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(54) **INCLINABLE CONCEALED SHELF SUPPORT BRACKET**

(57) A concealed shelf support bracket (1) comprising a plate (2) configured to be fixed to a wall and a pin (3) projecting from the plate is described, wherein the pin (3) is removably fastened to the plate (2), wherein the plate comprises a first curved surface (221) which is convex or concave.

wherein the pin comprises a second curved surface (52) having a curvature substantially matching the curvature of the first curved surface, and
wherein a relative movement of the first curved surface and the second curved surface allows an angle orientation of the pin with respect to the plate.

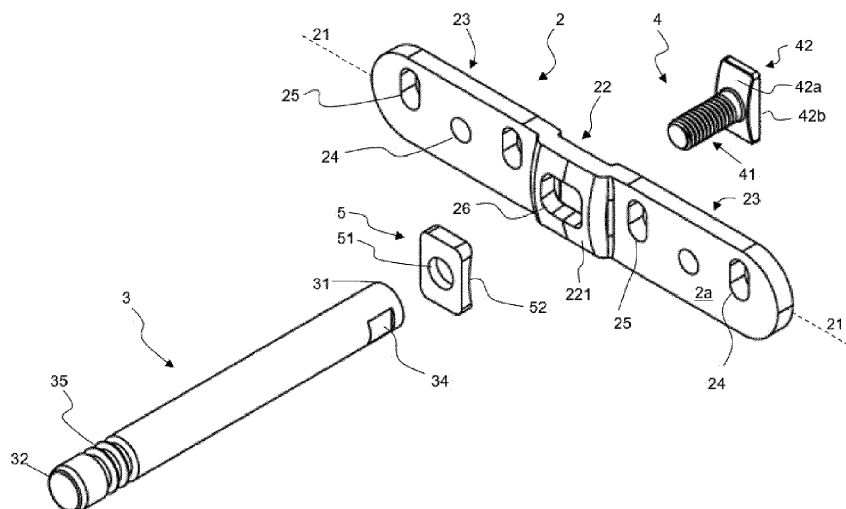


Fig. 3

Description

TECHNICAL FIELD

[0001] The present invention relates to the furniture sector. In particular, it relates to a device for fixing a shelf to a wall. Even more particularly, it relates to a concealed shelf support bracket which can be adjusted in several ways.

PRIOR ART

[0002] For some time concealed brackets for supporting a shelf in a way such that they remain substantially invisible both on the upper surface and on the bottom surface of the shelf have been known. A known concealed shelf support bracket is fixed to the wall and is made so as to have a pin which projects substantially perpendicularly from the wall. The pin is designed to penetrate inside a hole formed in the thickness of the shelf to be supported.

[0003] Usually, depending on the length of the shelf to be fixed to the wall, two or more support brackets are provided for each shelf to be supported. Therefore, two or more holes are provided in the thickness of each shelf.

[0004] Typically, in the case of a flat shelf to be fixed in a horizontal position, the axes of the holes are parallel to each other and lie in a plane parallel to the plane of the shelf.

[0005] Ideally, by fixing the support brackets in such a way that the pins project from the wall at the same height from the ground, perfectly horizontal and perfectly perpendicular to the wall, it would be possible to fix a wall shelf in a perfectly horizontal configuration.

[0006] However, such a situation is merely theoretical. In fact, generally, the known support brackets are fixed with the axes situated at different heights, one being a few millimetres higher or lower than the other one.

[0007] Moreover, frequently, once two support brackets have been fixed to the wall, the axes of the respective pins are situated a distance which does not coincide with the distance between the respective holes in the shelf. In other words, even though the fitter is careful when mounting the support brackets on the wall, it often happens that the distance between the axes of the two pins is greater or smaller than the distance between the axes of the holes in the shelf. In either case, it is not possible to mount the shelf.

[0008] IT1391441 describes a concealed shelf support bracket which allows several adjustments to be made in order to compensate for any imprecision during mounting or defects present in the shelf to be mounted.

SUMMARY OF THE INVENTION

[0009] The Applicant has carefully examined the concealed shelf support brackets of the known type.

[0010] The Applicant has considered that there exists

the need to be able to incline the pin with respect to the horizontal in order to compensate for any imprecision in the wall to which the shelf must be fixed or to provide a "preload". As is known, if the shelf must support relatively heavy objects, the fitter tries to mount the shelf so that it is slightly inclined upwards, namely is "preloaded". In this way, when the shelf is subject to the load, it is arranged in a substantially horizontal manner. On other occasions there may be the need to incline the shelf support bracket downwards, for example when the wall to which the support bracket is fixed is not perfectly vertical.

[0011] The Applicant has defined the object of providing a concealed shelf support bracket which allows the shelf to be mounted also, if necessary, with an inclination different from the horizontal position.

[0012] This object is achieved with a pin configured to engage with a concave surface of the wall plate.

