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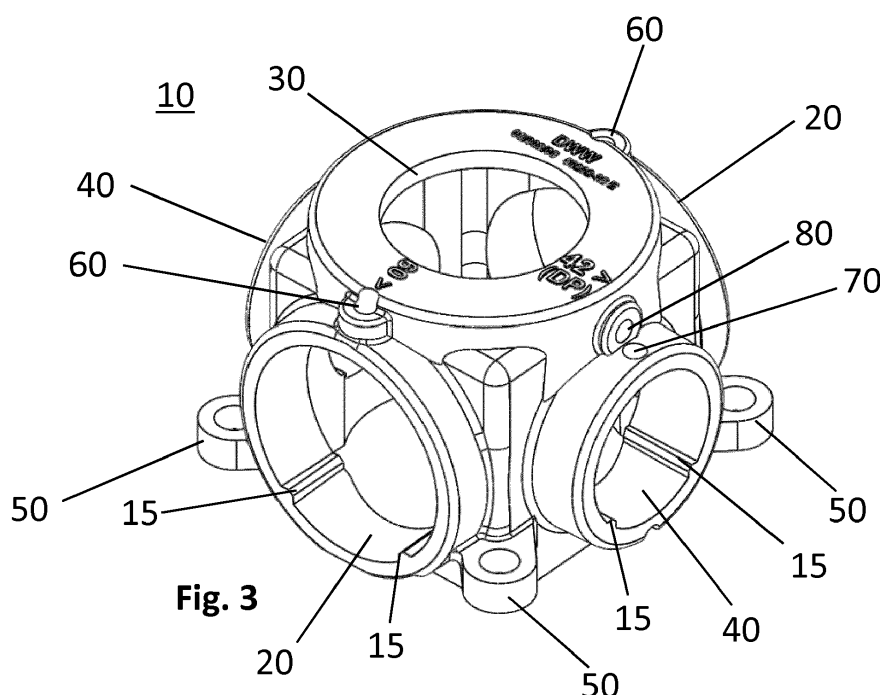
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(54) **Mounting block**

(57) The present invention relates to mounting blocks. In particular, the present invention relates to a versatile mounting block (10) for attaching a light housing (1) to a pole (2, 3). The present invention provides a mounting apparatus for attaching a lighting housing (1) to a pole (2, 3), comprising: a mounting block (10) comprising a first passageway (20) to receive a pole (2) for mounting the housing (1) in a first arrangement of pole (2) and housing (1), the first passageway (20) provided

along a first axis through opposing faces of the block (10); the block further comprising a second passageway (30) to receive a pole (3) for mounting the housing (1) in a second arrangement of pole (3) and housing (1), the second passageway (30) provided along a second axis through opposing faces of the block (10) and wherein the second passageway (30) is transverse to the first passageway (20); and wherein the block (10) is operable to attach to the housing (1).



**Fig. 3**

## Description

**[0001]** The present invention relates to mounting blocks. In particular, the present invention relates to a versatile mounting block for attaching a light housing to a pole.

**[0002]** When mounting lights on to poles or posts, for example on conventional street lighting poles, typically a light housing or luminaire is screwed directly on to the pole or post. Manufacturers of light housings sometimes do not supply any brackets to enable housings to be attached to poles. Other manufacturers supply multiple brackets to allow a housing to be attached in different circumstances. There is no standard mechanism to attach a housing to a pole and doing so may not be straightforward.

**[0003]** The present invention seeks to provide an improved method and apparatus for attaching a light housing or luminaire to a post.

**[0004]** According to a first aspect of the present invention, there is provided a mounting apparatus for attaching a lighting housing to a pole; comprising: a mounting block comprising a first passageway to receive a pole for mounting the housing in a first arrangement of pole and housing, the first passageway provided along a first axis through opposing faces of the block; the block further comprising a second passageway to receive a pole for mounting the housing in a second arrangement of pole and housing, the second passageway provided along a second axis through opposing faces of the block and wherein the second passageway is transverse to the first passageway; and wherein the block is operable to attach to the housing.

**[0005]** The present invention provides an apparatus to attach a light housing to a pole where the housing and pole can be in multiple arrangements, for example the pole could be orientated vertically or horizontally or the housing might need to be mounted on different size/shape poles. The multiple passageways through the mounting block are used to mount the light housing on to the pole in respective multiple arrangements. By providing a single mounting block that is able to mount the housing on different arrangements of pole and housing, a light housing can be installed without needing specific mounting apparatus for each arrangement of pole and housing.

**[0006]** The present invention provides a mounting block that allows a housing to be mounted on a pole in multiple orientations.

**[0007]** Preferably, the orientation of the pole relative to the housing differs in the first arrangement and the second arrangement.

**[0008]** By providing a single mounting block that is able to mount the housing at different orientations to the pole, a light housing can be installed without needing specific mounting apparatus for mounting a housing in the different orientations, for example on either a vertical or horizontal pole.

**[0009]** Preferably, the mounting apparatus further comprises a plurality of mounting points provided around one face of the block wherein the block is operable to attach to the housing using the mounting points.

**[0010]** By providing multiple mounting points, the mounting block can be designed to be rotated relative to the housing on which it is mounted by removing the mounting block from the housing and replacing it in a different orientation using the mounting points on the block to secure the block to different mounting points on the housing. Rotating the block enables a different passageway to be used to mount the housing to a pole.

**[0011]** Preferably, the block further comprises a third passageway to receive a pole for mounting the housing in a third arrangement of pole and housing, the third passageway provided along a third axis through opposing faces of the block wherein the third passageway is transverse to the first and/or second passageway.

**[0012]** By providing three passageways within the mounting block, the mounting block can mount a housing on to a pole in one of multiple orientations.

**[0013]** Preferably, the sizes and/or shapes of at least two of the first, second and third poles are different.

**[0014]** By providing two or three passageways within the mounting block with different sized or shaped cross-sections, the mounting block can mount a housing on to a pole in any of multiple orientations allowing the mounting block to have different sized/shaped passageways each used to mount on to different sized/shaped poles using a single apparatus.

**[0015]** Preferably, any or all of the passageways further comprise a plurality of ribs configured to engage with one of said poles.

**[0016]** By providing ribs configured to engage with the poles received by the mounting block, the contact surfaces of the mounting block that will contact the exterior surface of the pole are defined and reduce accidental rotation of the pole before it is secured in place in the mounting block.

**[0017]** Preferably, each mounting point is operable to cooperate with a spacer provided between the housing and the mounting point.

**[0018]** By providing spacers between the mounting points of the mounting block, the angle of the mounting block and therefore the passageways through the mounting block can be varied relative to the housing, allowing the angle at which the housing is mounted on to a pole to be varied accordingly.

**[0019]** Preferably, the spacers are operable to tilt the mounting block relative to the housing.

**[0020]** By connecting the mounting block to the housing at the mounting points of the mounting block, the angle of the mounting block and therefore the passageways through the mounting block can be varied relative to the housing, for example using screw threads that provide a gap between some of the mounting points and the housing, allowing the angle at which the housing is mounted on to a pole to be varied.

