest potential and will be connected to the filament of the same tube.

In Fig. 6 is shown a modified form of the coil in which the outer portion 27 is wound on larger pins than the central portion 27^a, with a result that the outer turns of the coil are spread out more than those of the center for the reasons heretofore stated.

While I have shown and described but a single embodiment of this invention, it is to be understood that it is capable of many modifications. Changes therefore in the construction and arrangement may be made which do not depart from the spirit and scope of the invention as disclosed in the appended claims.

What I regard as new, and desire to secure by Letters Patent, is:

1. A radio-frequency transformer unit comprising a coil formed about a hollow center, the strands crossing a plane of the coil in wave form so that adjacent strands cross each other at intervals and lie on opposite sides of said planes, the strands in one portion of said coil being more widely separated laterally than on the other.

2. A radio-frequency transformer unit comprising a D-shaped coil, the strands crossing a plane of the coil in wave form so that adjacent strands cross each other at intervals and lie on opposite sides of said

plane, the strands on the rounded portion of said D-shaped coil being more widely separated laterally than on the relatively straight side.

5 3. A radio-frequency transformer unit comprising a coil which has a relatively flat portion, the coil on the opposite portion being divided into laterally spaced sections, each section being made up of adjacent
10 strands of wave form crossing each other at intervals.

4. A radio-frequency transformer unit comprising a coil which has a relatively flat portion, the coil on the opposite portion being divided into laterally spaced sections,
15 each section being made up of adjacent strands of wave form crossing each other at intervals, the strands of the diverging sections being more widely separated than in
20 said straight portion.

5. A radio-frequency transformer having a primary and a secondary, the secondary being composed of a series of units according

to claim 1, these units being so wired that the low voltage side of said secondary is adjacent the primary and the high voltage side opposite said primary. 25

6. A radio-frequency transformer having a primary and a secondary, the secondary being composed of a series of units according to claim 3, these units being so wired that the low voltage side of said secondary is adjacent the primary and the high voltage side opposite said primary. 30

7. A radio-frequency transformer having a primary and a secondary, the secondary being composed of a series of units according to claim 4, these units being so wired that the low voltage side of said secondary is adjacent the primary and the high voltage side opposite said primary. 35 40

8. A radio-frequency transformer having a primary and a secondary, the secondary being composed of a series of units according to claim 4.

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