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(54) **Fixing system for recessed luminaire**

Befestigungssystem für Einbauleuchte

Système de fixation pour luminaire encastré

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Description

Field of the invention

[0001] The invention relates to a fixing system for recessed luminaire according to the preamble of claim 1.

[0002] From CA 2577753 a recessed lighting fixture is known including a housing of a carrier frame for the luminaire and a spring which is mounted in the housing and which can be loaded by rotation of a screw. The screw is installed next to an inner surface of the housing. By loading the spring it is deformed and clamps the housing to a ceiling. Depending on the degree of rotation of the screw the load of the spring can vary. As a result of the undefined load of the spring ceiling may be damaged. As the clamping unit built by the screw and the spring in interaction with the housing is on the inner side of the housing the mounting of the luminaire follows in a second installation step after the housing is mounted to the ceiling.

[0003] From the US 5377088 a fixing device for recessed luminaires is known with a carrier frame and a clamping unit which is hold at the carrier frame. A clamping element of the clamping unit is moved linearly in the direction of a center axle of the carrier frame by rotating a screw. The screw is located inside the carrier frame. Therefore the installation of the luminaire also follows in second installation step after the carrier frame is mounted to the ceiling.

[0004] From EP 2 320 136 a carrier frame is known that provides a clamping element designed for mounting the carrier frame to a ceiling. The clamping element is adjusted by rotating a screw. The load is provided by a spring. As the spring exerts a force on the clamping element the exact mounting condition remains unknown and the ceiling might be damaged due to an overload.

[0005] From the US 2008/0186718 a carrier frame for a recessed luminaire is known with a clamping unit which is located on the inner side of the carrier frame. The clamping unit comprises a clamping element which can be moved from an installation position to a fixing position by rotating the clamping element. Again the installation of the luminaire follows in a second installation step as the clamping element is located inside the carrier frame while mounting the fixing system to the ceiling.

[0006] From the US 2010/252703 A1 a fixing system for recessed speaker is known.

[0007] From the DE 10 2009 057 443 A1 a fixing system for recessed luminaire is known with a clamping unit providing a clamping element. A control surface of the clamping element is not in contact with a control edge of the carrier frame.

Summary of the invention

[0008] The problem to be solved by the invention is to provide a fixing system for a one step installation of the recessed luminaire. The design of the fixing system should prevent damages of the ceiling and allow easy installation as well as disassembly.

[0009] Solutions to the problem are described in the independent claim 1. The depending claims relate to further embodiments of the invention.

[0010] The inventive fixing system comprises a carrier frame for the luminaire and a clamping unit. The clamping unit comprises a flap as a clamping element, a nut and a screw. The clamping unit does not make use of a spring element or the like. It therefore prevents damages of the ceiling due to local high stress which is created by a spring element. Especially soft ceiling materials e. g. gypsum plates are prevented from damages by using the inventive clamping unit. The mounting load can be adjusted exactly. It only depends on the degree of rotation of the screw.

[0011] Moreover the clamping unit is located outside the carrier frame. This allows a one-step installation process. The luminaire can be mounted in the recessed opening formed by the carrier frame before mounting the fixing system including the recessed luminaire to the ceiling.

[0012] The cylindrical surface section provides at least one groove which extends parallel to the center axle with the front side of the groove defining the control edge. Making the control edge an integral part of the cylindrical surface section reduces costs and allows a very compact and cost efficient design. The groove may be designed as a linear groove with the control edge being defined by a front side of the groove.

[0013] The disassembly is also simple. Both the installation position and the fixing position are built as rest positions due to the absence of springs which try to bring the clamping element in a preferred position, e. g. the fixing position. The screw and the nut may have a self-locking thread allowing a controlled stop of the flap at any position desired.

[0014] The fixing system is suitable for both soft and rigid ceilings. Depending on the design of the clamping unit and especially depending on the length of the screw ceiling depth of 0.5 up to 30 mm can be handled by one and the same fixing system. The fixing system is therefore highly flexible.

[0015] In a further embodiment of the invention the flap is rotated by an angle of 85° to 95° when being moved from the installation position to the fixing position or vice versa. In a preferred embodiment the rotation of angle is 90°. Within the specified range the movement of the flap ensures both a positive locking in the fixing position as well as a small footprint in the installation position. It therefore provides an easy installation and disassembly as well secure fit in the fixing position.

[0016] According to a further embodiment of the invention the second contact surface is a plane contact surface with the center axle of the carrier frame being in a rectangular orientation to the second contact surface when the flap is in the fixing position and with the second contact surface being a tangential orientation to the cylindrical surface section of the carrier frame in the installation

position. The plane contact surface ensures low stress to the ceiling in the fixing position as the load is divided to a relatively large area of the ceiling. Reducing the stress to the ceiling once again prevents damages and allows the installation of the fixing system to soft ceilings.

[0017] The flap and the nut of the clamping unit can be made completely out of plastic. No metal parts expect for the screw is needed. This allows cost reductions as the plastic parts can be built very cheaply in high volume. Moreover plastic parts are not electrically conductive and therefore favorable due to safety reasons.

[0018] In a further embodiment of the invention the flap provides a guiding surface which interacts with a guiding rail, provided by the cylindrical surface section of the carrier frame when moving the flap from the installation position to the fixing position or vice versa. The guiding rail of the cylindrical surface section and the center axle of the carrier frame are oriented in parallel to each other. The guiding surface and the guiding rail allow smooth and exact movement of the flap. This makes assembly and disassembly easy and prevents damages caused by misalignments of the clamping unit.

Brief description of the drawings

[0019] The present invention will become more fully understood from the detailed description given hereinbelow and the accompanying drawings which are given by way of illustration only, and thus, are not limitive to the present invention.

Figure 1 shows a perspective view of a fixing system;

Figure 2 shows an exploded view of the fixing system of figure 1;

Figure 3 shows a first installation step of a recessed luminaire using the fixing system of figure 1;

Figure 4 shows a second installation step of a recessed luminaire using the fixing system of figure 1;

Figure 5 shows a third installation step of a recessed luminaire using the fixing system of figure 1; and

Figure 6 shows the installed recessed luminaire.

