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SIGNALING SYSTEM

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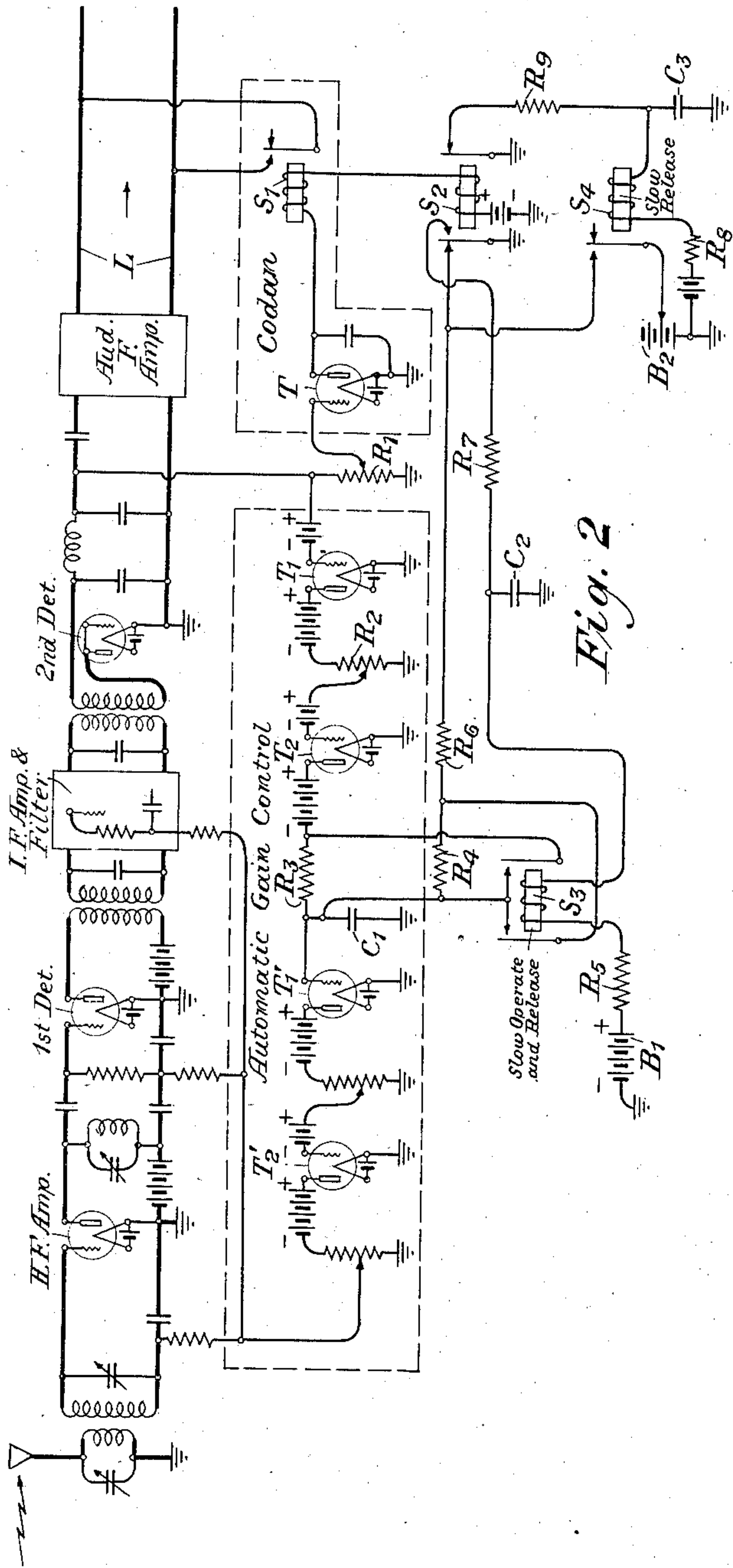


