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F21S 1/02 3/02 // F16B 37/08

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F4R RE RFT RMR R325 R421
E2A ACAT AGKFJ A175 A370 A374

(56) Documents Cited

GB 2155534 A	**GB 2145462 A**	**US 5581448 A**
US 5409323 A	**US 5121309 A**	**US 4315302 A**
US 4188854 A	**US 4048491 A**	**US 3883732 A**
US 3872296 A	**US 3810085 A**	

(58) Field of Search
UK CL (Edition P) **E2A ACAT AGD AGKFH AGKFJ , F4R RCGA RE RFM RFN RFP RFT RL RMR**
INT CL^6 **F16B 2/12 37/08 , F21S 1/00 1/02 3/02**

(54) Abstract Title
A two part luminaire

(57) A recessable luminaire, comprises a rim portion 3 adapted for affixing to a support surface 7 and a separate, detachable, bulkhead portion 5, bearing functional components for the luminaire and being detachably located within the rim portion. The rim portion may be affixed to the support surface by a clamp (6, Fig 2) having a ratcheting mechanism. A multi-position diffuser 2 may be included.

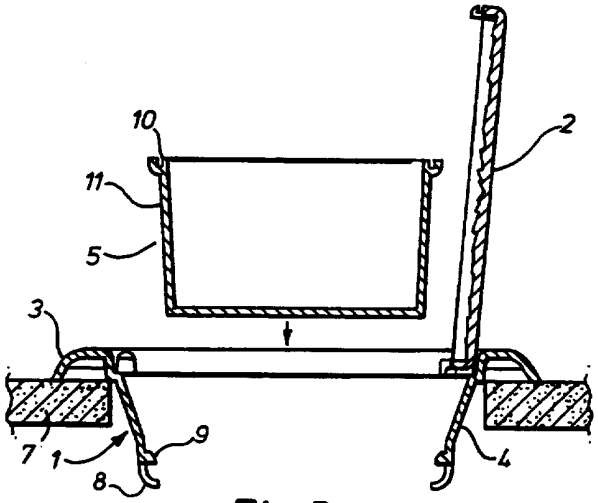


Fig.3.

GB 2 324 142 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995

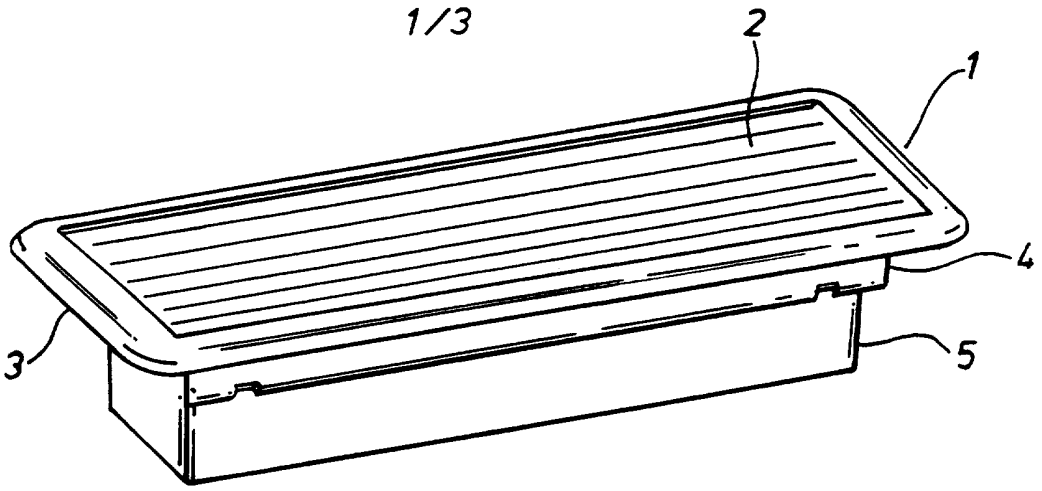


Fig.1.

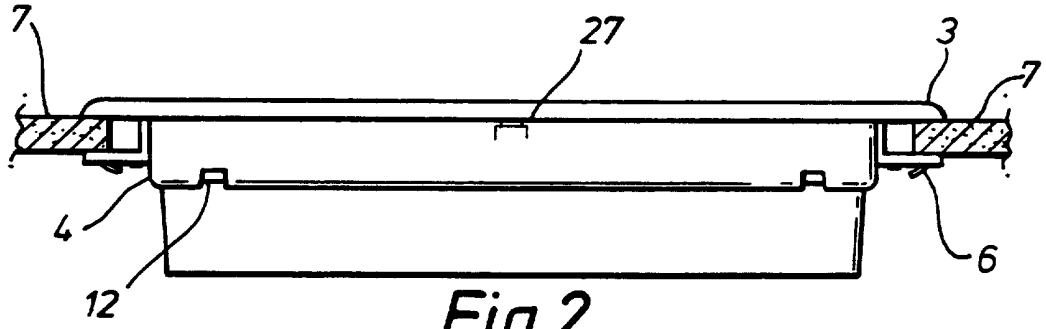


Fig.2.