Detailed description of the drawings

[0020] Figure 1 shows a fixing system 1 for recessed luminaires in a perspective view. Figure 2 shows an exploded view of the same fixing system 1. The fixing system 1 has a carrier frame 2 and a clamping unit 3 connected to the carrier frame 2. The fixing system 1 is designed for recessed luminaires which are mounted to a ceiling. E. g., a LED light can be mounted to the fixing system 1.

[0021] The carrier frame 2 comprises a cylindrical surface section 4 which defines a recessed opening 5 for mounting the luminaire to the carrier frame 2. The cylindrical surface section 4 is oriented coaxial to a center axle 6 of the carrier frame 2. The carrier frame 2 also comprises a flat rim section 7 which protrudes from the cylindrical surface section 4 radially to the outside. The flat rim section 7 provides a first contact surface 8 of the fixing system 1 which is built as a plane contact surface. The contact surface 8 is designed for connecting the fixing system 1 to an outer side of the ceiling.

[0022] The clamping unit 3 comprises a flap 9, a nut 10 and a screw 11. The flap 9 is the clamping element of the clamping unit 10. The flap 9 has a second contact surface 12 and a control surface 13 which is designed for interaction with a control edge 14 of the carrier frame 2. The interaction will be described later in detail.

[0023] The flap 9 is L-shaped with a first arm 21 comprising the control surface 13 and with a second arm 22 comprising the second contact surface 12.

[0024] The nut 10 has two bearing pins 15 protruding from a thread section 16 of the nut 10. The bearing pins 15 are mounted in two recesses 17 of the flap 9. The nut 10 is therefore rotatable arranged to the flap 9.

[0025] The screw 11 meshes with the nut 10. The screw 11 comprises a screw head 18 and a shaft 19 which extends in parallel to the center axle 6 of the cylindrical surface section 4 and the carrier frame 2.

[0026] For mounting the clamping unit 3 to the outside of the carrier frame 2 the flat rim section 7 of the carrier frame 2 provides a hole 20 for the screw 11. A diameter of the hole 20 is smaller than a diameter of the screw head 18 and taller than a diameter of the shaft 19 of the screw 11. The hole 20 is positioned next to the cylindrical surface section 4 of the carrier frame 2.

[0027] The nut 10 has a guiding lug 23 which interacts with and translatory travels in a sliding rail 24 of the carrier frame 2 when mounting the carrier frame 2 to the ceiling. The sliding rail 24 is part of the cylindrical surface section 4 and extends in parallel to the center axle 6. Guiding lug 23 and sliding rail 24 are designed for smooth and exact movement of the nut 10 and prevent the clamping unit 3 from misalignment.

[0028] On both sides of the sliding rail 24 grooves 25 and guiding rails 26 are provided. The two grooves 25 as well as the guiding rails 26 extend in parallel to the center axles 6. The lower front sides 28 of the grooves 25 define the control edge 14 which interact with the control surface 13 of the flap 9.

[0029] The two guiding rails 26 interact with two guiding surfaces 27 of the flap 9. The guiding surfaces 27 are installed next to the control surface 13 on the first arm 31 of the flap 9. Control surface 13 and guiding surface 27 are in a rectangular orientation to each other.

[0030] The fixing system 1 has identical two clamping units 3 which are connected to the carrier frame 2 on opposite sides of the center axle 6. The two clamping

units 3 allow a secure fastening of the fixing system 1.

[0031] Turning now to figures 3 to 6 the installation process of the fixing system 1 is illustrated. In a first step the flaps 9 are in upright position with the second contact surfaces 12 being tangential oriented to the cylindrical surface section 4 of the carrier frame 2. This upright position of the flaps 9 define an installation position of the clamping unit 3 in which the fixing system 1 is pushed into a mounting hole 29 of a ceiling 30 to which the fixing system is mounted.

[0032] As it can be seen the luminaire 31 is located in the recessed opening 5 of the carrier frame 2 and mounted to the fixing system 1. Therefore the fixing system 1 allows one step installation process with a combined installation of fixing system 1 and luminaire 31.

[0033] After the first contact surface 8 which is part of the flat rim section 7 of the carrier frame 2 is connected to an outer surface 32 of the ceiling 30 the two flaps 9 are moved to the fixing position by rotation of the screws 11. Starting in the installation position the rotation of the screw 11 leads to a linear movement of the nut 10 along the shaft 19 of the screw 11. As a result of the linear movement of the nut 10 and the contact between the control surface 13 of the flaps 9 and the control edge 14 of the groove 25 the flaps 9 rotates. This rotation by an angle of 90° brings the second contact surface 12 into a rectangular orientation to the center axle 6. After the 90° rotation of the flaps 9 the first contact surface 8 and the second contact surface 12 are in a parallel orientation. Further rotation of the screw 11 will move the flaps 9 towards the ceiling 30. When the second contact surface 12 meets an inner surface 33 of the ceiling 30 the flaps 9 are in the fixing position and the fixing system 1 is mounted to the ceiling 30. Finally a cover 34 can be mounted to the flat rim section 7 of the carrier frame 2.

[0034] For disassembly the screws 11 are rotated in the opposite direction causing the flaps 9 to move from the mounting position to the installation position. After the installation position is reached the fixing system 1 including the recessed luminaire 31 can be removed from the ceiling 30.

List of references numbers

[0035]

1 fixing system
2 carrier frame
3 clamping unit
4 cylindrical surface section
5 recessed opening
6 center axle
7 flat rim section
8 first contact surface
9 flap
10 nut
11 screw
12 second contact surface
13 control surface
14 control edge
15 bearing pin
16 thread section
17 recess
18 screw head
19 shaft
20 hole
21 first arm
22 second arm
23 guiding lug
24 sliding rail
25 groove
26 guiding rail
27 guiding surface
28 lower front side
29 mounting hole (ceiling)
30 ceiling
31 luminaire
32 outer surface
33 inner surface
34 cover

