(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 814 119 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
17.12.2014 Bulletin 2014/51

(51) Int Cl.:
H01R 13/58 *(2006.01)* ***H01R 13/595*** *(2006.01)*
H01R 9/24 *(2006.01)*

(21) Application number: **14172322.1**

(22) Date of filing: **13.06.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **13.06.2013 EP 13171783**

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(54) **An electrical component**

(57) An electrical component (1) configured for having at least one electrical cable being electrically connected to the electrical component (1). The electrical component (1) comprises a frame part (2), a clamp part (8) connected to the frame part (2) by a hinge connection enabling rotary motion of the clamp part (8). The clamp part (8) comprises at least one arm (19) having a first surface area (18) being configured for receiving an electrical cable when the clamp part is in the open state and being configured for clamping the electrical cable towards the frame part (2) when the clamp part (8) is in the closed state. The electrical component (1) further comprises a fastening member (13) provided between the hinge connection and the first surface area (18) of the at least one arm (19), the fastening member (13) being operable by a user and being configured for fastening the clamp part (8) to the frame part (2) in the closed state.

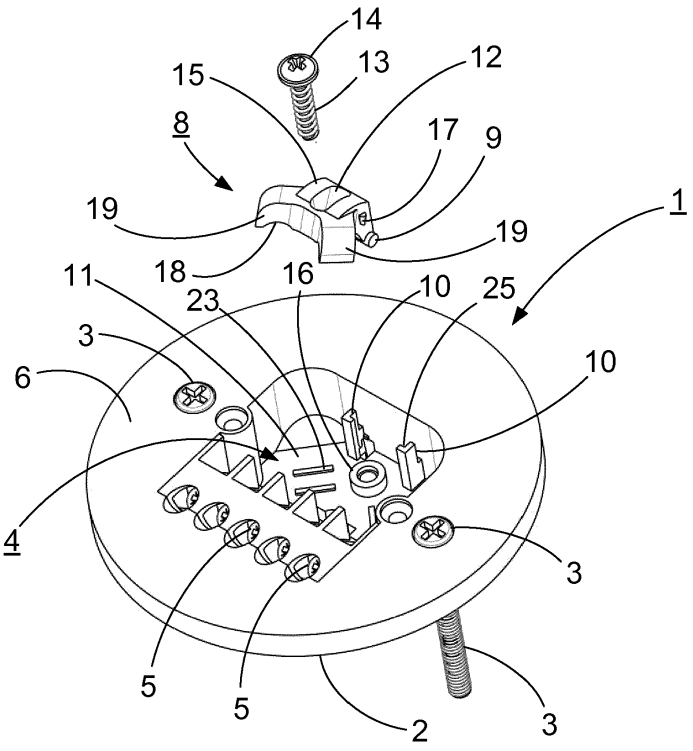

Fig. 1

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Description

[0001] An electrical component configured for having at least one electrical cable being electrically connected to the electrical component.

[0002] In electrical apparatuses and installations it is well known to secure the electrical cable using clamps in order to relieve strain on the electrical connections between the electrical cable and the electrical component, thus preventing the cable from being forcefully drawn out of the apparatus or installations such as installation boxes or outlets and/or preventing damages of the electrical connections. Typically strain reliefs involve clamps tightened using screws. One such strain relief is known from EP-A-908972.

[0003] One reason for the desire to secure the cables is that if the uninsulated ends of the conducting cores of the cable are drawn out of the apparatus or the installation box, e.g. from screw terminals or the like therein, the stripped ends where the insulation has been removed, may pose an electroshock hazard. Another reason is that some apparatuses such as lamps may actually be suspended using the electrical cable. Thus, if the cable is drawn out of either the apparatus or the installation box in the ceiling, the apparatus may fall down and break and/or cause a security risk.

[0004] In particular the fixing of electrical cables, e.g. for lamps in prior art installations boxes forming outlets in ceilings, provides problems because the person installing the cables has to fight gravitation, and therefore needs to use one hand in an often awkward position in order to keep cables in place when connecting them first to the electrical screw terminals in the outlet and then subsequently to place and hold the cables in the strain relief. Thus, often the person will have the cumbersome task of simultaneously holding the cable, keeping the clamp in place and then tightening the screws, while standing leaned backward on a ladder for visibility and for being within reach.

[0005] The strain relief of EP-A-908972 comprises a clamp allowing the cable to be clamped in three different places in order to allow the cable to extend in three different directions, main and lateral, from the apparatus depending on the user's desire. Though the strain relief disclosed in EP-A-908972 may be suited for apparatuses, it does not lend itself for use in outlets in ceilings. In order to clamp a cable in the main direction the cable has to be passed under the clamp between two clamping screws, before the ends of the conductors are connected electrically in the screw terminals, in turn, making it difficult to make the actual electrical connection in the confined space in the outlet, while standing in an awkward position as described above. On the other hand, if the electrical connection is made first, the clamp and cable will have to be held by one hand in their desired respective position, while the screws of the clamp are tightened. Also, in that case while standing in the awkward position.

[0006] Though in the lateral clamping directions the cable does not need to be passed between two clamping screws, insufficient room appears to be available for actually passing the cables under the clamp, without loosening one of the screws or possibly both entirely. Again, this is very cumbersome while standing in an awkward position and working against gravity.

[0007] Based on this prior art, it is an object to provide a strain relief that overcomes the above problems, facilitates provision of strain relief for electrical cables during connection of the electrical cable to an electrical component, and in particular facilitates easy mounting of cables in strain reliefs when working in awkward positions.

[0008] According to a first aspect of the invention this object is achieved by an electrical component configured for having at least one electrical cable being electrically connected to the electrical component, the electrical component comprising: a frame part, a clamp part connected to the frame part by a hinge connection enabling rotary motion of the clamp part between an open state and a closed state, the clamp part comprising at least one arm, each arm having a first surface area being configured for receiving a respective one of the at least one electrical cable when the clamp part is in the open state and being configured for clamping the respective one of the at least one electrical cable towards the frame part when the clamp part is in the closed state, and a fastening member provided between the hinge connection and the first surface area of the at least one arm, the fastening member being operable by a user and being configured for fastening the clamp part to the frame part in the closed state.

[0009] Using a clamp part with rotary motion and providing the fastening member between the hinge connection and the first surface area allow the clamp part to be opened fully in a jaw-like manner while using only little movement of the fastening member. Also, providing the fastening member between the hinge connection and the first surface area prevents the fastening member itself from obstructing the insertion of the cable into the desired position between the first surface area of the clamp part and the frame part. Moreover, providing the fastening member between the hinge connection and the cable enables a compression force on the hinge element, rather than a tension, which would be the case if the cable is provided between the fastening member and the hinge, thus acting as a fulcrum for the clamp part. This may be an advantage since the hinge connection may be better able to withstand a compression force than a tension force.