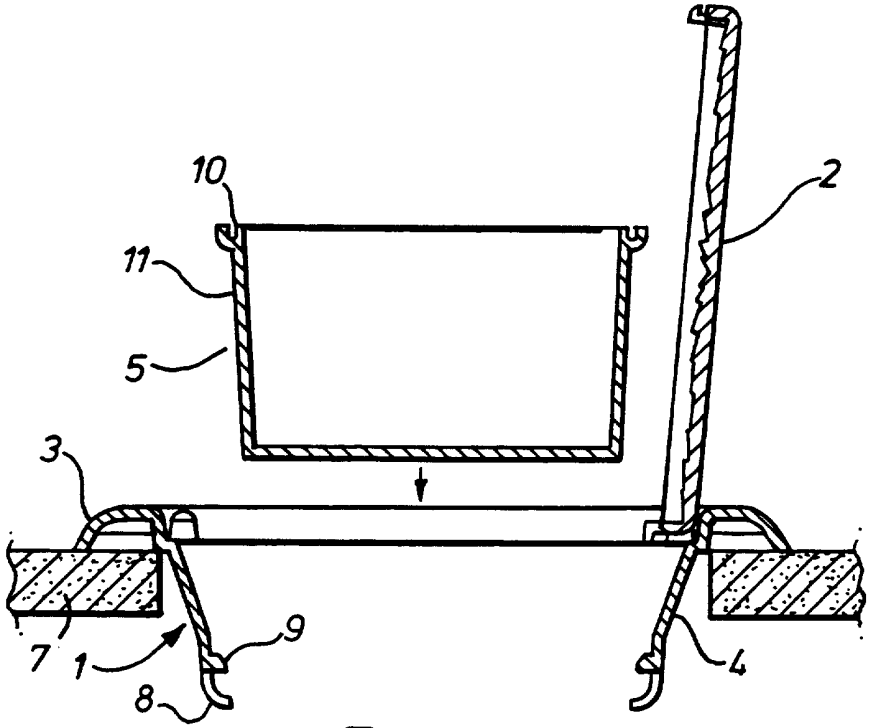


Fig.3.

Fig.4.

