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PROCESS FOR SEALING WIRES INTO VITREOUS ENVELOPES

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Fig. 1.

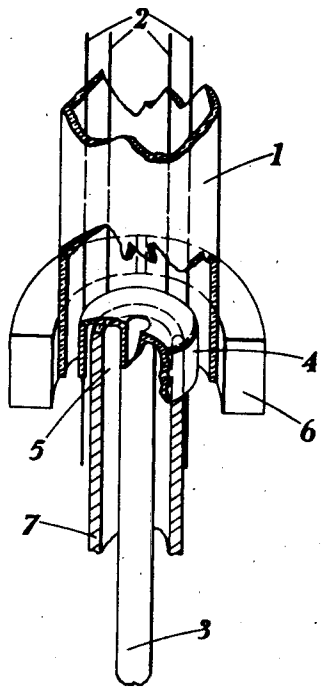
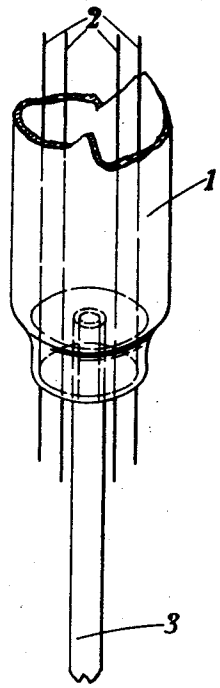


Fig. 2.



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PROCESS FOR SEALING WIRES INTO VITREOUS ENVELOPES

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4 Claims. (Cl. 49—78)

This invention relates to a method of sealing leading-in-wires into vitreous vessels.

In the manufacture of electric incandescent lamps, valves and other electrical apparatus with vitreous envelopes, the leading-in-wires are usually introduced through a "pinch" mounted on a foot-tube. Two operations are involved in the process. In the first one end of a "foot-tube" is melted and pressed into a solid mass around the wires; in the second the other end, provided with a flange, is sealed to the main part of the envelope. Methods have been suggested and used whereby an exhausting tube may be attached to the pinch during the first operation. The object of this invention is to improve this process by combining the two operations and to provide a better method for attaching the exhaust tube.

According to the invention the open end of a vitreous vessel is closed, leading-in-wires are sealed through it and an exhaust tube attached to it by a process which comprises presenting to the open end a vitreous sealing body to which an exhaust tube is attached, softening the open end and the sealing body by heat and pressing the vitreous material of the open end and of the sealing body together around the leading-in-wires by pressure applied between the exterior of the vessel and some part of the sealing body other than the interior of the exhaust tube. The sealing body may consist of a flange formed on the end of the exhaust tube and the pressure may be applied between a member through which the exhaust tube is threaded and some other member on the exterior of the vessel. Preferably the flange is turned backward, so that an annular groove is formed between the flange and the exhaust tube, and one of the members between which pressure is applied is a ring placed in this groove.

The invention will now be described, by way of example, with reference to the accompanying drawing, of which Figure 1 shows the exhaust tube and leading-in-wires assembled in the open end of the envelope of an electric discharge vessel, for example a thermionic valve, ready for heating and pressing to form a pinch, and Figure 2 shows the completed pinch.

As shown the base of the main envelope is formed as a tube 1, and the leading-in-wires 2 are supported during the process so that they lie along the inner wall of the tube 1. At their upper ends they are attached in any desired manner to the electrodes of the device. An exhaust tube 3, the upper end of which is flared, and the edge 4 turned over so that it forms a groove 5 surrounding the exhaust tube 3, is brought just within the end of the main tube 1 so that the leading-in-wires 2 lie between the open end of the tube 1 and the flared edge 4 of the exhaust tube. The leading-in-wires are spaced approximately evenly round the circumference of the tube 1. The bottom of the tube 1 and the flared edge 4 of the exhaust tube are now heated and pressed together to form the pinch. For this purpose a tubular mandrel 7 is brought up into the groove 5 of the exhaust tube 3 and a collapsible ring 6 placed outside the end of the tube 1. The ring 6 is contracted so that the molten glass of the tubes is squeezed together and around the leading-in-wires. Instead of using a collapsible ring 6, a roller may be held against the outside of the tube 1, and the tube 1, mandrel and exhaust tube 3 may be rotated against the roller so that the roller presses the glass together against the mandrel to form the pinch.

It has been proposed previously to attach an exhaust tube to a vessel and simultaneously to seal leading-in-wires through its walls by placing the wires and the exhaust tube within the open end of the vessel, softening the glass and applying pressure between the exterior of the vessel and a mandrel placed within the exhaust tube. The method according to the invention differs from this proposal because the pressure is applied in such a manner that it does not tend to reduce the cross-sectional area of the exhaust tube. This difference brings with it two advantages. First the cross-section of the exhaust tube is not actually reduced; secondly (and more important) the diameter of the circle on which the leading-in-wires are distributed may be much greater than that of the exhaust tube; this second advantage is very important when a large number of leading-in-wires have to be sealed through the pinch and it is desirable that they should be spaced a considerable distance apart.

I claim:—

1. A process for sealing an exhaust tube to the open end of a vitreous vessel with leading-in wires passing through the seal which comprises holding the leading-in wires in position adjacent to the interior surface of the open end, providing the end of the exhaust tube with a flange of vitreous material turning the edge of the flange back to form an annular groove between the tube and the flange, inserting the flange within the open end so that the leading-in wires are arranged between the turned back part of the flange and the interior surface of the open end, softening the flange and the open end by heat, arrang-

ing a member adjacent to the flange to support the flange and pressing the open end and the turned back part of the flange against said member so that the vitreous material of the vessel and flange is pressed around the leading-in wires.

2. A process for sealing an exhaust tube of vitreous material to the open end of a vitreous vessel with leading-in wires passing through the seal which comprises forming a flange on the end of the exhaust tube, inserting the flange within the open end, holding the leading-in wires in position between the flange and the inner surface of the open end, softening the vitreous material of the flange and open end by heat, arranging a member around the tube adjacent to the flange and pressing the softened material against said member so that the material is pressed around the leading-in wires.

3. A process for sealing an exhaust tube of vitreous material to the open end of a vitreous vessel with leading-in wires passing through the seal which comprises forming a flange on the end of the tube, turning the edge of the flange back to form an annular groove between the tube and the flange, inserting the flange within the open end, arranging the leading-in wires between the turned back part of the flange and the inner surface of the open end, softening the turned back part of the flange and the open end by heat, inserting a tubular mandrel within the groove and applying pressure to the outside of the open end to press the open end and the turned back part of the flange around the leading-in wires against the tubular mandrel.

4. A process for sealing a glass exhaust tube to the open end of a tubular glass vessel with leading-in wires passing through the seal which comprises forming a flange on the end of the exhaust tube, turning back the edge of the flange to form an annular groove between the exhaust tube and the flange, inserting the flange within the open end, arranging the leading-in wires around the turned back part of the flange, softening the turned back part of the flange and the open end by heat, inserting a tubular mandrel within the groove, arranging a collapsible ring around the exterior of the open end and contracting the ring to squeeze the glass of the turned back part of the flange and the open end around the leading-in wires against the mandrel.

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