[0010] Provision of the fastening member between the hinge connection and the first surface area of the at least one arm may be understood as any embodiment configured such that the force, which may be exercised by the fastening member on the clamp part, will be directed to one or more parts of the clamp part, which one or more parts are located between the hinge connection and the first surface area of the at least one arm such as a distal end of the first surface area of the at least one arm.

[0011] According to a preferred embodiment of the invention, the clamp part has a second surface area being configured for being engaged by a clamp engagement part of the fastening member, wherein the second surface area is convex. This allows the engagement part to slide easily along the second surface area while clamping the at least one cable between the clamp part and the frame part. Moreover it allows the force from a rigid fastening member to be distributed evenly and normal to the clamp part and/or it allows the tension by the clamp part on a rigid fastening member to be along the extension of such rigid fastening member and/or normal to the frame part.

[0012] According to a preferred embodiment of the invention, the electrical component comprises a snap lock part configured for snap locking the clamp part to the frame part when the clamp part is in the open state. This allows the clamp part to snap into and remain in the opening state. This allows easy insertion of the cable between the first surface area and the frame part. Furthermore, it allows the clamp part to stay in the open state, even if the electrical component has an orientation, where gravitation would otherwise tend to force the clamp part towards the closed state. Furthermore, a snap lock part may impede that the clamp part unintentionally enters the closed state during insertion of the cable.

[0013] According to a preferred embodiment, the electrical component comprises at least one resilient part configured for forcing the clamp part towards the open state. This may be advantageous if for instance gravity itself is insufficient to bring the clamp part into the open state or if the electrical component has an orientation where gravity will work against the movement of the clamp part into the open state.

[0014] According to a preferred embodiment, the at least one resilient part comprises a resilient part of the clamp part, which resilient part is configured to be elastically deformed when the clamp part is forced from the open state towards the closed state. This allows the resilient part to be formed integrally with clamp part, thus reducing the number of parts that have to be manufactured, stored and assembled.

[0015] However, in some situations it may be advantageous to use standard components, and accordingly in a preferred embodiment, the at least one resilient part comprises a spring being configured for spring-loading the clamp part towards the open state.

[0016] According to a preferred embodiment, the at least one electrical cable includes a first electrical cable and a second electrical cable and wherein the at least one arm comprises a first arm and a second arm, the first arm being configured to receive and clamp the first electrical cable, the second arm being configured to receive and clamp the second electrical cable. Accordingly, one or two cables may be clamped using one and the same clamp part and by using one fastening member, such as a single screw.

[0017] According to a preferred embodiment, the fastening member comprises a screw thread, such as an external screw thread, and the frame part comprises a corresponding screw thread, such as an internal screw thread, configured to receive the screw thread of the fastening member.

[0018] According to a preferred embodiment, the fastening member is configured for a gradual fastening of the clamp part. This allows the clamp part to properly engage and secure cables with a wide range of cross-sections and dimensions.

[0019] According to a preferred embodiment, the first surface area of each arm comprises a concave shaped part. This facilitates an improved hold of the cable by the individual arm when the clamp part is in the open state as well as between the first surface area and the frame part when the clamp part is in the closed state, which is in particularly helpful, when working in an awkward overhead position. Furthermore the concave shaped part may help in trapping the cable below the first surface and may prevent it from being withdrawn sideways, as compared to the longitudinal extension of the cable.

[0020] According to a preferred embodiment, the hinge connection is a flexible hinge connection. A flexible hinge connection may enable easier mounting of the at least one cable between the clamp part and the frame part.

[0021] The flexible hinge connection may be configured for allowing a tilting of the clamp part around a first axis being perpendicular to the rotational axis of the hinge connection. The first axis may furthermore extend parallel with a base part of the frame part. For instance for an embodiment comprising two arms this aids in clamping only a single cable or in clamping two cables of different cross sectional dimensions using one and the same clamp part, such as in particular using one single screw. The tilting enabled by the flexible hinge connection may for instance be limited to +/- 5 degrees, +/- 4 degrees, +/- 3 degrees, +/- 2 degrees, or +/- 1 degree.

[0022] The flexible hinge connection may allow a translatory motion of the clamp part in relation to the frame part. The flexible hinge connection may be configured for a translatory motion of the clamp part in relation to the frame part along a normal to the base part of the frame part. Provision hereof may enable easier mounting of one or more cables between the clamp part and the frame part. The translatory motion enabled by the flexible hinge connection may for instance be limited to 4 mm, 3 mm, 2 mm, or 1 mm.

[0023] According to a preferred embodiment the clamp part is provided in a recess of the electrical component. Providing the clamp part in a component having a recess greatly facilitates the securing of cables in such components, as compared to a traditional component with a recess and a prior art strain relief, where a clamp is provided across a cable and fixed on both sides of the cable by means of e.g. screws.

[0024] According to a preferred embodiment, the electrical component is an outlet, such as a luminary outlet. Providing the clamp part in an outlet greatly facilitates

the securing of cables in such components where, due to the orientation and awkward working positions, it is difficult to hold on to and manipulate the parts involved in the securing of a cable. This is in particular the case when the frame part is configured for being mounted in or on a ceiling or a wall and/or when the electrical component is an outlet, such as a luminary outlet, wherein the clamp part is provided in a recess of the electrical component.

[0025] According to a preferred embodiment, the base part of the frame part is configured to be provided in parallel (or substantially in parallel) with the ceiling or the wall when the electrical component is mounted in or on the ceiling or the wall. Thereby the at least one arm is provided such that the at least one cable is to be mounted/dismounted in a direction parallel to the part of the ceiling or wall where the electrical component is mounted. Accordingly, when the at least one electrical cable is inserted, it is at least partly retained by the clamp part - even when the clamp part is in the open state. The at least partly retention is i.a. caused by that motion of the at least one electrical cable is impeded in the direction perpendicular to the part of the ceiling or wall where the electrical component is mounted. Accordingly, mounting and fixing of an electrical cable to the electrical component is easier for the user than mounting and fixing an electrical cable to electrical components of the prior art - in particular, but not only, when the at least one electrical cable is electrically connected to the electrical component.