**[0021]** Preferably, the pole does not extend all the way through the mounting block when mounting the housing in one or more arrangements of pole and housing.

**[0022]** By providing a way to prevent the pole extending beyond the top of the mounting block, the mounting block allows the housing to be placed on top of a vertical pole before being secured in place such that it doesn't need to be held in place other than by resting on top of the vertical pole.

**[0023]** Preferably, the pole is secured in the passageway using a one or more fasteners, where these are preferably a plurality of grub screws or a plurality of set screws.

**[0024]** By providing fasteners, for example grub screws or set screws, that can preferably extend through the mounting block and contact the outer surface of the pole, the mounting block can more securely fasten the mounting block, and thus the housing in which it is mounted, in a selected place, orientation and position on a pole.

**[0025]** According to a second aspect of the present invention, there is provided a method of mounting a lighting housing to a pole using a mounting apparatus of any preceding claim, comprising the steps of: attaching the mounting block to the housing; and receiving the pole to which the housing is mounted through one of the passageways provided through opposing faces of the block.

**[0026]** The present invention provides a way to attach a light housing to a pole, where the pole can be in multiple orientations, using the mounting block of the present invention. By providing a single mounting block that is able to mount a housing on a pole in one of multiple arrangements, a light housing can be installed without needing specific mounting apparatus for each arrangement of pole and housing.

**[0027]** Embodiments of the present invention will now be described, by way of example only and with reference to the accompanying drawings having like-reference numerals, in which:

Figure 1 illustrates a light housing mounted to a pole in the same orientation as the pole according to an embodiment of the present invention;

Figure 2 illustrates a light housing mounted to a pole in a different orientation to the pole according to an embodiment of the present invention;

Figure 3 illustrates a mount according to an embodiment of the present invention when viewed from above;

Figure 4 illustrates a mount according to an embodiment of the present invention when viewed from below;

Figure 5 illustrates a mount according to an embodiment of the present invention when installed inside a light housing;

Figure 6 illustrates a mount according to an embodiment of the present invention when installed inside a light housing and having spacers in place on two mounting points;

Figure 7 illustrates a mount according to an embodiment of the present invention when installed inside a light housing and connected to a small horizontal pole in use;

Figure 8 illustrates a mount according to an embodiment of the present invention when installed inside a light housing and connected to a large horizontal pole in use;

Figure 9 illustrates a cross sectional view of the mount according to an embodiment of the present invention when installed inside a light housing and connected to a large horizontal pole in use;

Figure 10 illustrates a mount according to an embodiment of the present invention when installed inside a light housing and connected to a large vertical pole in use;

Figure 11 illustrates a cross section of the mount according to an embodiment of the present invention when installed inside a light housing and connected to a large vertical pole in use; and

Figure 12 illustrates a cross section of the mount according to an embodiment of the present invention when installed inside a light housing and connected to a small vertical pole in use.

**[0028]** Referring to Figures 1 and 2, the present invention relates to a method and apparatus for mounting a lighting housing 1 in use on a substantially horizontal hollow pole 2 or a substantially vertical hollow pole 3 according to a first and a second embodiment of the present invention respectively.

**[0029]** Referring to Figures 3 and 4, a mounting block 10 of an embodiment of the present invention will now be described.

**[0030]** According to this embodiment of the invention, there is provided a mounting block 10 having openings 20, 30, 40 in each of the facets, or faces, of the mounting block 10. The openings 20, 30, 40 are arranged in three pairs, each pair of openings 20, 30, 40 being provided on opposing faces of the mounting block 10. The pairs of openings 20, 30, 40 co-operate to accept a pole 2, 3, for example in either a horizontal or a vertical orientation in use as will be described below.

**[0031]** In this exemplary embodiment, the first pair of openings 20 are sized in use to accept a horizontally orientated circular pole with a maximum diameter of 60mm, as will be described below. The second pair of openings 40 are sized in use to accept a horizontally orientated circular pole 2 with a maximum diameter of 42mm, as will be described below. The third pair of openings 30 are sized to accept in use a vertically orientated circular pole 3 with a maximum diameter of 76mm, as will be described below.

**[0032]** The openings 20, 40 that accept in use a horizontally-orientated pole 2 are also each provided with two ribs 15 located on the inner face of the opening in the lower region of each opening 20, 40. These ribs 15 act as points which the surface of the pole 3 touches, i.

e. contact points, when inserted through the openings 20, 40 and ensure two contact points for the pole 3. The ribs 15 also function to reduce the subsequent rotation of the pole 3 before it is, and while it is being, secured in the mounting block 10.

**[0033]** Each of the openings 20, 40 that accept in use a horizontally-orientated pole 2 are further provided with a fastening hole 60, 70. The fastening holes 60, 70 are provided at the top of the openings 20, 40 and a grub screw (not shown) can be screwed through the fastening holes 60, 70 and extend into the openings 20, 40 to act as a third contact point on the pole 2, thus co-operating with the ribs 15 to hold the pole in each opening 20, 40 as a set of three contact points within the opening 20, 40. For a horizontally mounted pole 2, the pole 2 extends in use through two openings to enable both sets of contact points to hold the pole 2 in place. In addition, when fitting the mounting block 10 on to a pole 2, the mounting block 10 will stay in place on the pole 2, without needing to secure the mounting block 10 to the pole 2 with grub screws 61, 71, due to the support provided by both openings and gravity, before the grub screws 61, 71 are tightened.

**[0034]** The openings 30 sized to accept in use a vertically orientated circular pole 3 are provided with fastening holes 80 to secure the vertically-orientated pole 3 inside the mounting block 10. The fastening holes 80 are provided in the main body of the mounting block 10, near the openings 30. The openings 30 are sized such that in use a vertically-oriented pole 3 can extend through the lower of the openings 30 and into the mounting block 10, but the lip of the upper of the openings 30 prevents the pole 3 extending further and allows the mounting block 10 to rest on top of the pole 3 while the pole 3 is secured to the mounting block 10 using the fastening holes 80. Grub screws 81 are provided through the fastening holes 80 that extend into the mounting block 10 and contact the surface of the pole 3, holding the pole against the opposite surface of the inside of the mounting block 10.

**[0035]** It should be noted that the pole 2, 3 will be provided with electrical cabling with which to power a light in the housing 1 and this cabling will run inside the pole 2, 3 and through the openings 20, 30, 40 of the mounting block 10 and on into the housing 1 to the light.

**[0036]** Figures 5 and 6 show the mounting block 10 secured in place inside the housing 1. Figure 5 shows the mounting block 10 fastened using bolts at each of four mounting points 50 directly to the housing 1. The housing 1 is provided with suitable mounting points to receive the bolts provided through the mounting points 50 of the mounting block 10 so that the mounting block 10 is fastened securely to the housing 1. Spacers 55 are provided on rotatable mountings next to the mounting points in the housing 1 such that, should the mounting block need to be mounted in use at an angle to the horizontal on the housing 1, the spacers 55 can be rotated to a position in between the mounting points 50 of the mounting block 10 and the mounting points of the housing

1. As there are four spacers 55 provided at each mounting point of the housing, the mounting block can be angled at different positions depending on the pair of spacers provided between the mounting block 10 and the housing 1. By providing spacers 55 underneath the two mounting points 50 that are nearest the opening in the housing 1, the mounting block 10 allows the housing 1 to be mounted on the pole 2 in use at an angle of around 5° to the horizontal while providing spacers 55 underneath the two mounting points 50 furthest from the opening in the housing 1, the mounting block 10 allows the housing 1 to be mounted in use on the pole 2 at an angle of -5° to the horizontal.

