Dec. 12, 1933. R. M. ALLISON 1,939,288

INDIRECT LUMINOUS TUBE ILLUMINATION

Filed March 15, 1933

Fig. 1.




Fig. 2.

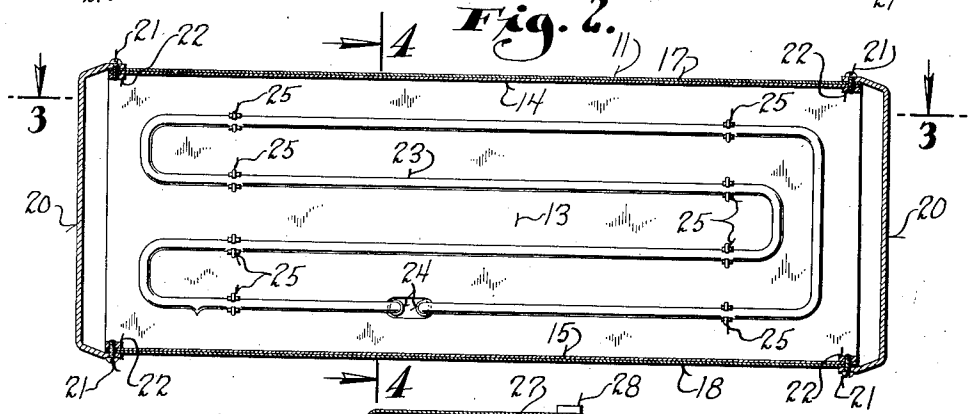


Fig. 4.

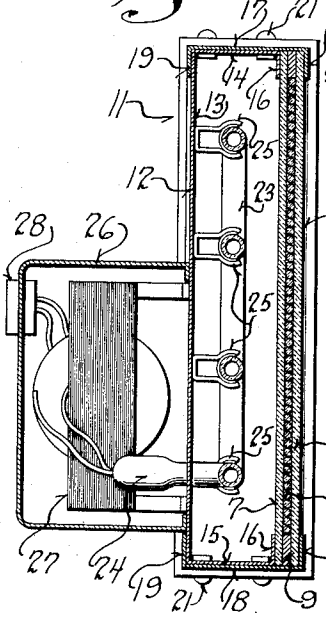


Fig. 3.

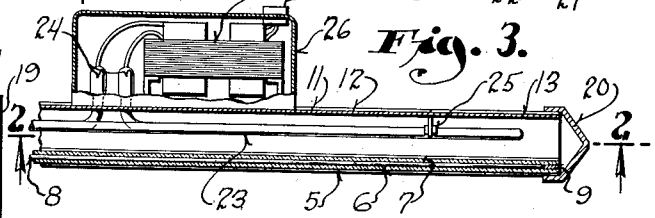


Fig. 5.

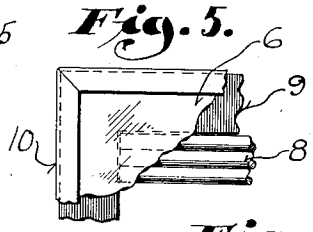


Fig. 6.

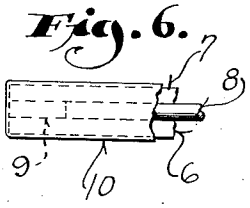
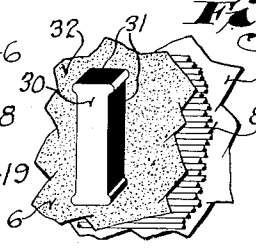


Fig. 7.



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# UNITED STATES PATENT OFFICE

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## INDIRECT LUMINOUS TUBE ILLUMINATION

Roger M. Allison, Milwaukee, Wis.

Application March 15, 1933. Serial No. 660,815

12 Claims. (Cl. 40—132)

This invention relates to improvements in indirect luminous tube illumination and refers more particularly to illuminated signs and advertising medium.

The use of luminous gas filled tubes, generally designated neon tubes, for signs and similar installations is now quite common, and as is well known the message or indicia to be displayed, of necessity, has been formed entirely by the tube or tubes shaped to the desired configuration.

