

Oct. 18, 1960

B. BERNSTEIN
MULTI-ELEMENT COUNTER TUBE

2,957,098

Filed Dec. 18, 1958

FIG. 1

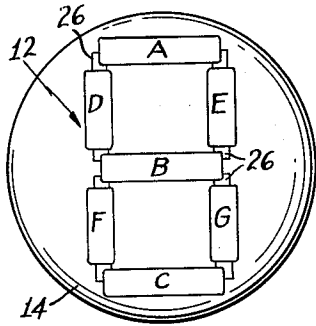


FIG. 2

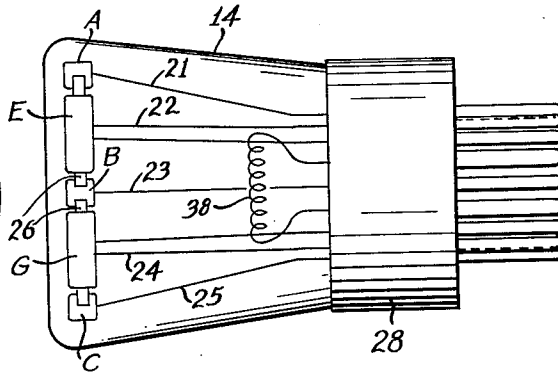


FIG. 3

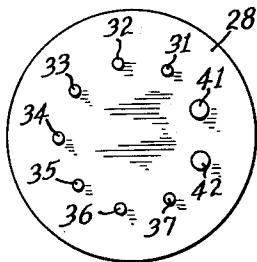
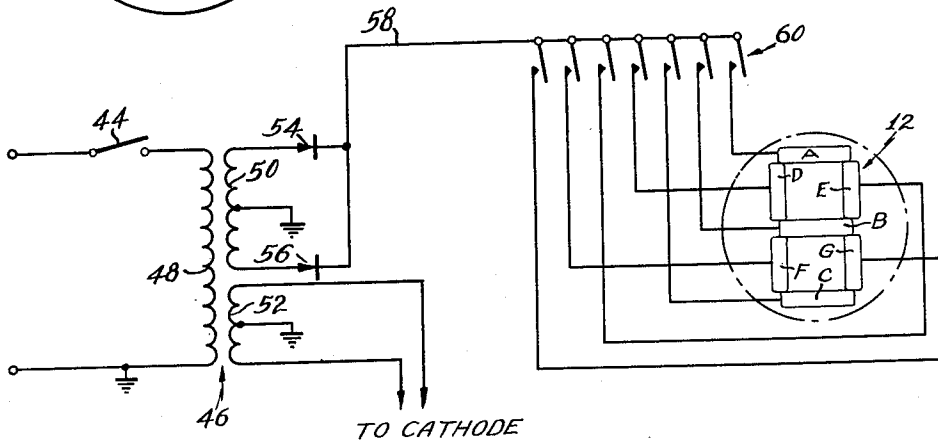


FIG. 4



INVENTOR.
BERNARD BERNSTEIN
BY *Karl Huber*
James E. Bryan
Oliver C. Rose
ATTORNEYS

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MULTI-ELEMENT COUNTER TUBE

Bernard Bernstein, West Orange, N.J., assignor to Nuclear Corporation of America, Inc., Denville, N.J., a corporation of Delaware

Filed Dec. 18, 1958, Ser. No. 781,265

2 Claims. (Cl. 313-108)

This invention relates to number display devices. The number display devices which have been proposed heretofore have involved individual neon lamps, superposed wires in number form, and various other arrangements. Among other drawbacks these devices have involved the disadvantages of using unnecessarily high voltages, of providing numerical representations which are fuzzy or otherwise difficult to read, or of requiring unnecessarily complex control circuits.

Accordingly, one object of the present invention is to simplify and improve number display arrangements.

