Jan. 6, 1931. A. RAVA 1,787,595

LUMINOUS SIGN

Filed May 6, 1929

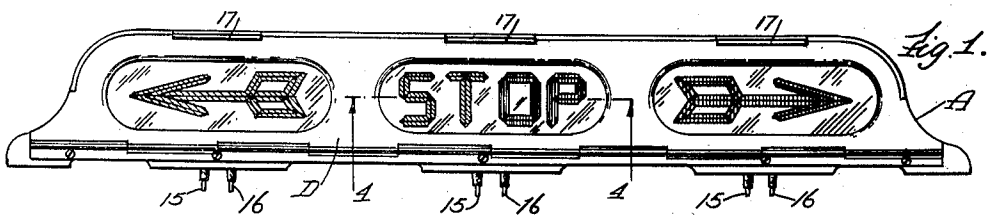

Fig. 1.

Fig. 2.

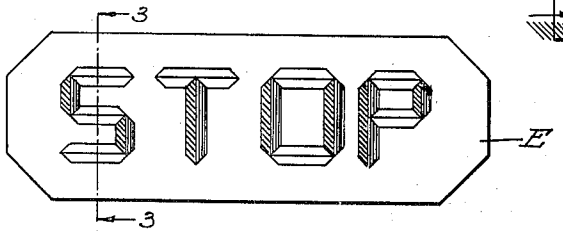

Fig. 3.

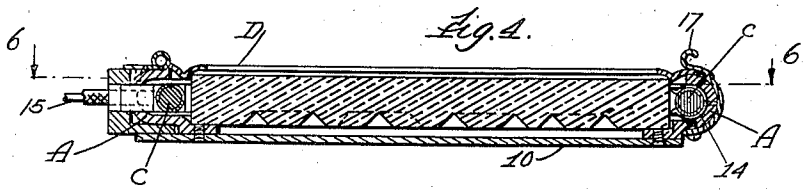

Fig. 4.

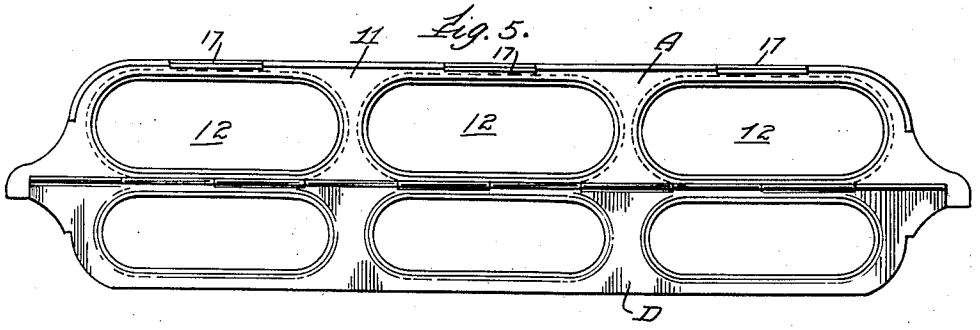

Fig. 5.

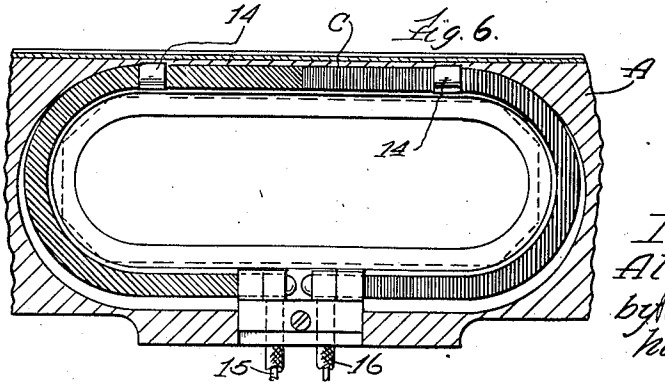

Fig. 6.

