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(54) **MOUNTING FOR AN EMERGENCY LIGHTING PANEL**

(57) The invention provides a mounting for an emergency lighting panel. The mounting according to the present disclosure comprises an enclosure for attaching the mounting to a target mounting surface and a connection element for connecting an emergency lighting panel to the enclosure. The enclosure comprises a connection portion configured to pivotably support the connection element and to define a plurality of locking positions. The connection portion and the connection element are configured such that, in each of the plurality of locking positions, the connection portion and the connection element engage with each other so as to lock the connection element in a target orientation relative to the connection portion, the target orientation being different for each of the locking positions.

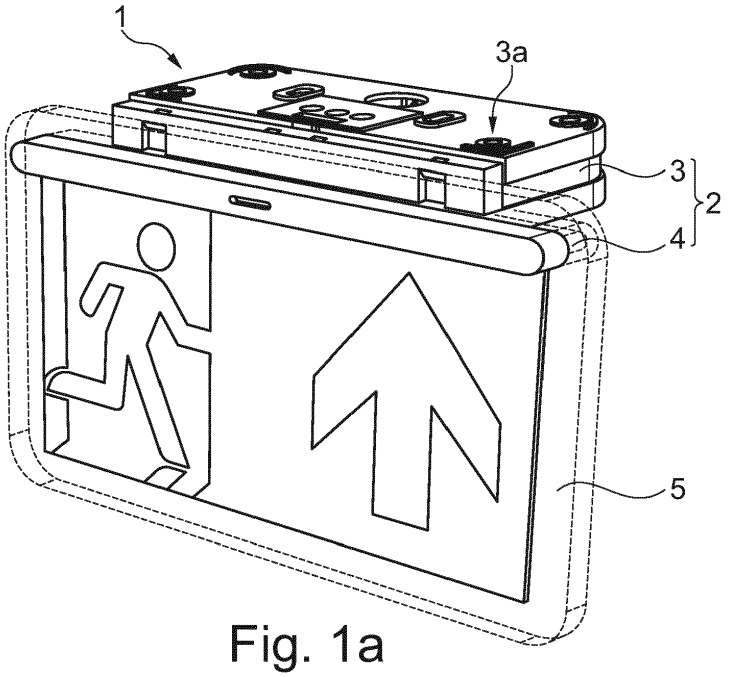

Fig. 1a

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Description

FIELD OF THE INVENTION

[0001] The invention pertains to a mounting for an emergency lighting panel, an emergency lighting product, a method for assembling the mounting, and a method for mounting an emergency lighting panel.

BACKGROUND

[0002] Currently, emergency lighting panels are mounted on a target mounting surface, like a wall or a ceiling, by means of a mounting element that is specifically configured for mounting the emergency lighting panel to this type of target mounting surface. There are different types of mounting elements for different types of target mounting surfaces. For example, there may be a mounting element configured for mounting the emergency lighting panels on a wall and a different mounting element configured for mounting the emergency lighting panels on a ceiling.

[0003] In many practical applications, it may not be known at the time of purchase what types of mounting elements will be required for installation at a site, or the requirements may change after placing the order, or the order may have been wrongly placed, or wrongly fulfilled.

[0004] In this case, a time delay and additional costs may be incurred for obtaining the right amount of the respective types of mounting elements, or for obtaining adapters, or for changing the plans for mounting the lighting panels at the site. An increase in waste may also occur when overproducing or over-fulfilling an order for one type of mounting elements.

[0005] As can be seen from the above, the present technology may be error-prone and errors are impactful in different ways and on-site flexibility for changing mounting plans may be low. Moreover, the present situation may also be challenging for installation and maintenance.

[0006] It is an objective of the present invention to provide at least one of a mounting for an emergency lighting panel, an emergency lighting product, a method for assembling the mounting, and a method for mounting an emergency lighting panel that alleviate at least some of the above disadvantages.

SUMMARY

[0007] The object is achieved by the present invention. The invention provides a mounting for an emergency lighting panel, an emergency lighting product, a method for assembling the mounting, and a method for mounting an emergency lighting panel according to the independent claims. Preferred embodiments are laid down in the dependent claims.

[0008] The invention provides a mounting for an emergency lighting panel. The mounting according to the present disclosure comprises an enclosure for attaching the mounting to a target mounting surface. The mounting according to the present disclosure comprises a connection element for connecting an emergency lighting panel to the enclosure. The enclosure comprises a connection portion. The connection portion is configured to pivotably support the connection element and to define a plurality of locking positions. According to the present disclosure, the connection portion and the connection element are configured such that, in each of the plurality of locking positions, the connection portion and the connection element engage with each other so as to lock the connection element in a target orientation relative to the connection portion, the target orientation being different for each of the locking positions.

[0009] An advantage of such a mounting is that it allows for using the same type of mounting for different types of target mounting surfaces. Thus, it is not required to provide different types of mounting elements for different types of target mounting surfaces. Accordingly, the mounting can be made to adapt to the current plan for mounting the emergency lighting panel on site at the time of mounting. This allows for high flexibility and is less error-prone in terms of the planning, order and order-fulfillment process. Moreover, as any installation and maintenance require the knowledge and/or availability of only one type of mounting, this can also improve planning, ease of handling, reliability, and efficiency. Thus, the mounting of the present disclosure fulfils the above objective.

[0010] The mounting may be an element that allows for connecting an element to be mounted, for example the emergency lighting panel, to another object. Accordingly, a mounting for an emergency lighting panel is configured in such a manner as to allow for attachment of an emergency lighting panel thereto and for attachment of the mounting to another object, e.g., a wall or ceiling.

[0011] An emergency lighting panel may comprise a pictogram, e.g. indicating an emergency exit, and a light guide that may provide backlighting. The backlighting may be implemented lighting elements and the light guide being arranged so as to receive light from the lighting elements and guide light so as to backlight the pictogram. For example, the light guide may be a light guiding plate arranged adjacent to a plate comprising the pictogram or the pictogram may be applied directly on the light guiding plate. The lighting elements may be arranged so as to emit light into the light guiding plate, for example arranged at one of the ends of the light guiding plate.

[0012] An enclosure may be any type of element that has at least one hollow portion wherein another element can be housed, for example, electronics. The enclosure may form the static part of the mounting during assembly, i.e., the absolute position of the enclosure may be fixed, e.g., by attaching it to the target mounting surface, and the connection element may be pivoted so as to lock it in the target orientation. The enclosure may have multiple parts, as will be described in more detail below.

[0013] Excepting the connection portion, the enclosure need not have any particular shape, as long as it is suitable for being attached to a target mounting surface by any type of attachment mechanism, e.g., screwing, nailing, or other types of attachment mechanisms.

[0014] The connection portion of the enclosure need not be a coherent portion of the enclosure. For example, the connection portion may have two separate sub-portions arranged at different positions of the enclosure.

[0015] The connection portion being configured to pivotably support the connection element and to define a plurality of locking positions may be structurally implemented in different ways that will be described in more detail below.

[0016] Being configured to pivotably support the connection element may comprise providing a structure, e.g., a hook, that is configured to support a structural element, e.g., a pin, which may also be referred to as a shaft or pivot, of the connection element in such a manner that a pivoting motion around the structural element can be performed. The structure may be integrally formed with the remaining parts of the connection portion.

[0017] The connection portion may comprise, particularly, be integrally formed with, one or more structural elements, e.g., protrusions, arranged and configured to lock the connection element in the target orientation. The configuration of the one or more structural elements, in particular their shape and/or arrangement, may define the plurality of locking positions.

[0018] A locking position may, for example, be described by a pivot angle at which the connection element is arranged in the target orientation with respect to a reference orientation.

[0019] The connection element may have an elongated shape and the pivoting axis may be parallel to the longitudinal axis. The connection element being suitable for attaching the emergency lighting panel to it may comprise, for example, having a portion that allows for such an attachment. As an example, it may comprise clips for clipping on the emergency lighting panel.

[0020] Examples for the connection portion and the connection element engaging with each other so as to lock the connection element in a target orientation relative to the connection portion will be provided in detail below. Engaging, in the present disclosure, refers to a mechanical engagement. The engaging may comprise that a structural element of the connection element and a structural element of the connection portion exert a force on each other counteracting a pivoting movement of the connection element relative to the connection portion.

[0021] That the target orientation is different for each of the locking positions may, for example, entail that the connection portion is configured so as to define locking positions at different pivoting angles.

[0022] In the present disclosure, when arrangements of elements are described, unless otherwise specified, this will refer to the mounting in an assembled state, i.e., with the connection element connected and locked in the target orientation.

[0023] According to the present disclosure, the connection portion and the connection element may be configured so as to provide a connection mechanism configured to enable toolless assembly of the connection element to the connection portion, particularly, toolless locking of the connection element in the target orientation.

[0024] A toolless connection allows for ease of assembly. In particular, a toolless assembly may exclude screwing, gluing, nailing, soldering, or the like.

[0025] According to the present disclosure, the connection mechanism may comprise a clicking mechanism for locking the connection element in the target orientation.

[0026] A clicking mechanism for establishing a connection allows for efficient and easy assembly. As an example, no tools are required and the exact arrangement of the connection element need not be verified by means of measurements. The clicking mechanism may be a mechanism wherein the connection element snaps into place by application of force, generally, manual application of force.

[0027] Such a connection is particularly advantageous in cases, where it is not necessary to provide a continuous range of installation orientations, e.g., where a discrete number of orientations is sufficient. For example, in case it is sufficient to allow for only a limited number of types of target installation surfaces, for example walls and ceilings, it is sufficient to allow for installation in a corresponding limited number of target orientations.

[0028] According to the present disclosure, the connection element may comprise a protrusion protruding towards the connection portion and the connection portion may comprise two or more protrusions. According to the present disclosure, the connection element and the connection portion may be configured such that the protrusion of the connection element and at least one of the protrusions of the connection portion engage so as lock the connection element in the target orientation.

[0029] Protrusions may be elongated structures formed on the surface of the connection element and the connection portion, respectively. They may, in particular, be integrally formed with the remaining parts of the connection portion. For example, the connection portion including the protrusions may be part of a single an injection-molded component.

[0030] An advantage of employing the protrusions is that it allows for quickly and easily, yet securely, locking the connection element and, accordingly, the emergency lighting panel, in the target orientation. Specifically, the protrusions of the connection element may be made to slip over the protrusion of the connection portion by pivoting with some force being applied. Forces that occur afterwards during intended use are generally not high enough to allow for the protrusion of the connection element to slip over the protrusions of the connection por-

tion, i.e., move out of the target orientation.

[0031] Thus, the mutually engaged protrusions securely hold the connection portion and, accordingly, the emergency lighting panel, in the target orientation.

[0032] Providing the protrusions allows for a reliable locking mechanism that can still be easily manufactured, e.g., using injection molding techniques, and is also easy to use, reducing the probability of installation errors.

[0033] According to the present disclosure, a shape and/or arrangement of the protrusions of the connection portion may define the plurality of locking positions. Thus, locking positions are reliable and reproducible and do not depend on installation accuracy.

[0034] The protrusions of the connection portion may define the locking positions. For example, each protrusion of the connection portion may define a locking position or a pair of protrusions of the connection portion may together define a locking position. The former may be the case when there is some other limiting factor to the pivoting motion after assembly and/or mounting, such that pivoting only needs to be blocked in one direction by the protrusion. A pair of protrusions may together define a locking position by forming an accommodation that is configured to accommodate the protrusion of the connection portion, particularly, to support it from both sides.

[0035] According to the present disclosure, as an example, if the protrusion of the connection element, after insertion, is arranged between two protrusions of the connection portion, the connection element may be pivoted towards one of these protrusions to arrive at one of the target orientations.

[0036] The protrusions of the present disclosure may each extend along a pivot axis of the connection element and may be arranged circumferentially with respect to a circle described by the pivoting motion. Thus, the pivoting motion of the connection element will lead to the protrusion of the connection element and one of the protrusions of the connection portion to collide and counteract the pivoting motion. The connection element may have a convex-shaped surface, which may have the protrusion, and the connection portion may have a concave-shaped surface, which may have the protrusions. The connection element and connection portion may be configured and arranged such that the concave-shaped surface is arranged facing the convex-shaped surface. In particular, the concave shaped surface and he convex-shaped surface may have a cylinder shape, each having a cylinder axis parallel to the pivot axis. Thus, the connection element may be partially enclosed by the connection portion.