Fig. 2

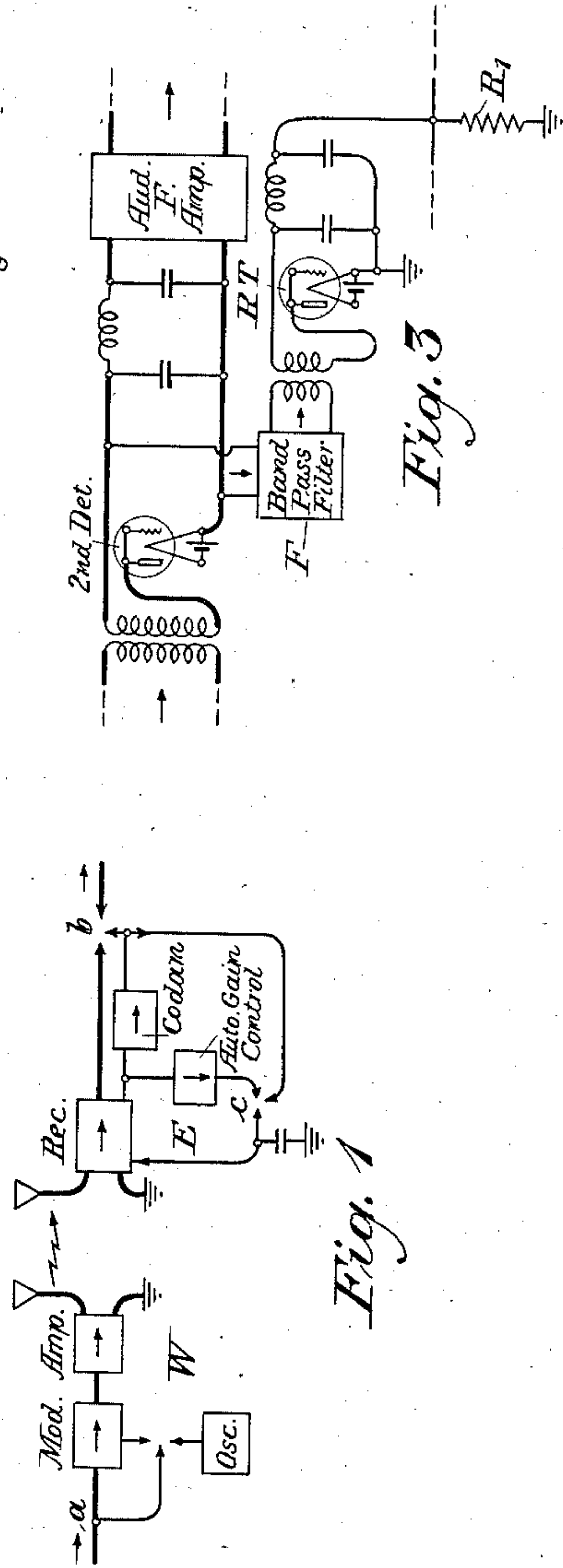


Fig. 1

Fig. 3

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SIGNALING SYSTEM

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This invention relates to signaling systems, and more particularly to signaling systems in which either carrier energy or special control energy is applied to the transmitter only during the periods of signal transmission. With greater particularity, the invention relates to carrier systems of the type indicated in which the gain of the receiver is automatically controlled by the received carrier energy. An example of the systems to which the invention is applicable is a short-wave transoceanic radio system in which it is desirable that the carrier be removed when no signal energy is applied to the transmitter and that the receiver gain be controlled by the carrier energy. It is to be understood that the invention is equally applicable to systems in which the control is effected by a special frequency wave which is not the carrier.

In systems of the indicated type as operated heretofore, when the carrier (or other control energy) is removed from the transmitter, the receiver gain may rise by 25 decibels or even a greater amount; when the carrier is again applied to the system, it becomes necessary to reduce the receiver gain before signal waves can be received without considerable distortion due to overloading. Since it is generally desirable to make the gain adjusting action relatively slow, in order to avoid excessive "hunting" in the gain control device and the resultant distortion, there may be a period of several seconds after the carrier is re-applied which is marked by the distortion of the signal due to the excessive gain of the receiver.

The principal object of the invention is to reduce as far as possible the distortion heretofore introduced in the receiver in connection with the removal of the carrier or other control energy and the subsequent re-application of that energy. Subordinate objects are to provide for a receiver gain of a desirable value when the carrier is removed and to provide for the quick readjustment of that gain when the carrier is again received, possibly with a widely different value.

In general, the above-stated objects are attained by novel methods and means whereby, when the carrier or other control energy is removed, the receiver gain is either maintained at its last value or, if the carrier is off for a predetermined time, brought to some other predetermined value, and, when that energy again arrives, the receiver gain is quickly readjusted to the new carrier or other control energy intensity, without the delay which would normally be introduced by the slow action of the gain adjusting device.

