

[54] **LUMINOUS DISPLAY PANEL WITH
GEOMETRIC SEGMENT MATRIX AND
DIFFUSER PANEL**

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Pfund

[30] **Foreign Application Priority Data**

Mar. 31, 1971 Japan..... 46-23100[U]

[52] U.S. Cl. 340/383, 340/336

[51] Int. Cl. G09f 9/34

[58] Field of Search..... 340/336, 383

[56] **References Cited**

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ABSTRACT

In a luminous display device of the type comprising a substrate, a plurality of depressions formed in one surface of the substrate, a plurality of lamps disposed in respective depressions and means for selectively lighting the lamps so as to display a selected pattern, there is provided a light diffusing layer covering the depressions.

1 Claim, 6 Drawing Figures

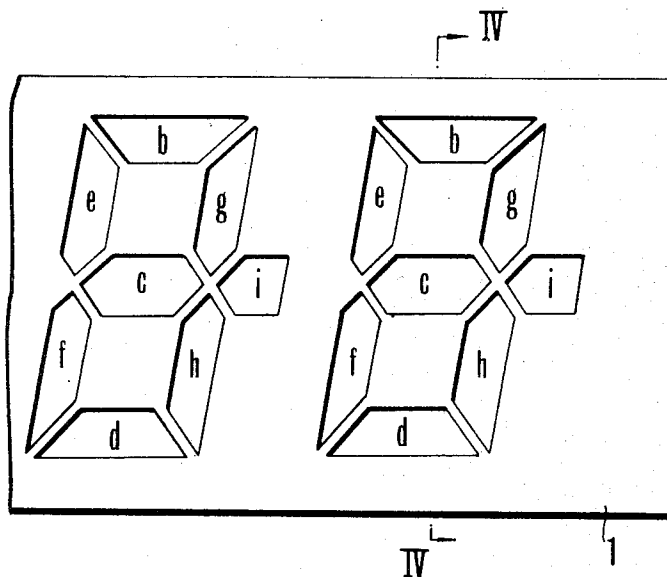


FIG. 1

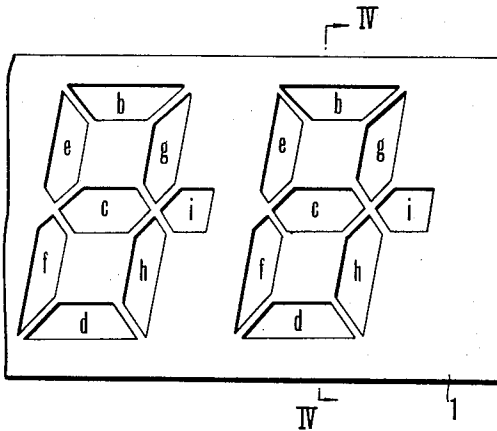


FIG. 4

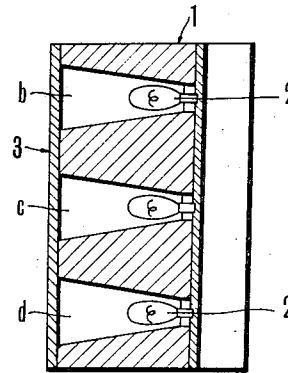


FIG. 2

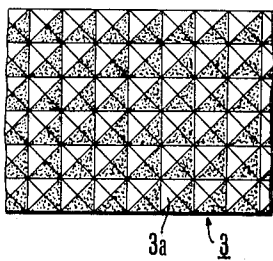


FIG. 3

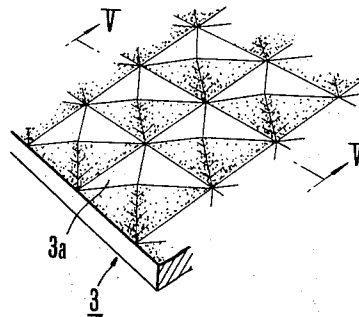


FIG. 5

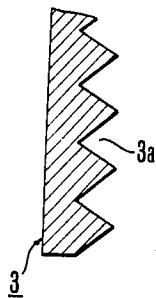
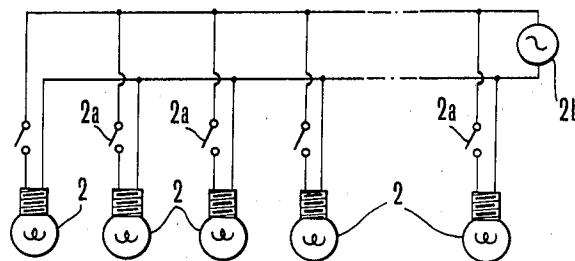


FIG. 6



LUMINOUS DISPLAY PANEL WITH GEOMETRIC SEGMENT MATRIX AND DIFFUSER PANEL

BACKGROUND OF THE INVENTION

This invention relates to a luminous display device for displaying digits or the like by causing selected portions of a display surface to luminesce.