Claims

1. Fixing system (1) for recessed luminaire (31) comprising at least

- a carrier frame (2) for the luminaire (31) with a cylindrical surface section (4) which is oriented coaxial to a center axle (6) of the carrier frame (2) and which surrounds a recess opening (5) for mounting the luminaire (31) to the carrier frame (2) and with a flat rim section (7) protruding from the cylindrical surface section (4) radially to the outside wherein the flat rim section (7) provides a first contact surface (8) of the fixing system (1) for connecting the fixing system (1) to an outer surface (32) of a ceiling (30)
- a clamping unit (3) attached to the carrier frame (2) with a clamping element (flap 9) providing at least one second contact surface (12) of the fixing system (1) for connecting the fixing system (1) to an inner surface (33) of the ceiling (30)

the clamping unit (3) being movable form an installation position in which the clamping element (flap 9) is in an upright orientation in such a way that the fixing system (1) can be pushed through a mounting hole (29) of the ceiling (30) to a fixing position in which the clamping element (flap 9) protrudes from the carrier frame (2) with the second contact surface (12) facing the first contact surface (8) in such a way that the ceiling (30) can be wedged between the two contact surfaces (8, 12)
wherein the clamping unit (3) comprises at least

- a flap (9) as the clamping element wherein the flap (9) provides the second contact surface (12) and at least one control surface (13) which is at least temporarily in contact with a control edge (14) of the carrier frame (2) when moving the flap (9) form the upright installation position to the fixing positior and the flap (9) is designed as a L-shaped flap (9) with a first arm (21)
- a nut (10) being fixed to the flap (9) wherein the nut (10) is rotatable with respect to the flap (9)
- a screw (11) meshing with the nut (10) in such a way that when rotating the screw (11) the nut (10) linearly travels along a shaft (19) of the screw (11) and the flap (9) is moved from the installation position to the fixing position or vice versa

characterized in that the cylindrical surface section (4) provides at least one groove (25) with extends parallel to the center axle (6) with a front side (28) of the groove (25) defining the control edge (14), and/or that in the installation position the first arm (21) of the flap (9) extends into the groove (25).

2. The fixing system of claim 1 **characterized in that** the flap (9) is rotated by an angle of 85° to 95° when bringing the flap (9) from the installation position to the fixing position or vice versa.

3. The fixing system of claim 1 or 2 **characterized in that** the second contact surface (12) is perpendicular oriented to the control surface (13) of the flap (9), and/or that at least two clamping units (3) are installed on opposite sides of the cylindrical surface section (4) of the carrier frame (2).

4. The fixing system of one of the claims 1 to 3 **characterized in that** the second contact surface (12) is a plane contact surface (12) with the center axle (6) of the carrier frame (2) and the second contact surface (12) being in rectangular orientation when the flap (9) is in the fixing position and/or with the second contact surface (12) being in an tangential orientation to the cylindrical surface section (4) of the carrier frame (2) in the installation position.

5. The fixing system of one of the claims 1 to 4 **characterized in that** the flap (9) provides a guiding surface (27) and that the guiding surface (27) of the flap (9) at least temporarily interacts with and travels along a guiding rail (26) provided by the cylindrical surface section (4) of the carrier frame (2) when moving the flap (9) from the installation position to the fixing position or vice versa, the guiding rail (26) of the cylindrical surface section (4) being in a parallel orientation to the center axle (6) of the carrier frame (2).

6. The fixing system of one of the claims 1 to 5 **characterized in that** the nut (10) has two bearing pins (15) which bearing pins (15) are mounted in two recesses (17) of the flap (9), and/or that the nut (10) has a fixing element (guiding lug 23) for holding the nut (10) at the carrier frame (2) and for guiding the nut (10) when traveling the flap (9) from the installation position to the fixing position or vice versa.

7. The fixing system of one of the claims 1 to 6 **characterized in that** the shaft (19) of the screw (11) extends parallel to the center axle (6), and/or the shaft (19) of screw (11) is installed next to the cylindrical surface section (4) on the outside.

8. The fixing system of one of the claims 1 to 7 **characterized in that** the flat rim section (7) of the carrier frame (2) provides a hole (20) for the screw (11) next to the cylindrical surface section (4) with a diameter of the hole (20) being smaller than a diameter of a screw head (18) but being taller than a diameter of the shaft (19) of the screw (11).

9. The fixing system of one of the claims 1 to 8 **characterized in that** the flap (9) is designed as a L-shaped flap (9) with a first arm (21) comprising the control surface (13) and/or the guiding surface (27) and with a second arm (22) comprising the second contact surface (12).

Patentansprüche

1. Befestigungssystem (1) für Einbauleuchte (31), mindestens umfassend

- einem Tragrahmen (2) für die Leuchte (31) mit einem zylindrischen Flächenabschnitt (4) der koaxial zu einer Mittelachse (6) des Tragrahmens (2) ausgerichtet ist und der eine Einbauöffnung (5) zum Einbau der Leuchte (31) in den Tragrahmen (2) umgibt und mit einem flachen Randabschnitt (7) der radial vom zylindrischen Flächenabschnitt (4) nach außen vorspringt, wobei der flache Randabschnitt (7) eine erste Kontaktoberfläche (8) des Befestigungssystems (1) zur Verbindung des Befestigungssystems (1) mit einer äußeren Oberfläche (32) einer Decke (30) bildet
- einer am Tragrahmen (2) befestigte Spanneinheit (3) umfassend ein Spannelement (Lasche 9) welches mindestens eine zweite Kontaktoberfläche (12) des Befestigungssystems (1) zur Befestigung des Befestigungssystems (1) an einer inneren Oberfläche (33) des Dachhimmels (30) bildet

wobei die Spanneinheit (3) aus einer Montagestel-

lung heraus beweglich ist, in welcher das Spannelement (Lasche 9) derart aufrecht orientiert ist, dass das Befestigungssystem (1) durch eine Montageöffnung (29) im Dachhimmel (30) in eine Befestigungsstellung geschoben werden kann in der das Spannelement (Lasche 9) vom Tragrahmen (2) absteht, wobei die zweite Kontaktfläche (12) der ersten Kontaktfläche (8) so gegenüberliegt, dass der Dachhimmel (30) zwischen den beiden Kontaktflächen (8, 12) eingeklemmt werden kann.
wobei die Spanneinheit (3) mindestens umfasst

- eine Lasche (9) als Klemmelement, wobei die Lasche (9) die zweite Kontaktoberfläche (12) bildet und zumindest einer Führungsfläche (13), die zumindest zeitweise Kontakt mit einer Führungskante (14) des Tragrahmens (2) hat wenn die Lasche (9) von der aufrechten Montagestellung in die Befestigungsstellung bewegt wird, wobei die Lasche (9) als L-förmige Lasche (9) mit einem ersten Arm (21) ausgebildet ist
- eine Mutter (10), die an der Lasche (9) befestigt ist, wobei die Mutter (10) relativ zur Lasche (9) drehbar ist
- eine Schraube (11) die derart mit der Mutter (10) in Eingriff steht, dass sich bei Drehung der Schraube (11) die Mutter (10) linear auf einem Schaft (19) der Schraube (11) entlang bewegt und die Lasche (9) von der Montagestellung in die Befestigungsstellung bewegt wird oder umgekehrt,

dadurch gekennzeichnet dass der zylindrische Flächenabschnitt (4) über zumindest eine Nut (25) verfügt, die sich parallel zur Mittelachse (6) erstreckt, wobei die Vorderseite (28) der Nut (25) die Führungskante (14) definiert bzw. dass in der Montagestellung der erste Arm (21) der Lasche (9) in die Nut (25) hineinragt.

