



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
22.01.2020 Bulletin 2020/04

(51) Int Cl.:
E05D 3/14 (2006.01) **E05F 5/00 (2017.01)**
E05D 7/04 (2006.01)

(21) Application number: **19185412.4**

(22) Date of filing: **10.07.2019**

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

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(30) Priority: **18.07.2018 IT 201800007274**

(54) **AN ENHANCED HINGE WITH DAMPENING ELEMENT FOR PIECES OF FURNITURE**

(57) A hinge (1) for pieces of furniture comprises a first end portion or body (2) suitable for being coupled with either a structure, be it a side or an upright, of a piece of furniture, or a door movable with respect to such structure, a link member (3), subject to a spring (7) and connected to such first hinge portion (2) and suitable for being connected to a second hinge portion (4) coupled with the other of said structure, such as a side or an upright, and said door, said link member (3) comprising first and second interconnected elements (5, 6) connected to the first and the second hinge portion (2, 4) respectively, a damp-

ening element (8) being provided, suitable for braking at least the closing movement of the hinge (1) whereby the door moves towards the structure of the piece of furniture, such dampening element (8) being associated with the second element (6) of the link member (3) of the hinge; such dampening element being a rotating damper suitable for cooperating with a gear element integral with the first element (5) of the link member (3), said rotating damper and said gear element being connected to each other in a selectively connectable manner.

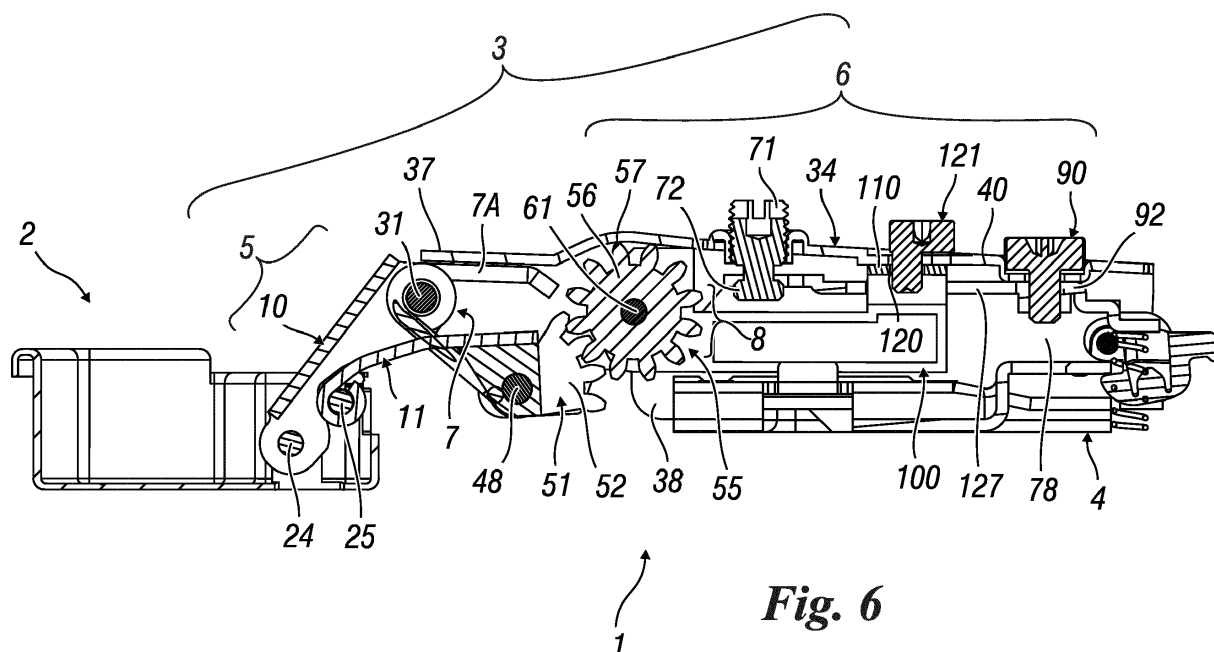


Fig. 6

Description

[0001] The scope of the present invention is a hinge for pieces of furniture according to the preamble of the main claim.

[0002] Hinges for pieces of furniture provided with a dampening element suitable for braking the movement of a door of a piece of furniture on the structure, be it a side or an upright of the latter, for instance upon closing it, are known for a long time. Such hinges are implemented in a variety of ways different from each other. For example, they comprise such dampening element that is an integral part of the hinge: usually, such dampening element comprises a piston movable inside an oleodynamic cylinder and is longitudinally secured to an articulated or link member of a hinge. Such dampening element is suitable for co-operating with a first part of the hinge connected to the door, while the latter is moving (in general, being closed). In this way, the closing movement is braked or dampened, thus preventing such door from violently slapping in the above-mentioned structure. In another solution, the dampening element (also in this case having a movable piston inside the cylinder) is secured to a part of the hinge constrained to the structure of a piece of furniture and directly acts onto the link member whenever the door is being closed.

[0003] In a further known solution the dampening element (also in this case defined by a piston movable inside an oleodynamic cylinder) is longitudinally inserted within a first element of the link member of the hinge and co-operates with driving means interposed between said first element of said hinge member and a second element of such hinge member.

