



(11)

EP 4 223 966 A1

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
09.08.2023 Bulletin 2023/32

(21) Application number: 23153626.9

(22) Date of filing: 27.01.2023

(51) International Patent Classification (IPC):  
**E05D 3/02 (2006.01)** **E05D 5/04 (2006.01)**  
**E05D 11/10 (2006.01)** **E05F 1/12 (2006.01)**  
**E05F 3/20 (2006.01)** **E05F 5/10 (2006.01)**

(52) Cooperative Patent Classification (CPC):  
**E05D 5/046; E05D 3/02; E05D 11/1064;**  
**E05F 1/1253; E05F 3/20; E05F 5/10;**  
E05Y 2201/256; E05Y 2201/264; E05Y 2201/41;  
E05Y 2201/638; E05Y 2201/682; E05Y 2800/676;  
E05Y 2900/20

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

(30) Priority: 08.02.2022 IT 202200002207

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## (54) WIDE OPENING SIMPLIFIED SOFT-CLOSE HINGE

(57) Wide opening simplified soft-close hinge (11) suitable to be arranged between a fixed part of a cabinet (M), such as an upper wall (16) of an inner compartment (V) of the cabinet (M), and a moving part of a cabinet for closing the compartment, such as a door (15), wherein the hinge comprises

- a mounting plate (12) to said fixed part of the cabinet M and a fastening plate (14) to said moving part for closing the compartment, such as the door (15), wherein
- said mounting plate (12) is provided with two extensions (21), spaced from each other and directed towards the fastening plate (14), wherein said two extensions (21) are each provided with a through hole (22), where each through hole is aligned with the other to receive a rotation pin (18) of the hinge,
- said fastening plate (14) is also provided with two extensions (28), arranged at an end of the fastening plate (14), facing the mounting plate (12) and spaced from each other so as to be able to be placed side by side with the two extensions (21) of the mounting plate (12) and each also provided with a through hole (29) suitable to be placed side by side and aligned with the holes (22) of the mounting plate (12) and to receive the rotation pin (18) of the hinge,
- said mounting plate (12) is also provided, in the body thereof in a position between said two extensions (21), with a soft-close cylinder (26),
- said fastening plate (14) is further provided, in the body thereof in a position between said two extensions (28) thereof, with a cam element (30) for operating said

soft-close cylinder (26) and springs (38) for the return and stable positioning of the hinge, and a snap action and return pin (19) inserted passing through slots (34) obtained on opposite sides of said fastening plate (14) and in a slot (33) of said cam element (30), - wherein said fastening plate (14) can rotate between a hinge open position and a hinge closed position relative to said mounting plate (12) through an angle of 90° or greater relative to each other, there being provided in said two positions at least two rounded seats or recesses (23, 24) to be able to house at least part of said snap action and return pin (19) .

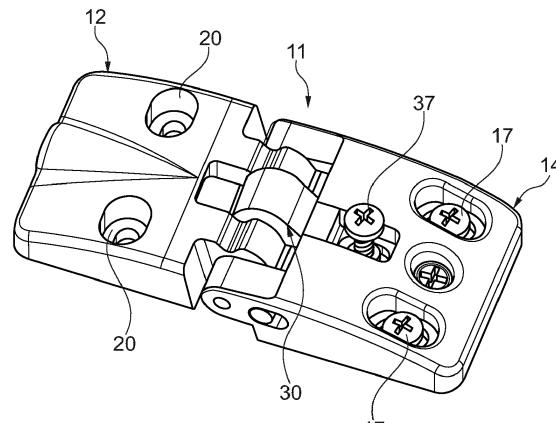


Fig. 1

## Description

**[0001]** The present invention relates to a wide opening simplified soft-close hinge.

**[0002]** Among the many types of hinge, it must be noted that in the furniture production sector, in particular in furniture for caravans, camper vans, boats, road transport vehicles, etc., hinges are known and used for pivoting closing doors of various types of compartment around a horizontal axis. In general, this rotation axis is substantially coincident with the upper side of the door, similar to that used in wall-mounted cabinets or similar.

**[0003]** Hinges of this type are useful to allow the door to rotate between a closed position of the opening of the compartment, in which it is arranged vertically or tilted towards the furniture and in any case directed downwards, and an open position, in which it is open and moved upward, rotated through an angle of 90° or even greater relative to the preceding closed position.