**[0037]** In Figure 5, the mounting block 10 is shown with the relatively larger openings 20 aligned with the hole in the housing 1, which will allow in use a horizontal 60mm diameter circular pole 2 to extend into the housing and into the mounting block 10 when the housing is fitted on to a pole 2.

**[0038]** In Figure 6, the mounting block is shown with two spacers 55 inserted between the mounting points 50 of the mounting block 10 and the mounting points of the housing 1. The two spacers 55 are the pair nearest the opening in the housing 1, causing the mounting block 10 to be mounted in use in the housing 1 at an angle relative to the horizontal and thus allowing the housing 1 to be mounted in use to the pole 2 at an angle of 5° relative to the horizontal. This allows the housing 1 to be mounted in use more flexibly on the pole 2 as it can be positioned at  $\pm 5^\circ$  to the horizontal pole 2 or horizontally on the pole 2.

**[0039]** Referring now to Figure 7, the mounting block 10 is shown with the relatively smaller openings 40 aligned with the opening in the housing 1, such that the openings 40 co-operate to allow a horizontal 42mm diameter circular pole 2 in use to extend into the housing and into the openings 40 of the mounting block 10.

**[0040]** Referring next to Figure 8, the mounting block 10 is shown with the relatively larger openings 20 aligned with the hole in the housing 1, to allow in use a horizontal 60mm diameter circular pole 2 to extend into the housing 1 and into the mounting block 10. All of the spacers 55 are not provided in between the mounting points 50 of the mounting block 10 and the mounting points of the housing 1.

**[0041]** Referring then to Figure 9, the arrangement of Figure 8 is shown as a cut-away cross-section. The pole 2 is shown extending through the opening in the housing 1 and into the mounting block 10. The grub screws 61 provided through the mounting holes 60 extend into the mounting block 10 and secure against the top of the pole 2, holding the pole 2 in the mounting block 10.

**[0042]** Referring to Figures 10 and 11, the mounting block 10 is shown in the embodiment where the housing 1 is mounted in use on top of a vertically-orientated circular hollow pole 3 where the pole 3 has a diameter of 76mm.

**[0043]** Referring first to Figure 10, the mounting block

10 is shown mounted in the housing 1. The openings 30 align with an opening in the bottom of the housing 1 such that the openings 30 co-operate to accept a pole 3 which in use extends vertically into the housing 1 and on into the mounting block 10. In this embodiment, the spacers 55 are not provided in between the mounting points 50 of the mounting block 10 and the mounting points of the housing 1, and are left in a position rotated clear from the mounting block 10. As discussed above, the pole 3 extends into the housing 1 and on into the mounting block 10.

[0044] Referring then to Figure 11, the mounting block 10 and housing 1 are shown in a cut-away cross-section view of Figure 10. The lower of the openings 30 of the mounting block 10 allows the pole 3 to extend into the mounting block 10 but the upper of the openings 30 has a smaller diameter than the outer diameter of the pole 3, the upper opening 30 forming a lip that provides an end stop for the vertical pole 3 in use. The pole 3 is secured in the mounting block 10 using grub screws 81 provided through the mounting holes 80 such that the grub screws 81 extend into the mounting block 10 and contact the outer edge of the pole 3, holding it against the inner surface of the mounting block 10 and the grub screws 81 extending through the mounting holes 80.

[0045] Referring to Figure 12, there is shown a similar embodiment to that shown in Figures 10 and 11 but having a smaller diameter circular hollow pole 3, having a diameter of 60mm, on to which the housing 1 and mounting block 10 are positioned. Here the mechanism to fasten the pole 3 into the mounting block 10 works in the same way as that described in relation to the embodiment shown in Figures 10 and 11 but the grub screws 81 extend through the mounting holes 80 further than in the embodiment of Figures 10 and 11, such that they contact the outer surface of the pole 3 and fasten the pole 3 between the ends of the grub screws 81 and the inside surface of the mounting block 10. The pole 3 is thus mounted off-centre to the vertical centroid axis of the mounting block 10 in use.

[0046] The diameters of the poles 2, 3 accepted by the mounting block 10 can be varied from those diameters disclosed in the embodiments above. The standard nominal diameters for street lighting poles in the UK are usually 42mm for side-entry mounting and 76mm for top-entry mounting. In Europe, the standard diameters for street lighting poles are usually 60mm for both side-entry and top-entry mounting. Further the poles described in relation to the embodiments above have a circular cross-section but other embodiments of the present invention can be adapted to work with poles of different size or shaped cross-sections, such as square cross-sections, without departing from the teaching of the present invention.

[0047] While the embodiments above have been described in relation to mounting on poles or posts, other embodiments of the present invention allow the mounting block 10 to mount a housing 1 on the arm of a bracket,

which is can be in use a horizontal pole, to allow the housing to be mounted on the side of a building, for example.

[0048] The mounting block 10 of the embodiments described above is made from die-cast aluminium but other suitable materials can be used, for example materials that are suitable for outdoor use and which have suitable strength and longevity can be used instead of die-cast aluminium, such as other metals or some plastics.

[0049] Any system feature as described herein may also be provided as a method feature, and vice versa. As used herein, means plus function features may be expressed alternatively in terms of their corresponding structure.

[0050] Any feature in one aspect of the invention may be applied to other aspects of the invention, in any appropriate combination. In particular, method aspects may be applied to system aspects, and vice versa. Furthermore, any, some and/or all features in one aspect can be applied to any, some and/or all features in any other aspect, in any appropriate combination.

[0051] It should also be appreciated that particular combinations of the various features described and defined in any aspects of the invention can be implemented and/or supplied and/or used independently.

