

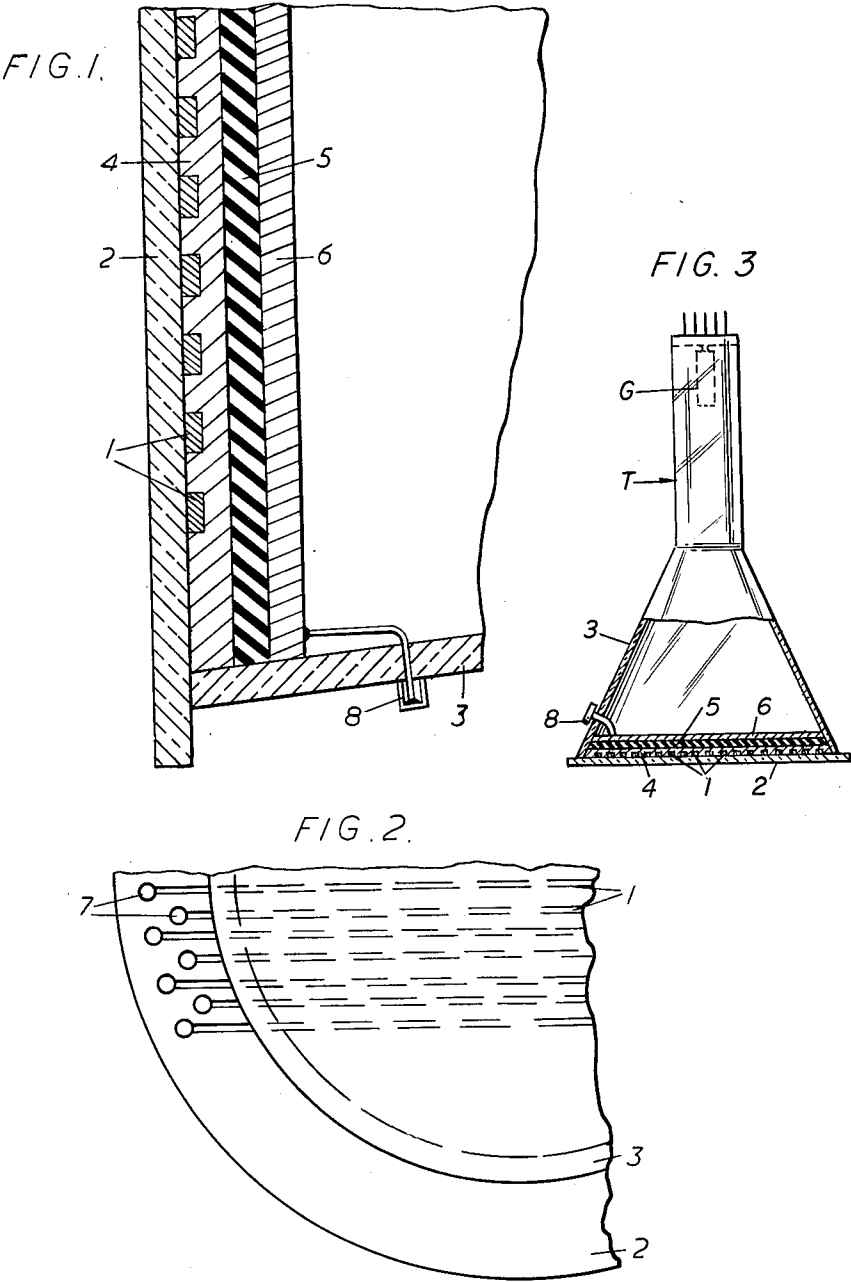
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ELECTROLUMINESCENT SCREEN FOR CATHODE-RAY TUBES

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ELECTROLUMINESCENT SCREEN FOR CATHODE-RAY TUBES

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5 Claims. (Cl. 313-92)

This invention relates to cathode-ray tubes.

More specifically the invention is concerned with cathode-ray tubes for use in systems where it is desired to utilise a single cathode-ray tube to display electrical signals from a plurality of sources. One example of such a system is a Doppler radar system in which an output from any one of a plurality of output channels is utilised to indicate the speed of a target.

According to the present invention a cathode-ray tube includes a screen comprising, in the following order, a plurality of strips of transparent electrically conductive material mounted on a transparent base and electrically separate from one another, a layer of an electroluminescent phosphor covering said strips, a layer of an electrical insulating material which becomes electrically conductive when subjected to electron bombardment and which is stable at all temperatures which it is likely to be subjected to during manufacture of the cathode-ray tube, and a layer of electrically conductive material, the electron beam, in operation, being incident on the last named layer, and electrical connections from the exterior of the cathode-ray tube to each of said strips and to said layer of electrically conductive material.

