Dec. 2, 1941. W. DILLENBURGER 2,264,624

IMAGE ANALYZING TUBE

Filed Oct. 20, 1939

FIG. 1.

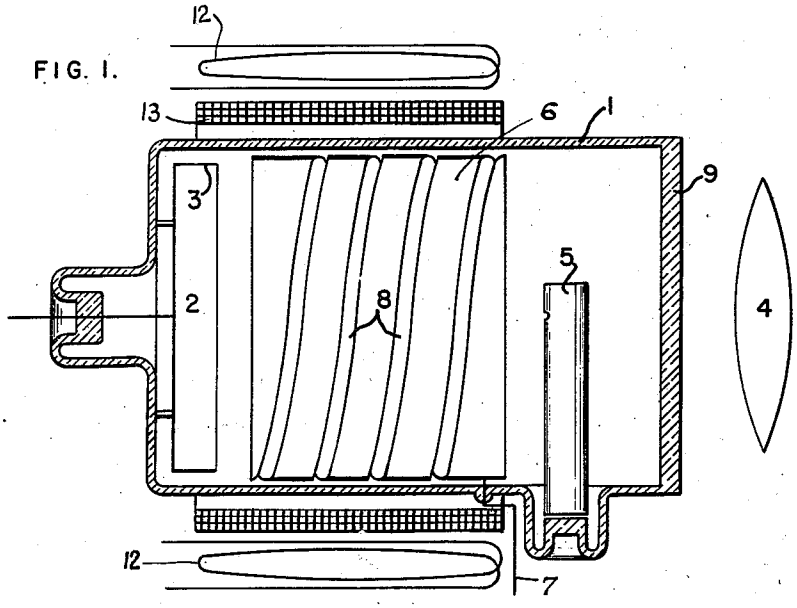
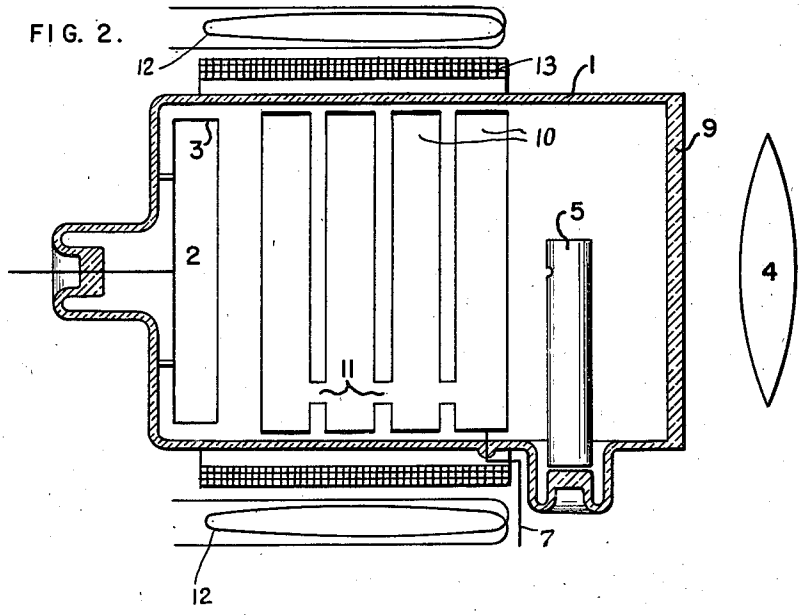


FIG. 2.



INVENTOR.

WOLFGANG DILLENBURGER.

BY: Edwin De Martin

ATTORNEY.

Patented Dec. 2, 1941

2,264,624

UNITED STATES PATENT OFFICE

2,264,624

IMAGE ANALYZING TUBE

Wolfgang Dillenburger, Berlin-Nikolassee, Germany, assignor to Fernseh Aktiengesellschaft, Berlin-Zehlendorf, Germany

Application October 20, 1939, Serial No. 300,429
In Germany October 1, 1938

4 Claims. (Cl. 250—153)

My invention relates to image analyzing tubes, in which the image to be televised is projected upon an electron-emitting light-sensitive cathode. The electrons emitted by the cathode are deflected across a stationary aperture and are focused in the plane of the aperture.

Tubes of this type, often called dissector tubes, contain preferably an electrode surrounding the discharge space and having a potential which is more positive than that of the cathode. This electrode may have the form of a cylinder, or of a wall coating. The electrode in co-operation with a cylindrical ring surrounding the cathode forms an electron lens, which co-operates with a concentrating coil surrounding the tube in order to produce a sharp electron image in the plane of the aperture.

It is an object of the present invention to provide a tube of the type described in which the electrons are deflected by magnetic deflecting fields with an energy as small as possible. It is a further object to avoid eddy currents in the electrode surrounding the deflecting space which otherwise would be present under the influence of the alternating deflecting field. It is a further object to form the electrode surrounding the deflecting space in such a manner that eddy currents flowing in that electrode have substantially no effect on the deflecting field.