[0026] Within the scope of the present invention, the electrical component may form part of an extension cord, a power extender, or an extension lead. Furthermore, within, the scope of the present invention, the electrical component may be a plug or one or more sockets. The at least one electrical cable may form part of an electrical cord. The at least one electrical cable (sometimes just referred to as "cable") is within the scope of the present invention understood as any wire, conductor, or cable comprising at least one electrical conductor being at least partly insulated. More specifically, the at least one electrical cable may be or may comprise an assembly of electrical conductors (such as 2, 3 or more) insulated from each other and laid up together, such as by being twisted around a central core or running along each other, such as running in parallel to each other.

[0027] The invention will now be described in greater detail based on nonlimiting exemplary embodiments and with reference to the drawings on which:

Fig. 1 is an exploded view of an electrical component according to the invention,

fig. 2 is a perspective view of the electrical component of fig. 1 in the assembled state,

fig. 3. is a top plan view of the electrical component of fig. 1,

fig. 4 is a schematic partial cross-section along the line IV-IV of one embodiment of the frame part, the clamp part and the fastening member according to the invention as shown in fig. 8,

fig. 5 is a schematic partial cross-section of another embodiment of the frame part, the clamp and the fastening member part according to the invention,

figs. 6a to 6c are schematic partial side views illustrating the clamping of cables between the frame part and the clamp part in the electrical component according to the invention,

figs. 7a to 7c are schematic partial top plan views corresponding to figs. 6a to 6c, respectively, illustrating the clamping of cables between the frame part and the clamp part in the electrical component according to the invention,

fig. 8 is a schematic partial top plan view of an alternative embodiment of the frame part, the clamp part and the fastening member according to the invention,

fig. 9 is a perspective view of the embodiment of fig. 8 illustrating the clamping of a cable between the frame part and the clamp part, and

fig. 10 is a perspective view of the embodiment of fig. 8 in the open state without a cable.

[0028] Turning first to fig. 1 an exploded view of an electrical component 1 according to the invention is shown. The electrical component 1 has a frame part 2 adapted to be mounted in a suitable cut-out in a ceiling or a wall (not shown) by means of fasteners, such as screws or bolts 3, in order to serve as an outlet, such luminary outlet for lamps or the like. Normally the screws or bolts 3 would engage suitably threaded means in an installation box accommodated in the cut-out in the ceiling or wall, in order to securely enclose the wiring of the installation. The frame part 2 has a recess 4 in the front surface 6 thereof, i.e. the surface facing away from the ceiling or wall when the electrical component 1 is mounted in the cut-out therein. The recess 4 has a generally rectangular shape as seen in the plane of the front surface 6. Along one side of the rectangle five terminals 5, such as screw terminals, are arranged. The number of terminals 5 is not restricted to exactly five. The skilled person will realize that any suitable number of terminals 5 can be used. The wiring of the installation behind the ceiling or wall is connected electrically to the terminals 5, preferably from the rear side of the frame part 2, as seen from the front surface so as to be securely enclosed in an installation box behind the ceiling or the wall. In the recess 4 the stripped ends of a cable 7 (not shown in fig. 1, see however e.g. the cable 7 in figs. 6b, 6c, 7b, 7c, and 9) may be connected electrically to the terminals 5, preferably from the front side in the recess 4.

[0029] As explained above, the stripped ends of the cable 7 connected to the terminals 5 cannot be relied on and/or may not be allowed according to security standards in some countries for securing the cable 7 in the electrical component 1. Therefore, a strain relief is incorporated in the electrical component 1. The strain relief

comprises a clamp part 8. The clamp part 8 comprises a pair of short cylindrical shafts 9 held in corresponding bearings (or shaft confinements) in respective uprights 10 protruding from the bottom 11 of the recess 4, thus allowing pivotal motion of the clamp part 8 with respect to the frame part 2. The bottom 11 may be regarded as a base part of the frame part. The two short cylindrical shafts 9 are aligned. In other words, a hinge connection is provided where the clamp part 8 with the cylindrical shafts 9 engages the uprights 10. In addition to providing rotational motion of the shafts 9, the bearings (or the shaft confinements) of the respective uprights 10 also provide individual translatory motion of the cylindrical shafts 9. Accordingly, the hinge connection allows the shafts 9 to be individually translated a few mm (such as 2 mm) along the respective uprights 10. Accordingly, the hinge connection is a flexible hinge connection. Other kinds of hinge connections are evidently also possible. At the opposite end of the clamp part 8 as seen from the short cylindrical shafts 9 the clamp part comprises at least one arm 19. For the present embodiment the at least one arm 19 comprises two arms 19. The two arms 19 extend in different directions, e.g. a first arm 19 extending in a first direction and a second arm 19 extending at an angle, such as, 90 degrees to the first arm 19. Each arm 19 of the clamp part 8 has a respective first surface 18, configured to receive and clamp a respective cable 7.

[0030] Between the shafts 9 and the arms 19, the clamp part 8 comprises an elongated central aperture 12 through which a threaded fastening member such as a bolt or screw 13 is passed. The bolt or screw 13, e.g. a self-cutting screw, has a clamp engagement part in the form of a head 14 with larger dimensions than the width of the central aperture 12 allowing the head 14 to engage a convex second surface, i.e. a convex top surface 15 of the clamp part 8. The thread of the bolt or screw 13 engages in suitable corresponding means, such as the inside of a tubular tower 16.

[0031] Since the bolt or screw 13 is located centrally i. e. between the arms 19 and the hinge, the bolt or screw 13 does not obstruct the access for the cable 7, to be clamped between a respective arm 19 of the clamp part 8 and the frame part 2. Rather, the gap between the respective arm 19 of the clamp part 8 and the frame part 2 forms a jaw-like configuration, into which the cable may be easily placed without the need of removing the bolt or screw 13. Having the two arms 19 extending in different directions allows each of two different cables 7, each connected at one end to the terminals 5, to be placed under respective arms 19 without one cable 7 obstructing the other. Thus, the cables 7 may be lead out of the recess 4 in different directions, e.g. to two lamps placed diametrically opposite each other on either side of a centrally located outlet provided by the electrical component 1 according to the invention. Furthermore, both of these cables 7 leading in different directions may be secured using one and the same bolt or screw 13, i.e. a single fastening means only.

[0032] Fig. 6a illustrates i.e. a clamp part 8 substantially identical to the clamp part 8 of fig. 1. The respective first surfaces 18 of each arm 19 are best visible in fig. 6a. Each first surface 18 of the illustrated clamp part 8 is concave allowing the clamp 8 to trap a cable 7 between the first surface 18 and the frame part 2. The frame part, on the other hand may have means to engage the cable 7, such as ribs 23 extending across the longitudinal direction of the cable 7, when the cable 7 is correctly trapped under the clamp part 8. The ribs 23 may be inclined in relation to the bottom 11 (or base part) e.g. for providing a better hold of the cable 7.

