

Jan. 30, 1962

A. KROHS ETAL

3,019,364

PHOTOELECTRIC DEVICE FOR ULTRA-VIOLET RADIATION

Filed Nov. 27, 1956

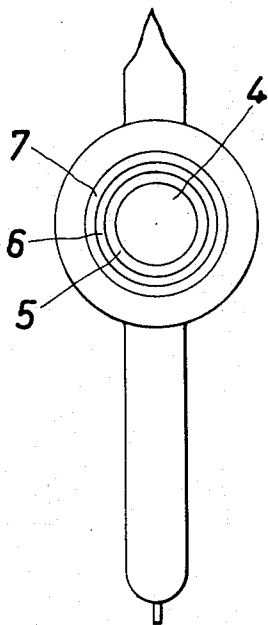


Fig. 1

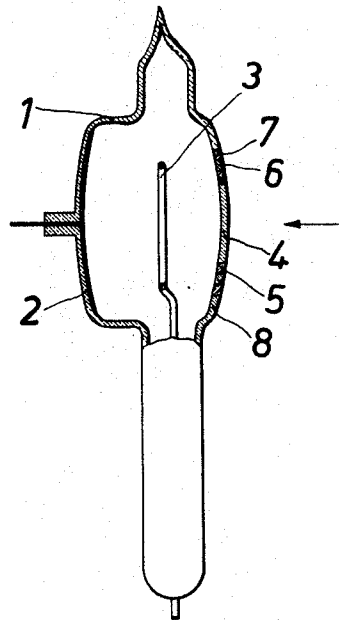


Fig. 2

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PHOTOELECTRIC DEVICE FOR ULTRA-VIOLET RADIATION

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Filed Nov. 27, 1956, Ser. No. 624,705

Claims priority, application Germany Dec. 22, 1955

1 Claim. (Cl. 313-102)

In the production of glass envelopes for photoelectric cells, image converters or the like for use with ultraviolet waves, a quartz window through which ultra-violet rays can pass must be sealed to a bulb of conventional soft glass. As is well known, the considerable difference between the heat expansion coefficients of quartz and soft glass precludes a direct sealing there-between, for which reason such sealings are usually effected with the aid of intermediate glasses consisting of kinds of glass with different heat expansion coefficients so that there is only a relatively small difference between the heat expansion coefficients of the substances to be sealed.

To this end, it is known to melt tubular pieces of various intermediate glasses on to one another, the quartz window and the normal glass flask being sealed to the two ends of the connecting member thus produced. This known method results in an increase of the distance between the quartz window and the glass bulb which contains the light-sensitive element, but the associated increase in the distance which the light must travel from the entry window to the place where the light is to act, for instance, a photoemissive layer, is often undesirable.

To obviate this disadvantage, the invention proposes the production of a glass bulb with a melted-in quartz window on which intermediate glass rings of appropriate heat coefficients are disposed around the outer edges of said quartz window and so sealed to said edges and to each other and to the wall of said bulb that said quartz window, said intermediate glass rings and that part of the wall of said bulb, which is to be sealed to the window lie in one common plane. The advantage of such an envelope is that the distance from the quartz window to the light-sensitive layer is no longer than in the conventional construction of a corresponding photoelectric cell. Another advantage is that if the structure according to the invention is used, there is no need to have tubular material of different kinds of glass available. Another advantage is that where photoelectric cells or the like are provided with sockets, no modification is necessary as compared with the conventional construction without a

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quartz window. This advantage is more particularly apparent in the case of secondary electron multipliers which are relatively complicated as regards construction and provision with sockets.

An example of how the invention can be applied is diagrammatically illustrated in the drawing in which FIG. 1 is a front view and FIG. 2 is a side view partially in section of a photoelectric cell according to the invention. In the drawing the reference 1 denotes a glass bulb forming part of an envelope containing a photo-emissive layer 2 and an anode 3. A quartz window 4 through which the ultra-violet rays can pass in the direction of the arrow is sealed to the bulb with the use of intermediate glass rings 5 to 7. The latter are made of glass in rod form with different heat expansion coefficients, the glass used for the ring 5 having the smallest heat expansion coefficient and the glass used for the ring 7 having the greatest heat expansion coefficient. To produce the union by fusion, the quartz window 4, rings 5 to 7 and the associated wall 8 of the glass bulb 1 are disposed in a single plane.

We claim:

A photoelectric device comprising at least a photoemissive layer sensitive to the ultra-violet range of radiation in an envelope consisting of a glass bulb with a quartz window, said photo-emissive layer lying in the path of said radiation entering through said window in said photoelectric device, said window being sealed to said bulb by means of a graded seal composed of several intermediate glass rings of appropriate heat coefficients disposed around the outer edges of said quartz window and so sealed to said edges, to each other and to the wall of said bulb that said quartz window, said intermediate glass rings and the wall of said bulb which is to be sealed with the window lie in one common plane.

References Cited in the file of this patent

UNITED STATES PATENTS

1,537,921	Mailey	May 12, 1925
2,075,447	Smith	Mar. 30, 1937
2,100,187	Handrek	Nov. 23, 1937
2,144,519	Wilson	Jan. 17, 1939
2,232,322	Gilmore	Feb. 18, 1941
2,237,065	Van Den Bosch	Apr. 1, 1941
2,499,854	Ellefson	Mar. 7, 1950
2,517,019	Nordberg	Aug. 1, 1950
2,534,392	Walsh	Dec. 19, 1950
2,549,504	Messana	Apr. 17, 1951