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(54) DEVICE FOR OPENING SLIDING DOORS

(57) A device (10) for opening doors (1) that can slide within an in-wall frame (11), constituted by a box-like body (12), which can be recessed at the front edge (5) of the door (1), with which a lever (21) is associated eccentrically. The lever is provided with first means for its temporary tilting externally to the box-like body (12) and cooperates with second means for its temporary recessing within the box-like body (12).

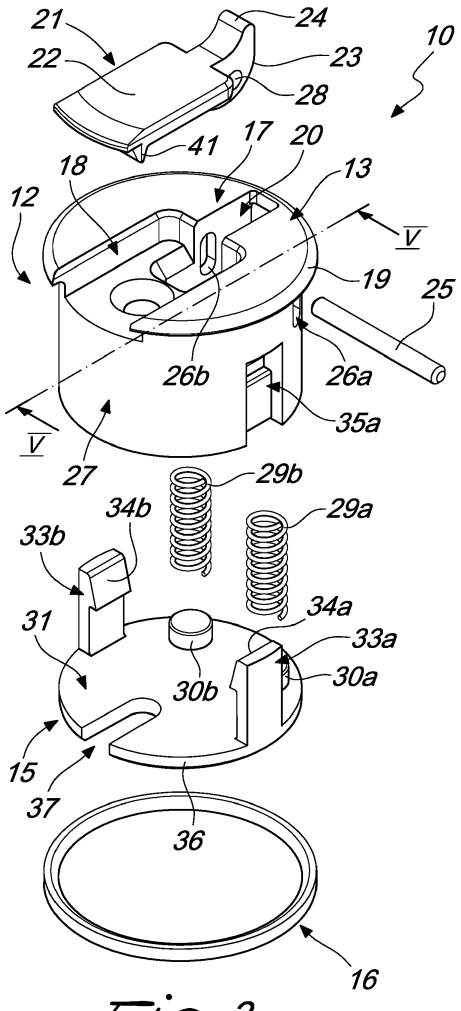

Fig. 3

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Description

[0001] The present invention relates to a device for opening sliding doors.

[0002] Currently it is known to provide doors or windows which use an in-wall frame, firmly arranged inside a wall, within which a door or a panel, also referenced as retractable door, is associated slidingly.

[0003] This solution allows to reduce the space occupation of the door inside a room by virtue of the possibility to make it slide within the in-wall frame: it is thus possible to use the space adjacent to the door, which instead would be occupied by doors of the type that is hinged laterally to a frame.

[0004] In the prior art, the in-wall frame, embedded in the wall or between two plasterboard panels, forms a containment box for the sliding door and is usually constituted by a framework which comprises a plurality of vertical profiles, including a front post and a rear post, between which said door slides, and an upper crossmember, all of which form the opening or space that can be closed by means of said door.

[0005] A rail protrudes above the box, along an axis that is longitudinal to said box and is extended on the opposite side with respect to the containment box, and is concealed by a horizontal jamb.

[0006] Carriages are slidingly associated within the rail and are coupled to the upper edge of the door in order to allow its sliding into and out of the in-wall frame.

[0007] An additional element is usually associated with the end of the rail that is not associated with the vertical posts and acts as a terminal element or stroke limiter for the abutment and contact of the front edge of the door.

[0008] As shown in Figures 1 and 2, such stroke limit is usually adjusted so as to keep a door 1, when it is in the open position, protruding a few centimeters from the perimetric shoulder 2 in the vertical section of the masonry, so that the handle 3 remains completely external and is therefore easy to grip in order to move the door 1.

[0009] However, in order to increase the passage opening or for aesthetic reasons, the stop element is often moved in order to make the door 1 completely retractable, as shown in Figure 2.

[0010] In this case, in order to be able to extract the door 1 from the compartment/in-wall frame, a door pull 4 is used which is constituted by a cylindrical element, recessed beforehand on the front edge 5 of the door 1, within which a finger must be inserted, thus allowing to pull the leaf in order to make it exit just enough to then grip the actual handle 3.

[0011] Although functional, this system however has some drawbacks: one is the fact that the dimensions of this door pull 4 are always small, since they are necessarily linked to the thickness of the door 1, with the consequence that the hold provided for grip performed by a finger can be awkward.

[0012] Another drawback is the fact that sliding systems increasingly often use mechanisms for cushioning the stroke limit and for gently placing the door ajar, such as for example the one disclosed in Italian patents no. 1397672 and no. 273159.

[0013] The operation of these systems resides in that they engage the leaf and pull it toward the stroke limit point by means of a spring which acts in contrast with the force applied by a shock-absorbing system for controlling its stroke.

[0014] In these cases, in order to extract the door by means of the handle of the door pull 4, it is therefore necessary to overcome the elongation force of the spring to reactivate the system, and this maneuver is awkward.

[0015] The aim of the present invention is therefore to solve the described technical problems, eliminating the drawbacks of the cited background art, by providing a device which, applied to one or two retractable sliding doors, allows to pull easily and quickly the door both in the condition in which it is open a few centimeters and in the condition in which it is completely recessed and retracted.

[0016] Within this aim, an object of the invention is to provide a device which combines with the preceding characteristics that of facilitating the user in moving the door.

[0017] Another object is to provide a device that also allows to not have an aesthetic impact, to not hinder the movement of the door and is applicable even to doors of the known type without requiring particular work thereon.

[0018] A further object is to provide a device that can be provided with usual systems and machines and has modest manufacturing costs.

[0019] This aim, these objects and others which will become better apparent hereinafter are achieved by a device for opening doors that can slide within an in-wall frame, characterized in that it is constituted by a box-like body, which can be recessed at the front edge of said door, with which a lever is associated eccentrically which is provided with first means for its temporary tilting externally to said box-like body and cooperating with second means for its temporary recessing within said box-like body.

[0020] Further characteristics and advantages of the invention will become better apparent from the detailed description of a particular but not exclusive embodiment thereof, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figures 1 and 2 are partial lateral perspective views of the prior art;

Figure 3 is a first exploded view of the device according to the invention, taken from above;

Figure 4 is a second exploded view of the device, taken from below;

Figure 5 is a sectional view, taken along the sectional line V-V of Figure 3, in which the device is not activated;

Figure 6 is a view, similar to the preceding one, in the condition in which the door is closed and adjacent

to the vertical jamb;

Figures 7, 8, 9 and 10 are views of the activation of the device;

Figures 11 and 12 are views of the condition of the device in which it is spaced and mated to the vertical jamb;

Figures 13 and 14 are views of the device in the arrangement in which it is applied to two mutually opposite leaves in the condition in which the doors are mutually spaced and mated.

