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(71) Applicant: **Borovec, Josef**
17000 Praha (CZ)

(72) Inventor: **Borovec, Josef**
17000 Praha (CZ)

(74) Representative: **Bauer, Karel**
Uresova 1266/2
148 00 Praha 4 (CZ)

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(54) MEANS AND SYSTEM FOR ATTACHING OBJECTS TO A SUPPORT MEMBER AND METHOD OF TEMPORARILY CONNECTING THE MEANS TO THE SUPPORT MEMBER

(57) The invention relates to a device (1) for securing an object to a vertical panel (2). The device includes a first part (3) for detachably securing the device (1) to the panel (2) and a second part (4) for temporarily securing the object to the device (1). The first part (3) comprises upper (32) and lower (31) sections with cutouts (33, 34) for attachment to the panel. The lower section has three surfaces, the first (311) being planar, the second (312) perpendicular to the first and also planar, and the third (313) opposite the first surface with a concave curvature. The upper section has two surfaces, the first (321) being planar and the second (322) being convex and curving from the bottom edge of the first surface over the top edge of the first surface. The first surfaces of the upper and lower sections are in the same plane, with the distances at the narrowest points of the cutouts being less than the thickness of the vertical panel.

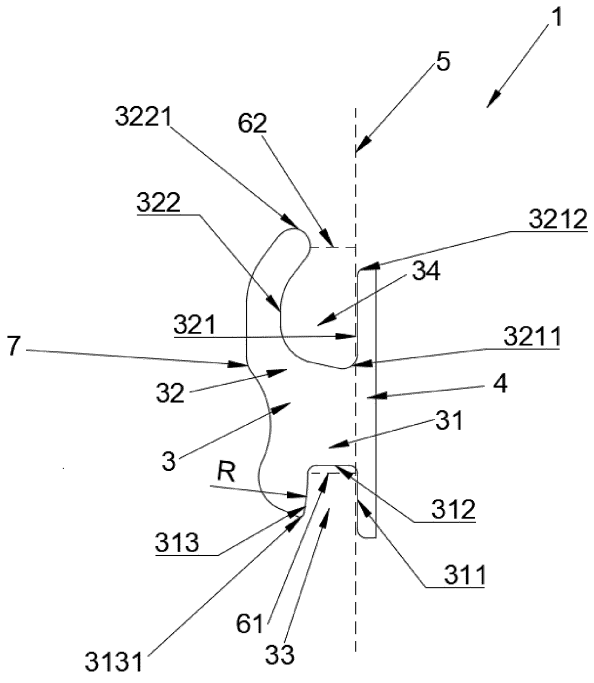

Fig. 1A

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Description

Technical field

[0001] The present invention relates to a means for hanging and/or holding objects, in particular household items such as outdoor clothing, shoes, household products and other consumer items, on a supporting element, in particular a vertical panel. More particularly, the present invention relates to the mechanical hanging of objects on a support member with openings.

[0002] In a further aspect, the present invention relates to a means for hanging and/or holding objects, in particular household items such as outdoor clothing, shoes, household products and other consumer items, on a support member and an assembly for hanging objects on the support member comprising a plurality of apertures for the means.

[0003] In another aspect, the present invention relates to a method of temporarily attaching a means according to the present invention to a support member.

Background art

[0004] In the case of a temporary mechanical connection of the device and the plate to the hole(s) in vertical systems, the principle of a hook in the shape of an inverted U and suspended in the hole is used. Such a connection is provided by the force given by the product of the weight of the device and the gravitational acceleration. The action of this force ensures the position of the device in the hole. To move the device vertically out of the desired position, it is sufficient to apply a force opposite to the above force and greater than the force holding the device in the hole, and for lateral displacement a force even less. This force may be very small and therefore unintentional, and may cause the coupling to disengage and therefore the hook to fall out of the hole.

[0005] In order to increase the force required for displacement, the use of various inverted-U shaped hooks is known to improve the connection by reducing the distance between the free ends of the hook so that their distance is less than the thickness of the plate on which the hook is suspended. This creates a force between the faces of the ends of the hook and the hook and the plate after mounting. These forces create a frictional force between the hole plate and the lower faces of the hook, which must be overcome for assembly and disassembly. However, this principle ensures that the force is applied on only one side of the mounting hole.

[0006] In non-vertical systems, various moving parts or latches are used to secure the mutual position of the connection of the two parts and prevent their unintentional displacement or disconnection.

[0007] The hooks are usually fixed with screws or adhesive layers, such as a permanent adhesive layer, which require additional technical means or brute force to remove, and the panel or wall is often damaged or has screw holes or unsightly residues of permanent adhesive. The damaged wall is thus unaesthetic and the remedy requires additional resources to restore the wall or panel to its original condition, if at all possible.

[0008] In the home, items such as outdoor clothing or outdoor shoes should be hung in a place that interferes as little as possible with the normal functioning of the home. However, as the seasons change, so does the amount of items that need to be kept on hand at all times. An example is the difference between winter and summer, where in winter it is desirable to hang many layers of clothing such as winter coat, sweatshirt, sweater, winter gloves in one particular place. In winter, it is also desirable to have winter skis on hand if the user is a ski enthusiast. On the other hand, in the summer it is desirable to have a lightweight top hung up, and a number of summer boots put away, preferably in the same place. The need for a means of hanging clothes or putting away boots or skis thus varies according to the season. It is therefore advisable to provide a universal system which can be easily and effortlessly modified according to the needs of the user.

[0009] In technical areas, e.g. car workshops or warehouses, there is a similar need for a universal system allowing tools, e.g. hammers, saws, drills, etc. to be handled or put away where they are needed. In warehouses it is also desirable to save as much space as possible, while the amount and form of the object(s) to be stored may change with time.

[0010] Thus, the technical problem which the present invention solves is to provide a technical solution for temporarily joining two elements so that their joining and disjoining requires a greater force and thus avoids unintentional disconnection of the joint, without the need to use moving parts or elements, using only the elasticity of the material used, the forces generated by the deformation of the material and the frictional forces generated by the action of these forces.

[0011] The present invention also addresses providing a means and system for holding and organizing various objects and/or tools, including, without limiting the list, those listed above; wherein the system is relatively inexpensive and easy to install and use. Another challenge addressed by the present invention is to provide a system that can be expanded as needed to accommodate a greater number and/or different types and/or forms of objects and/or tools.

Summary of the Invention

[0012] A first embodiment of the present invention provides a means for attaching an object to a support member as defined in claim 1. The means according to the present invention comprises a first part for removably attaching the means to the support member and a second part for temporarily attaching the object. The first part comprises a lower part and an upper part having cutouts for attaching the means to the support member. The

cutout of the lower part has three faces, the first of which is at least partially planar, the second of which is perpendicular to the first and is adapted to seat on the support member. Preferably it is at least partially planar. The third face is opposite the first face and its curvature is at least partially concave. The upper cutout has two faces, the first of which is at least partially planar and the second of which is curved and this curvature is convex. The first faces of the lower and upper parts lie in one plane. Alternatively, the interfaces between the support member and the first faces of the lower and upper means are flush. Prestressing is induced at the contact points between the middle and the support member.

[0013] By the term temporary attachment of an object to a means according to the present invention is meant, for example, the hanging of outer clothing such as a winter jacket, the hanging of outdoor shoes, the hanging of a ski or motorcycle helmet, the hanging of a saw, the hanging of a box, etc.

[0014] Thus, the preloaded device provides mechanical position locking and, in combination with the support member, provides a simple and easily adjustable system for holding the objects. The support member may, in a certain embodiment, be a vertical panel. In another embodiment, the support member may be a horizontal panel or a face fixed to a ceiling. In still other embodiments, the support member may represent a panel or face that is inclined.

[0015] According to the present invention, a preload is induced at the contact points of the means and the support member. This prestressing can be achieved by ensuring that the distance at the narrowest points between the first and third faces of the lower part of the means and/or the first and second faces of the upper part of the means is reasonably less than the thickness of the support member. This distance at the narrowest point may depend on the material. Preferably, a distance at the narrowest points between 90 % - 99 % of the thickness of the support member may be selected.

[0016] In a preferred embodiment of the means, the amount of curvature of the second face of the upper part varies along the edge of this face.

[0017] In a further preferred embodiment, the means further comprises a concave-convex-convex outer face extending from a lower part edge of a third face of the lower part of the means to an upper edge of a second face of the upper part of the means.

[0018] In another preferred embodiment of the means, the first part of the means further comprises a further lower part having the same geometry of the lower part.

[0019] In a further preferred embodiment of the means, the second face of the lower part is perpendicular to the first face of the lower part and is at least partially planar or is at least partially curved and is adapted to at least partially seat on the support member.

[0020] In a further preferred embodiment of the means, the lower part edge of the first face of the lower part of the means is below the lower part edge of the third face of the lower part of the means.

[0021] In another preferred embodiment of the means, the upper edge of the second face of the upper part of the means is above the upper edge of the first face of the upper part of the means.

[0022] In another preferred embodiment of the means, the second part comprises at least one projection for hanging an object, in particular an outer garment or a helmet.

[0023] In another preferred embodiment of the means, the second part of the means is a hollow prism with a hinged side, in particular a shoe rack.

[0024] In another preferred embodiment of the means, the second part of the means comprises at least one horizontal plane for positioning objects, preferably two horizontal planes with openings at the sides and an opening at the front.

[0025] In a further preferred embodiment of the means, the second part of the means is a hanging system for placing skis.

[0026] In a further preferred embodiment of the means, the second part of the means suitable for hanging clothes hangers comprises a protrusion on which recesses are provided for hanging the clothes hanger hook.

[0027] In a second embodiment of the present invention, a system for attaching an object to a support member is defined in claim 12.

[0028] The system according to the invention is suitable for attaching an object to a support member, in particular a vertical panel. The system comprises: a means for attaching the object and a support member comprising a plurality of holes. The means comprises two parts: a first part for removably attaching the means to the support member, and a second part for temporarily attaching the object to the means. The first part comprises a lower part and an upper part, both parts containing cutouts for removably attaching the object to the support member. The support member includes a plurality of apertures having a width corresponding to the thickness of the first part of the means. The means is removably insertable into the opening of the support member such that the first part of the means is disposed behind the rear face of the support member and the second part of the means extends forward of the front face of the support member. The second part is accessible to the user for holding the object. The second part may then be, for example, a hanger, a shoe rack, a shelf or any means for attaching an object to the support member.

[0029] The system according to the invention allows an object to be attached to a support member by means of a removable means, which can be easily attached to and removed from the support member, for example from a vertical panel, without disturbing the face thereof. Further, it allows the use of multiple means for attaching multiple objects to the same support member.

[0030] In a preferred embodiment, the support member is provided with a system for attaching the support member, in this embodiment the panel to the wall, where-

in the attachment comprises a pair of rails fixedly attached to the wall and an adjustable mechanism attached to the rear side of the support member. This attachment system allows the panel to be suspended from the guide rails, the tilt of the panel to be adjusted relative to the rails and the position of the panel to be subsequently fixed to the guide rails or rails.

[0031] In another preferred embodiment of the system, the vertical and/or horizontal offset of the holes on the support member is constant.

[0032] Another embodiment of the present invention provides a method of temporarily connecting a means for holding an object and a support member. This method comprises the steps: providing a support member having apertures; and providing a means having a first part for removably attaching the means to the support member; and a second part for temporarily attaching an object to the means; wherein the first part includes a lower part and an upper part, both parts including a cutout for removably attaching the means to the support member; and wherein the apparatus is mounted to the support panel to cause tensioning of the material of the upper part of the apparatus, and wherein a force (F) is applied at the contact point between the face of the upper part and the support member and a reaction force (F_R) is applied at the contact point between the first face of the upper part and the support member; and a force (F) is applied at the point of contact between a third face of the lower part and the support member, and a reaction force (F_R) is applied at the point of contact between the first face of the lower part and the support member, thereby arresting the means against rotation relative to the support member; and wherein the application of the force (F) and the reaction forces (F_R) induces a frictional force between the faces and the support member, thereby arresting the means against translational movement in the plane of the support member.

[0033] Another embodiment of the present invention provides a method of removing the means from the support member. This method is comprising the steps of: providing a system according to any of the preceding embodiments; wherein a force greater than the sum of the frictional forces between the faces and the support face is exerted, the direction of the force being in a direction from the lower part of the first part of the means to the top of the first part in the means; and sliding the lower part of the first part of the means out of the opening of the support member in front of the supporting wall; and then sliding the top of the first part of the means out of the opening of the support member in front of the supporting wall.

Short description of drawings

[0034]

FIG. 1A is an example embodiment of a clamping mechanism of a means to a support member according to the present invention.

