Sept. 9, 1941. N. R. BLIGH ET AL 2,255,645

AUTOMATIC SELECTIVITY CONTROL SYSTEM

Filed Jan. 23, 1936

Fig. 1.

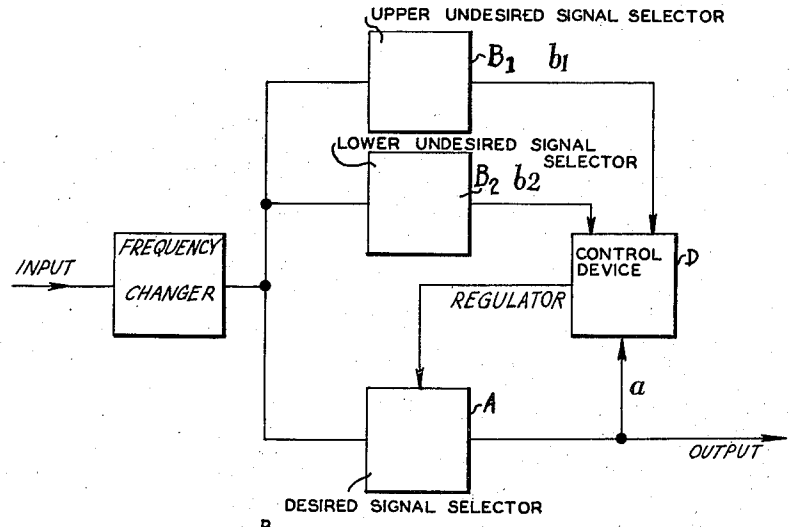
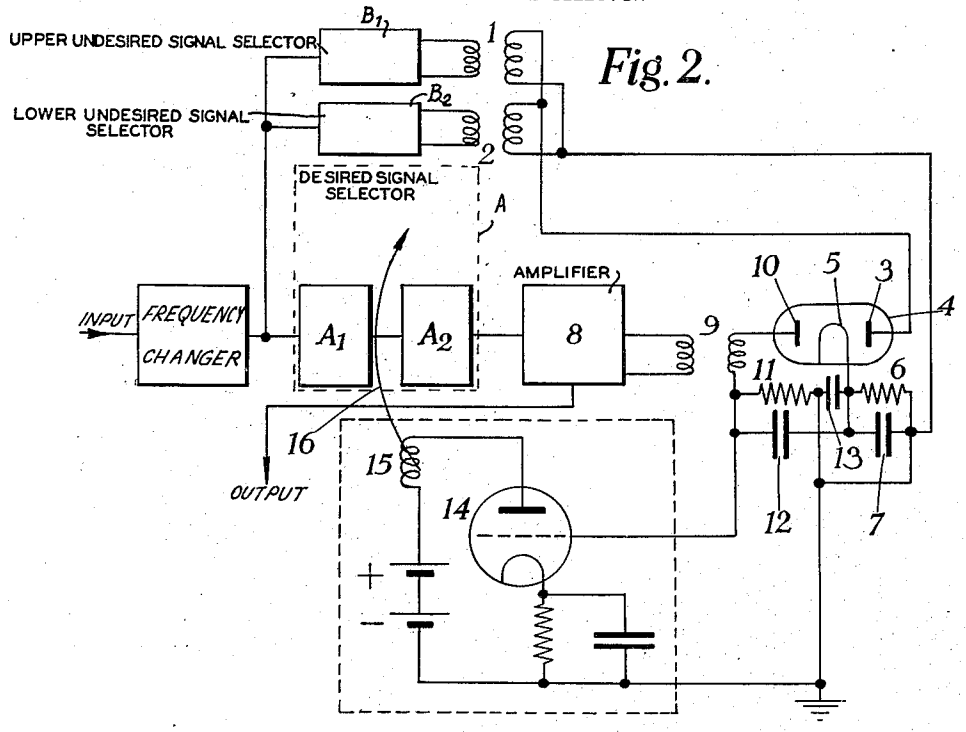


Fig. 2.