According to the invention the electrode is divided into a number of elements which are conductively connected with each other. It is preferable to divide the electrode in a plane perpendicular to the axis of the tube, so that practically no conducting path for eddy currents is formed. The cylindrical electrode is therefore replaced by an electrode consisting of a helical band or by a large number of rings spaced apart but conductively connected to each other.

The invention shall now be described in detail in connection with the drawing, showing two embodiments of the invention.

Figs. 1 and 2 show each a cross-section through a dissector tube containing an electrode formed in accordance with the invention.

The tube of Fig. 1 consists of a glass receptacle 1 containing a photoelectric cathode 2, having a cylindrical extension 3 of the same potential as the cathode. The light passes through the lens 4, through a window 9 of the tube and on both sides of the anode finger 5 containing in known manner the scanning aperture and an electron multiplier for amplifying the electrons passing through the aperture. The discharge space within the tube is surrounded by a metal band 6 having the form of a helix, and having uniform potential. This electrode is connected by a lead 7 to a potential lying between the potential of cathode 2 and of anode 5 which is the target for the electrons emitted by the cathode 2. The focusing effect of this electrode in co-operation with extension 3 is not influenced by the spaces 8, because the entire surface of the electrode 6 and of the spaces 8 carries a uniform potential. The tube is surrounded by deflecting coils 12 and a focusing coil 13. The alternating deflecting currents flowing through the coils 12 set up a deflecting field within the tube. This field however cannot influence eddy currents of considerable amount within the electrode because the electrode is subdivided in the described manner.

The helical band may for instance consist of a metal strip, inserted in the tube before the window 9 has been fused to the envelope 1. Another form of electrode consists of a wall coating applied to the inner wall of the tube for instance by means of a brush. The electrode consists in both cases of a material which is well conducting. Another method of producing the electrode consists in producing a substantially uniform wall coating covering the whole surface and removing the coating from parts of the tube wall so that the desired form of the electrode is obtained.

In the arrangement of Fig. 2 the electrode consists of rings 10 adjacent to one another and conductively connected by a strip 11. This electrode can be produced or inserted in a similar manner as electrode 6 of Fig. 1. The conductive path formed by the rings does not hinder the effect of suppressing eddy currents because the rings lie in a plane vertical to the deflecting field.

The electrode can also be subdivided into strips parallel to the axis of the tube but this is not so advantageous because the extension of the strips corresponds to that of the deflecting field and it is therefore preferable in such a case to use a finer subdivision than in the case of Fig. 2.

Instead of the electrode with cylindrical cross-section also other forms of electrodes, for instance with square cross-section, can be used. The described type of electrode can also be used in connection with cathode ray tubes of other types in which a magnetic deflecting field is set up outside of the tube in such a manner that an electrode of large surface is located within the space of the deflecting field.

What I claim is:

1. A television picture-signal generating tube including a photoelectric cathode, a target spaced

from said cathode and adapted to receive electrons from said cathode, means for developing a magnetic field for deflecting the electrons emitted by said cathode, and a unipotential electrode extending over at least a portion of the electron discharge path between said cathode and said target and extending into said magnetic field, said electrode having relatively low conductivity in the direction of said electron discharge path and relatively high conductivity in the direction transverse thereto, thereby substantially to reduce the generation of eddy currents in said electrode.

2. A television picture-signal generating tube including a photoelectric cathode, a target spaced from said cathode and adapted to receive electrons therefrom, means for developing a magnetic field for deflecting the electrons emitted by said cathode, and a unipotential electrode extending over at least a portion of the electron discharge path between said cathode and said target and extending into said magnetic field, said electrode having relatively low conductivity in the direction of said electron discharge path and relatively high conductivity in the direction transverse thereto and comprising a plurality of spaced sections adjacent each other and conductively connected to each other.

3. A television picture-signal generating tube including a photoelectric cathode, a target spaced from said cathode and adapted to receive electrons therefrom, means for developing a magnetic field for deflecting the electrons emitted by said cathode, and a unipotential electrode extending over at least a portion of the electron discharge path between said cathode and said target and extending into said magnetic field, said electrode having relatively low conductivity in the direction of said electron discharge path and relatively high conductivity in the direction transverse thereto and comprising a plurality of cylindrical sections spaced from each other and conductively connected to each other.

4. A television picture-signal generating tube including a photoelectric cathode, a target spaced from said cathode and adapted to receive electrons from said cathode, means for developing a magnetic field for deflecting the electrons emitted by said cathode, and a unipotential conductive wall coating extending over at least a portion of the electron discharge path between said cathode and said target and extending into said magnetic field, said wall coating having relatively low conductivity in the direction of said electron discharge and relatively high conductivity in the direction transverse thereto, thereby substantially to reduce the generation of eddy currents in said electrode.

WOLFGANG DILLENBURGER.