

No. 768,479.

PATENTED AUG. 23, 1904.

D. J. O'BRIEN.
INCANDESCENT ELECTRIC LAMP.

APPLICATION FILED MAY 25, 1903.

NO MODEL.

Fig. 1.

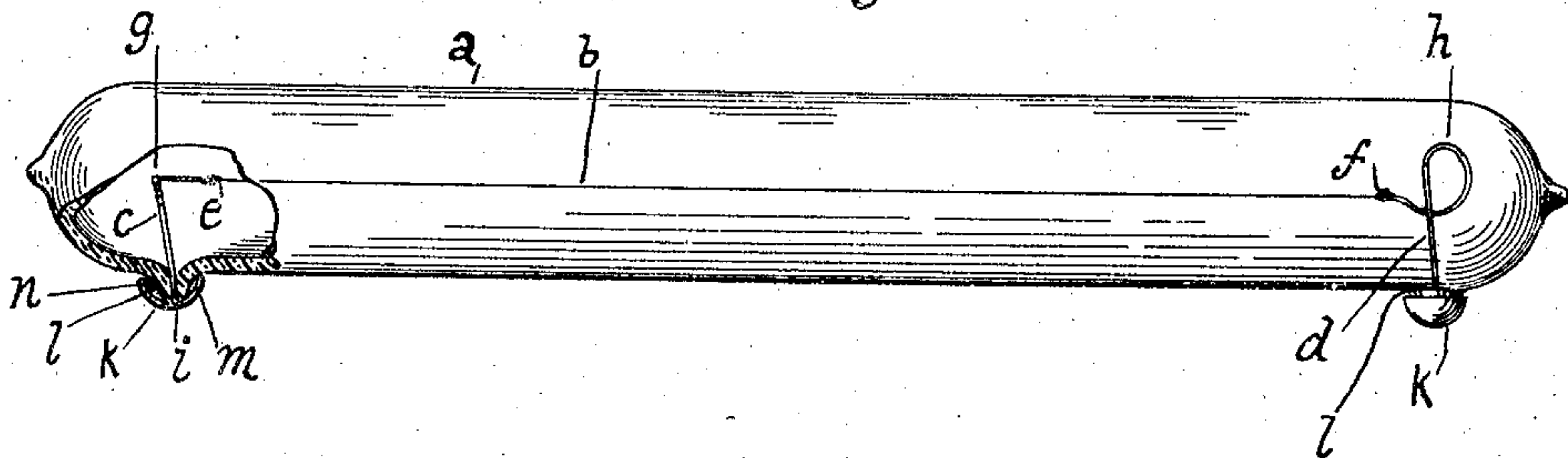


Fig. 2.