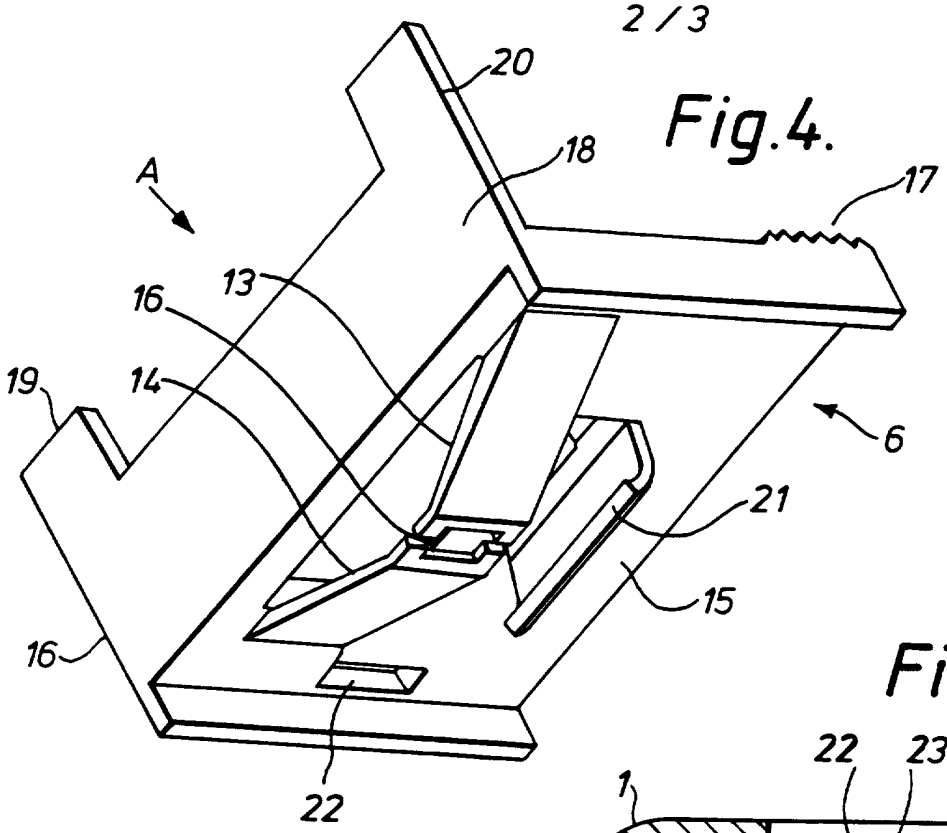


Fig.6.

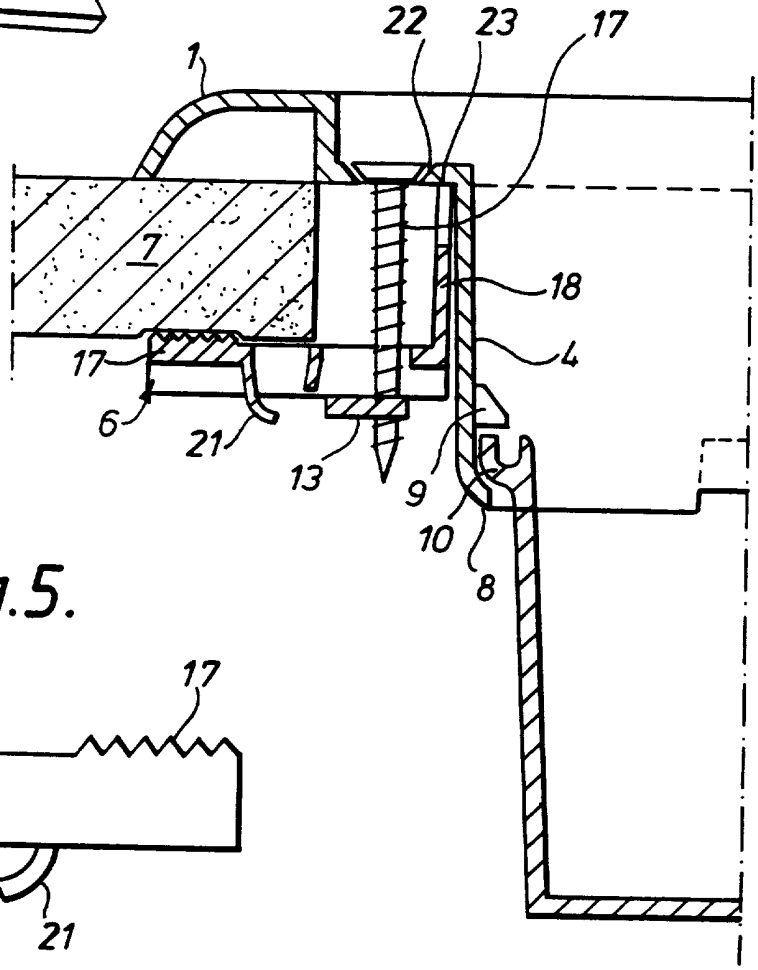
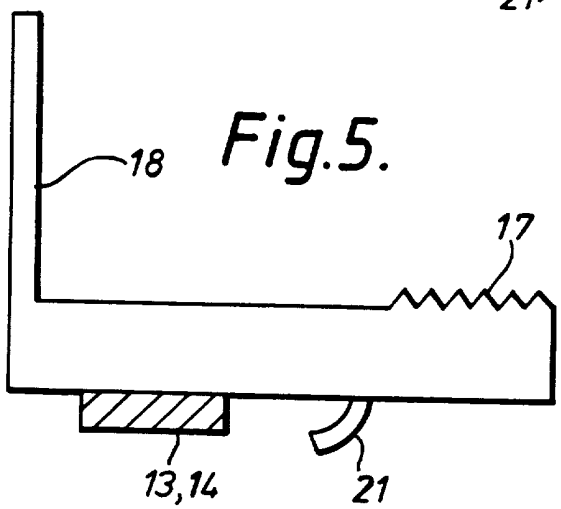


Fig.5.