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Patented Sept. 9, 1941 2,255,645

UNITED STATES PATENT OFFICE

2,255,645

AUTOMATIC SELECTIVITY CONTROL SYSTEM

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Application January 23, 1936, Serial No. 60,436
In Great Britain January 31, 1935

32 Claims. (Cl. 250—20)

This invention relates to apparatus for receiving signals conveyed by modulated carriers comprising means for varying the selectivity of the apparatus in accordance with the intensity of the said carriers. More particularly it refers to broadcast receiving sets comprising such means.

When signals conveyed by a carrier A of one frequency have to be received in the presence of the carrier B of neighbouring frequency, it is known to be desirable that the receiving set should be more selective when the neighbouring carrier is relatively strong than when it is relatively weak. For although increase of selectivity may cause some of the signals of higher frequency to be lost, the disadvantage of such loss is outweighed by the greater freedom from interference. On this account it has been proposed to make the selectivity automatically variable in accordance with the strength of the carrier A.

But this proposal does not solve the difficulty fully. For even if carrier A is strong, troublesome interference may arise if carrier B is also strong or stronger; yet in this case selectivity will be a minimum and there will be no provision against interference. On the other hand, if A is weak, selectivity will be high and the signals of higher frequencies lost, even if there is no interference from B and therefore no need to sacrifice these high frequencies.

A better method is to regulate selectivity in accordance with the strength of carrier B. For then, if there is no neighbouring carrier B, the set will be at low selectivity, even if carrier A is weak. When the carrier B is strong, the selectivity will always be high even if carrier A is weak. A still better method is to regulate the sensitivity in accordance with the relative strength of A and B; for it is that which really determines in all cases the desirable selectivity.

According to the invention apparatus for receiving signals conveyed by modulated carriers comprises means for regulating the selectivity of the apparatus in accordance with the intensity or intensities of one or more carriers (B) of frequencies adjacent to but different from that of the carrier (A) conveying the signal to be received. Preferably it comprises also means for regulating the selectivity in accordance with the intensity of the carrier (A) conveying the signals that are being received, so that the selectivity depends on the relation between the intensity of carrier A and that of the carrier or carriers B. Of course the regulation must be such that the selectivity increases in general with increase of the intensity of B and decreases with increase of the intensity of A.

In accordance with one feature of the invention, there is provided, in apparatus adapted to select the signals conveyed by one of a plurality of modulated carriers applied to its input, the combination comprising selectivity regulating means for varying the selectivity of the apparatus, and control means responsive to at least one carrier adjacent to the one conveying the signals to be selected. The control means are arranged to operate the regulating means to increase the selectivity of the apparatus in response to an increase of the intensity of the adjacent carrier.

Also in accordance with a feature of the invention, an electric circuit arrangement for controlling the selectivity of a modulated-carrier signal receiver to discriminate against an undesired signal on a carrier frequency near the desired signal-carrier frequency comprises a band-pass selector, and means responsive to the undesired signal for automatically adjusting the width of the band of frequencies passed by the selector inversely in accordance with the input amplitude of the undesired signal.

Also in accordance with a feature of the invention, there is included in a modulated-carrier signal receiver a band-pass selector, for selecting a desired signal comprising a carrier frequency and a band of modulation frequencies, and means responsive to the amplitude of an undesired signal of a frequency near the desired signal-carrier frequency for automatically adjusting the width of at least the portion of the band on the same side of the desired signal-carrier frequency as the undesired signal frequency inversely in accordance with the input amplitude of the undesired signal.

Also in accordance with the invention, there is provided in a modulated-carrier signal receiver means for selecting and reproducing a desired signal comprising a carrier frequency and a band of modulation frequencies, means for attenuating signal components represented by modulation frequencies separated from the carrier frequency by more than a predetermined frequency difference, and means for automatically adjusting the first-named means to vary the said frequency difference inversely in accordance with the amplitude of an undesired signal on a carrier frequency near the desired signal-carrier frequency.