Such signs, while very effective at night have little or no appeal during the day time. Also, their use has been greatly limited by the fact that only simple and comparatively large designs and letters could be formed.

Another very serious objection to signs of this character is that it is impossible to add anything to or take away any part of the message without entirely rebuilding the sign.

A further disadvantage of exposed luminous tube signs of this character is their inherent glare or glow which makes them difficult to view at close range and illegible when viewed from even a slight angle.

The present invention contemplates as one of its objects the elimination of these and other objectionable features of luminous tube illumination for signs and other purposes, by successfully diffusing the light of a luminous tube without entailing any loss in effectiveness.

Another object of this invention is to provide a luminous tube sign having greater legibility and capable of being read at an angle without distortion.

Another object of this invention is to provide a sign of the character described which is attractive and legible not only when lighted, but also during the day time.

Another object of this invention is to provide display means for utilizing the intensity of light obtained from a luminous tube in such a manner that small lettering or special lettering and complicated designs may be made part of the message without involving prohibitive costs, and wherein changes may be made to signs already in use at but a small cost.

More specifically, it is an object of this invention to provide a novel diffusing curtain for diffusing the light of a luminous tube, and which comprises a plurality of small diameter glass rods so arranged with respect to the luminous tube as to distribute the light rays emanating therefrom with uniform intensity.

A further object of this invention is to provide a sign of the character described, wherein the message is formed by transparent or translucent portions of an opaque facing set in front of a luminous tube or other similar means of illumination with a light diffusing curtain disposed between the facing and the tube to diffuse the light rays emanating therefrom.

A still further object of this invention is to provide a sign of the character described, which is of compact simple construction capable of manufacture at an exceptionally low cost.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

In the accompanying drawing, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a front view of a sign constructed in accordance with this invention;

Figure 2 is a section view through the sign taken on the plane of the line 2—2 of Figure 3;

Figure 3 is a section view taken through Figure 2 on the plane of the line 3—3;

Figure 4 is a cross section view on an enlarged scale taken through Figure 2 on the plane of the line 4—4;

Figures 5 and 6 are fragmentary views illustrating the detail construction of the front panel or facing of the sign; and

Figure 7 is a fragmentary detail view illustrating a novel type of lettering made possible by this invention.

Referring now more particularly to the accompanying drawing in which like numerals indicate like parts throughout the several views, the numeral 5 designates the front panel or facing of the sign. This panel or facing is a composite unit consisting of outer and inner glass plates 6 and 7, respectively, spaced apart by a diffusing curtain composed of a plurality of contiguous horizontally disposed small diameter glass rods 8. These glass rods 8, which are known in the art as canes, are as small in diameter as practical since the smaller diameters provide the greatest brilliancy. Canes approximately two millimeters in diameter afford very good results, although it is to be understood that smaller or

larger diameter canes may be employed as desired.

The inner and outer glass plates are held assembled with the rods or canes therebetween in any suitable manner. In the present instance, a frame 9 of any suitable material and of a thickness substantially equal to the diameter of the glass rods is positioned between the peripheral edge portions of the outer and inner glass plates and a binding of adhesive tape 10 or any other suitable material is applied over the edges to hold the several parts together. Figures 5 and 6 illustrate this manner of retaining the composite front facing assembled.

The inner plate 7 is either transparent or translucent glass and is provided only to retain the canes 8 assembled with the front plate. The front plate is opaque except for the design or letters of the message intended to be displayed. These portions of the front plate are left clear to be pervious to light. Any desired means may be employed to render the portions of the front plate which are not part of the design or message, opaque. Sand blasting the plate and coating it with several coats of black lacquer is one method. Opaque paper cut to the required design and glued to either face is another possible scheme; but as this feature is unimportant any desired expedient may be employed. It is evident, however, that there is no limitation as to the size of the letters or the nature of the design.

