May 24, 1938. J. J. SHIVELY 2,118,385

ILLUMINATED SIGN

Filed May 20, 1935 3 Sheets-Sheet 1

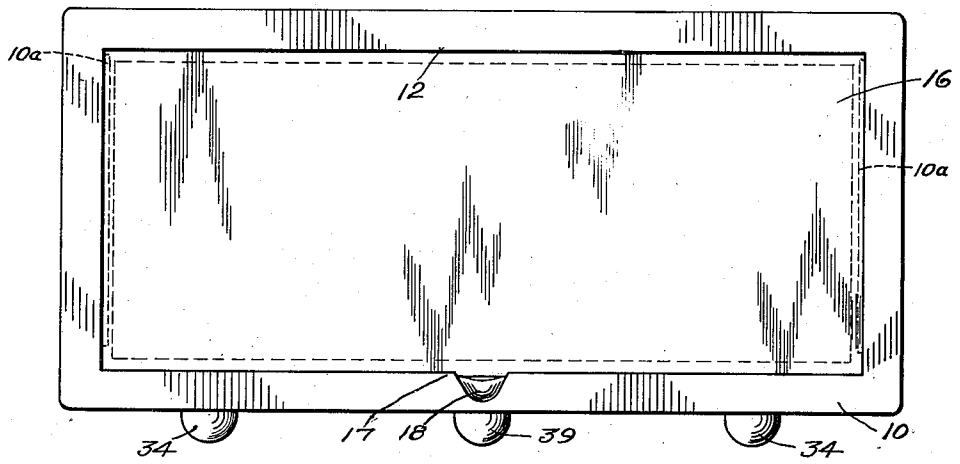


Fig. 1

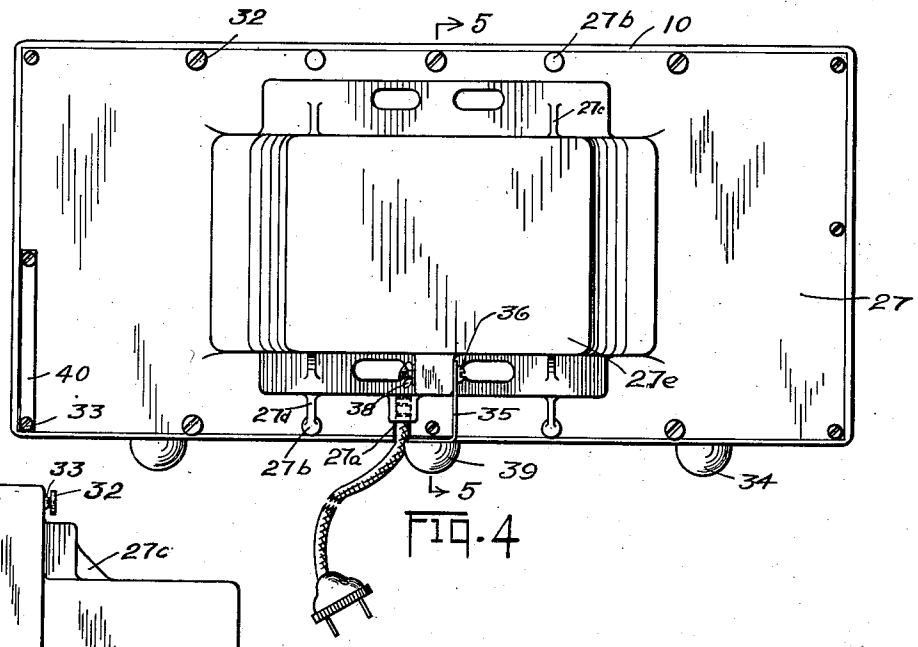


Fig. 4

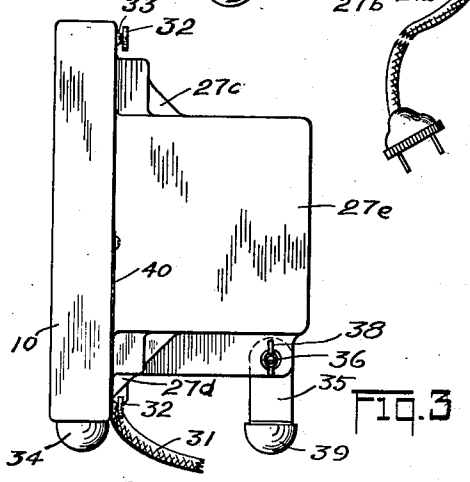


