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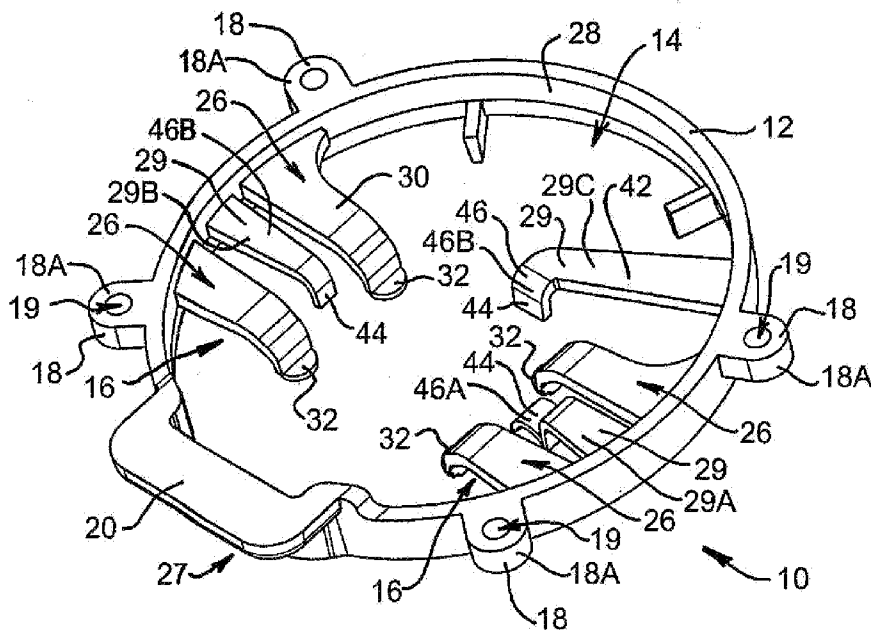
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(54) Title: ASSEMBLY INCLUDING A FASTENING DEVICE



(57) Abstract: The present invention generally relates to a fastening assembly including a fastening device for fastening a component onto a support. The fastening device comprises a mounting section which is securable into a fixed position relative to the support; at least two resilient fastening fingers extending from the mounting section. The at least two fastening fingers abut and engage the component in at least two spaced apart locations. Each finger exerts a clamping force thereby clamping the component in a fixed position on the support. In an exemplary application, the fastening device is used to clamp a component within a light fixture.

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ASSEMBLY INCLUDING A FASTENING DEVICE

Field of the Invention

5 The present invention generally relates an assembly which includes a component, a support, and a fastening device for fastening the component to the support. In an exemplary application, the invention is used in underwater light fixtures to mount a light element and a heat sink arrangement within the light fixture and it will be convenient to hereinafter disclose the invention in
10 relation to that exemplary application. However, it is to be appreciated that the invention is not limited to that application and can be used in any number of devices where a component is fasten onto a surface.

Background of the Invention

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 The following discussion of the background to the invention is intended to facilitate an understanding of the invention. However, it should be appreciated that the discussion is not an acknowledgement or admission that any of the material referred to was published, known or part of the common general
20 knowledge as at the priority date of the application.

 Underwater light fixtures for use in swimming pools, spas, fountains, ponds or the like typically consist of a waterproof housing enclosing a light source. A recent development in this field is the use of ceramic light engines, a
25 light emitting diode (LED) encased in a ceramic structure, as the light source. These types of light sources are much brighter, have a longer life span and are more compact than conventional halogen globes. However, the increased brightness of the ceramic light engine also produces substantial heat. It is therefore necessary to mount the ceramic light engine onto a heat sink in order
30 to facilitate cooling of the light engine. One side of the heat sink is typically arranged to contact water.

 When attaching the ceramic light engine to the heat sink, it is preferable that the fastening means does not affect the waterproofing of the underwater

light fixture. Most conventional fasteners such as screws, bolts or other projection type fasteners require a bore hole to be made in the heat sink into which the fastener can be secured. However, any such bore hole has the potential of forming a fluid pathway through which water can leak into the light fixture.

It would therefore be desirable to provide an assembly which could provide an alternative arrangement for mounting or otherwise fastening a component, such as a ceramic light engine, onto a support, such as a heat sink used within an underwater light fixture.

Summary of the Invention

According to the present invention, there is provided an assembly including a component, a support, and a fastening device for fastening the component to the support, the fastening device comprising:

a mounting section which is securable into a fixed position relative to the support; and

at least two resilient fastening fingers extending from the mounting section, the at least two fastening fingers abutting and engaging the component in at least two spaced apart locations in a manner to clamp the component in a fixed position on the support.

The assembly of the present invention therefore includes a fastening device which provides a non-destructive means of mounting a component onto a support or mounting surface rather than a destructive method such as screwing, welding or the like which can damage the structure of the support. In this respect, the fastening device fastens the component onto the support by exerting a clamping force onto the component to clamp at least two portions of the component between the resilient fastening fingers and the support. This is an indirect fastening method as compared to conventional fasteners such as screws and bolts, which directly screw into and/or through the component and into the support.

In some embodiments, it may be necessary to locate the component on the support in a certain position. It is therefore preferable for the assembly to further include a locating means for positioning the component in a predetermined location on the support. The location means can take many forms. In one form, the locating means can be provided separately from the fastening fingers. In one preferred form, the locating means includes one or more locating fingers which extend between the mounting section of the fastening device and the component. However, it should be appreciated that the fastening fingers can also act as a locating means for positioning the component in a predetermined location on the support. In such an embodiment of the invention, the fastening fingers can be configured to abut and engage both a top portion and/or side portion of the component.

