

No. 892,332.

PATENTED JUNE 30, 1908.

O. M. THOWLESS.
ELECTRICAL INCANDESCENT LAMP.
APPLICATION FILED OCT. 26, 1908.

Fig. 1.

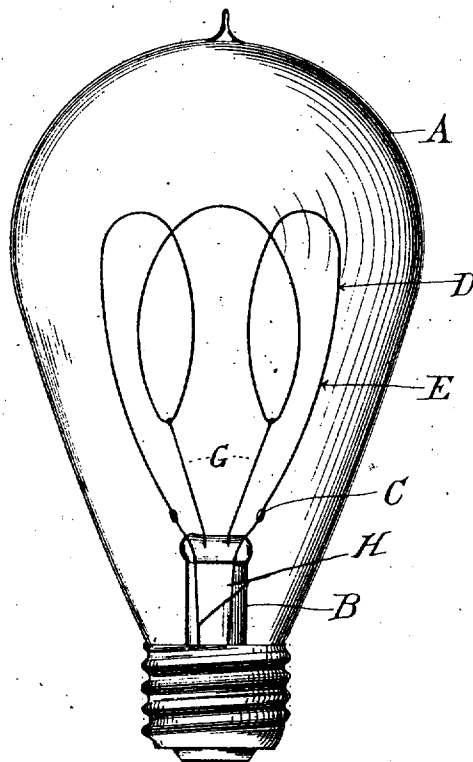
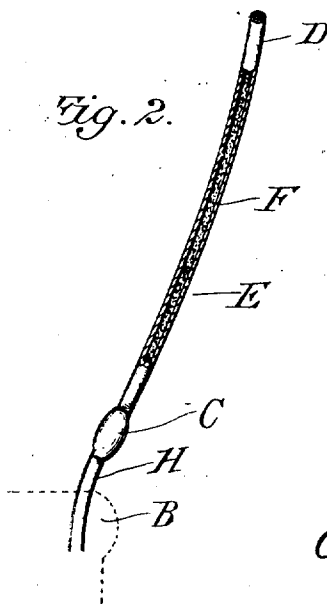


Fig. 2.



Witnesses
Edward C. Rowland
Arthur J. Thowless.

Inventor
Orlando M. Thowless.

UNITED STATES PATENT OFFICE.

ORLANDO M. THOWLESS, OF NEWARK, NEW JERSEY.

ELECTRICAL INCANDESCENT LAMP.

No. 892,332.

Specification of Letters Patent.

Patented June 30, 1908.

Application filed October 26, 1906. Serial No. 340,723.

To all whom it may concern:

Be it known that I, ORLANDO M. THOWLESS, a subject of the King of Great Britain, residing at Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Electrical Incandescent Lamps, of which the following is a specification.

The present invention relates to electrical incandescent lamps and more particularly to the class of lamps having filamentary glowers, and consists of a glower, placed in a vacuum-bulb and connected with leading-in wires, formed of a tube of metal of homogeneous, ductile and highly refractory character, having a filling of closely-packed refractory metallic oxid material, which, when properly packed, shall produce a body, capable of being drawn and wrought into a filament, which shall be pliable and of such ductility that it can be drawn around supports in the bulb without danger of breakage, in the same manner as though it were made of solid metal throughout, and the object of this invention is to produce an electrical incandescent lamp with a glower having the qualities of a ductile metallic filament, with the added quality of a higher electrical resistance for the same length and cross-section as a metallic filament would have if made of the same metal entirely. To attain this object I take a hollow cylinder of highly refractory metal, such as substantially pure tantalum, or of an alloy of substantially pure metals of the vanadium group, possessing ductility and having the quality of being capable of manufacture into tubes, or of some other refractory ductile metals or alloys, or of some one or more metals of the platinum group, such as platinum, or an alloy of platinum with osmium, or with iridium, or with rhodium, or with ruthenium, or with any or all of these, and in such cylinder I pack a refractory substance, such as thorium, or magnesia, or ceria, or zirconia, or yttria, or terbia, or other refractory oxid. The material selected for the filling should be in a fine powder, and must be tightly packed in the metal cylinder, and any air, moisture or occluded gases should be, as much as possible, driven from the filling material, or a rupture of the walls of the glower might be caused during the operation of drawing down. The cylinder, when properly packed, is then treated as though made of solid metal in the

manner employed in drawing wire. It will be found when the wire, as it may be termed, is drawn or worked, the result will be a tubular shell of metal containing, all through the interior, a uniform, closely-packed, continuous core of non-conductive refractory material, the finished wire with the core being perfectly pliable and ready for cutting into lengths. Each length can then be placed in a lamp bulb; connected with leading-in wires, by means of cement or solder, or fastened or attached to them in any proper way; sealed and the bulbs exhausted and finished in the old and well-known manner, and the lamp is ready for use. The bulb may contain indifferent gases instead of being exhausted.

