

Nov. 21, 1944.

J. FLAWS, JR

2,363,055

COATING APPARATUS

Original Filed Jan. 14, 1942

Fig. 1.

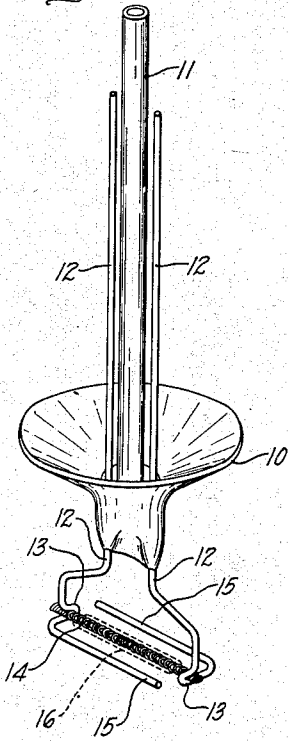


Fig. 2.

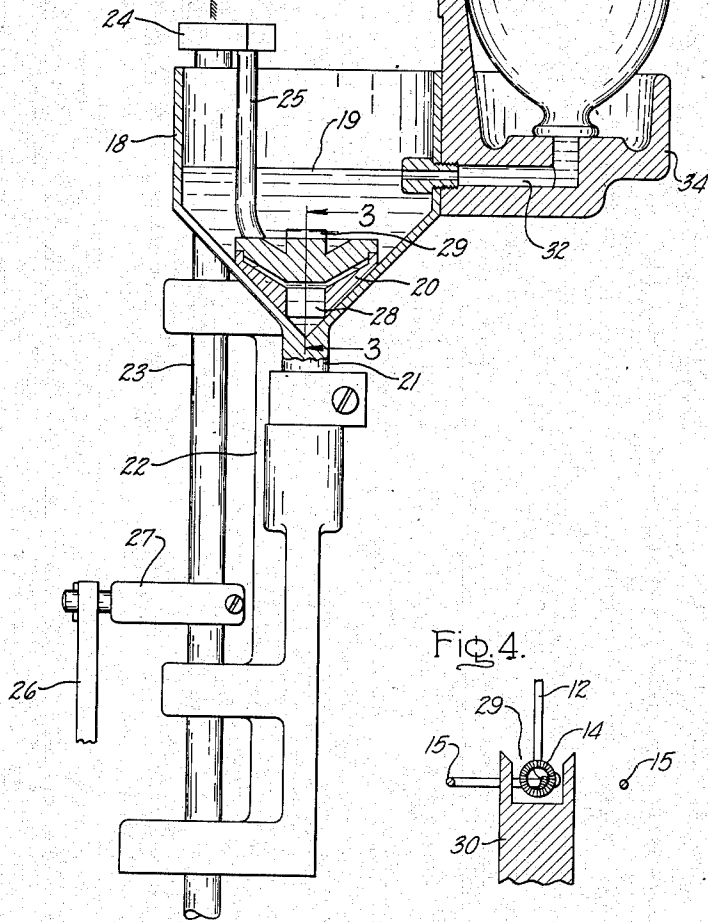
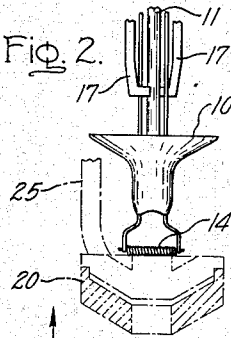


Fig. 4.

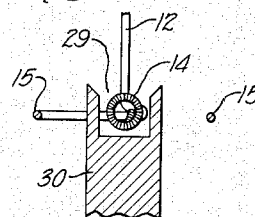
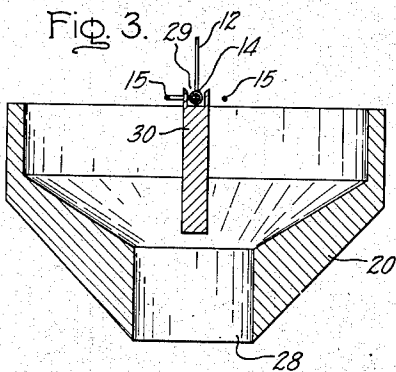


Fig. 3.



