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(54) Hinge for flap doors of furniture elements

(57) Hinge for flap doors of furniture elements, the doors being able to swing around a horizontal axis to assume a substantially horizontal open position to allow access inside the furniture element and a substantially vertical closed position, the hinge comprising a first hollow body (10) fastened to the internal surface of the base (B) of the furniture element and a second hollow body (11) fastened to the internal surface of the door (A).

The first and the second body of the hinge are connected by means of a pair of levers (23), parallel to each other, and a lever (24), interposed between said pair of levers (23), said levers (23, 24) being pivoted in the first body (10) and in the second body (11) and in an intermediate adjusting block (18), respectively, so that the lower and upper end of the door (A) remain, respectively, above the bottom surface of the base (B) of the furniture element and below the upper surface of the top wall (T) of the furniture element during the door opening/closing movement.

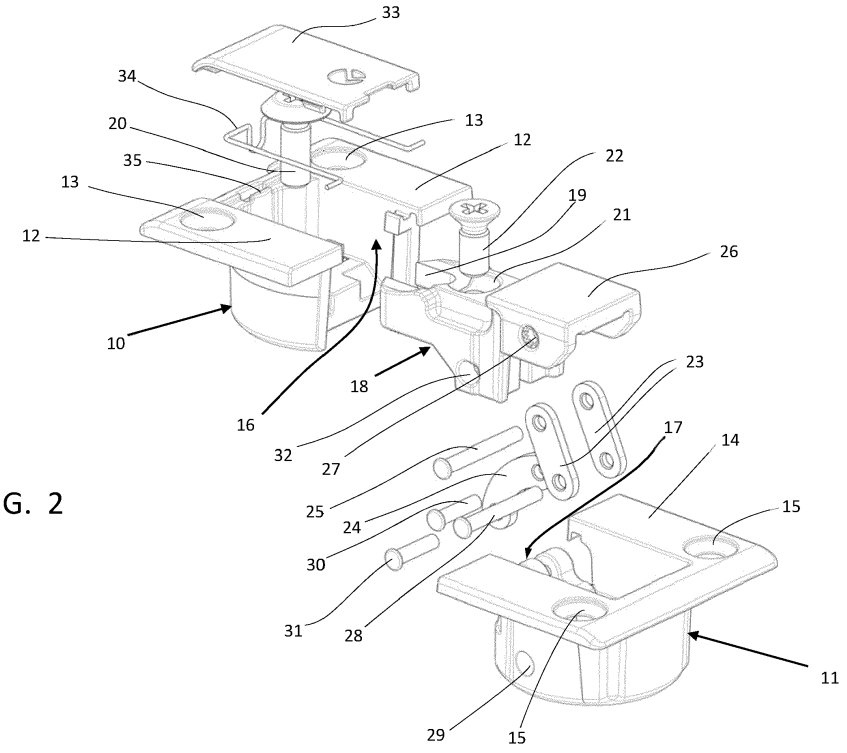

FIG. 2

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Description

TECHNICAL FIELD OF INVENTION

[0001] The present invention refers to an improved hinge for furniture flap doors, in particular for wall-hung furniture elements but also for stacked furniture elements and floor-mounted furniture elements.

PRIOR ART

[0002] As is well known, furniture elements can be provided with closing flaps or doors that are hinged on the side walls of the furniture and that open by rotating around a vertical axis, or the flaps are hinged on the lower wall (base) or upper wall (top) of the furniture elements and open by rotating around a horizontal axis.

[0003] The present invention concerns this second type of flap doors. One example is represented by British Patent GB 1374661.

[0004] One of the main problems with flap doors is to allow the closing of the furniture element so that the edges of the door and the respective edges of the walls of the furniture element are substantially flush with each other, and to provide, in the open condition, a position in which the edge of the door is flush with the furniture wall. These conditions must be satisfied to guarantee a correct positioning of the door, in both the closed and the open condition, so as to avoid having gaps in the surfaces between the door and the furniture walls. In particular, a projection of the edge of the door below or above the furniture element, in the open or closed position of the door, could create some problems for the user.

[0005] Another problem with flap doors is to have the hinges completely embedded in the body of the door and in the wall of the furniture element, so as to avoid the formation of obstacles to the movement of objects when they are placed in or removed from the furniture element.

[0006] Another problem with flap doors is to allow the stacking of furniture elements provided with this type of doors or their installation on the floor, in particular when the door and the element on which the door is hinged are of different thicknesses, naturally within certain limits.

[0007] A further problem with flap doors is to close the hinges so as to eliminate the possibility of dust and dirt settling on the fastening screws and, in particular, on the adjusting screws, creating hygienic and functional problems.

SUMMARY OF THE INVENTION

[0008] The main objective of the invention is thus to provide an improved hinge for flap doors that solves the above-mentioned problems. These and other objectives will be achieved with a hinge having the characteristic defined in claim 1 of the present patent.