The fastening fingers can include any number of sections or protuberances which abut the component. It is preferable however for each fastening finger to include a distal end which abuts and engages with a portion of the component. Each finger can therefore exert a clamping force on the component through the distal end to clamp the component between the distal end of the finger and the support. More preferably, the component has an inwardly facing surface for facing the support, an opposite outwardly facing surface and at least one side portion. At least one fastening finger can therefore be configured to abut and engage both a portion of the outwardly facing surface and a side portion of the component. More preferably, at least one fastening finger has a distal end, such that the distal end of at least one fastening finger having a distal end abuts and engages both a portion of the outwardly facing surface and the side portion of the component.

Many configurations of the distal end of each fastening fingers are possible. However, it is preferable for the distal end of at least one fastening finger having a distal end to include a flange arranged to engage a portion of an outwardly facing surface of the component, i.e. a surface of the component which does not face the support to which the component is fastened. More preferably, the distal end includes two or more engagement or locating parts and for example, the outwardly facing surface of the component can be

engaged by a first engagement part, such as a flange, to engage and exert a clamping force on the outwardly facing surface of the component. Moreover, in order to provide a locating function, the distal end of at least one fastening finger having a distal end can also include a second engagement part, such as
5 a projection, arranged to engage a side portion of the side of the component. It is preferable that the projection includes an engagement surface which faces and is arranged to abut a side edge or surface of the component. In those embodiments which include both a flange and a projection, it is preferred that the distal end of at least one fastening finger having a distal end includes a
10 stepped structure having a flange arranged to engage a side portion of the component.

The component which is clamped onto the support can also include features which enhance the clamping and/or locating functions of the fastening
15 device.

In some embodiments, the component includes at least one recessed portion, preferably a recessed side portion, configured to receive the distal end of at least one fastening finger having a distal end. The distal end of at least
20 one fastening finger can be preferably configured to be received in the recessed portion of the component. Preferably, the projection also engages an edge surface of the recess for locating the component.

In some embodiments, the recessed portion includes a tapered or
25 ramped edge area configured to be positioned under a portion of the distal end of at least one fastening finger having a distal end. The tapered or ramped edge area of the recessed portion is preferably wedged under the distal end of a fastening finger. More preferably, the tapered or ramped edge area of the recessed portion is wedged under the first engagement part of the flange of the
30 fastening finger. The or each recessed portion can be formed at an edge or edges of the component, or inboard of the edges, or a combination of both. Each recessed portion can be of any suitable shape, but preferably they are curved, such as semi-circular.

Further finger members can be included in the fastening device to abut the component or further components (a second component, a third component or the like) which need to be fastened or otherwise mounted on or proximate to the support. In this respect, the fastening device can further include at least
5 one locating finger which abuts a portion of a further component, thereby locating the further component on or in a fixed position relative to the support. In some embodiments, the fastening device further includes one or more further fastening fingers for clamping a second component in a fixed position on the support.

10

In one preferred arrangement, the assembly includes a fastening device having four fastening fingers and at least one (preferably two) locating fingers. The four fastening fingers each engage an outwardly facing surface of the component to clamp the component to the support. For a component that is
15 square or rectangular, the fastening fingers can engage at or adjacent the corners of the component. Further fastening fingers can engage the component between one or more pairs of corners. The locating finger can locate a further component, such as a resistor, portion of a circuit board, transistor, diode or the like. That location can occur at the edge of the component, over the edge
20 thereof, or to the side, or the location can be inboard of edges thereof.

The mounting section is preferably secured to a structure, part, object or housing which has a fixed position relative to the support. In order to facilitate securing the mounting section in a fixed position, the mounting section
25 preferably includes one or more fastening points for fastening the mounting section in a position relative to the support. The fastening points are preferably configured to fit fasteners which can be fastened to or within a corresponding structure or housing.

30 The mounting section provides a framework or structure from which the fastening fingers extend, to abut and engage the component. It is therefore preferable that the mounting section forms a perimeter around part of or all of the component. More preferably, a portion of the mounting section encircles the component, such as forming a perimeter portion arranged in any suitable

configuration or shape around the perimeter of the component. In this arrangement, the mounting section can form a ring configured to substantially surround the component. In this arrangement, it is preferable for the fastening fingers to be circumferentially spaced around the circumference of the ring.

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In one exemplary embodiment of the invention, the assembly according to the present invention includes a ceramic light engine component, a heat sink support and a fastening device. The fastening device is used to fasten the ceramic light engine component onto the heat sink support. In this
10 embodiment, it is preferable that the fastening device is constructed of a material which can withstand temperatures of up to 80°C and more preferable up to 100°C. Furthermore, in some embodiments a conductive substance is provided between the heat sink and the component. This conductive substance enhances heat transfer from the component to the heat sink. The conductive
15 substance can be a silicon and/or metal powder formulation, paste or sheet.

As can be appreciated, the assembly of the present invention can be assembled as part of a larger structure. In some embodiments, the support is mounted in a housing. The mounting section can therefore be secured to a
20 portion of the housing. Preferably, the housing forms part of a larger apparatus such as a light fixture, electronic device or the like. More preferably, the housing forms part of an underwater light fixture.

According to another aspect of the present invention there is provided a
25 fastening device for fastening the component to the support, the fastening device comprising:

a mounting section which is securable into a fixed position relative to the support; and

at least two resilient fastening fingers extending from the mounting
30 section, the at least two fastening fingers abutting and engaging the component in at least two spaced apart locations in a manner to clamp the component in a fixed position on the support.

Brief Description of the Drawings

5 The present invention will now be described with reference to the figures of the accompanying drawings, which illustrate particular preferred embodiments of the present invention, wherein:

Figure 1 is a top perspective view of a fastening ring which forms part of
10 one preferred embodiment of the assembly according to the present invention.

Figure 2 is a bottom perspective view of the fastening ring shown in Figure 1.