[0021] In the exemplary embodiments that follow, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0022] Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0023] With reference to the figures, the reference numeral 10 generally designates a device for opening doors 1, which can slide within an in-wall frame 11, which is constituted by a box-like body 12, which is preferably cylindrical and has a substantially T-shaped diametrical cross-section so as to form a flat head 13 and, on the opposite side, an opening 14 that can be closed by means of an adapted plug or containment bottom 15 with which it is optionally possible to associate an adapted compensating ring 16.

[0024] The compensating ring 16 is used if the machining performed on the door panel adapted to accommodate the device is too deep, so as to compensate for any difference in depth and therefore align the front of the device 10 with the perimetric edge of the door panel.

[0025] At the head 13 there is, along a diametrical axis, a first seat 17 which is provided with a first portion 18 that has a substantially rectangular plan shape which starts from the perimetric edge 19 of the head 13 so as to affect part of its width, to which a second portion 20 is contiguous which has a similar shape but reduced dimensions and ends proximate to the perimetric edge 19.

[0026] A lever 21 is eccentrically associated at the first seat 17 and has a grip body 22, which is shaped complementarily to the first portion 18 of the first seat 17 and can be accommodated temporarily therein in a retractable manner, a first tab 23 being contiguous thereto, being accommodatable within the second portion 20 of the first seat 17 and being provided with a protrusion 24 which protrudes temporarily from the head 13 and constitutes first means for its temporary tilting outside the box-like body 12.

[0027] The eccentric connection of the lever 21 to the head 13 is allowed by means of an adapted pivot 25 which passes through a pair of slots 26a, 26b, which are provided at the same axis that is transverse to the box-like body 12 so as to affect the second portion 20 and are provided with an extension that is axial with respect to the box-like body 12 and to its lateral surface 27, pivot 25 further being inserted in an adapted hole 28 provided transversely to the first tab 23.

[0028] The lever 21 therefore can be accommodated within the first and second portions 18, 20, the grip body 22, in the condition in which the lever 21 is not in use, being flush with the surface of the head 13 and the protrusion 24 protruding slightly from the head 13.

[0029] If the user imparts a slight pressure to the protrusion 24, this forces the rotation of the lever 21 and the exit of the grip body 22 from the first portion 18 so that it can be gripped by the user.

[0030] Below and transversely to the grip body 22 there is a tooth 41 which facilitates the user in imposing an axial traction on the box-like body 12.

[0031] The dimensions of the grip body 22 are such that once it is no longer gripped by the user it rearranges itself by gravity within the first portion 18 of the head 13.

[0032] The lever 21 further cooperates with second means for its temporary recessing within the box-like body 12, which are constituted by the pair of slots 26a, 26b and by a pair of springs 29a, 29b which are arranged internally and axially to the box-like body 12 within adapted first cylindrical sleeves 32a, 32b which protrude internally and axially to the box-like body 12, a first end of each one of the springs 29a, 29b resting on the overlying pivot 25 and the second end resting at adapted bushes 30a, 30b, which protrude from the lower surface 31 of the plug 15.

[0033] The bushes 30a, 30b compress the pair of springs 29a, 29b just enough to support the lever 21 but at the same time yield with the slightest pressure.

[0034] Advantageously, each one of the pair of springs 29a, 29b is accommodated within adapted first cylindrical sleeves 32a, 32b, which protrude internally and axially to the box-like body 12.

[0035] Two second elastically deformable tabs 33a, 33b protrude diametrically with respect to each other from the lower surface 31 of the plug 15 and each one has a terminal end 34a, 34b which is lance-shaped for temporary interconnection at complementarily shaped seats 35a, 35b provided on the outer lateral surface 27 of the box-like body 12.

[0036] Radially to the plug 15, starting from its perimetric edge 36, there is a slot 37 which allows access, once the plug 15 has been arranged to close the opening 14, to a second cylindrical and axially hollow sleeve 38, which protrudes internally and axially to the box-like body 12 and is adapted to allow coupling with an adapted screw 39.

[0037] The device 10 can be inserted within a complementarily shaped seat which is provided at the front edge 5 of the door 1 and can be associated therewith by means of the screw 39.

[0038] When the panel of the door 1 moves to close and rests against the abutment jamb 40, as shown in Figures 11 and 12, or when in a double leaf/door system 1a, 1b, shown in Figures 13 and 14, the two doors 1a,

1b move to close, the front edge 5 of each one making contact, the protrusion 24 of the lever 21 is forced to retract into the second portion 20 and therefore retracts into the head 13, arranging itself at least flush with it, thus allowing the precise mating of the doors.

[0039] This movement is possible by virtue of the slotted connection between the pivot 25 and the box-like body 12 and by virtue of the presence of the pair of springs 29a, 29b, which, once mating ends, returns the protrusion 24 so that it protrudes from the head 13 and thus allows the oscillation of the grip body 22.

[0040] Of course, the elastic constant of the pair of springs 29a, 29b is such that the unintentional spacing of the door 1 from the abutment jamb 40 when the door is closed is not permitted.

[0041] It has thus been found that the invention has achieved the intended aim and objects, a device having being provided which, applied to one or two retractable sliding doors, allows to pull easily and rapidly the door both in the condition in which it it is open a few centimeters and in the condition in which it is fully recessed and retracted.

[0042] Furthermore, the device facilitates the user in moving the door by virtue of the possibility to grip the lever 21, which, if not used, does not hinder optimum closure of the door on the jamb, since it can be accommodated within the box-like body 12.

[0043] This further allows to obtain a device that does not have an aesthetic impact with respect to the door, does not hinder the movement of the door and can be applied also to doors of the known type without requiring particular work thereon.

[0044] The invention is of course susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0045] The materials used, as well as the dimensions that constitute the individual components of the invention, may of course be more pertinent according to the specific requirements.

[0046] The various means for performing certain different functions need not certainly coexist only in the illustrated embodiment but can be present per se in many embodiments, including ones that are not illustrated. The characteristics indicated as advantageous, convenient or the like may also be omitted or be replaced with equivalents.

[0047] The disclosures in Italian Patent Application No. 102017000073850 from which this application claims priority are incorporated herein by reference.

[0048] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device (10) for opening doors (1) that can slide within an in-wall frame (11), **characterized in that** it is constituted by a box-like body (12), which can be recessed at a front edge (5) of said door (1), with which a lever (21) is associated eccentrically which is provided with first means for its temporary tilting externally to said box-like body (12) and cooperating with second means for its temporary recessing within said box-like body (12).

