

NEGATIVE GLOW LAMP

Original Filed Feb. 28, 1931

Fig. 1.

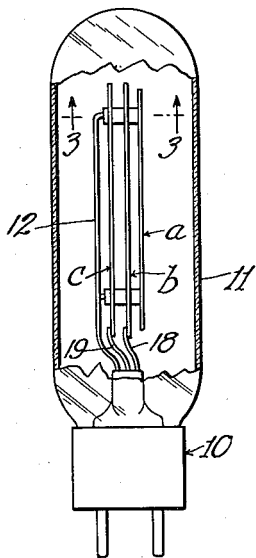


Fig. 2.

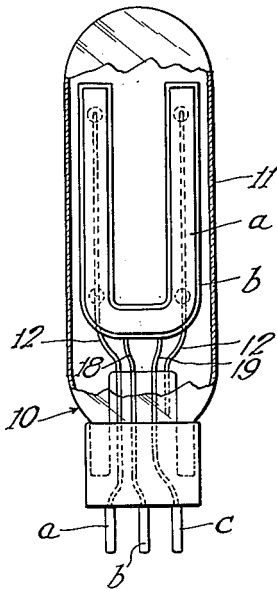


Fig. 3.

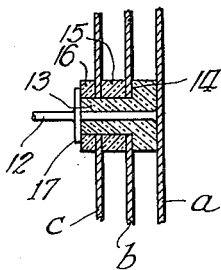
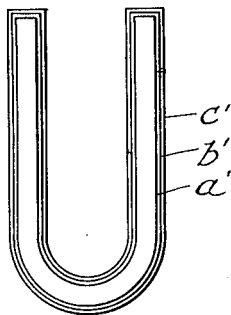


Fig. 4.



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# UNITED STATES PATENT OFFICE

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## NEGATIVE GLOW LAMP

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Original application February 28, 1931, Serial No. 518,981. Divided and this application December 7, 1933, Serial No. 701,271

3 Claims. (Cl. 250—27.5)

This invention relates to negative glow display devices and particularly to a construction and control means therefor by which signs or display devices may be built from any number of individual characters or figures.

My invention contemplates as one of its objects the provision of an improved display device by the utilization of characters or figures for electrodes in negative glow devices which characters or figures are caused to glow with a distinctive color and in different combinations depending upon the path of current between the electrodes which make up each character or figure. To this end, each character or figure is preferably made up of a plurality of units or electrodes each of which in itself takes the form of the character or figure.

My invention also contemplates the provision of a novel arrangement of electrodes within the envelope of the negative glow device or devices which make up the display pattern in combination with control means whereby one may cause successive changes in the appearance of the characters or figures without destroying their identity.

My invention also contemplates a novel mounting scheme for the electrodes and the negative glow devices whereby to insure permanent alignment and positioning of the parts thereof which is necessary to give the desired effects.

Other objects and advantages of the invention will appear as the description proceeds in connection with the accompanying drawing wherein the preferred form of the invention is shown. It is to be understood, however, that this disclosure is illustrative only and that many minor modifications may be made without departing from the scope of the invention as above outlined and as defined by the claims.

In the drawing—

Fig. 1 is a side view partly in section of one of the negative glow devices;

Fig. 2 is a front view partly in section of one of the negative glow devices;

Fig. 3 is a fragmentary section on the line 3—3 of Fig. 1;

Fig. 4 shows the modified arrangement of the electrodes shown in Fig. 1.

This application is a division of my co-pending application Serial No. 518,981, filed February 28, 1931, now Patent No. 1,960,245, granted May 29, 1934.

Referring now in detail to the drawing, the negative glow device 10 consists of the envelope 11 having mounted therein a plurality of spaced

electrodes *a*, *b*, and *c* and having a gaseous filling of some suitable gas such for example as neon or argon which forms the conducting medium between the electrodes *a*, *b*, and *c*. The electrodes may be made of any suitable conducting material such for example as nickel, and, in the manufacture of the device, the usual methods of removing the air and other gases from the interior of the envelope 11 and the electrodes is, of course, employed. The gas pressure within the envelope may be made any desirable amount that is found proper for the particular gas employed and for the effects desired.

In mounting the electrodes, it is to be noted that the electrode *a*, which forms the front electrode when looking at the sign, is somewhat smaller in surface area than electrode *b* for example. In the form shown in Fig. 1, however, electrodes *b* and *c* are of substantially the same size. In the modified form shown in Fig. 4, the electrodes gradually increases in size from front to back so that, upon looking at the sign from the front, electrode *a'* forms the main body of the letter, electrode *b'* forms a border therearound, and electrode *c'* gives an additional border.

In order to insure proper alignment and spacing of the electrodes, I employ the mounting structure shown in section in Fig. 3. In this mounting structure, the supporting wire 12 is welded or otherwise secured to electrode *a*, and then the insulator 13 is pressed against the back of the electrode *a*, and electrode *b* is fitted thereon so as to bear up against the shoulder 14 on the insulator. An insulating washer 15 is mounted between electrodes *b* and *c*, and a further insulating washer 16 fits over insulator 13 against electrode *c*. The washers and insulators are held in place by any suitable means such for example as the wire 17 welded onto the supporting wire 12. There may be one or more of these supporting wires 12 on which the electrodes are mounted. In the present instance, two are shown, one of them forming the conducting lead for electrode *a*. Electrodes *b* and *c* are provided with conducting means 18 and 19 which are secured thereto at the end in any suitable manner.

Wires 12 and 18 and 19 are preferably coated with an insulating cement to prevent glow thereon, and the backs of electrodes *a*, *b*, and *c* preferably are also coated with insulating cement to reduce current consumption or to increase the brilliancy of the glowing portions for a given current consumption.

In the modified form shown in Fig. 4, the better effects can be obtained owing to the fact that two distinct borders may be made dark or light in combination with the body portion of the letter. It is, of course, obvious that further effects can be obtained by adding additional electrodes of different sizes or by the particular construction, as for example by making some of the electrodes of a mesh rather than a solid construction, as the mesh is somewhat transparent and also has a different tone than the solid plate when illuminated.

From the above description, it is believed the construction and operation of this device will be clear to those skilled in this art and the advantages thereof readily apparent.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A negative glow device comprising a transparent envelope, a base on which said envelope is mounted, a series of more than two generally flat electrode plates forming a design, said plates being mounted side by side in spaced relation and successively increasing in size from front to back, a tubular insulator extending through the rearward plates and abutting the front plate, means on said insulator for spacing the successive plates and for securely holding the plates in assembled relation, a conductor extending through said tubular insulator and connected with the front plate, separate conductors connected to the rearward plates, and terminal con-

tacts carried by the base and respectively connected with the respective conductors.

2. A negative glow device comprising a transparent envelope, a base on which said envelope is mounted, a series of more than two generally flat electrode plates forming a design, said plates being mounted side by side in spaced relation and successively increasing in size from front to back, an insulator extending through the rearward plates and abutting the front plate, means on said insulator for spacing the successive plates and securely holding the plates in assembled relation, a conductor connected with the front plate, individual conductors connected to the rearward plates, and terminal contacts carried by the base and respectively connected with said individual conductors.

3. A negative glow device comprising an elongated transparent envelope having a press and a base for said envelope, a series of more than two generally flat electrode plates forming a design and extending lengthwise approximately parallel with the longitudinal central axis of the envelope and in alignment with said press, said plates being insulatively mounted side by side in spaced relation and successively increasing in size from front to back, more than two terminal contacts projecting from said base one for each of said plates for alternate energizing thereof, and individual conductors respectively joining said plates to said contacts.