Jan. 9, 1962 R. F. FRINK ETAL 3,015,900

INTERNALLY ILLUMINATED SIGN

Filed Nov. 7, 1958

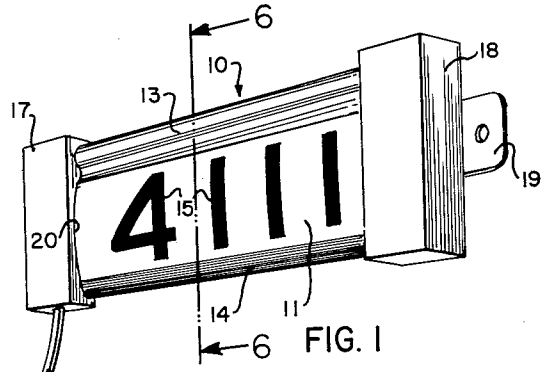


FIG. 1

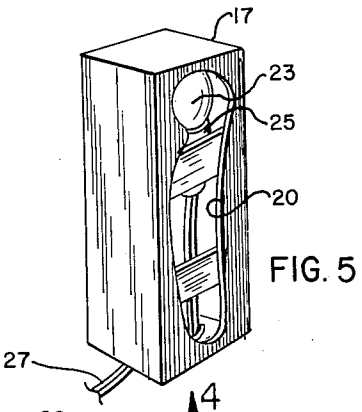


FIG. 5

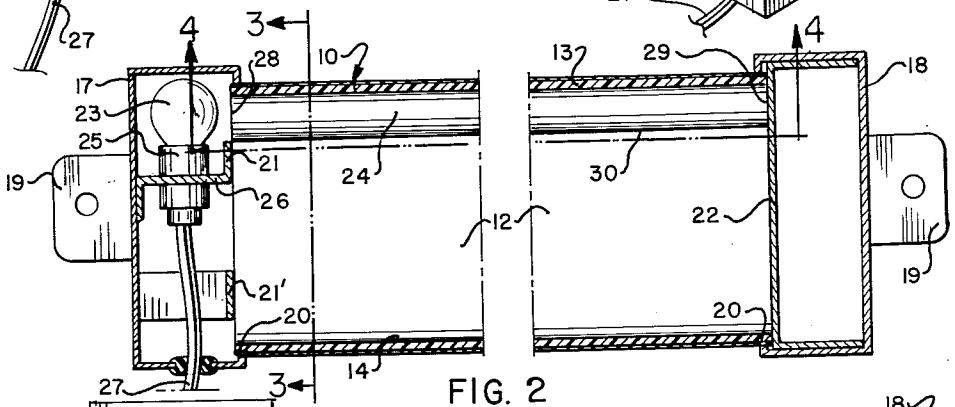


FIG. 2

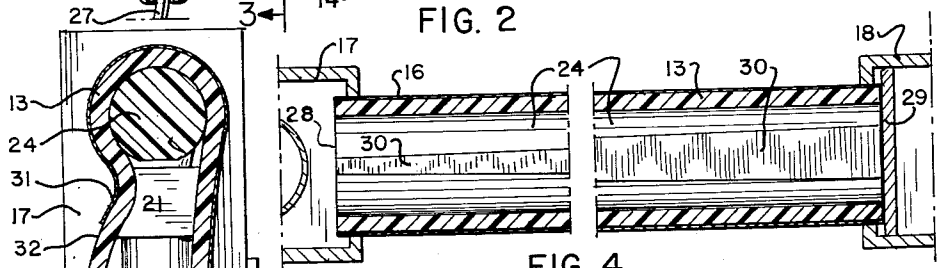


FIG. 4

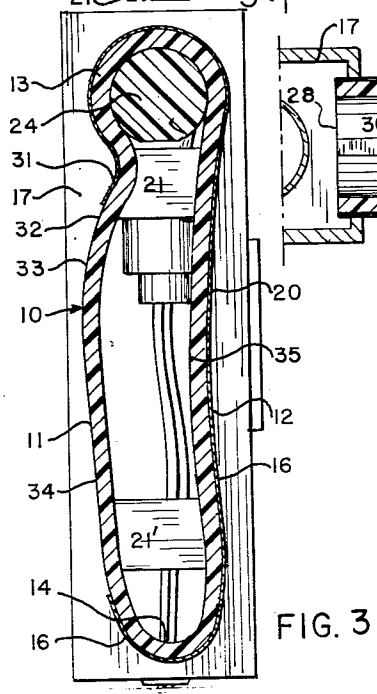


FIG. 3

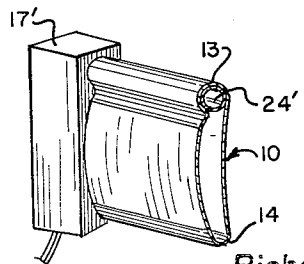


FIG. 6

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3,015,900

Patented Jan. 9, 1962

3,015,900

INTERNALLY ILLUMINATED SIGN

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Filed Nov. 7, 1958, Ser. No. 772,613

5 Claims. (Cl. 40—130)

This invention relates to illuminated signs and more particularly to internally illuminated signs which have a light source behind a transparent or translucent face to offset characters or symbols displayed thereon. As such, the invention will be hereinafter referred to as an internally-illuminated sign.

A primary object of the invention is to provide a novel and improved internally-illuminated sign which is especially adapted to present a black, opaque display of characters or symbols upon a white, luminescent background for clear visibility both during the day and the night.

Another object of the invention is to provide, in an internally-illuminated sign, a novel and improved lighting arrangement which evenly and uniformly luminesces the face of the sign to clearly and uniformly offset the characters and symbols displayed thereon without the use of a huge and deep light chamber behind the sign face.

Another object of the invention is to provide a novel and improved internally-illuminated sign which is especially adapted for the display of house numbers, names and like uses where small, flat and compact displays are required.

Another object of the invention is to provide a novel and improved internally-illuminated number and name-plate sign for day and night use which may be illuminated to render the characters and symbols thereon visible with an absolute minimum of light-generating power requirements.

Another object of the invention is to provide, in a self-illuminated sign, a novel and improved arrangement of reflective and refractive surfaces in the lighting chamber which uniformly and evenly luminesces the transluscent surface forming the face of the sign.

Yet other objects of the invention are to provide a novel and improved self-illuminated sign which is simple in construction, economical in cost and use, versatile, reliable and durable.