2. The device (10) according to claim 1, **characterized in that** said box-like body (12), which is cylindrical, has a substantially T-shaped diametrical cross-section so as to form a flat head (13) and, at the opposite end, an opening (14) which can be closed by means of an adapted plug or containment bottom (15) with which it is possible to associate a compensating ring (16), at said head (13) there being, along a diametrical axis, a first seat (17) having a first portion (18) that has a substantially rectangular plan shape and extends from the perimetric edge (19) of said head (13) so as to affect part of its width, to which a second portion (20), which has a similar shape but has smaller dimensions and ends proximate to said perimetric edge (19), is contiguous.

3. The device (10) according to claims 1 and 2, **characterized in that** said lever (21) is associated eccentrically at said first seat (17) and has a grip body (22), which is shaped complementarily to said first portion (18) of said first seat (17) and can be accommodated temporarily and retractably thereat, and to which a first tab (23) is contiguous which can be accommodated within said second portion (20) of said first seat (17) and is provided with a protrusion (24) that protrudes temporarily from said head (13) and constitutes said first means for the temporary tilting of said head (lever (21)) externally to said box-like body (12).

4. The device (10) according to one more of the preceding claims, **characterized in that** the eccentric connection of said lever (21) to said head (13) is allowed by means of a pivot (25) that passes within a pair of slots (26a, 26b), which are provided at the same transverse axis with respect to said box-like body (12) so as to affect said second portion (20) and have an axial extension with respect to said box-like body (12) and its lateral surface (27), said pivot (25) being further inserted within a hole (28) that is provided transversely to said first tab (23).

5. The device (10) according to one more of the preceding claims, **characterized in that** in the unused condition said lever (21) is allowed to be accommodated within said first and second portions (18, 20),

said grip body (22) being substantially flush with the surface of the head (13) and said protrusion (24) protruding slightly from said head (13).

6. The device (10) according to one more of the preceding claims, **characterized in that** a pressure applied to said protrusion (24) is followed by a rotation of said lever (21) and the exit of said grip body (22) from said first portion (18) so as to allow to be gripped by the user, below and transversely to said grip body (22) there being a tooth (41) which facilitates the user in imposing an axial traction to said box-like body (12), the dimensions of said grip body (22) being such that once it is no longer gripped by the user it rearranges itself by gravity within said first portion (18) of said head (13).

7. The device (10) according to one more of the preceding claims, **characterized in that** said lever (21) cooperates with second means for its temporary recessing within said box-like body (12), which are constituted by said pair of slots (26a, 26b) and by a pair of springs (29a, 29b) which are arranged internally and axially to said box-like body (12) within first cylindrical sleeves (32a, 32b) which protrude internally and axially with respect to said box-like body (12), a first end of each one of said springs (29a, 29b) resting on said overlying pivot (25) and the second end resting at adapted bushes (30a, 30b) which protrude from the lower surface (31) of said plug (15), said bushes (30a, 30b) compress said pair of springs (29a, 29b) enough to support said lever (21) but at the same time yield with the slightest pressure.

8. The device (10) according to one more of the preceding claims, **characterized in that** two second elastically deformable tabs (33a, 33b) protrude diametrically with respect to each other from the lower surface (31) of said plug (15), each having a terminal end (34a, 34b) that is lance-shaped for a temporary interconnection at complementarily shaped seats (35a, 35b) provided on the outer lateral surface (27) of said box-like body (12), radially to said plug (15), starting from its perimetric edge (36), there being a slot (37) that allows access, once said plug (15) has been arranged to close said opening (14), to a second cylindrical and axially hollow sleeve (38) that protrudes internally and axially to said box-like body (12) and is adapted to allow coupling with an adapted screw (39).

9. The device (10) according to one more of the preceding claims, **characterized in that** it can be inserted within a complementarily shaped seat provided at the front edge (5) of said door (1) and can be associated therewith by means of said screw (39).

10. The device (10) according to one more of the preceding claims, **characterized in that** when the panel of said door (1) moves to close and rests against the abutment jamb (40), or when, in a double leaf/door system (1a, 1b) said leaves/doors move to close, the front edge (5) of each one making contact, said protrusion (24) of said lever (21) is forced to retract into said second portion (20) and into said head (13), arranging itself at least flush with it, thus allowing the precise mating of said doors (1, 1a, 1b), the movement of said protrusion (24) being provided by virtue of the slotted connection between said pivot (25) and said box-like body (12) and by the presence of said pair of springs (29a, 29b) which, once mating has ended, returns said protrusion (24) to protrude from said head (13) and therefore allow the tilting of said grip body (22).

