

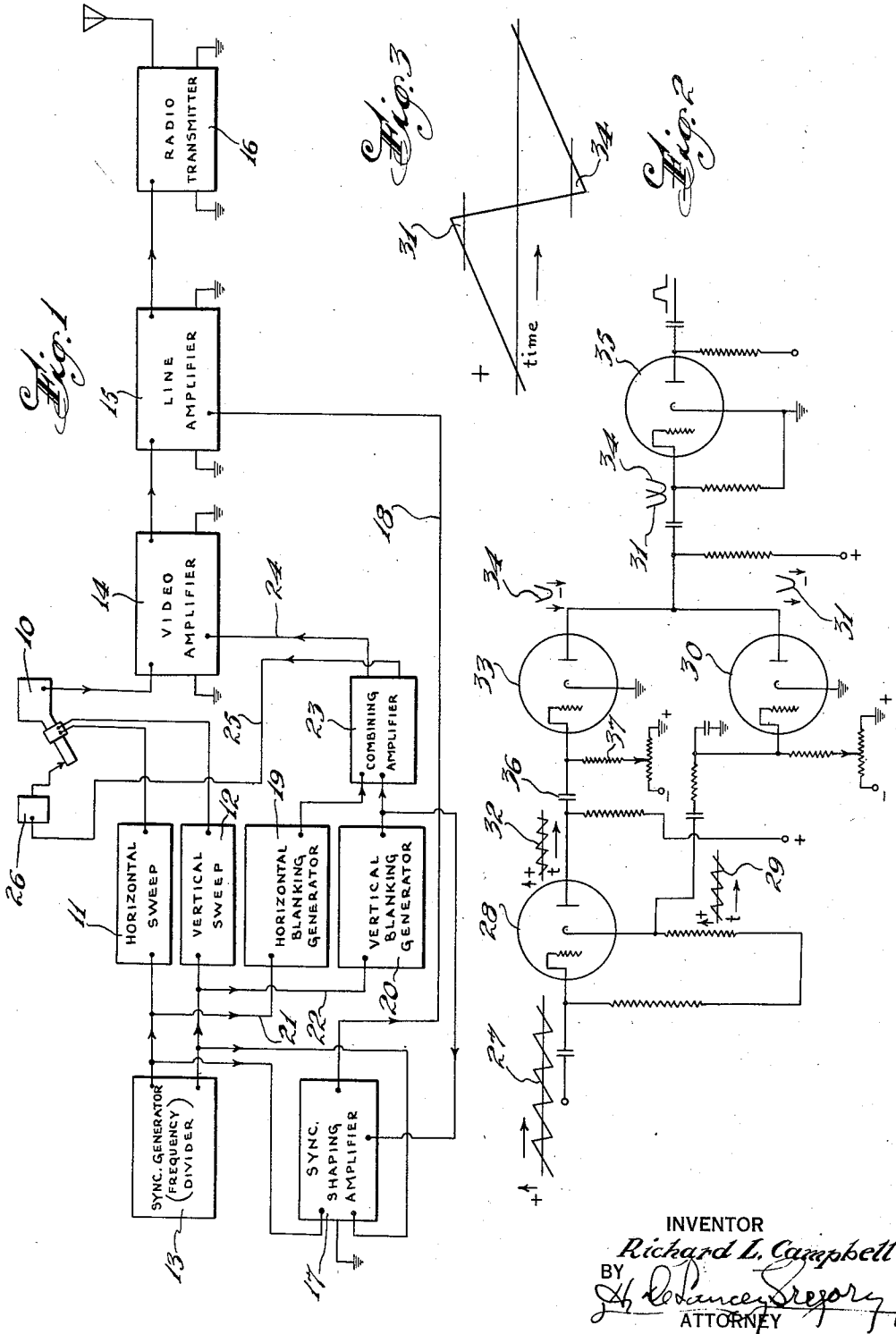
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TELEVISION TRANSMITTING SYSTEM

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TELEVISION TRANSMITTING SYSTEM

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10 Claims. (Cl. 178—7.1)

My invention relates to improvements in television transmitting systems, and more particularly to those employing a cathode-ray tube for generating the video or picture signals.

