

1,306,912.

Patented June 17, 1919.

Fig. 2

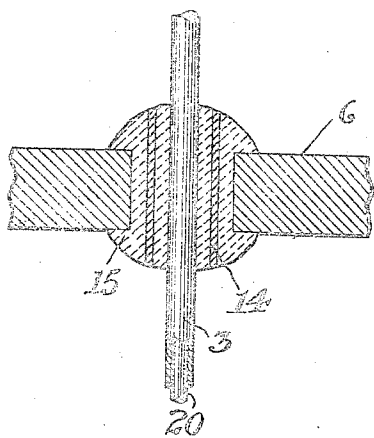


Fig. 1

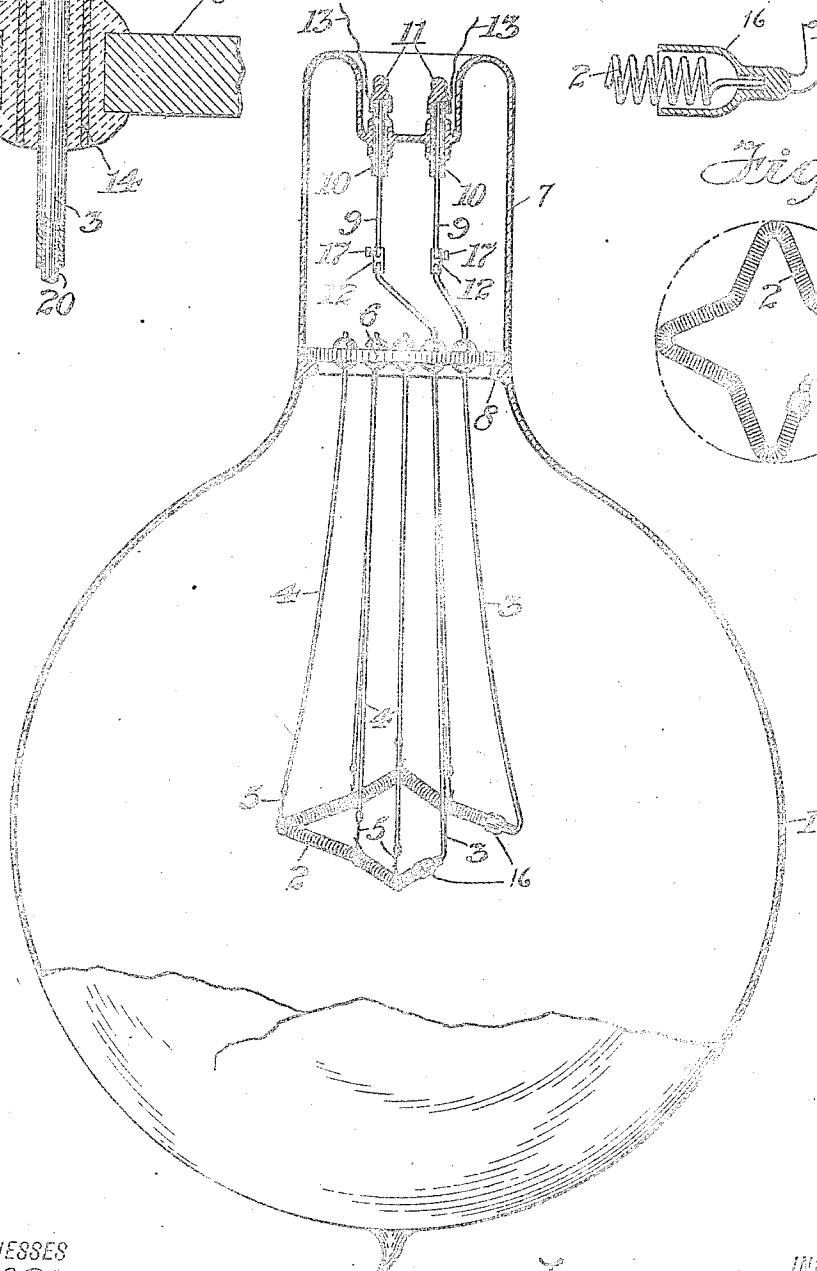


Fig. 3

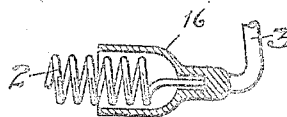
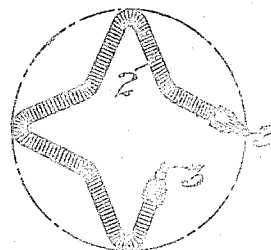


Fig. 4



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ELECTRIC LAMP.