## Claims

1. A mounting apparatus for attaching a lighting housing to a pole, comprising:

a mounting block comprising a first passageway to receive a pole for mounting the housing in a first arrangement of pole and housing, the first passageway provided along a first axis through opposing faces of the block;

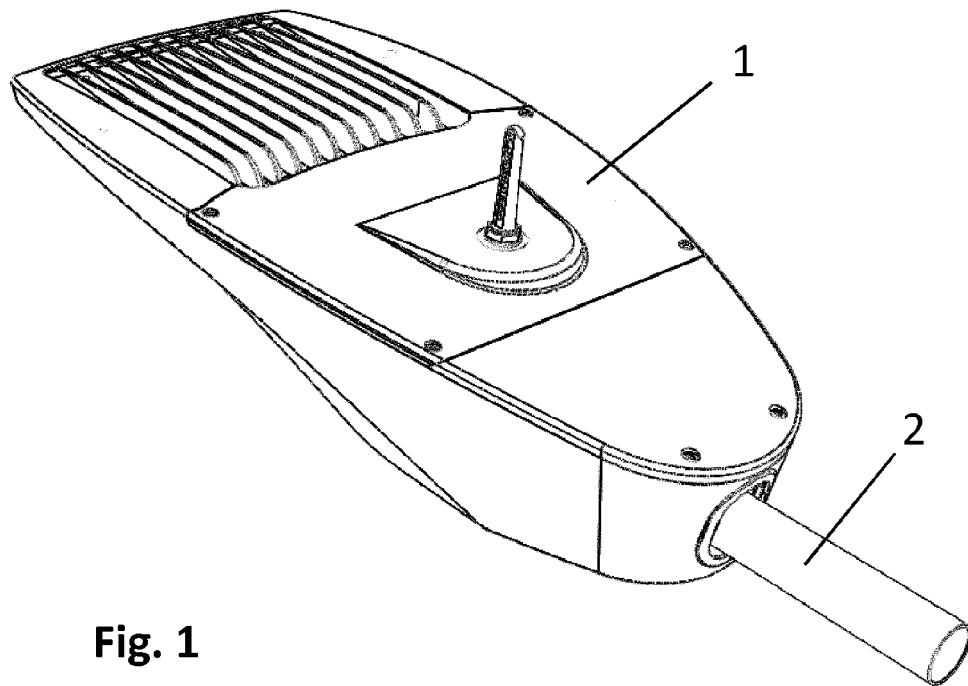
the block further comprising a second passageway to receive a pole for mounting the housing in a second arrangement of pole and housing, the second passageway provided along a second axis through opposing faces of the block and wherein the second passageway is transverse to the first passageway; and

wherein the block is operable to attach to the housing.

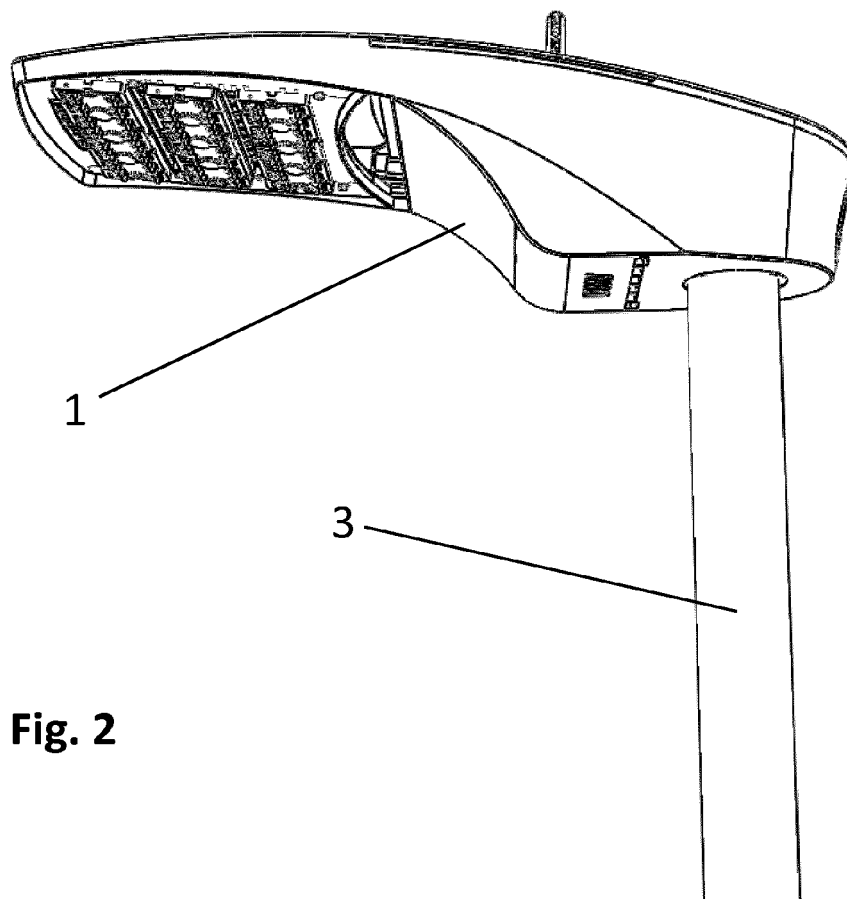
2. The mounting apparatus of any preceding claim wherein the orientation of the pole relative to the housing differs in the first arrangement and the second arrangement.

3. The mounting apparatus of any preceding claim further comprising a plurality of mounting points provided around one face of the block wherein the block is operable to attach to the housing using the mounting points.