[0009] Further details of the hinge according to the invention are specified in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Characteristics and advantages of the present invention will become more evident from the following description of an embodiment given by way nonlimiting example with reference to the enclosed figures, wherein:

- figure 1 illustrates a hinge according to the invention in a perspective view;
- figure 2 is an exploded view of the hinge of figure 1;
- figure 3 illustrates a side view, partially in cross section, of a furniture element with the door in a completely open position connected to the furniture with the hinge according to the invention;
- figures 4 and 5 illustrate, in side and partially cross-sectional views, the furniture element of figure 3 with the door in two different operating positions intermediate between the opened and closed position;
- figure 6 is a side view showing, partially in cross section, the furniture element of figure 3 with the door in a completely closed position.

DETAILED DESCRIPTION OF THE INVENTION

[0011] With particular reference to figures 1 and 2, the hinge according to the invention includes a first body 10 fastened to the internal surface of the lower wall, or base B, of a furniture element, and a second body 11 fastened to the internal surface of the door A of the furniture element. The first and the second body are connected to each other so that the second body can rotate with respect to the first body, or vice versa, to allow the opening and closing of the door.

[0012] The solution described herein refers to a flap door hinged at the base (B) of the furniture element so that it rotates upward to the closed position. Naturally, the solution can be similarly applied to a door hinged to the top wall (T) of the furniture element so as to rotate downward to the closed position.

[0013] The first body 10 has preferably a hollow cylindrical part that is inserted into a seat of corresponding shape formed in the base B of the furniture element. The cylindrical part of the first body is provided with two wings 12 diametrically opposite to each other and orthogonal to the axis of the body, in each of which is formed a through hole 13 for at least one screw (not shown) that is used to fasten the first body to the base B. When the first body is inserted and fastened in the base B, its wings are coplanar with the surface of the base B.

[0014] Similarly, the second body 11 has a hollow cylindrical part that is inserted into a seat of corresponding shape formed in the door A. The cylindrical part of the second body is provided with a flange 14 orthogonal to the axis of the body, in which are formed two or more through holes 15 for as many screws (not shown) that are used to fasten the second body of the door A. When the second body is inserted and fastened in the door A, the flange 14 is coplanar with the surface of the door A.

[0015] The main characteristic of the invention consists of the linking system of the parts that make up the hinge.

[0016] In this regard, the cylindrical parts of the first and the second body are, respectively, provided with an opening 16 and 17 on their side wall, the two openings facing each other (Fig. 2).

[0017] The hinge according to the invention includes, moreover, an intermediate adjusting block 18 contained in the hollow cylindrical parts of the first and the second body, passing through the lateral openings 16 and 17 in the first and the second body.

[0018] The part of the intermediate block that is housed in the hollow of the first body of the hinge includes a first seat 19 in which is inserted a first screw 20 that is used to fasten the block to the first body, and a second seat 21 in which is inserted a second screw 22 that is used to adjust the hinge.

[0019] The intermediate block 18 is connected to the second body 11 of the hinge through a pair of levers 23, preferably rectilinear, that are parallel to each other and pivoted in the second body of the hinge and in the adjusting block, respectively, and through a lever 24, preferably arc-shaped, interposed between said rectilinear levers and pivoted in the first body of the hinge and in the adjusting block, respectively.

[0020] Naturally, the levers 23 and 24 can also have different shapes, provided they maintain the necessary functionality, as described hereafter. The levers 23 can also be made in a single piece, or they can be connected by a further transversal pin. Furthermore, the levers 23 and 24 can be reversed in their reciprocal position, in the sense that it is possible to have a lever 23 interposed between two levers 24.

[0021] Each rectilinear lever 23 is rotatably hinged at one end to a first pin 25 that is inserted into an extension 26 in the shape of an upside-down U of the intermediate block, passing through relative holes 27 (only one being shown in fig. 2). This extension in the shape of an upside-down U is housed in the hollow of the second body of the hinge, so as to be coplanar with the surface of the flange 14 of the same body.

[0022] The opposite ends of the rectilinear levers are rotatably pivoted on a second pin 28 that is fastened to the cylindrical part of the second body of the hinge, passing through relative holes 29 (only one being shown in fig. 2).

[0023] The arc-shaped lever 24, arranged between the two rectilinear levers 23, has an end that is rotatably pivoted on a third pin 30. This third pin 30 is fastened to the cylindrical part of the second body 11 of the hinge, while the other end of the arc-shaped lever 24 is pivoted on a fourth pin 31 fastened to the intermediate block 18, passing through relative holes 32 (only one being shown in fig. 2).

[0024] The specific shape of the elements making up the hinge according to the invention and their articulated connection provide the desired result of realizing a hinge that makes it possible to open the door of the furniture element so as to align the same door with the base of the furniture element.

[0025] In addition, as shown in figures 3 to 5, the lower and upper ends of the door A remain, respectively, above the bottom surface of the base B of the furniture element and below the upper surface of the top wall (T) of the furniture element during the door opening/closing movement.