5 In the operation of television transmitters employing a cathode-ray tube for generating the video signals, blanking pulses are applied to blank off the undesirable surges occurring during both the vertical and horizontal return lines. 10 For the purpose of shaping the blanking pulses, a tuned circuit has been used heretofore. This method, however, limited the operation to the frequency of the tuned circuit, and furthermore, adjustment of phase of the blanking pulse was difficult. 15 It was then proposed to use another method to provide a satisfactory source of square wave, which consisted in passing a saw-tooth wave through a distorting network and then picking off the peak of this wave. This, however, was not entirely satisfactory because phase 20 conditions were not right. That is, the synchronizing pulse either ended or began at the center of the wave, which did not then provide a pedestal for the vertical synchronizing wave. It was then proposed to use a circuit calculated to introduce delay, but this did not aid matters much because the peak of the saw-tooth is always just ahead or just behind the synchronizing pulse, depending on the pulse selected.

25 With the foregoing in mind, it is one of the objects of my invention to provide an improved and comparatively simple system and method of the character referred to for generating blanking pulses whose duration or width can be adjusted, in which the synchronizing pulses can be positioned anywhere along the blanking wave it may be desired, and in which no adjustments are necessary in event either or both of the scanning frequencies are changed. 30

35 Other objects and advantages will hereinafter appear.

40 For the purpose of illustrating my invention, an embodiment thereof is shown in the drawing, in which

45 Figure 1 is a simplified, diagrammatic view of a television transmitting system constructed and operating in accordance with my invention;

Fig. 2 is a simplified circuit diagram showing the details of one of the circuits in Fig. 1; and

50 Fig. 3 is a view representing a wave form, and illustrative of the principle of operation.

55 With reference to Fig. 1, the numeral 10 designates a cathode-ray tube of a conventional construction for generating video or picture signals, and in which a ray of electrons is caused

to scan a photosensitive screen on which is projected an image of the view for transmission. The scanning ray is deflected by coils or plates horizontally at a suitable line frequency and vertically at a suitable field frequency. For this purpose, a horizontal sweep circuit 11 applies a saw-tooth wave at line frequency across the horizontal-deflection coils or plates, and a vertical sweep circuit 12 applies a saw-tooth wave at field frequency across the vertical-deflection coils or plates. The sweep circuits are controlled and kept locked in step by synchronizing signals supplied from a generator 13.

The video signals are amplified in the video amplifier 14 and in the line amplifier 15, and are then fed to the transmitter 16.

The synchronizing signals from the generator 13 are amplified in an amplifier 17 and thence go by way of the line 18 to a stage of the line amplifier 15.

20 The horizontal blanking pulses are supplied from a generator 19 for this purpose, and the vertical blanking pulses are supplied from a generator 20 for this purpose. The generators 19 and 20 are held locked in step by signals from the synchronizing generator 13, as represented in the drawing by the connections 21 and 22. The horizontal and vertical blanking pulses are combined in an amplifier 23. The combined blanking pulses are supplied by a line 24 to a stage of the video amplifier, and by a line 25 to a blanking amplifier 26 and thence at negative polarity to the intensity-control grid of the electron gun in tube 10.

35 Fig. 2 shows details of the circuit of the generator 20. A saw-tooth voltage wave 27 at field frequency is impressed on the grid of tube 28 operating as a phase inverter, and having plate and cathode outputs which are opposite in phase. The positive-phase saw-tooth from the cathode of tube 28, and represented at 29, is fed to tube 30 whose grid is overbiased so that plate current flows only during the extreme positive peak of the wave 29. Accordingly, a peak signal 31 is developed whose duration begins toward the end of the scanning period and ends following the voltage reversal, since the slope of the saw-tooth voltage decreases with time, as represented. The inverted-phase saw-tooth from the plate of tube 28, and represented at 32, is fed to the grid of tube 33 whose grid is also overbiased so that plate current flows only during the extreme positive peak of the wave 32. Since in this case slope of the saw-tooth voltage decreases with time, as represented, a peak signal 34 is developed. 55

oped whose duration begins during the return time and extends into the beginning of the succeeding saw-tooth wave. Thus, in the common output resistor of tubes 30 and 33 there are two waves which may be combined to form a wave whose duration may easily be adjusted to extend before and after the actual return time of the saw-tooth in any amount desired.