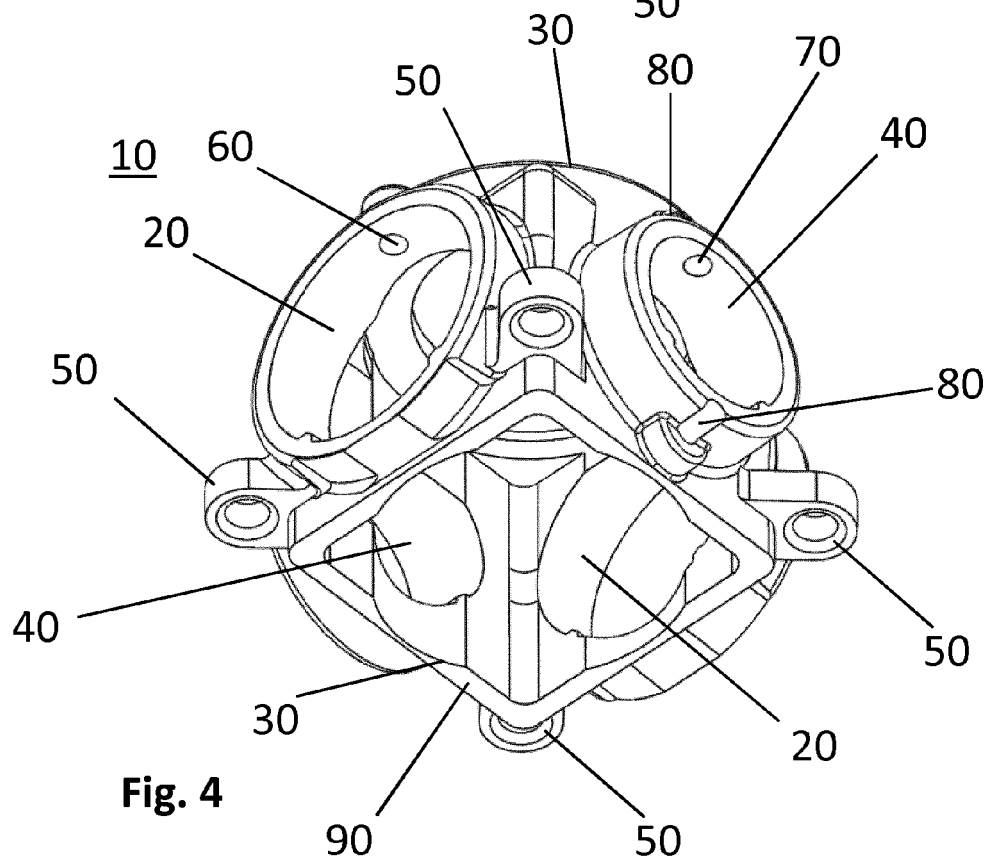
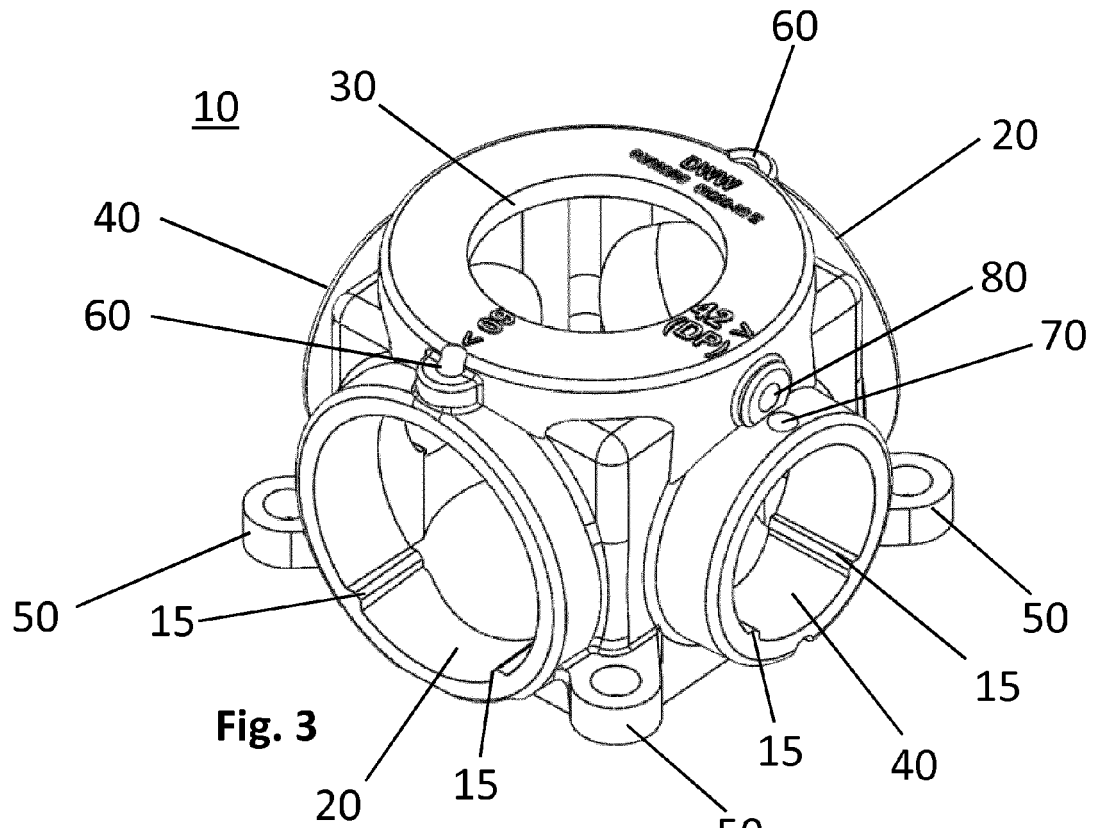
4. The mounting apparatus of any preceding claim wherein the block further comprises a third passageway to receive a pole for mounting the housing in a third arrangement of pole and housing, the third passageway provided along a third axis through opposing faces of the block wherein the third passageway is transverse to the first and/or second passageway. 5
5. The mounting apparatus of any preceding claim wherein the sizes and/or shapes of at least two of the poles in the first, second or third arrangements of poles and housing are different. 10
6. The mounting apparatus of any preceding claim wherein any or all of the passageways further comprise a plurality of ribs configured to engage with one of said poles. 15
7. The mounting apparatus of any preceding claim wherein each mounting point is operable to cooperate with a spacer provided between the housing and the mounting point. 20
8. The mounting apparatus of any preceding claim wherein the spacers are operable to tilt the mounting block relative to the housing. 25
9. The mounting apparatus of any preceding claim wherein said pole does not extend all the way through the mounting block when mounting the housing in one or more arrangements of pole and housing. 30
10. The mounting apparatus of any preceding claim wherein the pole is secured in the passageway using one or more fasteners. 35
11. A method of mounting a lighting housing to a pole using a mounting apparatus of any preceding claim, comprising the steps of: 40
  - attaching the mounting block to the housing; and
  - receiving the pole to which the housing is mounted through one of the passageways provided through opposing faces of the block. 45
12. The method of claim 11 further comprising the steps of:
  - providing a plurality of spacers between the mounting block and the housing. 50
13. The method of claim 11 or claim 12 further comprising the steps of: 55
  - fastening the mounting block to the pole with one or more fasteners.
14. The method or apparatus of any preceding claim wherein the one or more fasteners are a plurality of grub screws or a plurality of set screws.