FIG. 1B is an alternative example embodiment of a clamping mechanism of a means to a support member according to the present invention.

FIG. 1C is another alternative example embodiment of a clamping mechanism of a means to a support member according to the present invention.

Fig. 2 is an isometric front view of the preferred embodiment schematically shown in Fig. 1.

Fig. 3 is an isometric rear view of the preferred embodiment schematically shown in Fig. 1.

Fig. 4 is a side view of the first example embodiment with a second part, which is formed by two hooks, e.g. for hanging a coat.

Fig. 5 is an isometric view of a first example embodiment with a second part formed by two hooks.

Fig. 6 is a side view, sketch and isometric representation of another embodiment of a means particularly suitable for hanging a helmet.

Fig. 7 is another embodiment of a means according to the present invention suitable for hanging hangers.

FIG. 8 is a side view of a second embodiment of a clamping mechanism of a means to a support member according to the present invention, wherein the second embodiment comprises two lower parts of a first part of a means according to the invention.

FIG. 9 is an isometric schematic representation of a second embodiment of a clamping mechanism comprising two lower parts of a first part of a means according to the present invention.

Fig. 10 is a further embodiment of a means comprising a second embodiment of the clamping mechanism according to the present invention, wherein the means is particularly suitable for hanging skis.

FIG. 11 is a further embodiment of a means comprising a second embodiment of the clamping mechanism according to the present invention, the means being particularly suitable for placing small objects on a shelf.

Fig. 12 is a further embodiment of a means comprising a second embodiment of the clamping mechanism according to the present invention, wherein the means is particularly suitable for storing shoes.

FIG. 13 is a schematic representation of a system according to the present invention comprising means according to the present invention and a support member attached to a wall.

Fig. 14 is a detailed schematic drawing of A of Fig. 13.

Fig. 15 is a detailed schematic drawing of B of Fig. 13.

FIG. 16 is a schematic sketch, isometric view and detail of a system according to the present invention.

FIG. 17 is a sketch and side view of a system according to the present invention, the detail focusing on the attachment mechanisms for securing the support member to the wall.

Fig. 18 shows detail A and B of the gripping system of Fig. 17.

FIG. 19 is an isometric view of a system according to the invention, showing details C and D of the attachment device clamping the support member to the wall.

Fig. 20 schematically shows a detail of the gripping device at the top of the panel, specifically detail C of Fig. 19.

Fig. 21 schematically shows a detail of the gripping device at the top of the panel, specifically detail D in Fig. 19.

FIGS. 22A and 22B schematically show a detail of the distribution of forces in a method of temporarily connecting a means and a support member according to the present invention.

Detailed description

[0035] The present invention is described in this section with reference to the accompanying drawings. However, the scope of protection is determined by the patent claims. The following description represents only certain preferred embodiments which may be modified by one skilled in the art at his discretion and/or needs.

[0036] The terminology here, particularly the references to "means" and "system", etc. in the claims should be broadly construed to mean "any structure meeting the characteristics of a claim".

[0037] Further, one skilled in the art will be able to construct other preferred embodiments after reading this description of the present invention. However, the applicant is requesting the scope of protection defined in the independent patent claims. Protection is also sought for preferred embodiments not explicitly disclosed in this disclosure which will be obvious to those skilled in the art, or further variations and modifications or obvious alternatives thereof. Such variations and modifications may include equivalent and additional features already known in the art which may be used in place of or in addition to the features already described herein.

[0038] References to "preferred embodiments", "embodiments", "exemplary embodiments", "various embodiments", "certain embodiments", "embodiments of the invention", etc. may indicate that the embodiments of the invention so described may include a particular technical feature, structure or characteristic, but not every possible embodiment of the invention necessarily includes a particular preferred technical feature, structure or characteristic.

[0039] References to "user" or any similar term as used herein may mean a consumer of the invention or another user. In addition, "user" or any similar term as used herein, unless otherwise expressly stated, means a user at any stage of the process of use, including, without limitation, direct user(s), intermediate user(s), indirect users, and end users. The meaning of "user" or any similar term as used herein should not otherwise be inferred from any exemplary description, embodiments, examples, or the prior art references that may (or may not) be provided in this disclosure. Accordingly, a user may be an individual using the invention for object deposition, or even a business using the means and system for object deposition, or a large storage facility using the means and system for storing objects for an extended period of time.

[0040] The term "comprising" or which is synonymous with "including", "containing" or "characterized" is inclusive or open-ended and does not exclude other, unstated technical features of the means or system according to the present invention. "Containing" is a term used in the language of patent claims that should be interpreted to mean that the named elements of the claim are essential, but additional technical features of the claim may be added that still constitute a structure within the scope of the claim.

[0041] **Fig. 1a** shows one possible example of an embodiment of the present invention, which for simplicity is schematically illustrated without the second part **4,** which serves for attaching the object to the support member, which in the following examples of embodiments represents the vertical panel **2. Fig. 1a** thus shows in particular schematically a clamping mechanism for attaching the means to the vertical panel **2.** In accordance with the present invention, a means **1** for attaching an object to the vertical panel **2** has been formed, comprising: a first part **3** for removably attaching the means **1** to the vertical panel **2,** comprising a lower part **31** and an upper part **32.** Both parts comprise cutouts **33** and **34** for removably attaching the means **1** to the vertical panel **2.** The second part **4** is for temporarily attaching the object to the means **1.** The temporary attachment may be, for example, hanging an outdoor coat behind a coat rack, which embodies an example of the second part **4** of the means **1,** or a shoe rack for storing shoes. Examples of

embodiments of these second parts are given below.

[0042] The cutout **33** of the lower part **31** has three faces **311, 312** and **313.** The first face **311** of the lower part **31** is planar, the second face **312,** which is perpendicular to the first face **311** of the lower part **31,** is planar and the third face **313** of the lower part **31,** which is opposite the first face **311** of the lower part **31,** is curved such that the curvature **R** is concave. The concave curvature **R** of the third face **313** of the lower part **31** has a technical function to provide flexible attachment of the vertical panel **2** to the means **1.** During the installation of the means **1** to the vertical panel **2,** one face of the vertical panel **2** slides over the curved third face **313** until it reaches the second face **312** of the lower part **31.** The cutout **34** of the upper part **32** has two faces **321** and **322.** The first face **321 of** the upper part **32** is planar and the second face **322** of the upper part **32** is curved and runs from the lower edge **3211** of the first face **321** of the upper part **32** over the upper edge **3212** of the first face **321 of** the upper part **32.** The curvature of the second face **322** of the upper part **32** is convex. Additionally, the curvature of the second face **322** may be different from the curvature **R** of the third face **313** of the lower part **31.** Preferably, the curvature of the second face **322** of the upper part **32** varies. The first face **311** of the lower part **31** and the first face **321** of the upper part **32 of** the means **1** lie in the same plane. Both faces **311** and **321** are planar so that they can be supported by the vertical panel **2.** One edge of the vertical wall **2** is schematically indicated in **Fig. 1** by the dashed line **5. Fig. 4** then shows the entire vertical panel **2,** specifically its thickness is indicated by two dashed parallel lines. From **Fig. 4,** it can then be seen that the means **1** is wedged in the opening of the vertical panel **2,** the means **1** being firmly fixed at the narrowest point **61** in the lower part **31** of the first part of the means **1** and at the narrowest point **62** in the upper part **32** of the first part **3** of the means **1.** At these narrowest points **61** and **62** of the first part **3** of the means **1,** the means **1** is then securely and removably, attached to the vertical panel **2.** The distances at the narrowest points of the cutouts of the lower part and top parts are less than the thickness of the vertical panel **2.** By this mechanism, the means **1** is locked to the vertical wall **2.**

[0043] The embodiment in **Fig. 1b** differs from the embodiment in **Fig. 1a** only in that the first face **311** of the lower part **31** of the means **1** and the first face **321** of the lower part **31** of the means **1** are not completely planar, but only partially so. It can be seen from **Fig. 1b** that these first faces **311** and **321** are partially convex. The interfaces between the means **1** and the support member lie in one plane. These contact points are characterised by pre-stressing after fixing the means **1** to the support member. This prestressing is achieved, for example, by a smaller distance at the narrowest points between the first face **321** and the contact point **3221.** This distance is indicated by the horizontal dashed line in **Figs. 1a** and **1b.** Smaller distances between the contact points in the lower part, namely between the contact point on the first face **311** and the contact point on the third face **313** in the lower part **31,** may also be selected preferably depending on the material, e.g. the elastic modulus of the material. In a certain embodiment, the distance at the narrowest point may be selected between 90 % - 99 % of the thickness of the vertical wall **2. Fig. 1C** shows a further alternative embodiment, which comprises a second face **312** of the lower part **31** which is curved and is adapted to engage the support member by means of a contact face.

[0044] **Figs. 2** and **3** represent the above preferred embodiment without a more detailed view of the second part **4.** The area of the second part **4** is only schematically illustrated, with various protrusions, or storage spaces, etc., adjoining this area. From the following example embodiments, it will further be apparent how to implement the second part **4** to the present means **1.**

[0045] **Fig. 2** is a schematic isometric view of a part of the means **1** according to the present invention. **Fig. 2** shows a first part **3** of the means **1.** The first part further comprises a lower part **31** and an upper part **32.** The lower part **31** of the means **1** is provided with a cutout **33** in the lower part **31.** The upper part **32** is also provided with a cutout **34.** The cutout **33** comprises faces, wherein the first face **311** is planar and is disposed on the same plane as the first face **321** of the upper part **32** so that the vertical panel **2** closely abuts these faces. The second face **322** of the upper part **32** of the first part **3** of the means **1** is curved.

[0046] The curvature of the second face **322** of the upper part **32** of the first part **3** of the means **1** and the third face of the lower part **31** of the first part of the means **1** is more apparent in **Fig. 3.** The curvature of the second face **322** of the upper part **32** of the first part **3** of the means **1** may comprise a plurality of faces of different curvatures, as can be seen in the drawing of **Fig. 3,** wherein the faces of different curvatures are shown by separate lines on the second face **322.**

[0047] The isometric view in **Fig. 2** further shows the concave-convex-concave curvature of the outer face **7** of the first part **3** of the means **1.** The outer face **7** comprises a lower part having a first concave curvature **71,** which is followed by a part having a convex curvature **72,** which is followed by an upper part having a second concave curvature **73** of the outer face **7.** This overall curvature allows the means **1,** for example a hook, to be inserted and suspended from the vertical panel **2** positioned close to the supporting wall **21** without causing a collision between the hook and the supporting wall **21,** in particular the lower part having the first concave curvature **71,** or the first part **3** of the means **1** and the vertical panel **2** and the lower edge of the opening into which the first part **3** of the means **1** is inserted, more particularly the convex part **72** and the second concave part **73.** Due to this geometry, it is possible to have a relatively long overlap of the upper and lower parts of the means **1** and at the same time a small distance of the panel from the supporting wall **21,** the whole means being designed so that the supporting wall is offset from the vertical panel, for example at a

distance of from 10 to 20 mm, in particular from 12 to 18 mm, preferably from 14 to 16 mm, and at the same time to be able to securely and conveniently fix the means **1.**

[0048] **Fig. 4** shows a first exemplary embodiment of the means **1** with a second part **4.** The insertion mechanism of the first part **3** of the means **1** into the vertical wall **2** is identical to the exemplary embodiment of **Fig.s 1-3,** the second part being formed by two protrusions **41** and **42.** In another preferred embodiment, the second part **4** of the means **1** may be provided with only one protrusion **41** or **42.** In a further embodiment, the second part **4 of** the means **1** may be provided with more protrusions.

[0049] **Fig. 5** is a schematic drawing of an isometric representation of a first exemplary embodiment of the means **1** according to the present invention. The means **1** comprises a first part **3** and a second part **4.** The first part **3** is provided with a fastening so that the means **1** can be easily removed from the vertical wall **2.** The first part **3** has a lower part **31** and an upper part **32** as described above and an outer face **7.** The outer face **7** is curved, with the first concave curvature **71** continuing to the cutout **33** in the lower part **31.** The first concave curvature **71** of the face further continues to the convex curvature **72,** which continues to the second concave curvature **73** of the outer face **7.** The first concave curvature **71** is in the lower part **31** of the means **1,** while the second concave curvature **73** is in the top part **32.** The convex curvature **72** is located at the interface between the lower part **31** and the upper part **32.** The second part **4** is provided with protrusions **41** and **42.**

[0050] **Fig. 6** is an isometric representation, sketch and side view of another exemplary embodiment of the means **1** for suspending an object. Preferably, the object is a helmet. The means **1** comprises a first part **3** comprising a lower and upper part **31** and **32.** The first part **3** is described in more detail above. The second part **4** comprises a stand **43** suitable for holding a helmet. The stand **43** includes an opening **431** for hanging a strap. The stand **4** is provided at one end with a face **432** for removing the helmet behind the inner side of the helmet. The face **432** comprises openings **4321** for allowing air to enter the part of the helmet above the face **432,** thereby contributing to its ventilation.

