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(54) Improved light panel

(57) A flat light panel which has a frame carrying linear illumination sources and which has a screen receiving the illumination and carrying the advertising motif, and which panel is characterized in that it has a diffuser which is located between the light sources and the front screen of the panel and which is provided with regions

of variable opacity corresponding to the location of the linear illumination members of the panel, the opacity of those regions being inversely proportional to the illumination intensity of the illumination tubes in order to compensate for the difference in luminous intensity of the linear illumination members, giving rise to a constant illumination of the front screen of the light panel.

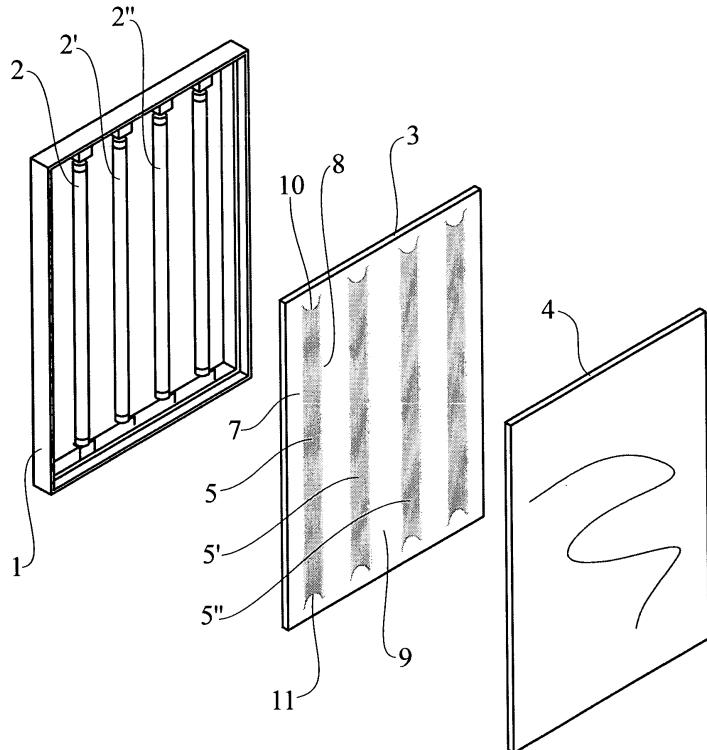


FIG. 1

Description

[0001] The present invention is aimed at providing an improved light panel which brings substantial features of novelty and inventive step over the prior art.

[0002] The light panel to which the present invention relates is of the flat type with internal light means and is intended for advertising applications and the like, having light sources, such as fluorescent tubes, on the inside and an advertising motif superposed on a transparent or translucent screen for permitting the visualisation thereof.

[0003] A problem arising in current illumination panels provided with internal fluorescent tubes is the irregular illumination produced by the varying intensity of illumination produced by the fluorescent tubes on the intermediate screen and finally on the advertising motif or the like which it is desired to illuminate. Fluorescent tubes have a linear arrangement so that the maximum luminous intensity coincides with the axis which, passing through the fluorescent tube, is perpendicular to the screen, while for the other regions, the luminous intensity decreases. This results in a marked striped effect on a translucent plate arranged in front of the fluorescent tubes, giving rise to an unpleasant effect of irregular illumination.

[0004] In order to solve the problem indicated, the present invention provides a diffuser which is to be located between the fluorescent illumination tubes and the front screen of the light panel and which is provided with regions of dots in a grid like pattern or lines, having a density varying from the portion corresponding to the front of the fluorescent tubes as far as the intermediate region between each pair of fluorescent tubes, so that the greatest density and therefore the greatest opacity corresponds to the front portion opposite each of the tubes and the opacity fades or becomes less marked progressively from the central portion up to the separating regions between each pair of tubes. The density of the array and therefore the opacity effect produced is continuously variable from the region coinciding with the tube up to the intermediate regions between each pair of tubes so that the array density or opacity is inversely proportional to the illumination intensity produced by the tube on the screen, thus compensating for the variable illumination intensity produced by the tubes and giving rise to regular and constant illumination of the panel.

