United States Patent

[11] 3,618,014

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[54] **VARIABLE INDICATION CONTROL SIGNAL**
11 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** **340/112,** 340/84, 240/46.33, 40/137
[51] **Int. Cl.** **B60q 1/00**
[50] **Field of Search** 340/107, 110, 84; 240/46.33, 46.53; 40/1.6, 97, 36, 124.1, 137

[56] **References Cited**
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D.64,322	3/1924	Petersen	340/84
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Attorney—Kinney, Alexander, Sell, Steldt & Delahunt

ABSTRACT: A traffic signal, appearing from a distance as a simple warning light, converts progressively into an instructional signal as viewed during the approach.

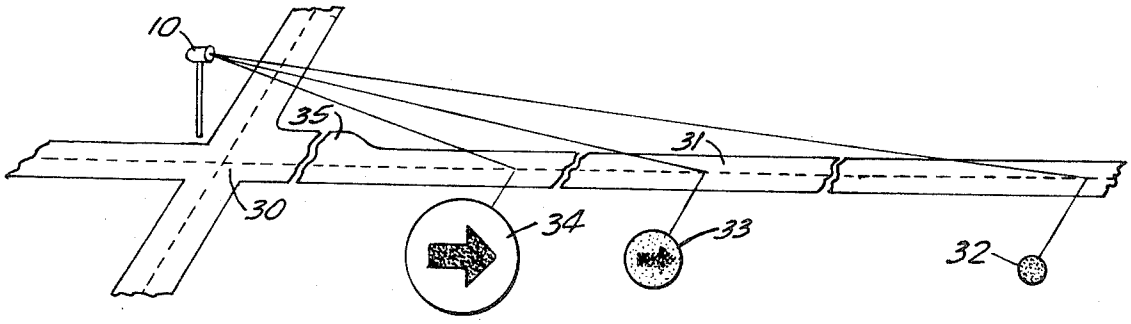


FIG. 1

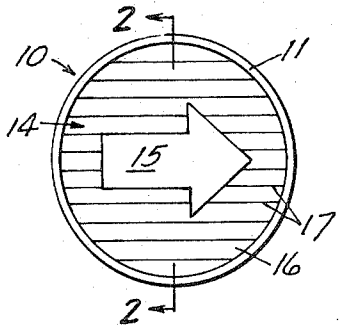


FIG. 2

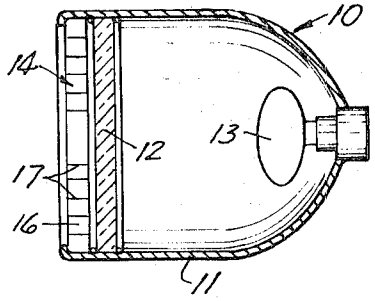


FIG. 3

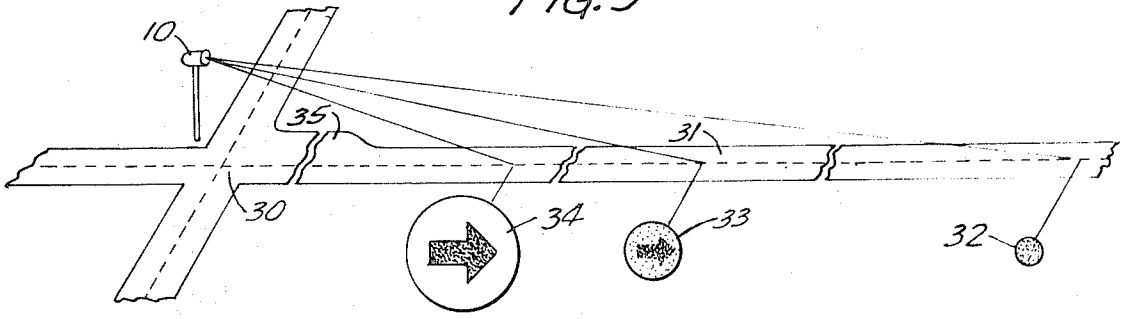


FIG. 4

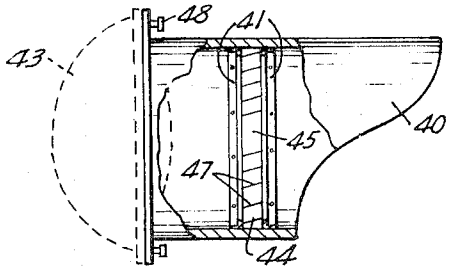


FIG. 5

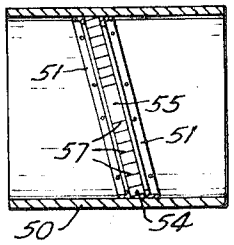


FIG. 6

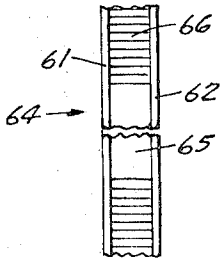


FIG. 7

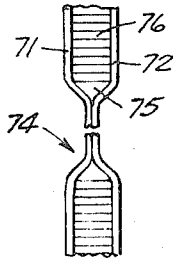
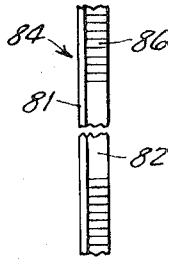


FIG. 8



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VARIABLE INDICATION CONTROL SIGNAL

This invention relates primarily to the instruction and control of vehicular and other moving traffic and to novel signal lights for use therein. One illustrative embodiment is an arrow turn signal for instructing approaching traffic to make the indicated turn; and the invention, while not in any way restricted thereto, will for convenience be described primarily in terms of a light signal showing an illuminated arrow as an instructional area on a larger display surface.

Lighted-arrow displays are ordinarily provided by masking the background areas so that light from the source passes through only the arrow portion. The resultant restriction in lighted area makes the display difficult to see at a distance.

The present invention on the contrary provides for illumination of the full area of the viewing surface as seen from a distance, while causing progressively greater blocking of light from the background areas to a viewer approaching the device. As a result, the signal is first seen as a relatively large and substantially uniformly illuminated area, thereby capturing the attention of the viewer as well as suggesting caution during the approach. At closer distances the amount of light reaching the viewer from the instructional area, i.e. the arrow symbol, remains substantially constant; but the light from the background areas is progressively reduced, so that from positions on the highway relatively close to the signal only the symbol appears lighted.

