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(54) A RECESSED ASSEMBLY, AN INSERT, AN INSERT TOOL, AND A METHOD FOR ASSEMBLING THE RECESSED ASSEMBLY

(57) The invention is concerned with a round-shaped insert (1) to be inserted in a hole (2) in a surface (3). The insert (1) has an outside threading for housing an emitting or sensing device (10). The invention is also concerned with a recessed assembly comprising such an insert (1) and an emitting or sensing device (10) positioned within the insert (1). The invention is furthermore concerned with an insert tool (6) intended for inserting the insert (1) in a hole (2) in a surface (3). The insert tool (6) has an upper round-shaped section (7) that fits tightly inside the round-shaped insert (1) and extends as a raised part on a lower round-shaped section (8) in the insert tool. The lower round-shaped section (8) has a larger diameter than that of the upper round-shaped section (7) and that of the insert (1) thereby supporting the insert (1) at inserting and preventing an excessive insertion of the insert (1). Furthermore, the insert tool (6) has an extension part (9) below the lower round-shaped part (8). Still further, the invention is concerned with a method for installing the recessed assembly in a hole (2) in a surface (3). The method further comprises connecting the insert tool (6) to the insert (1) so that the upper round-shaped section (7) is tightly inside the round-shaped insert (1) and the lower round-shaped section (8) supports the insert (1). The insert (1) is then screwed in, the insert tool (6) is detached from the insert (1), and an emitting or sensing device (10) is inserted in the insert (1) and the device (10) is connected to power supply.

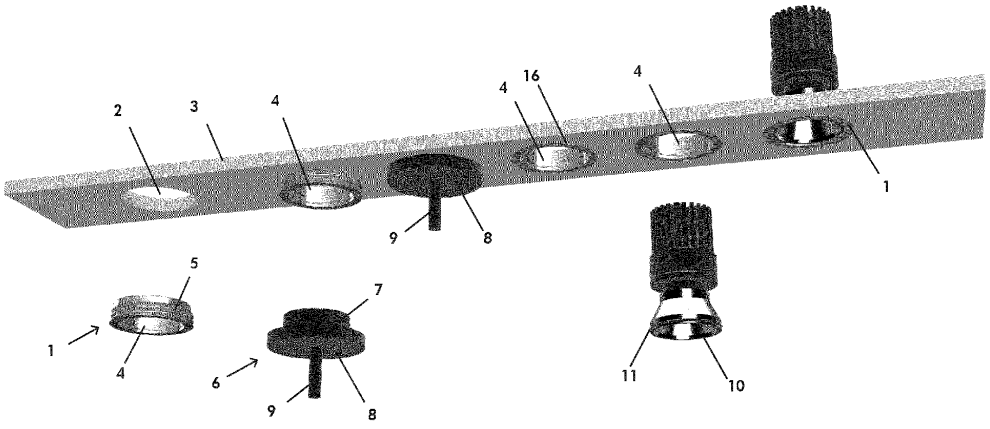

FIG. 1

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Description

TECHNICAL FIELD

[0001] The invention is concerned with a recessed assembly, an insert, an insert tool and a method for assembling the recessed assembly.

BACKGROUND

[0002] Recessed light fixtures or recessed luminaires, also called can lights or downlights, are flush with the ceiling, making them especially useful for rooms with low ceilings. Recessed luminaires direct light downward, or downward and toward a wall.

[0003] In a recessed luminaire, all electrical and optical components are housed above the ceiling line. It comprises components such as a housing, a trim or a plate and a type of bulb, spotlight (also called just "spot") or lamp to work as a light source. Most recessed luminaires have a single bulb and round or square trims or plates. The housings are usually metal light housings installed in the ceiling for a sleek look. Their diameter generally varies from 3 inches to 6 inches corresponding to about 7.6 - 15.2 cm. In new constructions, recessed lighting is usually installed between ceiling joists.

[0004] Therefore, the installing methods of recessed luminaires require a hole to be bored in the ceiling and conventionally, also a plate surrounding the hole to be screwed through the ceiling to an upper support installed a bit upwards in the ceiling.

[0005] Such prior art is e.g. disclosed in WO publication 2021/055450 A1 that is concerned with a recessed luminaire that includes a housing that supports a light emitter and a plate coupled to the housing. The housing is configured to be positioned at least partially through a ceiling. The housing also includes a stepped surface. The plate is positioned adjacent to the stepped surface.

[0006] Another example of such prior art is presented in US patent 10,125,958. The recessed luminaire components therein include a lathing ring that is installed in a ceiling using fold-over tabs that are coupled to the lathing ring. The recessed luminaire components further include a rimless housing can and a plurality of flange clips that are removably coupled to the rimless housing can. The rimless housing can and flange clip assembly is installed in the ceiling fitted with the lathing ring.

[0007] The recessed luminaires being interior design articles, effort has been done for creating experiences of graceful and exquisite atmosphere in their use. That is done by a choose of nice materials and stylish design. Extra emphasis can be added to the textures and materials of ceiling accent fixtures with recessed spotlights. Extra light can add sparkle to crystal and increase overall brightness.

[0008] Excessive glare from recessed lights can be bothersome and distracting. This problem can be solved by choosing trims that trap and shape light to minimize glare and reduce ceiling brightness. Baffles absorb light to minimize glare while reflectors refocus the light to improve lighting efficiency. Both of them work to modify the illumination the downlight produces. For general lighting, a simple trim and reflector to spread light across a large area is ideal while a baffle will remove general glare.

[0009] In spite of all this effort done for a non-intrusive solution, the appearance of the recessed luminaires is not discrete enough and their installation has remained complicated. The object of the invention is an improved solution in these respects.

SUMMARY

[0010] The round-shaped insert of the invention is to be inserted in a hole in a surface. The insert has an outside threading for housing an emitting or sensing device.

[0011] The recessed assembly of the invention comprises a round-shaped insert for housing an emitting or sensing device, which insert has a threaded outside surface for housing the emitting or sensing device. The assembly furthermore comprises the emitting or sensing device positioned within the insert.

[0012] The insert tool of the invention is intended for inserting a round-shaped insert in a hole. The insert tool has an upper round-shaped section that fits tightly inside the round-shaped insert and extends as a raised part on a lower round-shaped section. The insert tool further has a lower round-shaped section with a larger diameter than that of the upper round-shaped section and that of the insert thereby supporting the insert at inserting and preventing an excessive insertion of the insert. Furthermore, the insert tool has an extension part below the lower round-shaped part.