[0004] However, the known solutions are often difficult and expensive to implement because, for example, they are implemented during the manufacturing step together with the dampening element associated therewith. Also, some known hinges feature non-negligible dimensions or space occupation, for example both because of the dampening element being positioned outside the link member and because of the piston/cylinder conformation of such dampening element; this also affects the appearance of the piece of furniture.

[0005] Other known solutions have a unique application in that the dampening hinges (also in this case having the piston inside the cylinder) "are born" the dampening element being secured to the link member or to another part of the hinge. Therefore, it is not possible to separate the component parts (dampening element and link member or another part of the hinge, for example the body that secures the latter to the door of the piece of furniture) from each other. Consequently, a furniture manufacturer shall stock both dampening hinges and non-dampening hinges even though the hinge taken as a whole (link member and body), is basically the same. This results in a greater investment in terms of component parts and in a need for having available space for storing such component parts.

[0006] Both documents AT4486U1 and WO2010/082028 describe a hinge for pieces of furniture wherein the dampening element is a rotary dampener. In such documents the preamble of claim 1 is set forth. AT4486 comprises the preamble of the main claim of the present document.

[0007] CN103015825 describes a dampening hinge for pieces of furniture wherein the dampening element or snubber can also co-operate with a spring.

[0008] An object of the present invention is to offer a dampening hinge, i.e. a hinge provided with a dampening element, that overcomes the drawbacks of the known solutions.

[0009] In particular, an object of the present invention is to offer a hinge of the mentioned type that features dimensions smaller than those of the known hinges, is easy to implement and assemble and such that, even though equipped with a dampening element, the latter can be used only when so desired and necessary.

[0010] These objects and others that will be apparent to those skilled in the art are achieved by a hinge according to the attached claims.

[0011] In order to make the present invention better understandable, the following drawings are attached hereto for merely explanatory, non-limitative purposes, wherein:

figure 1 shows a perspective view of a dampening hinge not in accordance with the present invention; figure 2 shows an exploded perspective view of the hinge depicted in figure 1; figure 3 shows a cross sectional view according line 3-3 in figure 1; figure 4 shows a perspective view of a hinge according to the invention; figure 5 shows an exploded perspective view of the hinge depicted in figure 4; and figure 6 shows a cross sectional view according to line 6-6 in figure 4.

[0012] With reference to figures 1-3, a dampening hinge is generally identified by the reference numeral 1 and is suitable for connecting a door of a piece of furniture to a structure, be it a side or an upright of the latter (neither of them shown), so as to allow for its movement. Such hinge comprises a first portion (or body) 2 suitable for being associated with a door, a link member 3 connected to such first portion and a second portion 4 which the link member 3 is connected to and suitable for being connected to the structure, be it a side or an upright of the door. Obviously, the first portion 2 can be associated with the door and the second portion 4 with said structure of a piece of furniture.

[0013] The link member 3 comprises a first element 5 connected to the first hinge portion 2 and a second element 6 connected to the second hinge portion 4. A basically helical-shaped spring 7 with end arms 7A and 7B and a protruding intermediate portion 7C is interposed

therebetween. The second hinge element 6 receives a dampening element 8.

[0014] The first and second elements of the link member 3 will be hereafter referred to as first and second interconnected element 5, 6 respectively. Together they form an articulated quadrilateral link, subject to the action exerted by the spring 7, which allows the movement of the hinge 1.

[0015] More specifically, the first interconnected element 5 comprises two component parts 10 and 11. The first component part 10 comprises pairs of end wings 14 and 15 with through holes 14A and 15A respectively, and the second component part comprises a folded portion 18 delimiting a hole 19 at a first end 17 and wings 21 with through holes 22 at a second end 20.

[0016] A U-shaped pin 23 comprises arms 24 and 25 suitable for penetrating a pair of holes 26 and 27 respectively, facing the first hinge portion or body 2. The first arm 24 also co-operates with the holes 14A of the first component part 10 of the interconnected element 5 and constrains it to such body. The hole 19 of the second component part 11 of such element 5 receives the arm 25 of the pin 23 that thus constrains it to the body 2.

[0017] A pin 31 penetrates the turns of the spring 7 and constrains it to the wings 15 (by going through the holes 15A) of the first component part 10 of the first interconnected element, said pin 31 also penetrating coaxial holes 33 of a first component part 34 of the second interconnected element 6, thus constraining the latter to the first component part 10 of the first interconnected element 5. Such holes 33 are provided in wings 35 of such component part 34. The latter comprises a portion 37 interposed between said wings 35 on which the arms 7A and 7B of the spring 7 rest.

[0018] The first component part 34 of the second interconnected element 6 features parallel side walls 38 projecting from the edges of a flat portion 40 including a hole 41 and a slot (or elliptical hole) 42. The walls 38 include corresponding coaxial holes 43 and 44.