1,306,912.

Specification of Letters Patent.

Patented June 17, 1919.

Original application filed January 8, 1914, Serial No. 811,003. Divided and this application filed April 2,
1915. Serial No. 18,674.

To all whom it may concern:

Be it known that I, FREDERICK G. KEYES, a citizen of the United States, and resident of Hoboken, county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification.

The present invention relates to improvements in tungsten lamps, more particularly lamps of that class having high candle power. The central feature of these novel lamps is a tungsten filament of considerably larger diameter than is now customarily used for the filaments of constant potential tungsten lamps, the same being connected with heavy iron lead wires. With the arrangement thus described the potential of tungsten lamps may be considerably reduced, while the current carrying capacity thereof is correspondingly increased. The result is that with the same expenditure of electrical energy a lamp having far less fragility than usual is provided and by reason of the lower applied potential, the lamp operates within a less limited sphere and escapes certain of the limitations imposed by the usual commercial supply voltages.

In the commercial forms of filament lamp now in use, the largest value of the current is about 2.5 amperes. In the metal filament lamps here represented, a current of over eighteen amperes may be utilized. In speaking hereinafter of heavy filaments or filaments of considerable diameter, the intention is to make such terms apply to filaments having the capacity indicated above, that is to say, capable of carrying current of above eighteen amperes.

Whatever attempts have been made heretofore to produce lamps having the characteristics of the lamp herein described have been defeated by the failure of the seals which, in the usual form, are unable to sustain currents of the indicated magnitude for more than a brief period.

Another feature of the lamp resides in the mode of securing the proper sealing of the lead wires and of the anchors which support the tungsten filament which in the present invention usually appears in the form of a spiral.

Special means are also provided for making stable connections between the ends of the tungsten spiral and the iron leads and

other details are present which will be described in due course in the present specification.

My invention is illustrated in the accompanying drawings in which Figure 1 is a vertical section of one of my lamps, a portion of which is shown in full lines; Fig. 2 is a sectional detail of the seal and support for what may be called the inner leads of the tungsten spiral; Fig. 3 is a detail, also mainly in section, of the connection between an end of the tungsten spiral and one of the inner leads; and Fig. 4 is a bottom view of the filament.

In the drawings, 1 is a globe for one of my lamps and 2 is a tungsten filament, here shown in the form of a spiral, located approximately at the center of the globe 1. The filament is attached at its ends to lead wires 3, 3, of copper sheathed with iron, the copper being utilized for its good conducting qualities and the iron being employed for its stiffness or rigidity to prevent the bending or distortion of the copper wire under the influence of the high temperature developed within the globe.

In Fig. 2 the copper conductor is shown at 20, and the iron sheathing at 3. Iron anchor rods are shown at 4, 4, the same being provided with tip portions 5, 5, of tungsten wire which are sealed to the iron rods and may be bent around at their outer ends so as to surround completely or partially the central portion of the tungsten spiral 2, and support the same along its middle.

The leads, 3, 3, and the rods 4 pass through a disk or diaphragm 6, of aluminum lying within a tubular extension, 7, of the globe 1 and being arranged just above a shoulder, 8, near the bottom of said extension. The object of the diaphragm 6 is to shut off from the tubular extension and from the lamp seals, presently to be described, near the upper end of said extension, all unnecessary heat. The diaphragm 6 does not necessarily form any part of the support for the leads 3, 3, although the anchor rods 4 are supported by the said diaphragm, through intermediate connections.

