

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
20.10.2010 Bulletin 2010/42

(51) Int Cl.:
E05B 3/04 (2006.01)

(21) Application number: **10160068.2**

(22) Date of filing: 15.04.2010

(84) Designated Contracting States:
**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 SE SI SK SM TR**
 Designated Extension States:
AL BA ME RS

(30) Priority: 17.04.2009 IT BS20090072

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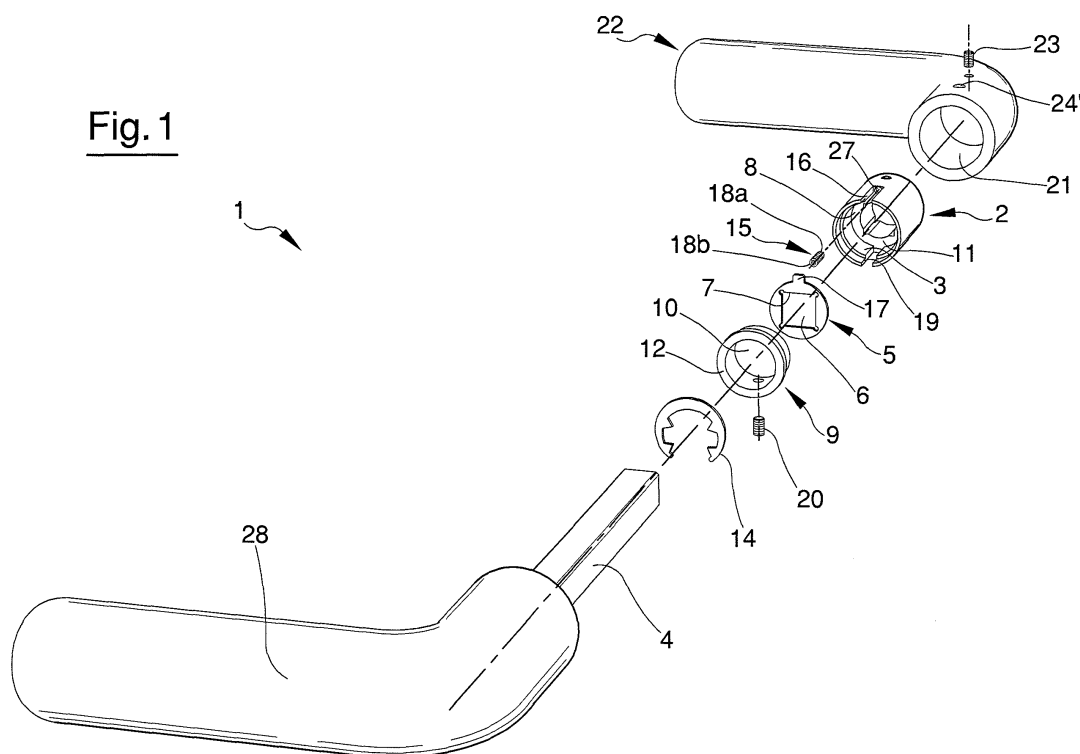
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(54) **Device for mechanical interconnection to a square axis for door handles**

(57) A device (1) for mechanical interconnection to a rod (4) for door handles, comprising a body (2) provided with a coupling opening (3) designed to enable insertion of a rod (4) internally thereof along an insertion direction such as to couple the body (2) with the rod (4), a retaining element (5) provided with a through-opening (6) having a profile (7) destined to be crossed by the rod (4), the retaining element (5) being housed in a seating (8) ob-

tained in a portion of the coupling opening (3) of the body (2), the seating (8) being configured such as to enable movement of the retaining element (5) at least between a first operating position in which the retaining element (5) exhibits the through-opening (6) arranged such as to enable the passage of the rod (4), and at least a second operating position in which at least a portion of the profile (7) of the through-opening (6) interferes with the rod (4) such as to prevent extraction thereof from the body (2)



Description

[0001] The invention relates to a mechanical connection with a rod. In particular the invention relates to a mechanical interconnection device with a rod for mounting door handles.

[0002] In the prior art door handles are generally mounted on respective rods by inserting the rods in interconnecting openings afforded on the body of the handles and then fastening the handles on the rods using fastening screws which are inserted and screwed into respective holes realised on the body of the handles. The screw is then screwed up to constraining the rod internally of the door handle, possibly in a housing seating afforded in the rod, thus fastening handle and rod together.

[0003] The handle rod is then coupled to a respective rotation mechanism housed internally of the door and another handle is mounted to the other end of the rod.

