March 21, 1939. W. VAN BAIN 2,150,902

NEON ADVERTISING SIGN

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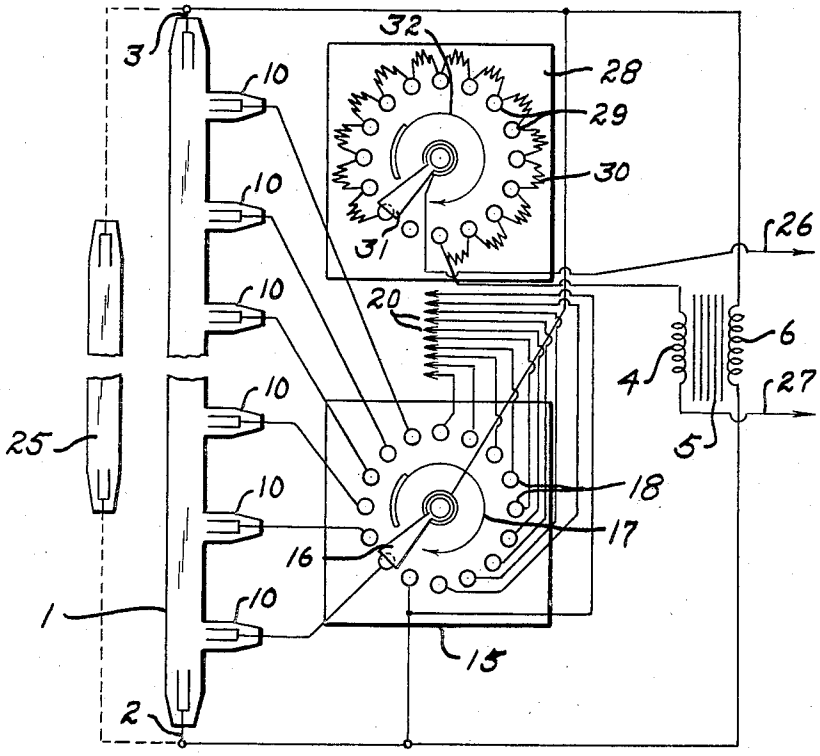


Fig. 1.

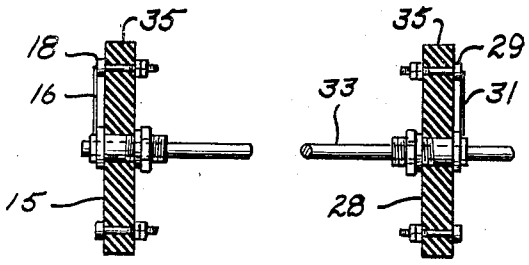


Fig. 2.

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6 Claims. (Cl. 177—346)

The invention relates to a method of controlling the light in a neon tube and more particularly to a device for producing an animated effect in tubes of this type.

It is an object of the invention to provide a device for illuminating elongated tubes by sections and in predetermined patterns so that an animated effect will be produced.

It is also an object to provide a device of the class described wherein high voltage arcing is minimized.

Another object is to provide a device in which the extreme ends of an elongated illuminated unit are constantly connected to the source of electrical energy.

Still another object is to provide a device in which the source of potential is constantly connected across the ends of an elongated illuminated unit and means are provided for altering a short circuit of sections of the unit in a predetermined manner so that a traveling effect will be produced.

Still another object is to provide a device of the class described which is so constructed that spurious advance flashes in unilluminated sections will be avoided.

Other objects together with the foregoing will be apparent from the following description taken in connection with the drawing in which:

Fig. 1 is a circuit diagram showing the general construction of the device of the invention.

Fig. 2 is a vertical sectional view through a tandem switch comprising an element of the invention.

The invention, as illustrated in the drawing, comprises an elongated tube 1 provided with end terminals 2 and 3. This tube may be of any desired length and configuration and is filled with a suitable gas as is well known in the art so that the potential applied between the electrodes 2 and 3 will cause the tube to become illuminated.

The secondary 6 of a transformer 5 is permanently connected to the electrodes 2 and 3 so that a desired potential may be applied to the elongated tube.

Intermediate the electrodes 2 and 3 in the tube 1 are provided a plurality of spaced electrodes 10, whereby the tube 1 is divided longitudinally into sections which it is desired to illuminate in a predetermined sequence so as to obtain the desired animated effects.

A multiple contact switch element 15 has a wiper arm 16 connected to the terminal 3 of the tube 1. This wiper arm rotates as indicated by the arrow 17 and makes contact sequentially with the contacts 18. One of these contacts is electrically connected to the other terminal 2 of the tube 1 and successive contacts are connected to the intermediate terminals 10 of the tube. It is believed apparent that the switch element 15 thus forms a variable short circuit for a portion of the tube 1, in the illustration there being potential only across the lowermost section of the tube.

The construction just described is an important feature of the invention as the provision for short circuiting a portion of the tube maintains the short circuit sections dark until such time as it is desired that such sections shall be illuminated. In this manner spurious advance flashes in the dark sections of the tube are avoided.

The additional leads 20 are provided for extended lengths of tubing, these leads being shown as open or disconnected in the drawing. With this construction the entire tube will be illuminated during the travel of the contact arm 16 over the disconnected contacts.

In Fig. 1 there is shown a vacuum condenser 25 connected between the end terminals 2 and 3 of the tube 1. Such a condenser is an important adjunct to the device of the invention for eliminating high frequency stray fields when an illuminated tube of extreme length is used.

