

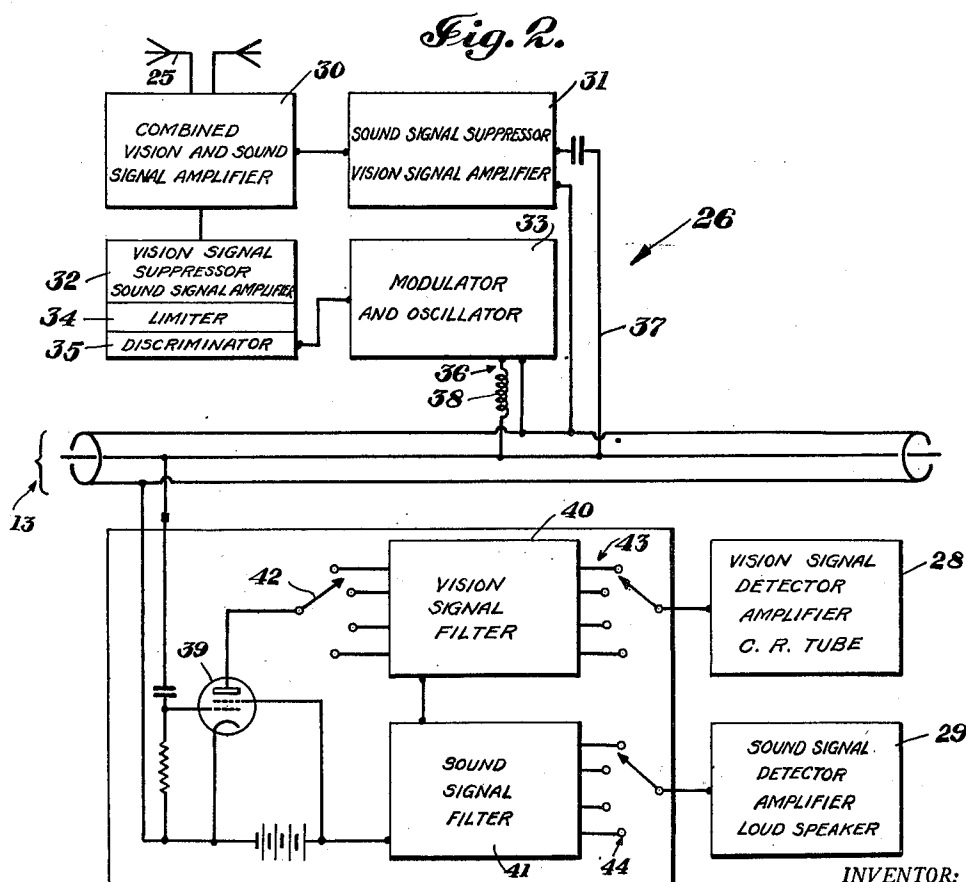
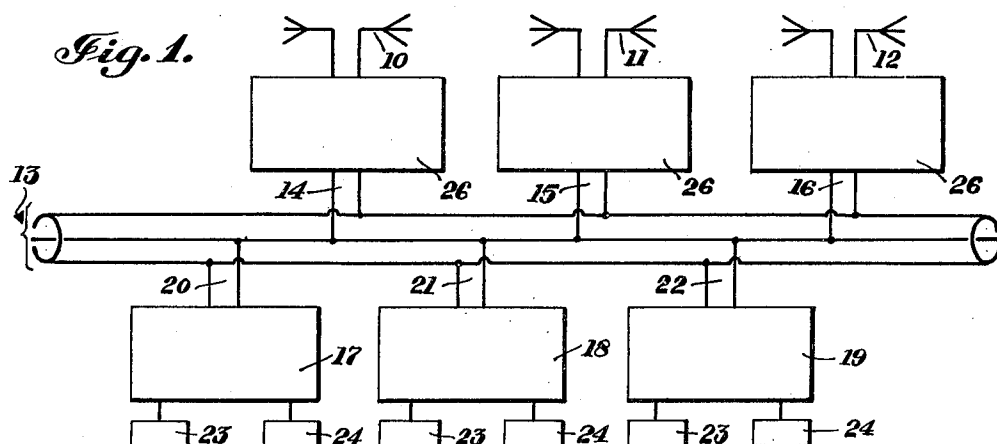
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TELEVISION RECEIVING SYSTEM

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TELEVISION RECEIVING SYSTEM

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9 Claims. (Cl. 178—5.8)

My present invention relates to receiving systems for television and other short wave transmitters, and more particularly to systems capable of reception of signals from more than one transmitter.