[0013] According to one aspect, a concealed shelf support bracket comprising a plate configured to be fixed to a wall and a pin projecting from the plate is provided,

wherein the pin is removably fastened to the plate, wherein the plate comprises a flat body extending in a main direction and comprising a longitudinal axis, a central part and two wings which extend from the central part, a first face and a second face, which, in use, is directed towards the wall, wherein the central part comprises a first curved surface which is convex or concave, wherein either

- a. the pin comprises a second curved surface having a curvature substantially matching the curvature of the first curved surface, or
- b. the shelf support bracket further comprises a support adapter between the pin and the plate and wherein the support adapter comprises a second curved surface substantially matching the curvature of the first curved surface, and

wherein a relative movement of the first curved surface and the second curved surface allows an angle orientation of the pin with respect to the plate.

[0014] According to embodiments, the second curved surface is made integral with the pin.

[0015] According to embodiments, the pin comprises a threaded longitudinal hole for a screw passing through a window of the plate for removably fastening the pin to the plate.

[0016] According to embodiments, the window has a width and/or height greater than the diameter of the shank of the screw.

[0017] According to embodiments, the plate comprises a recessed central part and the screw head is seated in the recessed central part of the plate.

[0018] According to embodiments, the recessed central part is curved and the head of the screw comprises

a surface which is correspondingly curved.

[0019] According to embodiments, the pin also comprises two opposite flat surfaces for screwing the pin with respect to the screw.

[0020] According to embodiments, the shank also comprises a plurality of grooves for a safety retaining screw.

[0021] According to embodiments, the first curved surface and the second curved surface are cylindrical surfaces. In alternative embodiments, the first curved surface and the second curved surface are spherical surfaces.

[0022] According to embodiments, each wing of the plate comprises a hole and/or an eyelet, for instance a vertical-axis eyelet.

[0023] According to embodiments, each wing of the plate comprises a thickness of 1-5 mm, wherein the shelf support bracket is configured to be inset in a milled zone in the edge of the shelf facing the wall to which the shelf support bracket must be fixed.

[0024] According to embodiments, each wing of the plate comprises ends which are rounded, for example semi-circular ends.

BRIEF DESCRIPTION OF THE FIGURES

[0025] The invention will become entirely clear from the following description, provided purely by way of a non-limiting example, to be read with reference to the attached figures, in which:

Fig. 1 is a first axonometric view of the concealed shelf support bracket according to an embodiment of the present invention;

Fig. 2 is a second axonometric view of the concealed shelf support bracket according to an embodiment of the present invention;

Fig. 3 is an exploded view of the shelf support bracket according to Figures 1 and 2;

Figs. 4.1 - 4.3 are front views of the shelf support bracket according to Figures 1-3 which show three different positions of the pin with respect to the plate;

Fig. 5.1 is a partially sectioned side view of the pin of the shelf support bracket according to Figures 1-3;

Fig. 5.2 is an axonometric view of the pin of the shelf support bracket according to Figures 1-3;

Figs. 6.1 - 6.3 are three views of the plate of the shelf support bracket according to Figures 1-3;

Figs. 6.4 - 6.6 are three cross-sections obtained from Fig. 6.3; and

Figs. 7.1, 7.2 and 7.3 are cross-sections through a shelf with the support bracket according to the present invention with the pin inclined at three different inclinations.

DETAILED DESCRIPTION

[0026] The shelf support bracket 1 according to the

present invention comprises a wall plate 2 (or also simply "plate"), a pin 3 and a screw 4 for fixing the pin 3 to the plate 2. According to embodiments, optionally the shelf support bracket 1 also comprises a support adapter 5 between the pin 3 and the plate 2.

[0027] The plate 2 may have any shape, not necessarily the shape shown in the figures by way of example. The plate 2 may be made of metallic material, for example steel or aluminium. Alternatively, it may be made of thermoplastic material or a composite material.

[0028] Preferably, the plate 2 is a flat body which extends in a main direction and defines a longitudinal axis 21. Considering that the plate 2 must be inset in a milled zone 61 in the edge of the shelf 6 facing the wall to which the support bracket must be fixed, preferably the height of the plate 2 is not greater than the thickness of the shelf 6. For example it may be about 2 cm or 3 cm.

[0029] Preferably, the plate 2 has ends which are rounded, for example semi-circular. This is advantageous because it allows the milled receiving zone 61 in the shelf 6 to be made using a normal circular milling tool.

[0030] Preferably, the plate 2 is symmetrical with respect to a transverse plane and comprises a central part 22 and two wings 23 which extend from the central part 22. The plate 2 comprises a first face 2a and a second face 2b. During use, the first face 2a is the face directed towards the shelf 6 while the second face 2b is directed towards the wall 10.

[0031] The wings 23 of the plate 2 lie preferably in the same plane. According to embodiments, the first face 2a projects in the region of the central part 22 from the plane defined by the wings 23. According to embodiments, the second face 2b is recessed in the region of the central part 22 with respect to the plane defined by the wings 23.

[0032] According to embodiments, for each wing 23 of the plate 2, a hole 24 and/or an eyelet 25 is provided. For example, two vertical-axis eyelets 25 and a circular hole 24 may be provided. The vertical-axis eyelets 25 allow adjustment of the height of the shelf 6 with respect to the wall 10. The circular hole 24 is for a screw configured to fix the plate (and therefore the bracket) to shelf when the bracket is arranged in a milled area in the thickness of the shelf.