In accordance with this invention, any number from 0 through 9 may be displayed by the energization of selected sets of seven anode segments which are provided in a single envelope. These seven segments are coated with a fluorescent material which glows visibly under electrode bombardment. The display tube has the advantage that the simplest form of rectifier and control circuits may be employed. Specifically, a simple transformer-type full wave or half wave rectifier may be used. Individual switching circuits to the seven anode segments may be employed.

A more complete understanding of the present invention may be obtained by a consideration of the following detailed description and the drawings, in which:

Figure 1 is a front view of a number display tube in accordance with the present invention;

Figure 2 is a side view of the display tube of Figure 1;

Figure 3 shows a view of the input terminals to the display tube; and

Figure 4 is a circuit diagram of the energization circuit for the tube of Figures 1 through 3.

With reference to Figures 1 and 2 of the drawings, the anode assembly 12 includes seven segments designated by the letters A through G. Letters are employed to designate the anode segments to distinguish from the numerals which they represent, particularly for convenience in Table I set forth below.

The anode segments A through G are mounted within the envelope 14 by means of the input anode energization wires, five of which are shown at 21 through 25 in Figure 2 of the drawing. To provide additional rigidity, the anode segments may be physically interconnected by the insulating spacing elements 26 as shown in Figures 1 and 2.

The conductors for energizing the anode segments pass through the socket 28 of the tube assembly and are connected to the terminal pins 31 through 37. A suitable thermionic emitter 38 is provided within the envelope 14. The emitter 38 may be a conventional oxide coated, thoriated tungsten cathode. The input leads to the cathode are brought out to the two large pins 41 and 42 as shown in Figure 3.

The anode segments A through G are coated with a fluorescent material such as willemite, which glows visibly under electron bombardment. Other known mate-

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rials having this property may also be used to coat the anode segments. In operation, selected anode segments are provided with a positive voltage, and electrons from the cathode 38 light up these selected segments.

5 The seven segments are arranged to represent any desired digit from 0 through 9. Thus, for example, the segments A, E and G are energized to represent the numbers 7. Similarly, the number 8 would be represented by the energization of all seven segments. The following table indicates the segments which are energized to represent each of the digits 0 through 9:

Table I

Number:	Elements to be lit
1	E, G
2	A, E, B, F, C
3	A, E, B, G, C
4	D, B, E, G
5	A, D, B, G, C
6	D, F, C, G, B
7	A, E, G
8	A, B, C, D, E, F, G
9	A, D, B, E, G
0	A, C, D, E, F, G

25 The energization circuits for the tube of Figures 1 through 3 may take the form shown in Figure 4. The circuit of Figure 4 includes an on-off switch 44, a transformer 46 having a primary 48 and two secondary windings 50 and 52, and the rectifiers 54 and 56 in the power circuit. The secondary 52 is connected to pins 41 and 42 of Figure 3 to supply heater power to the cathode 38. The secondary 50 and the rectifiers 54 and 56 are arranged in a conventional full wave rectification circuit to provide anode energization voltage on lead 58. The switches 60 supply voltage from lead 58 selectively to the individual anode segments A through G. It is to be understood that the switches 60 may be replaced by equivalent electric circuits. Furthermore, it may be noted by reference to Table I that more than half of the anode segments are normally energized. Accordingly, in practice, the switches 60 are arranged to be normally closed and selection of anode segments is effected by deenergizing some of the anode segments.

It will be obvious to those skilled in the art that many more modifications may be made within the scope of the present invention without departing from the spirit thereof, and the invention includes all such modifications.

What is claimed is:

1. In a number display tube, an evacuated envelope, seven anode segments arranged generally in one plane in a substantially rectangular figure eight configuration within said envelope, a cathode also located in said envelope, and seven individual switching means for selectively applying a positive voltage to the individual anode segments, each of said switching means being normally in the closed state.

2. In a number display tube, an evacuated envelope, seven anode segments arranged generally in one plane in a figure eight configuration within said envelope, a coating of fluorescent material on each of said anode segments, insulating supporting material interconnecting the anode segments, a cathode also located in said envelope, and means for selectively applying a positive voltage to the individual anode segments.

References Cited in the file of this patent

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