With the foregoing and other objects in view, all of which more fully hereinafter appear, our invention comprises certain novel and improved constructions, combinations and arrangements of parts and elements as hereinafter described, defined in the appended claims and illustrated in preferred embodiment in the accompanying drawing in which:

FIGURE 1 is a perspective view of an internally-illuminated sign constructed in accordance with the principles of my invention.

FIGURE 2 is a longitudinal sectional elevation view of the sign, with the front thereof removed to show the interior construction and with the central portion of the sign being broken away to conserve space.

FIGURE 3 is a transverse sectional elevation view of the sign as taken substantially from the indicated line 3—3 at FIG. 2.

FIGURE 4 is a fragmentary sectional detail as taken substantially from the indicated line 4—4 at FIG. 2.

FIGURE 5 is a perspective view of an end element adapted to hold the sign.

FIGURE 6 is a fragmentary perspective view of a sign as taken substantially from the indicated line 6—6 at FIG. 1, but illustrating a modified construction thereof.

There is a need and demand for an improved internally-illuminated sign which may be adapted for use as a house number, name plate and the like, which will clearly display the numbers, letters or symbols constituting the sign both in daylight and in darkness and which may be illuminated for an absolute minimum of expense. One difficult problem involved in the construction of such signs is the obtaining of uniform luminescense on the face of the sign while at the same time keeping the sign compact in size and fully and efficiently using the light available and eliminating wasteful absorption and loss of light. Heretofore, signs of this character necessarily required large light chambers back of a translucent face to accomplish this purpose and in their very nature were bulky and inefficient. With such in view, the present invention was conceived and developed, and comprises, in essence, an illuminated sign formed as a partially-flattened tubular body with the flat, compact body forming the light chamber, with one side thereof being the sign face and with a line-like light source along one edge of the body illuminating the face. For efficient performance, the body is configurated to effect uniform distribution of light from the source and across the body, as hereinafter described in detail.