Said transparent base may be the glass face plate of the cathode-ray tube envelope.

The invention will now be described by way of example with reference to the accompanying drawings in which:

FIGURE 1 is a fragmentary sectional view of the screen end of a cathode-ray tube in accordance with the invention,

FIGURE 2 is a plan view of part of the screen end of the cathode-ray tube shown in FIGURE 1, and

FIGURE 3 is a side view, partially in section, of a cathode-ray tube embodying the screen shown in FIGURES 1 and 2.

A cathode-ray tube T in accordance with the invention includes the usual electron gun G and accelerating and scanning means (not shown). The screen of the cathode-ray tube, however, as shown in the drawings, includes a plurality of parallel strips 1 of gold, which are so thin as to be transparent as well as electrically conductive, mounted on the face plate 2 which is sealed to the envelope 3 the cathode-ray tube, the face plate 2 having a larger diameter than the end of the conical part of the envelope 3. The strips 1 are covered by a layer 4 of electroluminescent phosphor, the layer 4 is covered by a layer 5 of silica which is an electrical insulator which remains stable at all temperatures to which the cathode-ray tube is subjected during manufacture, and the layer 5 is covered by a layer 6 of aluminium. Electrical connections may be made to each of the strips 1 by means of silver terminals 7 on the face plate 2 outside the envelope

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3 and to the layer 6 of aluminium by means of a terminal 8 mounted on the envelope 3.

In operation output channels carrying alternating current electrical signals which it is desired to display are connected to the strips 1 by means of the terminals 7, the presence of a signal on any one of the output channels thereby causing an alternating current field to be applied between the particular strip 1 connected to the channel and the layer 6 of aluminium.

At the same time the electron beam produced by the electron gun G is caused to scan the screen at a high frequency in a direction perpendicular to the strips 1 and at a lower frequency in a direction parallel to the strips 1. The energy of the electron beam is such that electrons penetrate the layer 6 of aluminium and enter the layer 5 of silica causing therein bombardment induced conductivity.

When the electron beam crosses the area of the layer 5 of silica behind one of the strips 1 which is carrying a signal, the effect of the alternating current field between the strip 1 and the layer 6 of aluminium on the electroluminescent phosphor behind the strip 1 is increased due to the bombardment induced conductivity of the silica and the electroluminescent phosphor is caused to fluoresce, thus indicating the presence of a signal on the particular strip 1. An afterglow may be produced on the tube by a suitable choice of electroluminescent phosphor or by mixing a phosphor having suitable afterglow characteristics with the phosphor.

The cathode-ray tube described above has the advantage that all of the strips 1 may be permanently connected in a circuit without the necessity of any switching device.

What is claimed:

1. In a cathode-ray tube of the type including an electron beam producing gun and an envelope having a glass face plate, a screen comprising, in the following order from the face plate, a plurality of strips of transparent electrically conductive material mounted on a transparent base and electrically separate from one another, a layer of an electroluminescent phosphor covering said strips, a layer of electrical insulating material which becomes electrically conductive when subjected to electron bombardment and which is stable at all temperatures which it is likely to be subjected to during manufacture of the cathode-ray tube, and a layer of electrically conductive material which, when the tube is in operation, is penetrated by the electron beam and permits the beam to enter said layer of electrical insulating material and thereby cause therein bombardment induced conductivity, and electrical connections from the exterior of the cathode-ray tube to each of said strips and to said layer of electrically conductive material.

2. A cathode-ray tube as claimed in claim 1 in which said transparent base is the glass face-plate of the cathode-ray tube envelope.

3. A cathode-ray tube as claimed in claim 1 in which said layer of electrical insulating material is a layer of silica.

4. A cathode-ray tube as claimed in claim 1 in which said strips of transparent electrically conductive material are strips of gold which are so thin as to be transparent as well as electrically conductive.

5. A cathode-ray tube comprising an electron beam

producing gun, an envelope having a glass face plate, a screen comprising, in the following order from the face plate, a plurality of strips of transparent electrically conductive material mounted on said face plate and electrically separate from one another, a layer of an electro-
 luminescent phosphor covering said strips, a layer of silica
 insulating material which becomes electrically conductive
 when subjected to electron bombardment and which is
 stable at all temperatures which it is likely to be subjected
 to during manufacture of the cathode-ray tube, and a
 layer of aluminium conductive material on which, when
 the tube is in operation, the electron beam is incident,

the energy of said beam being such that the electrons penetrate said aluminium layer and enter said silica layer so as to cause therein bombardment induced conductivity, and individual electrical connections from the exterior of said envelope to each of said strips and to said aluminium layer.

References Cited in the file of this patent

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