Nov. 2, 1926. 1,605,087

C. A. WELLER

METHOD OF AND APPARATUS FOR GETTERING FILAMENTS

Filed Dec. 8, 1923

Fig. 1.

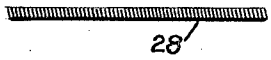


Fig. 5.

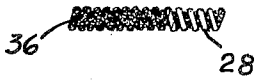


Fig. 4.

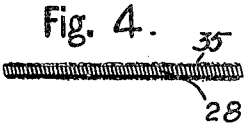


Fig. 2

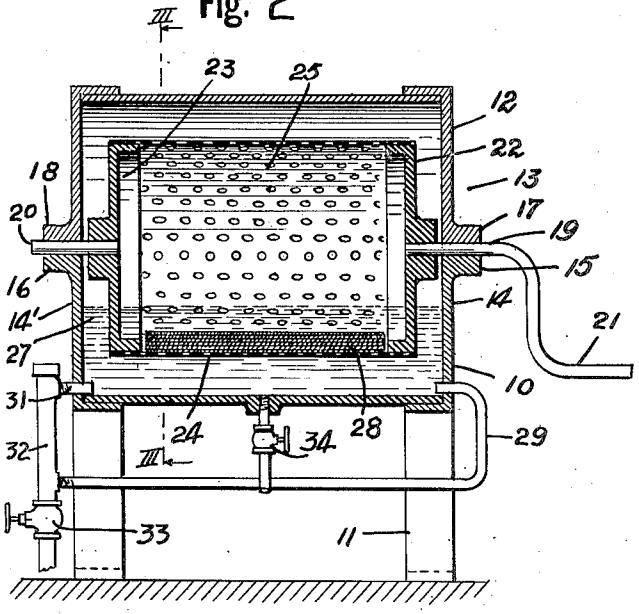
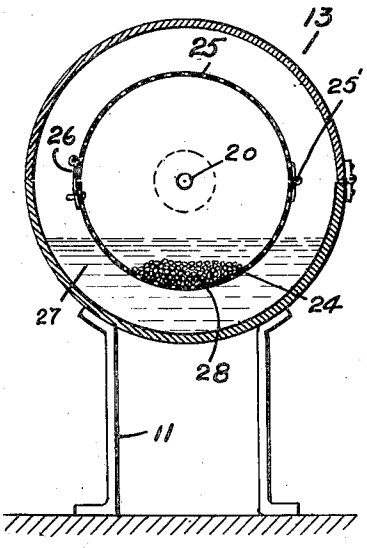


Fig. 3.



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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR GETTERING FILAMENTS.

Application filed December 8, 1923. Serial No. 679,296

This invention relates to incandescent electric lamps and more particularly to a method and apparatus for applying a substance to a filament of such lamps to prolong the useful life thereof.

One of the objects of the invention is to provide a method for controlling the amount of getter disposed within a lamp.

Another object of the invention is to utilize the interior of the coiled filament for the disposition of getter material.

A further object of the invention is to so dispose a quantity of getter upon a filament that any surplus amount of getter material may be removed without disturbing a definite portion of deposited material.

A still further object of the invention is to provide an apparatus in which coiled filaments may have their interior filled or partially filled with a getter material and in which surplus surface deposits of such material may be expeditiously removed.

Other objects and advantages will be apparent as the description proceeds.

The manufacture of incandescent electric lamps includes a step comprising the activation of a getter material or clean-up agent within the lamp after the same has been subjected to an exhausting operation.

The getter material may be deposited upon the filament and, after the exhausting or inert-gas-filling operation, activated by bringing the filament to incandescence or by other means, in order that a clean-up action may be effected on the gas within the lamp, as well as a candle-power maintenanec action, if desired.

The getter material may be in finely divided form and mixed with a binder or vehicle and has heretofore been either sprayed or applied with a brush to the filament or the mount has been dipped therein. This manner of depositing a layer of getter material upon a filament has been found to present certain disadvantages, for example, the thickness of the layer applied cannot very well be controlled and an uneven distribution of the getter results in masses or beads which cause deterioration of the filament and produce a deleterious effect, reducing the useful life of the lamp.

Furthermore, it is difficult to regulate the amount of material deposited upon the filament, as can readily be appreciated from the fact that a spraying or painting operation will result in a thicker or thinner layer, depending upon the time interval or instruments used for application.