The invention will be clearly understood when the following description of one desirable arrangement of the circuits and of the operation thereof is read with reference to the accompanying drawing, of which—

Figure 1 shows schematically a signaling system in which the carrier is applied at the transmitter only when signal energy is to be transmitted and in which the received carrier controls the receiver output path and the receiver gain, and indicates the novel features introduced by the applicant;

Fig. 2 shows diagrammatically a suitable arrangement of the receiver circuits; and

Fig. 3 shows diagrammatically a modification of the circuits of Fig. 2 to suit the case of control energy other than the carrier.

With reference to the schematic disclosure of Fig. 1, there is indicated a signaling system including a transmitting station W at the left and a receiving station E at the right. The system specifically indicated is a radio system but it will be understood that the transmission from station W to station E might as well be over wires. When there is no signal to be transmitted, the oscillator is disassociated from the modulator at the transmitting station W. At the receiving station E, there is indicated a receiver having a demodulated signal path which may be controlled at a point b. When no signal is applied to the system, this demodulated signal path is disabled at point b.

If signal is transmitted, energy is diverted at point a at the transmitting end and serves to connect the oscillator with the modulator. After being amplified and radiated from the station W, this energy is received at the station E. There are indicated schematically at the station E a "codan"—that is, a carrier operated device anti-noise—and automatic gain control apparatus. When the carrier energy is received at the station E, energy is taken from the receiver circuit to operate the codan and the automatic gain control circuit. The effect of the operation of the codan is to remove the disability at point b and thus render the receiver output operative. It will be noted that normally the output of the automatic gain control is disassociated from the receiver. When, however, the carrier energy arrives, an operation at point c serves to connect the output of the gain control with the receiver input. As is indicated by the condenser, provision is made, in accordance with the applicant's invention, for some normal control of the receiver gain in the absence of the connection of

the automatic gain control output with the receiver input.

Thus, by the schematic showing of Fig. 1, there is indicated a signal system in which the carrier is applied at the transmitting end only under the control of the signal; when the carrier reaches the receiving end, the normally disabled demodulated signal path is rendered operative and the gain of the receiver is controlled by the incoming carrier. In the absence of the reception of carrier energy, however, a certain control is exercised over the receiver gain.

In Fig. 2, there is shown diagrammatically and, in part, schematically, one desirable arrangement of the receiver circuits. It will be understood that the carrier energy is applied to the system and its application interrupted in the manner indicated in Fig. 1. The pertinent portions of the complete receiver circuit are shown as a high frequency amplifier, a first detector, an intermediate frequency amplifier and filter, a second detector and an audio-frequency amplifier. The output of the audio-frequency amplifier or, in other words, a portion of the demodulated signal path is designated L. Those portions of the complete circuit which make up the codan and the automatic gain control device are appropriately indicated. A relay chain comprises the codan relay S₁, a relay S₂, which may be called the gain-maintaining relay, and a relay S₃, which is preferably slow-operating and slow releasing and may be called the quick gain control relay. It should be noted that the circuits are shown in the condition produced by the reception of carrier energy at the receiving station; accordingly, relays S₁, S₂ and S₃ are in released condition and the path L is operative.

The apparatus already mentioned, along with certain condensers, resistances and batteries, make up the circuits arranged in accordance with the applicant's invention, except that certain elements may be added in accordance with a modification to be described hereinafter. It is believed that the details of the circuits will be best understood from a reading of the following discussion of the operation.

Received carrier energy causes current to flow in the circuit of the second detector, which includes a resistance R₁. When current flows through resistance R₁ to ground, the grids of the two vacuum tubes T and T₁, which are connected to resistance R₁, become negative with respect to ground. In tube T, which forms a part of the codan circuit, the voltage on the grid is adjusted so that, with the reception of carrier, it will be sufficiently negative to reduce the plate current of tube T substantially to zero. Accordingly, relays S₁ and S₂ have no appreciable current in their windings and are in the released condition. The release of relay S₁ removes the disability normally applied to the path L and incoming transmission is permitted to pass on over the receiving circuits.

The release of relay S₂, the gain-maintaining relay, connects ground through the left-hand armature to a resistance R₆ associated with the condenser C₁ of the gain-control circuit. This connection permits the normal action of the gain-control circuit while the carrier is being received; also the position of the left-hand armature of relay S₂ causes relay S₃, the quick gain control relay, to be released.

