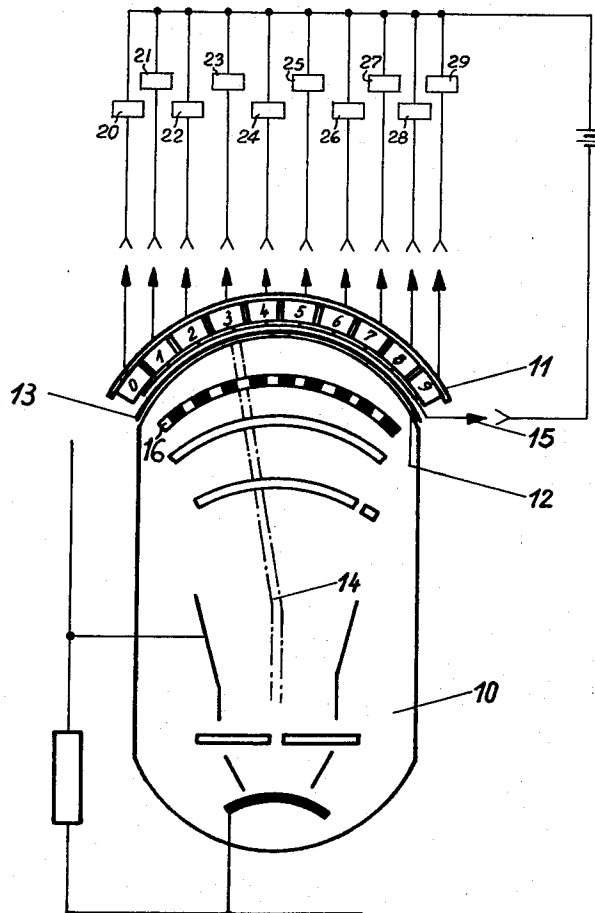


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APPARATUS FOR ELECTRICALLY TRANSMITTING
DECADE COUNTER TUBE RESULTS
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APPARATUS FOR ELECTRICALLY TRANSMITTING DECADE COUNTER TUBE RESULTS

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3 Claims. (Cl. 250—208)

Decade cold cathode tubes with ten cathode connections, in the leads of which resistances can be introduced are known. The voltages on these resistances are utilized for transmitting counted results to following instruments. Such counter tubes are open to the objection that they only count impulses in one direction (additive). A tube cannot therefore carry out two calculations, such as addition and subtraction per decade.

Decade counting tubes are also known which operate like a cathode ray tube and count impulses in both directions or senses. These counter tubes are capable of counting impulses positively and negatively in quick succession. After a counting operation, a spot of light remains on the screen of the counter tube and the position of said light spot corresponds to the result. In the case of these tubes it is possible to pick up the result of a calculation by electric means only with complex equipment as otherwise the reliability of the counting is jeopardized.

In order to enable the counting of impulses in both directions or senses by a decade counter tube with very simple means, it is proposed according to the invention, to arrange on the luminous screen of a decade counter tube light-sensitive cells, such as photo-resistors. The light-sensitive cells can be vaporized or deposited upon the inner and/or outer side of the glass bulb of the counter tube. It is likewise possible to vaporize the light-sensitive cells onto supports which are fixed on the counter tubes. The light-sensitive cells can be vaporized upon the glass bulbs before these counter tubes are assembled. If the light-sensitive cells are applied on the inner side of the glass bulb, they are well protected against moisture, whereas if they are applied on the outer side of the glass bulb, they are easier to connect.

In the case of existing counter tubes, it is advisable to vaporize the light-sensitive cells upon a support or base and to fix said support or base on the glass bulb of the counter tube.

The light-sensitive cells can be provided with layers for altering the light spectrum at the points representing values so as to adapt the spectrum of the light spots to the spectrum of the light-sensitive cells, because the spectral sensitivity of the light-sensitive cells does not in most cases lie in the same spectrum as the luminous screen of the counter tube.

It is possible, according to the invention, to carry out electronically either positive or negative additions at each place with a counter tube of the cathode ray type and to electrically transmit the results via the light-sensitive

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cells. The light-sensitive cells have separate inputs and outputs, each of which can be joined together on one side to a terminal.

A schematic circuit diagram of a counter tube with photo-resistors applied on its outer side is illustrated by way of example in the only figure of the accompanying drawing.

The decade counter tube 10 provided with a glass bulb has, in known manner, a luminous screen 12 and a perforated screen 16. Photocells 0 to 9 are arranged on a support 11 which is fixed on the glass bulb of the tube 10. For the purpose of adapting the luminous spectrum of the light spots on the luminous screen 12 to the spectral sensitivity of the photocells 0 to 9, a chalk layer 13 is arranged between the luminous screen 12 and the photocells 0 to 9.

If, after passing through a perforation in the mask 16, the electron beam 14 strikes the screen 12 to create a luminous spot which remains on the luminous screen 12 at the location of photo-cell 3, this cell generates a voltage which is utilized for recording or for some other purpose.

The photo-cells 0 to 9 are connected jointly by a lead 15. The loads for the individual photo-cells are designated 20 to 29, respectively, as shown by the drawing and may comprise any suitable indicators, such as signal lamps.

The automatic passing on of the result indicated eliminates any errors of transfer such as can occur in the case of reading with the human eye.

Of course, various changes may be made in the details disclosed in the foregoing specification without departing from the invention and the claims annexed hereto.

We claim:

1. Apparatus for converting visible phenomena from a counting tube representing numerical values by relative positioning thereof into electrical signals, said apparatus comprising a plurality of photo-sensitive elements operatively positioned with respect to said phenomena and electrically connected together on one side thereof, said elements each being individually associated with individual phenomena and responsive thereto to effect output voltage signals, means interposed between said photo-sensitive elements and the source of the visible phenomena for matching the spectrum of the phenomena to the spectral response of the photo-sensitive elements, and means for connecting output equipment to said elements.

2. The apparatus defined in claim 1 wherein said elements comprise photo-resistive cells and means for connecting energizing sources thereto.

3. The apparatus defined in claim 1 further including a support member and means for mounting said elements on said support member.

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