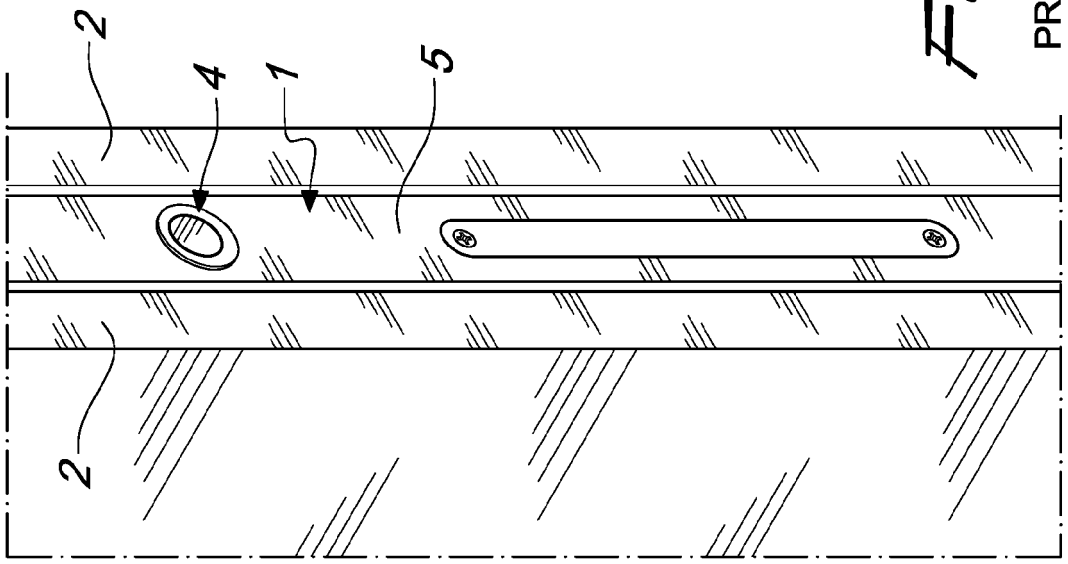

Fig. 2
PRIOR ART

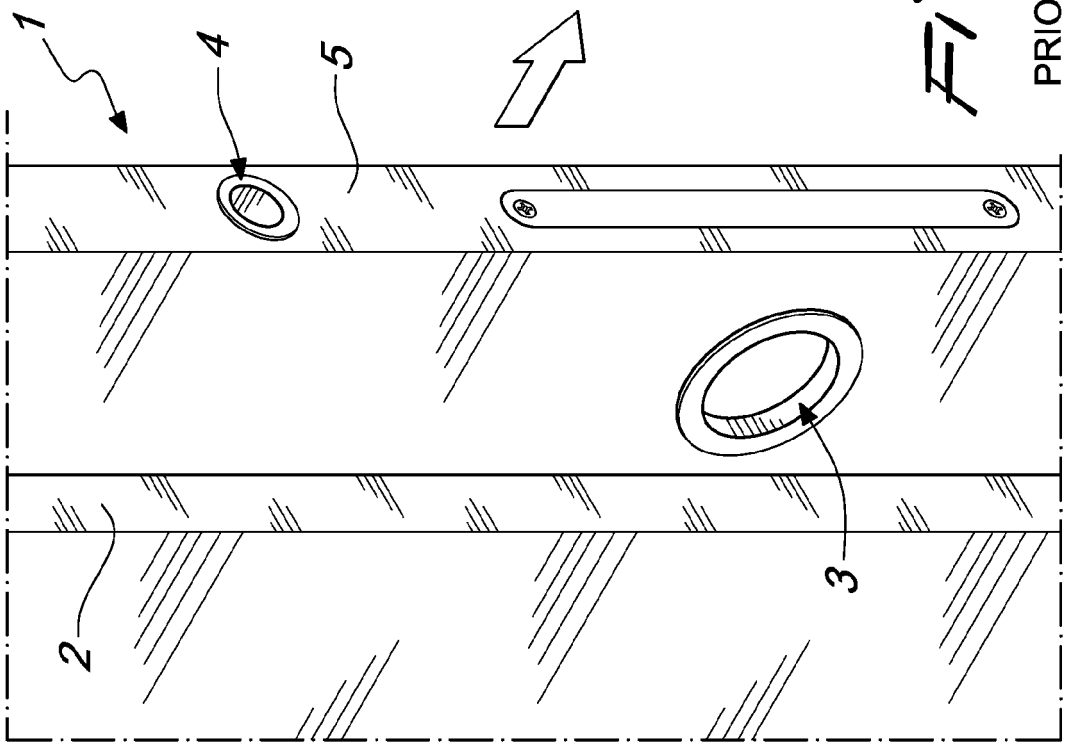

Fig. 1
PRIOR ART

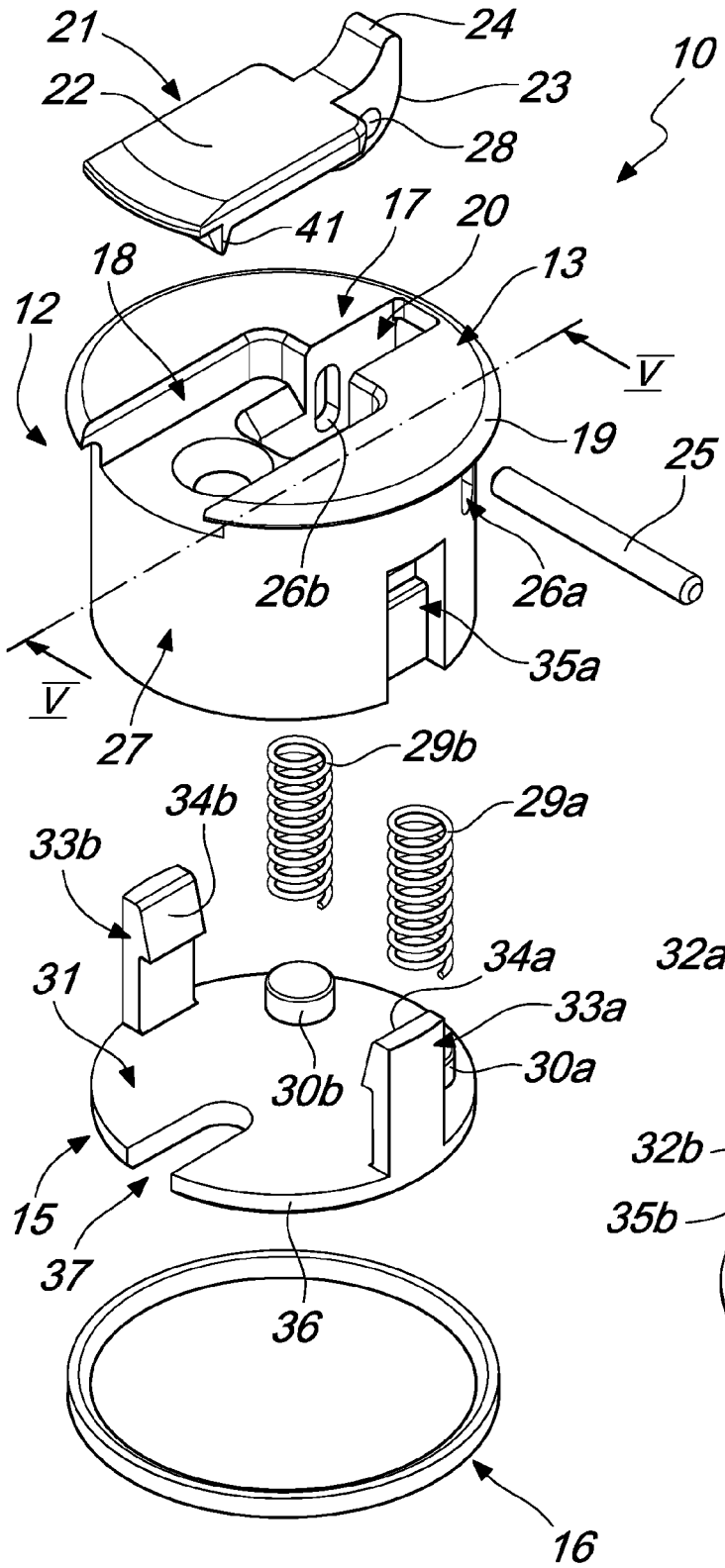
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Fig. 3