It will be appreciated that a reverse situation may also occur, wherein the light from the arrow or other indicia is progressively reduced while the surrounding areas continue to appear fully illuminated; in which case the arrow becomes the background area. Similarly, a moving signal approaching a stationary or moving observer is to be considered the full equivalent of an observer approaching a stationary signal.

In the drawing,

FIG. 1 is a front elevation, and FIG. 2 is a cross-sectional elevation taken approximately at section 2—2 of FIG. 1, of one form of signal;

FIG. 3 is a schematic illustration showing the signal of FIGS. 1 and 2 in operation at an intersection and indicating the appearance of the display surface to an observer at each of three locations along the traffic lane;

FIG. 4 is a side elevation, partly in section, of an attachment for a common form of highway signal, the latter being schematically indicated in dotted outlines,

FIG. 5 is a side elevation in section showing an alternative and preferred form of a portion of the attachment of FIG. 4, and

FIGS. 6–8 represent illustrative alternative forms of control panels shown schematically in cross section.

Hereinafter, any references to horizontal and vertical positions are with reference to signal lights as ordinarily mounted and as illustrated in the accompanying drawing. Where the device is to be used in a different situation or position, correspondingly different relationships will be understood to apply.

The signal device 10 of FIGS. 1 and 2 is comprised of an internally specularly reflective generally parabolic housing 11 fitted with a light-transmitting light-scattering plate or lens 12 and a light source 13. A transparent control panel 14 is placed over the forward face of the lens. It consists of a central clear transparent indicia portion 15, here shown in the shape of a directional arrow, and a surrounding portion 16 containing a number of uniformly spaced thin narrow louvers 17 disposed in parallel horizontal planes.

FIG. 3 illustrates the placement of the traffic control device 10 adjacent a highway intersection 30, in this instance with the device above and to one side of the line of traffic, and disposed so as to direct traffic approaching the intersection along a lane 31. From a distance, e.g. 500–1,000 feet from the intersection, a driver will see the signal as an area 32 of small size and uniform light intensity. As the driver nears the intersection the apparent size of the signal increases and the intensity at the central portion remains much the same, but the outer or background areas begin to lose intensity as shown at

33 representing a position at, for example, about 300 feet from the signal. Further advance toward the intersection results in progressive reduction in background intensity until at position 34, somewhat in advance of the entrance to the right turn lane 35, only the central arrow appears lighted.

