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TELEVISION RECEIVER

Original Filed April 28, 1939

Fig. 1.

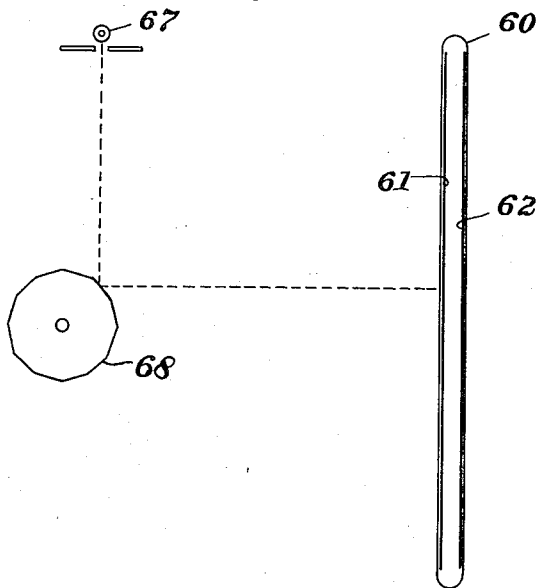
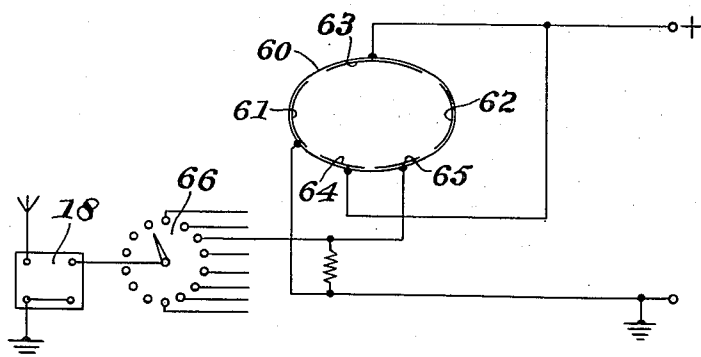


Fig. 2.



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TELEVISION RECEIVER

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Original application April 28, 1939, Serial No.
270,672, now Patent No. 2,313,286, dated March
9, 1943. Divided and this application January
13, 1943, Serial No. 472,240. In Great Britain
April 29, 1938

5 Claims. (Cl. 178—7.3)

The present invention relates to television receivers and is divided from my prior application Serial No. 270,672 filed April 28, 1939, patented March 9, 1943, No. 2,313,286.

The invention described and claimed in the specification of that application comprises a television receiver comprising a plurality of long evacuated tubes, said tubes being arranged vertically in one plane in close proximity to one another, a set of elongated electrodes for each tube arranged parallel to the axis thereof, said electrodes comprising a source of electrons, a control electrode and an anode, an elongated fluorescent layer for each tube adapted to receive such electrons from said source that pass said control electrode and anode, a plurality of magnetic controlling members arranged horizontally and externally of said tubes, a line frequency commutator in operative connection with the control electrodes of said tubes, a frame frequency commutator in operative connection with said magnetic controlling members, a picture signal receiver in electrical connection with the armature of said line frequency commutator and a source of electrical current in electrical connection with the armature of said frame frequency commutator.

In the present invention it is proposed to replace said horizontally arranged magnetic controlling members and the commutator therefore by means for sweeping along the lengths of the tubes a beam of light. To this end the cathode in said tubes is made photo-electric.

An arrangement according to the present invention is described with reference to Figs. 1 and 2 of the accompanying drawing in which

Fig. 1 is a diagrammatic view of an arrangement according to the invention and

Fig. 2 is a sectional view across one of the tubes of Fig. 1.

Referring to the drawing, a number of glass tubes 60 are arranged vertically side by side in one plane. Each tube has extending along its length a photo-electric cathode 61, and a fluorescent layer 62. These two electrodes are preferably in the form of layers formed by any suitable method on the walls of the tube 60. Also along the length of the walls of the tube 60 are arranged electrodes 63, 64, 65, in the form of metallic deposits. The electrodes 63 and 64 are held at the same positive potential, whilst the electrode 65 is given varying potentials by means of the line scanning commutator 66 fed with the picture signals from the receiver 18. When the potential of the electrode 65 is in the neigh-

bourhood of that of the electrodes 63 and 64, the beam of electrons from the cathode 61 will strike the fluorescent screen 62, but when this potential becomes more negative, the electrons will be collected by the electrode 63.

