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455/3

TX1253

Cross Reference

TX5189D

X340/310R

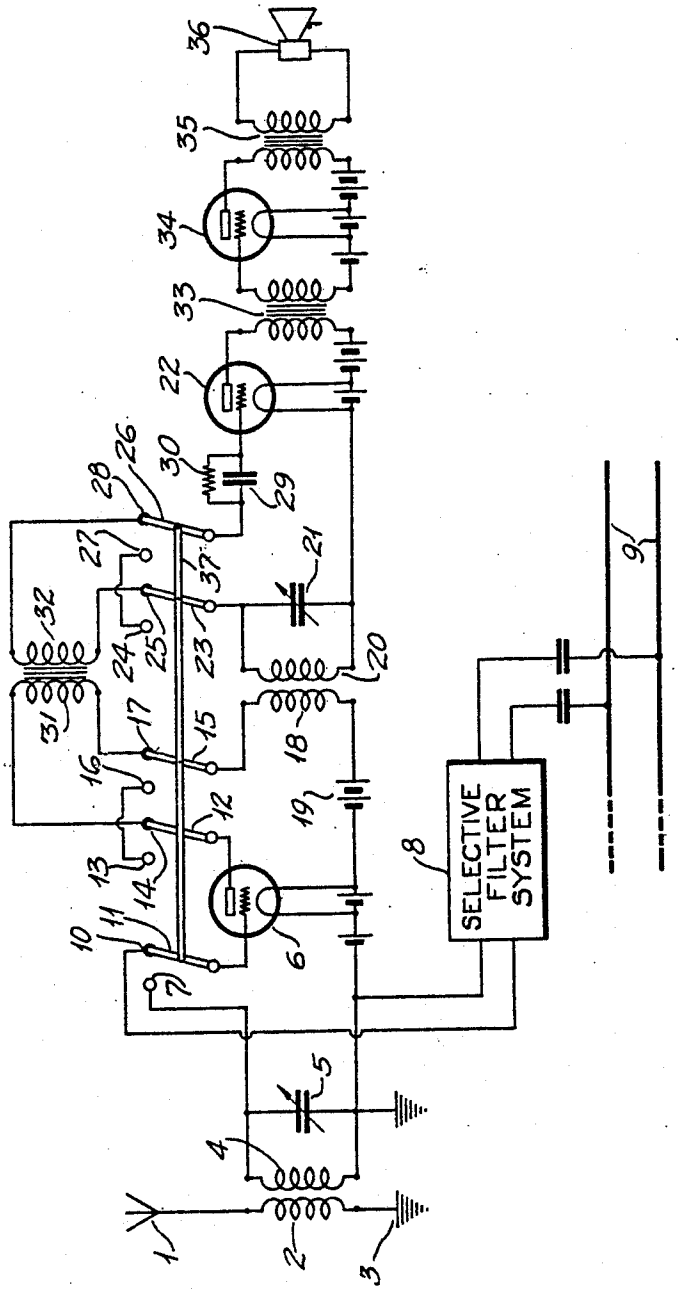
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RADIO RECEIVING SYSTEM

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RADIO RECEIVING SYSTEM

Application filed June 3, 1931. Serial No. 541,749.

My invention pertains in general to radio receiving systems and specifically relates to a system for the selective reception of either space radio or wired radio signals.

My invention is directed to provide a common receiving system which will be responsive to either space radio or wired radio signals whereby a wide range of program entertainment can be made available to a user without undue complication or multiplication of apparatus. The frequency ranges employed in space radio broadcasting are much higher than those employed in carrier frequency, or wired radio broadcasting. The frequencies now commonly employed in space radio broadcasting are of the order of 500–1500 kilocycles, whereas carrier frequencies used for wired radio purposes are anywhere in the super-audibility range up to 100 kilocycles. It will be evident, then, that apparatus especially designed for handling space radio frequencies will not be as efficiently responsive to wired radio frequencies. This is particularly true of transformers for coupling thermionic tube circuits in a receiving system.

One of the objects of my invention consists in providing a radio receiving system for reception of either wired radio or space radio signals with a minimum number of components.

Another object consists in producing a radio receiving system having certain circuits common to both wired radio and space radio signals and other circuits individual to space radio or wired radio signals.

A further object comprises providing a radio receiving system having two independent sources of radio signals and different transformer paths for each source of signals.

I accomplish the above desirable objects in a novel receiving system in which a common switching mechanism changes the circuits of a radio receiving system from space radio reception to wired radio reception.

In the drawing I have diagrammatically represented one embodiment of the radio receiving system of my invention.

My invention contemplates providing a receiving system connected to a space radio antenna and to a wired radio selective filter system. This radio receiving system is provided with an air-core space radio frequency transformer and also with an iron-core carrier transformer, either of which can be rendered effective for transfer of modulated high frequency energy, depending upon whether the system is connected to the energy collecting antenna system for reception of space radio signals or to the selective filter system for the reception of wired radio signals. The provision of an iron-core transformer for wired radio use and an air-core transformer for space radio use increases the efficiency of the system since the iron-core transformer is best suited for wired radio modulated high frequency energy, while the air-core transformer is best suited for space radio modulated high frequency energy.

