Method of Forming Buttons on Glass Rods

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by

His Attorney.
METHOD OF FORMING BUTTONS ON GLASS RODS
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3 Claims. (Cl. 49—84)

My invention relates to a method for forming a button on vitreous cane (rod) useful, for example, as an arbor into which are embedded support wires for properly supporting the filament of an incandescent electric lamp. The cane rod is later attached to the lamp stem by means of a sleeve which is then fused to the flare. The invention is particularly applicable when the cane or rod is of "hard" glass, i.e., glass having a low coefficient of expansion and relatively high melting temperature, usually a borosilicate glass. This application is a division of my application Serial No. 465,535, filed October 29, 1954.

Prior to my invention, button forming apparatus was adequate for the lower wattage lamps then in demand. As the demand grew for lamps of higher wattage, which necessitated an increased number of support wires of larger diameter to support the filament, the buttons formed by these machines proved too small and thin and would either crack or the embedded ends of the support wires would touch and short-circuit the lamp filament. Attempts to make larger and thicker buttons on these machines resulted in undesirably shaped buttons with distorted cane portions beneath the button.

One object of my invention is to provide a method of making an accurately formed button on glass cane into which filament support wires will be embedded.

Another object of my invention is to provide a method of making of an accurately formed button of a desired diameter, thickness and flattened shape on glass cane.

Still another object of my invention is to provide a method of making of an accurately formed button of a desired diameter, thickness and flattened shape on glass cane without any bending or distortion of the remaining vitreous cane beneath the button.

My invention will be better understood from the following detailed description and from the accompanying drawing wherein Figs. 1 to 5 are a series of side elevations showing the various steps in the formation of a button in accordance with my invention.

In a preferred sequence of steps in accordance with the invention, the glass cane or rod 1 is held in a vertical position and the tip portion of its upper end, indicated by the shaded portion 2, is preheated by burner flames 3.

In the next step, the previously heated tip portion 2 is heated to a still higher temperature and degree of plasticity, and a predetermined adjacent length thereof is also heated. This step is illustrated in Fig. 2 and is effected by moving a flame 4, preferably an annular flame from a ring shaped burner, upwardly and downwardly along the line 5 representing the length of rod necessary to be heated to form the button. The tip portion 2 has thus been preliminarily heated in the Fig. 1 step and has been heated to a higher temperature in the Fig. 2 step with the rest of the heated portion attaining a medium temperature whereat the rigidity is still maintained.

Immediately thereafter the heated portion of the rod 1 is upset by downward movement of a push-down head member 6 (Fig. 3) so that it assumes an inverted truncated cone shape as illustrated at 7. During this upsetting operation the rod is further heated by an annular flame 8 which is maintained in a constant fixed relation below the head 6 and is moved therewith to soften the glass during the upsetting operation until the entire volume of glass indicated by the line 9 and which is to constitute the button, has been softened and spread by the continuing downward motion of the head 6. Immediately upon completion of the upsetting, the heating of the intense flame 8 is terminated.

In the next step, illustrated in Fig. 4, the button is reshaped by a concentrated flame from a burner 9 which is directed on the center of the top of the inverted truncated cone shaped button 7 to cause the glass to draw up into a nearly spherical shaped button 10 by surface tension.

In the next step, the spherical button is pressed into the desired button shape 11 (Fig. 5) resembling a flattened sphere. This is effected by pressing a butt-down head 12 down upon the button. The rod 1 is then annealed by application of a soft flame thereto, followed by cooling to room temperature.

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

1. The method of forming a button on the end of a length of glass cane which comprises differentially preheating an upper end portion of the cane over a length several times its diameter and sufficient to form the button and with the tip extremity the hottest, upsetting the said upper end portion of the cane to a preliminary inverted truncated cone shaped button by rod application of pressure longitudinally of the cane and against the heated end thereof, heating the preliminarily formed button by application of a concentrated flame to the top thereof at its center portion only to draw the button into an approximately spherical shape by surface tension, and flattening the button by application of pressure to the top thereof.

2. The method of forming a button on one end of a length of vitreous cane which comprises vertically positioning the cane and preheating the tip thereof, further preheating said tip and additionally heating a predetermined adjacent length of the cane several times its diameter, applying still further heat progressively along said tip and said adjacent length while flattening down said tip and said adjacent length of the cane by mere application of vertical pressure thereto to form an inverted truncated cone shaped button, reshaping said button by directing a concentrated fire vertically down against the center portion only of the top thereof to draw it into a sphere-like form, and then flattening down the said reshaped button by again applying vertical pressure against the top thereof.

3. The method of forming a button on one end of a length of vitreous cane which comprises vertically positioning the cane and preheating the upper tip thereof for a distance approximating the diameter of the cane, further heating said tip to its point of plasticity and additionally heating a predetermined adjacent length of the cane for a distance several times the cane diameter to a degree just below its point of plasticity by movement of a concentrated flame vertically along the cane, applying further concentrated heat progressively along said tip and said adjacent length to soften and simultaneously flattening down said tip and said adjacent length by mere application of vertical pressure thereto to form an inverted truncated cone shaped button, reshaping said button by directing a concentrated fire vertically down against the center portion only of the top
thereof to draw it into a sphere-like form by surface tension, and then flattening down the said reshaped button by again applying pressure against the top thereof.

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