

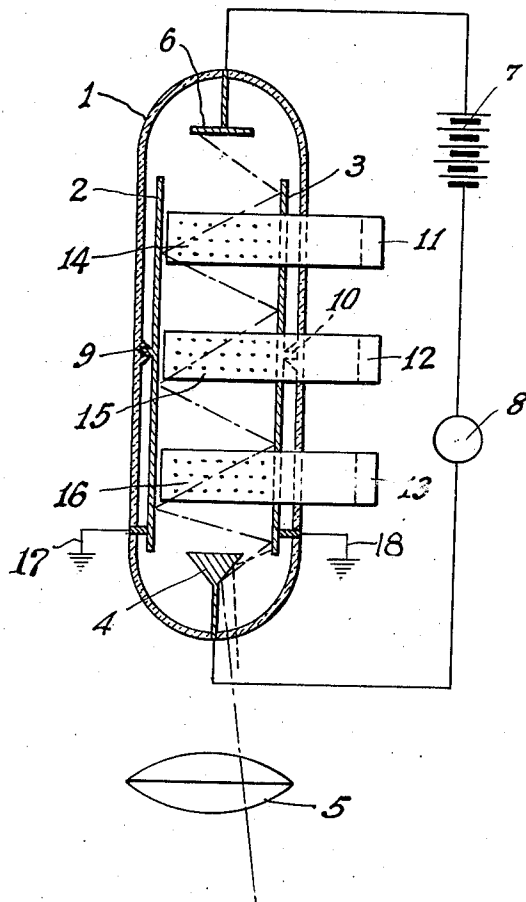
Aug. 23, 1938.

A. G. THOMAS

2,128,104

PHOTOTUBE

Original Filed May 13, 1936



Albert G. Thomas

Inventor

UNITED STATES PATENT OFFICE

2,128,104

PHOTOTUBE

Albert G. Thomas, Lynchburg, Va.

Original application May 13, 1936, Serial No. 79,420. Divided and this application April 24, 1937, Serial No. 138,692

2 Claims. (Cl. 250—27.5)

This invention relates to photo-tubes for use in radio and in television and the like, and is a division from my co-pending application, Serial No. 79,420, filed May 13, 1936.

5 An object is to provide a photo-tube in which electrons are liberated by successive reflections from a photo-emissive surface or surfaces.

10 Another object is to provide a phototube with a light reflecting and photo-sensitive cathode in combination with re-reflecting surfaces.

A further object is to provide a tube in which magnetic fields are used in order to produce secondary emission.

Other objects will appear in the specification.

15 In the drawing:

The figure is an elevation in part section of a photo-tube employing light reflections between photo-emissive surfaces, to increase the electron output.

20 In the figure tube 1 has parallel plates 2 and 3 supported by metal projections 9 and 10 sealed into tube 1. Wedge-shaped cathode 4 is suitably supported in tube 1 and is coated with potassium hydride or a caesium compound or with any suitable substance that emits electrons under influence of light. The inner surfaces of plates 2 and 3 are similarly coated. Anode plate 6 is connected to the positive terminal of battery 7, the negative terminal being connected to cathode 4. Element 8 may be included in the output circuit for any desired purpose. Lens 5 is placed so that it will gather a large amount of light and concentrate it on the inclined faces of cathode 4 so that a large number of electrons will be liberated from this cathode, since the number of electrons emitted is substantially proportional to the intensity of the light striking the cathode.

35 Cathode 4 is also smoothly coated so that it will readily reflect light so that the light rays will be reflected from the inclined faces of wedge-shaped cathode 4 and thence back and forth from plate 2 to 3 and vice versa, each reflection producing additional electrons so that a large number of

electrons will finally reach positively charged plate 6. Plates 2 and 3 may be grounded by wires 17 and 18 if desired and charged screens similar to those of Figure 3 as illustrated in my parent application, Serial No. 79,420, filed May 13, 1936, may be employed. These screens themselves may be coated with substances suitable for emitting secondary electrons by electronic bombardment or by the action of light.

A series of alternately oppositely disposed magnetic fields 14, 15 and 16 produced by magnets 11, 12 and 13 respectively may be used with tube 1 so that the electrons will be deflected back and forth between plates 2 and 3 as well as light, with the result that secondary electrons will be produced by electronic bombardment also. The added effects of the reflected and re-reflected light and the electronic bombardment of plates 2 and 3 will cause a very high output current through element 8. Magnets 11, 12 and 13 may be omitted however. Plates 2 and 3 may be grounded to prevent the accumulation of positive charges on them or they may be connected to cathode 4 through a high resistance. Mirrors may be used to collect light instead of lens 5. Cathode 4 may be a cone, and plates 2 and 3 may be replaced by a cylinder with coated inner surface.

What I claim is:

1. A phototube comprising, a light reflecting photo-sensitive cathode, an anode, and a pair of 30 opposed photo-sensitive surfaces adapted to reflect light from said cathode from one said surface to the other said surface to liberate electrons from said surfaces.

2. A phototube comprising, a light reflecting 35 photo-sensitive cathode, an anode, and photo-sensitive light-reflecting means disposed between said cathode and said anode and adapted to cause repeated reflections upon said means of light from said cathode to liberate electrons from 40 said means.

ALBERT G. THOMAS.