

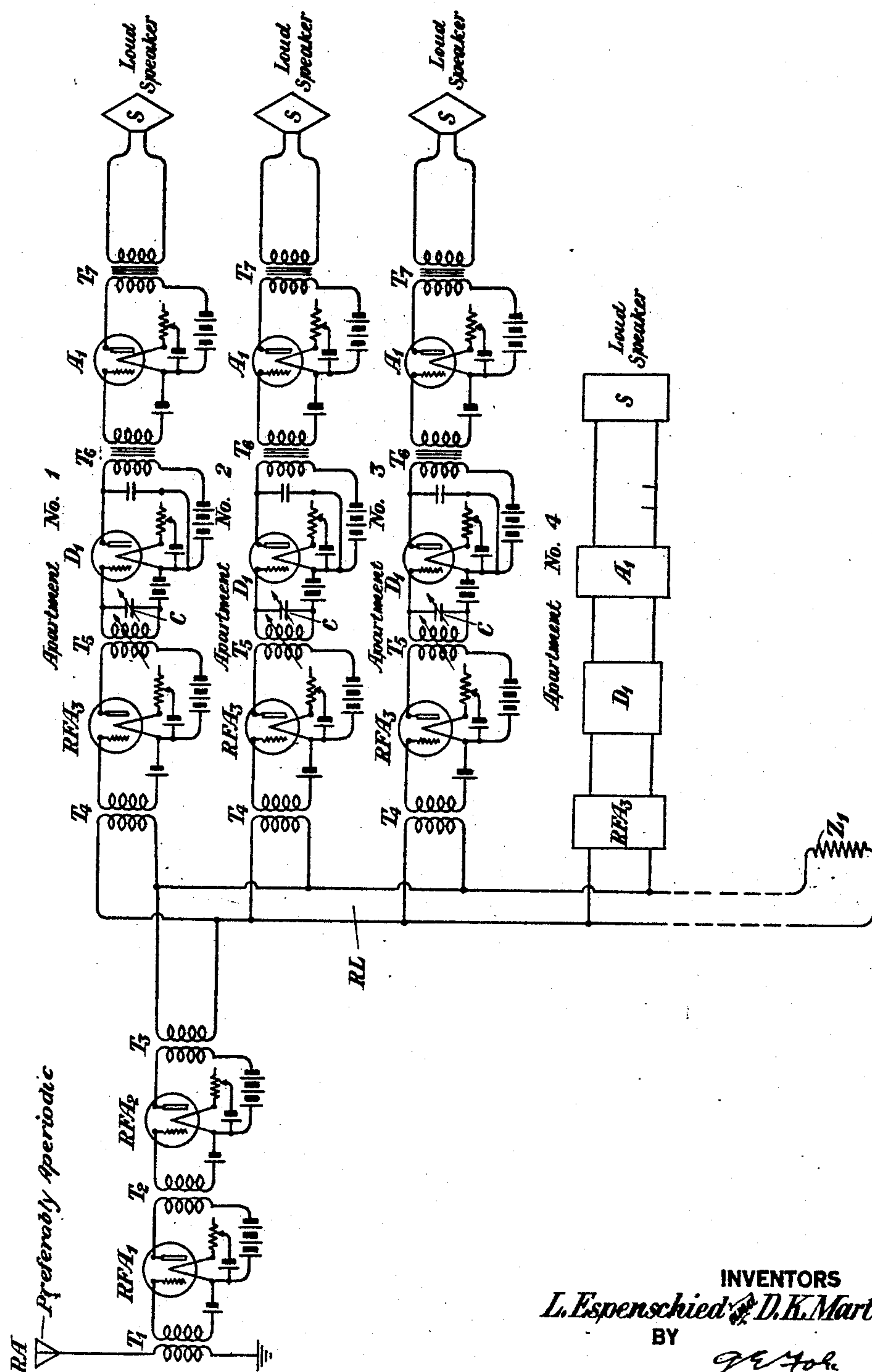
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MULTIPLE CHANNEL RADIO RECEIVER

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MULTIPLE-CHANNEL RADIORECEIVER.

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This invention relates to multiple channel radio receivers and more particularly to receiving circuits of this type for use in apartment houses or other places where a number of different broadcast listeners desire to simultaneously receive different programs.

In a large city where great numbers of people dwell in apartment houses, it is impractical and often impossible for each broadcast listener in the apartment house to operate a radio receiving set with an individual antenna. It has been sought to partially overcome this difficulty by providing a single antenna which is centrally located and associating with the antenna a radio receiving set which may be tuned by an operator to receive any program, the detected program being then trunked at low frequencies to the different dwellers in the apartment house.

