

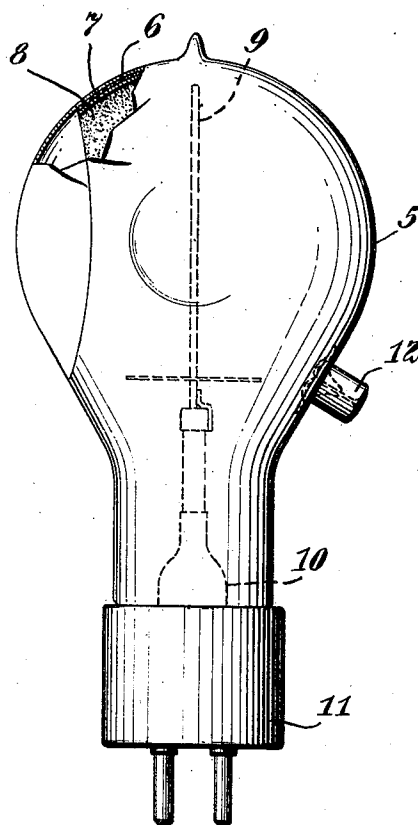
Oct. 15, 1940.

G. MAURER

2,218,340

PHOTOELECTRIC TUBE

Filed Oct. 1, 1938



INVENTOR
GEORG MAURER
BY *J. W. Greenhow*
ATTORNEY

UNITED STATES PATENT OFFICE

2,218,340

PHOTOELECTRIC TUBE

Georg Maurer, Stuttgart-Botnang, Germany, assignor to "Fides" Gesellschaft für die Verwaltung und Verwertung von gewerblichen Schutzrechten mit beschränkter Haftung, Berlin, Germany, a corporation of Germany

Application October 1, 1938, Serial No. 232,725
In Germany October 13, 1937

3 Claims. (Cl. 250—165)

The invention relates to photoelectric tubes which manifest a high sensitivity, particularly to daylight, and to artificial illumination. According to the invention, lead, selenium, tellurium, antimony or bismuth are deposited on a conductive carrying layer in an oxygen atmosphere. The intermediate layer thus prepared is finally treated with the actual photoelectric material, for example, alkali or earth alkali metal vapor, or mixtures of such vapors. Since the sensitivity of the tube depends on the amount of deposited material, we must either, by suitable dosing of the photo-sensitive material, provide for the bringing in of the desired amount originally, or we must afterwards remove any excess.

The conducting layer (carrying layer) may be formed of different materials suitable for this purpose, for example, a silver, copper or tungsten mirror may be used as base. In depositing the intermediate layer which carries the actual photoelectric material, a mixture displaced with reference to the oxide or the metal is formed in accordance with the vaporization speed and the oxygen content of the atmosphere in which the vaporization of the metals, lead, selenium, tellurium, antimony or bismuth takes place.

In the drawing a phototube of conventional design is shown having an envelope 5 which is provided with a conducting layer 6 of silver, copper or tungsten mirror, as before stated. To this base is deposited the intermediate layer 7 of lead, selenium, tellurium, antimony or bismuth in an atmosphere of oxygen, and finally the intermediate layer is treated with the alkali or earth alkali metal vapor 8 constituting the photo-sensitive material.

The phototube is provided with the usual anode electrode 9 supported by a suitable press 10 which is connected by a leading-in conductor sealed in the press portion of the envelope to a terminal provided on the base 11. The photo-sensitive surface constituting the cathode electrode is also

connected to a suitable terminal 12 by means of a leading-in conductor sealed through the wall of the envelope and in contact with the photo-sensitive surface interiorly of the envelope.

This process may also be carried out in such manner that no essential amounts of metals are contained in metallic form in the intermediate layer. To further the oxidation, a glow discharge may be maintained in the oxygen containing atmosphere in the tube during the vaporization of the above-named metals.

The introduction of the caesium vapor is carried out in itself in known manner. For example, caesium may be produced in an attachment by the reduction of caesium bichromate and distilled over into the tube. It is desirable to maintain the tube during a somewhat long time, for example, 30 minutes at an increased temperature, for example, at 150° C., so that the vapor of the photoelectric material acts on the intermediate layer during a somewhat long time. Under certain circumstances, after this treatment, also other heavy metals, for example, silver or tungsten may be precipitated in small amounts on the intermediate layer which has already been coated with the photoelectric material, for example, caesium.

What is claimed is:

1. A photoelectric cathode comprising a base metallic surface, an intermediate lead oxide layer on said surface, and a photo-emissive substance on said lead oxide.

2. A photoelectric cathode comprising a base tungsten surface, an intermediate lead oxide layer on said surface, and a photo-emissive substance on said lead oxide.

3. A photoelectric cathode comprising a base metallic surface, an intermediate lead oxide layer on said surface, and caesium on said lead oxide layer.

GEORG MAURER.

40