

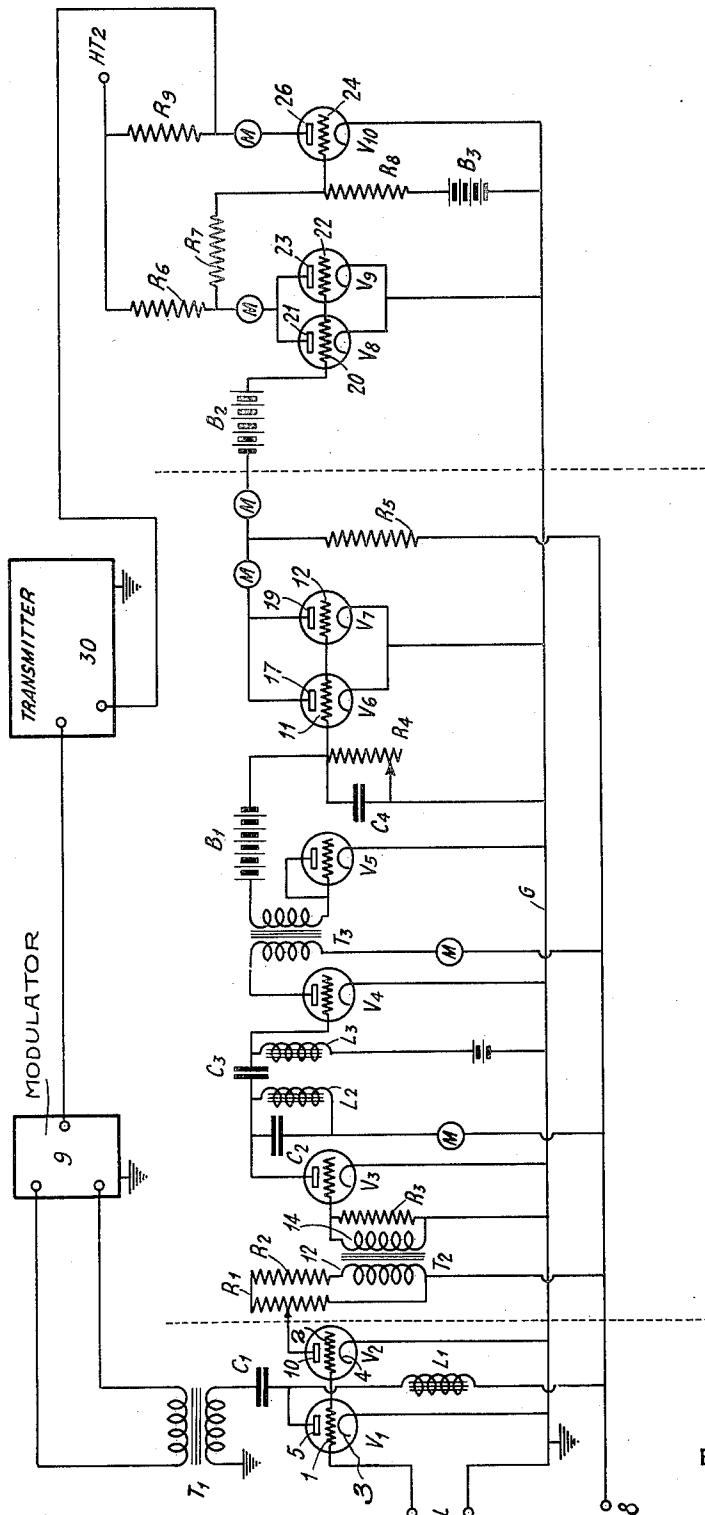
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HIGH FREQUENCY TRANSMITTER

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HIGH FREQUENCY TRANSMITTER

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2 Claims. (Cl. 250-17)

This invention relates to high frequency transmitters and more particularly to radio and similar carrier wave telephone transmitters.

The invention has for its object to provide an improved transmitter arrangement whereby the transmitter proper may be rendered active or inactive under the control of the voice or other signals to be transmitted. As is well known such control is desirable in high power radio telephone transmitters and like installations inter alia in order to prevent "echo" and "singing round a circuit", and to prevent carrier noise in the receiver on ship installations, and the like.

According to the present invention a radio or like transmitter is rendered active and inactive under the control of the voice or other signals to be transmitted by means of a rectifier to which the voice or other signal voltages are applied said rectifier containing in its output circuit a leaky condenser unit the voltage across which is utilized to render the transmitter active and inactive by controlling what may be termed a "keying arrangement", i. e. an arrangement whereby the transmitter may be in effect turned "on" or "off". Preferably the desired keying effect is obtained by controlling an absorber valve arrangement which diverts the anode feed from a valve or valves in the transmitter proper under the control of the voltage across the leaky condenser unit.

