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(54) **Home refrigerator**

(57) A home refrigerator is defined by a casing (2) having a front access opening (7) closed by at least one door (8) fitted with an opening device (15) having a fastening plate (16) for assembly to the door (8), a push member (23), and a handle (36) for moving the push

member (23) at least between a closed position and an open position closing and opening the door (8) respectively; the handle (36) being hingeable selectively to the fastening plate (16) about two separate hinge axes (41, 46).

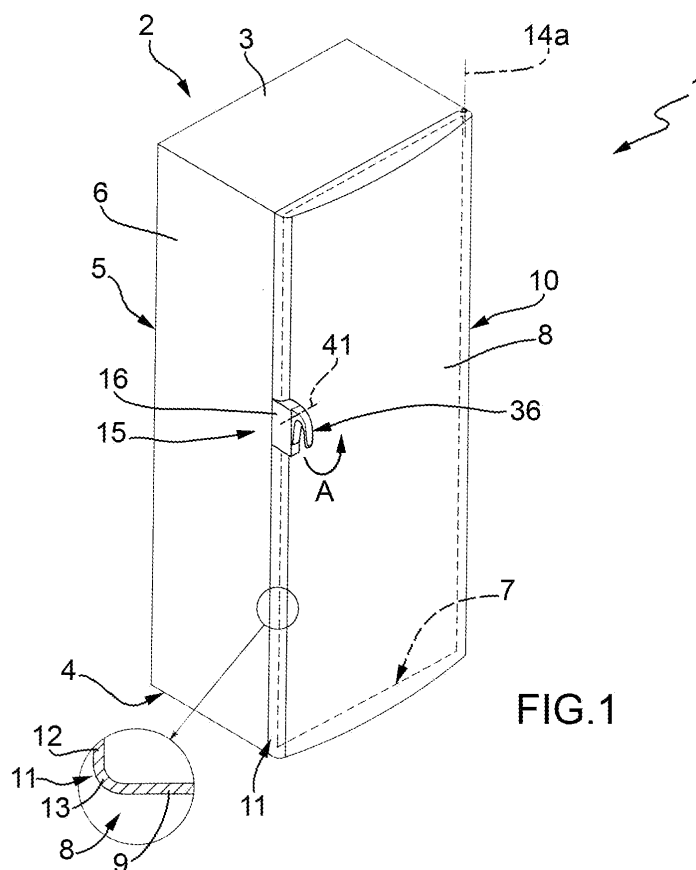


FIG. 1

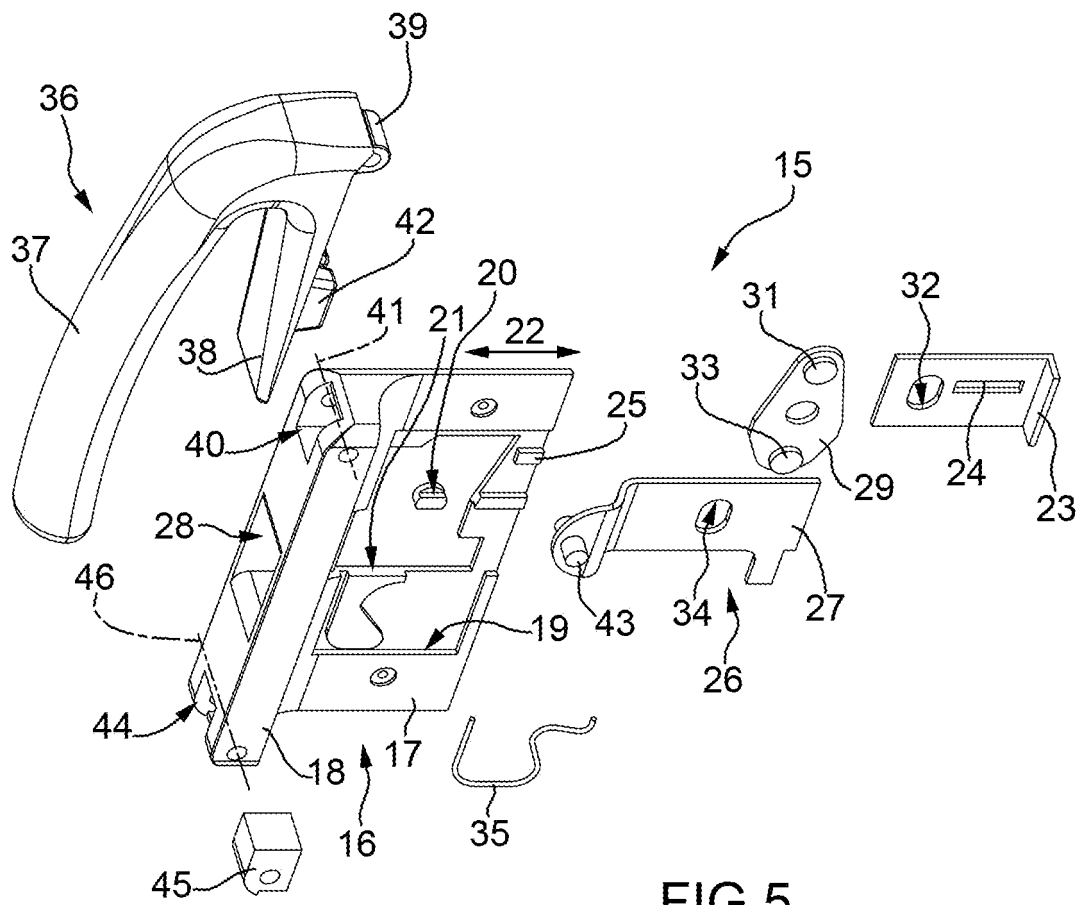


FIG.5

Description

[0001] The present invention relates to a home refrigerator.

[0002] More specifically, the present invention relates to a home refrigerator of the type comprising a casing with a front access opening closed by at least one door bounded laterally by two substantially vertical, parallel longitudinal edges; and an opening device, in turn comprising a fastening member for assembly to the door, a push member movable between an open position and a closed position opening and closing the door respectively, and a handle for moving the push member at least from the closed position to the open position.

[0003] The handle is normally substantially U-shaped, and comprises a fastening portion for assembly to the fastening member; and a handgrip.

[0004] Since the door is normally reversible and can be hinged selectively to both the vertical longitudinal edges of the casing, the fastening member of the opening device is also reversible and can be fitted selectively to both the vertical longitudinal edges of the door.

[0005] Known home refrigerators of the above type have various drawbacks, mainly due to assembly of the fastening member to one or other of the vertical longitudinal edges of the door involving 180° rotation of the opening device, thus altering the position of the handle, so that its concavity faces upwards or downwards, and the position of the handgrip, so that the handgrip extends upwards or downwards.