[0013] The method of the invention comprises installing the recessed assembly of the invention in a hole in a surface. The method further comprises connecting the insert tool of the invention to an insert of the invention so that the upper round-shaped section is tightly inside the round-shaped insert and the lower round-shaped section supports the insert. In the method, the insert is then screwed in, the insert tool is detached from the insert, and an emitting or sensing device is inserted in the insert and the device is connected to power supply.

[0014] The preferably embodiments of the invention have the characteristics of the subclaims.

[0015] The insert can thus have an even inside surface, or it can have at least one groove or thread in its inside surface for receiving a corresponding projecting portion, like a baffle, O-ring, a canted steel spring or the like, for holding the sensing device safely in place. Said groove can be a horizontal groove, a vertical groove or a bayonet groove.

[0016] The insert can have a peripheral edge that prevents the insert from being screwed too deep inside the surface and it might also cover the edge of the hole, which has been drilled in the surface.

[0017] The threading of the insert is preferably discon-

tinuous and/or the pitch of the threading is usually up to 5 mm, while the thread depth or height can raise from 0 to 2.1 mm.

[0018] The surface is in the first hand a ceiling and the insert is to be inserted in a hole in the ceiling, whereby the emitting device usually is a light source, being e.g. a bulb, spot, spotlight, LED, whereby the assembly is a recessed luminaire or lighting fixture in a ceiling or a wall. The emitting or sensing device can also be a sprinkler or sensor, such as a camera, motion detector, temperature sensors, or a fire alarm.

[0019] In some embodiment of the insert tool of the invention, the upper section has wings, baffles, or taps to transfer the rotational force from the inserting tool into the insert. The insert tool can further have means for connecting thereto an auxiliary insertion device for the insertion to said extension part. Then the screwing of the insert takes place by means of such an auxiliary insertion device.

[0020] The insert tool can further have connected thereto an alignment tool in the form of a planar plate with two legs of even length, whereby the alignment tool is connected to the insert tool, preferably to the extension part of the insert tool, so that the planar plate of the alignment tool is parallel with the round-shaped plate-like section of the insert tool and has a lock ring for keeping the alignment tool on top of the insert tool. Then the installing is performed into e.g. a ceiling and aligned by connecting the alignment tool to the inset tool by pushing it over the extension part and securing it from falling off with a lock ring.

[0021] The invention has several advantages of prior art. It enables lighting fixtures that are completely frameless or trimless and have no visible edges. The lighting fixtures of the invention are nice and discrete because of their effect of resembling a pure hole in the ceiling where the light comes from.

[0022] Furthermore, the assemblies of the invention, which usually are lighting fixtures or luminaires, are easy to install fast and exactly since the inventive insert of the assembly can be directly mounted in ceilings, especially in gypsum board ceilings, wood or Medium-Density Fibreboards (MDF). No screws through the ceiling material are required and there is less need for plastering, if at all.

[0023] The use of the insert is not restricted to luminaires only. Instead of lamps, bulbs, spotlights or other light sources, the insert can house other emitting or sensing devices, such as e.g. different sensors, such as cameras, motion detectors, temperature sensors, fire alarms, or even sprinklers.

[0024] The primary object, however, is to use the insert for a luminaire or sensor in a ceiling. Instead of mounting in a ceiling, other possibilities are mounting in e.g. a wall, furniture, a cupboard or an apparatus, or any surfaces, wherein such luminaires or sensors are desired. As the primarily is designed to work with soft materials, it is mostly enough to cut a hole and cutting a thread is not necessary. The idea is that the insert itself cuts the thread.

[0025] In the following the invention is described by means of a preferable embodiment by referring to figures. The invention is not restricted to the details of the figures.

FIGURES

[0026]

Figure 1 is a presentation of a general concept of an embodiment of the invention

Figure 2 is a presentation of a general concept of an other embodiment of the invention, wherein an alignment tool is used

Figure 3 illustrates an embodiment of an insert of the invention together with a suitable insert tool used in figures 1 and 2 seen in a perspective view obliquely from above

Figure 4 illustrates an embodiment of an insert of the invention together with a suitable insert tool used in figures 1 and 2 seen in a perspective view obliquely from below Figure 5 is a presentation of a general concept of a further embodiment of the invention

Figure 6 illustrates an embodiment of an insert of the invention together with a suitable insert tool used in figure 5 seen in a perspective view obliquely from above

Figure 7 illustrates an embodiment of an insert of the invention together with a suitable insert tool used in figure 5 seen in a perspective view obliquely from below

DETAILED DESCRIPTION

[0027] Figure 1 is a presentation of a general concept of a first embodiment of the invention. It presents how the recessed assembly of the invention is assembled. The recessed assembly is a luminaire, also called a lighting fixture.

[0028] The presentation is for illustrative purposes. In practice, the insert 1 always needs to be screwn in completely until it is flush with the mounting surface to be maintained therein.

[0029] There are six holes 2 in the ceiling 3 in figure 1 for showing different stages of the installing of an insert of the invention for receiving a light source, such as a luminaire, bulb, or spot of the invention into a hole 2 in a ceiling 3.

[0030] A round-shaped insert 1 of the invention is to be inserted in figure 1 into a hole 2 in a ceiling 3, the ceiling 3 shown in part in figure 1.

[0031] At the first hole 2 to the left, there is shown an empty hole 2 only, as drilled into a ceiling 3. The insert 1 is shown separately below the first hole 2 to show how

it looks like before inserting it into the hole 2. The insert 1 can have an even inside surface 4 like in figure 1 and threads 5 on the outside surface.

[0032] The inside surface 4 is not necessarily even. The most common insert surface will probably have a groove into which a corresponding projective part, such as an O-ring or a canted steel spring clips fits in and thus holds an emitting device or insert, such as a light source, like a spot, safer in place than without this arrangement. Depending on what embodiment of insertion tool is used, the inside surface of the insert can as well have vertical grooves into which the insertion tool's baffles fit. A further option is to have a thread or a bayonet groove on the insert's inner surface. The inner surface could have bayonet grooves so one could insert a spot or the like by pushing it in and "lock" it by turning. The inner surface could be a thread so one could thread a spot or the like into the insert. The inside surface thus depends on the chosen technique to mount the spot or other device inside the insert but most likely the best solution is a canted spring ring sitting on the spot or the inserted object which snaps into an inner groove of the insert ring.