Such an arrangement is unsatisfactory because only one program may be received at a time and furthermore all of the broadcast listeners must listen to the same program. In accordance with the present invention it is proposed to overcome these difficulties by providing an antenna for the apartment house which is common to all of the broadcast listeners and is made aperiodic over the range of frequencies employed in radio broadcasting. A radio frequency amplifier, adapted to efficiently amplify frequencies within the broadcasting range, may be associated with the antenna for amplifying all program channels which the system is to receive. Multiple connections are established from the output circuit of the amplifier to the individual broadcast listeners' stations in the different apartments of the apartment house. Each listener will then be equipped with a set including the necessary detecting apparatus and arrangements for tuning to any program which he desires to receive. Preferably, a radio frequency amplifier individual to each listener's set will be interpolated between his tuning arrangement and the connection from his set to the common amplifier, thus preventing the adjustment of his tuning arrangement from affecting the tuning of any of the other sets connected in multiple thereto. Each listener's set may also include, if desired, one or more stages of low frequency amplification.

The invention may now be more fully understood from the following detailed description thereof when read in connection with the accompanying drawing, the figure of which illustrates a preferred embodiment of the invention.

Referring to the drawing, RA designates a receiving antenna common to all of the broadcast listeners in an apartment house, for example. This antenna is made aperiodic or substantially aperiodic over the range of frequencies assigned to radio broadcasting by means well known in the art. A transformer T_1 connects the antenna to a radio frequency amplifier RFA_1 of any well known type. An additional stage of radio frequency amplification common to all of the broadcast listeners may be provided, if desired, by connecting a second amplifier RFA_2 through a transformer T_2 to the output side of the amplifier RFA_1 . The output side of the last stage of radio amplification is then connected through a transformer T_3 to a common receiving circuit RL to which the various broadcast listeners' sets are connected. The transformers T_1 , T_2 and T_3 are so designed as to have a transmission characteristic which is substantially flat over the range employed for radio broadcasting. The amplifiers RFA_1 and RFA_2 are so designed as to efficiently amplify all frequencies within this range.

The apparatus so far described is common to all of the broadcast listeners in the apartment house or other local area and may be located at some central point under the control of an attendant. At the individual apartment of each broadcast listener, individual receiving sets are provided, these receiving sets being connected to the common receiving circuit RL through transformers such as T_4 . Inasmuch as each listener's set is arranged, as will be described later, so that it may be adjusted to receive any desired program the transformers T_4 are all arranged so as to have a substantially flat characteristic over the entire radio broadcasting range.

The individual broadcast receiving set may comprise, as illustrated, a radio frequency amplifier RFA_3 , coupled by means of a transformer T_5 with a detector D_1 , which in turn is coupled through a trans-

former T_6 to a low frequency amplifier A_1 . The output circuit of the amplifier A_1 is then connected through a transformer T_7 to a suitable receiver such as a loud speaker S .

5 The circuit of the transformer T_5 is arranged to be tuned by means of an adjustable condenser C so that any listener may tune his detector to the particular program which he desires to receive. The radio frequency amplifier RFA_3 , interposed between his tuned circuit and the common connection to the common radio frequency amplifier RFA_2 , prevents his tuning adjustments from affecting the other sets connected in multiple
10 therewith. Preferably, the radio frequency amplifiers RFA_3 are made non-adjustable as to gain, gain adjustments being effected by adjusting the coupling of the transformer T_5 . The transformers T_6 and T_7 are, of course, low frequency transformers and they may be so designed that their transmission characteristic is flat only over the portion of the audible range necessary to efficiently receive a program.

25 It will be understood, of course, that the radio frequency amplifiers RFA_3 are designed to amplify efficiently all frequencies over the entire radio broadcasting range.

The amplifiers RFA_1 and RFA_2 are designed to amplify the voltage of the radio frequency signals in the radio broadcasting band up to a level sufficient to enable all of the individual receiving units in the apartment house or other local area to be energized through the distributing circuit, and, as already stated, this apparatus is common to all of the radio broadcast receivers in the area. It is also desirable that the input circuit of each radio frequency amplifier, such as RFA_3 which is connected to the distributing circuit, should have a high input impedance so that the effective load of the amplifier RFA_3 on the distributing circuit will be relatively small. The output circuit of the aperiodic radio frequency amplifier RFA_2 is arranged to have a terminating impedance through the transformer T_3 equal to the characteristic impedance of the multiple distributing circuit RL , with the latter
45 terminated with the terminating impedance Z_1 .