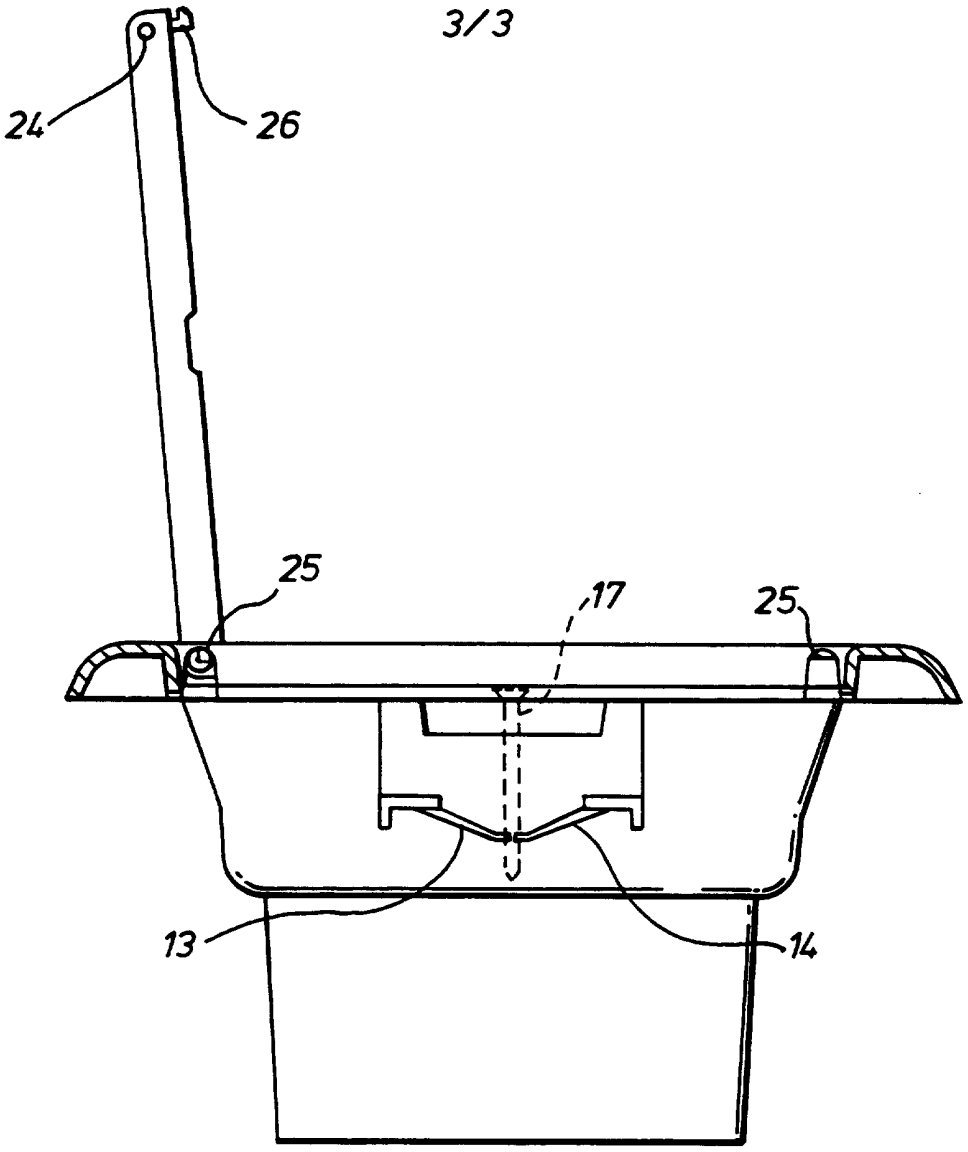


Fig.7.

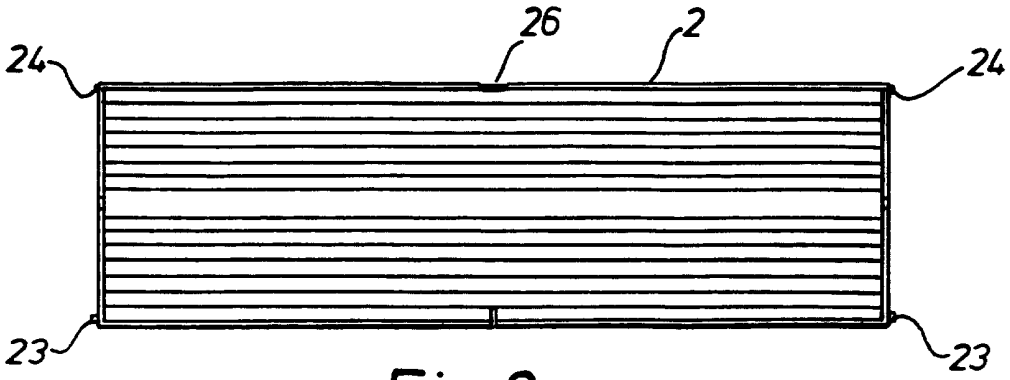


Fig.8.