[0019] The holes 43 are suitable for receiving a pin 48 which also co-operates with the through holes 22 of the wings 21 of the second component part 11 of the first interconnected element 5. In addition, such pin 48 also penetrates a hole 50 of a gear element 51 having protruding wings 52 with a free edge 53 shaped like a toothed sector. Such gear element 51 is secured to the two interconnected elements, i.e. it is fixedly inserted between the above-mentioned wings 21. This is also achieved thanks to the fact that the intermediate portion 7C of the spring 7 exerts a given pressure on the gear element 51.

[0020] A rotating damper 55, of a type known by itself and provided with a body 56 having a toothed perimetrical surface 57 directly co-operating with the wings 52, is suitable for co-operating with the partially toothed wings 52.

[0021] The rotating damper is of a type that is known by itself and can rotate both around its own hole 60 and a pin 61, in a dampening way thanks to the viscous fluid contained in the body 56 or a helicoidal spring inside such

body. The rotating damper is of a type that is known by itself and consequently it will not be further described here below.

[0022] As already said before the rotating damper 55 have a through hole 60 wherein is placed the pin 61 which also connects the coaxial holes 44 of the first component part 34 of the second interconnected element 6. Such rotating damper 55 is placed in and can rotate between the side walls 38 of such first component part 34, thus dampening at least the closing movement of the hinge 3. Such dampener 55 can also be a dual effect one, thus dampening both the opening and the closing movements of the hinge (hence of the door on the structure, side or upright of the piece of furniture).

[0023] The second interconnected element 6 comprises a second component part 70 interposed between the side walls 38 of the first component part 34 of such second interconnected element 6 and integral with the second portion 4 of the hinge. Such second component part 70 is glidingly integral (in the longitudinal direction) with the first component part 34 thanks to a screw 71 having a mushroom end 72, whose narrow portion is received in a slot 73 (open at one end 74) of such second component part.

[0024] The second component part comprises parallel walls 77 delimiting an inner cavity 78 of such component part.

[0025] A second screw 90 co-operating with a hole 91 in a wall 92 of the second component part 70 (from the edges of which the walls 77 depart) and with the slot 42 allows a transversal (orthogonal to its own longitudinal axis K) adjustment of hinge 1.

[0026] In use, closing a door with respect to the frame of a piece of furniture leads to a relative rotation between the elements 5 and 6 of the link member 3 of the hinge. This rotation takes place around the pins 31 and 48.

[0027] It follows that the gear element 51, which is fixed, moves the rotating damper 55: as a matter of fact, the toothed surface 57 moves on the partially toothed wings 52. This results in such dampener 55 rotating around the pin 61, consequently with a dampening action exerted onto the link member 3 upon the closing movement.

[0028] Thanks to the use of the rotating damper 55 together with the toothed surface 57 and to the co-operation with the gear element 51 (i.e. with the toothed portions of the latter), the movement of the hinge takes place in a precise manner and at a constant speed, which might be properly selected by selecting the type of rotating damper (more or less braked).

[0029] The above-described solution relates to a hinge 1 that is permanently dampened and does not fall in the scope of the present invention. On the contrary, the solution illustrated in figures 4 thru 6 relates to a hinge 1 that is selectively dampened, i.e. a hinge wherein the function performed by the dampening element 8 can be activated and deactivated.

[0030] In figures 4 thru 6, those parts that correspond

to those of the already described figures are identified by the same reference numerals.

[0031] The main difference between the embodiment illustrated in figures 1 thru 3 and that illustrated in figures 4 thru 6 consists in that the rotating damper 55 defining the dampening element 8 is not integral with the first component part 34 of the second interconnected element 6, but is rather inserted within the inner cavity 78 of the second component part 70 and is integral with a support body 100 featuring parallel arms 101, the rotating damper 55 being associated with a first end 102 of the arms by way of the pin 61 inserted into coaxial holes 103 cut in such ends 102. The arms 101 delimit an inner cavity 105 wherein said dampener 55 is positioned.

[0032] Such arms are connected to a transversal wall 110 including a through hole 120 suitable for containing a cam screw 121 (riveted) placed outside element 6. Such screw 121 arrives at said hole 120 through a hole 123 cut in the flat portion 40 of the first component part 34 of the second interconnected element 6 and through an opening 127 in the wall 92 of the second component part 70 of such second interconnected element.

[0033] Such screw 121 can freely rotate within such hole 120 by making translate the body 100 within said second component part 70. It results in the following consequences: by rotating the screw 121 in the hole 120 a translation takes place, both of the body 100 and of the members connected thereto (in particular, of the rotating damper 55) towards gear element 51.

[0034] In this way, the toothed surface 57 of the rotating damper 55 co-operates with the partially toothed wings 52 of the gear element 51. Therefore, the hinge is dampened.

[0035] If the screw 121 is rotated by 180° with respect to the above-achieved position, the body 10 and the component parts connected thereto (in particular, the rotating damper 55) move away from the gear element by running along the inner surface of the second component part 70 of the second interconnected element 6. In this way, the toothed surface 57 of the rotating damper 55 is no longer engaged with the partially toothed wings 52 of gear element 51.

[0036] In this way, whenever the hinge closes (or also opens, if the rotating damper is a bidirectional one) the dampener 8 does not exert any dampening action.

[0037] Therefore, hinge is not dampened.