[0051] **Fig. 7** is another example embodiment of the means **1** according to the present invention. The means comprises a first part **3** and a second part **4.** The second part comprises a protrusion **45** which is perpendicular to the vertical panel **2.** The protrusion **45** is provided with recesses **451** and protrusions **452** for hanging a hook, such as a clothes hanger hook.

[0052] **Fig. 8** is a second embodiment of the first part **3 of** the means **1,** by which the means **1** is arrested to the vertical face **2.** The second preferred embodiment of the clamping system further comprises a lower part **31** which is offset from the lower part **31.** The second lower part **31** is offset, the offset itself corresponding to the distance between the apertures **22** in the vertical panel **2.** The geometry of the second lower part **31** is identical to the geometry of the lower part **31** of the means **1** as shown above. The only difference is the outer face on the second lower part, which is only concave and terminates to an imaginary plane **5** defined by the first face **311** of the lower part **31** and the first face **321** of the upper part **32.**

[0053] **Fig. 9** shows a second embodiment of the first part **3** of the means **1** in an isometric view. **Fig. 9** also shows the offset of the second lower part **31** from the first lower part **31.**

[0054] **Fig. 10** is a further embodiment of the means **1** with a preferred embodiment of a gripping first part **3** comprising an upper part **32** and two lower parts **31.** Preferably, therefore, the means is provided with the two first and second parts **3** and **4** spaced apart at a distance corresponding to the spacing of the apertures **22** in the vertical panel **2.** The thickness, which is shown in the middle view, corresponds to the thickness of the aperture **22** of the vertical panel **2.** Each of the second parts is provided with apertures **441** in the rack for storing/retracting poles or for hanging, for example, a ski jacket hanger. The second part **4** of the embodiment of the present means **1** further comprises side cutouts **442** for storing one pair of skis, wherein the second part **4** of the means **1** is sized for downhill skis and is designed to allow each pair of skis to be removed separately and to avoid collisions between the bindings of the two pairs of skis when they are stored. The second part **4** of the means **1** further comprises a single longitudinal cutout **443** for storing a snowboard. The lower part of the second part **4** of the means **1** further comprises lower cutouts **444** for hanging accessories/clothing to the skis, for example hanging helmets, gloves, goggles, or clothing hangers.

[0055] **Fig. 11** is a side view, sketch and isometric representation of another example implementation. **Fig. 11** illustrates another exemplary embodiment of the invention comprising a second embodiment of the attachment of the first part **3** of the means **1,** the first part comprising an upper part **32** and two lower parts **31.** The second part in this case is a hollow prism **46** to which a hinged side **461** is attached on the opposite side. Also in this embodiment, the entire means **1** is provided with two identical first parts **3,** the offset between the two parts being determined by the offset of the apertures **22** in the vertical panel **2.** This embodiment can preferably be used as a shoe rack.

[0056] **Fig. 12** is another exemplary implementation of means **1.** This figure again shows a side view, a sketch and two isometric representations of the same means **1.** The means **1** comprises two first parts **3,** each having an upper part **32** and two lower parts **31** which are offset from each other. There is a further offset between the first parts which corresponds to the distance between the apertures **22** in the vertical panel **2.** The second part may comprise only one horizontal plane **462** or **463** for storing an object, or as shown in this example two horizontal planes **462** and **463** which are joined together to form a shelf. Fig. **12** also shows the thicknesses of the first parts **3** of the means **1,** which correspond to the thicknesses of the

apertures **22** of the vertical panel **2.**

[0057] **Fig. 13** is a system for attaching an object to a vertical panel **2.** The vertical panel **2** is attached to a wall **21,** wherein the vertical panel **2 is** mounted in its apertures **22** by various means **1** according to the above exemplary embodiments. From **Fig. 13** and from the details A and B shown in **Figs 14** and **15,** it can be seen that the first parts **3** of the means **1** are located behind the vertical panel **2,** being arrested to this vertical panel **2** due to the above geometry. The means can be removed at any time from the apertures **22** and inserted into any other unoccupied apertures **22** of the vertical panel **2.** Hence the technical effect of the removability of the entire means **1.**

[0058] **Fig. 16,** which is an isometric representation of the above system, shows the arrangement of the vertical panel **2** and the apertures **22** in the vertical panel **2** for accommodating the means **1.** A more detailed representation of **Fig. 16** then shows the panel being fitted with the means **1** having hooks, the means **1** for attaching the helmet, the means **1** for attaching the skis, the means **1** having a technical function as a shelf, and the means **1** for attaching the hooks to the hangers. The means **1** having the technical function of a shoe rack is then shown below.

[0059] **Fig. 17** shows the same system from a sketch and side view of the above system. Preferably, the apertures **22** in the indicated vertical and horizontal series are mutually constant offset for universally mounting the means **1** according to the invention to any location on the vertical panel **2.** The constant offset provides a particular advantage for the means **1** comprising at least two first parts **3** and/or the first part **1** comprising two lower parts **31.** Such a combination of openings in the vertical panel **2** together with the same indentation of the above means, in addition to allowing a wide range of adjustment, position and height level of said additional means, achieves further significant practical advantages for the system in that different means can be used as required and in any location on the vertical panel **2.** For example, standard hangers and/or racks for clothes can be used in the winter time, whereas in the summer time more storage space for shoes is required. This effect is achieved without the need for special installation work or dismantling the entire vertical panel using other technical means such as a screwdriver. If a modification in the layout of the means **1** on the vertical panel **2** is required, it is only necessary to remove this particular means **1** from the vertical panel **2,** which itself is simple to manufacture and install.

[0060] **FIG. 18** shows a more detailed view of the clamping system of the vertical panel **2** to the wall **21.** The vertical panel **2** is provided with an upper attachment **23** and a lower attachment **24.**

[0061] **FIGS. 19** to **21** then show an overall view and details showing a moving mechanism comprising a rail fixedly attached to the wall and a movable mechanism attached to the vertical panel **2.** In a certain embodiment, the movable mechanism may comprise a guide rail or a rail. The method of mounting the vertical panel **2** to the wall is known to the general public. In the simplest case, by means of clips, screws, holes in the wall and in the vertical panel and any brackets. A more sophisticated method of installation involving a sliding belt or rails is also known to those skilled in the art and requires no detailed description herein.

[0062] The method of installation of the means **1** itself into the vertical panel can also be seen from the attached drawings. In a first step, the user selects the appropriate means **1** to be placed on the vertical panel **2.** In a second step, the free opening **21** in the vertical panel **1** is found, or the number of required openings **21** with a specific offset, according to the number of required openings of the means **1.** The number of required holes **21** in the vertical panel **2** corresponds to the number of first parts **3** of the means **1,** or the number of upper parts **32** and adjacent lower parts **31** with the lower parts **31** offset. For example, the shoe rack shown in **Fig. 11** requires four holes **22** in the vertical panel **2,** two holes being required for the upper part **32** and the first lower part **31** and the second hole being for the second lower part **31.** In a third step, the upper part **31 of** the first part **3 of** the means **1** is first inserted into the selected hole **21.** From here, the upper part **32** of the first part **3** of the means **1** is brought behind the vertical panel **2,** thus substantially into the area between the wall **21** and the vertical panel **2.** In a fourth step, the means with the upper part **32** is moved upwards so that the second face **322** of the upper part **32** is brought to the ceiling of the opening, thus creating enough space for the insertion of the lower part **31,** or lower parts **31,** into the remaining space in the opening **21.** The means **1** is then wedged against the lower face **22** of the opening of the vertical panel **2** and the second face **312** of the lower part **31** of the first part **3** of the means **1.** The concave curvature **R of the** third face **313** of the lower part **31** and the convex curvature of the second face **322 of** the upper part **32** provide smooth movements during locking. Thus, no brute force is required. Further, arrestment is provided by the structure of the first part **3** of the means **1** at the narrowest points **61** and **62.** During disassembly, the opposite procedure is then chosen.

[0063] **Fig. 22a** illustrates a method of temporarily connecting the means **1** and the vertical panel **2** with a force distribution. This example embodiment may also be used to describe in detail the disassembly method according to the present invention. Specifically, Fig. **22** shows the means **1** attached to the vertical panel **2,** which is indicated by dashed lines for clarity. The means **1** is mounted to the vertical panel **2** in such a way as to induce tensioning of the material of the upper part **32** of the means **1.** The force **F** acts at the point of contact between the face **323** of the upper part **32** and the vertical panel **2,** and the reaction force $\mathbf{F_R}$ acts at the point of contact between the first face **321** of the upper part **32** and the vertical panel **2.** The force **F** also acts at the point of contact between the third face **313** of the lower part **31** and the vertical panel **2,** and the reaction force $\mathbf{F_R}$ acts at

the point of contact between the first face **311** of the lower part **31** and the vertical panel **2.** The forces **F** and the reaction force $\mathbf{F_R}$ cause a frictional force between the faces **323, 3212, 311, 313** and the vertical panel **2.**

[0064] **Fig. 22b** illustrates the same method for a method of temporarily connecting the means **1** and the vertical panel **2** with a distribution of forces, except for the representation of the first faces **311** and **321,** which are planar is partially. It can be seen from **Fig. 22b** that the contact points on the first faces **311** and **321** between the means **1** and the support member **2** are planar.

[0065] The method of disassembling the system according to the above embodiments comprises exerting a force greater than the sum of the frictional forces between the faces **323, 3212, 311, 313 of** the vertical panel **2.** The direction of this force is in the direction from the lower part **31** of the first part **3 of** the means **1** to the upper part **32 of the** first part **3** in the means **1.** Subsequently, the lower part **31** of the first part **3 of** the means **1** is slid out of the opening **22 of** the vertical panel **2** in front of this vertical panel **2.** Subsequently, the upper part **32** of the first part **3 of** the middle **1** is slid out of the opening **22 of** the vertical panel **2** in front of this vertical panel **2.**

List of reference marks

[0066]

1 means for attachment
2 vertical panel
- 21 wall
- 22 holes in the vertical panel
- 23 upper mounting of vertical panel 2 to the wall
- 24 lower part mounting of vertical panel 2 to the wall

3 first part for removable attachment of the device 1
- 31 lower part of the first part 3
- 311 first face of the lower part 31
- 312 second face of the lower part 31
- 313 third face of the lower part 31
- 3131 lower edge of the third face 313
- 32 upper part of the first part 3
- 321 first face of the upper part 32
- 3211 lower edge of the first face 321
- 3212 upper edge of the first face 321
- 322 second face of the upper part of 32
- 3221 upper edge of the second area 322
- 323 area in contact with vertical panel
- 33 cutout of the lower part 31
- 34 cutout of the upper part 32

4 second part for removable attachment of the device 1
- 41 first protrusion of the second part 4
- 42 second protrusion of the second part 4
- 43 helmet stand
- 431 hole in helmet stand 43
- 432 helmet storage area
- 4321 holes in the helmet removal area
- 44 Hanging system for placing skis
- 441 hole in the rack 44
- 442 side cutouts in the suspension system 44
- 443 longitudinal cutout in the suspension system 44
- 444 lower part cutouts in the suspension system 44
- 45 protrusion
- 451 deepening of the protrusion 45
- 452 protrusion on protrusion 45
- 46 hollow prism
- 461 tip side of hollow prism 46
- 462 first horizontal plane
- 463 second horizontal plane

5 plane
61 distance at the narrowest points of the lower part cutouts 31
62 distance at the narrowest points of the upper cutouts 32
7 exterior area of the first part 3
- 71 first concave curvature
- 72 convex curvature
- 73 second concave curvature

Claims

1. A means (1) for attaching an object to a support member comprising:

- a first part (3) for removable attachment of the device (1) to the support member; and
- a second part (4) for the temporary attachment of the object to the means (1); wherein

- a first part (3) comprising a lower and upper part (31 and 32), wherein both parts (31 and 32) include a cutout (33 and 34) for removably attaching the means (1) to the support member; and wherein
- the cutout (33) of the lower part (31) has three faces, wherein the first face (311) of the lower part (31) is at least partially planar, the second face (312) of the lower part (31) is adapted to seat on the support member, and the third face (313) of the lower part (31) opposite the first face (311) of the lower part (31) is curved such that the curvature (R) is at least partially concave; and wherein
- the cutout (34) of the upper part (32) has two faces, wherein the first face (321) of the upper part (32) is at least partially planar and the second face (322) of the upper part (32) is curved and extends from the lower part edge (3211) of the first face (321) of the upper part (32) above the top edge (3212) of the first face (321) of the upper part (32), and wherein the curvature of the second face (322) of the upper part (32) is convex; and wherein

- the first faces (311 and 321) of the lower and upper parts (31 and 32) of the means (1) lie at least partly in one plane (5), or the contact points on the first faces (311 and 321) of the lower and upper parts (31 and 32) of the means (1) with the support member lie in one plane (5), and
- prestressing is induced at the contact points of the means and the supporting element.