The combined wave 31, 34 from tubes 30 and 33 is fed to a limiting amplifier 35 which acts to square off the wave 31, 34 so that the top is flat. Further squaring may be done in succeeding stages by means of saturated amplifiers which are adjusted to steepen the slope of the sides of the wave.

The network shown in the grid circuit of tube 30 acts to slow the return period of wave 29 so that overlapping of the two waves 29 and 32 is insured. Also, in the grid circuit of tube 33, the condenser 36 and resistance 37 are adjusted to give a distorted saw-tooth wave which sharpens the positive peak so that it may be more easily selected by tube 33.

By means of my novel circuit and the adjustments provided, unequal widths of the pulses 31 and 34 can be maintained, thereby allowing for positioning of the synchronizing pulses anywhere along the blanking wave or pulse it may be desired.

The circuit and principle of operation of the horizontal blanking generator 19 is the same as that of the vertical blanking generator.

For a more detailed explanation of the operation of the system taken as a whole and as represented in a simplified way in Fig. 1, reference is made to the prior art, and particularly to Patent No. 2,132,655 issued October 11, 1938 to John P. Smith.

I claim as my invention:

1. In the art of television transmission, the steps in the method of operation which consist in generating a substantially saw-tooth electrical wave, selecting out, in separate circuits, the peaks only of said wave, combining said peaks at the same polarity with respect to each other to develop resulting blanking pulses, and utilizing the blanking pulses to compensate for undesirable electrical surges which would otherwise occur incident to the television transmission.

2. In a circuit for generating individual electrical pulses of the same polarity and substantially equally spaced in time of occurrence, a first tube operating as a phase inverter and having plate and cathode outputs which are opposite in phase, a connection for impressing on the grid of said tube a substantially saw-tooth voltage wave, a second tube, means for feeding to the grid of said second tube the positive-phase saw-tooth from the cathode output of said first tube, the grid of said second tube being overbiased so that plate current flows only during the extreme positive peak of said positive-phase saw-tooth whereby a peak signal is developed, a third tube, means for feeding to the grid of said third tube the inverted-phase saw-tooth from the plate output of said first tube, the grid of said third tube being overbiased so that plate current flows only during the extreme positive peak of said inverted-phase saw-tooth whereby a peak signal is developed, and means common with respect to the output circuits of said second and third tubes for combining said peaks to form jointly one of said pulses.

3. In a circuit for generating individual electrical pulses of the same polarity and substan-

tially equally spaced in time of occurrence, a first tube operating as a phase inverter and having plate and cathode outputs which are opposite in phase, a connection for impressing on the grid of said tube a substantially saw-tooth voltage wave, a second tube, means for feeding to the grid of said second tube the positive-phase saw-tooth from the cathode output of said first tube, the grid of said second tube being overbiased so that plate current flows only during the extreme positive peak of said positive-phase saw-tooth whereby a peak signal is developed, a third tube, means for feeding to the grid of said third tube the inverted-phase saw-tooth from the plate output of said first tube, the grid of said third tube being overbiased so that plate current flows only during the extreme positive peak of said inverted-phase saw-tooth whereby a peak signal is developed, means common with respect to the output circuits of said second and third tubes for combining said peaks to form jointly one of said pulses, and a network associated with the grid circuit of said second tube for slowing the return period of said positive-phase saw-tooth whereby overlapping of said positive-phase saw-tooth and said inverted-phase saw-tooth occurs.

