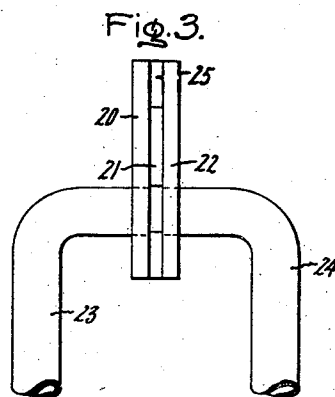
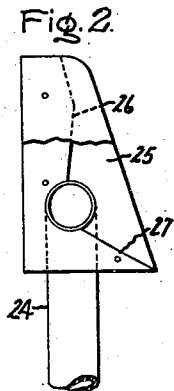
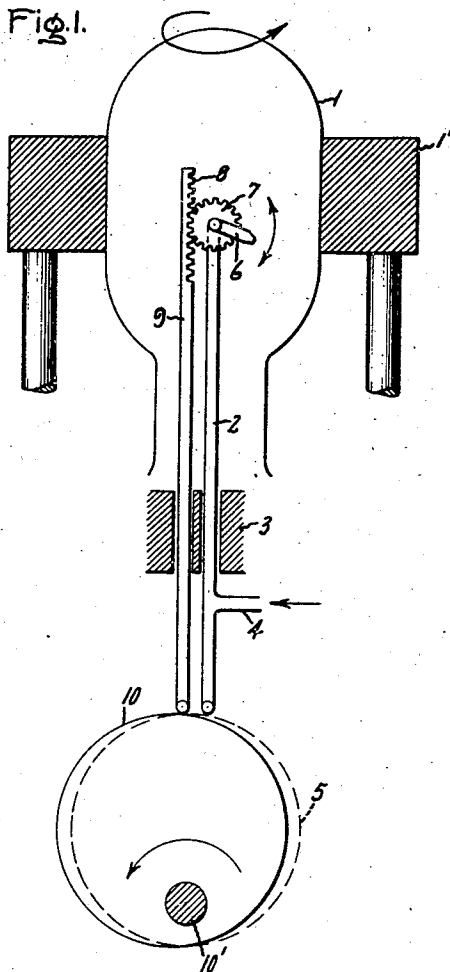


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APPARATUS FOR APPLYING POWDERED MATERIAL
TO THE INNER WALL OF HOLLOW ARTICLES
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APPARATUS FOR APPLYING POWDERED MATERIAL TO THE INNER WALL OF HOLLOW ARTICLES

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2 Claims. (Cl. 91-44)

My invention relates to methods and apparatus for applying powdered material to the inner wall of hollow articles such as electric lamp envelopes. More particularly my invention relates to methods and apparatus for applying luminescent material to the inner wall of electric discharge lamps of the fluorescent type.

In the manufacture of fluorescent lamps it is customary to coat the interior of the envelope with an adhesive, such as an aqueous solution of potassium silicate, and then to deposit on the adhesive coating a layer of a fluorescent powder carried into the envelope by a current of air or other gas. As a number of different shapes of envelopes are used, it is difficult to obtain the necessary uniform coating.

The object of my invention is to provide an improved method and apparatus for applying a uniform coating of powdered material to any of the usual shapes of lamp envelopes. Further objects and advantages of my invention will appear from the following description of a species thereof and from the accompanying drawing:

In the drawing, Fig. 1 is an elevation, partly in section, of one form of apparatus comprising my invention; and Figs. 2 and 3 are side and front elevations respectively, on an enlarged scale, of a nozzle suitable for use with the apparatus shown in Fig. 1.