15 Figure 2A is a magnified view of one clamping finger shown in Figure 2.

Figure 3 is a view of the one side of the fastening ring shown in Figure 1 with a light engine component mounted on each clamping finger.

20 Figure 4 is a top view of the fastening ring and light engine component shown in Figure 3.

Figure 5 is a view of front of the fastening ring and light engine component shown in Figure 3 with the light engine shown in cross-section along
25 line A-A of Figure 4.

Figure 6 is an exploded perspective view showing the orientation of the fastening ring shown in Figure 1 relative to a ceramic light board which is to be fastened to a heat sink to form an assembly according to one preferred
30 embodiment of the present invention.

Figure 7 is an exploded side view showing the relative orientations of each of the components of the underwater light which incorporates the fastening ring shown in Figure 1.

Detailed Description

5 Referring to Figures 1 to 4 there is illustrated a fastening ring 10 which forms part of one preferred embodiment of the assembly according to the present invention. The illustrated fastening ring 10 comprises two main portions, being a mounting ring 12 forming generally circular enclosure around a fastening space 14 and a series of finger members 16 which extend inwardly
10 from an inner surface of the mounting ring 12 to predetermined positions within the fastening space 14.

The mounting ring 12 consists of a substantially cylindrical section formed from resilient plastic. Spaced around one edge of the mounting ring 12
15 are four fastening lugs 18. Each of the fastening lugs 18 extend outwardly from an upper exterior edge of the fastening ring 10, and are positioned on opposite sides of the mounting ring 12. Each fastening lug 18 comprises a generally rectangular projection having a rounded distal end 18a. A bore hole 19 is situated in the centre of each lug 18, through which a fastener (not illustrated)
20 such as a screw, nail, rivet or plug can be inserted in order to secure the fastening ring 10 to a further structure or housing. The mounting ring 12 also includes an elongate front lip 20 which extends outwardly from an upper edge (as viewed in Figures 1 and 2) at the front side of the mounting ring 12. The front lip 20 extends over an archway 22 which borders an opening in the body
25 of the front of the cylindrical section of the mounting ring 12. The perimeter of the archway 22 is reinforced by shoulders 24 and 25, each of which are positioned either side of the opening 27. The archway 22 is configured to fit over a rectangular component (power coupling 81 shown in Figure 7) used in a circuit of an underwater light fixture 70.

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Each finger member 16 is integrally formed with the mounting ring 12 and these are formed (typically moulded) from the same resilient plastic. Each finger member 16 consists of an elongate member that extends from an inner surface of the cylindrical portion of the mounting ring 12 to a distal or free end

which is configured to abut and/or engage a particular portion of a component, as will be described in more detail later in the specification.

5 The finger members 16 can be generally classified in two functional groups, clamping fingers 26 which are used to clamp a component on a support (such as 60 in Figure 6) and locating fingers 29 which are used to locate and hold a component in position within the fastening space 14 of the fastening ring 10. The clamping fingers 26 can also have a holding effect on a component to which they are applied.

10

As shown in Figures 1 to 6, four clamping fingers 26 are provided for fastening and locating a component on a support 60 (Figure 6) in a particular position within the fastening space 14. In the illustrated embodiment, the clamping fingers 26 are positioned in two pairs on opposite sides of the mounting ring 12. Each of the pairs of clamping fingers 26 are spaced apart around the circumference of the ring 12 on that side of the mounting ring 12. Each pair of clamping fingers 26 is orientated on the inner surface 28 of the mounting ring 12 in positions which mirror the positions of the clamping fingers 26 on the opposite side of the mounting ring 12. As can be appreciated, this configuration is necessitated by the configuration of the ceramic light engine component 50 (best illustrated in Figures 4 and 6) that the fastening ring 10 is designed to clamp onto a support 60. In this case, ceramic light engine 50 (as best shown in Figures 4, 6 and 7) has a generally square shape, and therefore necessitates that the distal or clamping ends 32 of each clamping finger 26 form a square configuration within the fastening space 14. It should be appreciated however, that the clamping fingers 26 could extend from any location around the circumference of the mounting ring 12 and the distal ends 32 thereof could be located in the fastening space 14 at any location required to clamp a component within that space 14.

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As best illustrated in Figure 2A, it can be seen that each clamping finger 26 consists of elongate section 30 which is integrally connected to a location at the inner surface 28 of the mounting ring 12. The elongate section 30 extends perpendicularly to the inner wall 28 of the mounting ring 12. The elongate

section 30 extends substantially the operative length of the clamping finger 26. At the distal end 32 of each clamping finger 26, the elongate section 30 curves downwardly (as shown in Figure 1) with respect to the central axis of the fastening ring 10 over about a 90 degree angle to locate the distal clamping section 32 of the clamping finger 26 at a clamping height, suitable for engaging the top or outwardly facing surface of a component, in this case the light engine 50. The clamping section 32 comprises a generally half circular member extending generally parallel to the elongate panel section 30. As best illustrated in Figures 2A, 3 and 5, the clamping section 32 has a step like configuration formed from a flange portion 34 and a projection 36. The projection 36 extends proud of the flange portion 34. Both the flange portion 34 and projection 36 have a half circular shape, with the radius of the projection 36 being generally half that of the flange portion 34.

