

[54] **OUTDOOR ILLUMINATED SIGNS**

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[52] U.S. Cl.40/130 M

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[58] Field of Search40/130 M, 133, 135, 152

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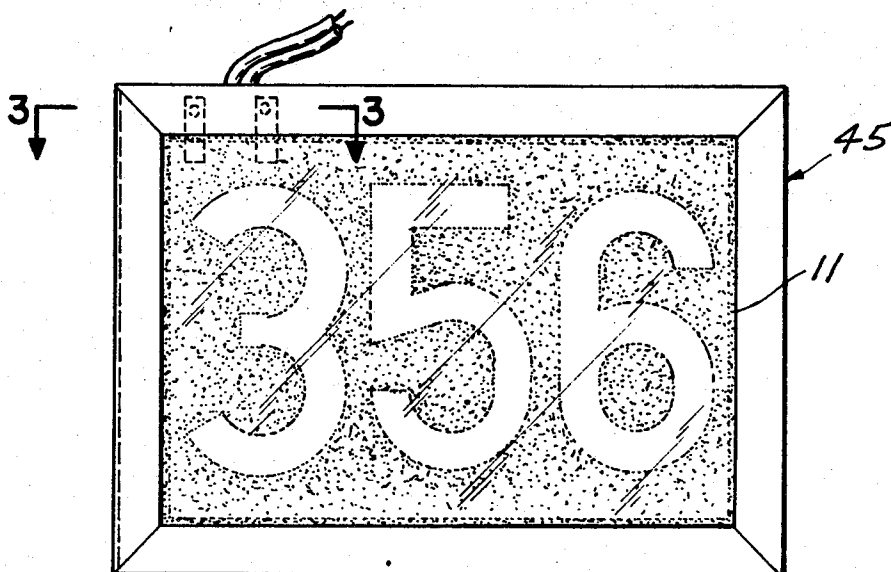
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[57] **ABSTRACT**

The outdoor illuminated sign is composed of a front transparent plate, a rear backing plate, a masking material between such plates providing opaque and transparent areas forming sign indicia, an electroluminescent lamp panel between such masking material and the back plate, and means sealing the edges of said sign against moisture entering between the plates, masking material and lamp panel and holding them together as a complete, stable, weatherproof unit.

