United States Patent

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[33] **Japan**
[31] **58015/1968**

[54] **PORTABLE TRAFFIC SIGN**
3 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **350/98,** 350/105
[51] **Int. Cl.** **G02b 5/12**
[50] **Field of Search** 350/98, 19, 300, 305, 306, 72, 74, 75, 289, 298, 308, 309, 105, 106

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ABSTRACT: A portable traffic sign comprising a frame having a handle and a reflex reflecting plate which may be fixedly or more advantageously rotatably secured to the frame. For example, the portable traffic sign carried by a pedestrian crossing a street at night can give a positive warning to a driver.

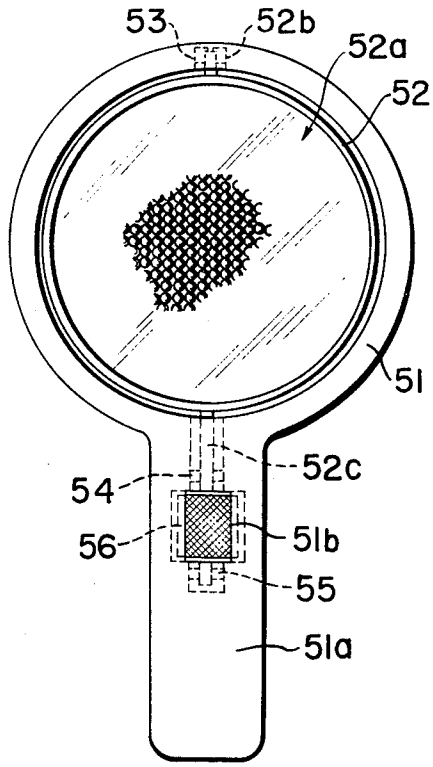


FIG. 1

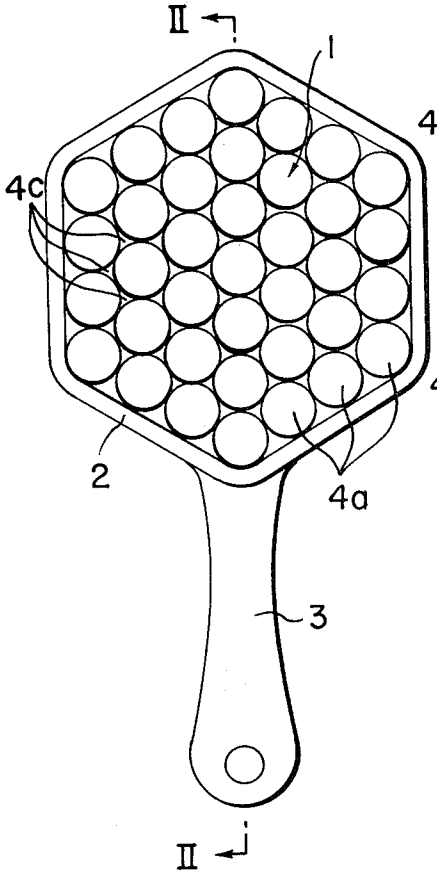


FIG. 2

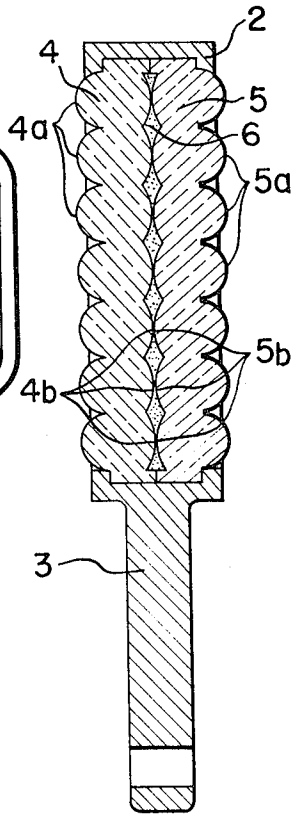


FIG. 5

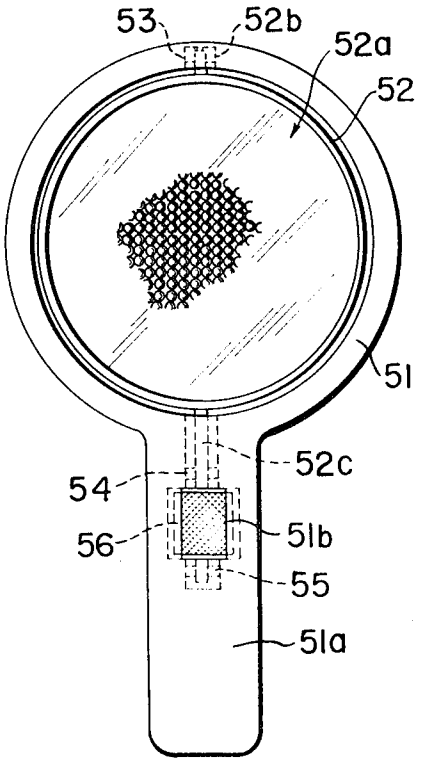


FIG. 3

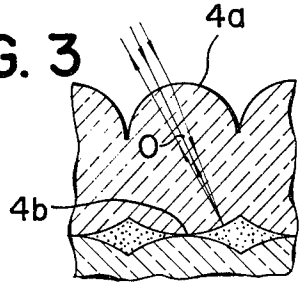


FIG. 6

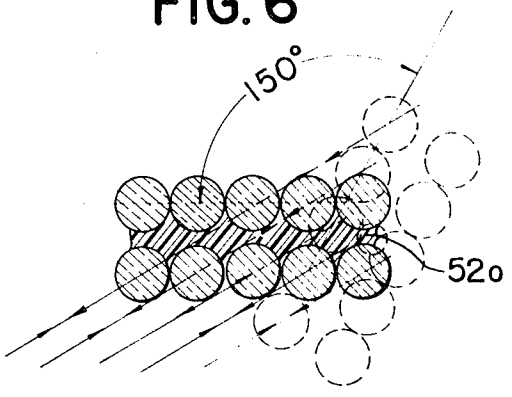
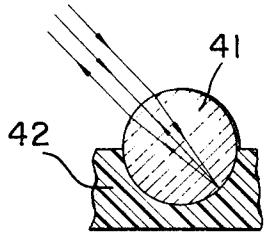


FIG. 4



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PORTABLE TRAFFIC SIGN

BACKGROUND OF THE INVENTION

The present invention relates to a portable traffic sign and more particularly a portable traffic sign utilizing a reflex reflecting plate or plates.

When a pedestrian crossing a street wants to give a warning to a driver, the pedestrian generally raises his hand or carries a warning flag. However, the drivers find it difficult to recognize these signs indicated by the pedestrians at night and especially at the streets insufficiently illuminated so that the accidents tend to occur. To eliminate this problem, there has been proposed a portable traffic sign having rotating reflecting mirrors attached to both of the surfaces thereof for reflecting the light beams from the head lights of an automobile, thereby giving a warning to the driver when a pedestrian crosses a street. However, it is not ensured that the reflecting mirrors can reflect the light beams from the head lights always to the drivers and even when a convex reflecting mirror is used, the reflected light rays are not directed toward the drivers in some cases and the intensity of light reflected by the convex reflecting mirror is low as the reflected light rays diverge.

In view of the above, the primary object of the present invention is to provide an improved portable traffic sign which can positively reflect the light beams from the head lights of automobiles to the drivers irrespective of the direction of the reflecting plate.

SUMMARY OF THE INVENTION

In brief, the present invention provides a novel portable traffic sign comprising a reflex reflecting plate attached to a frame having the configuration adapted to be easily carried or handled by hand.