**[0004]** In general, these hinges are composed of pairs of four-bar linkages, which on one side have a base element, such as a mounting plate to a fixed part of the structure of the cabinet in which the compartment is provided and a fastening plate to a moving door for closing said compartment. As stated, the aforesaid hinges are such as to be able to pass from a closed configuration to an open configuration in which the fastening plate of the door lies on a different plane relative to the mounting plate of fixed part of the cabinet, when passing from one position to another, due to the rotation of the door through an angle of 90°, or greater than 90°.

**[0005]** In these arrangements of cabinets or furniture in general, it must be possible to maintain the weight of the rotating door in the open position and it is also necessary to guarantee a more tilted and be able to guarantee a more tilted and recessed correct vertical closed position and for this purpose specific springs are provided.

**[0006]** These known hinges with opening angle greater than 90° also have some drawbacks, including the complexity of four-bar linkages, the arrangement of the springs with closing with force exerted by the springs with rapid rotation of the door and slamming and risk for the integrity of the cabinet and of the user. The presence of a slow-closing element interposed can improve operation but the complexity of the solution remains. Moreover, the presence of the four-bar linkages makes the assembly cumbersome and difficult to install.

**[0007]** JP 2009 121169 A describes a hinge according to the preamble of claim 1.

**[0008]** The general object of the present invention is to produce a wide opening slow-close hinge with a particularly simple construction and with reduced overall dimensions so as to be easy to position.

**[0009]** Another object of the present invention is to produce a hinge that is capable of solving the aforesaid drawbacks of the prior art in a very simple, economical and particularly functional manner.

**[0010]** Yet another object of the present invention is to produce a compact hinge, with minimum overall dimensions and which does not require large seats in the cabinet and in the door.

**[0011]** The aforesaid objects are achieved by a wide opening simplified slow-close hinge according to the independent claim 1 and the following sub-claims.

**[0012]** The structural and functional features of the present invention and its advantages in relation to the prior art will be even more evident from examination of the following description, referring to the accompanying schematic drawings, which show an example of embodiment of the invention.

**[0013]** In the drawings:

Fig. 1 shows a perspective view of a wide opening simplified slow-close hinge according to the present invention open and from above;

Fig. 2 shows the same hinge as Fig. 1 overturned and with its components in an exploded view relative to the two plates;

Fig. 3 is a plan view from below of the hinge of the invention in an open position when it opens the door;

Fig. 4 is a sectional view along the line IV-IV of the hinge shown in Fig. 3 in open position;

Fig. 5 is a sectional view along the line V-V of the hinge shown in Fig. 3 in open position;

Fig. 6 is a plan view from below of the hinge of the invention in closed position, when it closes a door of a cabinet;

Fig. 7 is a sectional view along the line VII-VII of the hinge shown in Fig. 6 in closed position;

Fig. 8 is a sectional view along the line VIII-VIII of the hinge shown in Fig. 6 in closed position;

Figs. 9, 10 and 11 show side elevation and perspective views of a cabinet with closing door in open position and a side elevation view in closed position of a compartment of the cabinet.

**[0014]** In the following description, to illustrate the figures identical reference numbers are used to indicate constructive elements with the same function. Moreover, for clarity of illustration, some numerical references may not have been repeated in all the figures.

**[0015]** Indications such as "vertical" and "horizontal" "upper" and "lower" (in the absence of other indications) must be interpreted with reference to the assembly (or operating) conditions and with reference to the normal terminology in use in everyday language, where "vertical" indicates a direction substantially parallel to the direction of the gravitational force vector "g" and horizontal a direction perpendicular thereto.

**[0016]** With reference to the figures, provided by way of nonlimiting example, these show an embodiment of a wide opening simplified slow-close hinge indicated as a whole with 11 and having an opening angle greater than 90°, as can be seen in the figures.

**[0017]** The hinge 11 comprises a mounting plate 12 to

a fixed part of a cabinet M, such as an upper wall 16 of an internal compartment V of the cabinet M, and a fastening plate 14 to a moving part for closing the compartment, such as a door 15.

**[0018]** In the use of the hinge 11 in a cupboard door 15, for example of a caravan, the mounting plate 12 is connected under and inside an upper wall 16 of a fixed part of the cabinet that defines the compartment V subsequently closed by the door 15, and the fastening plate 14 is connected inside the door 15 that closes the front of the compartment (Figs. 9, 10, 11). A connection and fastening of this kind can take place, for example, with conventional screws 17 or other similar threaded fastening members.

**[0019]** Provided between the mounting plate 12 and the fastening plate 14 are a hinge rotation pin 18 and a snap action and return pin 19 in the hinge open position, which connect them rotationally and operate them between open and closed position relative to one another.

