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(54) Appliance handle assembly and method for mounting such assembly to an appliance

(57) The invention refers to an appliance handle assembly (1) and to a method for mounting such handle assembly (1) to an appliance (30). An appliance handle assembly (1) according to the invention comprises a grip portion (2), and a locking member (3) resiliently mounted on the grip portion (2) through a first pivotal connection (4). A supporting member (16) is resiliently arranged on the grip portion (2) through a second pivotal connection (19) so as to be rotatable relative to the locking member (3) and to the grip portion (2); the pivotal supporting member (16) is provided with fastening portions (25) for associating the handle assembly (1) to a portion of a door (28).

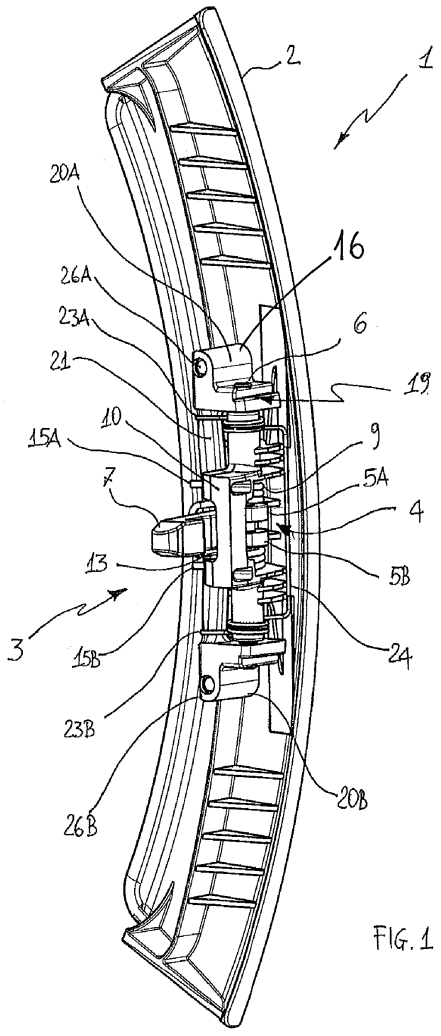

FIG. 1

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Description

[0001] The present invention refers to an appliance handle assembly and to a method for mounting such handle assembly to an appliance.

[0002] It is known in the art that many appliances, such as washing machines, laundry dryers, washer dryers, and so on, are provided with a handle assembly generally mounted on a door or porthole for closing an article loading/ unloading opening. Typically the door comprises an outer and an inner frames, joined one another, which define at least a portion, typically the perimeter, of the door.

[0003] An appliance handle assembly of known type comprises a grip portion that can be hold by a user hand, and a locking member, in the form of a hook, that cooperates with a coupling structure provided on the appliance for holding the handle assembly in a lock state, and for releasing said lock state upon rotation of the grip portion. Locking member is pivotally and resiliently mounted on the grip portion by means of one or more springs interposed therebetween, such that it can be rotated both together with the grip portion (the spring in fact acts on the hook in such a way to tend to take it stationary with respect to the grip portion) both relative to the grip portion (in order to rotate the hook with respect to the grip portion, a force higher than the force exerted by the spring may be applied between the grip portion and the hook).

[0004] An appliance handle assembly of the above type is normally mounted on an appliance by pre-loading the one or more spring elements when placing the assembly between the outer and the inner frame of a door.

[0005] This pre-loading is necessary in order to compensate possible clearances of the frames/springs/hook/grip portion, which could reduce the action of the spring between the grip portion and the hook, and therefore the stability of the closure of the door.

[0006] Such known arrangement may cause several difficulties both in the handle assembly mounting procedure, both in its operation. In fact, known mounting procedure requires placing into position a spring element on one of the outer and the inner frame of a door and then producing an increase of potential energy in this spring element during the reciprocal joining of the outer and the inner frame of the door. This operation may cause the spring element to jump out of the frame where it is mounted thereby prolonging time for correctly mounting the handle assembly onto the appliance. In addition a wrong preload of a spring element produces failures in reliably holding the handle assembly in a lock state, which is particularly dangerous in case the handle assembly is mounted on laundry machine (e.g. a washing machine, a laundry drier, a washer drier).

[0007] The aim of the present invention is therefore to solve the noted drawbacks and thus providing an appliance handle assembly having an improved structure and further providing a simplified method for mounting such handle assembly to an appliance.

[0008] An object of the present invention is to provide an appliance handle assembly wherein all its operational members are preassembled and ready to be mounted on an appliance.

[0009] A further object of the invention is to provide an appliance handle assembly whose structure allows mounting operations even in a tight space.

[0010] Another object of the invention is to provide an appliance handle assembly that may be mounted on a large variety of appliances, and in particular on a laundry machine.

[0011] Still another object of the present invention is to provide an appliance handle assembly whose construction allows a great dimensional tolerance in designing an appliance door suitable for receiving such handle assembly.

[0012] Yet another object of the present invention is to provide a method for mounting a handle assembly to an appliance that is easier to be performed compared to known methods.

[0013] A further object of the present invention is to provide a method for mounting a handle assembly to an appliance that allows a correct pre-loading of resilient elements for ensuring a reliable operation of the assembly.

[0014] Advantageously, the present invention regards an appliance handle assembly comprising a grip portion, a locking member resiliently mounted on the grip portion through a first pivotal connection; a supporting member is resiliently arranged on the grip portion through a second pivotal connection so as to be rotatable relative to the locking member and to the grip portion, the pivotal supporting member being provided with fastening portions for associating the handle assembly to a portion of a door.

[0015] Preferably the first pivotal connection comprises a first biasing element which is loaded in potential energy by rotating the locking member and the supporting member in opposite directions.

[0016] Advantageously the first biasing element comprises end portions arranged on the supporting member.

[0017] Preferably the second pivotal connection comprises a second biasing element which is loaded in potential energy by rotating the grip portion and the supporting member in opposite directions.

[0018] Advantageously the second biasing element comprises end portions arranged on the supporting member.

[0019] Advantageously the first and second pivotal connections are arranged on a same pivot shaft.

[0020] Preferably the locking member and the supporting member are rotatably mounted on a bridge which is provided with a resting surface on which locking member is pushed by a biasing element.

[0021] More preferably the bridge is integrally formed on the grip portion as a single unitary piece.

[0022] The invention further regards a laundry machine comprising a casing provided with a loading/un-

loading opening for allowing loading/unloading laundry into/from a rotatable drum contained in the casing, the laundry machine comprising a door for closing the opening. The laundry machine comprises a handle assembly according to the invention.

[0023] The invention further regards a method for mounting an appliance handle assembly on a laundry machine; the method comprises the following steps:

a) resiliently mounting a locking member on a grip portion through a first pivotal connection;
b) resiliently mounting a supporting member on the grip portion through a second pivotal connection so as to be rotatable relative to the locking member;
c) associating the appliance handle assembly formed in steps a) and b) to a door of an appliance by engaging fastening portions thereto;
d) while performing step c), causing a rotation of supporting member relative to the locking member and to the grip portion.

