May 31, 1938. K. SCHLESINGER 2,118,865

CATHODE RAY TUBE FOR TELEVISION PURPOSES

Filed March 26, 1934

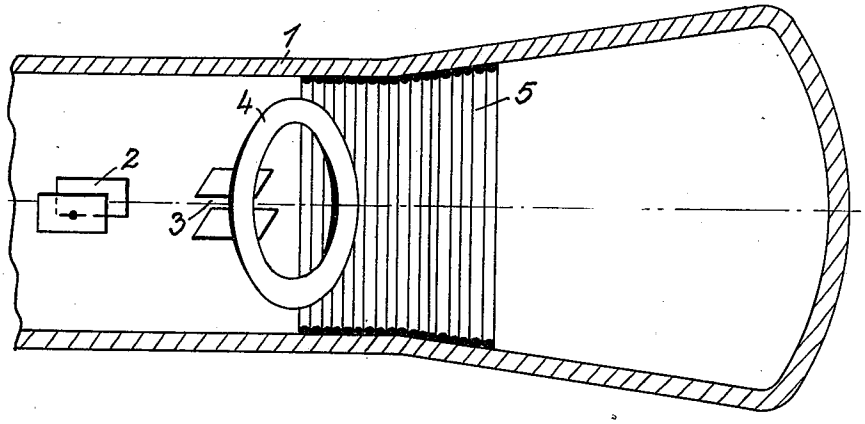


Fig. 1.

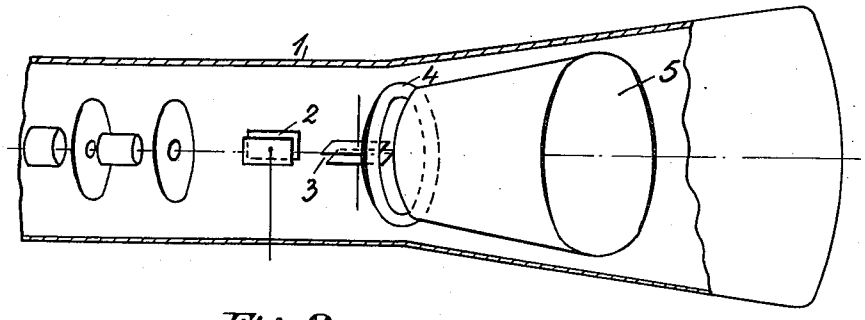


Fig. 2.

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CATHODE RAY TUBE FOR TELEVISION PURPOSES

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Application March 26, 1934, Serial No. 717,308
In Germany March 29, 1933

9 Claims. (Cl. 250—27)

In the case of Braun tubes furnished with deflecting plates as hitherto known there occurs the error that parts of the image are lacking in sharpness. This partial lack in sharpness is due partly to uncontrollable wall charges and in part to influences which are not yet understood.

The object of the invention is a Braun tube which is free of these errors, and enables television images to be produced which are equally sharp over the entire surface of the image.

According to the invention, a separate concentration field is provided between the final pair of deflecting plates and the image screen.

This concentration field may consist of an auxiliary electrode closing off the electrode system and a concentration electrode provided on the wall of the tube itself. It is, however, also possible, to replace the wall electrode by a preferably funnel-shaped electrode connected with the system.

It has been found that a satisfactory concentration effect is only obtainable if the wall or funnel electrode is made weakly negative in relation to the auxiliary electrode closing off the system. The difference in potential necessary for producing absolutely sharp images is dependent to a very great extent on the construction of the tube (length of the bulb, operating potential, etc.), but may be adjusted without difficulty in each individual case.

According to the invention, it is convenient to connect the wall or funnel electrode with the anode, and to impart to the auxiliary electrode a positive bias in relation to the anode.

In the case of tubes having three-part deflecting plate systems according to the patent application Serial Number 694,915, Patent No. 2,083,204, dated June 8, 1937, the auxiliary electrode terminating the system may conveniently be connected with the middle plate of the three-part deflecting system.

The invention will be more fully understood from the appended drawing, whereof

Fig. 1 shows a cathode ray tube according to the invention wherein the auxiliary electrode consists of a metallic wall coating, while

Fig. 2 shows another embodiment of the cathode ray tube furnished with a funnel-shaped auxiliary electrode.

In Fig. 1, 1 is the tube having the pairs of deflecting plates 2 and 3, 4 the auxiliary electrode terminating the system, and 5 the wall electrode, which, as shown in Fig. 2, may be replaced by a funnel electrode 5 connected with the system itself. The extreme portion of the wall electrode situated towards the anode is preferably located, according to the invention, approximately on a level with the auxiliary electrode. The wall electrode projects to the extent of approximately 8–12 cm. into the bulb, but in any case is made so short that the same is incapable of exerting any deflecting action on the cathode ray.

This electrode may have, for example, a negative bias of 100–250 volts against the electrode 4, supplied by a source 6. As shown in Fig. 2, the auxiliary electrode may be connected directly to the anode 7, the electrode 4 then being positively biased with regard to the anode.

The tube according to the invention enables for the first time television images to be produced with the use of Braun tubes furnished with deflecting plates, which are equally sharp over their entire surface and do not possess any blurred or indistinct marginal portions or corners.