[0026] This feature results from the reciprocal position of the pins 25, 28, 30 and 31. Specifically, the pin 28 always remains at a level lower than that of the fixed pin 25, and swings for a limited arc of a circle around the same pin 25. The pin 30 swings around the fixed pin 31, covering an arc of a circle whose ends remain always below the level of the fixed pin 25 (compare figures 3 to 5).

[0027] This innovative solution makes it possible to stack furniture elements provided with flap doors upon each other, as well as to set them down on any top, avoiding any interference in the operation of the doors.

[0028] Another characteristic of the hinge according to the invention is the fact that the first body 10 of the hinge is provided with a lid 33 that completely closes the space between the two wings 12 of the body itself. The lid 33 is preferably hinged on the side of the first body opposite to the second body, and can be snapped closed against the action of a C-shaped spring 34. The spring is coupled with its intermediate side in a hook 35 inside the first body and acts with its ends against the free edge of the lid.

[0029] Thus, the lid 33 protects and conceals the fastening screws 20 and adjusting screws 22 of the hinge, and is coplanar with the wings 12 of the first body. In this manner, the external surface of the hinge is completely flat and makes it possible to eliminate any obstruction on the internal wall of the furniture element.

[0030] Naturally, the extension in the shape of an upside-down U of the intermediate block 18 of the hinge cannot completely close the hollow of the second body of the hinge, as it is necessary to allow the rotation of the second body.

Figure 3 is a cross-sectional side view of the hinge according to the invention, with the flap door in a completely open position, and shows the condition of substantial coplanarity of the door A and the base B of the furniture element. The curved lever 24 is completely rotated counterclockwise around the fixed pin 31. The first body 10 and the second body 11 are aligned.

Figures 4 and 5 are cross-sectional side views of the hinge according to the invention shown in two intermediate operating positions between the opened and closed positions of the door A. The curved lever 24 is partially rotated clockwise around the fixed pin 31 compared to the position of Figure 3. The second body 11 is partially rotated counterclockwise around the fixed pin 31.

[0031] Figure 6 is a cross-sectional side view of the hinge according to the invention, with the flap door A in a completely closed position orthogonal to the base B of the furniture element. The curved lever 24 is further rotated clockwise around the fixed pin 31 compared to the intermediate opening position of figure 2.

[0032] A further improvement of the hinge according to the invention provides that the adjusting screw 22 be provided with a tip 36 suitable to cooperate with a surface portion 37 of the first body 10 of the hinge, said surface being possibly recessed or corrugated. This detail prevents the possibility of the two bodies 10 and 11 of the hinge to slip off from each other during particular conditions of operation of the door.

[0033] Thus, the hinge according to the invention resolves the problems of hinges for furniture flap doors currently in use. Naturally, the described solution can be modified without departing from the scope of patent protection defined by the claims of the present patent.

[0034] For example, to ensure that the edge of the door during the opening or closing rotation movements of the same remains clear above the surface of reference of the furniture element, even in cases of different thicknesses of the door and the wall, a thin shim can be applied under the wings 12 of the first body 10. In addition, the dimensions of the adjusting block 18 can also be suitably changed to allow a proper adjustment of the rotation of the door.

[0035] In this manner, a larger range of combinations of thicknesses of the door and the furniture wall can be covered, thus allowing an optimum operation and alignment of the flap door.

Claims

1. Hinge for flap doors of furniture, the flap doors being able to turn around an horizontal axis in order to reach an opening position substantially horizontal allowing the access inside to the furniture and a closing position substantially vertical, the hinge comprising a first hollow body (10), fixed to the internal surface of the base (B) or the top wall (T) of the furniture, and a second hollow body (11), fixed to the internal surface of the flap door (A),
   characterized in that the first and second body of the hinge are connected by means of a pair of levers (23), parallel each other, and a lever (24) arranged between said pair of levers (23), said levers (23, 24) being pivoted on the first body (10) and on the second body (11) and also on an intermediate adjusting block (18), respectively, so that the bottom end and the upper end of the flap door (A) remain, respectively, above the bottom surface of the base (B) of the furniture and below the upper surface of the top wall (T) of the furniture during the opening/closing movement of the flap door.

2. Hinge for flap doors of furniture according to claim 1, **characterized in that** said pair of levers (23) is formed by two straight levers, whereas said lever (24) has a curved shape, or vice versa.

3. Hinge for flap doors of furniture according to claim 2, **characterized in that** an end of the levers (23) is pivoted on a pivot (25) fixed to the adjusting block (18) and the opposed end of the levers (23) is pivoted on a pivot (28) fixed to the second body (11) of the hinge, whereas an end of the lever (24) is pivoted on a pivot (30) fixed to the second body (11) of the hinge and the opposed end is pivoted on a pivot (31) fixed to the first body (10) of the hinge.

4. Hinge for flap doors of furniture according to claim 3, **characterized in that** said pivot (28) remains always at a level lower than the fixed pivot (25), and swings around the same pivot (25) along a limited arch of circle, whereas said pivot (30) swings around the fixed pivot (31) along an arch of circle whose ends remain always below the level of the fixed pivot (25).