13 Claims, 11 Drawing Figures



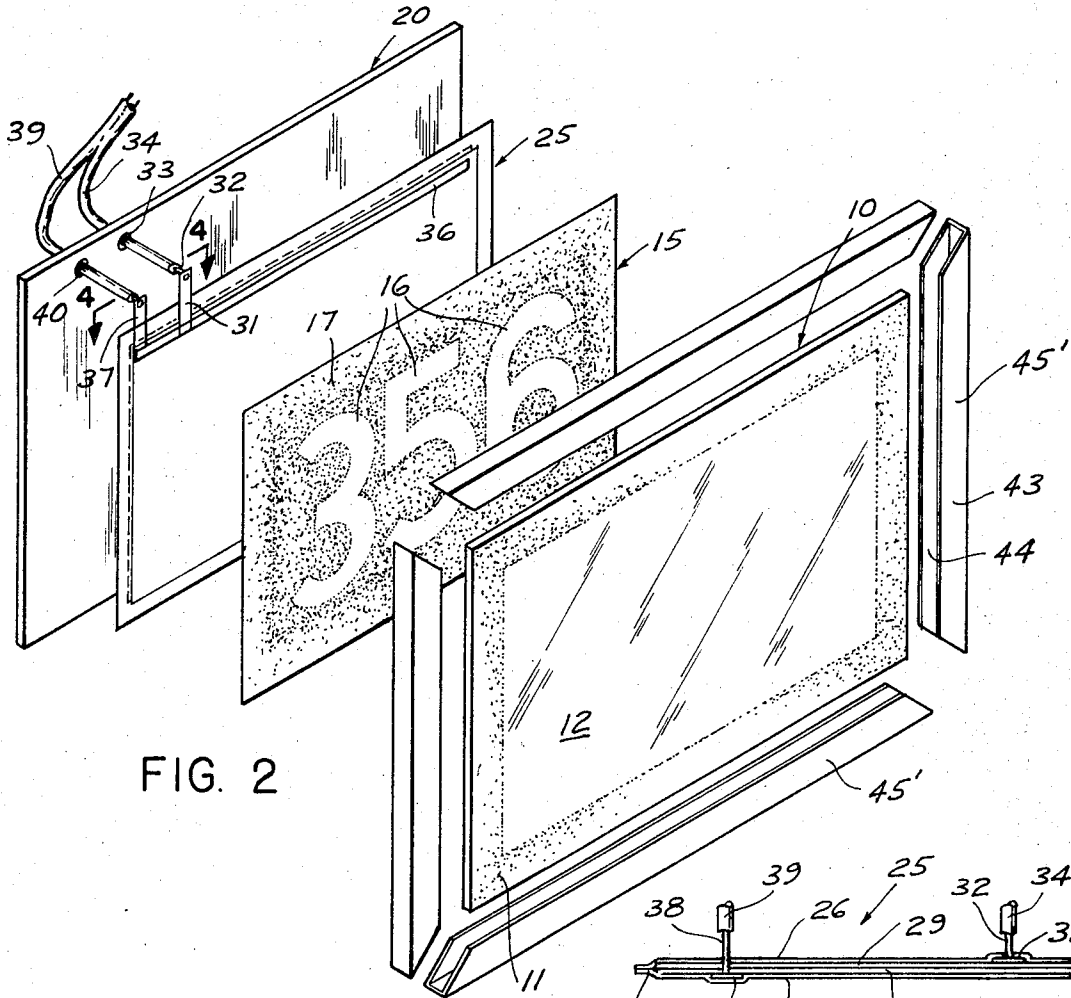


FIG. 2

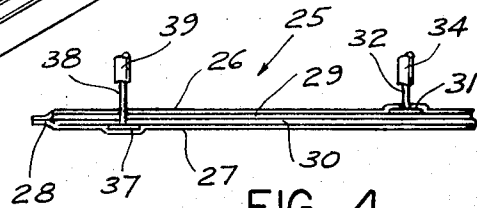


FIG. 4

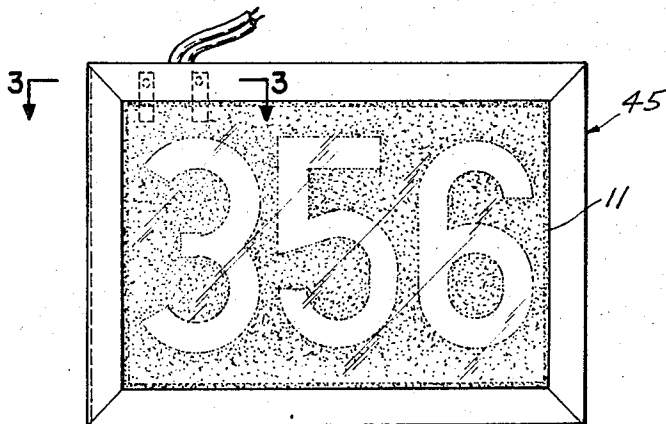


FIG. 1

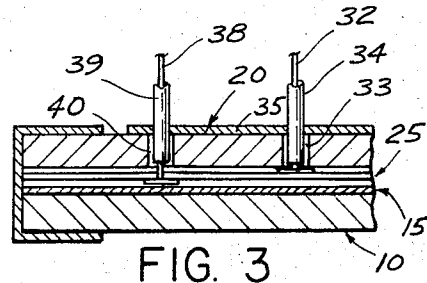
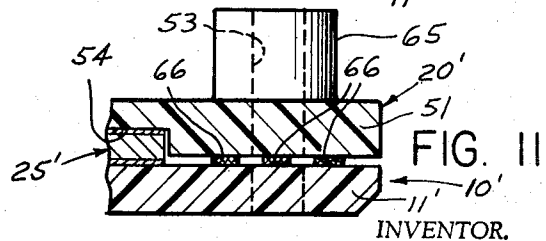
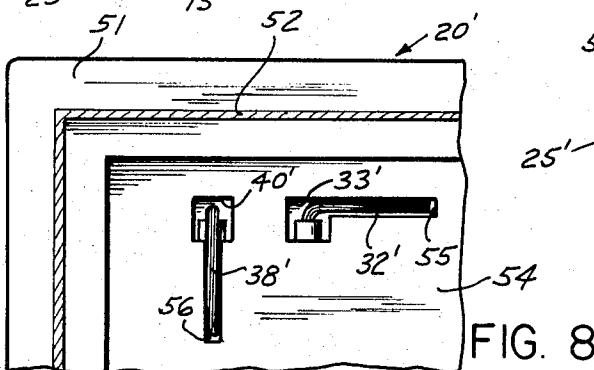
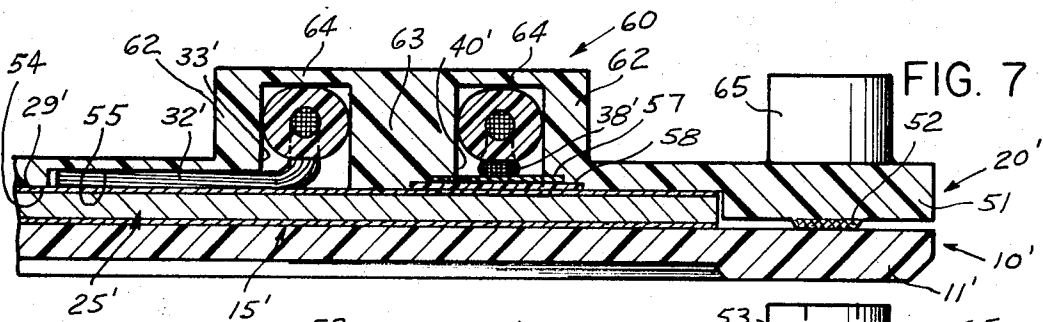
