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H. DE FRANCE

TELEVISION METHODS AND SYSTEMS

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2 Sheets-Sheet 1

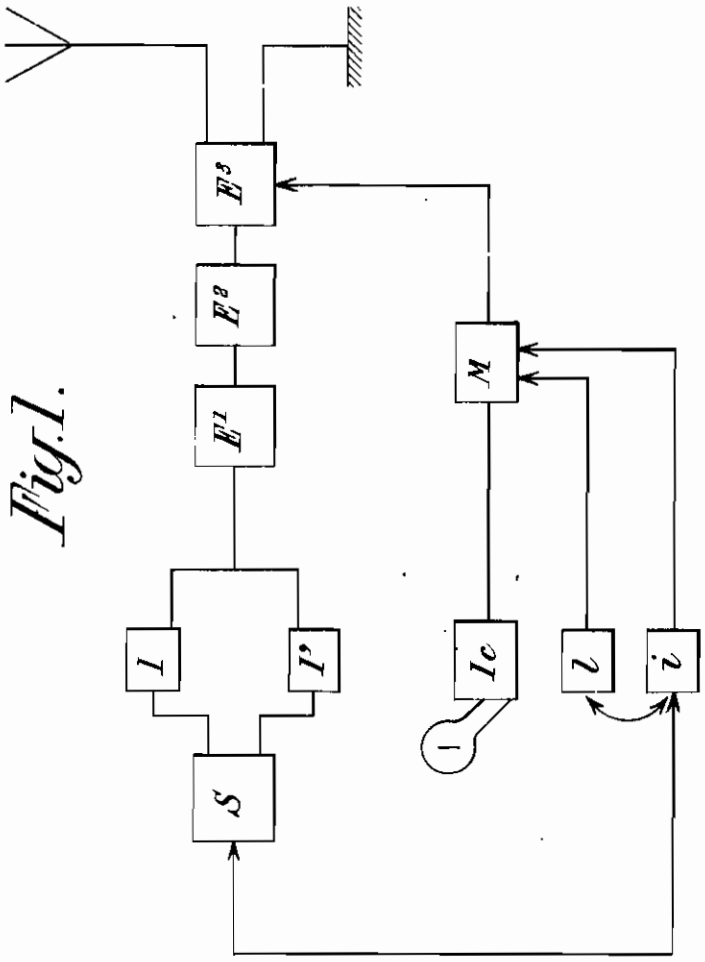

Fig. 1.

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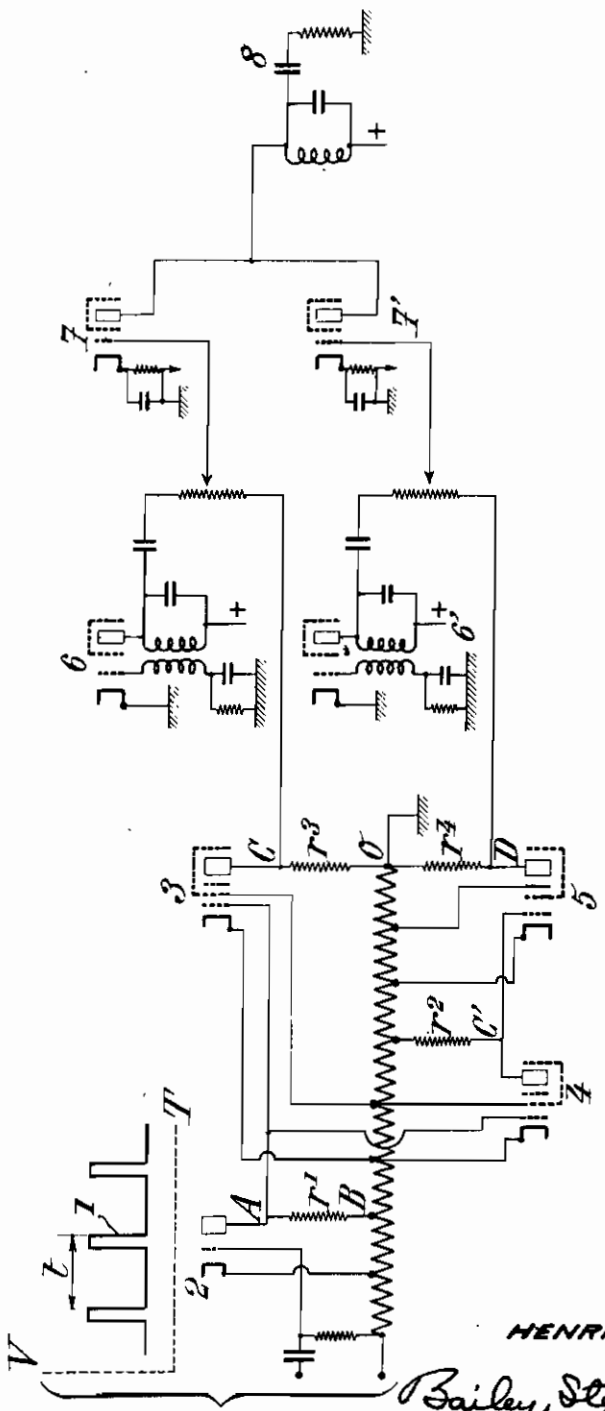
Fig. 2.