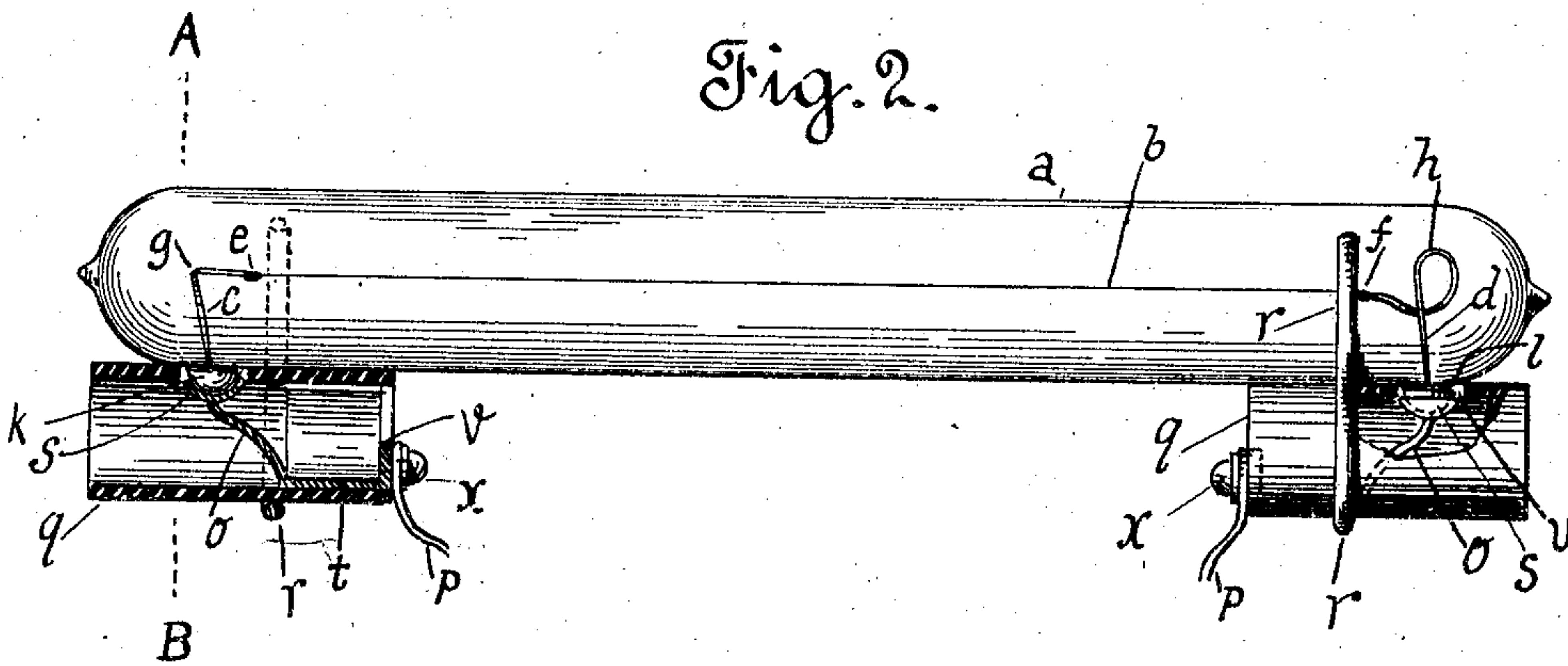


Fig. 3.

