

L. GLASER.
 INCANDESCENT LAMP.
 APPLICATION FILED MAR. 3, 1908.

1,023,307.

Patented Apr. 16, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

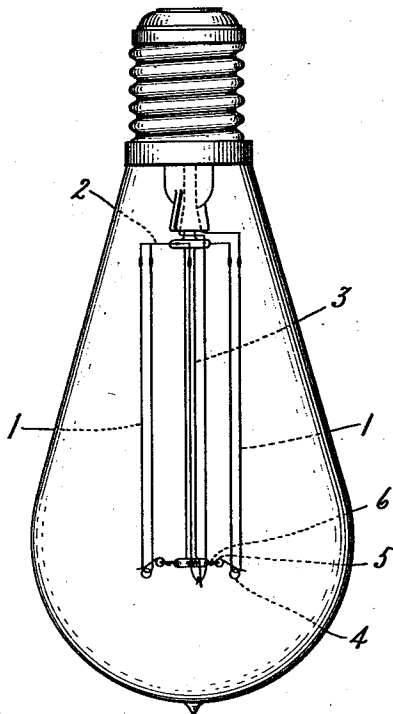


Fig. 2.

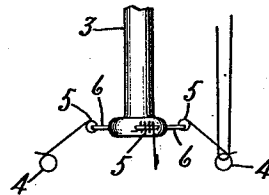


Fig. 3.

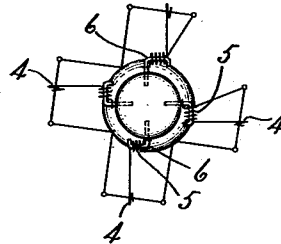


Fig. 5.

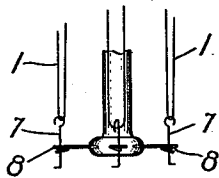
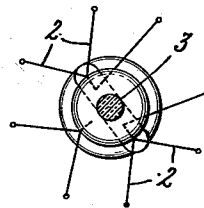


Fig. 4.



Witnesses:

George H. Tilden
J. Ellis Allen

Inventor:

Ludwig Glaser,

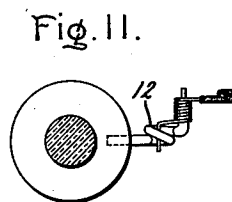
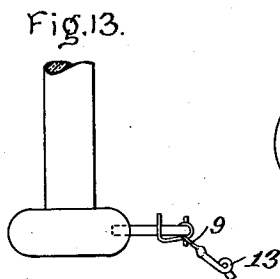
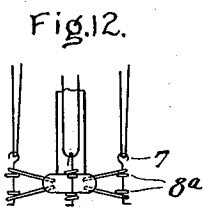
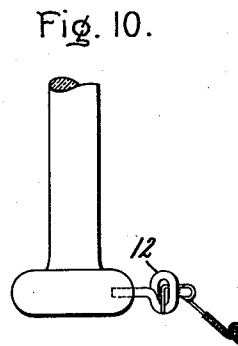
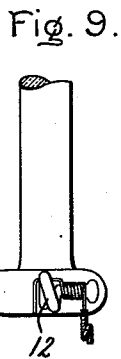
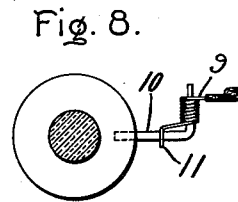
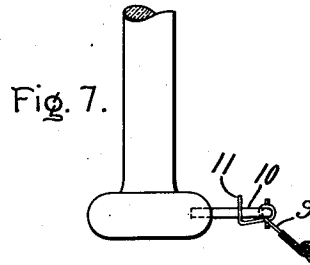
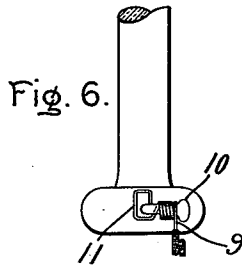
by *Albert H. Davis*
 Att'y.

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2 SHEETS—SHEET 2.



Witnesses:

George W. Tilden.
J. Ellis Glen.

