Nov. 15, 1932. E. S. WOLD 1,887,534

LUMINOUS SIGN

Filed Nov. 24, 1930

Fig. 1

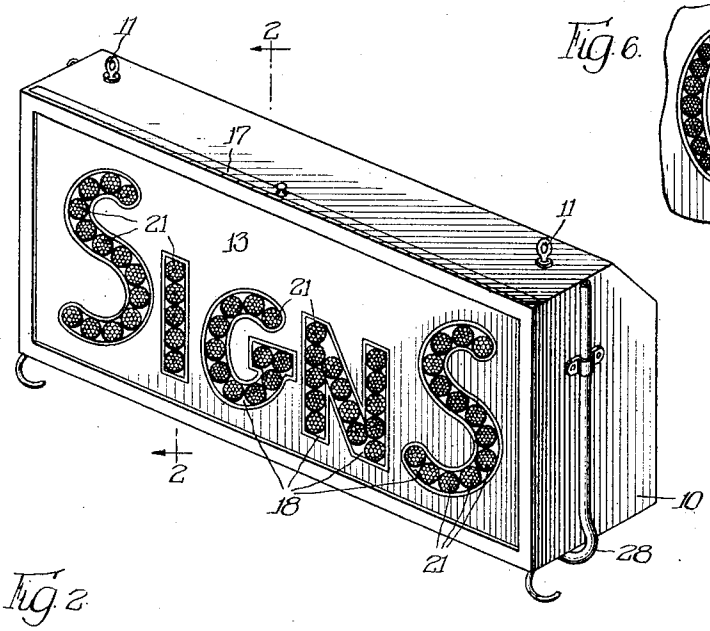



Fig. 6.

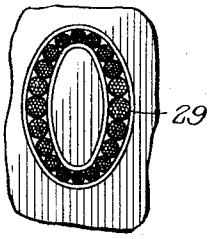



Fig. 2.

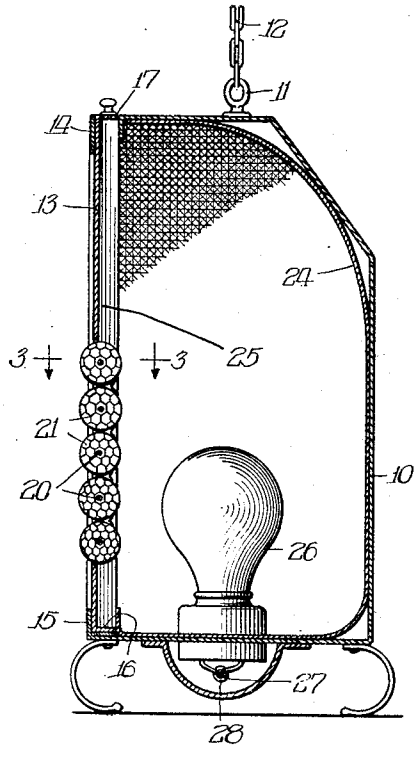



Fig. 3.

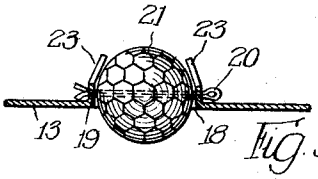



Fig. 4.

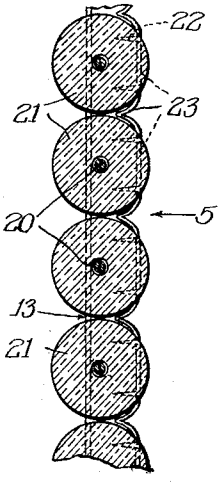
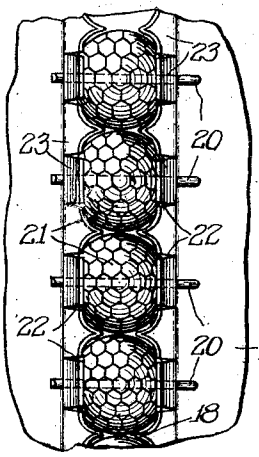



Fig. 5.




