

H. C. G. REMANÉ.  
ELECTRIC INCANDESCENT LAMP.  
APPLICATION FILED OCT. 3, 1905.

997,413.

Patented July 11, 1911.

Fig. 1.

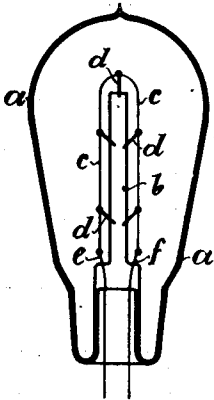


Fig. 2.

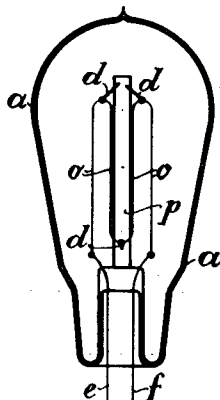


Fig. 3.

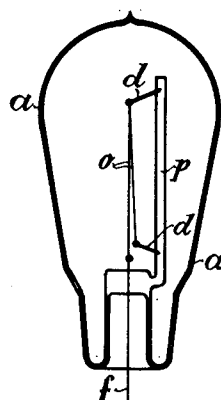


Fig. 5.

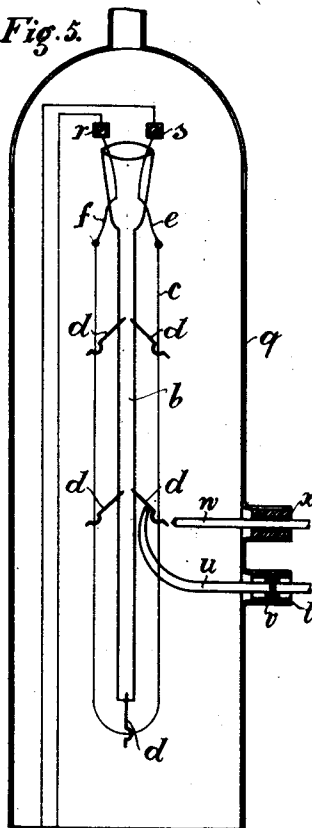
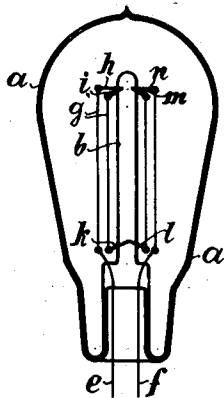


Fig. 4.



WITNESSES.

John A. Percival.

William L. Root

INVENTOR

Herman Carl Gustav Remané

Richardson & Co.  
Attys

# UNITED STATES PATENT OFFICE.

HERMANN CARL GUSTAV REMANÉ, OF BERLIN, GERMANY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## ELECTRIC INCANDESCENT LAMP.

997,413.

Specification of Letters Patent.

Patented July 11, 1911.

Application filed October 3, 1905. Serial No. 281,153.

*To all whom it may concern:*

Be it known that I, HERMANN CARL GUSTAV REMANÉ, engineer, a subject of the King of Prussia, residing at Berlin, Germany, have invented new and useful Improvements in Electric Incandescent Lamps, of which the following is a specification.

The present invention relates to incandescent lamps or filament apparatus and particularly to the securing of incandescent bodies or filaments to the members to which they are attached in such apparatus.

The object of the invention is an attachment between the filament and the member to which it is to be secured in which the incandescent body is embedded in the member by fusion and quickly following cooling thereof. In this manner thickening of the ends of the member may be produced about the filament.

In order to make the disclosure of my invention and its various applications clear, I have hereinafter referred to several illustrative types of lamp in which the filament is supported by being secured to metallic members or conducting wires, by which current is introduced into the lamp through an insulating member or stem and to additional metallic supporting members secured in an insulating member or holder carried by said stem, which latter metallic members may serve to conduct current from one filament to another, or merely to support a filament.

The embedding of the filament can for instance be effected by means of the electric arc, which can be caused to operate upon the end of the support brought into contact with or surrounding the incandescent body, and quick removal of the arc after its formation.

The new incandescent lamp is illustrated in the accompanying drawing in some constructional forms.