Inventor:

Ludwig Glaser,
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UNITED STATES PATENT OFFICE.

LUDWIG GLASER, OF PANKOW, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

INCANDESCENT LAMP.

1,023,307.

Specification of Letters Patent.

Patented Apr. 16, 1912.

Application filed March 3, 1908. Serial No. 418,960.

To all whom it may concern:

Be it known that I, LUDWIG GLASER, a subject of the Grand Duke of Saxe-Coburg-Gotha, residing at Pankow, Germany, have invented certain new and useful Improvements in Incandescent Lamps, of which the following is a specification.

Filaments of incandescent lamps should be anchored or fastened for the following reasons: first, in order to avoid breakage of the filaments during transportation, and second, in order to avoid contact of the softened filaments, when glowing, either with themselves or with the glass pedestal of the lamp. Various fixed anchoring devices of a variety of materials have been used, but all of them have the disadvantage that the filaments, because of their high temperature, will adhere to a greater or less extent to the anchors. It will also happen that the anchors, either through friction, or because of their springiness, present a considerable resistance to the linear motion of the filament, such as takes place when the lamp is turned on or off. As the result, the filaments are often torn in two or torn from their supports or stretched unduly. This disadvantage is entirely obviated when the anchoring device is constructed of two parts, one part being united firmly on an inner rod or upon the walls of the bulb, while the second part is movable in such a manner that it will prevent lateral movement of the filament but will allow free linear expansion and contraction. The weight alone of the second part of the anchoring device enters into effect, and this may be made as small as possible in proportion to the diameter of the filaments, so that no mechanical destruction of the filament will result therefrom.

For a better understanding of my invention reference may be had to the accompanying drawings in which—

Figure 1 is an elevation of a lamp having my improved filament support; Fig. 2 is an enlarged detail of the supports; Fig. 3 is a plan of the same; Fig. 4 is a sectional elevation through the lamp stem; Fig. 5 is a modification thereof; Figs. 6 to 8 inclusive show a second modification; Figs. 9 to 11 inclusive show still another embodiment of my in-

vention; Fig. 12 is a detail view of a modified form of support, and Fig. 13 shows a support consisting of wires of different sizes fused together.

The stirrup shaped filaments 1 are supported from the usual current supply wires 2 and are grouped about a central glass pedestal 3. Each filament engages at its lower end with a guiding loop 4 of the anchoring device having its opposite end 5 wound in spiral manner about a hook 6 in the end of the glass pedestal. The guiding loop 4 is thus free to move up and down by turning on hook 6 as a pivot. If it happens that the filaments 1 are of such nature that they will still contract several millimeters while in the lamp, as by sintering together, it is advantageous to arrange the movable anchoring parts when the lamp is sealed in a position extending away from the socket of the lamp, as shown in Figs. 1 and 2, in order that when the filaments are entirely sintered together the anchors will draw up horizontally in the lamp to a degree that may be considerable if these parts are of considerable length. By so doing, the anchoring device extends the filaments somewhat farther toward the sides of the bulb, so that a more favorable end-on lighting effect is obtained. This special advantage is lacking in the modification shown in Fig. 5 which, however, is distinguished by greater simplicity. In this arrangement the guiding loops or hooks 7 hang on the filaments and have stems or projections passed downward through a loop 8 formed by the fixed part. Instead of a single guiding loop two may be arranged, one above the other, as illustrated by Fig. 12, in which the hook 7 passes through two loops 8^a.

In the transportation of lamps it is unavoidable that they take a position different from that in which the filaments hang freely from above. It therefore may easily occur that because of a shock, holders will revolve 180 degrees and thereby the filaments may be destroyed, or because of this revolution a short circuit may occur when later the current is turned on. To avoid the possibility of trouble from this cause, I may arrange the movable holders so that they will turn only through a small angle. This is illus-

trated in Figs. 6 to 8 inclusive, in which the movable lever-like parts 9 are wound as spiral springs of several revolutions around the hook-like fixed part 10, and end in stops 11 which when revolving touch the radial parts of the hooks.

