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FRAME AERIAL AND THE LIKE

Filed April 5, 1926

Fig. 1.

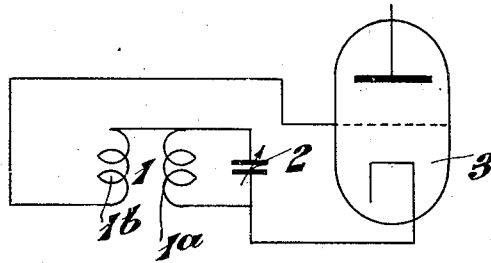


Fig. 2.

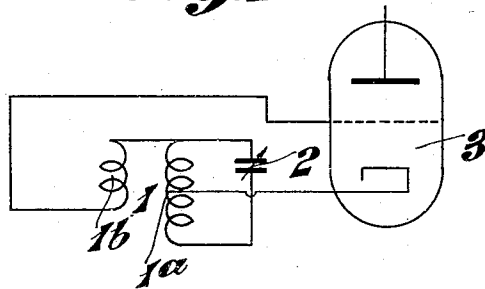
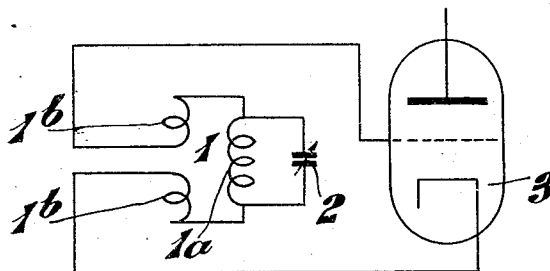


Fig. 3.



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FRAME AERIAL AND THE LIKE.

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This invention relates to frame and other closed aeri-
als and the like and has for its object the provision of a closed aerial which
will be adapted to minimize interference
5 from any station operating on a higher wave length than that being received. The invention is thus particularly useful in connection with receiving sets operating on the well-known superheterodyne principle, since it
10 will minimize interference from stations, operating on a wave length corresponding to the intermediate frequency of such a receiving set. I have found that the electromotive force picked up by the turns of a frame
15 aerial from a transmitting station operating on a wave length to which the intermediate frequency amplifier of a superheterodyne receiver is tuned is sufficient to cause interference when the frame aerial is connected
20 across the grid filament circuit of the amplifier, no matter how well the latter is itself screened.

In accordance with the present invention the aerial has a part only of its winding
25 shunted by a tuning condenser, the remaining part or parts being connected, in series with the tuned part, in the external circuit (say the grid filament circuit). The tuned and untuned parts of the frame aerial are so
30 connected and proportioned that the sum of the electromotive forces induced in them by transmitting stations is zero.

As a result of this construction the voltage produced across the terminals of the frame
35 aerial will be equal to the voltage drop due to the current flowing in the tuned part. The latter will be negligibly small for wave lengths greatly in excess of the natural wave length of the tuned part and in this case the
40 interference will be cancelled out.

Three embodiments of the invention are illustrated diagrammatically in Figures 1, 2 and 3 respectively of the accompanying
45 drawings and the same will now be described, it being understood that the particular arrangements illustrated are susceptible of various modifications without departing from the scope of the appended claims.

In Figure 1 is shown a frame aerial 1
50 having a solenoidal winding of say twelve turns, six of which 1^a are wound in a right handed helix and shunted by a tuning condenser 2, and the remaining six 1^b in a left handed helix but not tuned. The two sets of
55 six turns are connected together in series

across the grid and filament of a thermionic valve 3.

The electromotive force induced in the turns 1^a by any signal is equal and opposite to that induced in the turns 1^b by the same
60 signal. The voltage across the turns 1^a depends upon the value of the shunting condenser 2. If the value of this condenser 2 is such that the turns 1^a are tuned to a
65 wave length well below that of a certain transmitting station the voltage across these turns as a result of signals from such station is approximately the same as the electro-
70 motive force induced in them by such signals, and is therefore approximately equal and opposite to the voltage from the same cause across the turns 1^b. The total voltage
75 across the aerial as a result of the said transmitting station is therefore approximately zero. At the same time the voltage across
the turns 1^a as a result of signals on a wave length equal to that to which said turns are
tuned is so large that the voltage across the
turns 1^b set up by the same signal is
negligible. It is thus clear that the aerial
80 transmits impulses to the valve 3 as a result of signals on a wave length to which the turns 1^a are tuned but does not substantially transmit impulses as a result of signals on a
85 wave length considerably higher than that to which said turns 1^a are tuned.

Owing to the fact that the voltage across the turns 1^a as a result of a signal on a
higher wave length than that to which said
turns are tuned is only approximately equal
90 to the electromotive force induced in said turns by the same signal, it will be clear that in the case above described the total voltage
across the aerial will never be exactly zero
95 though it is sufficient nearly so for all ordinary purposes. It is quite clear however that the turns 1^a and 1^b may if desired be so proportioned that a perfect zero voltage will be obtained for one given wave length higher than that to which the turns 1^a are tuned.
100

The arrangement of Figure 2 differs from that of Figure 1 in that the turns 1^a are of greater number than the turns 1^b. In this case therefore the second terminal of the
105 aerial is connected to some point intermediate the extremities of these turns 1^a. It will be clear to those skilled in the art that by suitable design this arrangement may be made to function in like manner to
110 the arrangement of Figure 1.

The arrangement of Figure 3 differs from that of Figure 1 only in as much as the turns 1^b are divided into two halves and the turns 1^a are connected in series between them. It will be clear that this difference is without effect upon the function of the device.

What I claim and desire to secure by Letters Patent is:—

1. A frame or other closed aerial having its winding so arranged that the electromotive force induced by any signal in one part thereof opposes that induced by the same signal in another part thereof, and having only a part thereof shunted by means of a tuning condenser, the arrangement being such that signals on a wave length equal to that to which said shunted part is tuned will set up substantial voltages across the terminals of the aerial and that signals on a wave length greater than that to which said shunted part is tuned will set up no substantial voltage across said terminals.

2. A frame or other closed aerial having its winding so arranged that the electromotive force induced by any signal in one part thereof opposes that induced by the same signal in another part thereof, and having one of said parts only shunted by means of a tuning condenser, the arrangement being such that signals on a wave length equal to that to which said shunted part is tuned will set up very much greater voltages across said shunted part than across said nonshunted part and that signals on a wave length greater than that to which said shunted part is tuned will set up substantially equal and opposite voltages across said shunted and nonshunted parts.

3. A frame or other closed aerial according to claim 2 wherein the nonshunted part consists of two portions arranged one at each extremity of the shunted part.

In witness whereof I affix my signature.

PETER WILLIAM WILLANS.