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H. B. COXHEAD

MULTIPLE CHANNEL RADIORECEIVER

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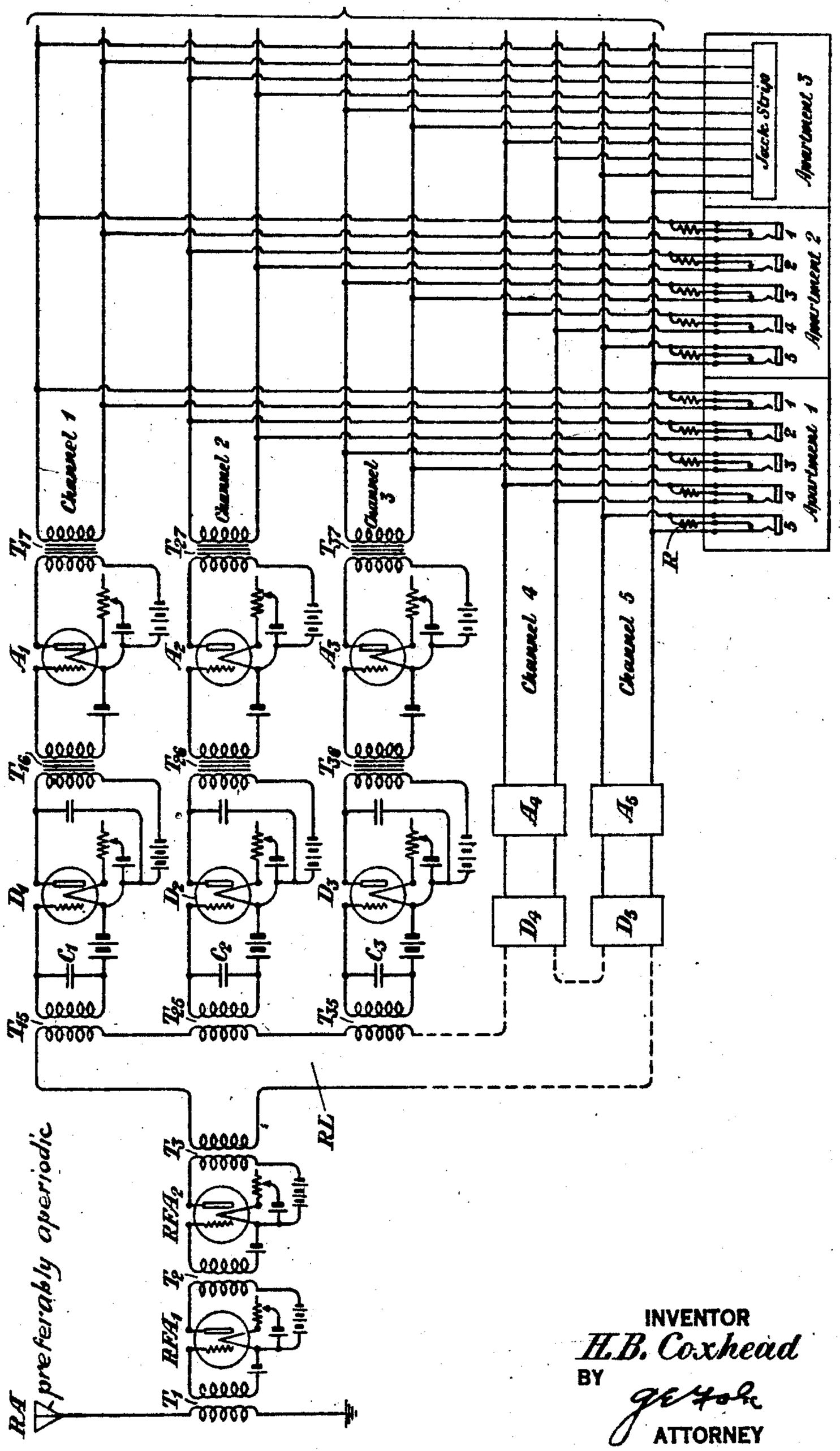

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MULTIPLE-CHANNEL RADIORECEIVER.

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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 difficult 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 which is common to all of the broadcast listeners, this antenna being aperiodic over the range used for radio broadcasting and associating with the antenna a radio frequency amplifier which is also so designed as to amplify efficiently all frequencies within the radio broadcasting range. The output of the amplifier is associated with separate detecting and amplifying sets for each radio broadcasting channel so that the frequencies of the desired program may be selected into a particular channel and there translated into low frequency currents for transmission to the broadcast listeners. The low frequency bus-bars of each channel are multipled to the various broadcast listeners so that the listeners may establish a connection to any channel by some suitable switching means. For example, the several channels may terminate at each broadcast listener's station in a plurality of jacks so that any listener may establish a connection with a desired channel by plugging his receiver or loud speaker into the jack of the proper channel.

The invention may now be more fully understood from the 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 which may be made aperiodic or substantially aperiodic over the range of frequencies employed in radio broadcasting in a manner well understood in the art. A transformer T_1 associates the antenna with a radio frequency amplifier RFA_1 which may be of any type well known in the art, the output circuit of said amplifier being associated through a second transformer T_2 with a second radio frequency amplifying unit RFA_2, if desired. The output circuit of the last amplifier of the series is connected through a transformer T_3 with a common receiving circuit RL, with which are associated the individual receiving channels, to be described later. The transformers T_1, T_2 and T_3 are so designed as to have a substantially flat transmission characteristic over the entire range of frequencies employed for radio broadcasting.