[0006] It is an object of the present invention to provide a home refrigerator designed to eliminate the aforementioned drawbacks, and which is also cheap and easy to produce.

[0007] In particular, it is an object of the present invention to provide a reliable and simple opening device which can be easily actuated by the user.

[0008] According to the present invention, there is provided a home refrigerator as claimed in the accompanying Claims.

[0009] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic view in perspective of a preferred embodiment of the home refrigerator according to the present invention;

Figures 2 and 3 show two schematic side views of a detail of the Figure 1 refrigerator in two different operating positions;

Figure 4 shows a view in perspective of the Figure 2 and 3 detail;

Figure 5 shows an exploded view in perspective of the Figure 2 and 3 detail;

Figure 6 shows a schematic view in perspective of a variation of the Figure 1 refrigerator.

[0010] Number 1 in Figure 1 indicates as a whole a

home refrigerator comprising a substantially parallelepiped-shaped casing 2, in turn comprising a substantially horizontal top wall 3 and a substantially horizontal bottom wall 4 parallel to each other; a substantially vertical rear wall 5 perpendicular to walls 3 and 4; and two substantially vertical lateral walls 6 perpendicular to walls 3, 4 and 5.

[0011] Casing 2 also comprises a front access opening 7 closed, in the example shown, by a substantially rectangular door 8 comprising a central panel 9 bounded laterally by two substantially vertical, parallel longitudinal edges 10, 11, each of which comprises a respective substantially flat portion 12, and a respective curved portion 13 interposed between portion 12 and panel 9.