Fig. 3

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ILLUMINATED SIGN

Filed May 20, 1935 3 Sheets-Sheet 2

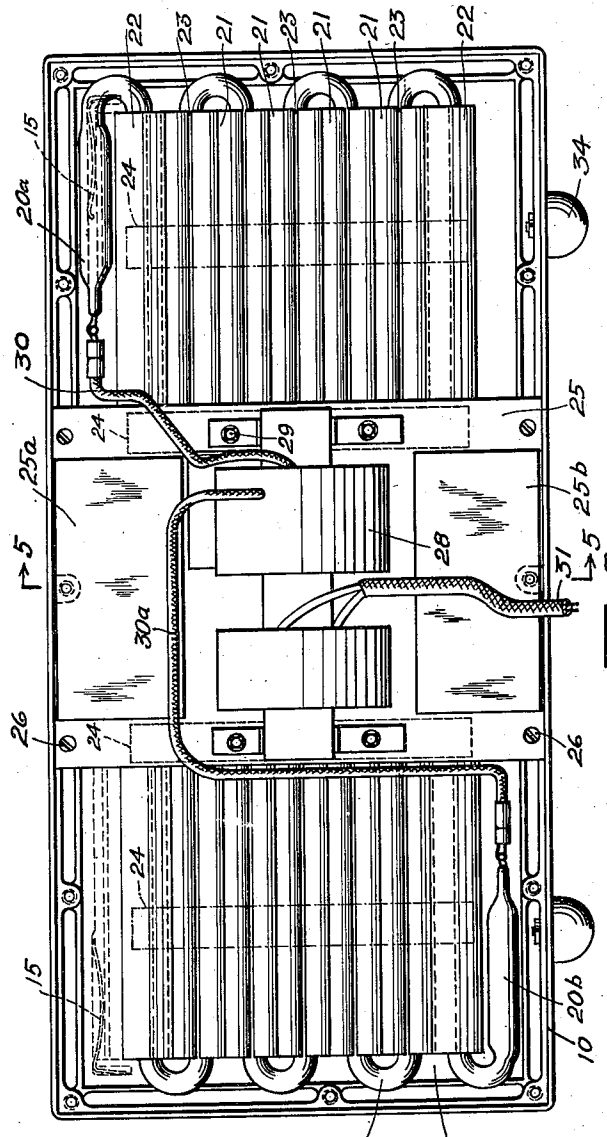


Fig. 6

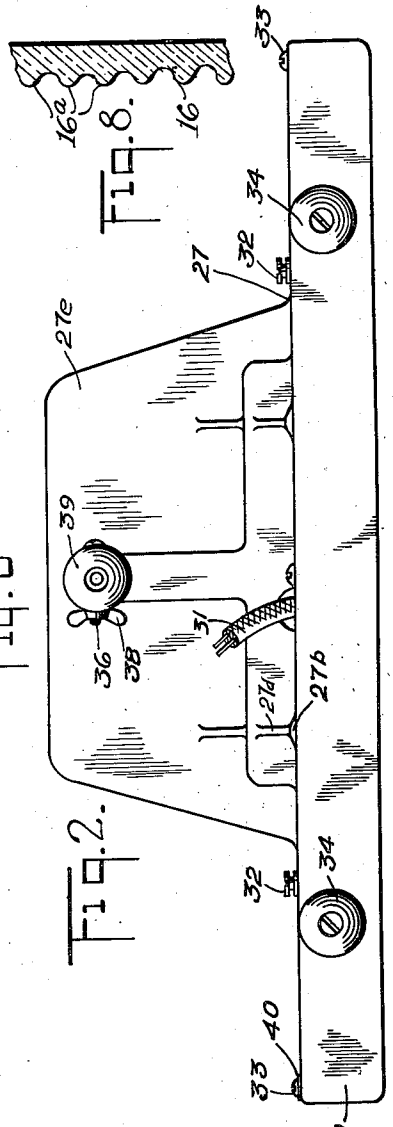


Fig. 2.