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ALIEN PROPERTY CUSTODIAN

TELEVISION METHODS AND SYSTEMS

Henri de France, Lyon, France; vested in the Alien Property Custodian

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The present invention relates to television methods and systems and more especially those in which the synchronization of the images is obtained through the transmission of synchronization signals mixed with the image modulation, so as to synchronize, at the receiving station, the scanning of the lines and of the images.

The chief object of the present invention is to provide a method and system of the type above referred to which are better adapted to meet the requirements of practise than those used for the same purpose up to the present time.

According to an essential feature of the invention, I distinguish the different kinds of synchronization signals (to wit, line synchronization and image synchronization signals) no longer, as it has been done prior to my invention, by differences of amplitude and duration, but by a frequency modulation of the carrier and, in a particularly simple embodiment of the invention, by a mere change of the carrier frequency during the time of transmission of the image signals.

This feature is advantageous in particular in that it permits of maintaining the line signals while the image signals are being transmitted and thus of maintaining the precision of scanning at the receiving station.

Other features of the present invention will result from the following detailed description of some specific embodiments thereof.

Preferred embodiments of the present invention will be hereinafter described, with reference to the accompanying drawings, given merely by way of example, and in which:

Fig. 1 is a diagrammatical view illustrating the transmission of television image signals, according of the principle of the invention;

Fig. 2 is a diagram of a system for carrying out this principle, according to an embodiment of the invention.

As above stated, the invention which will now be described in a more detailed manner is intended to improve the synchronizing of scanning between the transmitter and the receiver, in a television system, by transmitting line and image synchronization signals, according to a general method which is known.

In the systems of this kind used up to the present time, two different kinds of signals are used, which generally occupy about thirty per cent of the maximum amplitude of the total modulation, while only the image modulation varies from thirty to one hundred per cent.

Furthermore, according to these known systems, the line synchronization signals are distinguished from the image synchronization signals by their length or duration, which is considerably greater for the last mentioned kind of signals. At the receiving station, use is made of circuits having different time constants for separating the two kinds of signals, after filtering of the image modulation by a detecting or limiting device of any suitable type.

Experience has taught that this method of transmission does not permit of obtaining a sufficient precision of scanning, especially when the scanning is effected in the so-called "interlaced line" manner, because, in this last mentioned case, the precision must be extremely high if a correct interlacing is to be obtained.

The lack of precision is due in particular to the fact that, on the one hand, the line signals are not transmitted while the image signal is being transmitted, and, on the other hand, the beginning of the image signal is defined but rather softly by the time constant circuits of the various types existing at the present time.

In order to obviate these drawbacks, according to the present invention, the image synchronization signals are transmitted with characteristics different from those of the line synchronization signals so that it is possible to maintain said line synchronization signals while the image signals are being transmitted.

For instance it suffices, for this purpose, either to form the image signals by a frequency modulation of the carrier frequency of the television transmission, or, more simply, as it will be hereinafter supposed, in the following examples, by a sharp variation of this carrier frequency, lasting for the whole time of transmission of each image synchronization signal.

Preferably, the change or variation of frequency of the carrier will be chosen of relatively small value, for instance of the order of magnitude of 500,000 cycles, so as to permit of remaining within the frequency band of several megacycles that is necessary for the image modulation at the receiving station.

Such a modification of the frequency will not give rise to any detected current in a normal detector and, on the other hand, will not change anything to the conditions of operation of the circuits through which the line synchronization signals are to be received.

Of course, the receiver will include all the elements necessary for detecting the special frequency of the image signals, or, in a general manner, all the means necessary for producing, in said receiver, in response to image signals trans-

mitted in the manner above described, the signals, of any conventional or other kind, capable of correctly controlling the scanning and synchronizing of the images.

Of course, there are many possible embodiments of such a system, among which the following will be described, by way of example:

According to a preferred arrangement, which may, eventually, be used separately, the transmitter includes the following elements:

a. Two oscillators I and I' (Fig. 1), working, respectively, the first with a frequency n to be used for the transmission of image synchronization signals, and the second with a frequency n' to be used during the transmission of the images, it being well understood that these transmitters might be devices other than oscillators, provided, that they give the same result; and

b. For passing from the operation of one to that of the other, a control device itself influenced by the image synchronization signal, itself produced in the usual manner, this control device being capable of working instantaneously, that is to say practically without time constant, and being, for instance, adapted to produce, in a suitable manner, the synchronizing of the tubes of oscillators I and I'.

In said Fig. 1, I have diagrammatically shown a television transmitter made according to the invention.