Figure 1 shows an incandescent lamp with single incandescent loop held by several supports. Fig. 2 shows a modification in which the incandescent body is coiled in multiple windings. Fig. 3 is a side elevation of Fig. 2. Fig. 4 shows another modification in which the incandescent body consists of a plurality of straight filaments. Fig. 5 illustrates an apparatus suitable for the carrying out of the fusion process.

In Fig. 1, the stem of the incandescent lamp *a* is provided with a glass holder *b*, in which the metallic supports *d* holding the

incandescent body *c* are inserted. The loop-shaped incandescent body *c* is connected to the conducting wires *e*, *f* which wires pass through the stem of the lamp in the well known manner.

According to the modification shown in Figs. 2 and 3 the incandescent body is convoluted in multiple windings, and is held by the metallic supports *d*, which are inserted in the side holder *p* constructed of insulating material.

In the modification shown in Fig. 4 the incandescent body is composed of individual filaments *g* of which the first one is connected at one end to the conducting wire *e* and with the other end to the metallic support *h*. The second filament *g* is connected on the one hand to the support *i* and on the other hand to the support *k*, the third filament is connected on the one hand to the support *l* and on the other hand to the support *m*, and the fourth filament is connected on the one hand to the support *n* and on the other hand to the conducting wire *f*. The metallic supports *h*, *i*, *k*, *l*, *m* and *n*, are in conducting connection two by two with one another, so that the current from one conducting wire can flow through the several filaments in series and finally reach the other conducting wire. Obviously a greater number of filaments *g* could also be employed and could be distributed according to requirement over the entire surface of the holder *b*.

The embedding of the incandescent body in the free ends of the metallic supports is best effected by means of the apparatus illustrated in Fig. 5, whereby the securing point is surrounded during the fusion by a gas such as hydrogen which does not attack the incandescent body even under the influence of the electric arc. Into the bell *q* is introduced a stream of gas (say hydrogen) which expels the air from the said bell. The incandescent body connected to the conducting wires *e*, *f* is so suspended together with the glass holder *b* through the stem whereof the conducting wires *e*, *f* pass, that the incandescent body can be connected by means of the terminals *r* and *s* to a source of current. The incandescent body *c* is placed close to the free end of the support *d* or is inserted in a little bend thereof. The electrode *u* inserted in the wall of the bell *q* through the stuffing box *t* and

connected to one pole of the source of current, which electrode is revoluble in the stuffing box *t* about a pivot *v*, is advanced with its free end up to the support *d* at the point where the incandescent filament is to be embedded. After this the electrode *w* connected to the other pole of the source of current, which is also adjustable in the stuffing box *x* also inserted in the bell *g*, is approached to the support *d*, behind the fusion point and immediately removed again. Upon the withdrawal of the electrode *w* an arc is drawn, which causes a ball shaped thickening of the free end of the support, which cools again very quickly upon the breaking of the arc and firmly surrounds the incandescent body. The incandescent body or filament is not itself reduced to a fused condition but remains solid with the metal of the support fused closely around it and upon the solidification of the fused metal of the support the filament is found to be securely united therewith.

The effect of the fusion of the end of the support into a bulb, drop or globule by means of the electric arc treatment rapidly followed by cooling is to change the physical characteristics of this portion of the support; the physical appearance of the metal resulting from its fused condition being readily observable. The fusion of metal followed by rapid cooling results in a smooth bulbous surface due to the unequal strain of contraction or surface tension.

Having now described my invention and

in what manner the same is to be performed what I claim and desire to secure by Letters Patent is:

1. In an electric incandescent lamp, the combination of an incandescent filament and a metallic support for said filament permanently connected with the filament by means of an enlarged portion of fused metal located at the extremity of the support and entirely surrounding the filament, said portion being of the same material as the support and being in the form of a smooth globule.

2. The combination with a filament of a member of insulating material carrying a metallic member in the extremity of which the filament is embedded, the metal surrounding the filament being a fused portion of said member and having a smooth rounded outer surface.

3. The combination with a filament, of a metallic member secured thereto by a connection consisting of a fused portion of said member itself in which the filament is embedded and which has the smooth outer surface characteristic of solidified fused metal, the filament being surrounded by the solidified metal of the metallic member.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HERMANN CARL GUSTAV REMANÉ.

Witnesses:

Dr. FRITZ BLAU,  
Dr. HEIBERLEIN.