Referring to Fig. 1, the numeral 1 designates a lamp envelope or bulb which is to be coated internally with a luminescent powder. The bulb 1 is held in any suitable rotatable holder 1', so that it can be rotated at a speed such that centrifugal gathering of the adhesive to be applied to the inner bulb surface does not take place. Such a suitable speed is between 60 to 80 revolutions per minute. The coating mechanism, which is arranged substantially along the longitudinal axis of the bulb 1, comprises an elongated tubular supply rod 2, mounted in suitable guides 3 and having a tubular branch 4 communicating with it through which a current of air carrying the luminescent material is admitted. The lower end of the tubular rod 2 is closed and bears on the cam surface of a suitable rotating cam 5. The upper end of rod 2 carries a nozzle 6 communicating with the interior of the rod 2. The said nozzle 6 is pivotally mounted on the rod 2 so as to rotate or swing in a plane substantially parallel to the longitudinal axis of the rod 2, as shown by the arrow in Fig. 1. The movement of the nozzle 6 relatively to the rod 2 is controlled by means of a pinion 7 to which the nozzle is relatively fixed and which engages with a rack

8. This rack is carried by an elongated operating rod 9 which is mounted in the guide 3 and is arranged parallel to the rod 2. The supply and operating rods 2 and 9 respectively are mounted in the guide bearing 3 for reciprocatory movement in a direction substantially parallel to the longitudinal axes of the said rods. The lower end of the rod 9 bears on the cam surface of a rotating cam 10 secured to the same shaft 10' as that on which cam 5 is mounted. The holder for the bulb 1 and the cam mechanism are relatively movable in a vertical direction so that the cam mechanism may be lowered out of the way to permit insertion and removal of the bulb 1 from its holder.

The operation of the coating mechanism is as follows. Before being mounted in the bulb holder, the bulb to be treated is given a coating of an adhesive or binder in any suitable manner as, for example, by spraying and then draining off the excess. The bulb is then mounted in the rotatable holder 1' and the nozzle 6, with its connected supply rod 2, and the operating rod 9 raised into the neck of the bulb. The cam and bulb-rotating mechanism is then started and air under pressure, in which the luminescent powder is entrained, is admitted through the pipe 4 and hollow tube 2 to the nozzle 6. As previously described, the nozzle 6 is fixed relatively to the pinion 7 so that as the rotating cams 5 and 10 raise the rods 2 and 9 upwards and relatively to one another, the axis of the nozzle will be kept substantially normal to the surface of the bulb. Obviously the cams 5 and 10 have to be designed to suit the various shapes of bulbs to be treated.

If desired, the form of nozzle illustrated in Figs. 2 and 3 may be used instead of the nozzle shown in Fig. 1. Referring to Figs. 2 and 3, the nozzle there shown comprises three flat sheets of metal 20, 21 and 22 which are secured together in any convenient manner. The middle or inner plate 21 is cut away, as indicated by the dotted lines in Fig. 2, so as to leave a space 25 between the outer or side plates 20 and 22 which space is in communication with the interior of a tube 23 corresponding to tube 2 in Fig. 1. The recess 25 is preferably formed so that the walls 26, 27 thereof flare outwardly at an angle of approximately 115° or thereabout. Instead of having a single inlet, the nozzle may have a double inlet by being connected to a second tube 24 shown dotted in Fig. 3.

I have found that with apparatus such as described above, a very uniform coating of a lumi-

nescent powder can be applied to a bulb, and it will be obvious that by replacing the luminescent powder with a colored pigment a uniform coating of a coloring matter might also be applied to the inner wall of a bulb or other hollow glass article.

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

1. Apparatus for applying powdered material to open-ended hollow glass articles comprising a rotatable holder for said article, an elongated hollow supply rod adjacent said holder having a nozzle pivotally mounted at one end thereof, said supply rod communicating with a source of air under pressure in which the powdered material is entrained, means for reciprocating said supply rod to carry the nozzle thereon into said glass article and means for simultaneously pivoting said nozzle in a plane substantially parallel to said supply rod.

2. Apparatus for applying powdered material

to open-ended hollow glass articles comprising a rotatable holder for said article, an elongated hollow supply rod adjacent said holder having a nozzle pivotally mounted at one end thereof for swinging movement in a plane substantially parallel to the axis of said supply rod, a pinion rotatably mounted on said supply rod adjacent said nozzle and fixed thereto, said supply rod communicating with a source of air under pressure in which the powdered material is entrained, an operating rod extending substantially parallel to said supply rod and provided at one end with a rack engaging the said pinion, said supply and operating rods being mounted for parallel reciprocatory movement, and cam means cooperating with said supply and operating rods to reciprocate the same and to rotate the said pinion and its associated nozzle through a limited angle.

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