It is an object of my present invention to provide a receiving system which enables connection of one or several receivers with a plurality of receiving antennae.

A further object of my present invention consists in a new multiple antenna arrangement, for example for television receiving systems, permitting of clear and distinct reception of signals from several transmitters by one or a plurality of individual receivers.

Still a further object of my present invention consists in a multiple antenna arrangement for television, and other radio receiving systems permitting distinct and clear reception of the television and sound signals, transmitted by any one of a number of different television and sound transmitters, by a plurality of individual television and radio receivers.

Another object of my present invention consists in a new television and radio receiving system which permits use of simplified individual receivers fed from a common multiple antenna arrangement.

Still another object of my present invention consists in a multiple antenna arrangement combined with amplifying means and other electrical devices for reception of television and radio transmission from several different transmitters by a plurality of individual receivers.

With the above objects in view, my present invention mainly consists of a multiple antenna arrangement for television and other shortwave receiving systems comprising a plurality of preferably directional receiving antennae, each adjusted to a different transmitter, a common signal transmission line associated with all these directional receiving antennae, and one or a plurality of individual television and radio receivers coupled to and fed by this common transmission line.

An arrangement of this type solves the problem of providing clear television reception in locations where television signals arrive from different directions. This arrangement avoids the poor signal-to-noise ratio and the multi-path reception typical of all-wave, all-directional antennae by provision of a number of directional receiving antennae each of which might be optimally tuned, directed and located.

It is evident that an arrangement of the above type may also be used for reception of other radio

signals, i. e. that my new multiple antenna arrangement may serve simultaneously for reception of television as well as other radio signals by a plurality of individual television and radio receivers.

In order to avoid or at least to minimize interference and interaction between the individual receivers during their operation, it is preferable to provide electrical means, constructed so as to avoid such interaction and interference, located between the individual receivers, for example in the common transmission line. It is also of advantage to insert in this transmission line between the single antennae means constructed in such a manner as to minimize interaction between these antennae.

Each of the antennae might be combined with an amplifying system for the reception of vision and sound signals. I might also provide means for separating these signals, in combination with each of the antennae. The thus obtained separated sound signals might be further amplified and then modulated upon a new carrier, this new carrier being further removed from that of the vision carrier, so as to simplify the separation of these two signals in the individual television receivers. For reception of frequency modulated signals, I might also incorporate so-called discriminator circuits into the amplifiers associated with each of the antennae and thereby transform the frequency modulation of the signals into amplitude modulation.

The novel features which I consider characteristic of my invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments, when read in connection with the accompanying drawing in which:

Fig. 1 shows the general arrangement of my new television and radio receiving system; and

Fig. 2 shows the detailed arrangement of one antenna arrangement and one television receiver in detail.

As shown in Figure 1, my new receiving system consists of a plurality of preferably directional television and radio receiving antennae 10, 11 and 12 adjusted and tuned to several different transmitters, the common transmission line 13 connected with the antennae 10, 11 and 12 by conductors 14, 15 and 16, and a plurality of individual receivers 17, 18 and 19 coupled also to the common transmission line 13 by means of

conductors 20, 21 and 22. Each of these receivers may be provided with television reproducing means 23, e. g. a cathode ray tube, and sound reproducing means 24, e. g. a loud speaker of usual type.

The signal level to be maintained in the transmission system depends on the type and sensitivity of the receivers connected to it. In case of relatively strong incoming signals and ordinary type, fully sensitive receivers the output of the antennae may be directly combined by suitable passive networks matched to the impedance of the transmission system. Whenever the resulting signal energy level is inadequate, a booster amplifier near the antenna end of the transmission system is desirable.

In accordance with a preferred embodiment of my present invention, I propose to assign a separate amplifier channel to each antenna and to feed their combined output to the common transmission line either by paralleling all the output electrodes of the amplifiers or by separating their capacities in a well-known manner in a matched network. Such a network may be a simple low-pass filter with a cut-off above the highest received frequency, or an m-derived low-pass filter adapted to accommodate larger capacities with a given matching impedance; the network may also be a band-pass filter system passing all desired frequencies and accommodating the output electrode capacities as the capacities of the shunt circuits, or an m-derived band-pass filter. One end of these filter systems may either be terminated with a matching resistance or be matched to another branch of the transmission system.

