

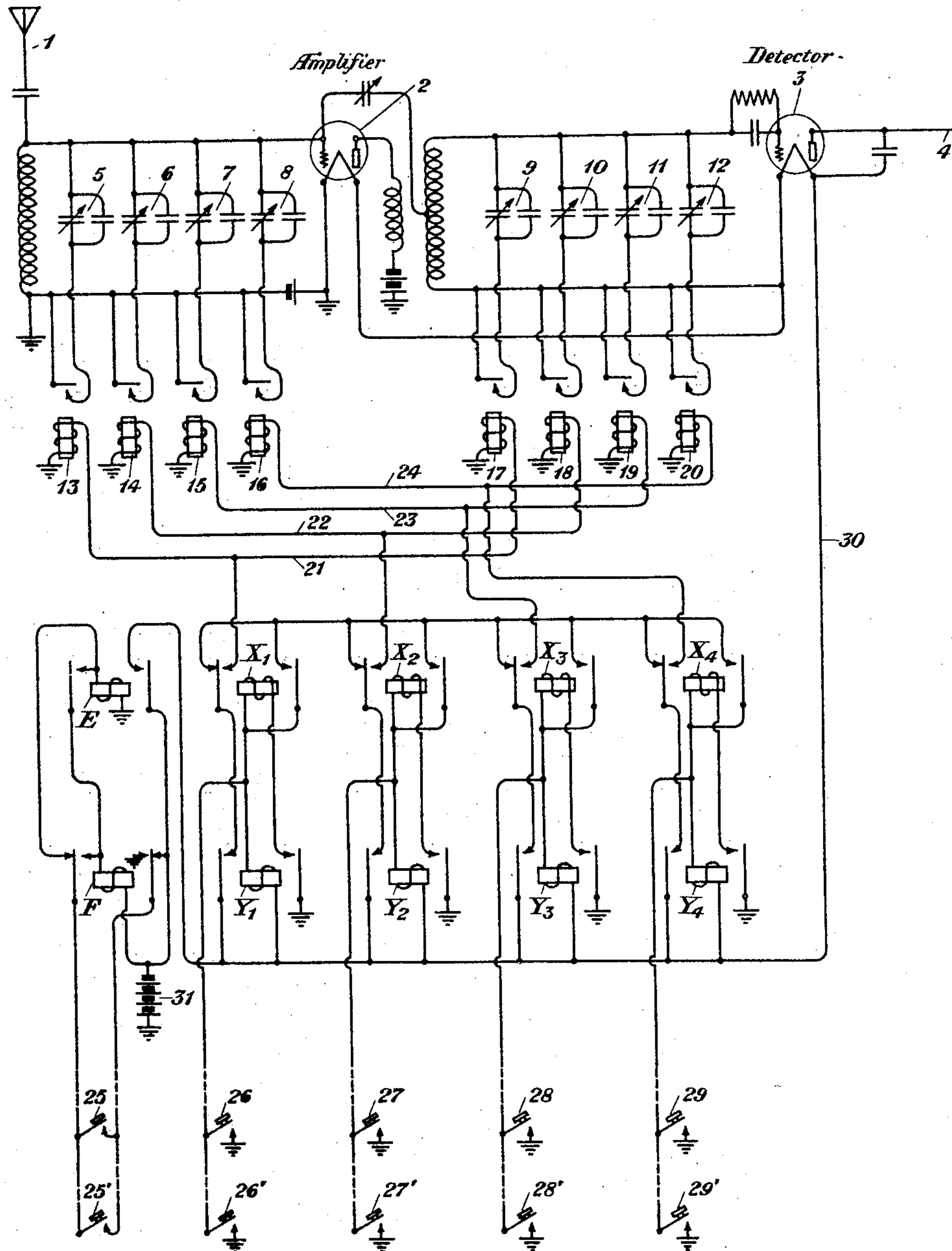
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CONTROL ARRANGEMENT FOR CARRIER APPARATUS

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## UNITED STATES PATENT OFFICE

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## CONTROL ARRANGEMENT FOR CARRIER APPARATUS

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This invention relates to transmission systems over which a plurality of different carrier channels might be transmitted, and more particularly relates to improved arrangements whereby receiving or translating apparatus in such systems may be controlled so as to be rendered selective for any of the transmitted carrier channels.