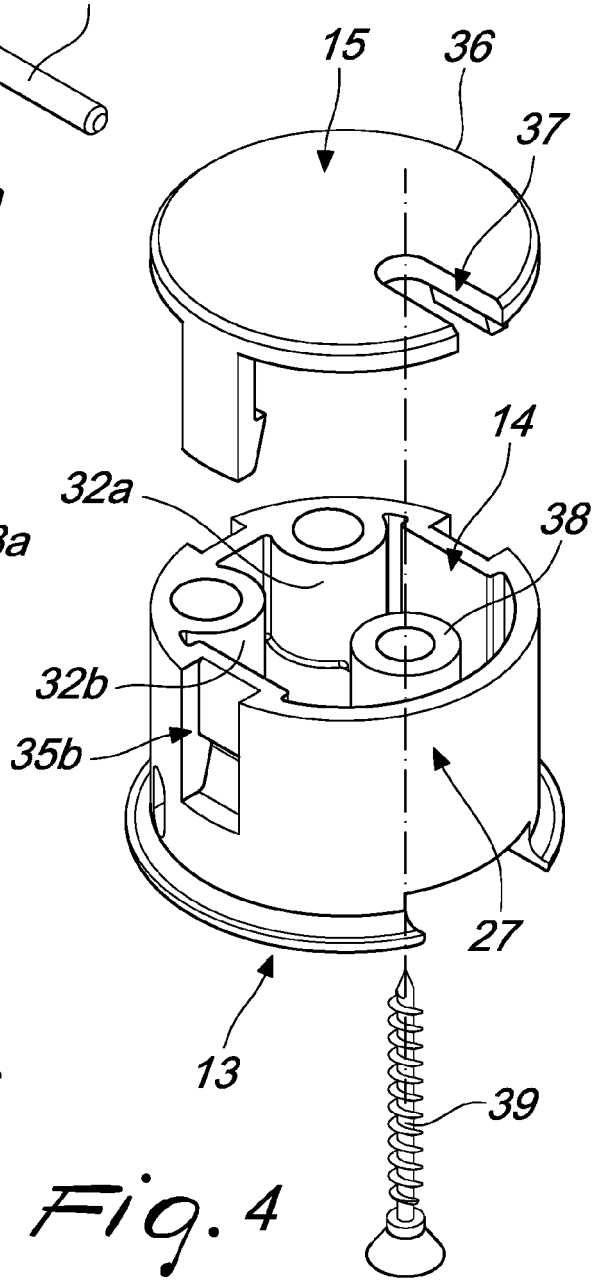
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Fig. 4

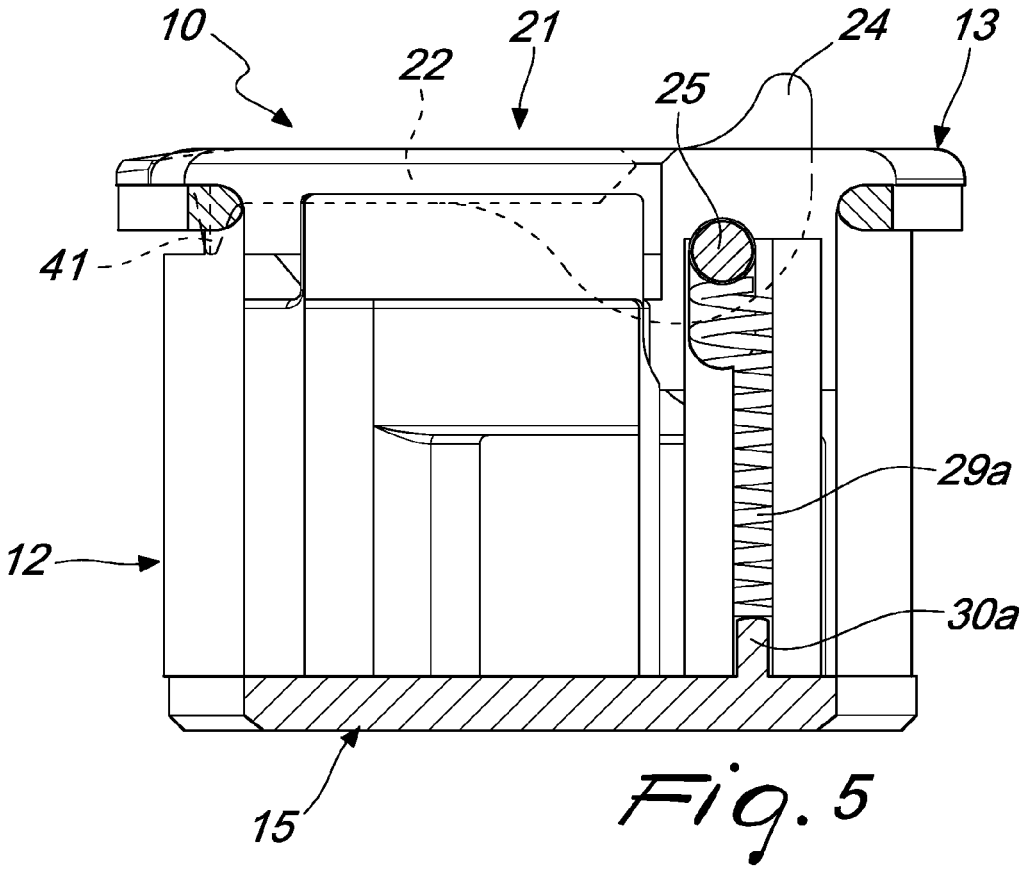
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Fig. 5