As indicated above, the voltage set up in resistance R₁, when the carrier is received, acts on the automatic gain control circuit through tube

T₁. The negative voltage in the resistance tends to lower the current in tube T₁ and thereby results in the lowering of the current in resistance R₂ and the reduction of the negative voltage applied to the grid of the tube T₂. Thus, the plate current of tube T₂ tends to increase, with the resultant tendency to charge the condenser C₁ through resistance R₃, the upper side of the condenser being charged to a negative value with respect to ground. It will be understood that tubes T₁ and T₂ form a second stage of the gain control circuit, through which stage there is directly exercised an appropriate control of the grid voltages of the vacuum tubes constituting the high frequency amplifier, the first detector and the intermediate frequency amplifier of the receiver proper. It will be understood further from the discussion already had and from an examination of the batteries included in the circuit that the arrangement disclosed tends to maintain a constant output of carrier from the second detector; if this output becomes too high, the increased negative voltage in resistance R₁ results in the charging of condenser C₁ and the increase of the negative voltage on the grids of the receiver tubes. If, on the other hand, the carrier output becomes too low, condenser C₁ discharges through resistances R₄ and R₅ and the left-hand armature of relay S₂, and the negative bias on the receiver tube grids is reduced, with the result of an increased gain. Resistance R₃ tends to slow down the charging of condenser C₁ while resistances R₄ and R₅ tend to delay the discharge of that condenser. The net result of the operation of this gain control circuit is that the carrier output of the second detector tends to remain constant.

If, now, the reception of carrier energy ceases, the current in resistance R₁ drops to zero, the negative bias on the grid of tube T is removed and plate current flows in this tube and through the windings of relays S₁ and S₂. The operation of relay S₁ places a short circuit on the audio-frequency amplifier output or path L and thus, in the absence of carrier and signal transmission, interfering energy cannot pass on over the receiving circuit.

When relay S₂ operates its left-hand armature, ground is removed from resistance R₆ and the further discharge of condenser C₁ is prevented. This relay operation also connects ground to resistance R₇ and a second condenser C₂ starts to discharge through that resistance. This discharge, if continued, will cause the operation of the quick gain control relay S₃. It will be noted that the current through the winding of this relay is that produced by the difference between the voltage from the battery B₁ associated with resistance R₅ and the voltage of condenser C₂. It should be noted at this point that since, with the removal of the carrier and the operation of relay S₂, the condenser C₁ can no longer discharge, the gain of the receiver will be maintained at a substantially constant value, some slight allowance being made for the gradual leakage of the charge on condenser C₁; in other words, the receiver gain is maintained at a predetermined value, that is at the setting last established by the operation resulting from the reception of the carrier energy.

As has been indicated hereinabove, it is desirable that the gain adjusting action be relatively slow in order to prevent excessive "hunting" of the gain control devices and the resultant distortion. Accordingly, when the carrier comes on

again, it may be an appreciable time before the receiver gain will be adjusted to prevent distortion, since the value of the re-applied carrier may be widely different from that obtaining before the cessation of carrier reception. To avoid this difficulty, the applicant provides for the abnormal, quick adjustment of the receiver gain when the carrier is again received. To accomplish this quick adjustment is the function of the relay S₃. After the removal of the carrier and the effective discharge of condenser C₂, relay S₃ operates and places a short circuit around resistances R₃ and R₄. Accordingly, when the carrier again comes on, the gain control circuit will quickly adjust the receiver gain to meet any change between the new carrier value and the old. As has been indicated above, relay S₃ is made slow operating and slow releasing. The relay should operate slowly so that when the carrier is merely interrupted for a very short period instead of actually being removed for a considerable period, the gain control apparatus will function in the normal manner; the relay should release slowly so that when the carrier reappears after a substantial interval, the quick adjusting feature will be maintained long enough to permit the receiver to become adjusted to the new carrier value. After that function has been performed, of course, relay S₃ releases and the gain control circuit functions normally until after the carrier is again removed.

The action of the quick gain control relay S₃ will now be considered in further detail. The time actions of this relay are affected by resistances R₅ and R₇ and the condenser C₂. When relay S₂ first operates after an extended period of release, condenser C₂ starts to discharge through resistance R₇. Previously, this condenser has been charged to the value of battery B₁ associated with resistance R₅. If relay S₂ is operated only for a short period, the discharge of condenser C₂ will be slight and the current flowing through resistance R₅ and the winding of relay S₃ will be small, since, as stated above, this current depends on the difference between the voltage of battery B₁ and the charge on condenser C₂ and relay S₃ will not operate. If relay S₂ operates for a sufficient time to discharge C₂ as far as possible, however, the current in relay S₃ will be more than sufficient to operate it. The joint action of resistance R₅ and condenser C₂ then serves to delay the release of relay S₃ for a short period after relay S₂ releases.