The assembled composite front panel closes the open front of a sheet metal housing or casing indicated generally by the numeral 11. This housing or casing, to facilitate assembly and disassembly and to permit a low cost of production, is preferably formed of a stamped channel shaped member 12 forming the back wall 13 of the housing, its top 14 and its bottom 15, the forward edges of its top and bottom having inwardly directed flanges 16 against which the composite facing 5 rests. This member 12 is, of course, co-extensive with the dimensions of the front panel or facing.

Engaged over the top and bottom walls of this channel shaped casing member are upper and lower channels 17 and 18, the webs of which are in flat engagement with the top and bottom walls 14 and 15 respectively, and the flanges 19 thereof engage the back wall 13 and the front faces of the top and bottom portions of the front panel 5, thus holding the panel or facing against the flanges 16.

Engaged over the ends of this assembled structure are end caps 20, preferably formed as castings and merely slipped over the ends of the assembled structure, where they are detachably held in position by screws 21 threaded into reinforced portions 22 of the sheet metal top and bottom walls 14 and 15. This method of construction affords maximum simplicity and materially facilitates assembly and disassembly of the entire structure.

Disposed in the space between the back wall 13, which is painted white for light reflection, and the front facing or panel is a luminous tube 23. The tube is supported from the back wall 13 by clip-like brackets 25, and extends horizontally back and forth, with its ends 24 passing from the housing near its bottom.

The ends 24 of the tube pass rearwardly through the back wall 13 into a transformer housing 26 which is fixed to the back of the casing as shown, to be electrically connected with a transformer 27 in the customary manner. A socket 28 electrically connected with the transformer facilitates its connection to a suitable source of electrical energy.

In operation, the light rays emanating from the luminous tube 23 are uniformly diffused by the horizontal glass rods or canes so that the message or design is displayed on the front panel or facing with uniform intensity throughout. The rods or canes of glass have a prismatic effect to bend all light rays striking the same either directly from the luminous tube or by reflection from the back wall of the housing, into straight rays substantially perpendicular to the front face of the sign.

If desired, the glass rods or canes may be supplanted with rows of beads or other similar glass formations, although the use of canes or rods obtains the best results.

Where a neon tube is employed for the light source the letters of the message or design have a fiery red color as is common to neon tubes, but this color may be varied or changed in any desired manner either by providing tubes filled with other gases or by the use of colored glass rods or canes or colored glass in either the front or rear plate of the composite facing.

The perfect diffusion of the high intensity neon light accomplished by the curtain composed of glass rods or canes permits many novel effects in lettering and in the display generally, and Figure 7 illustrates a style of lettering which heretofore has been imposible in illuminated signs. As shown, the effect is that of adding depth or a third dimension to the letter. It is obtained by treating the front plate 6 so that the forward portion 30 of the letter is left clear, and its receding top and side portions 31 are opaque while the background or field 32 of the panel is semi-opaque or at least of a degree of light perviousness midway between that of the clear and opaque portions of the letter. The diffusing curtain of glass rods and the supporting plate 7 are positioned behind the plate 6 as before.

From the foregoing description taken in connection with the accompanying drawing, it will be readily apparent to those skilled in the art that this invention affords a novel innovation in luminous electrical signs and in direct illumination generally; that it makes possible the use of a luminous tube with its high light intensity without the heretofore objectionable glow or glare, and that this desired result is obtained in a practical and inexpensive manner.

What I claim as my invention is:

1. A device of the character described, comprising a composite front face having spaced front and rear plates of glass and a plurality of parallel contiguous glass bars between said plates, the rear plate being pervious to light and the front plate having portions thereof pervious to light and the remainder opaque, a supporting structure to mount the composite front face, and illuminating means carried by the supporting structure and arranged to project light toward the front face to illuminate the pervious portions of the front plate.

2. A device of the character described, comprising a composite front facing including a transparent supporting plate, a plurality of small diameter glass rods contiguous throughout their length overlying one face of the supporting plate, and a front plate pervious to light at predetermined portions and opaque at other portions covering the glass rods, means to hold the supporting plate and front plate together to maintain the composite facing assembled, a casing

having an open front closed by said composite facing, and illuminating means within the casing arranged to project light through the facing.