[0033] At the second hole 2 to the left, there is, for illustrative purposes, shown a stage, wherein the insert 1 has partly been inserted in the hole 2 but not yet screwed in. In practice, the insert 1 would probably or necessarily not remain in the hole before having been screwed in completely.

[0034] An insertion tool 6, separately shown below the second hole 2 from left, is used for the insertion of the insert 1 into the hole 2.

[0035] The insert tool 6 has an upper round-shaped section 7, which fits tightly into the insert 1, and it extends as a raised section on a lower round-shaped plate like section 8. The lower round-shaped section 8 has a larger diameter than that of the upper round-shaped section 7 and that of the insert 1 thereby supporting the insert 1 at inserting.

[0036] The primary function of the round-shaped section 8 is, however, to work as a brake at inserting the insert 1 into the ceiling in order to prevent the insert 1 to be inserted too deep into the hole 2.

[0037] There is furthermore an extension part 9 below the lower round-shaped part 8, which extension part 9 works as a handle or as a part to which auxiliary tools for driving screws can be connected.

[0038] Instead of or in addition to having a round-shaped section 8 with a larger diameter in the insert tool, the insert 1 can have a peripheral edge 16 with a diameter larger than that of the hole 2 in order to prevent the insert 1 to be inserted too deep in to the hole 2. The edge will then surround the hole 2 outside it against the surface of the ceiling 3.

[0039] The insert tool 6 is shown separately below the second hole 2 to show how it looks like before connecting it to the insert 1. After connecting the insert tool 6 to the inset with the upper round-shaped section 7 being brought into the insert 1, the insert tool 6 is then used for inserting the insert 1 into a hole 2 in the ceiling 3.

[0040] There are different alternatives for how to perform the inserting depending partly on how much power is required, which might vary case by case, e.g. due to the size of the insert 1 and insert tool 6, and the ceiling material.

[0041] An auxiliary device for the insertion (not shown in figure 1) is preferably connected to an extension part 9 of the insert tool 6 for screwing in the insert 1 into the hole 2 of the ceiling 3.

[0042] Such an auxiliary device can be a manual or powered tool, used for driving screws, such as a screwdriver. A typical simple screwdriver with a handle and a shaft and ending in a tip can be connected to the insert tool before turning the insert tool 6. The shown insert tool works only with power drills, but it is possible to tool a hexagonal shaped end on the part 9 so that hand driven tools like a handheld Hex nut screwdriver could be used. A power drill or an electrical drill, that is a more versatile and quicker tool, can also be used and be connected to the insert tool 6, such as to the extension part 9. The insert tool 6 is most comfortably used together with such a drill or powered screwdriver. In some cases, pure hand craft may, however, suffice, whereby the extension part 9 works as a handle. In such a case, a real handle part or grip on top of the extension part 9 would in practice be required or at least recommendable.

[0043] At the third hole 2, there is shown how the insert 1 has been inserted in the hole 2, the insert tool 6 and the insert 1 still being connected together so that the upper round-shaped section 7 of the insert tool 6 fits tightly inside the insert 1. Neither the upper round-shaped section 7 nor the insert 1 can now be seen at the third hole 2 of figure 1, since the hole is seen perspectively from below and since the lower round-shaped section 8 of the insert tool 6 has a larger diameter than those of the hole 2, of the insert 1 and of the upper round-shaped section 7. A peripheral section of the lower round-shaped section 8 will therefore stay outside the hole 2 when the insert 1 is in the inserted stage. The hole 2 can not be seen either at the place of the third hole being hidden by the lower round-shaped section 8 of the insert tool 6.

[0044] The insert tool 6 has now been detached and removed and the fourth hole 2 shows how the insert 1 is wholly inserted in the hole 2. A peripheral edge can be seen outside the hole 2 but since the edge actually is flush with the surface, nothing is protruding out anymore.

[0045] The fifth hole 2 shows in similar to the fourth hole 2 how the insert 1 is wholly inserted in the hole 2. There is furthermore a light source 10, such as a LED lamp, shown separately below the fifth hole 2. Reference number 11 shows an O-ring or canted spring, which will hold the light source 10 in place inside the insert 1.

[0046] The sixth hole 2 shows how the light source has been inserted in the insert 1. The light source 10 will be connected to a power supply, such as to the grid. In practice, the light source 10 is first connected to a power supply and then clipped into the insert 1 in the ceiling 3.

[0047] Figure 2 is a presentation of a general concept of an other embodiment of the invention, wherein an alignment tool 13 is used.

[0048] The assembling otherwise takes place as in figure 1, but here an alignment tool 13 is connected to the insert tool 6 before bringing in the insert 1 connected to the insert tool 6 into a hole in a ceiling.

[0049] The alignment tool 13 e.g. has a planar plate with two legs of even length coming against the ceiling 3. The alignment tool 13 is attached to the insert tool 6 by removing the lock ring 14 pushing the alignment tool 13 over the extension part 9 and locking the lockring back on its place on its place on part 9. The alignment tool can now freely move up and down on part 9 connected to the insert tool 6, preferably to the extension part 9 of the insert tool 6 by means of a nut 17, so that the planar plate of the alignment tool 13 is parallel with the round-shaped plate like section 8 of the insert tool 6.

[0050] In the first stage at the hole most left in figure 2, the alignment tool 13 have been connected to the insert tool 6. The insert 1 having threads 5 on its outside surface has also been connected to the insert tool 6, which has been carried out by inserting the insert tool 6 into the insert 1. The combination of insert 1, insert tool 6, and alignment tool 13 has in the first stage been placed against the hole in a ceiling 3 into which the insert 1 is to be inserted. By pressing the alignment tool 13 firmly against the ceiling 3 it is ensured that the inserting tool 6 and the insert 1 placed on top of it are perfectly orthogonal screwed into the ceiling 3.

[0051] In the second stage the alignment tool 13 is still pressed against the ceiling 3 but the insert 1 has been screwed completely into the ceiling 3. The lockring 14 does not work as a stopper for the inserting tool, it just prevents the alignment tool 13 from dropping of from the extension 9 if it is not kept in the hand.

[0052] In the third stage at the hole most to the right in figure 2, the insert tool 6 together with the alignment tool 13 have been detached and removed from the insert 1, which now is in place in the hole 2 and the inner surface 4 of which and its peripheral edge that is outside the hole can be seen.

[0053] A light source can then be inserted like in figure 1 (not shown).

[0054] Figure 3 illustrates an embodiment of an insert 1 of the invention together with a suitable insert tool 6 used in figures 1 and 2 seen in a perspective view obliquely from above.