**Fig. 1**



**Fig. 2**





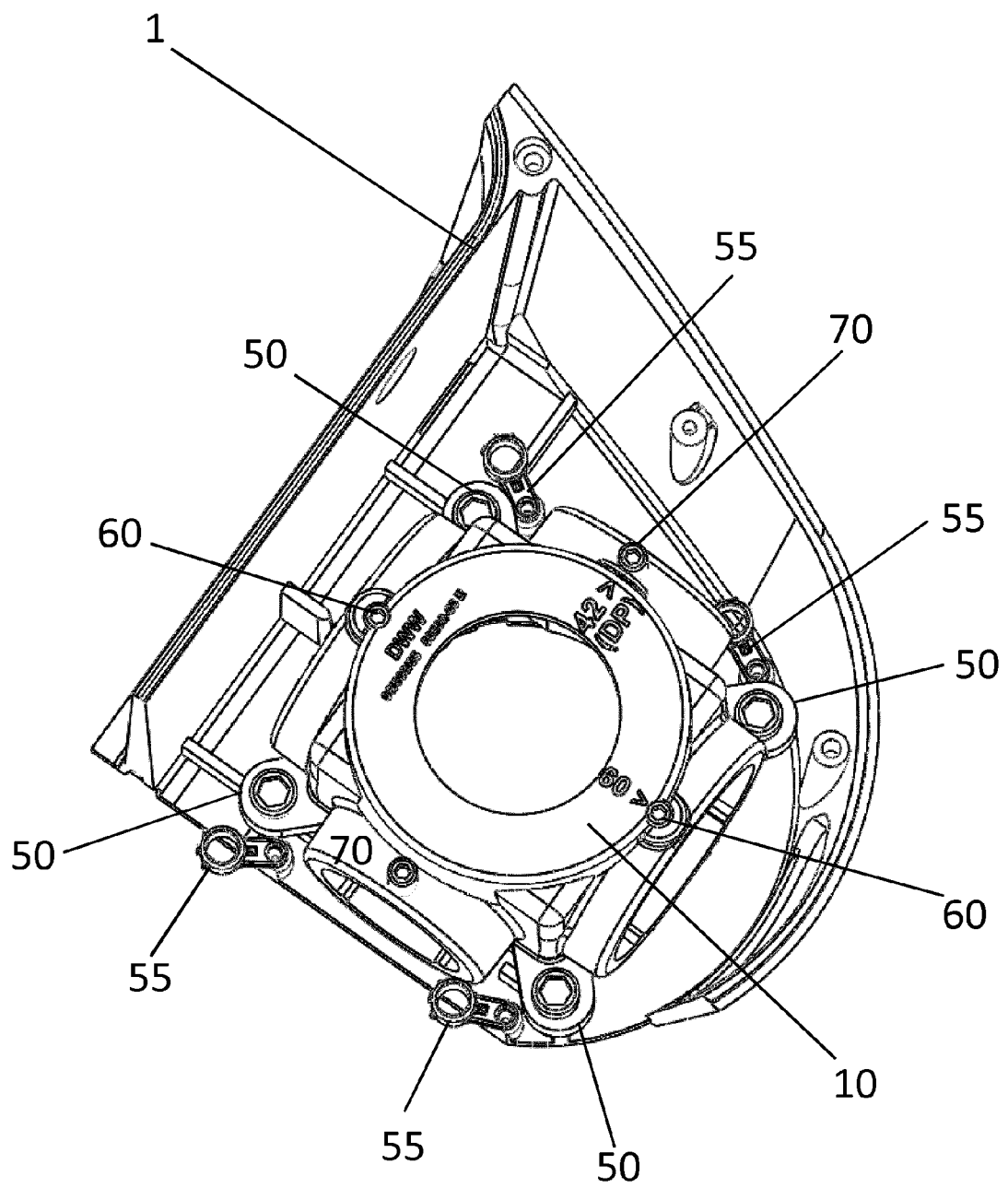
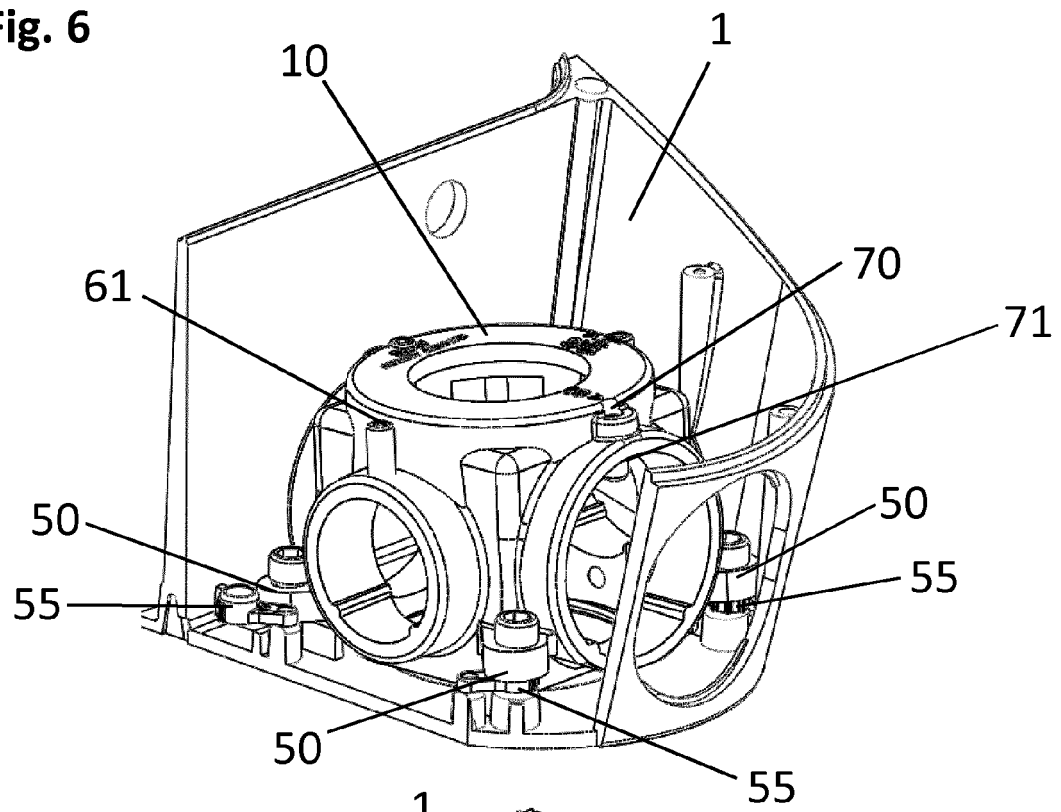
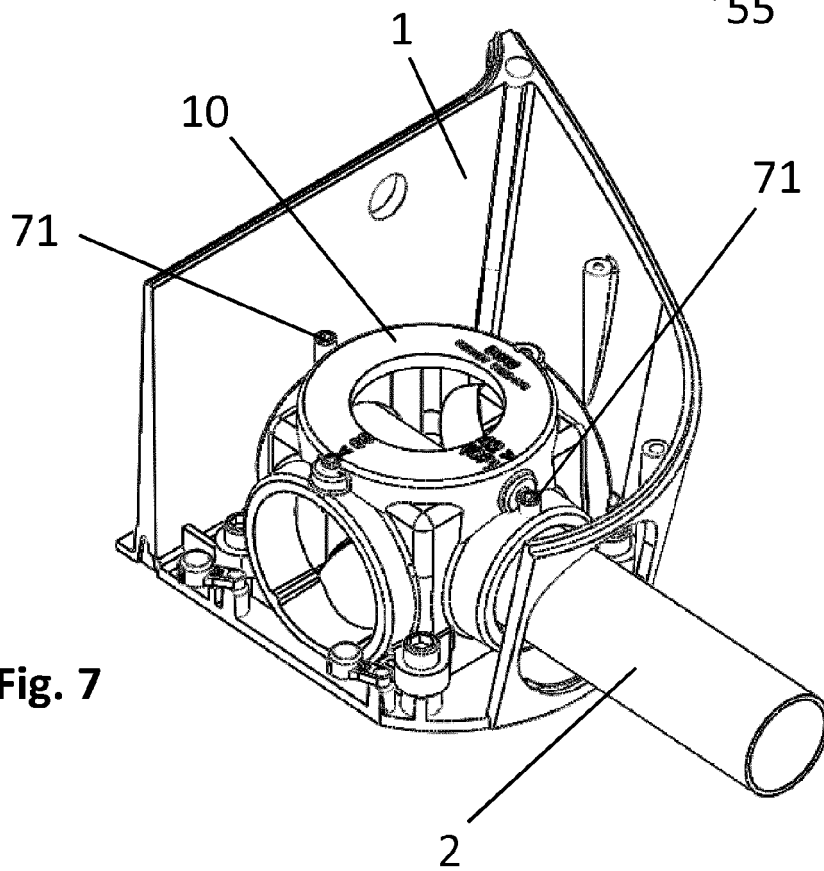


