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TELEVISION DEVICE

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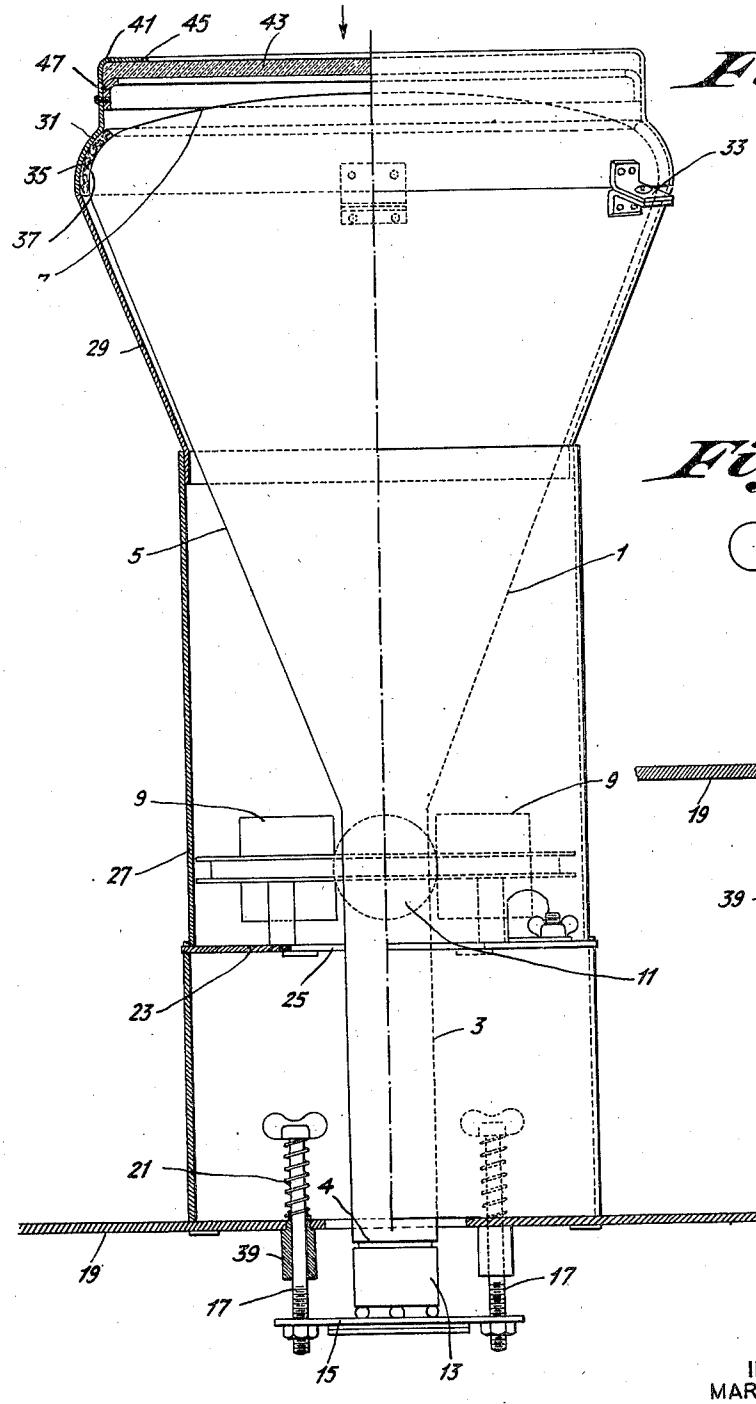
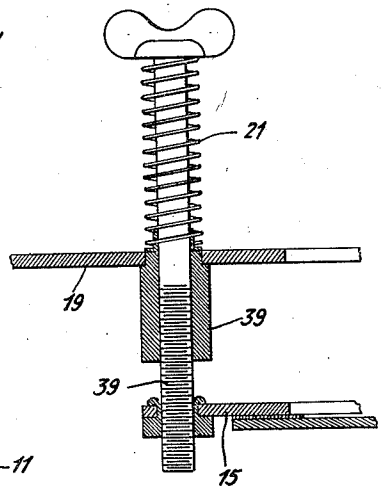


Fig. 1

Fig. 2



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TELEVISION DEVICE

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4 Claims. (Cl. 250—27.5)

The present invention relates to cathode ray devices and, more particularly, to a means by which cathode ray tubes and the like may be supported within suitable housing members for use in television receivers and transmitters, for use as oscilloscopes or oscillographs, and for many other similar and allied purposes.