[0033] As mentioned above, the first face 2a of the plate 2, in the region of the central part 22, is curved (projecting) with respect to the wings 23 and the second face 2b of the plate is recessed with respect to the wings 23 in the region of the central part 22. The convex curvature of the central part is indicated by the number 221, while the opposite concave curvature (in the recessed part of the plate) is indicated by the number 222.

[0034] Preferably, the central part 22 of the plate 2 is curved, for example with a substantially cylindrical surface. The radius of curvature may be for example about 10-20 mm, for example about 15 mm. In another embodiment, it may be about 20-40 mm, for example about 30 mm. The curvature 221 and 222 is clearly visible, for example, in the cross-sections of Figures 6.5 and 6.6. Ac-

cording to embodiments, the positive (projecting, convex) curvature 221 is substantially equal to the negative (recessed, concave) curvature 222.

[0035] The central part 22 of the plate comprises a central window 26. The central window 26 may have any shape, but preferably is substantially square or rectangular. The reasons for which this shape is preferred will become clear below. Preferably, the corners of the central window 26 are rounded. The pin 3 is a substantially cylindrical body with a circular cross-section having a first end 31 and a second end 32. According to embodiments, the first end 31 comprises a longitudinal hole 33. The longitudinal hole 33 is a threaded blind hole. According to embodiments, two opposite flat surfaces 34 are provided in the vicinity of the first end 31 for an adjustment spanner.

[0036] According to embodiments, a circular groove 35 (or several circular grooves) is/are formed at the second end 32 for engagement by a safety retaining screw 36 (Figs. 7.1, 7.2, 7.3).

[0037] The screw 4 for fixing the pin 3 to the plate is shown, for example, in the exploded view of Fig. 3. The screw 4 comprises a threaded shank 41 and a head 42. The threaded shank 41 is configured to engage inside the threaded longitudinal hole 33 of the pin 3. The head 42 of the screw 4 has its face 42a which is directed towards the threaded shank 41 curved so as to match the recessed curvature in the central part 22 of the plate. The head 42 of the screw 4 has preferably a size such as not to allow complete relative rotation thereof with respect to the plate 2. At the most, the screw 4 may rotate a few degrees with respect to the plate 2, but may not perform a complete revolution.

[0038] The central window 26 has a width greater than the diameter of the shank of the screw 4. For example, it may be about 1.5 - 2 times the diameter of the shank of the screw 4. For example, in the case of a screw 4 with a diameter of 8 mm, the width of the central window 26 may be 13.5 mm and, in the case of a screw 4 with a diameter of 5 mm, the width of the central window 26 may be 9 mm.

[0039] The central window 26 has a height greater than the diameter of the shank of the screw 4. For example, it may be about 1-2 mm greater than the diameter of the shank of the screw 4. For example, in the case of a screw 4 with a diameter of 8 mm, the height of the central window 26 may be about 10 mm and, in the case of a screw 4 with a diameter of 5 mm, the height of the central window 26 may be 6 mm.

[0040] The shelf support bracket 1 also comprises a support adapter 5 between the pin 3 and the plate 2. Alternatively, the first end 31 of the pin 3 could be shaped substantially like the adapter 5.

[0041] The support adapter 5 is substantially in the form of a washer with a central opening 51 for the shank 41 of the screw 4. The support adapter 5 comprises a first face 52 and a second face 53. The first face 52 is configured to be directly in contact with the curved central

part 22 of the plate 2. For this reason, the first face 52 of the adapter 5 has a negative, i.e. recessed, curvature corresponding to the positive curvature of the central part 22 of the plate 2. The second face 53 is configured to be directly in contact with the first end 31 of the pin 3. For this reason, the second face 53 is preferably flat.

[0042] The shelf support bracket 1 according to the present invention may be preassembled by inserting the shank 41 of the screw 4 into the central window 26 of the plate 2, causing the shank 41 of the screw 4 to pass through the central opening 51 of the adapter 5 and screwing the screw 4 inside the threaded longitudinal hole 33 of the pin 3. Preassembly may also be performed without using tools. In order to firmly lock the pin 3 with respect to the plate 2 advantageously a fixed spanner may be used to engage the two opposite flat surfaces 34 of the pin 3. However, it is advisable to perform the definitive locking after firmly fixing the support bracket 1 to a wall 10.

[0043] The eyelets 25 which extend in the vertical direction allow the position of the support bracket 1 to be adjusted vertically with respect to a wall 10.

[0044] The horizontal adjustment is instead obtained owing to the fact that the pin may be moved to the right or to the left. The movement is limited by the dimensions of the shank 41 of the screw 4 with respect to the central window 26 of the plate 2.

[0045] Fig. 4.1 shows the pin 3 in its position further to the right, when the shank 41 of the screw 4 is situated against the right-hand wall 10 of the central window 26.

[0046] Fig. 4.2 shows the pin 3 in its central position, when the shank 41 of the screw 4 is situated between the right-hand wall and the left-hand wall of the central window 26.

[0047] Fig. 4.3 shows the pin 3 in its position further to the left, when the shank 41 of the screw 4 is situated against the left-hand wall of the central window 26.

