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WIRELESS RECEIVING APPARATUS

Filed March 18, 1927

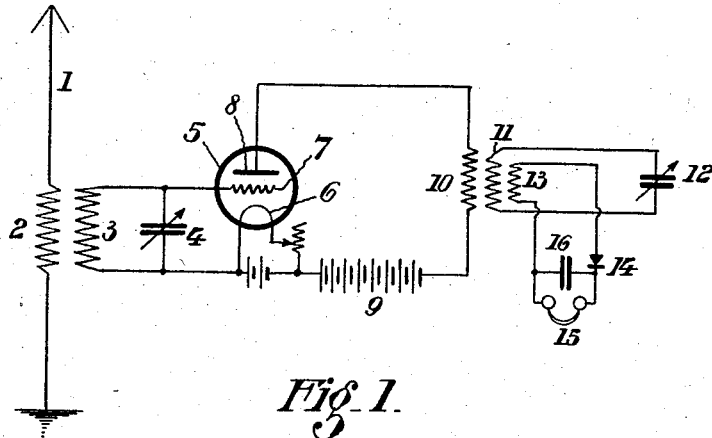


Fig. 1.

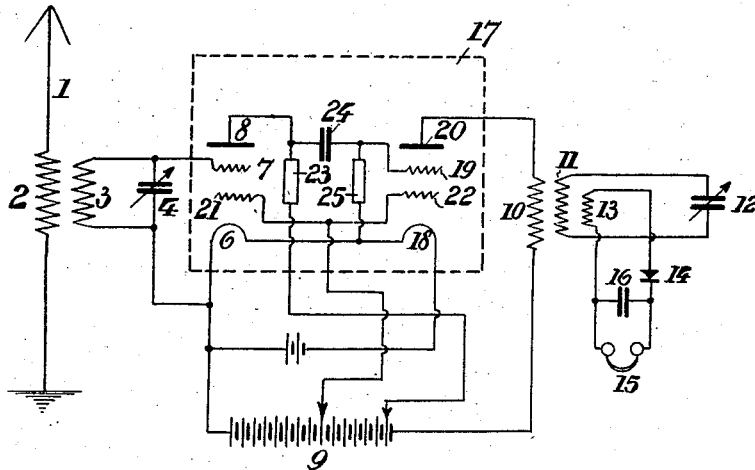


Fig. 2.

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## UNITED STATES PATENT OFFICE.

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## WIRELESS RECEIVING APPARATUS.

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The object of the invention is a method of eliminating the troubles in wireless reception due to the so-called microphonic noises of the valves. If for instance a receiving set containing one or more valves is installed on an aeroplane, the vibrations will cause loud disturbing sounds in the telephone of the receiver which prevent the signals received from being heard.

This difficulty is overcome according to the invention in the following manner. It has to be considered that the vibrations of the aeroplane are of comparatively low frequency in comparison with the frequency of the wireless waves. Therefore, a receiving instrument is made use of for the purpose referred to which only responds to high frequency impulses but not to low frequency impulses.

My invention may be better understood by reference to the drawings.

Figure 1 is a diagrammatic representation of one form of my invention.

Figure 2 is a diagrammatic representation of my invention in which a multi-unit valve is employed in the amplifying circuit.

In Figure 1 the antenna of an aeroplane wireless installation is represented by 1; a coupling coil 2 is provided which is in inductive relation to a tuned grid circuit 3, 4 of a high frequency amplifying valve 5 containing a filament 6, grid 7 and anode 8. The anode circuit is connected between the anode 8 and the filament 6 including a battery 9 and a coupling coil 10 which is in inductive relation to a tuned circuit 11, 12. The telephone receiver 15 is connected to the tuned circuit 11, 12 by means of a coupling coil 13 and with the interposition of a detecting device 14, e. g. a crystal detector, and may be bridged in the usual way by means of a bye-pass condenser 16.

The main feature of the invention is that whatever noises or electrical impulses due to vibration that may be passed through the valve, they are not transferred to the telephone receiver as these electrical impulses are of low frequency. As the impedances of the coils 10, 11, 13 are very low for low frequency, no coupling effect for the low frequency current due to the vibrations is observed. If the detector itself does not cause microphonic noises due to vibrations, no disturbing effect at all will occur. For instance a carborundum detector may be

used which permits a rather heavy pressure to be placed upon the electrodes without losing its efficiency as detector. The same effect may be obtained by using a Fleming valve as detector in place of the detector 14 shown in Figure 1.

In general the signals received are very weak, so that one stage of high frequency amplification is not sufficient for obtaining good reception. This difficulty can be overcome best by using aperiodic high frequency amplifying double electrode valves, such valves may contain two or more grid-anode-filament systems together with reaction elements such as anode resistance, coupling condenser, and grid leak with a single vacuum tube. The valve systems generally consist of a double grid system in order to overcome space charge and make the internal resistance low (about 6,000 ohms or less); the anode coupling resistance between the two valve systems within the single vacuum tube may have a value of about 100,000 ohms.

Figure 2 shows a double valve and its application for the purpose of the invention. Reference numerals have the same meaning as in Figure 1. By the dotted line 17 a single vacuum tube is indicated which contains two valve systems. One of them is indicated at 6, 7, 8 as in Figure 1, the other may be represented by a filament 18, grid 19 and anode 20. The valves are four electrode valves. The space charge destroying grids are represented by 21, 22 and are connected together and have a potential of about 20 volts applied to them. The anode resistance 23, a coupling condenser 24 and a grid leak 25 are provided. The function is the same as in Figure 1 except that much higher amplification is obtained. If necessary two or more of such systems as indicated by 17 may be connected in cascade and interconnected by means which only transfer high frequency impulses, such as coils of low impedances, very small coupling condensers or the like.

## Claims:

1. In combination, an antenna circuit an amplifying circuit in which audio frequency oscillations are set up by mechanical vibrations, associated with said antenna circuit, a detector circuit including a mechanically rugged detector element, coupled to said amplifying circuit, and a circuit associated

with the coupling between said amplifying circuit and said detector circuit for absorbing said audio frequency oscillations.

2. In combination, a radio receiver comprising an antenna circuit, an amplifying circuit in which low frequency oscillations are set up by mechanical vibrations, coupled to said antenna circuit, and a detector circuit containing a mechanically rugged de-

detector element coupled to said amplifying circuit, and absorbing means associated with part of said receiver for absorbing the low frequency oscillations set up in said amplifying circuit. 10

In testimony whereof I have affixed my signature. 15

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