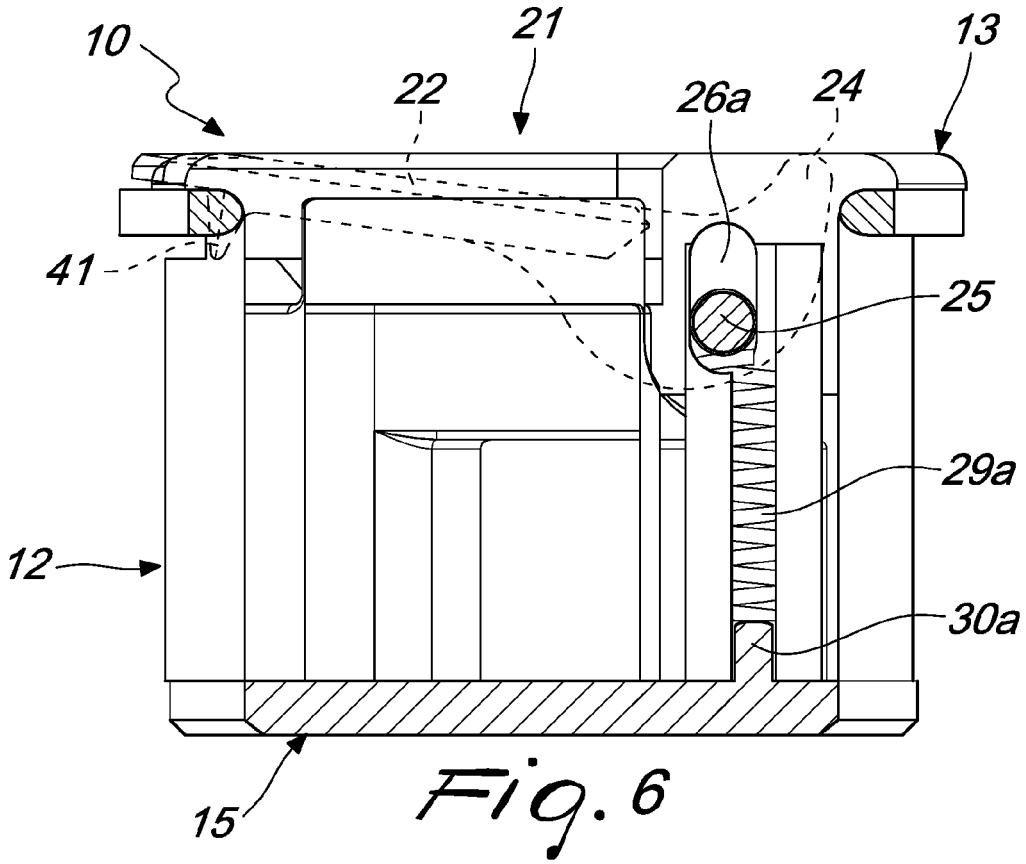
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Fig. 6

