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SELECTIVE TRANSMISSION SYSTEM

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Fig. 1

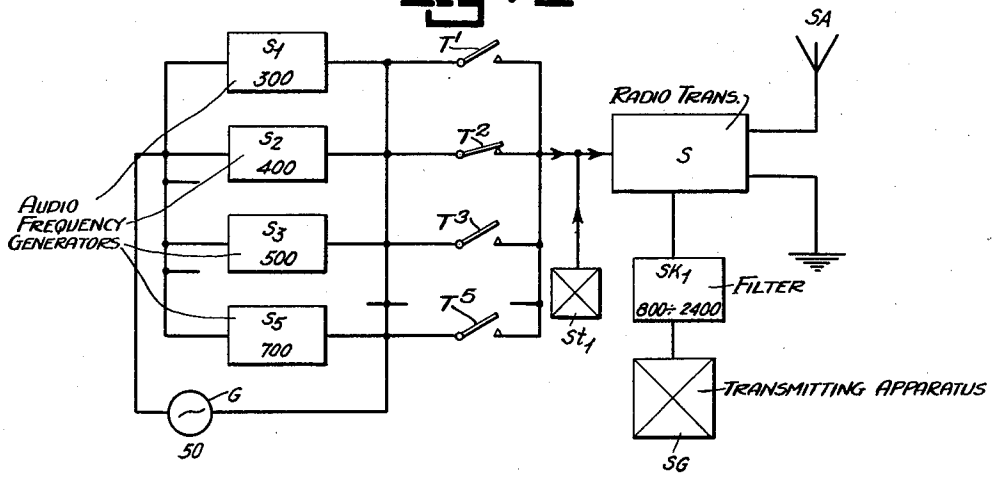
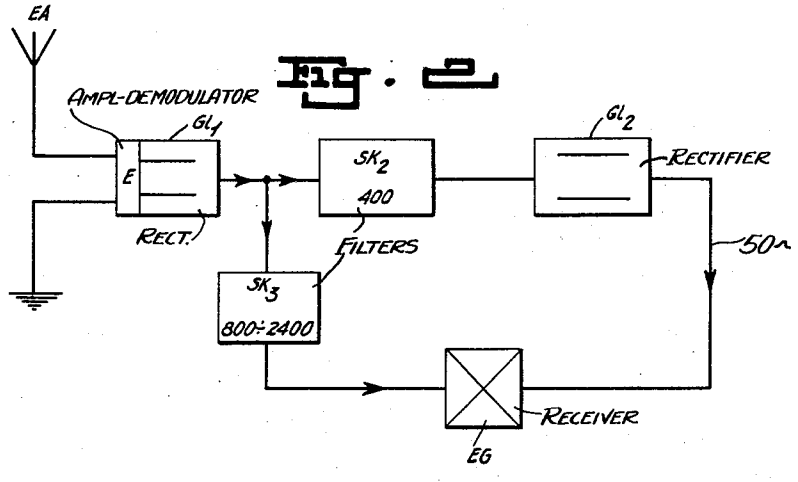


Fig. 2



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SELECTIVE TRANSMISSION SYSTEM

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7 Claims. (Cl. 178—51)

The invention is concerned with a method adapted to the electric transmission of signals or intelligence selectively to one or more receivers.

If certain radio transmissions or communications are to be sent by way of the air or conductors to only a single receiver or to a certain group of receivers, this, as is well known in the art, is accomplishable by the aid of selective calling or ringing in such a way that to each group of receivers a definite call, say, in the form of a pre-arranged sequence of impulses is coordinated. However, such a scheme fulfills only in a very imperfect way the requirement that each receiver should pick up only the signals intended for it. Also, in automatic blocking of uncalled receivers it is, generally speaking, not difficult to eliminate such blocking and to also receive signals and news intended for other receivers. For purely telegraphic intelligence transmission it has for this reason been suggested in the prior art to modulate a radio frequency carrier wave by an audio frequency current the tonal frequency beink keyed with a telegraph transmitter, a distinct tonal frequency being allotted to the different receivers or groups thereof. If, then each receiver is fitted with a corresponding audio frequency filter it will not be enabled readily to receive news or signals intended for other groups.

Now, a disadvantage of such a system resides in that, while the individual receiver will not require it, the employment of all receivers will require a relatively larger frequency band than is necessary for the transmission of the sort of signals here involved. In other words, this method as known in the prior art will be so much more disadvantageous, the wider the transmission channel required for each individual news. While this method of selective intelligence transmission is still useful for ordinary telegraph signals it will become unserviceable in the case of transmissions or communications requiring a broad frequency band such as needed in picture telegraphy or television apparatus.