[0012] In the example shown, door 8 is hinged to casing 2 by edge 10 to rotate, with respect to casing 2, about a substantially vertical hinge axis 14a parallel to edges 10, 11, and comprises a fully reversible opening device 15 outside door 8.

[0013] As shown in Figures 4 and 5, device 15 comprises a substantially L-shaped fastening plate 16, which has a profile corresponding to the profile of edges 10, 11, is fixed removably to edge 11 by two known screws (not shown) substantially crosswise to axis 14a, and in turn comprises a substantially flat portion 17 positioned contacting portion 12 of edge 11, and a curved portion 18 positioned contacting portion 13 of edge 11.

[0014] A cavity 19 is formed in the inner surface of portion 17, faces flat portion 12 of edge 11, and has two straight guides 20, 21 substantially parallel to each other and to a horizontal direction 22 crosswise to axis 14a.

[0015] Guide 20 is engaged in sliding manner by a push member 23, which is defined by a substantially L-shaped plate, projects outwards of cavity 19 in direction 22, faces one of lateral walls 6 of casing 2, and has a slot 24 engaged in sliding manner by a tooth 25 projecting towards door 8 from a bottom wall of cavity 19.

[0016] Member 23 is movable in direction 22, with respect to plate 16 and by an actuating device 26, between an extracted open position (Figure 2), in which member 23 exerts thrust on relative wall 6 to open door 8, and a withdrawn closed position (Figure 3), in which member 23 allows door 8 to be closed.

[0017] Device 26 comprises a transmission member 27, which is defined by a plate extending through a hole 28 formed in an intermediate part of portion 18 parallel to direction 22, engages guide 21 in sliding manner, and is connected to the push member 23 by a rocker arm 29 hinged to the bottom wall of cavity 19 to oscillate, with respect to plate 16, about a substantially horizontal hinge axis 30 perpendicular to direction 22 and to axis 14a.

[0018] Rocker arm 29 comprises a first arm having a connecting pin 31 parallel to axis 30 and engaging in sliding manner a guide slot 32 formed through member 23; and a second arm having a connecting pin 33 parallel to pin 31 and engaging in sliding manner a guide slot 34 formed through member 27.

[0019] In connection with the above, it should be point-

ed out that members 23, 27, guides 20, 21, pins 31, 33, and tooth 25 are all substantially coplanar and do not project outwards of cavity 19, so plate 16 can be fitted correctly on edge 11.

[0020] Member 23 is moved into and normally maintained in the withdrawn closed position by a spring 35 housed inside cavity 19 and connected to member 27, and is moved into the extracted opening position by a substantially U-shaped handle 36, which is connected to plate 16 with its concavity facing downwards, and comprises a grip 37, and a fastening portion 38 for assembly to plate 16.

[0021] Portion 38 comprises a bracket 39, which projects from handle 36 to engage a cavity 40 formed in the outer surface and at the top end of portion 18, and is hinged to cavity 40 by a known pin member (not shown) to allow handle 36 to oscillate, with respect to plate 16, about a substantially horizontal hinge axis 41 parallel to axis 30.

[0022] Handle 36 is connected to transmission member 27 by two substantially L-shaped projections 42 positioned with their concavities facing each other, and which project from fastening portion 38 on opposite sides of transmission member 27, and are engaged by a connecting pin 43 extending, parallel to axis 41, through one end of member 27.

[0023] A further cavity 44, identical to cavity 40, is formed in the outer surface and at the bottom end of portion 18, is located on the opposite side of hole 28 to cavity 40, and is closed by a plug 45 inserted inside cavity 44.

[0024] Rocker arm 29 allows the user to easily rotate the handle 36 and open the door 8.

[0025] The Figure 6 variation differs from Figures 1-5 solely by door 8 being hinged to casing 2 by edge 11 to rotate, with respect to casing 2, about a substantially vertical hinge axis 14b parallel to axis 14a, and opening device 15 therefore being rotated by an angle of 180° and being fitted to edge 10.

