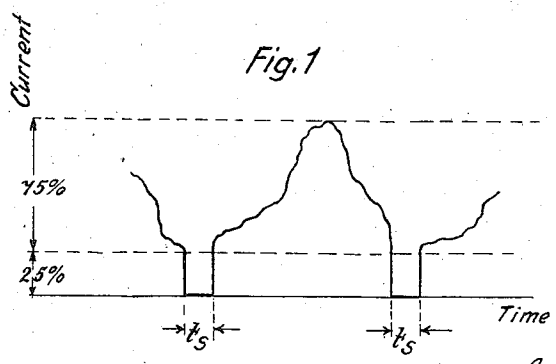
March 28, 1939. W. SCHEPPMANN 2,151,942

TELEVISION METHOD

Filed March 13, 1936

Fig. 1



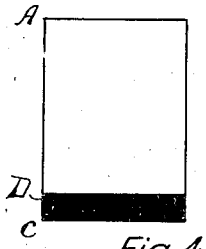


Fig. 4

Fig. 2

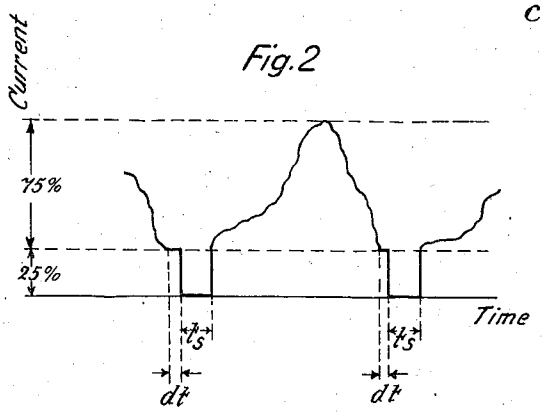
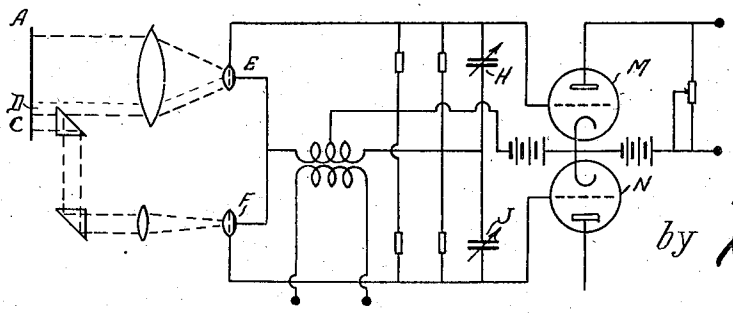


Fig. 3.



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UNITED STATES PATENT OFFICE

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TELEVISION METHOD

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3 Claims. (Cl. 178—7.1)

In the television art the so called gap synchronization has recently become known, in which the transmitter in the unmodulated condition operates with a carried value of 25% of the maximum carrier amplitude. From this value onward the luminosity values are controlled upward towards the full carrier amplitude. The synchronizing impulses, however, are produced by controlling the carrier wave downward, that is, towards the carrier value zero. In this way a gap is produced each time a synchronizing pulse occurs, and therefore this method has been designated as gap synchronization.

The invention will be understood from the following description and be particularly pointed out in the appended claims, reference being had to the accompanying drawing, in which

Fig. 1 is a diagram illustrating a known method of controlling a transmitter, this method involving the gap synchronization as practised hitherto, Fig. 2 is a diagram similar to Fig. 1 and by way of example represents the novel method, Fig. 3 illustrates a known type of scanning system in which the method of the invention may be used, and Fig. 4 illustrates a picture to be scanned modified for practicing the invention with the circuit of Fig. 3.

In Fig. 1 the carrier amplitudes are shown in dependence upon time. The synchronization gaps are designated *ts*. In the use of this synchronization method it has been experienced that on the receiving side the release of the so called tripping or kipp devices, controlled by the synchronizing pulses, depends upon the degree of luminosity peculiar to that edge of the picture where the scanning ceases, that is, where the scanning lines leave the picture. This edge may therefore be designated as leaving-edge. For instance, if the picture is scanned from left to right, then the right-hand-edge is the leaving-edge. The curves in Fig. 1 represent the currents due to the picture. From these curves it will be seen that in the case of a synchronization gap such as shown on the left in Fig. 1 the luminosity value is much less than in the case of the synchronization gap shown on the right, that is to say, in the first case the last picture points, that is, those aside the leaving-edge, are dark, whereas in the second case the picture points at the leaving-edge are bright, so that in the first case the gap synchronization starts from a dark picture value, whilst in the other case it starts from a bright one.

