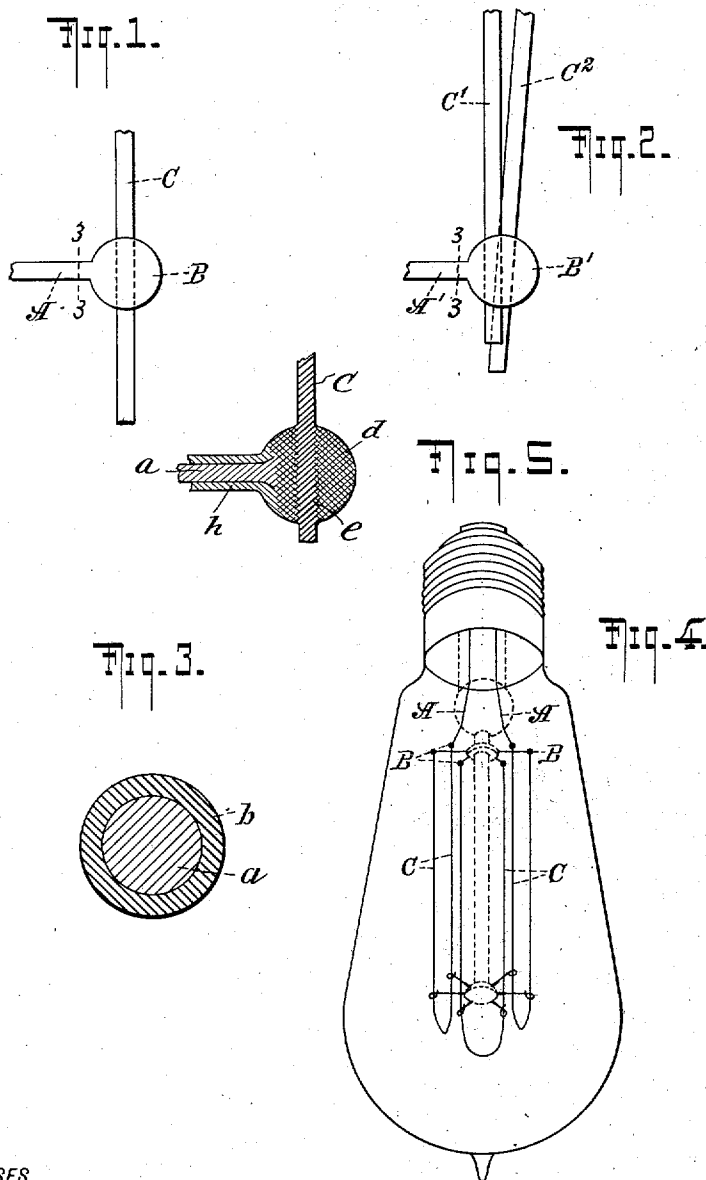


H. REMANÉ, E. GOTTSCHALK & E. HURWITZ.
ELECTRIC GLOW LAMP.

APPLICATION FILED DEC. 17, 1908.

974,296.

Patented Nov. 1, 1910.



WITNESSES

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HERMANN REMANÉ, OF BERLIN, EMIL GOTTSCHALK, OF CHARLOTTENBURG, AND
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PORATION.

ELECTRIC GLOW-LAMP.

974,296.

Specification of Letters Patent.

Patented Nov. 1, 1910.

Original application filed July 18, 1907, Serial No. 384,357. Divided and this application filed December 17, 1908. Serial No. 468,000.

To all whom it may concern:

Be it known that we, HERMANN REMANÉ, a resident of Berlin, Germany, EMIL GOTTSCHALK, a resident of Charlottenburg, Germany, and EUGEN HURWITZ, a resident of Berlin, Germany, all three subjects of the Emperor of Germany, have invented certain new and useful Improvements in Electric Glow-Lamps, of which the following is a specification.

Our invention relates to electric glow lamps in which the filament is composed of tungsten. Great difficulty has been encountered in practice as regards the proper connection of the filaments with their supports, whether or not these supports themselves serve to convey the current. The use of platinum supports has become so expensive that a cheaper substitute is very desirable. For this reason the use of nickel and also of copper has been tried, the support being melted by the use of an electric arc until it forms a globule at the point at which it is desired to effect the connection with the filament end. It has been found, however, that nickel is objectionable for the reason that it forms an alloy with the tungsten of the filament, which alloy is readily fusible and therefore causes a reduction in the sectional area of the filament in the vicinity of the fused portion owing to the fusible alloy running down; the filament therefore breaks readily at these weakened places. If on the other hand copper is used, as a filament support, the filament is liable to break through and escape from the surrounding fused globule before the latter has solidified.

