

Aug. 6, 1940.

H. J. LEMMENS ET AL

2,210,489

ELECTRICAL DEVICE

Filed June 26, 1939

Fig. 1.

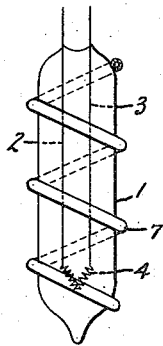
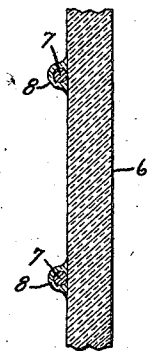


Fig. 2.



Inventors:
Hendricus J. Lemmens,
Willem Uytterhoeven,
Josephus A.M. Smelt,

by *Harry E. Dunbar*
Their Attorney.

UNITED STATES PATENT OFFICE

2,210,489

ELECTRICAL DEVICE

Hendricus J. Lemmens, Willem Uytterhoeven, and
Josephus A. M. Smelt, Eindhoven, Netherlands,
assignors to General Electric Company, a cor-
poration of New York

Application June 26, 1939, Serial No. 281,290
In Germany June 27, 1938

4 Claims. (Cl. 176-16)

Our invention relates in general to electrical devices such as incandescent lamps and discharge tubes in which the bulb is provided with a metallic protective network are known in themselves. Such nets in some cases have the purpose of protecting the device from external influences. In other cases they serve the purpose of holding together the fragments of the bulb when explosions occur, which may be the case, for instance, when the operating pressure in the device is greater than one atmosphere. Particularly when the protective net is to serve for the latter purpose, it has been heretofore necessary to select a net of rather small mesh, as otherwise there would be insufficient assurance that the fragments of the bulb would be kept from being blown through the openings in the net by the force of the explosion. It is self-evident that such a net, because of the small openings therein, causes a relatively high light loss.

Electrical devices such as incandescent lamps or discharge tubes in which the bulb is provided with a metallic protective network are known in themselves. Such nets in some cases have the purpose of protecting the device from external influences. In other cases they serve the purpose of holding together the fragments of the bulb when explosions occur, which may be the case, for instance, when the operating pressure in the device is greater than one atmosphere. Particularly when the protective net is to serve for the latter purpose, it has been heretofore necessary to select a net of rather small mesh, as otherwise there would be insufficient assurance that the fragments of the bulb would be kept from being blown through the openings in the net by the force of the explosion. It is self-evident that such a net, because of the small openings therein, causes a relatively high light loss. One object of our invention is to provide a protective network for the glass envelopes of electric incandescent lamps and discharge devices which will serve to effectively prevent shattering of the glass envelope and flying fragments of glass, should an explosion occur, without causing any appreciable loss in the light produced within the envelope during lamp operation.

A feature of our invention is the provision of a protective net which is fastened, by means of a thin layer of a transparent glass-like material having a melting point below the softening point of the bulb glass, to the outer surface of the bulb in such a way that it constitutes one unit with the bulb. This construction affords the possibility of utilizing a net having openings considerably larger than in the case where the net is placed loosely around the bulb. As a result of this measure, the light loss of the lamp according to the invention is limited to a minimum.

Further objects and advantages of our invention will appear from the following description of a species thereof and from the accompanying drawing, in which:

Fig. 1 is an elevation of an electric incandescent lamp provided with a protective net comprising our invention; and Fig. 2 is a longitudinal sectional view, on an enlarged scale, of a portion of the bulb wall of the lamp shown in Fig. 1.

Referring to the drawing, the lamp there shown is of the high operating pressure type,

being adapted to operate at a pressure of, for instance, ten atmospheres. The lamp comprises a bulb 1 containing a gas filling consisting of krypton with a small addition of nitrogen. The volume of the bulb of the lamp illustrated in the drawing is approximately 2 cm.³. The bulb 1 is made of hard glass with a softening point of approximately 600 to 800° C. A filament 4 is mounted within the bulb 1 by means of a pair of current supply wires 2 and 3 which extend through the wall of the bulb at one end thereof. The wall 6 of the bulb 1 is surrounded by a metallic protective net 7 preferably in the form of a wire helix or spiral. The said net constitutes one unit with the bulb 1 and is fastened thereto by means of a thin layer 8 of a transparent, glass-like material with a melting point of approximately 500° C. There, as shown in Fig. 2, the turns 7 of the wire net are securely fastened to the wall 6 of the bulb by means of the glass-like transparent material 8 which is sealed to the bulb wall 6 and which encases the wire turns 7.

As shown in the drawing, the openings in the network are large, thus presenting very little obstruction to the free transmission of the light rays generated by the filament 4 within the bulb and thus causing relatively little light loss. Nevertheless, the network is capable of holding the fragments of the bulb together if the lamp should explode, since the glass of the bulb is uniformly stuck to the net 7.

The bulb 1 can be provided with the protective net 7 according to the invention by first immersing the bulb, with the net in place thereon, in a bath consisting of a liquid in which there is suspended the finely ground, transparent glass-like material 8 with a melting point below that of the bulb material. The bulb and its surrounding net are then allowed to dry, after which the unit is heated to a temperature between the melting point of the finely ground, glass-like material 8 and the softening point of the bulb material. The glass-like fastening material 8 is then allowed to cool.

The glassy material 8 may have the following composition:

	Per cent
SiO ₂ -----	25-14
PbO-----	55-70
B ₂ O ₃ -----	12-16
Al ₂ O ₃ -----	3- 0
Na ₂ O-----	1- 3

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

1. An electrical device comprising a sealed vitreous envelope containing a light source, said envelope being provided with a metallic protective net secured to the outer surface of said envelope by a thin layer of a transparent glass-like material having a melting point below the softening point of said envelope, said material being fused to the said envelope. 5
2. An electrical device comprising a sealed vitreous envelope containing a light source, a protective wire net surrounding said envelope, said wire net having relatively large openings and being secured to the outer surface of said envelope by a layer of a transparent glass-like material on the wires of said net, said material having a melting point below the softening point of said envelope and being fused to the said envelope. 10
3. The method of attaching a metallic wire net to the outer surface of a vitreous lamp envelope which comprises, surrounding the envelope with the wire net, immersing the envelope and net in a bath of a liquid in which there is suspended a finely ground transparent glass-like material having a melting point below that of the envelope, drying the said envelope and net, and then fusing the said glass-like material to the said surface of said envelope by heating to a temperature between the melting points of said glass-like material and said envelope. 15
4. An electrical device comprising a sealed vitreous envelope containing a light source, said envelope being provided with a surrounding metallic protective net secured to the outer surface of said envelope by a layer of glass-like material fused to the said envelope. 20

HENDRICUS J. LEMMENS.
WILLEM UYTERHOEVEN.
JOSEPHUS A. M. SMELT.