

UNITED STATES PATENT OFFICE.

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SUPPORT FOR METALLIC GLOW-FILAMENTS FOR ELECTRIC INCANDESCENT LAMPS.

1,047,541.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, ANTON LEDERER, a subject of the Empire of Austria-Hungary, residing at No. 83 Atzgersdorf, near Vienna, in the Province of Lower Austria and Empire of Austria-Hungary, have invented certain new and useful Improvements in Supports for Metallic Glow-Filaments for Electric Incandescent Lamps, of which the following is a specification.

This invention relates to improvements in supports for metallic glow filaments for electric incandescence lamps.

Supports of refractory oxids as used with lamps having glow filaments of osmium are not suitable for incandescence lamps having metallic glow filaments other than of osmium. For example, glow filaments of tungsten which burn with an economy of 1 watt per Hefner candle cannot be supported by means of hooks or eyes made of refractory oxids. It seems that at the points of contact of the glowing filament with the support there takes place oxidation of the metal and respectively reduction of the support in consequence of which processes the filaments are untimely destroyed at these points.

If electric incandescence lamps having glow filaments of tungsten the supports of which are made of oxids,—are supplied with alternating current, the phenomena above mentioned occur more rarely in consequence of the vibrations of the filament. However if such a lamp is placed in the circuit of a continuous current whereby the filament will not vibrate, it will be found, that the filament after a short time (12 to 48 hours) will be burned through at the point of contact with the support.

The purpose of the present invention is to provide supports mainly consisting of refractory oxids such, for example, as the oxids of the rare earths, of magnesium, aluminium or of mixtures of these oxids—also with electric incandescence lamps, the glow filaments of which are of tungsten or other metals.

For a better understanding of this invention, I will describe the processes already known according to which supports for osmium filaments are manufactured, viz: There is prepared an intimate mixture of about 10 parts by weight of pure thorium oxid and about 1 part by weight of magnesia. These oxids, in a finely divided or pow-

dered condition, are well ground to a paste by the addition of an organic viscous binding material, as, for instance, a solution of sugar. The paste thus produced is then shaped into flexible filaments, of suitable length, and one end of the filament is bent or fashioned into the form of a small loop, hook, or spiral, designed subsequently to engage the osmium filament at the required point of support. The paste filaments are then dried, and subsequently burned in free air until all the organic substance is consumed. Finally, they are subjected to the action of a very high temperature until the particles are sintered or fritted together.

In order to make supports manufactured as above described,—suitable for electric lamps having metallic filaments other than osmium I “metallize” such supports in the manner hereafter described:—The supports are impregnated with solutions of metallic compounds that may be reduced to metal, if necessary *in vacuo*, in order to remove the gases contained in the supports and to permit of a more uniform distribution of the liquid in the support. Then the hooks, loops or similarly shaped supports after having been dried (eventually only in free air) are heated in reducing gases. For example, the supports manufactured of thorium oxid are impregnated with solutions of meta-tungstic acid, colloidal tungstic acid, of the ammonium—or eventually amino-salts of tungsten,—the thio-tungstates, then they are dried and heated in suitable vessels at the required temperature in a current of hydrogen. The supports thus heated are then allowed to cool in the reducing gas. The so cooled supports are all of a bright gray color and even under the microscope no places of another color may be discovered.

It is obvious that the supports may be subjected repeatedly to the process described, in order to increase the metallizing of the support of oxid, especially on the surface of same.

Supports may be metallized also in the following manner: If the supports,—consisting of refractory oxids,—are exposed to the action of vapors of halogen compounds of tungsten or of molybdenum or if they are introduced into the molten halogen compounds of these metals, they may be provided with metallic coatings or be metallized thoroughly, in the presence of reducing agents.

By means of the described process supports of oxid may be metallized with nearly all difficultly fusible metals. The so obtained metallized supports of oxid possess the advantages of metallic supports without their disadvantages, viz: If metallic supports are used, the incandescent filaments in consequence of the high conductivity of the metals are deprived at the points of contact (of the filament and the support) of so much heat that they show dark (non-incandescent) places. The supports of pure oxid suffer from the defects before mentioned. Under circumstances, supports made of carbon may be exposed to a similar treatment but in general, the use of refractory oxids is preferable.

It will be understood that by first making the strips of the refractory oxids with appropriate binding material, drying and sintering them and then impregnating them to such extent as they will receive the metallic solutions, a small quantity of the metal will be added but this, of course, is relatively small.

I am aware that it has been proposed to construct conducting filaments for incandescent electric lamps of mixtures of refractory oxids and metals, but in such in-

stances it is desirable that the metal should largely predominate in order to render the filament conductive.

The supports produced by the process herein described, not being intended for conducting purposes, serve their function better than would any support having a large portion of metal and furthermore they could not be used as filaments.

What I claim as my invention, and desire to secure by Letters Patent is:—

1. Supports for metallic glow filaments of electric incandescent lamps consisting of a preponderance of refractory oxids impregnated with a difficultly fusible metal, substantially as described.

2. Supports for metallic glow filaments of electric incandescent lamps consisting of a preponderance of refractory oxids and an impregnation of difficultly fusible metal distributed thoroughly in the mass of the oxids, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

ANTON LEDERER.

Witnesses:

ALVESTO S. HOGUE,
AUGUST FUGGER.