The present invention discloses a new method for selective transmission work. The procedure according to the invention consists in that, in addition to the news signals proper, additional signals are transmitted which, while not required for the news proper, are needed in order to insure correct and intelligible reception and which enable only those receivers which communication is intended to effect proper reception.

If, for certain communication work, supplementary signals are anyway required for insuring perfect reception, such as synchronizing impulses in combination with synchronous apparatus or fading control impulses and the like, these signals could at the same time be used for selective transmission in that they are transmitted in a certain characteristic form. Equipment for this invention could also in principle be so designed to transmit, in addition to the carrier impulses of the news proper, impulses that are necessary for insuring intelligible reception. Transmission of intelligence may be effected in such a way that the real specific intelligence currents are transmitted inside the same or inside only partly the same frequency range or band, whereas supplemental signals for selective transmission are sent out either on different frequencies coordinated to the various receivers over separate transmission channels, or else the said supplemental signals always have the same frequency, but are transmitted on different carrier waves whereby, if desired, a joint radio frequency carrier wave may further be modulated.

The present invention possesses the advantage of requiring only a comparatively small frequency band. If the supplemental or auxiliary impulses are at the same time used for regulation purposes, for instance, for the control of the driving motor of the receiver outfit, then the generator provided for the production of supplemental signals on different frequencies, of which, however, only the frequency corresponding to the momentary transmission is sent out, is coupled with the driving means of the transmitter equipment. At the receiving end, suitable synchronizing means must be provided and these may consist of a filter and, in addition, such apparatus as a synchronous motor having a suitable number of poles. If the auxiliary signals are of the same frequency for all transmissions, then for their utilization for synchronizing in a particularly simple scheme the same synchronous motors could be used both at the sending and the receiving stations. The auxiliary signals in such a scheme could be transmitted simultaneously or alternately with the working signals, for instance, in picture transmission predicated upon the start-stop method always after the picture seam.

If the selector means consist only of one filter chain after removal thereof, reception of news not intended for a given receiver would still be feasible without any serious difficulties. This may be obviated in that jamming waves are simultaneously sent out which are produced at irregular time intervals. In order that unauthor-

ized reception may be rendered still harder it would also be possible to proceed in such a way that reception of supplemental signals or of the specific news signals, or of both, is made dependent upon the transmission of a further wave with the result that signals will be received, for instance, in a tele-typewriter, only if simultaneously a pre-arranged frequency is picked up together with a permanent signal in that arrangements are made so that all of the relays will only be caused to respond if a certain relay depending on the impulse in question has actually been operated. The same method in a similar way would be usable also in telephony work. Instead of a permanent signal, also definite impulse trains could be employed.

The method herein suggested is useful, generally speaking, for communication over the air as well as over wires. It is particularly suited for transmission over lines or networks which are used for other purposes, such as high potential lines or lighting circuits connected with subscribers or consumers.

Further details of the invention will become clearer by referring to the following description accompanied by a drawing illustrating a number of embodiments by way of example.

Figures 1 and 2 illustrate transmitting and receiving arrangements respectively embodying the principles of this invention in connection with picture telegraphy transmission. The auxiliary signals or impulses to insure selective transmission serve simultaneously as synchronizing impulses between transmitter and receiver. The frequency thereof is 50 cycles for all transmissions and by the same frequency another musical frequency carrier wave is modulated for each transmission. Radio transmission is effected by means of a radio frequency carrier oscillation wave suitably modulated by the news and the supplementary signals. At the receiving end the incoming radio frequency waves are first rectified, and the supplemental impulses are separated from the signals by filters.

The assumption is made that for the transmission a frequency band of a coverage of from 300–2400 cycles is available. For news signals, jointly, the range between 800 and 2400 cycles is used for all transmissions, while the range 300 to 800 cycles is set aside for supplemental signals, that is to say, for five receiver groups for each of which a frequency between 300 and 800 cycles is selected, in the example here dealt with; group one has a selective frequency of 300 cycles, group two 400 cycles and so on.

Figure 1 shows the transmitting circuit, and Figure 2 the receiving circuit of one of the five receiver groups here assumed.

Referring to Figure 1, SG denotes the picture transmitter apparatus operating on a frequency between 800 and 2400 cycles. The picture currents are passed by way of filter SK_1, which has a range of 800 to 2400 cycles, and fed to the radio frequency transmitter S being finally transmitted by way of antenna SA. The supplemental or synchronizing impulses are furnished from generator G which is preferably driven directly from the driving motor of the transmitter apparatus. The fundamental frequency of the supplemental signals amounts to 50 cycles. S1—S5 are audio frequency generators furnishing 300, 400, etc. cycles. These frequencies are used as selective carrier waves without which correct reception would not be feasible at all, for the 50 cycles supplemental signals and thus for the entire transmission of news to the different receivers or groups of receivers. By the depression of one of the keys T1—T5 or, in case of simultaneous transmission to several receiver points, upon the depression of a plurality of said keys, the supplemental impulses for modulation are imparted to the radio frequency transmitter. In the example here shown only key T2 is depressed for the transmission of signals to the particular receiver equipped with filter chains SK2 400.