Fig. 5

**Fig. 6**



**Fig. 7**



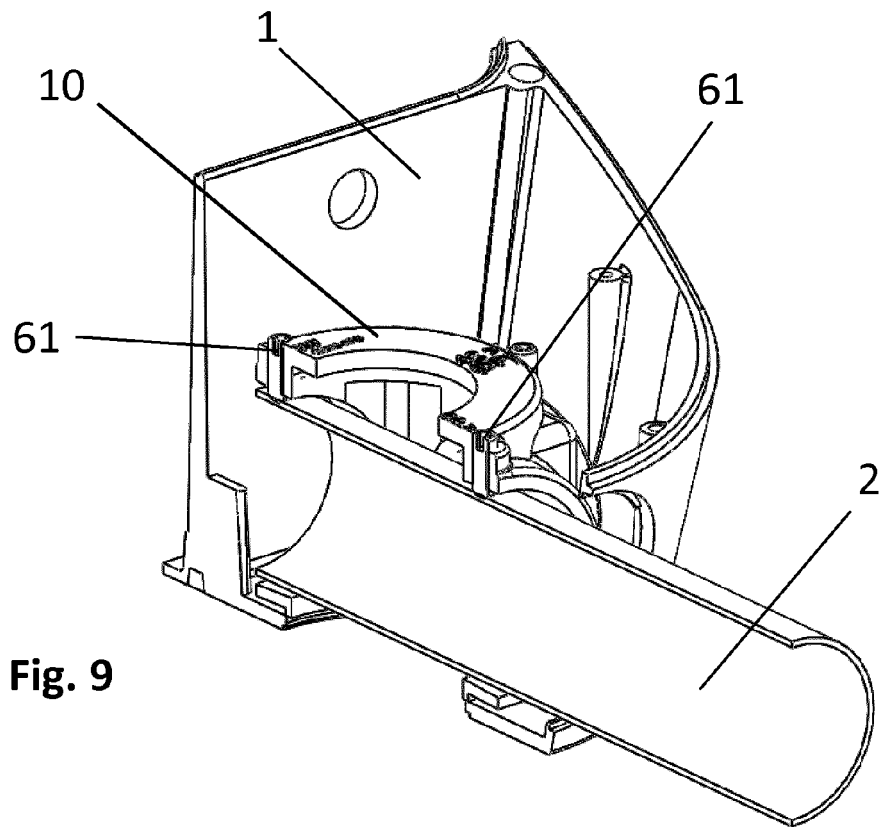
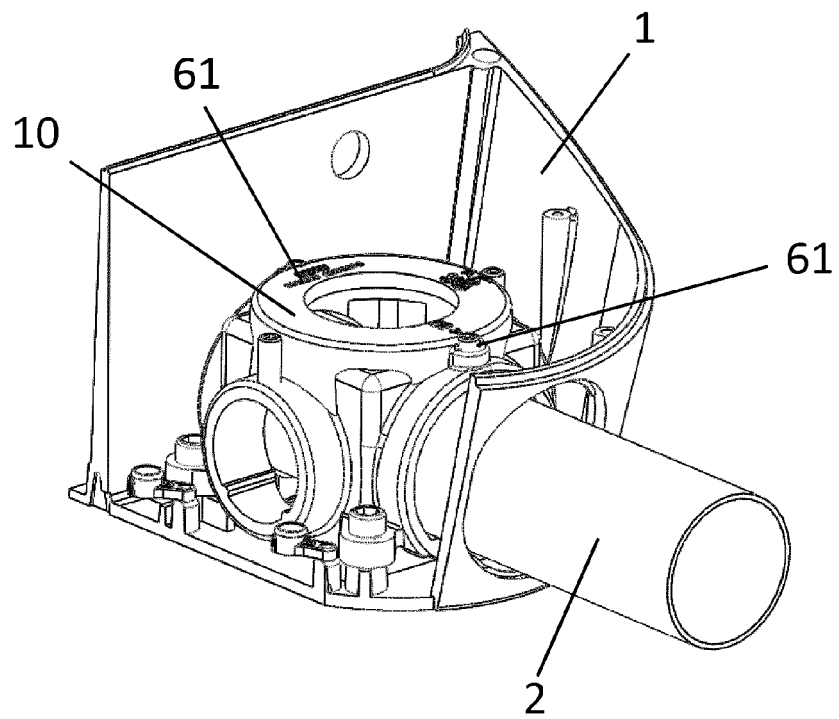