[0024] Preferably step a) further comprises causing an increase of potential energy in a first biasing element operatively associated to the locking member.

[0025] Advantageously step d) further comprises causing an increase of potential energy in a second biasing element operatively associated to the supporting member.

[0026] Advantages, objects, and features of the invention will be set forth in part in the description and drawings which follow and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objects and advantages of the invention may be reached and attained as particularly pointed out in the appended claims.

[0027] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate possible embodiments of the invention and together with the description serve to explain the principles of the invention. Like reference numbers represents like features throughout the accompanying drawings, wherein:

[0028] Figure 1 shows a perspective view of an appliance handle assembly according to the invention;

[0029] Figure 2 shows a further perspective view of the appliance handle assembly depicted in Figure 1;

[0030] Figure 3 shows a perspective exploded view of the appliance handle assembly depicted in Figure 1;

[0031] Figure 4 is a view in elevation of the appliance handle assembly depicted in Figure 1;

[0032] Figure 5 shows a cross sectional view taken along line V-V in Figure 4;

[0033] Figure 6 shows a cross sectional view taken along line VI-VI in Figure 4;

[0034] Figure 7 shows the handle assembly depicted in Figure 1 disassembled from an appliance door;

[0035] Figure 8 shows a perspective view of an appliance comprising a handle assembly according to the invention.

[0036] With reference to Figures 1 to 4 an appliance handle assembly 1 according to the invention comprises a grip portion 2 that can be grasped by a user hand in order to operate a locking member 3. Locking member 3 is in form of a latch 7 which is resiliently mounted on the grip portion 2 by means of a pivotal connection 4. The pivotal connection 4 is preferably made by rotatably coupling a pair of wings 5A, 5B formed on an end portion of latch 7, and a pair of seats 11A, 11B of a supporting bridge 10 by inserting a pivot shaft 6 into coaxially arranged through holes 6A, 6B and 12A, 12B provided respectively on wings 5A, 5B and on seats 11A, 11B. Preferably, said supporting bridge 10 is integrally formed with the grip portion 2 as a single unitary piece.

[0037] A biasing element 8, like for example a torsional spring 9, is arranged on the pivotal connection 4 for urging latch 7 towards a resting surface 13 formed on the supporting bridge 10 and for contrasting a rotational movement of latch 7 that separate the latter from its resting surface 13. Such rotational movement of latch 7 is clockwise in Figures 5 and 6. It is highlighted that in the present application the expressions "clockwise direction" and "anticlockwise direction" have to be intended with reference to Figures 5 and 6.

[0038] In an assembled configuration of the appliance handle 1 (see Figures 1-3), biasing element 8 advantageously is pre-loaded so as to keep latch 7 in contact with the resting surface 13 formed on the supporting bridge 10. In this view, biasing element 8 comprises a leaning portion 14 in contact with latch 7 and a pair of end portions 15A, 15B arranged on a supporting member 16. A first and a second plurality of coils 17A, 17B are preferably respectively formed between one of said end portions 15A, 15B and the leaning portion 14 so as to extend around pivot shaft 6 when the latter is inserted into through holes 6A, 6B and 12A, 12B.

[0039] Supporting member 16 advantageously comprises a bracket- like shape and two ends 20A, 20B each provided with a through-hole 18A and 18B, respectively, for accommodating pivotal shaft 6 therein, thereby making a further pivotal connection 19. In this way, supporting member 16 may rotate about pivotal shaft 6 relative to the locking member 3 and independently therefrom. A connecting portion 21 advantageously joins the ends 20A, 20B of supporting member 16 and serves as support for biasing element 8, as described above, and for a further biasing element 22 whose ends 23A, 23B advantageously rest on the connecting portion 21 on the same side where end portions 15A, 15B of biasing element 8 rest, as better shown in Figures 1 and 2. A leaning portion 24 is provided in the biasing element 22 to be placed in contact with the grip portion 2 (see Figure 1). Similarly to the arrangement of biasing element 8, in the second biasing element 22, a first and a second plurality of coils 27A, 27B are preferably respectively formed between

one of said end portions 23A, 23B and the leaning portion 24 so as to extend around pivot shaft 6 when the latter is inserted into through holes 18A, 18B and 12A, 12B.

[0040] Connecting portion 21 can be urged towards the grip portion 2 by biasing elements 8 and 22, and, as better described below, the biasing element 22 is provided for opposing, i.e. contrasting a rotation of grip portion 2 in a direction (clockwise direction in Figures 1-4) that moves the resting surface 13 of supporting bridge 10 towards latch 7, for example when it is desired to unlock latch 7. It should be noted that potential energy stored within biasing elements 8, 22 can be increased by rotating latch 7 and the connecting portion 21 of supporting member 16 respectively in opposite directions.

[0041] In addition, supporting member 16 advantageously has fastening portions 25 that are provided for removably connecting the whole handle assembly 1 to a portion of an appliance door, for example to a frame body, like an appliance door edge portion. Fastening portions 25 advantageously may be in the form of holes 26A and 26B each formed on one end 20A, 20B of connecting portion 21. Each hole 26A and 26B has a longitudinal axis that extends along a transverse direction, preferably a perpendicular direction, relative to the longitudinal axis of through holes 18A, 18B of supporting member 16. Corresponding pins or screws, appropriately provided on a frame portion, may preferably engage holes 26A and 26B thereby allowing installation of handle assembly 1 on a portion of an appliance door.

[0042] Figures 5 and 6 shows cross sectional views respectively taken along lines V-V and VI-VI in Figure 4. With reference to such Figures, it will be described below how the handle assembly according to the invention works. It should be noted that the handle assembly 1 shown in Figures 5 and 6 is illustrated in the position in which it is after its assembly, but before being mounted on a portion (for example a frame body) of an appliance door. As it will be better explained in the following, the supporting member 16 and the door to which it has to be attached are so shaped that when supporting member 16 is attached to the door, such supporting member 16 is slightly rotated, with respect to the grip portion 2 (with respect to the position illustrated in Figures 5 and 6), in a direction (anticlockwise rotation with respect to Figures 5 and 6) that allows both biasing members 8, 22 to be pre-loaded.

[0043] After its assembly to a door, the handle assembly 1 is therefore in a rest position (not shown in the enclosed figures) which differs form the position illustrated in Figures 5 and 6 only because in this rest position the supporting member 16 is slightly rotated, with respect to the grip portion 2, in an anticlockwise direction, so that both biasing members 8 and 22 are preloaded; the rest position is a position in which the locking member 3 of handle assembly 1 is not engaged to a catching member, i.e. a position in which the handle assembly is not in use.