Device St1 has the purpose of transmitting jamming waves intended to preclude unauthorized reception, and these are initiated at instants varying from one rotation of the picture drum to the next. The same device could at the same time be used to permanently send out a definite signal that is also required to secure proper reception of news.

Referring to Figure 2, E designates the radio frequency receiver equipment in combination with a rectifier $G1_1$ which is adapted to demodulate the oscillations picked up by the receiver antenna EA. The picture impulses are fed by way of filter SK3, having a range of 800–2400 cycles wide, directly to the receiver apparatus EG, whereas the supplemental synchronizing impulses of 50 cycles with the carrier wave of 400 cycles are passed through filter SK2, are rectified by rectifier $G1_2$ and then also fed to the receiver apparatus EG. If the transmission takes place on supplemental signals which do not have a 400 cycle carrier wave then the receiving outfit will not be in position to insure proper and intelligible reception, indeed, in such case, only that particular receiving outfit will receive whose filter (SK2) is suitably tuned. If some of the receivers pertain at the same time, say, to several receiver groups adjusted to different carrier frequencies of the supplemental signals, then these receivers will have to be furnished with several filters tuned in accordance with the corresponding groups instead of with only one.

I claim:

1. In a selective multi-receiving system employing a plurality of receivers each tuned to receive a desired communication from a transmitting station, the method of operation which comprises generating at the transmitting station for each receiver a single frequency, which frequency differs from those generated for the other receivers, modulating radio frequency carrier energy by one of said frequencies and by a common auxiliary frequency, simultaneously modulating said carrier by a band of intelligence bearing frequencies, selectively receiving the transmitted energy on that one of the receivers which is tuned to the particular single modulating frequency selected, filtering out said single frequency and obtaining therefrom the auxiliary frequency to control said one receiver.

2. In a selective communication system employing a plurality of tuned receiving circuits, the method of communication which comprises impressing upon a radio frequency carrier wave different audio frequency characteristic frequencies modulated by synchronizing current, and a band of frequencies bearing intelligence, receiving and demodulating the transmitted energy and selectively choosing at the respective receivers only those frequencies to which the individual receivers are tuned.

3. In a selective communication system employing a plurality of tuned receiving circuits, the method of communication which comprises im-

pressing upon a radio frequency carrier wave different continuous audio frequency waves modulated by synchronizing current, and a band of frequencies bearing intelligence, receiving and demodulating the transmitted energy and selectively choosing at the respective receivers only those frequencies to which the individual receivers are tuned.

4. In a selective communication system, a plurality of audio frequency generators each generating a different frequency, an auxiliary audio frequency generator common to said audio frequency generators for modulating the frequencies obtained from the latter, a radio transmitter, individual connections from each of said first audio frequency generators to said radio transmitter, and individual circuit interrupters in each of said connections.

5. In a selective communication system, a plurality of audio frequency generators each generating a different frequency, an auxiliary audio frequency generator common to said audio frequency generators for modulating the frequencies obtained from the latter, a radio transmitter, individual connections from each of said first audio frequency generators to said radio transmitter, individual circuit interrupters in each of said connections, and facsimile transmitting apparatus in circuit with said radio transmitter, said facsimile transmitting apparatus being arranged to transmit a band of audio frequencies outside the range of said other audio frequencies.

6. In a selective communication system employing a plurality of receivers each adapted to receive message waves from a single transmitting station and each requiring the receipt of a different characteristic frequency from said transmitting station for conditioning the receiver to function properly, the method of communication which comprises generating at said single transmitting station the different characteristic frequencies for which all the receivers are receptive, impressing upon a carrier wave a band of intelligence bearing frequencies outside the range of said characteristic frequencies in addition to a characteristic frequency selected from those generated at the transmitting station, and selectively receiving the transmitted energy on that one of the receivers which is tuned to the particular selected characteristic frequency and filtering out the characteristic frequency to control said receiver.

7. In a selective multi-receiving system employing a plurality of receivers each tuned to receive a desired communication from a transmitting station, the method of operation which comprises generating at the transmitting station for each receiver a single frequency, which frequency differs from those generated for the other receivers, modulating radio frequency carrier energy by one of said frequencies and by a common auxiliary frequency, selectively receiving the transmitted energy on that one of the receivers which is tuned to the particular single modulating frequency selected, filtering out said single frequency and obtaining therefrom the auxiliary frequency to control said one receiver.

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