It may be desirable in certain cases to have the receiver gain set at some predetermined value other than the last value produced by the gain control circuit when the carrier is removed for more than a predetermined time. It would probably not be desirable to set the receiver at its fixed gain when the carrier dropped out for only a short interval. For such modified operation, there is added to the relay S₂ a right-hand armature and, furthermore, a relay S₄ and an adjustable battery B₂ are added, along with resistances R₈ and R₉ and condenser C₃. Relay S₄ controls the connection of a battery B₂ to resistance R₈. While carrier is being received, the right-hand armature of relay S₂ is against its contact and a circuit is completed through the winding of relay S₄. As long as this condition obtains, the circuit between battery B₂ and resistance R₈ is broken. If, however, the carrier is removed and the armatures of relay S₂ are separated from their back contacts, relay S₄ eventually releases and battery B₂ is connected

through resistance R₈ to the condenser C₃ of the gain control circuit. The time required for relay S₄ to release is controlled by the time required for condenser C₃ to be charged up through R₈ and the winding of S₄. Resistance R₉ is comparatively small and is used to prevent burning of the contacts of relay S₄. With the adjustment of battery B₂, the receiver gain setting can thus be brought back to any suitable predetermined value. The product R₈×C₃ should be greater than R₅×C₂ or R₇×C₂.

As has been stated hereinbefore, the applicant's invention is applicable not only to the case of control of the receiving circuits by the carrier but also to the case of such control by any other control energy of special frequency. In the latter case, the receiver arrangement for controlling the voltage in resistance R₁ may be modified to take the form indicated in Fig. 3, in which the control energy taken from the output of the second detector must pass through a band-pass filter F and operate a rectifier tube RT before there is any effect on resistance R₁. It will be understood that once the effect is produced in resistance R₁, the operation of the circuit as modified in accordance with Fig. 3 follows that of the circuit of Fig. 2.

While the invention has been disclosed specifically for the purpose of illustration, it is to be understood that it may take many other and widely different forms within the spirit of the invention as defined by the appended claims.

What is claimed is:

1. In a system for the reception of signals, including a receiver and means responsive to the reception and non-reception of distinctive energy for governing the receiver, the method of transmission control which consists in adjusting the gain of the receiver while the governing energy is being received in accordance with the intensity of said energy, and in the absence of said energy maintaining said gain at the value last established for a time not in excess of a predetermined period.

2. In a system for the reception of signals, including a receiver and means responsive to the reception and non-reception of distinctive energy for governing the receiver, the method of transmission control which consists in adjusting the gain of the receiver while the governing energy is being received in accordance with the intensity of said energy, maintaining said gain at the value last established while the reception of said energy is absent for a predetermined or shorter time, and setting said gain at a predetermined value at the expiration of said predetermined time if the absence of the governing energy continues.

3. In a system for the reception of signals, including a receiver and means responsive to the reception and non-reception of distinctive energy for governing the receiver, the method of transmission control which consists in adjusting the gain of the receiver while the governing energy is being received in accordance with the intensity of said energy, normally retarding the gain adjusting action, setting said gain at a suitable value in the absence of said energy, and temporarily speeding up the gain adjusting action after the absence of said energy has continued for a predetermined time.

4. In a system for the transmission of signals, including a transmitting station and a receiving station, the method of transmission control which consists in sending from the transmitting station during the periods of signal transmission control

