April 4, 1939. A. SITTEL 2,153,398

ELECTRIC LAMP

Filed Aug. 25, 1937

Fig. 1.

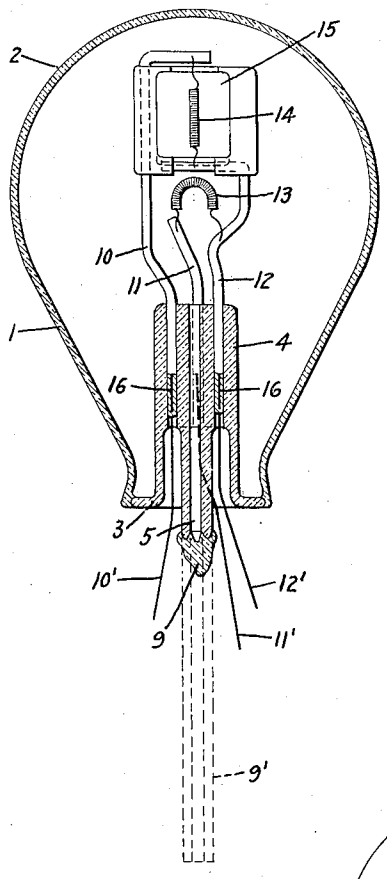


Fig. 2.

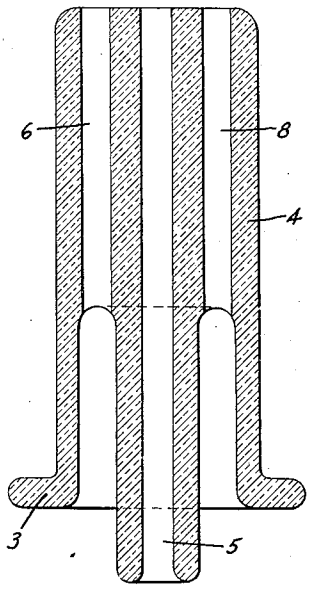
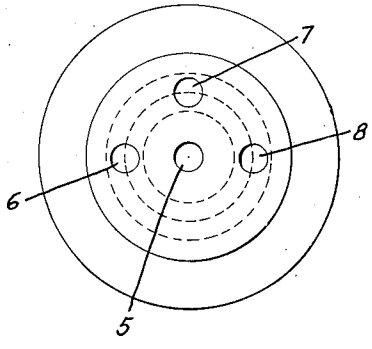


Fig. 3.



Inventor:
Alfred Sittel,
by Harry E. Dunham.
His Attorney.

Patented Apr. 4, 1939

2,153,398

UNITED STATES PATENT OFFICE

2,153,398

ELECTRIC LAMP

Alfred Sittel, Fichtenau, kreis Niederbarnim, Germany, assignor to General Electric Company, a corporation of New York

Application August 25, 1937, Serial No. 160,850
In Germany October 3, 1936

3 Claims. (Cl. 176—36)

My invention relates to electric lamps and similar devices comprising a bulb having an electric energy translation element sealed therein, and more particularly to stems for such devices.

Stems for electric lamps as made at the present time comprise a flared glass stem tube having a portion fused and compressed around portions of lead-in wires. Although such stems are highly satisfactory for ordinary lamps, they sometimes develop cracks when used in high intensity lamps carrying comparatively heavy current such as lamps used for vehicles, for projection purposes and for sound film purposes, due to the fact that the bulb and the internal parts of the lamps become very hot during operation. This is particularly the case when the lamp is subjected to intensive vibrations, for instance when the lamp is used in vehicles.

One of the objects of my invention is to provide a stem for electric lamps and similar devices which is not subject to cracking when carrying heavy current loads or when subjected to intensive vibrations.

According to my invention, the above disadvantages are avoided by making the stem tubes of a ceramic material. Such stem tubes are not only more resistant to heat and to impacts than ordinary glass stems, but since they also have a considerably higher insulating value at high temperatures, there is less danger of electrolysis. Further features and advantages of my invention will appear from the following detailed description of a species thereof.