While, for ordinary purposes, the filamentary form of glowing body may be used, a rod or rods may, for higher candle-power, be requisite, as such rods will be found to be quite economical, for only the metallic part will take current if proper refractory material is used for the core.

When the filament is finished the result will be an incandescing body for electrical glow-lamps formed of a conducting metallic exterior containing a continuous ductile core, non-conductive at all temperatures at which the filament is operated, therefore the metallic part only will take current so that the resistance for a given length and cross-section will be enormously raised as compared with a filament made of solid metal having the same dimensions. This is of the highest importance as filaments, made of solid refractory metals, are of such low resistance that it is found necessary to make them of so great a length as to limit the use of filaments made of tantalum, niobium, molybdenum, tungsten, vanadium, osmium, ruthenium and others, while with my invention metals of ductility may be used of shorter lengths for the same resistance.

In making the filaments great care must be taken in the annealing to prevent any carbon coming in contact with the metal, as a carbide might be formed with the metal when it is heated. In some instances it may be desirable to use metals of the platinum group, but only those having the quality of ductility will be of service. Also alloys of the platinum group may be used in some cases, such as platinum and iridium, platinum and ruthenium, or rhodium, or osmium,

or palladium, or any of these which would form ductile refractory alloys, or single metals may be used of the above, if ductile.

The words "non-conducting" and "non-conductive" used in this specification are to be understood as expressing that the materials mentioned as "non-conductive" or "non-conducting" are in a non-conducting electrical condition when cold and at all temperatures at which the filaments are operated.

In the accompanying drawings, Figure 1 is a view of an electric lamp illustrating my invention. Fig. 2 is an enlarged view of a portion of the filament of the lamp, a part of which is shown broken away to display its construction.

Similar letters refer to similar parts in both figures, in which A, is the lamp-bulb, B, the glass stem in which the leading-in wires are sealed; C, shows the cement or joint between the wires and the filament; D, represents the filament generally; E, is the metallic tubular shell part; F, the filling or core part; G, represents supports for the filament; while H, shows the leading-in wires.

In Fig. 2 the more particular construction of the filament is shown by E, the tubular shell; and F, the filling, while in Fig. 1 the letter D represents the filament as a whole.

Having thus described my invention, what I claim is:

1. An improved glower for electrical incandescent lamps, comprising a refractory non-conductive core having thereon a continuous coating of homogeneous refractory metal.

2. An improved glower for electrical incandescent lamps, consisting of a tube of substantially pure tantalum filled through-

out its interior with a compact core of refractory non-conductive metallic oxid.

3. An improved glower for electrical incandescent lamps, composed of a thin tube of ductile metallic tantalum containing a core of refractory non-conductive substance.

4. An improved glower for electrical incandescent lamps, having a high resistance as compared with solid metal, consisting of a tube of substantially pure tantalum containing a full and closely-united core of refractory non-conductive material.

5. An improved glower for electrical incandescent lamps composed of a thin shell of ductile metallic tantalum containing a core formed of refractory non-conductive substance.

6. An improved glower for electrical incandescent lamps consisting of a shell formed of wrought metal of the vanadium group and containing therein a core of refractory non-conductive metallic oxid.

7. An improved glower for electrical incandescent lamps consisting of a wrought filament formed of a shell of ductile metallic tantalum containing a pliable core of refractory non-conductive substance.

8. An improved glower for electrical incandescent lamps, composed of a ductile refractory metallic tube containing a compact pliable core of refractory non-conductive metallic oxid.

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

ORLANDO M. THOWLESS.

Witnesses:

HUBERT L. THOWLESS,
ARTHUR J. THOWLESS.