[0004] Known devices exhibit some drawbacks, in particular in relation to the laboriousness of the mounting and demounting operations of the handles on the relative rods. In order to constrain or release the handle from the relative rod, the operator has to insert the rod into the coupling opening and then fasten the screw, which is small, in order to obtain a correct handle mounting. The mounting operation is thus laborious and requires a time which though not very long for a single handle becomes relevant if we consider that often numerous handles are mounted at the same time on the doors of new buildings or on replacing a large number of doors.

[0005] Further, in a case in which an existing handle has to be replaced, first the screw from the old handle has to be unscrewed and then the new one mounted. In this situation the technical objective underlying the present invention is to make available a device for mechanical interconnection with a rod which obviates the above-cited drawbacks.

[0006] A particular aim of the present invention is to realise a mechanical interconnection device with a rod for mounting door handles.

[0007] In the ambit of the technical objective, one of the aims of the present invention is to provide a device for door handles which is able to accelerate and considerably simplify the mounting and/or demounting operations of door handles.

[0008] A further aim of the present invention is to provide a device which can be used with any handle.

[0009] A still further aim of the present invention is to make available a device which is simple and economical to manufacture.

[0010] These aims and others besides, which will better emerge in the following description, are substantially attained by a mechanical interconnection device having a rod as in one or more of the accompanying claims, each of which can be taken alone (without the relative dependent claims) or in any combination with the other claims.

[0011] In a further aspect, the invention relates to a

device as in any one of the claims in which the through-opening exhibits a main central axis that coincides with a main central axis of a coupling opening in a first operating position, inclined with respect to the main central axis of the coupling opening in a second operating position. In a further aspect the invention relates to a device of any one of the claims wherein the passage opening and/or the coupling opening are substantially complementarily-shaped to the section of the rod.

[0012] In a further aspect, the invention relates to a device of any one of the claims, **characterised in that** it further comprises a rod which is insertable in the body. In a further aspect, the invention relates to a device as in any one of the claims wherein in the first operating position the through-opening exhibits a projection on the plane that is perpendicular to the insertion direction which projection is larger than the section of the rod and in the second position the projection of the coupling opening on the plane exhibits at least a smaller dimension than the corresponding of the rod section.

[0013] In a further aspect the invention relates to a method as in claim 10 which further comprises a stage of removing the rod by acting on the activating portion of the retaining element in order to displace the retaining element towards the first opening position, thus freeing the rod, enabling its extraction from the coupling opening.

[0014] Further characteristics and advantages will better emerge from the detailed description that follows of some embodiments, among which a preferred though not exclusive embodiment, of the device for door handles of the present invention. The description will be made with reference with the accompanying figures of the drawings, which are provided by way of non-limiting example, and in which:

figure 1 is a perspective exploded view of a first embodiment of the mechanical interconnection device of the present invention;

figure 1a is a further perspective exploded view of the device of figure 1;

figure 2 is a longitudinal section view of the device of figure 1 in a condition in which the rod is completely removed from the body of the device;

figure 3 is a longitudinal section view of the device of figure 1 in a condition in which the rod is coupled to the body and the retaining element is in a second operating position;

figure 4 is a similar view to figure 3 in a condition in which the retaining element is brought into a first operating position in order to enable removal of the rod from the body;

figure 5 is a perspective exploded view of a second embodiment of the mechanical interconnection device of the present invention;

figure 6 is a longitudinal section view of the device of figure 5 in a condition in which the rod is completely inserted into the handle body.

[0015] With reference to the accompanying figures of the drawings, a mechanical interconnecting device with a stem for mounting door handles of the present invention is denoted in its entirety by reference number 1.

[0016] In a first embodiment, the device 1 comprises a body 2 provided with a coupling opening 3 destined to enable insertion of a rod 4 internally thereof, in an insertion sense 26a along an insertion direction 26, for coupling the body 2 to the rod 4. The device 1 further comprises a retaining element 5 provided with a through-opening 6 having a profile 7 destined to be crossed by the rod 4. In greater detail, the retaining element 5 is housed in a seating 8 afforded in a portion of the coupling opening 3 of the body 2 configured such as to enable displacement of the retaining element 5 internally of the body 2. The displacement is made between a first operating position in which the retaining element 5 exhibits the through-opening 6 arranged such as to enable passage of the stem 4 and a second operating position in which at least a portion of the profile 7 of the through-opening 6 interferes with the rod 4 in order to prevent extraction thereof from the body 2.