[0048] According to the present invention it is possible to vary the inclination of the pin 3 with respect to the plate 2. In fact, for as long as the pin 3 is not completely locked with respect to the plate 2, it may be inclined upwards or downwards, according to the specific need. When the correct inclination is reached, the pin 3 may be firmly locked in position.

[0049] Figures 7.1, 7.2 and 7.3 show three cross-sections through a shelf 6 with the support bracket 1 according to the invention. In the first figure it can be seen that the pin 3 of the support bracket 1 is inclined upwards so as to "preload" the shelf 6. In the second figure it can be seen that the pin 3 of the support bracket 1 is arranged horizontally. Finally, in the third figure, it can be seen that the pin 3 of the support bracket 1 is inclined downwards.

[0050] In fact, the inclination of the pin 3 corresponds to a relative rotation of the curved surface of the central part 22 of the plate 2 and the corresponding surface 52 of the adapter 5 which directly faces the curved surface of the central part 22. As mentioned, the inclination of

the pin 3 and its horizontal position are limited by the dimensions of the central window in relation, obviously, to the diameter of the shank 41 of the screw 4.

[0051] Advantageously, during assembly, the inclination of the shelf 6 may be varied by simply pulling out slightly the shelf 6 from the support bracket 1 (stably fixed to the wall) so as to be able to operate on the opposite flat surfaces of the pin 3. After defining the desired inclination of the shelf 6, the fitter locks the pin 3 with respect to the plate 2 and pushes the shelf 6 fully back in place again.

[0052] As shown in Figures 7.1, 7.2 and 7.3, in order to prevent the shelf 6 from coming away from the support bracket 1, a safety retaining screw 36 may be used, said screw being screwed in until it engages one of the grooves 35 which are situated close to the second end 32 of the pin 3.

Claims

1. A concealed shelf support bracket (1) comprising a plate (2) configured to be fixed to a wall (10) and a pin (3) projecting from the plate (2),

wherein the pin (3) is removably fastened to the plate (2),

wherein the plate (2) comprises a flat body extending in a main direction and comprising a longitudinal axis (21), a central part (22) and two wings (23) which extend from the central part (22), a first face (2a) and a second face (2b), which, in use, is directed towards the wall (10), wherein the central part (22) comprises a first curved surface (221) which is convex or concave,

wherein either

- a. the pin (3) comprises a second curved surface (52) having a curvature substantially matching the curvature of the first curved surface (221), or
- b. the shelf support bracket (1) further comprises a support adapter (5) between the pin (3) and the plate (2) and wherein the support adapter (5) comprises a second curved surface (52) substantially matching the curvature of the first curved surface (221), and

wherein a relative movement of the first curved surface (221) and the second curved surface (52) allows an angle orientation of the pin (3) with respect to the plate (2).

2. The shelf support bracket (1) of claim 1, wherein the second curved surface (52) is made integral with the pin (3).

3. The shelf support bracket (1) of claim 1 or 2, wherein the pin (3) comprises a threaded longitudinal hole (33) for a screw (4) passing through a window (26) of the plate (2) for removably fastening the pin (3) to the plate (2).

4. The shelf support bracket (1) of claim 3, wherein the window (26) has a width and/or height greater than the diameter of the shank (41) of the screw (4).

5. The shelf support bracket (1) of claim 3 or 4, wherein the plate (2) comprises a recessed central part and wherein the screw head (42) is seated in the recessed central part of the plate (2).

6. The shelf support bracket (1) of claim 5, wherein the recessed central part is curved and the head (42) of the screw (4) comprises a surface (42a) which is correspondingly curved.

7. The shelf support bracket (1) of any one of claims 3-6, wherein the pin (3) further comprises two opposite flat surfaces (34) for screwing the pin (3) with respect to the screw (4).

8. The shelf support bracket (1) of any one of the preceding claims, wherein the pin (3) further comprises a plurality of grooves (35) for a safety retaining screw (36).