[0037] According to the present disclosure, the protrusions of the connection portion and the protrusions of the connection element may be comprised in a/the connection mechanism. In particular, the protrusions of the connection portion and the protrusions of the connection element may be configured so as to implement a/the clicking mechanism for locking the connection element in the target orientation.

[0038] The protrusions provide an easy to manufacture and implement way of providing a clicking mechanism, as manufacturing precision need not be particularly high. Moreover, no clamp-like shape, which may be difficult to manufacture and may be prone to material fatigue, is required.

[0039] According to the present disclosure, each of the protrusions of the connection portion may be configured, particularly shaped and arranged, such that the required force for sliding the protrusion of the connection element over the protrusion of the connection portion depends on the sliding direction, particularly, the pivoting direction of the connection element.

[0040] In particular, each of the protrusions of the connection portion being shaped and arranged such that the required force depends on the sliding direction may comprise a slope and/or curvature of the surface of the protrusion of the connection portion being configured such that the required force for sliding the protrusion of the connection element over the protrusion of the connection portion depends on the sliding direction, particularly, the pivoting direction of the connection element.

[0041] Thus, the assembly, particularly the pivoting and locking of the connection portion into the target orientation, can be achieved with reasonable effort while also efficiently preventing that the connection portion pivots out of the target orientation.

[0042] In particular, based on an expected orientation of the connection portion at the beginning of assembling the mounting, each of the protrusions of the connection portion may be shaped and arranged such that the required force for sliding the protrusion of the connection element over a protrusion of the connection portion into the target orientation is lower than the force for sliding the protrusion back out of the target orientation.

[0043] According to the present disclosure, at least one of the protrusions of the connection portion may be a wedge-shaped protrusion. In particular, the wedge-shaped protrusion may be arranged such that the steep slope of the wedge engages with the protrusion of the connection element so as to lock the connection element in the target orientation. Thus, the wedge-shaped protrusion may define a locking position adjacent to its steep slope.

[0044] Alternatively or in addition, according to the present disclosure, at least two of the protrusions of the connection portion may be configured such that each engages with one of two opposing sides of the protrusion of the connection element so as to lock the connection element in the target orientation. The two of the protrusions may define a locking position, which is arranged between and bounded by them.

[0045] The above-described wedge-shaped protrusions allows for easily slipping the protrusion of the connection element over the protrusion of the connection portion, specifically, the less steep side of the wedge, thereby improving ease of assembly, and for securely holding the connection portion in place after assembly, as the protrusion of the connection portion cannot easily

slip over the steep side of the wedge. A wedge-shaped protrusion is advantageous for implementing a clicking mechanism, as it is simple and robust.

[0046] In the case where the at least two of the protrusions may each engage with one of two opposing sides of the protrusion of the connection element so as to lock the connection element in the target orientation, this allows for limiting a movement of the connection element in both pivoting directions and may provide a particularly secure locking.

[0047] According to the present disclosure, the connection portion may comprise at least two hooks and the connection element may comprise at least two pins, wherein the connection portion may be configured to pivotably support the connection element by means of the hooks into each of which one of the pins may be inserted in an assembled state.

[0048] For example, the pins may have a longitudinal axis extending along the pivoting axis. Thus, the connection element may pivot around the pins, which are supported inside the hooks. The hooks may, in particular, be configured so as to guide the pivoting motion. An advantage of using hooks and pins is that assembly is easy and the arrangement is reliable and durable.

[0049] The hooks may, in particular, be integrally formed with the remaining parts of the connection portion. For example, the connection portion including the hooks and optionally the protrusions may be part of a single an injection-molded component.

[0050] According to the present disclosure, each of the hooks may comprise an insertion portion and a bearing portion. The insertion portion may lead into the bearing portion and/or be tapered towards the bearing portion. This allows for easy insertion of the pins into the bearing portion. A taper angle may, for example, be between 5° and 35°, particularly between 10° and 30°, particularly between 15° and 25°, particularly approximately 20°.

[0051] The narrowest part of the insertion portion may be smaller than a diameter d_2 of the bearing portion. This allows to securely hold the pin in the bearing portion. In particular, the distance d_1 at the narrowest part of the insertion portion may be smaller than the diameter of the pin and the diameter d_2 may be bigger than the diameter of the pin. The distance d_1 may be such that the pins are snaped into the bearing portion upon assembly. The diameter of the bearing portion may be approximately the same as the diameter of the pin, for example, less than 5 % bigger than the diameter of the pin. Thereby, the bearing portion may guide a pivoting motion of the connection portion. As an example, a ratio between the d_1 and d_2 may be between 25 % and 35 %, in particular about 30 %.

[0052] According to the present disclosure, the hooks may be arranged along a pivot axis of the connection element. This allows for securely supporting the connection element during pivoting, even for elongated connection elements.

[0053] According to the present disclosure, the locking positions may comprise a first locking position and a second locking position. The connection portion and the connection element may be configured such that, in the first locking position, the connection portion and the connection element engage with each other so as to lock the connection element in a first target orientation relative to the connection portion, and, in the second locking position, the connection portion and the connection element engage with each other so as to lock the connection element in a second target orientation relative to the connection portion.

[0054] In particular, the connection portion may comprise at least two of the above-described protrusions, including the wedge-shaped protrusion and at least one additional protrusion, and may be configured such that the wedge-shaped protrusion defines the first locking position and the at least one additional protrusion defines the second locking position.

[0055] Thus, for example, upon assembly the connection portion may pivoted from a starting orientation in a first direction and locked, for example by its protrusion slipping over one of the protrusions of the connection portion, in the first target orientation, or the connection portion may be pivoted from the starting orientation in a second direction and locked, for example by its protrusion slipping over another one of the protrusions of the connection portion.

[0056] In the present disclosure, at least two of the target orientations, in particular the first and second target orientations may be perpendicular with respect to each other and may, for example, correspond to a ceiling mounting and a wall mounting, respectively.

[0057] According to the present disclosure, the connection element may comprise at least two protrusions and the connection portion may comprise at least two sets of two or more protrusions. The connection element and the connection portion may be configured such that each of the at least two protrusions of the connection element engages with at least one of the protrusions of one of the sets of two or more protrusions so as lock the connection element in the target orientation. In particular, the sets of two or more protrusions may be arranged along a/the pivot axis of the connection element. As an example, there may be one set of two or more protrusions arranged adjacent to each of the hooks.

[0058] Locking the connection element at more than one position, particularly arranged along the pivot axis, is advantageous, as this may allow for a better distribution of the forces acting on the connection after assembly and, particularly, may allow for reducing shear forces.

[0059] The invention also provides an emergency lighting product comprising the mounting of the present disclosure.

[0060] The emergency lighting product according to the present disclosure may further comprise one or more first electronic components, e.g., one or more lighting elements and/or a PCBA, attached to the connection element in an assembled state. The electronic components

may be attached to the connection element so as to rotate or pivot together with the connection element. The lighting elements may be LEDs, for example arranged and configured for backlighting the pictogram of the emergency lighting panel. The PCBA may be connected to and configured for driving the lighting elements.

[0061] Alternatively or in addition, the emergency lighting product according to the present disclosure may further comprise one or more second electronic components, e.g., an energy supply and/or PCBA, housed in the enclosure in an assembled state. The energy supply may be configured for supplying energy to the lighting elements. The PCBA may be configured for driving the lighting elements and/or for controlling other electronic components.

[0062] Alternatively or in addition, the emergency lighting product according to the present disclosure may further comprise a wiring, e.g., comprising flat flexible wires, extending from the connection element into the enclosure, in particular so as to electrically connect the one or more first electronic components to the one or more second electronic components. Thus, the first electronic components may be supplied with power and/or control signals by the second electronic components via the wiring.

[0063] Alternatively or in addition, the emergency lighting product according to the present disclosure may further comprise an emergency lighting panel attached to the connection portion in an assembled state. The emergency lighting panel may, for example, be attached to the connection portion by a clicking mechanism, e.g., by means of clips.

[0064] The emergency lighting panel may comprise a light guide panel arranged, in an assembled state, adjacent to the one or more lighting elements such that light emitted from the one or more lighting elements is guided by the light guide panel so as to backlight a pictogram of the emergency lighting panel. Thus, good visibility of the pictogram at low surrounding lighting is ensured.

[0065] The invention also provides a method for assembling the mounting of the present disclosure. The method comprises a fist engaging step wherein the connection element and the connection portion are engaged such that the connection element is pivotably supported by the connection portion. The method further comprises, particularly after the first engaging step, a pivoting step wherein the connection element is pivoted relative to the connection portion. Specifically, the connection element may be pivoted towards the target orientation. The method further comprises a second engaging step, wherein the connection element and the connection portion are engaged such that the connection element is locked in the target orientation.

[0066] According to the present disclosure, the first engaging step may comprise inserting a/the pair of pins of the connection element into a/the pair of hooks of the connection portion. More specifically, each pin may be inserted via the insertion portion into the bearing portion of one of the hooks. The pair of pins may be inserted simultaneously. This allows for low risk of jamming.

[0067] Alternatively or in addition, according to the present disclosure, the second engaging step may comprise engaging a/the protrusion of the connection element with at least one of two or more protrusions of the connecting portion, e.g. of the above described two-or more protrusions, to lock the connection element in the target orientation. In particular, the protrusion of the connection element may be caused to slip over one of the protrusions of the connection portion to reach the target orientation.

[0068] In particular, the second engaging step may comprise continuing a pivoting motion of the pivoting step in such a manner as to, in particular with enough force to, cause the protrusions of the connection element to slip over the at least one of the two or more protrusions of the connection portion.

[0069] The invention also provides a method for mounting an emergency lighting panel comprising the method for assembling the mounting according to the present disclosure. The method for mounting an emergency lighting panel further comprises the steps of attaching the emergency lighting panel to the connection element, in particular by means of one or more clips, and attaching the enclosure, particularly an attachment surface thereof, to a target mounting surface. The clips may, for example, be part of or attached to the connection portion.

[0070] These steps may, for example, be performed prior to the steps of assembling the mounting. The enclosure may be a two-part enclosure wherein one part comprises the attachment surface for attaching the enclosure to the target mounting surface and the other part comprises the connection portion. These parts may connectable, e.g., by a clicking mechanism, and may be connected prior to or after attaching the attachment surface to the target mounting surface. The part comprising the connection portion, also referred to as the first fix part, may be attached to the part comprising the attachment surface prior to or after the assembly of the connection element and the part of the enclosure comprising the connection portion.

[0071] The features and advantages outlined above in the context of the mounting similarly apply to the emergency lighting products and the methods described herein.

[0072] Further features, examples, and advantages will become apparent from the detailed description making reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0073] In the accompanying drawings,

Figures 1a and 1b illustrate schematically an emergency lighting product according to the present disclosure in different arrangements;

Figures 2a to 2d illustrate schematically different views and portions of a mounting according to the present disclosure prior to assembly;

Figure 3 illustrates schematically portions of a mounting prior to assembly;

Figures 4a and 4b illustrate schematically a portion of a mounting in different arrangements;

Figures 5a and 5b illustrate schematically a portion of a mounting in different arrangements;

Figures 6a and 6b illustrate schematically an exemplary arrangement of electronic components;

Figures 7a and 7c illustrate schematically an exemplary portion of a mounting for attaching the emergency lighting panel;

Figure 8 illustrates schematically different views of a two-part enclosure; and

Figures 9a to 9e illustrates schematically different views of another possible configuration of the connection portion of a mounting according to the present disclosure.

DETAILED DESCRIPTION

[0074] Figures 1a and 1b illustrate schematically an oblique view of an emergency lighting product 1 according to the present disclosure comprising a mounting 2 according to the present disclosure. The mounting comprises an enclosure 3 and a connection element 4 that connects the emergency lighting panel 5 to the enclosure. It is noted that the invention pertains to a mounting alone and to an emergency lighting product comprising a mounting. Accordingly, any features described herein are to be seen for a mounting alone or for a mounting as part of an emergency lighting product unless otherwise specified.

[0075] In Figure 1a, the mounting is in an arrangement for mounting the emergency lighting panel to a ceiling. The emergency lighting panel is approximately perpendicular to an attachment surface 3a of the enclosure and extends downwards from the enclosure.

[0076] In Figure 1b, the mounting is in an arrangement for mounting the emergency lighting panel to a vertical wall. The emergency lighting panel is arranged essentially in parallel with the attachment surface 3a.

[0077] It is noted that the mounting according to the present disclosure may be combined with other types of emergency lighting panels than the one shown in Figure 1.