2. Befestigungssystem nach Anspruch 1, **dadurch gekennzeichnet, dass** die Lasche (9) um einen Winkel von 85° bis 95° gedreht wird wenn die Lasche (9) aus der Montagestellung in die Befestigungsstellung verbracht wird oder umgekehrt.

3. Befestigungssystem nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die zweite Kontaktfläche (12) rechtwinklig zur Führungsfläche (13) der Lasche (9) ausgerichtet ist bzw. dass mindestens zwei Spanneinheiten (3) auf gegenüberliegenden Seiten des zylindrischen Flächenabschnitts (4) des Tragrahmens (2) angebracht sind.

4. Befestigungssystem nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die zweite Kontaktfläche (12) eine ebene Kontaktfläche (12) ist, wobei die Mittelachse (6) des Tragrahmens (2) und die zweite Kontaktfläche (12) rechtwinklig zueinander ausgerichtet sind wenn die Lasche (9) sich in der Befestigungsstellung befindet bzw. die zweite Kontaktfläche (12) ist in der Montagestellung relativ zum zylindrischen Flächenabschnitt (4) des Tragrahmens (2) tangential ausgerichtet.

5. Befestigungssystem nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die Lasche (9) eine Führungsfläche (27) bereitstellt und dass die Führungsfläche (27) der Lasche (9) zumindest zeitweise in Wirkverbindung mit einer vom zylindrischen Flächenabschnitt (4) des Tragrahmens (2) bereitgestellten Führungsschiene (26) steht und an dieser entlang fährt wenn die Lasche (9) von der Montagestellung in die Befestigungsstellung oder umgekehrt bewegt wird, wobei die Führungsschiene (26) des zylindrischen Flächenabschnitts (4) parallel zur Mittelachse (6) des Tragrahmens (2) ausgerichtet ist.

6. Befestigungssystem nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Mutter (10) über zwei Lagerbolzen (15) verfügt, diese Lagerbolzen (15) sind in zwei Aussparungen (17) der Lasche (9) eingelassen bzw. dass die Mutter (10) über ein Befestigungselement (Führungselement 23) zur Aufnahme der Mutter (10) am Tragrahmen (2) verfügt sowie zur Führung der Mutter (10) wenn die Lasche (9) von der Montagestellung in die Befestigungsstellung bewegt wird oder umgekehrt.

7. Befestigungssystem nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** der Schaft (19) der Schraube (11) sich parallel zur Mittelachse (6) erstreckt bzw. der Schaft (19) der Schraube (11) außen neben dem zylindrischen Flächenabschnitt (4) angebracht ist.

8. Befestigungssystem nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** der flache Randabschnitt (7) des Tragrahmens (2) neben dem zylindrischen Flächenabschnitt (4) über ein Loch (20) für die Schraube (11) verfügt, wobei der Durchmesser des Lochs (20) kleiner ist als der Durchmesser eines Schraubenkopfes (18), jedoch größer als ein Durchmesser des Schaftes (19) der Schraube (11).

9. Befestigungssystem nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** die Lasche (9) als L-förmige Lasche (9) ausgebildet ist, mit einem ersten Arm (21), der die Führungsfläche (13) bzw. die Führungsfläche (27) umfasst, und mit einem zweiten Arm (22), der die zweite Kontaktfläche (12) umfasst.

Revendications

1. Système de fixation (1) pour luminaires encastrés (31) comprenant au moins

- un cadre support (2) pour le luminaire (31) avec une partie de surface cylindrique (4) qui est orientée de manière coaxiale vers un axe central (6) du cadre support (2) et qui entoure un évidement (5) pour le montage du luminaire (31) sur le cadre support (2) et avec une partie de bord plat (7) faisant saillie de la partie de surface cylindrique (4) de manière radiale vers l'extérieur, la partie de bord plat (7) offrant une première surface de contact (8) du système de fixation (1) pour lier le système de fixation (1) à une surface extérieure (32) d'un plafond (30),
- une unité de serrage (3) fixée sur le cadre support (2) par un élément de serrage (volet 9) offrant au moins une deuxième surface de contact (12) du système de fixation (1) pour lier le système de fixation (1) à une surface intérieure (33) du plafond (30),

l'unité de serrage (3) pouvant être déplacée d'une position de montage dans laquelle l'élément de serrage (volet 9) se trouve dans une position droite de telle manière que le système de fixation (1) puisse être poussé à travers une ouverture de montage (29) du plafond (30) dans une position de fixation dans laquelle l'élément de serrage (volet 9) fait saillie du cadre support (2) avec la deuxième surface de contact (12) faisant face à la première surface de contact (8) de telle manière que le plafond (30) puisse être maintenu entre les deux surfaces de contact (8, 12), l'unité de serrage (3) comprenant au moins

un volet (9) en tant que l'élément de serrage, le volet (9) apportant la deuxième surface de contact (12) et au moins une surface de contrôle (13) qui est au moins temporairement en contact avec une arête de contrôle (14) du cadre support (2) lorsque le volet (9) passe de la position de montage droite à la position de fixation et le volet (9) est construit en tant que volet (9) en forme de L avec un premier bras (21),

- un écrou (10) fixé sur le volet (9), l'écrou (10) étant rotatif par rapport au volet (9),
- une vis (11) s'engrenant avec l'écrou (10) de telle manière qu'en tournant la vis (11), l'écrou (10) se déplace linéairement le long d'une tige (19) de la vis (11) et le volet (9) passe de la position de montage à la position de fixation ou vice versa,

caractérisé en ce que
la partie de surface cylindrique (4) apporte au moins une rainure (25) qui s'étend parallèlement à l'axe central (6) avec une face avant (28) de la rainure (25) définissant l'arête de contrôle (14) et/ou que dans la position de montage le premier bras (21) du volet (9) s'étend dans la rainure (25).