For example, it is extremely difficult to control a spraying operation particularly since it is desirable to apply a relatively thin layer of material. The painting, by means of a brush, is likewise difficult to control since the thickness of the layer applied will, to a great extent, depend upon the pressure which is variable with each person who performs this operation.

My invention surmounts these difficulties by utilizing the interior capacity of a coiled filament as a container for a definite amount of getter material. The getter is introduced into the interior of the coil by reason of its capillary attraction and the amount of getter material; that is, the solids introduced into the coil may be determined by the size of the particles and by the pitch of the coil.

It will be appreciated that the percentage of solids in a getter, in a measure, effects the final percent of getter deposited within the coil of a filament. Furthermore, the pitch of the coils is a factor in governing the absorbing power of the filament coils, since it will be obvious that when a coarse grained getter is used for coils of relatively small pitch, a relatively small amount of getter solids will be absorbed within the coils.

When the coils are immersed in a well-agitated getter bath, the coils absorb the getter, the solids thereof passing into the coil center through the space between the coiled sections of the filament, the width of which space is determined by the pitch of the coil. The getter solids also pass through the open ends of the coils. When the coils are removed from the getter and dried, the liquid vehicle or carrier evaporates leaving getter solids and binder within the coils as well as upon the exterior thereof. The exterior deposits of getter material are removed by friction or otherwise, while the solid getter between the pitch of the coils and throughout their centers remains intact. Thus when all external getter is removed, the coils retain a definite percent of solid getter, subject to an arbitrary range.

An apparatus for practicing the invention may comprise a trough for the getter material and a perforated container in which the

sections of coils may be positioned so that they may be immersed in the getter material. After such immersion, the coils may be dried and the container rotated to effect a milling or tumbling operation of the coils, thus causing a removal of surplus deposited getter by mechanical abrasion between the coils.

One form of apparatus for practicing my invention will be more fully understood by reference to the annexed drawing, in which—

Fig. 1 is an enlarged side view of one type of coil to which getter material may be applied;

Fig. 2 is a vertical section of an apparatus for immersing and tumbling the coils;

Fig. 3 is a transverse sectional view taken on line III—III of Fig. 2;

Fig. 4 shows a coil prior to the tumbling operation and a layer of getter material is indicated therein by dotted lines; and

Fig. 5 is an enlarged section of a coil broken away to show a core or deposit of getter material therein.

An apparatus for carrying out the present invention may include a trough 10 supported on legs 11 and may be provided with a cover 12. The trough with the cover in place thereon may constitute a cylindrical casing 13 having closed ends 14 and 14'. The trough portion of the casing may be provided with half bearings 15 and 16 and the cover portion may be provided with half bearings 17 and 18. The said bearing portions may be disposed so that shafts 19 and 20 may be journaled therein and may be rotatable on the axial line of the casing. The shaft 19 may be provided at one end with a crank 21 and may be secured to a head 22 at its other end. One end of the shaft 20 may be secured to a head 23 and may have the opposite end thereof journaled in the end 14' of the casing 13. The heads 22 and 23 may be of circular form and may have secured therearound, a perforated sheeting or screen to constitute a barrel or drum. The drum may consist of two sections 24 and 25, the section 24 being permanently secured to the heads 22 and 23, the other section 25 being connected by a hinge 25' to the section 24 and adapted to be lifted to permit access to the interior of the drum.

A latch 26 may be provided to lock the section 25 in a closed position. The sections 24 and 25, which constitute a barrel or rotatable drum, may be positioned with the shafts 19 and 20 mounted in the bearings of the casing 13 and so disposed within the casing that, when a quantity of getter material 27 is placed in the trough 10, a segment of the drum will be immersed therein. A plurality of sections of coiled filament 28 may be disposed in the lower portion of the drum or barrel for immersion in the getter. For the purpose of more positively causing the entrance of the getter material into the interior of the coils, the getter material is agitated by means of air introduced through pipes 29 and 31, which may be connected to an air pressure line 32, a control throttle valve 33 being provided.