[0005] The opacity, created by arranging lines or dots, a combination thereof or other small figures or other means, can be produced by any known method, giving rise to shading whose basic feature is its symmetrical distribution from the portion coinciding with the front of each tube as far as the sides and which provides a density of opacity inversely proportional to the luminous intensity produced by the tube, thus compensating for the irregularity of illumination.

[0006] For a better understanding of the invention, some drawings of an embodiment thereof, which is

merely of a non-limiting exemplary nature, are appended by way of non-limiting example.

5 Figure 1 is a perspective view of an illumination panel in accordance with the present invention, with its components disassembled.

Figure 2 is a front elevation view.

Figures 3 and 4 are cross sections through cutting planes as shown, of the same light panel.

10 Figure 5 shows diagrammatically an example form of shading with variable opacity.

Figure 6 shows the mentioned arrangement of two examples of regions of variable opacity in a diffuser in accordance with the present invention.

15 Figures 7 and 8 are partial cross-sections of a light panel in accordance with the invention and in accordance with the prior art, respectively.

[0007] According to the Figures, the light panel to

20 which the present invention relates comprises a frame 1 provided in a conventional manner with linear illumination sources, especially fluorescent tubes 2, 2', 2" ... arranged parallel with one another between an upper edge and a lower edge of the frame 1, for example, in

25 a vertical arrangement, as shown in Figure 1. The panel to which the present invention relates basically has a diffuser 3 in an intermediate arrangement between the light tubes 2, 2', 2" ... and a front screen 4 which is, for example, translucent or of another type and which will

30 be the support for the advertising motif which it is desired to illuminate. The diffuser 3 has as a basic feature the provision of a series of regions 5, 5', 5" ... which are arranged to correspond to the location of the light tubes 2, 2', 2" ... and which have a variable opacity from the

35 central axis thereof parallel with the corresponding tube as far as the edges, forming regions having a substantially rectangular structure as represented and as can be seen in detail in Figures 5 and 6. The regions 5, 5', 5" are characterized in that they have maximum opacity in their central region 6, 6', 6" corresponding to the axis of the tubes on which they are superposed and the opacity decreases up to the edges which have been represented with the dash lines 7 and 8 for the stripe 6. The basic feature of the shading of those regions is that the

40 opacity thereof is inversely proportional to the illumination received from the tube so that, since the variable illumination is compensated for, the luminous effect of the panel on the front screen 4 is that of uniform illumination.

45 **[0008]** The variable opacity can be achieved by a large number of methods known in the art, such as, for example, arrays of dots or lines or other shapes or a combination thereof, which are obtained by silk screen printing, spraying, photographic methods, etc..

50 **[0009]** The edges of each of the regions 5, 5', 5" ..., which, for the sake of greater clarity, have been represented by the lines 7 and 8 for the region or stripe 5, will in practice be hardly distinguishable given that there will

be an even and gradual fading between the central region 6 and the regions of the edges until the intermediate regions 9 between each pair of regions of variable opacity are reached. Therefore, in practical embodiments, the lines 7 and 8 will in many cases not be noticed.

[0010] Another feature of the present invention is that both the upper portion and the lower portion of the regions of variable opacity have curved regions, such as 10 and 11, Figure 1, in which there is no opacity in order to accommodate the region where the fluorescent tube is connected. In that region, because illumination is minimal, the opacity effect of the diffuser is not necessary.

[0011] In the embodiments shown diagrammatically in Figures 7 and 8, it can be seen that, in the case represented in Figure 7, which corresponds to an application of the invention, the fluorescent tubes 12 and 13 produce variable illumination on the diffuser 14, as can be seen by the distribution of light rays, while, after passing through the diffuser, the illumination is regular, as can be seen by the light rays 15, 15', 15" which have been shown in a uniform manner.