2. Le système de fixation selon la revendication 1, **caractérisé en ce que** le volet (9) fait l'objet d'une rotation d'un angle de 85° à 95° lorsque le volet (9) passe de la position de montage à la position de fixation ou vice versa.

3. Le système de fixation selon la revendication 1 ou 2, **caractérisé en ce que** la deuxième surface de contact (12) est orientée perpendiculairement vers la surface de contrôle (13) du volet (9) et/ou qu'au moins deux unités de serrage (3) sont montées sur des côtés opposés de la partie de surface cylindrique (4) du cadre support (2).

4. Le système de fixation selon l'une des revendications 1 à 3, **caractérisé en ce que** la deuxième surface de contact (12) est une surface de contact plane (12) avec l'axe central (6) du cadre support (2) et la deuxième surface de contact (12) étant en position rectangulaire lorsque le volet (9) se trouve dans la position de fixation et/ou avec la deuxième surface de contact (12) étant en position tangentielle par rapport à la partie de surface cylindrique (4) du cadre support (2) dans la position de montage.

5. Le système de fixation selon l'une des revendications 1 à 4, **caractérisé en ce que** le volet (9) apporte une surface de guidage (27) et que la surface de guidage (27) du volet (9) interagit au moins temporairement avec et se déplace le long d'un rail de guidage (26) apporté par la partie de surface cylindrique (4) du cadre support (2) lorsque le volet (9) passe de la position de montage à la position de fixation ou vice versa, le rail de guidage (26) de la partie de surface cylindrique (4) étant dans une position parallèle par rapport à l'axe central (6) du cadre support (2).

6. Le système de fixation selon l'une des revendications 1 à 5, **caractérisé en ce que** l'écrou (10) possède deux goujons (15), dont les goujons (15) sont montés dans deux cavités (17) du volet (9) et/ou que l'écrou (10) possède un élément de fixation (tenon de guidage 23) pour maintenir l'écrou (10) sur le cadre support (2) et pour guider l'écrou (10) lorsque le volet (9) passe de la position de montage à la position de fixation ou vice versa.

7. Le système de fixation selon l'une des revendications 1 à 6, **caractérisé en ce que** la tige (19) de la vis (11) s'étend parallèlement à l'axe central (6) et/ou la tige (19) de la vis (11) est montée à proximité de

la partie de surface cylindrique (4) sur l'extérieur.

8. Le système de fixation selon l'une des revendications 1 à 7, **caractérisé en ce que** la partie de bord plat (7) du cadre support (2) apporte un trou (20) pour la vis (11) à proximité de la partie de surface cylindrique (4) avec un diamètre du trou (20) inférieur à un diamètre d'une tête de vis (18) mais supérieur à un diamètre de la tige (19) de la vis (11).

9. Le système de fixation selon l'une des revendications 1 à 8, **caractérisé en ce que** le volet (9) est construit en tant que volet (9) en forme de L avec un premier bras (21) comprenant la surface de contrôle (13) et/ou la surface de guidage (27) et avec un deuxième bras (22) comprenant la deuxième surface de contact (12).

