

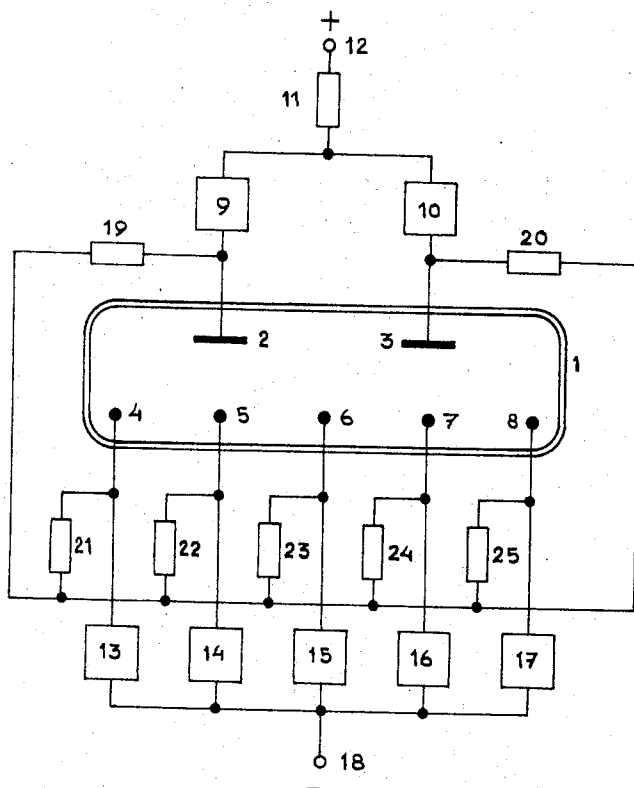
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3,374,397

INDICATOR CIRCUIT WITH ALL ELECTRODES CONNECTED TO
A COMMON POINT THROUGH INDIVIDUAL RESISTORS

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INDICATOR CIRCUIT WITH ALL ELECTRODES CONNECTED TO A COMMON POINT THROUGH INDIVIDUAL RESISTORS

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1 Claim. (Cl. 315-334)

The invention relates to an indicator circuit including a glow discharge tube having at least one anode and at least two cathodes, in which by connecting one anode and one cathode to the source of supply voltage, a glow discharge between the aforesaid anode and cathode can be effected selectively.

Such glow discharge tubes are often used as numeral indicators for electronic counters. A first embodiment of such a tube comprises a single anode which is continuously connected to the appertaining supply voltage. The tube also includes ten cathodes which, through separate switching devices, can be connected selectively to the appertaining supply voltage. Each of the ten cathodes carries one of the numerals 0 through 9 and during operation only the numeral which belongs to the cathode which at that time is connected to the supply voltage is illuminated.

In a different embodiment, the glow discharge tube comprises two anodes which, through switching devices, can be connected selectively with the appertaining supply voltage. The tube further comprises five cathodes which, through switching devices, can also be connected selectively to the appertaining supply voltage and which each carry two of the numerals from the series 0 through 9. Which of the two numerals of the cathode connected to the supply voltage is illuminated, is determined by which of the two anodes is connected to the supply voltage.

Especially if the switching devices employed in the supply circuits of the various electrodes do not exhibit an infinitely high resistance in the open condition, subsidiary discharges can exist at those electrodes, the switching devices of which are in the open condition. These subsidiary discharges can also illuminate undesired numerals to some extent which makes the display rather confusing.

An object of the invention is to provide a device in which the occurrence of such subsidiary discharges is prevented.

Basically this might be obtained by connecting all electrodes through separate resistors to a point of such potential that no discharge can be set up at these electrodes unless the electrode concerned is connected to the appertaining supply voltage through the appropriate switching device.

For example, such a potential could be the anode potential for the cathodes and could be the cathode potential for the anodes. In that case, however, there is a risk that if the switching device of an electrode should exhibit an unexpectedly high resistance in the open condition, the electrode concerned would assume the full anode potential if it is a cathode or would assume the full cathode potential if it is an anode.

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Consequently, a subsidiary discharge, be it in the opposite direction, could still be set up at the electrode concerned.

Another possibility would be to connect all electrodes through separate resistors to a tap on a voltage divider connected between the two supply voltages, at which tap a voltage prevails such that it cannot give rise to subsidiary discharges. However, this would necessitate a separate voltage divider, the dissipation of which might be objectionable and which at any rate would call for additional components.

The invention provides an indicator circuit in which each of the anodes and cathodes are connected through individual resistors to a common star point which is not connected to anything else.

In that case, the resistors of the anode and cathode which are switched on at any time constitute a voltage divider, to the tap of which all further electrodes are connected through separate resistors.

The resistors can be chosen in such a way that all electrodes which are not switched on assume a potential which prevents the occurrence of subsidiary discharges. In this circuit, a separate voltage divider is not necessary.

The invention is further elucidated below with reference to the drawing, which shows a circuit diagram of an indicator circuit according to the invention.

In the drawing, the indicator tube 1 is provided with two anodes 2 and 3 and five cathodes 4 through 8. Each cathode carries two of the numerals from the series 0 through 9. That anode which at any time is connected to the anode supply voltage determines which of the two numerals of a cathode which is connected to the cathode supply voltage, will be illuminated.

The anodes 2 and 3 are in the usual way connected to the anode supply terminal 12 through separate switching devices 9 and 10 and a common series resistor 11. The cathodes 4 through 8 are in the usual way connected to the cathode supply voltage terminal 18 through separate switching devices 13-17. So far the circuit is entirely conventional.

Each of the electrodes 2 through 8 is connected to one terminal of one of the resistors 19 through 25 and the other terminals of these resistors are connected to each other. If, for example, the switching devices 9 and 16 are conducting, a glow discharge is established between the electrodes 2 and 7. In that condition, a voltage is set up at the tap of the voltage divider constituted by the resistors 19 and 24. The value of this voltage lies somewhere between the voltages appearing at the electrodes 2 and 7. The electrodes 3 through 6 and 8, which are not switched on, are connected through the resistors 20 through 23 and 25 to this potential, so that subsidiary discharges cannot be established at these electrodes.

Although in the example discussed hereinabove a bi-quinary glow discharge tube is used, the invention is not restricted thereto. The invention equally applies to a glow discharge tube of the type having only one anode and ten cathodes. In that case, each of the cathodes is provided with a resistor corresponding to the resistors 21 through 25 of the drawing. The junction of these resistors can be connected through a further resistor to the single anode or to the anode supply conductor.

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In that case too, the electrode resistors themselves constitute a voltage divider which keeps the potential of the electrodes which have not been switched on at a permissible value.

What I claim is:

1. An indicator circuit comprising a glow discharge tube having at least one anode and at least two cathodes, means for selectively connecting one anode and one cathode to a source of supply voltage thereby to establish a glow discharge between the anode and cathode concerned, a plurality of separate resistors, and means connecting all

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anodes and cathodes through separate ones of said resistors to a common star point which is not connected to anything else.

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