[0017] In the preferred embodiment at least two portions of profile 7 (an upper and a lower portion) enter into contact with the surface of the stem 4 in the second operating position. In the first operating position the through-opening 6 preferably exhibits a projection on the plane that is perpendicular to the insertion direction having at least a predetermined dimension which is destined to enable passage of the rod 4, while in the second position the dimension of the projection of the coupling opening on the plane is smaller than the predetermined dimension.

[0018] The retaining element 5 is advantageously arranged perpendicular to the insertion direction of the rod 4 when in the first operating position and is instead inclined when in the second operating position. The retaining element 5 is displaceable from the second operating position to the first operating position by effect of the thrust exerted by the rod 4 during the insertion of the body 2 and is displaceable towards the second operation position by effect of the thrust exerted by the rod 4 in extraction from the coupling opening 3.

[0019] In the embodiments illustrated in the figures, the body 2 further comprises a closing element 9 destined to contain the retaining element 5 internally of the body 2 and provided with a central opening 10 which enables the rod 4 to cross. The closing element 9 exhibits a first external surface 12 and a second rest surface 13 facing towards the inside of the seating 8 and complementarily-inclined with respect to the inclination assumed by the retaining element 5 when in the second operating position.

[0020] In this way, a first rest surface 11 on the seating 8 is defined at the coupling opening 3, defining the first operating position of the retaining element 5, while the second rest surface 13 of the closing element 9 defines, for the retaining element 5, the second operating position

and is inclined with respect to the first rest surface 11.

[0021] The body 2 preferably further comprises a stop ring 14, for example a common seeger ring, destined to insert in a seating afforded in the body 2 and to maintain the closing element 9 internally of the body 2 and to prevent exit thereof, especially during the stages of insertion and extraction of the rod 4 from the body 2 of the device 1.

[0022] The body 2 advantageously further comprises an elastic element 15 housed internally thereof for pushing the retaining element 5 towards the second operating position. The elastic element 15 is preferably positioned at an axial slot 16 in the body 2. With reference to figures 3 and 4, the elastic element 15 is positioned such as not to interfere with the passage of the rod 4. It extends from the seating 8 towards the closing element 9 and acts in an axial direction.

[0023] In the illustrated embodiments the elastic element 15 is a helix spring housed at a first end 18a in a hole 27 afforded in the body 2 and having a second end 18b which is operatively active on the retaining element 5. Alternatively the elastic element 15 could be constituted by a different element suitable for the purpose.

[0024] As illustrated in figure 1, the retaining element 5 is substantially plate-shaped and exhibits an activating portion 17 which is preferably constituted by a radially-extending protuberance. The activating portion 17 rests on the second end 18b of the elastic element 15, as can be seen in figure 2. In the passage between an operating position and the other, the retaining element 5 moves internally of the seating 8 and the activating portion 17 slides internally of the axial slot 16.

[0025] The body 2 advantageously affords a further axial slot 19 for housing a pin 20 that is solidly constrained to the closing element 9. The pin 20 guarantees correct orientation of the closing element 9 (e.g. the correct angular position of the closing element 9) and the second rest surface 13 on which the retaining element 5 rests in the second operating position.

[0026] In the second position, the retaining element 5 is advantageously inclined at an angle comprised between 3° and 30°, and preferably between 5° and 10°, with respect to the first operating position.

[0027] In the first embodiment, the body 2 is insertable in a cavity 21 afforded in a handle 22. The body 2 is further fastenable to the handle 22 by means of a fastening screw 23.

[0028] As is better illustrated in figure 4, the body 2 is additionally provided with an activating opening 24 destined to enable displacement of the retaining element 5 from the second to the first operating position, overcoming the resistance of the elastic element 15. The activating portion 17 is activatable through the activating opening 24 by means of a specially-shaped key 25 (visible in figure 4, in which it is shaped such as to displace the activating portion 17 following a rotation thereof), in order to enable extraction of the rod 4 inserted in the body 2 from the body 2 itself. In the first embodiment the activating opening 24 is defined by a portion of the slot 16

and is further associated and aligned to an additional activating opening 24' defined in the handle 22.

[0029] A further embodiment of the present invention, illustrated in figures 5 and 6, comprises the body 2 of the device 1 fashioned in a single piece from the handle 22, and therefore integral there-with. In this case the fastening screw 23 is not present, as the body 2 is already solidly constrained to the handle 22. The functioning is entirely similar to what is described for the first embodiment.

