

Feb. 17, 1942.

T. R. DUNN

2,273,437

BEADING PROCESS

Filed Aug. 25, 1939

Fig. 1.

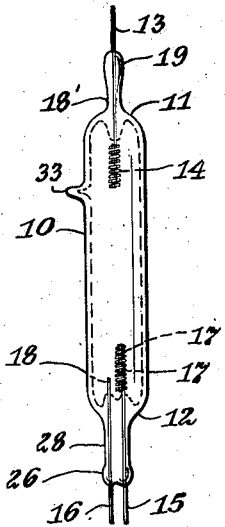


Fig. 2.



Fig. 3.

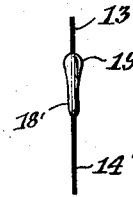


Fig. 4.

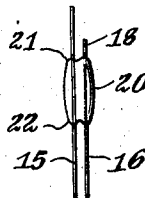


Fig. 5.

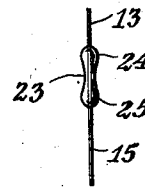


Fig. 7.

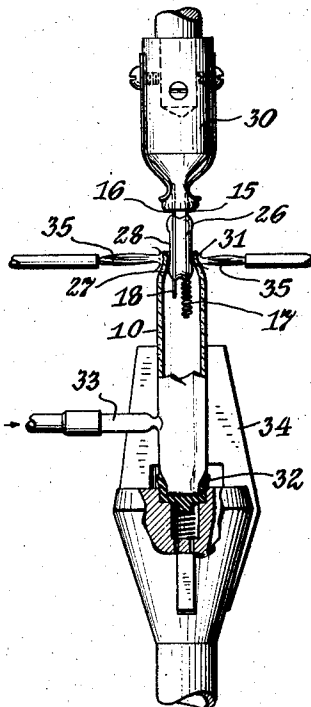


Fig. 8.

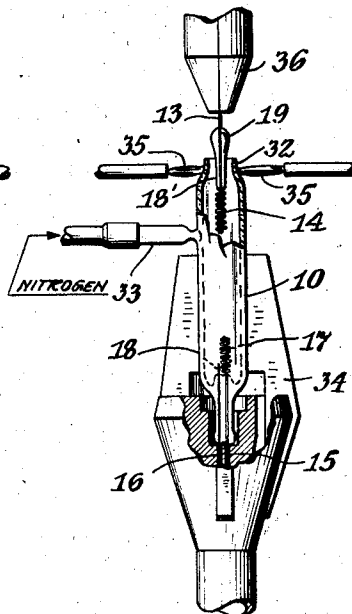
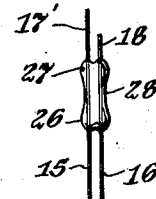


Fig. 6.



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2,273,437

BEADING PROCESS

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Westinghouse Electric & Manufacturing Company,
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Application August 25, 1939, Serial No. 291,855

3 Claims. (Cl. 49—81)

My invention relates to quartz lamps and especially to the sealing of the conductors to a quartz container.

An object of the invention is to prevent the cracking of the glass around the conductors during their sealing in the quartz container.

Other objects and advantages of the invention will become apparent from the following description and drawing, in which:

Figure 1 is an elevational view of a quartz discharge device in which the invention is incorporated.

Figures 2 and 3 are elevational views disclosing two steps in the formation of glass about one of the single conductors.

Figure 4 is an elevational view disclosing the usual form of glass beads about a double conductor.

Figures 5 and 6 are elevational views of two steps in the formation of the unified bead about a double conductor, according to the invention.

Figures 7 and 8, are views, partly in elevation and partly in cross-section, illustrating first the double conductor bead, and then the single conductor bead, being sealed in the quartz discharge device of Figure 1.

The invention is an improvement over the invention described in the copending application of George A. Freeman, Serial No. 284,575, filed July 15, 1939, for "Seal for quartz lamp."

In Figure 1 is disclosed a quartz discharge device having a quartz tubular container 10 with ends 11 and 12, generally of a graded quartz glass, as described in the above Freeman application, sealed to the tubular quartz main casing 10, and having sealed therein, one or more conductors.

In the particular embodiment disclosed, the end 11 has a single conductor 13 of tungsten sealed therethrough, and on the inner end is the active electrode surface 14, which is preferably comprised of a rod of thorium bound to the inner end of the conductor by a coil of tungsten. The other end 12, has two conductors 15 and 16, also preferably of tungsten, sealed therethrough. The end of one of these conductors 17, is preferably a strip of thorium surrounded by a coil of tungsten to correspond with the other electrode 14. The other electrode 16, preferably has merely an extension 18, to form a starting electrode or starting tip to break down the gaseous atmosphere between 17 and 18, and then to ignite the discharge between the main electrodes 14 and 17.