By copending application of Vladimir K. Zworykin, Serial #529,653, filed April 13, 1931, a system was disclosed which utilized a cathode ray tube mounted within a cabinet or housing member and positioned vertically with respect thereto, so that the observable indications produced on the fluorescent end wall of the cathode ray tube device were observable by viewing a mirror positioned in the inside portion of the lid of the supporting cabinet and placed at a suitable angle with respect to the tube to permit viewing of the image constructed upon the tube or to reflect light from the subject to the tube in the event that the tube was being used as a transmitting element.

The present invention is directed to a system which is, in general, related to devices of the type hereinabove named as having been disclosed by V. K. Zworykin, and also to devices of the general type disclosed by R. L. Campbell in application Serial #562,211, filed September 11, 1931. This invention, however, is directed primarily to a means by which the cathode ray tube used to reconstruct image signals for television work to produce indications of wave forms, or the like, for oscilloscope work or to produce varying intensity signalling indications for transmitting a series of signalling impulses, each representative of the varying intensities of light and shadow upon successive elemental areas of a subject of which the image is to be produced may be supported within the cabinet or housing member and shielded both against external electrical disturbances and against possible breakage occasioned by moving the cabinet within which the tube is located.

Frequently, when a cathode ray tube is vertically positioned, the tube is somewhat unstable and the slightest jar or vibration causes it to move relative to the stationary external magnetic deflecting coils or relative to external electrostatic deflecting plates customarily employed in connection therewith, and any resulting relative motion between the tube and the deflecting members causes distortion of the image developed upon the fluorescent screen constituting the end wall of the tube.

It is, therefore, an object of this present invention to provide a cathode ray tube supporting structure which will align and partially support the tube in such manner as to prevent the fluorescent effects produced within the tube from becoming distorted due to internal electrical effects and to prevent, at the same time, possible breakage of the tube or a motion of the tube within the cabinet used to house the same in the event that the cabinet is moved from one location to another.

A further object of this invention is to provide a supporting member for a cathode ray tube which will provide not only electrical shielding for the tube but also complete mechanical protection as well.

Another object of the invention is to provide a supporting member for a cathode ray tube which will position and locate the tube within a suitable supporting cabinet member in such a manner that the tube is supported only from its end portions.

A still further object of the invention is to provide a supporting housing for a cathode ray tube, or the equivalent, which resiliently supports both ends of the tube so that all intermediate portions are unsupported.

Still a further object of this invention is to provide a tube housing and shielding construction which will protect not only the longitudinally extending sections of the tube but also the fluorescent end wall from possible breakage and, at the same time, protect observers of the image produced upon the fluorescent end wall from possible injury due to any breakage of the glass tube occasioned by moving the housing cabinet from one location to another.

To accomplish these results, it is desirable to mount within the end of the tube housing or shielding member a layer of non-shatterable glass which does not affect appreciably the efficiency of the light transmission from the end wall of the tube to the observer.

Still a further object of the invention is to provide a supporting arrangement for a cathode ray tube device which is relatively simple in its construction and arrangement; to provide a supporting arrangement which can be disassembled easily to remove the tube from the housing; and to provide a supporting structure which can be built cheaply and still provide all necessary electrical and mechanical shielding for the tube element contained within the support.

Still other and further objects of the invention will become apparent and, naturally, suggest themselves to those skilled in the art to which

the invention is directed by reading the following specification in connection with the accompanying drawing, wherein:

Fig. 1 illustates a preferred form of tube mounting and shielding arrangements; and,

Fig. 2 illustrates, in further detail, the means for supporting the end of the tube to which connection terminals are supplied in the form of a tube socket to the shielding member.