Energy is supplied to the device through feeders 26 and 27, the latter of which is connected to one terminal of the primary winding 4 of the transformer 5. The other feeder is connected to a second multiple contact switch element 28 of which the contacts 29 are connected in succession to resistors 30 so that a variable resistance is placed in series with the primary winding 4 as the contact arm 31 is rotated in the direction indicated by the arrow 32.

As is best illustrated in Fig. 2 the switch elements 15 and 28 constitute a tandem multiple contact switch in which the contact arms 16 and 31 are fixed upon a common shaft 33 which is rotated at a desired speed from any suitable source of energy (not shown). The contacts 18 and 29 are arranged annularly about the shaft 33 in insulating blocks 35 in a manner well known in the art.

It is to be noted that one of the contacts 29 has no connection with the adjacent contacts. There is hence an instant during the rotation of contact arm 31 when the primary 4 of the transformer 5 is open. At the same instant the contact arm 16 engages the contact 18 which is electrically connected to the lower terminal 2 of the

tube 1 so that the tube is short circuited. At this instant therefore no potential is applied to the tube which becomes dark preliminary to progressive reenergization of the sections of the tube whereby the desired illuminating effect is produced.

It is believed that the operation of the construction described is apparent from the foregoing description. Attention is directed to the fact that when the contact arms advance from the position wherein the tube 1 is short circuited and the primary 4 of the transformer is open, engagement of the next adjacent contact causes current to flow through the primary of the transformer and through all of the resistors 30 whereby the current flowing through the primary of the transformer will be controlled. At the same time potential from the secondary 6 of the transformer will be applied across the lowermost section of the tube 1 so that illumination of the tube will be initiated.

Continued rotation of the contact arms 16 and 31 in synchronism will cause the sections of the tube to be successively illuminated and at the same time the resistors 30 will be successively cut out so that the desired potential for effective illumination of the tube 1 will be applied across the unshorted sections of the tube.

Broadly the invention comprehends a device whereby an elongated discharge tube with intermediate terminals will be illuminated in a manner to produce an animated effect without the production of high frequency stray fields and without the creation of spurious advance flashes which detract from the effectiveness of devices of this type.

The invention claimed is:

1. In a device of the class described, the combination comprising an elongated discharge tube having end terminals and spaced intermediate terminals, a source of electrical energy, a transformer, a rheostat connected in series with the primary of said transformer to said source of energy, connections between the secondary terminals of the transformer and the end terminals of the discharge tube, spark suppressor means in the secondary circuit of the transformer comprising a rotary contact switch having the movable contact thereof connected to one of said end terminals, one of the fixed contacts of said switch being connected to the other of said end terminals and the other of the contacts of the switch being connected sequentially to said intermediate terminals, and means interconnecting the movable contacts of said switch and rheostat so that the movable contacts will move in synchronism and the circuit through the transformer primary will be open when the end terminals are interconnected whereby spurious illumination of the tube will be avoided.

2. In a device of the class described, the combination comprising an elongated discharge tube having end terminals and spaced intermediate terminals, a source of electrical energy, a transformer, a rheostat connected in series with the primary of said transformer to said source of energy, connections between the secondary terminals of the transformer and the end terminals of the discharge tube, a rotary contact switch having the movable contact thereof connected to one of said end terminals, one of the fixed contacts of said switch being connected to the other of said end terminals and the other of the contacts of the switch being connected sequentially to said intermediate terminals and means interconnecting the movable contacts of said switch and rheostat so that the movable contacts will move in synchronism and the circuit through the transformer primary will be open when the end terminals are interconnected whereby spurious illumination of the tube will be avoided.

3. In a device of the class described, the combination comprising an elongated discharge tube having end terminals and spaced intermediate terminals, a source of electrical energy, a transformer, a rheostat connected in series with the primary of said transformer to said source of energy, said rheostat having an open circuit position, connections between the secondary terminals of said transformer and the end terminals of the discharge tube, a multiple contact switch having the movable contact thereof connected to one of said end terminals, one of the contacts of said switch being connected to the other of said end terminals and the other contacts of the switch being connected to said intermediate terminals, and synchronizing means interconnecting the movable contacts of said rheostat and said switch whereby the primary of the transformer is open when the end terminals of the discharge tube are short circuited.

4. In a device of the class described, the combination comprising an elongated gaseous discharge tube having end terminals and spaced intermediate terminals, a source of electrical energy connected to said end terminals, and a multiple contact switch having the movable contactor thereof connected to one of said end terminals, one of the contacts of said switch being connected to the other of said end terminals and other contacts of the switch connected to said intermediate terminals.

5. In a device of the class described, the combination comprising an elongated gaseous discharge tube having end terminals and spaced intermediate terminals, a source of electrical energy, a transformer having its primary connected to said source and its secondary connected across the end terminals of said discharge tube, and rotary switch having the rotary contact thereof connected to one of said end terminals, one of the contacts of said switch being connected to the other of said end terminals and other contacts of the switch connected to said intermediate terminals.

6. In a device of the class described, the combination comprising an elongated gaseous discharge tube having end terminals and spaced intermediate terminals, a source of electrical energy connected across the end terminals of said discharge tube, and means for progressively and sequentially connecting said intermediate terminals with one of said end terminals, whereby said discharge tube is progressively illuminated from one end to the other.

WM. VAN BAIN.