2. The means (1) according to claim 1, wherein the curvature of the second face (322) of the upper part (32) is varied along an edge of said face.

3. The means (1) according to any one of the preceding claims further comprising a concave-convex-convex outer face (7) extending from a lower edge (3131) of a third face (313) of the lower part (31) of the means (1) to an upper edge (3221) of a second face (322) of the upper part (32) of the means (1).

4. The means (1) according to any one of the preceding claims, wherein the first part (3) of the means (1) further comprising a further lower part (31) having the same cutout (33) of the lower part (31).

5. The means (1) according to any one of the preceding claims, wherein the second face (312) of the lower part (31) is perpendicular to the first face (311) of the lower part (31) and is at least partially planar or is at least partially curved and is adapted to at least partially seat on the support member.

6. The means (1) according to any one of the preceding claims, wherein the lower part edge of the first face (311) of the lower part (31) of the means (1) is below the lower part edge (3131) of the third face (313) of the lower part (31) of the means (1).

7. The means (1) according to any one of the preceding claims, wherein the upper edge of the second face (322) of the upper part (32) of the means (1) is above the upper edge (3212) of the first face (321) of the upper part (32) of the means (1).

8. The means (1) according to any one of the preceding claims, wherein the second part (4) comprises at least one projection (41 or 42) for hanging an object, in particular an outer garment and/or a helmet.

9. The means (1) according to any one of claims 1 to 6, wherein the second part (4) of the means (1) is a hollow prism (46) with a hinged side (461), in particular a shoebox.

10. The means (1) according to any one of claims 1 to 6, wherein the second part (4) of the means (1) is at least one horizontal plane (462 or 463) for the storage of objects, preferably two horizontal planes (462 and 463) with openings on the sides and an opening in the front.

11. The means (1) according to any one of claims 1 to 6, wherein the second part (4) of the means (1) is a suspension system (44) for positioning the skis.

12. The means (1) according to any one of claims 1 to 6, wherein the second part (4) of the means (1) is suitable for hanging the clothes hangers comprising a protrusion (45) on which recesses (451) for hooking the clothes hangers are provided.

13. A system for attaching an object to a support member comprising the means (1) according to any one of the preceding claims and a support member comprising a plurality of holes (22), wherein

- the width of each hole (22) corresponds to the thickness of the first part (3) of the means (1); and
- the means (1) is removably insertable into the opening of the support member such that a first part (3) of the means (1) is disposed behind the support face and a second part (4) of the means (1) extends forward of the support member, wherein the second part (4) of the means (1) is accessible to the user for holding the object.

14. The system according to claim 12 further comprising the attachment (23 and 24) of the support member to the wall, wherein the attachment (23 and 24) comprises a movable mechanism comprising a rail fixedly attached to the wall and a movable mechanism attached to the support member, in particular the guide rail, or the rail.

15. The system according to claim 12 or 13, wherein the vertical offset between any two holes (22) on the support member is constant.

16. The system according to any one of claims 12 to 13, wherein the horizontal offset between any two holes (22) on the support member is constant.

17. A method of temporarily connecting the means (1) for holding an object and a support member containing steps:

- the provision of a support member having apertures; and the provision of a means (1) having

  - a first part (3) for removable attachment of the device (1) to the support member; and
  - A second part (4) for temporarily attaching

an object to the means (1); wherein the first part (3) comprises a lower and upper part (31 and 32), the two parts (31 and 32) comprising a cutout (33 and 34) for removably attaching the means (1) to the support member; and wherein

- the means (1) is fitted to the support panel in such a way that
- causes the material of the upper part (32) of the device (1) to be tensioned, and whereby

- the force (F) acts at the point of contact between the face (323) of the upper part (32) and the support member, and the reaction force (F_R) acts at the point of contact between the first face (321) of the upper part (32) and the support member; and
- a force (F) is applied at the point of contact between the third face (313) of the lower part (31) and the support member, and a reaction force (F_R) is applied at the first face (311) of the lower part (31) and the support member, thereby arresting the means (1) against rotation relative to the support member; and

- the frictional force (F) and reaction forces (F_R) between the faces (323, 3212, 311, 313) and the support face, thereby arresting the means (1) against translational movement in the plane of the support member.

18. A method of removing the means (1) from the support member comprising the steps:

- the provision of a scheme under any of claims 12 to 15; whereby
- exerts a force greater than the sum of the frictional forces between the faces (323, 3212, 311, 313) and the support face, the direction of this force being in the direction from the lower part (31) of the first part (3) of the means (1) to the top (32) of the first part (3) of the means (1); and
- the lower part (31) of the first part (3) of the means (1) is slid out of the opening of the supporting member in front of the supporting wall; and then
- extends the upper part (32) of the first part (3) of the means (1) from the opening of the support member in front of the supporting wall.