[0033] When tightening the bolt or screw 13 the head 14 will engage the convex second surface 15 and press the clamp part 8 downward towards the bottom 11 of the recess 4, the downward motion comprising a pivotal motion. During the pivotal motion of the clamp part 8 the head 14 of the bolt of screw 13 will slide over the convex second surface 15 of the clamp part 8. The curvature of the convex second surface 15 is adapted to ensure proper engagement of the head 14 of the bolt or screw 13 during the pivotal motion of the clamp part 8. Since the head 14 of the bolt or screw 13 engages the clamp part 8 at the central location between the hinge and the arms 19, comparably few turns of the bolt or screw 13 are necessary in order to firmly engage the clamp part 8 with the cable 7 and securely clamp the latter against the frame part 2. Having to use a few turns only will be much appreciated by a person standing in an awkward position doing so, as described above.

[0034] For the present embodiment the clamp part 8 has one or more protrusions 17 adapted to engage behind suitable cut-outs 25 in the uprights 10 in a snap locking manner, thereby locking the clamp part 8 in a releasable manner in the open state, i.e. as shown in figs. 2 and 3. When tightening the bolt or screw 13 (or when otherwise applying a force (e.g. by a finger or a screwdriver) forcing the clamp part 8 from the open and snap-locked state towards the closed state) the protrusions 17 will be pushed past the cut-outs 25 and the clamp part 8 thus released from being locked in the open state. The protrusions 17 may have a size and shape allowing the clamp part to snap towards the closed state when released from the open state. This will allow the user to simply press (e.g. by using a finger or a screwdriver) the clamp 8 into engagement with a cable 7. The cable 7 will thus be held temporarily in the correct position until the clamp part 8 is secured properly using the fastening means. This facilitates the mounting, as the user will not have to use a finger or the like to maintain the cable 7 in the correct position while tightening the fastening means such as a bolt or screw 13. Accordingly, the clamp part may be provided as a bistable clamp part, where the two stable states are the open state and the closed state, respectively.

[0035] As an alternative to (or in combination with) using the protrusions 17 for locking the clamp part 8 in the open state, the clamp part 8 may be biased towards the

open stated by a resilient part forming suitable biasing means. This can best be seen in figs. 4 and 5, which illustrate a partial cross-section along the line IV-IV in fig. 8 of an alternative embodiment illustrated in figs. 8 to 10 having only a single arm. The biasing means is however fully applicable to both the embodiment in figs. 1 to 3 and 6 and 7 and the embodiment in figs 8 to 10. In fig. 4, the biasing means comprises a compression coil spring 20 interposed between the clamp part 8 and the frame part 2. The coil spring 20 may for instance be of steel allowing it to maintain its biasing properties over years. Thus, even if the clamp part 8 has been in the closed state for many years, it will still be able to force the clamp part 8 into the open state. In fig. 5 another biasing means is shown. Here the clamp part 8 has an integral leaf spring 21 engaging the frame part 2, in a suitable manner such as simply being located in a bore or hole 22 therein. Being integral, the leaf spring 21 is made of the same material, normally a plastic material, as the clamp part 8, but evidently it would be possible to also mould a metal or steel leaf spring 21 into the clamp part 8 during manufacture. An integral plastic leaf spring will be cheaper to manufacture than using a metal or steel spring. On the other hand, metal springs, as explained above will maintain their biasing properties over many years, whereas springs of plastic material may be prone to losing their biasing properties.

[0036] As to figs. 4 and 5 in general it should be noted that they are schematic and that *inter alia* for illustration purposes some features of figs. 1 to 3, which could also be present in figs. 9 to 10 have been omitted. The omitted features may *inter alia* be preferred but optional features, features not necessary for the understanding of the figures, and/or interchangeable design features. E.g. it should be noted that since the protrusions 17 may not be needed in order to maintain the clamp part 8 in the open state, the uprights 10 illustrated in figs. 1-3, which uprights 10 also provides bearings or shaft confinements for the pair of short cylindrical shafts 9, may be replaced with simple bearing parts 24, as shown in figs 4 and 5. These bearing parts 24 enable only a rotational motion of the shafts 9, i.e. the bearing parts 24 do not enable any translatory motion of the shafts 9. Accordingly, a non-flexible hinge connection is provided in figs. 4 and 5. However, it is evident that a flexible hinge connection may be provided for any embodiment according to the present invention.

[0037] Likewise, the skilled person will notice that the cylindrical tower 16 has been omitted in figs. 4 and 5, and that the bolt or screw 13 engages directly in the bottom 11 of the recess 4 of the frame part 2. The surroundings of the recess 4 have been omitted for illustration purposes. The skilled person will also notice the omission of the ribs 23 which, though improving the clamping of the cables 7, may not be essential to the invention.

[0038] Turning now to figs. 6a to 6c and 7a to 7c, the clamping of cables 7, 7a is illustrated. Again it should be noted that the drawings are schematic and that *inter alia* for illustration purposes some features of figs. 1 to 3 are not shown. Such features may be considered to have been omitted because they are not of importance for the understanding of the clamping, or because they, though preferred, constitute optional and/or interchangeable design features.

[0039] In figs. 6a and 7a the clamp part 8 is shown in the open state. In the top plan view of fig. 7a it can be seen that the head 14 of the screw 13 engages the convex second surface 15 of the clamp part 8 at a front end of the elongated central aperture 12. In figs. 6b and 7b it can be seen how two cables 7 have been clamped between the first surfaces 18 of the clamp part 8 and the frame part 2, by tightening of the screw 13. From fig 7b it can be seen how the clamp part 8 has moved forward by rotation, the screw 13 now engaging the convex second surface 15 more towards a back end of the elongated central aperture 12.

[0040] Referring now to figs. 6c and 7c, it will be noticed that cables 7, 7a of two different dimensions are clamped simultaneously between the clamp part 8 and the bottom 11 of the recess 4 in the frame part 2. The flexibility of the flexible hinge connection is sufficient to allow the clamping to be effective using only a single screw 13. In fact the flexibility is such that the clamp part 8 may efficiently clamp a single cable 7 between one arm 19 and the bottom 11 of the recess 4 in the frame part 2, even if there is no cable 7 to be clamped between the other arm 19 and the bottom 11 of the recess 4 in the in the frame part 2. The clamping is thus very versatile because cables 7 extending in one or more directions may be secured using a single clamp part 8 and a single bolt or screw 13 only.

[0041] Turning now to figs. 8 to 10 an alternative embodiment of an electrical component 1' according to the present invention employing a simplified clamp part 8' is shown. Apart from the clamp part 8', other parts of the electrical component 1', may be identical to the previously described embodiments, and may be omitted in the following description to avoid unnecessary repetition. For identical parts the same reference numerals will be used.