As already stated, the metal filaments may shrink considerably during the first few hours of glowing in the lamp. As it is not easily arranged that all filaments will shorten to the same degree, it is to be feared that individual filaments will strive to contract to a greater degree than the stop of the movable holder would allow. This may cause rupture of the filament. It is therefore best to provide a spring between the stop and the fixed hook. This is attained by the above mentioned spiral windings of the movable lever 9 about the fixed hook 10. By this arrangement the movable lever 9 acts as a spring.

According to the modification shown in Figs. 9 to 11 inclusive, the immovable hook is formed with an eye 12 serving to limit the movement of the inner end of the movable lever or member.

The movable parts of the anchoring devices described above, when made of heavy metal, may cause breaking of the filaments because of accidental shocks during transportation. It is therefore advantageous to decrease as much as possible the weight of the holder, particularly its diameter, in order to attain greater safety against shocks during transportation. In this connection, however, there exists a condition that in the region of contact of the movable holder with the filament, sufficient means of conducting away the heat must be provided, so that the temperature of the holder may remain low during the burning of the lamps. Unless this is done the wires from which the holders have been formed may melt and the lamps be thus destroyed. In accordance with this invention, the arrangement is made that the movable holder is thickest at the loop forming the point of contact with the filament. For example, a movable holder may be made of two wires of different size fused together, as illustrated by Fig. 13, in which the support consists of a thin wire 9 and thick wire 13. The thickening of the loop may also be brought about by causing a conducting metallic powder to adhere upon the same. For this purpose the particular metal of which the filament is composed, either entirely or in part, is useful. This metal is finely powdered and placed upon the point of contact in the form of a paste, and fused into position by glowing in a reducing atmosphere. Supports made in this way are illustrated in Figs. 6 to 11 inclusive.

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

1. A filament anchor having a pivotally supported movable part engaging with a filament loop and normally resting thereon to place the filament under tension proportional to the weight of the movable part.

2. A filament anchor comprising a hook rigidly mounted and a movable part engaging with the filament and spirally wound about said hook.

3. In an incandescent lamp, a filament anchoring device comprising two parts, one of which is fixed and the other of which hangs at an angle to the fixed part and is movable to move the filament laterally when the filament contracts.

4. An anchor for a lamp filament consisting of two parts one of which is rigidly mounted, while the other is movable and by its weight tends to hold the filament in position, and a spring which comes into action only after a predetermined contraction of the filament.

5. A filament anchor comprising a rigidly mounted hook and a movable member engaging with the filament and spirally wound about said hook, said member having a spirally wound portion which acts as a spring after the filament has undergone a predetermined contraction.

6. An anchor for a refractory filament comprising a loosely mounted element whose movement upon contraction of the filament over a certain range meets with a substantially constant resistance combined with means for opposing a progressively increasing resistance to movement of said element outside of said range.

7. In an incandescent lamp, the combination with a filament loop, of a fixed support, and anchoring means for the filament pivoted on said support with its free end engaging and supported by said filament loop, the path of movement of said free end upon a contraction of said filament being an arc tending away from said support.

8. In an incandescent lamp, the combination with a filament loop, of a fixed support, a light, flexible member for anchoring said filament pivoted on said support with its free end engaging and supported by said filament loop, said member having a free pivotal movement over a certain range, and stops for preventing the movement of said member beyond said range except by flexure of said member.

9. An anchor for a refractory filament loop comprising two parts, one fixed and the other pivoted thereon with its axis of movement transverse to the sides of the loop.

10. In an incandescent lamp, the combination with a plurality of filament loops

having their ends suitably supported, of independent pivoted anchors for the several loops, said anchors having their free ends engaging and supported by the bights of the
5 several loops, the path of movement of the free end of each of said anchors upon contraction of its filament loop being an arc tending away from the other anchors.

In witness whereof, I have hereunto set my hand this fourteenth day of February, 10 1908.

LUDWIG GLASER.

Witnesses:

HANS GALEN,
GUSTAV MATTHIS.