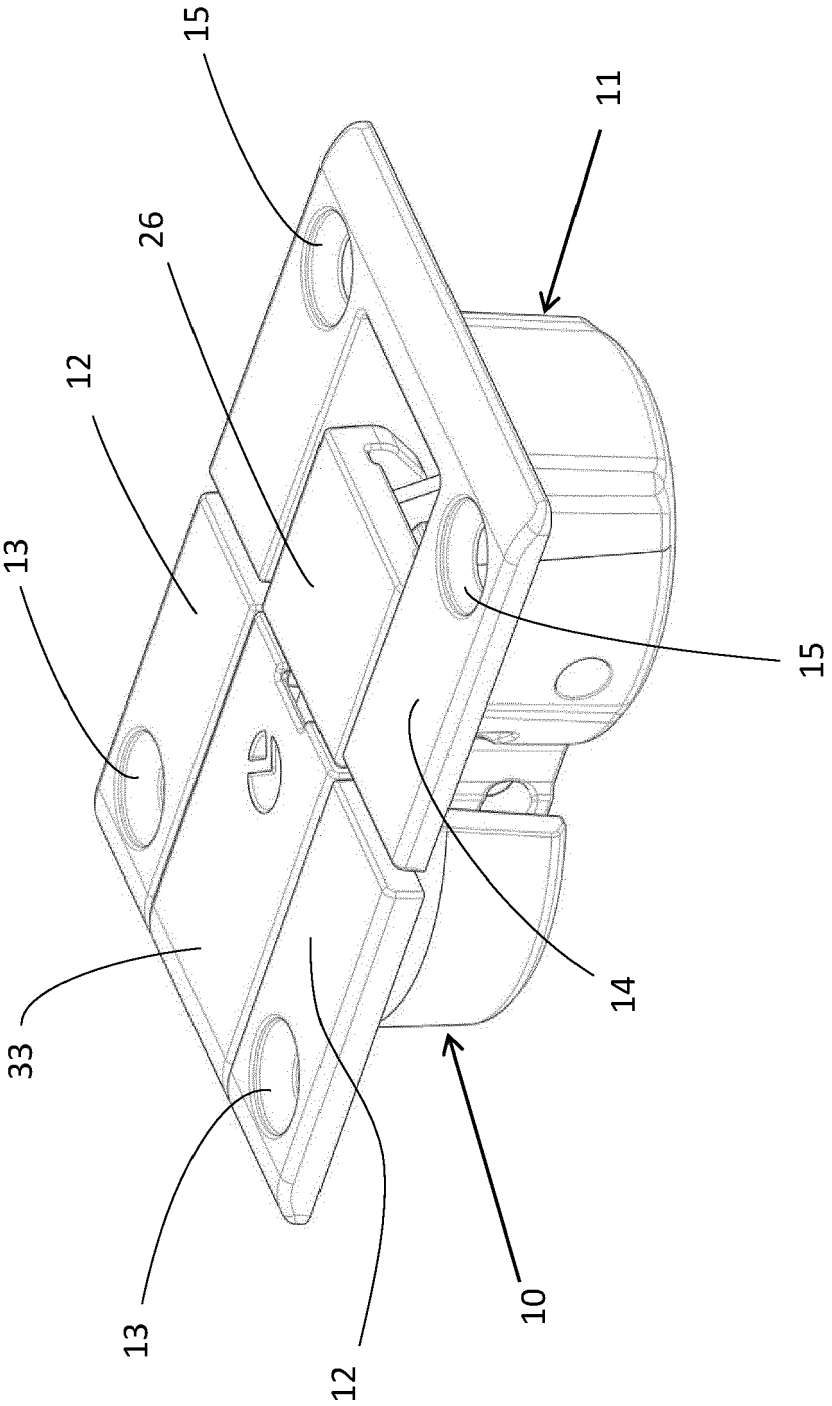
5. Hinge for flap doors of furniture according to any of the preceding claims, **characterized in that** the first and the second body (10, 11) are provided with apertures (16, 17) on their respective lateral walls, said apertures being faced each other, said adjusting block (18) passing through said apertures (16, 17) and being kept within the cavities of the first and second body (10, 11).

6. Hinge for flap doors of furniture according to any of the preceding claims, **characterized in that** said adjusting block (18) is fixed to the first body (10) by means of at least a screw (20) and is provided with a seat (21) wherein a screw (22) is engaged in order to adjust the hinge.

7. Hinge for flap doors of furniture according to any of the preceding claims, **characterized in that** in the first body (10) it is arranged an adjusting screw (22), which is provided with a point (36) able to cooperate with a surface portion (37) of the first body (10), said surface being in case recessed or corrugated, so that the mutual detachment between the first body (10) and the second body (11) is prevented.

8. Hinge for flap doors of furniture according to any of the preceding claims, **characterized in that** a cover (33) is hinged in the first body (10) to close and protect said screws (20, 22).