[0055] The insert 1 has threads 5 on its outside surface. A preferable pitch of the threads 5 on the outside surface of the insert 1 has found to be about 2.5 - 5 mm. The threading can be discontinuous to improve the self-cutting properties of the thread and to facilitate the inserting. Also, the size of the threads outwards influence on the inserting and its durability. Thread dimensions of for the depth or height is preferably raising from 0 to 2.1mm. The pitch and raise are the same in a smaller as in a larger insert. Important is that the threads' edge is as sharp as possible. The optimum is basically a knife sharp edge like a wood screw. Due to manufacturing limitations the thread edge radius can sometimes be about 0.2mm.

[0056] The construction of the embodiment of the insert tool 6 of figure 3 was described in connection with figure 1 above. The insertion tool 6 is to be inserted in the insert 1 so that the upper round-shaped section 7 fits tightly into the insert 1, and it extends as a raised section on a lower round-shaped plate like section 8. The lower round-shaped section 8 has a larger diameter than that of the upper round-shaped section 7 and that of the insert 1 thereby supporting the insert 1 at inserting. The extension part 9 below the lower round-shaped part 8 works as a handle or as a part to which auxiliary tools for driving screws can be connected.

[0057] This insert tool 6 of figure 3 transfers momentum in the form of rotational force via taps 12 that can be worm screws, such as M3x15 worm screws. There can e.g. be three of them (two of them seen in figure 3). Such worm screws project out from the lower round-shaped plate like section 8, e,g, they can watch 5 mm out. In figure 3, the worm screws 18 have been inserted into M3 thread holes inside the lower part 8.

[0058] Figure 4 illustrates the same thing as figure 3 but seen in a perspective view obliquely from below. The holes 19 in round-shaped plate like section 8 into which the taps 12 are inserted can be seen.

[0059] Figure 5 is a presentation of a general concept of a further embodiment of the invention and like figure 1, it presents how a recessed assembly of the invention is assembled. The recessed assembly is also here a luminaire, also called a lighting fixture.

[0060] Like in figure 1, the illustrations at the six holes 2 in the ceiling 3 show different stages of the installing of an insert of the invention for receiving a light source, such as a luminaire, bulb, or spot of the invention into a hole 2 in a ceiling 3.

[0061] A round-shaped insert 1 of the invention is to be inserted in figure 1 into a hole 2 in a ceiling 3, the ceiling 3 shown in part in figure 5.

[0062] At the first hole 2 to the left, there is shown an empty hole 2 only, as drilled into a ceiling 3.

[0063] At the second hole 2 to the left, there is, for illustrative purposes, shown a stage, wherein the insert 1 has partly been inserted in the hole 2 but not yet screwed in. The insert 1 has in this embodiment a step with two grooves 15 in its inside surface 4 and threads 5 on the outside surface. In practice, the insert 1 would probably or necessarily not remain in the hole before having been screwed in completely.

[0064] An insertion tool 6, separately shown below the second hole 2 from left, is used for the insertion of the insert 1 into the hole 2.

[0065] The insert tool 6 has an upper round-shaped section 7, to be tightly inserted into the insert 1, and it extends as a raised section on a lower round-shaped plate like section 8. The lower round-shaped section 8 has a larger diameter than that of the upper round-shaped

section 7 and that of the insert 1 thereby supporting the insert 1 at inserting.

[0066] The primary function of the round-shaped section 8 is, however, to work as a brake at inserting the insert 1 into the ceiling in order to prevent the insert 1 to be inserted too deep into the hole 2.

[0067] There is furthermore an extension part 9 below the lower round-shaped part 8, which extension part 9 works as a handle or as a part to which auxiliary tools for driving screws can be connected.

[0068] Instead of or in addition to having a round-shaped section 8 with a larger diameter in the insert tool, the insert 1 can have a peripheral edge 16 with a diameter larger than that of the hole 2 in order to prevent the insert 1 to be inserted too deep in to the hole 2. The edge will then surround the hole 2 outside it against the surface of the ceiling 3.

[0069] The insert tool 6 is shown separately below the second hole 2 to show how it looks like before connecting it to the insert 1. After connecting the insert tool 6 to the insert 1 with the upper round-shaped section 7 being brought into the insert 1, the insert tool 6 is then used for inserting the insert 1 into a hole 2 in the ceiling 3.

[0070] There are different alternatives for how to perform the inserting depending partly on how much power is required, which might vary case by case, e.g. due to the size of the insert 1 and insert tool 6, and the ceiling material. Like in figure 1, an auxiliary device, like a screwdriver or a powered tool can be used for the insertion and be connected to the insert tool 6.

[0071] In the embodiment of figure 5, the insert tool 6 has an upper section 7 with wings or baffles 18 to ensure a tight fit into the insert 1. The baffles 18 transfer rotational force (momentum) from the insert tool 6 to the insert 1. The baffles 18 are shorter than section 7 since the light source, like a spot, to be inserted has a larger diameter at the bottom.

[0072] The embodiment of the insert 1 of figures 1 - 4 are preferably used for bigger inserts and the embodiment of the insert 1 of figures 5 - 7 are preferably used for smaller inserts.

[0073] The insert tool 6 of figures 1 - 4 is primarily made for inserts where there is no space to push the baffles 18 inside the insert 1. This is usually the case when the inserted spot needs all the space insight the insert ring.

[0074] The insert tool 6 of figures 5 - 7 is primarily made for inserts where the grooves to slide in the tool baffles 18 are hidden inside the insert 1. It mainly works with spots which have a larger diameter at the bottom than at their upper end.

[0075] So the smaller insert tool 6 of figures 5 - 7 transfers the rotational force via the two baffles 12, and the bigger insert tool 6 of figures 1 - 4 transfer the force via three taps, such as 3 M3 X 15 screw "taps". Naturally, the number of the baffles or taps can vary according to situation and these different embodiments can be used interchangeably in inserts of different sizes.

[0076] At the third hole 2, there is shown how the insert 1 has been inserted in the hole 2, the insert tool 6 and the insert 1 still being connected together so that the upper round-shaped section 7 of the insert tool 6 fits tightly inside the insert 1. The upper round-shaped section 7 can now not be seen at the third hole 2 of figure 1, since the hole is seen perspectively from below and since the lower round-shaped section 8 of the insert tool 6 has a larger diameter than those of the hole 2, of the insert 1 and of the upper round-shaped section 7.

[0077] At the fourth hole, the insert tool 6 has now been detached and removed and the fourth hole 2 shows how the insert 1 is wholly inserted in the hole 2 (only a peripheral edge 16 being outside).