Luminous display devices have been provided in which the display surface thereof has a plurality of depressions which are arranged to form basic forms of digits, with lamps disposed in the depressions and the lamps are selectively lighted to display desired digits. Since in this type of the display device the display surface is covered by a black type filter in order to conceal lamps that are not lighted, the brightness of the lighted portions is decreased thus obscuring the digits displayed.

SUMMARY OF THE INVENTION

It is an object of this invention to provide improved luminous display device which can conceal lamps and yet provide clear and distinct display of desired patterns.

According to this invention, in a luminous display device of the type comprising a substrate, a plurality of depressions formed in one surface of the substrate, a plurality of lamps disposed in respective depressions and means for selectively lighting the lamps so as to display a selected pattern there is provided a light diffusing layer covering the depressions.

BRIEF DESCRIPTION OF THE DRAWING

In the accompanying drawing:

FIG. 1 shows a plan view of a portion of the luminous display device embodying the invention with the luminous panel removed;

FIG. 2 shows a plan view of a portion of the luminous panel;

FIG. 3 is an enlarged perspective view of a portion of the luminous panel;

FIG. 4 shows a cross-section taken along a line IV — IV in FIG. 1 with the luminous panel in place;

FIG. 5 shows a cross-section of the luminous panel taken along a line V — V in FIG. 3 and

FIG. 6 shows a connection diagram of the lamps used in the display device.

DESCRIPTION OF THE PREFERRED INVENTION

Referring now to FIGS. 1 and 2, the luminous display device shown therein comprises a substrate 1 of opaque material. A plurality of basic patterns of digits are formed side by side on one surface of the substrate. Each of the basic patterns is comprised by a plurality of independent depressions *b* to *i* which are arranged generally in the form of a figure 8. Thus, four depres-

sions *b*, *c*, *d* and *i* are arranged horizontally while four depressions *e*, *f*, *g* and *h* generally in the vertical direction, as shown in FIG. 1. At the bottom of each depression is mounted an electric lamp 2 which is connected across a source of supply 2*b* through an independent switch 2*a*, as shown in FIG. 6. Since, above described arrangement is well known in the art it is believed unnecessary to describe it in detail. By selective lighting of the lamps it is possible to display any one of the digits of from 0 to 9 inclusive. As shown in FIG. 4, the surface of the substrate 1 is covered by a luminous panel 3 having a diffusing layer 3*a* in the form of diamond prism cuts.

To display a digit "0" lamps 2 in depressions *b*, *e*, *f*, *d*, *g* and *h* are lighted. When viewed through the luminous panel 3, the lights from the lamps in these depressions are averaged by the diffusing layer 3*a* so that the entire surface of each depression luminesces uniformly. Following table shows the digits and corresponding depressions to be lighted.

Digits	Depressions
1	<i>g</i> , <i>h</i>
2	<i>b</i> , <i>g</i> , <i>c</i> , <i>f</i> , <i>d</i>
3	<i>b</i> , <i>g</i> , <i>c</i> , <i>h</i> , <i>d</i>
4	<i>c</i> , <i>e</i> , <i>i</i> , <i>g</i> , <i>h</i>
5	<i>b</i> , <i>e</i> , <i>c</i> , <i>h</i> , <i>d</i>
6	<i>e</i> , <i>f</i> , <i>d</i> , <i>h</i> , <i>c</i>
7	<i>b</i> , <i>g</i> , <i>h</i>
8	<i>b</i> , <i>c</i> , <i>d</i> , <i>e</i> , <i>f</i> , <i>g</i> , <i>h</i>
9	<i>b</i> , <i>e</i> , <i>c</i> , <i>g</i> , <i>h</i>

Where reflective layers are formed on the inner walls of respective depressions, it is possible to increase the brightness of the displayed digits.

As above described according to this invention, since the depressions containing lamps of the substrate is covered by a luminous panel having a diffusing layer, it is possible to display bright digits even in the bright. Further, the panel conceals the lamps not lighted, thus improving the appearance of the display device.

While above embodiment has been described in terms of digits, it will be clear that the invention is also applicable to display any types of letters or patterns.

What is claimed is:

1. A luminous display device of the type comprising a substrate, a plurality of depressions formed in one surface of said substrate in the shape of linear segments having tapered ends abutting each other forming a generally rectangular block shaped digit 8 matrix having diagonal separations between said segments, a plurality of lamps disposed in respective depressions, means for selectively lighting said lamps so as to display a selected pattern, and a light diffusing layer in the form of a plurality of diamond prism cuts overlying said depressions, the diagonals of said prism cuts lying generally along the direction of said diagonal separations.

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