[0030] In this case the activating opening 24 is defined directly in the body 2, solidly with the handle 22, and an additional activating opening 24' is not required.

[0031] In the figures, the rod 4 is represented solidly associated to a second handle 28. The shape of the section of the rod 4 and the cited openings can be any, for example square, rectangular, circular, elliptical, triangular, polygonal, etc.

[0032] The invention further relates to a method for rapid mounting of a door handle by means of the above-described device, comprising steps of mounting the rod 4 for door handles to a door, inserting a free end of the rod 4 in the coupling opening 3, pushing the stem 4 internally of the body 2 such as to displace, by means of the rod 4, the retaining element 5 from the second operating position to the first operating position and pushing the free end of the rod 4 through the through-opening 6 of the retaining element 5.

[0033] In the functioning of the device 1 the rod 4 is inserted in the coupling opening 3, and pushed internally of the body 2, such as to displace the retaining element 5 from the second operating position to the first operating position. When the rod 4 is inserted in the body 2, the retaining element 5 is newly pushed towards the second operating position by the elastic element 15, maintaining the rod 4 coupled with the body 2.

[0034] The retaining element 5 prevents extraction of the rod 4 from the body 2 as the extraction force exerted in an extraction direction 26b opposite the insertion direction 26a determines a push on the retaining element 5 towards the second operating position and a consequent interference with the rod 4, which remains in a coupling with the body 2. The greater the extraction force of the rod 4, the greater the push exerted by the retaining element 5 on the rod 4.

[0035] To enable removal of the rod 4, it is sufficient to act, for example by means of the key 25, on the activating portion 17 of the retaining element 5 in order to displace the retaining element 5 towards the first operating position and thus free the rod 4, enabling it to be extracted from the coupling opening 3.

[0036] The present invention attains the set aims, obviating the drawbacks in the prior art.

[0037] Firstly, the device is structurally simple and thus involves only contained costs.

[0038] Further, as above-specified, the assembly or disassembly of the handle is done following a simple push of the rod in the coupling opening, and is thus simple and

rapid.

[0039] Consequently, the mounting operations are particularly fast. Further, also the removal of the handle is very simple and rapid.

Claims

1. A device (1) for mechanical interconnection to a rod (4) for door handles, comprising:

a body (2) provided with a coupling opening (3) designed to enable insertion of a rod (4) internally thereof along an insertion direction such as to couple the body (2) with the rod (4);
a retaining element (5) provided with a through-opening (6) having a profile (7) destined to be crossed by the rod (4), the retaining element (5) being housed in a seating (8) obtained in a portion of the coupling opening (3) of the body (2), the seating (8) being configured such as to enable movement of the retaining element (5) internally of the body (2), at least between a first operating position in which the retaining element (5) exhibits the through-opening (6) arranged such as to enable the passage of the rod (4), and at least a second operating position in which at least a portion of the profile (7) of the through-opening (6) interferes with the rod (4) such as to prevent extraction thereof from the body (2).

2. The device according to the preceding claim, wherein the retaining element (5) can be moved from the second operating position to the first operating position as a result of the thrust exerted by the rod (4) when inserted into the body (2), and it can be shifted towards the second operating position as a result of the thrust exerted by the rod (4) during extraction from the coupling opening (3).
3. The device according to any one of the preceding claims, wherein in the first operating position the through-opening (6) has a projection, on a plane that is perpendicular to the insertion direction, having at least a predetermined dimension destined to enable passage of the rod (4), and in the second operating position the dimension of the projection of the through-opening (6) on the plane is smaller than the predetermined dimension.
4. The device according to any one of the preceding claims, wherein the retaining element (5) has a substantially plate-like conformation.
5. The device according to any one of the preceding claims, wherein the retaining element (5) is arranged perpendicular to the insertion direction (26) in the first operating position, and in the second operating

position is arranged tilted with respect to the insertion direction (26), and wherein it exhibits, at the seating (8), a first supporting surface (11) for the retaining element (5) defining the first operating position, and a second supporting surface (13) for the retaining element (5) defining the second operating position and tilted with respect to the first supporting surface (11). 5

6. The device according to any one of the preceding claims, wherein the retaining element (5) is tilted in the second operating position of an angle ranging from 3° to 30°, and preferably from 5° to 10°, with respect to the first operating position. 10

7. The device according to any one of the preceding claims, **characterized in that** it further comprises an elastic element (15) housed in the body (2) for pushing the retaining element (5) towards the second operating position. 15 20