[0012] On the other hand, in a conventional light panel, as shown in Figure 8, the tubes 16 and 17 produce an illumination such that, in the central portion of the screen 18, the illumination is of greater intensity, as can be seen by the rays 19 and 20, while, in the lateral regions, the light rays 21 and 22 are dimmer and therefore they produce an irregular illumination effect on the screen 18.

3. Improved light panel according to the preceding claims, **characterized in that** the regions of variable opacity have a substantially rectangular structure with the larger sides hardly defined, these being constituted by regions of smooth transition between the central portion and the intermediate portions of the diffuser.

10 4. Improved light panel according to the preceding claims, **characterized in that** the regions of variable opacity of the diffuser have at their ends concave recesses which are to compensate for the lack of illumination of the base for the connection of the linear illumination member.

Claims

1. Improved light panel, of the type which has a frame carrying linear illumination sources and which has a screen receiving the illumination and carrying the advertising motif or the like, **characterized in that** it has a diffuser which is located between the light sources and the front screen of the panel and which is provided with regions of variable opacity corresponding to the location of the linear illumination members of the panel, the opacity of those regions being inversely proportional to the illumination intensity of the illumination tubes in order to compensate for the difference in luminous intensity of the linear illumination members, giving rise to a constant illumination of the front screen of the light panel.
 2. Improved light panel according to claim 1, **characterized in that** the regions of variable opacity located in the diffuser in front of each of the linear illumination members have a variable opacity from the central portion coinciding with the tube up to the sides, compensating for the differences in illumination produced by the linear illumination sources on the diffuser.