**[0020]** In particular, the mounting plate 12 to the upper wall 16 of the fixed part of the cabinet M is provided with holes 20 that receive the fastening screws 17. Moreover, at an end facing the mounting plate 12 two extensions 21 are provided, spaced from each other and directed towards the fastening plate 14. These two extensions 21 are provided with through holes 22 aligned with each other to receive the rotation pin 18 of the hinge and ends provided with first rounded seats or recesses 23 to be able to house at least part of the aforesaid second pin 19 with hinge in open position, as will be seen below.

**[0021]** In the underneath part thereof, the two extensions 21 are provided with second rounded seats or recesses 24 to be able to house the aforesaid second pin 19 with hinge in closed position, as will be seen below.

**[0022]** In a central position between the two extensions 21 a blind circular seat 25 is also provided, obtained in the body of the mounting plate 12, in which a soft-close cylinder 26 with related rod 27 is arranged, directed towards the inside of said seat 25.

**[0023]** The fastening plate 14 which, as stated, is associated with the mounting plate 12, is in turn provided with a pair of extensions 28, arranged at an end of the fastening plate 14, spaced from each other and facing the mounting plate 12. The extensions 28, which are directed towards the mounting plate 12, are such as to be able to be placed side by side with the extensions 21 of the mounting plate 12. The extensions 28 are also provided with through holes 29 suitable to be placed side by side and aligned with the holes 22 of the mounting plate 12 and to receive the rotation pin 18 of the hinge.

**[0024]** Between the two extensions 28 the body of the mounting plate receives and houses a cam element 30 for operation of the soft-close cylinder 26. In particular, this cam element 30 has a cam end 31 that faces and coacts with the soft-close cylinder 26. This cam element 30 is also provided with a through hole 32 that receives the rotation pin 18 of the hinge followed by a through slot 33 in which the snap action and return pin 19 is arranged,

so as to be able to move inside the slot 33.

**[0025]** This snap action and return pin 19 is also arranged in through slots 34 obtained on opposite sides of said fastening plate 14 directly inside the body of the fastening plate 14 upstream of the through holes 29 obtained in the extensions 28 of the fastening plate 14.

**[0026]** This cam element 30 is positioned to be able to move forwards and backwards relative to the body of the fastening plate 14 by means of an appendage 35 thereof obtained at the opposite end relative to the cam end 31. This appendage 35 is also provided with a slot 36 suitable to receive a fastening screw 37 to the fastening plate 14 relative to which the entire cam element 30 is free to move.

**[0027]** Moreover, two return and stable positioning springs 38 are provided, arranged between the extensions 28 and the cam element 30, at the sides of the cam element 30 and on opposite sides. The two springs 28 at a first end are housed inside two blind seats 39 of the fastening plate 14. At the second end thereof, the two springs 38 are arranged inside cavities 42 of a pair of pushers 40 provided, at outer ends directed towards the mounting plate 12, with rounded seats or recesses 41, similar and complementary to the seats 23 of the extensions 21 of the mounting plate 12, so that they too are able to house at least part of the second pin 19.

**[0028]** In the passage from the open configuration (Figs. 1 to 5) to the closed configuration (Figs. 6 to 8), the elements of the hinge 11, i.e., the two plates, namely the mounting plate 12 and the fastening plate 14, are able to pivot around the rotation pin 18.

**[0029]** In the open hinge positions, as can be seen in Figs. 1 to 5, the springs 38 maintain a stable position due to the fact that they thrust the pushers 40 against the snap action and return pin 19 in the hinge open position. In fact, the rounded seats or recesses 41 of the pushers 40 house at least one part of the snap action and return pin 19 so that such position is stably maintained. The pin 19 is housed at one end of the through slot 33 and the cam element 30 with the cam end 31 thereof is arranged against, and to coact with, the soft-close cylinder 26, due to the rotation pin 18 of the hinge 30.

**[0030]** When wishing to pass to the closed position, rotating the hinge 11, or the fastening plate 14, around the rotation pin 18, the springs exert a return action and the cam end 31 of the cam element 30 acts on the soft-close cylinder 26 which is loaded, causing the return of its rod 27 abutting in the seat 25.

**[0031]** Simultaneously, the snap action and return pin 19 exits from the first rounded seats or recesses 23 of the two extensions 21 of the mounting plate 12 and, sliding on the rounded surfaces 13 of the extensions 21, when the door 15 of the cabinet 15 rotates, snaps into position in the second rounded seats or recesses 24 provided in the part underneath the two extensions 21 of the mounting plate 12 and is stably housed therein.