The invention is illustrated in the accompanying diagrammatic drawing which shows one way of carrying out the invention as applied to a radio telephone transmitter.

Referring to the drawing speech input, e. g. from a land-line is applied between grids 1 and 2 and cathodes 3 and 4 respectively of a pair of thermionic valves V_1 V_2 whose grids and cathodes are connected together each to each. The anode 5 of the valve V_1 is connected through a choke L_1 to a source of anode potential 8 (120 volts say) and through a condenser C_1 and the primary of a transformer T_1 in series to earth. The secondary of the transformer leads as in the usual way to a modulator 9. The anode 10 of the valve V_2 is variably tapped on to one of a pair of resistances R_1 R_2 in series, the two separate resistances together constituting a shunt across the primary 12 of an inter-valve transformer T_2 whose secondary 14 is connected between grid and cathode of an audio frequency amplifying valve V_3 . The two resistances R_1 R_2 are as shown in series in a loop circuit with the primary of the transformer T_2 and may conveniently be of 5000 ohms and 8000 ohms respectively. The secondary of

the transformer T_2 may be shunted by the usual stabilizing resistance R_3 .

The audio frequency amplifier valve V_3 is choke-capacity coupled by means of a system L_2 C_3 L_3 to a second audio frequency amplifier valve V_4 whose output circuit is transformer coupled by a transformer T_3 to the input circuit of a diode rectifier V_5 which may be conveniently constituted by a triode having its grid and anode connected together as shown. The choke L_2 is shunted by a condenser C_2 of such magnitude as to render the combination sensitive to voice frequencies but insensitive to the considerably higher frequencies likely to constitute undesired "noise" or "background". One end of the secondary winding of the coupling transformer T_3 is connected to the grid-anode connection of the rectifier V_5 and the other end to the positive terminal of a battery B_1 whose negative terminal is connected through a condenser C_4 of say one microfarad shunted by a leak resistance R_4 of say half a megohm to the common cathode connection G . In some cases the battery B_1 may be omitted and the transformer terminal connected direct to the condenser C_4 . Preferably the leak resistance R_4 is variable. The end of the condenser C_4 adjacent the battery B_1 is connected to the grids 11 and 12 of a pair of valves V_6 V_7 connected in parallel. These valves constitute what may be termed a "sub-absorber" stage. The anodes 17 and 19 of the sub-absorber valves are connected together and through a resistance R_5 of say 5000 ohms to the source of anode potential connected at 8. The junction point of the anodes of the sub-absorber control valves V_6 V_7 with the common anode resistance R_5 is connected through a bias battery B_2 to the grids 20 and 22 of a pair of sub-absorber valves V_8 V_9 which are also connected in parallel, the plates 21 and 23 of the valves V_8 V_9 being connected together and through a resistance R_6 of say 150,000 ohms, to a source of main anode potential not shown which may be, for example, 5000 volts and may be connected at HT_2 . As will be seen all the valves prior to those which are energized from the 5000 volts anode supply are energized from the common anode potential source connected at 8 this being a convenient and preferable arrangement. The common anode point of the valves V_8 V_9 is connected through two resistances R_7 R_8 in series one being of say 20,000 ohms and the other of say 17,000 ohms value and through a battery B_3 of say 250 volts to the common cathode connection the said battery having of course its negative terminal connected to the said cathode connection. The junction point of the resistances R_7 R_8

is connected to the grid 24 of a further triode V₁₀ whose plate 26 is connected through an anode resistance R₉ to the 5000 volt supply at HT₂ and also via a lead to the drive of for example the final power stage of the transmitter 30 to be controlled. The valve V₁₀ may be termed an absorber valve. In the figure various meters which may be provided as desired are indicated by references M in circles. These are however ignored in the preceding description.

The operation of the device will now be given. It will be assumed that modulating frequencies are applied from the line L by way of thermionic amplifier V₁ to transformer T₁ and by way of thermionic amplifier V₂ to the control circuit including the tubes V₃, V₄, etc. The modulating potentials from T₁ will be applied by way of modulator 9 to the transmitter 30 to modulate therein carrier frequency oscillations provided the transmitter is active. The purpose of the present invention is to insure that this transmitter will be rendered active when voice frequencies are impressed on the line L. This is insured by the control circuit including the tubes V₃, V₄, etc. The tubes V₃, V₄ amplify the audio frequency potentials applied from L to V₂ and from V₂ to V₃ by way of the resistors R₁, R₂ and transformer T₂. The purpose of these resistors is to predetermine the amplitude of the signals reaching the tube V₄. The tube V₃ is coupled by a voice frequency selective circuit L₂, C₃, L₃ to the tube V₄. The amplified and filtered audio frequency signals are impressed by way of transformer T₃ on to the rectifier V₅. V₅ converts these potentials into unidirectional current which flows in the resistance R₄ and the potentials causing these currents to flow charges the capacity C₄. This flow of current through R₄ impresses a high negative potential on the grids of tubes V₆, V₇ to bias these tubes to cut-off. The tubes are, due to this action, nonconductive. The potential at the upper terminal of R₅ rises and with the battery potential B₂ increases the potential on the control grids 20 and 22 of tubes V₈ and V₉ to such a value that these tubes become highly conductive. The tubes being conductive draw current from the source B₃ and from the high potential source HT₂. Flow of current through the resistance R₈ causes a drop in the potential applied to the control grid 24 of tube V₁₀ to bias said tube to cut-off or toward cut-off. The tube V₁₀ now is nonconductive and draws no current from the source HT₂. The potential on the anode 26 accordingly rises and is impressed by way of the line to the transmitter 30.