Fig. 8.

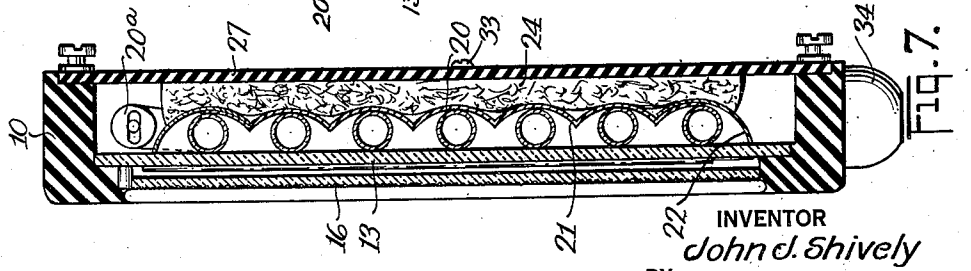


Fig. 7.

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May 24, 1938. J. J. SHIVELY 2,118,385

ILLUMINATED SIGN

Filed May 20, 1935 3 Sheets-Sheet 3

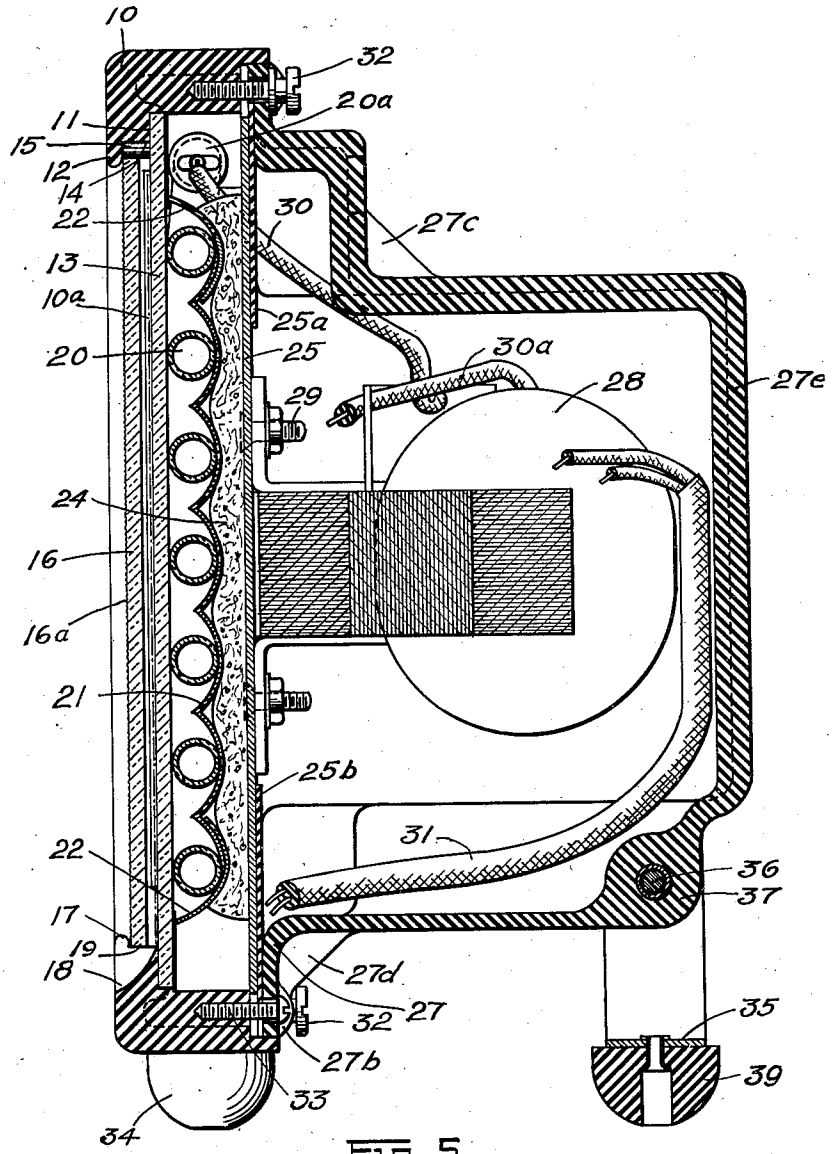


Fig. 5

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Patented May 24, 1938

2,118,385

UNITED STATES PATENT OFFICE

2,118,385

ILLUMINATED SIGN

John J. Shively, New York, N. Y., assignor, by mesne assignments, to Service Devices, Incorporated, New York, N. Y., a corporation of New York

Application May 20, 1935, Serial No. 22,333

12 Claims. (Cl. 40—132)

This invention relates to illuminated signs and has for its objects the production of a sign which is simple and cheap to manufacture; a sign that is easily portable; and a sign of the luminous tube type employing neon or the like and on which the design, lettering or figures or the like may be easily changed by an unskilled user.

Another object is to provide individual unit signs which can be grouped together as shown in Figure 6.

A further object is to provide a sign employing high voltage which has all operating parts thoroughly insulated from the outer casing, so that the user cannot be harmed in case the insulation of the transformer should fail, or the luminous tube puncture, or for any other reason. There are no external metal parts that can come in contact with the electrical circuits of the device.

The invention consists substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth, and as shown by the accompanying drawings and finally pointed out in the appended claims.

In the copending application Serial No. 667,728, filed April 4, 1933, is disclosed a sign of this general type. The present invention is an improvement thereon, embodying certain features of construction that result in economy of manufacture and add to the general usefulness of the sign.

In the drawings, where by way of illustration is shown a preferred embodiment of the invention covered by the appended claims:

Figure 1 is a front view of a sign embodying the invention;

Figure 2 is a bottom view of the sign, Figure 1;