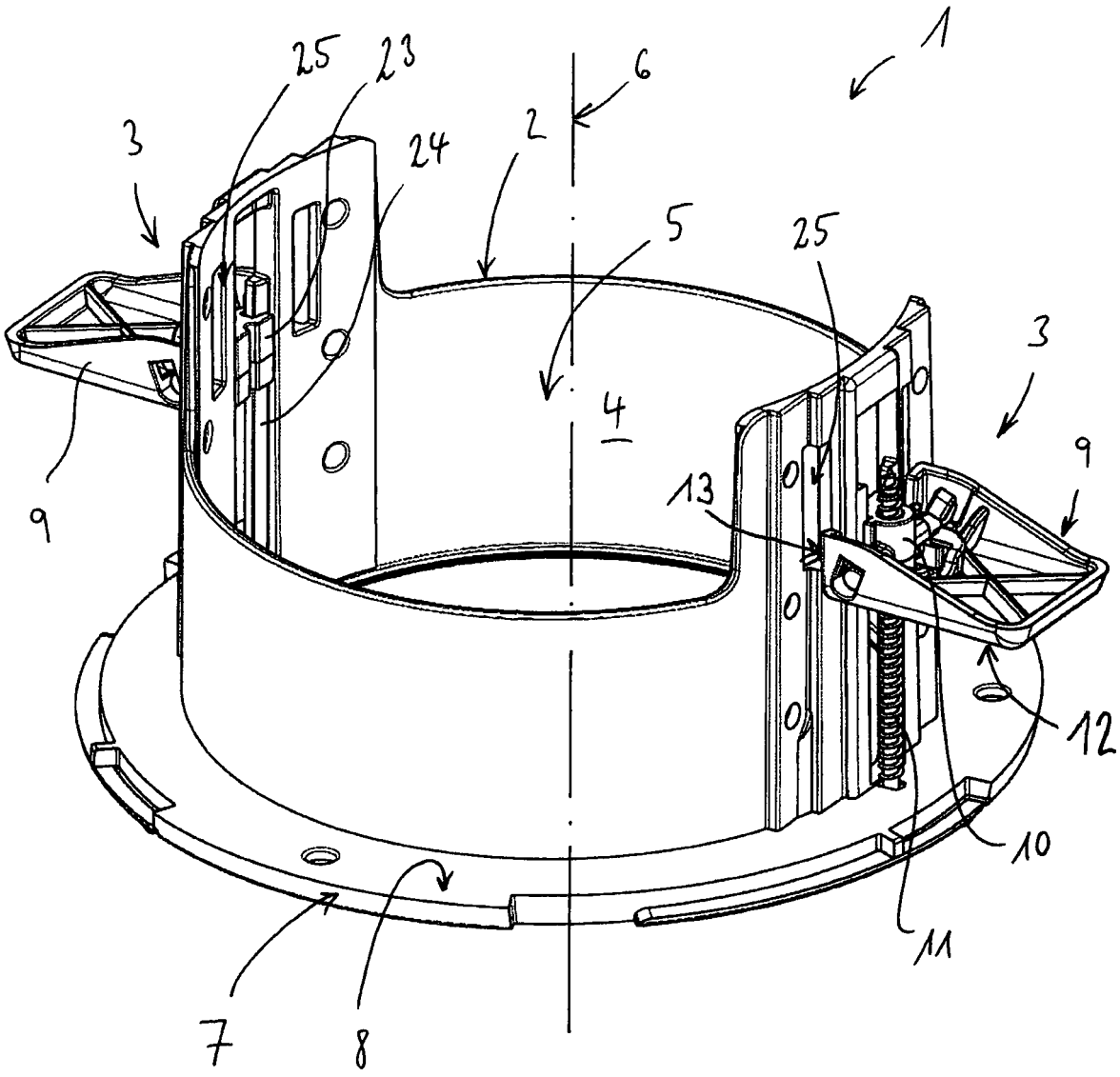


Figure 1

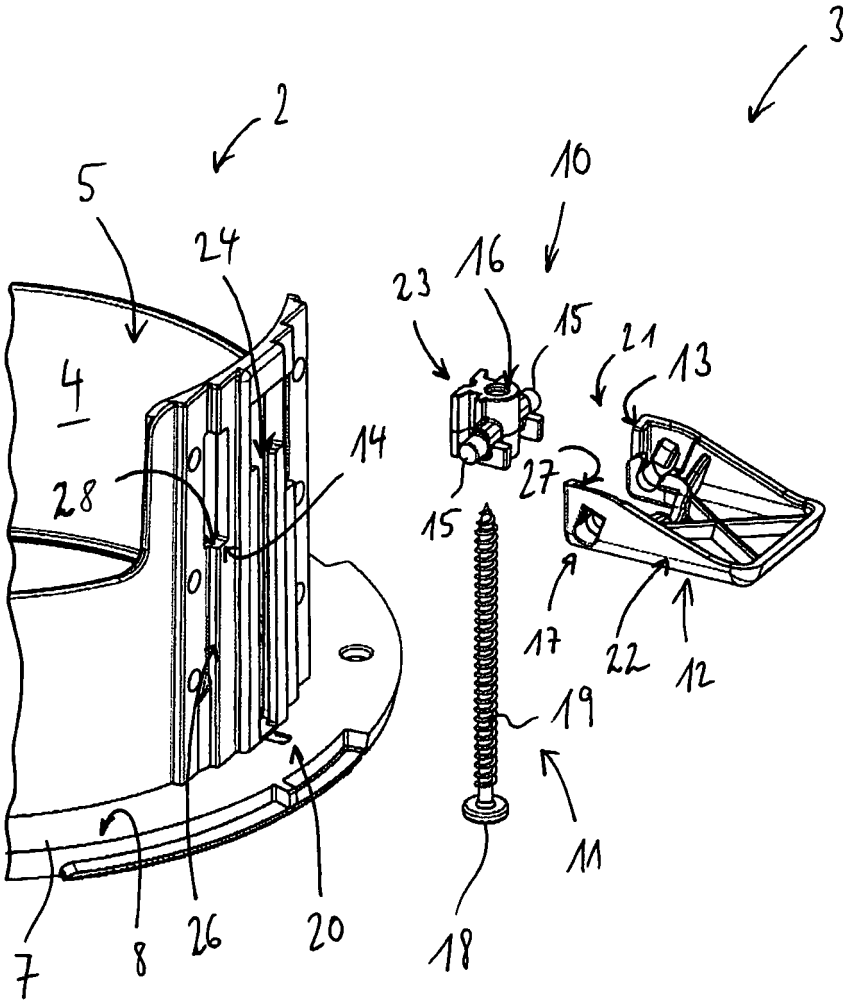


Figure 2

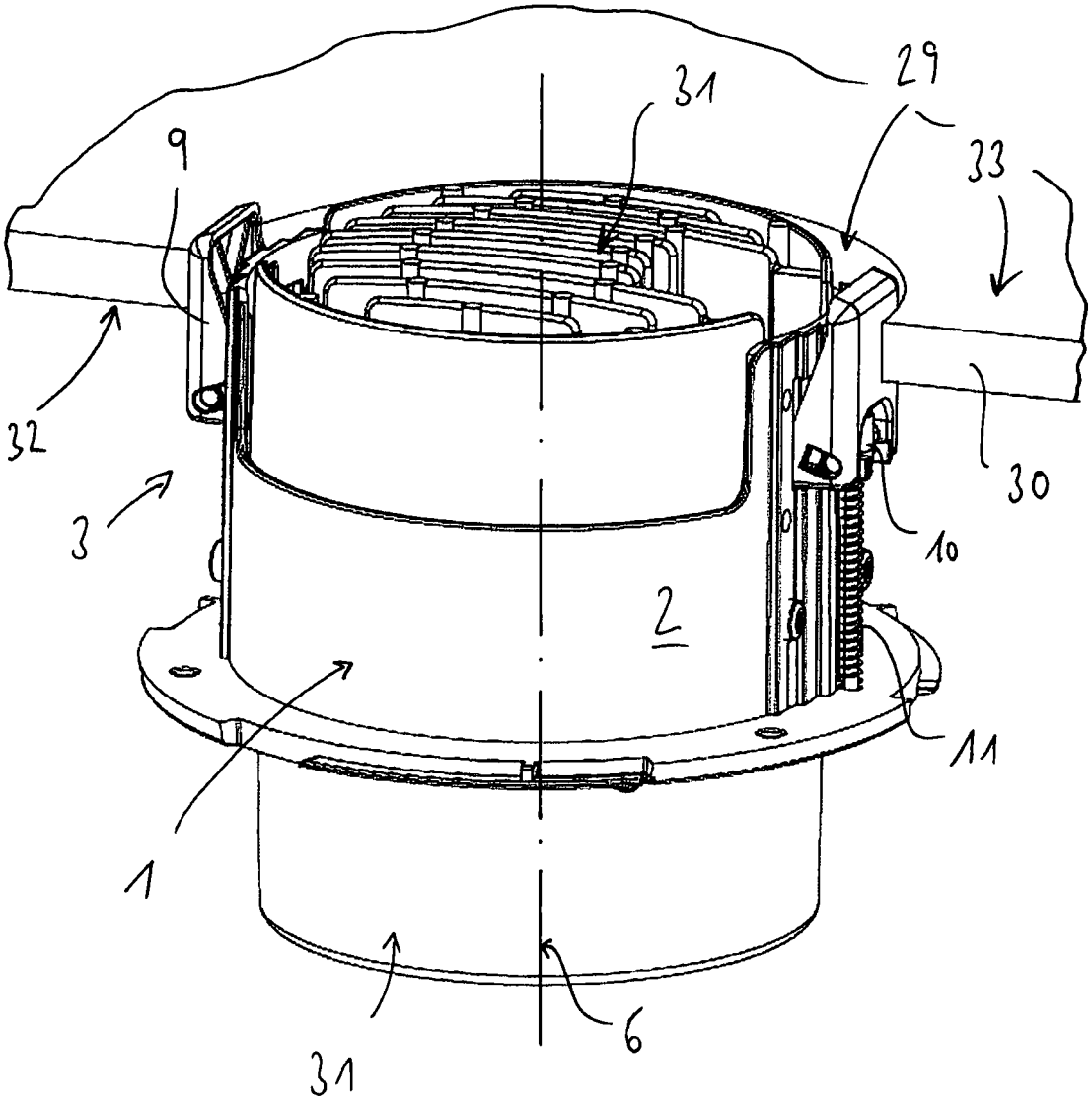