As best illustrated in Figures 2A, 3 and 5, a C-shaped surface 38 of the flange portion 34 around the projection 36 is provided to engage an outwardly facing surface of the light engine component 50. This allows the clamping finger 26 to exert a substantially perpendicular directed clamping force onto the surface of the light engine component 50 through the surface 38. The projection 36 is designed to abut a side edge surface portion of the component 50. In this respect, the projection 36 has a curved front periphery 40 (Figure 2A) which is configured to contact the side edges of a similarly shaped recess 52 in the component 50. The component 50 can therefore be positioned in a fixed longitudinal and transverse orientation within the fastening space 14 as constrained by the positions of the projections 36. The height H (Figure 5) of the projections 36 should generally be less than the thickness T (Figure 5) of the component 50 in order to allow for a clamping force to be exerted by the clamping finger 26 between the flange surface 38 and the upper surface 62 of the support 60 (Figure 6) on which the component 50 is to be fastened by the fastening ring 10. As can be appreciated, the flange surface 38 would not exert a clamping force onto the component 50 if the height H of the projections 36 was greater than the thickness T of the component 50.

As can be most clearly seen in Figure 6, the light engine component 50 includes four recesses 52 which are configured to receive each of the respective projections 36 of the clamping fingers 26. Each recess 52 comprises a generally half circular notch having a tapered or ramped edge 54. The taper of the ramped edge 54 forms a downwardly directed slope from the top surface 55 to the lower surface 56 of the component 50. The ramped edge 54 is designed to engage the flange surface 38, with the taper allowing the distal clamping section 32 to translate at least some of the vertical clamping force exerted by the clamping finger 26 in a longitudinal and/or transverse direction, thereby enhancing the locating and clamping function provided by the fastening ring 10. Moreover, the diameter of the lower edge of the taper is designed to receive the projection 38, with the projection nesting in this recess 52 when the fastener 10 and component 50 is assembled in an apparatus, such as a light fixture 100 shown in Figure 7.

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Referring to Figures 1 to 5, three locating fingers 29 are provided for locating three different components (not illustrated) in a fixed position within the fastening space 14. In the illustrated embodiment, two locating fingers 29A and 29B extend from opposite sides of the circumference of the mounting ring 12, each being positioned between the pair of clamping fingers 26 respectively. A third locating finger 29C is located on the right hand side of the mounting ring (according to the orientation shown in Figure 1). It should be appreciated however, that the locating fingers 29 could extend from any location around the circumference of the mounting ring 12 and the distal ends 46 thereof could be located in the fastening space 14 at any location required to clamp a component within that space 14.

Still referring to Figures 1 to 5, it can be seen that each locating finger 29 consists of elongate section 42 which is integrally connected to a location at the inner surface of the cylindrical portion of the mounting ring 12. The elongate section 42 extends perpendicularly to the inner wall of the mounting ring 12. The elongate section 42 has a length substantially the same as the length of the locating finger 29. At the distal end 44 of each locating finger 29, the elongate section 30 curves downwardly (as shown in Figure 1) with respect to the central

axis of the fastening ring 10 over about a 90 degree angle to position a fastening section 46 of the locating finger 29 at a locating height, suitable for contacting, holding or abutting the top or outwardly facing surface of a component (not illustrated).

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The illustrated fastening section 46 is used to position and hold an item in place within the fastening space 14 once the fastening ring 10 is assembled on the support 60 (Figure 6). The fastening sections 46 of each of locating fingers 29A, 29B and 29C have one of two terminal configurations 46A or 46B. Each terminal configuration 46A or 46B is adapted to hold or otherwise contact a specific surface of a particular component. Locating finger 29A has a half pipe shaped fastening section 46A which is configured to abut the upper surface of a cylindrical shaped component such as a transistor, resistor or the like (not illustrated). Locating fingers 29B and 29C comprise the flat terminal end 46B, and are used to abut a flat surface, such as the upper surface of a circuit board or rectangular component (not illustrated). Unlike the clamping fingers 26 which require the use of two or more fingers 26 to clamp and locate a component such as the light engine 60, in many case only one locating finger 29 is required to locate that component in position within the fastening space 14. In this sense, the function of the locating fingers 29 is to locate the component in a fixed position within the fastening space 14 between the fastening section 46 and the support 60.

In one exemplary application, illustrated in Figures 6 and 7, the illustrated fastening ring 10 is used to locate and clamp a ceramic LED light engine 50 on to a circular support 60. The support 60, light engine 50 and fastening ring 10 are all assembled within a waterproof, underwater light fixture 70 as shown in Figure 7. As can be appreciated, the heat sink 60 is initially secured into position onto a section of the housing of the light fitting 70. In the illustrated case (Figure 7), the heat sink 60 is secured to the housing base plate 72 by inserting fastening screws 64 though mounting holes 68 circumferentially spaced proximate to the outer edge 68 of the heat sink 60. The screws 64 are then secured into cooperating threaded bore holes (not illustrated) in the housing base plate 72.

Assembly of the light engine 50 onto the heat sink 60 is best described with reference to Figure 6 which shows an exploded view of the fastening ring 10, light engine 50 and heat sink support 60. As illustrated, a conductive paste 65 (silicon and/or metal powder formulation) is painted on the upper surface 62 of the heat sink 60. The paste 65 is used to ensure good heat transfer between the light engine 60 and the heat sink 60. In order to clamp the light engine 50 onto the heat sink 60, the light engine 50 is first placed on the top surface of the support 60, as indicated by the arrow F. The fastening ring 10 is then brought into alignment with the light engine 50, with the projections 36 of the clamping fingers 26 aligned with the recesses 52 of the light engine 50. The other components to be held by the locating fingers 29 should also be positioned on the heat sink 60. As shown in Figure 7 these components are all located on or are attached to a control circuit board 80. In addition, power coupling 81 is inserted under the archway 22 of the fastening ring 10.

Thereafter, the fastening ring 10 is positioned onto the light engine 50 over the support 60 in the direction of arrow G and is secured into place into the housing of the light fitting 70, in this case housing base plate 72, using fastening screws (not illustrated) which are secured through each bore hole 19 of each lug 18 and into the corresponding threaded bore holes (not illustrated) in the housing base plate 72. Support 60 is seated on a ring seat 71 in order to correctly position the support on the housing base plate 72.