[0026] As shown in Figures 1, 2, 3, and 6, irrespective of the edge 10, 11 to which the opening device 15 is fitted, the handle 36 always rotates in the same direction A of rotation to move member 23 into its extracted opening position and open the door 8 and in the same direction B of rotation opposite to direction A to move member 23 into its withdrawn closed position and close the door 8.

[0027] To fit opening device 15 to edge 10 without altering the position of handle 36, plug 45 is removed from cavity 44; bracket 39 is fitted inside and hinged to cavity 44 to allow handle 36 to oscillate, with respect to fastening plate 16, about a hinge axis 46 parallel to axis 41; connecting pin 43 is fitted once more to projections 42; and cavity 40 is closed by plug 45.

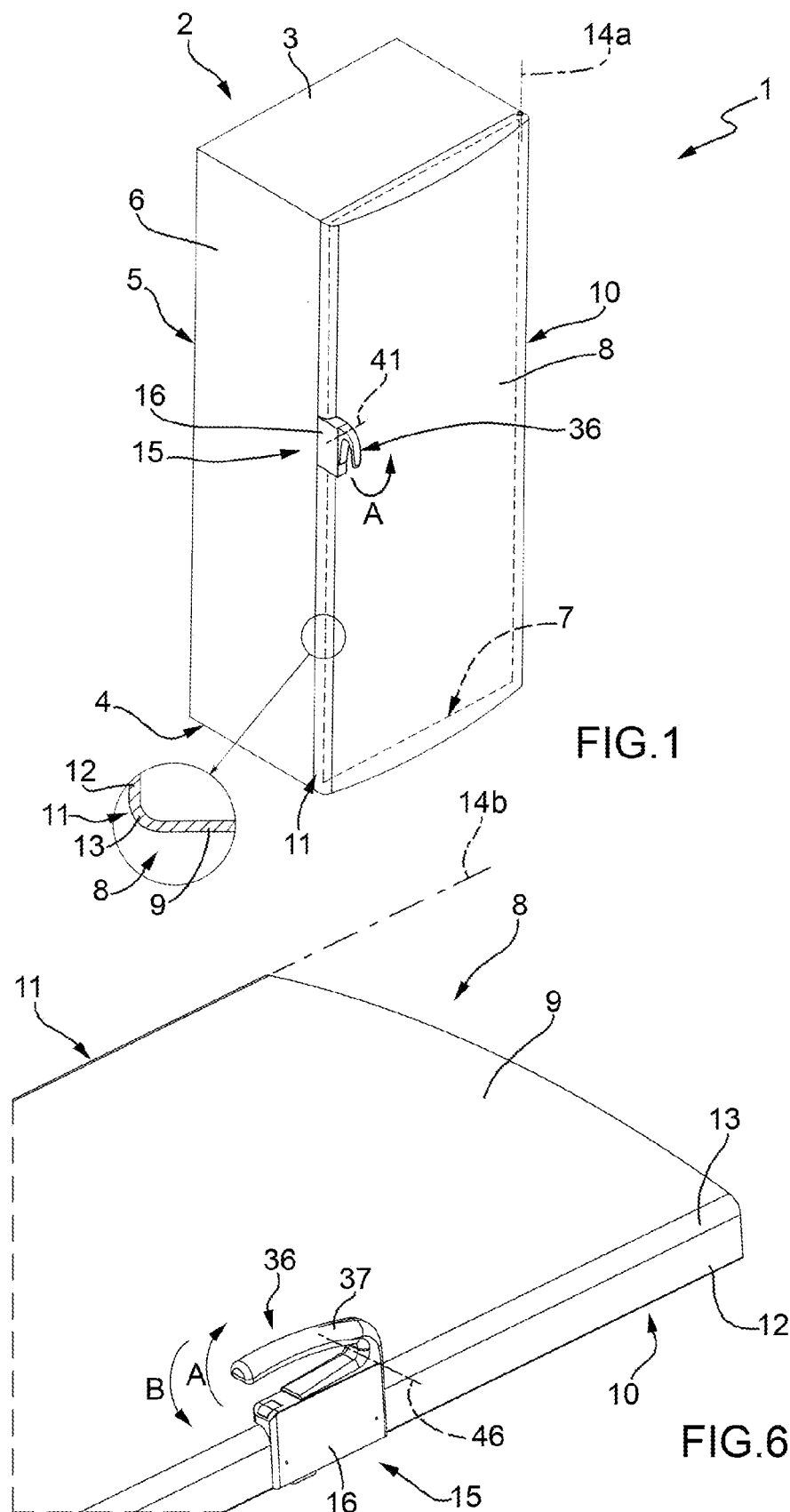
[0028] In other words, cavities 40 and 44 allow handle 36 to be hinged selectively to fastening plate 16 about two hinge axes 41 and 46, so opening device 15 can be fitted to either edge 10 or edge 11 without altering the position of handle 36.