[0078] Also, a spotlight 10 is shown as a light source to be inserted in the insert 1. The spotlight 10 has a 3-armed steel spring 20, which will clamp and hold the spot inside the insert 1 once the spot is fully pushed into the insert 1.

[0079] The fifth hole 2 shows in similar to the fourth hole 2 how the insert 1 is wholly inserted in the hole 2. There is furthermore a light source 10, such as a LED lamp installed in the insert 1.

[0080] The sixth hole 2 also shows how the light source 10 has been inserted in the insert 1. The light source 10 will be connected to a power supply, such as to the grid. In practice, the light source 10 is first connected to a power supply and then clipped into the insert 1 in the ceiling 3. At the sixth hole, an embodiment is shown where the flush mounted insert 1has been painted over so it is not anymore visible at all.

[0081] Figure 6 illustrates an embodiment of an insert 1 of the invention together with a suitable insert tool 6 used in figure 5 seen in a perspective view obliquely from above.

[0082] The insert 1 has threads 5 on its outside surface. In the embodiment of figures 5 - 7, the insert tool 6 has an upper section 7 with wings or baffles 12. The baffles 12 transfer rotational force (momentum) from the insert tool 6 to the insert 1. The baffles 12 are shorter than section 7 since the light source, like a spot, to be inserted has a larger diameter at the bottom.

[0083] Figure 7 illustrates the same thing as figure 6 but seen in a perspective view obliquely from below. There are grooves 15 inside the insert 1 into which the baffles 12 of the insert tool 6 fit in.

Claims

1. A round-shaped insert (1) to be inserted in a hole (2) in a surface (3), the insert (1) having an outside threading for housing an emitting or sensing device (10).

2. The insert (1) of claim 1, wherein the insert (1) has an even inside surface.

3. The insert (1) of claim 1 or 2, wherein the insert (1)

has at least one groove (15) or thread in its inside surface for receiving a corresponding projecting portion, like a baffle, O-ring, a canted steel spring or the like, for holding the sensing device (10) safely in place.

4. The insert (1) of any of claims 1 - 3, wherein the insert (1) has at least one groove (15) or thread in its inside surface for receiving baffles of an insertion tool (6), said groove (15) being selected from a horizontal groove, a vertical groove or a bayonet groove.

5. The insert (1) of any of claims 1 - 4, wherein the insert (1) has a peripheral edge (14) preventing the insert from being screwed too deep inside the surface (3) and covering the edge of the hole (2), which has been drilled in the surface (3).

6. The insert (1) of any of claims 1 - 5, wherein the threading (5) is discontinuous.

7. The insert (1) of any of claims 1 - 6, wherein the pitch of the threading is up to 5 mm, while the thread depth or height is raising from 0 to 2.1mm.

8. The insert (1) of any of claims 1 - 7, wherein the surface (3) is a ceiling and the insert (1) is to be inserted in a hole (2) in the ceiling (3) and the emitting device (10) is a light source.

9. A recessed assembly comprising
a round-shaped insert (1) for housing an emitting or sensing device (10), the insert (1) having a threaded outside surface for housing an emitting or sensing device (10), and an emitting or sensing device (10) positioned within the insert (1).

10. The assembly of claim 9, wherein the emitting or sensing device (10) is selected from light sources, like bulbs, spots, spotlights, LEDs, whereby the assembly is a recessed luminaire or lighting fixture in a ceiling (3) or a wall, or the emitting or sensing device (10) is selected from sprinklers, and from different sensors, such as cameras, motion detectors, temperature sensors, and fire alarms.

11. An insert tool (6) for inserting a round-shaped insert (1) in a hole (2), the insert tool (6) having

an upper round-shaped section (7) fitting tightly inside the round-shaped insert (1) and extending as a raised part on a lower round-shaped section (8),
a lower round-shaped section (8) with a larger diameter than that of the upper round-shaped section (7) and that of the insert (1) thereby supporting the insert (1) at inserting and preventing an excessive insertion of the insert (1), and
an extension part (9) below the lower round-shaped part (8).

12. The insert tool (6) of claim 11, wherein the upper section (7) has wings, baffles (12), or taps (18) to transfer the rotational force from the inserting tool (6) into the insert (1).

13. The insert tool (6) of a claim 11 or 12, further having means for connecting thereto an auxiliary device for the insertion to said extension part (9).

14. The insert tool (6) of any of claims 11 - 13, further having connected thereto an alignment tool (13) in the form of a planar plate with two legs of even length , the alignment tool (13) being connected to the insert tool (6), preferably to the extension part (9) of the insert tool (6), so that the planar plate of the alignment tool (13) is parallel with the round-shaped plate-like section (8) of the insert tool (6) and having a lock ring (14) for keeping the alignment tool (13) on top of the insert tool (6).

15. Method of installing a recessed assembly of claim 9 or 10 in a hole (2) in a surface (3), comprising

connecting an insert tool (6) of any of claims 11 - 14 to an insert (1) of any of claims 1 - 8 so that the upper round-shaped section (7) is tightly inside the round-shaped insert (1) and the lower round-shaped section (8) supports the insert (1), screwing in the insert (1),
detaching the insert tool (6) from the insert (1), and inserting an emitting or sensing device (10) in the insert (1) and connecting the device (10) to power supply.

16. Method of claim 15, wherein the screwing of the insert (1) takes place by connecting an auxiliary insertion device to the extension part (9) of the insert tool (6).

17. Method of claim 15 or 16, wherein the installing is performed into a ceiling (3) and aligned by connecting an alignment tool (13) to the inset tool (6), by pushing it over the extension part (9) and securing it from falling off with a lock ring (14).

