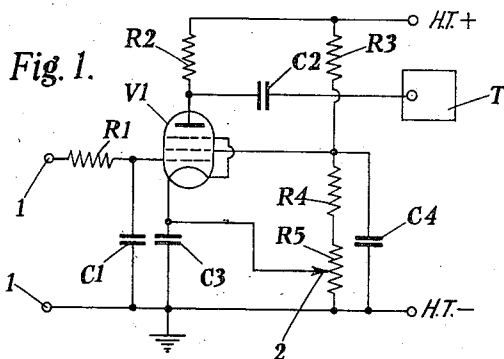
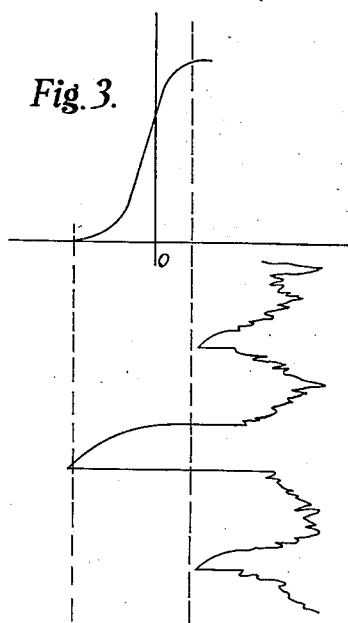
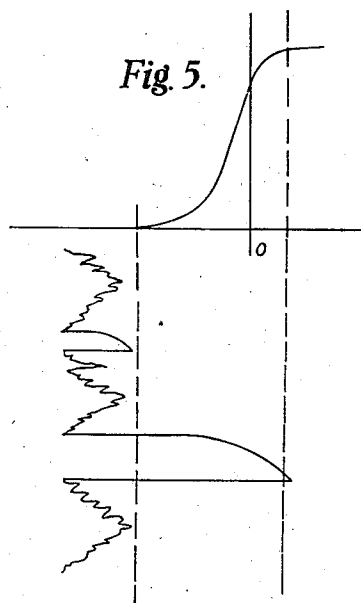
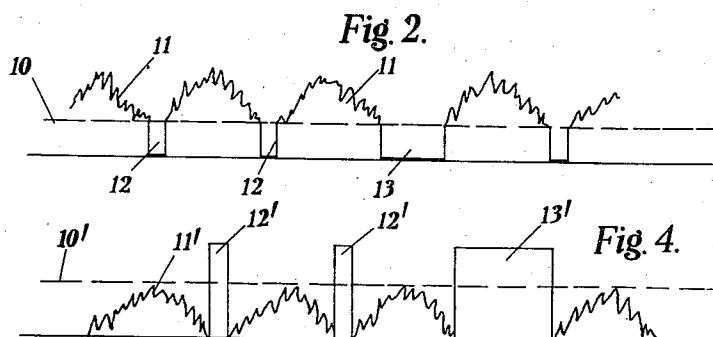
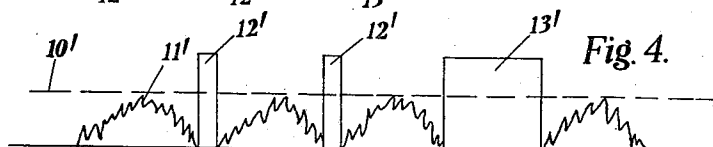


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TELEVISION AND LIKE SYSTEM

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Inventors
W. JONES,
B. J. EDWARDS
by *B. J. Edwards*
Attorneys

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TELEVISION AND LIKE SYSTEM

William Jones and Baden John Edwards, Cambridge, England, assignors to Pye Limited, Cambridge, England, a British company

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4 Claims. (Cl. 178-7.3)

The present invention relates to electrical picture transmission systems such as television, phototelegraphy and the like, and more particularly to a circuit arrangement for the separation of the frame synchronising impulses from the line synchronising impulses and the picture intelligence.

In the transmission of television two sets of synchronising impulses are usually transmitted; namely, the line synchronising impulses which are generated immediately before or after the scanning of each line of the picture to be transmitted, and frame synchronising impulses which are generated between complete scans of the picture, or, in the case in which the object to be transmitted is a cinematograph film, between the scanning of successive frames. Both the line synchronising impulses and the frame synchronising impulses are generally of substantially the same amplitude but are of different duration, the frame impulses being of longer duration than the line impulses.