Figure 3 is a side view of the sign, Figure 1;

Figure 4 is a rear view of the sign, Figure 1;

Figure 5 is a sectional view on the line 5—5, Figure 4; and

Figure 6 is a rear view of the sign, Figure 1, with the back or rear casing removed.

Figure 7 is a vertical cross section of the sign viewed outward near the end thereof.

Figure 8 is an enlarged sectional view showing the ribs 16*a* on the outer surface of the glass or diffuser 16.

The numeral 10 denotes a casing of suitable material preferably bakelite or some other molded insulating material, as all exterior parts of the sign should be insulated from the electrical circuits thereof. This is particularly desirable as the secondary voltage of the transformer supplying the luminous tube of the sign is usually 5,000 or more on commercial signs of this type.

The casing 10 forms a frame having the inwardly extending inner rim portions 11 and 12 extending across the top thereof. Against the inner face of the rim 11 is placed a transparent sheet 13 of glass or the like forming what is hereinafter termed the rear glass and completely closing the front of the casing 10. This glass is preferably cemented or otherwise secured to the casing 10 in order to prevent the ingress of air and moisture to the interior of the sign.

From Figure 5 it will be observed that a groove or space 14 exists across the top of casing 10 in which is secured one or more bowed springs 15 of flat stock, adapted to exert spring pressure downwardly on a transparent sheet 16 of glass or the like, hereinafter termed the front glass. This glass is placed in position by pushing its upper edge against the tension of springs 15 and lifting the bottom thereof over the lower rim 17 of the casing 10 and dropping the bottom edge of the glass into a shallow groove in the casing immediately behind the rim 17, so that the glass is normally in the position shown in Figure 5 but may be easily lifted out of the sign by inserting a finger in the depression 18, which gives access to the bottom edge 19 of the glass and enables it to be lifted over rim 17 for removal.