Also in accordance with a feature of the invention, a circuit arrangement for automatically controlling the selectivity of received signals comprises a band-pass amplifier adjusted, in the ab-

sence of a strong interfering signal from an adjacent carrier wave, to transmit a wide band of frequencies. This circuit arrangement also includes means coupled to the amplifier and responsive to the amplitude of the interfering signal for adjusting the band-pass amplifier to transmit a narrow band of frequencies.

The principle of the invention in its preferred form is illustrated diagrammatically with reference to a superheterodyne receiving set in Figure 1 of the accompanying drawing; Figure 2 of the same drawing, shows one method of putting the principle into effect.

In Fig. 1 there is disclosed a circuit arrangement for automatically controlling the selectivity of received signals in accordance with the strength of interfering signals on adjacent carrier waves. In Figure 1 the signals enter a frequency changer by the path marked "Input" and leave it by three paths. One path leads to a filter or desired signal selector A having a response curve centred on the intermediate frequency F proper to the set; the output of this filter carries the signals to be received to the ultimate receiving apparatus by the path marked "Output." The other two paths lead to subsidiary filters or undesired signal selectors B_1 and B_2 (which need not be physically separate), having response curves centred one on a frequency $F+f_1$ adjacent to the said intermediate frequency on the high side, that is, centered on the adjacent carrier on the high side as altered by the frequency changer, the other on a frequency $F-f_2$ adjacent to it on the low side. Preferably, but not necessarily, $f_1=f_2$; F may be appropriately 110 kilocycles, f_1 and f_2, 9 kilocycles. The outputs of selectors B_1, B_2 and the output of selector A are applied by paths b_1, b_2 and a to the control device D which generates a voltage which increases (or decreases), with the output of selector A and decreases (or increases) with the output of selector B_1 and with the output of selector B_2. This voltage is applied to selector A by the path marked "Regulator," so that the selectivity of selector A decreases (or increases) with this voltage. The selectivity of selector A is then the lower, the greater is the intensity of the carrier of frequency F relative to those of the adjacent carriers, $F+f_1$ and $F-f_2$.

In an alternative arrangement, the paths leading to undesired signal selectors B_1 and B_2 branch from the main path after, and not before the desired signal selector A. The sensitivity of selector A is then determined by the intensity of the side-bands of the modulated carrier leaving selector A. In this case complete elimination of interference cannot be achieved; for the selectivity of selector A will be increased only so far as to leave sufficient side bands to maintain the reduced selectivity.

Figure 1 shows only the functional relations of the elements of the circuit; it does not show their constructional relations. Two or more of the elements may have a part in common.

Figure 2 shows by way of example one method of constructing the control device D and certain parts closely associated with it. The parts not so closely associated are represented in the same manner as in Figure 1.

The transformers 1 and 2 apply an alternating voltage V_2, which increases generally with the output of both B_1 and B_2, between ground and one anode 3 of the double diode 4. The cathode 5 of tube 4 is connected to ground through the high resistance 6 and condenser 7 in parallel thus forming a load circuit for diode 5, 3; its potential v_2, representing the voltage developed across resistor 6, relative to ground therefore becomes more positive as V_2 increases. Amplifiers may, of course, be placed between undesired signal selectors B_1, B_2 and the diode 4.

