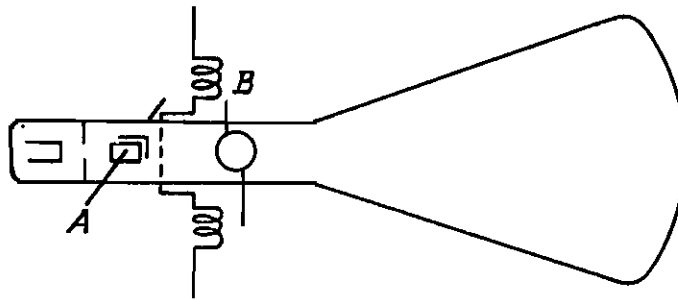


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ALIEN PROPERTY CUSTODIAN

BRAUN TUBES

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the Allen Property Custodian

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This invention relates to improvements in or concerning cathode ray or Braun tubes, and more particularly to the high vacuum type of such tubes for use in television systems.

It has been experienced in the past that the fluorescent screen of high vacuum Braun tubes becomes damaged under certain operating conditions. Investigations in this respect have proven that the fluorescent screen suffers during the course of longer active use, even in cases that the tube is of the hard vacuum type, and that the damage occurs on the fluorescent screen in the shape of a dark line or spot, whether the cathode ray is electromagnetically deflected along one or both coordinates of the coordinate system. It must be noted in this connection that the damages heretofore referred to are not identical with the well known injuries of the fluorescent screen due to the screen etching phenomenon. Further research work carried out in this field teaches that damages of the first mentioned kind result from the action of certain ions, the barium ions, for example, which practically remain uninfluenced by the cathode ray deflecting means, provided that the Braun tube operates with electromagnetic deflection. It has been found that the above mentioned ions which have frequently been observed and also taken in account in connection with glow cathode tubes become influenced in Braun tubes solely in cases that electrostatic deflection of the cathode ray is employed, but remain almost immune to an electromagnetic deflection due to their very great mass as compared with that of the electrons. An electrostatic field imparts the same deflection to all particles of equal charge independent of their mass, since particles of greater mass move with a correspondingly reduced velocity, provided that they have previously been accelerated by the same potential, while on subjecting these particles to an electromagnetic deflection under exactly the same operating conditions as heretofore mentioned, the relationship between the effective deflections is: VE/m , where VE denotes the charge, and m the mass. This rule clearly shows that certain precautions must be taken in connection with electromagnetic cathode ray deflection in order to eliminate the above mentioned difficulties.

This is accomplished according to the main feature of my present invention by directing the cathode ray in its state of rest toward the outer edge or idle area of the fluorescent screen, instead of leaving the cathode ray incident upon the active image area of said screen also during the absence of incoming image and synchronization

impulses. This transposition of the cathode ray onto the idle area or surface of the screen is effected by means of an electrostatic direct current field which removes deleterious ions from the active image area.

The invention will be more readily understood from the following description taken in conjunction with the accompanying drawing, the single figure of which schematically shows a Braun tube of standard type to which the invention is applied.

The useful deflection of the cathode ray beam away from its new position of rest imparted thereto on account of an artificial displacement by virtue of an initial or biasing electrostatic deflection applied at the point A of the Braun tube schematically shown in the drawing is magnetically effected in the opposite direction with respect to said initial or biasing electrostatic deflection. This facility makes sure that the ions remain in their positions, that is, outside the actual area of the image, so that the harmful ions are withdrawn from the image reproducing surface of the fluorescent screen. The corresponding deflection along the other coordinate at right angles to that heretofore considered may be carried out either by means of electrostatic or electromagnetic fields. The actual or useful deflection of the cathode beam takes place at the point B of the drawing along the coordinate of the electrostatic initial or biasing deflection, for instance, by the agency of coils or windings through which a pulsating direct current but no alternating current flows. This may be realized according to a further feature of my invention by directly connecting the deflecting coils or windings in the anode circuit of a final tube following a time base generator. The direct current portion thus applied to the deflecting coils magnetically restores the initial or biasing electrostatic deflection to the range of active operation. Because of the fact that the characteristic of the above mentioned final tube hardly becomes utilized exactly to the current value nil, the residual current thus present involves an appreciable minimum deflection in the vicinity of the artificial position of rest of the cathode ray which position might be critical due to the presence of the harmful ions, so that all possibilities for these ions to detrimentally affect the virtual area of the fluorescent screen are reliably eliminated.

It is also possible in accordance with still a further feature of the invention to provide particular direct current fed coils or windings which have for their object to convey back to the central

surface of the fluorescent screen the electrons only of the combined mixture of electrons and ions initially removed therefrom on account of the biasing electrostatic deflection.

The pure electron beam thus incident upon the central or active area of a Braun tube fluorescent screen may be utilized for a variety of purposes, e. g. for being so deflected as to produce an image in accordance with any optional method or scheme without running the risk that the deleterious ionic effect might injure the screen. Of course, precautions must be taken that the range through which the electronic beam passes during the useful deflection does not be-

come enlarged into the range of the cathode ray artificially produced therefor by virtue of the electrostatic initial or biasing deflection.

It is an essential advantage of the arrangement according to my above described invention that the well known standard type of cathode ray or Braun tubes requires no principal alterations for its application. The only additional means which are necessary for carrying out my invention is a simple electrode structure such as a pair of deflecting plates for generating the necessary electrostatic direct current field.

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