During the agitation of the getter, the barrel in which the filaments are positioned may be rotated by a manipulation of the handle 21. It is obvious, however, that if desirable, the barrel may be automatically rotated. After the coils have been immersed in the getter for a given time interval, the getter may be drained off by opening a cock 34. After the coils have been subjected to the bath of getter and the getter has been removed from the trough, the coils will have received an internal and a surface deposit of getter 35 which is indicated by a dotted outline in Fig. 4. The cock 34 may then be closed and the valve 33 operated to permit a gentle current of air to pass over the coils which are dried, during a continued rotation of the barrel, which rotation causes a rubbing action by reason of the tumbling of the coils in the barrel, resulting in a mechanical abrasion and a removal of a surface deposit of getter material.

After the coils have been immersed in the getter and have been tumbled to remove exterior surface deposits of getter material, they are in condition for use in incandescent electric lamps. The getter within the interior of each coil will be in the form of a core 36, as shown in Fig. 5, which is an enlarged sectional view of a filament 28.

It will be appreciated, that when practicing the invention as above set forth, a plurality of sections of coiled filaments will be provided having a core of getter material and that such core will be a definite quantity and may be predetermined. The production of coils having an interior core of getter material provides a desirable new article of manufacture, inasmuch as such prepared coils may be readily handled and when it is desired, sold as finished lamp parts.

The advantage of the interior deposit will be appreciated when it is understood that after a section of filament has been gettered, it is necessary before the incorporation thereof in a lamp, to subject the coil to a considerable amount of handling.

With getter applied to the surface, certain detrimental effects result, inasmuch as contact with other bodies tend to remove portions of the coating, thus an uneven activation follows when the getter material is vaporized for use as a clean-up or candle-power maintenance agent.

Although a preferred method of practicing my invention is described and an apparatus for carrying out such method is shown it is obvious that modifications may be made

therein without departing from the scope of the invention as defined by the appended claims.

What is claimed is:

1. The method of applying a getter to a coiled filament which comprises immersing the filament in a getter compound until an amount of said substance becomes deposited within the interior of and on the outer surface of the coil and in removing the outer deposit of said substance.

2. The method of applying getter to a coiled filament which comprises immersing the filament in a getter compound until an amount of such compound becomes deposited on the coil and in abrading the surface of the coil to remove surface deposits of said compound.

3. The method of applying a substance to coiled filaments which comprises immersing the filaments in a getter compound until an amount of such compound becomes deposited thereon and in tumbling said coils to remove a portion of said deposit.

4. The method of applying a getter to filaments which comprises immersing the filaments in a getter, agitating the getter to effect a deposit of getter material thereon and removing a portion of said getter from the coils.

5. The method of applying a getter to coiled lamp filaments which comprises immersing the filaments in a getter solution, agitating the solution to effect a deposit of getter material within the coils and mechanically abrading the coils to remove deposits of getter which adhere to the outer surfaces of the coils.

6. The method of applying a getter to coiled lamp filaments which comprises immersing the filaments in a getter solution, agitating the solution to effect a deposit of getter material within the coils and tumbling the coils to cause a mechanical abrasion thereof to remove deposits of getter material which adhere to the outer surfaces of the coils.

7. The method of gettering coiled filaments which comprises immersing the filaments in a getter material, removing the filaments from said material, drying said materials and in mechanically abrading the filaments to remove getter deposited on the exterior surfaces thereof.

8. The method of applying a getter to coiled filaments which comprises immersing the filaments in a getter material, agitating the material to cause a deposit thereof within said coils, removing the getter material, drying the coils by passing a current of air thereover and mechanically abrading the coils to remove surface deposits of getter material which adhere to the outer surfaces of the coils.

9. An article of manufacture comprising a coiled filament for incandescent electric lamps having a filling of getter material between the coils thereof.

10. An article of manufacture comprising a tubular filament for incandescent electric lamps having a core of getter material.

11. An article of manufacture comprising a helical filament for incandescent electric lamps having an internal deposit of predetermined amount of getter material.

12. An article of manufacture comprising a coiled filament for electric incandescent lamps having an interior deposit of getter material, said filament being free from exterior deposits of said getter.

13. A tubular filament for incandescent electric lamps having an internal deposit of getter material, said filament being free from external deposits of said material.

14. An article of manufacture, a filament for incandescent electric lamps comprising a helical filament having an internal deposit of getter material, said filament being free from external deposits of said material.

In testimony whereof, I have hereunto subscribed my name this 7th day of December 1923.

CHARLES ARTHUR WELLER.