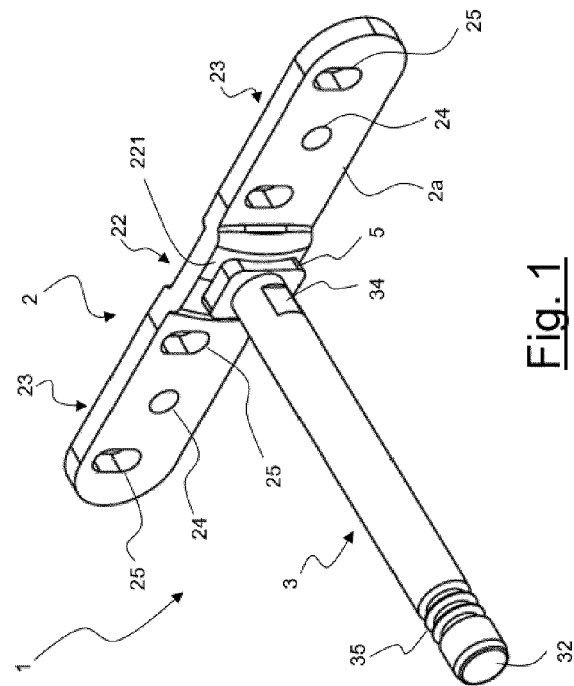
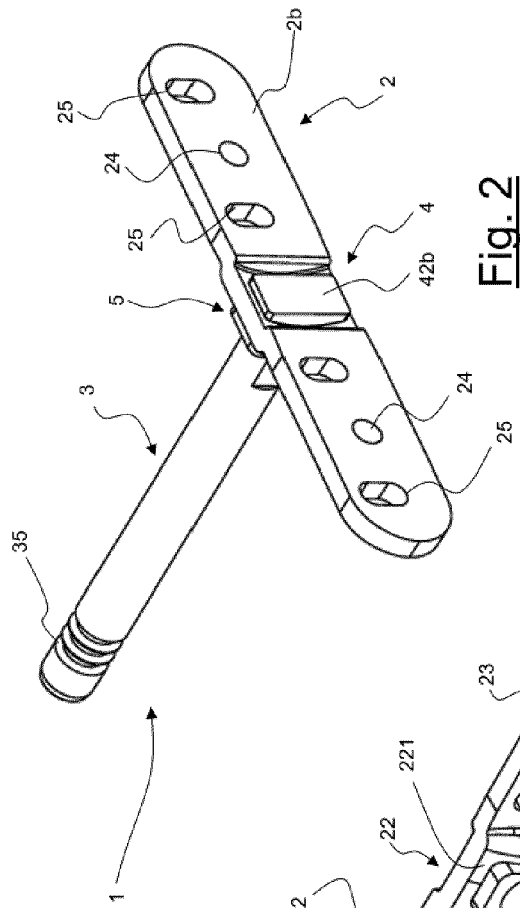
9. The shelf support bracket (1) of any one of the preceding claims, wherein the first curved surface (221) and the second curved surface (52) are cylindrical surfaces.

10. The shelf support bracket (1) of any one of claims 1-8, wherein the first curved surface (221) and the second curved surface (52) are spherical surfaces.

11. The shelf support bracket (1) of any one of the preceding claims, wherein each wing (23) of the plate (2) comprises a hole (24) and/or an eyelet (25), for instance a vertical-axis eyelet (25).

12. The shelf support bracket (1) of any one of the preceding claims, wherein each wing (23) of the plate (2) comprises a thickness of 1-5 mm, wherein the shelf support bracket (1) is configured to be inset in a milled zone (61) in the edge of the shelf (6) facing the wall to which the shelf support bracket must be fixed.

13. The shelf support bracket (1) of any one of the preceding claims, wherein each wing (23) of the plate (2) comprises ends which are rounded, for example semi-circular ends.



