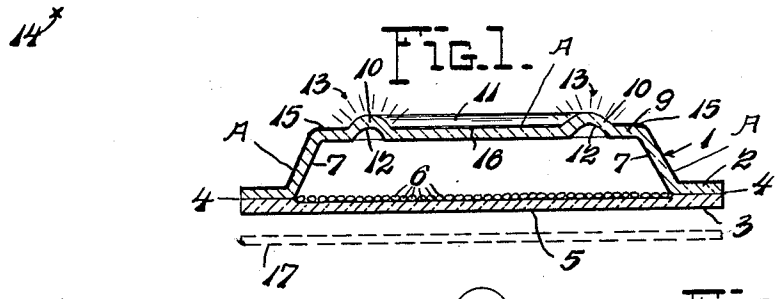
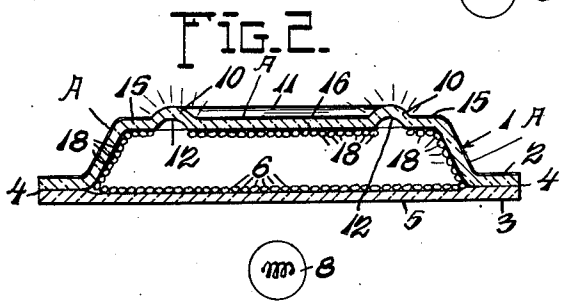
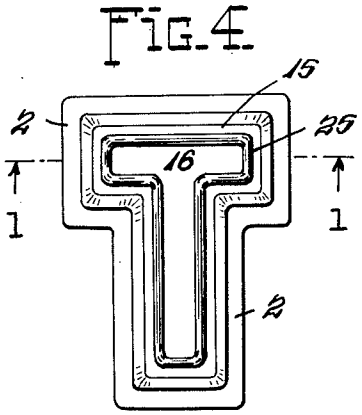
Sept. 1, 1931. J. W. KELLY ET AL 1,820,913

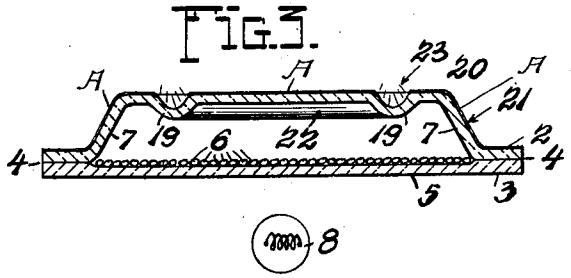
ILLUMINATED SIGN

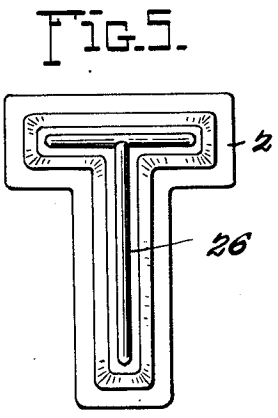
Filed March 6, 1930

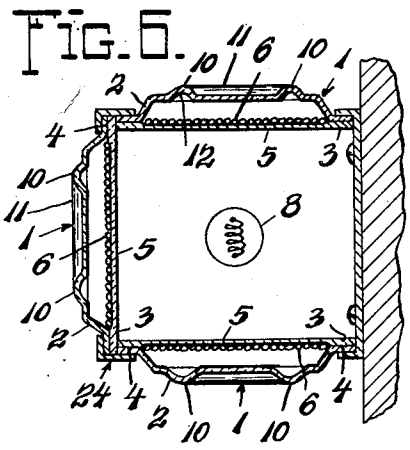












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Patented Sept. 1, 1931 1,820,913

UNITED STATES PATENT OFFICE

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ILLUMINATED SIGN

Application filed March 6, 1930. Serial No. 433,789.

This invention has to do with signs depending for their illumination primarily on artificial light, and it is one of the principal objects of this invention to provide a sign simulating that type of sign now quite extensively in use and constantly replacing other types, and known generally as neon signs.