The output of the selector A (which is shown divided into two parts for a reason explained below) is applied to the amplifier 8, which feeds the main output to other stages and also to the primary of the transformer 9. The ends of the secondary of this transformer are connected to the anode 10 of the double-diode 4 and through the high resistance 11 to earth. The cathode 5 of diode 4 is connected to the two ends of resistance 11 through the condensers 12 and 13. The alternating voltage V_1 across the secondary of transformer 9 increases with the output of selector A. The potential v_1 of anode 10 relative to cathode 5, becomes more negative the greater is V_1, the load circuit for diode 5, 10 including resistors 11 and 6 in series. The negative potential of anode 10 relative to ground is therefore $v_1—v_2$, where v_1 increases with V_1 and the output from selector A, and v_2 increases with V_2 and the combined outputs from B_1 and B_2. It is not hereby implied that v_1 varies with V_1 in a manner strictly independent of V_2 that v_2 varies with V_2 in a manner strictly independent of V_1, or that the v's vary continuously with the V's. The object of the invention will be attained if the selectivity of selector A is made to vary at an appropriate rate in the opposite sense to the voltage $v_1—v_2$.

Methods of varying the selectivity of a filter in accordance with a potential are already known; they do not form part of the invention. One of the simplest in principle is to divide the selector A into two parts, A_1 and A_2, the coupling between which is varied by mechanical means.

This arrangement may consist of a pair of coupled resonant circuits tuned to the desired signal, the degree of coupling between the tuned circuits being variable so that, with relatively weak interfering signals, the resonant circuits are responsive to a wide band of frequencies and with relatively strong interfering signals the resonant circuits are responsive to a narrow band of frequencies. By this arrangement, the system may be proportioned automatically to maintain within a predetermined small value the amplitude of the undesired signal in the output of the system. This method is indicated in Figure 2. The potential $v_1—v_2$ of anode 10 relative to ground is applied to the grid of the triode 14, whose anode circuit contains the electromagnet 15 actuating the mechanical coupling means 16 between sections A_1 and A_2. Alternatively purely electrical means of varying selectivity can be used; such means are described in British Patent specification No. 430,507.

Of course, means for regulating selectivity according to the invention can be combined with the usual automatic volume control. Further the invention can be applied to tuned radio-frequency receivers, if the filters A and B in Figure 1 are radio-frequency filters and the frequency changer is removed.

In summary, therefore, it is seen that the apparatus of Fig. 2 is adapted to select the signals conveyed by one of a plurality of modulated carriers applied to its input and includes selectivity-regulating means A for varying the selectivity of the apparatus. The control arrangement including tubes 4 and 14 is responsive to at least one carrier adjacent to the one conveying the

signals to be selected, that is, it is responsive to either the carrier from undesired signal selector B_1 or the carrier from undesired signal selector B_2, or both. The control means is arranged to operate the regulating means A to increase the selectivity of the apparatus in response to an increase of the intensity of the adjacent carrier.

The circuit arrangement of Fig. 2 also includes, in a modulated-carrier signal receiver, a band-pass selector A for selecting a desired signal comprising a carrier frequency and a band of modulation frequencies, and means, including undesired signal selectors B_1 and B_2 and diode **3**, **5**, responsive to the amplitude of an undesired signal on a frequency near the desired signal-carrier frequency for automatically adjusting the width of at least a portion of the band of signals transmitted by signal selector A on the same side of the desired signal-carrier frequency as the undesired signal frequency inversely in accordance with the input amplitude of the undesired signal.

The arrangement of Fig. 2 also includes, in a modulated-carrier signal receiver, means including desired signal selector A for selecting and reproducing a desired signal comprising a carrier frequency and a band of modulation frequencies. The arrangement comprises attenuating means, including the desired signal selector A, for attenuating signal components represented by modulation frequencies separated from the desired carrier frequency by more than a predetermined frequency difference, and means, including tubes **4** and **14**, for automatically adjusting desired signal selector A to vary the above-mentioned frequency difference inversely in accordance with the amplitude of an undesired signal on a carrier frequency near the desired signal-carrier frequency.

The circuit arrangement is also one for automatically controlling the selectivity of received signals and comprises a band-pass amplifier, including amplifier **8** and the desired signal-selective circuit A, adjusted, in the absence of a strong interfering signal from an adjacent carrier wave, to transmit a wide band of frequencies. The circuit also comprises means including control tubes **4** and **14** coupled to the amplifier and responsive to the amplitude of the interfering signal for adjusting the band-pass amplifier to transmit a narrow band of frequencies.