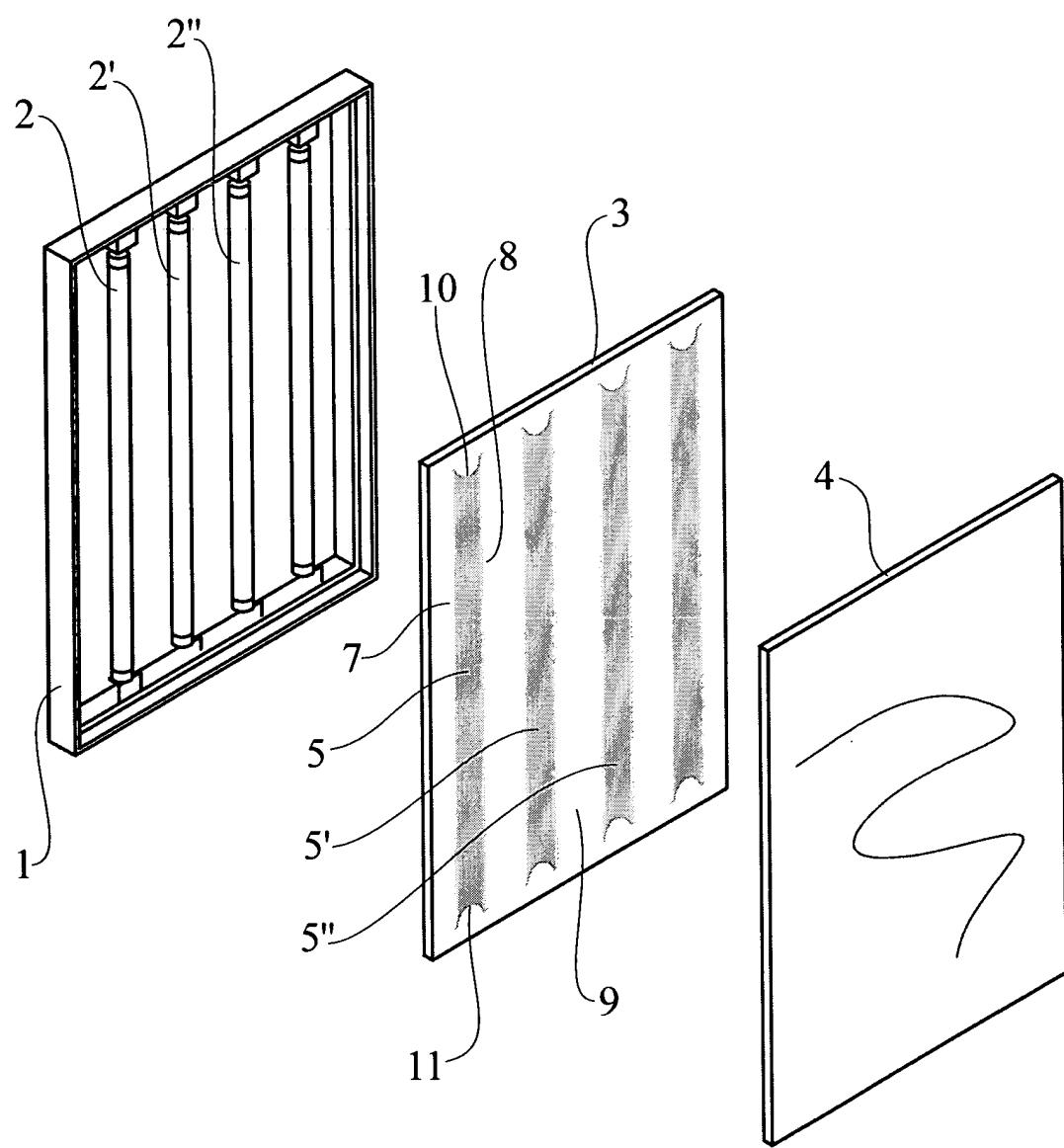
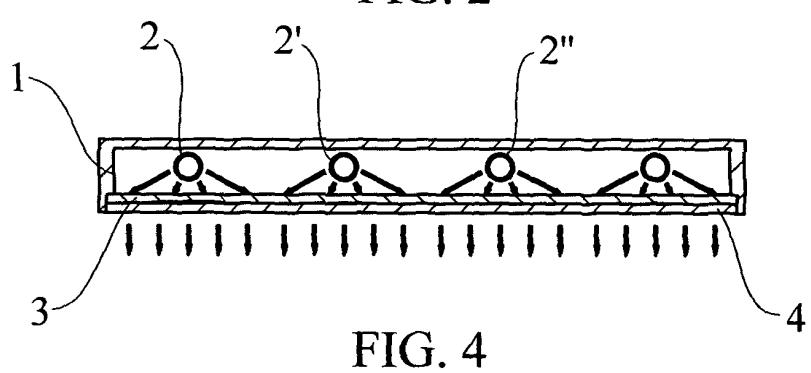