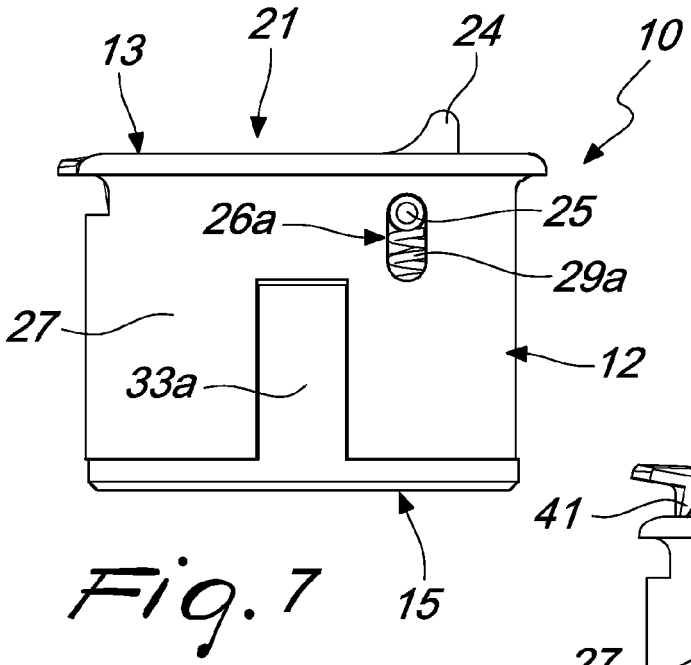

Fig. 7

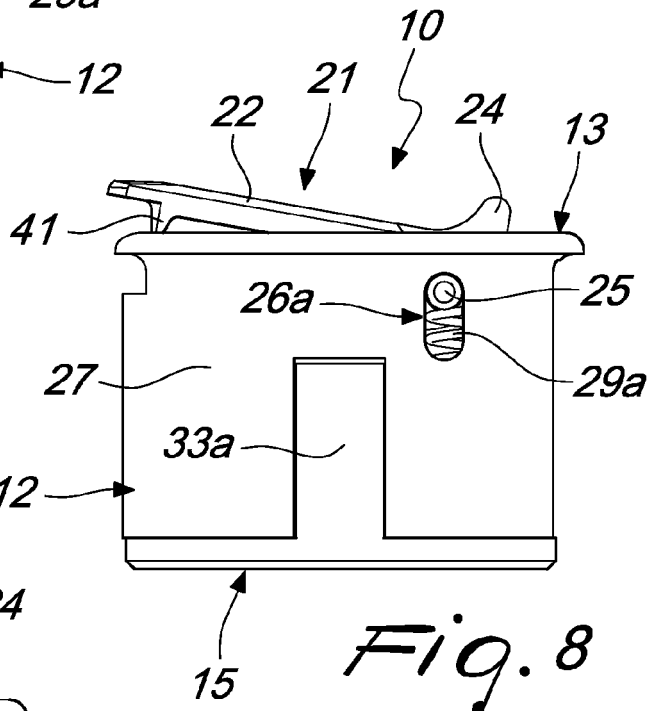

Fig. 8

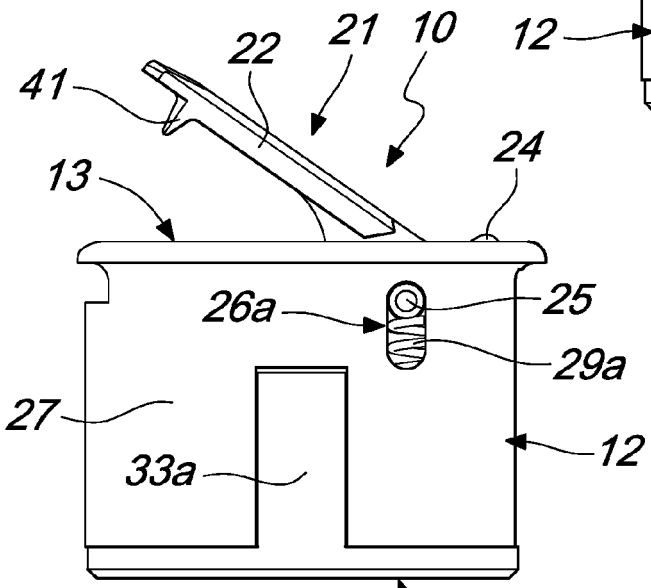

Fig. 9

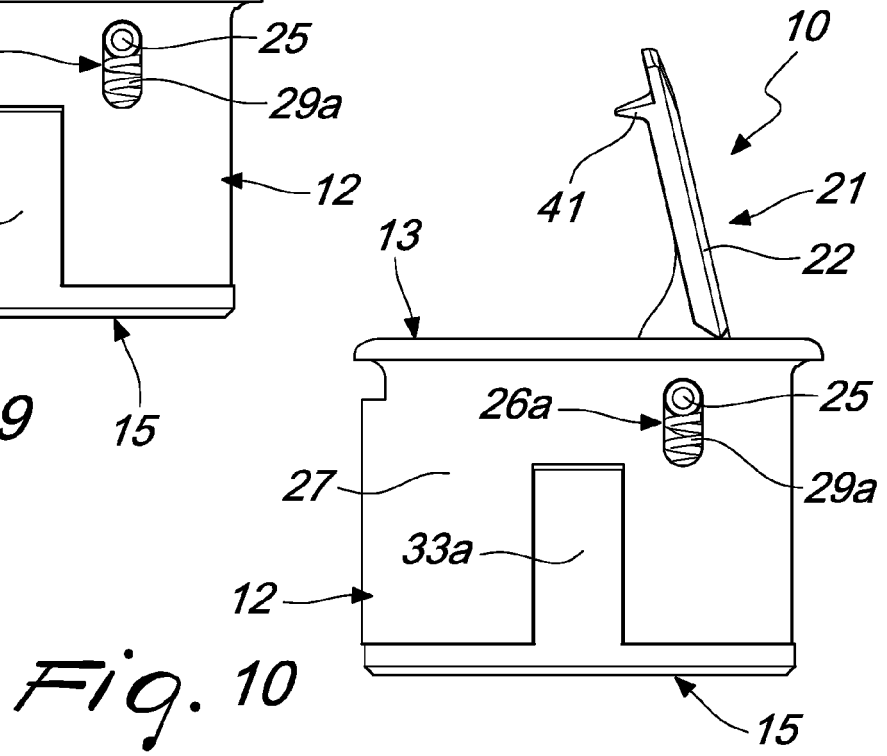

Fig. 10

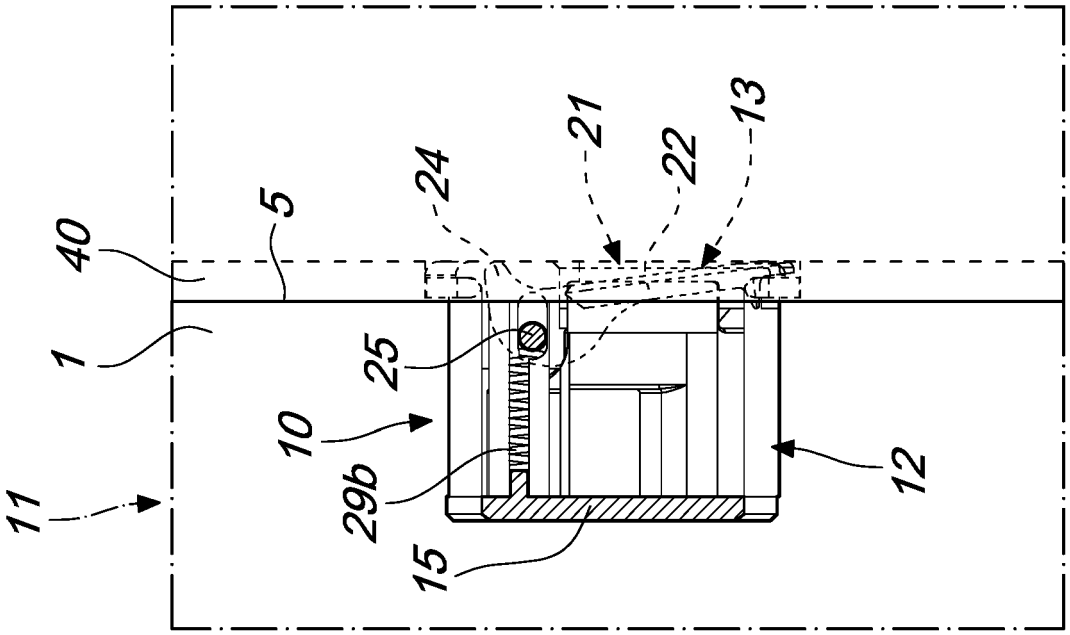
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Fig. 12

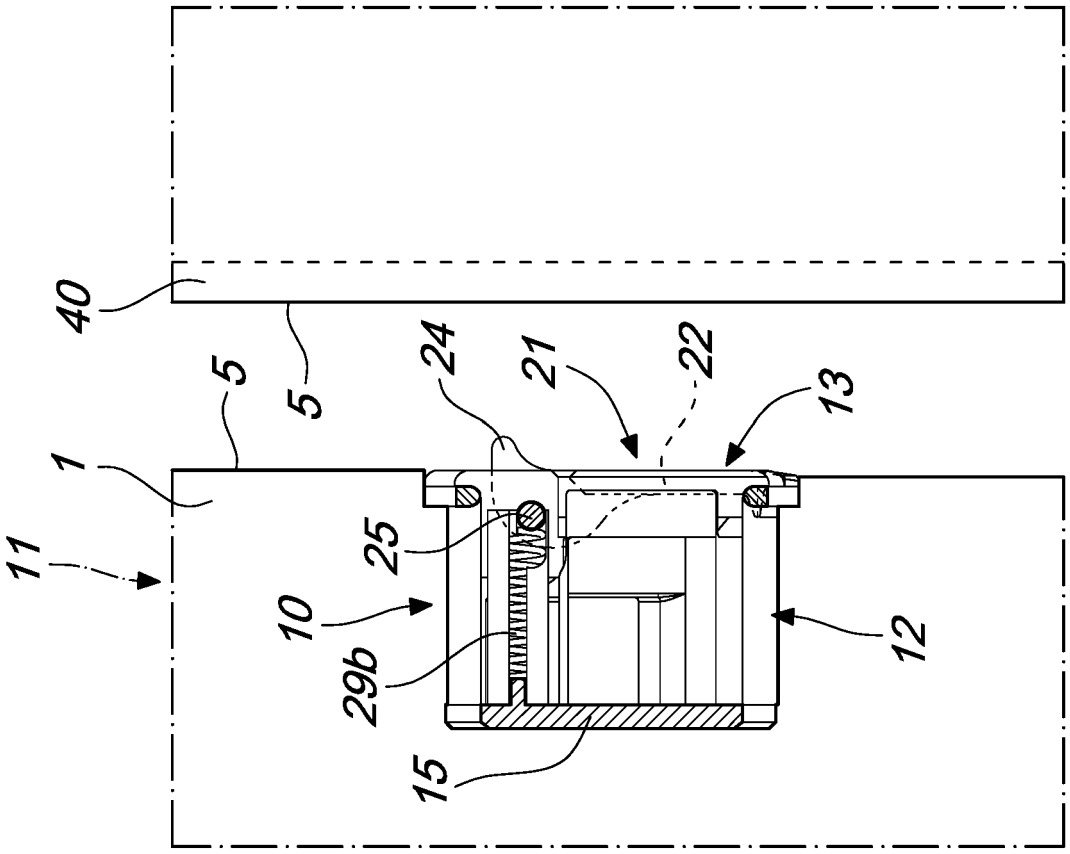
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Fig. 11