[0044] When latch 7 is to be engaged on a catching member (not shown), like for example a catch plate or pin installed on an appliance casing, said latch 7 is rotated clockwise (with reference to Figures 5 and 6) about pivot shaft 6 causing biasing element 8 to increase its potential energy because leaning portion 14, in contact with latch 7, and end portions 15A, 15B arranged on the supporting member 16 come closer each other (with respect to the rest position, when the latch 7 is engaged on a catching member the leaning portion 14 is rotated clockwise and therefore it comes closer to end portions 15A, 15B). Resting surface 13, which is preferably integral with grip portion 2, and also the supporting member 16, remain in the above mentioned rest position because latch 7 may rotate about pivot shaft 6 both relative to grip portion 2 and relative to supporting member 16 whose ends 20A, 20B are fastened to a portion of a door, for example a frame body, through fastening portions 25 (Figure 3). In this condition (i.e. latch 7 engaged on a catching member) a gap is formed between resting surface 13 and latch 7 since the latter have been moved away from its rest position towards a locking position (not shown in enclosed figures). When such gap exists, grip portion 2 may be rotated manually about pivot shaft 6 and relative to supporting member 16 (clockwise with respect to Figure 5 and 6) thereby loading biasing element 22, which opposes to such rotation of the grip portion 2. Thanks to the biasing element 22, grip portion 2 may be kept in its rest position even when latch 7 is detached from resting member 13 (i.e. when the latch 7 is engaged on a catching member).

[0045] When latch 7 has to be moved from its locking position to a released position a further clockwise rotation has to be given to latch 7. This may be done manually by rotating clockwise (with reference to Figures 5 and 6) the grip portion 2 about pivot shaft 6, thereby, firstly, closing the gap existing between resting surface 13 and latch 7 and, then, pushing latch 7 to rotate further clockwise by pressing resting surface 13 on it. In this way both biasing elements 8 and 22 are loaded such that, when the grip portion 2 is released, said elements 8, 22 may push back the latch 7 and the grip portion 2, respectively, to their rest position by means of an anticlockwise rotation.

[0046] Here below it will be further described one of the main advantages that can be achieved by a handle assembly 1 according to the invention.

[0047] When a handle assembly 1 has to be mounted on a portion of a door, for example a frame body 28 of an appliance door 29 (see Figures 7 and 8), handle assembly may be first assembled as a standing alone piece and then associated to such portion of a door (e.g. frame body 28). This can be done by rotatably mounting locking member 3 to a grip portion 2 through a pivot shaft 6 thereby forming a first pivotal connection 4. A supporting member 16 is further mounted on grip portion 2 through pivot shaft 6 thereby forming a second pivotal connection 19. Each pivotal connection 4 and 19 is provided, respectively, with a biasing element 8, 22 so as to allow latch 7, the grip portion 2 and supporting member 16 to resiliently rotate relative one another.

[0048] After a handle assembly 1 is mounted forming a standing alone piece (e.g. shown in Figures 5 and 6), it may be removably arranged, as a whole, on a portion of a door (e.g. frame body 28) by associating fastening portions 25, in the form of holes 26A and 26B formed on supporting member 16, to the portion of the door for example by means of screws received into corresponding holes 35A and 35B formed on the portion of the door (e.g. frame body 28).

[0049] Advantageously the grip portion 2, the supporting member 16, and the door 29 to which the handle assembly 1 have to be mounted are so shaped that in order to assembly the handle assembly 1 to the door 29, the supporting member 16 has to be rotated, with respect to the grip portion 2, in a direction (anticlockwise rotation in Figures 5 and 6) that allows both biasing members 8, 22 to be pre-loaded. This avoid the need of placing biasing member 8 and 22 in place and pre-loading them by arranging handle assembly components like the supporting member 16 on them during assembling operations.

[0050] Figures 5 and 6 show the position of supporting member 16 before being mounted on a frame body 28. In this position longitudinal axis of each hole 26A and 26B respectively formed on ends 20A, 20B of connecting portion 21 is not perpendicular to the front plane of frame body 28, i.e. it is not coaxial with longitudinal axis of holes 35A and 35B formed on the frame body 28. In order to align longitudinal axis of each hole 26A and 26B to longitudinal axis of holes 35A and 35B (and therefore in order to assembly the handle assembly 1 to the door 29), supporting member 16 has to be slightly rotated, with respect to the grip portion 2, in a direction (anticlockwise in Figures 5 and 6) that allows both biasing members 8, 22 to be pre-loaded. Preferably, holes 35A and 35B are obtained in the bottom of a seat, not illustrated, provided in the door 29 (in the example illustrated in Figure 7, it is provided in the frame body 28), in which the supporting member 16 is inserted in order to assembly the handle assembly 1 to the door 29; the supporting member 16, its the seat in the door 29, and the grip portion 2 are so shaped that during the insertion of the supporting member 16 into the seat, the supporting member 16 is rotated with respect to the grip portion 2 in a direction which causes the pre-loading of both biasing members 8, 22.

[0051] In Figure 8 it is shown an appliance 30, in particular a laundry machine (e.g. a washing machine, a laundry drier, a washer-drier), comprising a handle assembly 1 according to the invention. The appliance 30 comprises a casing 31 preferably formed by a first couple of upright side walls 32A, 32B arranged on a front and rear side of the appliance 30 and by a second couple of upright side wall 32C, 32D arranged on lateral sides of such machine. An upper wall portion 33 and a bottom wall portion 34 advantageously close the ends of the box-like structure formed by the upright side walls 32A, 32B, 32C, 32D, joined together.

[0052] A front door 29 is preferably pivotally coupled to the front upright side wall 32A for closing an article (e.g. laundry) loading/unloading opening allowing access to an interior region of a rotatable drum. Such drum is rotatably associated within the casing 31 (and also within a washing tub if the laundry machine is a washing machine or a washer drier) and receives articles to be treated by appliance 30. Advantageously the door 29 comprises a frame 28, to which the handle assembly 1 may be associated.

[0053] As it can be inferred from the description above, an appliance handle assembly according to the invention is easy to be mounted on an appliance frame, in particular on a laundry machine door. In fact, the inventive handle assembly is arranged so as to be placed on a single appliance frame thereby pre-loading, i.e. increasing potential energy of a biasing element ensuring a reliable locking operation. The proposed handle assembly has a compact structure that requires a little space on an appliance frame to be mounted thereon. In this way the inventive handle assembly may be advantageously mounted in a large variety of appliances.

[0054] Advantageously excessive manufacturing dimensional tolerances of an appliance frame may be compensated by the structure of the present handle assembly, thereby simplifying even the appliance design and its manufacturing method.

[0055] The method for mounting a handle assembly according to the invention to an appliance is quite easy to be carried out and allows the assembly to be set in a ready to be used state in few steps.