With the fastening ring 10 secured onto the support plate 60, the rest of the light fitting 70 can be assembled. Briefly, a seal 82 is assembled around the outer periphery 84 of the housing base plate 72, and then the upper housing section 86 and light lens 87 are secured together using screw fasteners 88 and 90. Installation is completed by installing power connector 91 onto the corresponding power inlet 93 on the base plate 72, fitting back plate 92 to the base plate 72. The light fixture 70 can be mounted on a wall by securing mounting plate 92A to a wall and then securing the assembled light fixture 70 onto the wall mounted mounting plate 92A.

Those skilled in the art will appreciate that the invention described herein is susceptible to variations and modifications other than those specifically described. It is understood that the invention includes all such variations and modifications which fall within the spirit and scope.

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Throughout the description and claims of the specification the word "comprise" and variation of the word, such as "comprising" and "comprises", is not intended to exclude other additives, components, integers or steps.

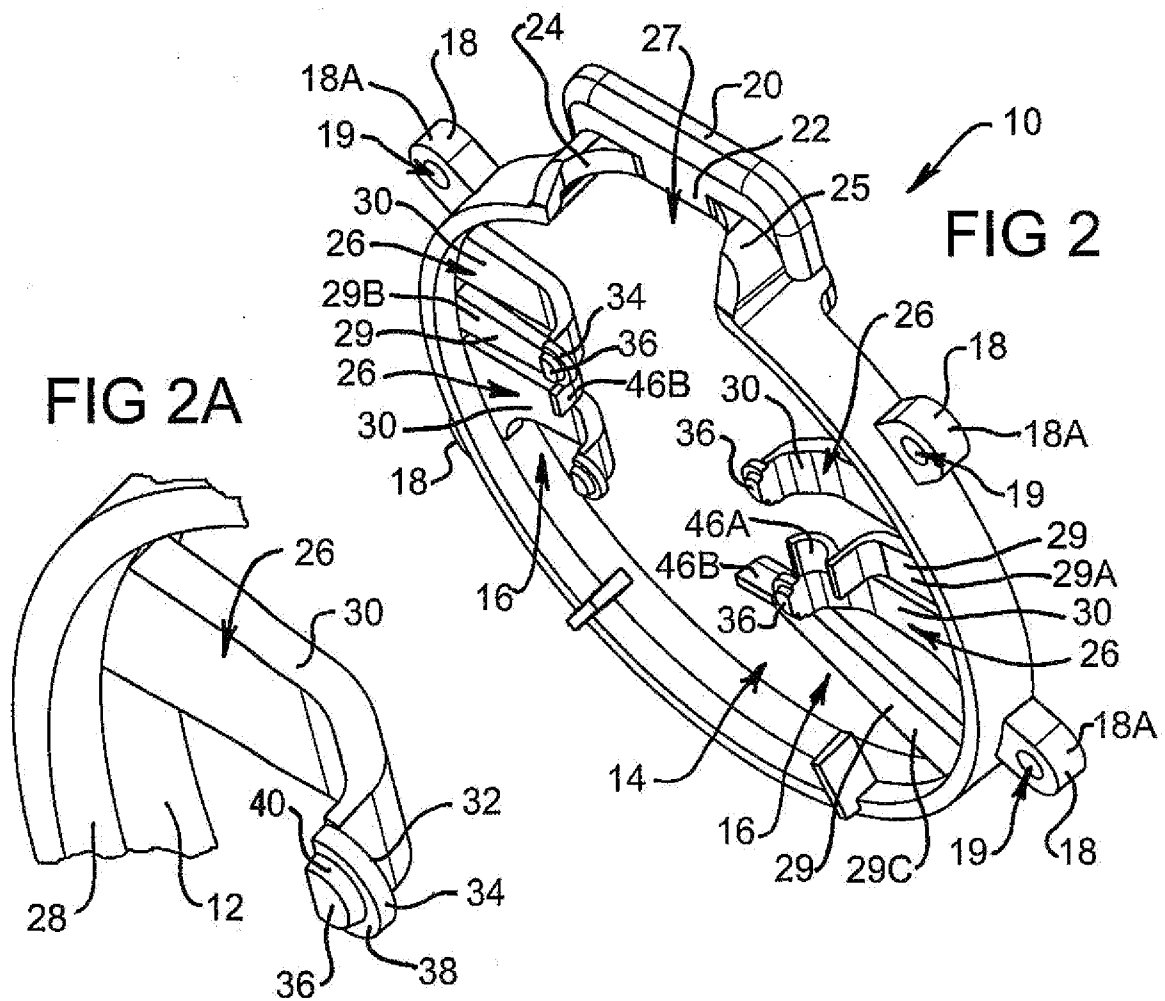
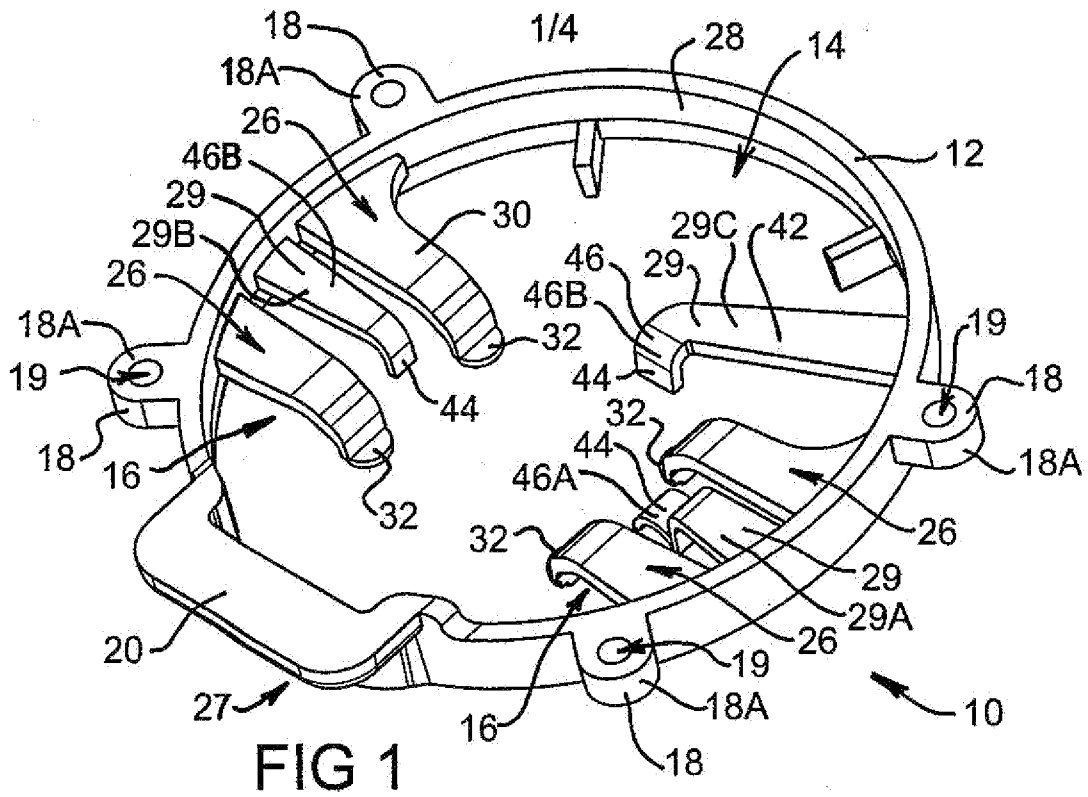
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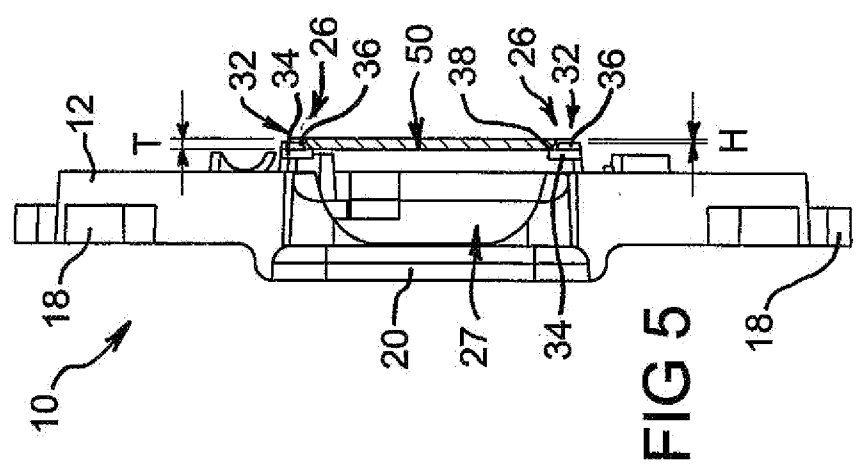
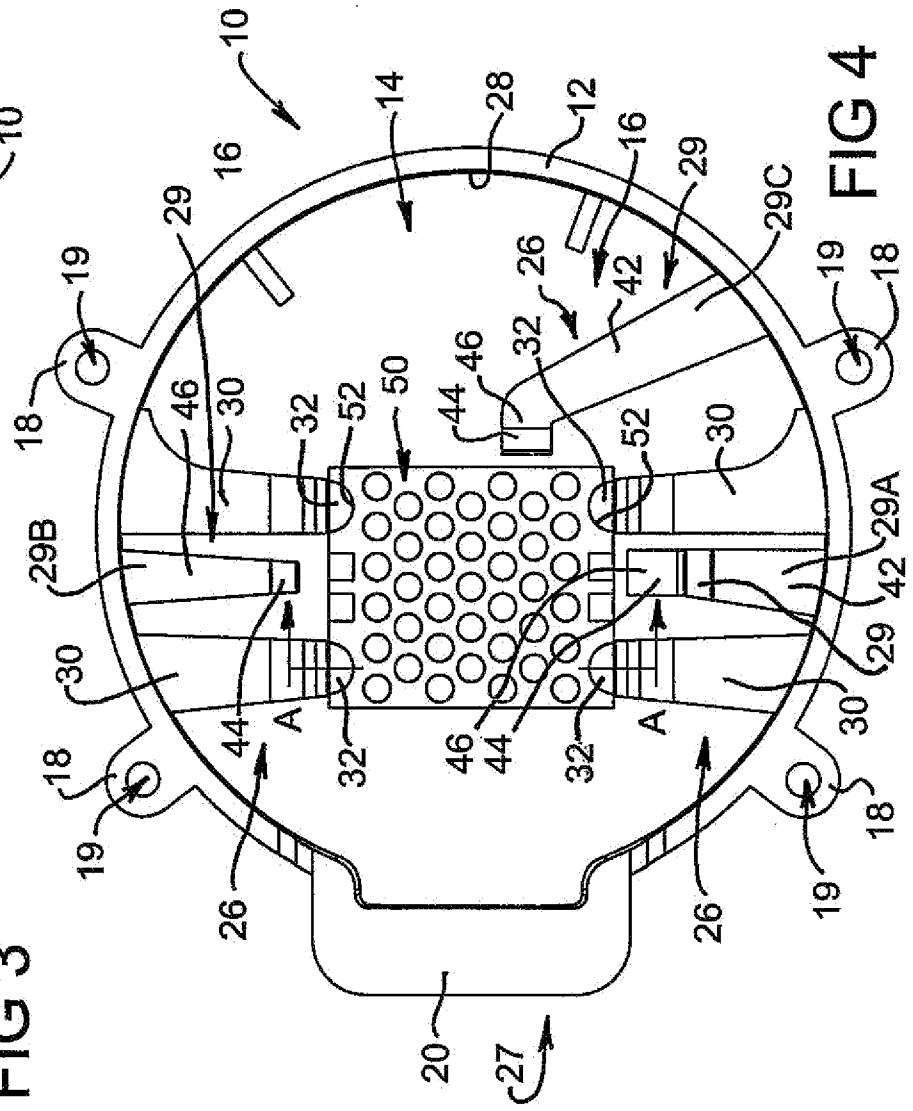
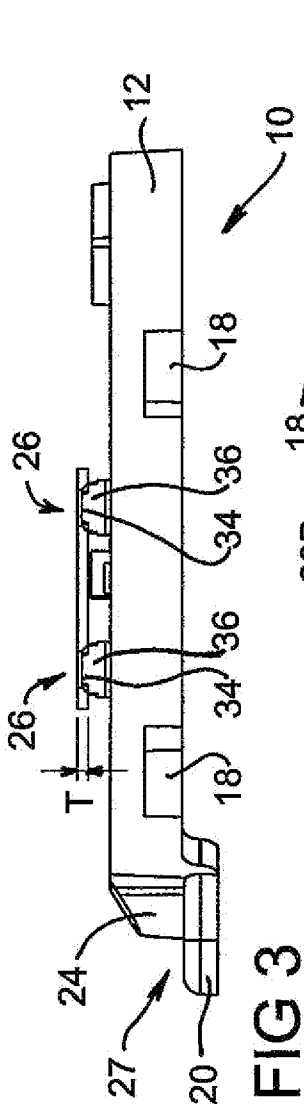
1. An assembly including a component, a support, and a fastening device for fastening the component to the support, the fastening device comprising:
 - 5 a mounting section which is securable into a fixed position relative to the support; and
 - at least two resilient fastening fingers extending from the mounting section, the at least two fastening fingers abutting and engaging the component in at least two spaced apart locations in a manner to clamp the component in a
 - 10 fixed position on the support.
2. An assembly according to claim 1, furthering including a locating means for positioning the component in a predetermined location on the support.
- 15 3. An assembly according to claim 1 or 2, wherein the locating means includes one or more locating fingers which extend between the mounting section of the fastening device and the component.
4. An assembly according to claim 2 or 3, wherein one or each of the
- 20 fastening fingers also acts as the locating means for positioning the component in a predetermined location on the support.
5. An assembly according to any one of claims 1 to 4, wherein at least one fastening finger includes a distal end which abuts and engages with a portion of
- 25 the component, each finger having a distal end exerting a clamping force on the component through the distal end to clamp the component between the distal end of the finger and the support.
6. An assembly according to claims 5, wherein the component has an
- 30 inwardly facing surface for facing the support, an opposite outwardly facing surface and at least one side portion, and whereby the distal end of at least one fastening finger having a distal end abuts and engages both a portion of the outwardly facing surface and the side portion of the component.