8. The device according to any one of the preceding claims, wherein the body (2) is provided with an activating opening (24) destined to enable the movement of the retaining element (5) between the second and the first operating position, and the retaining element (5) is provided with an activating portion (17) which can be actuated through the activating opening (24), such as to enable extraction of the rod (4) inserted in the body (2) from the body (2). 25 30

9. A rapid assembly device for a door handle, comprising a device for interconnection according to any one of the preceding claims, fastened to the handle (22), and a rod (4) which can be coupled with the device for interconnection. 35

10. A method for rapid assembly of a door handle by means of a device according to any one of the preceding claims, comprising the following steps: 40

mounting a rod (4) for door handles to a door, inserting a free end of the rod (4) into the coupling opening (3) pushing the rod (4) inside the body (2) such as to move, by means of the rod (4), the retaining element (5) from the second operating position into the first operating position, pushing the free end of the rod (4) through the through-opening (6) of the retaining element (5). 45 50

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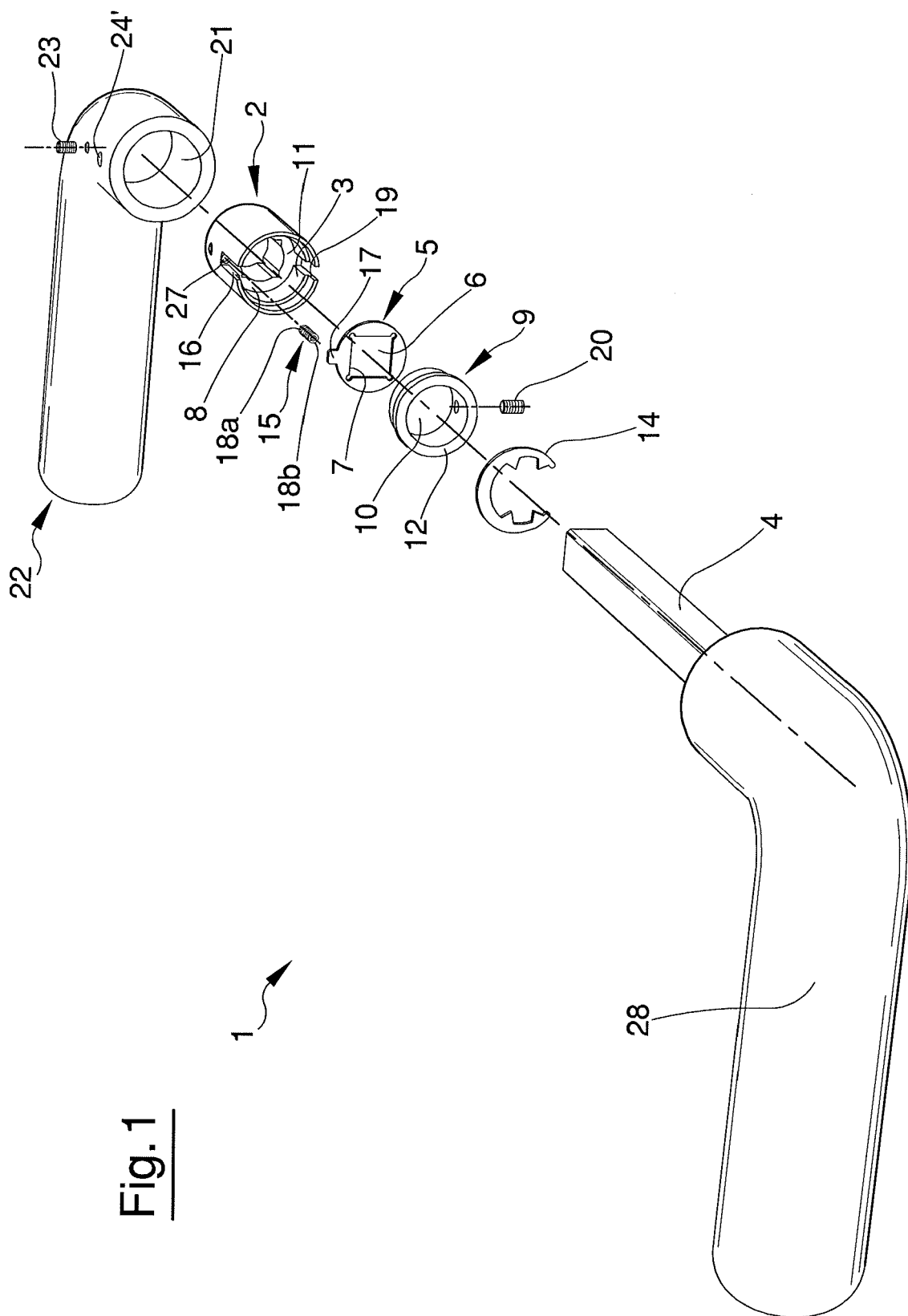