[0038] The hinges implemented according to the invention permanently provide an optimum dampening action, which can be finely adjusted by properly selecting the number of teeth of the wings 52 of the first gear element 51.

[0039] Therefore, the same hinge can be implemented in such a way as to make it a dampening or non-dampening hinge, at user's discretion, and if it is dampened, such effect can be achieved in a monodirectional manner (only in the closing movement of the door on the structure, be it a side or an upright of the piece of furniture) or in a bidirectional manner (i.e., in the opening and closing

movement) by properly selecting the rotating damper 55.

Claims

1. A hinge (1) for pieces of furniture comprising a first end portion or body (2) suitable for being coupled with either a structure, such as a side or an upright of a piece of furniture, or a door movable with respect to such structure, a link member (3) subject to a spring (7) and connected to such first hinge portion (2) and suitable for being connected to a second hinge portion (4) coupled with the other of said structure and said door, said link member (3) comprising first and second interconnected elements (5, 6) connected to the first and second hinge portions (2, 4) respectively, a dampening element (8) being provided, suitable for braking at least the closing movement of the hinge (1) whereby the door moves towards the structure of the piece of furniture, such dampening element (8) being associated with the second interconnected element (6) of the link member, such dampening element being a rotating damper (55) suitable for co-operating with a gear element (51) integral with the first element (5) of the link member (3), the second interconnected element (6) comprising a first component part (34) hinged (at 31) on the first interconnected element (5), **characterized in that** said second element comprises a second component part (70) adjustably inserted in said first component part (34), said second component part (70) containing the rotating damper (55), said rotating damper (55) being alternatively stably and continuously locked with the gear element (51) or being selectively unlockable from the latter, the rotating damper (55) of said dampening element (8), contained inside the second component part (70) of the second interconnected element (6), being integral with a body (100) placed inside said second component part (70), said body (100) including parallel arms (101) delimiting one inner cavity (105) wherein the rotating damper (55) is placed, such rotating damper (55) being integral with such parallel arms (101), said body (100) being subject to the action exerted by a cam screw (121) drivable outside said second interconnected element (6) and suitable for defining the use of the hinge alternatively as a dampening or non-dampening hinge.
2. The hinge according to claim 1, **characterized in that** said cam screw (121) co-operates with a hole (120) provided in a wall (110) of said body (100) which the parallel arms (101) are associated with, such cam screw being suitable for moving such body (100) into said second component part (70) of the second interconnected element (6) in such a way as to make the rotating damper (55) integral with such body get closer to or move away from said gear el-

ement.

3. The hinge according to claim 1, **characterized in that** the gear element (51) is fixed, the rotating damper (55) is movable on the gear element (51), i.e. it rotates on such gear element. 5
4. The hinge according to claim 1, **characterized in that** the rotating damper (55) is hinged, through a corresponding pin (61), on said second interconnected element (6). 10
5. The hinge according to claim 1, **characterized in that** said first interconnected element (5) comprises two component parts (10, 11), the second component part (11) carrying the gear element (51), the spring (7) being hinged (at 31) on the first component part (10), a pin (31) defining the hinge around which the spring (6) is located, thus also hinge-constraining said first interconnected element (5) to the second interconnected element (6). 15 20
6. The hinge according to claim 1, **characterized in that** said gear element (51) includes at least one portion (52) having a free edge (53) shaped like a toothed sector, a toothed perimetrical surface of the rotating damper (55) engaging said free edge (53). 25
7. The hinge according to claim 1, **characterized in that** the rotating damper (55) is alternatively mono-directional or bidirectional. 30

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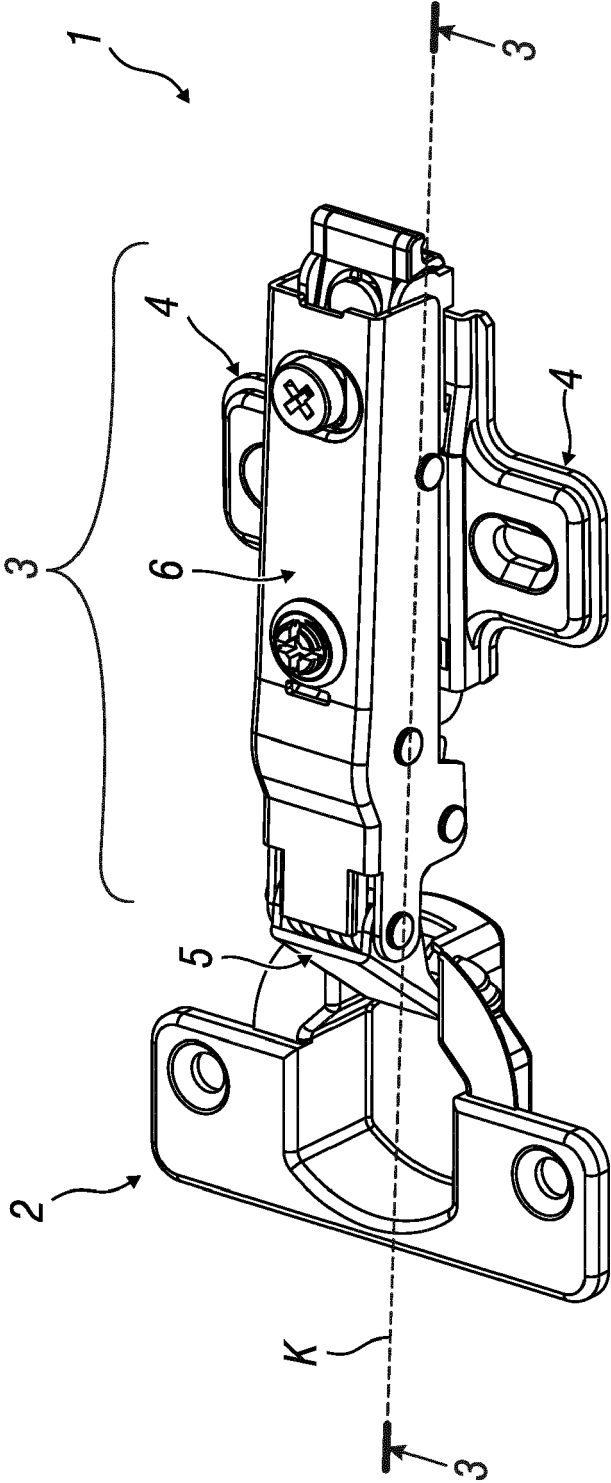