4. In a circuit for generating individual electrical pulses of the same polarity and substantially equally spaced in time of occurrence, a first tube operating as a phase inverter and having plate and cathode outputs which are opposite in phase, a connection for impressing on the grid of said tube a substantially saw-tooth voltage wave, a second tube, means for feeding to the grid of said second tube the positive phase saw-tooth from the cathode output of said first tube, the grid of said second tube being overbiased so that plate current flows only during the extreme position peak of the wave whereby a peak signal is developed, a third tube, means for feeding to the grid of said third tube the inverted phase saw-tooth from the plate output of said first tube, the grid of said third tube being overbiased so that plate current flows only during the extreme positive peak of the wave whereby a peak signal is developed, means common with respect to the output circuits of said second and third tubes for combining said peaks to form jointly one of said pulses, and adjustable means associated with the grid circuit of said third tube for distorting the inverted phase saw-tooth to sharpen the positive peak thereof.

5. In a circuit for generating individual electrical pulses of the same polarity and substantially equally spaced in time of occurrence, a first tube operating as a phase inverter and having plate and cathode outputs which are opposite in phase, a connection for impressing on the grid of said tube a substantially saw-tooth voltage wave, a second tube, means for feeding to the grid of said second tube the positive phase saw-tooth from the cathode output of said first tube, the grid of said second tube being overbiased so that plate current flows only during the extreme positive peak of the wave whereby a peak signal is developed, a third tube, means for feeding to the grid of said third tube the inverted phase saw-tooth from the plate output of said first tube, the grid of said third tube being overbiased so that plate current flows only during the extreme positive peak of the wave whereby a peak signal is developed, means common with respect to the output circuits of said second and third tubes for combining said peaks to form jointly one of said pulses, and a network associated with

the grid circuit of said second tube for slowing the return period of the positive phase saw-tooth whereby overlapping of the positive phase saw-tooth and the inverted saw-tooth occurs, and adjustable means associated with the grid circuit of said third tube for distorting the inverted phase saw-tooth to sharpen the positive peak thereof.

6. In the art of television transmission wherein a cathode-ray tube is used for generating the video signals, the steps in the method of generating blanking pulses which consist in deriving from a substantially saw-tooth wave two overlapping and substantially saw-tooth waves which are of positive phase and of inverted phase respectively, deriving from said overlapping and substantially saw-tooth waves two peak signals of the same polarity and overlapping in phase, and combining said overlapping peak signals.

7. In the art of television transmission wherein a cathode-ray tube is used for generating the video signals, the steps in the method of generating blanking pulses which consist in deriving from a substantially saw-tooth wave two overlapping and substantially saw-tooth waves which are of positive phase and of inverted phase respectively, deriving from said overlapping and substantially saw-tooth waves two peak signals of the same polarity and overlapping in phase, combining said overlapping peak signals to obtain a resulting wave, and squaring off said wave so that the top is substantially flat to obtain a blanking pulse.

8. In a television transmission system, a source of supply of a substantially saw-tooth voltage wave, means for deriving from said wave two

overlapping and substantially saw-tooth waves which are of positive phase and of inverted phase respectively, means for deriving from said overlapping and substantially saw-tooth waves two peak signals of the same polarity and overlapping in phase, and means for combining said overlapping peak signals to obtain blanking pulses.

9. In a circuit for generating individual electrical pulses of the same polarity and substantially equally spaced in time of occurrence, means for generating a substantially saw-tooth electrical wave, separate circuits operable respectively to select out the peaks only of said wave under conditions wherein some of said peaks are out of phase with respect to the others, and means for combining said out-of-phase peaks at the same polarity with respect to each other to develop resulting blanking pulses effective in television transmission to compensate for undesirable electrical surges which would otherwise occur incident to the television transmission.

10. In a circuit for generating individual electrical pulses of the same polarity and substantially equally spaced in time of occurrence, means for generating a substantially saw-tooth electrical wave whose slope decreases with time, means for generating a substantially saw-tooth electrical wave whose slope increases with time, means for developing peak signals from said waves wherein the respective peak signals derived from said waves are out of phase with respect to each other and are of the same polarity with respect to each other, and means for combining said peak signals.

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