- energy of a distinctive frequency, adjusting the gain at the receiving station while said control energy is being received in accordance with the intensity of said energy, normally retarding the gain adjusting action, maintaining said gain, during the periods when no control energy is being received, at the value last established, and temporarily speeding up the gain adjusting action after the absence of the control energy has continued for a predetermined time.
5. In a system for the transmission of signals, including a transmitting station and a receiving station, the method of transmission control which consists in sending from the transmitting station during the periods of signal transmission control energy of a distinctive frequency, adjusting the gain at the receiving station while said control energy is being received in accordance with the intensity of said energy, maintaining said gain at the value last established if the control energy is removed for a considerable time, and after the absence of the control energy has continued for a predetermined time, setting said gain at a predetermined value.
6. In a system for the transmission of signals, including a transmitting station and a receiving station, the method of transmission control which consists in sending from the transmitting station control energy of a distinctive frequency, adjusting the gain at the receiving station while said control energy is being received in accordance with the intensity of said energy, maintaining said gain at the value last established if the control energy ceases for a considerable time, setting said gain at a predetermined value after the control energy has been absent for a predetermined time, and quickly readjusting said gain when the control energy is re-applied to the system.
7. In a system for the reception of signals, including a receiver and a demodulated signal path associated therewith, the method of transmission control which consists in applying control energy of a distinctive frequency to the system only during the periods of signal transmission, providing for the adjustment of the receiver gain while the control energy is being received in accordance with the intensity of said energy, normally retarding the gain adjusting action, setting the receiver gain at a suitable value in the absence of the control energy, and rendering said adjustment temporarily effective without the normal retardation when the control energy is reapplied after a substantial interruption, even though the value of said energy has changed to a considerable degree.
8. In a system for the reception of signals, including a receiver and a demodulated signal path associated therewith, the method of transmission control which consists in applying control energy of a distinctive frequency to the system only during the periods of signal transmission, maintaining said demodulated signal path in a condition of disability when said control energy is not being received, causing the reception of said control energy to render said path operative, providing for the adjustment of the receiver gain while the control energy is being received in accordance with the intensity of said energy, setting said gain at a suitable value when the control energy is removed from the system for a considerable time, and quickly rendering said adjustment effective when the control energy is re-applied to the system after a substantial interruption, even though the value of said energy has changed to a considerable degree.
9. In a signaling system including a transmitting station and a receiving station, means at the transmitting station under the control of the signal energy for applying to the system control energy of a distinctive frequency, means at the receiving station controlled by the received control energy for regulating the gain of the receiver, means for normally retarding the action of the gain regulating means, means responsive to the cessation of the reception of said control energy for maintaining said gain at the value last established, and means responsive to the absence of said control energy beyond a predetermined time for temporarily disabling the retarding means.
10. In a signaling system including a transmitting station and a receiving station, means at the transmitting station under the control of the signal energy for applying to the system control energy of a distinctive frequency, means at the receiving station controlled by the received control energy for regulating the gain of the receiver, means responsive to a cessation of the reception of the control energy for maintaining said gain at the value last established, and means responsive to the absence of the control energy beyond a predetermined time for setting the receiver gain at a predetermined value.
11. In a signaling system including a transmitting station and a receiving station, means at the transmitting station under the control of the signal energy for applying to the system control energy of a distinctive frequency, means at the receiving station controlled by the received control energy for regulating the gain of the receiver, means responsive to the cessation of the reception of control energy for maintaining said gain at the value last established, means responsive to the absence of the control energy for longer than a predetermined time for setting said gain at a predetermined value, and means for quickly readjusting the receiver gain when the reception of the control energy is renewed.
12. In a signaling system, a transmitting station, a receiving station including a receiver and a demodulated signal path, said path being normally maintained in a condition of disability, means at the transmitting station under the control of the signal energy for applying to the system control energy of a distinctive frequency, means at the receiving station responsive to the reception of said control energy for removing the disability from said demodulated signal path, means at the receiving station controlled by said control energy for regulating the gain of the receiver in accordance with the intensity of said energy, means for normally retarding the action of the gain regulating means, means for setting the receiver gain at a suitable value during the absence of the control energy, and means responsive to the absence of the control energy beyond a predetermined time for temporarily disabling the retarding means.
13. In a system for the reception of signals, including a receiver and a demodulated signal path associated therewith, the method of transmission control which consists in maintaining the demodulated signal path in a condition of disability when no carrier energy is being received, causing the reception of carrier energy to render said path operative, adjusting the gain of the receiver while the carrier energy is being received in accordance with the intensity of said energy, normally retarding the gain adjusting action, maintaining said gain at the value last established

when the reception of carrier energy ceases, and temporarily speeding up the gain adjusting action after the absence of carrier energy has continued for a predetermined time.

14. In a system for the reception of signals, including a receiver and a demodulated signal path associated therewith, the method of transmission control which consists in adjusting the gain of the receiver while carrier energy is being received in accordance with the intensity of said energy, maintaining said gain at the value last established while the carrier energy is absent for a predetermined or shorter time, setting said gain at a predetermined value if the absence of carrier energy continues beyond said predetermined time and quickly readjusting said gain when said reception is renewed.

15. In a system for the reception of carrier energy to be modulated by signals, including a receiver and a demodulated signal path associated therewith, the method of transmission control which consists in adjusting the gain of the receiver while carrier energy is being received in accordance with the intensity of said energy, and in the absence of said energy maintaining said gain at the value last established for a time not in excess of a predetermined period.