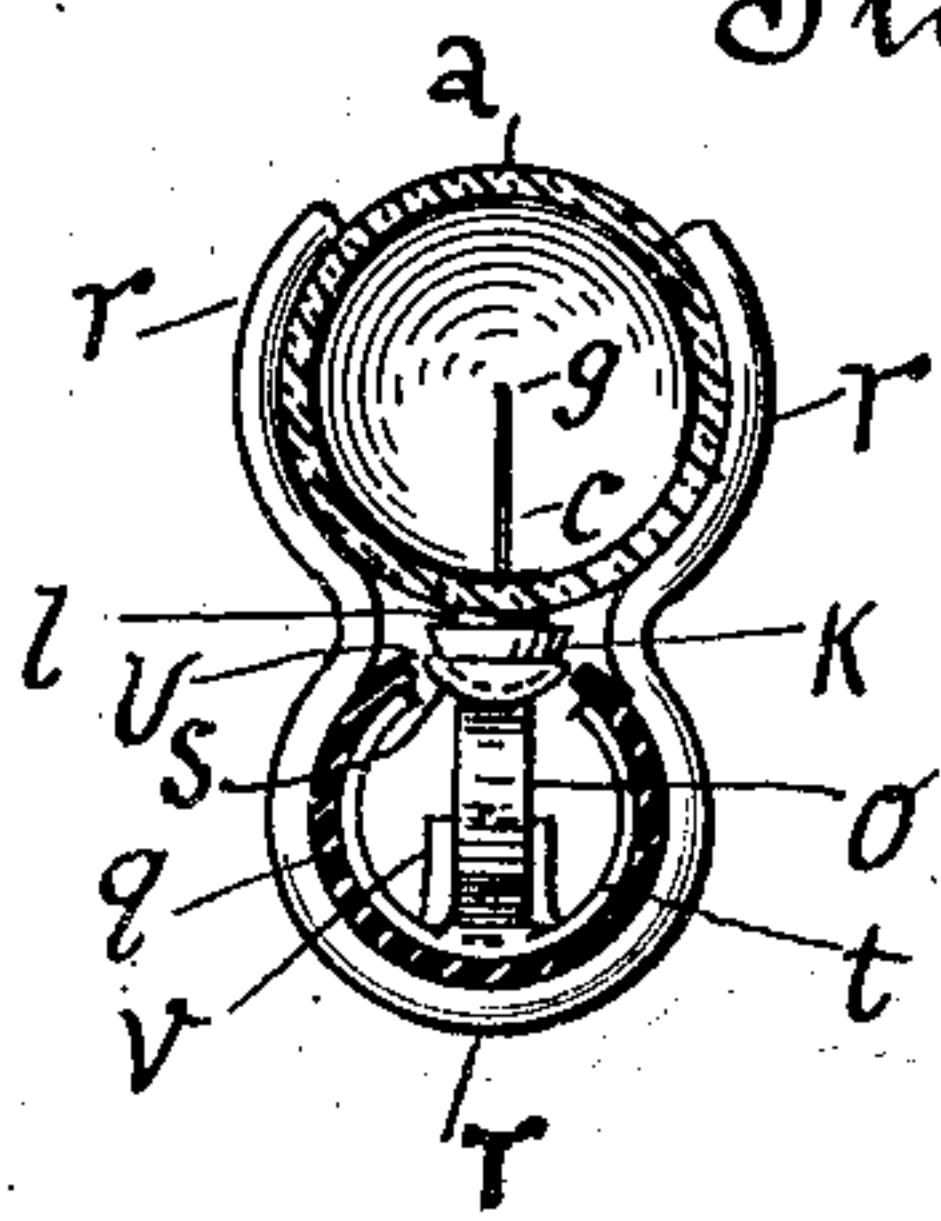


Fig. 4.