It is desirable that the arrangement of the conductors for the distributing circuit RL shall be such as to allow the impedance of the circuit to be practically uniform over the range of transmitted frequencies, and to be effectively controlled by the impedance Z_1 terminating the circuit. This circuit design has the advantage of transmitting to the inputs of the radio frequency amplifiers RFA_3 signals of practically uniform level.

It will be obvious that the general principles herein disclosed may be embodied in many other organizations widely different from those illustrated without departing
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from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. In a multiple channel radio receiver, an antenna common to a plurality of receiving sets, said antenna being substantially aperiodic over the range of a plurality of signaling channels, radio frequency amplifying equipment associated with said antenna and common to the individual listeners' sets, wire connections comprising conductors balanced against external disturbances extending from the output side of said amplifying equipment to the various listeners' sets, transformers interposed between each listener's set and said balanced conductors, each listener's set comprising a detector and an adjustable selecting circuit for selecting a particular program, and a radio frequency amplifier individual to each listener's set interposed between said adjustable selecting arrangement and the common amplifier to prevent reaction of the selective circuits upon the other receiving sets.

2. In a multiple channel radio receiver, an antenna common to a plurality of receiving sets, said antenna being substantially aperiodic over the range of a plurality of signaling channels, radio frequency amplifying equipment associated with said antenna and common to the individual listeners' sets, wire connections comprising conductors balanced against external disturbances extending from the output side of said amplifying equipment to the various listeners' sets, transformers interposed between each listener's set and said balanced conductors, each listener's set comprising a detector and an adjustable selecting circuit for selecting a particular program, a radio frequency amplifier individual to each listener's set interposed between said adjustable selecting arrangement and the common amplifier to prevent reaction of the selective circuits upon the other receiving sets, and means associated with said set for controlling the gain of the amplifier thereof without affecting the gain of the amplifiers individual to other sets.

3. In a multiple channel radio receiver, an antenna common to a plurality of receiving sets, said antenna being substantially aperiodic over the range of a plurality of signaling channels, radio frequency amplifying equipment associated with said antenna and common to the individual listeners' sets, wire connections comprising conductors balanced against external disturbances extending from the output side of said amplifying equipment to the various listeners' sets, transformers interposed between each listener's set and said balanced conductors, each listener's set comprising a detector and an adjustable selecting circuit for selecting a particular program, a radio frequency
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amplifier individual to each listener's set interposed between said adjustable selecting arrangement and the common amplifier to prevent reaction of the selective circuits upon the other receiving sets, and low frequency amplifiers included in each listener's set for amplifying the detected low frequency signals.

4. In a multiple channel radio receiver, an antenna common to a plurality of listeners' receiving sets, said antenna being substantially aperiodic over the range of a plurality of channels, wire connections comprising conductors balanced against external disturbances extending to the various listeners' sets, transformers interposed between each listener's set and said balanced conductors, each listener's set including a detector and a variable selecting arrangement for selecting a desired program, and a radio frequency amplifier individual to each set interposed between said adjustable selecting arrangement and the common point of connection with other sets to prevent the adjustment of said selecting arrangement from affecting the selectivity of any other set.

5. In a multiple channel radio receiver, an antenna common to a plurality of listeners' receiving sets, said antenna being substantially aperiodic over the range of a plurality of channels, wire connections comprising conductors balanced against external disturbances extending to the various listeners' sets, transformers interposed between each listener's set and said balanced conduc-

tors, each listener's set including a detector and a variable selecting arrangement for selecting a desired program, a radio frequency amplifier individual to each set interposed between said adjustable selecting arrangement and the common point of connection with other sets to prevent the adjustment of said selecting arrangement from affecting the selectivity of any other set, and means for adjusting the gain of each listener's set without affecting the gain of other sets connected therewith.

6. In a radio receiving system for apartment houses and the like, a central pick-up station, means at said station to pick up a plurality of radio frequency signal waves, a plurality of apartments, a wire circuit having conductors balanced against external disturbances led from said pick-up station to each of said apartments for transmitting signals thereto at radio frequency, individual receiving arrangements at each apartment, transformers interposed between each receiving arrangement and said balanced conductors, each receiving arrangement comprising means for selecting any desired radio wave transmitted over said conductors, and means for detecting a signal from the selected wave.

In testimony whereof, we have signed our names to this specification this 9th day of December, 1924.

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