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LUMINAIRES

This invention relates to luminaires. In particular, but not exclusively, it relates to emergency luminaires.

Emergency luminaires can be fairly bulky items, incorporating light elements, electronics and back-up power sources and can be obtrusive when affixed to a ceiling or other support. It is therefore sometimes desirable to recess an emergency light.

A typical known recessed emergency light has a rim or flange which is integrally connected to a body portion which comprises the electronics, light element, etc. The light is placed inside a prepared hole in a ceiling with the rim or flange resting against the bottom surface of the ceiling and has to be secured to the ceiling. It is then very difficult to actually secure the luminaire to the ceiling. It is generally not possible to screw directly into ceiling tiles or boards so it is usually necessary to provide further battens or supporting braces. Furthermore, access then has to be obtained to the ceiling space to secure the luminaire. This often necessitates securing access from the floor above which can be time consuming and troublesome.

The present invention arose in an attempt to provide an improved recessed type luminaire which overcomes the above problems.

According to the present invention in a first aspect there is provided a recessable luminaire, comprising a rim portion adapted for affixing to a support surface and a separate, detachable, bulkhead portion, bearing functional components for the luminaire and being detachably located within the rim portion.

Preferably, the bulkhead portion is secured within the rim portion by a snap-fitting so that it can be affixed or detached from within the body.

According to the present invention in a second aspect there is provided a luminaire comprising a portion adapted for affixing to a support surface, a clamp means, and a screw means, the clamp means comprising a clamping surface and a ratcheting means for receiving the shaft of the screw means longitudinally such that relative motion of the screw means and clamp means is possible one way by axial pressure or screwing and the other way only by screwing.

The ratcheting means may comprise a V-slot and may be formed by a pair of resiliently mounted fingers.

The luminaire may be clamped directly onto a surface such as fibreboard or a ceiling tile, using the clamp means without the need for additional battens or braces.

According to the present invention in a third aspect there is provided a luminaire comprising a body portion, and a diffuser or lens comprising means for allowing it to be mounted to the body in two alternative dispositions, such that it is pivotable outwards in each of the two dispositions.

According to the present invention in a fourth aspect there is provided a luminaire comprising any one or more of the novel features herein described.

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 shows an assembled luminaire;

Figure 2 shows a luminaire in situ;

Figure 3 shows a bulkhead portion of the luminaire being inserted into a rim portion;

Figure 4 shows a clamping member;

Figure 5 shows a side view of the clamping member of Figure 4;

Figure 6 shows the clamping member used to clamp

the rim portion of the luminaire into place;

Figure 7 shows a front view of the luminaire with diffuser in a pivoted open position; and

Figure 8 shows the diffuser.

It should be noted that in practice the luminaire is generally mounted to a ceiling and so will usually be inverted compared to the position shown in the drawings which are shown in an inverted disposition by way of clarity only. Alternatively, the luminaire may be mounted in a wall or other supporting structure.

As shown in Figures 1 and 2, the luminaire comprises a rim portion 1 mounting a diffuser plate 2. Rim portion 1 has a peripheral flange part 3 which in use secures over the edges of a hole in a ceiling or other surface in which the luminaire is to be mounted. The flange part may have an arcuate profile as shown for a pleasing appearance. Spaced a distance inwards from the flange 3 is a wall part 4 which is sized to fit within the aperture of the ceiling. A separate bulkhead 5 is sized to fit within wall 4 and to be detachably received therein. The bulkhead portion contains the functional components of the luminaire, such as the light source (usually a discharge type tube), control electronics and the back-up battery if the luminaire is for emergency use. Connections are also made through the bulkhead to external cabling. These functional components and external cabling are not shown in the figures.

The bulkhead is detachably affixed within the rim by a symmetrical clipping arrangement described further below. This enables the bulkhead moulding to be clipped in either orientation into a rim.

To install a luminaire according to the present invention, a hole of suitable size is first prepared in a ceiling, by cutting ceiling tiles or by cutting the fibre board forming the ceiling for example. The rim portion 1

is then fixed in place using clamp means 6 shown schematically in Figure 2 but described in more detail below. The method of fixing is such that it can be done entirely from below the ceiling and does not require any additional access to the ceiling. In particular, it does not require any access from above the ceiling as is required in many prior art luminaires. The rim is secured, by virtue of the clamping mechanism according to the invention, directly to ceiling tiles/boards, etc 7. Once the rim has been installed, then the bulkhead part may be simply snapped in place, in either of two dispositions 180° apart.