In these circumstances "drive" is applied to the final power stage of the transmitter so that said transmitter becomes active. As soon as speech or other signals cease the leaky condenser unit discharges and the transmitter becomes inactive again.

The transmitter 30 may be rendered active in numerous ways. For example, the potential on anode 26 of tube V₁₀ may be used to bias a tube or tubes in the transmitter to a point at which they become operative. Other schemes may be used but since the manner in which this positive potential renders the transmitter active per se forms no part of the present invention, it is thought that it need not be described here other than as described above. It is noted that, in addition to controlling the operativeness of the transmitter 30, the tube V₁₀ also acts to maintain a constant drain on the source HT₂. This is due to the fact that, when the transmitter is rendered

operative and is drawing current from the source HT₂, the tube V₁₀ is inoperative, that is, biased to cut-off, and draws no current from the source HT₂, and when the transmitter is rendered inoperative, so that it takes no current from the source HT₂, the tube V₁₀ is conductive and draws current from the source HT₂.

Where so-called "echo suppressors" are employed, if it be required to "open" a line (i. e. to render it operative) when speech or other signals are occurring the valves V₈ V₉ are made part of the speech amplifying system at a point nearer the output than that at which the echo suppressor unit is tapped off. If it be required to "close" the line (i. e. to render it inoperative) on the occurrence of speech or other signals, the negative voltage developed across the leaky condenser unit may be caused to render a valve or valves, such as the valves V₆ V₇ in the amplifier inoperative.

In the arrangement particularly described, the apparatus comprising the valves V₃ V₄ V₅ V₆ and V₇ may be regarded as an absorber control unit, the valves V₁ and V₂ may be regarded as stages in a land line or equivalent amplifier and the valves V₈ V₉ and V₁₀ as sub-absorber and absorber valves controlling the transmitter.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The combination with a transmitter and a source of signalling potentials to modulate said transmitter of means actuated by signalling potentials from said source for determining the operativeness of said transmitter comprising, a thermionic amplifier having its input electrodes connected to said source of signalling potentials, a thermionic rectifier coupled by way of amplitude regulating means to said thermionic amplifier, a condenser and a resistance in parallel in said rectifier circuit whereby said condenser is charged when signalling potentials from said line are impressed on said amplifier, a thermionic control tube having its input electrodes connected with said condenser and said resistance, an absorber tube having its input electrodes connected with the output electrodes of said control tubes and its output electrodes connected by way of a resistance to the source of potential for said transmitter, and a connection between said last named resistance and the output electrodes of said absorber tube and said transmitter for rendering said transmitter operative when said absorber tube is nonconductive and vice versa.

2. Signalling means comprising, a transmitter, a thermionic modulator connected therewith, a source of modulating potentials, means for connecting said source of modulating potentials to said modulator, and means for rendering said transmitter operative when voice frequencies are impressed from said source on said modulator comprising, a thermionic amplifier having its input electrodes connected with said source, a second thermionic amplifier having its input electrodes connected through amplitude regulating means with the output electrodes of said first named thermionic amplifier, a third thermionic amplifier having its input electrodes connected through a filter circuit with the output electrodes of said second named thermionic amplifier, a thermionic rectifier having its input electrodes coupled to the output electrodes of said third named thermionic amplifier, a condenser and resistance in parallel in the output circuit of said rectifier, a pair of thermionic control tubes hav-

ing their control electrodes coupled to said resistance and condenser whereby a negative potential is applied to said control electrodes when modulating potentials are impressed on said first named amplifier, a charging resistance connected between the anode and cathode of said control tubes, a pair of thermionic absorber tubes having their control electrodes connected through a source of potential to the anodes of said control tubes, said absorber tubes being normally biased to cut-off when no modulating potentials are impressed on said first named amplifier, an additional absorber tube having its input electrodes connected with the output electrodes of said first named absorber tubes, and a connection between the output electrodes of said additional absorber tube and said transmitter.

ERNEST GREEN.

5	80
10	85
15	90
20	95
25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150