The glass 16 is held out of contact with the glass 13 by any suitable means such as inwardly extending portions 10*a* on the sides of 10 extending beyond the rim 11 and serving to support the glass 16. A space therefore exists between the glasses 13 and 16 for a purpose hereinafter described.

The glass 16 preferably has one surface—preferably the outer surface 16*a*—provided with a plurality of closely spaced horizontal ribs which have been found to diffuse the light of the sign and reduce any streaked effect incident to the use of luminous tubes therein. Such glass is commonly used for partitions in offices and the like and is cheap and readily procurable, and this glass is hereinafter referred to as a diffuser.

If the sheet 16 is made of some other material than glass, such as celluloid, cellophane or the like, it can be ribbed in any suitable manner: the ribbing can consist of closely spaced horizontal lines printed or otherwise applied to the material, but not sufficiently heavy or numerous to adversely affect the light passing therethrough. The ribs or lines of the diffuser should be separated a lesser distance than the parallel legs of the grid 20 hereinafter described.

Against the inside of the rear glass 13 is positioned a suitable source of light—preferably a glass tube 20—bent to form and hereinafter termed a grid. The ends 20a, 20b of this tube are positioned to lie substantially in the plane of the grid as shown in Figure 4 and are provided with the usual electrodes sealed therein and circuit terminals projecting therefrom for connection to a suitable source of current. The tube 20 is filled with neon or some other suitable gas or substance and when current is applied thereto glows and furnishes light for the sign.

Against the horizontal parallel legs of the grid are placed the separate V-shaped reflector strips 21, one for each leg. These strips are curved as shown in the drawings and reflect the light outwards from the tube. At the top and bottom of the grid are placed the end reflectors 22 which overlap the adjacent reflectors 21 and serve to also reflect the light from the top and bottom legs of the grid. The end reflectors 22 overlap the adjacent portions of the adjoining reflectors 21 and may be adjusted relative thereto, so that their outer edges will contact firmly with the rear glass 13, as shown in Figure 5.

It will be observed that each strip-reflector 21 is spaced apart from the others, the spaces 23 being provided to break up the large metal surface that would otherwise exist adjacent the grid, causing objectionable electrical effects and a singing noise when alternating current is used on the sign, all as more fully set forth in the copending application, Serial No. 11,903, filed March 20, 1935, in which this form of reflector system is broadly claimed except the end reflectors 22 which constitute an improvement claimed herein.

The practical result of this combination of grid and reflector is to provide a substantially uniform sheet of light of uniform brilliancy completely covering the front of the sign and remarkably free of any streaked effect due to the parallel legs of the tube forming the grid 20. Such a streaked effect has heretofore interfered seriously with the use of grids of neon tubing for signs. The use of the ribbed glass 16 further improves the sign although it is not absolutely necessary.

In the rear of the reflectors 21, 22 is placed a plurality of pads 24 of sponge rubber or the like, two of which bear against the mounting plate or support 25 and two of which are shown in dotted lines, Figure 6, and rest against the back 27 after the reflectors have been adjusted as hereinafter described, and the back is put in place. The back 27 is formed as a flat plate covering the end portions of the reflectors and grid and having formed integrally therewith a central housing 27e covering the plate 25 which in turn covers the middle portions of the reflectors and grid. Plate 25 is secured to frame 10 by screws 26. As the ends of the grid project laterally beyond plate 25, and as the ends of all the reflectors likewise project, and the pads 24 are resilient, the parts can be readily shifted when the back or rear casing 27 is not in place as shown in Figure 4. Thus a simple and easy means is afforded of assembling the parts and properly spacing the reflectors from each other so that the spacing 23 is regular and horizontal and so that the legs of the grid 20 are not subjected to strain.

The transformer 28 is secured to the plate 25 in any suitable manner such as the screws and nuts 29, and after the grid and reflectors have been adjusted as just described, the terminals of the grid may be connected to the secondary of the transformer in any suitable manner such as by flexible insulated wires 30, 30a. If desirable, the transformer may be mounted elsewhere and separate from the sign, but the arrangement described is preferable.