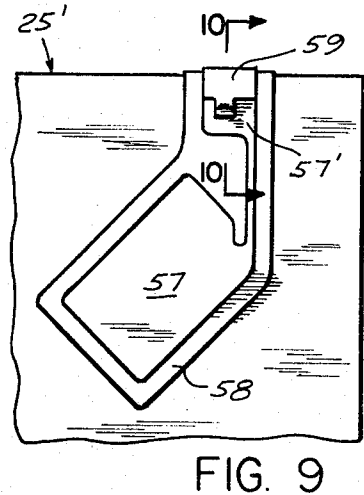
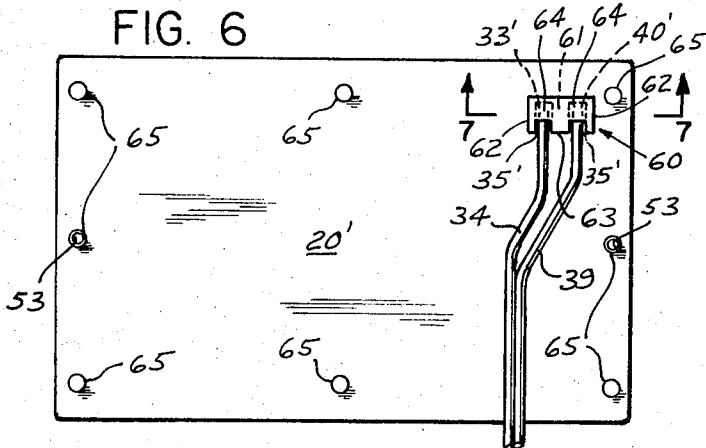
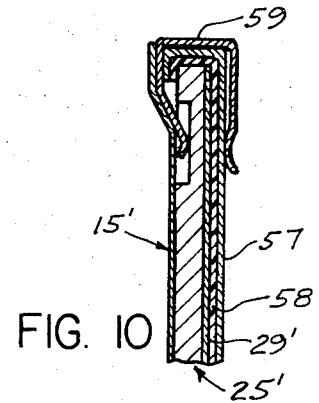
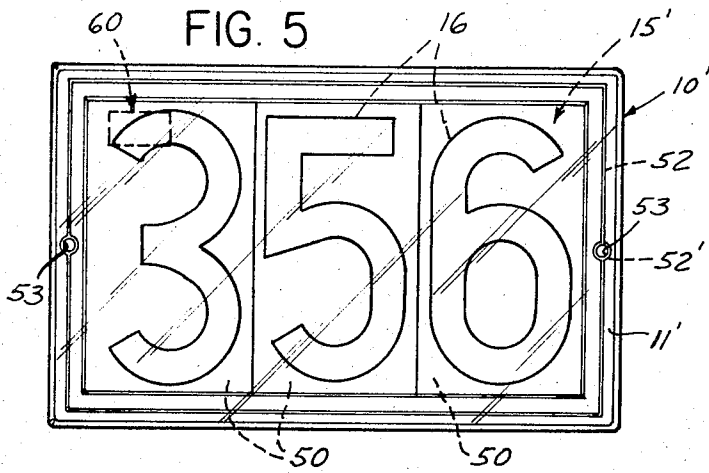


FIG. 3

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OUTDOOR ILLUMINATED SIGNS

This application is a continuation-in-part of application Ser. No. 845,778, filed July 29, 1969, and now abandoned.