Difficulties exist in separating the frame from the line synchronising impulses in the receiver, particularly when interlaced scanning of the picture is employed. The present invention has for its object to provide an improved method of effecting such separation and also for separating the frame synchronising impulses from the picture intelligence.

A further object of the invention is to provide a circuit arrangement for separating the frame impulses from the picture intelligence and line impulses in a single electronic discharge device, and without the necessity of first separating the synchronising impulses from the picture intelligence.

The invention will now be described by way of example with reference to the accompanying drawing in which

Fig. 1 shows one embodiment of a circuit arrangement according to the invention.

Figs. 2 and 3 show one type of wave form and the corresponding operation of the circuit.

Figs. 4 and 5 show an alternative type of wave form and the corresponding operation of the circuit.

Referring to Fig. 1 which shows a circuit arrangement for effecting the separation of frame impulses from the line impulses and picture intelligence, the arrangement comprises a pentode or other valve V1, to the input terminals 1 of which is applied the received video signals (rectified transmitted wave-form). The input circuit includes a series resistance R1 and a con-

denser C1 in shunt between the grid and cathode of the valve, or, as shown, between the grid and earth. The valve anode load is constituted by a resistance R2 and the coupling to the time base unit T is effected through the condenser C2. Any other alternative form of connection between the valve and the time base unit, such as a transformer, may, however, be employed. A suitable positive potential is impressed upon the screening grid of the valve from a potential divider R3, R4, R5 connected across the anode current supply lead, the negative terminal of which is earthed. A further tapping point 2 is provided upon the resistance R5 whereby a suitable bias may be applied between the control grid and the cathode. C3 and C4 are the usual by-pass condensers to the cathode and screening grid respectively.

The valve employed preferably has a steep slope so that a small change in the potential applied to the control grid can shift the operating point from anode current cut-off to anode current saturation.

The method of operation of the circuit will now be described.

Assuming in the first case that the received video signal is in the form shown in Fig. 2 and comprises picture intelligence 11, line synchronising impulses 12 and frame synchronising impulses 13. The line 10 represents a datum line corresponding to black in the picture signals so that the synchronising impulses are transmitted in the blacker-than-black sense. Both the line and frame impulses are of substantially the same amplitude but the frame impulses are of longer duration than the line impulses.

The input condenser C1 and the resistance R1 together form a charge circuit which is charged up by the incoming video signals. It will be assumed that the incoming signals charge the condenser positively. The grid is so biased that the picture intelligence signals apply a positive potential to the control grid and cause grid current to flow. During the synchronising impulses the charge on the condenser becomes less positive but due to the different duration of the line and frame impulses the potential to which the charge is reduced is different in each case. As shown in Fig. 3 the valve is so biased that the potential applied to the grid during picture intelligence and line impulses still lies within the region of anode current saturation whereas during frame impulses the grid potential is reduced so that the operating point is transferred through the sloping part of the characteristic to or beyond the

point of anode current cut-off whereby noise usually apparent on the base of the synchronising pulse is eliminated and improved synchronising is obtained. If the time constant of the charge circuit C1, R1 is substantially of the same duration as the duration of the frame impulses, and the valve is biased to the point of anode current saturation the operating point on the valve characteristic will be shifted to the point of anode current cut-off during the reception of frame impulses. The time constant of the charge circuit R1, C1, however, is preferably longer than the duration of the frame impulses, but in this case in order that the frame impulses may shift the operating point to the point of anode current cut-off the steady biasing potential applied to the control grid will have to be adjusted by varying the position of the tapping 2. The time constant of the charge circuit could be less than the duration of the frame impulses provided that it is greater than the duration of the line pulses, but in this case the adjustment would be more critical.

If the video signal is in the form shown in Fig. 4 in which the synchronising impulses are transmitted in the whiter-than-white sense, the valve should be biased positively, such as to the point of anode current saturation and the picture intelligence and line synchronising impulses would, in this case, lie in the region of anode current cut-off as shown in Fig. 5. In this case the condenser C1 is charged up by the synchronising impulses instead of being discharged as in the previous example.

In both cases it is only the frame synchronising impulses which are amplified, and the amplified frame impulses are then fed to the frame time base T.

