

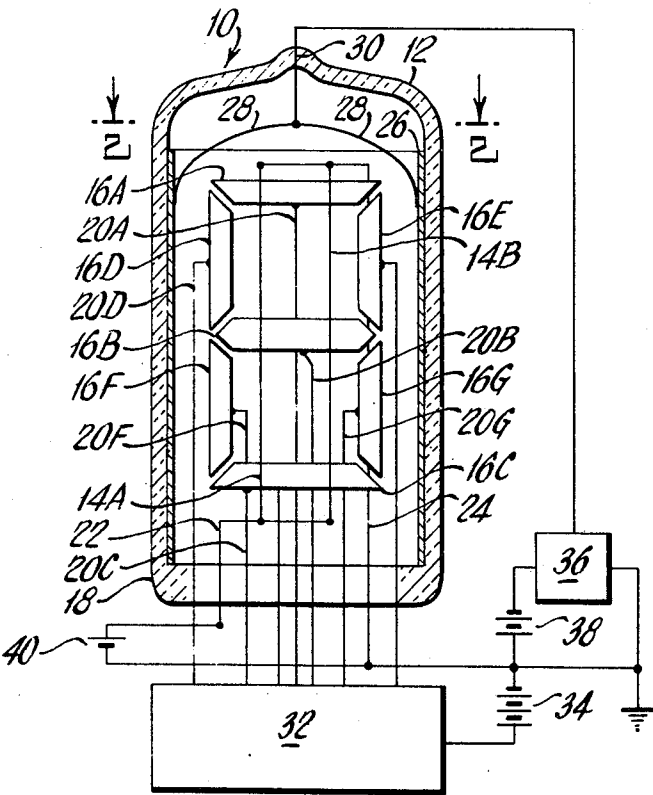
[72] Inventor **Richard Du Bois, Jr.**
Caldwell Township, N.J.
[21] Appl. No. **827,337**
[22] Filed **May 23, 1969**
[45] Patented **June 8, 1971**
[73] Assignee **Wagner Electric Corporation**

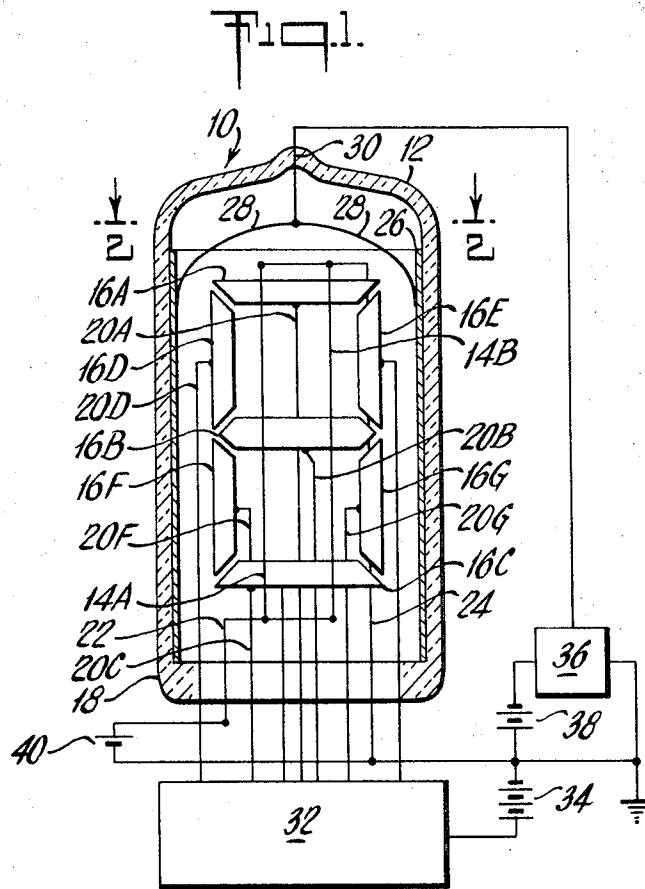
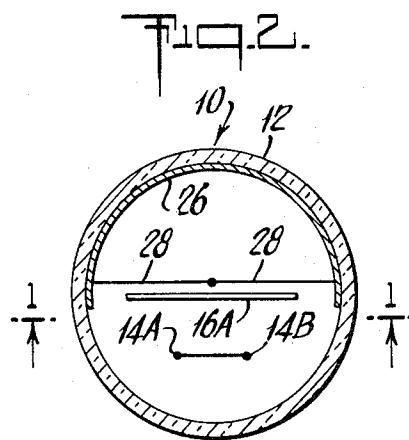
References Cited	
UNITED STATES PATENTS	
1,583,414	5/1926 Gill et al. 313/313
2,307,027	1/1943 Davie et al. 313/313
2,420,311	5/1947 Gowell 313/313X
3,062,980	11/1962 Bawdekar 313/313X
3,508,101	4/1970 Tanji 313/109.5
2,343,630	3/1944 Atwood, Jr. 313/313X
FOREIGN PATENTS	
234,906	6/1925 Great Britain 313/313

Primary Examiner—Roy Lake
Assistant Examiner—Palmer C. Demeo
Attorney—Eyre, Mann and Lucas

[54] **ELECTRICALLY-SHIELDED SYMBOL DISPLAY TUBE**
2 Claims, 2 Drawing Figs.
[52] U.S. Cl. 313/109.5,
313/313
[51] Int. Cl. H01j 1/52
[50] Field of Search 313/109.5,
291, 313, 210

ABSTRACT: An electrically conductive layer coextensive with at least a portion of the envelope of a symbol-display tube is operative to shield the tube from external electric fields.