This invention relates to outdoor illuminated signs and more particularly to an outdoor sign panel of the electroluminescent type.

The primary purpose of this invention is to provide a simple, inexpensive sign that is especially advantageous for use on the exterior of a home, although it may be used to advantage for advertising and other purposes.

A further object of the invention is to provide a reliable outdoor sign for homes that may be included readily in the present bell and light circuits thereof and will be clearly and distinctly readable both during the day and at night.

A still further object of the invention is to provide an outdoor sign for homes that is of a sturdy, simple construction capable of withstanding substantial variations in temperature and atmosphere moisture contact without damage, can be readily installed at any desirable exterior location of a home, and is very inexpensive to operate and maintain.

Other objects as well as the advantages of the invention will appear from the following description when read in connection with the accompanying drawings, in which

FIG. 1 is a front elevational view of a house number sign embodying the invention;

FIG. 2 is an exploded view showing in perspective the components of the sign in FIG. 1;

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 1;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 2;

FIG. 5 is a front elevational view of a modified form of sign;

FIG. 6 is a rear elevational view of the sign shown in FIG. 5;

FIG. 7 is a sectional view taken along the line 7—7 of FIG. 6;

FIG. 8 is a partial, enlarged front elevational view of the back plate in the sign of FIGS. 5-7;

FIG. 9 is a partial, enlarged rear elevational view of the lamp unit in such sign;

FIG. 10 is a sectional view taken along the line 10—10 of FIG. 9; and

FIG. 11 is a sectional view showing a further modification of the invention.

The house number sign shown in FIGS. 1-4 of the drawings is composed of face plate 10 made of a suitable plastic material such as acrylite. The face plate 10 is approximately one-sixteenth inch thick and is formed with an opaque, preferably black frame 11, and a clear, transparent central portion 12. The frame 11 is about one-half inch wide and frames a sheet 15 of film that has been developed to provide transparent numerals 16 and an opaque background 17. The sheet of film 15 may be of any suitable type that is stable when developed and capable of withstanding change under the varying conditions it will be subjected to in usage as an outdoor sign. A suitable film for this purpose is 0.004 or 0.007 Cronan stable base film. The front surface of the film 15 directly engages the rear surface of the face plate 10 and is framed by the black opaque border 11 of such plate so that the two present to the

view of the observer a black background in which there is located in sharp contrast the bold numbers 16 constituting the number of the house.

The sign is provided with a black plate 20 of any suitable weatherproof, opaque material, such as a 1/8-inch thick plate of black acrylic plastic, steel sheeting, etc.

Sandwiched between the film 15 and the back plate 20, is a flat electroluminescent lamp unit 25, the rear surface of which lies in direct flat contact against the front surface of the back plate 20, and the front surface of which lies in direct flat contact against the rear surface of the film 15. Thus, an observer sees portions of the front of the lamp unit 25 in the form of the numerals 16 through the transparent numeral portions 16 of the film and the transparent central portion 12 of the face plate 10. The lamp unit 25 is a commercially available electroluminescent panel essentially composed of a layer of properly prepared phosphor associated with two electrodes to which current is supplied to provide the electric field. The lamp unit 25 may be obtained from companies like the General Electric Company and Sylvania Electric Co. and, as shown, comprises two outer layers 26, 27 of transparent plastic material fully sealed along their borders 28 to assure protection to the two layers 29, 30 sandwiched between such plastic layers 26, 27 from the effects of moisture and temperature change. The layer 29 is a thin layer of suitable electrically conductive material, such as aluminum, and has secured to its outer rear surface a bronze wire mesh lead 31 which is connected by a wire 32 to the house circuit. The wire 31 extends through an opening 33 in the back plate 20 and is preferably covered with a weatherproof sheathing 34 which extends into such opening 33 and its end sealed therein by suitable waterproof sealing material 35 in FIG. 3, such as for example plastic material. The layer 30 is a thin layer of properly prepared phosphor having along the upper edge portion of its front face, a bus bar 36 in FIG. 2 of any suitable material such as silver and to which is connected a bronze wire mesh lead 37. A wire 38 covered with waterproof sheathing 39 connects the lead 37 to the house circuit. As in the case of the wire 32, the wire 38 extends through an opening 40 in the back plate 20 and its connected end is sealed against weather by the seal 35.