For the purpose of considering this invention, it is intended that the entire tube arrangement shall be considered as mounted within a cabinet of the general type disclosed by the above referred to Zworykin application, wherein the tube extends vertically of the cabinet and is arranged so that the upper end portion of the tube having the fluorescent end wall is supported near the uppermost portion of the cabinet and the cabinet lid, which is arranged to be pivoted for movement to different angular positions, is provided upon its internal surface with a reflecting mirror which can be either a plain mirror, or concave or convex, depending upon whether or not it is desired to have reduced or enlarged or substantially exact size views of the image constructed by the cathode ray pencil striking the fluorescent layer on the internal end wall of the tube. To simplify the showing in the drawing, this arrangement, however, has not been specifically illustrated, since it is intended that this particular arrangement only be combined with the arrangement of the type disclosed by Zworykin, and because the present invention is directed particularly to the shielding of the tube and not to the tube in combination with a viewing device.

To refer now more particularly to the drawing, the cathode ray tube device 1, which is provided with an electron emitter, a controlling grid and one or more anode members (all not shown), is arranged so that it extends in a vertical direction with the neck portion of the tube 3, containing the greater number of electrodes, extending downwardly and the pear-shaped portion of the tube 5 extending upwardly. At the end of the pear-shaped portion of the tube, there is an internal coating 7 which is a material adapted to fluoresce at areas where it is subjected to a bombardment of the cathode rays generated within the tube. To deflect the cathode ray originating from the electron emitting element, which may be either a hot or a cold cathode, suitable magnetic deflection coils, indicated schematically as 9 and 11, for the purpose of deflecting the ray in each of two directions at right angles to each other, have been illustrated. These magnetic coils are supplied with current impulses usually following a saw-tooth path, as was disclosed, for example, by copending application Serial #544,959, filed on June 17, 1931, by A. W. Vance. The lowermost portion of the tube 1 is provided with a socket having a number of prongs (not shown but usually corresponding to the number of tube electrode elements) extending outwardly therefrom which fit into the socket member 13 carried upon a base member 15 and supported therefrom by the screws or bolts 17 which are resiliently mounted from the supporting base member or shelf of the cabinet 19. By means of spring members 21 wrapped about the bolts 17, these members are adapted to cause the base member 15 to be drawn upwardly toward the end of the tube and thus support more rigidly this end of the tube. The bolts or adjusting screws 15 are provided with suitable thumb nuts which may be turned to adjust the position of the supporting base member 15 carrying the socket member 13, and the spring portion 21 permits a suitable adjustment or change in the position of the base member caused by any possible expansion due to heating effects produced when the tube is in operation.

The magnetic deflecting coils 9 and 11 for deflecting the cathode ray, for which electrostatic deflecting plates could also be substituted, are supported on a supporting plate 23 formed with a circular or annular opening 25 and carried from the cylindrical shielding member 27 which is rigidly supported in any desired manner upon the base or supporting member 19 which, in turn, is suitably fastened to the cabinet member intended to house the entire arrangement. Extending upwardly from the upper portion of the cylindrical shielding member 27, and shaped so as to conform substantially to the shaping of the cathode ray tube 1, is a second section 29 of the shield which is suitably riveted or welded to the cylindrical shield portion 27. This frusto-conical shielding section 29 extends upwardly of the tube 1 for substantially the entire portion of its conical section. A lid or cover section 31 is then mounted immediately above the frusto-conical section 29 and is suitably fastened thereto by means of clamps or other fastening members 33, of which one section is provided on the upper cover member 31 and the other section on the frusto-conical member 29, so that the tube is totally shielded throughout its entire length by means of the cylindrical shielding member 27, the frusto-conical shielding member 29 and the upper shielding member 31.

Upon the internal wall of the covering shield member 31, I have provided a resilient layer 35 which may be of a fibrous, non-resonant, laminated material such as felt, flake asbestos, or other type of vibration deadening pliable moulding material which serves to absorb the shock due to external vibrations tending to move the tube within the shielding members. This material 35 may be fastened in any desired manner to the internal portion of the upper shield member by any suitable form of adhesive substance, and is so arranged as to extend completely around the circumferential extent of the upper shield member so that the end portion 37 of the tube 1 rests against the resilient non-resonant fibrous material 35 throughout its circumferential extent. The tube, it is thus seen, is supported at its end portion 37 by means of the fibrous non-resonant resilient material, and also at its end portion 4 by means of the resiliently mounted supporting base. At all points intermediate these two fixed location points the tube is suspended and not supported.