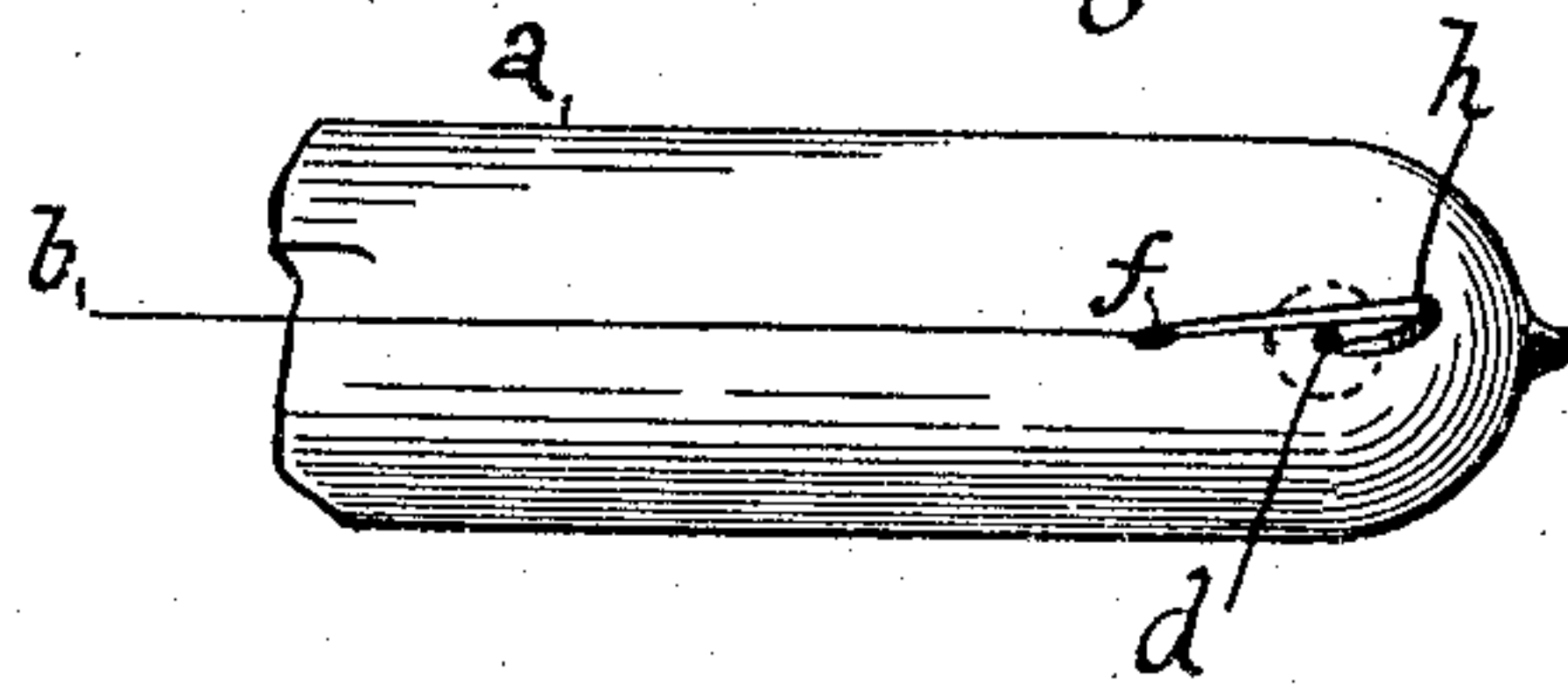
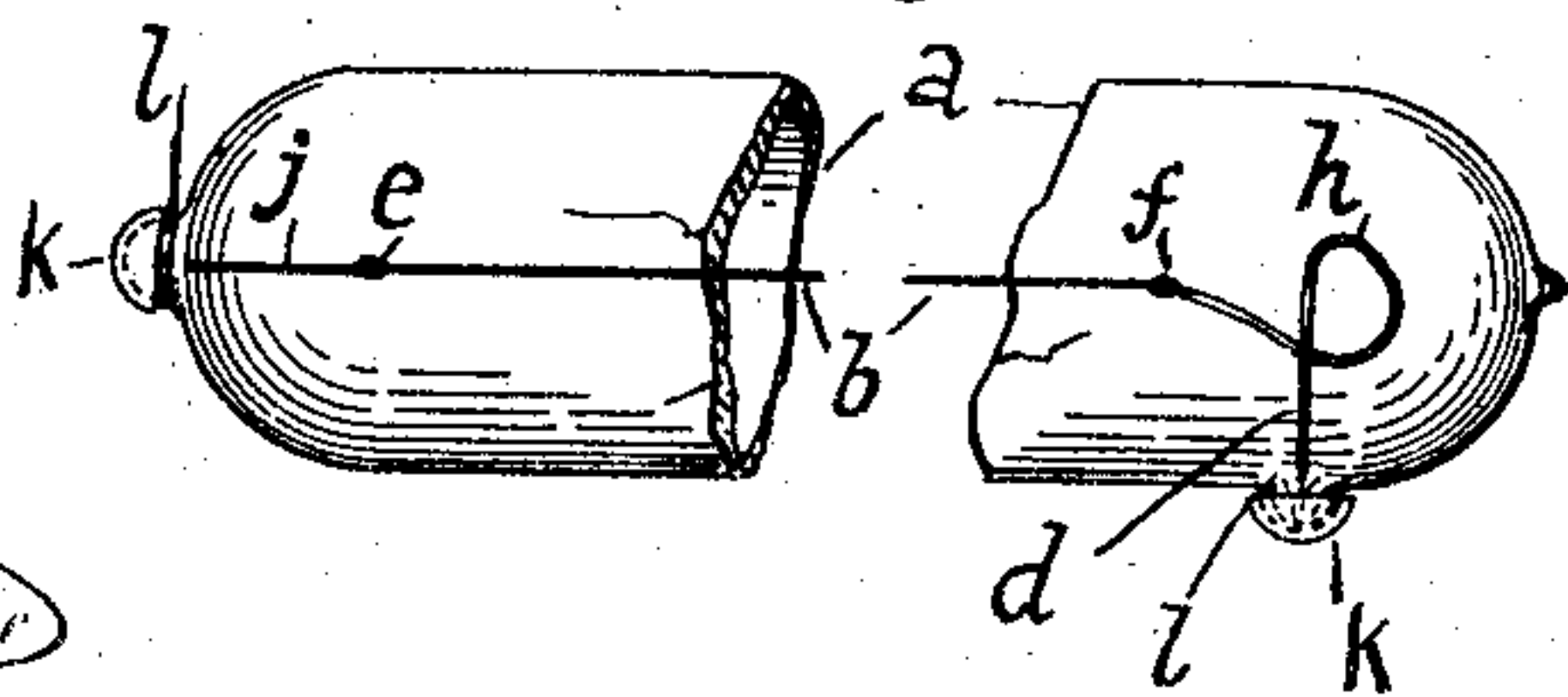


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

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INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 768,479, dated August 23, 1904.