We claim:

1. In apparatus adapted to select the signals conveyed by one of a plurality of modulated carriers applied to its input, the combination comprising selectivity regulating means for varying the selectivity of the apparatus, and control means responsive to at least one carrier adjacent to the one conveying the signals to be selected interposed between said input and said regulating means, said control means being arranged to operate the regulating means to increase the selectivity of the apparatus in response to an increase of the intensity of said adjacent carrier.

2. In apparatus adapted to select the signals conveyed by one of a plurality of modulated carriers applied to its input, the combination comprising selectivity regulating means for varying the selectivity of the apparatus, control means responsive to at least one carrier adjacent to the one conveying the signals to be selected interposed between said input and said regulating means, said control means tending to operate the regulating means to increase the selectivity of the apparatus in response to an increase of the intensity of said adjacent carrier, and further control means responsive to the carrier conveying the signals to be selected interposed between said input and said regulating means, said further control means tending to operate the regulating means to decrease the selectivity of the apparatus in response to an increase of the intensity of the carrier conveying the signals to be selected.

3. In apparatus adapted to select the signals conveyed by one of a plurality of modulated carriers applied to its input, the combination comprising selectivity regulating means for varying the selectivity of the apparatus, control means interposed between said input and said regulating means, said control means being responsive to at least one carrier adjacent to and of higher frequency than the one conveying the signals to be selected and tending to operate the regulating means to increase the selectivity of the apparatus in response to an increase of the intensity of said adjacent carrier, a second control means interposed between said input and said regulating means, said second control means being responsive to at least one carrier adjacent to and of lower frequency than the one conveying the signals to be selected and tending to operate the regulating means to increase the selectivity of the apparatus in response to an increase of the intensity of the carrier to which the second control means is responsive, and a third control means interposed between said input and said regulating means, said third control means being responsive to the carrier conveying the signals to be selected and tending to operate the regulating means to decrease the selectivity of the apparatus in response to an increase of the intensity of the carrier conveying the signals to be selected.

4. Apparatus for receiving signals conveyed by modulated carriers and for selecting therefrom the signals conveyed by one particular carrier comprising an input to which said carriers are applied, a frequency changer connected to said input, a main filter connected to the output side of the frequency changer, said main filter having a response curve centered on the frequency of the particular carrier as changed by the frequency changer, one output connected to the output side of said filter, a subsidiary filter connected to the output side of the frequency changer, said subsidiary filter having a response curve centered on the frequency of an adjacent carrier as altered by the frequency changer, a device for generating a control voltage connected to the output sides of both the filters, said device generating a control voltage which changes with the outputs of the two filters but in opposite directions, a regulator responsive to said control voltage and interposed between the output side of said device and the main filter, said regulator being arranged to decrease the selectivity of the main filter if the output of the main filter increases relatively to the output of the subsidiary filter.

5. In apparatus adapted to select the signals conveyed by one of a plurality of modulated carriers applied to its input, the combination comprising selectivity regulating means for varying the selectivity of the apparatus, a filter connected to said input, said filter being adapted to select an alternating voltage dependent on the intensity of a carrier adjacent to the one conveying the signals to be selected, a rectifier connected to the filter, said rectifier being adapted to rec-

tify the selected voltage, an amplifier interposed between the rectifier and the regulating means, said amplifier serving to amplify the rectified voltage, and to apply it to the regulating means to vary the selectivity of the apparatus so that it increases with an increase of the intensity of said adjacent carrier.

6. In apparatus adapted to select the signals conveyed by one of a plurality of modulated carriers applied to its input, the combination comprising selectivity regulating means for varying the selectivity of the apparatus, and control means responsive to at least one carrier adjacent to the one conveying the signals to be selected, said control means being arranged to operate the regulating means to increase the selectivity of the apparatus in response to an increase of the intensity of said adjacent carrier.