By suitably mounting and locating the bushings 39 through which the adjusting screws or bolts 17 are passed in the base member 19, and by uniformly covering the internal portion of the upper shield member 31 with a suitable layer of felt, it can be seen that the cathode ray tube can be so mounted within the shield member that the portions thereof which pass between the magnetic deflecting coils 9 and 11 are spaced equal distances from each coil with a result that the magnetic effects produced by passing suitable deflection currents through the magnetic coils will influence uniformly the path of the cathode ray within the tube and distortion of the resulting image produced by the bombardment of the positioned con-

trolled cathode ray or the tube end wall cannot take place.

Also, forming the extreme end portion 41 of the upper shielding member 31, there is arranged a layer of non-shatterable glass 43, customarily known in the art as "safety glass", which is suitably fastened within the end portion 41 of the upper shield by means of the projecting lugs 45 and 47, each formed with any desired internal opening which may be rectangular, square, circular or any other desired shape. In assembling this arrangement, the non-shatterable glass plate 43 is positioned so as to rest upon the inner portion of the supporting lug 45, and the internal supporting member 47 is then fastened by means of any suitable rivets or bolts to locate in a fixed manner the glass plate within the end of the upper shielding member. The images which are produced upon the fluorescent end wall 7 of the tube are then viewed in a direction indicated by the arrow through the glass plate member.

While the invention has herein been shown and illustrated in only one of its preferred forms, it is, of course, to be understood that the same is capable of many and varied modifications, and, therefore, it is believed that the invention should be restricted only in so far as is necessary to fall within the spirit and scope of the hereinafter appended claims, wherein I claim and desire to secure by Letters Patent the following:

1. A supporting and shielding means for a cathode ray tube comprising shielding means surrounding the tube and extending longitudinally thereof for a portion of the length and having a progressively changing size to correspond substantially to the change in size of the tube throughout the shielded length, a separate shielding section for shielding one end portion of the tube, the last named shielding section being adapted to be placed adjacent the first named shielding section and clamped thereto, means forming a part of the end shield to permit viewing the end portion of the electron tube therethrough and a resilient non-resonant pliable material mounted within the inner surface of the last named shielding section against which the outer wall of the tube is adapted to rest, so as to be secured in a predetermined position by the shielding member.

2. A supporting and shielding means for a cathode ray tube comprising shielding means surrounding the tube and extending longitudinally thereof for a portion of the length and having a progressively changing size to correspond to the change in size of the tube throughout the shielded length, a separate shielding section for shielding one end portion of the tube, the last named shielding section being adapted to be placed adjacent the first named shielding section and clamped thereto, a resilient non-resonant pliable material mounted within the inner surface of the last named shielding section against which the outer wall of the tube is adapted to rest, so as to be secured in a predetermined position by the shielding member, and a viewing window forming the central portion of the last named shielding section.

3. A shielding device for a cathode ray tube which comprises a cover portion for covering the end wall of the tube, a non-shatterable glass plate forming the end section of the cover member and surrounding the end wall portion of the tube, a resilient support layer mounted within the cover portion of the tube upon which the end section of the tube is adapted to rest, a shielding section conforming substantially to the tube shaping surrounding the tube throughout the remaining portion of its length and connected with the cover portion, and means for resiliently supporting the end of the tube opposite the cover portion from the shielding section so that the tube is supported longitudinally at each end portion thereof only.

4. A cathode ray tube support comprising a shielding member concentric with and of length commensurate with the length of tube to be supported, resilient means for supporting the tube base within the shielding member and establishing electrical connections from the said tube base terminals to external circuits, an end housing member for enclosing and supporting the opposite end portion of the tube, said housing member having the end thereof provided with a central opening of a size commensurate with the maximum dimension of the tube fluorescent viewing screen, means to connect said member with said shielding member so as to form a complete tube housing, and pliable non-resonant material carried upon the end housing member and upon which the viewing screen end portion of the tube is adapted to rest and be supported.

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