This has several significant advantages: firstly, a standard product may be made and then a number of product variations can be made by altering the design of the bulkhead inside the standard rim, and/or by replacing the lens within the recessing rim. The bulkhead can then be clipped in either orientation as described. For the actual installation, the rim can be mounted to the ceiling and an electrician can then either clip in the bulkhead and then make electrical connections to the bulkhead from cabling within the ceiling cavity, or may make the locations firstly within the bulkhead and then clip it into the rim. Thus, several options are possible for ease of installation. The bulkhead itself can then easily be removed by unclipping it from the rim at any time, leaving the rim in situ, for maintenance, replacement or substitution by a different type of bulkhead for example. A further advantage is that the rim moulding can be installed by a "non-electrician", eg. a plasterer, during construction of the ceiling itself for example. The rim moulding will usually have no electrical connections. The bulkhead may then be connected during a second phase by an electrician or other technician. A further advantage is that the bulkhead is clipped

in/removed from the "underside" (that is below the ceiling) of the product. Thus, the rim can remain in situ at all times during maintenance.

Figure 3 shows schematically a cross-section during a stage in installation, in which the bulkhead 5 is being mounted within rim 1. The figure also shows the diffuser element 2 in an opened, pivoted, position, enabling installation of the bulkhead into the rim. As is shown in the figure, the diffuser may include a fresnel type lens structure for enabling direction and focussing of light. The pivoting and mounting mechanism of the lens 2 within rim 1 is described further below.

Figure 3 also illustrates the means for snap-fitting or clipping the bulkhead 5 into wall 4 of rim 1. The wall part 4 is provided with an in-turned lip portion 8 extending around its lower surface. Spaced above this are a symmetrically arranged plurality of protrusions 9. In one embodiment, two protrusions are provided down each long side of the rim member. Protrusions 9 have a relatively narrow top portion and slope down to a wider bottom portion as shown in Figure 3.

Bulkhead 5 is provided with a channel-forming peripheral part 10 at its top surface. The bulkhead moulding 5 is of a plastics material and possesses sufficient resilience that during installation the walls 11 can flex sufficiently to enable channel portion to pass protrusions 9 and to spring outwards to lodge and be secured between protrusions 9 and lip 8. To facilitate this, the channel 10 may be provided with one or more ledge portions spaced along the underside of channel part 10 at positions corresponding to protrusions 9. Immediately below each of protrusions 9 in wall 4 of the rim part there is formed an open ended slot 12, as shown in Figure 2. The bulkhead 5 sits between lip 8 and protrusions 9 in use. To remove bulkhead 9, a screwdriver

or other means may be used to flex its side walls 11 inwardly, and thereby to free channel portion 10 from protrusions 9. Other snap-fit mechanisms may be used.

In order to clamp the rim member 1 onto the ceiling surface adjacent to the prepared hole, a combination of screws and clamping means, as shown in Figure 4, are desirably used in embodiments of the present invention. The clamping member 6 shown in Figure 4 includes a pair of resilient finger portions 13, 14 which extend generally downwardly from a planar portion 15 toward each other. At their adjacent ends, the fingers 13 and 14 are bifurcated and spaced apart slightly. An enlarged central gap 16 is also formed between them by the gaps between the bifurcations of each finger. This gap is suitable to allow the entry of the point of a screw 17. It is seen from Figure 4 that fingers 13 and 14 are generally resiliently biased such that if pressure is exerted in direction A, that is, away from face 15, they will flex such that their angle increases with respect to face 15 and this will tend to open the gap 16 between them. However, they will tend to spring back to the position shown in the figure if allowed. However, only a small degree of movement can be achieved in the opposite direction, to bring their ends towards face 15, since their bifurcated portions 18 will abut, resisting any additional movement. Thus, if a screw or other threaded object is inserted between the fingers, in the direction A, the fingers can displace outwardly as the threaded object is simply pushed through longitudinally to pass each pitch of the thread without substantial resistance. The screw could also, of course, be screwed by a screwing action through the fingers. It will not, however, be possible to withdraw the screw in a direction 180° to that of arrow A by merely pulling; it is instead necessary to rotate the screw in an unscrewing action. Thus, the

fingers achieve a ratcheting action in which generally axial movement in one direction is relatively freely possible yet such axial movement is not possible in the other direction.