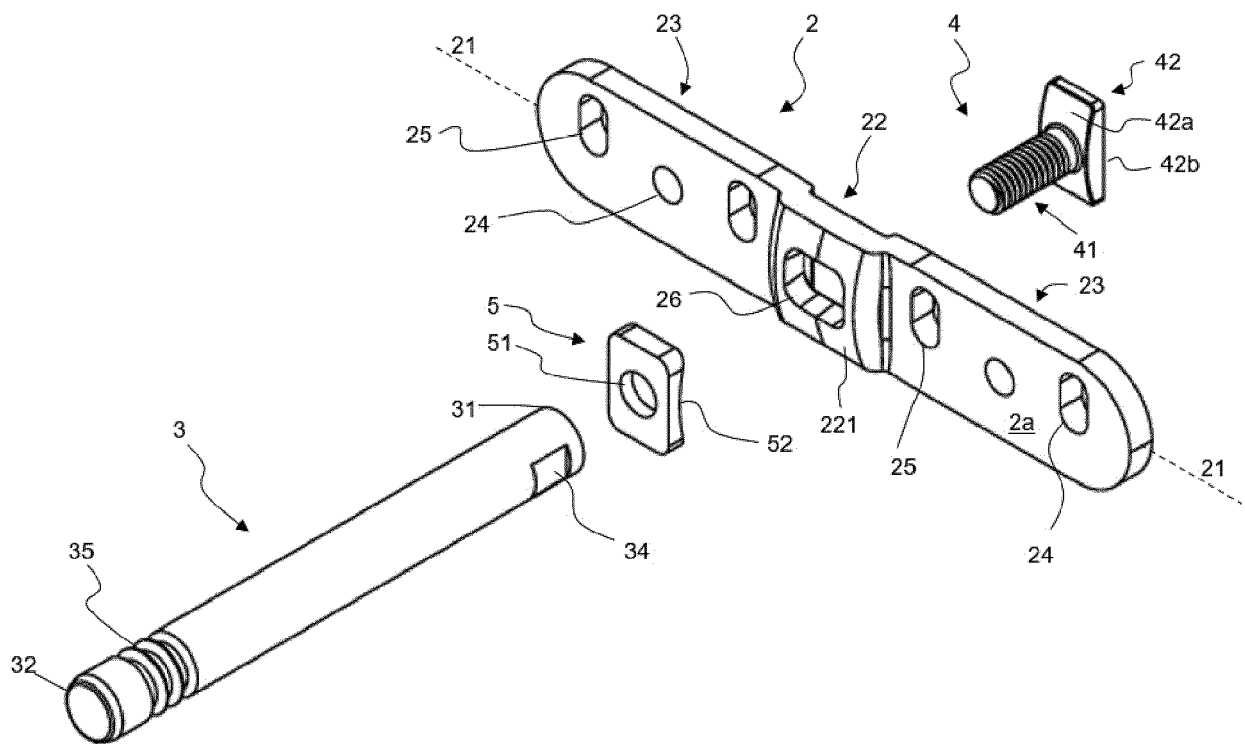


Fig. 3

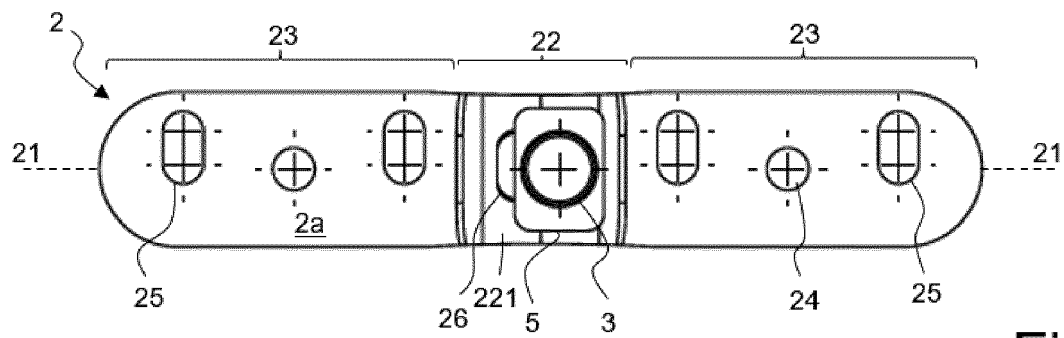


Fig. 4.1

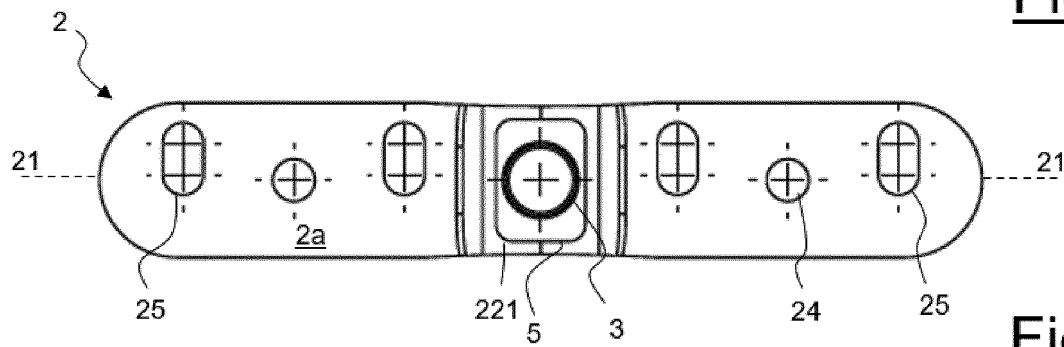


Fig. 4.2

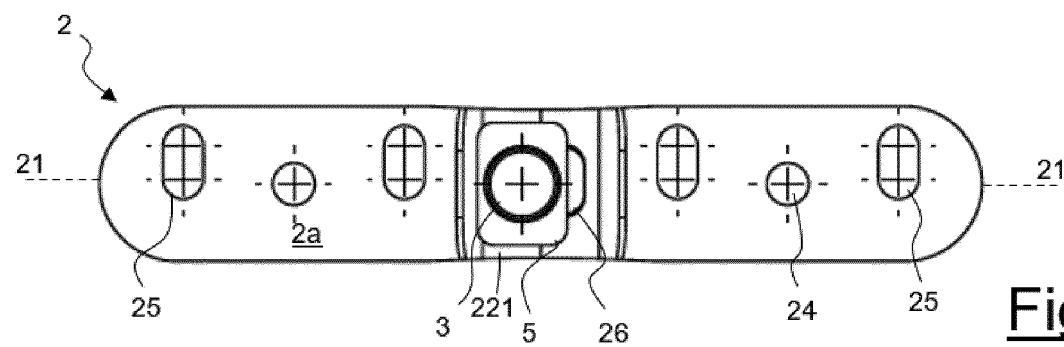


Fig. 4.3

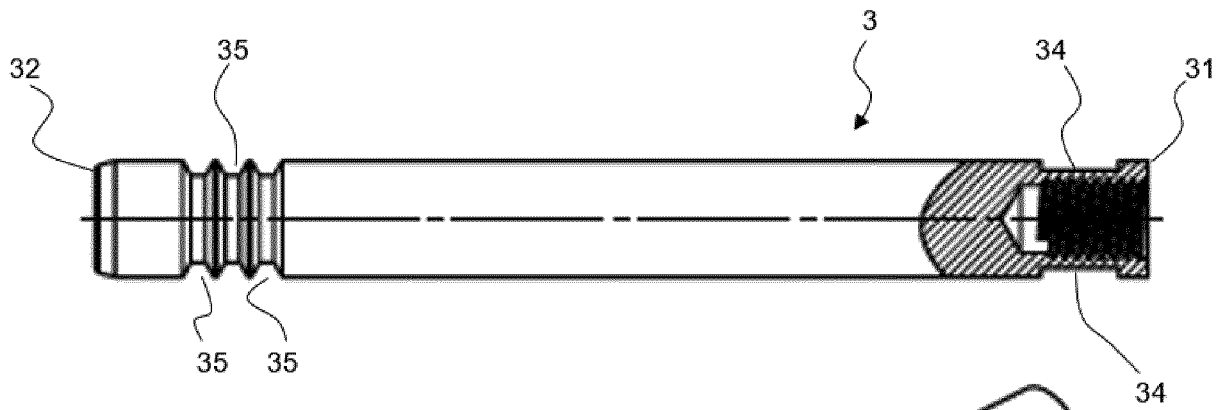