[0078] Figures 2a and 2b illustrate a mounting 2 according to the present disclosure prior to assembly, particularly, illustrate the connection mechanism 7 configured to pivotably connect the connection element 4 to a connection portion 6 of the enclosure 3. In Figure 2b, a detailed view of a part of the mounting 2 prior to assembly is shown.

[0079] The enclosure 3 comprises a connection portion 6. The connection portion comprises two set of protrusions 6a, 6b, and 6c, each protrusion extending in a longitudinal direction, e.g., having an elongated shape. The longitudinal axis 11 is shown in Figure 2b, for example. Moreover, the connection portion comprises a pair of hooks 6d. One of the set of protrusions and one of the hooks is arranged at each longitudinal end of the enclosure. As will be explained in detail below with respect to Figures 9a to 9e, it is not necessary to have three protrusions per set. For example, protrusion 6a may be omitted.

[0080] Within one set of protrusions, all protrusions are arranged adjacent to each other, the protrusions 6a and 6b forming a pair of protrusions arranged at surface 12a that is approximately perpendicular to a surface 12b at which the protrusion 6c is arranged.

[0081] The connection element 4 comprises a pair of protrusions 4a configured to engage with the protrusions 6a, 6b, and 6c of the enclosure to lock the connection element in a position.

[0082] Specifically, protrusions 6a and 6b serve for locking the connection element in a position as shown in Figure 1a, e.g., a ceiling mounting position, by engaging with protrusions 4a. The protrusions 6c serve for locking the connection element in a position as shown in Figure 1b, e.g., a wall mounting position, by engaging with the protrusions 4a.

[0083] Moreover, the connection element 4 comprises a pair of pins 4b, each configured to engage with one of the hooks 6d. This is explained in detail below. The openings of the hooks extend along the longitudinal direction. Similarly, the pins extend in the longitudinal direction. Thus, the connection element is pivotable around an axis extending in the longitudinal direction.

[0084] Figure 2c shows another oblique view of the enclosure 3 illustrating the connection portion 6. The inner surface of each hook 6d has two surface portions, i.e., a first surface portion 6d-1 and a second surface portion 6d-2. The inner surface may be seen as defining or limiting the opening.

[0085] A side view of one of the hooks is shown in Figure 2d.

[0086] As can be seen in Figure 2d, the first surface portion consists of two oppositely arranged surfaces facing each other. The oppositely arranged surfaces form an insertion portion 13a of the hook. In this example, the insertion portion of the hook is tapered. In particular, the distance between oppositely arranged surfaces increases towards the outside of the hook or, in other words, are inclined away from each other towards the outside of the hook. Thus, the insertion portion may be seen as funnel-shaped or V-shaped. The insertion portion serves to guide the pin inwardly, e.g., towards the bearing portion

described below. This may ease insertion and, accordingly, assembly. However, the insertion portion need not necessarily be tapered. It may alternatively have the opposite surfaces arranged in parallel.

[0087] As can also be seen in Figure 2d, the second surface portion 6d-2 of the hook has a cylindrical shape and meets the oppositely arranged surfaces of the insertion portion 13a. The second surface forms a bearing portion 13b of the hook. During assembly, a pin will be inserted, particularly guided by the insertion portion 13a, into the hook, particularly into the bearing portion 13b. This arrangement allows for pivoting the connection portion with respect to the enclosure around the pin supported by the bearing portion.

[0088] In the present example, the distance d_1 between the oppositely arranged surfaces of the insertion portion 13a is smaller than the diameter d_2 of the bearing portion 13b. This allows for decreasing the risk of the pin slipping out of the hook upon pivoting and at the same time allows for the pins being held loosely enough to allow for a smooth pivoting motion.

[0089] In Figure 3, the above-described connection mechanism is shown from a different perspective. In particular, it shows that the connection portion has two part that are arranged in a symmetrical manner, in particular, is symmetrically arranged at both longitudinal ends of the enclosure 3 and corresponding positions on the connection element 4.

[0090] In Figures 4a and 4b, exemplary cross-sections illustrating the assembled mounting in two different arrangements are shown.

[0091] Specifically, in Figure 4a, the mounting is shown in an arrangement similar to the one in Figure 1a, e.g., in a ceiling mounting arrangement. It can be seen that the protrusion 4a of the connection element engages with the protrusion 6c of the enclosure. Although not visible in this view, this is also the case for the other protrusion 4a and the other protrusion 6c.

[0092] The protrusion 6c is shown as having a ramp or wedge shape in this example. Although this is optional, it may be advantageous, as it allows for ease of moving the protrusion 4a over the protrusion 6c during assembly and also for safely locking the connection element, specifically the protrusion 4a, after assembly, as the protrusion cannot easily slip over the steep side of the wedge.

[0093] In Figure 4b, the mounting is shown in an arrangement similar to the one in Figure 1b, e.g., in a wall mounting arrangement. The protrusion 4a of the connection element engages with the pair of protrusions 6a and 6b of the enclosure, specifically, is locked between the pair of protrusions. Although not visible in this view, this is also the case for the other protrusion 4a and the other protrusion 6a and 6b.

[0094] The protrusions form a click connection. During assembly, the protrusion 6c is pushed over one of the protrusions 6b and 6c so as to lock the connection element in a target arrangement.

[0095] Due to the overall configuration of the emergency lighting product in the present example, a one-sided support by the protrusion 6c may be sufficient to lock the connection element. Optionally, an additional protrusion may be provided to form a pair of adjacent protrusions with protrusion 6c that are each arranged on one side of the protrusion 4a in an assembled state.

[0096] Figures 5a and 5b show a similar view as the one in Figures 4a and 4b. In this example, electronic components 9, for example a main PCBA of the emergency lighting product, are arranged inside the enclosure 3. Moreover, electronic components 8, for example LEDs 14 and a corresponding PCBA 15, connected to the LEDs are arranged inside the connection element in an area between the pins. For example, a plurality of LEDs might be arranged in a row along the longitudinal direction to illuminate the emergency lighting panel 5 from above. A wiring 10, for example flat flexible wires, connect the PCBA of the connection element and the main PCBA in the enclosure. To allow for the connection, an opening is provided in the wall of the connection element and of the enclosure. Preferably, the opening is configured in such a manner that the flat flexible wires are guided such that they are securely arranged in the different arrangements of the connection element.

[0097] In Figures 6a and 6b two views illustrating an exemplary arrangement of LEDs 14 and LED PCBA 15 are shown in an oblique view. Moreover, a light guide panel 16 arranged adjacent to the LEDs and configured and arranged for guiding light emitted from the LEDs so as to backlight a pictogram 5a of the emergency lighting panel is shown.

[0098] In Figures 7a and 7b, an example of how the emergency lighting panel may be attached to the connection element is shown in an overview and an enlarged view. For example, the connection element may comprise a plurality of clips 17 arranged in a row along the longitudinal direction. The clips may be configured such that, upon assembly, the carrier plate of the LEDs and LED PCBA can be inserted into the clips 17 and thereby fixed to the connection element.

[0099] In Figure 7c, the assembly and disassembly of the emergency lighting panel is visualized. In addition to the clips, a cover 18 is illustrated, which is attached to the connection portion after inserting the emergency lighting panel, for example by means of a click connection using clips 20, one of which may be arranged at each longitudinal end of the connection element. Attaching the cover 18 may at the same time fix the emergency lighting panel in place, thereby allowing for mounting the emergency lighting panel by means of a click connection.

[0100] In Figure 8, various views show that optionally the enclosure may be a multi-part, in particular a two-part, enclosure 3 with a fist part comprising the attachment surface 3a and a second part comprising the connection portion 6. The enclosure may, for example, be closed by a click connection 19. Such a two-part configuration may ease the installation. For example, the first part may be attached to the target mounting surface and

then the second part, potentially with the connection portion already connected to it, may be attached to the first part.

[0101] Figures 9a to 9e show different views of another possible configuration of the mounting according to the present disclosure. In this example, instead of having protrusions 6a and 6b for locking the connection portion 4 in the wall mounting arrangement, there is only the protrusions 4b for locking the connection portion in the wall mounting arrangement. The protrusions 4a are entirely omitted. This arrangement allows for an even simpler construction of the connection portion and at the same time allows for locking the connection portion in the target orientation. As can easily be seen from the Figures, the pivoting direction that could be blocked by the protrusions 6a can also blocked by the arrangement of other elements of the mounting or other elements of the emergency lighting product, which in turn directly or indirectly may rest against the wall. This allows for sufficient stability as to not require protrusions 6a.

[0102] Apart from the omission the protrusions 6a, the mounting and the emergency lighting product may be configured for example as shown in Figures 1 to 8 and described above.

[0103] In the following, an exemplary method for assembling a mounting according to the present disclosure, for example a mounting 2 as described above in the context of Figures 1 to 9, is described.

[0104] A first engaging step is performed, wherein the connection element 4 and the connection portion 6 of the enclosure 3 are engaged such that the connection element is pivotably supported by the connection portion. For example, the pins 4b may be inserted into the hooks 6d.

[0105] The method further comprises a pivoting step after the first engaging step. The connection element is pivoted relative to the connection portion while being supported by the connection portion, for example, by the hooks. If the hooks have the above described tapered-shape of the insertion portion 13a, this may prevent that the pins slip out of the hooks during the pivoting.

[0106] As an example, the first engaging step may be performed with the connection portion arranged such that protrusion 4a is arranged between the protrusion 6b and 6c after the first engaging step and prior to the subsequent pivoting step.

[0107] The connection element may be pivoted in a first direction for locking it in a first target orientation or in a second direction, opposite to the first direction, for locking it in a second target orientation. For example, if the protrusion 4a, after insertion, is arranged between the protrusion 6b and 6c, the connection element may be pivoted towards one of these protrusions to arrive at one of the target orientations. Other arrangements are, however, conceivable. For example, different target orientations may be reached by pivoting in the same direction depending on the shape and/or arrangement of the protrusions and depending on how the first engaging step is performed.

[0108] The method further comprises a second engaging step, wherein the connection element and the connection portion are engaged such that the connection element is locked in the target orientation. For example, the protrusion 4a may be slipped over one of the protrusions 6b and 6c. Having slipped over the protrusion the connection element may be arranged in the first or second target orientation and the protrusion 6b or 6c will interact with the protrusion 4a so as to lock the connection portion in the respective target orientation.

[0109] The second engaging step, thus, may comprise continuing a pivoting motion of the pivoting step with enough force to cause the protrusions of the connection element to slip over the protrusion 6b or 6c.

[0110] In the following, an exemplary method for mounting an emergency lighting panel 5 will be described. The method comprises a method for assembling the mounting according to the present disclosure, e.g., the method as described in the above example.

[0111] The method for mounting an emergency lighting panel further comprises attaching the emergency lighting panel to the connection element 4 by means of one or more clips, in particular held in place by the cover 18 attached to the connection element by means of one or more clips, for example the clips 20. This may be performed prior to assembling the mounting or after the mounting has been assembled.

[0112] The method also comprises attaching the enclosure 3, particularly an attachment surface 3a thereof, to a target mounting surface. For example, it may be screwed or nailed or attached in some other suitable manner to a wall or ceiling. This step may be performed prior to assembling the mounting. This may make it easier to attach the enclosure to the target mounting surface. However, the step might also be performed after the assembling of the mounting.

[0113] If a two-part enclosure as described above is used, the first part may be attached to the target mounting surface and subsequently, the second part may be attached to the first part, e.g., after connecting the connection portion to the second part of the enclosure.

[0114] While the invention has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered exemplary and not restrictive. The invention is not limited to the disclosed embodiments. In view of the foregoing description and drawings it will be evident to a person skilled in the art that various modifications may be made within the scope of the invention, as defined by the claims.

Claims

1. A mounting (2) for an emergency lighting panel (5), comprising

an enclosure (3) for attaching the mounting (2)

to a target mounting surface; and
a connection element (4) for connecting an emergency lighting panel (5) to the enclosure (3),
wherein the enclosure (3) comprises a connection portion (6),
wherein the connection portion (6) is configured to pivotably support the connection element (4) and to define a plurality of locking positions, and
wherein the connection portion (6) and the connection element (4) are configured such that, in each of the plurality of locking positions, the connection portion (6) and the connection element (4) engage with each other so as to lock the connection element (4) in a target orientation relative to the connection portion (6), the target orientation being different for each of the locking positions.

2. The mounting (2) of claim 1, wherein the connection portion (6) and the connection element (4) are configured so as to provide a connection mechanism (7) configured to enable toolless assembly of the connection element (4) to the connection portion (6), particularly, toolless locking of the connection element (4) in the target orientation.