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# UNITED STATES PATENT OFFICE

EDWARD S. WOLD, OF CHICAGO, ILLINOIS

## LUMINOUS SIGN

Application filed November 24, 1930. Serial No. 497,643.

My invention relates to luminous signs and is concerned more particularly with signs of this character in which the figures or letters displayed are defined by transparent or translucent beads which are exposed to natural or artificial light rays.

One object of my invention is to devise a novel manner of disposing and sustaining in position the several beads which form the sign proper, the nature of the support permitting the detachment or replacement of selected beads without interfering with the remaining beads of the sign.

A further object is to provide for a series of reflectors in conjunction with the arrangement of beads, which shall create a pleasing and attractive effect through the capacity of the reflectors to be colored as desired.

A further object is to devise a sign having luminous properties arising from the use of beads which may have smooth or faceted surfaces and which are disposed to insure the unhindered reflection and transmission of light rays therethrough in all directions so that the sign is free from shadow effect and presents a clear and readable appearance when viewed from locations other than those in front.

A further object is the provision of a sign employing transparent or translucent beads in conjunction with a series of reflectors wherein the luminosity of the sign at night is provided by an artificial light source within the sign whose rays pass through the beads to give the same a glowing appearance by reason of the reflectors, and during the day, by external, natural light rays which pass through the beads and are directed outwardly of the sign through the beads again by the reflectors.

A further object is to devise a beaded, luminous sign in which the mounting of the beads permits their easy rotation by hand for the purpose of facilitating washing, cleaning, or a redisposition of the bead surfaces.

These and further objects of my invention will be set forth in the following specification, reference being had to the accompanying drawing, and the novel means by which said objects are effectuated will be definitely pointed out in the claims.

In the drawing:

Figure 1 is a perspective view showing one embodiment of my improved luminous sign.

Fig. 2 is a section along the line 2—2 in Fig. 1, looking in the direction of the arrow, and showing the internal construction of the sign.

Fig. 3 is an enlarged section along the line 3—3 in Fig. 2, looking in the direction of the arrows, and showing the individual support for each bead and the reflector structure therefor.

Fig. 4 is an enlarged view, corresponding to the pertinent portion of Fig. 2 and showing a further relation of the beads, their supports in the sign, and the reflectors therefor.

Fig. 5 is a partial view looking in the direction of the arrow 5 in Fig. 4 and showing the manner of closing the gaps between adjacent beads.

Fig. 6 is an elevation showing the portion of a sign plate which incorporates a character requiring the use of a plurality of beads which are graduated in size.

The numeral 10 represents a box which may have any desired shape, but which for the purpose of illustration will be considered as having the elongated conformation shown in Fig. 1. The upper side of said box may be provided with any desired number of eye bolts 11 for attachment to a suitable chain 12, whereby the box 10 may be suspended in any given location. It will be understood, however, that the box may be suspended or supported, dependent upon the particular environment in which placed.

The box 10 is closed on all sides except the front thereof, and the latter is normally closed by a sign plate 13 which is slidably received in suitable upper and lower guideways 14 and 15 provided on the box proper. In the particular construction indicated, the plate 13 is shaped with a channel section with the flange 16 thereof resting on the bottom of the box 10 and the flange 17 closing the gap which would otherwise exist between the

members of the upper guideways 14, as shown clearly in Fig. 2.

The sign plate 13 is provided with a plurality of openings 18 which are cut to create the desired conformation of the figures, letters, or characters in general, which the plate is designed to portray and the sides of the openings 18 are defined by flanges 19 which extend inwardly of the plate 13.

The flanges 19 are pierced to receive a plurality of cotter pins 20 which are bridged transversely across the openings 18 between said flanges and each of which pass through beads 21 which may be formed of glass, or some material which will transmit light rays. Each of the beads 21 is supported for free rotation on its particular cotter pin and all the beads in any particular opening 18 are so positioned as to just barely touch each other, but without disturbing the capacity of each bead to rotate freely on its support. The particular external appearance of each bead 21 forms no part of the present invention, so that it is contemplated that they may have smooth or faceted surfaces and that they may be characterized by either transparent or translucent characteristics. It is also considered to be within the scope of the present invention to use other supporting means than the cotter pins 20, provided such support extends transversely of the openings 18 and further provided that each bead 21 is individually supported.

