Feb. 8, 1927. 1,616,645

A. H. WEGNER, JR

TRANSFORMER

Filed Dec. 12, 1925

FIG. 1.

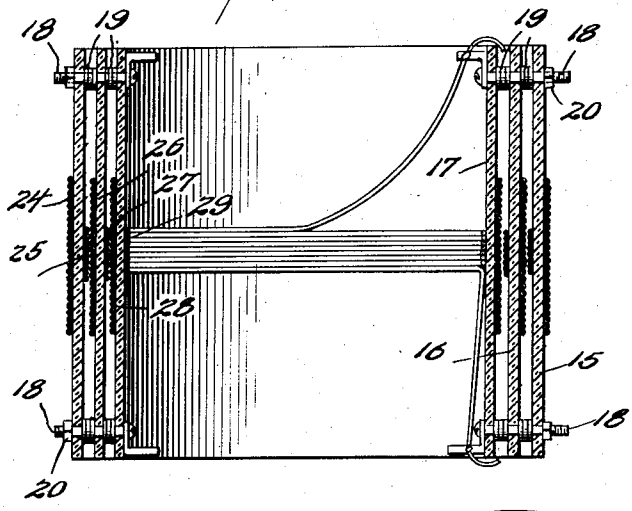


FIG. 2.

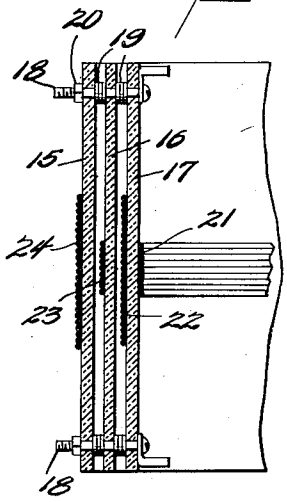


FIG. 3.

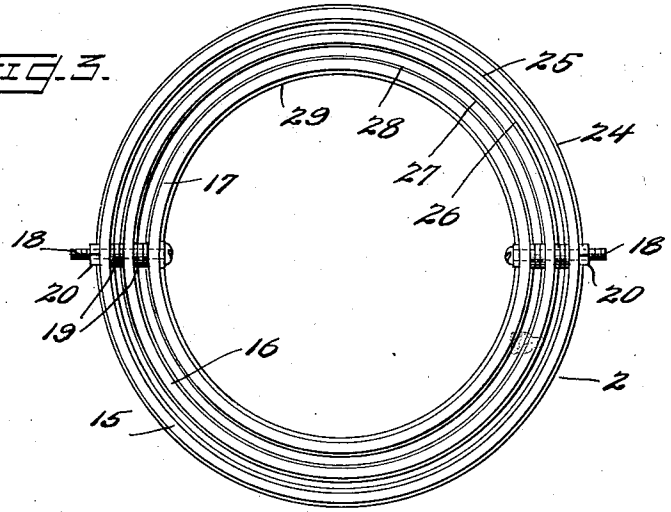
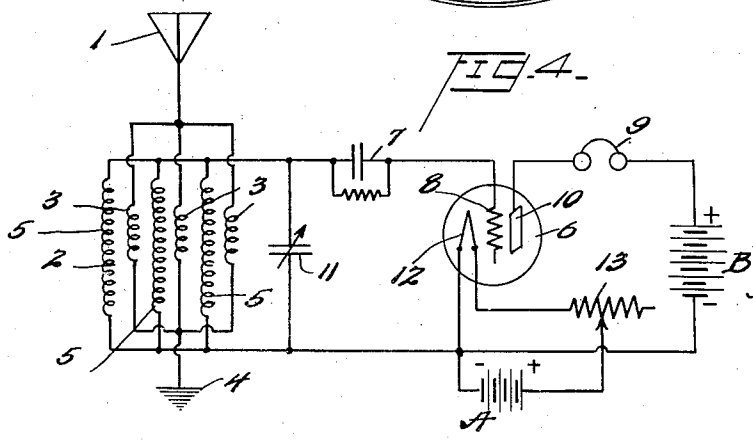


FIG. 4.



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UNITED STATES PATENT OFFICE.

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TRANSFORMER.

Application filed December 12, 1925. Serial No. 75,048.

This invention relates to electrical apparatus and refers particularly to apparatus for use in wireless or radio receiving systems.

One object of the present invention is to provide an air core transformer for an electrical circuit of radio apparatus which is exceptionally efficient in operation in comparison with the present type transformers.

Other objects of the invention are to provide a transformer operative to absorb or take up a maximum signal strength; operative to reduce the outside magnetic field around the transformer and thus eliminate undesired coupling with other units of the receiving system; and operative to provide a coupling for a radio apparatus tending to stabilize the action of the apparatus and to increase the range and signal strength.