Figure 3

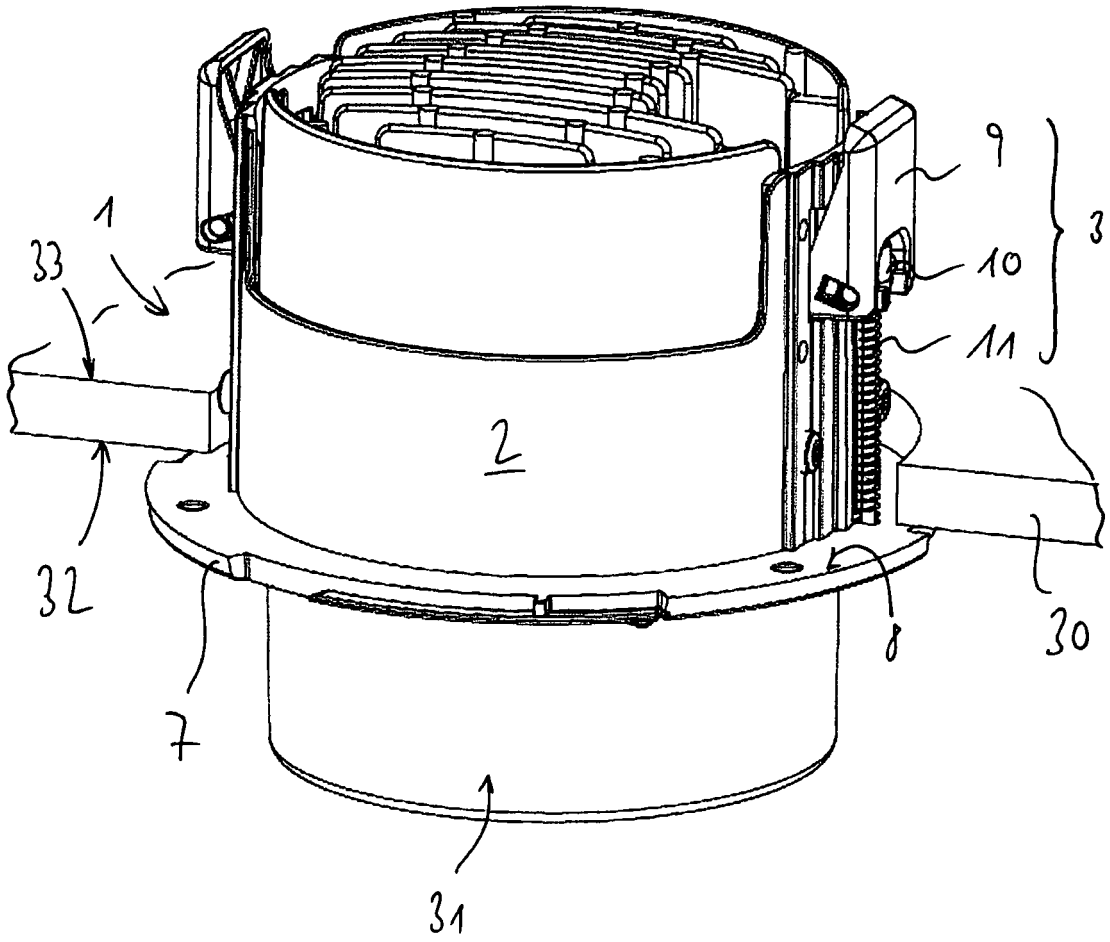


Figure 4

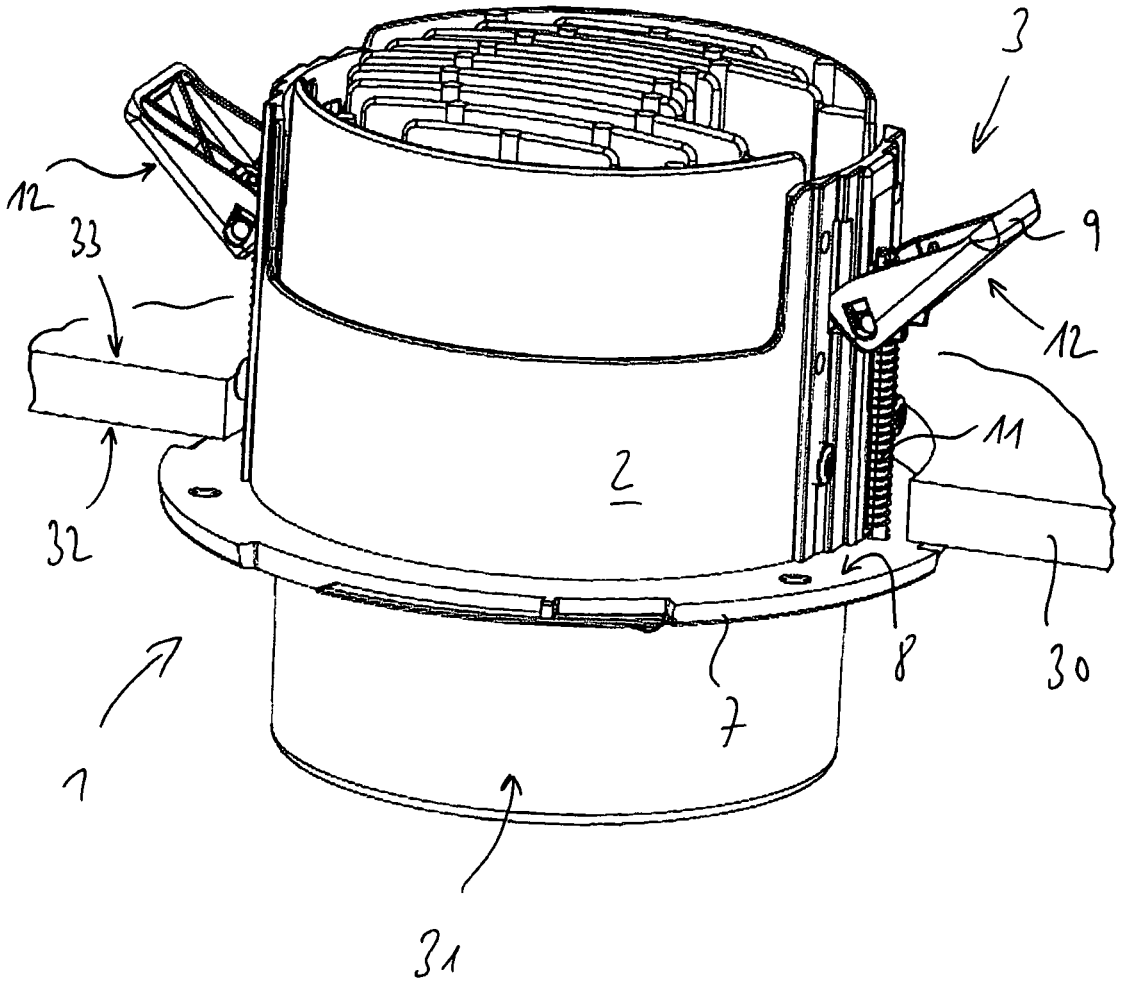


Figure 5