Referring more particularly to the drawing, the body **10** of the sign is tubular in form and is flattened and configurated to form a face **11** at one flattened side thereof and a back **12** at the other side. The longitudinal edges are curved to interconnect the face and back with one edge carrying the light emanating element constituting the head **13** of the tubular section and with the other edge constituting the base **14** of the section. The material constituting this flattened tubular body is necessarily a white transluscent material to form a clearly visible white sign face **11** whereon black, opaque characters or symbols, such as numbers **15** are easily seen and read. A preferred material is a white, opalescent type acrylic plastic, which is easily formed by injection molding or by heating and shaping a tube of the material, the acrylic being thermoplastic in nature, but stable under the moderate temperatures to which it is subjected in use as a lighted sign, as hereinafter described. Another suitable material is any type of white opalescent glass having good light transmitting and dispersing properties, although such glass must be formed at comparatively high temperatures.

The back **12**, head **13** and base **14** are covered with an opaque coating **16** of a material which preferably presents a black outer surface, but has a reflective surface at the contact surface of the body **10** whereon the coating is applied so that all light within the body **10** striking this coating is reflected back into the body and substantially all of the light emanated inside the body is ultimately reflected to light up the face **11**. A high-gloss black enamel has been found suitable for this purpose.

For efficient mounting and installation of the light, this flattened tubular body **10** is mounted in a pair of box-like end headers, one header carrying a light source being hereinafter referred to as a light source header **17** and the other header being a holding header **18**. Each header **17** and **18** includes a suitable orificed wall bracket **19** for properly mounting the sign to a wall surface or the like. Each header also includes a pocket **20** at its inner face which is shaped to the sectional form of the body **10** to receive and hold an end of the body **10**, the light source header **17** including a pair of spaced stops **21** and **21'** and the holding header including a single stop **22** which traverse the pocket openings **20** to limit the depth of movement of the ends of the body **10** into the pockets, as clearly illustrated at FIG. 2 of the drawing.

In preferred construction, where the body is formed of acrylic material, the lighting elements include a lamp **23** in the light source header **17** and a longitudinally disposed dispensing rod **24** in the head **13**. The lamp **23** is a conventionalized type of electric bulb which is aligned with the head **13** of the body and the end of the

tube 24. It is carried in a socket 25 which is conveniently mounted upon a shelf 26 within the header 17, the shelf 26, in turn, may be part of a stop 21 as illustrated. A cord 27 extends from the socket 25 and from the header 18 to any conventional electrical supply adapted to light the lamp 23 and convey light to the rod 24.

The light dispensing rod 24 is a transparent acrylic of the type having a high index of refraction capable of piping light within the rod. The light extends through this rod from the source end 28 at the lamp 23 to a reflective terminal end 29 and is dispensed laterally therefrom along a dispersing face 30 which is directed inwardly from the head 13 and into the body 10. This dispersing face 30 is tapered from a minimum width at the source end 28 to a maximum width at the terminal end 29 to provide for uniform lateral dispersion of the light therefrom, for the light intensity in the rod 24 decreases in proportion to the distance from the source lamp 23. This dispensing face 30 is suitably ground and polished to be either flat or slightly inwardly arched and it is possible for a skilled artisan to easily design, taper and shape the diffusing face 30 to obtain uniform emanation of light along the entire length of the rod 24.

The flattened white body 10 is shaped to disperse the linear source of light from the diffusing face 30 in a uniform manner across the face 11 so that there are no noticeable variations of light intensity on this face 11, such as shiny spots, highlights and shadows as commonly seen on signs of this type. It was discovered that when the body 10 was configurated in a manner characterized by certain types of curvature on the face and back in the region adjacent to the light source at the head 13 and other types of curvature in the region away from the light source, near the base 14, the light on the face would be substantially uniform.

The sectional form of this body can best be described with reference to the head 13. The head 13 of the body snugly embraces the rod 24, and is set off by an inward neck 31 at the front side of the body immediately below the head. Light rays emanating from the face 30 and into the body are directed through this neck 31 and against the inside walls of the body. The light striking these walls is either reflected from or refracted through them and when the light is refracted into the back 12 it is again reflected into the body by the coating 16.

The flatter the angle of the front and back walls to the direction of light rays, the less the refraction and this condition is taken advantage of to uniformly light the face 11. The edge 32 of the face adjacent to the neck 31, closest to the light source, is at an outward curve from the neck 31 and is substantially tangential to the direction of the light to receive a minimum of light. Thence, the upper portion of the face 11 curves inwardly on an arc 33 to progressively receive more and more light. From the curved section the face 11 is formed as a straight section 34 which extends to the bottom of the face adjacent to the base 14. The straight section 34, directed inwardly, also received the direct light from the source at rod 24 at an angle.