Another object of the invention is to provide an air core transformer operative to efficiently amplify signals received while providing a sharp tune and which may be constructed at a relative low cost.

Various other objects and advantages of the invention will be apparent from the description of a preferred form embodying the invention set forth hereinafter.

In the accompanying drawings, the invention is shown in its preferred form or forms in which Figure 1 is a sectional elevation of the preferred form of the air core transformer.

Figure 2 is a sectional elevation of a modified form of the air core transformer.

Figure 3 is a top view of the air core transformer.

Figure 4 is an elevated diagram of a wireless receiving or radio apparatus embodying the invention.

Referring to the drawings 1 represents the ordinary grounded aerial or antenna connected through an air core radio frequency transformer, 2, embodying the present invention, the antenna 1 being connected through the parallel primary windings 3 of the transformer, and grounded as indicated at 4. 5 indicates parallel secondary windings of the transformer, the terminals of which may, if desired, be connected as usual directly with a detector of any well known type, for example, the thermionic detector 6. In the preferred form of circuit shown the secondary windings 5 are connected as usual through a grid leak 7 in the grid circuit.

The plate circuit of the detector tube 6, preferably connects through the phones 9, a positive potential being impressed upon the plate 10 of the detector tube from a suitable source indicated by the "B" battery. The secondary windings 5 of the transformer 2 are preferably shunted by a tuning element such as a condenser 11. The filament circuit comprises the usual "A" battery, filament 12 of the detector, and the control resistance 13.

The air core frequency transformer comprises a plurality of cylindrical shells made of material having insulating properties disposed one within the other and so mounted as to permit an air space between the respective shells, each shell being provided with a primary winding or a secondary winding on its exterior surface or a secondary winding on its exterior surface and a primary winding on its interior surface, the respective secondary or primary windings being connected in parallel.

The transformer 2 made in accordance with this invention comprises cylindrical shells or tubes 15, 16, and 17, which are suitably mounted one within the other and retained in spaced relation to each other by means of screws 18, lock washers 19 and nuts 20. Shell 17 is provided with a primary winding 21 on its interior face and a secondary winding 22 on its exterior face, shell 16 is provided with a primary winding 23 on its exterior face, and shell 15 is provided with a secondary winding 24 on its exterior face as clearly shown in Fig. 2. It is to be noted that in this construction the secondary windings are connected in parallel as are also the primary windings.

In the preferred structure as shown in Fig. 1, shell or tube 15 is provided with a secondary winding 24 on its exterior face and a primary winding 25 on its interior face, shell 16 is provided with a secondary winding 26 on its exterior face and a primary winding 27 on its interior face, and shell 17 is provided with a secondary winding 28 on its exterior face and a primary winding 29 on its interior face, all of the secondary windings being connected in parallel as are all the primary windings.

It is to be noted that the size and the length of the wire constituting the primary or secondary windings on each one of the tubes or shells is exactly the same irrespective of the circumference of the particular shell or tube. In other words, the length

of wire constituting the primary windings on each one of the plurality of tubes or shells must be precisely the same as must also the length constituting the secondary windings on each one of the plurality of shells. Any variation in the size or length of the wire will cause the defeat of the desired results inherent to a transformer made in accordance with this invention.

This type of transformer is adapted for use in any of the well known type of radio or carrier frequency signalling systems, and is particularly effective when used in association with the antenna and in place of the transformers commonly used between the respective detector tubes, as in the case of systems which include two or more tubes.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a radio frequency transformer, a plurality of coaxial shells disposed one within the other and having a permanently maintained air space between the respective shells, the said shells carrying primary or secondary windings on their respective faces, the different windings being connected in parallel.

2. In a radio frequency transformer, a plurality of coaxial shells disposed one within the other and having a permanently maintained air space between the respective shells, the innermost shell carrying a primary winding on its interior face and a secondary winding on its exterior face, the outermost shell carrying a secondary winding on its exterior face, and the intermediate shell carrying a primary winding upon one of its faces, the said windings being connected in parallel.

3. A radio frequency transformer comprising a plurality of coaxial shells disposed one within the other and having a permanently maintained air space between the respective shells, each shell carrying a primary winding on its interior face and a secondary winding on its exterior face, the different windings being connected in parallel.

4. A radio frequency transformer, comprising a plurality of coaxial shells disposed one within the other and having a permanently maintained air space between the respective shells, each shell carrying a primary winding on its interior face and a secondary winding on its exterior face, the windings on the respective shells constituting the primary or the secondary windings being of the same length, the said windings being connected in parallel.

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