In our Letters Patent of the United States No. 919,381 issued April 21, 1909, (of which the present case is a division) we have explained that the defects referred to above can be avoided by using a filament support containing two metals, one of which readily forms an alloy with tungsten, while the other metal does not. As instances of metals of the first kind we have named nickel and iron (that is, metals of the iron group) and as instances of metals of the second kind we have named copper and silver (that is, metals of the copper group).

According to the specific embodiment of

our invention which forms the subject matter of the present application, we employ a filament support in which the two metals are united mechanically and not alloyed; for example, the filament support may consist of a nickel core coated with copper, or of a copper wire coated with nickel.

In the accompanying drawings Figure 1 illustrates the connection of a tungsten filament with a support which is at the same time a current lead or terminal; Fig. 2 shows the arrangement of two filament ends in a common fusion globule of the support; Fig. 3 is a cross-section of the improved support taken on line 3—3 of Figs. 1 and 2 drawn on an enlarged scale and Fig. 4 shows a complete incandescent electric lamp of the character herein referred to. Fig. 5 represents a section through the center of the globule B at right angles to the plane of Fig. 3.

The filament support A or A' consists in the present case of a wire core *a* and a coating *b*. The core and the coating are made of different metals, for instance one of them of nickel and the other of copper, or, more generally speaking, one of them is made of a metal of the iron group and the other of a metal of the copper group. The metals of the former group have the property of readily forming alloys with tungsten, while the metals of the latter group do not form alloys with tungsten. Therefore, when (by the use of the electric arc) a fused globule such as B or B' is formed on said support to receive the filament, the readily fusible alloy formed will effect a good connection between the filament and the support, while the metal of the copper group will preserve the solidity of the joint. In other words, each of the metals of the support counteracts the injurious tendencies above explained which the other metal of the support exerts when used alone.

In Fig. 1 we have shown the connection of a single filament with a support which may be at the same time a current lead, as in Fig. 4.

In Fig. 2 we have shown a construction in which the same globule, B', receives the ends of two filaments C' and C² and in this case the support is not properly speaking a

current lead, a, the current will pass directly from the filament C' to the filament C² through the globule B'.

In Fig. 5 *a* indicates the copper wire core, 5 and *b* the nickel coating. The tungsten filament is indicated as C. The alloy of copper and nickel is indicated as *d*, and the intermediate layer as *e*.

Instead of tungsten we may use other 10 metals of analogous properties.

We claim as our invention:

1. An incandescent electric lamp comprising a tungsten filament and a support therefor, composed of two separate bodies of 15 metals connected mechanically, one of said metals having the property of forming an alloy with tungsten, while the other has the contrary property.

2. An incandescent electric lamp comprising a tungsten filament and a support therefor, composed of a core of one metal and 20 of a coating of a different metal, one of said metals having the property of forming an alloy with tungsten, while the other has the contrary property.

3. An incandescent electric lamp comprising a tungsten filament and a support therefor composed of a core of one metal and a coating of a different metal, one of said 30 metals belonging to the copper group and the other to the iron group.

4. An incandescent electric lamp compris-

ing a tungsten filament and a support therefor composed of a core of one metal and a coating of a different metal, one of said 35 metals being nickel and the other copper.

5. The combination of a refractory metal filament and a support therefor, composed of distinct bodies of different metals, of which 40 one has the property of forming an alloy with the material of the filament, while another has the contrary property.

6. The combination with a refractory metal filament of a metal support comprising a core and a coating of different materials 45 connected with the filament by a fused joint, the material of one of them being metal which alloys with the metal of the filament, and that of the other being metal which acts to protect the portion of the filament 50 adjacent to the joint from deterioration by said first named metal.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses. 55

The foregoing specification signed at Berlin, Germany, this twenty-eighth day of November, 1908.

HERMANN REMANE.
EMIL GOTTSCHALK.
EUGEN HURWITZ.

In presence of—

HENRY HASPER,
WOLDEMAR HAUPT.

Correction in Letters Patent No. 974,296.

It is hereby certified that Letters Patent No. 974,296, granted November 1, 1910, upon the application of Hermann Remané, of Berlin, Emil Gottschalk, of Charlottenburg, and Eugen Hurwitz, of Berlin, Germany, for an improvement in "Electric Glow-Lamps," were erroneously issued to "Deutsche Gasglühlicht Aktien Gesellschaft (Auergesellschaft)," whereas said Letters Patent should have been issued to *General Electric Company, a corporation of New York*, as owners by *mesne assignments* of said invention, as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3d day of January, A. D., 1911.

[SEAL.]

E. B. MOORE,
Commissioner of Patents.

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