16. In a system for the reception of carrier energy to be modulated by signals, including a receiver and a demodulated signal path associated therewith, the method of transmission control which consists in adjusting the gain of the receiver while carrier energy is being received in accordance with the intensity of said energy, normally retarding the gain adjusting action, maintaining said gain at the value last established if the reception of the carrier energy is absent for a time not in excess of a predetermined period, and temporarily speeding up the gain adjusting action after the absence of carrier energy has continued for a predetermined time.

17. In a system for the reception of carrier energy to be modulated by signals, including a receiver and a demodulated signal path associated therewith, the method of transmission control which consists in maintaining the demodulated signal path in a condition of disability when no carrier energy is being received, causing the reception of carrier energy to render said path operative, adjusting the gain of the receiver while the carrier energy is being received in accordance with the intensity of said energy, and in the absence of said energy maintaining said gain at the value last established for a time not in excess of a predetermined period.

18. In a system for the reception of signals, including a receiver and a demodulated signal path associated therewith, the method of transmission control which consists in maintaining the demodulated signal path in a condition of disability when no carrier energy is being received, causing the reception of carrier energy to render said path operative, adjusting the gain of the receiver while the carrier energy is being received in accordance with the intensity of said energy, maintaining said gain at the value last established while the carrier energy is absent for a predetermined or shorter time, and setting said gain at a predetermined value if the absence of carrier energy continues beyond said predetermined time.

19. In a system for the reception of carrier energy to be modulated by signals, including a receiver and a demodulated signal path associated therewith, the method of transmission control

which consists in maintaining the demodulated signal path in a condition of disability when no carrier energy is being received, causing the reception of carrier energy to render said path operative, adjusting the gain of the receiver while the carrier energy is being received in accordance with the intensity of said energy; normally retarding the gain adjusting action, in the absence of the carrier energy maintaining said gain at the value last established for a time not in excess of a predetermined period, setting said gain at a predetermined value if the absence of carrier energy continues beyond said predetermined period, and temporarily speeding up the gain adjusting action after the absence of the carrier energy has continued for a predetermined time.

20. In a system for the reception of carrier energy to be modulated by signals, including a receiver and a demodulated signal path associated therewith, the method of transmission control which consists in providing for the adjustment of the receiver gain while carrier energy is being received in accordance with the intensity of said energy, normally retarding the gain adjusting action, and rendering said adjustment temporarily effective without the normal retardation when the carrier is received after a substantial interruption, even though the value of the carrier has greatly changed.

21. In a system for the reception of carrier energy to be modulated by signals, including a receiver and a demodulated signal path associated therewith, the method of transmission control which consists in providing for the adjustment of the receiver gain while carrier energy is being received in accordance with the intensity of said energy, normally retarding the gain adjusting action, setting said gain at a suitable value in the absence of carrier energy, and temporarily speeding up the gain adjusting action after the absence of carrier energy has continued for a predetermined time.

22. In a system for the reception of a carrier wave to be modulated by signal energy, a receiver having a demodulated signal path associated therewith, means controlled by carrier energy transmitted to the receiver for regulating the gain of the receiver, and means responsive to the cessation of the reception of carrier energy for maintaining said gain at the value last established for a time not in excess of a predetermined period.

23. In a system for the reception of a carrier wave to be modulated by signal energy, a receiver having a demodulated signal path associated therewith, means controlled by carrier energy transmitted to the receiver for regulating the gain of the receiver, means for normally retarding the action of the gain regulating means, means responsive to the cessation of the reception of carrier energy for maintaining said gain at the value last established, and means responsive to the absence of carrier energy beyond a predetermined time for temporarily disabling the retarding means.

24. In a system for the reception of signal energy, a receiver having a demodulated signal path normally maintained in a condition of disability, means responsive to carrier energy transmitted to the receiver for removing the disability from said path, means controlled by said carrier energy for regulating the gain of the receiver, means responsive to the substantial interruption of the reception of carrier energy for a predetermined or shorter time for maintaining said gain at the value last established, and means responsive to

the absence of carrier energy continued beyond said predetermined time for setting said gain at a predetermined value.

25. In a system for the reception of a carrier wave to be modulated by signal energy, a receiver having a demodulated signal path normally maintained in a condition of disability, means responsive to carrier energy transmitted to the receiver for removing the disability from said path, means controlled by said carrier energy for regulating the gain of the receiver in accordance with the intensity of said energy, means for normally retarding the action of the gain regulating means, means responsive to the cessation of the reception of carrier energy for maintaining said gain at the value last established, and means responsive to the absence of carrier energy beyond a predetermined time for temporarily disabling the retarding means.