[0029] In a variation not shown, handle 36 is hinged to fastening plate 16 with its concavity facing upwards. In which case, obviously, handle 36 must be hinged to plate 16 about hinge axis 46 when opening device 15 is fitted to edge 11, and about hinge axis 41 when opening device 15 is fitted to edge 10.

Claims

1. A home refrigerator comprising a casing (2) having a front access opening (7); at least one door (8) hinged to the casing (2) to close the front access opening (7), the door (8) having two substantially vertical, parallel longitudinal edges (10, 11); and an opening device (15), in turn comprising a fastening member (16) fixable selectively to the two longitudinal edges (10, 11), a push member (23) carried by the fastening member (16) and movable between an open position and a closed position opening and closing the door (8) respectively, and a handle (36) for moving the push member (23) at least from the closed position to the open position; and **characterized in that** the handle (36) can be hinged selectively to the fastening member (16) about two separate parallel hinge axes (41, 46) such that, irrespective of the longitudinal edge (10, 11) to which the opening device (15) is fitted, the handle (36) always rotates in the same direction of rotation (A) to move push member (23) from its closed position to its open position.
2. A refrigerator as claimed in Claim 1, wherein said hinge axes (41, 46) are substantially horizontal and located at a top end and a bottom end respectively of the fastening member (16).
3. A refrigerator as claimed in Claim 1 or 2, wherein the handle (36) comprises a bracket (39) which selectively engages two connecting portions (40, 44) formed in the fastening member (16) at said hinge axes (41, 46).
4. A refrigerator as claimed in any one of the foregoing Claims, wherein the opening device (15) is located entirely outside the door (8).
5. A refrigerator as claimed in any one of the foregoing Claims, wherein the opening device (15) also comprises a transmission member (27) connected to the handle (36) to move parallel to the push member (23); and a rocker arm (29) interposed between the push member (23) and the transmission member (27) to oscillate about a further hinge axis (30) substantially parallel to said hinge axes (41, 46).
6. A refrigerator as claimed in Claim 5, wherein the rocker arm (29) is connected to each of said push