3. The mounting (2) of claim 2, wherein the connection mechanism (7) comprises a clicking mechanism for locking the connection element (4) in the target orientation.

4. The mounting (2) of any of the preceding claims,

wherein the connection element (4) comprises a protrusion (4a) protruding towards the connection portion (6),
wherein the connection portion (6) comprises two or more protrusions (6a, 6b, 6c), and
wherein the connection element (4) and the connection portion (6) are configured such that the protrusion (4a) of the connection element (4) and at least one of the protrusions (6a, 6b, 6c) of the connection portion (6) engage so as lock the connection element (4) in the target orientation.

5. The mounting (2) of claim 4,

wherein a shape and/or arrangement of the protrusions (6a, 6b, 6c) of the connection portion (6) define the plurality of locking positions, and/or
wherein the protrusions (6a, 6b, 6c) of the connection portion (6) and the protrusions (4a) of the connection element are comprised in a/the connection mechanism (7), in particular, are configured so as to implement a/the clicking mechanism for locking the connection element (4) in the target orientation.

6. The mounting (2) of claim 4 or claim 5, wherein each of the protrusions (6a, 6b, 6c) of the connection portion (6) is configured, particularly shaped and arranged, such that the required force for sliding the protrusion (4a) of the connection element (4) over the protrusion (6a, 6b, 6c) of the connection portion (6) depends on the sliding direction, particularly, the pivoting direction of the connection element (4),
in particular, wherein each of the protrusions (6a, 6b, 6c) of the connection portion (6) being shaped and arranged such that the required force depends on the sliding direction comprises a slope and/or curvature of the surface of the protrusion (6a, 6b, 6c) of the connection portion (6) being configured such that the required force for sliding the protrusion (4a) of the connection element (4) over the protrusion (6a, 6b, 6c) of the connection portion (6) depends on the sliding direction, particularly, the pivoting direction of the connection element (4).

7. The mounting (2) of any one of claims 4 to 6,

wherein at least one of the protrusions (6c) of the connection portion (6) is a wedge-shaped protrusion, and in particular arranged such that the steep slope of the wedge engages with the protrusion (4a) of the connection element (4) so as to lock the connection element (4) in the target orientation, and/or
wherein at least two of the protrusions (6a, 6b) of the connection portion (6) are configured such that each engages with one of two opposing sides of the protrusion (4a) of the connection element (4) so as to lock the connection element (4) in the target orientation.

8. The mounting (2) of any of the preceding claims, wherein the connection portion (6) comprises at least two hooks (6d) and the connection element (4) comprises at least two pins (4b), wherein the connection portion (6) is configured to pivotably support the connection element (4) by means of the hooks (6d) into each of which one of the pins (4b) is inserted.

9. The mounting (2) of claim 8,

wherein each of the hooks (6d) comprises an insertion portion (13a) and a bearing portion (13b), wherein the insertion portion (13a) is tapered towards the bearing portion (13b), in particular, the narrowest part of the insertion portion (13a) being smaller than a diameter (d2) of the bearing portion (13b), and/or
wherein the hooks (6d) are arranged along a pivot axis (11) of the connection element (4).

10. The mounting (2) of any of the preceding claims,

wherein the locking positions comprise a first locking position and a second locking position, wherein the connection portion (6) and the connection element (4) are configured such that, in the first locking position, the connection portion (6) and the connection element (4) engage with each other so as to lock the connection element (4) in a first target orientation relative to the connection portion (6), and, in the second locking position, the connection portion (6) and the connection element (4) engage with each other so as to lock the connection element (4) in a second target orientation relative to the connection portion (6), particularly, wherein the first target orientation and the second target orientation are perpendicular,
in particular, wherein the connection portion (6) comprises the wedge-shaped protrusion (6c) of claim 7 and at least one additional protrusion (6a, 6b) according to any one of claims 4 to 7 and is configured such that the wedge-shaped protrusion (6c) defines the first locking position and the at least one additional protrusion (6a, 6b) defines the second locking position.

11. The mounting (2) of any of the preceding claims,

wherein the connection element (4) comprises at least two protrusions (4a) and the connection portion (6) comprises at least two sets of two or more protrusions (6a, 6b, 6c),
wherein the connection element (4) and the connection portion (6) are configured such that each of the at least two protrusions (4a) of the connection element (4) engages with at least one of the protrusions (6a, 6b, 6c) of one of the sets of two or more protrusions (6a, 6b, 6c) so as lock the connection element (4) in the target orientation,
in particular, wherein the sets of two or more protrusions (6a, 6b, 6c) are arranged along a/the pivot axis of the connection element (4).

12. An emergency lighting product (1) comprising the mounting (2) of any of the preceding claims and further comprising at least one of:

one or more first electronic components (8), e.g., one or more lighting elements (14) and/or a PCBA (15), attached to the connection element (4) in an assembled state;
one or more second electronic components (9), e.g., an energy supply and/or PCBA, housed in the enclosure (3) in an assembled state;
a wiring (10), e.g., comprising flat flexible wires, extending from the connection element (4) into the enclosure (3), in particular so as to electrically connect the one or more first electronic components (8) to the one or more second electronic components (9);
an emergency lighting panel (5) attached to the connection portion (6) in an assembled state, in particular, the emergency lighting panel (5) comprising a light guide panel (16) arranged, in an assembled state, adjacent to the one or more lighting elements (14) such that light emitted from the one or more lighting elements (14) is guided so as to backlight a pictogram (5a) of the emergency lighting panel (5).

13. A method for assembling the mounting of any of claim 1 to 11, the method comprising

a fist engaging step wherein the connection element (4) and the connection portion (6) are engaged such that the connection element (4) is pivotably supported by the connection portion (6);
a pivoting step wherein the connection element (4) is pivoted relative to the connection portion (6); and
a second engaging step, wherein the connection element (4) and the connection portion (6) are engaged such that the connection element (4) is locked in the target orientation.

14. The method of claim 13,

wherein the first engaging step comprises inserting a/the pair of pins (4b) of the connection element (4) into a/the pair of hooks (6d) of the connection portion (6), and/or
wherein the second engaging step comprises engaging a/the protrusion (4a) of the connection element (4) with at least one of (the) two or more protrusions (6a, 6b, 6c) of the connecting portion (6) to lock the connection element (4) in the target orientation,
in particular, wherein the second engaging step comprises continuing a pivoting motion of the pivoting step in such a manner as to, in particular with enough force to, cause the protrusions (4a) of the connection element to slip over the at least one of the two or more protrusions (6a, 6b, 6c) of the connection portion (6).

15. A method for mounting an emergency lighting panel comprising the method of claim 13 and further comprising, particularly prior to the steps of assembling the mounting (2), the steps of

attaching the emergency lighting panel (5) to the connection element (4), in particular, directly or indirectly, by means of one or more clips (20);

and
attaching at least part of the enclosure (3), particularly an attachment surface (3a) of the enclosure (3), to a target mounting surface.

