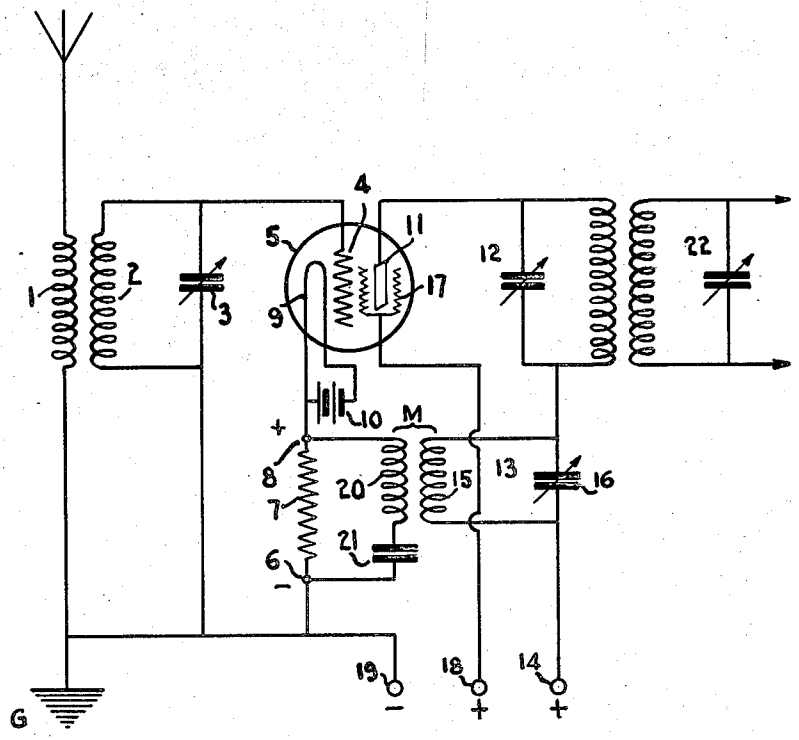
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OSCILLATOR DETECTOR

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INVENTOR
Garrard Mountjoy
BY Isaac Adams
ATTORNEY

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OSCILLATOR-DETECTOR

Garrard Mountjoy, Jackson, Mich., assignor, by mesne assignments, to Radio Corporation of America, New York, N. Y., a corporation of Delaware

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2 Claims. (Cl. 250—36)

This invention relates to oscillator-detectors for superheterodyne receiving sets and particularly to self biasing arrangements therefor.

An object of the invention is to devise oscillator-detector circuits with minimum amount of resistance material in the feed-back circuit and with greater tolerance in the manufacture of such resistances without affecting the feed back operation.

Another object is to obtain oscillator-detectors with minimum grid bias which means higher mutual conductance of the tube and higher transition gain.

Other objects will appear in the following specification with reference to the drawing in which the single figure is a circuit arrangement embodying the invention.

The single figure of the drawing is a diagrammatic illustration of a superheterodyne oscillator circuit embodying the principles of the invention.

Referring to the drawing, the antenna coil 1 is connected to coil 2 tuned to the signal by the variable condenser 3. One end of this tuned loop is connected to the grid 4 of a screen grid tube 5 and the other end is connected to the negative terminal 6 of resistance 7. The other terminal 8 of this resistance is connected to the filament 9 of the vacuum tube, which filament is supplied by any appropriate source of voltage 10.

The plate 11 of the vacuum tube is connected through tuned loop 12, tuned to the intermediate frequency and through the tuned loop 13 to the positive side 14 of the voltage supply. The tuned loop 13 consists of feed-back coil 15 and variable condenser 16 and this loop causes the vacuum tube to oscillate at a frequency that produces the desired intermediate frequency by reaction with the signal to which the loop 12 is tuned. The screen grid 17 of the vacuum tube may be connected to positive terminal 18 having appropriate voltage usually below the voltage of the plate terminal 14. The negative terminal 19 of the voltage supply for both the screen grid and the plate is connected to ground G through the antenna connection and also to the negative terminal 6 of the resistance 7. The coil 15 is coupled to coil 20 which has one terminal connected to the terminal 8 of the resistance and the other terminal connected to one side of condenser 21, the other side of the condenser being connected to the terminal 6 of resistance 7. This condenser 21 is of sufficient capacity to render its impedance negligible at the frequency of the oscillations.

The tuned loop 12 is connected to loop 22 which is also tuned to the intermediate frequency and connected to suitable amplifiers which form no part of the invention and are therefore not illustrated.

The vacuum tube will oscillate due to the feed-back action between coils 15 and 20 through the mutual coupling M. The electron current passing through the resistance 7 will produce a negative bias on the grid 4 of the input circuit.

If it should happen that the resistance 7 is made to have higher resistance than usual, this increase in resistance would cause a larger bias on the grid 4, thus causing the tube to oscillate less freely. This is compensated for, however, by the decreased damping of the tuned loop brought about by the increase in resistance of resistor 7. Conversely, if the resistor 7 should happen to be smaller than the desired value it would produce a lower bias on the grid of the vacuum tube, causing it to tend to oscillate harder. This tendency is compensated for by the increased damping of the plate loop 13. By connecting the condenser 21 and the feed-back coupling to the resistance 7 in the way shown wide tolerance in the resistance value is permitted and there are practically no factory rejects. It will thus be seen that my improvement not only has simplified the grid blasing and feed-back arrangement but also has reduced the cost and improved the action of the vacuum tube circuit in receiving signals.

With my improvement a transition gain of 50% can be obtained over prior art arrangements because the tube may be safely operated with lower bias which will produce a higher transition conductance.

I have shown the oscillator-detector magnetically coupled to the antenna but any other coupling may be employed and radio frequency amplifiers may be used between the antenna and the tube 1.

Having described my invention, what I claim is:

1. A vacuum tube oscillator, having a cathode, an anode and a control electrode, a circuit between the control electrode and the cathode containing a resistance, a circuit between the anode and the cathode containing said resistance and a tunable loop, the last mentioned circuit being adapted to contain a source of direct current supply for placing a positive voltage on said anode, and a condenser and coil in series with each other across said resistance and coupled to said loop, whereby a variation in the value of said resistance tends to cause the tube to oscillate more strongly

through the effect on one of said circuits and less strongly through its effect on the other.

2. A vacuum tube oscillator, having a cathode, an anode and a control electrode, a circuit between the control electrode and the cathode containing a resistance and a tunable loop, a circuit between the anode and the cathode containing said resistance and a tunable loop consisting of a coil and condenser, the last mentioned circuit being adapted to contain a source of direct current supply for placing a positive voltage on said anode, and a condenser and coil in series with each other across said resistance, said coil being magnetically coupled to the first mentioned coil, whereby a variation in the value of said resistance tends to cause the tube to oscillate more strongly through its effect on one of said circuits and less strongly through its effect on the other.

GARRARD MOUNTJOY.