Application filed May 25, 1903. Serial No. 158,726. (No model.)

To all whom it may concern:

Be it known that I, DENNIS JOSEPH O'BRIEN, a citizen of the United States of America, and a resident of the city and county of San Francisco, in the State of California, have invented a new and useful Incandescent Electric Lamp, of which the following is a specification.

The present invention pertains to that kind of electric light wherein the body of the lamp consists of an exhausted glass tube inclosing a filament which is disposed centrally in a single longitudinal line therein.

One object of the invention is to provide a novel means or method of holding up the filament within the tube, whereby its accurate adjustment and safe anchorage are secured previously to and without interference from the sealing of the tube, these operations now becoming less difficult to accomplish in the manufacture of this class of lamps.

A second object correlative of the above is so to anchor the filament as to keep it uniformly straight and under every thermal or antithermal condition, thereby preventing or at least minimizing its vibration from any cause and further precluding its coming into contact with or getting dangerously near the walls of the surrounding tube, owing to flexure, or by bowing or sagging, this notwithstanding the filament's greater than ordinary length and corresponding tenuity.

Another object is to reduce to the smallest practicable dimensions the metallic contacts needed to place the lamp electrically in circuit and to so locate the same that facing the lamp one will see nothing but the glass tube and filament therein nor anything else on any side except a tiny metal piece at either end, and when the lamp is lighted the viewer will behold an unbroken line of light and a luminous sheath therefor shining brightly from tip to tip with no furnishings or appendages to break its continuity and impair its brilliancy.

A further object is to provide a ready and convenient means of attachment for the lamp, whereby it can be suspended, framed, or

bracketed and held in any desirable position in perfect safety both as regards itself and its mounting.

A still further general object is to produce a superior lamp involving a mode of manufacture that is simplified and cheapened and easily practiced with better, surer, and more enduring results than heretofore.

Proceeding now to a detailed description of the invention, reference will be made to the accompanying drawings, in which every part hereinafter specified is illustrated and given its own designatory letter wherever it appears in the several figures.

Figure 1 is a side elevation showing the lamp partly broken and sectioned at one end in order to expose the manner of fixing the anchors for the filament in the under or rear wall of the glass tube and of appending thereto the metal contact-pieces. Fig. 2 is a similar view of the complete lamp with its contacts and attachments, the latter partially broken and sectioned. Fig. 3 is a cross-section on the line A B of the preceding figure looking to the right. Fig. 4 is a partial plan giving a top view of a spring-anchor seen in elevation in Figs. 1 and 2. Fig. 5 is a broken side elevation of a lamp embodying the same principle as that illustrated in the other views, but involving a variation in the method of anchoring the filament at one end.

The body of the lamp and the filament therein are respectively designated by the reference-letters *a* and *b*. The former consists of a transparent glass receptacle in the shape of a tube, usually straight and sealed at both ends. The latter is an ordinary carbon thread, but runs in a single line along the axis of its tubular envelop. Anchors *c* and *d* are provided at or near each end of the tubular lamp-body *a* in order to sustain the filament *b* within it in the correct central position, as shown in the various figures of the drawings. These anchors are conveniently made of platinum wire. In the preferred form of construction both anchors *c d* are fixed in the under side

or rear wall of the tube *a*, thence rise to about the middle of the tube transversely thereof, and after being bent away from the filament have their inner ends turned toward it, so as to be in line with and be jointed to its ends at *e f*, all as indicated in Figs. 1 and 2. The bend of the anchor *c*, it will be seen, is a plain angular bend *g*, while that of the anchor *d* constitutes a coil or loop *h*, which is flattened, as shown in Fig. 4, and forms a spring that tends to uncoil away from the filament and pull it oppositely to the anchor *c*. The latter-named anchor also has more or less of a spring action, and therefore the two anchors *c* and *d* can be considered as spring-anchors oppositely located and acting in opposite directions. To distinguish them structurally, however, the first may be called an "angular" spring-anchor and the second a "looped" spring-anchor. The outer end of each is sealed in the side of the tube, through which it passes and from which it slightly projects outward, as represented at *i* in the sectioned part of Fig. 1 on the left.