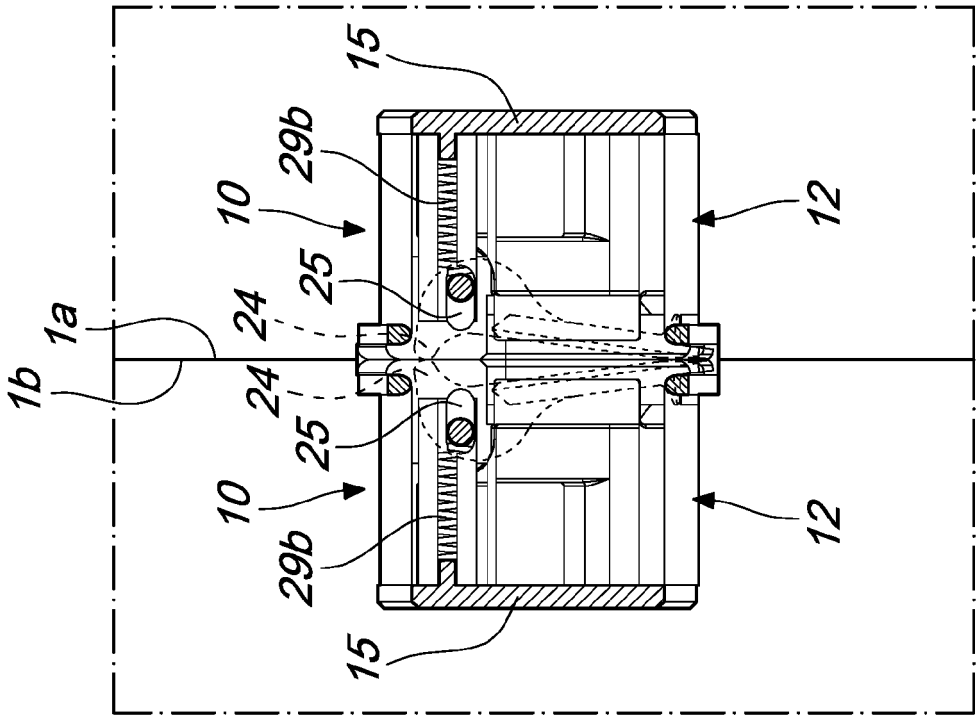
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Fig. 14

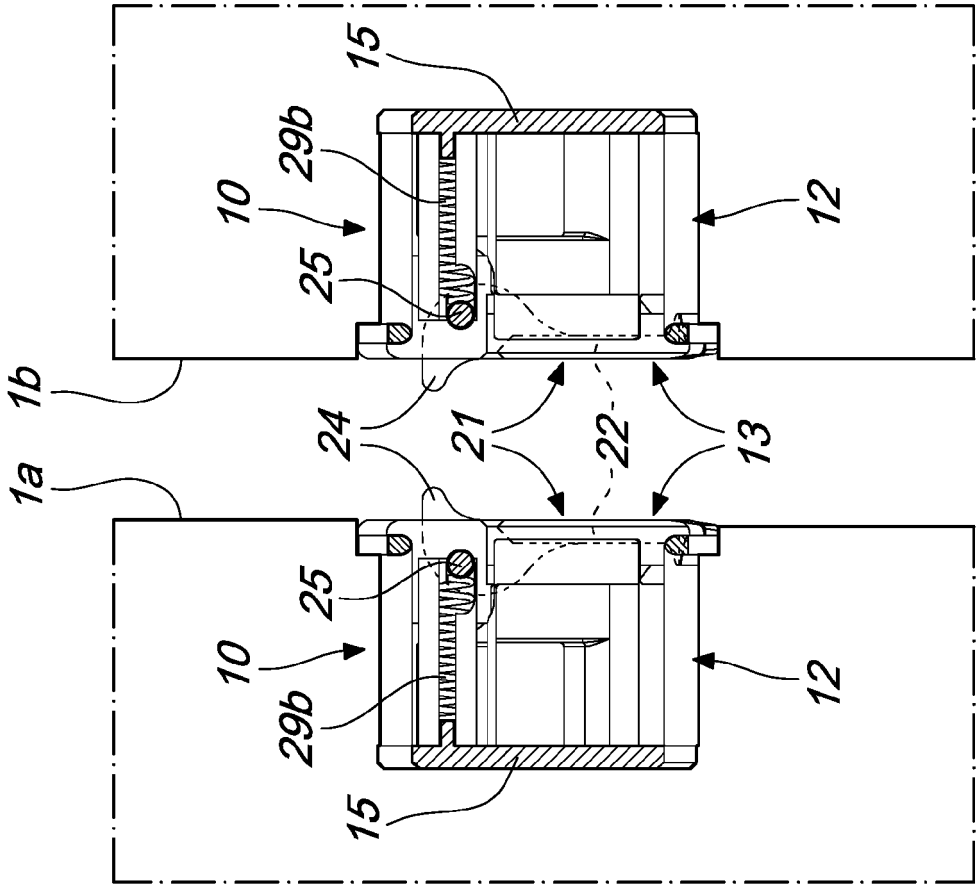
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Fig. 13

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 18 17 8958

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 A	US 2015/225985 A1 (GUIDOS MICHAEL JOHN [US]) 13 August 2015 (2015-08-13) * paragraphs [0052] - [0054]; figures 8A-8F2 * -----	1 2-10	INV. E05B5/00
X A	US 5 676 408 A (DAVIDIAN RICHARD M [US]) 14 October 1997 (1997-10-14) * column 3, lines 1-9 * * column 3, line 62 - column 4, line 2 * * column 4, lines 20-25 * * figures 3,4 * -----	1 2-10	

TECHNICAL FIELDS SEARCHED (IPC)

E05B
E05F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	31 October 2018	Klemke, Beate

CATEGORY OF CITED DOCUMENTS

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

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 17 8958

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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31-10-2018

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