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ELECTRIC SIGNAL PULSE CONTROLLING CIRCUITS

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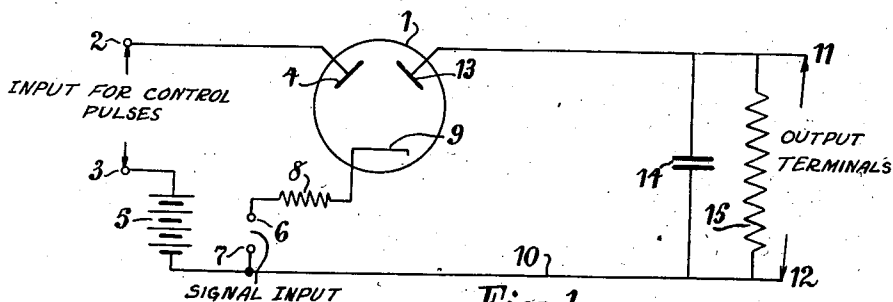
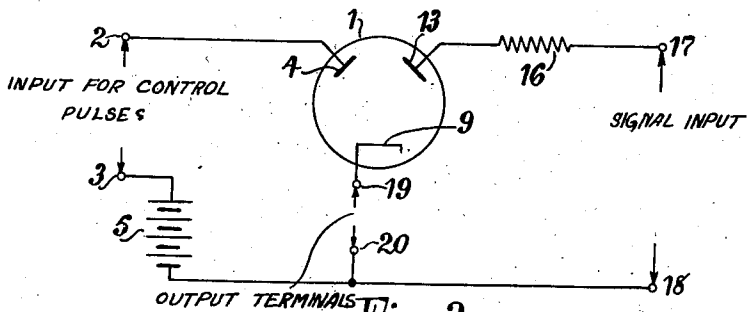


Fig. 1.



^sFig. 2.

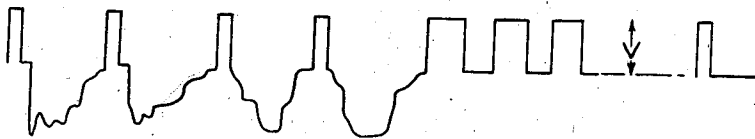


Fig. 3.

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ELECTRIC SIGNAL PULSE CONTROLLING CIRCUITS

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3 Claims. (Cl. 250—27)

This invention relates to electric signal pulse controlling circuits and is of general application in circuits in which input signal pulses control output potentials to provide, for example, synchronising pulses in television systems, automatic gain controlling potentials, a beat frequency resulting from two different input frequencies or signals in a multiplex signalling system.

According to the present invention in an electric signal pulse controlling or mixing circuit a unidirectional conducting device or devices provide two current paths having a common pole connected to one end of an impedance which may be the load impedance and the application of suitable control pulses between the other end of said impedance and the other pole of one of said unidirectional conducting devices will allow or prevent the passage of signals through the second unidirectional conducting device. The current paths may be constituted by the anode/cathode paths in a thermionic valve or valves which may be of the diode type. The effect of the control pulses applied between the common pole and the other pole of one of the unidirectional conducting devices may be determined by biasing potentials applied to said common pole or said other pole or to both said poles.

In order that the invention may be more clearly understood and readily carried into effect two pulse controlling circuits embodying the invention will now be more fully described by way of example with reference to the accompanying drawing in which:

Figures 1 and 2 show such alternative forms of circuit, and

Figure 3 represents a television picture signal and synchronising pulse waveform which may be applied to the circuit of Figure 1, for example.

Referring to Figure 1 of the drawing, a double diode valve 1 is provided with one pair of input terminals 2, 3 between an anode 4 and biasing battery 5 and another pair of input terminals 6, 7 between a resistance 8 in the lead to the cathode 9 and earthed line 10. The biasing battery 5 is also connected to the line 10. Output terminals 11, 12 are connected to the anode 13 and earthed line 10 respectively, and a condenser 14 and resistance 15, both shown in dotted lines, are used in certain applications of the circuit.

Assuming the circuit of Figure 1 is to be used for selecting a signal for a specified period, this signal is applied to the input terminals 6, 7.