The above reflex reflecting plate may be a transparent plastic or glass so molded as to have an incident surface consisting of a large number of spherical surfaces having a relative small diameter or radius of curvature and a reflecting surface consisting of a large number of spherical surfaces having a diameter or radius of curvature larger than that of said spherical incident surface and being in concentric and opposed relation therewith.

The reflex reflecting plate may be a large number of transparent small glass beads bonded to an adhesive layer applied to a supporting body such as cloth or the like.

According to the present invention, the reflex reflecting plates of the character described above are bonded with each other in back-to-back relation and this assembly is held in the frame.

According to one embodiment of the present invention, the above reflex reflecting plate assembly is fixedly secured to the frame while according to another embodiment, rotatably secured to the frame. The reflex reflecting plate of the character described above can reflect almost all of the light rays incident thereupon at various angle of incidence in the direction of their light source so that when the portable traffic sign of the present invention that is carried by a pedestrian crossing a street is directed at a right angle relative to the direction of the street, he can give a positive warning to a driver. When the reflex reflecting plate is rotatably fixed to the frame, the reflected light becomes alternately intense and weak as a pedestrian rotates the reflex reflecting plate so that a more positive and effective warning may be given to a driver.

The above and other objects, features and advantages of the present invention will become more apparent from the following description of illustrative embodiments thereof with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view of one embodiment of a portable traffic sign according to the present invention;

FIG. 2 is a section view thereof taken along the line II–II of FIG. 1;

FIGS. 3 and 4 are for explanation of the principle of a reflex reflecting plate used in the present invention;

FIG. 5 is a front view of another embodiment of the present invention; and

FIG. 6 is an explanatory view of a reflecting device thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, a portable traffic sign of the present invention comprises a reflex reflecting plate generally indicated by 1 and fixedly secured to a frame 2 and a handle 3 extending therefrom. As best shown in FIG. 2, the reflex reflecting plate 1 consists of two transparent members 4 and 5 each having an incident surface consisting of spherical surfaces 4*a* or 5*a* having a smaller diameter and a reflecting surface consisting of spherical surfaces 4*b* or 5*b* having a diameter larger than that of the spherical surface 4*a* or 5*a* and being concentric therewith, that is having the common center with the opposing spherical surface. These transparent members 4 and 5 may be bonded together by an adhesive agent 6 in back-to-back relation. As the term implies, the spherical surfaces 4*b* and 5*b* are adapted to reflect the light beams incident upon the spherical surfaces 4*a* and 5*a* passing through the members 4 and 5 while the aspherical portions 4*c* in FIG. 1 of the transparent members 4 and 5 are so treated as to absorb the light incident thereto.

The unique function of the reflex reflecting plate 1 will be described with reference to FIG. 3 illustrating one reflecting element consisting of one pair of opposed spherical surfaces 4*a* and 4*b*. When the parallel light beams are incident upon the spherical surface 4*a* at an angle relative to the vertical axis of this reflecting element, the light beam passing through the common center 0 is incident at a right angle to the spherical surface 4*b* and reflected at right angle so that this light beam passes through the center 0 again and emerges from the spherical surface 4*a* in the same direction with that of the incident ray. The optical path of this light beam or ray will be referred to as "optical axis" of the parallel beams described above. The light beams parallel with the optical axis but spaced apart therefrom by a small distance is incident upon the spherical surface 4*a*, refracted and reflected by the spherical surface 4 at the intersection of the optical axis with the spherical surface 4*b*. The reflected light beam is refracted again at the spherical surface 4*a* and emerges therefrom along an optical path which is symmetrical to the optical path of the incident light beam with respect to the optical axis. Thus, it will be noted that the reflex reflecting plate 1 has the unique feature of reflecting the light beams substantially to the source of these light beams. For example, when the light beams from the head lights of an automobile or the like are incident upon the plate 1, the light beams are reflected to the automobile so that the driver can perceive these reflected light beams, that is the plate 1.