26. In a system for the reception of signal energy, a receiver having a demodulated signal path normally maintained in a condition of disability, means responsive to carrier energy transmitted to the receiver for removing the disability from said path, means controlled by said carrier energy for regulating the gain of the receiver in accordance with the intensity of said energy, means responsive to the cessation of the reception of carrier energy for maintaining said gain at the value last established, means responsive to the continuation of the absence of the carrier energy beyond a predetermined time for setting said gain at a predetermined value, and means for quickly readjusting said gain when the reception of carrier energy is renewed.

27. In a system for the reception of a carrier wave to be modulated by signal energy, a receiver having a demodulated signal path associated therewith, means controlled by carrier energy transmitted to the receiver for regulating the gain of the receiver in accordance with the intensity of said energy, means for normally retarding the action of the gain regulating means, and means responsive to the absence of carrier energy beyond a predetermined time for temporarily disabling the retarding means.

28. In a system for the reception of a carrier wave to be modulated by signal energy, a receiver having a demodulated signal path associated therewith, means controlled by carrier energy transmitted to the receiver for regulating the gain of the receiver in accordance with the intensity of said energy, and means responsive to the cessation of the reception of carrier energy for maintaining said gain at the value last established for a time not in excess of a predetermined period.

29. In a system for the reception of a carrier wave to be modulated by signal energy, a receiver having a demodulated signal path normally maintained in a condition of disability, means responsive to carrier energy transmitted to the receiver for removing the disability from said path, means controlled by said carrier energy for regulating the gain of the receiver in accordance with the intensity of said energy, and means responsive to the cessation of the reception of carrier energy for maintaining said gain at the value last established for a time not in excess of a predetermined period.

30. In a signaling system, a transmitting station, a receiving station including a receiver and a demodulated signal path, means at the transmitting station under the control of the signal energy for applying carrier energy to the system,

means at the receiving station controlled by the received carrier energy for regulating the gain of the receiver, and means responsive to the cessation of the reception of carrier energy for maintaining said gain at the value last established for a time not in excess of a predetermined period.

31. In a signaling system, a transmitting station, a receiving station including a receiver and a demodulated signal path, said path being normally maintained in a condition of disability, means at the transmitting station under the control of the signal energy for applying carrier energy to the system, means at the receiving station responsive to received carrier energy for removing the disability from said demodulated signal path, means at the receiving station controlled by said carrier energy for regulating the gain of the receiver in accordance with the intensity of said energy, means for maintaining the receiver gain at the last established value when the reception of the carrier energy ceases, means responsive to the absence of the carrier energy continued beyond a predetermined time for setting said gain at a predetermined value, and means for quickly readjusting said gain when the reception of the carrier energy is renewed.

32. In a receiver of signal energy, means responsive to incoming energy for regulating the gain of the receiver, means for normally retarding the action of the gain regulating means, and means responsive to the absence of incoming energy beyond a predetermined time for temporarily disabling the retarding means, whereby the subsequent renewal of the incoming energy will produce immediate readjustment of the gain of the receiver.

33. In a receiver of signal energy, means responsive to incoming energy for regulating the gain of the receiver, means for normally retarding the action of the gain regulating means, means responsive to the cessation of incoming energy for setting the gain of the receiver at a suitable value, and means responsive to the absence of incoming energy beyond a predetermined time for temporarily disabling the retarding means, whereby the subsequent renewal of the incoming energy will produce immediate readjustment of the gain of the receiver.

34. In a receiver of signal energy, the method of transmission control which consists in adjusting the gain of the receiver in accordance with the intensity of incoming energy, normally retarding the gain adjusting action, and providing for the temporary withdrawal of the retardation of the gain adjusting action after the absence of incoming energy has continued for a predetermined time, whereby the subsequent renewal of the incoming energy will produce immediate readjustment of the gain of the receiver.

35. In a receiver of signal energy, the method of transmission control which consists in adjusting the gain of the receiver in accordance with the intensity of incoming energy, normally retarding the gain adjusting action, setting the gain of the receiver at a suitable value in the absence of incoming energy, and providing for the temporary withdrawal of the retardation of the gain adjusting action after the absence of incoming energy has continued for a predetermined time, whereby the subsequent renewal of the incoming energy will produce immediate readjustment of the gain of the receiver.