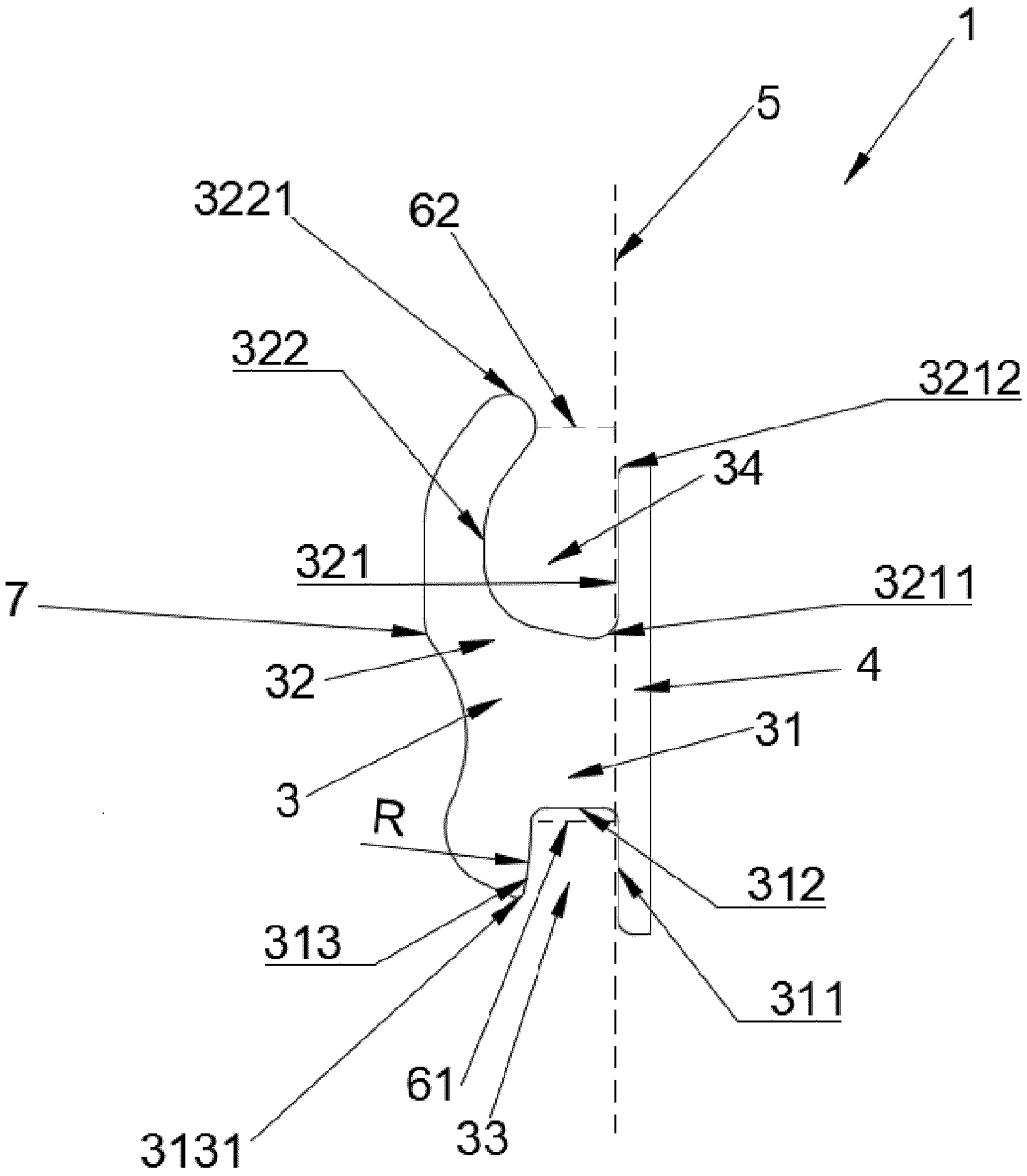


Fig. 1A

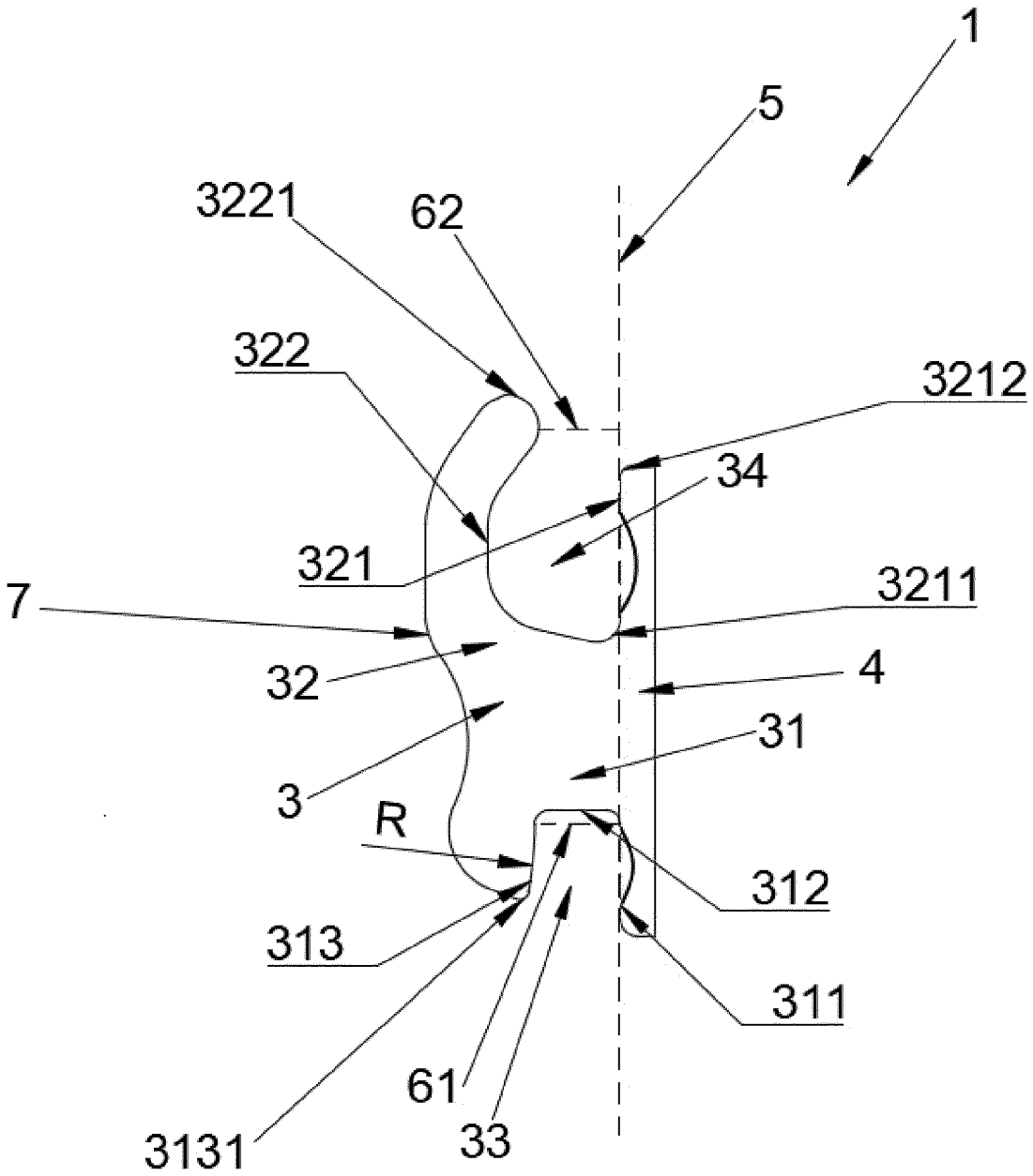


Fig. 1B

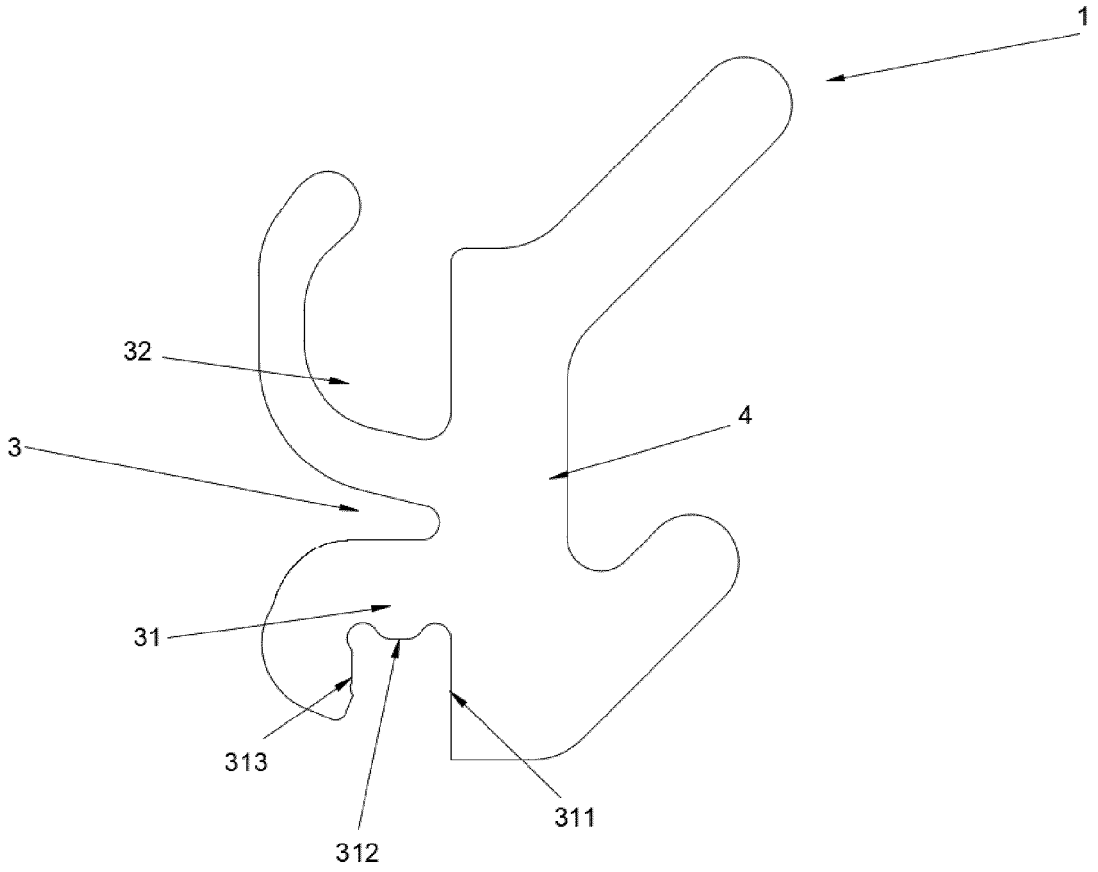


Fig. 1C

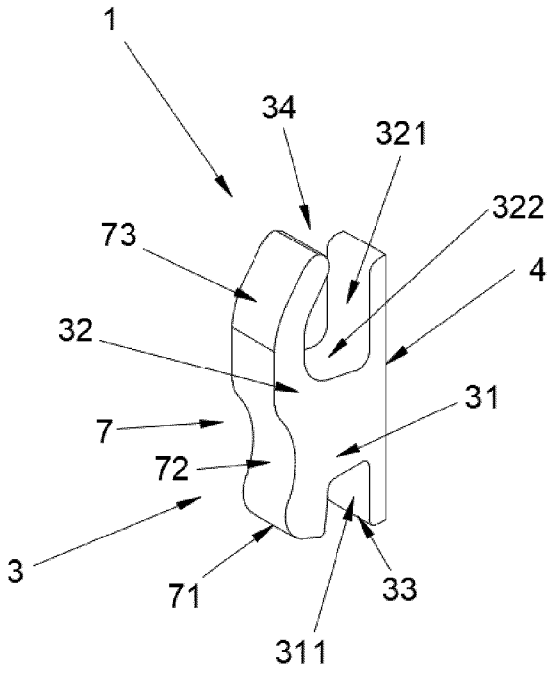


Fig. 2

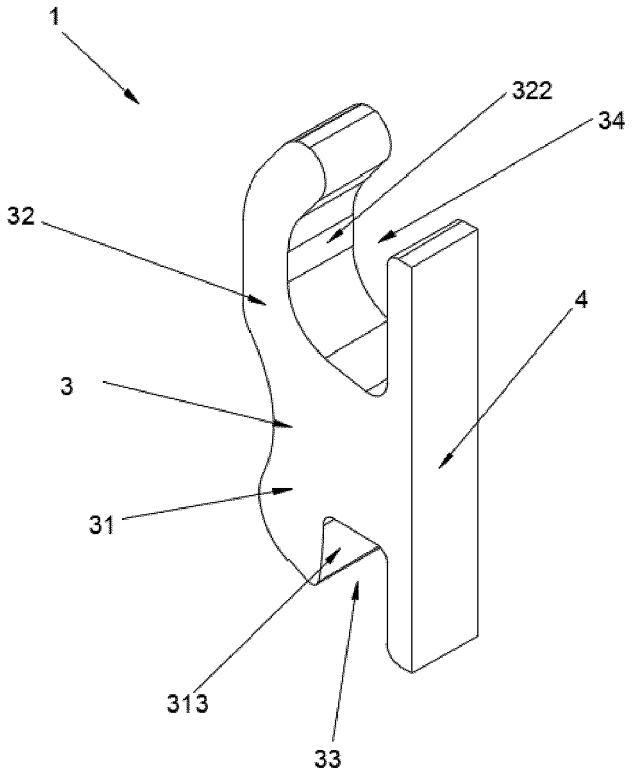


Fig. 3

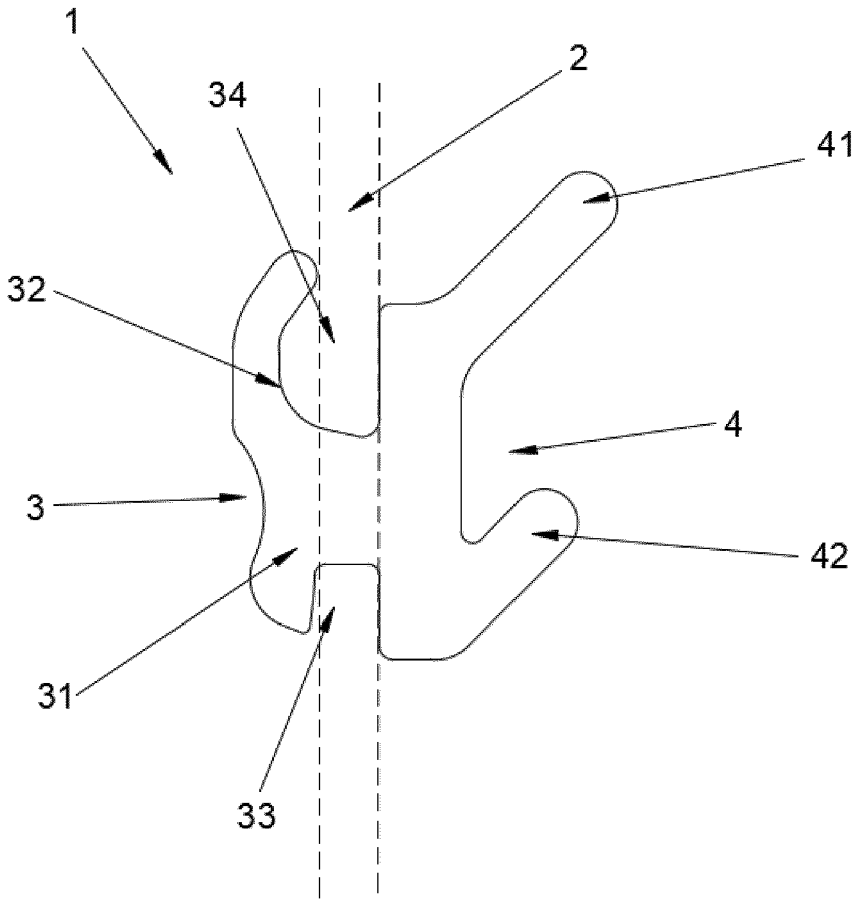