The clamping member 6, which is preferably manufactured as a single one piece plastics moulding, also comprises a clamping surface 17, as shown more clearly in Figure 5, which has a grooved profile and this surface is used to clamp onto a ceiling tile or other support. At the opposite end to that bearing the clamping surface 17, the clamping member 6 is provided with a surface 18 which extends at generally 90°, away from fingers 13 and 14 and which includes extended end portions 19 and 20. Portions 19 and 20 are intended as "cut off" areas, the length of which can be cut off to suit different sizes (ie. depths) of ceiling tile or other support.

In preferred embodiments of the invention, the clamping member 6 may also be provided with a generally arcuate portion 21 extending outwardly from the face 15 in the same direction as fingers 13 and 14, and two slots 22 (of which one is not shown) either side of this. Part 15 is shaped such that a screw 17 can be supplied with the product, held by parts 15 and with its enlarged head lying in one of slots 22. Thus, an entire luminaire assembly can be stored and distributed, which assembly contains all the components necessary to install it, that is, a rim and lens, a bulkhead, two clamps 6 and two accompanying screws. The screws are preferably number 8 wood screws, although other types of screws may be used. The term 'screw' is to be construed widely and is intended to mean any elongate member having an external thread.

The fingers may be viewed as a semi-rigid "V" slot and other methods of achieving such a V-slot with a ratcheting action, whether with a V-slot or otherwise, may be envisaged and are within the scope of the present

invention.

Figure 6 illustrates the use of the clamp 6. Each rim portion 1 includes an opposed pair of counter sunk holes 22 at its short ends. These are preferably positioned such that in use they are on a ledge which is underneath the pivoting lens so as not to show in the finished product. After rim 1 has been placed into its desired position, a clamping member 6 is fed by hand through the hole in the centre of the rim and held in place with wall 18 lying adjacent wall 4 of the rim. Screw 17 is then applied through counter sunk hole 22, through the rim 1, into the V-slot formed by fingers 13 and 14. The clamp 6 can then be pushed by finger pressure onto the screw 17 such that it lies loosely with the free edges of parts 19 and 20 lying against the ledge 23 of the rim and with a ceiling tile clamped between the member 6 and the rim. Parts 19 and 20 should have been previously cut to size to match the depth of the ceiling tile such that when the clamp lies in this disposition it is of suitable length to clamp against the tile. Due to the ratcheting action, only finger pressure is necessary to loosely make the clamp clamping action. Once this has been achieved, the screw 17 may then be tightened and this draws the clamp tightly against the under surface of the rim and tightly against the ceiling tile 7 so as to clamp the ceiling tile between the rim and the clamping member 6. As shown in the figure, the grooved portion 17 of the clamping member may tend to bite slightly into the ceiling tile and this improves the clamping. The rim is then securely held on and cannot be removed other than by unscrewing screw 17. The rim will initially be clamped without a bulkhead in place to enable easy access of the hand to hold a clamp 6 in place. The bulkhead 5 will then be secured into place by snap-fitting as described above.

As described, the facility to cut off parts of

legs 19 and 20 of the clamping member 6 enables the same components to be used with a range of tile sizes. In one example, a clamp may be optimised for a ¾" thick tile but when trimmed can be used on 3/8" tiles without having to change the screw. This facilitates distribution and ease of installation.

The clamp tends to ratchet down the length of the screw, clamping the rim securely to the ceiling tile. This means that the rim can be installed from below the ceiling without the need for supporting battens, braces etc, since it is not necessary to screw directly into a surface such as a ceiling surface. All the installation can be completed from within the aperture.

Figure 8 shows the diffuser plate or lens which is pivotally attached to the rim. The lens 2 comprises, at each end, a pivot 23 and a protrusion or bump 24. Thus, a pair of bumps 24 and a pair of pivots 23 are provided in opposed positions as shown. The rim has an inner ledge which is shaped symmetrically such that the pivots 23 can be placed on either of the long surfaces, such that the pivoting lens can be pivoted from either side of the rim moulding. Thus, the position of the lens may be rotated by 180°.

This can be particularly useful where, for example, legends, such as labels, are affixed to the diffuser plate or lens since sometimes these may be inadvertently placed the wrong way round, in which case, with previous designs, the whole of the luminaire assembly would then have to be rotated to cause the legend to be viewed correctly. Correct disposition of such legends is very important for emergency luminaires where the legends may be exit signs, emergency signs or others and must be correctly viewed. The lens or diffuser has moulded in pivot pins on one side and retaining "bumps" on the other. The rim 1, provided with two pairs of slots 25, one pair at

each end, for receiving pivots. When the lens is clipped into one of a pair of slots 25 on the rim, the bumps latch into slots on the other side of the rim. If the lens were rotated through 180°, then the same would happen, albeit that a different pair of slots would be used. This is shown in Figure 7. The figure also shows quite clearly the ratcheting fingers 13 and 14, forming the V-slot, with an inserted screw 17.