**[0032]** In this way, stable positioning of the closed position, with the door 15 closing the compartment V of the

cabinet M, is achieved.

**[0033]** It must be noted that the pushers 40 resting on the snap action and return pin 19, ensure a thrust even if the hinge is not perfectly adjusted.

**[0034]** In fact, on one side the rounded seats or recesses 41 of the pushers 40 house at least a part of the pin 19 in two spaced positions at the sides of the cam element 30.

**[0035]** On the other side, the snap action and return pin 19 in turn rests on the two rounded seats or recesses 23 of the two extensions 21 of the mounting plate 12 in a first position and on the two rounded seats or recesses 24 provided in the part underneath the two extensions 21 of the mounting plate 12. In any case, the production of a thrust between the parts to ensure optimal operation of the hinge according to the invention is always guaranteed.

**[0036]** This makes it possible to obtain an advantageous and useful arrangement of parts, making the hinge particularly functional, while also being of simple construction and operation.

**[0037]** All this is achieved in a simple and immediate manner, without slamming, due to the presence of the soft-close cylinder 26, which dampens the closing force of the springs 36.

**[0038]** The hinge is particularly compact and simple in construction and has minimum overall dimensions, due to the presence of its two plates 12 and 14, which can be installed in relatively small spaces.

**[0039]** Advantageously, moreover, plastic materials are widely used to produce the hinge according to the present invention, for example in the plates 12, 14, in the cam element 30, in the pushers 40, etc., guaranteed for a wide temperature range and therefore suitable for the specific use, for example, in particular for furniture for caravans, camper vans, boats, road transport vehicles, etc.

**[0040]** The particular arrangement described above allows considerably silent operation, as mentioned without slamming.

**[0041]** Use with special aluminium profiles, customised for the specific use, must not be excluded.

**[0042]** It has also been seen, as shown in Figs. 9 to 11, that a wide closing angle is possible even for tilting doors like those shown.

**[0043]** In fact, Fig. 9 shows how the door 15 is arranged in the open position supported by the hinge of the present invention.

**[0044]** A minimum force must be used for opening, due to the positioning of the springs, to the shape of the cam element and to the rounded seats provided.

**[0045]** The weight of this hinge is truly limited, as are its dimensions and the spaces required for its positioning.

**[0046]** The object set forth in the introduction of the description is thus achieved.

**[0047]** The scope of protection of the present invention is defined by the appended claims.

## Claims

**1.** Wide opening simplified soft-close hinge (11) suitable to be arranged between a fixed part of a cabinet (M), such as an upper wall (16) of an inner compartment (V) of the cabinet (M), and a moving part of a cabinet for closing the compartment, such as a door (15), wherein the hinge comprises:

- a mounting plate (12) to said fixed part of the cabinet M and a fastening plate (14) to said moving part for closing the compartment, such as the door (15), wherein

- said mounting plate (12) is provided with two extensions (21), spaced from each other and directed towards the fastening plate (14), wherein said two extensions 21 are each provided with a through hole (22), where each through hole is aligned with the other to receive a rotation pin (18) of the hinge,

- said fastening plate (14) is also provided with two extensions (28), arranged at an end of the fastening plate (14), facing the mounting plate (12) and spaced from each other so as to be able to be placed side by side with the two extensions (21) of the mounting plate (12) and each being provided with a through hole (29) suitable to be placed side by side and aligned with the holes (22) of the mounting plate (12) and to receive the rotation pin (18) of the hinge,

- said mounting plate (12) is also provided, in the body thereof in a position between the two extensions (21), with a soft-close cylinder (26),

- said fastening plate (14) is further provided, in the body thereof in a position between said two extensions (28) thereof, with a cam element (3) for operating said soft-close cylinder (26) and springs (38) for the return and stable positioning of the hinge,

- wherein said fastening plate (14) can rotate between a hinge open position and a hinge closed position relative to said mounting plate (12) through an angle of 90° or greater relative to each other,

### characterised in that

said fastening plate (14) is also provided with a snap action and return pin (19) inserted passing through slots (34) obtained on opposite sides of said fastening plate (14) and in a slot (33) of said cam element (30), and **in that** in said two positions at least two seats or recesses (23, 24) are obtained to house at least part of said snap action

and return pin (19).