The system of separation according to this invention has several advantages including the complete separation of the line and frame impulses before amplifying. It is usual to have a four to one discrimination between the two sets of impulses and an amplitude filter is arranged to pass only the frame impulses. In the arrangement according to the invention, however, the discrimination is infinite as no line impulses are amplified. Further, the equipment necessary for separating the frame impulses from both the line impulses and picture intelligence comprises only one valve which acts as a synchronising pulse separator and amplifier.

It will be understood that by varying the working point on the valve characteristic the circuit arrangement may be used for the separation of frame impulses in other types of video signals, or video signals applied in a different phase.

We claim:

1. Circuit arrangement for separating and simultaneously amplifying frame synchronizing impulses from a composite signal including frame and line synchronizing impulses of substantially the same amplitude but of different duration, comprising a single amplifying device containing cathode, control grid and anode electrodes therein and having a transmission characteristic curve with a steep sloping portion terminating at each end in a substantially horizontal portion, an input circuit having a predetermined time constant comprising a resistance and capacitance so as to be responsive to the duration of a signal applied to said input circuit for varying the biasing potential applied to said amplifying device and thus the operating point on said curve, means for applying the frame and line synchronizing impulses to said input circuit, the initial operating

point of said amplifying device so lying on one substantially horizontal portion of said curve that the biasing potentials applied to the amplifying device due to line synchronising impulses cause the amplifying device to continue to operate on said substantially horizontal portion to produce negligible output change, while the biasing potentials applied to the amplifying device due to frame synchronising impulses cause the operating point on the curve to swing over to the other substantially horizontal portion of said curve through the steep sloping portion of said characteristic curve, and an output circuit from said device connected to said plate electrode in which said frame synchronising impulses appear as a square topped wave form.

2. Circuit arrangement as claimed in claim 1, wherein the composite signals applied to said input circuit comprise also picture intelligence, the initial operating point of the amplifying device so lying on the one horizontal portion of said curve that the biasing potentials applied to the amplifying device due to picture intelligence also cause the operating point of said amplifying device to remain on said substantially horizontal portion to produce negligible output change.

3. Electronic valve circuit arrangement employing a single electronic vacuum valve for separating frame synchronising impulses from a composite signal including frame and line synchronising impulses of substantially the same amplitude but of different duration and picture intelligence, comprising a single electronic vacuum valve having a cathode, a control grid and an anode, and being of the type having a transmission characteristic curve with a steep sloping portion terminating at each end in a substantially horizontal portion, a reactive impedance having a predetermined time constant and comprising resistance and capacitance, means for applying the frame and line synchronizing impulses and picture intelligence to the control electrode of the valve through said reactive impedance, and means for biasing the control electrode to such a point on the transmission characteristic of the valve that the potentials applied to the control grid from the reactive impedance due to line synchronising impulses and picture intelligence cause the valve to operate on one of the substantially horizontal portions of the transmission characteristic of the valve, while the potentials applied to the control electrode from the impedance due to the frame synchronising impulses cause the operating point to swing completely through the steep sloping portion of the valve characteristic and on to the other substantially horizontal portion of the characteristic to produce a square topped signal.

4. Circuit arrangement for separating frame synchronising impulses from a composite signal including frame and line synchronising impulses of substantially the same amplitude but of different duration, comprising an electronic amplifying device having a cathode, a control grid and an anode, and having a control grid voltage/anode current characteristic curve having a steep sloping portion terminating at each end in a substantially horizontal portion, means for applying a biasing potential to said control grid so as to bring the operating point of said amplifying device initially on one of the substantially horizontal portions of the characteristic curve, a reactive impedance having a predetermined time constant, said reactive impedance comprising a

capacity and resistance being connected between said cathode and said control grid for varying the biasing potential applied to said control grid, means for applying the composite signal to said control grid through said reactive impedance, 5 and an output circuit connected to said anode, said predetermined time constant being so related to the duration of the frame and line synchronizing impulses and said sloping portion being so steep that, in operation, the variations of 10 the biasing potential due to line synchronising impulses cause the amplifying device to continue to operate on said one of the substantially hori-

zontal portions of the characteristic curve to produce negligible output change, while the variations of the biasing potential due to frame synchronising impulses cause the operating point on the characteristic curve to swing over to the other substantially horizontal portion of said characteristic curve through the steep sloping portion of said characteristic curve, whereby in said output circuit only the amplified frame synchronising impulses appear as a square topped wave.

BADEN J. EDWARDS.
WILLIAM JONES.