Claims

1. An appliance handle assembly (1) comprising a grip portion (2), a locking member (3) resiliently mounted on the grip portion (2) through a first pivotal connection (4) **characterized in that** a supporting member (16) is resiliently arranged on the grip portion (2) through a second pivotal connection (19) so as to be rotatable relative to said locking member (3) and to said grip portion (2), said pivotal supporting member (16) being provided with fastening portions (25) for associating said handle assembly (1) to a portion of a door (28).

2. An appliance handle assembly (1) according to claim 1 wherein said first pivotal connection (4) comprises a first biasing element (8) which is loaded in potential energy by rotating the locking member (3) and the supporting member (16) in opposite directions.

3. An appliance handle assembly (1) according to claim 2 wherein said first biasing element (8) comprises end portions (15A, 15B) arranged on said supporting member (16).

4. An appliance handle assembly (1) according to claim 1 or 2 or 3 wherein said second pivotal connection

(19) comprises a second biasing element (22) which is loaded in potential energy by rotating the grip portion (2) and the supporting member (16) in opposite directions.

5. An appliance handle assembly (1) according to claim 4 wherein said second biasing element (22) comprises end portions (23A, 23B) arranged on said supporting member (16).

6. An appliance handle assembly (1) according one or more of previous claims wherein said first and second pivotal connections (4, 19) are arranged on a same pivot shaft (6).

7. An appliance handle assembly (1) according to any preceding claim wherein the locking member (3) and the supporting member (16) are rotatably mounted on a bridge (10) which is provided with a resting surface (13) on which locking member (3) is pushed by a biasing element (8).

8. An appliance handle assembly (1) according to claim 7 wherein the bridge (10) is integrally formed on the grip portion (2) as a single unitary piece.

9. A laundry machine (30) comprising a casing (31) provided with a loading/unloading opening for allowing loading/unloading laundry into/from a rotatable drum contained in said casing (31), said laundry machine (30) comprising a door (29) for closing said opening, **characterized in that** said laundry machine comprises a handle assembly (1) according to any previous claims.

10. Method for mounting an appliance handle assembly (1) according to any claim 1 to 8 on a laundry machine (30) according to claim 9, **characterized by** comprising the following steps:

a) resiliently mounting a locking member (3) on a grip portion (2) through a first pivotal connection (4);
b) resiliently mounting a supporting member (16) on the grip portion (2) through a second pivotal connection (19) so as to be rotatable relative to said locking member (3);
c) associating the appliance handle assembly (1) formed in steps a) and b) to a door (29) of an appliance (30) by engaging fastening portions (25) thereto;
d) while performing step c), causing a rotation of supporting member (16) relative to said locking member (3) and to said grip portion (2).

11. Method according to claim 10 wherein said step a) further comprises causing an increase of potential energy in a first biasing element (8) operatively associated to the locking member (3).

12. Method according to claim 10 or 11 wherein step d) further comprises causing an increase of potential energy in a second biasing element (22) operatively associated to the supporting member (16).