Fig. 4

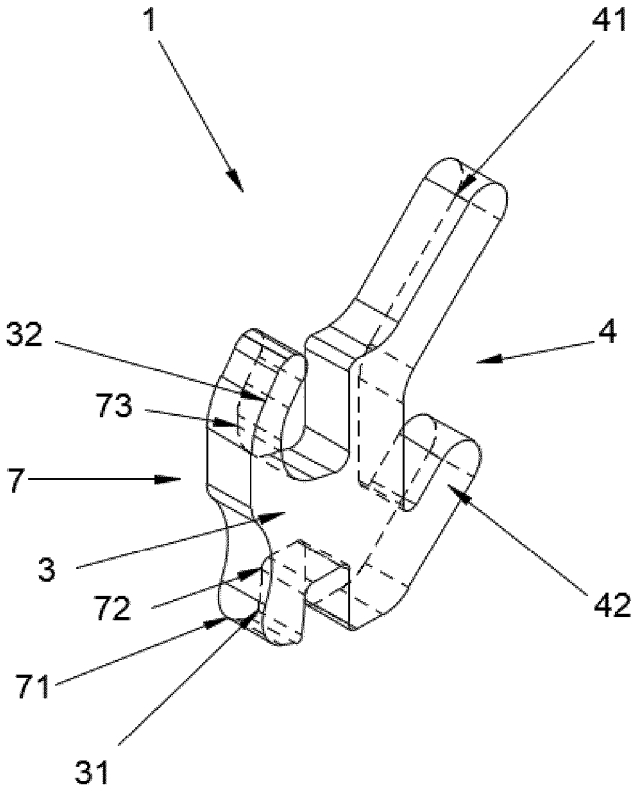


Fig. 5

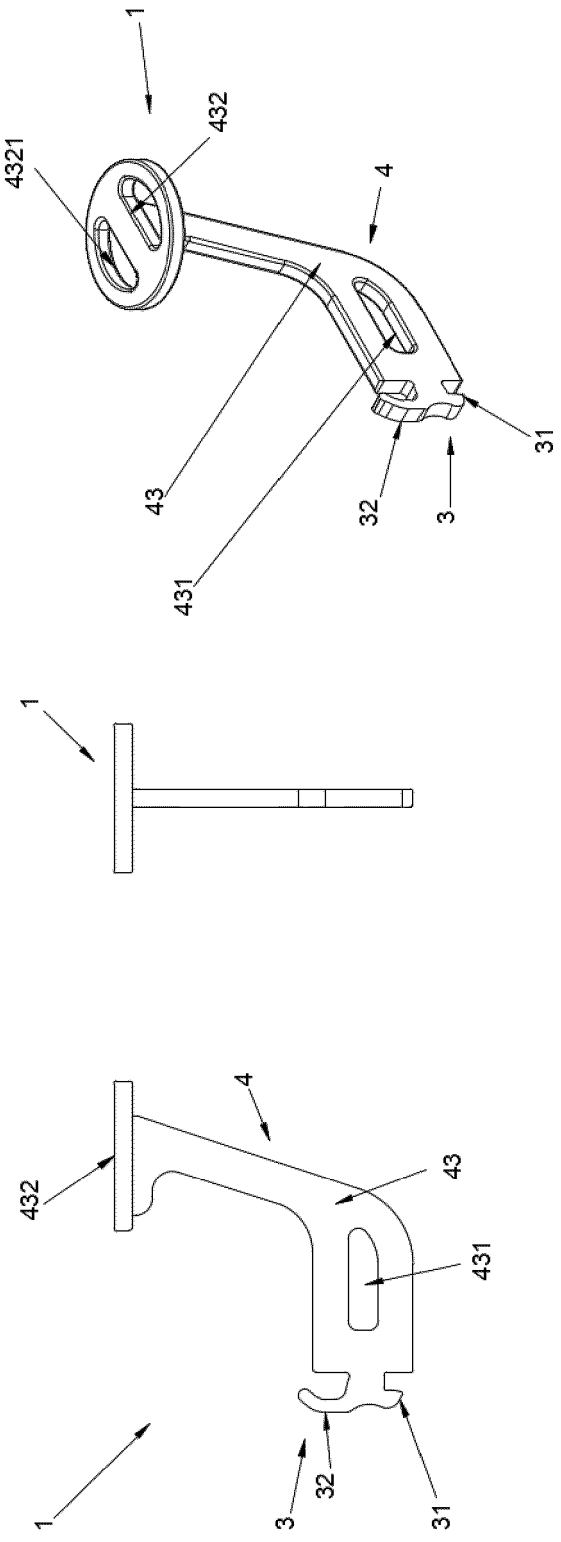


Fig. 6

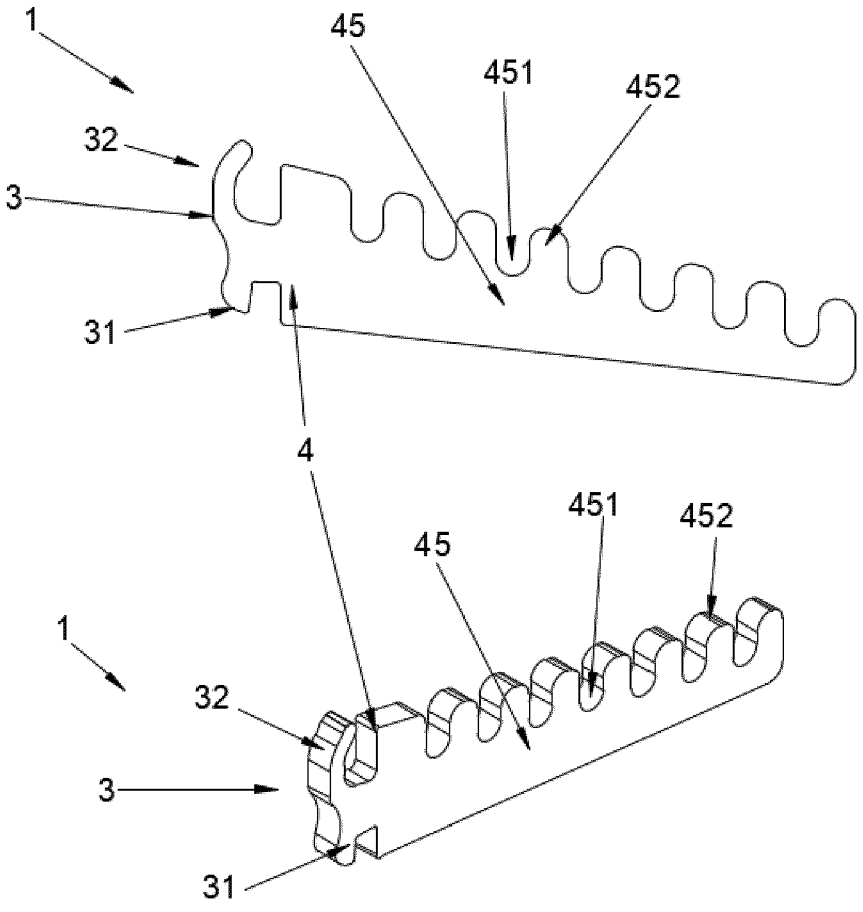


Fig. 7

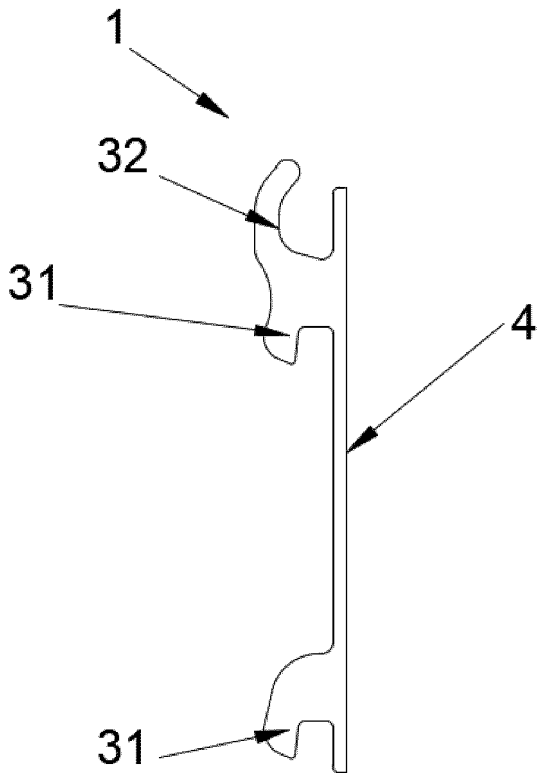


Fig. 8

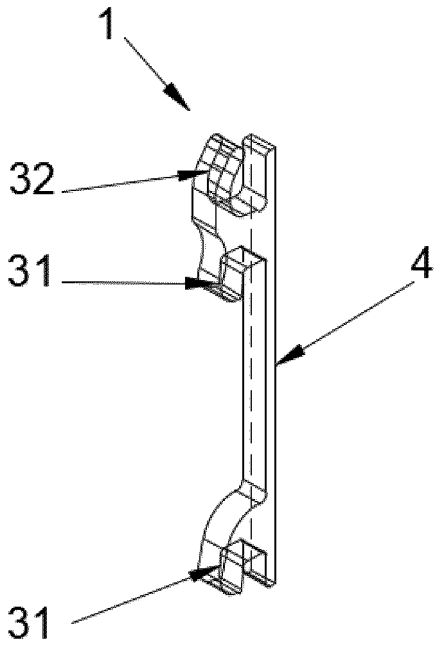
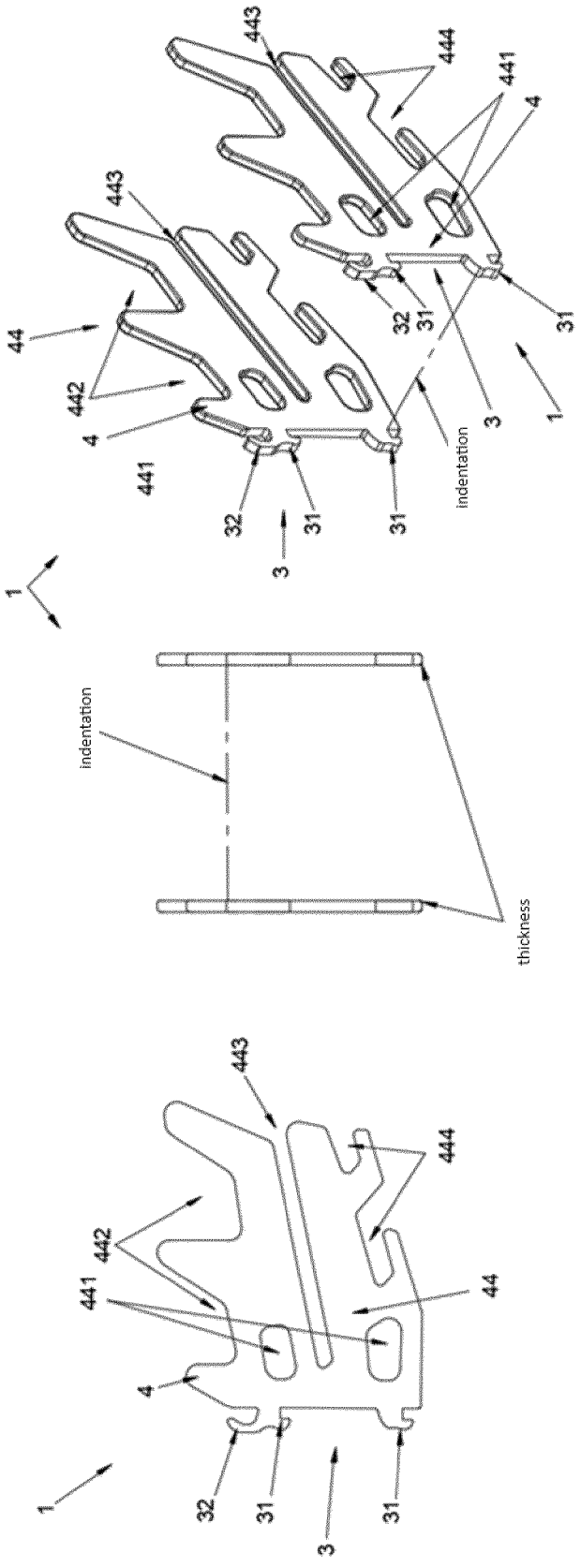