The battery 5 applies to the anode 4, a positive bias potential which is less than a negative pulse applied to the terminals 2, 3 while the signal is applied to the terminals 6, 7. Until the negative pulse is applied to the anode 4, the positive potential applied to this anode causes current to flow through the diode, the cathode 9 becoming positive with respect to the anode 13. Thus no current can flow to the anode 13 and there is no output from the circuit. When the negative pulse is applied to the anode 4, this anode ceases to take current and the cathode potential falls to such a value that the anode 13 takes current and allows the signal applied to the terminals 6, 7 to pass to the output terminals 11, 12.

If desired, during the absence of the negative pulse applied to terminals 2 and 3, these terminals may be used as output terminals for the signal applied to the terminals 6, 7. Again, the biasing potential applied by battery 5 to the anode 4 may be in the negative sense, the pulse applied to the terminals 2 and 3 being positive and of greater magnitude than the negative voltage applied by battery 5. The pulse is, of course, applied during instants at which no output from the terminals 2 and 3 is required.

In an alternative application of the circuit, pulses of opposite sign may be applied to the anodes 4 and 13 respectively, and the output taken from anode 4 or 13. In such a case the insertion of the resistance 8 in the cathode lead is not essential.

In the arrangement shown in Figure 2, the resistance is omitted from the cathode lead and a resistance 16 is inserted in the lead to the anode 13. The signal input is applied to terminals 17, 18 connected to the anode 13 and line 10 respectively and output terminals 19 and 20 are connected in the cathode lead of the diode.

It is assumed that the signals to be controlled or modified are applied between the terminals 17 and 18, the insertion of the resistance 16 between the anode 13 and terminal 17 not being essential. The controlling signals or pulses are applied between the terminals 2 and 3 and the output is taken from the cathode between the terminals 19 and 20. It is further assumed that any apparatus connected between the terminals 19 and 20 will constitute a load impedance and that it is not necessary therefore to include in the cathode lead a resistance corresponding with the resistance 8 in Figure 1.

The anode 4 is normally biased positively so that current will flow from the cathode 9 to the anode 4. When the controlling or switching

pulse of negative potential is applied to the anode 4, this anode ceases to take current and the potential of the cathode falls to such an extent that a current flows to the anode 13 and the signals applied to the terminals 17, 18 provide an output at terminals 19, 20.

The vision signal waveform shown in Figure 3 may be used in conjunction with the circuit of Figure 1 to provide automatic gain controlling voltages, the circuit including the condenser 14 and resistance 15 having values of 1 microfarad and 1 megohm respectively. Thus, in order to obtain automatic gain control it is required to produce a steady voltage equal to the voltage V (Fig. 3). The signal waveform with the synchronising pulses in the positive sense is applied to the terminals 6, 7 and a negative pulse which may be derived from the return stroke of the frame frequency blocking oscillator is applied to the terminals 2, 3. During the instants that the negative pulse is applied there will be an output from the anode 13 which will be smoothed by the condenser 14 and resistance 15 and will provide a gain controlling potential which will vary in accordance with the mean amplitude of the voltage V.

The circuit of Figure 2 may be applied to a multiplex signalling system of the kind described in the specification of United States Patent 2,172,354 dated September 12, 1939. Thus, instead of the hexode signal distributing valves shown in certain circuit arrangements described in that specification, double diode valves operated in accordance with the present invention may be employed. In a receiver the anodes 4 of a number of double diode valves are connected at regular intervals along a delay network along which a pulse is passed so as to switch on the channel containing each diode in succession. In

the case of a transmitter, the outputs are connected along a delay network and pulses applied simultaneously to all the anodes 4.

While a double diode valve has been described as providing the two unidirectionally conducting devices, it will be understood that equivalent devices may be employed. Thus two separate diodes or other valves may be employed or contact rectifier devices may be used instead of thermionic valves.

We claim:

1. An electrical signal developing means comprising a thermionic tube having a cathode source of electrons and at least a first and a second electron collecting member contained within the envelope of said tube, means for biasing the first of said electron collecting members to a predetermined bias value relatively to the cathode, a common terminal member for said electron collecting members, an input circuit connected between said cathode and said common terminal member, impedance means connected serially with said cathode and said common terminal member, and an output circuit connected between said common terminal and said second electron collecting member.

2. Apparatus in accordance with claim 1, wherein there is provided in addition additional input terminal means connected between the first electron collecting member and the common terminal of the electron collecting members.

3. Apparatus in accordance with claim 1, wherein there is provided in addition a time constant circuit connected in the output circuit of said second electron collecting member.

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