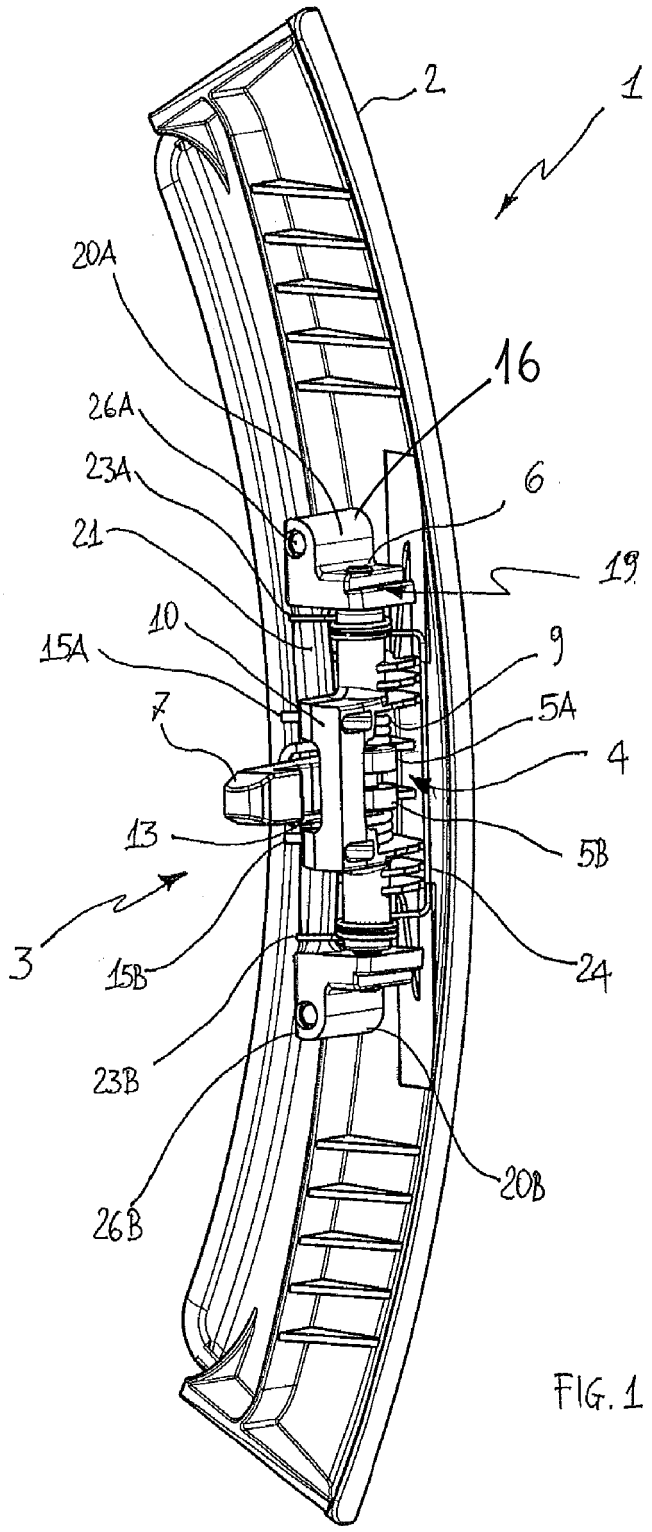

FIG. 1

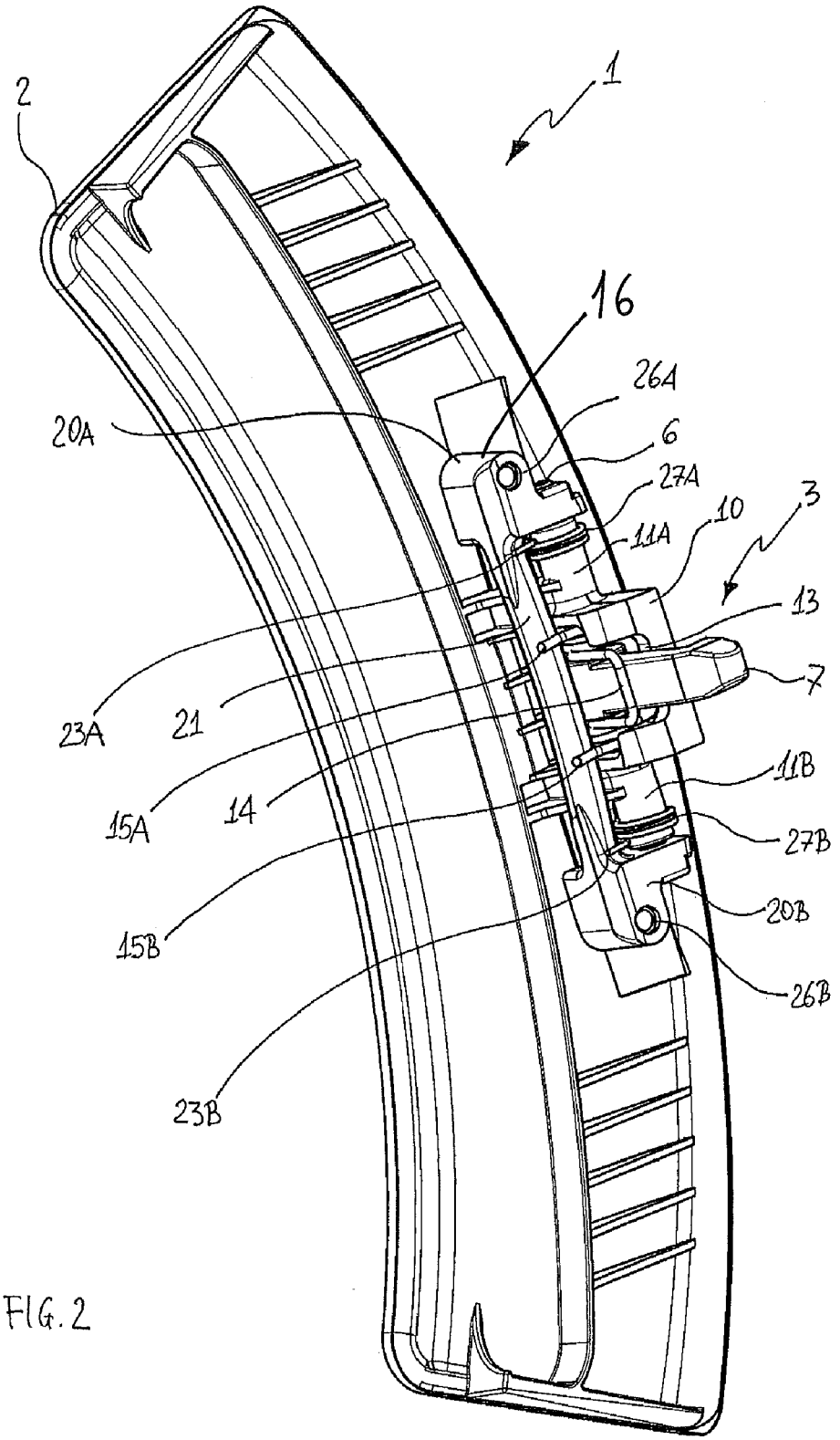
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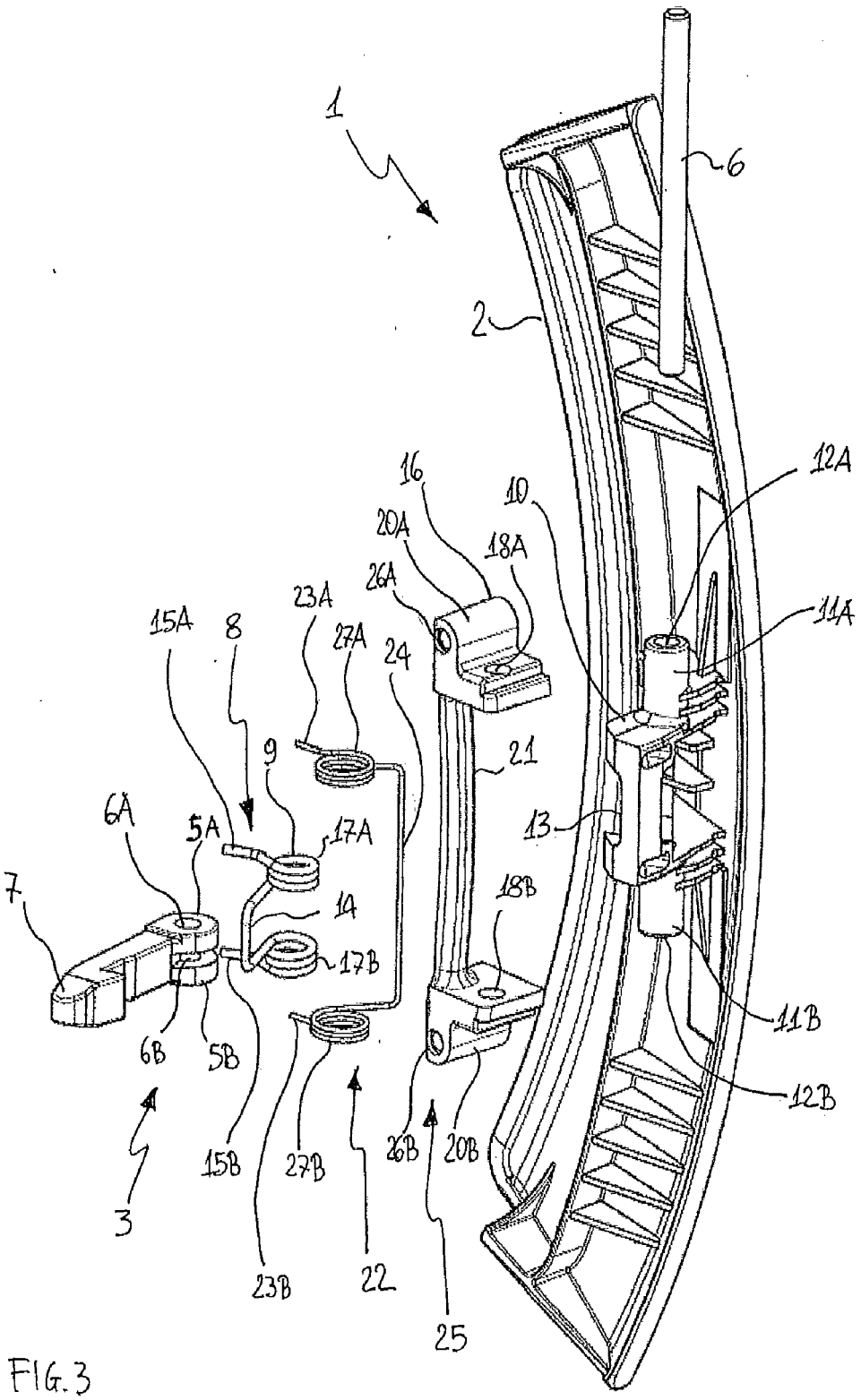
FIG. 2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25