What I have called the inner leads 3, 3, are provided with sockets 12, 12, suitably sealed thereto and having any convenient depth. Into these sockets extend copper leads 9, 9, which form mechanically a part

of the seals of the lamp. The rods, 9, 9, pass through platinum tubes 10, 10 constituting the main conducting portion of the lamp seals. On the outer ends of the tubes 10, 10, are placed iron caps 11, 11, which are welded to the tubes 10, 10 and the rods 9, 9, by means of an oxy-acetylene flame. The external leads may be copper wires 13, 13, fused or soldered to the caps 11, 11, as shown.

It will be observed that the seals are made within a reëntrant portion of the extension 7, whereby the danger of fracture from mechanical causes is reduced. The tubes 10, 10, are sealed within the said reëntrant portions. The entire interior of the lamp is thus sealed off from exposure to the external air and a structure is provided which will admit of the safe and continuous application thereto of currents above eighteen amperes. In this way lamps of exceedingly high candle power are obtainable without unduly shortening the life of the lamps.

The mode of connection between one of the inner leads 3, and the aluminum disk 6 is illustrated in Fig. 2. An opening being made in the diaphragm at the proper point the tube of copper and iron, surrounded by a tube 14 of quartz is passed through the diaphragm and the entire inner space is then packed with a suitable cement, 15, such as might be formed by the mixture of ground silica and sodium silicate. This prevents the contact of the inner leads with the aluminum disk and thus obviates the danger of short circuiting between said leads. By similar construction the anchor rods 4 are supported in the disk and insulated therefrom and from the inner leads 3, 3.

At the inner terminals of the leads 3, 3, the iron coverings are attached to or formed into cups 16, 16, into which the ends of the tungsten spiral extend and within which they are attached to the said cups or welded thereto so as to form good electrical connection therewith.

As a means for joining the heavy copper leads 9, 9, to the inner leads 3, 3, through the medium of the sockets 12, 12, I may make use of any suitable sort of juncture. For example, I may extend the lower ends of the leads 9, 9, down into the socket 12, 12, and hold them there by means of set screws 17, 17.

This application is a division of my application Serial Number 811,003, filed January 8th, 1914.

I claim as my invention:

1. In an electric device, a container, a conductor located within the container, leads connected with the terminals of the conductor and sealed in the wall of the container, and means independent of the seals

for carrying the weight of the conductor, said means consisting of a diaphragm mounted in said container and anchor rods extending therefrom and connected to said conductor.

2. In an electric device, a container, a concentrated filament of conducting material located within the container, leads connected with the terminals of the filament and sealed in the wall of the container, and means independent of the seals for carrying the weight of the filament, said means consisting of a diaphragm mounted in said container and anchor rods extending therefrom and connected to said filament.

3. In a tungsten lamp, a container, a filament of tungsten located within the container, leads connected with the terminals of the filament and sealed in the wall of the container, and means independent of the seals for carrying the weight of the filament, said means consisting of a diaphragm mounted in said container and anchor rods extending therefrom and connected to said filament.

4. In an electric device, a container, a filament of conducting material located within the container, tubular seals connected with the terminals of the filament and sealed in the wall of the container, and means independent of the seals for carrying the weight of the filament, said means consisting of a diaphragm mounted in said container and anchor rods extending therefrom and connected to said filament.

5. In a tungsten lamp, a container, a filament of tungsten located within the container, tubular seals connected with the terminals of the filament and sealed in the wall of the container and means independent of the seals for carrying the weight of the filament, said means consisting of a diaphragm mounted in said container and anchor rods extending therefrom and connected to said filament.

6. In a tungsten lamp, a container, a filament of tungsten located within the container, leads connected with the terminals of the filament and sealed in the wall of the container, and means for supporting the filament independently of the seals, said means consisting of a diaphragm mounted on the wall of the container and anchor rods extending therefrom and connected to the filament.

Signed at New York in the county of New York and State of New York this 31st day of March, A. D. 1915.

FREDERICK G. KEYES.

Witnesses:

WM. H. CAPEL,
HAROLD B. WOODWARD.