The electrodes 65 of the various tubes are fed in turn with varying potentials by means of the commutator 66, so that line scanning is effected. Frame scanning is produced by sweeping a line of light from the source 67, which can be an elongated tubular source, by means of the slow speed mirror drum 68 over the photo-electric cathode 61.

Any suitable form of light source or sources and optical system for producing a line of light may be employed.

By controlling in this manner vertical columns and horizontal rows of electrons it can be arranged that only the electrons at the crossing point of a simultaneously controlled column and row can reach the picture area, and thus, by controlling successive columns at the line scanning frequency and liberating electrons from successive points along the tubes at the frame scanning frequency, the crossing point will move so that the whole picture area is scanned.

The term "commutator" is intended to include not only mechanical devices in which an armature moves over fixed contacts, but also electronic devices in which the armature is constituted by an electron beam, and optical devices in which it is constituted by a light beam. In the latter case the usual fixed contacts are replaced by photo electric cathodes, which may also serve as the electron controlling means referred to above. Further details of such an arrangement are fully described in the specification of the application from which the present application is divided.

By controlling continuous vertical columns with one commutator and continuous horizontal rows with the other, instead of controlling individual elemental areas, difficulties arising out of the use of an individual device for each elemental area are largely overcome. Thus even in the case of large picture areas of a size comparable with that of a full sized cinema screen, the number of discharge devices required need only be equal to the number of picture lines.

Storage of the received signals can be effected in all cases by controlling the leakage time of the charges which control the line scanning. Alternatively it can be effected by providing no permanent leakage path, but by periodically connecting the line scanning electrodes to earth or

to a source of negative potential at predetermined time intervals after each positive charge has been applied. This can be done by providing the line frequency commutator with a second armature which follows the first and which makes the required connection after the required time interval has elapsed.

I claim:

1. A television receiver comprising a plurality of long evacuated tubes, said tubes being arranged vertically in one plane in close proximity to one another, a set of elongated electrodes for each tube arranged parallel to the axis thereof, said electrodes comprising a photo-electric cathode, a control electrode and an anode, an elongated fluorescent layer for each tube adapted to receive such electrons from said cathode that are directed thereon by said control electrode, a line frequency commutator in operative connection with said control electrodes, a picture signal receiver electrically connected to the armature of said commutator, means for developing a horizontal line of light, and means for periodically sweeping said line of light in a vertical direction over said photo-electric cathodes.

2. A television receiver comprising a plurality of long evacuated tubes, said tubes being arranged vertically in one plane in close proximity to one another, a set of elongated electrodes for each tube arranged parallel to the axis thereof, said electrodes comprising a source of electrons, a control electrode and an anode, an elongated fluorescent layer for each tube for receiving such electrons from said source, a line frequency commutator in operative connection with the control electrodes of said tubes, a picture signal receiver for applying picture signals to the armature of said line frequency commutator, and control means for controlling in all said tubes simultaneously the incidence of electrons in said fluorescent layer from point to point along the length of each tube, and an optical frame frequency commutator for energising said control means.

3. A television receiver according to claim 2 wherein said source of electrons in each tube is photo-emissive, and said frame commutator comprises means for sweeping a horizontal strip of light over said tubes.

4. A television receiver comprising a plurality of long evacuated tubes arranged side by side in one plane, and having their length extending in the frame scanning direction, and within each tube and extending along the length thereof, a cathode, a control electrode and a fluorescent screen, a line frequency commutator for applying to each control electrode in turn a voltage such as to permit the passage of electrons to said fluorescent screen to an extent dependent upon received television signals, controlling means for permitting the passage of electrons to said fluorescent screen in part only, at any instant of the length of said tube and comprising a layer of photo-electron emissive material within each tube acting as the cathode thereof, and a frame frequency commutator comprising means for throwing a strip of light across all said tubes simultaneously and scanning means for sweeping said light strip along the length of said tubes.

5. A television receiver comprising a plurality of long evacuated tubes arranged side by side in one plane and having their length extending in the frame scanning direction, and within each tube and extending along the length thereof a photo-electric cathode, a control electrode and a fluorescent screen; a line frequency commutator for applying to each control electrode in turn a voltage such as to permit the passage of electrons to said fluorescent screen to an extent dependent upon received television signals, and a frame frequency commutator comprising means for sweeping along the length of the tubes a beam of light extending across all the tubes, for permitting the passage of electrons to said fluorescent screen in a part only, at any instant, of the length of said tube.

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