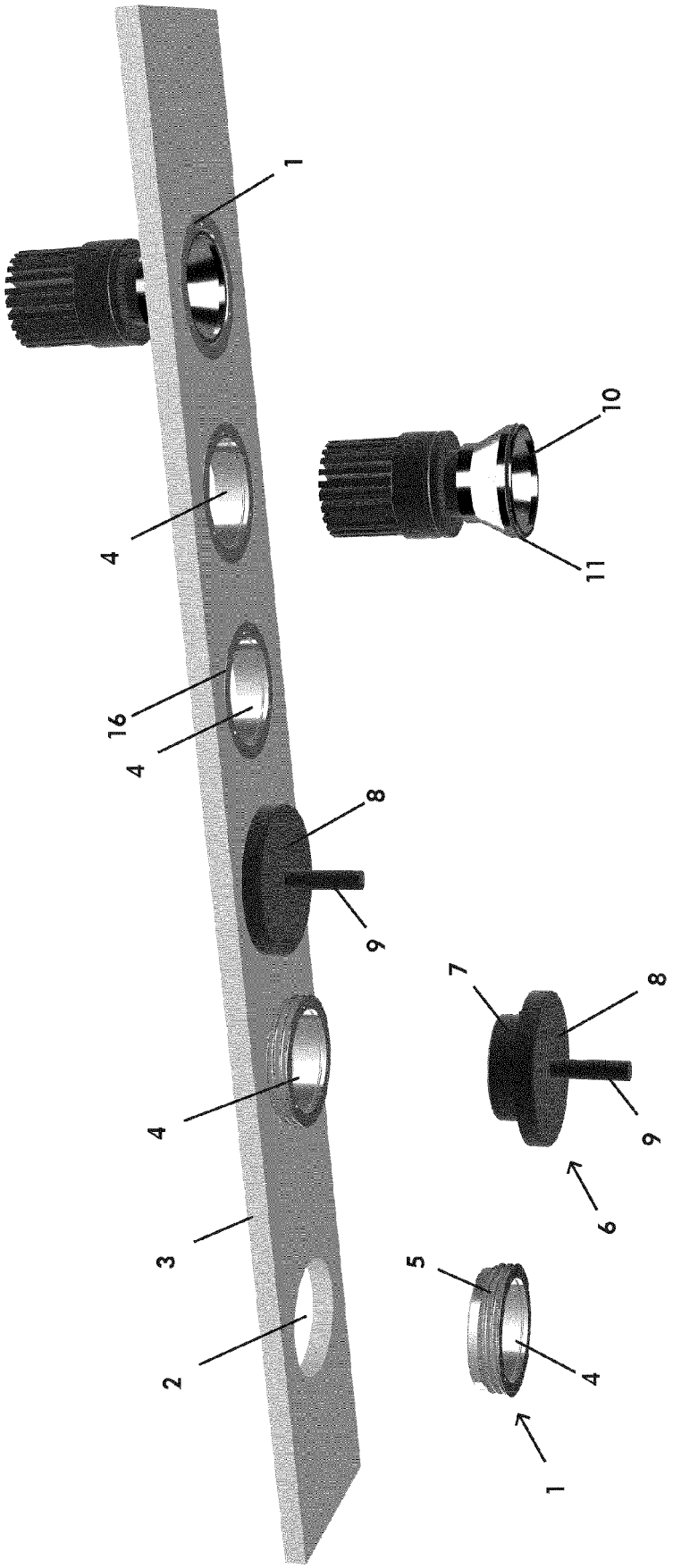

FIG. 1

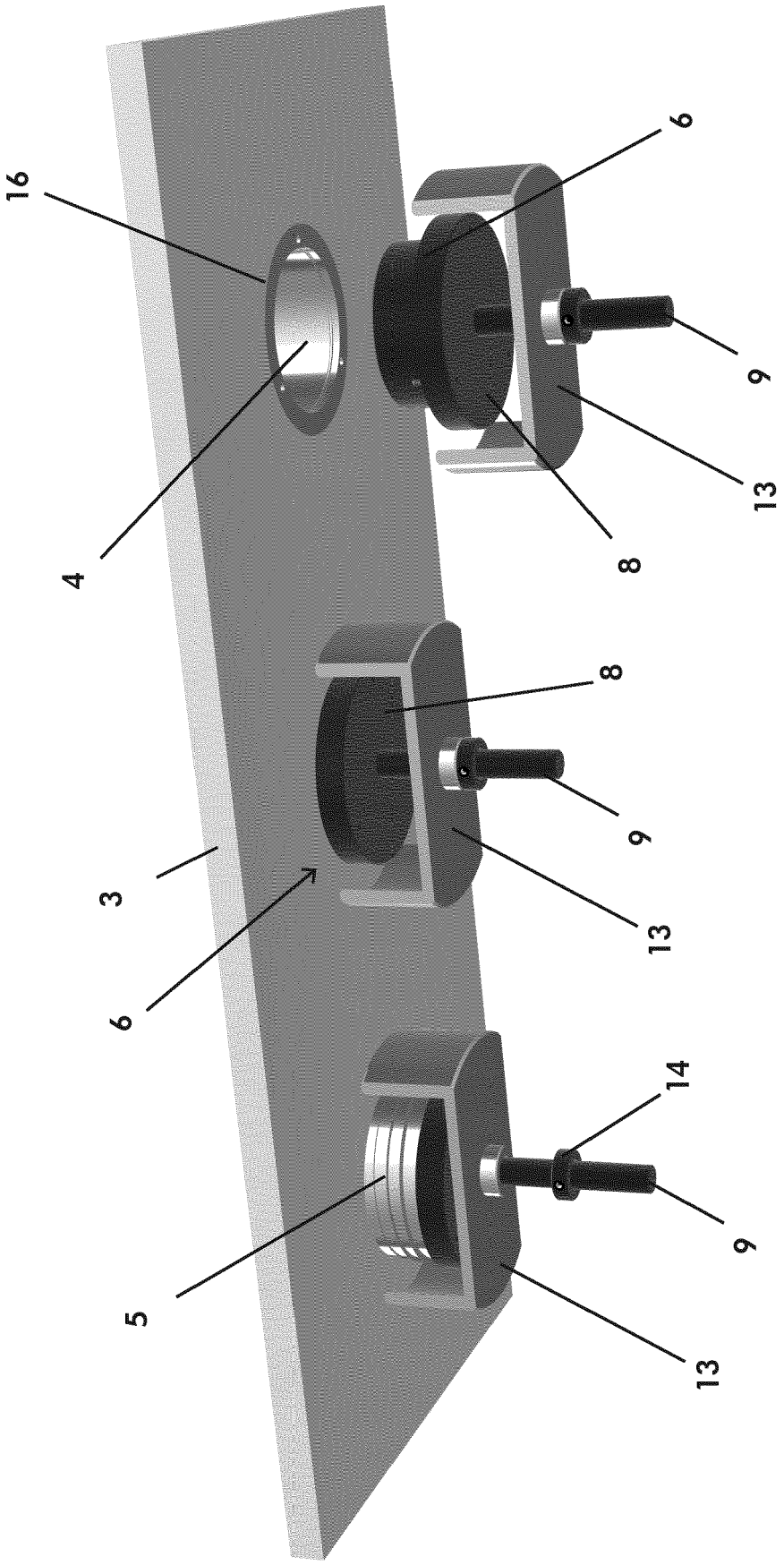

FIG. 2

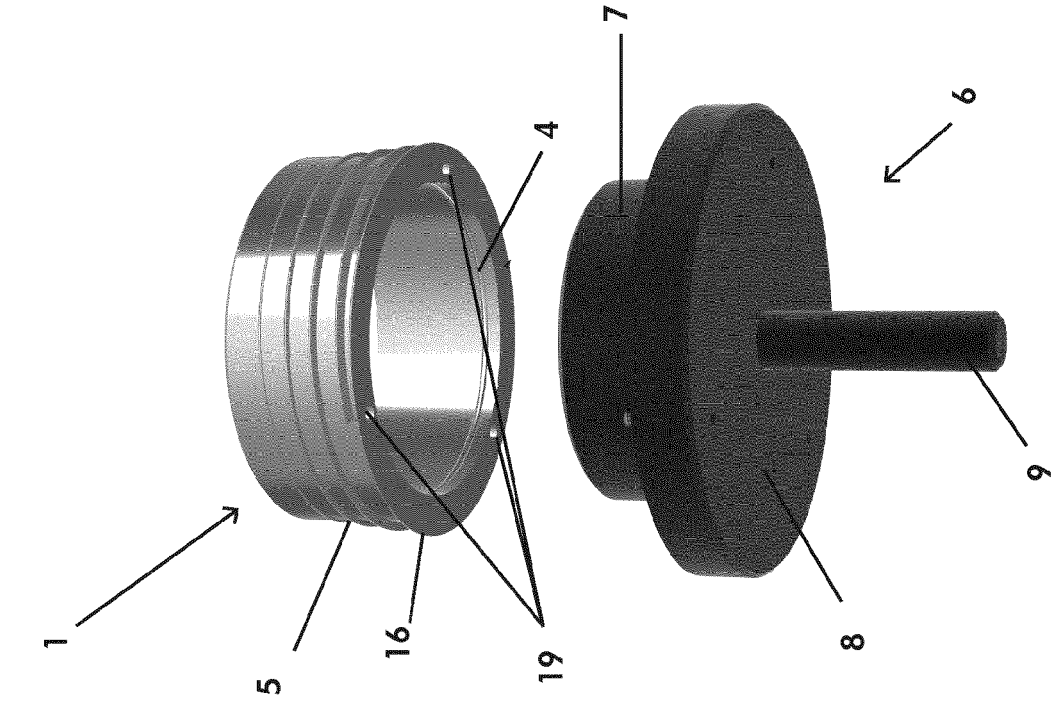

FIG. 4

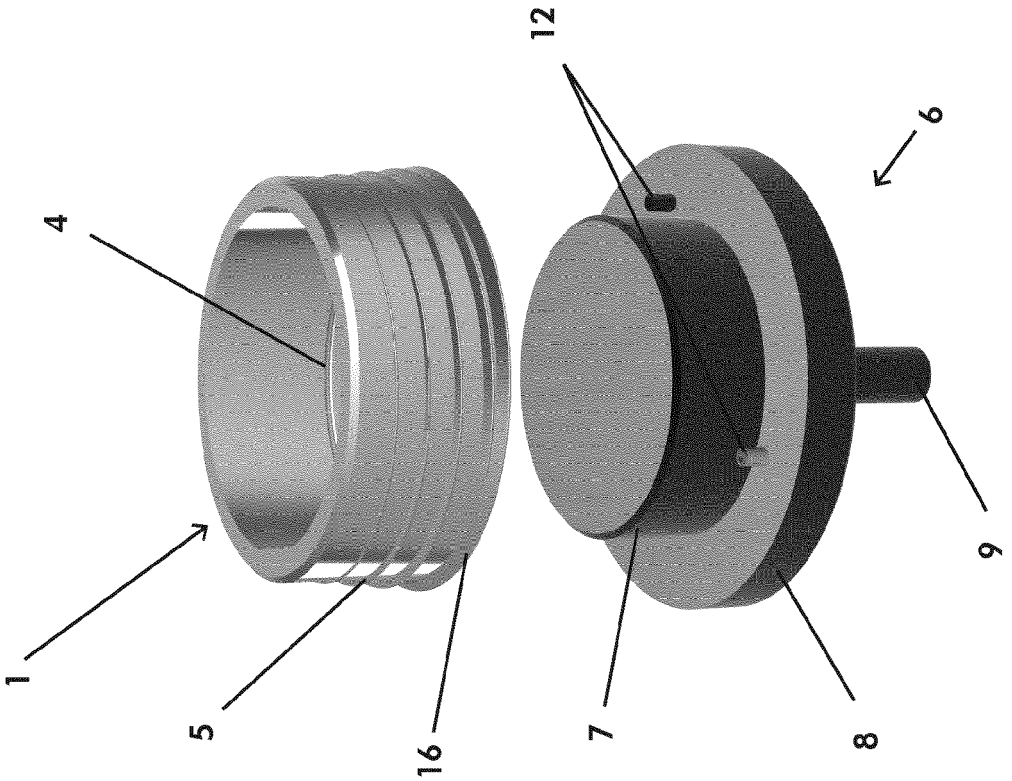

FIG. 3

