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G. B. RICKARD

2,531,345

TELLTALE ELECTRIC TUBE AND COMBINATION THEREOF

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FIG. 1.

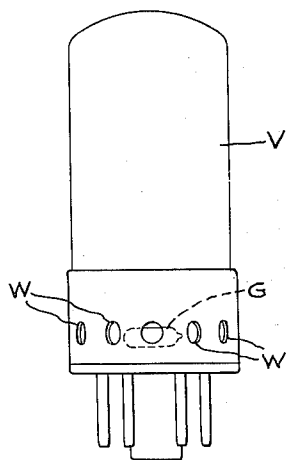


FIG. 2.

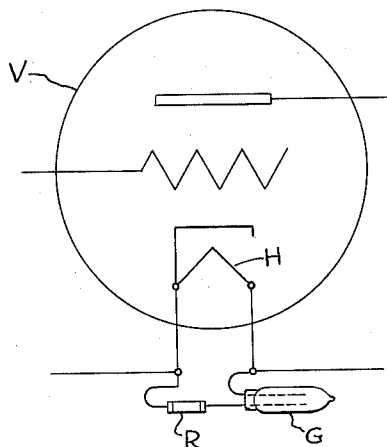
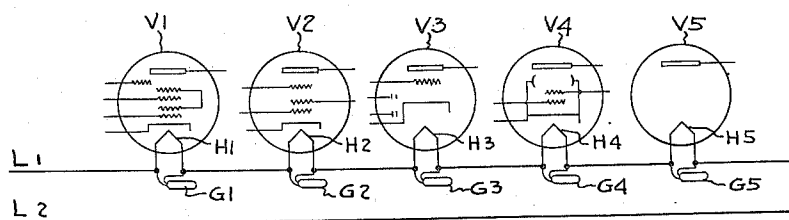


FIG. 3.



INVENTOR
GAIL B. RICKARD

BY *G. B. Rickard*

ATTORNEY

UNITED STATES PATENT OFFICE

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Gail B. Rickard, Molalla, Oreg.

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1 Claim. (Cl. 250-27.5)

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This invention relates generally to radio receiving sets and more particularly to the common type of relatively lower cost receiving sets for home use wherein, to eliminate a relatively expensive heater transformer having multiple taps, the electron tubes used in the set are selected so that the sum of the heater voltages of all of the tubes in the set adds up to equal the supply line voltage for which the set is designed and the heaters are connected in series across the supply line.

When the tube heaters are thus series connected, it is seen that if one heater is burned out or open circuited, all of the tubes go dark and it is not readily apparent which tube has failed.

It is a particular object of this invention to provide a radio set with a tube heater circuit, as described, wherein, should the heater circuit of one tube be open circuited, a glow light in the base of the faulty tube will light up and indicate the faulty tube.

It is a further object of this invention to provide radio tubes equipped with means for indicating a faulty heater in whatever tube in a circuit the fault may occur.

How these and other objects are attained will be clear on reference to the following description and the drawing in which:

Fig. 1 is an elevation in outline of a common type of radio tube showing, in dotted lines, the location and approximate size of the glow tube used in the practice of my invention.

Fig. 2 is a schematic representation of a common type of radio tube showing the glow tube and its series resistor connected in parallel across the heater terminals.

Fig. 3 is a schematic representation of all of the tubes of a common type of radio set but, for purposes of simplicity, all of the equipment of the set, except the tubes and the heater circuit, are omitted.

Like numbers of reference refer to the same or similar parts throughout the several views.

Referring now to the drawing, V represents a standard form of radio or vacuum tube in elevation in Fig. 1 and in scheme in Fig. 2. Similarly, G represents a simple glow tube of the neon filled glow discharge type in location in the base of a tube of this invention in Fig. 1 and in schematic circuit position in Fig. 2. R in Fig. 2 represents an accessory resistor used with most of the glow lamps of this type now available. It is understood that wherever a glow tube is indicated in the drawing or description of this invention,

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a resistor K is considered to be associated with it in the circuit relation shown in Fig. 2.

Now referring to Fig. 3, a common type of radio receiver might include the vacuum tubes V1, V2, V3, V4 and V5, wherein

V1 is a type 12SA7 Pentagrid Converter Tube with a heater drawing .15 ampere at 12.6 volts.

V2 is a type 12SK7 Remote Cut-off Pentode Tube with a heater drawing .15 ampere at 12.6 volts.

V3 is a type 12SQ7 Duplex-Diode Triode Tube with a heater drawing .15 ampere at 12.6 volts.

V4 is a type 50L6 Beam Power Amplifier Tube with a heater drawing .15 ampere at 50 volts.

V5 is a type 35Z5 Half Wave Rectifier Tube with a heater drawing .15 ampere at 35 volts.

The above tube designations are standard in the art and may be checked with manufacturer's catalogues or standard publications like "The Radio Amateur's Handbook."

It is seen that since the sum of the heater voltage for the above five vacuum tubes is approximately 120 volts and since all of the heaters are rated at .15 ampere, these five tubes will work nicely with their heaters connected in series across the usual household electric supply lines available in the United States.

In Fig. 3, the tube heaters H1, H2, H3, H4, and H5 are shown so connected to the supply lines L1 and L2.

Also in Fig. 3, glow tubes G1, G2, G3, G4, and G5 are shown connected in parallel each with its corresponding heater H1, H2, H3, H4, and H5, and it is understood that each glow tube, G1, etc., has connected with it a resistor in the same way that resistor R is in circuit with glow tube G in Fig. 2.

Glow tubes G1, etc., are common in the art and available with associated resistors which draw no current and do not glow below a fairly definite firing voltage but when the voltage is raised above the firing value, the tube draws a small current which is also limited by the resistor having usually a value of several thousand ohms. In the present case, a tube and resistor combination is used which has a firing voltage of approximately 75 volts which is less than the line voltage but greater than the heater voltage of any of the tubes used.

From the drawings and the above description, it is seen that if a heater H1, H2, H3, H4 or H5 of any of the tubes V1, V2, V3, V4 or V5 is open circuited when in use the full line voltage will be impressed on the corresponding glow tube G1, G2, G3, G4 or G5 and the glow tube will light

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up and be plainly visible through windows W in the base of tube V. The voltage drop across the heaters of the remaining tubes will be too small to light up their heaters in the usual way and they will remain dark. The defective tube is therefore clearly apparent.

Having thus shown how my invention is practiced and its objects attained,

I claim:

In a radio receiving set a vacuum tube comprising a glass envelope, a cathode heating means mounted within said envelope and having its two terminals sealed into and protruding through to the outside of said envelope, a cup shaped insulating tube base into which said envelope is fixed for permanent support, tube terminals fixed in said base and extending therethrough, the inner end of two of said tube terminals being respectively connected within said base to the protruding terminals of said cathode heat-

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ing means, a glow tube and a resistance mounted inside said base and outside said envelope, said glow tube and resistance being connected in series across said terminals of said cathode heating means, and translucent means formed in said base whereby the glow from said tube may penetrate to the outside of said base.

GAIL B. RICKARD.

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