Dec. 30, 1952 G. G. EMANUELSSON 2,623,998

DEVICE FOR OBTAINING FROM A PULSE ANOTHER PULSE OF ACCURATELY PREDETERMINED DURATION

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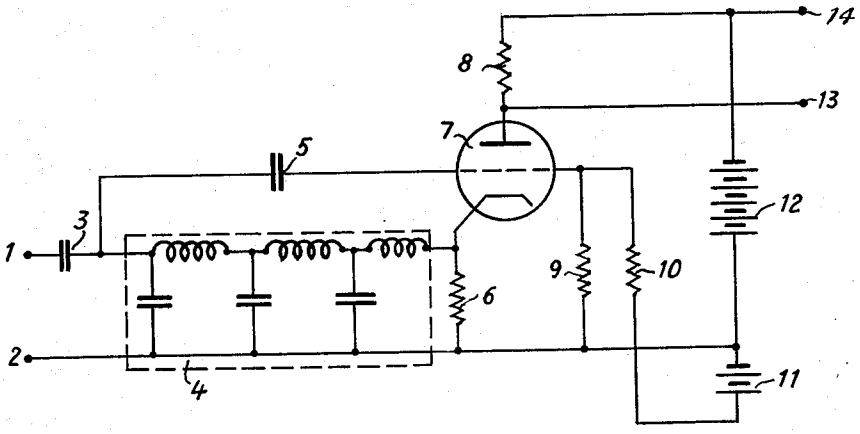


Fig. 1

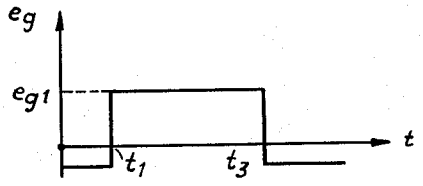


Fig. 2

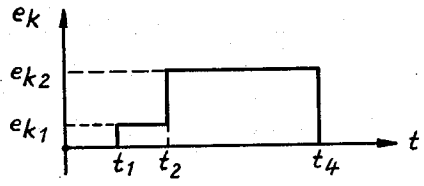


Fig. 3

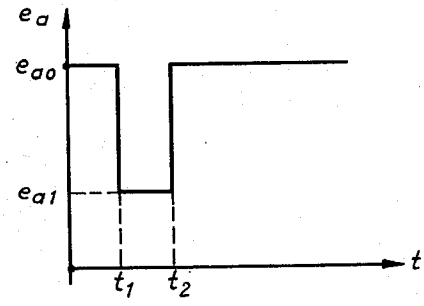


Fig. 4

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DEVICE FOR OBTAINING FROM A PULSE ANOTHER PULSE OF ACCURATELY PREDETERMINED DURATION

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2 Claims. (Cl. 250—27)

1

The present invention relates to a device for obtaining a pulse of accurately predetermined duration, which within some ranges of technics, for instance signal transmission with time modulated pulses in several transmitting channels, is an indispensable condition for obtaining a good transmission.

In order to solve the problem of obtaining a pulse of accurately predetermined duration, devices have earlier been proposed working with rectifiers or electron tubes as principal constituents. The principle for these devices is to amplify a narrow strip from a fed-in pulse, the base of which is of longer duration than the base of the rectangular pulse which is finally desired to have, said strip being parallel to the time axis and chosen at a suitable distance from the same. The flanks of the strip are comparatively steep, whereby a pulse having a nearly rectangular shape is obtained. This may for instance be done with a device containing an electron tube, the voltages and connection elements of which have been chosen so, that the tube is barred at grid bias voltages smaller than the voltage representing the lower limit of the above-mentioned strip and overloaded for grid voltages greater than the voltage representing the upper limit of the strip.

It is also known to let the original pulse produce two pulses, which have almost opposite sign, and to let each of said pulses influence a tube, these tubes lying in series in a circuit. On the output side of this circuit a pulse is obtained, the duration of which is a function of the deviation from opposite sign existing between the two pulses.

