

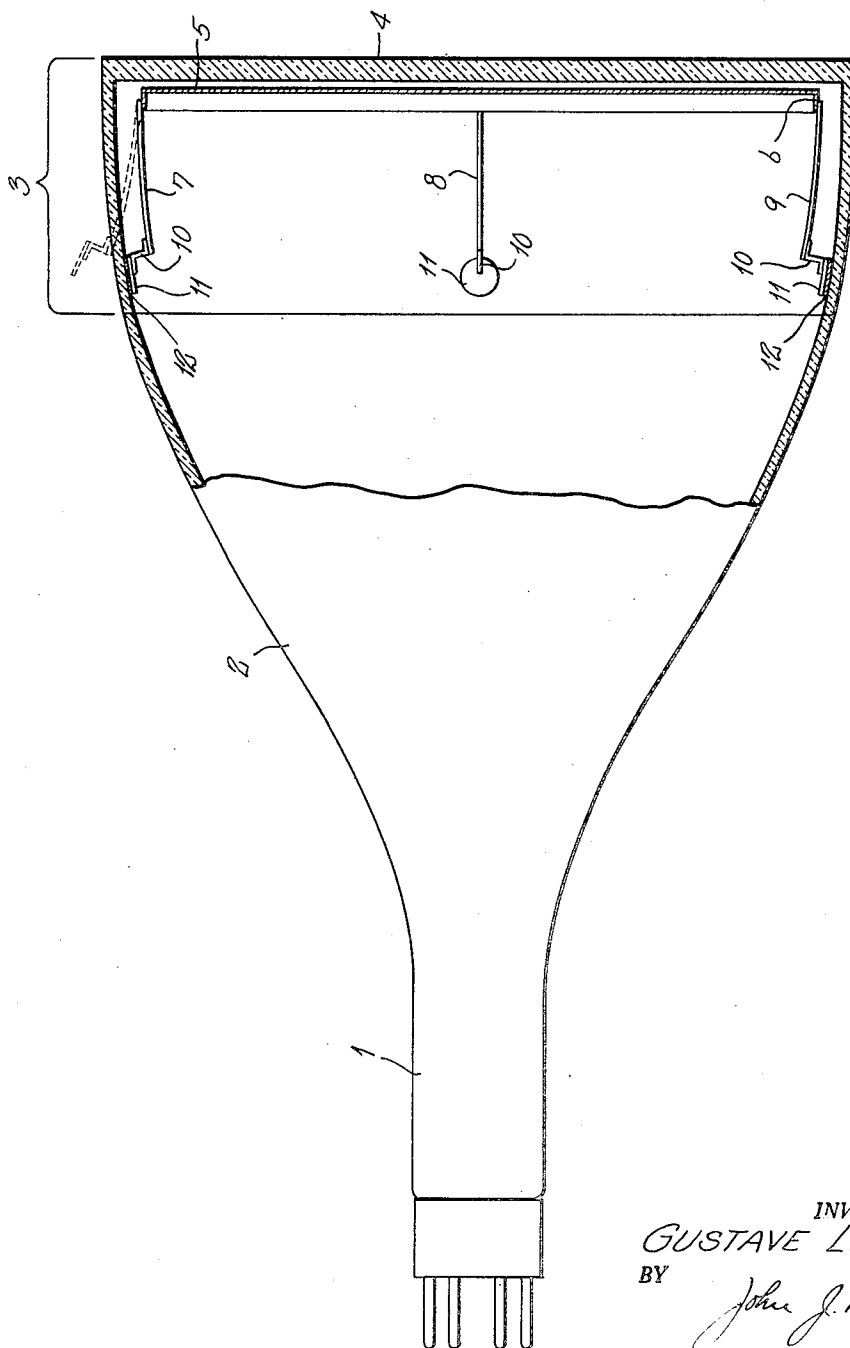
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TARGET ASSEMBLY FOR CATHODE-RAY TUBES

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TARGET ASSEMBLY FOR CATHODE-RAY
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1 Claim. (Cl. 313-89)

1

This invention relates to electron tubes and more particularly to methods and means for supporting large area targets or screens within a cathode-ray tube and the like.

A principal object of the invention is to provide a novel support arrangement for fluorescent screens, target electrodes and the like, whereby the screen or target can be prepared and processed prior to mounting it within the cathode-ray tube bulb and can thereafter be permanently attached within the bulb without using wires or leads sealed through the bulb wall.

A further feature of the invention relates to an improved arrangement for accurately locating and supporting a plate-like screen or target in the enlarged end portion of a cathode-ray tube.

A further feature relates to the novel organization, arrangement and relative location and inter-connection of parts which cooperate to provide an improved target supporting arrangement for cathode-ray tubes.

Other features and advantages not particularly enumerated, will be apparent after a consideration of the following detailed descriptions and the appended claims.