The synchronizing pulses are produced each time the scanning means, for instance a perforated disc of the well known construction or a cathode ray, has reached the leaving edge. At the same instant the transmitter is controlled towards zero.

Certain building-up transients however entail that certain differences of time occur until the transmitter has been controlled to zero, namely differences which as to their magnitude depend upon the luminosity value that has been active at the leaving-edge. As a result the release of the kipp devices on the receiving side is more or less retarded, the consequence being that the beginning of the next following line is more or less displaced with respect to the commencement of the preceding line. The pictures therefore present certain distortions at their edges and thus are distorted throughout, lines which should be straight and vertical being broken.

In order to overcome these drawbacks the invention proposes to start all the synchronizing impulses from the same value of the carrier wave and short periods are inserted during which the transmitting current is controlled to a constant value to such end. Preferably this is done by providing the picture to be transmitted with a border, this being provided at least at the leaving-edge thereof, as will be fully described hereafter.

In Fig. 2 the synchronization gaps are likewise denoted by *ts*. Here, however, care is taken that a short time *dt* before the commencement of each gap *ts* the transmitter is controlled to a value equal to 25% of the maximum carrier. The gaps *ts* are thus in any case started downward from the value of 25%. If then certain retardations occur in controlling the transmitter to the value 25%, the synchronization will not be affected thereby.

In order to accomplish the novel control method the leaving-edge of the picture is provided with a border for example. If for instance a perforated disc is used for scanning, this disc may in a customary manner be of the type having two rows of perforations. Behind each row a photo-electric cell is located. One row serves to scan the picture lines, while the other row with the aid of its photo-cell acts to produce the synchronizing pulses. These perforations are so disposed that the synchronizing pulses immediately follow upon the picture impulses, as indicated in Fig. 1. If devices of this kind are to be used here then all that is necessary to such end is to reduce the useful area of the picture, for instance by disposing a black strip at the leaving edge thereof.

A circuit suitable for practicing this invention

may, for example, comprise a gap synchronizing system such as disclosed in British Patent No. 413,561. A portion of the transmitting circuit of such a system is illustrated in Fig. 3. In this apparatus light from the scanned object AC normally falls on a light sensitive cell E, but at the end of each scanning line unmodulated light falls on a second cell F. The cells are connected to amplifying tubes M, N, and neutralizing condensers H, J, are so adjusted that neutralization of the two cells is obtained when the cell E is unilluminated and the cell F illuminated. This neutralization produces a gap of zero potential for synchronizing purposes at the end of each scanning line. The reference character D applied to the lower portion of the scanned object AC represents the black border used in practicing the present invention. This border at the termination of the scanning line reduces the light passing to cell E to substantially zero bringing the scanning line to a constant value immediately prior to the introduction of the scanning impulse through illumination of cell F.

In Fig. 4 is shown a diagram of the object to be scanned. This object is shown as a rectangle AC and is provided with a black border D at its lower end so that the invention may be practiced using the apparatus illustrated in Fig. 3.

The invention may however be effected also by employing a disc of this kind, whose perforations are slightly offset with respect to each other.

The same ideas may of course be carried into effect if the scanning is accomplished by means of a cathode ray.

If the leaving-edge is covered, as stated, by a black strip for example, then this strip, being reproduced in the received picture, may impair the appearance of the picture. Therefore it will for aesthetic reasons be advantageous to provide the picture with a border all around. It will be seen however that such a border or frame as regards the synchronization itself will not present any advantage over a border arranged along one edge only.

What is claimed is:

1. The method of operating television devices comprising transmitting image impulses of variable current amplitude to define lines of a picture, producing gaps or periods of no current between said image impulses as synchronizing impulses, and reducing said image impulses to a predetermined constant amplitude for short periods immediately prior to the production of said gaps or periods, whereby said image impulses create a minimum distortion of said synchronizing impulses.

2. A method according to claim 1, wherein a picture to be transmitted is provided with a border at that edge where the scanning lines leave this picture.

3. A method according to claim 1, wherein a picture to be transmitted is provided with a border all around.

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