It is understood that the filament *b* is mounted in the manner above set forth, while the tube *a* remains open at both ends, and that all the work involved in securely anchoring it and adjusting it with adequate precision can be performed before the tube need be closed at either end. The manipulation of the several parts is thereby rendered easy as compared with what it is when both ends of the filament are jointed to straight platinum wires fastened to the corresponding extremities of the tube, as was done formerly and as is illustrated for the left end only of the tube in Fig. 5. It should be apparent that when the platinum wires extend straight out from the extremities of the filament in the manner last referred to, and consequently must be sealed in by closing the ends of the tube, the filament is not capable of the same delicate or thorough adjustment, nor can it be expected to give as good and lasting results as are obtainable by following the improved method herein disclosed. However, it is not necessary to leave both ends of the tube open till the filament is finally adjusted in order that fair results may be obtained, as Fig. 5 clearly demonstrates. In this figure only one of the two bent anchors is retained, the anchor *d*. The other, *c*, is replaced by a straight anchor consisting of a platinum wire *j*, sealed in one end of the tube *a*, the left end, as shown. The anchor *d* being retained, it will be readily perceived that the tension put upon the filament can be perfectly adjusted after closing the end of the tube in which the anchor *j* is sealed. The closing or sealing of the tube at the ends is equally well and easily effected in either case whether the anchors *c d* or *j d* be employed, and in neither case is it necessary or useful in exhausting the lamp of air to do so through a specially-made opening, as in the case of other

tube-lamps—that is to say, by using a lateral vacuum-tube or what lamp-makers term a "tubulating tube." Fig. 5 plainly shows in addition that it is not indispensable to have two spring-anchors. One will suffice, and the two anchors need not be located on the side or on the same side of the tube, the only essential requisite of their combination being that one of them, if not the pair, be transversely disposed with relation to the filament and shall at the same time exert an endwise pull thereon, which permits the filament to be completely adjusted before the tube is entirely closed or sealed as distinguished from the cases when such adjustment takes place or is attempted while the closing or sealing is being done. As the spring of the pair of anchors will relax outward or endward in the inclosing tube, it is evident that the filament will always be kept straight by and between them, the filament acting when cold or contracted to keep each anchor under a greater or lesser tension and when hot or expanded having its slack taken up by their said spring or springs becoming relaxed. Provision is thus made for an even or equable straightness of the filament whether it be burning or not or regardless of the presence or absence of the electric current under any climatic condition, and there is secured a single-line illuminator that can be more than double the length of the incandescing loop of the ordinary electric lamp without corresponding increase in cross-sectional area and whose length, in fact, is limited only by the voltage to be carried.

To properly adapt the lamp for connection in an electric circuit, the outer end of each one of the anchors *c* and *d* or *j* and *d* is covered with a small bell *k*, preferably of brass or copper, which bell also protects the sealed opening in the glass tube through which the said outer end of the anchor passes in each instance. As seen in Fig. 1, the glass is drawn out where the anchor passes through, forming a small outwardly-projecting gland *l*, which not only furnishes a congruent setting for the anchor, but also affords a convenient bearing for the bell. Each bell is soldered to its respective anchor end, as at *m*, Fig. 1, and is cemented to the glass, as at *n*, in the same figure. Were the bells to be large and their respective connections with the anchors extended, then they would not be soldered directly, as economy would require the use of intervening wires less costly than platinum or copper wires, for example; but such are not required with the small-sized bells shown in the drawings. Bells of approximately the size shown are used by preference because they are not seen from the face of the lamp when disposed as in Fig. 1, so that when the lamp is burning there is not a dark or an obscure spot on it anywhere throughout its length as viewed frontwise, both terminals of the lamp being on the side. This, it will be observed, is of

capital importance when several lamps are placed or fitted together—for instance, end to end or side by side—to form letters, figures, symbols, or characters of any sort or groups thereof, &c., either for ornamental or utilitarian purposes.