Among the advantages of the neon type of sign are the high luminosity of the light produced thereby and the uniformity of illumination throughout the indicia constituting the sign. However, the neon type of sign is difficult of manufacture, all indicia being required to be made by hand. This work results in a great expense. Another disadvantage is that, ofttimes, there occurs a non-uniformity of gas throughout a given continuous tube of the sign, with the result that the light flickers, thus detracting from the satisfactory appearance of the sign. A still further objection to this type of light lies in the fact that portions of the sign are made up of individual tubes, each operating independently of the others. Where one or more of the individual tubes fails to function, and this is not an uncommon occurrence, the effect of the whole sign is entirely lost, portions of it being visible and others entirely invisible.

To incorporate the advantages of the neon type of sign and yet do away with the above mentioned and other disadvantageous features of the neon type of sign, we have provided novel instrumentalities, the manufacture of which may take place in much less time and at a greatly reduced expense as compared to the neon sign. In carrying our invention into practice, we provide a sign comprising an indicia carrying member. This member is preferably in the form of a substantially hollow member, trapezoidal in cross section, and consists wholly or in part of glass or other transparent or translucent material. The portions of the sign constituting the indicia are in the form of lenticular ribs protruding either inwardly or outwardly from a portion of the face side of the hollow member and certain portions of the interior wall of the member adjacent to the indicia are provided with reflecting means. The portion of the wall opposite the indicia is preferably translucent and is provided with means for diffusing light coming from a source outside the hollow member and striking said portion of the wall. Thus said light is diffused by said wall portion and strikes said reflecting means, whereupon it is reflected back onto said wall portion, the diffusing means serving also as reflecting means in so far as light incident thereto is concerned. In the form of our invention wherein the ribs project outwardly of the hollow member, it will be apparent that, by diffusing and reflecting the light in all directions within the hollow member, said light is caused to strike all parts of the indicia with substantially uniform intensity, and the indicia is thereby rendered visible from all points forwardly and laterally of the indicia. With the type of sign wherein the indicia projects inwardly of the hollow member, it will be apparent that a sharp line of light will be visible instead of a spread-out light as in the case of the outwardly protruding ribs above described. The ribs may be solid or hollow.

For purposes of illumination we employ any type of lamp, preferably the incandescent type, and may, if so desired, employ additional light spreading and diffusing means intermediate the hollow sign member and the source of light. In this connection, we note that the sign may be in the form of a box-like member with the light source substantially centrally disposed therein so that the same light source may be employed to illuminate indicia constituting part of the various walls of the box-like structure. Means may be employed for imparting a predetermined color to the light passing through the indicia as desired. Thus the colors employed quite extensively in the neon type of sign are pink or blue, or shades similar to these, the intensities of which shades are of such a degree as to have unusual luminous qualities. The color imparting means may take the form of a plate interposed between the hollow sign member and the light source or the indicia themselves may be so colored, or the diffusing plate may provide this feature. Any other suitable device may be employed for this purpose, however.

While in the preferred form of our invention we choose to make the indicia integral with the hollow member, we consider it well within the province of our invention to make the indicia separate and associate it with the light diffusing instrumentalities in any suitable manner. The portions of the sign immediately adjacent the indicia forming ribs are preferably opaque so that the light issuing from the ribs will be clear cut.

While various instrumentalities may be employed for the purpose of diffusing the light as set forth above, we preferably employ a layer of light refracting and diffusing members, conveniently glass beads, although any similarly acting members are to be regarded equivalent to the beads. These members or beads may be applied to the desired glass surface in such manner that they retain their quality of individuality and their physical shape of substantial spheres, while being firmly secured to the surface.

For a full and more complete understanding of our invention, reference may be had to the following description and accompanying drawings, in which—

Figure 1 is a cross sectional view illustrating our novel sign member and the lighting source associated therewith, and taken in the plane indicated by the line 1—1 in Figure 4.

Figure 2 shows a modification of the construction of Figure 1.

Figure 3 shows a further modification.

Figure 4 shows a top plan view of the sign structure illustrated in Figures 1 and 2.