7. The method of adjusting the selectivity of a band-pass selector in the signal-selecting system of a modulated carrier signal receiver, which comprises automatically adjusting the width of the band of frequencies passed by said selector directly in accordance with the amplitude of the desired signal input to said selector and inversely in accordance with the amplitude of undesired signals on frequencies near the carrier frequency of the desired signal.

8. An electric circuit arrangement for controlling the selectivity of a modulated carrier signal receiver to discriminate against an undesired signal on a carrier frequency near the desired signal carrier frequency, comprising a band-pass selector and means responsive to said undesired signal for automatically adjusting the width of the band of frequencies passed by said selector inversely in accordance with the input amplitude of said undesired signal.

9. In a modulated carrier signal receiver, a band-pass selector for selecting a desired signal comprising a carrier frequency and a band of modulation frequencies, and means for automatically adjusting the width of the band of frequencies passed by said selector inversely in accordance with the amplitude of an undesired signal on a carrier frequency near the desired signal carrier frequency.

10. In a modulated carrier signal receiver, a band-pass selector for selecting a desired signal comprising a carrier frequency and a band of modulation frequencies, and means responsive to the amplitude of an undesired signal on a frequency near the desired signal carrier frequency for automatically adjusting the width of at least the portion of said band on the same side of the desired signal carrier frequency as said undesired signal frequency inversely in accordance with the input amplitude of said undesired signal.

11. In a modulated carrier signal receiver, a band-pass signal amplifier for selecting and amplifying a band of frequencies including frequencies on both sides of a signal carrier frequency, and means for automatically adjusting the width of at least the part of said band on one side of the carrier frequency inversely in accordance with the input amplitude of an undesired signal on a frequency near said band on the same side of said carrier frequency.

12. The method of adjusting the selectivity of a band-pass selector in the signal-selecting system of a modulated carrier signal receiver, which comprises automatically adjusting the width of the band of frequencies passed by said selector inversely in accordance with the amplitude of an undesired signal on a frequency near the carrier frequency of the desired signal.

13. In a modulated carrier signal receiver, means for selecting and reproducing a desired signal comprising a carrier frequency and a band of modulation frequencies, means for attenuating signal components represented by modulation frequencies separated from said carrier frequency by more than a predetermined frequency difference, and means for automatically adjusting said first-named means to vary said frequency difference inversely in accordance with the amplitude of an undesired signal on a carrier frequency near the desired signal carrier frequency.

14. In a modulated carrier signal receiver for selecting and reproducing a desired signal comprising a carrier frequency and a band of modulation frequencies, means for attenuating signal components represented by modulation frequencies at the outer edges of said band, and means for automatically controlling said attenuating means directly in accordance with the amplitude of an undesired signal on a carrier frequency near the desired signal carrier frequency.

15. A circuit arrangement for selectively receiving and amplifying modulated high frequency carrier waves comprising a pair of coupled circuits tuned to the desired carrier wave, means for variably adjusting the coupling between said circuits whereby the width of the transmitted frequency band is controlled, and means responsive to carrier waves adjacent the desired received carrier wave for automatically adjusting the coupling between the tuned circuits in accordance with the amplitude of the carrier waves adjacent the desired carrier wave to be received.

16. A circuit arrangement for selectively receiving and amplifying high-frequency carrier waves comprising, a pair of coupled tuned circuits tuned to the desired carrier wave, means for variably adjusting the coupling between the circuits whereby the width of the transmitted frequency band is controlled, two selective circuits one of which is tuned to a higher and the other to a lower frequency than the frequency to which the coupled circuits are tuned, and means responsive to carrier waves adjacent the desired received carrier wave and translated by said selective circuits for automatically adjusting the coupling between the tuned circuits in accordance with the amplitude of the carrier waves adjacent the desired carrier wave to be received, whereby the band width of the amplifier is automatically controlled in accordance with the alternating voltages occurring in the selective circuits.

