

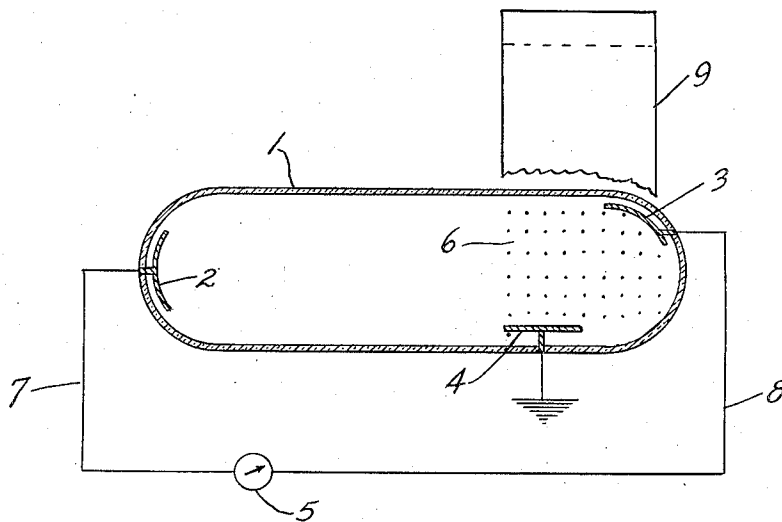
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SELF GENERATING PHOTOTUBE

Original Filed May 13, 1936



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SELF GENERATING PHOTOTUBE

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2 Claims. (Cl. 250—27.5)

This invention relates to phototubes and is a division from my application, Serial No. 79,420, filed May 13, 1936.

An object is to provide a phototube which will generate its own operating potential difference rather than using a battery for this purpose. This effect may be achieved by employing two photo-emissive elements and deflecting electrons from one element by means of a magnetic field, or by illuminating the two elements with light of different intensity, or by employing elements of different size or design.

Such a device will be useful in generating electricity directly from light, such as sun light, or it may be used in place of the ordinary photo-electric tube.

In the drawing:

The figure is an elevation, in part section, of a phototube employing two photo-emissive elements, a magnetic field, and a grounded element.

In the figure phototube 1 the envelope of which may be made of glass or other transparent material and which may be highly evacuated or gaseous as desired has photo-emissive cathode 2 and photo-emissive "anode" 3. Metal plate 4 is placed in tube 1 near "anode" 3 and is grounded as shown. Magnetic field 6, shown endwise is provided by magnet 9, shown broken away, so that any electrons ejected from "anode" 3 will be bent downward to strike grounded plate 4 and electrons ejected from cathode 2, travelling in opposite direction, will be bent upward to strike "anode" 3. The curvature of cathode 2 may also be arranged so that the electrons which are emitted normally to the surface, will strike anode 3 and this anode may be similarly curved so that electrons ejected from it will strike plate 4. In either case the electrons from anode 3 will strike grounded plate 4 and will be neutralized or re-

moved from tube 1 so that anode 3 will be left positively charged so that electrons from cathode 2 will be attracted to anode 3 with the result that a current will be indicated by instrument 5 connected to wires 7 and 8 leading to cathode 2 and anode 3 respectively.

Anode 3 may also be illuminated more strongly than cathode 2 to enhance further its positive potential with respect to cathode 2. It will be seen then that electrons leaving cathode 2 will strike anode 3 but electrons leaving anode 3 will not strike cathode 2. The result will be that a current will flow in the outside circuit 8, 5, 7, without an anode battery, element 5 being a suitable instrument.

In case a difference in the intensity of illumination of the two photo-emissive elements is employed, the current generated can be reversed by reversing the relative intensity of illumination of the two elements. Such a device could of course be used for comparing light intensities.

What I claim is:

1. A phototube comprising a photo-sensitive cathode, a photo-sensitive anode, an electron receiving element intermediate said cathode and anode, and means for creating a magnetic field perpendicular to a plane passing through said cathode, anode, and element to direct electrons from said anode upon said element and to assist in directing electrons from said cathode away from said element and onto said anode.

2. A phototube comprising, a photo-sensitive cathode, a photo-sensitive anode, an electron receiving element intermediate said cathode and anode, and means for creating a magnetic field directed across the normal electron path between said cathode and anode.

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