It is understood that in this case all signals remain on their original carriers and on a relatively low signal level. Thus, the individual receivers 17, 18 and 19 coupled to and fed by the common transmission line 13 may be of the ordinary type. In the case of strong received signals, the antennae may be connected directly to the transmission line 13 and only in some instances may it be necessary to provide at the antenna end of the transmission line booster amplifiers which may serve to obtain an adequate and regulated energy level yet leave carrier frequencies and type of modulation unchanged.

In the case that simplified individual receivers are used, the entire receiving system is modified in accordance with another embodiment of my present invention. Such an integrated receiving system is shown in Fig. 2 and will now be described in detail.

This integrated receiving system may consist, as shown in Fig. 2, of a plurality of antennae 25, one of which is shown in the figure, a combined signal amplifying and separating system 26 interposed between each of the antennae and the common transmission line 13, and filtering and selecting systems 27 interposed between each of the simplified vision and sound signal receivers 28, 29 and the transmission line 13.

As shown in Fig. 2, I connect the antenna 25 with a combined vision and sound signal amplifier 30 providing both vision and sound signals on carriers of relatively high energy level. Automatic volume control means for keeping this relatively high energy level constant are forming part of this amplifier 30. This amplifier 30 is connected on the one hand with a vision signal amplifier incorporating sound signal suppressing means 31 and on the other hand with a combined vision signal suppressor and sound signal amplifier 32. After detection and further amplifi-

cation, the sound signals may either be directly fed into the transmission line 13 or may serve to modulate a local carrier oscillator 33. In this way, it is possible to shift the sound signals from a carrier of relatively high frequency onto a carrier of relatively low frequency and yet to choose for each sound channel a separate carrier frequency differing from the frequencies of all other sound and television channels used in the area in which the new television and sound receiving system is located.

For reception of frequency modulated sound signals, I may combine, as shown in Fig. 2, so-called limiting means 34 with the sound signal amplifier 32 for stripping the frequency modulated sound signals of any amplitude modulations which are usually caused by undesired noise. These limiting means are followed by a so-called frequency modulation discriminator 35 transforming carrier frequency variations into audio frequency currents corresponding to the transmitted sound signals. These in turn serve to modulate a local carrier oscillator 33, having a different carrier frequency for each program received.

The modulated oscillator 33 on the one hand and the vision signal amplifier 31 on the other hand are connected by conductors 36 and 37 respectively to transmission line 13. Means for preventing interaction between them, e. g. an ultra short wave choke 38 adapted to prevent vision ultra short waves to enter the sound carrier oscillator 33 may be provided in the conductors 36.

Each of the filtering and selecting systems comprises vision signal filtering means 40 and sound signal filtering means 41 connected in the way shown in the drawing with transmission line 13 by a buffer tube 39. The vision and sound signals are filtered by the vision signal filtering means 40 and the sound signal filtering means 41. Ganged selector switches 42, 43 and 44 for selecting one of the vision and sound channels, i. e. for adjusting the receiver to one of the pairs of signals from the antennae 10, 11 or 12, are provided before and after the filtering means 40 and 41. The vision signal channel 28 comprises detecting and amplifying means and the cathode ray tube for reproducing the received vision signals in the customary way. The sound signal channel 29 also comprises detecting and amplifying means and feeds a loud speaker for reproducing the sound signals in the usual way.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of signal reception system differing from the types described above.

While I have illustrated and described the invention as embodied in television receivers, comprising vision and sound channels, I do not intend to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of my invention.

Without further analysis, the foregoing will so fully reveal the gist of my invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What I claim as new and desire to secure by Letters Patent is:

1. Multiple antenna arrangement for television receiving systems comprising a series of directional television receiving antennae each adjusted to a different television transmitter, a common television transmission line associated with all said directional television receiving antennae, a plurality of individual television receivers coupled to and fed by said common television transmission line, and electrical means interposed between any two of said receivers and constructed in such a manner as to minimize interaction and interference between said receivers during operation of the same.

2. Multiple antenna arrangement for television receiving systems comprising a series of directional short wave receiving antennae each adjusted to a different short wave transmitter, a common transmission line associated with all said directional short wave receiving antennae, a plurality of individual television receivers coupled to and fed by said common television transmission line, and electrical means interposed between said antennae and constructed in such a manner as to minimize interaction and interference between them.

3. Multiple antenna arrangement for television and radio receiving systems, comprising a series of directionally selective television and radio receiving antennae each directionally adjusted to a different television and radio transmitter, a series of combined vision and sound signal amplifying systems connected each to one of said directionally selective antennae adapted to separate the sound signals from the vision signals, a common transmission line, a series of electrical couplings feeding each of said separated sound signals to said common transmission line, a series of other electrical couplings feeding each of said vision signals to said common transmission line, and a plurality of individual television and radio receivers coupled to and fed by said common transmission line.