3. In combination with a luminous tube, a casing enclosing the tube and having an open front, a composite facing closing the open front of said casing and including a supporting plate pervious to light, a front plate having predetermined portions thereof pervious to light and other portions thereof opaque, and a diffusing curtain disposed between said plates and comprising a series of small diameter glass rods contiguous throughout their length, and means to hold said composite front facing to the open front of the casing.

4. A device of the character described, comprising a casing having an open front and having the inner face of its back wall adapted for the reflection of light, a luminous tube supported from said back wall, and a composite front for the casing comprising, a supporting plate pervious to light, a front plate having portions thereof pervious to light and other portions opaque, and a plurality of glass rods contiguous throughout their length disposed between said plates to diffuse light emanating from the tube and reflecting from the back wall to pass through the pervious portions of the front plate.

5. A device of the character described, comprising a casing having an open front and removable ends, the back wall of the casing being adapted for the reflection of light, a luminous tube supported from the back wall of the casing, a composite front for the casing comprising a transparent glass plate, a second glass plate pervious to light at predetermined portions and opaque throughout the remainder thereof, a plurality of small diameter glass rods contiguous throughout their length disposed between said glass plates, channel members extending across the top and bottom of the casing to hold the composite front of the casing in place and said channel members being held in place by the removable ends of the casing.

6. A device of the character described, comprising a sheet metal member channel shaped in cross section to afford the back, top, and bottom walls of a casing, a composite front facing for the casing comprising a transparent plate of glass, a second plate of glass pervious to light at predetermined portions and opaque at others and a plurality of contiguous small diameter glass rods disposed between said plates of glass, channel members extending across said top and bottom walls to retain the composite facing in position, readily detachable end walls engaged over said channel members to hold the same assembled with the first mentioned member, and illuminating means within the casing arranged to project light through the composite front facing.

7. A front facing for illuminated signs and the like, comprising a supporting plate pervious to light, a second plate pervious to light at predetermined portions and opaque at others, a plurality of small diameter contiguous glass rods interposed between said plates, and means to hold the plates together with the glass rods interposed therebetween.

8. A front facing for illuminated signs and the like comprising a supporting element pervious to light, a member overlying said supporting element in spaced relation thereto, means on said member to define portions pervious to light and other portions opaque, a plurality of glass bars contiguous throughout their length disposed in the space between said supporting element and said member, and means to hold said supporting element and member together with the glass rods interposed therebetween.

9. In combination with illuminating means comprising, a luminous gas filled tube and means to pass an electric current through the gas, a light diffusing curtain comprising a plurality of small diameter glass rods in contiguous relationship and mounted substantially parallel to said luminous tube, and a glass plate covering the diffusing curtain and treated to have different portions thereof of different degrees of light perviousness to form indicia.

10. A front facing for illuminated signs and the like comprising, a glass plate treated to have different portions thereof of different degrees of light perviousness, a second glass plate in parallel spaced relation to the first mentioned plate, a diffusing curtain comprising a plurality of small diameter contiguous glass members disposed between said plates, and means to hold said plates assembled with the diffusing curtain confined therebetween.

11. In an illuminated sign of the character described, a front panel comprising a plate of glass, means on said plate of glass to define indicia to be displayed, said means rendering part of said indicia opaque and other parts thereof clear and rendering the field surrounding said indicia of a degree of light perviousness less than that of said clear portions of the indicia, whereby upon the passage of light through said panel an effect of depth is given to said indicia, a diffusing curtain behind said glass panel, a second glass plate confining the diffusing curtain between it and said first mentioned plate and illuminating means arranged to project light through said diffusing curtain and the front panel.

12. An illuminated sign comprising, a composite display face having spaced plates of glass and a plurality of parallel contiguous glass bars confined between said plates, one of said plates being pervious to light and the other having portions thereof pervious to light and the remainder opaque to define the indicia to be displayed, supporting means to mount the composite display face, and illuminating means arranged to project light toward the display face to illuminate the pervious portions of said second designated glass plate.

ROGER M. ALLISON.