[0042] The clamp part 8' is simplified in that it comprises a single arm 19 only. The clamp part 8' comprises an elongated central aperture 12 through which a bolt or a screw 13 is passed. On one side of the central aperture the clamp part 8' is adapted for pivotal or hinged motion, e.g. using bearing parts 24 corresponding to those shown in figs. 4 and 5 or using uprights 10 as shown in figs. 1 to 3. Though not shown, most features from the previous embodiments such as protrusions 17 cooperating with uprights 10, a flexible hinge connection, springs 20 or 21 are fully interchangeable and may also be used with the clamp part 8', e.g. *inter alia* in order to keep the clamp part 8' in the open state and to allow more flexibility in the hinge connection.

[0043] On the other side of the elongated central aperture 12 the clamp part 8 has a first surface 18 below the single arm 19. This embodiment thus presents the

same advantage as the previously described embodiments in that the bolt or screw 13 does not obstruct the insertion of the cable 7 to be clamped between the concave first surface 18 and the bottom 11 of the recess 4 in the electrical component 1. The clamp part 8' also presents an upper convex second surface 15 allowing the head 14 of the bolt or screw 13 to efficiently engage the clamp part 8' while the curved surface 15 slides along the head 14, when the bolt or screw 13 is tightened and the clamp part 8' pivots about the hinge.

[0044] Though simplified, the clamp part 8' still provides many of the above-mentioned advantages, in particular in terms of handling a cable, tool, apparatus, etc. while working in an awkward position, e.g. when installing a lamp in a ceiling where the electrical component is serving as a luminary outlet.

Claims

1. An electrical component (1) configured for having at least one electrical cable being electrically connected to the electrical component (1), the electrical component (1) comprising:

- a frame part (2),
- a clamp part (8) connected to the frame part (2) by a hinge connection enabling rotary motion of the clamp part (8) between an open state and a closed state, the clamp part (8) comprising at least one arm (19), each arm (19) having a first surface area being configured for receiving a respective one of the at least one electrical cable (7, 7a) when the clamp part (8) is in the open state and being configured for clamping the respective one of the at least one electrical cable (7, 7a) towards the frame part (2) when the clamp part (8) is in the closed state, and
- a fastening member (13) provided between the hinge connection and the first surface area (18) of the at least one arm (19), the fastening member being operable by a user and being configured for fastening the clamp part (8) to the frame part (2) in the closed state **characterized in that**

the fastening member (13) is configured for a gradual fastening of the clamp part (8).

2. An electrical component (1) according to claim 1, wherein the clamp part (8) has a second surface area (15) area being configured for being engaged by a clamp engagement part of the fastening member, wherein the second surface area (15) area is convex.

3. An electrical component (1) according to claim 1 or 2, wherein the electrical component (1) comprises a snap lock part configured for snap locking the clamp part (8) to the frame part (2) when the clamp part (8) is in the open state.

4. An electrical component (1) according to any of the preceding claims, wherein the electrical component (1) comprises at least one resilient part configured for forcing the clamp part (8) towards the open state.

5. An electrical component (1) according to claim 4, wherein the at least one resilient part comprises a resilient part of the clamp part (8), which resilient part is configured to be elastically deformed when the clamp part (8) is forced from the open state towards the closed state.

6. An electrical component (1) according to claim 4 or 5, wherein the at least one resilient part comprises a spring (20) being configured for spring-loading the clamp part (8) towards the open state.

7. An electrical component (1) according to any of the preceding claims, wherein the at least one electrical cable (7, 7a) includes a first electrical cable (7, 7a) and a second electrical cable (7, 7a), and wherein the at least one arm (19) comprises a first arm (19) and a second arm (19), the first arm (19) being configured to receive and clamp the first electrical cable (7, 7a), the second arm (19) being configured to receive and clamp the second electrical cable (7, 7a).

8. An electrical component (1) according to claim 7, wherein the fastening member (13) comprises a screw thread, such as an external screw thread, and the frame part (2) comprises a corresponding screw thread, such as an internal screw thread, configured to receive the screw thread of the fastening member (13).

9. An electrical component (1) according to any of the preceding claims, wherein the first surface area (18) of each arm (19) comprises a concave shaped part.

10. An electrical component (1) according to any of the preceding claims, wherein the hinge connection is a flexible hinge connection allowing a tilting of the clamp part (8) around an axis being perpendicular to the rotational axis of the hinge connection.

11. An electrical component (1) according to claim 10, wherein the flexible hinge connection is configured for allowing a translatory motion of the clamp part (8) in relation to the frame part (2) along a normal to the base part of the frame part (2).

12. An electrical component (1) according to any of the preceding claims, wherein the clamp part (8) is provided in a recess (4) of the electrical component (1).

13. An electrical component (1) according to any of the

preceding claims, wherein the electrical component (1) is an outlet, such as a luminary outlet.

14. An electrical component (1) according to any of the preceding claims, wherein the frame part (2) is configured for being mounted in or on a ceiling or a wall.

15. An electrical component (1) according to claim 14, wherein the frame part (2) comprises a base part configured to be provided in parallel (or substantially in parallel) with the ceiling or the wall when the electrical component (1) is mounted in or on the ceiling or the wall.