Fig. 8



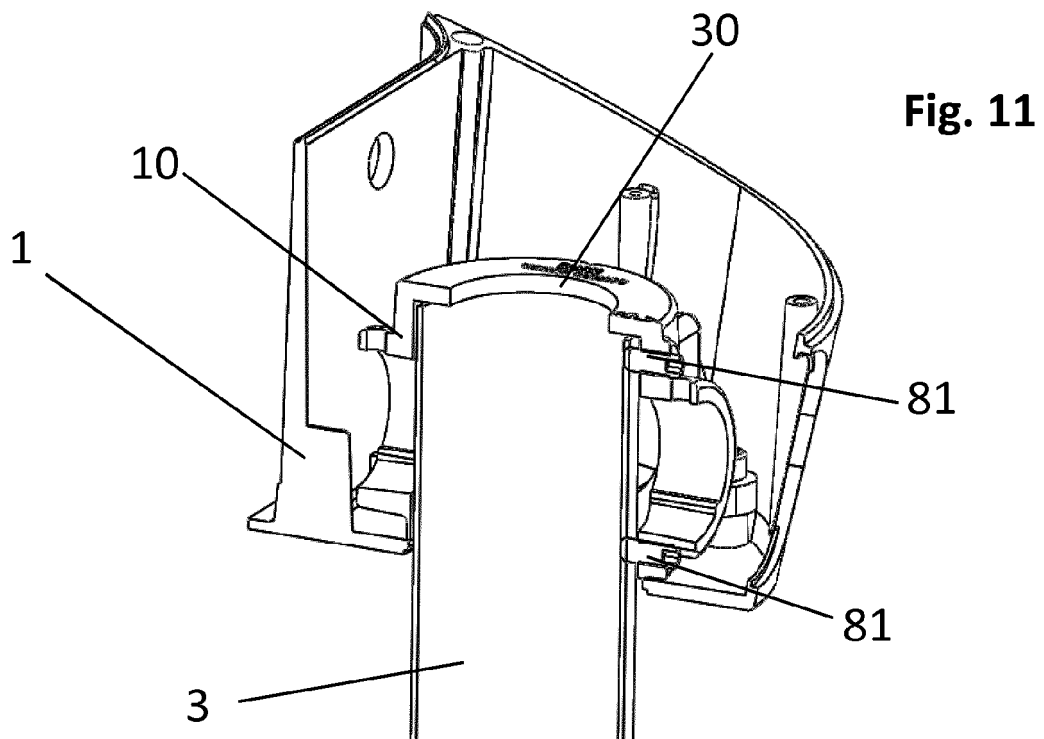
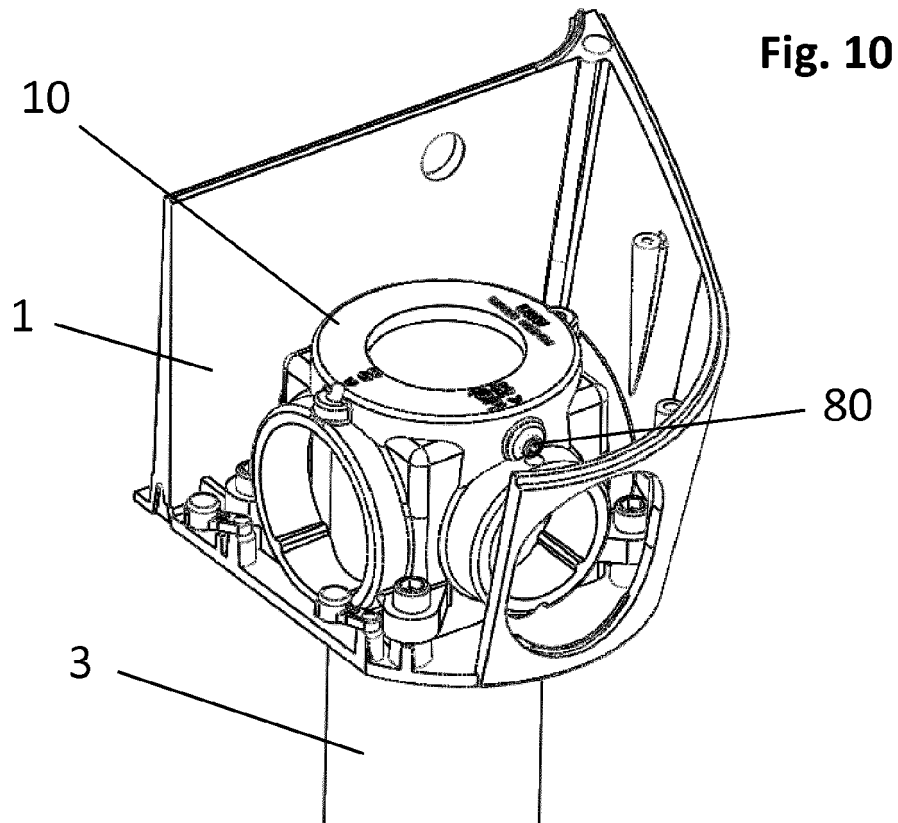
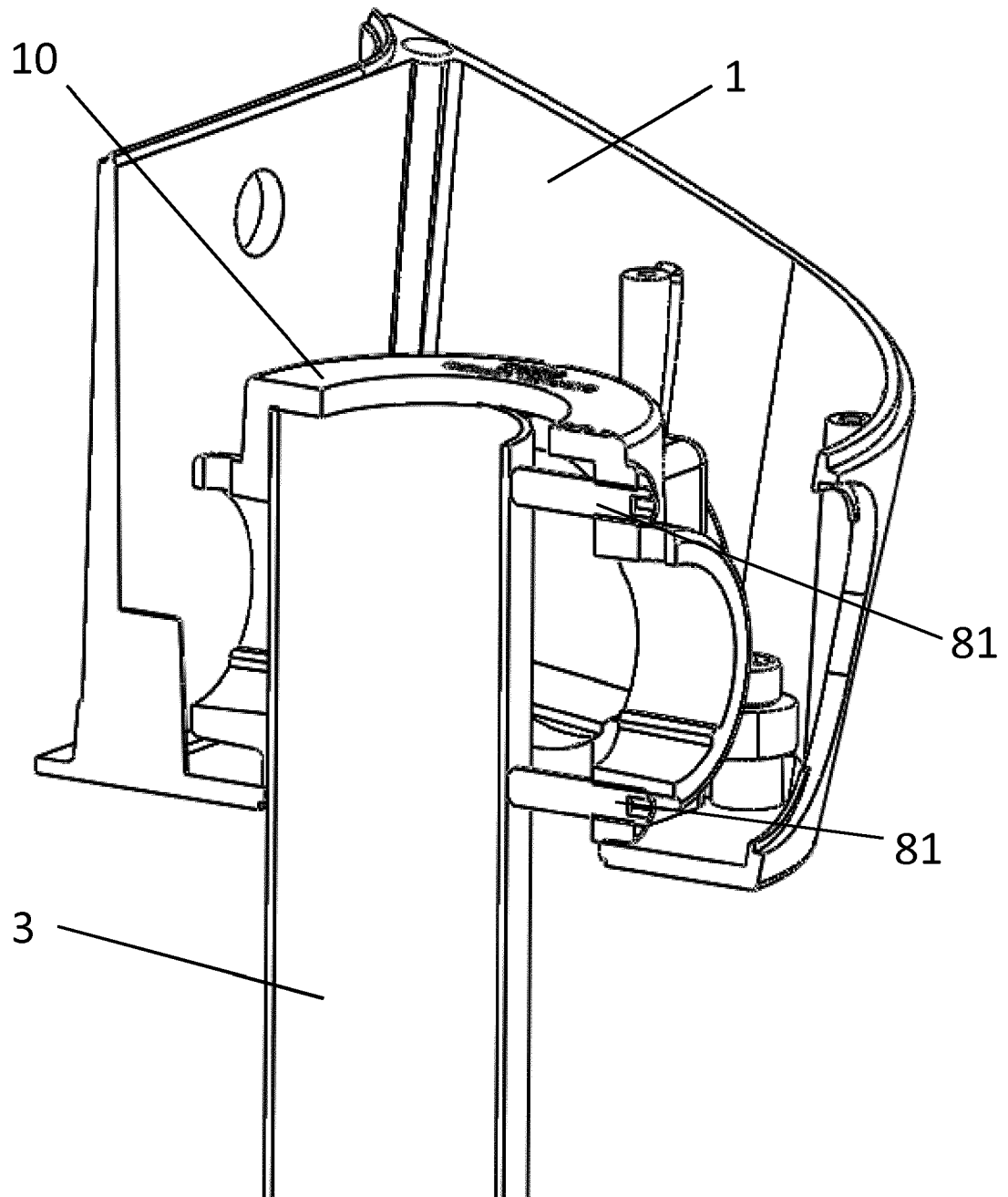


Fig. 12





## EUROPEAN SEARCH REPORT

 Application Number  
EP 15 15 3339

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Y	* figures 1-3 * * pages 3, 4, 5 *	7,8, 12-14	ADD. F21W131/103
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X	EP 0 652 401 A2 (SIEMENS AG [DE] SIEMENS BELEUCHTUNGSTECHNIK GM [DE]) 10 May 1995 (1995-05-10) * figures 1, 2, 6, 7 * * claims 1, 2 * * column 3, line 20 - column 4, line 29 * * column 6, lines 3-44 *	1-14	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 22 May 2015	Examiner Vida, Gyorgy
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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## EUROPEAN SEARCH REPORT

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DOCUMENTS CONSIDERED TO BE RELEVANT			
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
Place of search		Date of completion of the search	Examiner
The Hague		22 May 2015	Vida, Gyorgy
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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 EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 15 3339

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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