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(71) Applicant(s):  
**Beadlight Limited**  
(Incorporated in the United Kingdom)  
B3-B7 New Yatt Business Centre, WITNEY,  
OX29 6TJ, United Kingdom

(56) Documents Cited:  
GB 2418011 A EP 0658655 A1  
US 6336735 B1 US 4929021 A  
US 4675575 A

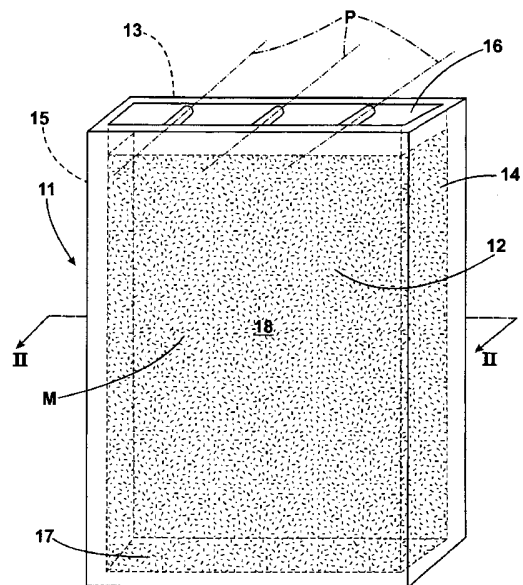
(72) Inventor(s):  
**Alan Parker**

(58) Field of Search:  
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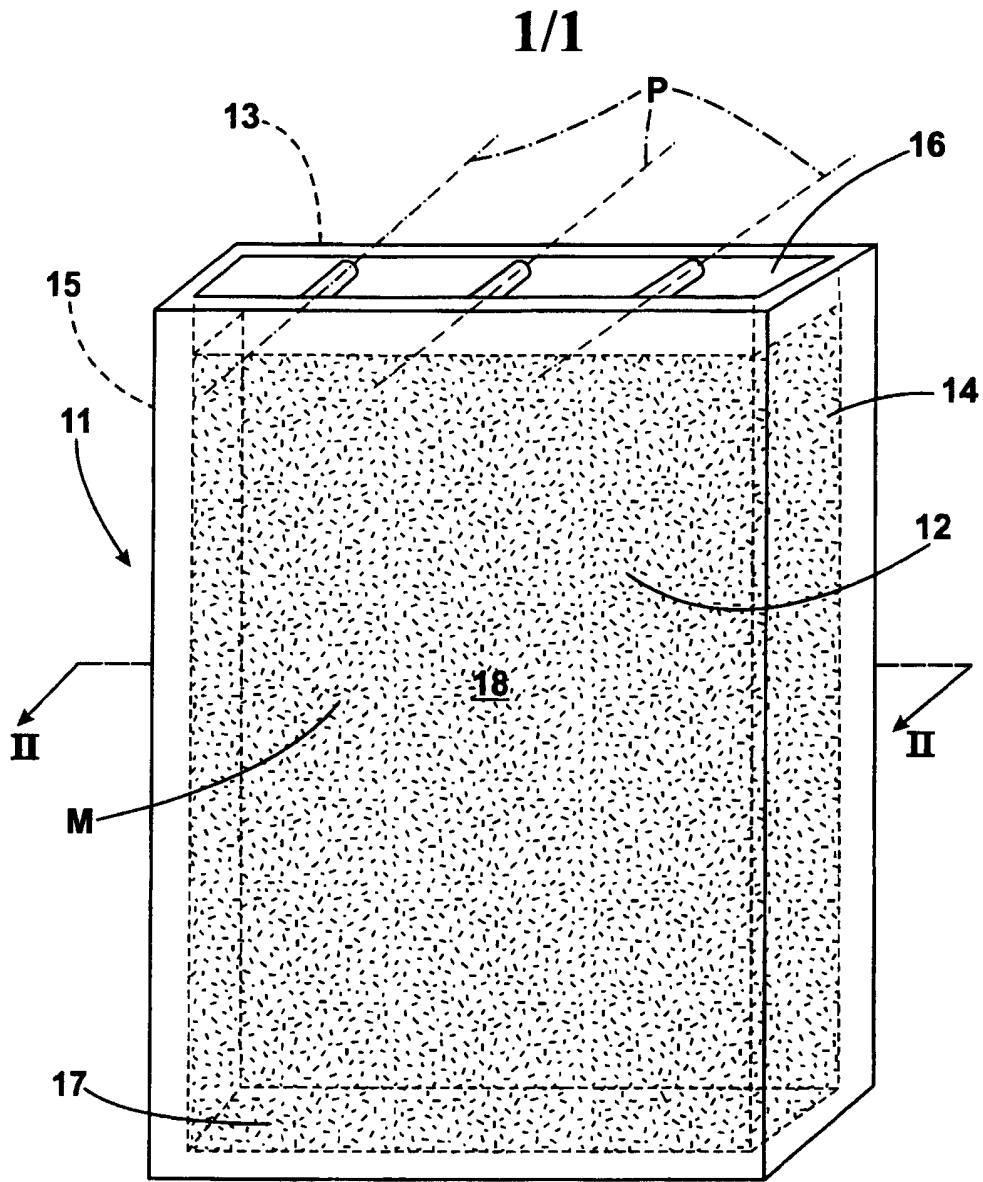
(74) Agent and/or Address for Service:  
**Rock and Company**  
Trelawn, Cassington, WITNEY, Oxon,  
OX29 4DN, United Kingdom

