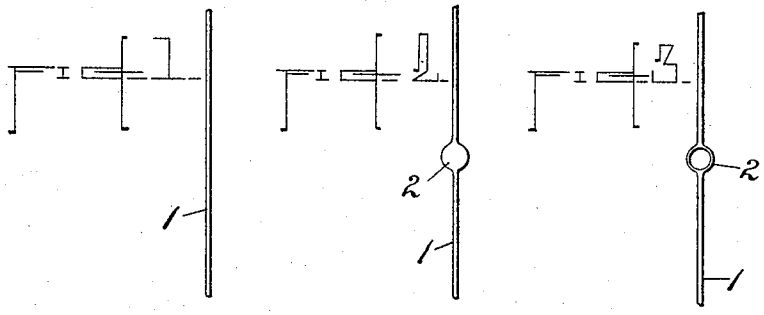
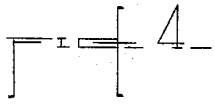
No. 782,749. PATENTED FEB. 14, 1905.

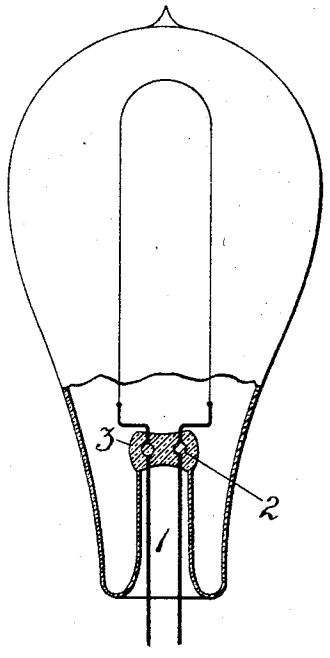
J. H. GUEST.

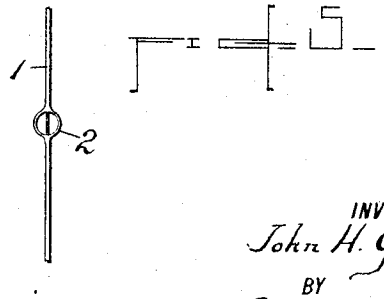
INCANDESCENT ELECTRIC LAMP.

APPLICATION FILED MAY 14, 1904.









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No. 782,749. Patented February 14, 1905.

UNITED STATES PATENT OFFICE.

JOHN H. GUEST, OF BROOKLYN, NEW YORK.

INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 782,749, dated February 14, 1905.

Application filed May 14, 1904. Serial No. 207,890.

To all whom it may concern

Be it known that I, JOHN H. GUEST, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, (with post-office address 223 Schermerhorn street, Brooklyn, New York,) have invented certain new and useful Improvements in Incandescent Electric Lamps, of which the following is a specification.

My invention relates to electric lamps, such as incandescent lamps, which as now ordinarily constructed have their leading-in wires made wholly or partially of platinum at the point where they pass through the glass seal.

The general object of my invention is to cheapen the cost of production of such lamps by substituting copper or other cheap metal for the more expensive metal platinum.

A further object of the invention is to dispense with the use of fused joints, such as are employed in the seal, when for the sake of cheapness the leading-in wire is made of a short piece of platinum wire secured to copper wire.

Heretofore in this art it has been the practice to make that portion of the leading-in wire which is sealed in the glass wholly or partly of platinum, which metal, although an expensive metal, has heretofore been uniformly used, because it has been deemed impossible to make a good seal without using a metal whose coefficient of expansion is the same or approximately the same as that of the glass. By my invention, however, it becomes possible to use a leading-in wire which within the glass seal is entirely of copper or other cheap metal whose coefficient of expansion is very different from that of the glass in which it is sealed.

My invention consists, first, of a leading-in wire which at some point within the seal has an offset or deviation from the straight line of the main portion of the wire, thus compensating for or eliminating the effects of the contraction or expansion of said main portion, such offset portion being preferably highly attenuated or of much reduced cross-section as compared with the main portion, which is of sufficient size to afford the desired mechanical support to the parts.

My invention consists, further, of a leading-in wire which at some part thereof within the glass seal is attenuated or of reduced cross-section, said reduced and contiguous unreduced portion being integral and being both sealed in the glass.

In carrying out my invention I prefer to subdivide the leading-in wire into two or more conductors at the offset or attenuated portion thereof, in which case the two subdivisions springing from the main portion of the wire would constitute a loop in the form of a ring, oval or other shape, depending upon the curve or form of each offset.

By making the conductor highly attenuated I greatly reduce the liability to a defective seal due to lateral expansion of the conductor. The high degree of attenuation which it is possible to employ for this purpose is due to the fact that in the case of copper especially its conductivity is extremely high, being approximately six times that of platinum, so that the conductor may be reduced in cross-section or highly attenuated and yet be capable of carrying the required amount of current for the filament.

The process of manufacturing the leading-in wire to give it the required form may obviously be greatly varied.

