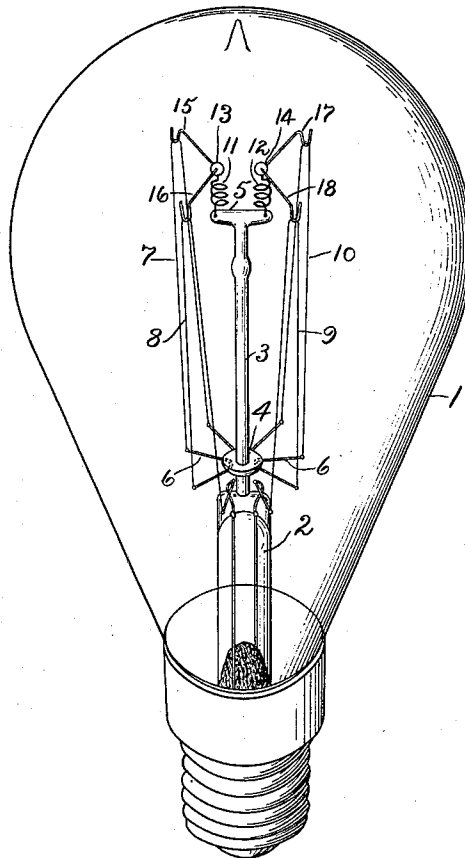


W. R. BURROWS.
FILAMENT SUPPORT.
APPLICATION FILED MAR. 13, 1907.

1,013,859.

Patented Jan. 9, 1912.



WITNESSES:
Hester & Fulmer.
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UNITED STATES PATENT OFFICE.

WILLIAM R. BURROWS, OF NEWARK, NEW JERSEY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

FILAMENT-SUPPORT.

1,013,859.

Specification of Letters Patent.

Patented Jan. 9, 1912.

Application filed March 13, 1907. Serial No. 362,175.

To all whom it may concern:

Be it known that I, WILLIAM R. BURROWS, a citizen of the United States, residing at Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Filament-Supports, of which the following is a specification.

My present invention relates to incandescent lamps, and more particularly to means for supporting the filaments therein.

Incandescent lamps having filaments of tungsten, osmium, molybdenum, and other refractory metals, must be provided with some means for holding the filaments in position. These metals, for instance tungsten, operate at very high temperatures, and the supporting means must be of such a nature that the part contacting with the filament will not alloy or chemically combine therewith. Furthermore, the supporting means should permit the progressive contraction of the filament during normal operation of the lamp. This progressive contraction is ordinarily sufficient to rupture the filament if rigidly anchored at each end, even though the filament may have been originally adjusted with sufficient slack to permit of the normal expansion and contraction due to changes in temperature.

The filament support embodied in my present invention is so constituted that it does not chemically combine with the filament, and is so arranged that it will maintain the filament under tension when the lamp is new without danger of subjecting the filament to a disruptive tension after the filaments have aged and shrunk.

My improved filament support has the additional advantage of protecting the filaments from shocks and jars during transportation. When the filaments consist of tungsten, or other non-ductile material, this last mentioned characteristic is of very considerable importance.

The drawings forming a part of this specification show my invention as applied to a four filament lamp.

The lamp bulb 1 is of ordinary type and provided with the usual stem 2 through which the leading-in conductors pass. The stem is provided with a glass pedestal 3 having a glass hub 4 near its base, and a cross-bar 5 at its top. Platinum or other

metal holders 6 are sealed in the hub 4 and serve to connect the adjacent ends of the filament loops 7, 8 and 9 and 10. These platinum wires may be welded or otherwise attached to the ends of the filaments. The cross-bar at the top of the glass pedestal 3 serves as a support for two helically coiled springs 11 and 12 of steel. These springs are arranged in an upright position and have their upper ends embedded in small glass beads 13 and 14. These glass beads serve as supports for the radial arms 15, 16, 17 and 18 which engage with the upper ends of filament loops. In the drawing each glass ball serves as a support for two of the radial arms, but the arms are so sealed in the glass that they do not contact with each other or with the coiled spring. The radial arms may be made of copper as I find that copper does not readily alloy or combine with incandescent tungsten. The large diameter of the wire prevents the copper from heating to its fusing temperature. If preferred, a more refractory material than copper may be employed, as tantalum or the like.

It will be noted that as the filaments contract, they put the radial arms under a transverse stress and cause the compression and transverse flexure of the helical springs 11 and 12. It is possible to secure a very considerable movement of the end of the radial arm without materially increasing the tension on the filament. The flexibility of the supporting means permits progressive contraction of the filaments during normal life of the lamp but maintains the proper tension on the filament, both when hot and when cold. The peculiar arrangement of the springs protects the more fragile filaments from jars and shocks during transportation.

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

1. The combination of a lamp stem having a central pedestal, a coiled spring supported thereby and having its axis parallel with that of the pedestal, laterally extending arms supported by said spring, and filament loops engaging with said radial arms, the portion of an arm engaging with a filament undergoing displacement with refer-

ence to a plane perpendicular to the filament loop as the longitudinal direction of the loop varies in length while the portion adjacent the spring remains relatively stationary.

2. The combination of a lamp filament, a supporting arm engaging therewith, and a coiled spring attached to said arm and subjected to compression and transverse flexure when said filament contracts.

3. The combination of a filament loop, a coiled helical spring having its axis substantially parallel to that of the loop, and a laterally extending arm supported by said spring engaging with said filament loop and free to tilt with reference to said axis.

4. The combination of a lamp stem, a pedestal carried thereon, a spring mounted on said pedestal, a bead of insulating material supported by said spring, a plurality of supporting arms carried by said bead, and a filament loop engaging with each of said arms.

5. The combination of a lamp stem, a pedestal mounted thereon, a plurality of filaments disposed about said pedestal, a spring carried by said pedestal, and means for supporting said filaments comprising a plurality of suitably rigid devices carried

by said spring and movable laterally with reference to said pedestal.

6. The combination of a filament loop, a supporting arm engaging the bend of said loop and extending transversely with reference thereto, and a spring supporting said arm and extending transversely with reference to the same which is subject to transverse flexure when the filament varies in length.

7. The combination with a plurality of filaments and a relatively rigid supporting member adjacent the same of a device adapted to afford the filaments resilient support comprising rigid means directly supporting said filaments and extending transversely with reference thereto and a spring part extending transversely with reference to said means by which said means is carried from said member, said spring part being subject to transverse flexure when a filament contracts.

In witness whereof, I have hereunto set my hand this 8th day of March, 1907.

WILLIAM R. BURROWS.

Witnesses:

W. K. KEARSLEY,
CHAS. H. HEELEY.