(54) Abstract Title: **Optical panel**

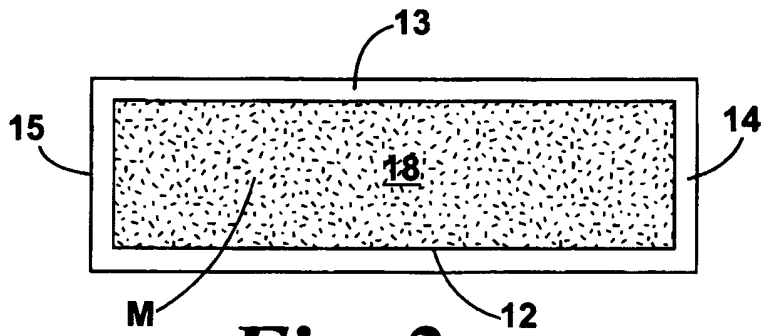
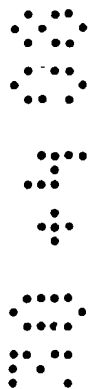
(57) An optical panel 11 comprises a plenum chamber 18 containing a mass of discrete optical particles M that are pressurised. The particle sizes can be uniform or vary. The pressurisation can be generated by loading imposed on the mass by the containment or, if the chamber is not completely filled thus defining a free surface, arise from the weight of the particles in the mass. The plenum walls 12-17 may be an acrylic material and the particles may be glass. The optical panel can be used to diffuse light for illumination with lights mounted along its edges, as a display panel, and may be part of a load bearing structure such as a floor or wall.



*Fig. 1*



**Fig. 1**



**Fig. 2**

## OPTICAL PANEL

### TECHNICAL FIELD

This invention relates to an optical panel. In particular it is concerned with the provision of an optical panel which serves to diffuse light radiation passing from one side of the panel to a viewable side of the panel so that the viewable side discloses a uniformly diffused light output. This light output can be of light in the visible and/or in the near visible spectrum

### BACKGROUND ART

Modern sources of light are available which, while being physically small, provide a powerful light output to an extent that direct viewing of the light source can lead to discomfort. In our Patent GB 2,392,488 there is disclosed an illuminating device comprising a body member surrounding one or more sources of light aligned on a longitudinal axis of the member. The body member has one or more transparent regions through which light from each source passes. The device includes optical particles lying between the light sources and the insides of the transparent regions. The optical particles serve to diffuse the light in order to overcome dazzle.

### DISCLOSURE OF INVENTION

According to a first aspect of the present invention there is provided an optical panel comprising a containment bounding a plenum; a mass of discrete optical particles contained within the plenum; the particle mass being subject to pressurisation.

According to a first preferred version of the first aspect of the present sizes of the particles in the mass vary in accordance with a predetermined spectrum of particle sizes.

[2]

According to a second preferred version of the first aspect of the present invention or of the first preferred version thereof the pressurisation is generated by loading imposed on the mass by way of the containment.

According to a third preferred version of the first aspect of the present invention or of the first preferred version thereof the mass serves to define a free surface within the plenum and the pressurisation arises from the weight of the particles in the mass.

According to a second aspect of the present invention an optical panel according to the first aspect or any preferred version thereof adapted to serve as, or for incorporation in, a load bearing structure.

According to a third aspect of the present invention there is provided a display unit made up of two or more optical panels according to the first aspect or of any preferred version thereof.

According to a first preferred version of the third aspect of the present invention there is provided a display unit adapted to serve as, or for incorporation in, a load bearing structure.

Among other aspects the present invention provides an optical panel which can serve as a wall, floor or ceiling unit which allows light to pass through from natural or powered sources. Typically when used as part of a floor the unit readily supports the weight of a passer-by.

#### BRIEF DESCRIPTION OF DRAWINGS

An exemplary embodiment of the invention will now be described with reference to the accompanying drawing of which:

Figure 1 is a perspective view; and

Figure 2 is a section on section II-II of Figure 1.