2. Hinge according to claim 1, **characterised in that** the free ends of said springs (38) are arranged inside pushers (40), which at their ends directed towards said mounting plate (12) and said snap action and return pin (19) are provided with rounded seats or recesses (41), similar and complementary to the seats (23) of the extensions (21) of the mounting plate (12), so that they too are able to house at least part of the snap action and return pin (19). 5
3. Hinge according to claim 1 or 2, **characterised in that**, to be able to house at least part of said snap action and return pin (19), said at least two rounded seats or recesses (23, 24) are arranged one on said extensions (21) of the mounting plate (12) in a position facing said fastening plate (14) and the other moved by an angle of 90° or greater relative to the first (23). 15
4. Hinge according to one or more of the preceding claims, **characterised in that** said cam element (30) is provided with a cam end (31) which faces and coacts through thrust with said soft-close cylinder (26), where said cam element (30) is also provided with a through hole (32) that receives said rotation pin (18) of the hinge followed by a through slot (33) in which said snap action and return pin (19) is arranged, so as to be able to move inside the slot (33). 20
5. Hinge according to claim 4, **characterised in that** said cam element (30) is positioned to move forwards and backwards relative to the body of the fastening plate (14) by means of an appendage (35) thereof obtained at the opposite end relative to the cam end (31), where said appendage (35) is also provided with a slot (36) suitable to receive a fastening screw (37) to the fastening plate (14) relative to which the whole cam element (30) is free to move. 35
6. Hinge according to one or more of the preceding claims, **characterised in that** many of the elements of which the hinge is composed are made of plastic materials, such as the plates (12, 14), the cam element (30), the pushers (40), etc. 45

