GLASS SEALING DEVICE

Fig. 1.

Fig. 2.

Fig. 3.

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The present invention relates to means for side sealing glass parts, one of said parts being enclosed within the other. More particularly, the invention relates to an improved sealing collar, forming part of a sealing head assembly, for sealing the glass bulb to the flare portion of a radio tube mount unit.

According to the present sealing-in practice of the radio tube industry, a glass bulb is sealed to the mount of a tube by supporting a mount unit on a rotatable head of a sealing-in machine. The bulb is then placed over the mount and is supported therefrom by the inner surface of the bulb engaging the ends of mica supports carried by the mount. The operative pushes the bulb down over the mount until the end of the bulb is in close proximity to the flare.

In performing this operation, there is lack of uniformity as to how far down the operative pushes the bulb with the result that besides possibly injuring the delicate top leads of the mount, there is also considerable variation in the overall length of the sealed-in tube. In addition to this variation in bulb length, other difficulties are inherent in the practice described, as for example, severe glass strains are produced between the sealed portion of the bulb and the flare.

It is an object of the present invention to provide means for sealing a flare or similar internal part of a mount unit to an external envelope of fusible material, such as glass, without producing severe shock to the flare and setting up strains in the seal.

Another object is the provision of means which will insulate uniformly in over-all length of the sealed-in tube, said means also preventing injury to the delicate parts of the sealed-in structure, by limiting the distance the enclosing envelope may be moved downwardly over the enclosed structure.

Other objects of the invention have to do with simplifying the sealing-in operation and producing a superior type of seal, which features are inherent in the structural arrangement herein contemplated and are apparent from reading the following description.

Referring to the accompanying drawing:

Fig. 1 is an elevational view of a sealing-in head showing in fragmentary form the assembly of a mount unit and outer envelope positioned to be sealed in accordance with the present invention;

Fig. 2 is a top plan view of the sealing-in collar contemplated by the invention; and

Fig. 3 is a sectional view, taken on the line 3–3 of Fig. 2 showing the collar for supporting the glass envelope in desired relation to the mount unit.

In the accompanying drawing, I have illustrated my invention as applied to a sealing-in head assembly for radio tubes, but it will be understood that the invention has wider application. I have shown only so much of the sealing-in head as seemed necessary to comprehend the invention, as sealing-in units are well known in the art.

The sealing head comprises a center sealing pin 1 provided with a downwardly tapered edge 2 and a central aperture for accommodating the exhaust stem 3 which extends from the flare 4 of a mount unit designated generally by the reference character 5. The mount unit 5 may include the usual structure consisting of support wires 6, to which the electrode elements may be attached, and mica separator supports 7. The mica supports 7 may terminate in prongs or fingers 8 which engage the inner wall of the bulb 9 when placed over the mount 5.

A sealing collar 10 surrounds the sealing pin 1 and is adjustable vertically thereon by means of a set screw 11. The collar 10 is provided with a plurality of flat wedge-shaped shoulders 12. Preferably, I provide three of the shoulders 12 circumferentially spaced 120 degrees apart and merely of sufficient width to afford substantial points of support for the end of the bulb 9, but at the same time without being sufficiently massive to produce undesirable cooling effects at the points of contact or places where the bulb 9 rests on the shoulders 12. The height of the shoulders 12, although not critical, should be sufficient to provide clearance between the bulb 9 and the base 14 of the sealing collar 10, so as to permit the gas flames from the jets 13 to splash against the bottom of the bulb 9 and lap up underneath the same, thus effecting a preheating of the flare 2 during the sealing-in operation.

The construction of the sealing collar 10 coupled with its vertical adjustment on the sealing pin 1 permits the use of bulbs cut to a predetermined length. With the bulb cut to a given length for a given type of tube, uniformity is assured for the over-all length of the sealed-in tube. In determining the length of the bulb 9, such factors should be taken into consideration as providing a bulb length which when the end thereof is seated on the shoulders 12, the end of the bulb will extend slightly below the rim of the flare 2. The length of the bulb is also coordinated.
3 with the feature of having it sufficiently long so that when the bulb 9 is resting on the shoulders 12, there will be proper clearance between the top leads (not shown) of the mount unit, to avoid injuring the same, which parts are delicate and might be easily injured by contact between the bulb and the top leads. This feature is indirectly accomplished by the vertical adjustment of the sealing collar 10 with respect to the sealing pin 1. That is to say, in vertically adjusting the collar 10, the shoulders 12 should be in a plane just below the horizontal plane of the flare 2, and this plane serves as a base plane from which to measure the length of the straight side wall portion of the bulb so that the top thereof will not contact any part of the mount unit.

The sealing-in operation, after the foregoing adjustments are made, is in accordance with the general design of standard sealing-in machines. That is to say, the sealing heads are indexed into position under the various preliminary fires on the sealing-in machine, the flames from the fires being directed onto the lower portion of the bulb 9 just above the sealing collar 10. Because of the clearance between the end of the bulb and the base of the sealing collar 10, the flames are permitted to pass under the end of the bulb, thus preheating the flare particularly at its flange portion. As the sealing operation progresses, the lower portion of the bulb wall contracts onto the flare and the remaining glass of the bulb rolls up on the lower or under side of the flare. Because of the preheated condition of the flare when the hot plastic glass of the bulb comes into contact therewith, these glass parts are of substantially the same temperature and therefore no severe glass strains are produced as is the case where the flare is relatively cool with respect to the temperature of the melted portion of the bulb as would be in the case in following the practice heretofore.

From the foregoing, it is apparent that the present invention is characterized by the features of relieving glass strains between the end of the bulb and the flare by the preheating of the flare during the sealing operation; also close control may be had over the over-all length of the sealed-in tube.

With respect to the form of seal per se, it is obvious that the invention may be applied broadly in the making of side seals between two work parts one of which is enclosed within the other, said work parts being components of such devices as radio tubes, fluorescent lamps, incandescent lamps, and so forth; also to any glass fixtures in which an inside glass disc, plate, button or flare is sealed to an external envelope or shell.

Modifications or refinements of the invention will suggest themselves to those skilled in the art, but it is my desire to cover all such modifications as come within the scope of the appending claims.

What is claimed is:

1. In a sealing-in machine, a rotatable head having a center pin adapted to support a mount unit provided with a flare, a collar concentric with the center pin and rotatable therewith, said collar being adjustable mounted on said pin with freedom for vertical movement with respect to the pin, said collar comprising a base having substantially coplanar projecting portions adapted to support an open-ended bulb placed over the mount unit, whereby clearance is provided between the end of the bulb and the base of the collar, and gas jets being positioned laterally with respect to the aforesaid projecting portions and substantially in the plane of said projecting portions, whereby heat may be applied directly to the flare through the clearance formed on the collar and simultaneously with the heating of the bulb.

2. The construction claimed in claim 1, wherein the collar projecting portions consist of flat wedge-shaped shoulders extending upwardly from the base of the collar, the mass of each of said shoulders being insufficient to produce undesirable cooling effects at the points of contact where the bulb rests thereon.

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