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METHOD OF MAKING FLAT-BOTTOMED CATHODE RAY TUBES

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Fig. 1

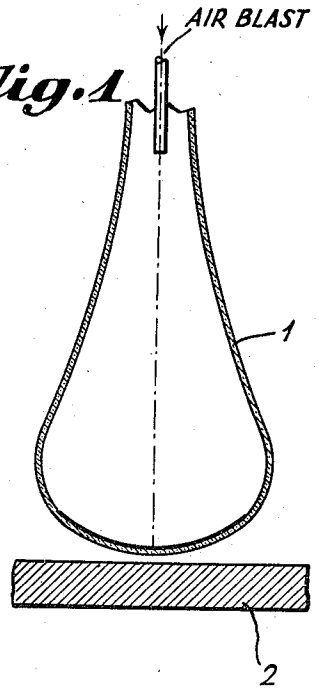
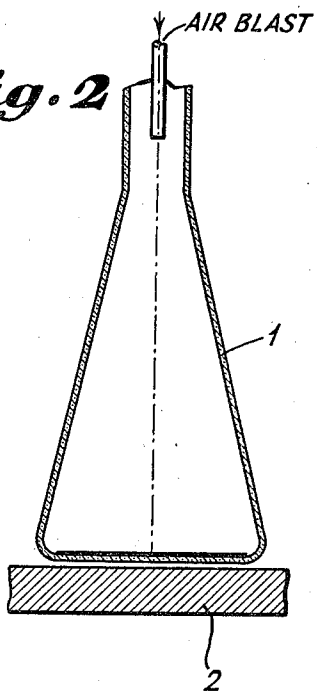


Fig. 2



INVENTOR
KURT DIELS
BY H. S. Snover
ATTORNEY

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METHOD OF MAKING FLAT-BOTTOMED CATHODE RAY TUBES

Kurt Diels, Berlin, Germany, assignor to Telefunken Gesellschaft für Drahtlose Telegraphie m. b. H., Berlin, Germany, a corporation of Germany

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2 Claims. (Cl. 49—83)

The present invention is concerned with a method of manufacturing cathode ray tubes having a flat bulb bottom.

The customary form of cathode ray tube of the kind used, for instance, for television work consists of a cone-shaped flaring bulb which is closed by a curved bottom which mostly supports the luminescent or fluorescent substance (phosphor). For reasons of ruggedness and strength a curved bottom has proved most advantageous in these tubes or bulbs for this makes it feasible to make the bottom of comparatively thin glass; and if the bulb of the tube is conical, the change from or the connection between the bottom of the bulb and the sides carrying the bottom may be so formed that the risk of breakage is minimized.

However, the curvature of the bulb bottom, when viewing a picture oscillogram or the like delineated upon the bottom of the bulb proves extremely annoying on the ground that in addition to the reflection of light reaching the viewer's eyes from the convex glass surface, the image seems subject to the "barrel" type of distortion. Also in the case of a projection of a fluorescent screen image, a bulb bottom which is convex in reference to the imaging lens is very unsuited. For this reason, compensatory optical lenses have been suggested in the prior art both in the case of direct viewing as well as in the case of optical projection of fluorescent screen pictures. Particularly where compensating lenses of large diameters are required for the said purpose, means of the said kind are very costly. Because of all of these disadvantages and difficulties inherent in the use of bulbs having curved bottoms it has been felt very desirable to create a flat bottomed bulb, so much more so that as changes in the size of the spot occurring in this case may be rendered negligible provided the paths of the rays are properly directed by providing suitable electron optic means.

Tubes or bulbs are known in the prior art in which the bottom in the form of a planar or flat disk is welded onto the end of the bulb. However, the manufacture of such bulbs is rather complicated and tedious, not to mention the fact that the risk of breakage in flat bottom bulbs is far greater than with bulbs with a curved bottom which can be made in one piece.

Now, the present invention discloses an extremely simple method of manufacturing tubes having a flat bottom of the kind used particularly for television work. According to the invention, the bulb of the tube including the flat closure or end disk thereof is made by blowing, in one working stage, a heated glass parison (gob) when in plastic state against a flat surface preferably consisting of metal. It has been discovered that if the glass gob is blown against a sufficiently flat surface, the surface produced in the interior of the bulb will turn out so flat and smooth that no trace of distortion is noticeable. A tube or bulb manufactured by the method of this invention is eminently suited also for projection work. It has also been ascertained that especially when a hard variety of glass is employed in making the bulb and if care is taken so that the smooth and flat bulb surface is heavier and thicker than the lateral walls of the bulb, the risk of breakage will be extremely small.

Figs. 1 and 2 are partial elevations of the tube bulb in the course of production and in finished state. Referring to the drawing, 1 denotes the glass bulb, 2 is the flat surface against which the gob is blown when in heated plastic state, by the agency of an air blast acting in the direction of the arrow so that a tube having a perfectly flat bottom ensues of the kind shown in Fig. 2.

What I claim is:

1. The method of making a cathode ray tube having a flat end wall which comprises the steps of blowing a glass gob in heated plastic state with its closed end against a flat surface while the remaining portions of the gob are unconfined, and permitting the glass to harden while in this condition.

2. The method of making a cathode ray tube having a conical body portion and a flat end wall which comprises the steps of blowing a heated and plastic gob of glass with its closed end against a flat metal surface while the remaining portions of the gob are unconfined, and retaining the glass in such position until it hardens.

KURT DIELS.