7. An assembly according to claim 6, wherein the distal end of at least one of the fastening fingers having a distal end includes a flange arranged to engage a portion of the outwardly facing surface of the component.
- 5
8. An assembly according to 6 or 7, wherein the distal end of at least one of the fastening fingers having a distal end includes a projection arranged to engage a side portion of the component.
- 10
9. An assembly according to any one of claims 6 to 8, wherein the distal end of at least one of the fastening fingers having a distal end includes a stepped structure having a flange surface arranged to engage a portion of the outwardly facing surface of the component and a projection arranged to engage a side portion of the component.
- 15
10. An assembly according to any one of claims 6 to 8, wherein the component includes at least one recessed portion configured to receive the distal end of at least one fastening finger having a distal end having a distal end.
- 20
11. An assembly according to claim 10 when appended to claim 8, wherein the projection of at least one fastening finger is configured to be received in the recessed portion of the component.
- 25
12. An assembly according to claim 10 or 11, wherein the recessed portion includes a tapered or ramped edge configured to be positioned under a portion of the distal end of at least one fastening finger having a distal end.
- 30
13. An assembly according to any one of the preceding claims, further including at least one locating finger which abuts a portion of a further component, thereby locating the further component on or in a fixed position relative to the support.

14. An assembly according to any one of the preceding claims, further including one or more further fastening fingers for clamping a second component in a fixed position on the support.
- 5 15. An assembly according to any one of the preceding claims, wherein the mounting section includes one or more fastening points for fastening the mounting section in a position relative to the support.
16. An assembly according to any one of the preceding claims, wherein a
10 portion of the mounting section forms a perimeter around the component.
17. An assembly according to claim 16, wherein the mounting section includes a ring configured to substantially surrounds the component.
- 15 18. An assembly according to claim 17, wherein the fastening fingers are circumferentially spaced around the circumference of the ring.
19. An assembly according to any one of the preceding claims, wherein the support includes a heat sink.
20
20. An assembly according to any one of the preceding claims, wherein a conductive substance is provided between the heat sink and the component.
21. A fastening device for use in an assembly according to any one of the
25 preceding claims.
22. An apparatus including an assembly according to any one of the preceding claims, the apparatus including a housing within which the support is mounted, the mounting section being secured to a portion of the housing.
30
23. An apparatus according claim 22, wherein the apparatus is a light fixture.
24. An apparatus according to claim 23, wherein the light fixture is an underwater light fixture.