In the accompanying drawings I illustrate one method that may be used when my improved leading-in wire is manufactured from ordinary copper wire.

Figure 1 shows a piece of ordinary copper wire as it appears previously to the first step in the process. Fig. 2 shows the same as flattened out at the first stage in the process of manufacture. Fig. 3 shows a leading-in wire constructed in accordance with my invention in the preferred form. Fig. 4 shows the same as sealed in the lamp. Fig. 5 shows a modification.

The wire, Fig. 1, having been flattened out by pressure and preferably in a mold to form a disk, as indicated in Fig. 2, of considerable area, said disk may be placed in a punch or press and punched to produce the loop shown in Fig. 3, each side of which loop is of any desired form and of much reduced area in cross-section as compared with the main or unsub-

divided portion of the wire. As will be seen, each side is offset from the main portion and is hence not affected by the contraction of such main portion. I do not limit myself to any particular degree of attenuation or reduction of the cross-section in the conductor forming the offset or sides of the loop, but in general prefer to make the same as small as possible consistent with the ability of the conductor to carry the current without undue heating. For an ordinary sixteen-candle-power lamp the said cross-section of reduced area may be equivalent to that of a round wire .063 millimeters in diameter.

The leading-in wire, formed as shown, is sealed in the glass of the lamp by compressing the glass while in fused condition around said wire and, as indicated at 3, Fig. 4, so that the seal shall embrace both the main portion of the conductor and the attenuated portion or portion of reduced cross-sectional area. The seal is established and maintained at such attenuated and offset portion of the wire.

The contiguous portions of the conductor 1, around which the glass is also compressed, are firmly anchored or supported in the glass, and the contraction and expansion, if it should interfere with the integrity of the seal around such larger portions, will not destroy the mechanical support, while at the same time the seal is insured by the close and continued union between the glass and the contiguous finer section or sections.

While the integrity of the seal may be attributed to the fact that there is an offset in the wire which relieves a part from the effects of linear expansion in the main portion of the wire, it may also be attributed to the fact that the smaller portion is of such small cross-section that its total amount of contraction and expansion is exceedingly small, and whatever contraction takes place is practically followed up or compensated for by the elasticity of the glass in which it is embedded. In other words, by making the wire at this point sufficiently thin or attenuated, which I am able to do because of its high conductivity, the difference in the coefficient of contraction and expansion of the glass and the copper is fully compensated for.

While I have specified copper as the material because of its cheapness and high conductivity, I do not limit myself to the use thereof, but include in my claims any metal which is substantially like copper in that it has a coefficient of expansion different from glass in contradistinction to platinum, heretofore selected and used because it has substantially the same coefficient of expansion, and in that it has, like copper, a high degree of conductivity, permitting it to be greatly attenuated and yet be able to carry sufficient current to supply the filament with the requisite amperage.

It is obvious that the subdivision of the conductor into a number of branches is useful in contributing to the result, since each is then required to carry a portion only of the current and may therefore be made finer than would be the case if one conductor only were used.

I am aware that it has been proposed before to make a leading-in wire out of a number of strands or separate wires sealed in the glass; but in all such previous cases the separate strands have projected from the glass and have been united by soldering, twisting, or otherwise to the main portion of the said leading-in conductor.

As indicated in Fig. 5, the conductor may be subdivided into three wires or conductors each of smaller cross-section, this being secured by a punch of suitable form operating on the flattened disk 2 or by any other desired manipulation of the leading-in conductor to secure a section which shall be of very fine wire, there being preferably, however, a multiplicity of said sections or subdivisions.

What I claim as my invention is—

1. In an incandescent electric lamp, a leading-in wire which, within the glass seal, is of reduced cross-section, said reduced portion and contiguous unreduced portion being integral with one another and being both sealed in the glass of the lamp.

2. An incandescent electric lamp, having a leading-in wire composed wholly of copper and having a portion attenuated or reduced in cross-section as described, said attenuated portion and contiguous unreduced portions being integral and being both sealed in the glass of the lamp as and for the purpose described.

3. In an incandescent electric lamp, a leading-in wire subdivided into a number of finer wires integral therewith, the said subdivided portion and contiguous undivided portion being sealed together in the glass of the lamp.

4. An incandescent electric lamp having a leading-in wire, a section or portion of which within the glass seal consists of an attenuated ring or loop.

5. An incandescent electric lamp having a leading-in wire which at some portion within the glass seal consists of a loop integral with the main portion of said leading-in wire which projects from the seal.

6. In an incandescent electric lamp a leading-in wire having an offset within the glass seal as and for the purpose described.

7. In an incandescent lamp a leading-in wire having an attenuated offset within the glass seal.

Signed at New York, in the county of New York and State of New York, this 11th day of May, A. D. 1904.

JOHN H. GUEST.

Witnesses:
C. F. TISCHNER, Jr.,
ANNA B. TALLMAN.