The laminated structure composed of the face plate 10, the numbered film 15, the lamp unit 25 and the back plate 20 is secured in assembled relation by a frame 45 in FIG. 1 which is of a construction capable of completely sealing all of the side edges of the laminated structure against weather. Thus, the frame 45 may be constituted of a suitable weatherproof tape of a known type, such as the now available acrylic plastic tape, or of rigid frame members of any suitable material, such as treated wood, or stainless steel. If a tape is utilized for this purpose, it is applied to the edges of the laminated structure while the components thereof are held together under pressure. The tape is sufficiently wide to overlie the outer edge portions of the front and back plates as indicated in FIG. 1. The tape may be used as a single piece and suitably folded at the corners, or used in four pieces with the ends suitably shaped so that when assembled on the device they form a continuous frame. In FIG. 2 of the drawings, the frame is

indicated as being made of four U-shaped metallic frame members 45' having front and rear side portions 43,44, respectively, which define a space which is slightly less than the combined thickness of the layers 10, 15, 20 and 25. The frame members 45' are preferably made of an inherently resilient metal material such as stainless steel, so that such layers will be held together in clamped relation by such frame members 45'. The four frame members 45' are shaped at their ends so that when clamped in proper relation on the device they form a substantially continuous frame, thereby sealing the edges of the laminated structure against weather.

In the embodiment shown in FIGS. 5-10 of the drawings the face plate 10' is made entirely of a clear transparent plastic material and is provided with a thickened border 11' which serves to frame the masking material 15' providing opaque and transparent areas forming the sign indicia constituted of the transparent numerals 16. In this embodiment, the masking material is composed of a plurality of film-like pieces 50 of known pressure adhesive plastic material, each of which has a transparent numeral 16 and an opaque background 17. The film-like plastic pieces 50 are adhered to the front surface of the electroluminescent lamp unit 25' which essentially is of the same construction as the previously described unit 25. It will be understood that instead of the plastic pieces 50, there may be employed the previously described film 15. It is also within the contemplation of the invention to use as the masking material, an opaque stencil, or stencils, or a coating of a suitable opaque material applied to the front surface of the lamp unit so as to form the desired numerals 16 through which portions of the lamp unit can be observed.

The back plate 20' in this embodiment is provided with a forwardly projecting thickened border 51, the front surface of which is connected to the rear edge portion of the face plate 10' immediately in back of the border or frame 11' formed on such face plate. Since the back plate 20' is made of an opaque material such as black acrylic plastic, the transparent frame 11' will appear to an observer as a black frame. The thickened border 51 of back plate 20' is welded to the rear surface of the face plate 10' by a narrow band 52 of suitable plastic material which preferably is formed from a small triangularly-shaped bead of black acrylic plastic, the base of which is integral with the front surface of such thickened border 51. It will be noted that the weld band 52 is a closed band that extends continuously around the thickened border 51 and, in the region of the two holes 53,53 extending through the two end portions of the frame 11' and border 51, includes two circular portions 52' that encloses such holes 53. Thus, the weld band 52 permanently assembles the face plate 10' and back plate 20' together by weatherproof joint that seals the interior of the unit against the entry of moisture between such plates.

The thickened border 51 causes a sealed, flat, rectangular chamber 54 to be formed between the two plates 10' and 20', in which chamber is contained the lamp unit 25' and the masking material 15'. The chamber 54 has an area which is substantially the same as those of the lamp unit 25' and masking material 15', and has a depth which is substantially the same as the