The primary winding of the transformer may be connected to a flexible cord 31 which may be led out of the back 27 via a slot 27a therein. This enables the cord to be attached to the transformer and assembled therewith in the frame 10 to form a unit assembly complete without the back 27. However, if preferred, this cord may be led out through a hole in either 10 or 27 as desired.

Plates 25a, 25b of insulating material, such as fibre, overlie the metal plate 25 and effectively prevent the wires from coming in contact therewith. The plates 25a, 25b may be clamped between the casings 10 and 27 as shown in Figure 5.

The parts being assembled and connected as just described, it will be seen that the cord 31 can be connected to a suitable source of current and the sign operated to give it an electrical test and that should this test develop misadjustments of the relative positions of the grid, reflectors or other parts, or defects therein, that the misadjustment can be easily corrected without disassembling the sign and defective parts are easily replaced.

If the unit assembly of the parts (with or without the transformer) mounted on the frame 10 tests all right, then the back casing 27 is attached thereto in any suitable manner such as by screws 32 having shouldered or collar button heads and standard screws 33.

The back 27 has hollow bosses as shown at 27b to cover the heads of screws 26 so there are no metal parts exposed that could come into contact with the electrical parts of the sign. This is important on account of the high voltage used. As the glass 13 and casings 10 and 27 are insulating material and as screws 32 and 33 which clamp the casings 10 and 27 are not in contact with the metal parts, there is no danger to the user in case a winding of the transformer should become accidentally connected to the support 25 or any other conducting part.

The back 27 is preferably made of molded material such as bakelite and is provided with the outer stiffening ribs 27c, 27d which serve to strengthen the box-like portion of the back 27e enclosing the transformer.

Rubber feet 34 are secured by screws to the bottom of frame 10 and form supports therefor.

A leg 35 is movably mounted by means of the bolt 36 in the web 37 of the back and may be locked thereto in any desired relation by means of the wing nut 38. This leg carries a rubber foot 39 which serves as a support for the sign and it will be apparent that by changing the position of the leg 35 the face of the sign may be displaced from the vertical, thereby enabling the sign to be adjusted to be easily read from different angles.

The sign is assembled with one or more sealing strips 40 secured under the heads of the screws 33 by any suitable means such as solder or the like so that the user cannot remove the screws, open the sign and tamper with the interior. This sealing is also required by the Underwriters' Laboratories.

The finished sign can be used in a number of ways, two of which are (a) By coating the rear glass 13 with a removable coating, which can be

erased to permit the light from the grid **20** to shine through. The front glass **16** can in this case be omitted if desired, but it is advisable to use same as it forms a diffuser which minimizes the streaked effect of the grid.

(*b*) A transparent panel or panels carrying thereon the indicia forming the sign proper, may be placed in the space between the glasses **13** and **16**. Such panels are preferably of the type disclosed in the copending application, Serial No. 19,039, filed April 30, 1935.

The signs may be assembled in groups by using a connecting strip having notches adapted to engage the grooved heads of screws **32** as shown. By providing these strips of different sizes a large variety of groups of signs may be assembled and held firmly, one supported on another, to form a display. This specific arrangement is more fully shown, described and claimed in the copending application Serial No. 29,581, filed July 3, 1935.

Although the invention has been disclosed in connection with the specific details of preferred embodiments thereof, it must be understood that such details are not intended to be limitative of the invention except in so far as set forth in the accompanying claims.

What is claimed is:

1. A sign comprising a frame having a transparent front supported thereon adapted to present display matter, a grid of luminous tubing, a reflector behind said grid comprising arcuate members behind each length of tubing therein, said reflector being in contact with said grid and adapted to direct light therefrom through said front so that all parts thereof are substantially equal in brilliancy, a support extending across the back of said frame and secured thereto and adapted to hold said grid and reflector in position, a transformer mounted on said support and connected to said grid, and a rear casing secured to the rear of said frame and closing the open back thereof together with said frame inclosing all of the working parts of the sign.

2. The sign as claimed in claim 1 wherein the frame has a removable transparent front removably supported therein and overlying said first front, leaving a space between.