In the drawing, Fig. 1 is an elevation, partly in cross section, of a gas-filled incandescent search-light lamp having a stem tube made in accordance with my invention; Fig. 2 is a cross-section, at an enlarged scale, of the stem tube; and Fig. 3 is a plan view thereof.

Referring to the drawing, the lamp comprises a gas-filled bulb 2 having a neck portion 1 to which the flared outer edge 3 of a stem tube 4 is sealed. The stem tube 4 consists of a ceramic material which can be hermetically sealed to glass without forming stresses, for example a mixture of approximately 50% titanium oxide and 50% magnesium oxide. The stem tube 4, as shown in Fig. 3, is provided with four longitudinal holes 5, 6, 7, 8 at its transversely closed inner end. The center hole 5 serves for evacuation and for the introduction of gas and the integral exhaust tube portion communicating therewith is closed off at its outer end by the sealed residue 9 of a glass exhaust tube extension 9'. Three heavy inner lead-in wires 10, 11 and 12 extend into the openings 6, 7 and 8 and support a main horseshoe shaped filament 13 and a linear auxiliary filament 14. The said lead-in wires may be made of nickel, a nickel alloy, tungsten or molybdenum. The main filament 13 is secured to the leads 11 and 12 so that it symmetrically intersects the axis of the bulb 2 and is at the focus of an associated reflector when the lamp is in use. The auxiliary filament 14 is secured to the bent ends of the leads 10 and 12 and is located in front of the focus of the associated reflector when the lamp is in use. A cap or shield 15 is mounted below the said filament 14 on the leads 10 and 12. The said shield 15 may also be made of ceramic material or of metal if it is insulated from one of the said leads.

The thin seal portions of the three lead-in wires 10, 11, 12 are hermetically sealed in the holes 6, 7, 8 by means of coatings 16 of a vitreous material such as glass or a readily fusible glass enamel. This sealing is preferably done by first coating the said seal portions of the lead-in wires with glass or enamel, then pulling them into the openings 6, 7, 8 and then heating the stem tube 4 in a furnace or by means of flames to such a temperature that the coatings 16 are fused and sealed to the stem tube. The stem tube will not be deformed because the ceramic material of which it is made does not soften below a temperature of 1,000° C.

The outer leads 10', 11', 12' may be made of copper and extend to the contacts of the base which is not shown. The lamp may of course be provided with only one filament or with more than two filaments, and the filaments and the bulb may have any desired shape. The invention is also applicable to other types of devices such as electric discharge lamps.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In an electrical device comprising a vitreous bulb having an electric energy translation element sealed therein, a stem of non-vitreous ceramic material comprising a stem tube having a flared outer end sealed to an opening in said bulb and an integral exhaust tube within said stem tube extending longitudinally thereof, the inner end of said stem being transversely closed except as to a plurality of longitudinally extending openings therethrough one of which communicates with said exhaust tube, lead-in wires extending through the other of said openings and being hermetically sealed therein by fused vitreous material, and means hermetically sealing the outer end of said exhaust tube.

2. In an electrical device comprising a vitreous bulb having an electric energy translation element sealed therein, a stem of non-vitreous ceramic material comprising a stem tube having a flared outer end sealed to an opening in said bulb and an integral exhaust tube within said stem tube extending longitudinally thereof, the inner end of said stem being transversely closed except as to a plurality of longitudinally extending openings therethrough one of which communicates with said exhaust tube, lead-in wires extending through the other of said openings and being hermetically sealed therein by fused vitreous material, and means consisting of the residue of a vitreous exhaust tube extension hermetically sealing the outer end of said exhaust tube.

3. In an electrical device comprising a vitreous bulb having an electric energy translation element sealed therein, a stem of non-vitreous ceramic material consisting of a mixture of the oxides of titanium and magnesium suitable for sealing to glass and comprising a stem tube having a flared outer end sealed to an opening in said bulb and an integral exhaust tube within said stem tube extending longitudinally thereof, the inner end of said stem being transversely closed except as to a plurality of longitudinally extending openings therethrough one of which communicates with said exhaust tube, lead-in wires extending through the other of said openings and being hermetically sealed therein by fused vitreous material, and means hermetically sealing the outer end of said exhaust tube.

ALFRED SITTEL.