The lens/diffuser is provided, midway along each long edge, with an L-shape resilient catch 26. The rim is provided with corresponding slots 27 (shown in Figure 2 for example), so that whichever disposition the lens is mounted in, the protrusion which is on the same side as the pivot rotates into the corresponding slot and the other protrusion snap-fits into the respective other slot by resilient action.

CLAIMS

1. A recessable luminaire, comprising a rim portion adapted for affixing to a support surface and a separate, detachable, bulkhead portion, bearing functional components for the luminaire and being detachably located within the rim portion.

2. A recessable luminaire as claimed in Claim 1, wherein the bulkhead portion is secured within the rim portion by a snap-fitting so that it can be affixed or detached from within the body.

3. A recessable luminaire as claimed in Claim 1 or Claim 2, wherein the rim portion is affixed to the support surface by means of a clamp means, and a screw means, the clamp means comprising a clamping surface and a ratcheting means for receiving the shaft of the screw means longitudinally such that relative motion of the screw means and clamp means is possible one way by axial pressure or screwing and the other way only by screwing.

4. A luminaire comprising a portion adapted for affixing to a support surface, a clamp means, and a screw means, the clamp means comprising a clamping surface and a ratcheting means for receiving the shaft of the screw means longitudinally such that relative motion of the screw means and clamp means is possible one way by axial pressure or screwing and the other way only by screwing.

5. A luminaire as claimed in Claim 3 or Claim 4, wherein the ratcheting means comprises a V-slot.

6. A luminaire as claimed in Claim 5, wherein the V-slot is formed by a pair of resiliently-mounted fingers.

7. A luminaire as claimed in any preceding claim, wherein a diffuser or lens is provided which comprises means for allowing it to be mounted to the luminaire in two alternative dispositions, such that it is pivotable outwards in each of the two dispositions.

8. A luminaire as claimed in Claim 7 when dependent

upon Claim 1, 2 or 3, wherein the diffuser or lens is mounted on the rim portion.

9. A luminaire comprising a body portion, and a diffuser or lens comprising means for allowing it to be mounted to the body in two alternative dispositions, such that it is pivotable outwards in each of the two dispositions.

10. A luminaire substantially as hereinbefore described with reference to, and as illustrated by, any of the accompanying drawings.

The Patent Office

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Application No:	GB 9706221.0	**Examiner:**	Philip Silvie
Claims searched:	4	**Date of search:**	8 September 1998

Patents Act 1977
Further Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): E2A (ACAT, AGD, AGKFH, AGKFJ)

Int Cl (Ed.6): F16B (2/12, 37/08); F21S (1/02, 1/03)

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
Y	GB 2 155 534 A	(RAYMOND) see page 1, lines 41-46	4
Y	GB 2 145 462 A	(TUCKER) see page 2, lines100-102	4
Y	US 5 409 323 A	(RESINFORM) see column 2, lines 29-36	4
Y	US 4 188 854 A	(SLATER) see column 2, lines 12-19	4
Y	US 4 048 491 A	(WESSMAN) see figs. 2,3	4
Y	US 3 872 296 A	(LIGHTOLIER) see column 2, lines 26-43	4

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.

The Patent Office

Application No:	GB 9706221.0	**Examiner:**	Jason Scott
Claims searched:	1-3	**Date of search:**	8 June 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): F4R (RMR, RFP, RL)

Int Cl (Ed.6): F21S (1/02, 3/02)

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	US 5581448	HARWOOD See column 4, line 51- column 5, line 15.	1
X	US 5121309	HOLOPHANE See column 3, lines 57-61 and figure 5.	1
X	US 4315302	KEENE See column 2, line 50 to column 3, line 6.	1
X	US 3883732	PETERSON & GRINDLE See column 2, lines 9-30.	1
X	US 3872296	LIGHTOLIER See column 1, lines 29-37.	1

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.

The Patent Office

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Application No: GB 9706221.0 **Examiner:** Jason Scott
Claims searched: 9 **Date of search:** 27 August 1998

Patents Act 1977
Further Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): F4R (RL, RE, RCGA, RFT, RMR, RFM, RFN)

Int Cl (Ed.6): F21S (1/00, 1/02, 3/02)

Other: Online : WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	US 3810085	LIGHTOLIER See column 2, lines 3-14 & figure 2	9

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.