3. A sign comprising a frame having a transparent front supported thereon and adapted to position display matter, a grid of luminous tubing, a reflector behind said grid comprising arcuate members behind each length of tubing therein, said reflector being in contact with said grid and adapted to direct light therefrom through said front so that all parts thereof are substantially equal in brilliancy, means for holding said luminous tube and said grid and reflector in operative position in said frame, a one piece sheet-like removable diffusing member mounted in said frame in front thereof and adapted to diffuse light emitted by said grid, said grid having a plurality of horizontally disposed parallel legs and said diffusing member having a plurality of horizontally disposed ribs or ridges separated a lesser distance than the legs of the grid.

4. A sign comprising a frame having a transparent front adapted to carry display matter, a grid of luminous tubing behind said front and having a plurality of substantially parallel horizontal legs, a plurality of reflecting strips spanning the spaces between said legs and in the rear of said grid, each of said strips being spaced apart and insulatedly supported in said frame, and end reflectors comprising strips adapted to overlie a portion of the upper and lower of said first strips and to partially surround the upper and lower legs of said grid and having their horizontal edges in contact with the transparent front aforesaid.

5. The sign as claimed in claim 4 wherein said reflector strips are rearwardly supported in resilient material which in turn is supported by a cross member secured to the frame.

6. A sign comprising a front casing, a luminous grid supported therein, a reflector back of said grid adapted to project light outwardly through the front of said casing, said front being adapted to present transparent display matter, said grid and reflector being mounted therein and supported thereby, a support secured in the rear of said casing, a transformer secured to said support and connected to said grid, and a rear casing having laterally extended portions secured to said front casing and an integral rearwardly extended box-like portion adapted to encase said transformer.

7. The sign as claimed in claim 6 wherein the front casing is provided with a transparent front of insulating material and the casings are of insulating material whereby the working parts of the sign are entirely enclosed in insulation without external conducting parts.

8. In a sign, a casing having a transparent front adapted to present display matter, a luminous grid and reflector, a support extending across said casing and adapted to cooperate therewith to support said grid and reflector therein, means for securing said support to said casing, and a rear casing adapted to enclose said grid and reflector and having portions overlying said means, and means insulatedly supported by said casings for clamping them together.

9. In a sign, a frame of insulating material having a transparent member forming the front thereof adapted to present display matter, a luminous grid lying against the inner surface of said member, a reflector behind said grid and supported thereon, a metallic support secured across the open back of said frame and adapted to hold said grid and reflector in place therein, means for securing said support in place, a transformer mounted on said support and connected to said grid, and a back of insulating material secured to said frame and having portions overlying said support and the means that secure same to the frame, whereby all metallic parts liable to come in contact with the electric circuits of the device in case of breakdown are enclosed in insulation.

10. A sign comprising a frame having a transparent front supported thereon adapted to present display matter, a grid of luminous tubing, a reflector behind said grid comprising arcuate members behind each length of tubing therein, said reflector being in contact with said grid and adapted to direct light therefrom through said front so that all parts thereof are substantially equal in brilliancy, a support extending across the back of said frame and secured thereto and adapted to hold said grid and reflector in position, a transformer mounted on said support and connected to said grid and having primary and secondary connections extending therefrom and overlying said support, insulating material overlying a portion of the rear face of said support and adapted to prevent said connections from contacting therewith, and a rear casing secured to the rear of said frame and closing the open back thereof and together with said frame enclosing all of the working parts of the sign.

11. In a sign of the character described; a frame of insulating material, a light source, a reflector therefor and a transformer mounted in cooperative relationship with said frame; a rear casing of insulating material having laterally extending edges adapted to overlie and close the rear of said frame, and means for securing said frame and rear casing together comprising removable screws having rearwardly extending heads, said heads constituting means whereby said sign may be attached to a support.

12. In a sign of the character described; a frame of insulating material, a light source, a reflector therefor and a transformer mounted in cooperative relationship with said frame; and a rear casing of insulated material closing the rear of said frame and having a rearwardly extending depression therein adapted to receive at least a portion of said transformer, said rear casing being apertured to permit air circulation about said transformer.

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