I claim:

1. An arrangement comprising a cathode ray tube comprising means to produce a cathode ray of variable intensity, means to concentrate said cathode ray, a picture receiving screen, two pairs of deflecting plates disposed between said concentrating means and said screen, and further concentrating means mounted between said deflecting plates and said screen, said further concentrating means including a perforated plate-shaped electrode mounted in a cross-section of the cathode ray tube between said deflecting plates and said screen, and an auxiliary electrode consisting of a metallic wall coating, said coating beginning substantially in the cross-section of the cathode ray tube in which said plate-shaped electrode is mounted, said coating projecting for at least eight cm. in the direction towards said screen; and means for supplying between said wall coating and said plate-shaped electrode a potential difference, which, taken from said wall coating to said plate-shaped electrode, is negative.

2. An arrangement comprising a cathode ray tube comprising means to produce a cathode ray of variable intensity, means to concentrate said cathode ray, a picture receiving screen, two pairs of deflecting plates disposed between said concentrating means and said screen, and further concentrating means mounted between said deflecting plates and said screen, said further concentrating means including a perforated plate-shaped electrode mounted between said deflecting plates and said screen, a funnel-shaped auxiliary electrode mounted between said plate-shaped electrode and said screen; means for applying between said funnel-shaped electrode and said

plate-shaped electrode a potential difference, which, taken from said funnel-shaped electrode to said plate-shaped electrode, is negative.

3. An arrangement comprising a cathode ray tube comprising means including a cathode and an anode for producing and accelerating a cathode ray of variable intensity, means to concentrate said cathode ray, a picture receiving screen, two pairs of deflecting plates disposed between said concentrating means and said screen, and further concentrating means mounted between said deflecting plates and said screen, said further concentrating means including a perforated plate-shaped electrode arranged between said deflecting plates and said screen, an auxiliary electrode mounted between said plate-shaped electrode and said screen; means to supply said perforated plate electrode with a positive bias in relation to said anode; and means for directly connecting said auxiliary electrode with said anode.

4. A cathode ray tube comprising means to produce a cathode ray of variable intensity, means to concentrate said cathode ray, a picture receiving screen, two pairs of deflecting plates disposed between said concentrating means and said screen, and further concentrating means mounted between said deflecting plates and said screen, said further concentrating means including a perforated plate-shaped electrode and an auxiliary electrode to have a potential difference applied there-between, which, taken from said auxiliary electrode to said plate-shaped electrode, is negative, said plate-shaped electrode being mounted in a cross-section of the cathode ray tube between said deflecting plates and said screen, said auxiliary electrode consisting of a metallic wall coating beginning substantially in the cross-section of the cathode ray tube in which said plate-shaped electrode is mounted, said coating projecting for at least eight cm., in the direction towards said screen.

5. A cathode ray tube comprising means to produce a cathode ray of variable intensity, means to concentrate said cathode ray, a picture receiving screen, two pairs of deflecting plates disposed between said concentrating means and said screen, and further concentrating means mounted between said deflecting plates and said screen, said further concentrating means including a perforated plate-shaped electrode and a funnel-shaped electrode to have a potential difference applied therebetween, which, taken from said funnel-shaped electrode to said plate-shaped electrode, is negative, said plate-shaped electrode being mounted between said deflecting plates and said screen, said funnel-shaped auxiliary electrode being mounted between said plate-shaped electrode and said screen.

6. A cathode ray tube comprising means including a cathode and an anode for producing and for accelerating a cathode ray of variable intensity, means to concentrate said cathode ray, a picture receiving screen, two pairs of deflecting plates disposed between said concentrating means and said screen, and further concentrating means mounted between said deflecting plates and said screen, said further concentrating means including a perforated plate-shaped electrode mounted between said deflecting plates and said screen and to be maintained positive in relation to said anode, and an auxiliary electrode mounted between said plate-shaped electrode and said screen and directly connected with said anode.

7. For a cathode ray tube comprising means to produce a cathode ray, means to concentrate the cathode ray, a picture receiving screen, and cathode ray deflecting means disposed between said concentrating means and said picture receiving screen: the combination comprising a concentrating system disposed in the cathode ray tube between said deflecting means and said screen and including a perforated plate-shaped electrode mounted in a cross-section of the cathode ray tube between said deflecting means and said screen, and an auxiliary electrode consisting of a metallic wall coating beginning substantially in the cross-section of the cathode ray tube in which said plate-shaped electrode is mounted, said coating projecting in the direction towards said screen, and means for applying between said wall coating and said plate-shaped electrode a potential difference which, taken from said wall coating to said plate-shaped electrode, is negative.

8. For a cathode ray tube comprising means to produce a cathode ray, means to concentrate the cathode ray, a picture receiving screen, and cathode ray deflecting means disposed between said concentrating means and said picture receiving screen; the combination comprising a concentrating system disposed in the cathode ray tube between said deflecting means and said screen and including a perforated plate-shaped electrode mounted between said deflecting means and said screen, and a funnel-shaped auxiliary electrode mounted between said plate-shaped electrode and said screen, and means for applying between said funnel-shaped electrode and said plate-shaped electrode a potential difference which, taken from said funnel-shaped electrode, to said plate-shaped electrode is negative.

9. For a cathode ray tube comprising means including a cathode and an anode for producing and accelerating a cathode ray of variable intensity, means to concentrate the cathode ray, a picture receiving screen, and cathode ray deflecting means disposed between said concentrating means and said picture receiving screen: the combination comprising a concentrating system disposed in the cathode ray tube between said deflecting means and said screen, and including a perforated plate-shaped electrode mounted between said deflecting means and said screen, an auxiliary electrode mounted between said plate-shaped electrode and said screen, means for maintaining said plate-shaped electrode positive relatively to said anode, and a direct equipotential connection between said auxiliary electrode and said anode.

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