

June 22, 1948.

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2,443,864

VOLTAGE GAIN CONTROL DEVICE

Filed June 17, 1944

Fig. 1

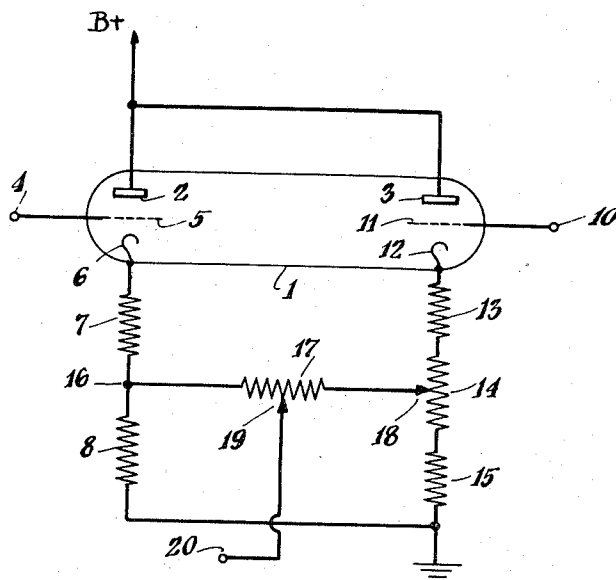
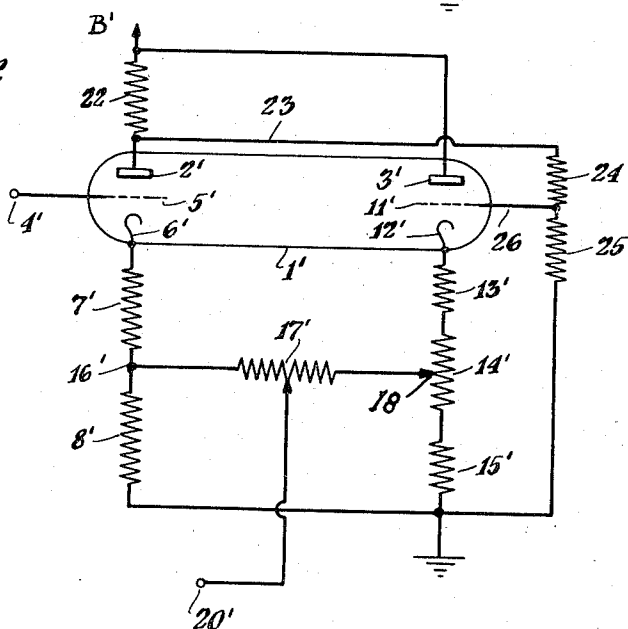


Fig. 2



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2,443,864

VOLTAGE GAIN CONTROL DEVICE

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Application June 17, 1944, Serial No. 540,873

4 Claims. (Cl. 250—27)

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This invention relates to a device for controlling voltages. With this invention either alternating or direct current voltages can be varied continuously over wide ranges. Alternating current voltages of a very wide range of frequencies, including very low frequencies, can be varied without the use of large coupling condensers, and no residual direct current appears across this control device.

In carrying out the invention, a plurality of sets of electrodes which may be in the same or separate envelopes are employed with resistors in the cathode circuits of said sets with a resistor coupling between intermediate points of said resistors, at least one of these points preferably being variable. The controlled voltage is taken off of this last named resistor.

The invention may be understood from the description in connection with the accompanying drawing, in which:

Fig. 1 is a diagram of connections showing an illustrative embodiment of the invention; and

Fig. 2 is a similar diagram showing a modification.

In the drawing, reference character 1 indicates a dual triode of which the plates 2 and 3 are connected to a source B of positive potential. The input terminal 4 is connected to the grid 5 of the first triode. The cathode 6 of this triode is connected to ground through resistors 7 and 8 which are connected in series.

A point 10 of constant potential is connected to the grid 11 of the other triode in the envelope 1, the cathode 12 of this triode being connected by series resistors 13, 14 and 15 to ground.

A point 16 is connected through resistor 17 by means of a sliding contact 18 to the resistor 14. The point 16 may be any point on resistor 7. A sliding contact 19 on the resistor 17 is connected to the output terminal 20.

In the modification shown in Fig. 2, the parts that are common to Fig. 1 are shown by the same reference characters with primes.

In this modification a resistor 22 is connected between a positive source B' and the plate 2', and this plate 2' is coupled by lead 23 to one end of two resistors 24 and 25 in series, the other end of these resistors being connected to ground. A point between the resistors 24 and 25 is connected by lead 26 to the grid 11' of the second triode in the envelope 1'.

The operation is as follows: The signal of which the amplitude is to be varied is applied to the terminal 4 which is connected to the grid 5 of the dual triode 1. The plates 2 and 3 are main-

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tained at the same potential while the potential applied at 10 to the grid 11 is kept constant. The gain control resistor 17 is connected between the point 16 and a point on the resistor 14 that is determined by the contact 18 so that the desired voltage can be taken off of the resistor 17 by adjusting the contact 19. When a signal at terminal 4 is applied to the grid 5, one end of the gain resistor control 17 increases or decreases in potential in accordance with the variation of the signal at this input terminal. The other end of this gain control resistor 17 will tend to remain at a fixed potential which depends upon the position of the contactor 18 because the effective impedance of the cathode resistors 13, 14 and 15 is small.

However, a small signal is caused to appear at the contactor 18 due to the voltage divider action of the gain control and part of the cathode load in the second section of the resistors in the circuit of the cathode 12. By utilizing the circuit shown in Fig. 2, this small signal is canceled. This is done by feeding a signal of proper phase and magnitude to the grid 11' of the second triode section instead of keeping this grid at a constant potential as indicated in Fig. 1.

As illustrated in Fig. 2, a small plate load 22 in the first section of the dual triode 1' provides a signal at its plate 2' that is of the correct polarity to change the potential applied by the lead 23, resistor 24 and lead 26 to the grid 11' so that the proper potential is applied to the grid 11' to cancel the distorting signal that might otherwise appear at the contactor 18' of the gain control 17', 19'.

What is claimed is:

1. A voltage gain control device which comprises two vacuum tubes at least one of which has its anode connected directly to a source of constant potential, each of said vacuum tubes having an anode, a control grid and a cathode, one of said tubes having its control grid connected to a source of constant potential and the other one having its control grid connected to a source of signal that is to be controlled, a resistance connected between each cathode and ground and a resistance off of which the output of said device is taken, said resistance being connected from a point on one of said cathode resistances between its ends and a point on the other cathode resistance between the ends thereof.

2. The device of claim 1 in which the anode of one of said tubes is connected to said source of constant potential through a resistor.

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3. The device of claim 1 in which a slidable contact is provided for said resistance off of which the output of said device is taken.

4. The device of claim 1 in which a slidable contact is provided for said resistance off of which the output of said device is taken and a slidable contact is provided between one end of said last named resistance and the resistance between the cathode of one of said tubes and ground.

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