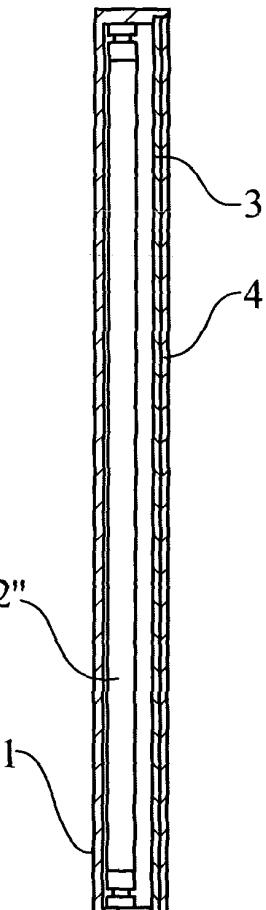
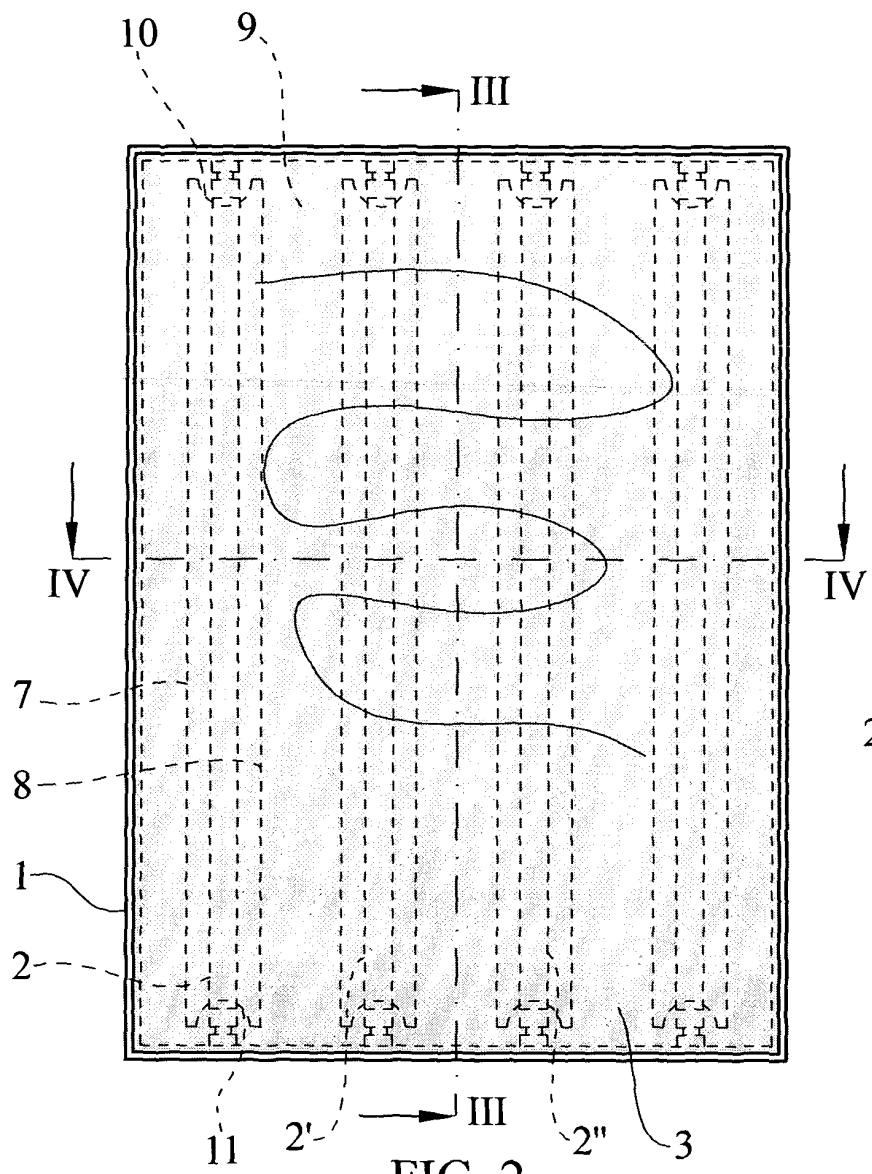