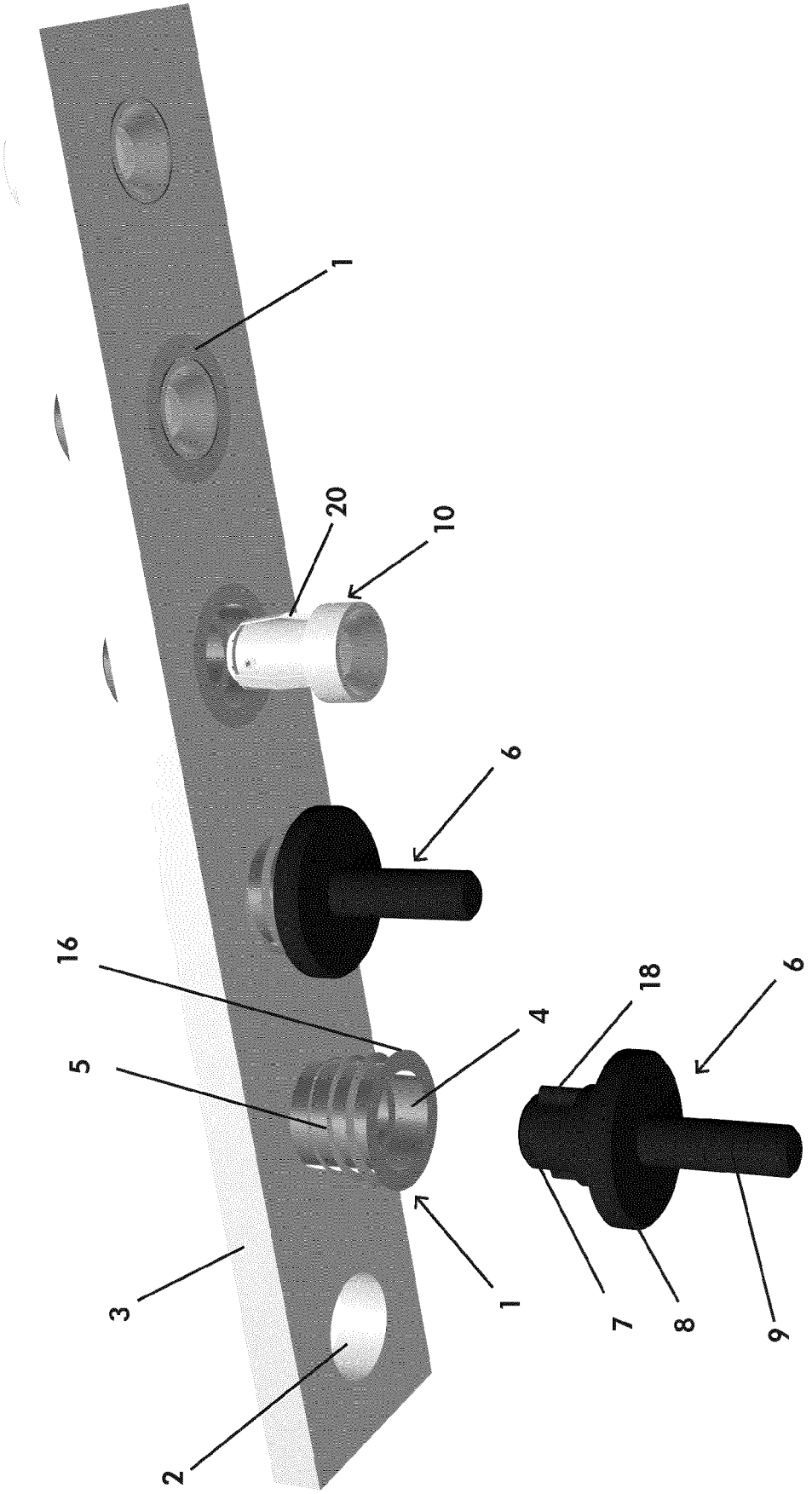

FIG. 5

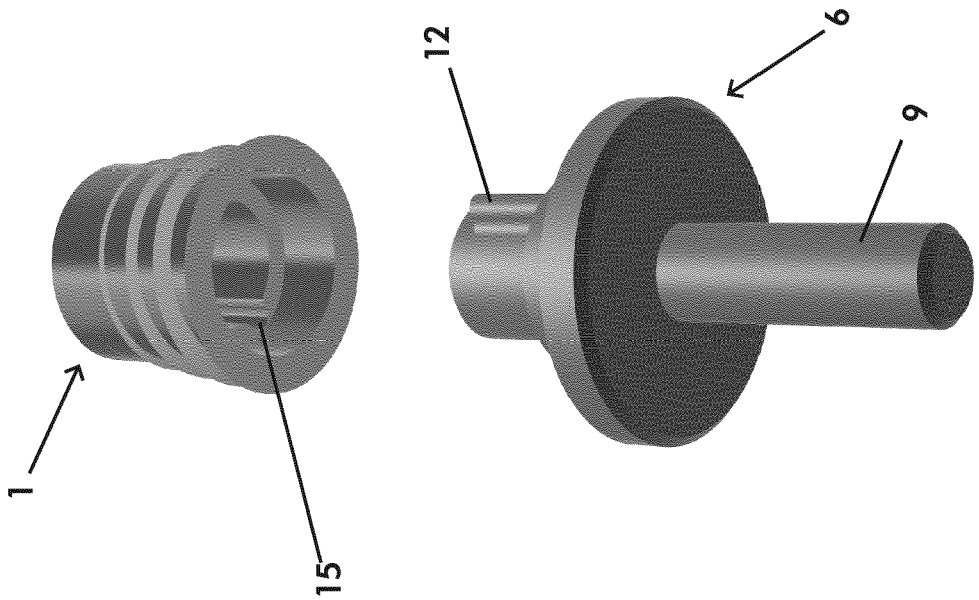

FIG. 7

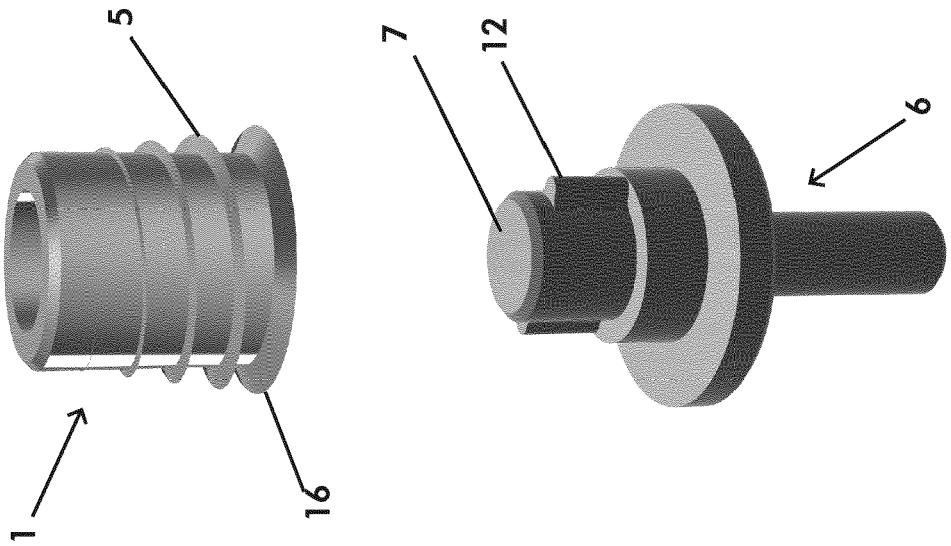

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 21 20 7186

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F21S
F21V
B25B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 March 2022	Dinkla, Remko

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