In the situation pictured in FIG. 3, with the control device very close to the line of traffic, the louvers are disposed with both their longitudinal and transverse axis in approximately the horizontal position. With the control device located at some lateral distance from the line of traffic, it is sometimes found necessary to place the louvers with their longitudinal axis at some angle with the horizontal for obtaining maximum light-controlling effectiveness along the pertinent viewing path. Maximum effectiveness is ordinarily obtained by so placing the louvers that a line connecting the signal and the observer approaches the perpendicular to the parallel planes of the louvers as the observer, proceeding along said path, approaches a point adjacent an edge of the panel. Incorporation of more than one set of parallel louvers arranged at different angles, for example at right angles to each other, is also possible and may serve to further extend the usefulness of the device, but is ordinarily not required.

FIG. 4 illustrates a modification wherein the louvers 47 are disposed with their lateral axis at an upward slant from the light source while their longitudinal axis remains horizontal. The control panel 44 is vertically supported within a hood 40 by means of flanges 41. The hood is attached to a standard highway signal 43, here indicated schematically in dotted outline, by suitable mounting means such as bolts 48. The louvered area surrounds a clear indicia-forming area 45.

The device illustrated in FIG. 5 is designed to be inserted within the hood 40 of FIG. 4 when the latter forms a permanent part of a conventional signal installation, i.e. in the absence of flanges 41 and panel 44. It consists of a tubular body 50 in which a control panel 54 is mounted between flanges 51 and at an angle of about 10 to about 15 degrees with the vertical, as represented by the position shown for panel 44 in FIG. 4. The louvers 57 are perpendicular to the surface of the panel, so that in the signal installation their lateral axis is at about 10–15 degrees to the horizontal while their longitudinal axis will ordinarily remain substantially horizontal. A directional signal is provided by the clear portion 55. The control panel of FIG. 5 may alternatively be inserted directly in the hood 40 of FIG. 4 in place of the panel 44.

The structure may be designed to provide a signal in color, for example by employing a separate color filter or a colored lens or control panel. The control panel may itself be properly contoured to serve as a lens. For some purposes colored semitransparent louvers may be used. The instruction or indicia-forming areas are conveniently prepared by removal of the corresponding portion of a uniformly louvered panel, the removed portion being replaced if desired with a clear or colored light-transmitting segment of a similar panel but free of louvers.

Some examples of other control panel structures are shown in FIGS. 6–8. Panel 64 of FIG. 6 consists of a louvered central layer 66, from which portions have been removed to provide indicia-forming openings 65, and thin transparent outer layers 61, 62 covering and unifying the entire panel. In the panel 74 of FIG. 7 the outer transparent plastic films 71, 72 are pressed and sealed together within the indicia-forming openings 75 of the louvered panel 76. A single outer transparent pane or film 81 is bonded to the louvered panel 86 containing a louver-free insert 82 to form the panel 84 of FIG. 8.

It is preferred to make the louvers as thin as possible so as to lose the least amount of light when viewed at a distance and with the light rays substantially parallel to the width of the louvers. One convenient form of louvered panel consists of a stack of bonded strips of clear thin plastic, e.g. polycarbonate or cellulose acetate butyrate, separated by single opaque layers of light-absorptive black paint, the panel being prepared by skiving from a precombined stack of painted

plastic sheets, for example as described in Astima U.S. Pat. No. 2,053,173. Combining the louvered panel with transparent surface films protects and further unifies the structure and serves as a convenient way of eliminating any light-diffusing surface roughness, but is not essential.

Skiving at right angles to the layers of painted plastic film produces a control panel for use as shown in FIG. 2 wherein the widths and lengths of the louvers are substantially horizontal. Three-mil transparent film coated with about one-half mil of black paint, bonded together in a panel of 30-mil thickness, has proven effective for such purposes. Slanted louvers as shown in the panel 44 of FIG. 4 may be obtained in the same manner by skiving at a greater or lesser angle, in this case preferably using somewhat thicker plastic film, for example 10-mil film, and skiving to a panel thickness of 20 mils. The specific angle, width, and spacing of the louvers, and their angle of maximum effectiveness, are selected with a view to providing full illumination at a distance while exhibiting substantially complete cutoff when viewed from the desired closeup position.