One of the purposes of the arrangements of the invention is to make it possible to accurately and automatically tune a radio receiving set to different transmitted channels by means of simple switches, or push buttons, which may be located either at the set or at certain control points at some distance from the radio set. The arrangements of the invention might be utilized to control apparatus other than a radio receiving set. For example, the arrangements might control repeater apparatus in a carrier transmission system so that it could be tuned automatically at a distance for the various carrier channels. A further feature of the arrangements of the invention is that they afford random operation with automatic release. In other words, the mere operation of a switch will tune the apparatus to a desired channel. The operation of another switch will release the selective apparatus which might be connected to the set and will immediately substitute apparatus to tune the set for another channel. The operation of such apparatus has the advantage that it does not depend on a progressive tuning in of all stations until the one desired is reached, but provides for the immediate selection of any station chosen at random. Further objects and features of the invention will appear more fully from a detailed description thereof hereinafter given.

The invention may be more fully understood from the following description together with the accompanying drawing, in the figure of which is a circuit diagram illustrating a preferred embodiment of the invention.

In the drawing, the arrangements of the invention are illustrated as controlling the tuning of a radio receiving set. The radio receiving set includes an antenna or input circuit 1 connected to a vacuum tube amplifier

2. The output of this amplifier is connected to a vacuum tube detector 3. The output circuit 4 of the detector may be connected to other amplifier tubes and to receiving apparatus. To tune the radio set to different incoming channels, there will be provided a number of circuits which will include condenser units such as 5, 6, 7, 8, 9, 10, 11 and 12. These circuits may be bridged across the input circuit of the amplifier 2 and the detector 3 by means of the relays 13, 14, 15, 16, and 17, 18, 19 and 20. The above-mentioned condenser units will have their capacities so chosen that they may tune the set for different incoming carrier channels. For example, the units 5 and 9 might have their constants so chosen that the set would be receptive for messages from a station termed A. Units 6 and 10 would have different values which would be chosen so that the set might be receptive for a station termed B. The other units would be arranged in a corresponding manner. The relays 13 to 20, inclusive, will be controlled by the switches 25 to 29, inclusive, and 25' to 29', inclusive, through the agency of a series of relays such as the "X" relays and the "Y" relays. Switches 25 to 29, inclusive, may be located at the set or at a distant point therefrom. Switches 25' to 29' may be located at another distant point, if desired. These switches may be of the non-locking or push button type, and a switch will be provided for each station for which it is desired to tune the radio set. For example, the operation of switch 26 will tune the set for reception from the station termed A. The operation of switch 27 will tune the set for reception from the station termed B. The other switches will tune the set for other stations. The switches 25 and 25' are utilized for starting and stopping operations.

The operation of the arrangements is as follows: If it is desired to tune the set for reception of signals from the station termed A, the switch 25 will be operated. This will complete the following circuit: from battery 31, right-hand back contact of relay F, switch 25, left-hand back contact of relay F, winding of relay E to ground. This will operate the relay E. Relay F will not operate at this



time, as it will be short-circuited by the operation of relay E. When the switch 25 is now released, the short-circuit about the winding of relay F will be removed, and relays E and F will remain locked in the operated position by current from battery 31, through the winding of relay F, left-hand contact of relay E, and winding of said relay to ground. Switch 26 will now be operated. This will complete the following circuit: from battery 31, right-hand contact of relay E, winding of relay  $Y_1$ , contact of switch 26, to ground. This will operate the relay  $Y_1$ . The relay  $X_1$  will not be operated, as it will be short-circuited by the operation of relay  $Y_1$ . However, when the switch 26 is released, the operating circuit for relay  $Y_1$  will be completed through the winding of relay  $X_1$  and right-hand contact of relay  $Y_1$  to ground. Accordingly, the operation and release of switch 26 will lock both the relays  $X_1$  and  $Y_1$  in operated position. The operation of both of these relays will connect battery 31 over the right-hand contact of relay E, left-hand contact of relay  $Y_1$ , left-hand front contact of relay  $X_1$  and thence over conductor 21 in parallel through the windings of relays 13 and 17 to ground. This will operate relays 13 and 17. The operation of relay 13 will bridge across the input circuit of amplifier 2 the condenser unit 5. The operation of relay 17 will bridge across the input circuit of the detector 3 the condenser unit 9. Accordingly, the radio receiving set will be tuned for the reception of signals from the station termed A.