combined thickness of such unit 25' and material 15'. Thus, the lamp unit 25' and masking material 15' is substantially snugly contained in the chamber 54 with the front surface of the material 15' substantially flush with the front surface of the thickened border 51. As in the previous embodiment, the lamp unit 25' is connected to the house circuit by two wires 32',38'. The wires 32',38' extend into the chamber 54 through two openings 33' and 40', respectively, in the back plate 20'. The openings 33',40' have associated therewith recesses 55,56, respectively, formed in the front surface of the back plate 20' to receive the exposed ends of such wires as is shown in FIGS. 7 and 8, and thereby enable the lamp unit 25' to seat properly in such chamber. It will be noted that recess 55 is horizontally disposed and extends inwardly from its opening 33', while the recess 56 extends vertically downwardly from its opening 40'. The exposed end of the wire 32' engages the rear surface of the thin layer 29' of electrically conductive material forming the rear layer of the lamp unit 25'. The exposed end of the wire 38' engages a contact plate 57 in FIGS. 9 and 10, overlying the rear surface of such lamp unit layer 29'. The contact plate 57 is mounted on a piece 58 of non-conducting plastic sheet material and both the upper portion of such plastic piece 58 and an extension 57' of the contact plate 57 are folded over the upper edge of the lamp unit 25'. The composite contact plate 57 and non-conductive plastic piece 58 are held attached to the unit by a clip 59 made of conducting metal material; the rear leg of the clip being in electrical contact with the contact plate 57. On the front side of the lamp unit, the front leg of the clip extends through an opening formed in the front coating of plastic material on such unit and into electrical contact with the bus bar 36, in FIG. 2, provided along the front upper edge portion of the front layer 30 of such unit.

The inserted ends of the wires 32',38' are protected against weather by a projection generally designed 60 and integrally formed on the rear side of the back plate 20'. This projection is constituted of a top wall 61 which extends across the tops of the two openings 33' and 40' and has its lower surface flush with the top edges of such openings. Connected at their upper ends to top wall 61 are two end walls 62,62 whose inner surfaces are flush with the outer side edges of the two openings. Located between the openings is a dividing wall or partition 63 which is connected at its upper end to the top wall 61 and the side surfaces of which are flush with the inner opposed side edges of the two openings 33' and 40'. The areas between the end walls 62 and the partition 63 and overlying the two openings are spanned by two rear wall portions 64,64 which conceal such openings. It will be observed thereof, that the wall portions 61-64 form two guideways which guide the wires directly through the openings 33', 40' and into the chamber 54 when the wires are inserted into such guideways. The wires are inserted into the guideways until the waterproof sheathing 34,39 covering such wires extends under the wall portions 64. The wires are then sealed in position by a moistureproof plastic sealing material 35' so that this connection is effectively sealed against weather. Also integrally formed on the rear side of the back plate are eight spacer members 65 of a height equal to that of the projection 60 so

that they cooperate with the latter in placing the unit properly on the side wall of a house.

In assembling the above described modified form of sign, the wires are first inserted into the projection 60 and sealed as above described and the exposed ends thereof inserted into the recesses 55,56 provided in the front surface of the back plate 20'. The lamp unit 25' with the masking material 15' thereon is then inserted into the chamber 54. It is to be noted that this is a self-contained unit for which no connection need be made and the mere placement of it into the chamber assures that a proper connection will be made with the house circuit. The face plate 10' is then placed in position on the back plate with frame 11' resting on the raised plastic bead formed on the thickened portion 51 of the back plate and from which is formed the weld joint 52. The height of this plastic bead is relatively small, in the neighborhood of 0.02 inches. The unit is then subjected to a known ultrasonic welding operation which causes the plastic material of the bead to melt and flow between the surfaces of the face and back plates to produce a uniform weld joint 52 between the surfaces. These surfaces are effectively sealed by the weld joint against the passage of any moisture therebetween thus rendering the edges of the unit completely weatherproof. The completely sealed unit is then drilled to form the two end holes 53 through which screws are inserted to attach it to the house. It will be noted from FIG. 6 that the holes 53 are drilled so that in addition to the thickened portions of the plates 10' and 20', they extend also through two of the spacer members 65. Thus, the attaching screws will also extend through such weatherproof plastic spacers and thereby be protected against the weather.

It has also been found advantageous in constructing a stronger joint than is possible with one weld band 52, to provide three spaced continuous placed beads on the front surface of the thickened portion 51 of the back plate 20' so that there will be formed three spaced continuous weld joints 66, 66, 66, around the edge portions of the unit as is shown in FIG. 11 of the drawings. In addition to making the unit stronger, such a construction makes it unnecessary to provide hole encircling weld portions such as the weld portions 52' in FIG. 5.