Figure 5 is a view similar to Figure 1 showing a different form showing a single line indicia instead of the outline as shown in Figure 4.

Figure 6 is a transverse sectional view illustrating a sign structure employing a plurality of signs illuminated by the same light source.

The sign member constituting our invention is designated generally at 1 and comprises a hollow member which may be conveniently trapezoidal in cross section. The member may be integral throughout, or may be formed in two parts 2 and 3 securely welded or otherwise held together as shown at 4. The sign member is preferably of transparent glass. The base 5 of the member, constituting the rear wall thereof, is preferably lined with a layer or the like of diffusing and reflecting means in the form of glass beads 6 which may be secured to the inner surface of the base 5 in any suitable way. We preferably apply the beads to the glass 5 while the latter is in a partially molten condition, but sufficiently cool to cause said beads to adhere to the same without melting the beads. Thus the beads while firmly secured to the plate or base 5 nevertheless retain their quality of individuality and their physical shape of substantial spheres. The sides of the hollow member have interior reflective surfaces 7. A source of light, preferably an incandescent lamp 8, is disposed outside the member 1 and opposite the base 5. Light emanating from the lamp 8 and striking the base 5 is diffused in all directions by the layer of beads 6 and certain rays strike the reflective surfaces 7. By reason of the inclination of the surfaces 7 to the base 5, due to the trapezoidal shape of the hollow member 1, the light, incident to the surfaces 7 is reflected for the most part back to the beads 6, by which the said light is further reflected. The top 9 of the member has portions thereof in the form of ribs 10, which ribs constitute the desired indicia. The said ribs project outwardly, as illustrated in Figures 1, 2, 4, 5 and 6, and may be hollow, as illustrated, or solid. The outer surface 11 of the rib 10 is substantially semi-cylindrical with the result that light incident to the interior surface 12 of the rib 10 is spread out as shown at 13 and consequently presents a substantial line of light even to an observer at a substantial distance laterally of the sign, as for example from the point 14. The width of the line visible to a person occupying a position indicated by way of example at 14 in Figure 1, is somewhat greater than the maximum normal distance which the surface 11 projects outwardly beyond the face 9 of the member. The marginal portions 15 and portions 16 of the wall within said margins are preferably opaque, as shown at A, to render the lighted indicia more sharply defined. Moreover, if desired, the outer surfaces of the portions 15 and 16 may be covered with a material of white or other color.

While it is our thought primarily to avail ourselves of the layer of beads 6 for the purpose of diffusing the light from the source 8 substantially uniformly, we nevertheless consider it within the province of our invention to employ other or further diffusing means indicated diagrammatically at 17 in Figure 1. This means may take the form of a substantially transparent plate having light spreading ribs or the like prismatic surface, as set forth in detail in a copending application Serial No. 395,339, filed September 26th, 1929. Moreover, while the base 5 may be of the desired color, such as pink or blue which are now in general use in the neon type of sign, for the purpose of coloring the light passing through the ribs 10, we may employ, instead, a separate coloring plate or other means for this purpose. In addition, the reflective surfaces 7 may employ silver or the like, or many employ beads 18 for this purpose as illustrated in the modification shown in Figure 2, and if so desired, the entire wall of the member 1 may be lined with a layer of beads, the indicia-forming ribs being excepted. Any other suitable means may also be employed for this purpose, but it should

be borne in mind that, as set forth above, the portions 15 and 16 of the face of the member 1 should be opaque in any event.

The form of rib 19 projecting from the face 20 inwardly of the member 21 may take substantially the same geometrical form as the rib 10 in the remaining figures, and it will be apparent that, by reason of this particular form, the light striking the incident surface 22 of the rib 19 will be condensed as illustrated at 23 and will be sharply defined.