Fig. 9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441
4
443
44
442
4
441
32
31
31
3
indentation
31
1
32
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441
44
4
1
32
31
31
3

Fig. 10

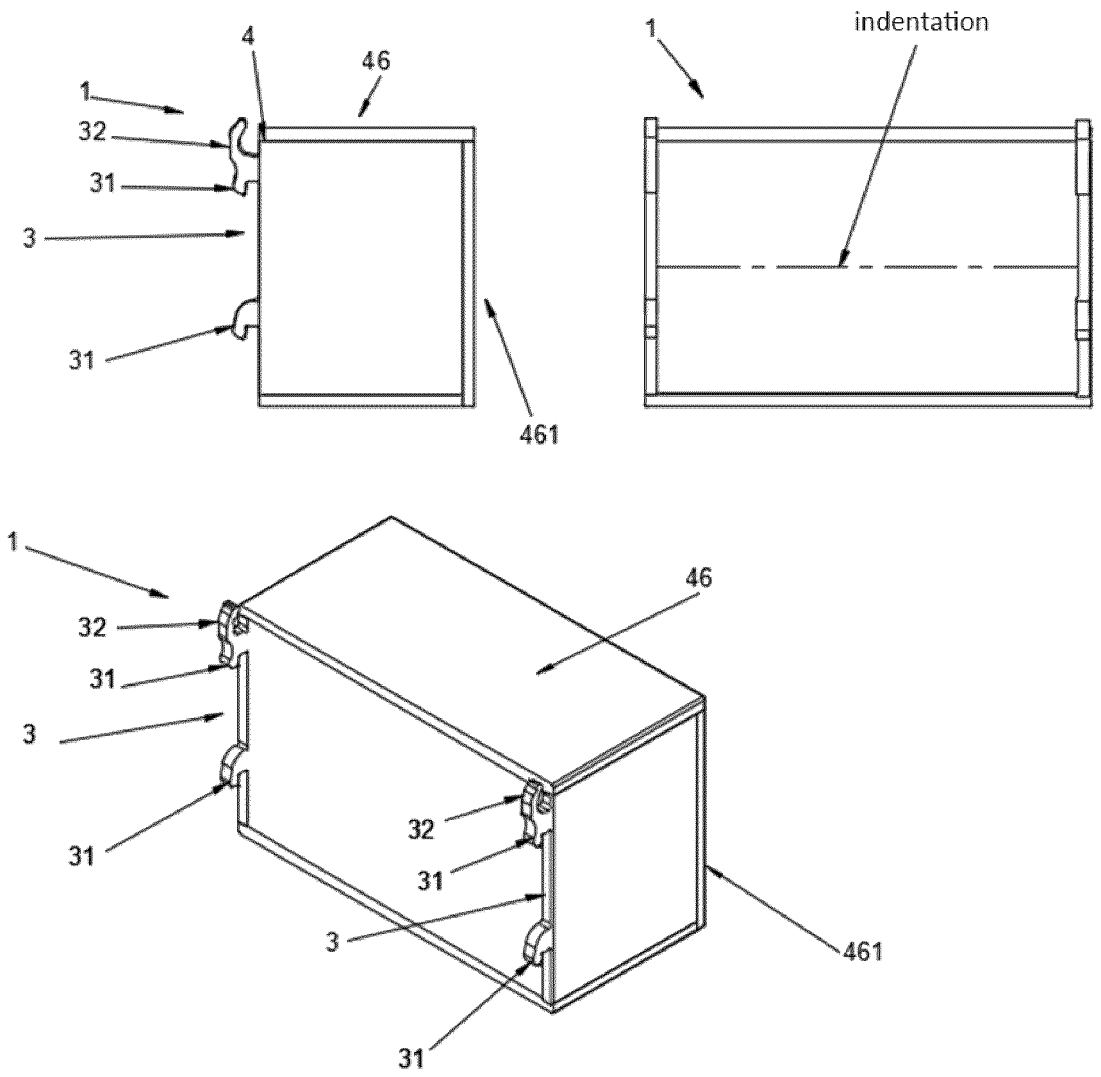
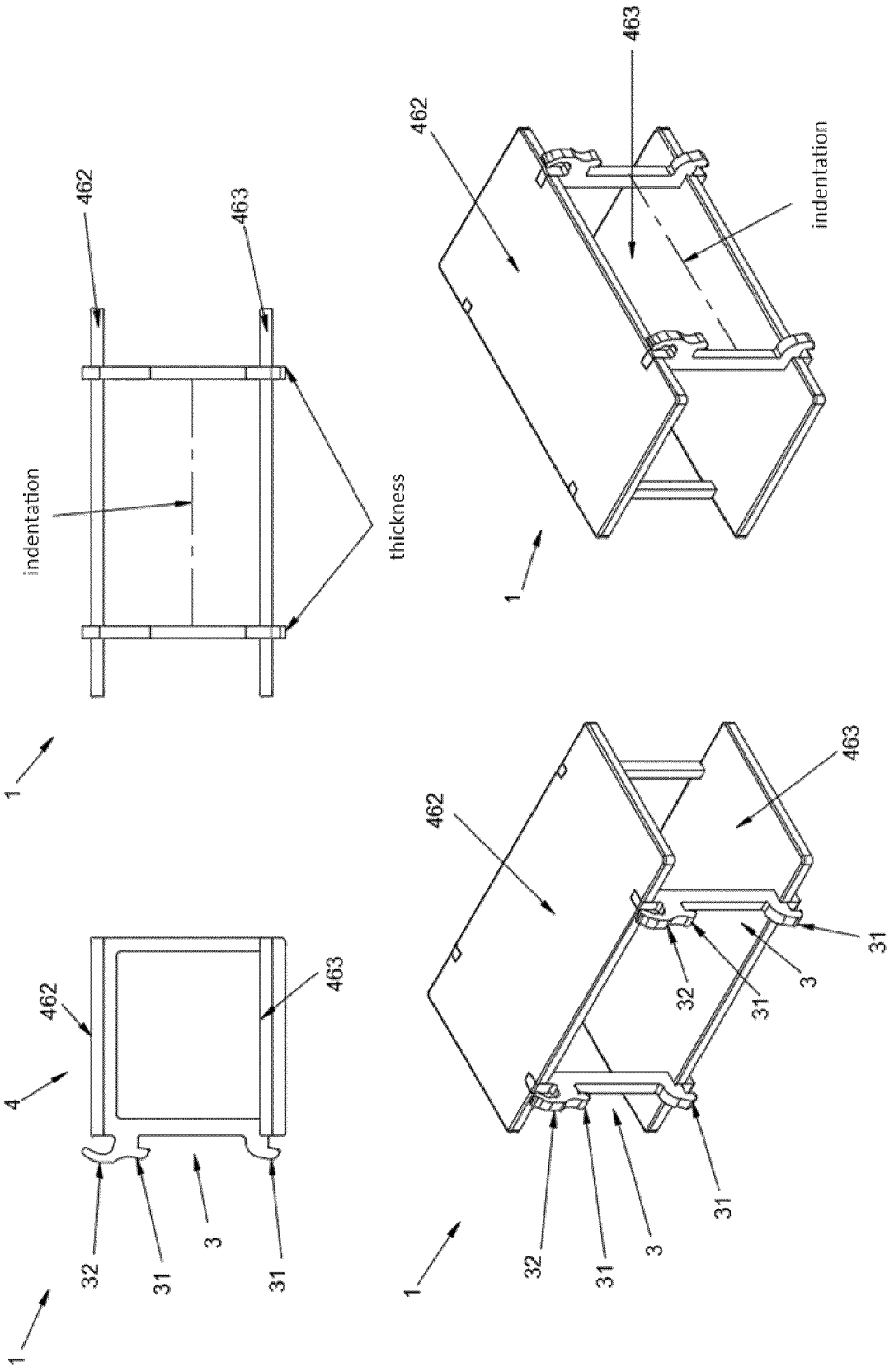


