

Nov. 22, 1938.

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2,137,401

ELECTRICAL CONTROL DEVICE

Filed July 8, 1936

Fig. 1

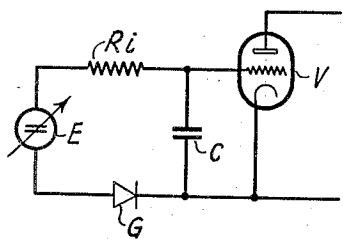


Fig. 2

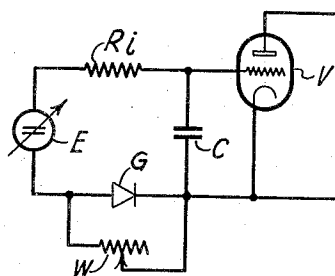
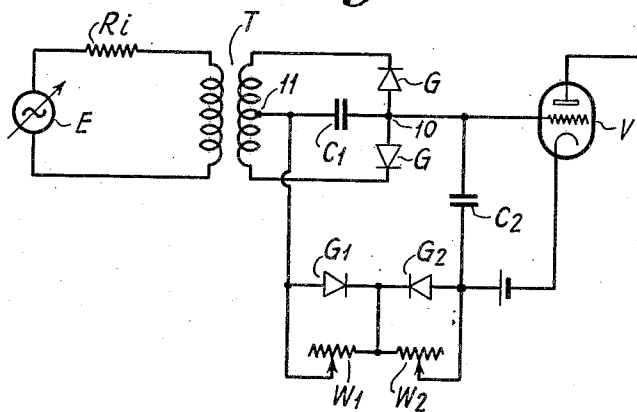


Fig. 3



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2,137,401

ELECTRICAL CONTROL DEVICE

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Application July 8, 1936, Serial No. 89,671
 In Germany July 26, 1935

4 Claims. (Cl. 250—20)

An object of this invention is to provide an electrical circuit having a time constant and means for permitting such time constant to be varied or controlled at the will of the operator.

A further object of the invention is to provide in connection with an electrical circuit on which a variable voltage is impressed a condenser subject to be charged and discharged and means for independently regulating the time of its charge and discharge.

Other objects of the invention will become apparent to those skilled in the art as the description thereof proceeds. For a better understanding of the invention, however, reference is made to the accompanying drawing, in which:

Fig. 1 is a schematic circuit diagram of a vacuum tube having an input circuit embodying the invention,

Figs. 2 and 3 are circuit diagrams of vacuum tube input circuits embodying different forms of the invention.

In the copending application Serial #65,446, filed February 24, 1936, Patent No. 2,111,386, dated March 15, 1938, in the name of E. Buchmann and E. Hobbie, there is disclosed and claimed a circuit arrangement in which the building-up time and the dying-out time of a circuit consisting of a direct current source and the input circuit of a tube are influenced independently of each other in that a resistor dependent upon direction of current flow is inserted in the circuit. Such a circuit is shown in Fig. 1. Herein E is a variable direct current source with the internal resistance R_i . The time for charging the condenser C placed in the grid circuit of the amplifier tube V is dependent upon the internal resistance R_i and upon the pass resistance R_d of the resistance G dependent upon direction which is inserted in the circuit. This resistance may be a dry rectifier for instance. For the time of discharge, besides the inner resistance R_i , there is to be taken into consideration the blocking resistance R_s of the rectifier. If for R_s a value is chosen that is high as compared with R_i or if the values chosen for R_s and R_i are of the same order, the time of charging due to continuous connection, remains substantially constant since R_s is generally high as compared with R_d , whereas the time of discharge will be considerably increased. If the rectifier is so inserted in the circuit that its pass resistance is in the opposite direction, the time of charging can be essentially increased with an approximately constant time of discharge.

The present invention provides an improvement of this circuit for conditions requiring a most con-

venient change in the time of charging and discharge determined by the resistor dependent upon direction. To this end, there is placed in parallel to the resistor dependent upon direction, a resistor independent of direction suitably in the form of a variable resistor. The parallel resistor when properly dimensioned, represents a short circuit resistor of a more or less high value for the blocking resistance of the resistor dependent upon direction.

In accordance with a further feature of the invention, besides the resistor dependent upon direction and bridged by a parallel resistor, a further resistor dependent upon direction and through which the current passes in the opposite direction, is inserted in the circuit. In this way, it is possible to influence the time of charging as well as the time of discharge independently of each other. If finally also the second resistor dependent upon direction is bridged by a variable parallel resistor, a circuit is obtained affording in an extremely convenient manner an independent adjustment of the time of charging as well as the time of discharge.

As distinct from Fig. 1, Fig. 2 shows the variable resistor W in parallel to the rectifier G. The resistor W is preferably so dimensioned that its maximum value is greater than the blocking resistance of the rectifier G. With this dimensioning, at connecting, neither the time of charging nor the time of discharge will be affected. If the value of this resistor is reduced so as to be equal or lower than the blocking resistance of the rectifier, the resultant resistance to be relied upon for the discharge of the condenser, is lower than the blocking resistance of the rectifier. It will be readily seen that by varying the resistance of value W at will, the time of discharge can be controlled within wide limits at approximately constant time of charging.

Fig. 3 shows the application of the invention in back of a two-way rectifier. The alternating current source E together with the inner resistor R_i is connected to the two rectifiers G across transformer T. The detected voltage is derived at a place between the common point 10 of the two rectifiers and a center tap 11 of the secondary of the transformer. According to the invention, this voltage is applied to the input circuit of the tube V across the condenser C2 and two resistors depending upon direction (rectifiers) G_1 and G_2 placed in series and which permit the passage of current in opposite directions. These rectifiers have the variable resistors W_1 and W_2 placed in parallel thereto. The time of subsequent action

is determined by G_1 and the time of response by G_2 . The resistors W_1 and W_2 serve for controlling these times in that they produce to a greater or lesser extent a short circuiting of the rectifiers. Preferably, the elements G_1 , G_2 , W_1 , W_2 and C_2 of the time control circuit are so dimensioned that the apparent resistances thereof are higher than those of the remaining elements of the detector circuit.

The invention can be utilized in all cases in which the time constant of a circuit, especially in back of a detector, is to be controlled at will. In this connection there are to be considered in the first place, all control circuits for constant amplitudes or levels, for fading compensation, or for volume control as well as blocking circuits (echo-and feed back blocking means).

Having described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. In combination, a vacuum tube having a cathode, grid and plate, an input transformer, oppositely disposed rectifiers connected across the secondary of said transformer, a condenser having one side connected to the common terminal of said rectifiers and its other side to the midpoint of said transformer secondary, a connection between the common terminal of said rectifiers

and said grid, and a circuit conductive to direct current connected between the midpoint of said transformer secondary and said cathode, said last named circuit including the series connection of two oppositely disposed rectifiers.

2. The combination of the preceding claim in which a variable resistance is connected across at least one of the two oppositely disposed rectifiers.

3. In combination, an electron discharge tube having a cathode, grid and plate, an input transformer, oppositely disposed rectifiers connected in series across the secondary of said transformer, a condenser having one side connected to the common terminal of said rectifiers, a circuit connecting said common terminal to said grid, a connection between the other side of said condenser and the midpoint of said secondary winding and a direct current connection including two oppositely disposed rectifiers between the other side of said condenser and said tube cathode.

4. The arrangement of claim 3 in which a variable resistor is shunted across at least one of said last named rectifiers, said resistor having a minimum value less than the blocking resistance of said one rectifier.

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