A. W. BEUTTELL.

INCANDESCENT LAMP.

APPLICATION FILED APR. 21, 1909.

1,107,650. Patented Aug. 18, 1914.

Fig. 1.

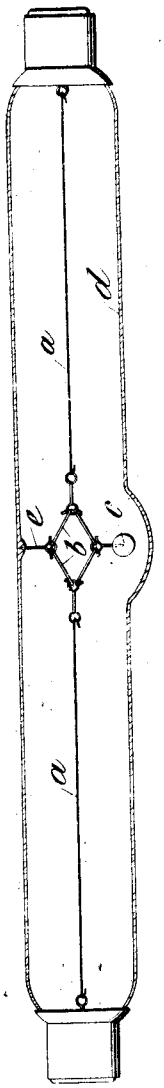


Fig. 2.

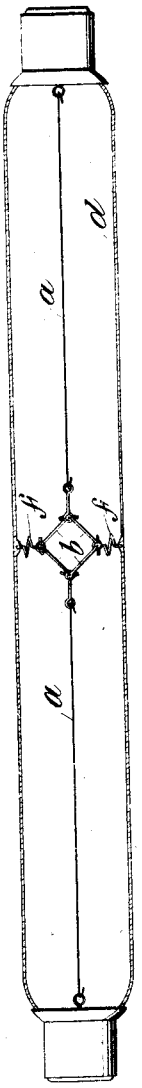


Fig. 3.

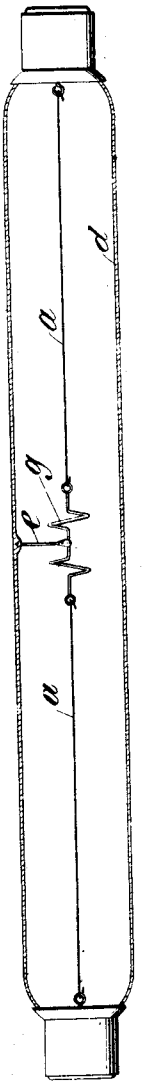
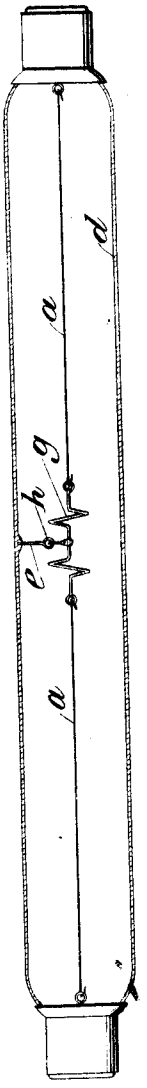


Fig. 4.



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INCANDESCENT LAMP.

1,107,650. Specification of Letters Patent. Patented Aug. 18, 1914.

Application filed April 21, 1909. Serial No. 491,386.

To all whom it may concern:

Be it known that I, ALFRED W. BEUTTELL, a subject of the King of Great Britain, and a resident of New York city, New York, have invented certain new and useful Improvements in Incandescent Lamps, of which the following is a specification, reference being had to the accompanying drawing, forming part hereof.

The object of the invention is to improve the construction of incandescent lamps of the straight filament type or variety, and particularly with reference to maintaining the filament in alinement at all times, and to the providing of an intermediate means of support for the filament which shall not be liable to cause the filament to rub or bend as it expands and contracts.

It has been proposed heretofore to maintain the alinement of the filament by providing a spring or some such device at one or both ends thereof in order to produce a sufficient tension along the filament to prevent it from sagging. Where, however, the filament is nine inches or so in length, for example, the degree of tension required along the filament to prevent sagging is apt to stretch or break the filament. In order that the spring or springs at the ends of the lamp may not be required to exert so great a tension along the filament, it has been proposed heretofore to supplement the spring or springs at the ends of the filament by the addition of intermediate supports for the filament, such supports obviously reducing the force required to be exerted at the ends of the filament, in order to keep it alined. But these supports have been open to the objection that the constant contracting and extending of the filament produced a rubbing contact thereof with the support or supports or caused the filament to bend constantly at the point or points of support, thus clearly weakening the filament at these points. Moreover, in such cases, where a lamp was dropped horizontally, the intermediate support would tend to produce a shearing strain upon the filament, and therefore a liability to breakage.

In accordance with the present improvements, the spring and support are combined in a single element located preferably near the center of the lamp.

The invention will be better understood upon referring to the drawings in which:

Figure 1 is a view in longitudinal section through a straight filament incandescent lamp, embodying the improvements, and Figs. 2, 3, and 4 are similar views showing other embodiments of the invention.

One of the characterizing features of the invention is that the intermediate support for the filament is movable, and thus may swing or bend toward either end of the lamp, or different parts of the support may swing or bend toward each end respectively at the same time, as the condition of the filament may require; whereas, in some older constructions, the spring was supposed to keep the filament alined by drawing it back and forth through the intermediate support. As before stated, where it was actually thus drawn through the support, it would develop a rubbing contact; but as was often the case, it would not be drawn through the support at all, but would bend upon the support, the part next to the spring being drawn taut, while the part on the other side of the support would be left sagging, unless, perchance, two springs were provided, one on each side of the support. In such case, there would be the continual bending of the filament at the point of support. Now, as distinguished from these older constructions, it will be seen upon reference to Fig. 1, that the intermediate support for the filament, which embodies the tension-producing member, may move with the filament toward one end or the other of the lamp, or toward both ends or the middle simultaneously. In the construction shown in the drawings, the filament *a* is divided, and in Figs. 1 and 2 the divided ends are attached to four loose links forming a scissors-like combination *b*, and constitute with a weight *c*, a tension member for the filament. This tension member is preferably anchored to the glass tube *d* in any suitable way as by a link *e*, one end of which is sealed in the tube, and thus said tension member constitutes the support for the filament as well as an alining means for the filament.