Connection with the source of electrical energy is established by placing the aforesaid bells *k k* of the tube *a* over spring-contacts *o o*, to which the circuit-wires *p p* are respectively attached and which spring-contacts are inclosed in insulating-tubes *q q*, held to the glass tube of the lamp by clamps *r r*. Two contacts, of course, are provided, and they are identical in form and construction, only they are oppositely turned. Each contact, as shown in Figs. 2 and 3, comprises a flat curved spring, (marked *o*,) a small cup *s* at the upper end thereof, adapted to receive the bell *k*, a partly-cylindrical base *t*, snugly fitting the interior of the thereto-appertaining insulating-tube at one end and holding up the said spring so that its cup *s* will be just below a hole or slot *u* in the upper side of the insulating-tube, through which hole or slot the corresponding bell *k* projects and reaches the said cup, and a small flange *v* at the end of the base that is remote from the spring, to which flange either wire *p* is secured by a screw *w*. The clamps *r* are spring-clamps and firmly grasp the lamp-body, so as to hold the insulating-tubes *q* and parts therein close enough to insure a perfect and permanent contact between the bells *k* and cups *s*. The tubes *q*, it will be noticed, completely insulate these clamps from the electric circuit and allow them to be connected with any ordinary frame or bracket, though it be composed partly or wholly of inflammable material, the lamp resting in the said clamps being thereby rendered quite safe in its application and use to the extent that it is believed to fully comply with the strictest municipal fire regulations that are in force anywhere.

It will be observed that I do not set forth the full and complete method of manufacturing the lamp, and particularly the means by which the filament is adjusted and anchored previously to the sealing of the tube, nor do I claim such portion of the process as is herein disclosed, for the reason that the process of manufacturing lamps of this description will form the subject-matter of another application, and therefore I have only disclosed so much of the process as is necessary to obtain a full and clear understanding of the invention presented, and I desire it to be understood that I reserve all rights relative to such process in so far as it is herein set forth.

I claim—

1. In an incandescent lamp, the combination with a receptacle, of a filament received therein, anchors located within the receptacle, the inner ends of the anchors extending in alinement with and secured to the ends of the fila-

ment, the outer ends of the anchors protruding exteriorly of the receptacle and means engaging the outer ends of the anchors and connected with a source of electrical energy, the terminal ends of the anchors within the receptacle extending transversely to the filament and the walls of the receptacle and means for supporting the receptacle.

2. In an incandescent lamp, the combination with a tube, of a filament therein, anchors, the inner ends of which anchors are secured to the filament, the terminal ends of the anchors within the tube extending approximately transversely to the inner ends thereof and the filament and protruding from the tube at points at a distance from the sealing-points of the tube.

3. In an incandescent lamp, the combination with a tube, of a filament therein, and means for constantly and automatically sustaining the filament in a straight line, the means comprising an anchor-conductor secured to one end of the filament and protruding exteriorly of the tube, the terminal end of the anchor-conductor within the tube extending substantially transversely to the walls of the tube and to the filament.

4. In an incandescent lamp comprising a tube sealed at its opposite ends, the ends being uncovered, a filament within the tube and anchor-conductors secured to the filament the anchors located within the tube, one of the anchors comprising an approximately angular member and the other anchor comprising an angular member having a coil formed therein, the inner ends of the anchors secured to the filament in alinement therewith, the outer ends of the anchors extending approximately transversely to the inner ends and protruding through the longitudinal walls of the tube at points at a distance from the sealed ends thereof.

5. In an electric lamp, the combination with a tube sealed at its opposite ends, of a filament within the tube, anchors within the tube secured to the filament, the terminal ends of the anchors protruding from the tube at points at a distance from the sealed ends thereof, the walls of the tube formed into a gland about each protruding end of the anchors, contact-bells secured to the protruding ends of the anchors, the bells each secured to the gland as well, a suitable support for the tube and means carried by the support and connected with a source of electrical energy, the means adapted to have removable engagement with the contact-bells.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DENNIS JOSEPH O'BRIEN. [L. s.]

Witnesses:

A. H. STE. MARIE,
F. B. WORLEY.