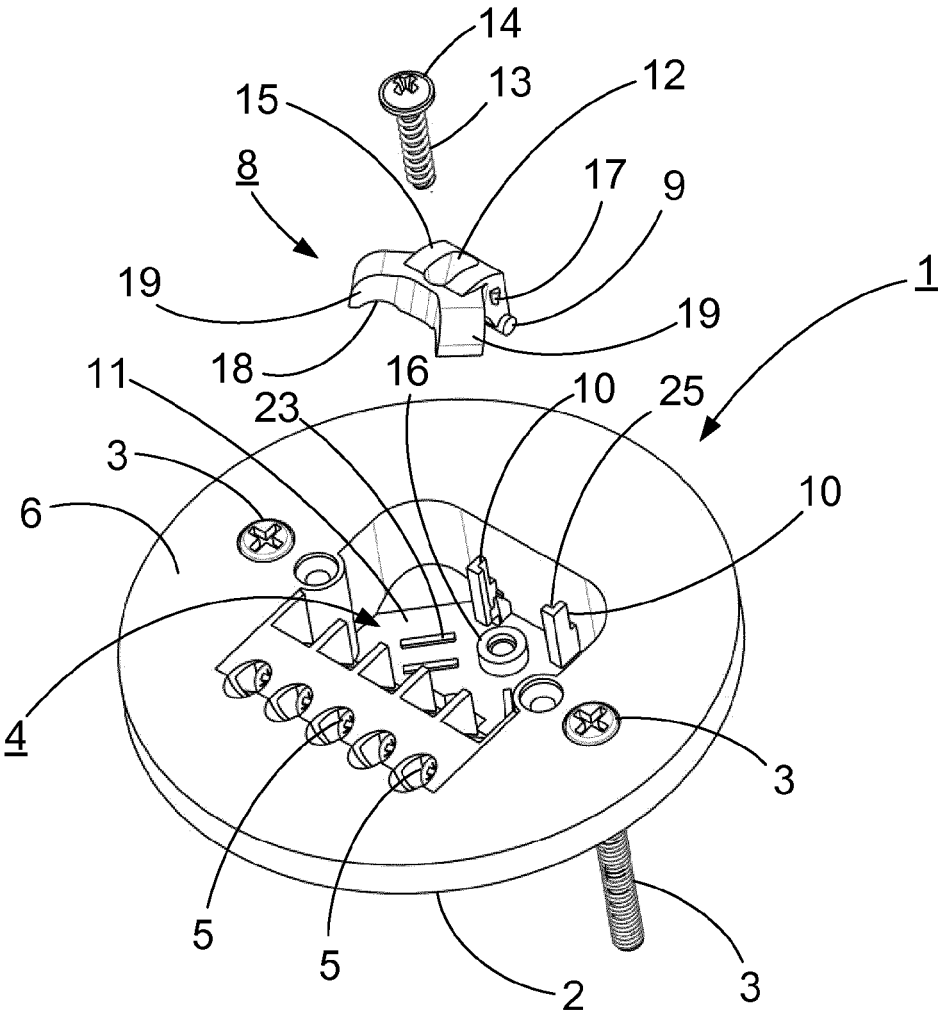
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Fig. 1

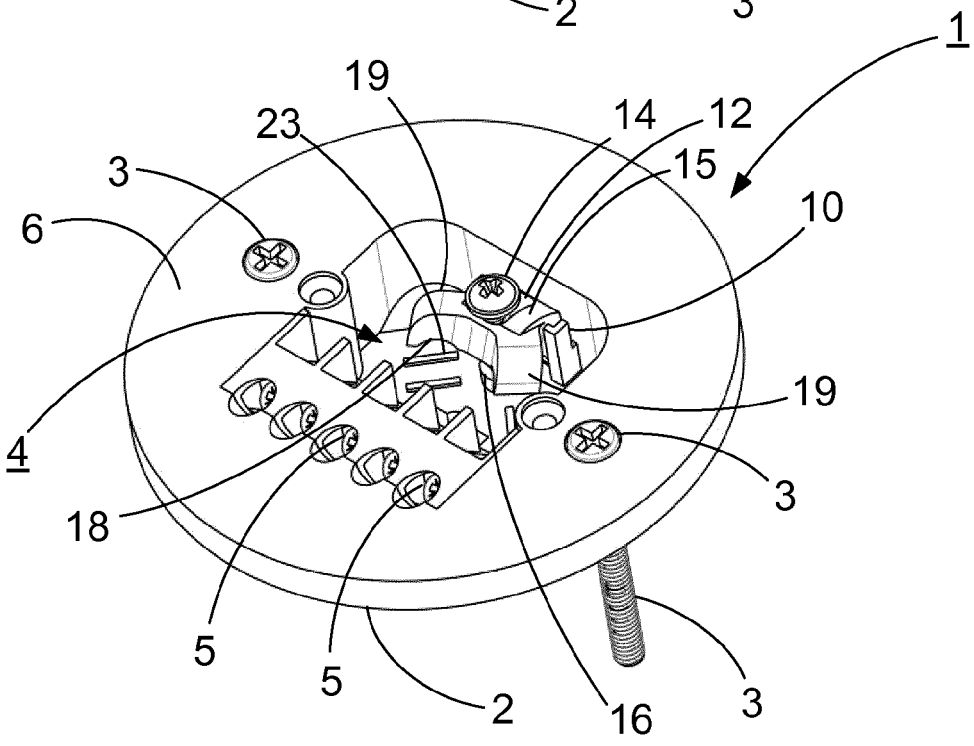
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Fig. 2

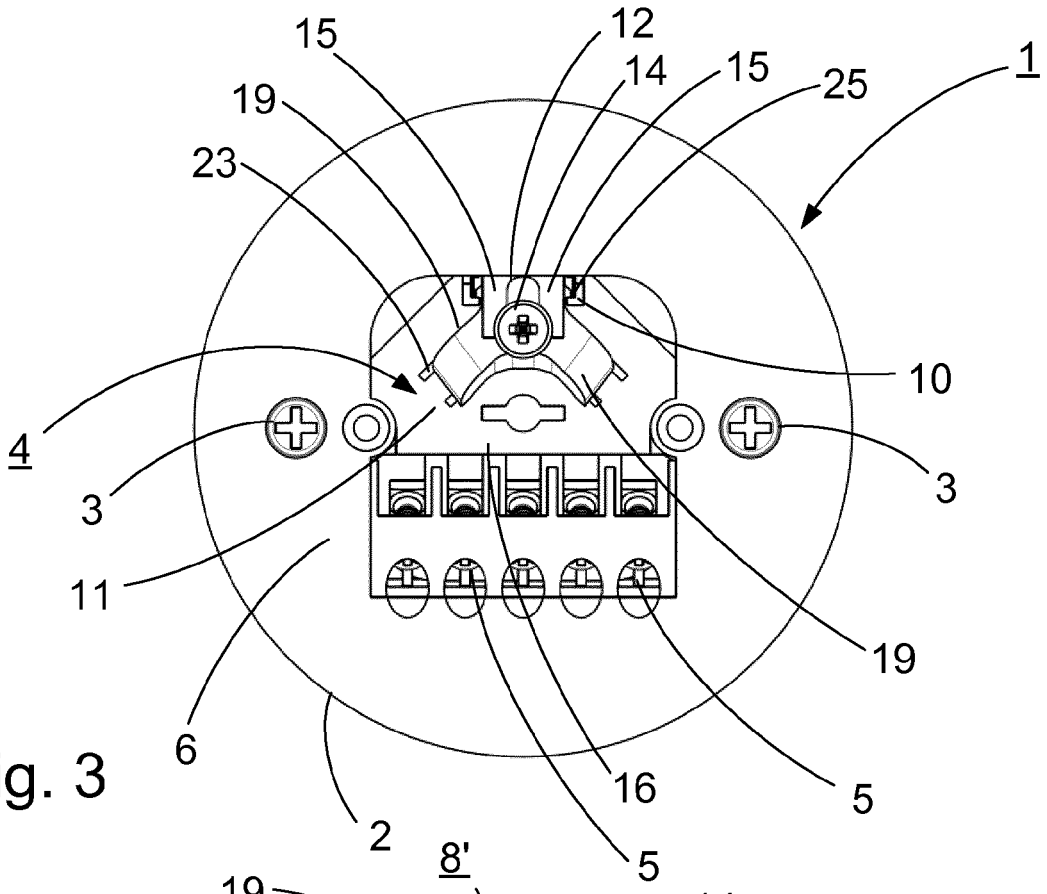
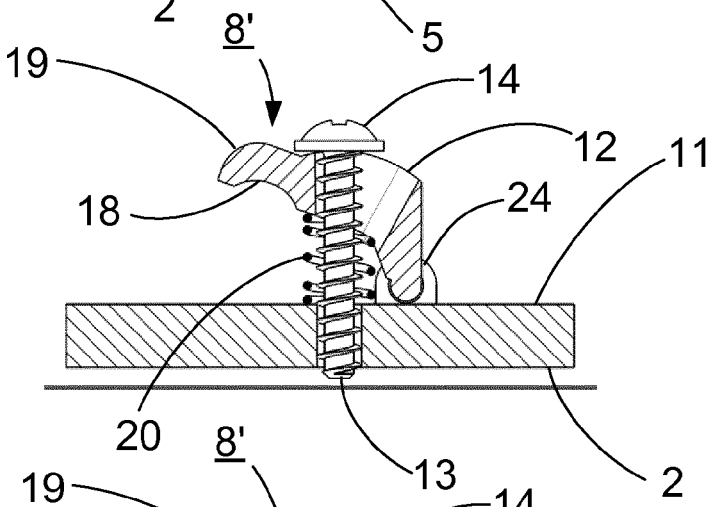