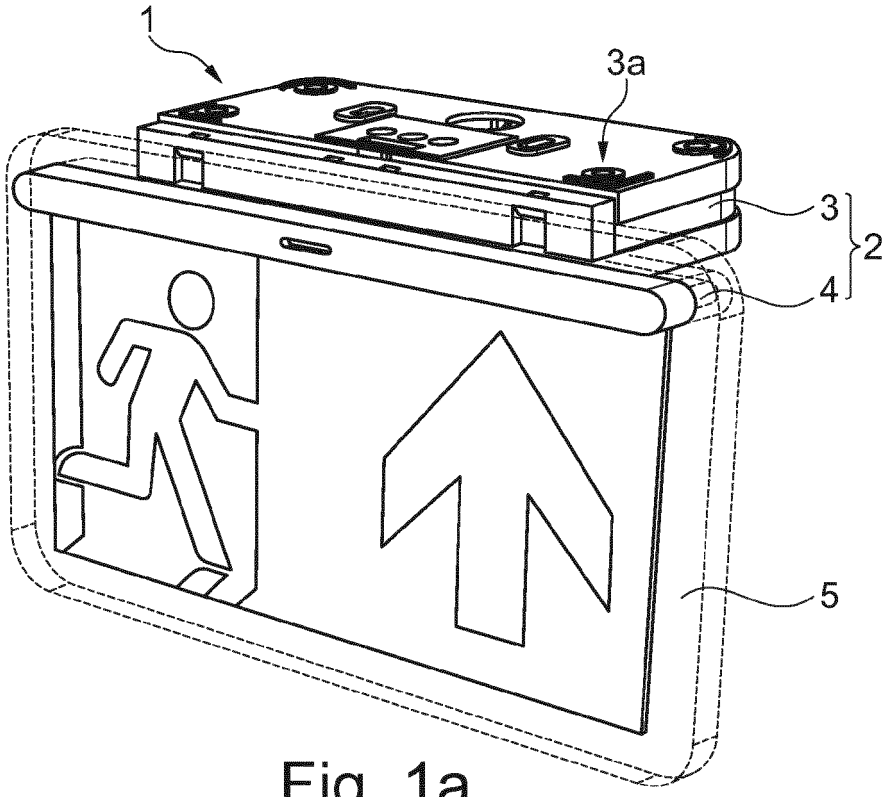


Fig. 1a

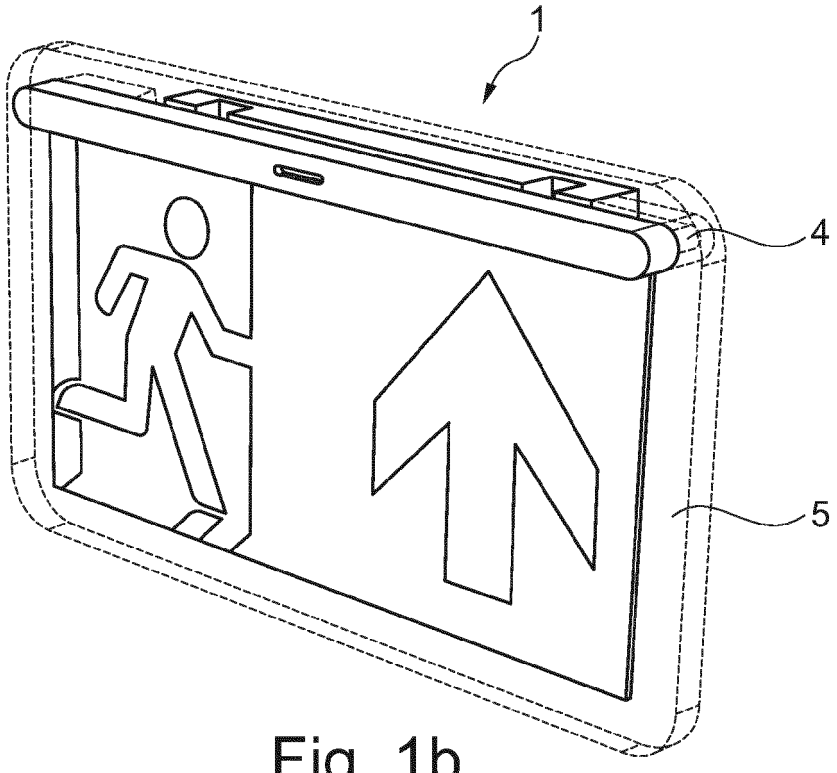


Fig. 1b

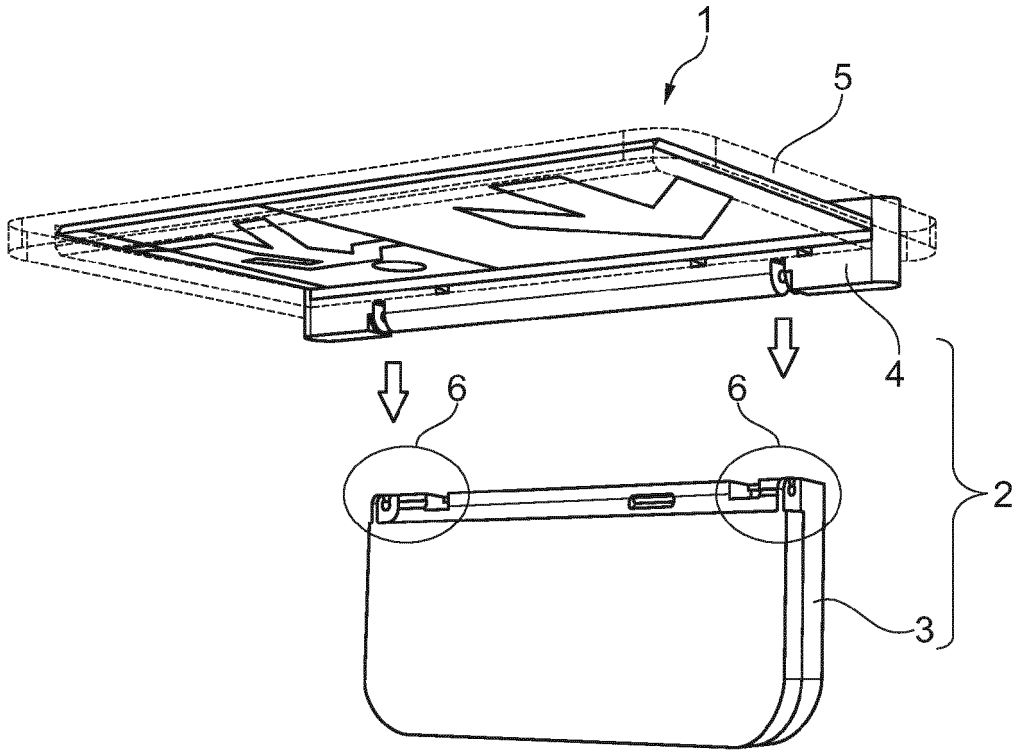


Fig. 2a

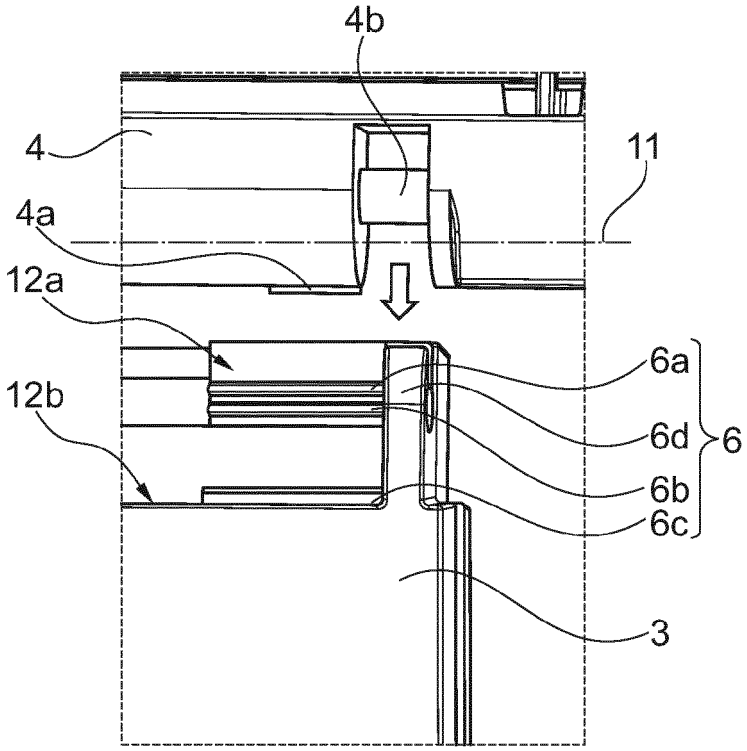


Fig. 2b

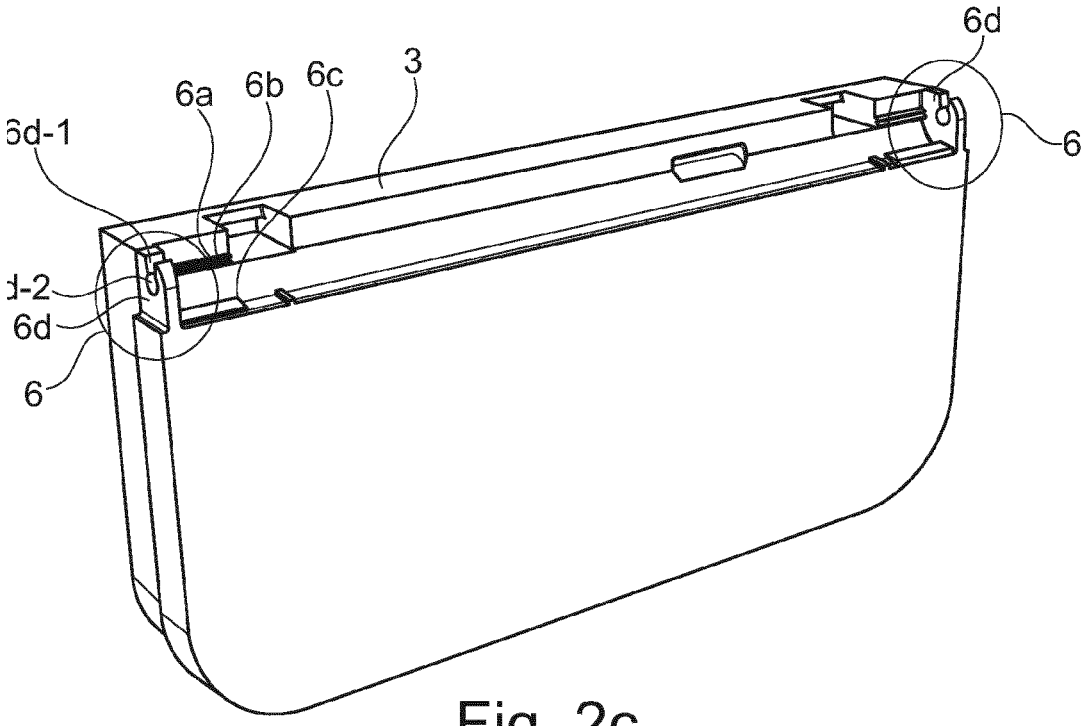


Fig. 2c

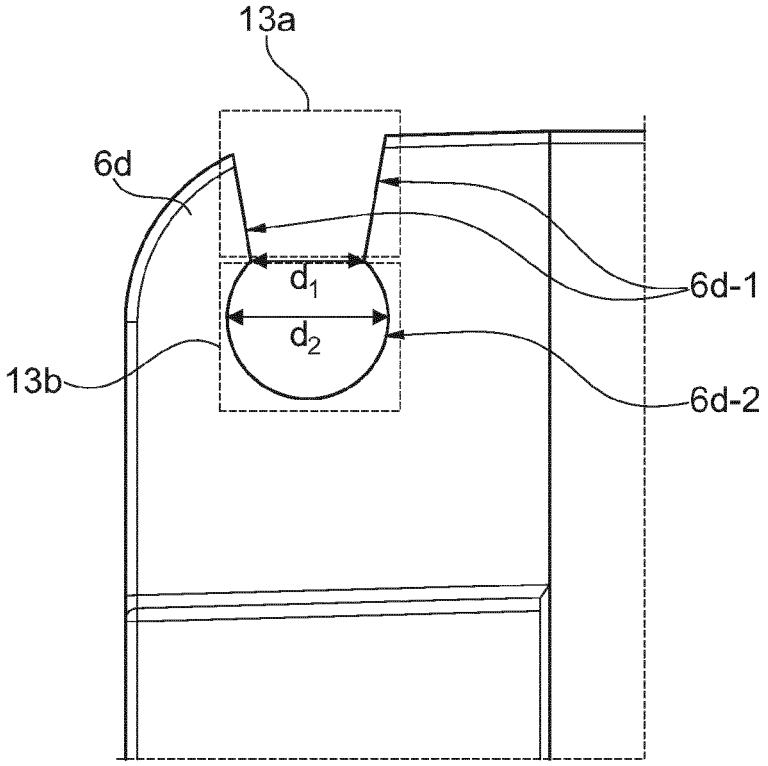


Fig. 2d

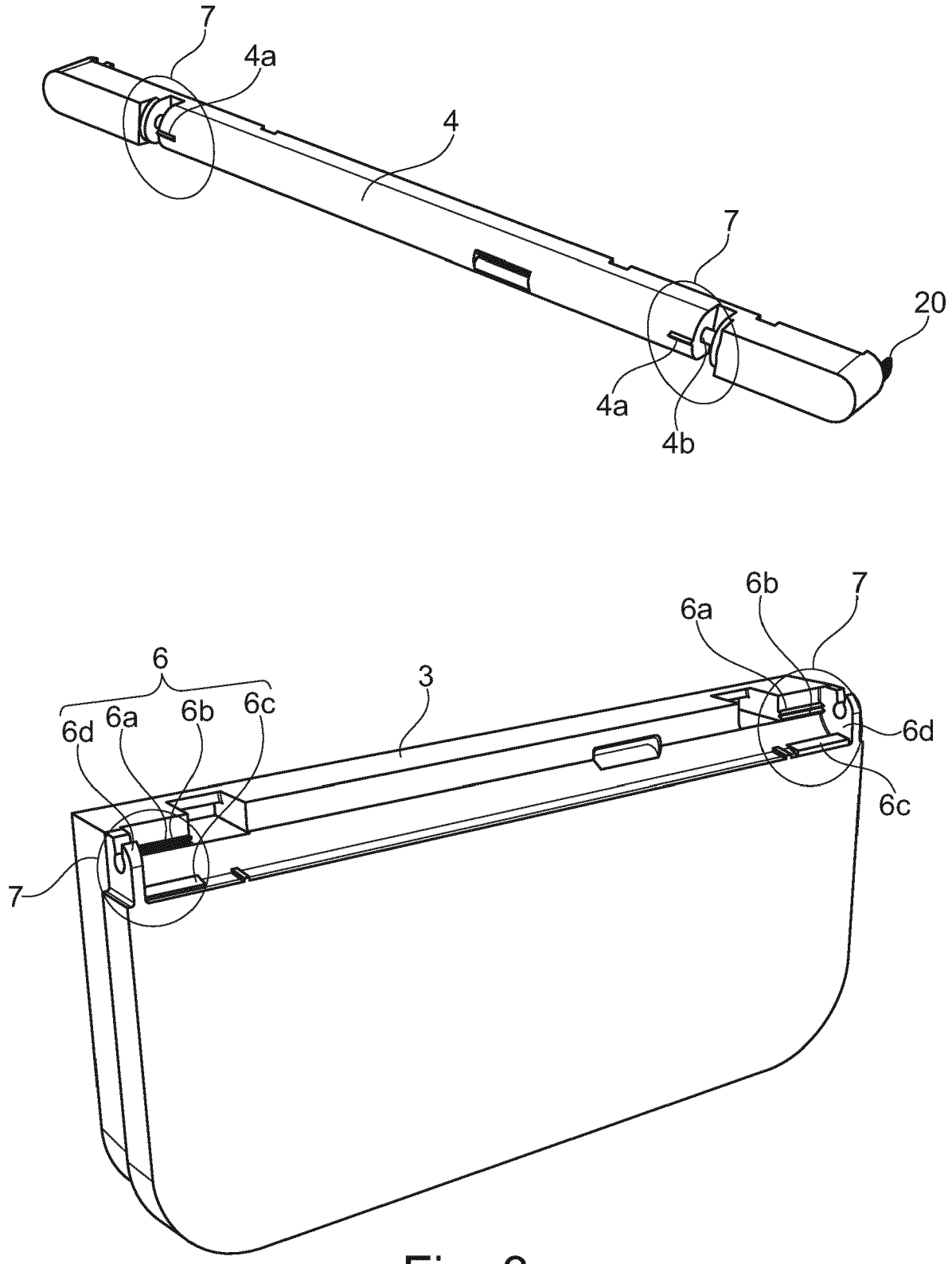


Fig. 3

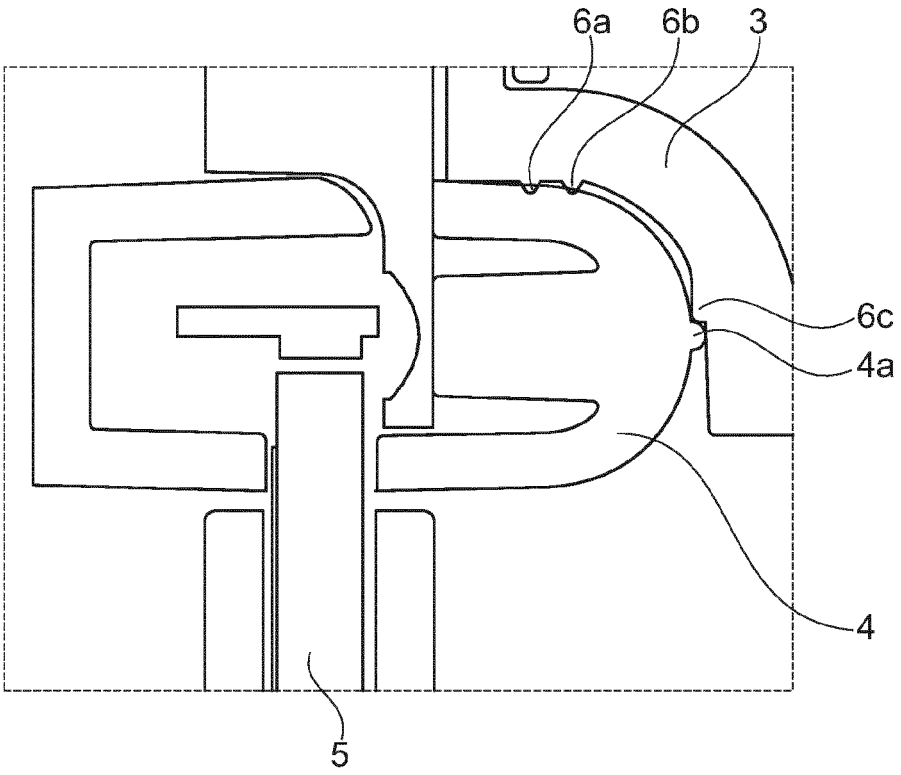


Fig. 4a

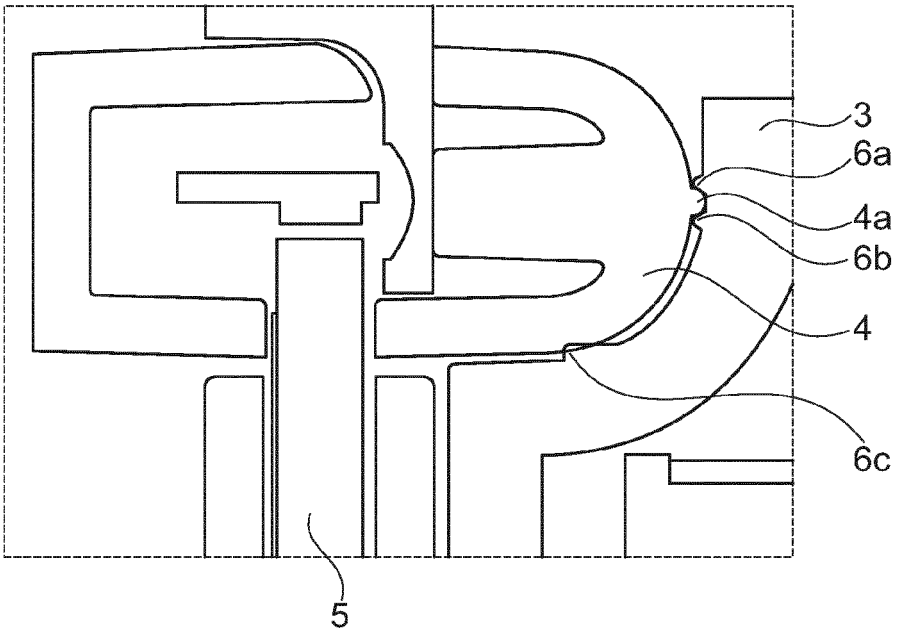


Fig. 4b

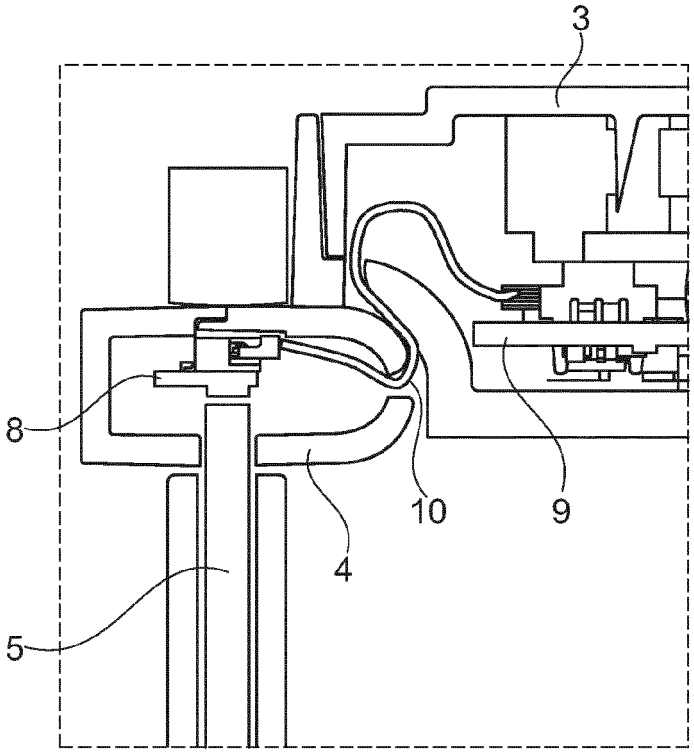


Fig. 5a

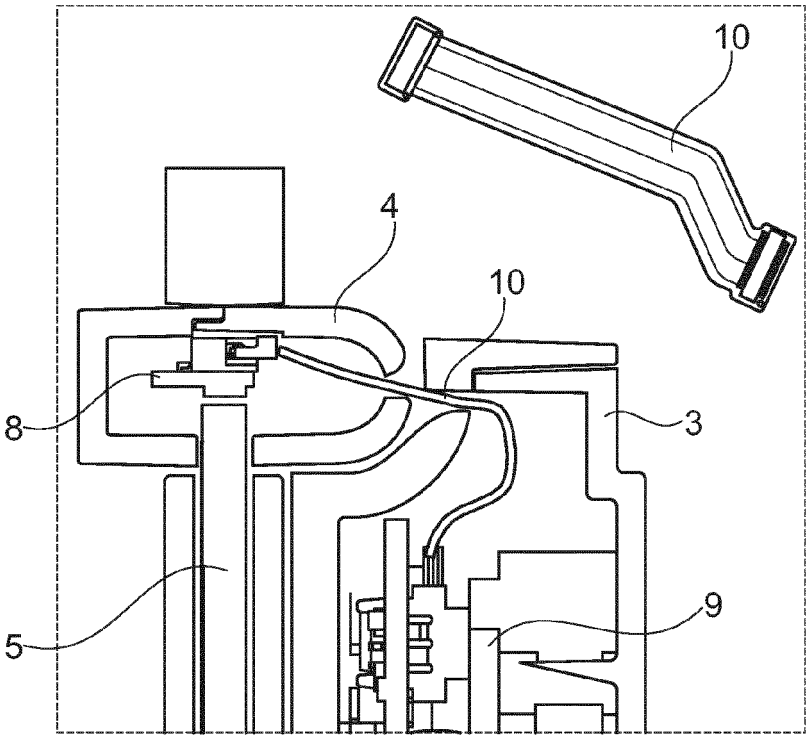


Fig. 5b

