H. J. JAEGER.

INCANDESCENT LAMP WITH CONCENTRATED METALLIC FILAMENT.

APPLICATION FILED DEC. 17, 1914.

1,168,077. Patented Jan. 11, 1916.

Fig. 1.

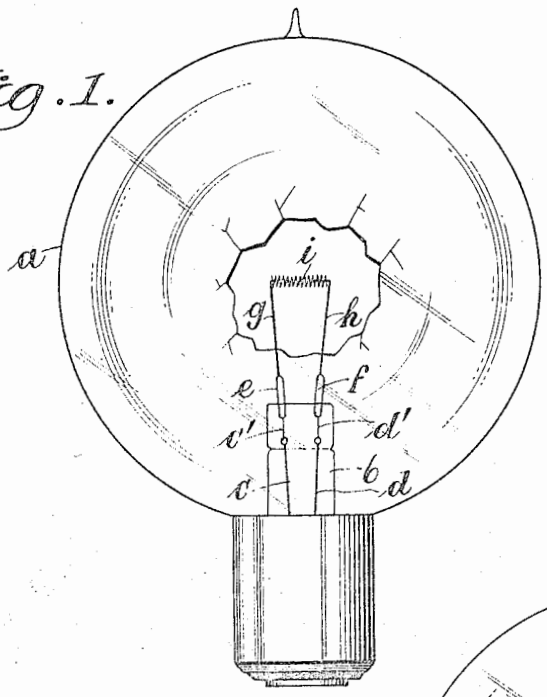


Fig. 2.

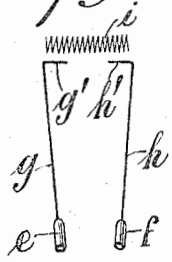


Fig. 3.

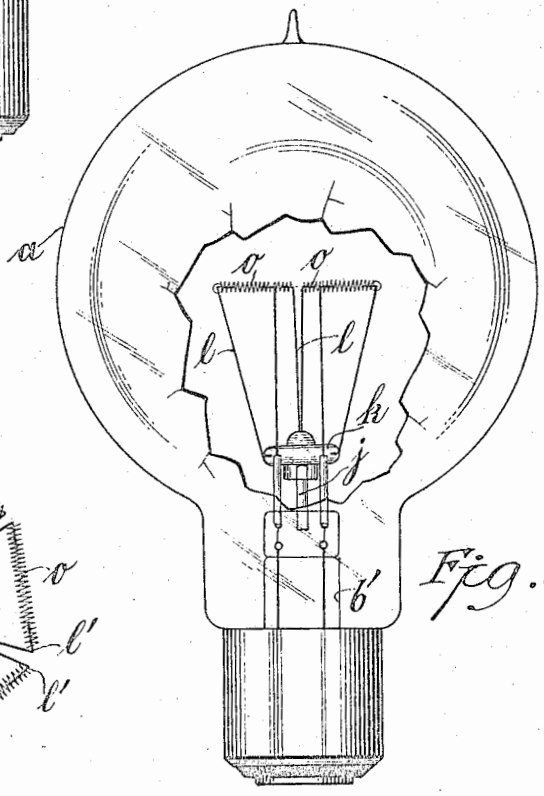
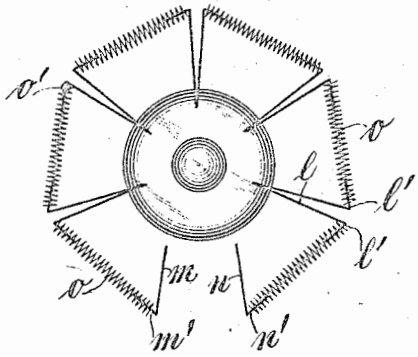


Fig. 4.



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INCANDESCENT LAMP WITH CONCENTRATED METALLIC FILAMENT.

1,168,077. Specification of Letters Patent. Patented Jan. 11, 1916.