Fig. 3



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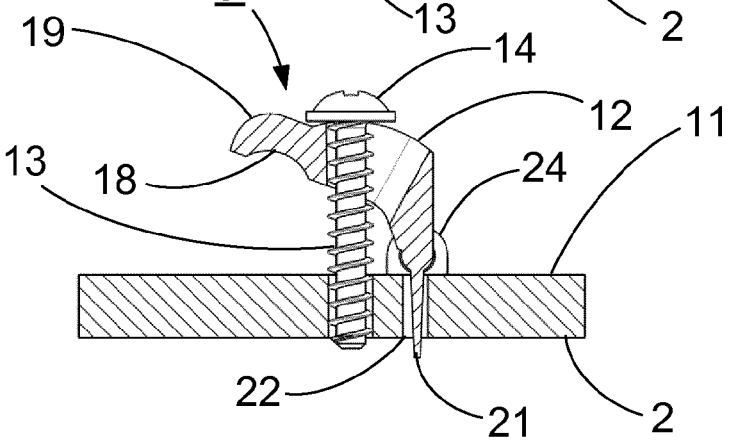

Fig. 5

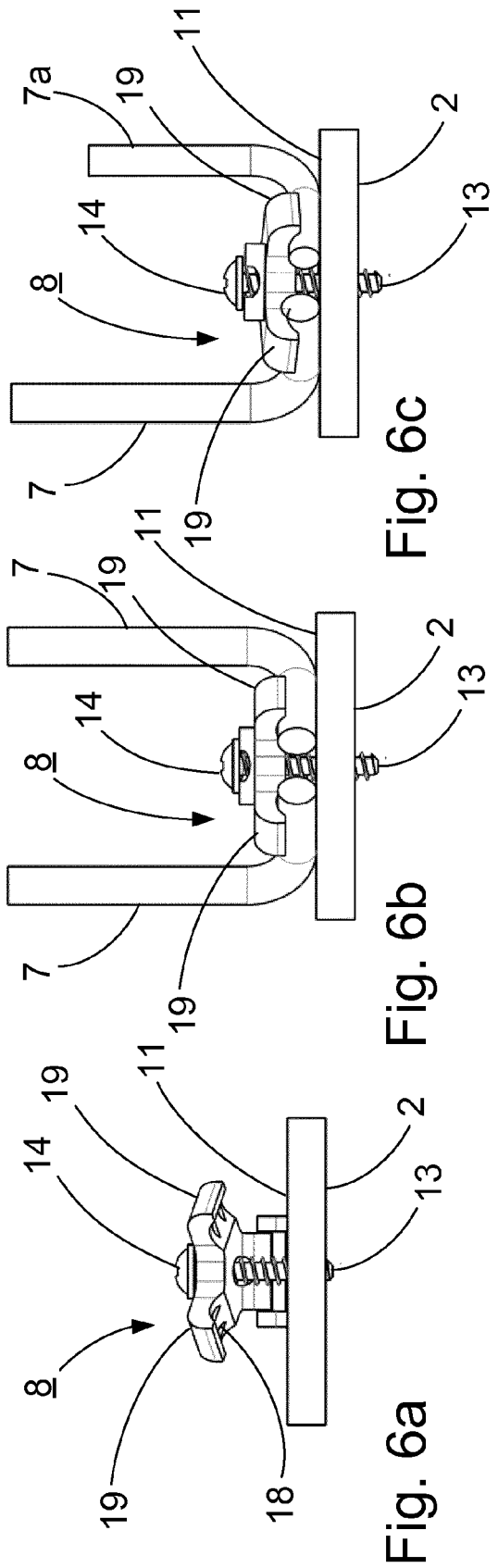
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Fig. 6a
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Fig. 6b
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Fig. 6c