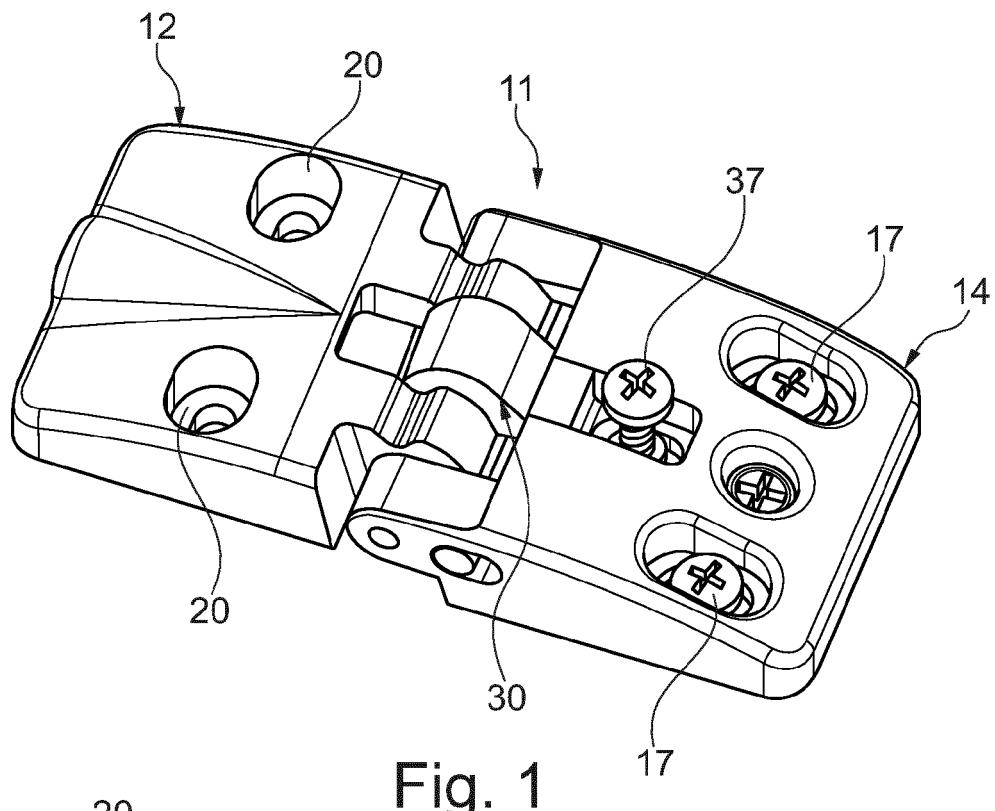


Fig. 1

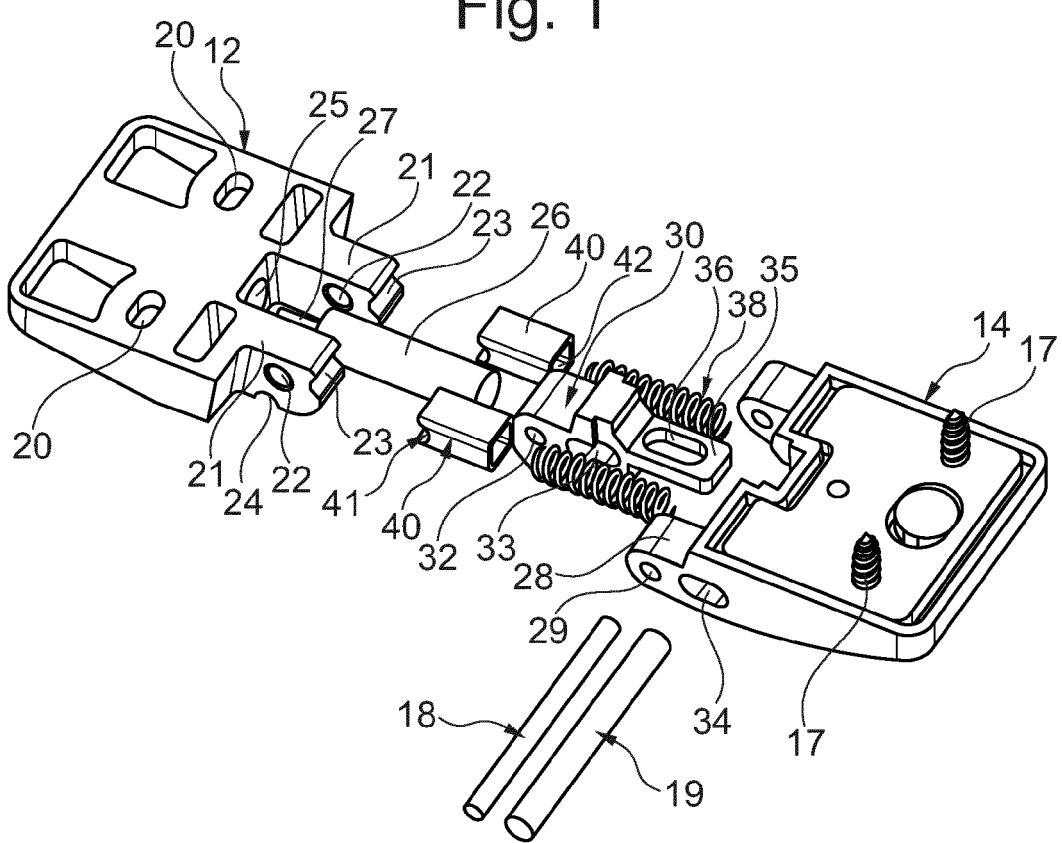


Fig. 2

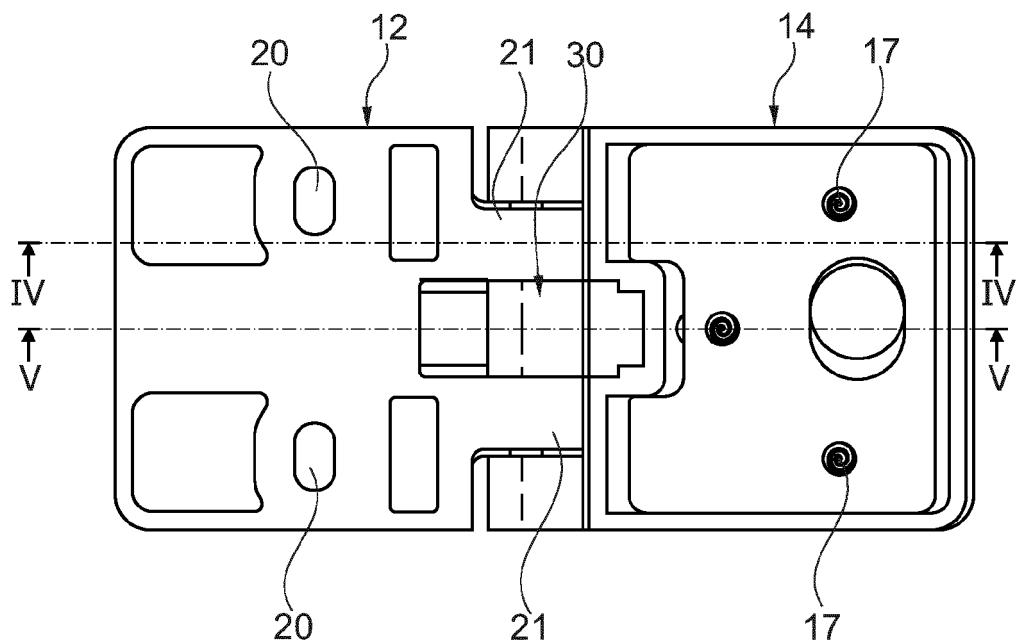


Fig. 3

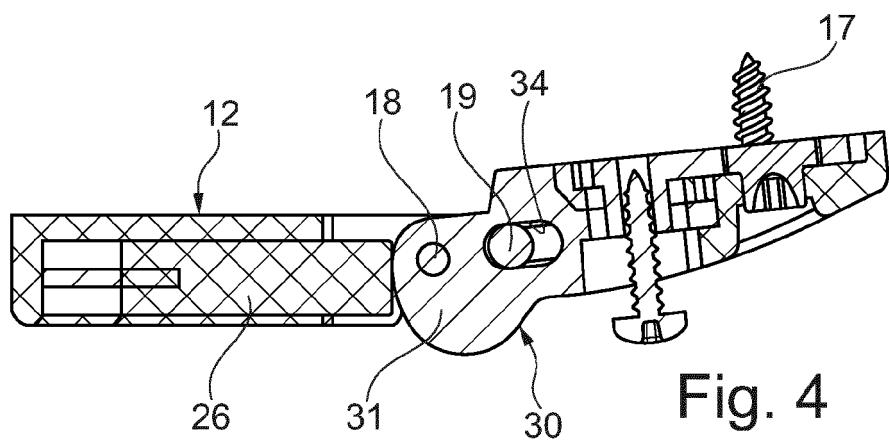