#### MODES FOR CARRYING OUT THE INVENTION

Optical panel 11 is a rigid structure made up of front panel 12, rear panel 13, side panels 14, 15 and end panels 16, 17. The panels 12 - 17 are made of an acrylic material. The panels enclose a plenum chamber 18 which, in this embodiment, is completely filled with a mass M of glass optical particles which vary in size between      and      . The spectrum of the sizes depends on the optical effect required. The end panel 16 is removed prior to filling and the optical particles poured in to create the mass M. The end panel 16 is then replaced and driven into the mass M so as to pressurise the mass M. The end panel is then secured in place by threaded pins on axis in such a way as to cause the panels to maintain pressure on the mass M. By pressurising in this way the optical properties of the mass are maintained which in this case ensures uniform diffusion of light through the panel 11.

In the present embodiment the optical particles making up the mass M are of clear glass. In alternative embodiments other transparent material can be used of glass or of plastics material or combinations of these. In addition some or all of the particles can be coloured.

The panels 12 - 17 are made up of a material or materials, and fabricated in such a way to be strong enough for the panel 11 to be incorporated in a load bearing structure such as a floor or wall. In this embodiment the panel 11 is of rectangular form and section. However a panel according to the present invention can be formed in any shape to enclose a plenum chamber. A panel can provide for varying local thicknesses of mass on different localities within the panel.

The panel 11 can be used in a display context, such as a wall panel, either on its own or in combination with one or more other panels of a similar type and can include an illumination function. If required the, or each, panel can have a light or lights mounted on one side or along the edges so as to show a uniformly diffused light to a viewer from the other side or edges.

[4]

In alternative embodiment containment similar to that described in connection with the figures and having a comparable plenum chamber which the mass of optical particles does not wholly fill but leaves a free surface of the particles. The weight of the mass of optical particles acts to pressurise the mass particularly in its lower region. This can be particularly useful in the case of containments of large size.

While the embodiments of the present invention are particularly applicable to diffusion of light in the visible spectrum the invention is not limited to such light. Typically it can be used in relation to an application requiring diffusion of radiation in the near visible spectrum such as infra-red or ultra-violet. In such an application the near visible radiation having been passed through the optical panel could be used to illuminate a material with which the radiation interacts to give a visible effect.

#### INDUSTRIAL APPLICABILITY

The present invention provides an optical panel of distinctive appearance which can be used in a variety of applications including decoration, display, structural, illumination or signal display or combinations of any of these. The panel can also be made of sufficient strength to act as a load bearing component.

CLAIMS

- 1 An optical panel comprising a containment bounding a plenum; a mass of discrete optical particles contained within the plenum; the particle mass being subject to pressurisation.
- 2 An optical panel as claimed in Claim 1 wherein the sizes of the particles in the mass vary in accordance with a predetermined spectrum of particle sizes.
- 3 An optical panel as claimed in Claim 1 wherein the pressurisation is generated by loading imposed on the mass by way of the containment.
- 4 An optical panel as claimed in Claim 1 wherein the mass serves to define a free surface within the plenum and the pressurisation arises from the weight of the particles in the mass.
- 5 An optical panel as claimed in any preceding claim adapted to serve as, or for incorporation in, a load bearing structure.
- 6 An optical panel as hereinbefore described with reference to the accompanying drawing.
- 7 A display unit made up of two or more optical panels as claimed in any preceding claim.
- 8 A display unit as claimed in Claim 7 adapted to serve as, or for incorporation in, a load bearing structure.

**Application No:** GB0717350.3

**Examiner:** Robert Barrell

**Claims searched:** 1-8

**Date of search:** 9 January 2008

## Patents Act 1977: Search Report under Section 17

### Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-3 and 7	GB2418011 A (TELECTRA) See: the abstract; page 4, line 12 - page 5, line 2; and figs 3 and 4
X	1, 2, 4 and 7	US4675575 A (SMITH et al) See: column 4, line 46 - column 5, line 41; column 10, line 21- column 11, line 60; and figs 1-9
X	1, 2, 4 and 5	US4929021 A (KAYE) See: the abstract; column 2, lines 34-56; and column 3, line 47 - column 4, line 46
X	1, 2 and 4	US6336735 B1 (EDDINS) See: the abstract; column 2, line 57 - column 3, line 48; and figs 1-7
A	8	EP0658655 A1 (NIEZEN) See: the whole document

### Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category	P	Document published on or after the declared priority date but before the filing date of this invention
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

### Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup> :

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Worldwide search of patent documents classified in the following areas of the IPC

F21V
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The following online and other databases have been used in the preparation of this search report

EPODOC, WPI
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### International Classification:

Subclass	Subgroup	Valid From
F21V	0005/00	01/01/2006



<b>Subclass</b>	<b>Subgroup</b>	<b>Valid From</b>
F21V	0031/04	01/01/2006
F21V	0033/00	01/01/2006