In certain kinds of cathode-ray tubes, it is important that a relatively large flat plate-like screen or target be mounted within the tube envelope adjacent the enlarged flattened end of the bulb. Two different procedures have been used heretofore. In one procedure, the screen or target is first located within the bulb and is then coated or processed with the desired material, for example, fluorescent material, ionic screen material, secondary emission material and the like. This usually requires that the screen or target be rigidly attached to metal tabs or inserts which are sealed through the wall of the bulb. Certain difficulties have been encountered with such procedure particularly as it is difficult to confine the coating entirely to the target. The alternative procedure has been to prepare or coat the screen or target before it is assembled into the bulb. This however has usually required that the target or screen be supported on metal rods or wires which are sealed through or anchored in the wall of the tube. For example, in one arrangement, the screen or target is supported on a rod or wire which is sealed through the press or neck of the tube, and when the target has been processed the enlarged portion of the bulb is assembled over the target and two parts of the bulb are welded or spliced together. However, even with this arrangement, the target be-

2

ing located at one extreme end of the tube and being supported by relatively long wires adjacent the opposite end of the tube, is subject to undesirable movement or vibration and it is some times difficult to locate the target with uniform accuracy as regards its closely spaced relation to the flattened end of the tube wall. Furthermore, in certain types of targets, for example those used in ionic crystal screen tubes and the like, it is highly important that the target be held out of direct heat conductive contact with the tube wall. The present invention provides an arrangement for meeting all the above-noted difficulties.

There is shown in the drawing any well-known cathode-ray tube bulb or envelope, comprising the usual constricted neck portion 1, which is jointed to a flared portion 2, which latter portion terminates in the enlarged bulbous end portion 3. Ordinarily, the end portion 3 is closed by a flattened wall 4. In accordance with one phase of the invention, the section 3 of the bulb is a separate unit from the section 2, and is arranged to be sealed thereto after mounting and anchoring of the target or screen electrode. The target or screen electrode 5 may comprise a thin plate of suitable material, for example a circular or rectangular disc of metal of the required thin cross section. In some cases, the target 5 may consist of a thin disc or plate of light transparent material such as glass or mica which is coated with any of the well-known fluorescent screen or ionic crystal screen materials. It is also desirable in devices of this type to locate the screen or target 5 as close as possible to the flattened end wall 4 of the tube but without direct heat conductive contact therewith.

Preferably, although not necessarily, the screen or target 5 has a flange or rim 6 to which there are attached as by welding, fusing, soldering or the like, a series of fine tungsten springy wires 7, 8, 9, for example of approximately .025 inch in diameter. At least four of these wires should be attached equally at spaced points around the flange 6, three of these wires being shown in the drawing. The wires 7 and 9 are preferably located diametrically opposite to each other, as is the wire 8 and the corresponding wire (not shown). Welded or otherwise rigidly united to the free end of each of the wires is a short length of chromium-iron alloy wire 10 which is also welded to a chromium-iron alloy disc 11. Preferably, the disc 11 and wire 10 are made of an alloy which may have the same temperature-expansion characteristics as the glass of section 3, for ex-

ample the alloy sold under the trade-name "Driver Harris Co. Alloy #14." Preferably this section 3 is made of lead glass having a relatively high melting point. The disc 10 has integrally fastened thereto a bead 12 also of lead glass.

It will be observed that by this arrangement of parts, the tungsten wires 7, 8 and 9, because of their natural springiness, tend to hold the glass-beaded discs 11 outwardly to the dotted line position. In order to assemble the parts, the target 5, carrying its four tungsten wires and their respective glass beaded discs, is inserted into the lead glass bulb section 3 to the desired distance until the target is closely spaced from the face 4. It will be observed that because of the springiness of the tungsten wires, when the target is inserted to the proper position, it is retained in that position because of the outward pressure of the glass beaded discs 10 against the inclined wall of the bulb section 3.

When the target has been thus located within the section 3, the latter is brought into abutting engagement with the corresponding section 2 of the bulb and the abutting area is subjected to the required sealing heat from the usual torches or the like. In accordance with one feature of the invention, the tungsten wires 7, 8 and 9, etc. are of sufficient length so that when the target 5 is properly located adjacent the wall 4, the glass beaded discs 10 are adjacent the end of section 3 which abuts against the section 2. Consequently, the heat that is used to fuse the sections 2 and 3 together also causes sufficient softening of the glass beads 12 to cause them to fuse to the wall of section 3. Thus the tungsten wires serve the double purpose of firmly holding the target in its accurate location during the joining of the bulb sections 2 and 3, and also they exert considerable pressure radially outward against the wall of section 3 to facilitate fusion of the glass beads 12 to the wall of section 3 during the bulb splicing operation. Furthermore, with this arrangement, the target 5 is completely electrically insulated from the cathode-ray bulb which is of importance in certain kinds of cathode-ray tubes.

Various changes and modifications may be made in the disclosed embodiment without de-

parting from the spirit and scope of the invention.

What is claimed is:

In combination, a cathode-ray tube having an enlarged bulb section which is arranged to be sealed to the end of a corresponding flared section of the cathode-ray tube, a screen member within the tube, means to anchor and locate said member in spaced relation to the inner surface of the end wall of said bulb section, the last-mentioned means comprising a series of springy tungsten wires each terminating at one end in a glass beaded metal alloy disc having substantially the same coefficient of expansion as the glass of the bulb, each wire being integrally attached at its opposite end to the margin of said member and being spring-pressed inwardly by engagement of the beaded end thereof with the wall of the bulb section, the glass bead on each wire being fused to the internal side wall surface only of said bulb section for thermally and electrically insulating the screen member from the bulb section, said discs on said wires being located adjacent the sealing region between said flared section and said enlarged bulb section whereby the sealing heat for effecting sealing of the two bulb sections simultaneously causes fusion of said glass beads to the wall of said bulb section.

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