Fig. 1

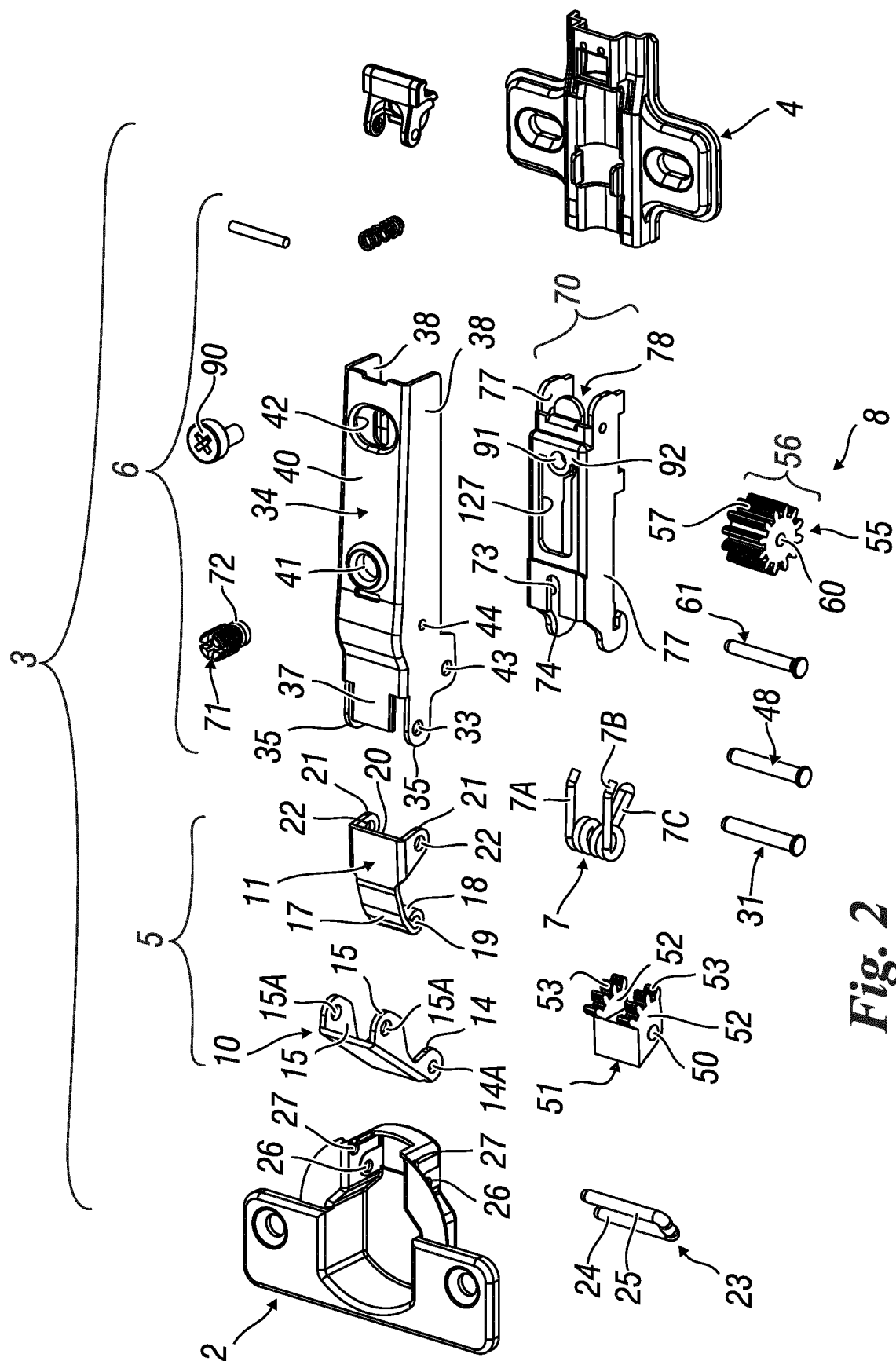


Fig. 2

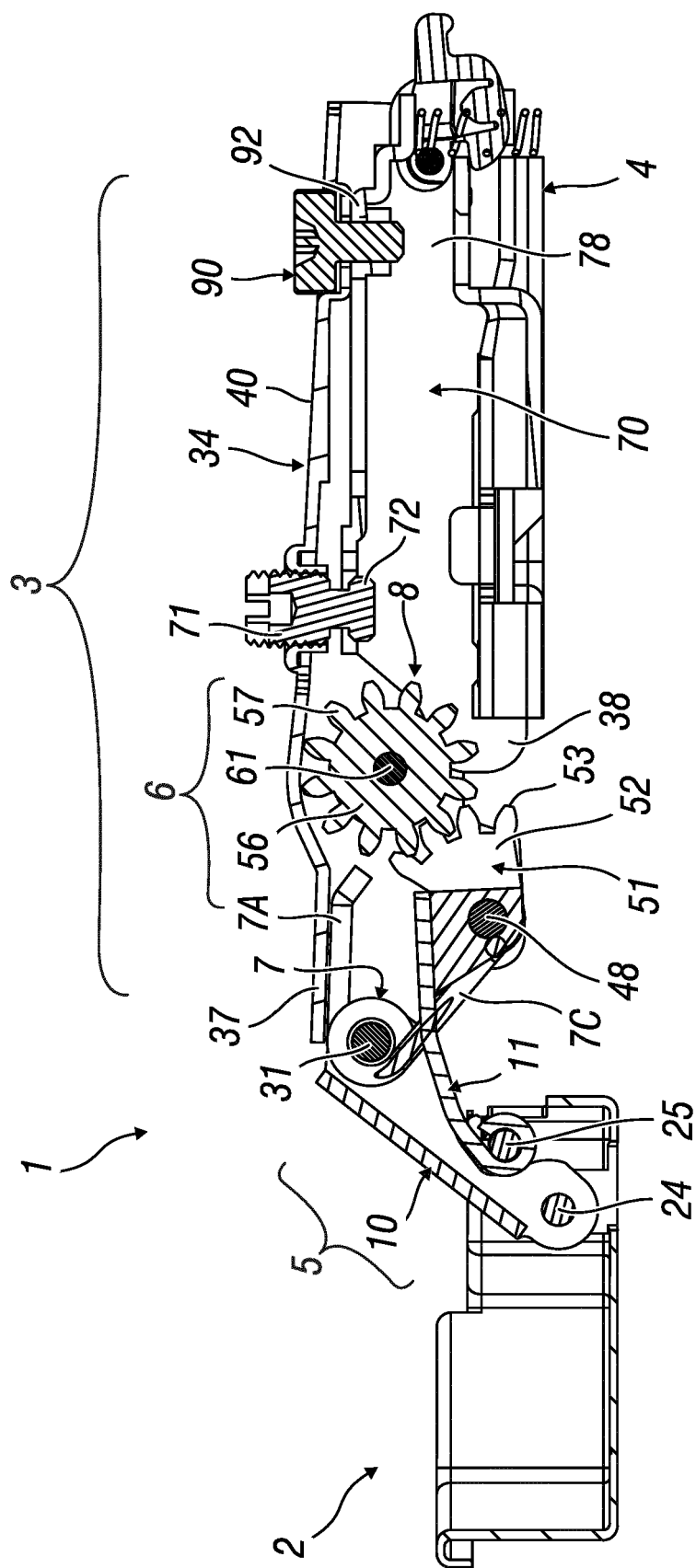


Fig. 3

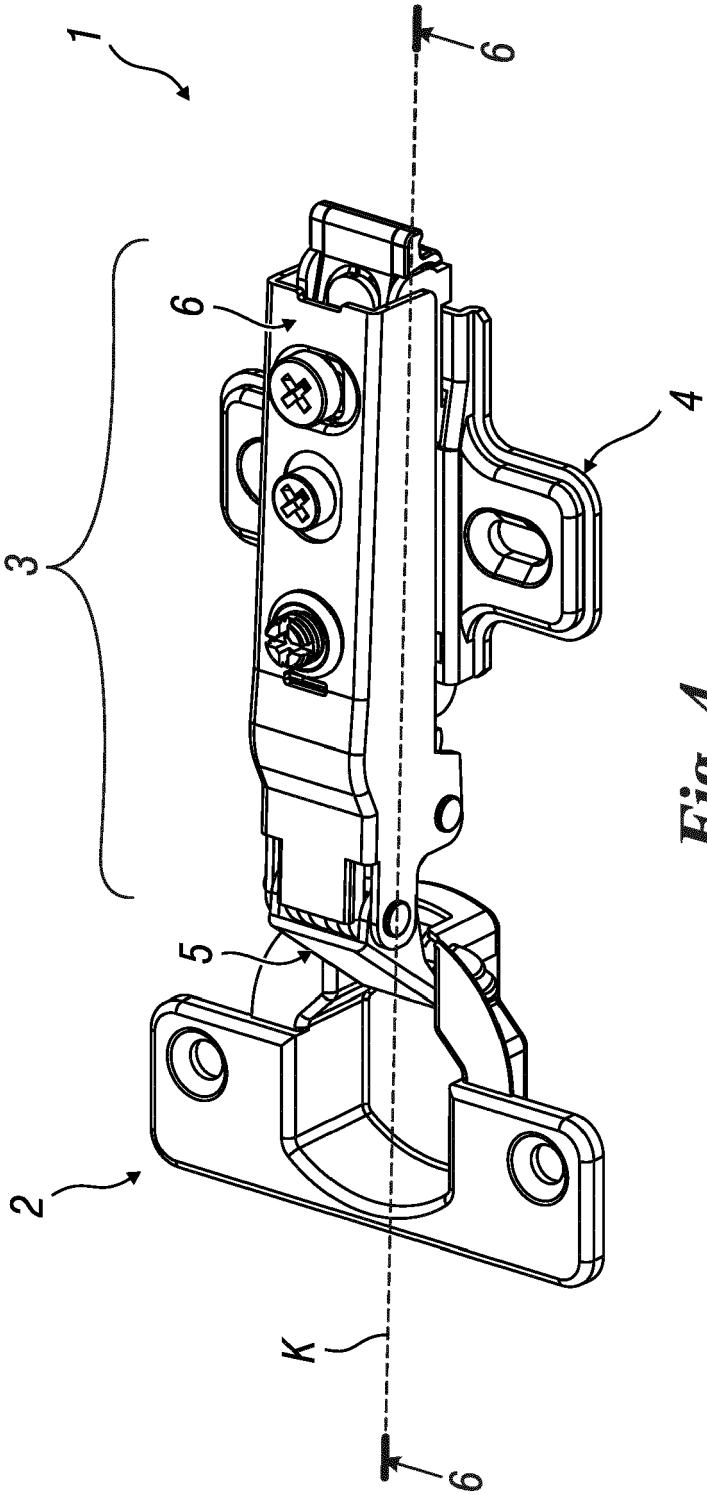
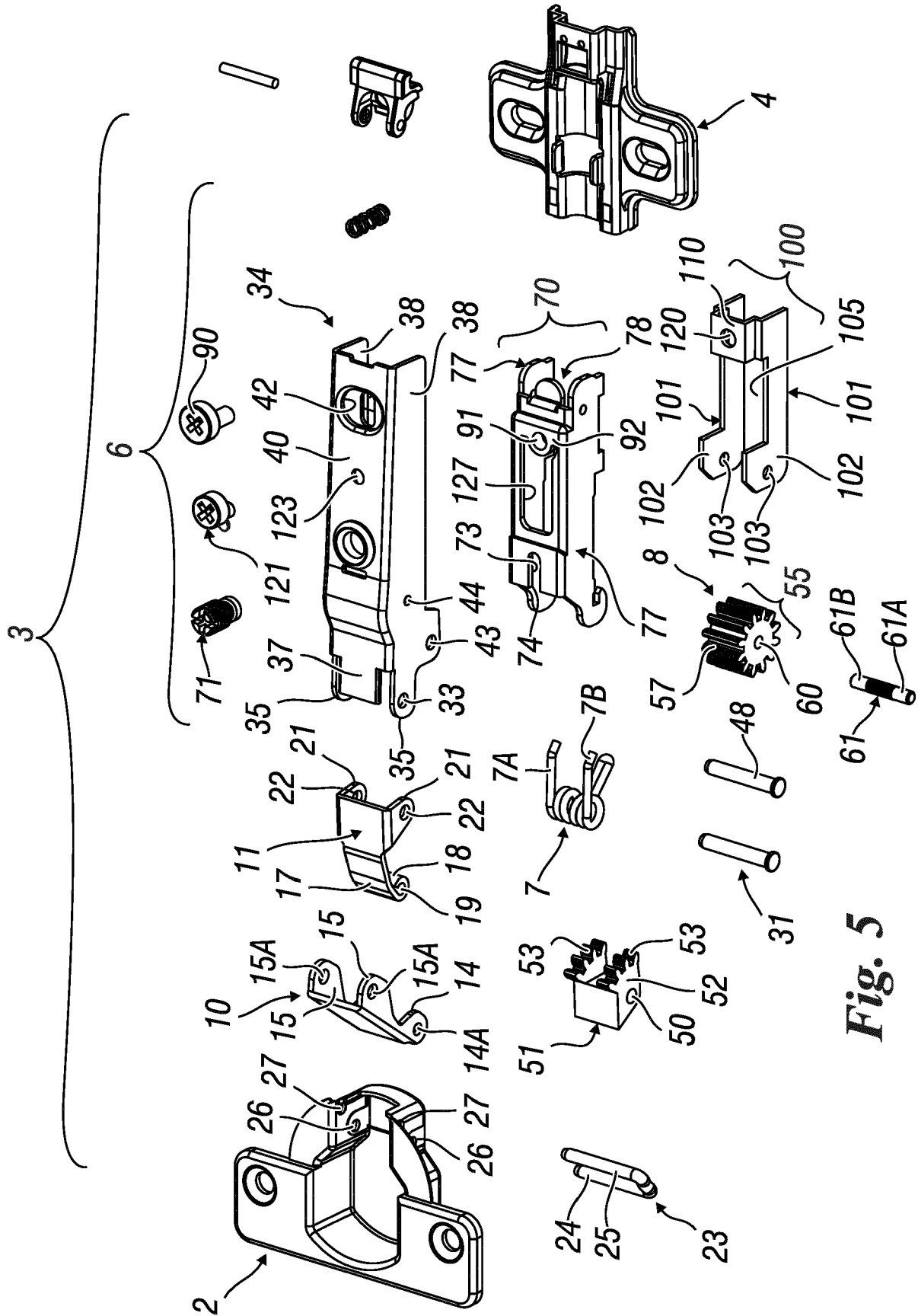