FIG. 1



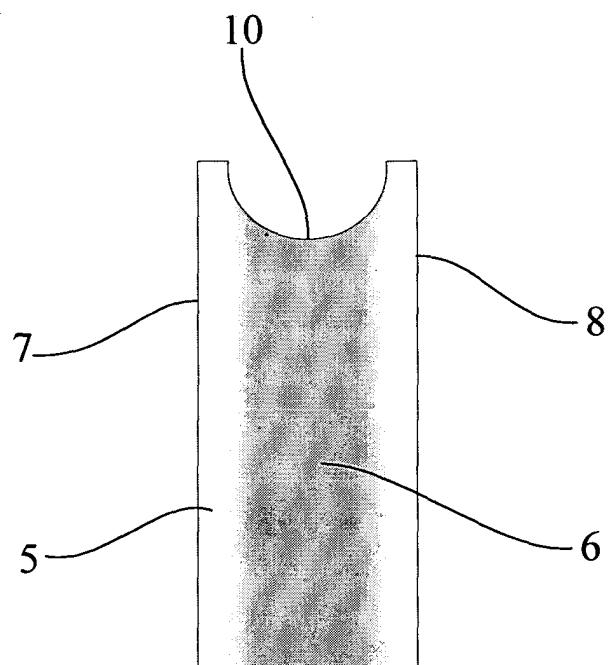


FIG. 5

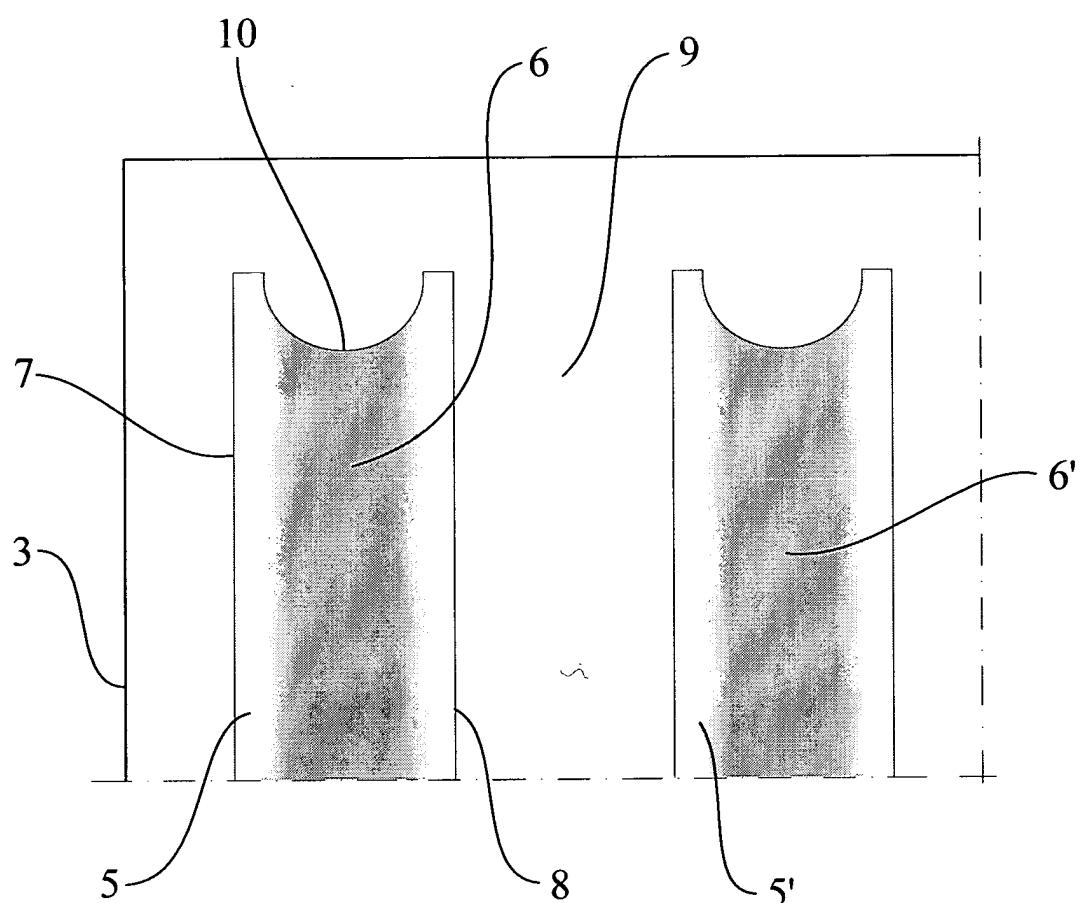


FIG. 6