Fig. 4

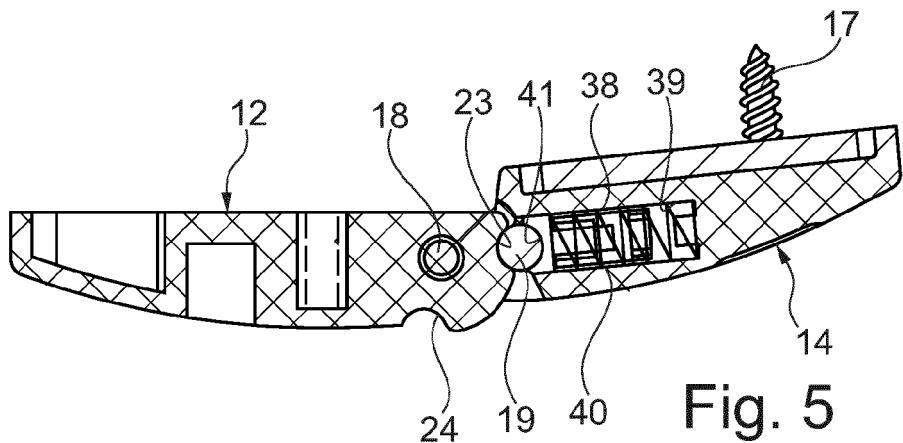
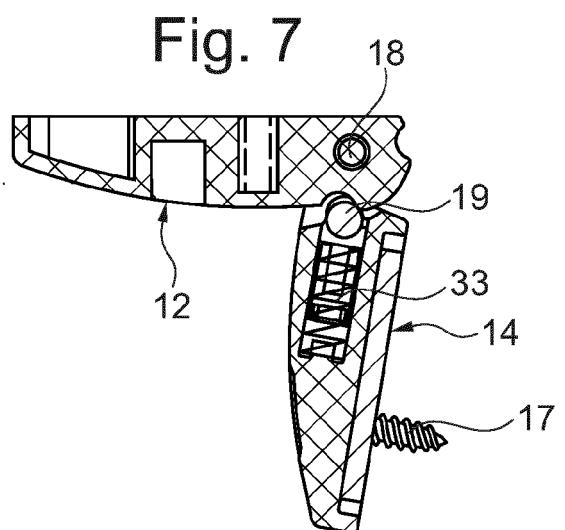
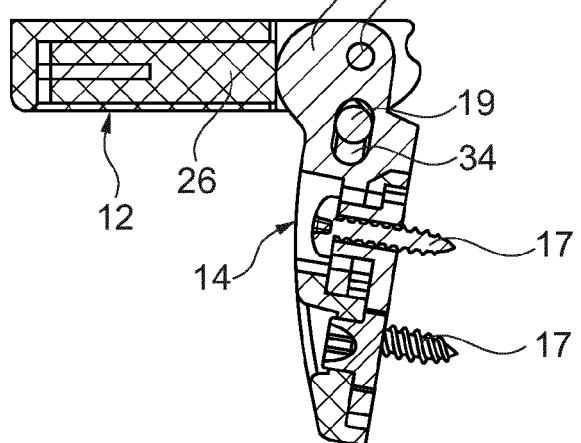
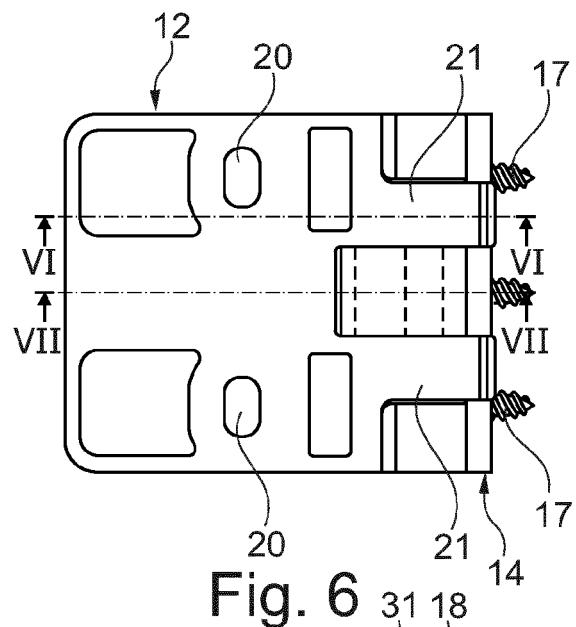