Fig. 2 illustrates how the weight *c* of Fig. 1 may be replaced by springs *f*, each of which has one end sealed in the tube. It will be observed that these springs are not included in the electrical circuit. Fig. 3 shows a spring *g* interposed near the center of the filament and anchored to the glass by a link *e*. Fig. 4 shows an arrangement very similar to Fig. 3, in which there is a joint, or the like, *h* in the link *e*, to permit a greater

freedom of movement of the spring support g to compensate for any inequalities in tension between the two sections of filament.

In all of the forms of lamp shown herein, it will be noted that parts of the intermediate spring support are movable in both directions sufficiently to accommodate the variations in the tension along the filament, and that in this way the filament may be kept alined at all times without any danger of becoming worn out or bent or broken by contact with or against an intermediate support. It will also be noted that the ends of the filament in each case are looped about or hooked into their supports instead of being sealed thereto, as heretofore. Such method of attachment has been found to be not only a convenient one to carry out from a manufacturing standpoint, but with the filaments thus attached to their supports, they are much less liable to fracture than when rigidly attached as by sealing.

In lamps of ordinary size, the spring support for the filament will generally be placed near the center of the lamp or filament, and this has an advantage from a manufacturing standpoint over a construction where there is a spring at the end, for, in the latter case, the spring is always in danger of being damaged by the "sealing-in process", whereas in the present case, it is out of the way, and would not be interfered with in sealing the ends of the lamp. In very long lamps, of course, the filament may have several intermediate supports, and advantage may even be taken of these supports to introduce the external supply current at one or more points throughout the extent of the lamp.

I claim as my invention:

1. An incandescent lamp having a filament, said filament having sections extending in opposite directions from the support and provided with a support for the filament, said support being anchored to the walls of the lamp-tube and including a tension-producing member.

2. An incandescent lamp having a filament comprising alined sections and provided with a support for the filament intermediate its ends, said support being flexibly anchored to the walls of the lamp-tube and including a tension-producing member.

3. An incandescent lamp having a filament with alined sections and provided with a movable support for the filament intermediate its ends.

4. An incandescent lamp having a filament comprising oppositely extending sections and provided with a spring interposed intermediate the sections, and means to anchor said spring to the lamp-tube.

5. In an incandescent lamp, the combination with a casing, and a plurality of spaced filament sections arranged end to end therein, of resilient means interposed between adjacent spaced filament sections and comprising members that engage the casing in order to maintain the filament sections substantially central therein.

6. An incandescent lamp comprising a casing, a filament therein, said filament having spaced sections, and separate resilient means in series with and located between the spaced filament sections.

7. In an incandescent lamp, the combination with a casing, and a system of conductors therein comprising a plurality of filament sections arranged end to end, of means for assisting in supporting the filament, the said means being movable within the casing.

8. In an incandescent lamp, the combination with a casing, of a system of conductors therein comprising a plurality of filament sections arranged end to end, and means between said sections for assisting in supporting the filament, said means being movable within the casing.

9. An incandescent lamp having a filament divided into a plurality of sections arranged in tandem and a member connecting said sections, which member acts as a tension means for the sections and also a means for limiting the lateral movement of the sections due to elements which extend laterally to at least one of the sections.

10. An incandescent lamp having a divided straight line filament and provided with a spring support for the filament interposed at a point of division of the filament, said support extending laterally relative to the filament.

11. An incandescent lamp having a filament divided into sections and provided with a yieldable support for the filament interposed at a point of division of the filament, said support extending laterally relative to adjacent sections of the filament that incandesces, said adjacent sections being arranged in endwise relationship.

12. An incandescent lamp having a divided filament comprising sections arranged in tandem and provided with a spring support for the filament interposed at a point of division which is between said sections of the filament, said support extending laterally to a section of the filament that incandesces.

13. An incandescent lamp having a tube, leading-in wires at opposite ends thereof, separated alined incandescing filament sections therein and means connecting the filament sections in series between the leading-in wires.

14. An incandescent lamp having a tube, separated alined incandescing filament sections therein and means carried by the tube and connecting the adjacent ends of the filament sections.

15. An incandescent lamp having a tube,

[illegible] at opposite ends thereof, [illegible] incandescing filament sections [illegible] between the [illegible] wires [illegible] connections [illegible] and connecting the adjacent [illegible] filament sections.

16. An incandescent lamp having a tube, leading-in wires at opposite ends thereof, separated aligned incandescing filament sections having tension means therefor and means connecting the adjacent sections to [illegible] the leading-in wires.

17. An incandescent lamp having a tube, separated aligned incandescing filament sections therein, tension means therefor and means connecting the adjacent [illegible] filament sections.

18. An incandescent lamp having a tube, separate aligned incandescing filament sections which are spaced apart and connected together by means which refer lateral support of the filaments to the walls of the tube.

19. An incandescent lamp having a tube and separate aligned incandescing filament sections which are spaced apart, connected together and restrained as to lateral movement by means communicating with the walls of the tube.

This specification signed and witnessed this 15th day of April, A. D., 1909.

ALFRED WILLIAM BEUTTELL.

Signed in the presence of—

LUCIUS E. VARNEY,

GRACE MCGRANN.