The present invention relates to a device, where a pulse with comparatively steep flanks and of a duration exceeding a certain value, may pass two different paths, of which one contains a time delaying device, to two electrodes in an electron tube device, whereby a pulse is obtained on the output side of the device, the duration of which pulse is a function of the difference of transit-time, which the two pulse paths give rise to. On condition that the amplitude and the duration of the original pulse exceed certain minimum values neither the normally occurring fluctuations of the voltages connected to stages immediately before the device nor those of the tubes of the device will influence the duration of the received pulse.

The invention will be described more closely with reference to the accompanying drawing, in which Fig. 1 shows a circuit diagram to a device according to the invention, and Figs. 2, 3 and 4

2

show the voltage as a function of time on grid, cathode and anode in a three-electrode valve working in said device.

In Fig. 1, 1 and 2 indicate the input terminals of the device, 3 is a blocking condenser for direct current, 4 is a delay network built up by coils and condensers, 5 a switching condenser and 6 a cathode resistance to the electron tube 7. 8 is a working resistance, 9 and 10 a voltage divider for obtaining a suitable grid voltage, 11 is a grid voltage battery, 12 an anode battery and 13 and 14 at last are output terminals of the device.

The function of the device is as follows: when a pulse arrives at terminals 1 and 2, there are two possible paths, partly via the switching condenser 5 to the grid in the electron tube 7, partly via the delay network 4 to the cathode in the same electron tube. If the input pulse is rectangular, the voltage e_g of the grid will be a function of the time t as Fig. 2 indicates. The pulse is supposed to arrive at terminals 1 and 2 at the time t_1; the voltage of the grid will then rise to e_{g1} and remains at this value until the time t_3, when the input pulse ceases.

Accordingly, when the grid grows positive, the tube is current carrying, whereby the anode voltage drops thanks to resistance 8. The anode voltage as a function of time appears from Fig. 4; before the pulse arrives at terminals 1 and 2 the anode voltage is equal to the voltage e_{a0} of the anode battery. At the time t_1 the anode voltage drops to e_{a1} due to the voltage drop arisen across the anode resistance 8. At the same time as the anode voltage is falling, the cathode voltage will rise because of the voltage drop across the cathode resistance 6. Fig. 3 shows the cathode voltage as a function of time. At the time t_1 the cathode voltage rises to e_{k1} and remains constant until the time t_2 when the pulse via the delay network 4 reaches the cathode. The cathode voltage rises to e_{k2} which causes that the current through the tube will be equal to 0, i. e. the anode voltage regains the value e_{a0}. When the pulse via the delay network ceases at the time t_4, the cathode will obtain the same voltage as before the time t_1, and the whole process is finished. A pulse is thus obtained across the output terminals 13 and 14, the duration of said pulse being dependent on the difference of transit-time t_2—t_1, which the two paths via the delay network 4 and the condenser 5 give rise to.

I claim:

1. An electrical impulse converting system for obtaining from an original pulse an accurately predetermined pulse of short duration compris-

ing an electrical delay network of fixed impedance, said network having separate input terminals and output terminals, an electron tube having a cathode, grid, and an anode, one of the input terminals of the electrical delay network being connected to the grid of the electron tube, one of the output terminals being connected to the cathode of the electron tube, the other output terminal being connected to a point in the cathode-anode circuit of the electron tube having a potential of a different value from the potential of the cathode of the electron tube.

2. An electrical impulse converting system comprising an electrical delay network having a fixed impedance and input and output terminals, an electron tube having a cathode, grid, and an anode, one output terminal of the electrical delay network being connected to the cathode of the electron tube, a branch circuit including a blocking capacitor between one input terminal of the electrical delay network and the grid of the electron tube, a voltage divider circuit including a resistor connected between the grid of the electron

tube and the other output terminal of the electrical delay network, and a grid battery and a resistor connected between the said latter output terminal of the electrical delay network and the grid of the electron tube, an output circuit including a resistor connected in series with the anode of the electron tube, output terminals connected on the opposite sides of said latter resistor, and an anode battery connected between the latter output terminal of the electrical delay network and one of the latter output terminals.

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