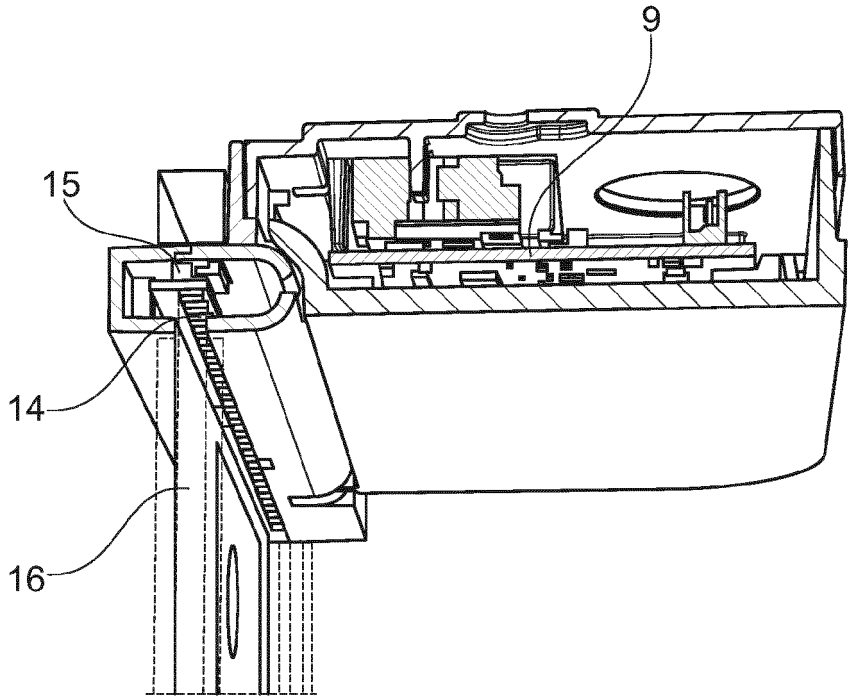


Fig. 6a

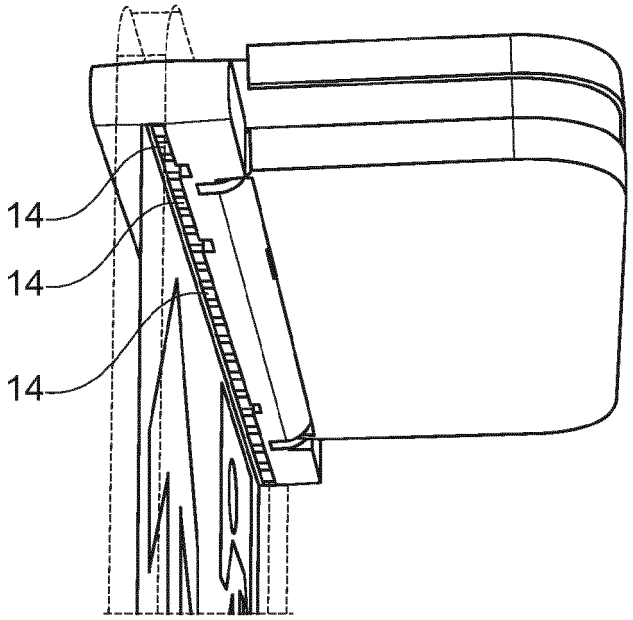


Fig. 6b

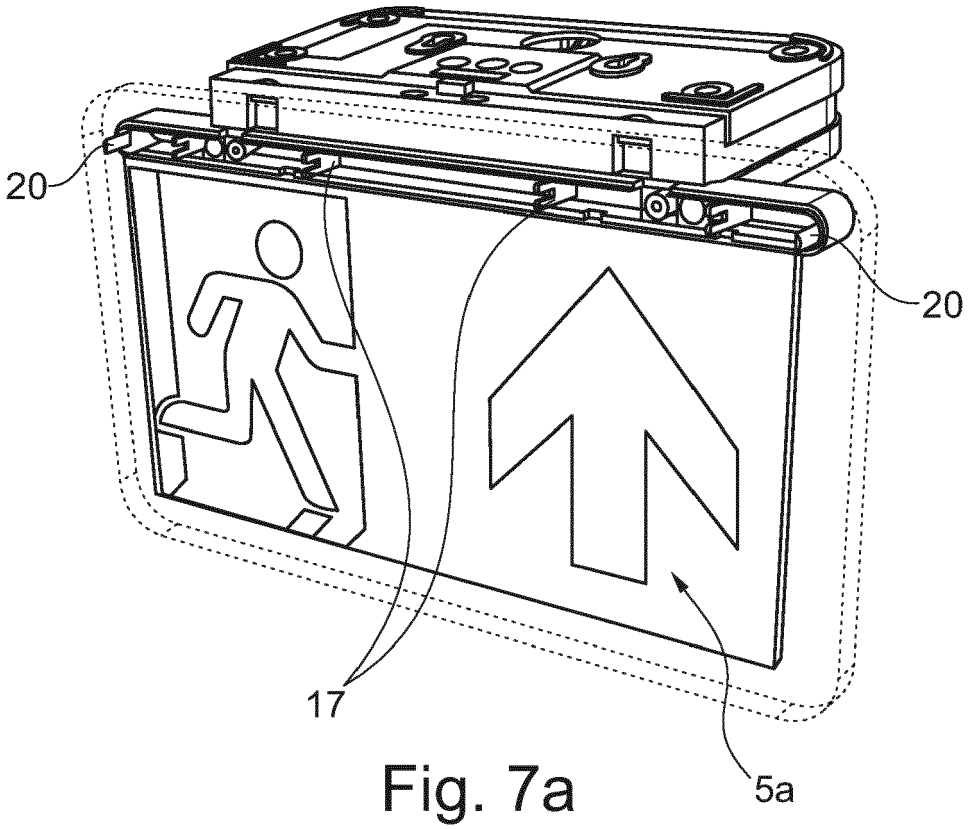


Fig. 7a

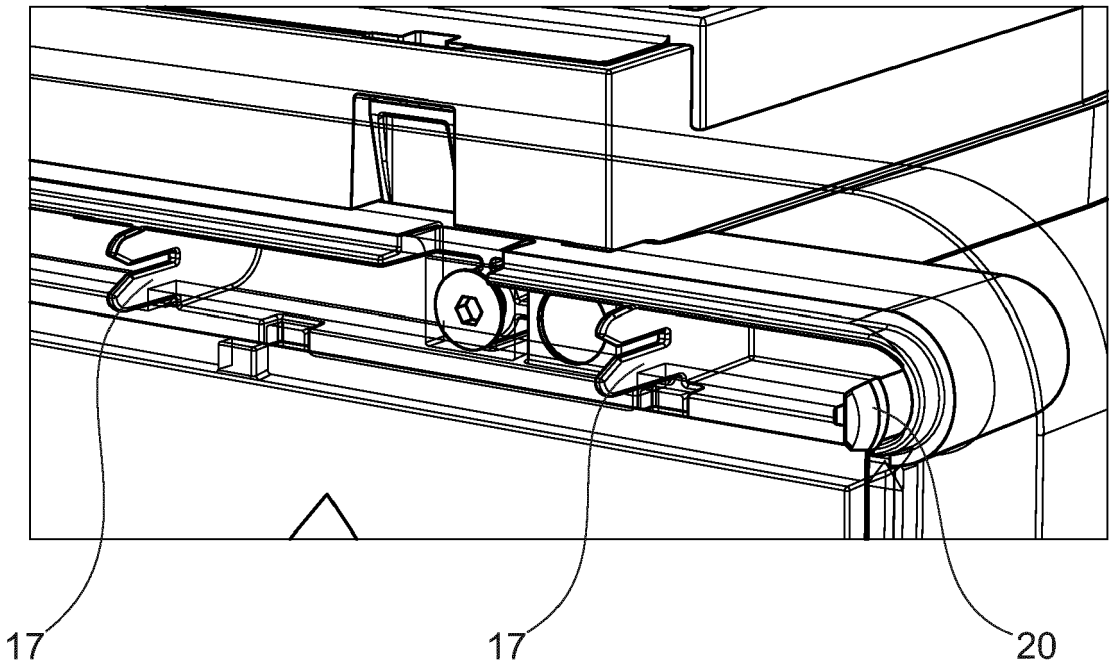


Fig. 7b

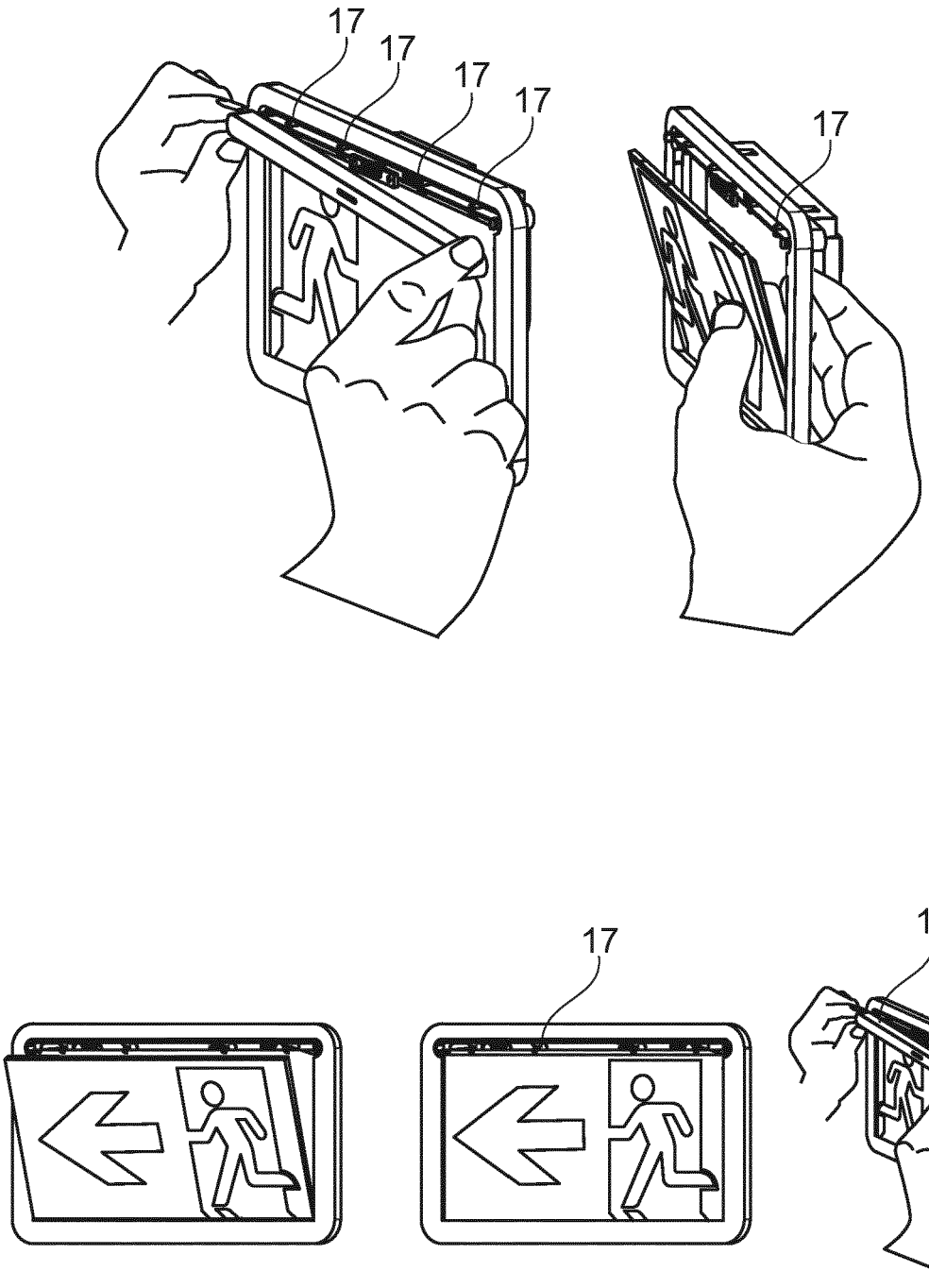


Fig. 7c

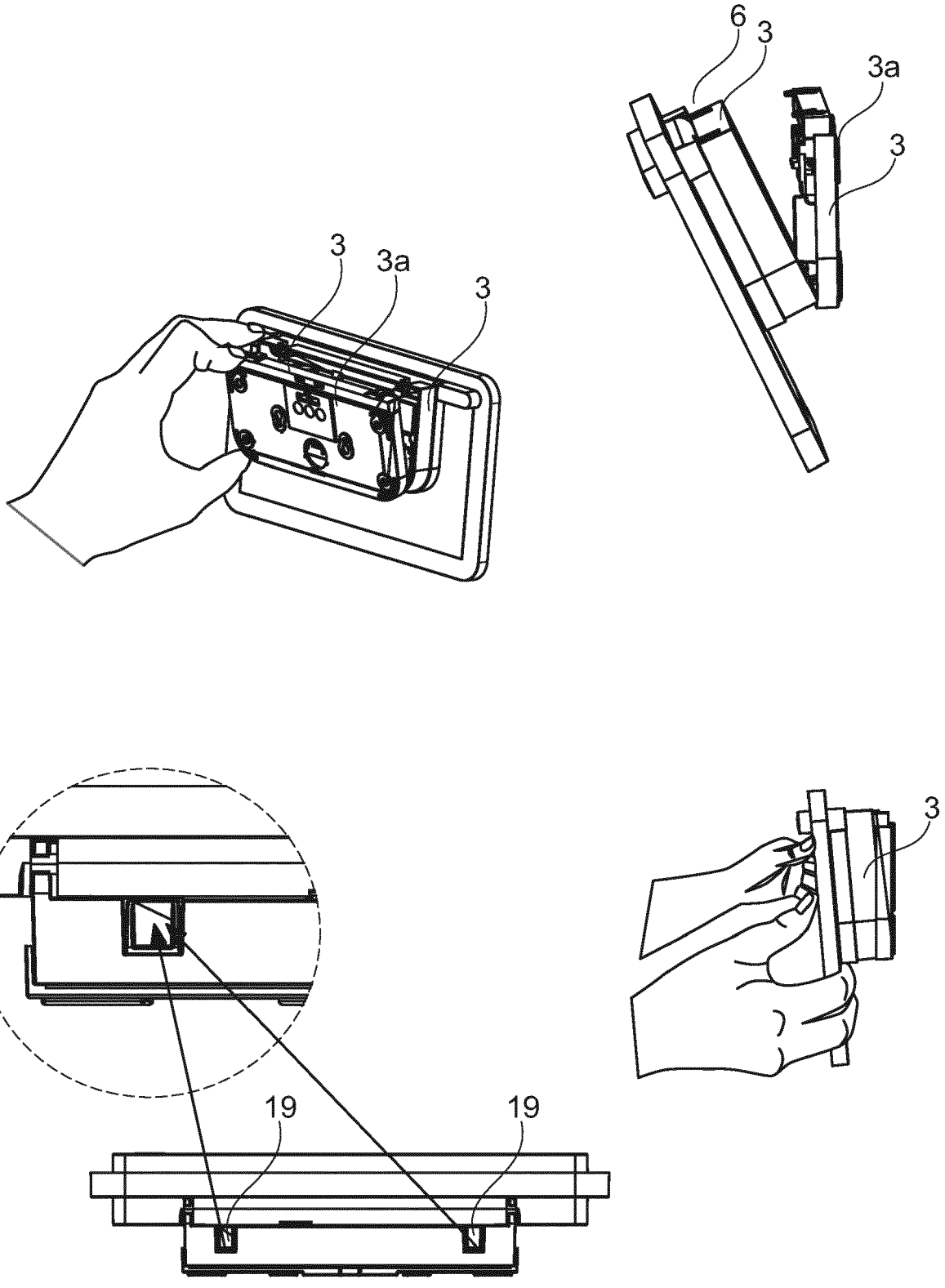


Fig. 8

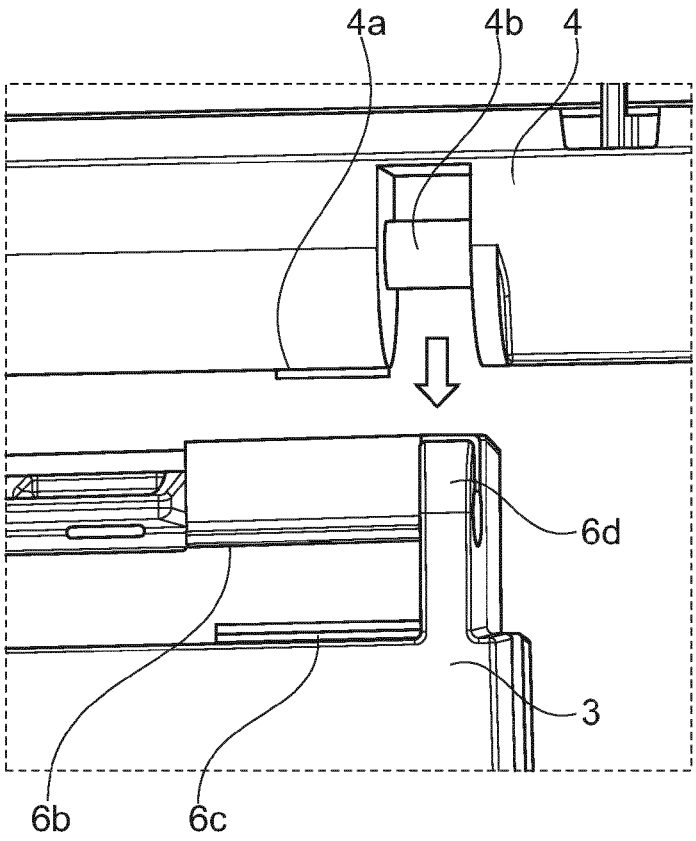


Fig. 9a

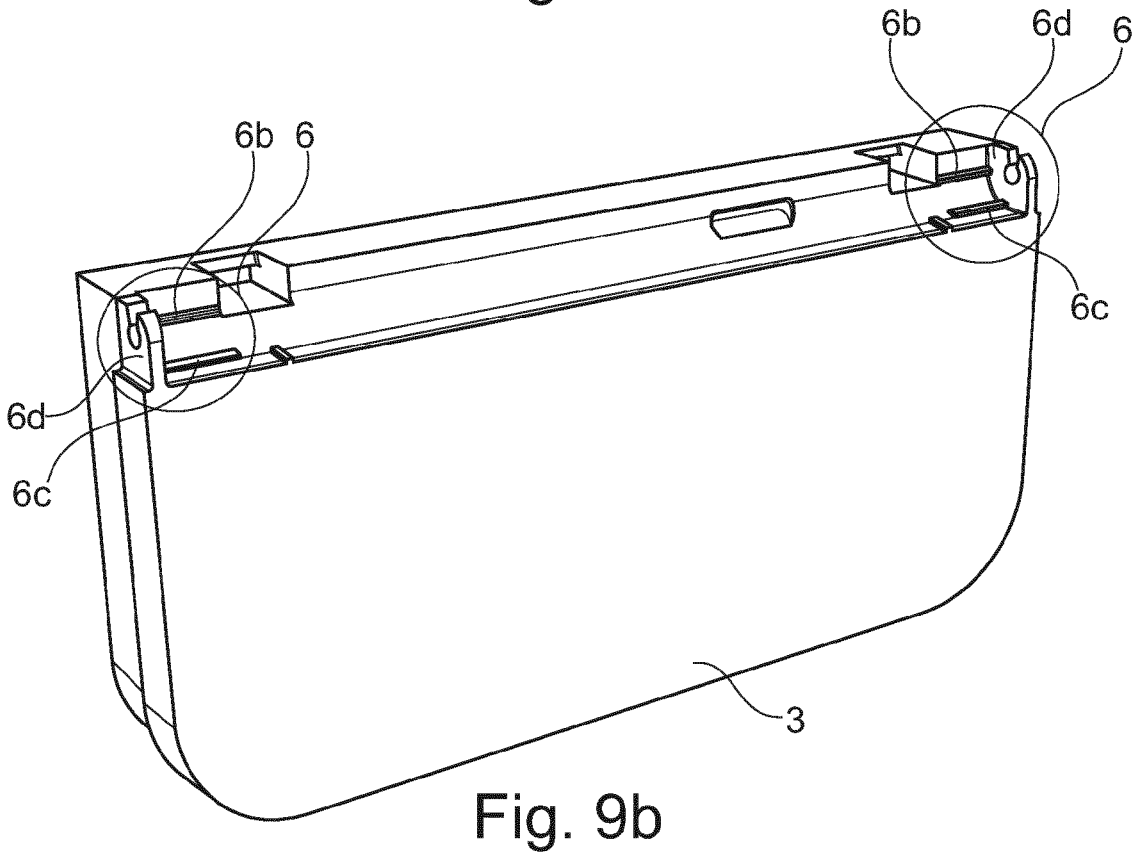
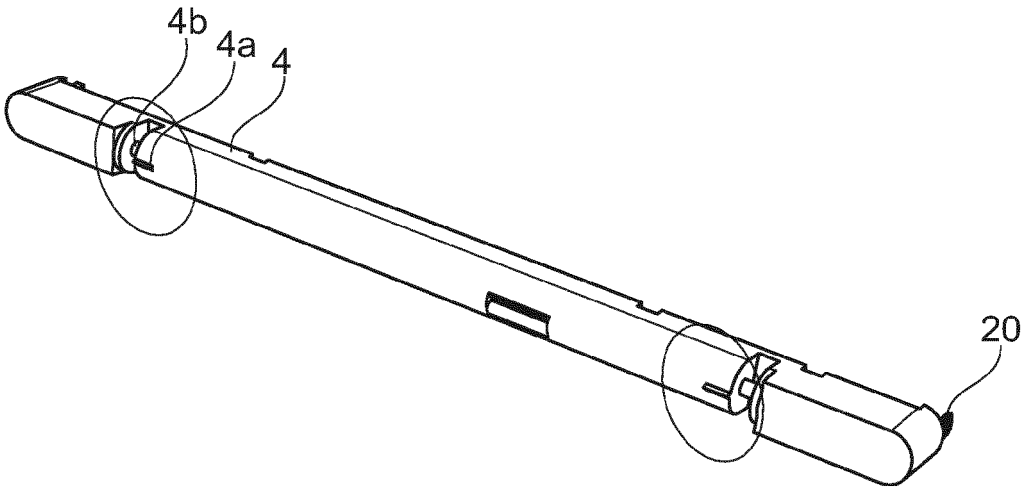


Fig. 9b



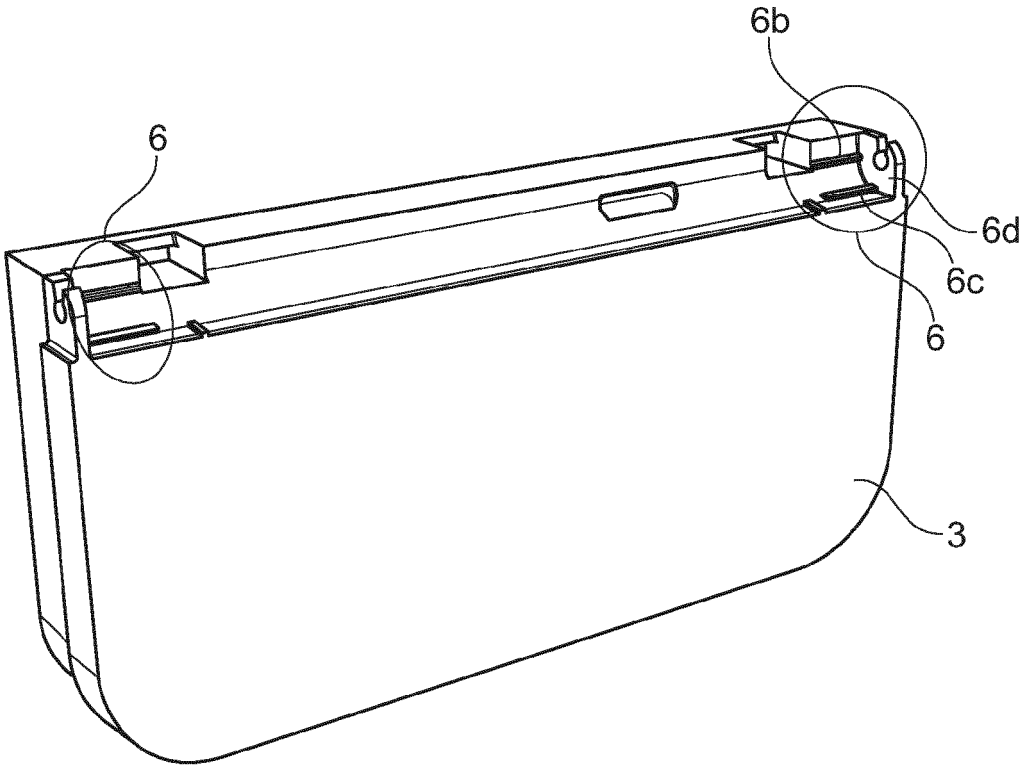


Fig. 9c

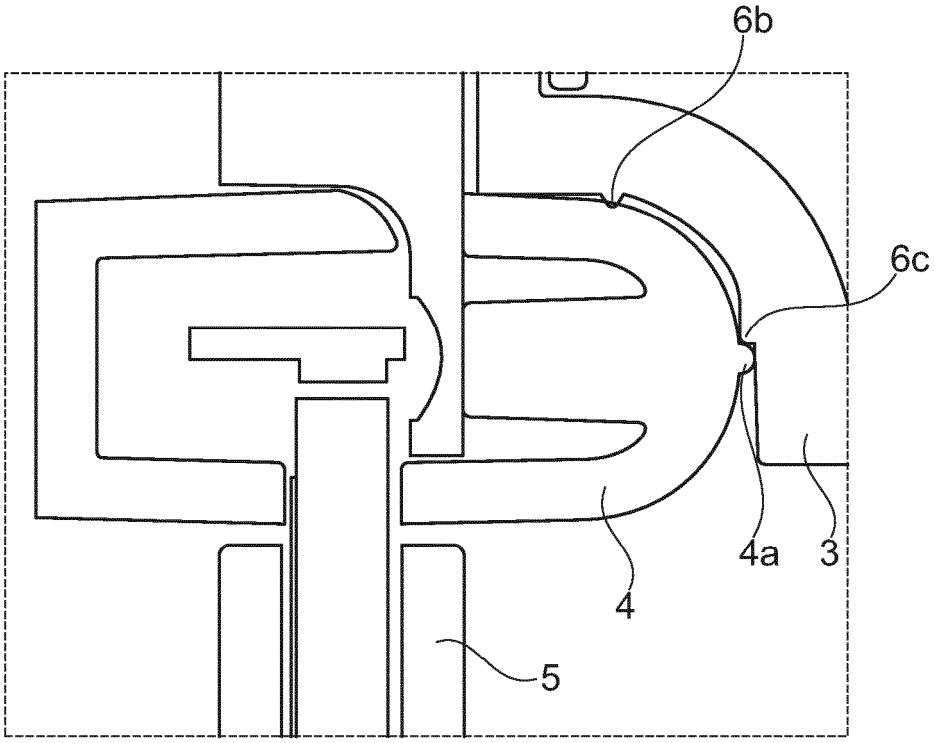


Fig. 9d