Inventor
Alexander Rava
by Burton & Burton
his Attorneys.

Patented Jan. 6, 1931 1,787,595

UNITED STATES PATENT OFFICE

ALEXANDER RAVA, OF CHICAGO, ILLINOIS

LUMINOUS SIGN

Application filed May 6, 1929. Serial No. 360,655.

The purpose of this invention is to provide an improved construction of a luminous sign in which the illumination of the characters and representations constituting the displayed matter is effected by a luminous tube energized by an electric current. It consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:

Figure 1 is a front elevation of a display device embodying this invention.

Figure 2 is an elevation of a transparent plate comprised in the device bearing the display characters.

Figure 3 is a section at the line 3—3 on Figure 2.

Figure 4 is a section at the line 4—4 on Figure 1.

Figure 5 is a front elevation of the device of Figure 1 with the display plate removed and a plate-retaining skeleton door swung to open position.

Figure 6 is a section in a plane parallel to the face of the display plate of the device shown in Figure 1, including the display plate in position therein.

The invention consists in the delineation in one face of a transparent plate of the characters and figures which are to constitute the display, such delineation being by angular grooves in the plate, the sides of which are sloped obliquely to the face of the plate at an angle which is substantially the angle of total reflection of the particular material of which the plate is made, and in obtaining illumination of the lines of said delineated characters by light directed edgewise into the plate so as to encounter the oblique slopes of the character lines at the angle of total reflection, causing the light to be reflected directly through and at right angles to the face of the plate opposite that in which the grooves are formed.

The means employed for directing illumination edgewise into the transparent plate consists of an electrically energized luminous tube, that is, a tube occupied by a suitable gas adapted to become luminous upon the passage of an electric current through it, such as, for example, the common so-called neon light tube. And for the purpose of thus directing the illumination against the edges of the plate at all sides thereof, as is necessary in order to obtain illumination by reflection as described, of all parts of the lines delineated by the grooves in the plate,—extending as they may in all directions,—such luminous tube is arranged encompassing the entire peripheral edge of the plate.

In order that the characters delineated in the plate and illuminated as described may not be rendered inconspicuous by the possibly greater brilliancy of the encompassing illuminating tube, and in order also to protect the tube, the latter is enclosed on all sides except the side toward the edge of the plate, by a suitable opaque housing which is made highly reflective by silvering or painting white in order to conserve the light of the luminous tube and concentrate it to the edge of the transparent plate. This housing also serves conveniently as a frame for the plate, into which the latter may be inserted and from which it may be removed without destroying or exposing to injury the illuminating tube or interrupting the energizing circuit. And the construction has the further advantage that a plurality of transparent plates of the same dimensions and contour may be interchangeably employed in the same frame encompassed by the same undisturbed luminous tube, the interchange being effected as readily as signs arranged to be suspended on the same hook may be interchanged with each other.

Referring more particularly to the drawings: A is a frame or casing having a closed back of opaque material, indicated at 10, and an apertured front wall of opaque material indicated at 11. The aperture, 12, being conformed in contour to the contour of the transparent plate, or interchangeable plates, provided for insertion therein as described, having the characters constituting the display delineated by grooves in the rear or inner face of the plate as described.

In the frame or casing just back of the margin of the aperture, 12, and encompassing the position of the transparent plate when the

latter is mounted in the aperture as mentioned, there is mounted on suitably distributed supports seen at 14, the luminous tube indicated at C, having inleading and outleading electrical connections indicated at 15 and 16 respectively.

For retaining the plate, E, safely in position in the casing and encompassed by the luminous tube, there is provided a skeleton door, D, dimensioned for lapping in front of the margin of the plate encompassing the aperture, 12, and lapping also the margin of the aperture and thereby lapping the margin of the plate lodged in the aperture of the casing, said skeleton door being desirably hinged at the lower side of the front plate of the frame and provided with a catch, 17, for holding it at closed position, lapping the margin of the plate as mentioned, and retaining said plate in position for being illuminated by the encompassing luminous tube, C.