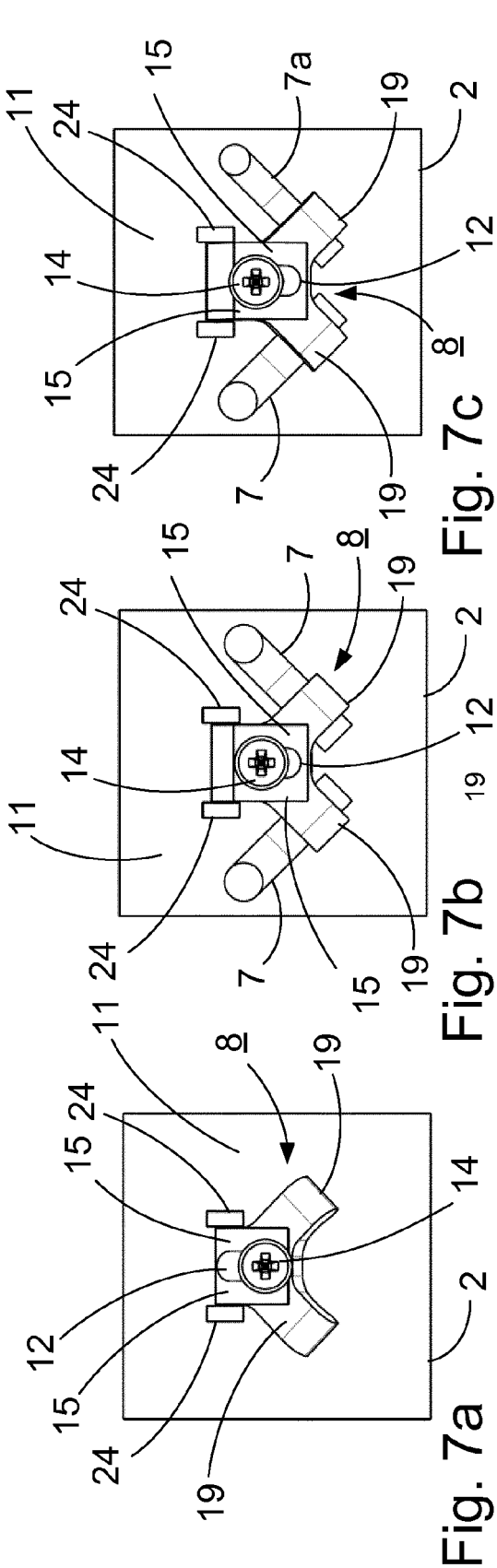
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Fig. 7a
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Fig. 7b
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Fig. 7c

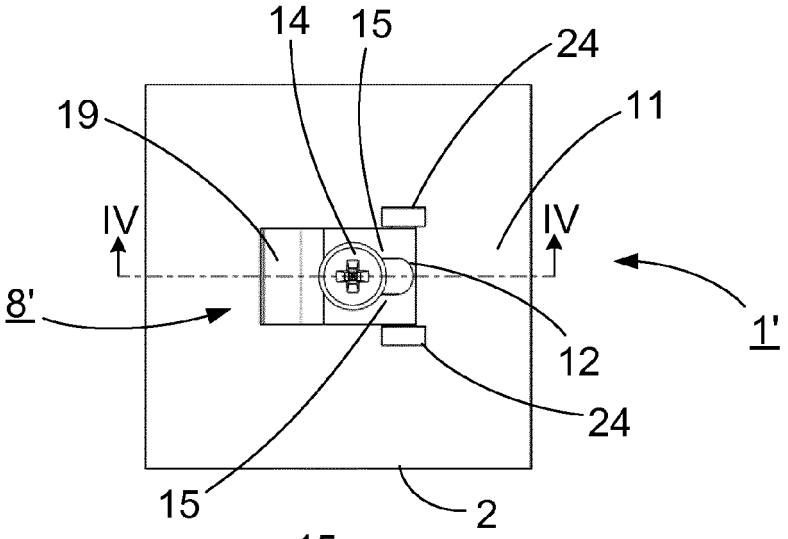

Fig. 8

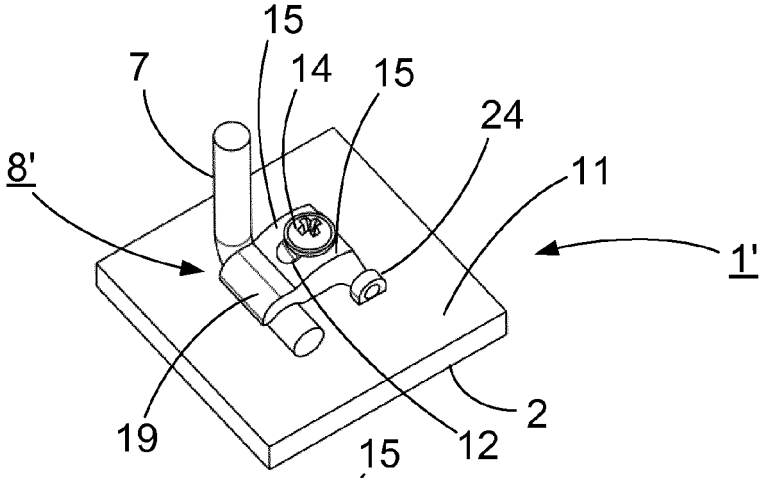

Fig. 9

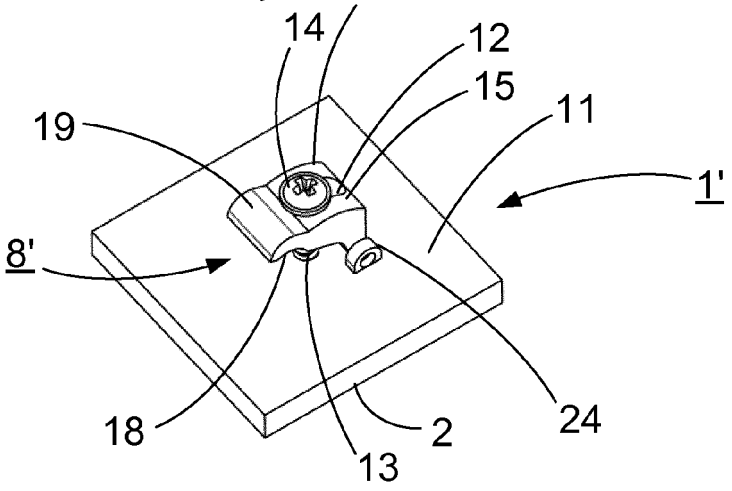

Fig. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 14 17 2322

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 2011/065583 A1 (YAZAKI CORP [JP]; OKABE TOSHIAKI; CHIBA SHINGO; TAKASAKI TETSURO) 3 June 2011 (2011-06-03) * page 18, line 21 - page 24, line 22; figures 2,3,4,6,10 * * page 1, line 19 - line 24 *	1-15	INV. H01R13/58 H01R13/595 H01R9/24
Y	EP 2 026 420 A2 (STEAB S P A [IT]) 18 February 2009 (2009-02-18) * paragraph [0016] - paragraph [0019]; figures 3,4,5 *	1-15	
A	WO 2012/149103 A1 (JOHNSON & SON INC S C [US]; BELONGIA DAVID C [US]) 1 November 2012 (2012-11-01) * paragraph [0029] - paragraph [0035]; figures 7,8,9 *	1-15	

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H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 July 2014	Bouhana, Emmanuel

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EPO FORM 1503 03.82 (P04C01)

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10-07-2014

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