It will be clearly seen from the drawings that the beads 6 are uniformly dispersed over the walls to which they are secured, and that they are in contiguous relationship with each other. It will also be seen that the beads have substantially spherical surfaces, and being transparent, they permit light to pass through them without loss through internal absorption, and cause the rays of light to be condensed and focused due to the spherical contour of the beads. In other words, each bead acts as a spherical lens, each bead collecting and concentrating the rays from the light source 8 to give a plurality of smaller concentrated light units, which, because of their individual focal characteristics, emit light rays that diffuse in all directions, this diffusion being uniform and being effected beyond the focal point of each individual bead. The light being thus dispersed beyond the focal length of the beads results in a uniform illumination of the indicia with an intensity substantially as great as the intensity of the light emitted from the source 8. This is obvious because of the transparency of the walls upon which the beads are secured and of the beads themselves, and because of the fact that the diffusion is produced by the scattering of the light rays beyond the focal point of each bead without the intervention of any additional agent for the accomplishment of this purpose. This action of the beads produces an increase in the intensity of the light and a magnification of the apparent size of the indicia, due to the lens effect of the beads.

The beads 6 being employed in relatively minute sizes, results in the provision of a multitude of the beads over the walls to which they are secured, so that the rays of light from the source 8 will be condensed by each bead to form a multitude of light points from which the above described dispersion occurs.

Further, because of the contour of the indicia, that is, the concavo-convex form thereof, as clearly shown in Figs. 1, 2, 4, 5, and 6, which show the preferred form of the indicia members, the indicia themselves act as magnifying lenses which effect results in a very markedly increased visibility of the sign. Each of these indicia, because of the curved or tubular form thereof, produces a spreading and enlarging of the light, which because of the transparency of the indicia is transmitted therethrough without loss; and as clearly illustrated in the drawings, the light transmitted through the indicia will be emitted therefrom in all directions radially of the curvature of the indicia. It will be understood that in the preferred form of the device, the indicia are formed with the concave face thereof facing the light source.

In Figure 6 is illustrated a sign comprising a substantially box-like structure indicated generally at 24, all or several of the walls of which may consist of individual sign members which may be of the type illustrated in Figures 1, 2, 4 and 5, as shown, or if so desired, of the type illustrated in Figure 3. In either case, the source of light 8 may be substantially centrally disposed within the box-like structure 24 and by reason of the diffusing instrumentalities employed in each of the sign members, the light passing through the indicia will be substantially uniform throughout and will in every case so closely simulate the light given out by the neon type of sign that the difference will not be apparent to an observer even at very close range.

As set forth previously, the neon or the like type of sign cannot employ an endless tube, since the ends of the tube contain separate electrodes connected to the source of energy. The indicia in our novel construction, being entirely independent of the source of light energy, may be made continuous either in outline form, as illustrated in Figure 4 at 25, or in single line form, as illustrated at 26 in Figure 5. Thus not only does our sign present indicia without a single break in continuity, but the appearance even at very close range is exceptionally smooth and pleasing. In this connection, it may be noted that in certain signs the indicia embody separated portions. Accordingly, if desired, the indicia forming a part of our invention may have portions spaced in any form or manner desired.

While we have set forth our invention as providing a beaded diffusing and reflecting surface, we desire it understood that other types of roughened surfaces may be employed for accomplishing the intended result. In addition, the beaded or otherwise roughened surface may be located on the outside rather than the inside of the wall above referred to.

We do not wish to be limited to the employment of a single lamp for purposes of illumination since any arrangement of lamps and cooperating reflecting means may be availed of so long as the desired effect is obtained. In this connection, we may employ one or more line sources of light as produced for example by lamps having elongated filaments, in combination with a ribbed or the like plate, as set forth in the copending application above identified, since this arrangement makes for a more uniform spreading

of the light without a serious loss in light intensity.

In view of the instrumentalities employed as set forth above for the diffusing of the light, the lamps employed may include clear glass instead of diffusing glass without adversely affecting the ultimate distribution of light. By the use of clear glass in the lamps, a greater intensity of light will pass through the sign than would be the case in the employment of a non-clear glass in the lamp.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent of the United States, is—

1. A sign apparatus comprising the combination with a light source, of a hollow member comprising an indicia carrying member and a light intensifying and dispersing member positioned between the light source and the indicia carrying member, the light source being located at one side of the hollow member, the light intensifying and dispersing member comprising a transparent surface which is provided with a plurality of transparent substantially spherical members uniformly distributed thereover in contiguous relationship.