Referring to the drawing in detail, a space radio energy collecting system or antenna 1 is connected through inductance 2 to ground 3. Another inductance 4 is electro-magnetically coupled to the inductance 2. Inductances 2 and 4 comprise an air-core transformer for transfer of high frequency energy at space radio frequencies. A variable condenser 5 is connected in parallel with inductance 4 for tuning purposes. One side of the inductance 4 is connected to the cathode of a thermionic amplifier tube 6, while the other side of the inductance 4 is connected to a contact terminal 7. A selective filter system 8 is capacitively coupled to power lines 9 which carry modulated high frequency energy at wired radio carrier frequencies. The selective filter system 8 comprises a filter network having a plurality of predetermined circuit constants for the selection of programs over different carrier frequency ranges. The output circuit of the selective filter system 8 is connected to the cathode of the thermionic tube 6 and to the contact terminal 10 as shown. A movable switch blade 11 is pivoted for engagement with either the contact terminal 7 or the contact terminal 10. The switch blade 11 is connected to the grid of the thermionic amplifier tube 6. The contact 13 is connected

to contact 16, and contact 24 is connected to contact 27.

The anode of the thermionic tube 6 is connected to a switch blade 12 which is adapted to engage with either of two contact terminals 13 and 14. A switch blade 15, which is adapted to engage with either of two contact terminals 16 or 17, is connected through an inductance 18 and battery 19 to the cathode of the thermionic tube 6. Another inductance 20 is electromagnetically coupled to the inductance 18 and is connected in parallel with a variable capacitance 21. The inductances 18 and 20 comprise an air-core transformer which is designed especially for handling high frequency energy at frequencies lying within the ordinary space radio broadcasting range and above 500 kilocycles. One side of the inductance 20 is connected to the cathode of a thermionic detector tube 22 and the other side of the inductance 20 is connected to a switch blade 23 which is adapted to engage with either of the two contact terminals 24 or 25. Another switch blade 26, adapted to engage with either of two contact terminals 27 or 28, is connected through the grid capacitance 29 and grid leak resistance 30 to the grid of the thermionic detector tube 22. The contacts 14 and 17 are connected to the primary winding 31 of an iron-core transformer, while the contact terminals 25 and 28 are connected to the secondary winding 32 of the same transformer. The iron-core transformer 31—32 is especially designed to handle wired radio carrier frequency energy within a range below 100 kilocycles. The output of thermionic detector tube 22 acts through an iron-core audiofrequency transformer 33 to control a thermionic amplifier tube 34. The output of the tube 34 acts through an iron-core audiofrequency transformer 35 to control a translating device such as loud speaker 36.

When switch blades 12 and 15 are in engagement with contacts 13 and 16, respectively, and when switch blades 23 and 26 are in engagement with contacts 24 and 27, the output of thermionic tube 6 will act through the air-core transformer comprising inductances 18 and 20 to control the grid of the thermionic detector tube 22. When the switch blades 12 and 15 are in engagement with contact terminals 14 and 17 and when switch blades 23 and 26 are in engagement with contact terminals 25 and 28, the output from thermionic tube 6 will act through transformer 31—32 for controlling the thermionic detector tube 22. The air-core transformer 18—20 will not detract from the efficiency of the iron-core transformer 31—32 and is, therefore, left in circuit therewith for operation at carrier frequencies. An insulating bar 37 is provided for interconnecting the switch blades 11, 12, 15, 23, and 26 so that all of these switch blades can be moved in unison for rendering the entire radio receiving system responsive to either space radio signals or wired radio signals to control the translating device 36. It will now be evident that I have provided a novel radio receiving system for the selective reception of either wired radio or space radio signals. An especial advantage resides in the fact that a minimum number of elements are employed to increase the utility of a singe receiving system for efficient reception of either space radio or wired radio signals. Although I have shown a preferred embodiment of my invention, I do not wish to be limited thereto except insofar as may be pointed out in the appended claims.

What I claim as new and original and desire to secure by Letters Patent of the United States is:

1. A radio receiving system comprising, a space radio energy collecting system, a selective filter system connected to a source of wired radio signals, a thermionic amplifier tube having an output circuit, means for connecting said amplifier tube to either said space radio energy collecting system or to said selective filter system, a thermionic detector tube having an input circuit, an air-core transformer coupling said amplifier tube to said detector tube, said transformer having a secondary and primary, an iron-core transformer having a secondary and primary, and means for connecting the primary of said iron-core transformer in series with the primary of said air-core transformer in said output circuit and connecting the secondary of said iron-core transformer in series with the secondary of said air-core transformer in said input circuit.

2. A radio receiving system comprising, a space radio energy collecting system, a selective filter system connected to a source of wired radio signals, a thermionic amplifier tube having an output circuit, a switch for connecting said amplifier tube to either said space radio energy collecting system or to said filter system, a thermionic detector tube having an input circuit, an air-core transformer coupling said amplifier tube to said detector tube, said transformer having a secondary and primary, an iron-core transformer having a secondary and primary, a switch for connecting the primary of said iron-core transformer in series with the primary of said air-core transformer in said output circuit, and a switch for connecting the secondary of said iron-core transformer in series with the secondary of said air-core transformer in said input circuit, and common means for moving all of said switches.

ALFRED H. HOTOPP, JR.