- member and said transmission member (23, 27) by a respective connecting pin (31, 33) engaging in sliding manner a corresponding guide slot (32, 34) formed in the relative push member and transmission member (23, 27). 5
7. A refrigerator as claimed in Claim 5 or 6, wherein the fastening member (16) comprises two guides (20, 21) engaged in sliding manner by the push member (23) and the transmission member (27) respectively. 10
8. A refrigerator as claimed in any one of Claims 5 to 7, wherein the transmission member (27) extends between said hinge axes (41, 46). 15
9. A refrigerator as claimed in any one of the foregoing Claims, wherein the handle (36) comprises a further connecting portion (42) acting on the push member (23) and located between said hinge axes (41, 46). 20
10. A home refrigerator comprising a casing (2) having a front access opening (7); at least one door (8) hinged to the casing (2) to close the front access opening (7); and an opening device (15), in turn comprising a push member (23) movable in a given direction (22) between an open position and a closed position opening and closing the door (8) respectively, a handle (36) for moving the push member (23) at least from the closed position to the open position, and connecting means (27, 29) interposed between the handle (36) and the push member (23); and **characterized in that** the connecting means (27, 29) comprise a transmission member (27) connected to the handle (36) to move in said direction (22); and a rocker arm (29) interposed between the push member (23) and the transmission member (27) to oscillate about a given hinge axis (30). 25 30 35
11. A refrigerator as claimed in Claim 10, wherein the rocker arm (29) is connected to each of said push member and said transmission member (23, 27) by a respective connecting pin (31, 33) engaging in sliding manner a corresponding guide slot (32, 34) formed in the relative push member and transmission member (23, 27). 40 45
12. A refrigerator as claimed in Claim 10 or 11, wherein the opening device (15) also comprises a fastening member (16) for assembly to the door (8), and which comprises two guides (20, 21) engaged in sliding manner by the push member (23) and the transmission member (27) respectively. 50
13. A refrigerator as claimed in Claim 12, wherein the handle (36) is hinged to the fastening member (16) to oscillate about at least one further hinge axis (41, 46) substantially parallel to said hinge axis (30). 55
14. A refrigerator as claimed in Claim 12 or 13, wherein the door (8) has two substantially vertical, parallel longitudinal edges (10, 11); the fastening member (16) being fixable selectively to the two longitudinal edges (10, 11). 5
15. A refrigerator as claimed in any one of Claims 12 to 14, wherein the handle (36) can be hinged selectively to the fastening member (16) about two separate further hinge axes (41, 46).
16. A refrigerator as claimed in Claim 15, wherein said further hinge axes (41, 46) are substantially horizontal and located at a top end and a bottom end respectively of the fastening member (16).
17. A refrigerator as claimed in Claim 15 or 16, wherein the transmission member (27) extends between said further hinge axes (41, 46).
18. A refrigerator as claimed in any one of Claims 10 to 17, wherein the opening device (15) is located entirely outside the door (8).