While I have hereinabove described and illustrated in the drawings, preferred embodiments of my invention, it will be understood by those skilled in the art that various modifications may be made therein without departing from the spirit of the invention. Thus, it is within the contemplation of this invention to eliminate the masking material 15 so that the observer's view of the entire lamp unit 25 is unobstructed. It has been found that the soft subdued light of such a completely clear unit is very useful on board ships, in the passageways, on the stairways, in bunk areas, etc., thereof. It is also useful on the steps of dimly lit nightclubs or restaurants, over cash registers, in hallways in institutions and at many other locations where a clear, subdued light might be desirable. Hence, it is intended to cover all constructions of the device coming within the scope of the appended claims.

I claim:

1. An illuminated sign comprising a front transparent plate, a rear backing plate, said backing plate having at least one aperture extending therethrough, an elec-

tro-luminescent panel adjacent to the front surface of said backing plate and between the latter and said front plate, indicia disposed between said electroluminescent panel and said front plate, said indicia having opaque and transparent areas defining a sign, a pair of electric wires extending through said at least one aperture of said backing plate into connection with said electroluminescent panel, said electric wires being sheathed in a weatherproof material, said backing plate having an means projecting rearwardly therefrom for overlying and protecting the connected ends of said wires against weather at their place of entry through said backing plate, and means extending continuously around the edges of said sign for both sealing the edges of said sign against moisture entering between said plates and holding said plates and luminescent panel in assembled relation as a complete, stable, weatherproof unit.

2. An illuminated sign as defined in claim 1, in which the outer edge portions of said front and backing plates are connected together by said sealing and holding means, and within the area defined by such means are constructed to form a chamber in which is located said electroluminous unit panel.

3. An illuminated sign as defined in claim 1, in which the outer edge portions of said front and backing plates are constituted of plastic material and the opposed surfaces thereof are welded together by said sealing and holding means, said sealing and holding means being constituted of melted plastic material and being located between said plate edge portions.

4. An illuminated sign as defined in claim 3, in which the outer edge portions of said front and backing plates have a plurality of fastening holes extending therethrough, and in which said sealing and holding means is constituted of a continuous band of plastic material having circular portions enclosing said fastening holes.

5. An illuminated sign as defined in claim 3, in which said sealing and holding material is constituted of a plurality of spaced bands of plastic material.

6. An illuminated sign as defined in claim 1, in which said protecting means comprises a projection on the rear surface of said backing plate and having top, side and rear walls covering the place of entry of said electric wires through said backing plate and provided on its bottom side with an opening for the wires to said covered place of entry.

7. An illuminated sign as defined in claim 6, in which said protecting means includes sealing material within said projection to hold and seal said wires in the same.

8. An illuminated sign as defined in claim 6, in which said backing plate is provided with two holes through which the wires extend, and in which said projection is provided with an interior partition between said two holes and parallel to the side walls of said projection, the inner surface of said projection top wall being substantially flush with the top edge portions of said holes and the inner surfaces of said side walls and the side surfaces of said partition being substantially flush with the side edge portions of said holes, whereby said top, side and rear walls and said partition of said projection form guideways for the wires from said opening and into said holes.

9. An illuminated sign as defined in claim 6, in which the inner surface of said backing plate is provided with

two elongated recesses extending from said place of entry for receiving the exposed ends of said wires so that the latter are substantially flush with said backing plate inner surface, the rear side of said electroluminescent panel engaging the exposed wire portions in said recesses and maintaining them in position therein.

10. An illuminated sign as defined in claim 9, in which one of said exposed wire ends is electrically connected to the rear surface of said luminescent panel, and in which said luminescent panel is provided on its rear surface with a contact plate in engagement with the other of said exposed wire ends, means for insulating said contact plate from the rear surface of said luminescent panel, and means supporting said contact plate on said luminescent panel and electrically connecting it to a bus bar provided on the front of said luminescent panel.

11. An illuminated sign as defined in claim 6, including a plurality of spacer members projecting from the

rear surface of said backing plate and each having a depth equal to the depth of said projection.

12. An illuminated sign as defined in claim 11, in which the outer edge portions of said front and backing plates have two fastening holes extending therethrough and through two of said spacer members, the outers of said spacer members being solid.

13. An illuminated sign as defined in claim 1, wherein said indicia comprises a masking material between said electroluminescent panel and said front plate providing opaque and transparent areas forming sign indicia, said masking material being composed of a plurality of pieces of pressure adhesive plastic film material, each of said pieces being adhered to the front surface of said electroluminescent panel and having an opaque background and a transparent area forming a portion of the sign indicia.

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