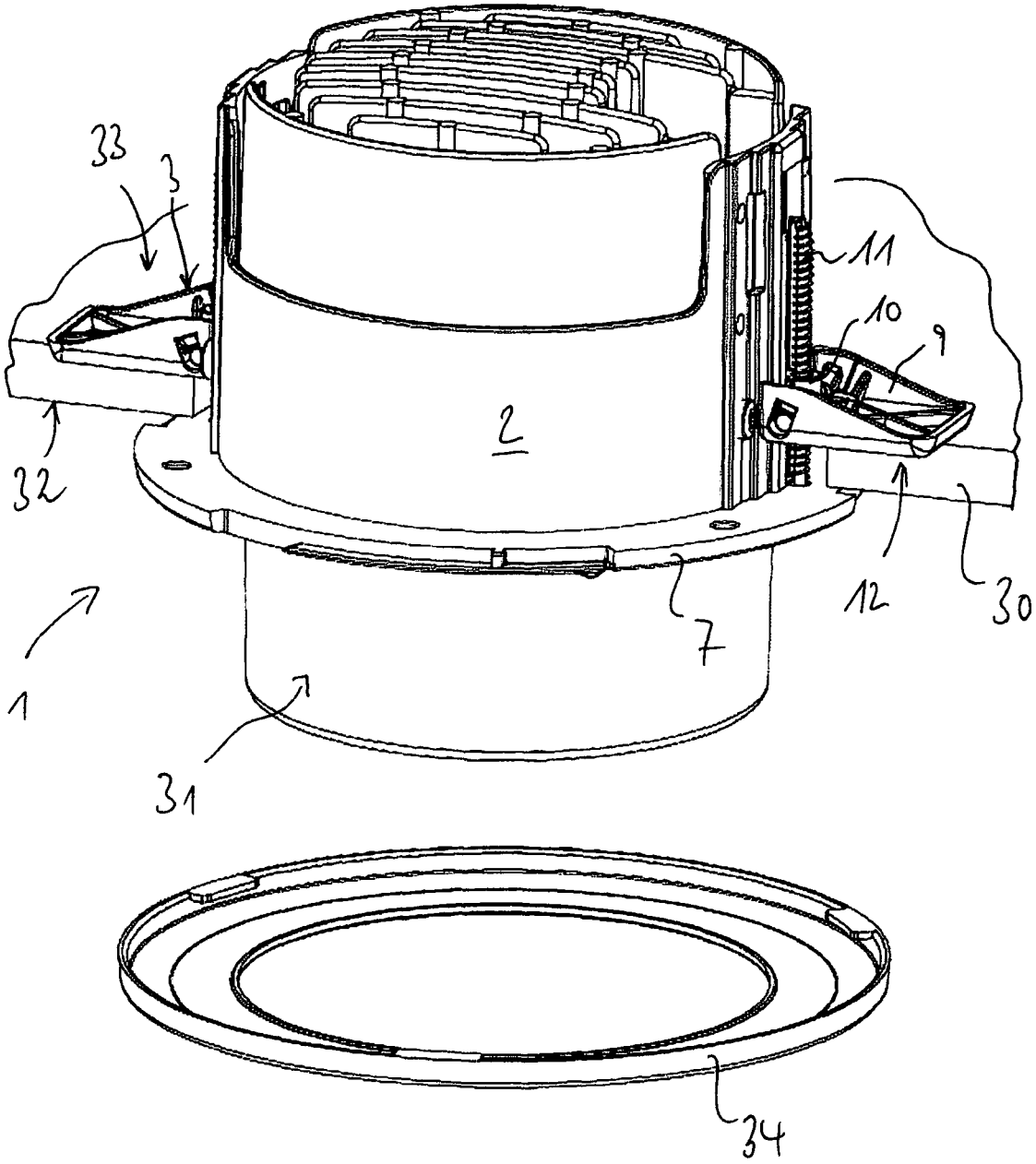


Figure 6

REFERENCES CITED IN THE DESCRIPTION

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