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To all whom it may concern:

Be it known that I, HERMAN J. JAEGER, a citizen of the United States of America, and a resident of Weehawken, county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Incandescent Lamps with Concentrated Metallic Filaments, of which the following is a specification.

This invention has reference to improvements in metallic filament lamps.

It pertains particularly to lamps provided with so-called, concentrated metallic filaments as the incandescing body. These concentrated filaments contain a relatively long incandescing wire in a rather small space, therefore both the metallic filament and the light emitting therefrom are concentrated and the size of the bulky lamp globes may be reduced which is an advantage in shipping.

Heretofore incandescing filaments were permanently secured or attached to the leads, supports, or anchors. The present concentrated filaments, however, are loosely mounted on the leads, supports or anchors but certainly serve to complete the circuit. When rendered incandescent these loosely mounted concentrated filaments, although expanding, do not extend in the longitudinal direction, but shrink and become shorter by reason of their coiled construction. The single coils expand and extend, but as the filament is loosely mounted the single windings contract, they get closer together and the whole filament becomes shorter whereby the light is concentrated. It is evident that this construction of lamp insures perfectly safe transportation and the loss through breakage or bending while in railroad cars and the like is practically *nil* because this particular construction of lamp with a loosely mounted filament requires somewhat heavier leads of high fusion point and substantial supports or anchors within the lamp which do not bend so easily.

The novel lamp may be made both for high and low voltage and candle power. For small lamps, such as automobile head lights, a single short concentrated filament is sufficient while for high voltage and candle power lamps a number of short, concentrated metallic filaments are arranged in peculiar manner in series, representing a long filament in sections, all as will be fully described hereinafter with reference to the accompanying drawing, in which:

Figure 1 represents in elevation, partly broken away, an incandescent electric lamp with a concentrated metallic filament loosely mounted therein, embodying in desirable form the present improvements. Fig. 2 shows on an enlarged scale the leads and a short concentrated filament not yet mounted thereon. Fig. 3 illustrates in elevation, partly broken away, an incandescent lamp with a multiple of short concentrated filaments therein, arranged in series. Fig. 4 illustrates on an enlarged scale the arrangement of a multiple of short concentrated filaments in series as used in the lamp shown in Fig. 3.

Similar characters of reference denote like parts in all the figures.

In the drawing *a* represents the lamp globe, *b* is the stem or support and *c*, *d* are the leads. Each lead connects with a short platinum wire *c'*, *d'* in the usual manner. The other end of the platinum wire *c'* connects with a fine conductive tube *e* and the other end of the wire *d'* with a similar fine tube *f*. The lower portions of these fine conductive tubes accordingly are fused into the solid portion of the stem or support, together with the fine platinum wires, as shown in Fig. 1. From the fine conductive tube *e* a rather heavy terminal *g* rises and from the fine conductive tube *f* a similar terminal *h* also extends upward. The lower ends of these terminals are permanently secured to the conductive tubes *e*, *f* while the upper end portions *g'*, *h'* are bent inwardly at approximately a right angle thereto, as best shown in Fig. 2. These terminals *g*, *h* consist of highly refractory material of a high fusion point such as tungsten, for instance, they are of sufficient thickness so as not to become incandescent when the current passes.

The top end portions *g'*, *h'* of the terminals *g*, *h* are purposed to support a short concentrated metallic filament *i* which is composed of fine helical windings forming practically a tube because the windings are very close together. The short concentrated filament is loosely mounted on the said end portions *g'*, *h'* of the terminals. It may also be snugly thereon but is not secured or connected thereto in any manner of form. Such loose mounting of the concentrated

filament is effected very quickly which results in a saving of wages. The filament can not break, when cold or incandescent, through expansion and contraction; at the same time the conductivity and connection is perfect when heated up. During use the incandescent filament, being loosely mounted, expands in the direction of its windings but contracts in the longitudinal direction without strain because it is not permanently connected to anything. Unless willfully over-heated by current the loosely mounted filament is under no strain and the supporting end portions of the terminals do not fuse because they are relatively heavy and of material of a high fusion point.