2. A sign apparatus comprising the combination with a light source, of a body member comprising an indicia carrying face and a light intensifying and dispersing member adapted to transmit light from the light source to the indicia carrying face, and means for reflecting a portion of the transmitted light back to the light intensifying and dispersing member, this member comprising a transparent member which is provided with a plurality of transparent beads uniformly distributed thereover in contiguous relationship, the beads acting as lenses to focus rays of light passing therethrough to a focal point and uniformly dispersing the light beyond the focal point.

3. A sign apparatus comprising the combination with a light source, of a hollow member comprising an indicia carrying member, a light refracting and diffusing member positioned between the light source and the indicia carrying member and transparent indicia carried by the indicia carrying member adapted to be illuminated with uniform intensity by light passing from the source through the light refracting and diffusing member, which member comprises a transparent plate having a layer of transparent light intensifying and dispersing members secured thereto in contiguous relationship.

4. A sign apparatus comprising the combination with a light source, of a hollow member comprising an indicia carrying member and a light refracting and diffusing member positioned between the light source and the indicia carrying member, the light refracting and diffusing member comprising a transparent plate having a beaded surface, the beads of the surface being substantially spherical in curvature and serving as light intensifying and dispersing means, the beads being uniformly distributed over one side of the transparent plate and in contiguous relationship with each other, the light source being located at one side of the hollow member.

5. A sign apparatus comprising the combination with a light source, of a hollow member comprising a light refracting and diffusing member, and a concave indicia carrying member secured thereto, transparent sign indicia carried by the outside of the said concave member, and a light reflecting surface over the interior of the said concave member except portions thereof covered by the indicia, the said light refracting and diffusing member being adapted to uniformly transmit light from the said light source to the said indicia for the illumination thereof, the said light source being located at one side of the hollow member.

6. A sign apparatus comprising a hollow member comprising an indicia carrying member and a light intensifying and dispersing member united thereto, the internal walls of the hollow member being light reflecting and diffusing, and comprising a plurality of spherical transparent beads uniformly distributed over the walls and in contiguous relation with each other, the beads serving as lenses to focus and uniformly distribute rays of light passing therethrough.

7. A sign apparatus comprising the combination with a light source, of a hollow member comprising an indicia carrying member and a light intensifying and dispersing member united thereto and comprising a plurality of transparent spherical beads uniformly distributed thereover in contiguous relationship, the internal walls of the hollow member being beaded and the light source being located at one side of the hollow member.

8. In an illuminated display of the class described, a sign comprising a tubular member, a wall of which is provided with transparent integral indicia, the indicia being concavo-convex in form, the convex surface forming the face of the indicia, light reflecting means disposed interiorly of the tubular member and adjacent each side of the indicia, and light intensifying and dispersing means also interiorly disposed within the tubular member and attached to a rear wall of the said member, the light intensifying and dispersing means being oppositely disposed to the indicia and comprising a plurality of beads uniformly disposed over the rear wall of the tubular member, the beads being in contiguous relationship with each other, the rear wall and beads being of transparent material to transmit light to the indicia from a source exteriorly of the tubular member, the

light reflecting means cooperating with the beads to produce an intense illumination of the indicia uniformly over its entire visible area.

9. A sign apparatus comprising the combination with a light source, of an indicia carrying member and a light refracting and diffusing member so arranged with respect to the said indicia carrying member that light passing from the said light source through the said refracting and diffusing member falls upon the indicia carrying member to render the same visible to an observer by means of transmitted light, indicia upon the said indicia carrying member, certain of the walls of the member being disposed at angles to the light refracting member and having light reflecting surfaces related thereto.