An appreciable amount of side glow may be experienced with signals wherein the louvers are disposed as shown in FIG. 1, since a small amount of light is reflected from the flat surfaces of the louvers. The side glow is typically seen from positions near the edge of the signal, as at position 34 of FIG. 3, as an indistinct second image corresponding to the clear area 15 but slightly displaced therefrom. Although maximum light transmission is obtainable with such a control panel, the side glow may in some instances be found disturbing. The condition may be corrected by tilting the louvers as in the device of FIG. 4, but at the expense of a considerable further reduction in viewing intensity. The tilted louvers receive substantially no light on their lower surfaces so that no light is reflected therefrom to cause observable glow at positions beneath or to the side of the signal; but the upper surfaces, being in the path of the beam, absorb or reflect a considerable proportion of the total light and thus reduce the useful output to the viewing area. The arrangement shown in connection with FIG. 5 is found to be equally as effective in eliminating side glow as that of FIG. 4, while providing unexpectedly high light intensity within the viewing zone. In this arrangement the lower surface of the louvers is shielded from the light rays, which however are refracted upwardly at the air-plastic interface. Most of the rays therefore do not touch the louver upper surfaces, but continue through the panel. Reverse refraction at the plastic-air interface then returns these rays to their original direction. For maximum transmission, the louvers may be placed at a slight angle to the perpendicular, so as to be parallel to the refracted rays.

In a comparative test using 20-mil panels containing parallel half-mil louvers spaced 10 mils apart, the intensity of the light beam measured at a point directly in front of the signal device is found to be at least half again as great for a structure containing louvers perpendicularly disposed within a slanted panel as in FIG. 5 as it is for a structure containing louvers disposed at an angle within a vertical panel as in FIG. 4. In both cases, side glow is virtually eliminated.

It will be appreciated that signal devices as here described may be used in conjunction with various other control devices as required for any particular traffic control situation. Merely as illustrative, the light source may be cycled between "on" and "Off" condition in conformity with the operation of additional signals by means of conventional timing and switching mechanism, not shown. The invention provides an illuminated traffic control device which offers maximum visibility at maximum distances and converts to positive instructional capability during approach, while being of simple and sturdy construction and requiring no motors, shutters or other moving parts.

What is claimed is as follows:

1. A visual control panel having light-transmitting indicia and background areas and including narrow louver means within said background areas for progressively reducing the proportion of transmitted light reaching a viewing station from said background areas as said station approaches a point adjacent an edge of said panel.

2. The control panel of claim 1 wherein said louver means are thin, parallel, and nontransparent, and are uniformly spaced throughout said background areas.

3. An illuminating device comprising the control panel of claim 2 in combination with light source means for supplying light therethrough.

4. The device of claim 3 wherein said source means is a traffic signal comprising a light source, a specular reflector, and a light-scattering lens.

5. The device of claim 3 wherein said louvers are disposed with their lateral axis at an upward slant from the light source.

6. The device of claim 3 wherein said panel is slanted upwardly toward said light source.

7. The device of claim 6 wherein said louvers are disposed with their lateral axis perpendicular to said panel.

8. The method of alerting and informing traffic approaching a control point comprising placing, at a viewing location adjacent said control point, a control device comprising a visual control panel having light-transmitting indicia and background areas and including narrow louver means within said background areas in combination with light source means for supplying light therethrough, and with said louvers disposed at the angle of maximum light-controlling effectiveness for the approaching traffic.

9. The method of providing a directional traffic signal, comprising placing a directional control panel, having light-transmitting indicia and background areas and including thin, narrow, parallel, nontransparent, uniformly spaced louver means within said background areas, and having said image areas designed to provide the desired directional signal, directly in front of a nondirectional traffic signal which supplies light over the entire area of said panel and with said louvers disposed at the angle of maximum effectiveness.

10. The method of claim 9 wherein said panel is placed at an upward slant toward said light source and said louvers are disposed with their lateral axis perpendicular to the surface of said panel.

11. The panel of claim 2 wherein said louver means are not greater than about 0.03 inch in width and are spaced apart not more than about 0.01 inch.

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