FIG. 4 illustrates a modification of a reflecting element of the reflex reflecting plate 1. The reflecting element is a glass bead 41 which is bonded securely to the adhesive agent layer 42 applied to a supporting member such as cloth or the like. The surface of the adhesive agent layer 42 is adapted to absorb all the light rays except those incident upon the glass beads 41 and the interface between the glass bead 41 and the layer 42 is adapted to reflect the light incident upon the glass bead 41 and passing therethrough. Such glass bead has the reflex reflectivity as described with reference to FIG. 3 so that the reflex reflecting plate 1 may be constituted by the supporting member having a large number of glass beads 41 arrayed thereupon instead of the transparent members 4 and 5.

FIG. 5 illustrates a rotating reflecting plate. A reflex reflecting device 52 whose both surfaces are reflex reflecting surfaces 52*a* is rotatably secured to a frame 51 through pins 52*b* and 52*c* extending from the device 52 coaxially of a handle 51*a* extending from the frame 51. Reference numeral 53 designates a bearing for holding the pin 52*b* while 54 and 55, bearings for holding the pin 52*c*. A knurled operating ring 56 is fitted over the pin 52*c* and is partially exposed out of an

opening **51***b* formed through the handle **51***a*. By rotating the ring **51***b* by a finger, the reflex reflecting device **52** may be rotated.

The reflex reflecting plate **52** consists of a large number of glass beads bonded to an adhesive layer applied to the surface of a plate-shaped supporting member. As described hereinabove, the surface of the adhesive agent layer is adapted to absorb all of the light rays incident thereupon except those incident upon the glass beads, and the interface between the glass beads and the adhesive agent layer is adapted to reflect the light rays passing through the glass bead and incident upon the interface. Thus, it will be noted that the reflex reflecting device **52** has a function of reflecting the incident rays to the direction of the source of these rays. When the glass beads are arrayed in rows and columns as shown in FIG. **5**, the light rays incident upon the device at the maximum incident angle of 75° may be reflected to the direction of the source of these light rays. That is, as shown in FIG. **6**, even when the reflex reflecting device **52** is rotated about the center 52_0 through an angle of 150° relative to the same parallel rays, they may be reflected to the direction of their source. The reflex reflecting device **52** must be rotated further through an angle of 60° before the other reflecting surface can reflect the light rays. That is this 60° is a dead angle, but since the reflex reflecting device **52** may be continuously rotated by the operating ring **56**, the light rays may be reflected in the direction of their light source almost continuously. Instead of the operating ring **56**, an electric motor or the like may be used so as to automatically rotate the reflex reflecting device **52**.

I claim:

1. A portable traffic sign comprising:

a handle;

a frame fixed to and extending from said handle;

a reflecting plate mounted to rotate within said frame on an axis parallel with and longitudinally bisecting said handle;

said plate formed on one side by a first plurality of reflecting elements mounted therein in side-by-side relation;

said plate formed on the other side by a second plurality of reflecting elements mounted therein in side-by-side relation;

each reflecting element of said first plurality and said second plurality of reflecting elements having an outer spherical surface adapted to allow a light beam to pass in an entrance path therethrough and having an inner spherical surface adapted to reflect said light beam in a return path common to the entrance path; and

said first plurality and said second plurality of reflecting elements having their inner spherical surfaces respectively bonded to each other said handle formed with an opening therein, a pair of pivot mountings being oppositely located on said axis in said frame to provide the rotation of said plate, one of said pivot mountings including a pin extending into said handle and having a part extending through said opening, said part having a ring mounted thereon for actuating rotation to rotate said plate.

2. A portable traffic sign according to claim **1**, in which the radius of curvature of each said inner spherical surface is greater than the radius of curvature of each said outer spherical surface in each reflecting element.

3. A portable traffic sign according to claim **1**, in which spacing is provided between adjacent reflecting units, and said spacing is formed to absorb light beams incident thereon.