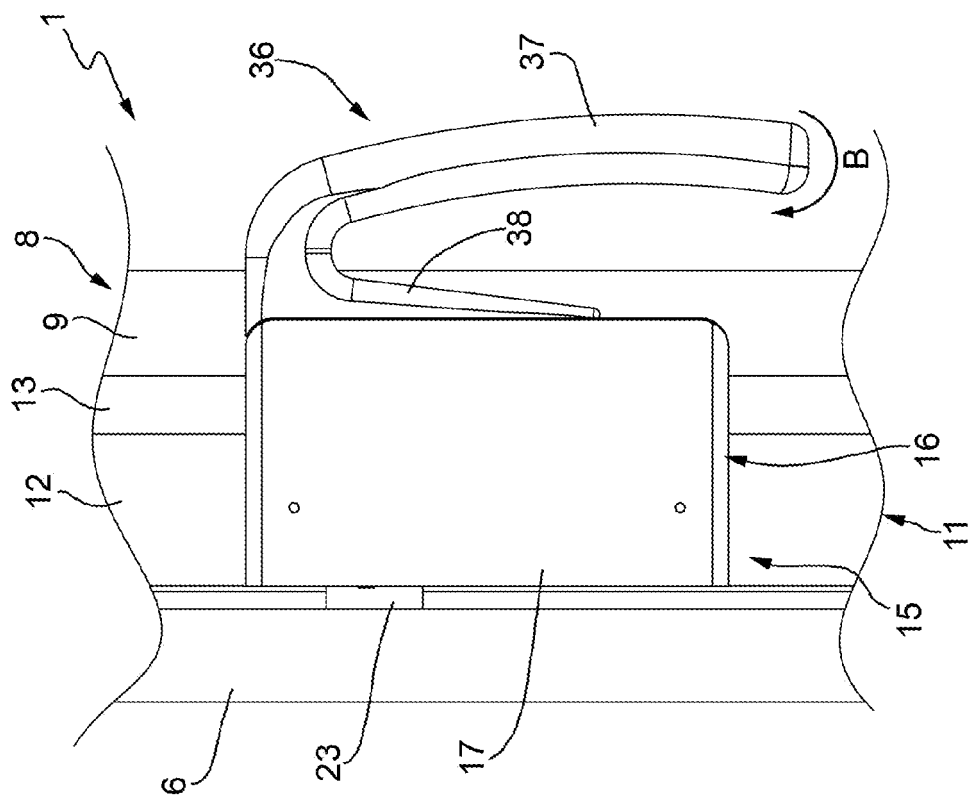


FIG.3

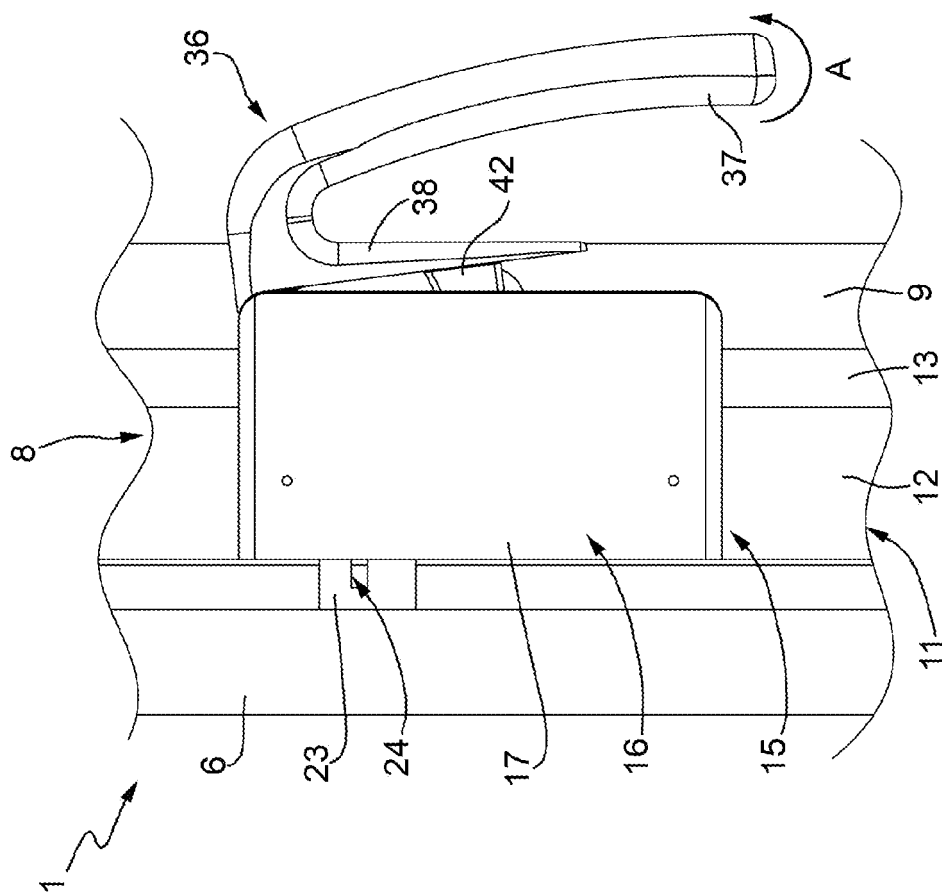
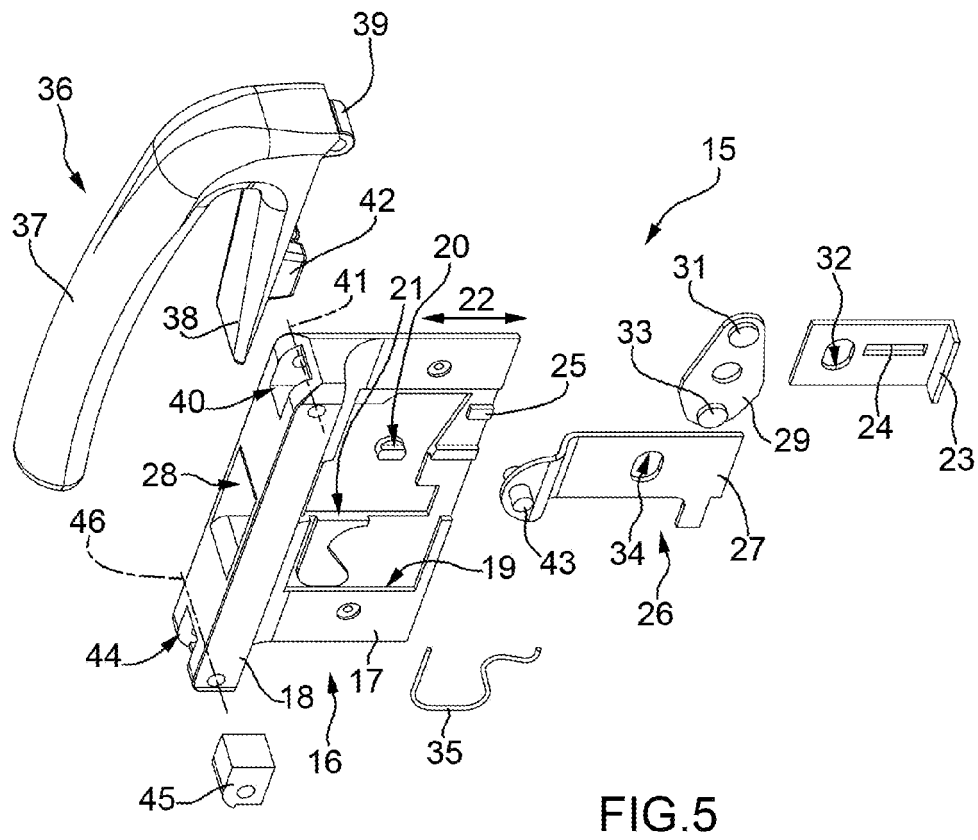
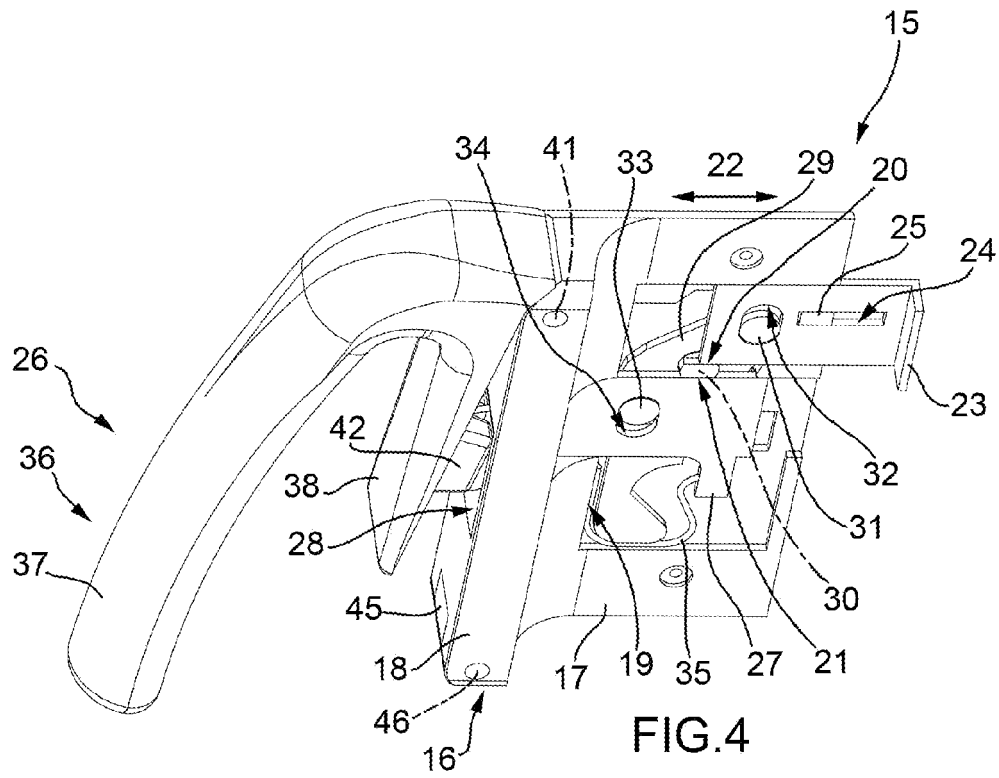


FIG.2





EUROPEAN SEARCH REPORT

Application Number
EP 08 15 4663

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Place of search The Hague		Date of completion of the search 30 October 2008	Examiner Léandre, Arnaud
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EPO FORM 1503 03.82 (P04C01)



EUROPEAN SEARCH REPORT

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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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