Fig. 5.1

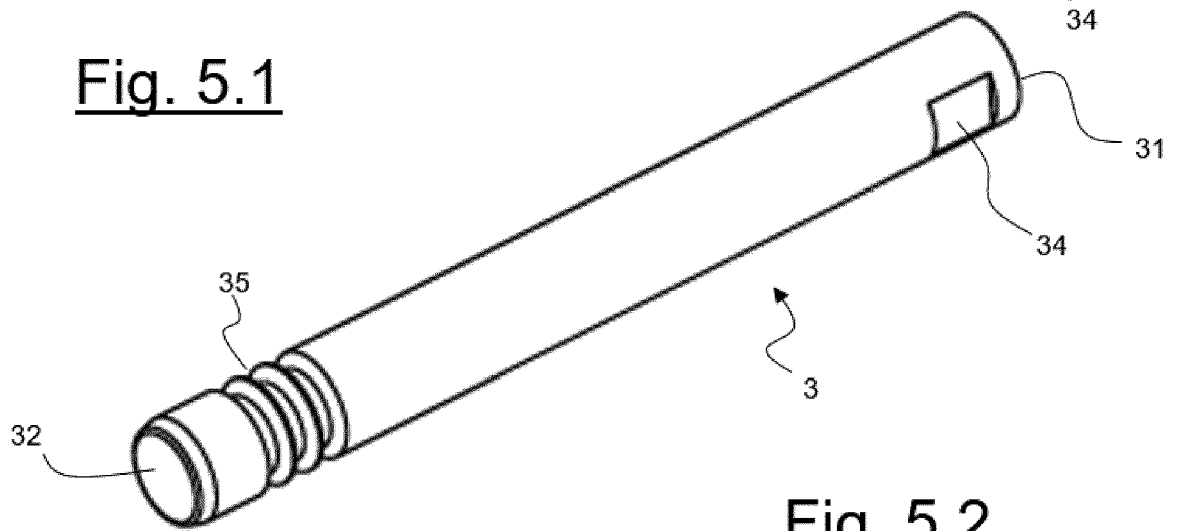
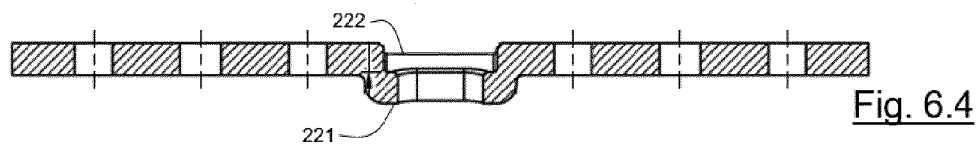
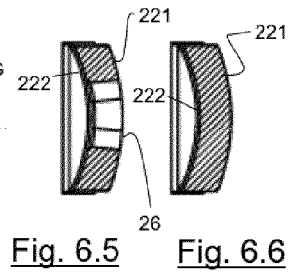
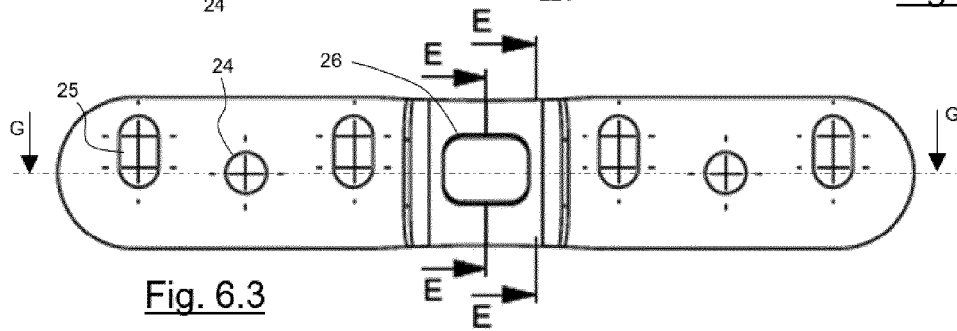
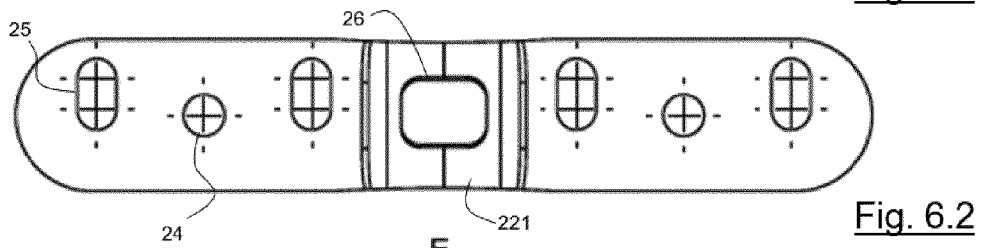
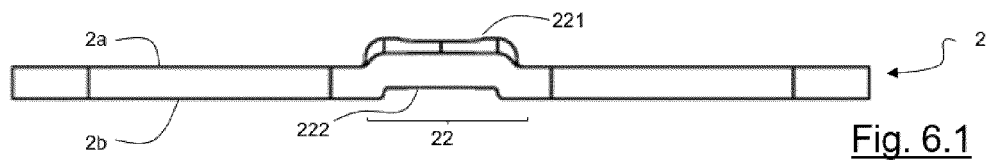