As shown in Fig. 3, the cotter pins 20 are located relatively close to the junction of the flanges 19 and the major portion of the sign plate 13, with the flanges 19 extending inwardly from the plate 13 for some distance. Said flanges are provided with a plurality of spaced cuts 22 which define a plurality of tongues 23 and the tongues immediately adjacent each of the beads 21 are bent closely theretoward, as shown clearly in Fig. 3, for the purpose of providing individual reflectors for each bead. It is contemplated that the surfaces of the reflectors 23 will be of a nature to provide for the most efficient reflection of light rays which may be incident thereon. Those reflectors which are intermediate the beads 21 are bent over to substantially close the gap that would otherwise exist between adjacent beads by reason of their relative curvature and the reflectors which are so bent definitely prevent the escape of errant light rays between the beads which would otherwise detract from the effects which the sign is intended to create. It will also be observed, from an examination of Fig. 3, that the positioning of each bead 21 in the plate 13 is such as to provide that a predetermined portion of each bead extends forwardly of the plate 13, so that the sign presents clear and undistorted effects when viewed from locations other than those in front of the sign.

The interior sides of the box 10 may be provided with the customary reflecting surface 24 and the inside of the plate 13 may also be provided with a similar surface 25, it being contemplated that the relation of the reflecting surfaces 24 and 25 will be such that they conjunctively act to eventually direct light rays that may be incident thereon outwardly through the beads mounted on the plate 13. On the bottom of the box 10 may be mounted one or more light bulbs 26, dependent upon the size of the sign, and the wires 27 leading thereto may be enclosed within a duct 28 which is mounted externally of the end of the box 10.

In Fig. 6 is illustrated one embodiment of my improved sign which illustrates the advantages characteristic of my improved mode of supporting the beads 21 in the plate 13. The figure is intended to generically represent a figure or character having such a conformation that it is necessary to employ beads which are graduated in size. Specifically, the character selected is the letter "O," as represented by the numeral 29. The flanges which define this letter are not spaced uniformly from each other throughout the complete extent of the letter, so that, for example, in moving downwardly from the upper portion of the letter along either branch toward the bottom thereof, the initial spacing between the flanges is the minimum distance but this spacing gradually increases to a maximum at a point midway between the end of the letter and thereafter decreases in diameter to the minimum at the bottom thereof. By providing for an individual support for each bead and by arranging this support to extend transversely across the space between the flanges which define the letter, it is possible to easily, quickly and most efficiently position the graduated beads within the opening.

In employing my sign, illumination at night is provided by the bulbs 26, from which the light rays, either pass directly through the beads 21, or pass therethrough after a series of redirections of path of travel by the reflectors 24 and 25, with secondary reflections being provided by the reflectors 23 for such light rays as may be directly incident thereon from the primary light source 26, or for such light rays as may be reflected outwardly of the beads 21 by the facets thereon and which, of course, are thereafter reflected back through the indicated beads by the reflectors 23. During the day, the sign also exhibits a luminous character by reason of the external light rays which pass through the beads 21 and become incident upon the reflectors 23, being thereafter redirected back through said beads in order to provide the glowing or luminous condition desired. Many attractive effects can be secured with my improved design

merely by appropriately coloring the reflectors 23, the coloring so selected thereby establishing the colored nature of the sign.

Whether subjected to natural or artificial light rays, the beads 21 provide an effective means of catching and reflecting, as well as scattering and diffusing the transmitted rays, so that the ultimate effect provided by the sign is both striking and brilliant. Owing to the shape of the beads and the fact that they project externally of the sign plate 13, unhindered transmission of the light rays is provided in every direction, so that the sign is substantially free from distorted effects, even when viewed from directions other than those immediately to the front of the sign. The substantially scintillating effect produced by the plurality of facets on the several beads 21 provides my improved sign not only with value as an ordinary sign letter, but also lends itself more particularly to the production of brilliant and striking effects with "flashes," changing color devices and other known lighting contrivances, such as the production of the appearance effect of running water, flames and the like.