The common receiving circuit RL is connected through transformers such as T_{15}, T_{25}, etc., with individual receiving channels such as 1, 2, 3, etc. The transformers T_{15}, T_{25}, etc., are tuned by means of condensers such as C_1, C_2, C_3, etc., to the different frequencies in the broadcasting range, which are employed by the different broadcasting stations from which it is desired to receive programs. Detectors D_1, D_2, D_3, etc., are included in the individual channels for the purpose of detecting from the radio frequency currents received in the channel, currents corresponding to the original signaling currents transmitted from the broadcasting station. These detectors may be of any type well known in the art such, for example, as vacuum tube detectors. Where desired, one or more stages of voice frequency amplification may be provided by associating the output circuits of the detectors through transformers such as T_{16}, T_{26}, etc., with amplifiers such as A_1, A_2, A_3, etc. The output sides of these amplifiers are connected by means of transformers T_{17}, T_{27}, etc., with the individual channels 1, 2, 3, etc. It will be understood that the apparatus schematically shown in connection with channels 4 and 5 will be similar to that il-

lustrated in more detail in connection with the other channels. It will also be understood that as many channels may be provided as are necessary to give the desired service.

Branch circuits are led, as indicated, from the bus-bars of each of the channels, 1, 2, 3, 4 and 5 to the different apartments in the apartment house. the branch circuits terminating in individual switches such as jacks such as 1, 2, 3, 4 and 5 of a jack strip. In the jack circuit an impedance such as a resistance R is normally bridged across the circuit. this resistance being equal to the equivalent impedance of the reproducing receiver which is used by the broadcast listener. Consequently, if any broadcast listener plugs in upon a given channel the impedance of that channel will not be changed and no variations in the volume of transmission to other listeners upon the same channel will occur.

It will be noted that by means of the radio frequency amplifying equipment, all of the broadcasting channels in the broadcasting range are amplified by a common amplifying equipment. It will also be noted that the detecting and low frequency amplifying equipment, while individual to each channel, is common to all of the broadcast listeners so that this equipment need not be provided for each individual listener.

The tuning of the circuits of the individual channels, when once fixed, need not be changed and in any event such adjustments in tuning as are necessary may be under the control of an attendant. The individual listener is thus enabled to receive any desired program by simply inserting the plug of his receiver in the proper jack. This arrangement not only makes it impossible for the individual listener to produce the annoying squawks and squalls which the average broadcast listener produces by attempting to make tuning and other adjustments which he does not understand, but it also prevents him from annoying his neighbors in the same apartment house by transmitting such disturbances to their circuits.

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

What is claimed is:

1. A multiple channel radio receiver comprising an antenna common to the channels and substantially aperiodic over the frequency range employed by the channels, a radio frequency amplifier common to the channels, said amplifier amplifying with substantially equal efficiency the frequencies employed by all of the channels, fixed means to select to each channel its individual frequency range, means associated with each channel to detect the signals selected to the channel, a plurality of subscribers' stations exceeding the number of channels, and means at each subscriber's station to variably connect a receiver at each subscriber's station to any channel.

2. A multiple channel radio receiver comprising an antenna common to the channels and substantially aperiodic over the frequency range employed by the channels, a radio frequency amplifier common to the channels. said amplifier amplifying with substantially equal efficiency the frequencies employed by all of the channels. means to select to each channel its individual frequency range, means associated with each channel to detect the signals selected to the channel, separate multiple connections from all of a plurality of said channels to each of a plurality of listeners' stations, and switching arrangements at each listener's station whereby a plurality of receiving instruments may be selectively connected simultaneously to any channel and whereby any receiving instrument may be connected to any channel.

3. A multiple channel radio receiver comprising an antenna common to the channels and substantially aperiodic over the frequency range employed by the channels, a radio frequency amplifier common to the channels, said amplifier amplifying with substantially equal efficiency the frequencies employed by all of the channels, fixed means to select to each channel its individual frequency range. means associated with each channel to detect the signals selected to the channel, low frequency amplifiers individual to each channel for amplifying the detected currents. a plurality of subscribers' stations exceeding the number of channels, and means at each subscriber's station to variably connect a receiver at each subscriber's station to any channel.

4. A multiple channel radio receiver comprising an antenna common to the channels and substantially aperiodic over the frequency range employed by the channels, a radio frequency amplifier common to the channels, said amplifier amplifying with substantially equal efficiency the frequencies employed by all of the channels, means to select to each channel its individual frequency range, means associated with each channel to detect the signals selected to the channel, low frequency amplifiers individual to each channel for amplifying the detected currents, separate multiple connections from all of a plurality of said channels to each of a plurality of listeners' stations, and switching arrangements at each listener's station whereby a plurality of receiving instruments at such stations may be selectively connected simultaneously to any channel

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and whereby any receiving instrument may be connected to any channel.

5. A multiple channel radio receiver comprising an antenna common to the channels and substantially aperiodic over the frequency range employed by the channels, a radio frequency amplifier common to the channels, said amplifier amplifying with substantially equal efficiency the frequencies employed by all of the channels, means to select to each channel its individual frequency range, means associated with each channel to detect the signals selected to the channel, separate multiple connections from all of a plurality of said channels terminating in jacks at each listener's station whereby listeners at a plurality of stations may plug receiving instruments into the jacks of any channel to connect a receiving instrument at each subscriber's station to any desired channel, and means to prevent the establishment of a connection through any jack from producing material change in the impedance of the channel.

6. In a broadcast receiving system, means at a central point for simultaneously receiving a plurality of message carrying radio frequency waves, means to select said waves to physically separate channels, one corresponding to each message wave, means in each channel to translate to audio frequency the message carried by the selected wave, means to extend separate circuits from all of a plurality of said channels to each of a plurality of subscribers' stations, and means at each subscriber's station whereby a subscriber's receiver may be connected exclusively to any one of the circuits leading to the channels.

In testimony whereof, I have signed my name to this specification this 9th day of December, 1924.

HARRY B. COXHEAD.