Fig. 5



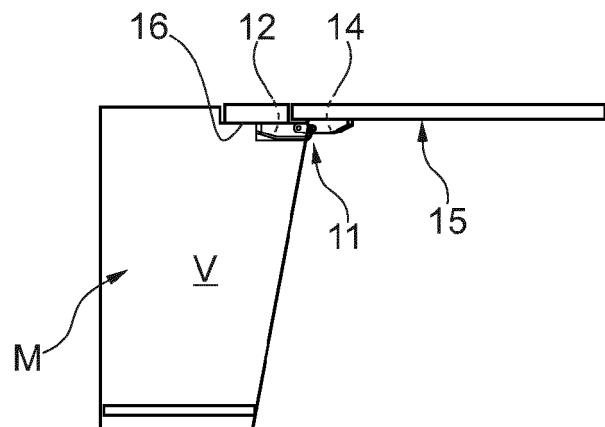


Fig. 9

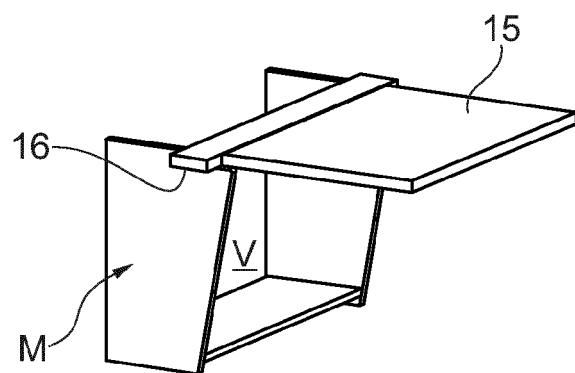


Fig. 10

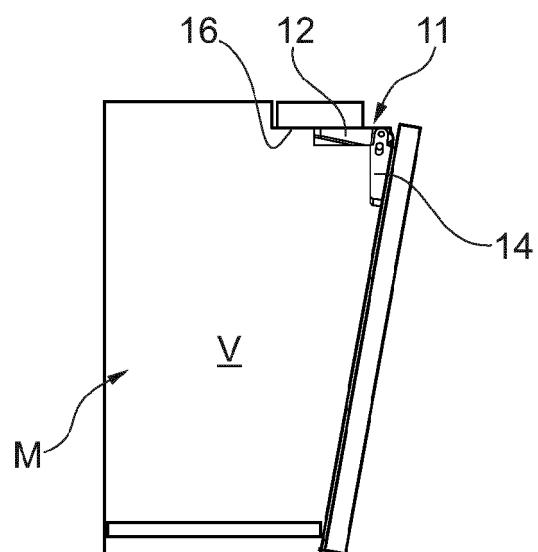


Fig. 11



## EUROPEAN SEARCH REPORT

Application Number

EP 23 15 3626

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20	<b>A</b> EP 3 181 787 A1 (SYSTEM HOLZ S R L [IT]) 21 June 2017 (2017-06-21) * paragraph [0043] - paragraph [0094]; figures 1-23 *	1-6	
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30			TECHNICAL FIELDS SEARCHED (IPC)
35			E05D E05F
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45			
50	1 The present search report has been drawn up for all claims		
55	1 Place of search The Hague	1 Date of completion of the search 16 June 2023	1 Examiner Viethen, Lorenz
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