Fig. 11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1

Fig. 12

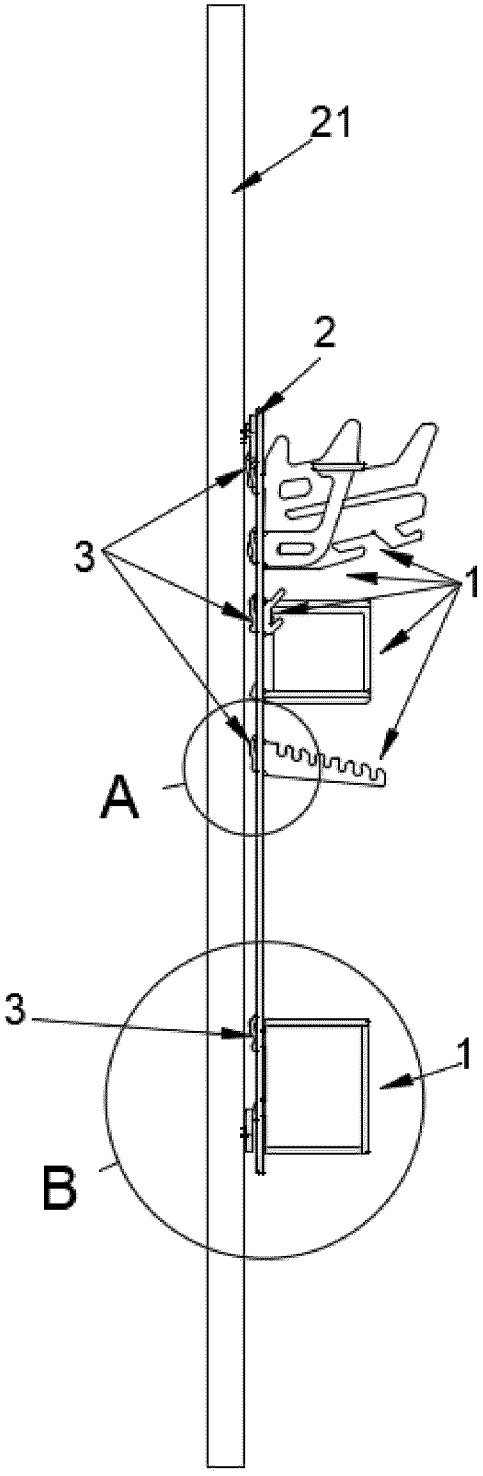

Fig. 13

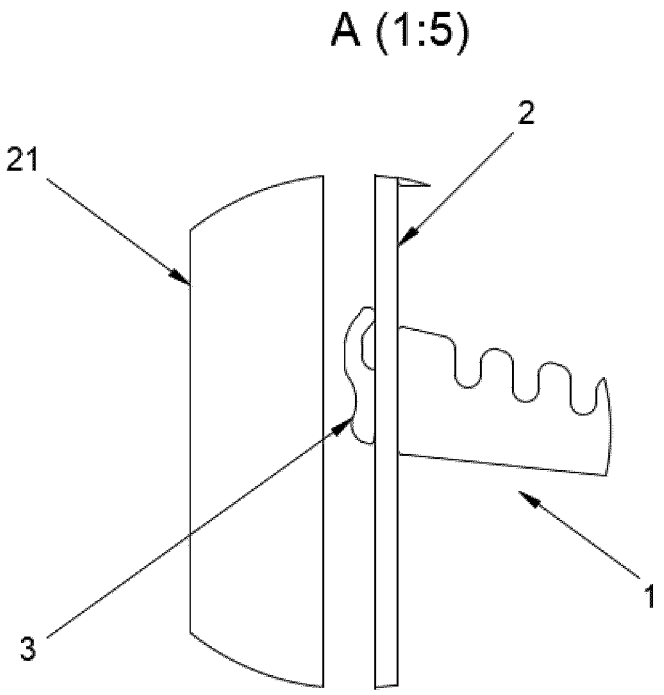

Fig. 14

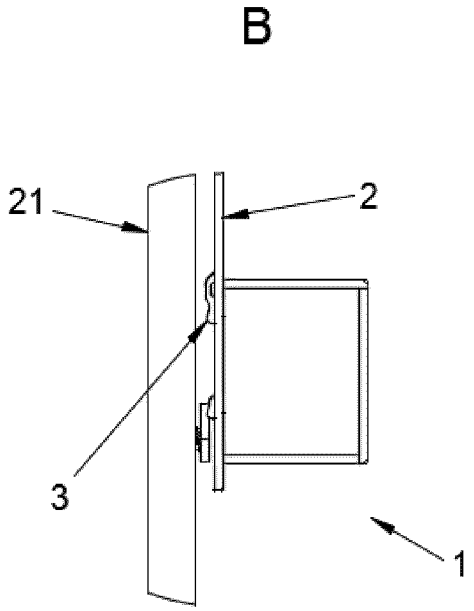

Fig. 15

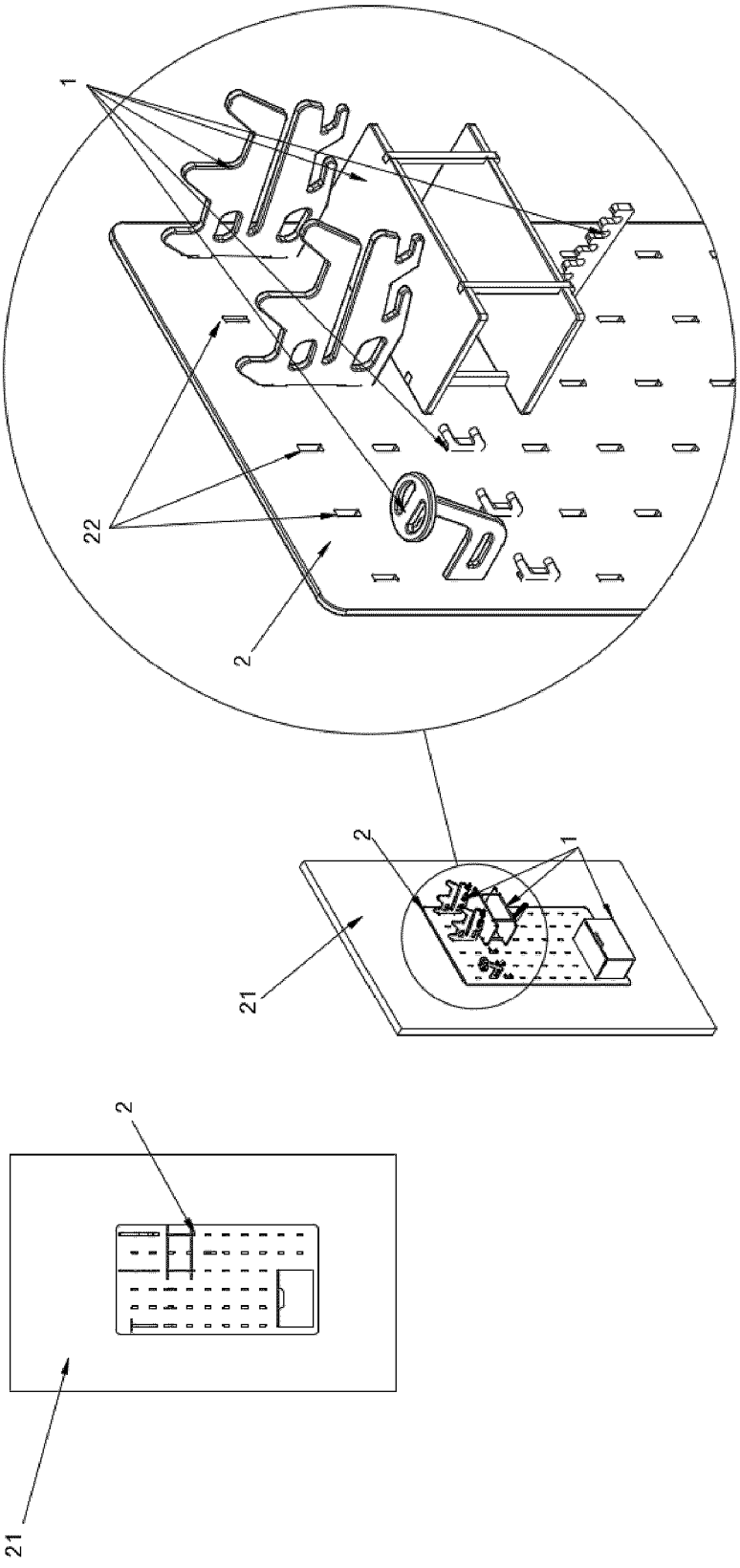

Fig. 16

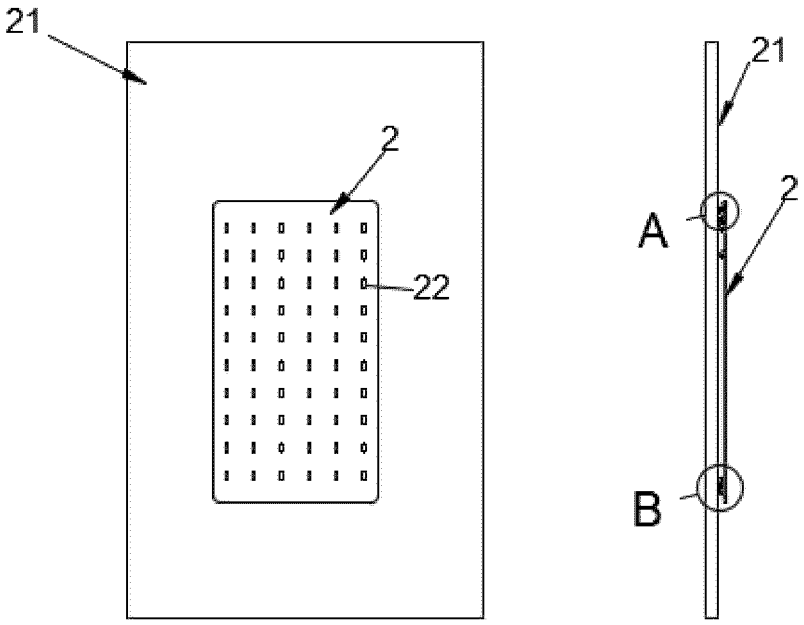

Fig. 17

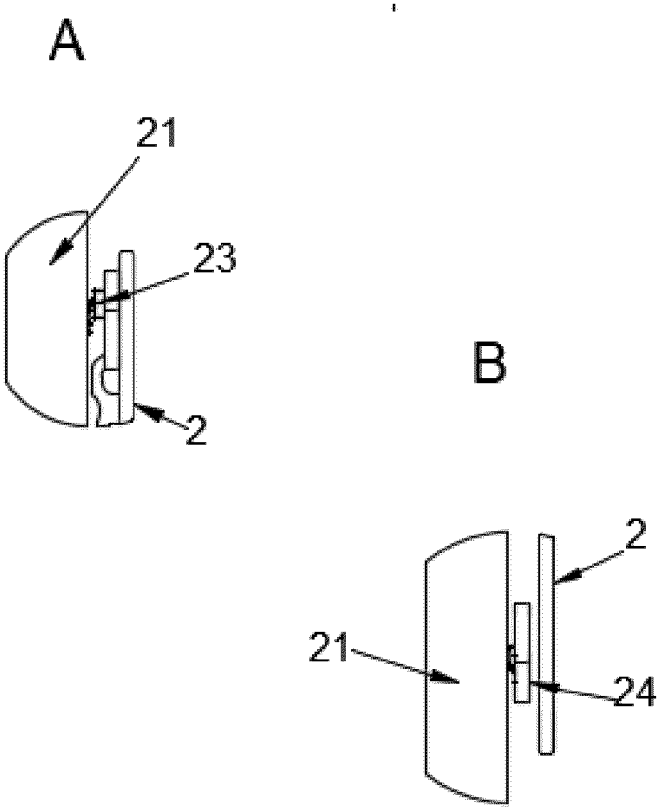

Fig. 18

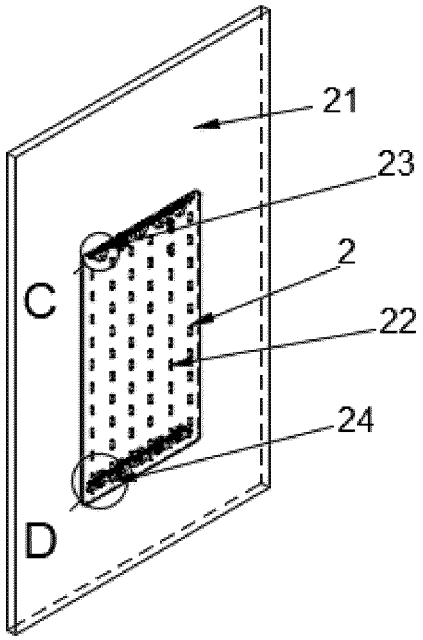

Fig. 19

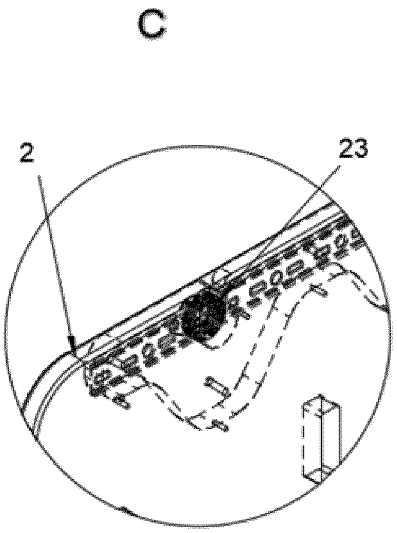

Fig. 20

D

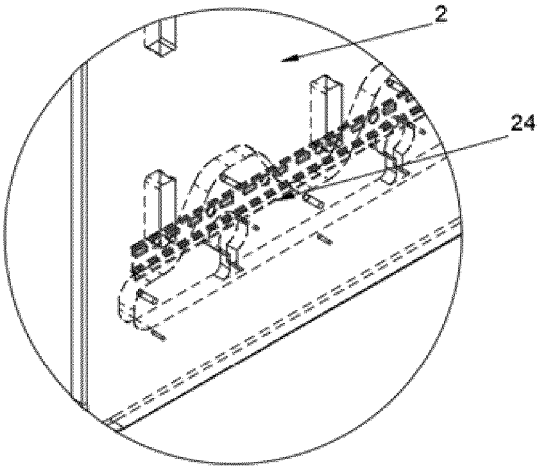

Fig. 21

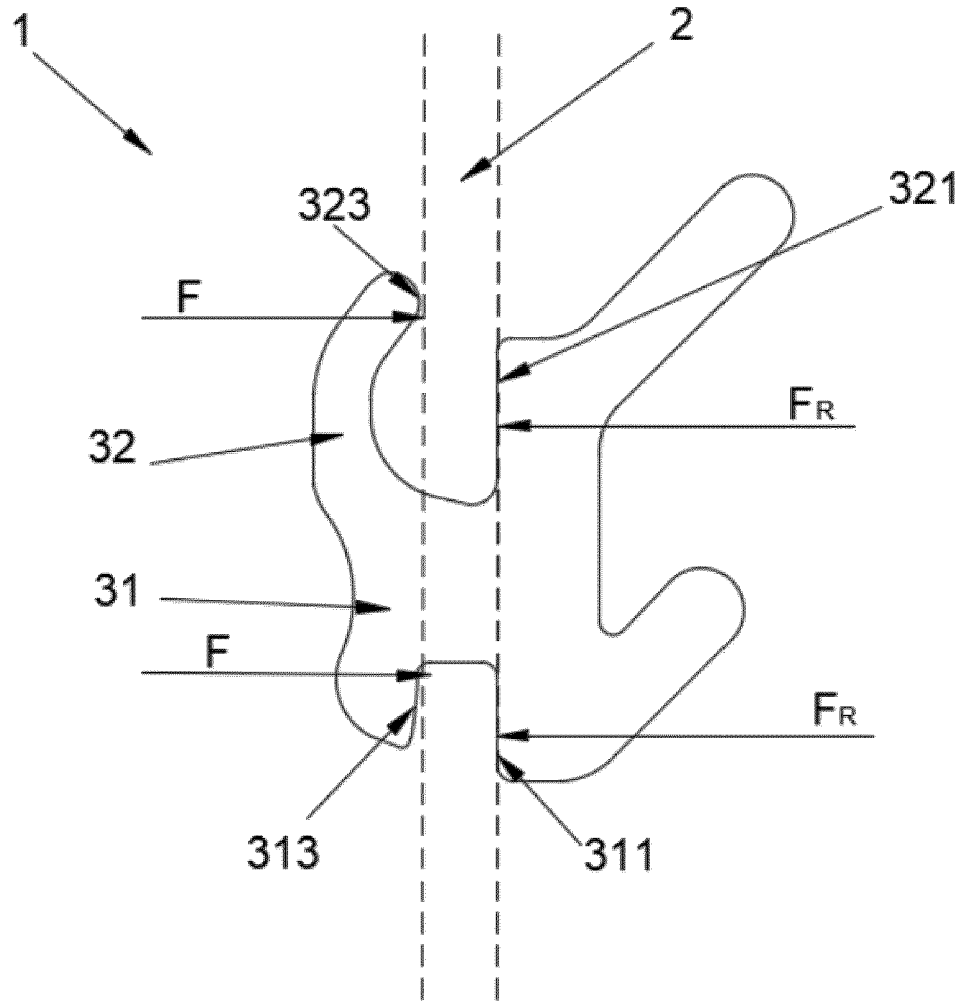

Fig. 22A

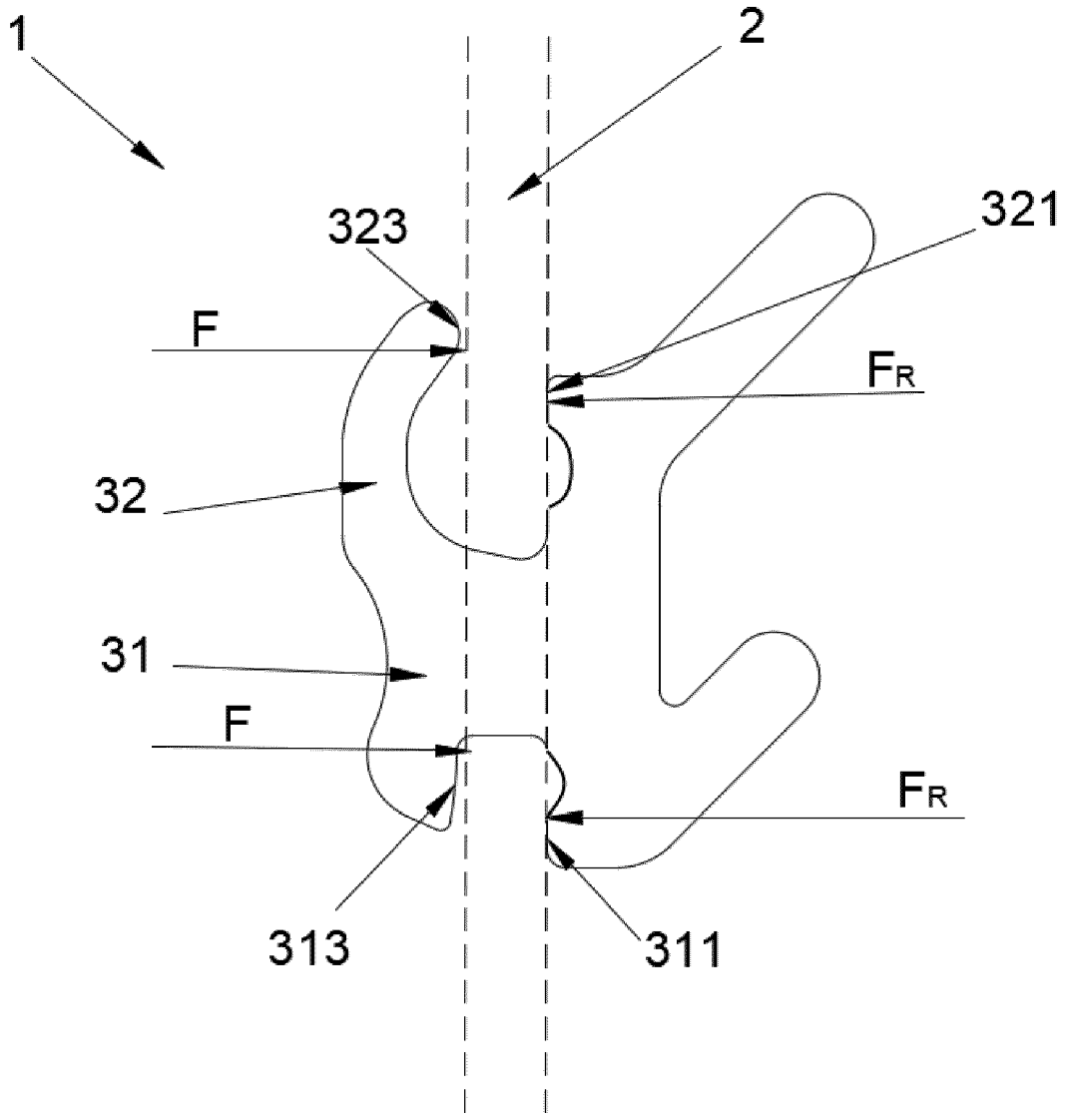

Fig. 22B

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EUROPEAN SEARCH REPORT

Application Number
EP 24 17 8716

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A47G
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 January 2025	Martinez Valero, J

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