It will be understood that the color in which any groove line of the plate will be illuminated will be determined by the color of the light emitted from the portion of the luminous tube extending at the portion of the edge of the plate through which the light enters for reflection from the proximate slope of the groove; and accordingly it will be understood that by making different portions of the encompassing tube, C, of different colors, or so that the light emitted through the tube from the luminous gas within, in view of the color presented by the particular gas used in the tube when rendered incandescent by the energizing current, shall be different at the different portions of the tube, different lines of the several characters will be illuminated in different colors. And, for example, by making the tube at the opposite side edges of the plate to emit light of complimentary colors, as red and green respectively, the groove lines running transversely to the direction of the rays reaching the oppositely sloped sides of the grooves will be displayed each in two colors, which may be complimentary for brilliancy of effect. That is, each such line will present two colors in parallel. And similarly, by making the portions of the tube which extend along the upper and lower edges of the plate at the right hand half of the length of the plate of one color, and the portions extending along the left hand half of the plate of a different color, the two portions of the sign will be displayed in the two different colors.

Such variations of color are indicated in the drawings by the conventional surface markings for different colors, the right hand portion of the sign in Figure 1 being represented as illuminated in red, the left hand portion represented as illuminated in green. And in Figure 2 the vertical lines of letters are represented as double, half red and half green, in parallel.

I wish it understood that my invention is not limited to any particular transparent material, or to having any particular angle of total reflection; and while in the drawings I have shown the grooves as right angular, which presumes on the employment of a transparent medium whose angle of total reflection is approximately 45°, which is substantially the angle of total reflection of some grades of glass, other sorts of glass or other transparent material having a greater or less angle of total reflection may be employed with substantially equal effectiveness.

It will be observed upon consideration that by this method the length of luminous tube required for a given sign being only the length necessary to encompass the sign as an entirety, will almost always be very much less than would be necessary to form the sign in the customary manner, that is, with a continuous luminous tube flexed to follow the course of the lights constituting the characters of the sign or other display.

It will also be observed that this method of illumination imposes no limitation upon the form of the letters or characters such as is imposed by the necessity of flexing the luminous tube, so that its continuity from beginning to end of the entire inscription or other delineation constituting the display is not interrupted, this requirement, it will be recognized, making it practically impossible or very difficult to delineate certain words and phrases by the method of a continuous luminous tube forming all the letters of all characters. By the method above described, on the contrary, the sign may be first designed in any form desired, and then delineated in the grooves; and thereupon, by encompassing the body of the plate by a luminous tube, all the lights of the sign to be displayed become luminous by reflection.

Although I have shown a plain or flattened glass as the transparent plate, I wish it understood that the invention is not thus limited and that other forms beside perfectly flat plates may be used with the marks engraved or molded by grooves having oppositely sloped sides and illuminated through the edges of the glass, with very pleasing effects, all within the scope and intent of my invention.

I claim:

1. A luminous sign consisting of a transparent plate having the characters to be luminously displayed formed by grooves in the face of the plate, said grooves having their sides sloped at an angle to the face of the plate opposite that in which they are formed which is substantially the angle of total reflection of the particular material of the plate, and a luminous tube mounted to extend along opposite side edges of the plate;

whereby the light projected from opposite directions into the plate edgewise thereof is reflected from the opposite slopes of the grooves forwardly with respect to the plane of the face of the plate opposite that in which the grooves are formed.

2. A luminous sign consisting of a transparent plate having the characters to be luminously displayed formed by grooves in the face of the plate, said grooves having their sides sloped at an angle to the face of the plate opposite that in which they are formed which is substantially the angle of total reflection of the particular material of the plate, and a luminous tube mounted to extend respectively along opposite side edges of the plate; whereby the light projected from the plate edgewise thereof is reflected from the slopes of the grooves forwardly from the plane of the face of the plate opposite that in which the grooves are formed, said luminous tube portions being constructed for admitting light of different colors at the opposite side edges of the plate, whereby the character lines each comprise two colors in parallel.