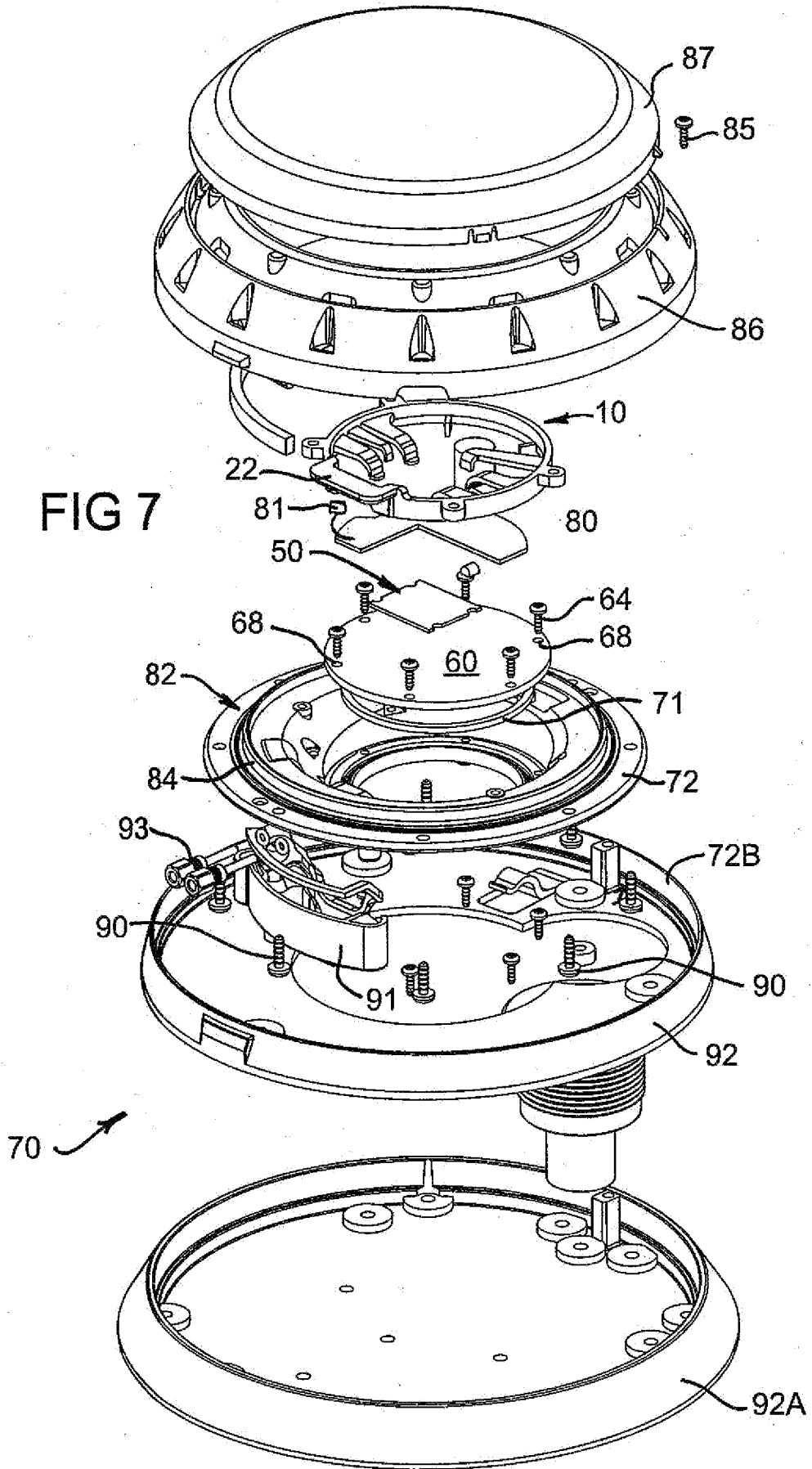
25. A fastening device for fastening the component to the support, the fastening device comprising:
- a mounting section which is securable into a fixed position relative to the support; and
 - 5 at least two resilient fastening fingers extending from the mounting section, the at least two fastening fingers abutting and engaging the component in at least two spaced apart locations in a manner to clamp the component in a fixed position on the support.





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FIG 7



INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2007/000606

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

F21V 17/16 (2006.01) F16B 2/22 (2006.01) F21V 17/10 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DWPI & JAPIO: IPC: F21V 17/00, 10, 16 & 18 with keywords: resilient, spring, elastic, clamp, mount, fasten, hold, held, support, locate or position.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5392913 A (MERRICK) 28 February 1995 Figures 1, 6, 17, 29, 34 and associated description	1-9, 13, 21, 25
X	US 5576933 A (CAMPANELLA et al.) 19 November 1996 Figures 1-14 and associated description	1, 2, 5, 13, 14, 19-25
X	US 5381041 A (HARMON) 10 January 1995 Figures 1-6 and associated description	1, 2, 5, 19-25

 Further documents are listed in the continuation of Box C See patent family annex

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"E" earlier application or patent but published on or after the international filing date

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"O" document referring to an oral disclosure, use, exhibition or other means

"&" document member of the same patent family

"P" document published prior to the international filing date but later than the priority date claimed

Date of the actual completion of the international search
12 June 2007Date of mailing of the international search report
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU2007/000606

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5735596 A (DAUMUELLER) 7 April 1998 Figures 2-4 and associated description	1-5, 16, 21-23, 25
X	US 7040785 B2 (STEGMAIER) 9 May 2006 Figures 1& 2 and associated description	1-4, 13, 15, 21, 25
X	US 4636926 A (ROBERGE) 13 January 1987 Figures 1-3	1-4, 21-23, 25

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU2007/000606

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	5392913	NONE					
US	5576933	NONE					
US	5381041	NONE					
US	5735596	DE	4443682	FR	2728057	JP	8222007
US	7040785	EP	1381809	HK	1057917	US	2004170023
		WO	02086383				
US	4636926	NONE					
Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.							
END OF ANNEX							