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UNITED STATES PATENT OFFICE

2,363,055

COATING APPARATUS

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Original application January 14, 1942, Serial No.
426,766. Divided and this application May 29,
1943, Serial No. 488,955

6 Claims. (Cl. 91-46)

My invention relates to apparatus for coating filaments for electric lamps or similar devices. This application is a division of my application Serial No. 426,766, filed January 14, 1942.

One of the objects of my invention is to provide apparatus which will apply a liquid coating to a definite portion of a coiled filament. More particularly, it is an object of my invention to provide apparatus which will apply a coating material to a coiled filament which is secured at its ends to portions of lead-in wires of a lamp mount, without applying the coating material to the joints between the said lead-in wires and the ends of the filament or to any portion of the lead-in wires.

Further objects and advantages of my invention will appear from the following description of a species thereof and from the drawing.

In the drawing, Fig. 1 is a perspective view of a lamp mount carrying a filament or cathode which is to be coated; Fig. 2 is an elevation, partly in section, of coating apparatus comprising my invention; Fig. 3 is a section, along line 3-3 of Fig. 2, showing a dipper or applicator portion of the apparatus; and Fig. 4 is a detailed sectional view of a trough portion of the applicator.

Fig. 1 illustrates one form of mount carrying a filament which is coated by the apparatus comprising my invention. This mount is of the type disclosed and claimed in my Patent No. 2,312,245, dated February 23, 1943, and it comprises a flare or stem tube 10, an exhaust tube 11, and leads 12 which extend through the seal joining the said stem and exhaust tubes. The said seal is provided with an opening (not shown) between the leads 12 providing a passage through the stem from the exhaust tube. The inner ends of the leads 12 are bent outward, and intermediate portions thereof are bent to form oppositely facing hooks 13 in which are clamped the ends of a coiled-coil tungsten filament 14. The extremities 15 of the said inner ends of the leads 12 are bent to extend parallel to and on opposite sides of the filament 14.

The mount just described is used in gaseous electric discharge lamps, such as the well-known fluorescent lamps, wherein two such mounts are sealed to opposite ends of a tubular envelope. The filament 14 then serves as a cathode, and the lead extremities 15 as auxiliary anodes. For this purpose the filament 14 is coated with an electron-emissive material, indicated by the dotted lines 16.

Referring to Fig. 2, the mount 10 is supported,

with the filament 14 lowermost, in a suitable holder which may comprise jaws 17 which grip the exhaust tube 11. The said jaws 17 may form part of a head which is moved along on a suitable carrier or turret, as shown in my parent application Serial No. 426,766, the coating apparatus being located at one of the stations into which the said head is indexed.

The coating apparatus comprises a cylindrical reservoir or cup 18 having a conical bottom and containing the liquid coating material 19. In this case, the coating material may consist of a suspension of powdered alkaline earth carbonates in a cellulose binder, and it is carried up to the filament 14 by a cup-shaped applicator or dipper member 20 which is normally submerged in the liquid 19. The reservoir 18 is supported at its lower end by a post 21 which is held by a bracket 22 which may be mounted on a suitable table (not shown). The dipper 20 is carried by a vertical shaft 23, through an arm 24 and rod 25, and is vertically reciprocated by said shaft 23 to thus agitate the liquid 19 as well as to carry the applicator up to the filament 14. The said shaft 23 is reciprocated by suitable mechanism which may include suitable cam means (not shown) through the rod 26 and arm 27 which move the shaft 23 vertically in the bracket 22. The rod 25 is located in front of the vertical plane along which cup 18 is sectioned in Fig. 2 so that the said rod 25 and arm 24 clear the flare 10 when they move upward.

As shown in Fig. 2, and in Fig. 3 on a larger scale, the dipper 20 has an opening 28 in the bottom thereof which permits the liquid 19 to circulate freely through it for an interval during which the dipper is repeatedly agitated up and down in the container 18, and the said opening also allows the liquid to drain back into the container 18 when the dipper is raised into operative relation to the filament 14. Both operations contribute to thorough agitation of the liquid and complete replacement of the liquid within the dipper 20 and the trough 29 in the upper edge of the partition or rib 30 within the said dipper. The said trough 29 is carried up about the filament 14 by movement of the dipper 20, and it holds a sufficiently large quantity of the liquid to coat the filament 14 although its ends are open and allow a good portion of the liquid to flow back into the dipper. The coating is applied to the filament before the liquid drains out of the trough. The trough 29 is also proportioned so that the filament 14 contacts the liquid therein, which liquid is drawn into

the interstices of the coiled-coil filament by capillary attraction. The center portion of the partition 30 which forms the trough 29 has a length such that it limits the application of the liquid to the portion of the filament 14 between the lead wire hooks 13, thereby preventing the liquid from collecting on the leads and immediately adjacent portions of the filament. The coating on the filament is indicated at 16 in Fig. 1.