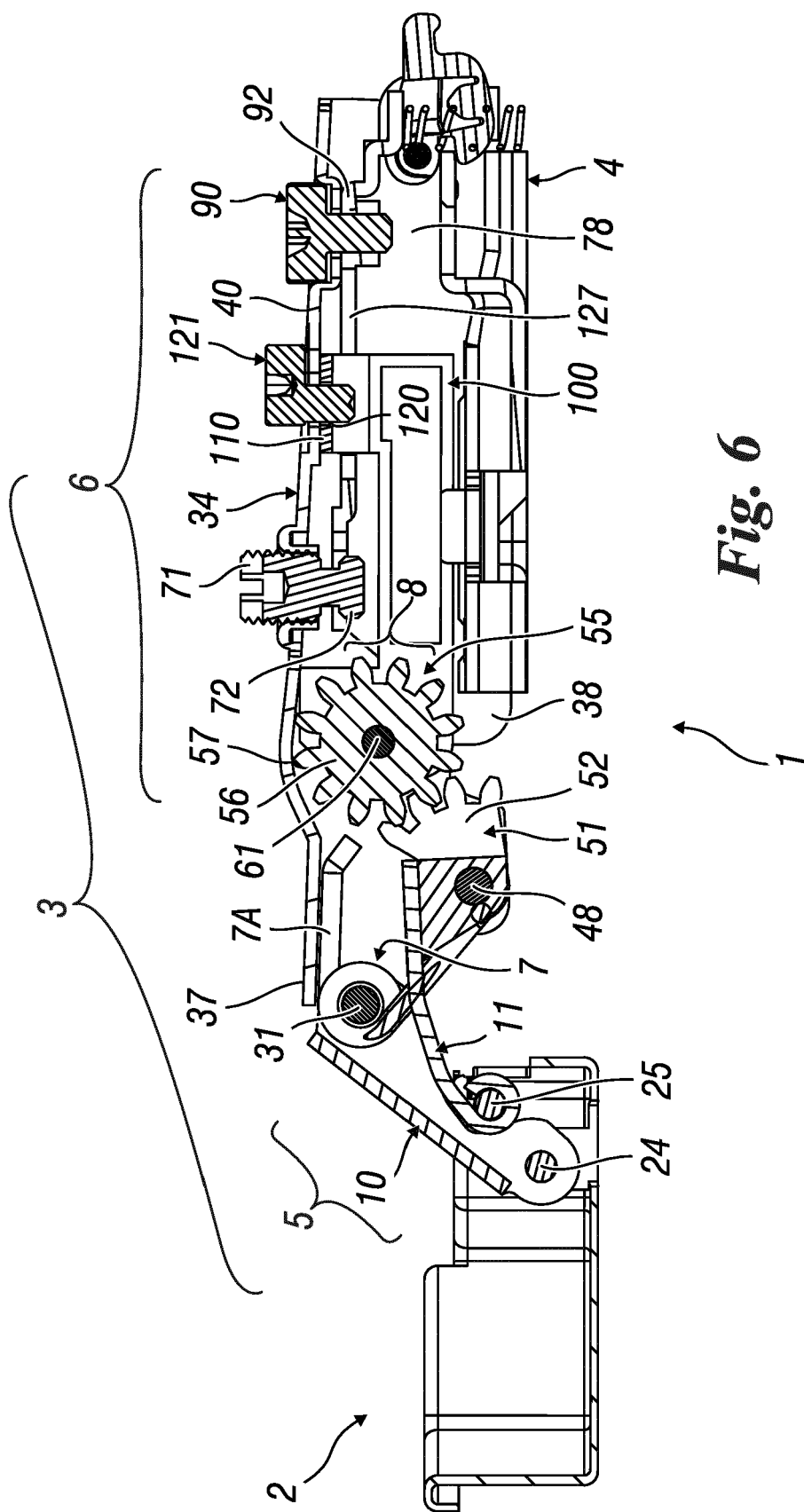


Fig. 4







EUROPEAN SEARCH REPORT

Application Number
EP 19 18 5412

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			TECHNICAL FIELDS SEARCHED (IPC)
			E05D E05F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 19 November 2019	Examiner Wagner, Andrea
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WO 2010082028	A1	22-07-2010	NONE
CN 103015825	A	03-04-2013	NONE

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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