FIG. 1



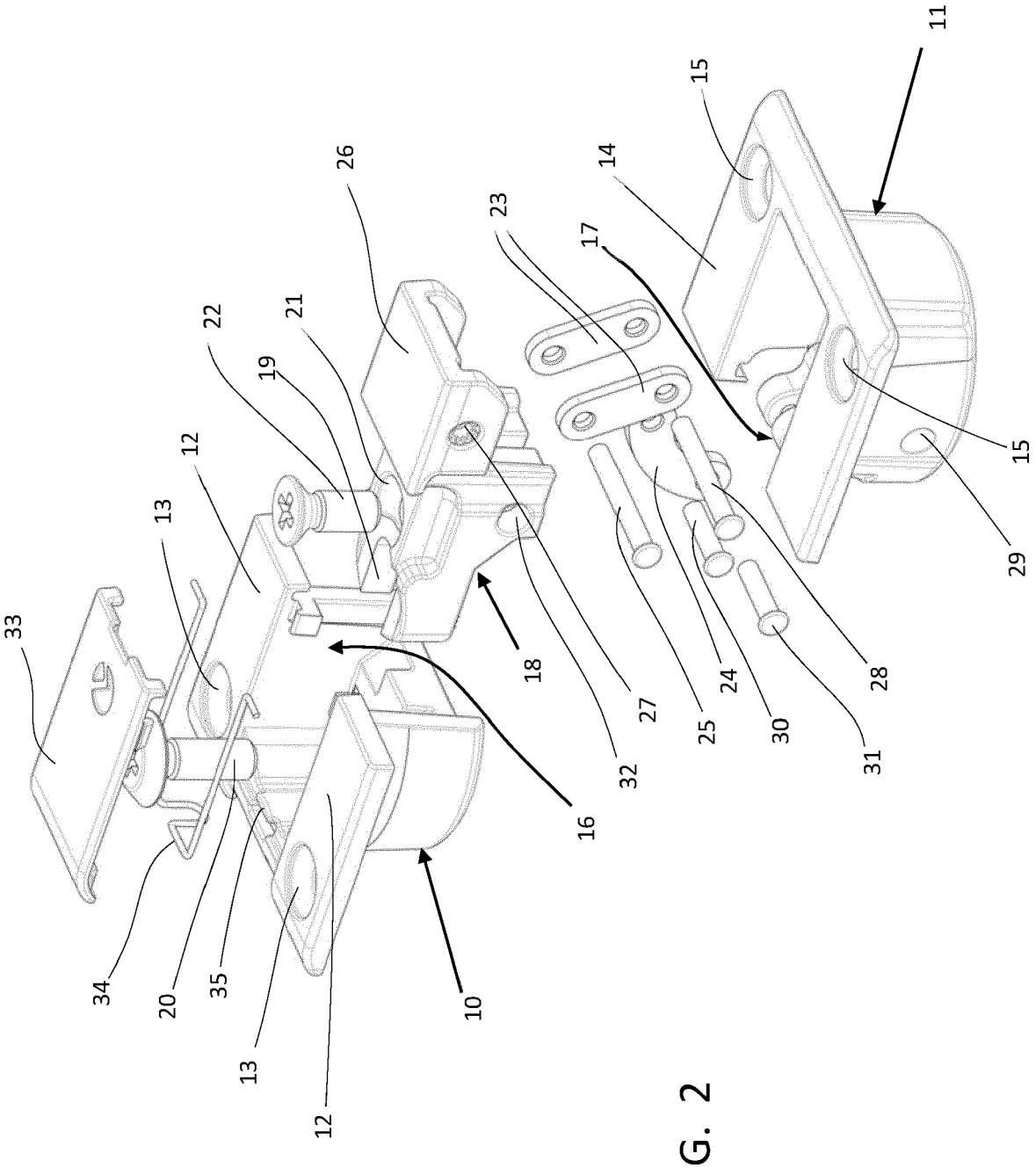

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FIG. 2

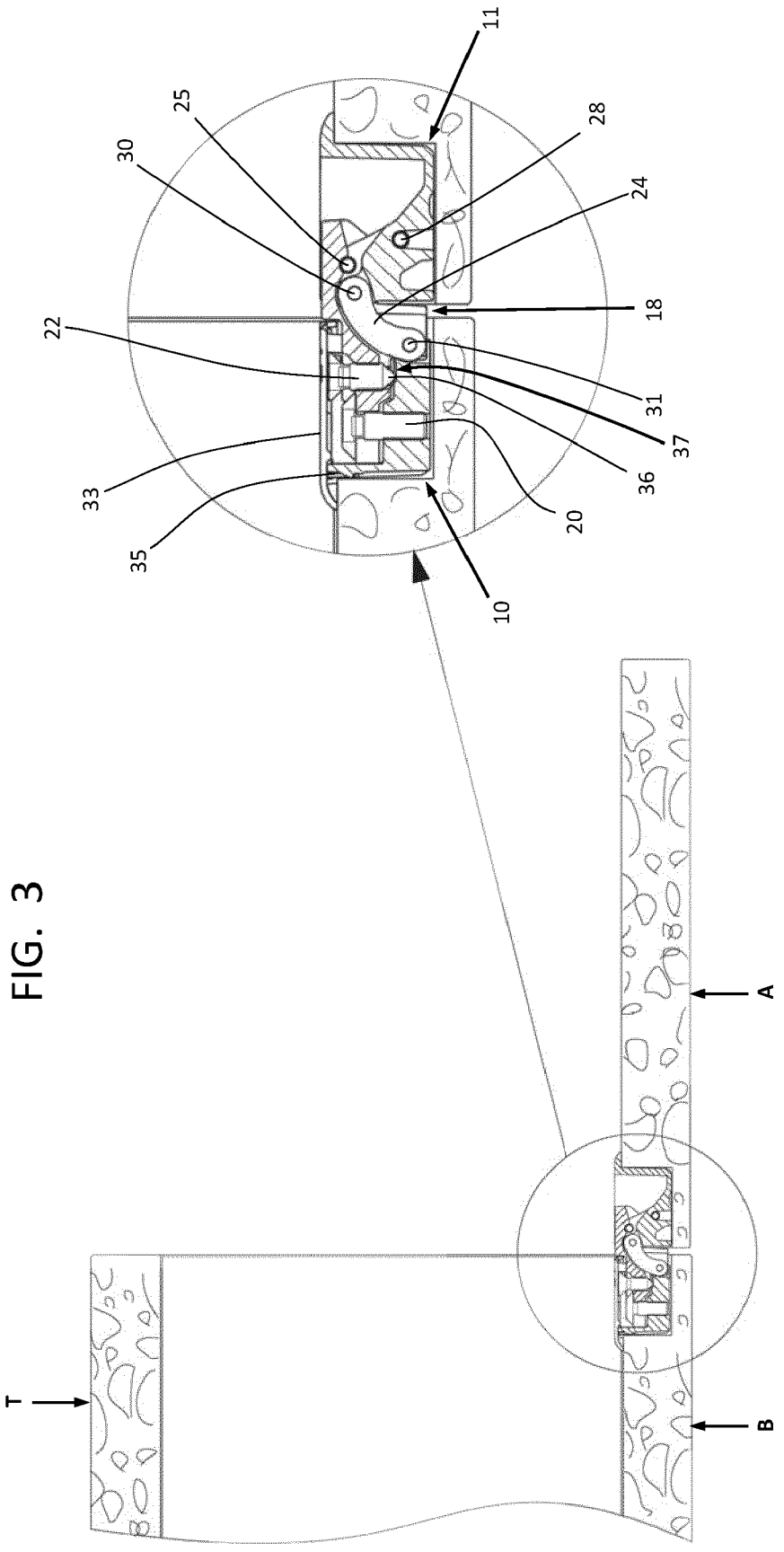