Fig. 5.2



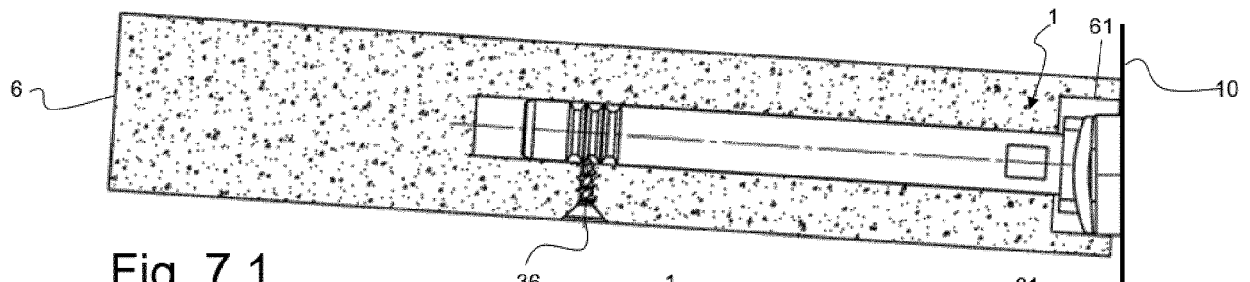


Fig. 7.1

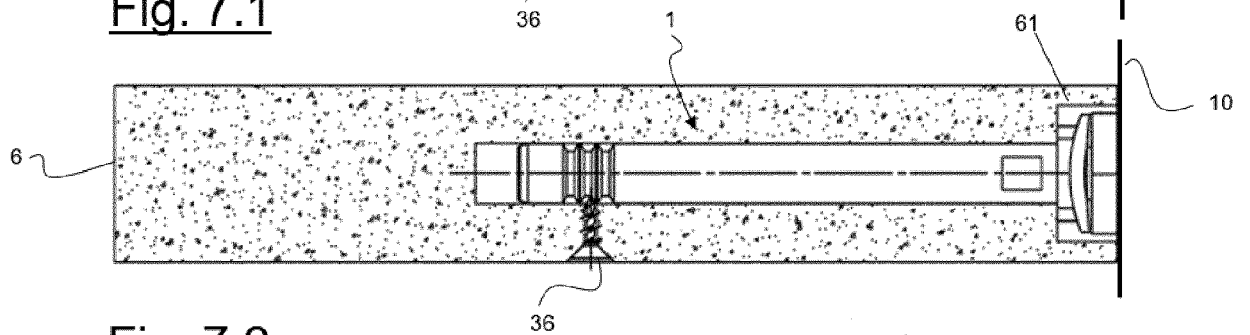


Fig. 7.2

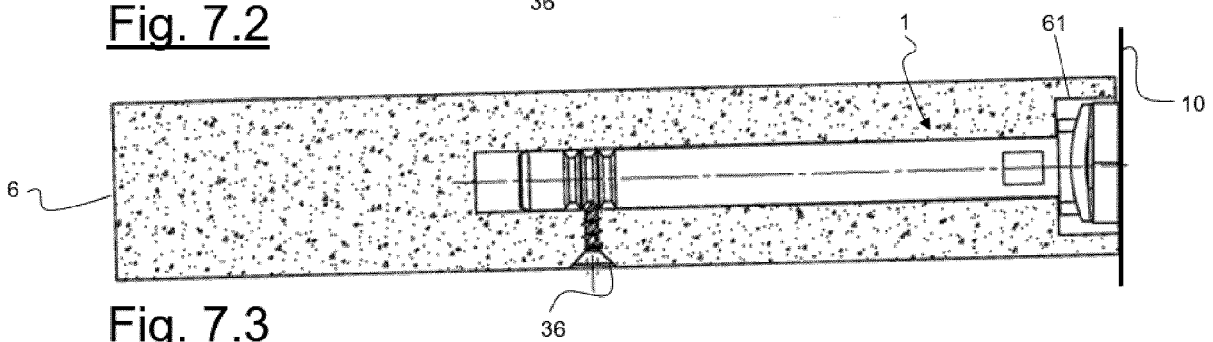


Fig. 7.3



EUROPEAN SEARCH REPORT

Application Number

EP 24 17 3938

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EPO FORM 1503 03.82 (P04C01)

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 3 September 2024	Examiner Martinez Valero, J
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