The individual mounting of the beads 21 provides for their easy replacement in the event that they become broken, or discolored to an extent such as would otherwise detract from their value as light transmitting agencies, while their easy rolling capacity on their individual supports enables them to be cleaned easily on all sides thereof. Owing to the box 10 being enclosed, so that substantially the only outlet for heat therefrom exists through the beads 21 themselves, it has been found that the sign possesses certain display advantages when located on the inner side of a store window or the like, when the latter is subjected to a frosting condition by reason of the external weather conditions. The heat emitted through the beads 21, being directly incident on the glass of a store window, maintains the latter at such a temperature as to completely free the same from such accumulation of snow and ice as may have gathered thereon.

While I have shown one set of elements and combinations therof for effectuating my improved luminous sign, it will be understood that the same is intended for the purpose of illustration only and in no wise to restrict my device to the particular forms and structures shown, for many changes may be made therein without departing from the spirit of my invention.

I claim:

1. A sign comprising a plate provided with an opening conforming to the letter or character to be displayed, light transmitting beads positioned in said opening, the thickness of each bead conforming substantially to the width of said opening, and individual cotter pins passing through each bead and bridged transversely across said opening for supporting said beads in position.

2. A sign comprising a plate provided with an opening conforming to the letter or character to be displayed, flanges defining the opposite sides of said opening, light transmitting beads positioned in said opening, the thickness of each bead conforming substantially to the width of said opening, and individual cotter pins passing through each bead and transversely of the opening for supporting said beads in position.

3. A sign comprising a plate provided with an opening conforming to the letter or character to be displayed, light transmitting beads positioned in said opening, the thickness of each bead conforming substantially to the width of said opening, means for supporting each bead extending therethrough and transversely across said opening, and individual reflectors located on the rear side of and in close proximity to said beads to reflect outwardly through the beads those light rays which are incident on the beads externally of the sign.

4. A sign comprising a plate provided with an opening conforming to the letter or character to be displayed, flanges defining the opposite sides of said opening, light transmitting beads positioned in said opening, and means for supporting said beads extending therethrough and transversely across said opening between said flanges, said flanges being cut to provide tongue reflectors on the rear side of said beads.

5. A sign comprising a plate provided with an opening conforming to the letter or character to be displayed, flanges defining the opposite sides of said opening, light transmitting beads positioned in said opening, the thickness of each bead conforming substantially to the width of said opening, and means for supporting each bead extending therethrough and transversely across said opening between said flanges, said flanges being cut to provide individual tongue reflectors on the rear side of each bead.

6. A sign comprising a plate provided with an opening conforming to the letter or character to be displayed, flanges defining the opposite sides of said opening, light transmitting beads positioned in said opening, the thickness of each bead conforming substantially to the width of said opening, and means for supporting each bead extending therethrough and transversely across said opening between said flanges, said flanges being cut to provide individual tongue reflectors on the rear side of each bead, and the flanges between said reflectors fitting closely the adjacent portions of said beads.

7. A sign comprising a plate provided with an opening conforming to the letter or char-

acter to be displayed, light transmitting, spherical beads positioned in said opening, the diameter of each bead conforming substantially to the width of said opening, and individual means for supporting each bead extending therethrough and transversely across said opening, said plate fitting closely the sector-like openings between adjacent beads.

8. A sign comprising a plate provided with an opening conforming to the letter or character to be displayed, light transmitting beads positioned in said opening, means for supporting said beads, and tongue reflectors formed along said opening on the rear sides of said beads.

9. A sign comprising a plate provided with an opening conforming to the letter or character to be displayed, light transmitting beads positioned in said opening, the thickness of each bead conforming substantially to the width of said opening, means for supporting said beads, and tongue reflectors formed along said opening on the rear side of each bead.

10. A sign comprising a plate provided with an opening conforming to the letter or character to be displayed, light transmitting beads positioned in said opening, the thickness of each bead conforming substantially to the width of said opening, means for supporting said beads, and a plurality of flanges formed along said opening, certain of said flanges being bent to provide individual tongue reflectors on the rear side of each bead and the other flanges fitting closely the adjacent portions of said beads between said reflectors.

In testimony whereof, I have subscribed my name.

EDWARD S. WOLD.