INVENTOR
 RICHARD DUBOIS, JR.
 BY
 Eyre, Mann & Lucas
 ATTORNEYS

ELECTRICALLY-SHIELDED SYMBOL DISPLAY TUBE

The present invention relates to an improved symbol-display tube. Such a tube may employ a number of phosphorescent, selectively energizable anodes mounted in an evacuated glass envelope with one or more thermionic cathodes to provide an electron beam or beams with which the anodes are selectively bombarded. Certain of these symbol-display tubes operate with relatively low voltages, and thus are vulnerable to the effects to electrical fields imposed upon them in the environment in which they are employed. Such a low-voltage tube is disclosed in copending application Ser. No. 751,168, filed by Rein Raago on Aug. 8, 1968. The present invention specifically comprises an electrically conductive shielding layer disposed about a portion of the envelope of the tube. When grounded, this shielding layer serves as a shield against the aforementioned electrical fields. When placed at a negative potential with respect to the cathode, the shielding layer serves to blank out the display by preventing electrons from reaching the anodes. Since the anodes-to-cathode circuit carries current and the shielding layer does not carry current, it is advantageous to perform the blanking function by placing the shielding layer at the proper potential than by opening the anodes-to-cathode circuit. A better understanding of the present invention may be had by referring to the accompanying drawings, of which:

FIG. 1 is a sectional view of one embodiment of the symbol-display tube taken through line 1-1, shown connected to external power and switching circuitry.

FIG. 2 is a sectional view of one embodiment of the symbol-display tube taken through line 2-2; the several electrical connectors associated with the anode elements and with the cathode have been omitted for the sake of clarity.

Referring specifically to FIG. 1, the display tube 10 comprises an envelope 12, preferably of glass, with cathodes 14A and 14B mounted therein between the viewing surface of envelope 12 and anode elements 16A, 16B, 16C, 16D, 16E, 16F, and 16G. In this embodiment, the anode elements are arranged to form a FIG. "8." The glass envelope 12 has a thickened base portion through which pass electrical connectors 20A, 20B, 20C, 20D, 20E, 20F and 20G, which support the anode elements 16A, 16B, 16C, 16D, 16E, 16F and 16G, respectively. Electrical connectors 22 and 24 are attached to the terminals of the cathodes 14A and 14B and extend through the thickened base portion 18 for connection to a source of power. The electrically conductive shielding layer

26 is preferably disposed about a section of the inner surface of the cylindrical portion of the envelope 12. The shielding layer 26 may also be disposed about a corresponding section of the outer surface of envelope 12. In the preferred embodiment shown in FIGS. 1 and 2, the shielding layer 26 is electrically connected to exterior circuitry by means of conductive spring contacts 28 which are connected to lead wire 30. However, the shielding layer 26 may be connected to the cathodes within the envelope without any provision for connection to external circuitry. In such an embodiment, the layer 26 will perform its shielding function, but will not be utilizable for blanking out the display.

The external circuitry for controlling the symbol-display tube comprises a switching system 32 to selectively connecting the anode elements to a source of electrical power 34. A switch 36 serves to connect the shielding layer 26 to ground to enable it to perform the shielding function, and enables the shielding layer to be placed at a negative potential with respect to the cathodes by connecting it to the negative terminal of a source of electromotive force 38. A heating current source 40 is connected between electrical connectors 22 and 24 to render the cathodes 14A and 14B thermoemissive.

The advantages of the present invention, as well as certain changes and modifications to the disclosed embodiment thereof, will be readily apparent to those skilled in the art. It is the applicant's intention to cover all those changes and modifications which could be made to the embodiment of the invention herein chosen for the purposes of the disclosure without departing from the spirit and scope of the invention.

What I claim is:

1. In a symbol display tube including a sealed envelope having a substantially cylindrical portion, a plurality of display elements and means for bombarding said display elements with electrons when said tube is connected to a source of external power and switching circuitry, the improvement comprising: an electrically conductive layer disposed on about at least half of the circumference of said cylindrical portion of the envelope to form an electrical shield for the display elements within the envelope, and connecting means for connecting said layer to the external circuitry

2. The improvement according to claim 1 wherein said connecting means comprises:

- a. a conductive spring disposed substantially diametrically within the envelope to contact the electrically conductive layer at two points; and
- b. a lead wire connected to said conductive spring and extending through the envelope.

50

55

60

65

70

75