FIG.3

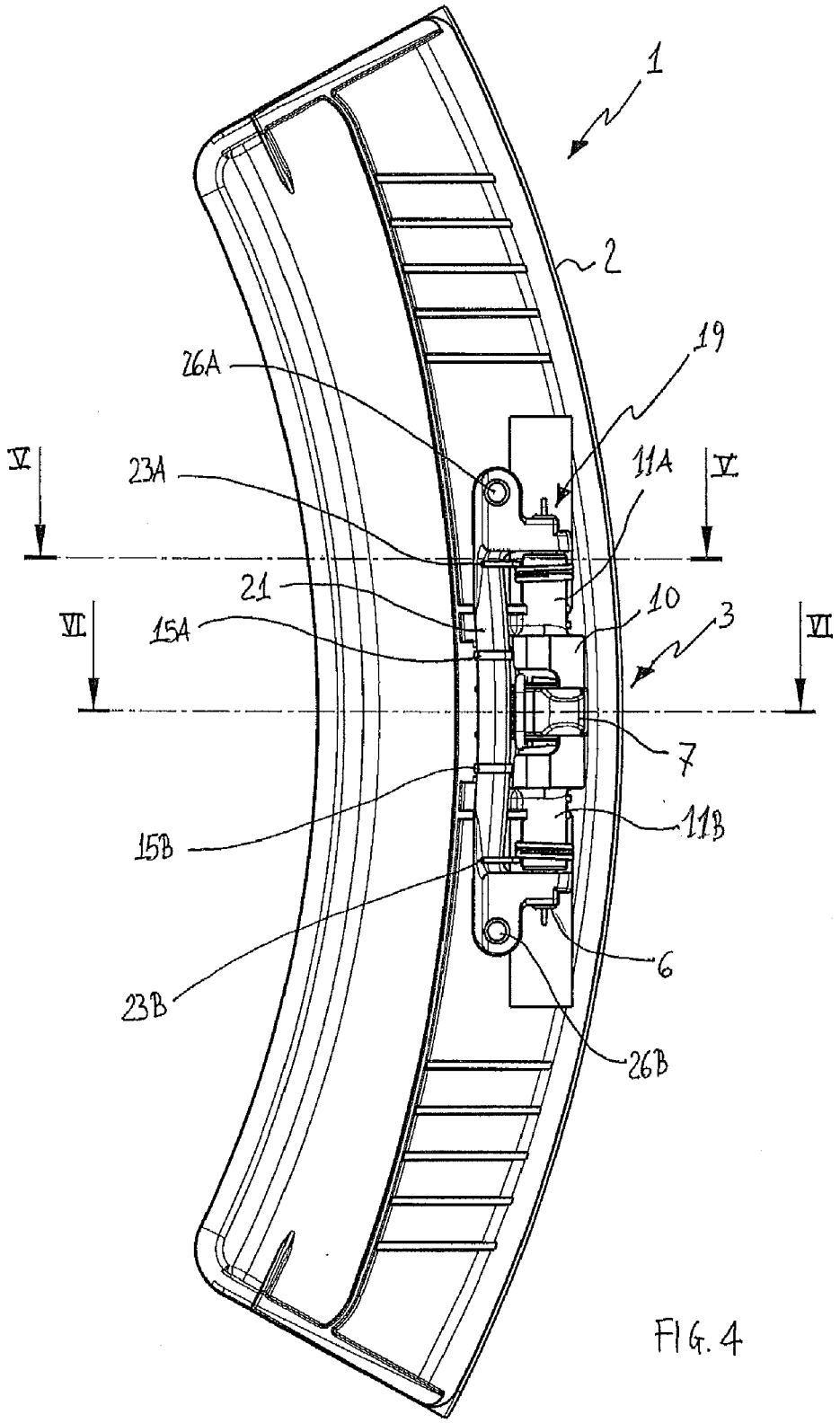

FIG. 4

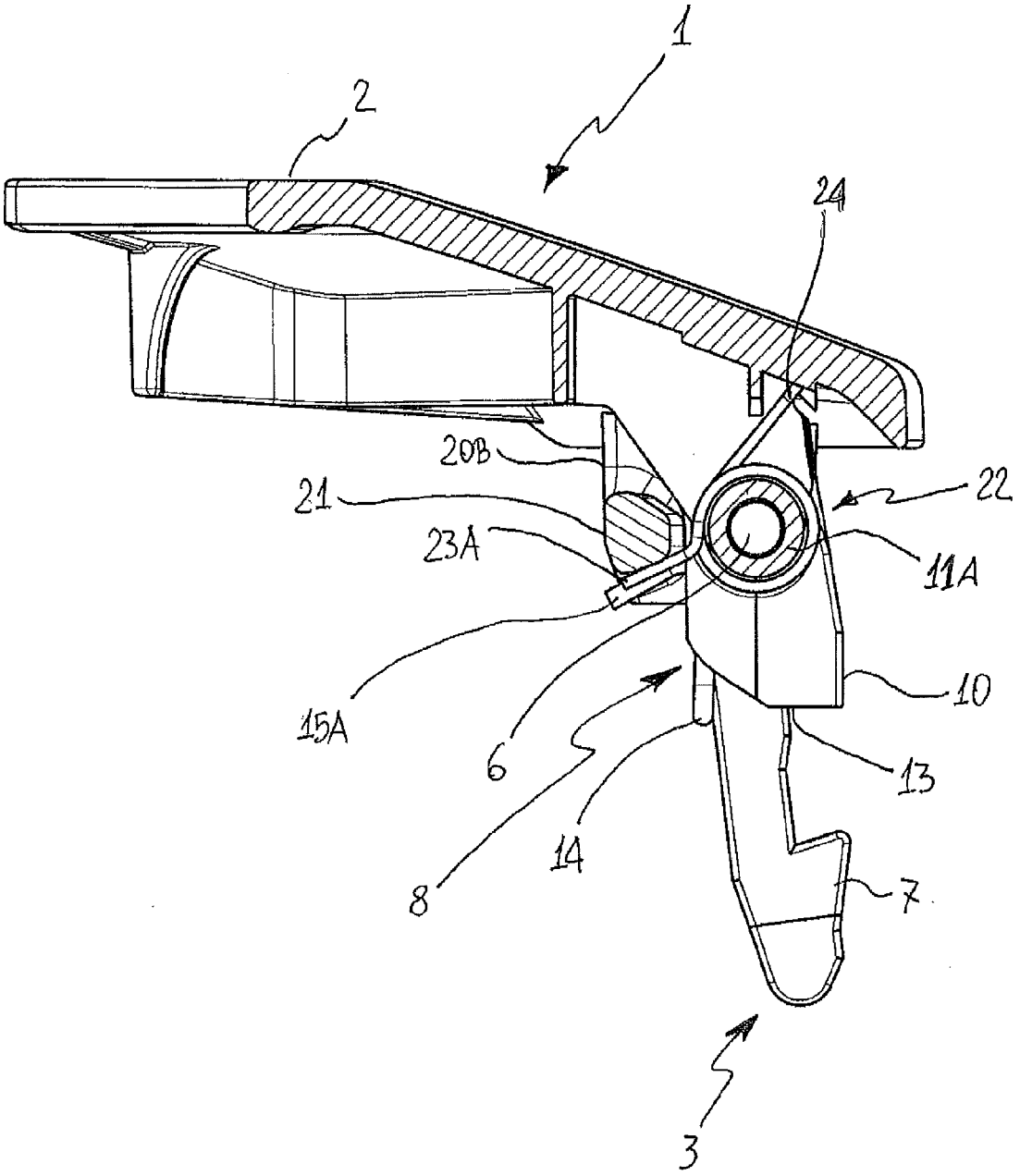

FIG. 5

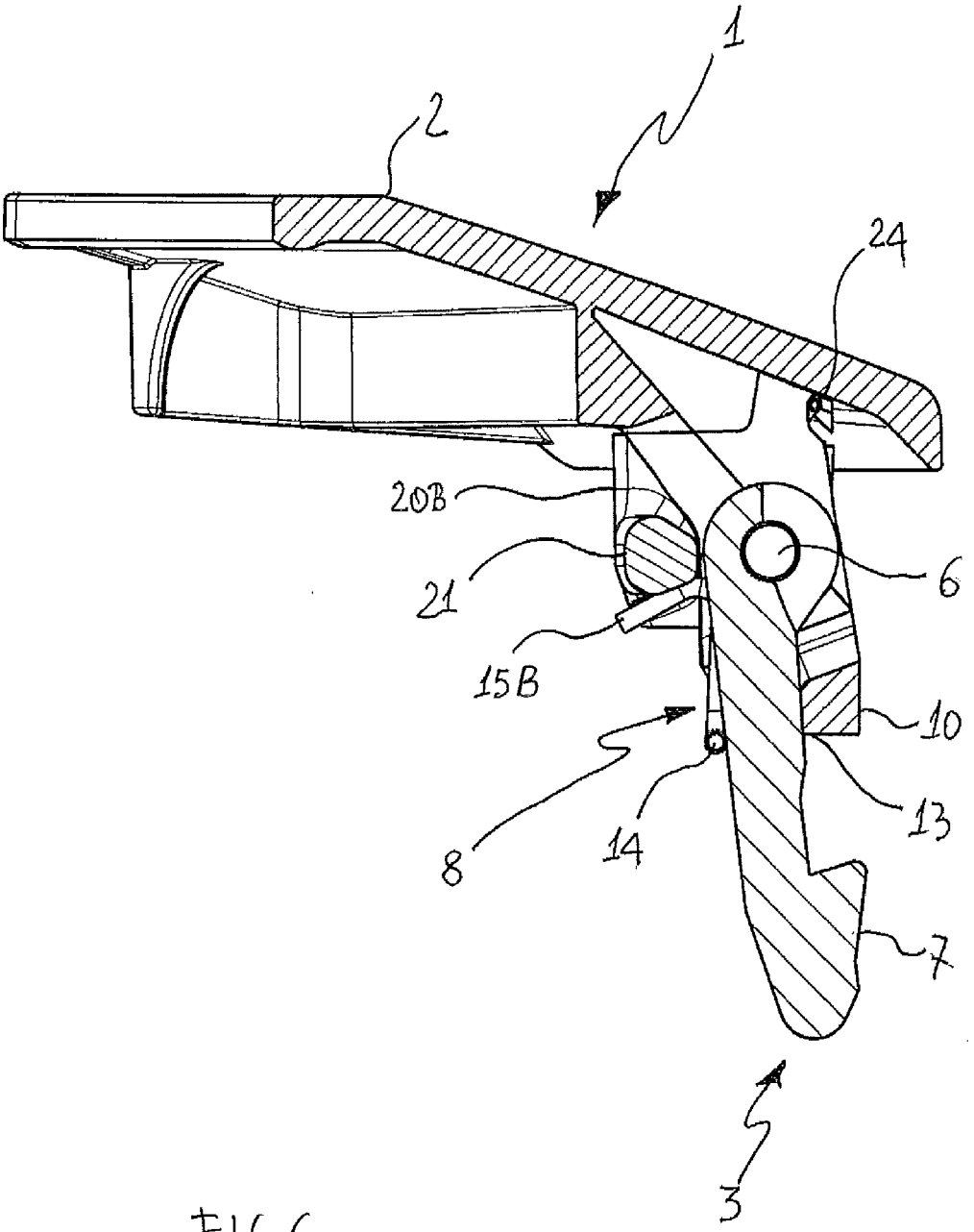

FIG.6

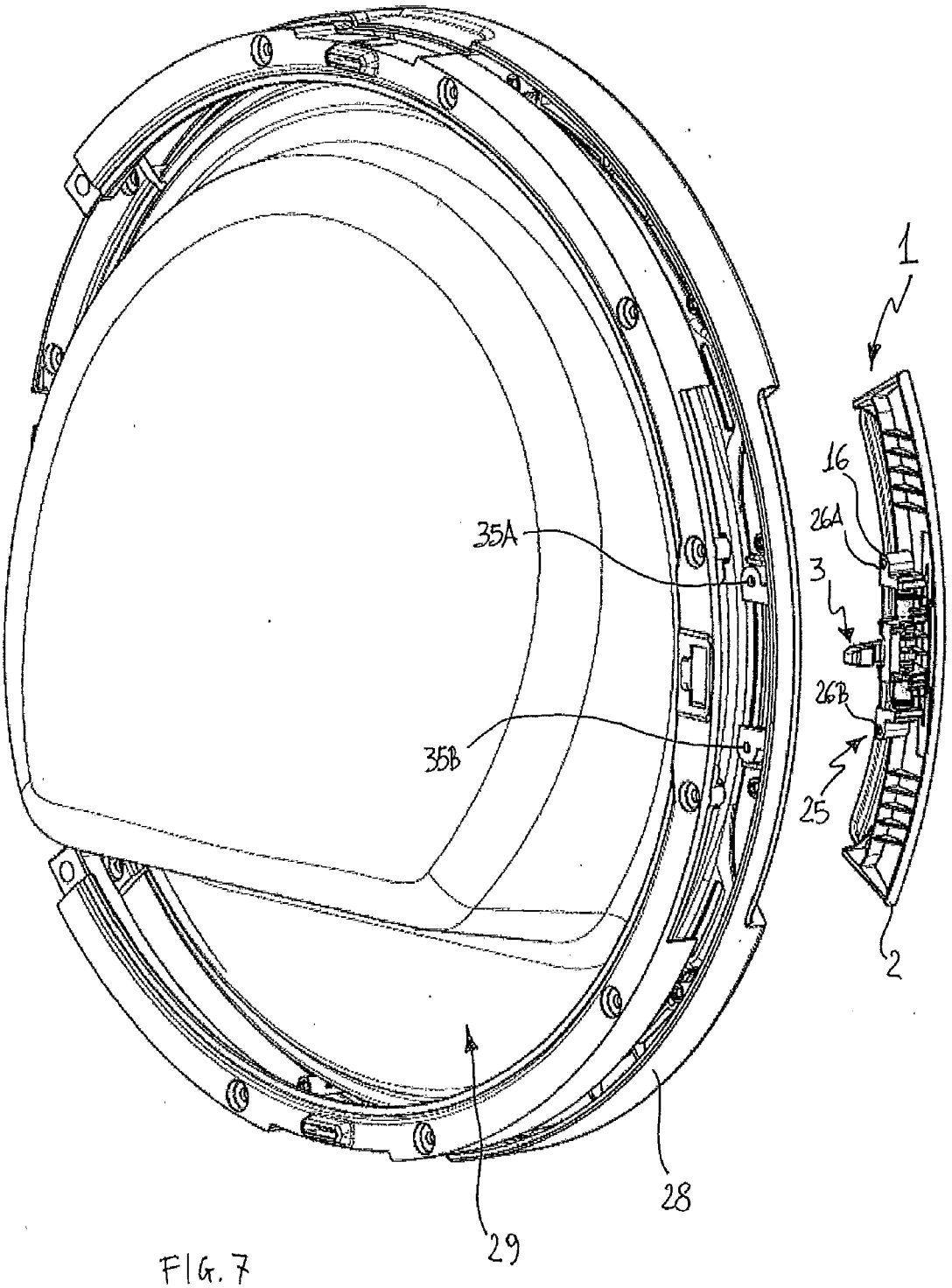

FIG. 7

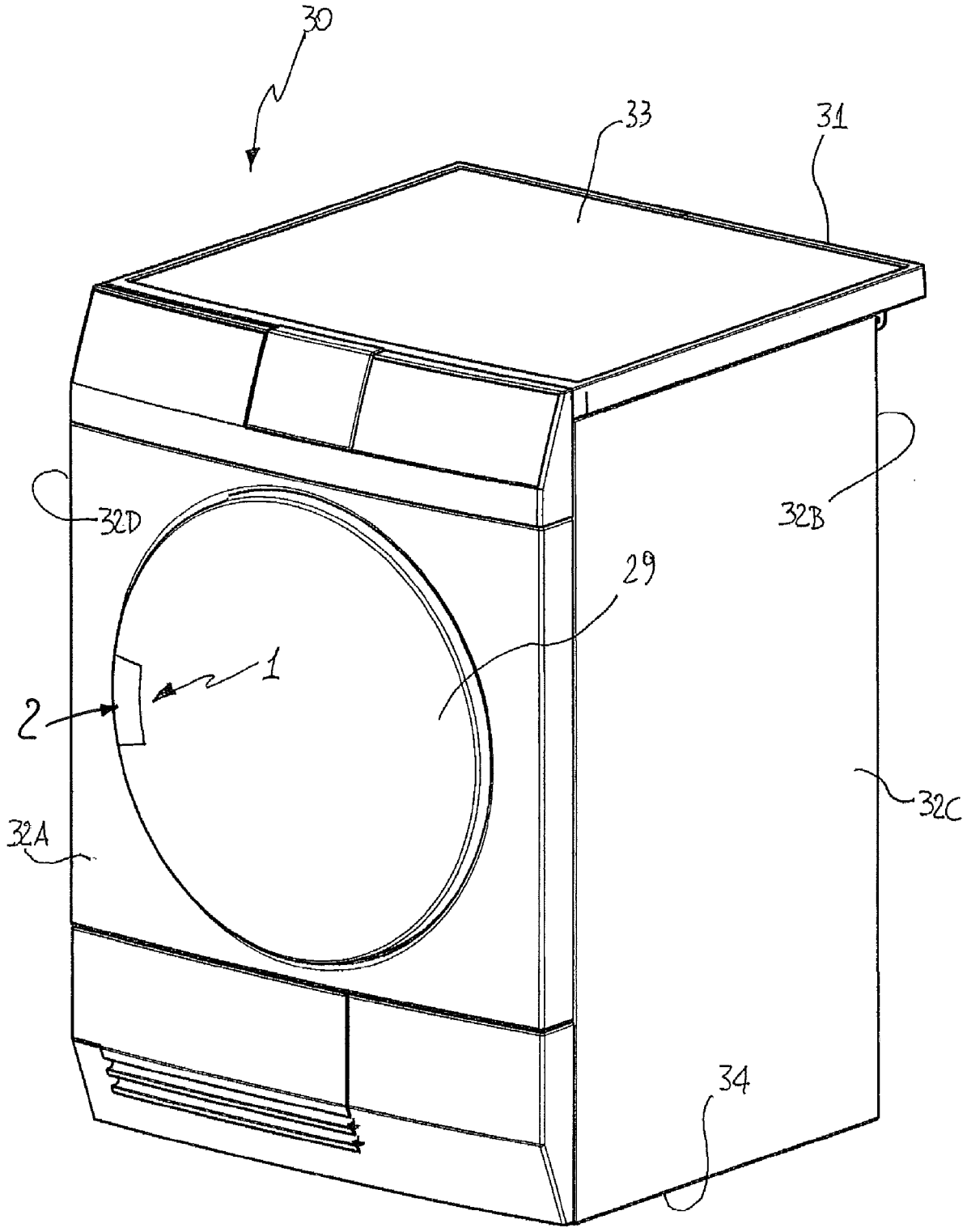

FIG. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 10 19 2888

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 184 395 A1 (SAMSUNG ELECTRONICS CO LTD [KR]) 12 May 2010 (2010-05-12) * paragraph [0045] - paragraph [0070]; figures 2-4 *	1-3,6, 9-11	INV. D06F37/42 D06F39/14 E05C3/16
X	US 5 630 630 A (PRICE ROBERT J [US] ET AL) 20 May 1997 (1997-05-20) * column 3, line 1 - column 4, line 42; figures 1-2 *	1,2,4,6	
A	EP 1 826 309 A1 (GIRBAU SA [ES]) 29 August 2007 (2007-08-29) * paragraph [0019] - paragraph [0020]; figures 1-4 *	1-12	

TECHNICAL FIELDS SEARCHED (IPC)

D06F
E05C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 May 2011	Diaz y Diaz-Caneja

CATEGORY OF CITED DOCUMENTS

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D : document cited in the application
L : document cited for other reasons

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1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 19 2888

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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18-05-2011

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