17. A circuit arrangement for automatically controlling the selectivity of received signals, comprising a band-pass amplifier adjusted in the absence of a strong interfering signal from an adjacent carrier wave to transmit a wide band of frequencies, and means coupled to said amplifier and responsive to the amplitude of said interfering signal for adjusting the band-pass amplifier to transmit a narrow band of frequencies.

18. A circuit arrangement for automatically controlling the selectivity of received signals in accordance with the strength of interfering signals on adjacent carrier waves, comprising a pair of coupled resonant circuits tuned to the desired signals, the degree of coupling being such that with relatively weak interfering signals the resonant circuits are responsive to a wide band

of frequencies, circuit means for deriving a potential proportional to the strength of interfering signals on adjacent carrier waves, and means controlled by said derived potential to variably adjust the degree of coupling between the resonant circuits, the degree of coupling being such that with relatively strong signals the resonant circuits are responsive to a narrow band of frequencies.

19. A circuit arrangement for automatically controlling the selectivity of received signals in accordance with the strength of interfering signals upon adjacent carrier waves comprising, a pair of coupled resonant circuits tuned to the desired signals, the degree of coupling being such that with relaitvely weak interfering signals the resonant circuits are responsive to a wide band of frequencies, a rectifier having its input circuit responsive to the interfering signals for deriving a potential proportional to the strength of interfering signals on adjacent carrier waves, and means actuated by the rectified currents of said rectifier variably to adjust the degree of coupling between the resonant circuits, the degree of coupling being such that with relatively strong signals, the resonant circuits are responsive to a narrow band of frequencies.

20. A method of operating a radio receiver of the type which comprises cascaded resonant circuits tuned to a desired signal frequency and means responsive to variations in signal amplitude for automatically adjusting the degree of selectivity of the cascaded circuits, which includes the step of automatically varying the selectivity of said cascaded circuits in response to collected undesired adjacent channel signals differing in frequency from the desired signals by a predetermined magnitude.

21. A method of operating a radio receiver of the type which comprises cascaded resonant circuits tuned to a desired signal frequency and means responsive to variations in signal amplitude for automatically adjusting the degree of selectivity of the cascaded circuits, which includes the step of automatically varying the selectivity of said cascaded circuits in response to collected undesired adjacent channel signals differing in frequency from the desired signals by a predetermined magnitude of the order of 10 kilocycles.

22. A method of receiving modulated radio frequency signals which comprises collecting such signals, transmitting the signals through at least one resonant circuit tuned to the frequency of said signals, varying the degree of selectivity of the resonant circuit in response to variations in amplitude of the received signals, and adjusting the degree of selectivity of said resonant circuit in response to collected undesired adjacent channel signals differing in frequency from the desired signal frequency by an amount of the order of 10 kilocycles.

23. In a modulated carrier signal receiver, a band-pass selector for selecting a desired signal comprising a carrier frequency and a band of modulation frequencies, means for adjusting the width of the band of frequencies passed by said selector, means responsive to the amplitude of the desired signal for controlling said adjusting means automatically to adjust said band width directly in accordance with the amplitude of said desired signal, and means responsive to the amplitude of an undesired signal on a carrier frequency near the desired signal carrier frequency for automatically controlling said adjusting means to adjust said band width inversely with the input amplitude of said undesired signal.

24. In a modulated carrier signal receiver, a band-pass signal amplifier for selecting and amplifying a desired signal comprising a carrier frequency and a band of modulation frequencies, means for adjusting the width of the band of frequencies passed by said amplifier directly in accordance with the input amplitude of the desired signal carrier, and means for automatically adjusting the width of said band inversely in accordance with the input amplitude of an undesired signal on a carrier frequency near said band, said means being proportioned to maintain automatically within a predetermined small value the amplitude of said undesired signal in the output of said amplifier.