10. A sign apparatus comprising the combination with a light source of an indicia carrying member, a light intensifying and dispersing member comprising a uniformly beaded surface adapted to transmit light from the light source to the indicia carrying member, the dispersing member being transparent and transmitting light therethrough without appreciable loss in intensity thereof, and means for reflecting at least a portion of the transmitted light back to the intensifying and dispersing member, this member being positioned between the light source and the indicia carrying member.

11. A sign apparatus comprising the combination with a light source, of an indicia carrying member, a light intensifying and dispersing member comprising a transparent wall having a transparent uniformly beaded surface, the beads of which are in contiguous relationship and having substantially spherical surfaces, the light intensifying and dispersing member being adapted to transmit light from the light source to the indicia carrying member, the indicia carrying member having its surface opposed to the light intensifying and dispersing member beaded.

12. A sign apparatus comprising the combination with a light source, of a hollow member comprising an indicia carrying member, a light intensifying and dispersing member comprising a transparent wall having a uniformly beaded transparent glass surface, the beads of which are spherical and in contiguous relationship with each other, the internal walls of the member being light reflecting.

13. A sign apparatus comprising the combination with a light source, of an indicia carrying member, and a light intensifying and dispersing member comprising a transparent glass wall with a layer of transparent spherical glass beads uniformly embedded therein, in contiguous relationship, the light intensifying and dispersing member being so arranged with respect to the indicia carrying member that light passing from the light source through the intensifying and dispersing member falls upon the indicia carrying member to render visible by transmitted light indicia upon the indicia carrying member, the opposed surfaces of the respective members being beaded, each indicia on the indicia carrying member being transparent and constituting a magnifying lens to increase the visibility thereof when illuminated.

14. A sign apparatus comprising the combination with a light source, of a hollow member comprising an indicia carrying member, a light intensifying and dispersing member united thereto, this member comprising a transparent wall having a plurality of transparent spherical beads uniformly distributed thereover in contiguous relationship with each other to intensify and disperse rays of light passing through them, the internal walls of the member being light reflecting, the indicia of the indicia carrying member consisting in a lenticular projection utilizing the form of the indicia character.

15. A sign apparatus comprising the combination with a light source, of a body member comprising an indicia carrying face having transparent indicia members thereon, and a transparent member adapted to transmit light from the light source to the indicia carrying face, the transparent member being provided with a beaded surface, the beads of which are uniformly dispersed over the member in contiguous relationship, each bead forming a spherical lens for focusing rays of light passing therethrough to a point intermediate the bead and the indicia carrying member, and then uniformly spreading the light beyond the focal point of the beads to illuminate the indicia carrying member with substantially uniform intensity, the intensity of the illumination being substantially the intensity of illumination of the light source, the said indicia forming lenses for spreading and enlarging the light transmitted therethrough to increase visibility thereof when illuminated from the light source.

16. A sign comprising a wall, transparent protuberant indicia members upon the wall, a source of light, and means positioned between the wall and source of light for uniformly illuminating the indicia, the said means comprising a transparent light transmitting surface and a plurality of transparent light transmitting beads distributed over the surface in contiguous relationship between themselves, the beads serving through cooperative action to condense, focus, and then diffuse all rays of light striking the transparent light transmitting surface and passing through the surface and beads, to illuminate the indicia member with uniform intensity over the entire surface thereof, the intensity of illumination being substantially that of the light source.

17. A sign comprising a tubular member having front and rear walls, concavo-convex

indicia on the front wall, the rear wall being formed of transparent material, a source of light positioned exteriorly of the tubular member, the light transmitting wall being between the source of light and the indicia member, the said tubular member being provided on at least one of its walls with a plurality of transparent spherical beads distributed thereover in contiguous relationship to focus the rays of light passing therethrough at points between the beads and the indicia, and thence to spread the light uniformly over the indicia to illuminate the indicia with a uniform intensity corresponding to that of the light source, the concavo-convex indicia forming enlarging lenses to increase visibility thereof when illuminated and to enlarge the apparent size thereof.

In testimony whereof we affix our signatures.

JOHN W. KELLY.
DANIEL J. KELLY.