FIG. 3

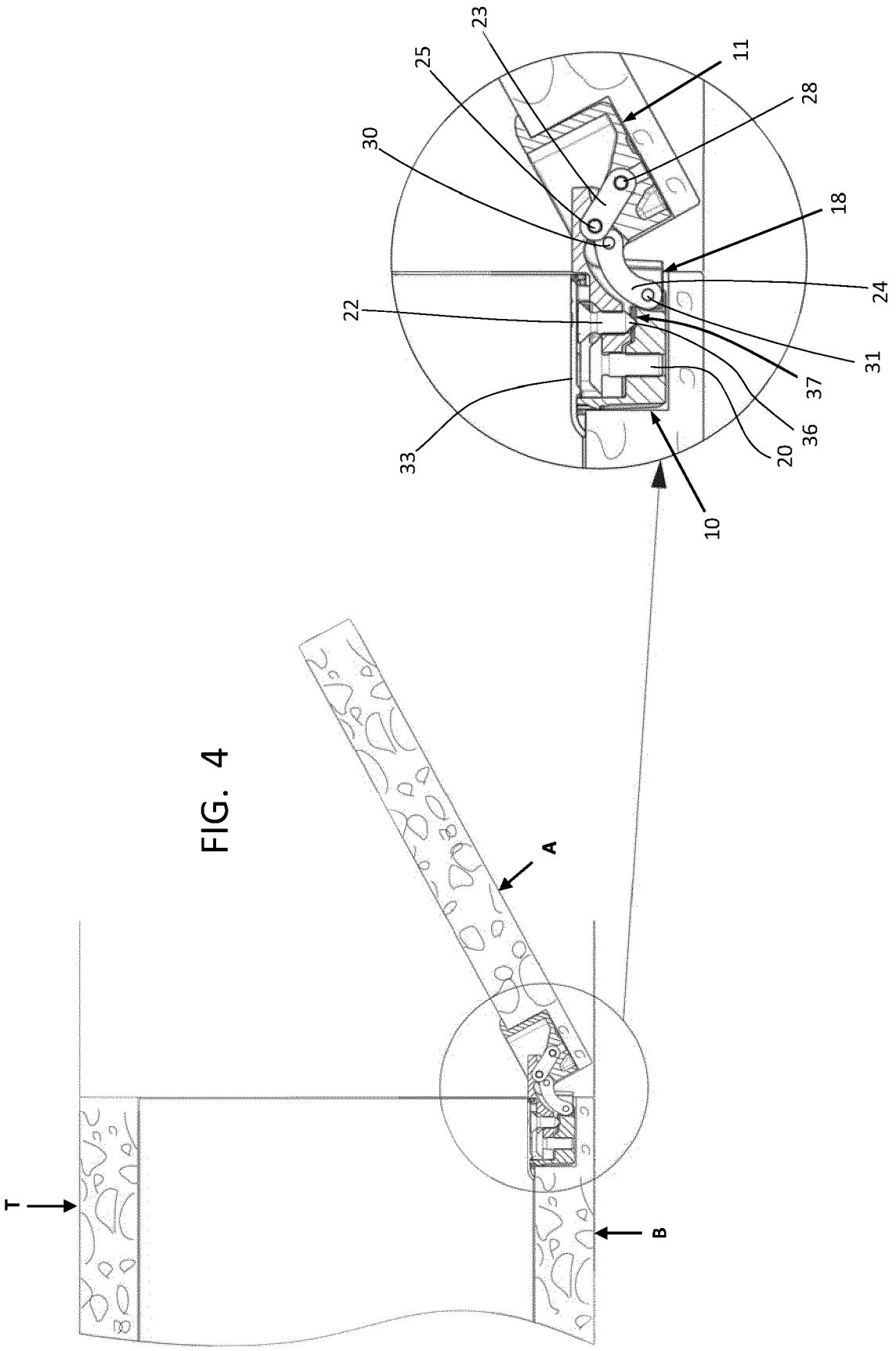

FIG. 4

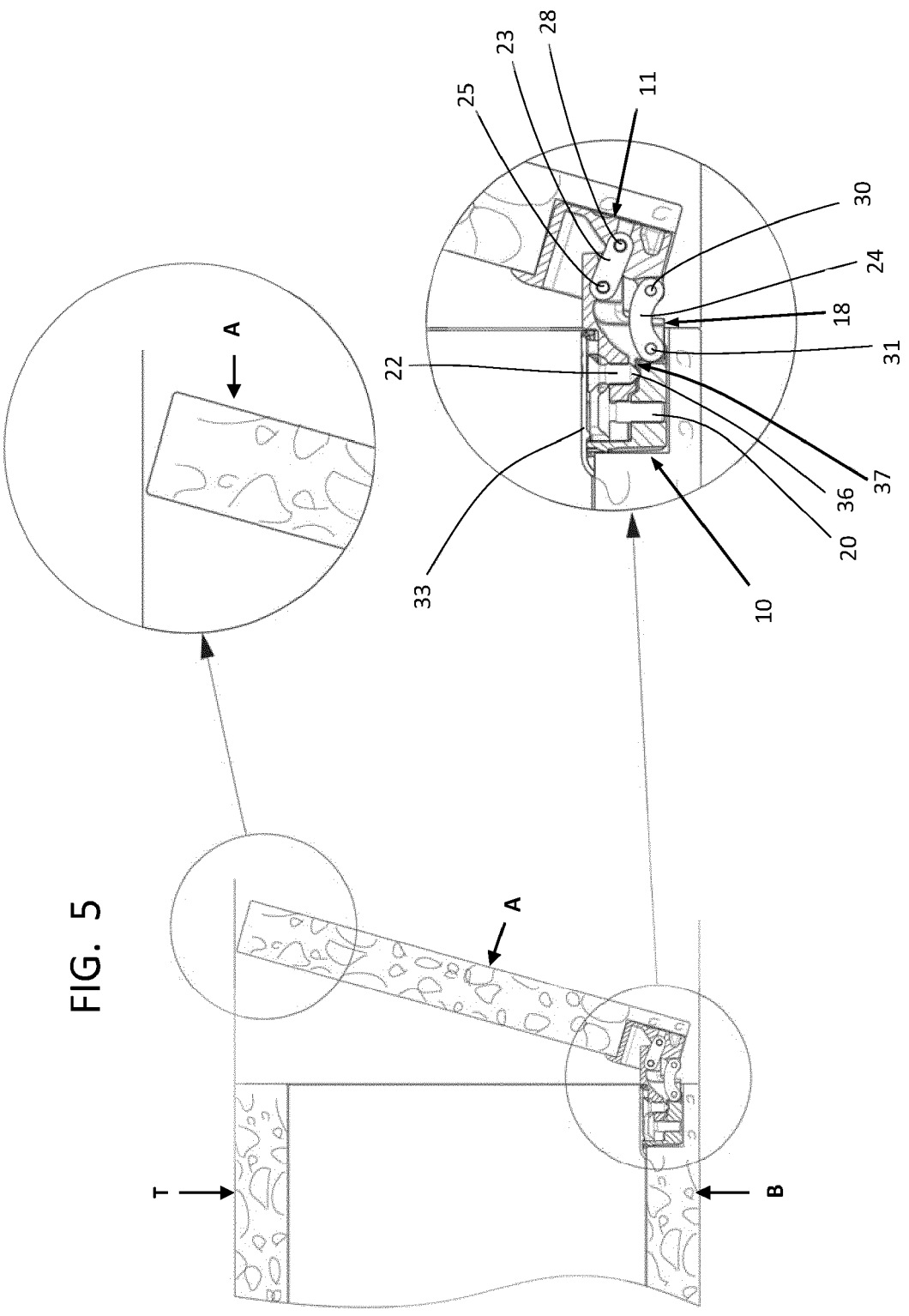

FIG. 5

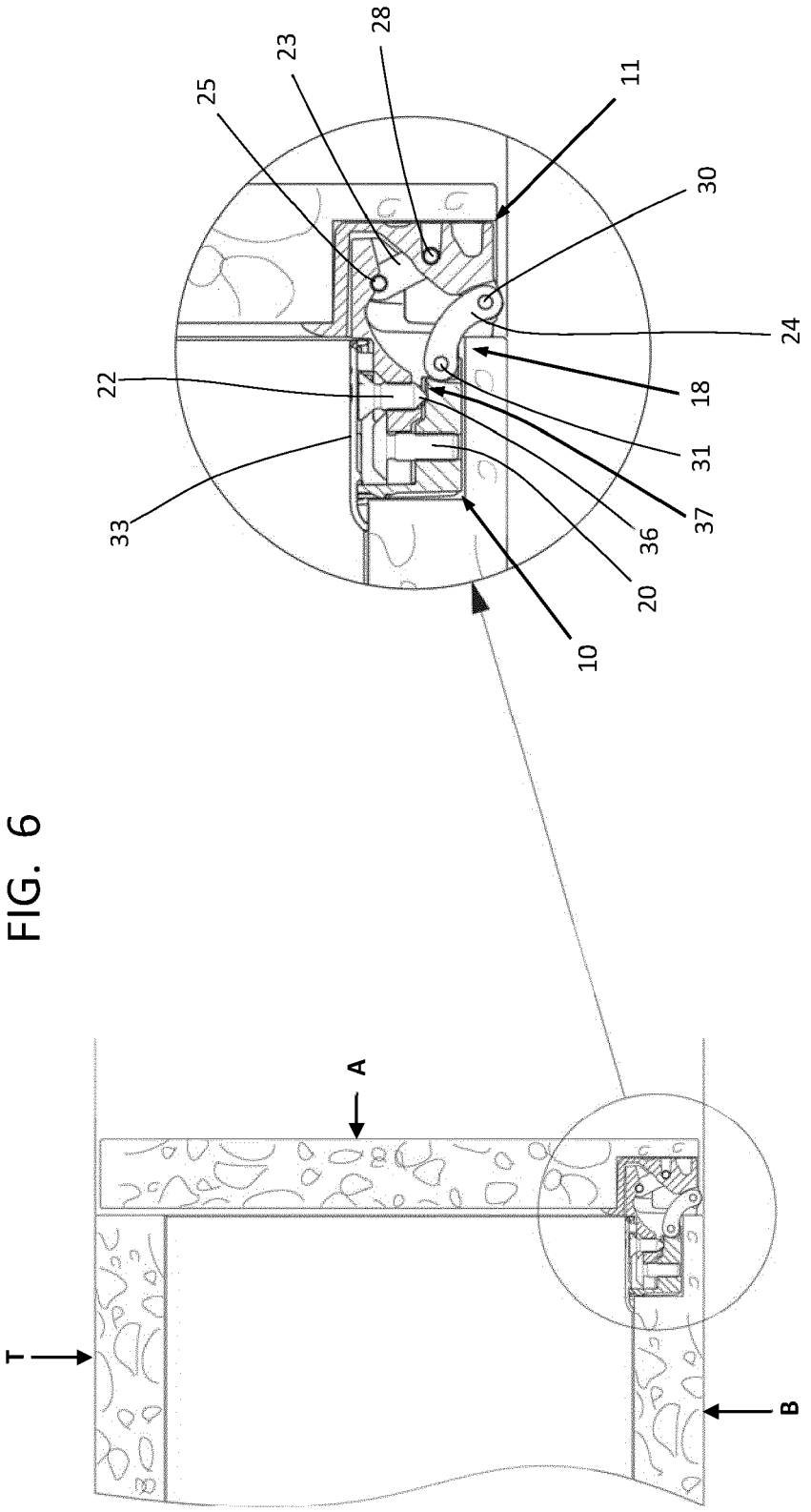

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 12 15 9815

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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	3 April 2012	Witasse-Moreau, C

CATEGORY OF CITED DOCUMENTS

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