Various means are provided for controlling the thickness of the coating 16. The most important of these are the size and shape of the trough 29, the period of time the filament 14 is kept in said trough, and the viscosity of the coating liquid 19. In certain instances a second, and even a third coating may be applied to the filament 14. In an automatic machine such as disclosed in my parent application Serial No. 426,766, the said second and third coatings may be applied by providing coating devices like the one disclosed herein at succeeding indexing stations of the machine.

Provision is made, by means of a bottle 31 and connecting passage 32, for replenishing the liquid 19 as rapidly as it is used. A spring clip 33 and bracket 34 hold the bottle 31 in place.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a device of the class described, means for supporting a stem having a pair of leads thereon with a filament extending horizontally between said leads and attached thereto, and means for applying a liquid coating material to said filament comprising a horizontal trough-shaped member containing the coating material and located below said stem supporting means so that the longitudinal axes of the trough and filament are parallel and in alignment, said member having a length shorter than the distance between the points of attachment of said filament to said leads, and means for effecting a relative movement of said trough-shaped member and filament toward each other so that said filament enters the trough.

2. In a device of the class described, means for supporting a stem having a pair of leads thereon with a filament extending horizontally between said leads and attached thereto, a reservoir located below said supporting means and containing liquid coating material, a horizontal trough-shaped member normally submerged in the coating material in said reservoir and disposed so that its longitudinal axis is parallel to and in alignment with the longitudinal axis of the filament, said trough-shaped member having a length shorter than the distance between the points of attachment of said filament to said leads and having its ends open, and means for moving said trough-shaped member upward out of the coating material in said reservoir and around said filament before the coating material drains out of the trough.

3. In a device of the class described, means for supporting a stem having a pair of leads thereon with a filament extending horizontally between said leads and attached thereto, a reser-

voir located below said supporting means and containing liquid coating material, a cup-shaped dipper normally submerged in the coating material in said reservoir, a horizontal trough-shaped member carried by said dipper with its longitudinal axis parallel to and in alignment with the longitudinal axis of said filament, said trough-shaped member having a length shorter than the distance between the points of attachment of said filament to said leads and having its ends open, and means for moving said dipper upward to carry said trough-shaped member out of the coating material and around said filament before the coating material drains out of the trough.

4. In a device of the class described, means for supporting a stem having a pair of leads thereon with a filament extending horizontally between said leads and attached thereto, a reservoir located below said supporting means and containing liquid coating material, a cup-shaped dipper normally submerged in the coating material in said reservoir and having an opening in the bottom thereof, a horizontal trough-shaped member carried by said dipper with its longitudinal axis parallel to and in alignment with the longitudinal axis of said filament, said trough-shaped member having a length shorter than the distance between the points of attachment of said filament to said leads and having its ends open, and means for moving said dipper upward to carry said trough-shaped member out of the coating material and around said filament before the coating material drains out through the trough.

5. In a device of the class described, means for supporting a stem having a pair of leads thereon with a filament extending horizontally between said leads and attached thereto, a reservoir located below said supporting means and containing liquid coating material, a cup-shaped dipper normally submerged in the coating material in said reservoir, a vertically extending partition in said dipper having a horizontal trough in its upper edge with its longitudinal axis parallel to and in alignment with the longitudinal axis of said filament and of shorter length than the distance between the points of attachment of said filament to said leads, and means for moving said dipper upward to carry said trough out of the coating material and around said filament before the coating material drains out of the trough.

6. In apparatus of the class described for coating a filament, a reservoir for liquid coating material, an applicator member having a horizontally extending open-ended trough in its upper surface normally disposed in said reservoir with the trough submerged in the coating material, support means above said reservoir for supporting a filament in a horizontal position with its longitudinal axis parallel to and in alignment with the longitudinal axis of the trough, and means for moving said applicator member upward out of the coating material to apply coating material in the trough to the filament before the coating material drains out of the trough.

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