3. A luminous sign consisting of a transparent plate having the characters to be luminously displayed formed by grooves whose sides are sloped at an angle to the face of the plate opposite that in which they are formed which is substantially the angle of total reflection of the particular material of the plate, and a luminous tube encompassing the peripheral edge of the plate, said tube being constructed for admitting light of different colors at different parts of its plate-encompassing extent.

4. A luminous sign consisting of a transverse plate having the characters to be luminously displayed formed by grooves whose opposite sides are sloped at an angle to the face of the plate opposite that in which they are formed, which is substantially the angle of total reflection of the particular material of which the plate is formed, and a luminous tube encompassing the peripheral edge of the plate, said tube being constructed for admitting light of different colors at opposite side edges of the plate.

5. A luminous sign consisting of a transparent plate having the characters to be luminously displayed formed by grooves in the face of the plate whose sides are sloped at an angle to the face opposite that in which the grooves are formed which is substantially the angle of total reflection of the particular material of the plate, and a luminous tube mounted to extend along the edge of the plate, whereby the light projected into the plate edgewise thereof is projected onto the slopes of the character grooves forwardly from the plate of the face opposite that in which the grooves are formed, a frame for the transparent plate comprising a housing for the encompassing luminous tube, said housing being open toward the edge of the transparent plate and closed at the remaining sides, said frame comprising a closure plate extending over the entire area encompassed by the housing at the grooved side of the transparent plate, and having a skeleton plate-retaining member for retaining the transparent plate in tube-encompassed position, and means for removably holding said skeleton member to the housing in position for retaining the transparent plate in said encompassed position.

6. A luminous sign consisting of a transparent plate having the characters to be luminously displayed formed by grooves in the face of the plate whose sides are sloped at an angle to the face opposite that in which the grooves are formed which is substantially the angle of total reflection of the particular material of the plate, and a luminous tube mounted to extend along the edge of the plate, whereby the light projected into the plate edgewise thereof is projected onto the slopes of the character grooves forwardly from the plate of the face opposite that in which the grooves are formed, a housing for the luminous tube enclosing the same on all sides except the side toward the edge of the transparent plate and open at that side, said housing having its interior surface rendered highly reflective to avoid absorption of the light of the luminous tube and increase the light emitted through the open side toward the edge of the plate.

7. A luminous sign consisting of a transparent plate having the characters to be luminously displayed formed by grooves in the face of the plate whose sides are sloped at an angle to the face opposite that in which the grooves are formed which is substantially the angle of total reflection of the particular material of the plate, and a luminous tube mounted to extend along the edge of the plate, whereby the light projected into the plate edgewise thereof is projected onto the slopes of the character grooves forwardly from the plate of the face opposite that in which the grooves are formed, a frame structure for housing and protecting the luminous tube having at the side opposite the grooved face of the plate an opening dimensioned for admitting the plate to the position at which it is encompassed by the luminous tube, and means for removably retaining the plate in tube-encompassed position.

8. A luminous sign consisting of a transparent plate having the characters to be luminously displayed formed by grooves in the face of the plate whose sides are sloped at an angle to the face opposite that in which the grooves are formed which is substantially the angle of total reflection of the particular material of the plate, and a luminous tube mounted to extend along the edge of the

plate, whereby the light projected into the plate edgewise thereof is projected onto the slopes of the character grooves forwardly from the plate of the face opposite that in which the grooves are formed, a frame structure for housing and protecting the luminous tube having at the side opposite the grooved face of the plate an opening dimensioned for admitting the plate to the position at which it is encompassed by the luminous tube, and a skeleton retaining member movably attached to the frame structure apertured for exposing the illuminated area of the plate and lapping the margin of the plate for retaining it safely in tube-encompassed position.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 2d day of May, 1929.

ALEXANDER RAVA.