If the set is tuned for the reception of signals from station A and it is desired to tune the set for reception from a station, such as station D controlled by the switches 29 and 29', the operation will be as follows: Switch 29 will be operated. This will close the circuit from battery 31, right-hand contact of relay E, winding of relay  $Y_4$ , contact of switch 29 to ground, and the relay  $Y_4$  will be operated. The relay  $X_4$  will not be operated, as it will be short-circuited by the operation of relay  $Y_4$ . The operation of relay  $Y_4$  will connect battery 31 over the left-hand contact of relay  $Y_1$ , left-hand back contact of relay  $X_4$ , right-hand contact of relay  $X_1$  to the conductor connected between the windings of relays  $X_1$  and  $Y_1$ . This places an effective short-circuit across the winding of relay  $Y_1$ , releasing it. The release of  $Y_1$  releases relay  $X_1$  also. This will release relays 13 and 17 and disconnect the condenser units 5 and 9 from the input circuits of the amplifier and detector tubes. The switch 29 will then be released. This removes the short-circuit about the winding of relay  $X_4$  and allows this relay to operate over the right-hand contact of relay  $Y_4$  to ground. The operation of relay  $X_4$  will connect battery 31 over the left-hand con-

tact of relay  $Y_4$ , left-hand front contact of relay  $X_4$  and over conductor 24 in parallel through the windings of relays 16 and 20, thereby operating said relays. This will connect the condenser unit 8 across the input circuit of amplifier 2 and will connect the condenser unit 12 across the input circuit of the detector 3, and the radio set will be tuned for reception of signals from station D.

The operation of the other switches, such as 27 and 28, will lock up their corresponding "X" and "Y" relays in a similar manner. To turn the radio set off, either of the switches 25 or 25' will be operated a second time. The operation of switch 25, under these conditions, connects an effective short-circuit across the winding of relay E and releases said relay. When the switch 25 is then released, the relay F releases. When the relay E releases, battery is removed from all of the "X" and "Y" relays, and any combination that is previously operated will be released. It is pointed out that the filament circuit for the tubes 2 and 3 may be completed over conductor 30 and the right-hand contact of relay E to battery 31. Accordingly, the power for the set may be turned on or off by the switches 25 or 25'.

Instead of providing separate relays, such as the relays 13 to 20, inclusive, for connecting the various condenser units across the vacuum tube circuits, these relays might be dispensed with and the condenser units connected across the vacuum tube circuits directly by the operation of the series of "X" and "Y" relays. Accordingly, while the invention has been disclosed as embodied in certain specific arrangements which are deemed desirable, it is understood that it is capable of embodiment in many and other widely varied forms without departing from the spirit of the invention as defined by the appended claims.

What is claimed is:

1. A translating device for a plurality of different carrier frequencies, an input circuit connected to said translating device, a plurality of selective circuits adapted to be connected to said input circuit for rendering it selective for the different carrier frequencies, a series of relays each of which controls the connection of one of said selective circuits to said input circuit, a second series of relays each of which is paired with one of the relays of said first series and operates to prepare an operating and locking circuit therefor, individual operating circuits for the relays of said second series, and means controlled by the operation of one of the relays of said second series subsequent to the prior operation of a pair of relays of both of said series for opening the locking circuits for said pair of relays.

2. A translating device for a plurality of different carrier frequencies, an input cir-



5 cuit connected to said translating device, a  
plurality of selective circuits adapted to be  
connected to said input circuit for rendering  
it selective for the different carrier frequen-  
cies, a series of relays each of which controls  
the connection of one of said selective cir-  
cuits to said input circuit, a second series of  
relays each of which is paired with one of  
the relays of said first series and operates to  
10 prepare an operating and locking circuit  
therefor, switching means for preparing an  
operating circuit for all of the relays of said  
second series, and switching means individ-  
ual to each of the relays of said second series  
15 for completing the operating circuit there-  
for.

In testimony whereof, I have signed my  
name to this specification this 1st day of  
July, 1929.

20 WILTON T. REA.

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