The described lamp with a single concentrated tungsten wire spiral is preferably used for smaller lamps of low voltage and limited candle power as, for instance, automobile head lights. For lamps of high voltage and candle power which require a long filament these short concentrated filaments are arranged in sections, in series as shown in Figs. 3 and 4. In order to render this possible the stem b' is provided centrally with a short third tube j which carries a solid glass ring k from which a plurality of anchors l extend upward as shown in Fig. 3. The leads m, n are arranged in substantially the same manner as described in connection with Figs. 1 and 2 and their top end portions m', n' support each one end portion of a short concentrated filament o. The anchors consist of bent metal wires which are fused into the glass ring k. These anchors preferably are slightly separated toward the top and have end portions l' bent at practically a right angle thereto in opposite direction, as best shown in Fig. 4. Each of the end portions l' of the anchors l supports one end portion of a short concentrated filament. In this manner a multiple of short concentrated filaments may be mounted in one lamp in series because the inner ends of the anchors are insulated by the glass of which the ring k is composed. The current passing through one terminal then goes through one short concentrated filament, an anchor, a second concentrated filament, a second anchor, and so forth, and passes out through the second terminal. It is clearly understood by arranging any required number of short concentrated filaments in series, as described, any kind of lamp of high voltage and candle power may be produced. The anchors l or at least their end portions are also made of material of a high fusion point of such thickness as to make them good conductors and to prevent them becoming incandescent. The multiple of filaments of course cannot break during transportation because each one is loosely but preferably snugly mounted and under no strain when incandescent. Each filament may expand and contract independently without strain.

The same effect of an unstrained expansion and contraction of the filament is attained if one end of the filament is permanently secured to a short top end of a terminal as indicated at o' in Fig. 4. The free end of such filament certainly permits of any expansion in the herein described manner while the longitudinal contraction also takes place without strain.

I claim as my invention.

1. An incandescent electric filament lamp comprising conductive supporting means having free ends bent toward each other, and short concentrated incandescing means loosely mounted on the said free bent end portions of the conductive supporting means.

2. An incandescent metallic filament lamp comprising conductive supporting means having free ends bent at approximately a right angle toward each other, and short metallic concentrated incandescing means loosely mounted on the said free bent end portions of the conductive means.

3. An incandescent electric filament lamp comprising a multiple of conductive supports having the free ends of each adjoining pair of supports bent at approximately a right angle toward each other, and a short concentrated incandescing means loosely mounted on the said free bent end portions of each adjoining pair of supports.

4. An incandescent metallic filament lamp comprising a multiple of conductive supports having the free ends of each adjoining pair of supports bent at approximately a right angle toward each other, and a short concentrated metallic filament loosely mounted on the said free bent end portions of each adjoining pair of supports.

5. An incandescent metallic filament lamp comprising a multiple of conductive supports having the free ends of each adjoining pair of supports bent at approximately a right angle toward each other, and a short concentrated tungsten filament loosely mounted on the said free bent end portions of each adjoining pair of supports.

6. An incandescent metallic filament lamp comprising two leads with their free ends bent at approximately a right angle in opposite directions, a multiple of radially arranged conductive anchors having each two free ends bent at approximately a right angle in opposite directions, and a short concentrated tungsten filament loosely mounted on each pair of the said adjoining free end bent portions.

7. An incandescent metallic filament lamp comprising conductive supporting means having free ends bent at approximately a right angle toward each other, and short concentrated incandescing means secured

with one end and loosely mounted with the other end on the said free end portions of the conductive supporting means.

8. An incandescent metallic filament lamp comprising a multiple of conductive supports having the free ends of each adjoining pair of supports bent at approximately a right angle toward each other, and a short concentrated tungsten filament secured with one end portion to one of the said free bent ends and loosely mounted with the other end portion on the adjoining free bent end of another support.

Signed at New York, N. Y., this 15th day of December, 1914.

HERMAN J. JAEGER.

Witnesses:
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