It has been found, that there were seal cracks originating around the external ends of lead-in conductors due to weakness at those points. It

is the object of the invention to provide a method for overcoming the cracking of the glass around the conductors.

In Figure 2, I have disclosed the conductor 13, about which is formed the usual bead of glass 18'. The inner end 14' has not yet had attached thereto, the thorium, and its coil of tungsten wire. On the outer end of the glass bead, I form an additional amount of glass material, such as indicated at 19 in Figure 3. The purpose of this additional amount of glass material, is to provide a firm mass about the conductor, where it is inserted in the jaws of the chuck, as illustrated in Figure 8.

In Figure 4, I have illustrated the conductors 15 and 16, with the usual bead 20 of the prior art. I have discovered that with the particular glass utilized for sealing to quartz containers, that the bead about the double conductors takes the barrel shape illustrated in Figure 4, with a thickened middle portion and very much thinner end portions 21 and 22. When the barrel portion is being sealed to the quartz container, the ends 21 and 22 of the bead are mechanically weak, so that when the conductors 15 and 16 are held, the glass will tend to crack at the weakened end 22. The connection of the container to such a bead is generally thin and mechanically weak. Accordingly, I take the conductor 15, and place about it a dumbbell shaped bead with about the usual thickness 23 at the middle portion and additional material 24 and 25 at either end of this dumbbell bead. A similar dumbbell shaped bead is placed about the other conductor and the two are then united into the unified bead disclosed in Figure 6. The result is that instead of the barreled shaped device of Figure 4, the unified bead has a thick portion 26 at one end, and a thick portion 27 at the other end, and a medium sized portion 28 at the center thereof.

The inner end of 15, namely 17', has attached thereto, a strip of thorium and enclosing coil of tungsten attached thereto, as shown in Figure 1.

During the formation of the double bead, the conductors 15 and 16 were inserted in the special chuck 30, disclosed in Figure 7, which chuck and method of forming the double bead therein, is more particularly described in the copending application of George A. Freeman, Serial No. 284,575 previously referred to.

The quartz container 10 with its tapered ends 31 and 32 and tubulation 33, is inserted in a chuck 34, and the double bead inserted in the open end 31, and flame 35 is directed against the

tapered sides 31 to seal it to the center portion 28 of the double bead. The thickened portion 26 adjacent the chuck 30, will prevent any cracking of the bead that might otherwise occur if there was a strain thereon due to its being held by the chuck 30. The direction of the flame against the tapered edge 31 of the container melts this edge 31 into a thick mechanically strong seal with the additional material 27 as disclosed in the lower portion of Fig. 1.

After the double bead has been sealed in the quartz container, the tube is inverted and the single bead with its thickened end 19 is held adjacent the chuck 36, while the sloping side 32 of the quartz container, is sealed by means of the flame 35, to the intermediate portion of the single bead.

During the step of sealing the double bead, a flow of nitrogen is passed through the interior of the tube 10, either through the tubulation or through the open end 32 of the tube, such as is described in the copending application of George A. Freeman, Serial No. 242,178, filed Nov. 25, 1938, for "Electrode sealing-in."

During the step disclosed in Figure 8, the nitrogen is also flowing through the tube as disclosed in the copending application of George A. Freeman, previously referred to.

Because of the additional strength of the thickened ends of the double bead in Figure 7, and also of the single bead in Figure 8, the cracking of the glass about the electrodes, that was previously experienced, does not happen. The method of supplying the additional glass material at one end of the single conductor bead, and at both ends of the bead with the double conductors, results in a decrease in the spoilage of these quartz discharge devices and in mechanically strong seals with the tapered sides of the container.

Although there has been shown and described,

a specific embodiment of the invention, it is not desired that the invention be limited thereto, as various other modifications of the same may be made without departing from the spirit and scope of the appended claims.

I claim:

1. The hereindescribed method comprising sealing a bead on a conductor and supplying an additional amount of the bead material next an end for forming an enlargement next the end of the bead, sealing a second bead on a second conductor with a like additional amount of bead material next an end of said second bead forming an enlargement thereon, and unifying said beads into a single bead about the two conductors and with both of said enlargements unified into and serving to correspondingly enlarge the unified bead thereat.

2. The hereindescribed method comprising sealing a bead on a conductor and supplying an additional amount of the bead material next an end for forming an enlargement next the end of the bead, sealing a second bead on a second conductor with a like additional amount of bead material next an end of said second bead forming an enlargement thereon, and unifying said beads into a single bead about the two conductors and with both of said enlargements unified one into the other and serving to doubly enlarge the unified bead thereat.

3. The hereindescribed method comprising sealing beads on a plurality of conductors, applying additional amounts of bead material to each bead at both ends of each substantially as dumbbell formations, and unifying the plurality of dumbbell-like formations into a single enlarged bead and unifying the enlargements of said formations into single enlargements at the ends of the unified bead formation.

THOMAS R. DUNN.