25. In combination, means for receiving desired signals, means for controlling the selectivity of said receiving means in accordance with the strength of said desired signals and in a sense such that the stronger the desired signals the lower is the selectivity of the receiver, means responsive to undesired signals differing from the desired signals by a predetermined frequency value, said last mentioned means being electrically associated with said selectivity control means so as to cause the latter to increase the selectivity of the receiver in accordance with the strength of the undesired signals.

26. In a radio receiver, the combination of at least two tuned circuits, means for transferring energy from one of said circuits to the other of said circuits, means for selecting desired signals traversing said receiver, means for rectifying said desired signals, means for selecting undesired signals traversing said receiver, means for rectifying said undesired signals, means for combining at least a part of both of said rectified signals in opposed sense, means for controlling said circuit energy transfer as a function of said combined rectified signals.

27. The method of governing the selectivity of a receiver for electrical oscillations, which consists in amplifying signals in a limited range of frequencies, deriving a control potential from the amplified signals dependent in strength upon their amplitude, selecting and amplifying signals which are in limited bands of frequencies adjacent to said limited range, deriving a control potential from said last-mentioned signals dependent in strength upon their amplitude, combining said control potentials differentially, and utilizing the resultant potential to regulate the selectivity of said receiver.

28. In a radio receiving system, a plurality of amplifying devices, coupling means interconnecting said devices in cascade, means for altering the selectivity of the system in one sense through at least one of said coupling means in response to variations in strength of the received signal energy of a limited range of frequencies and in the opposite sense in response to variations in the strength of received signal energy of limited frequency bands adjacent to said limited range, and additional means for altering the gain of said system in response to variations in the amplitude of signal energy in said limited range and in response to changes in the gain caused by the operation of said selectivity control by the signal energy of said limited frequency bands.

29. In a radio receiving system, means for selecting received signals of a desired range of frequencies, means for deriving from at least one component of said signals a control potential

dependent in strength thereupon, means for selecting received signals of at least one frequency band adjacent to said desired range, means for deriving from at least one component of said last-mentioned signals a second control potential dependent in strength thereupon, means for altering the selectivity of said system in response to changes in the amplitude of one of said control potentials, and means, responsive to changes in the amplitude of the other of said potentials, for varying the effectiveness of the selectivity-controlling potential in altering said selectivity.

30. In a radio system, the combination of means for receiving and selecting signal energy of a desired frequency range, means for receiving and selecting a signal energy of at least one frequency adjacent to said frequency range, and means for controlling the selectivity of said system in one sense in response to changes in the amplitude of at least one component of the signals in said desired frequency range, and in the opposite sense in response to changes in the amplitude of at least one component of the signals of said adjacent frequency.

31. In a radio receiving system, in combination, means for receiving and selecting signals of any desired band of frequencies, means for producing a potential from at least one component of said signals dependent in strength thereupon, means for receiving and selecting signals of frequencies adjacent to said desired band, means for producing a potential from at least one component of said last-mentioned signals dependent in strength thereupon, coupling means for at least two amplifiers in said system, said coupling means including elements responsive to variations in load to vary the selectivity characteristic thereof, and an electronic control device connected to said coupling means for altering the load thereon in one sense in response to changes in the strength of said first potential, and in the opposite sense in response to changes in the strength of said second named potential.

32. A radio receiving system having a plurality of cascade-coupled amplifiers and including means for altering the selectivity thereof in one sense in response to variations in the amplitude of a potential derived from electrical energy in a limited range of frequencies and in the opposite sense in response to variations in the amplitude of a potential derived from electrical energy in frequency bands adjacent to said limited range, in which said means comprise at least one coupling device for at least two of said amplifiers, said coupling device including two intercoupled tuned circuits, an electronic control device providing variable impedance means connected in parallel with at least one of said tuned circuits, and means for applying said control potentials in opposed sense to said control device to cause the impedance thereof to vary and thereby to alter the selectivity of said coupling device.

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