The back 12, which is covered by a reflective coating 16, reflects and refracts the light from the source, and to provide for effective reflecting and refracting, this back is formed as an arc 35 having the upper portion inclined inwardly to receive direct light at an angle and having the lower portion turned outwardly to be substantially tangent with the direction of the source light. It follows that the upper portion of the back 12 reflects and disperses light to the face 11 while the lower portion of the back 12 is ineffectual for dispersing direct light, but will disperse reflected light.

The base 14 is curved to reflect and spread light to both the face 11 and back 12. To demonstrate the importance of curving this base 14 it was discovered that elimination of the curve by using a flat bottom would noticeably affect light intensity near the top of the face 11. Although it is to be recognized that a substantial portion of this light is absorbed, especially because of the translucent nature of the material forming the body, a greater portion of the light is transmitted in a uniform manner to the face 11 by the reflecting and refraction patterns of the flat tubular body. All of this is further assisted by the opalescent quality of the material used.

As set forth in FIGS. 1 through 5, this arrangement provides for a small compact lighted sign which is ideal for house numbers, name plates and the like because of the very small power requirement for lamp 23 having a five or seven-watt capacity will operate satisfactorily with the ordinary sign. Heating problems do not exist because of the small power consumption and the acrylic plastic will diffuse the light without any noticeable heating effect.

However, where larger and more brilliant units are desired, and where the use of an acrylic plastic to transmit a line of light is not feasible, the invention may be modified as illustrated at FIG. 6. This figure shows a portion of a sign having a light source header 17', a body 10, face 11, back 12, head 13, all as hereinbefore described. However, instead of using the acrylic light dispensing rod 24, an electrical light tube 24', such as a neon or fluorescent type, may be used with the electrical light tube fitting into the head much in the same manner as the acrylic tube fitted as hereinbefore described. Again the result is an internally-illuminated sign of a very flat simple construction with uniform illumination on the face 11 being effected by the controlled reflection and refraction of light rays against the front and back walls of light rays against the front and back walls of the body 10 as in the manner hereinbefore described.

While we have now described our invention in considerable detail, it is obvious that others skilled in the art can devise and build alternate and equivalent constructions which are within the scope and spirit of our invention. Hence, we desire that our protection be limited, not by the constructions herein illustrated and described, but only by the proper scope of the appended claims.

We claim:

1. In an internally illuminated sign formed as a flattened tube-like element of translucent, opalescent-like material with one side forming a face side with the other side and edges being covered by a reflective backing and with a longitudinally-disposed rod-like linear light-emanating element at one edge thereof, an arrangement of curved sections adapted to dispense a uniform light on the face thereof including a head at the edge adapted to embrace the light emanating element, a curved base edge opposite the head adapted to reflect light to each side thereof, a necked-in portion between the face and head turning outwardly adjacent to the face, an inwardly turned portion of the face surface adjacent to the neck and a substantially flat face portion extending tangentially from the inwardly turned portion to the edge opposite the light source edge and at an inclination which permits a portion of the light from the element to strike this surface.

2. An internally illuminated sign adapted to provide an illuminated face of diffused light of substantially uniform intensity and comprising, a flattened tube-like body with one side thereof forming the illuminated face between the edges of the tube, wth one edge thereof being turned about an angle greater than 180 degrees to form a longitudinally disposed head with a necked portion at the face side adjacent to the face, with the opposite edge being curved about a radius sufficient to separate the face side from the back side, a light-emanating element longitudinally extending through the head, a reflective backing on the back side of the body which extends about the head and over the necked portion and about the curved portion of said opposite edge said body including an outwardly-directed curved portion of the neck adjacent to the face, a reversed inwardly-directed curved

portion of the face adjacent to the neck, and a substantially flat face portion extending tangentially from said inwardly directed curved portion to said opposite edge and at an inclination which permits light from the element within the head to strike its inner surface.

3. In the sign defined in claim 2, said back side being arched inwardly sufficiently to permit light from the element within the head to strike the portion of the back side adjacent to the head but to be directed substantially parallel with the portion of the back side adjacent to said opposite edge.

4. In the sign defined in claim 2, the ends of the sign being closed by headers.

5. In the sign defined in claim 2, said body being acrylite.

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