4. Multiple antenna arrangement for television and radio receiving systems comprising a series of directionally selective television and radio receiving antennae each directionally adjusted to a different television and radio transmitter, a series of combined vision and sound signal amplifying systems connected each to one of said directionally selective antennae adapted to separate the sound signals from the vision signals, a series of oscillators modulated with said separated sound signals, a common transmission line, means electrically connecting each of said amplifying systems with said common transmission line, means electrically connecting each of said modulated oscillators with said common transmission line, and a plurality of individual television and radio receivers coupled to and fed by said common transmission line.

5. Multiple antenna arrangement for television and radio receiving systems comprising a series of directionally selective television and radio receiving antennae each directionally adjusted to a different television and radio transmitter, a series of combined vision and sound signal amplifying systems connected each to one of said directionally selective antennae, a series of vision signal suppressing means connected each with one of said combined vision and sound amplifying systems, a series of sound signal amplifying and frequency transforming means connected each with one of said vision signal suppressing

means for amplifying the sound signals separated by said vision signal suppressing means and reducing the frequencies of said sound signals, a common transmission line, means electrically connecting each of said sound signal suppressing means with said common transmission line, means electrically connecting each of said amplifying and frequency transforming means with said common transmission line, and a plurality of individual television and radio receivers coupled to and fed by said common transmission line.

6. Multiple antenna arrangement for television and radio receiving systems comprising a series of directional television and radio receiving antennae adjusted to several different television and frequency modulation radio transmitters, a series of vision and sound signal amplifying systems connected each to one of said antennae, a series of discriminating means for transforming the frequency modulations of said sound signals into amplitude modulations, a series of frequency transforming means connected each with one of said discriminating means for reducing the frequencies of said amplitude modulated sound signals obtained by said discriminating means, a series of sound signal suppressing means connected each with one of said vision signal amplifying systems, a common transmission line, a series of electrical connections feeding said sound signals into said common transmission line, a series of electrical connections feeding said vision signals into said common transmission line, and a plurality of individual television and amplitude modulation radio receivers coupled to and fed by said common transmission line.

7. Multiple antenna arrangement for television and radio receiving systems comprising a series of directional television and radio receiving antennae adjusted to several different television and radio transmitters, a series of combined vision and sound signal amplifying systems connected each to one of said antennae, a series of vision signal suppressing means connected each with one of said combined vision and sound amplifying systems, a series of sound signal amplifying means connected each with one of said vision signal suppressing means for amplifying the sound signals separated by said vision signal suppressing means, a series of oscillating systems, a series of modulators fed each from one of said sound signal amplifying means and modulating said oscillating systems, a common transmission line, means electrically connecting each of said oscillating systems with said common transmission line, means electrically connecting each of said combined vision and sound signal amplifying means with said common transmission line, and a plurality of individual television and radio receivers coupled to and fed by said common transmission line.

8. Multiple antenna arrangement for television and radio receiving systems comprising a series of directional television and radio receiving antennae adjusted to several different television and radio transmitters, means for separating the transmitted vision and sound signals, a common transmission line associated with said separated means, and a plurality of individual television and radio receivers coupled to and fed by said common transmission line, each of said individual receivers including separate vision and sound signal filters for said separated vision and sound signals, vision and sound signal amplifiers, selector switches connecting said vision and sound

signal filters with said vision and sound signal amplifiers for adjusting said vision and sound signal filters to the various television and radio transmissions, and television and sound reproducing means connected to said vision and sound signal amplifiers respectively.

9. Multiple antenna arrangement for television and radio receiving systems comprising a series of directional television and radio receiving antennae adjusted to several different television and frequency modulation radio transmitters, a series of combined vision and sound signal amplifying systems comprising means for separating the transmitted vision and sound signals, connected each to one of said antennae, a

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trically connecting each of said amplifying systems with said common transmission line, and a plurality of individual television and amplitude modulation radio receivers coupled to and fed by said common transmission line, each of said individual receivers including vision and sound signal filters for said separated vision and sound signals, vision and sound signal amplifiers, selector switches connecting said vision and sound signal filters with said vision and sound signal amplifiers for adjusting said vision and sound signal filters to the various television and radio transmissions, and television and sound reproducing means connected to said vision and sound signal amplifiers respectively.

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