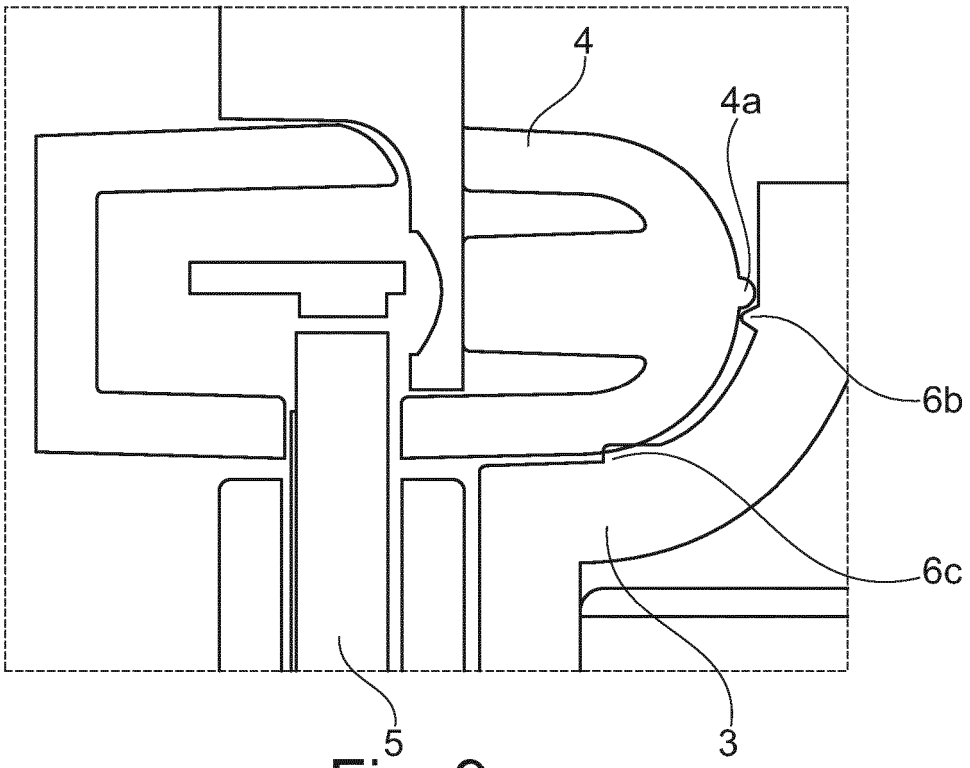


Fig. 9e

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EUROPEAN SEARCH REPORT

Application Number
EP 22 15 9180

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 765 659 A1 (COOPER TECHNOLOGIES CO [US]) 13 August 2014 (2014-08-13) * paragraph [0006] * * paragraph [0017] - paragraph [0029] * * paragraph [0033] - paragraph [0053] * * figures 1-11 *	1-15	INV. G09F13/04
X	US 8 998 440 B1 (WU COLIN [CN] ET AL) 7 April 2015 (2015-04-07) * column 3, line 9 - column 7, line 39 * * figures 1-7 *	1-5,8-15	
A	US 2010/107462 A1 (LEE SUNG-KEUN [CN]) 6 May 2010 (2010-05-06) * paragraph [0027] - paragraph [0032] * * figures 1-6 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			G09F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	5 August 2022	Pantoja Conde, Ana

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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L : document cited for other reasons

& : member of the same patent family, corresponding document

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 22 15 9180

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