The various amplification stages of the transmitter are shown at E^1, E^2, E^3. The image modulation signal is produced by an iconoscope Ic. The usual line and image synchronization signals are produced multivibrators or relaxation oscillators, for instance of a known type, *l* and *i*, suitably synchronized in such manner as to ensure that the ratio of the respective transmission frequencies of the line and image synchronization signals is ensured, and maintained.

These last mentioned signals are mixed with the image modulation, at M, and the whole is caused to modulate, for instance, the last amplification stage E^3. Furthermore, and this is a particular feature of the present invention, the signals produced in *i* are caused to influence control device S, in such manner as to control the passage from frequency n to frequency n' or inversely.

Concerning this device S, it includes for instance a powerful potentiometer (that is to say of high power and low resistance), in combination with tubes mounted as shown or in any other way so as to obtain, at the output end, a polarization voltage which starts one of the oscillators and a blocking voltage which stops the other oscillator, these two voltages being temporarily interchanged when an image synchronization signal is being transmitted, after which they immediately return to their prior values, and so on.

Said device, according to the embodiment shown by the drawing, includes four vacuum tubes, to wit **2**, **3**, **4**, **5**.

Tube **2** receives the signal in the form of a voltage V variable as a function of time T, the signals being emitted for instance at the rate of 50 per second. It is normally blocked by a high polarization, point A being then at the same potential as the point B of the potentiometer, that is to say a high potential.

Tube **3** has its control grid connected to the output end A of tube **2** and the same is true of tube **4**. Therefore, when tube **2** is blocked, a normal current flows through tubes **3** and **4**.

Finally, tube **5** has its control grid connected at C' with the output of tube **4**. Owing to the presence of a resistance r^2, this point C' is brought to a highly negative voltage when current flows through tube **4**. It follows that said tube **5** is, under these conditions, blocked.

It will already be seen, from what has been above stated, that, under normal working conditions, that is to say during the time interval *t* between two signals, considering, at the output ends of tubes **3** and **5**, respectively, two points C and D connected, respectively, to a point O of voltage equal to zero (or an intermediate voltage, which may even be positive) through resistances r^3 and r^4, I obtain, on the one hand, at C, a highly negative voltage and, on the other hand, at D, a voltage equal to zero (or in any case equal to that of point O). The tensions that are respectively utilized for polarizing oscillators I and I' permit of bringing into action the one I' that serves to the transmission of the images, while oscillator I remains blocked.

It will be easily understood that, under the effect of a signal transmitted from *l*, tube **2** is released and point A becomes highly negative under the effect of a resistance r^1. It follows that tubes **3** and **4** are blocked and that, on the contrary current flows through tube **5**. The conditions above described are reversed and oscillator I is started for the short time interval corresponding to said signal, while, during this time, oscillator I' is on the contrary blocked.

As for oscillators I and I', they may be of any suitable type.

In Fig. 2, these oscillators include each two tubes, **6**, **7** and **6'**, **7'**, respectively, the second of which, to wit **7** or **7'** has its grid polarized by the above described device, said grid being connected to point C or D, preferably through voltage adjusting means.

At **8**, I have diagrammatically shown the input end of the transmitter proper which will permit, through amplification, frequency multiplication and modution means, known in themselves, of transmitting the image modulation accompanied by its synchronization signals.

As for the receivers capable of receiving from systems such as that above described, they must first include, concerning the circuits for reconstituting the image and those serving to distinguish the line synchronization signals, any suitable means, of a conventional or other type.

For the reception of the image synchronization signals, said receivers are provided with means for selecting frequencies, such means utilizing for instance frequency modulation receiving arrangements, that is to say, for instance, arrangements including: a saturation circuit capable of bringing back the amplitude to a constant peak level whatever be the frequency, and a frequency filter stopping a band of amplitudes when the frequency passes from n to n' or inversely.

Then it suffices to have recourse to a polarized two electrode separators or the like for obtaining a signal only for the amplitude corresponding to the frequency n that is utilized during the transmission of the image synchronization signal, after which it is possible, by means of any known device, to reconstitute the usual image synchronization signals according to the result of this detection.

Any way, whatever be the particular embodiment that is chosen, I obtain a system the operation of which results sufficiently clearly from the preceding explanations for making it un-

necessary to enter into further description thereof.

This system has, over those existing at the present time and used for the same purpose, the following advantages, among others:

a. It permits of maintaining the line synchronization signals while the image synchronization signal is being transmitted;

b. It ensures a sharp start of the image synchronization in the receiver, since the time constant brought into play in this operation is at most equal to that of a filter capable of separating frequencies n and n' which are very close to each other, or to that of a frequency modulation detecting circuit, which time constants can easily be made much smaller than the length or duration of a line synchronization signal.

In a general manner, while I have, in the above description, disclosed what I deem to be practical and efficient embodiments of the present invention, it should be well understood that I do not wish to be limited thereto as there might be changes made in the arrangement, disposition and form of the parts without departing from the principle of the present invention.

HENRI DE FRANCE.