Fig. 1

Fig. 1a

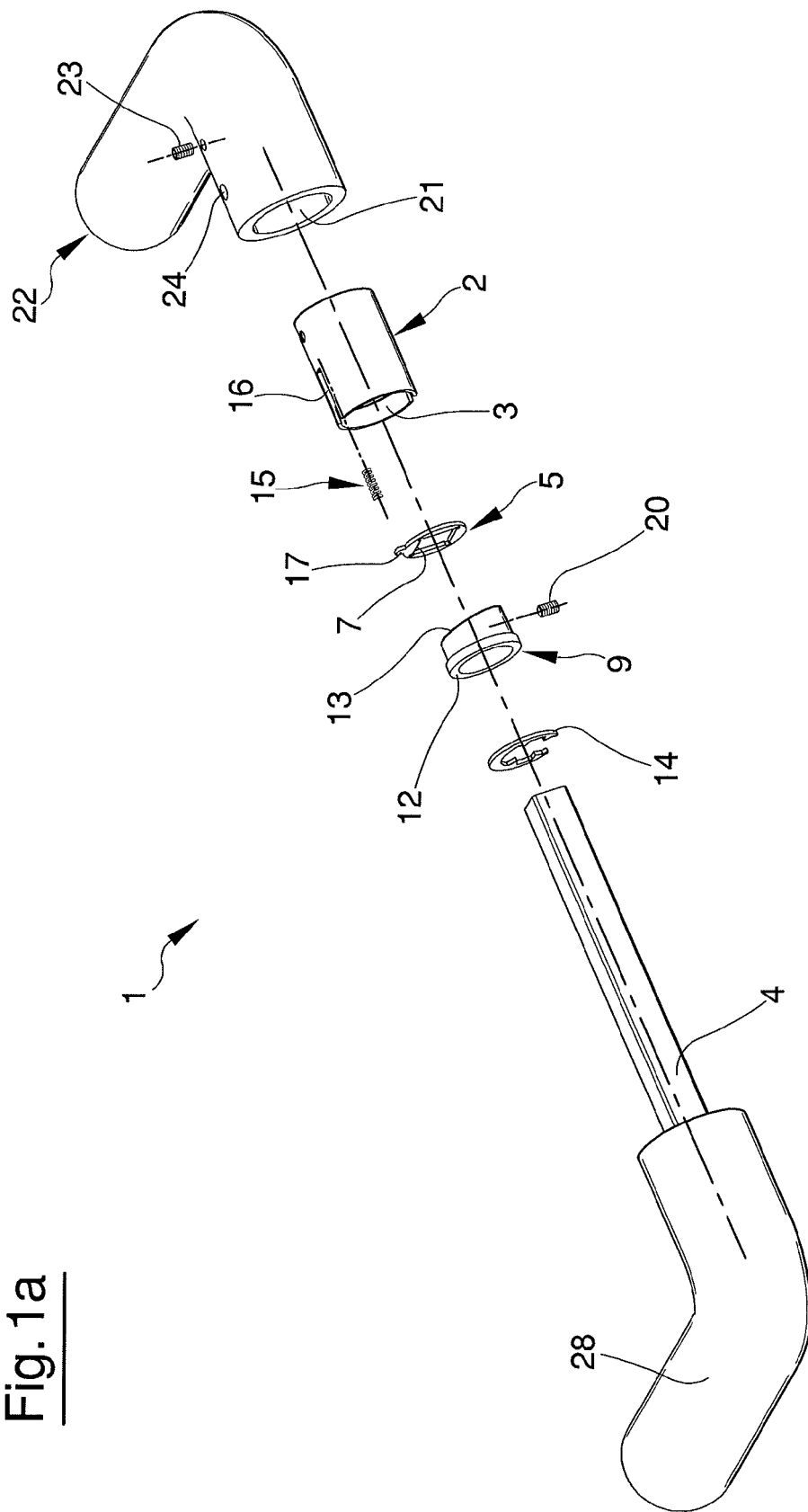


Fig. 2

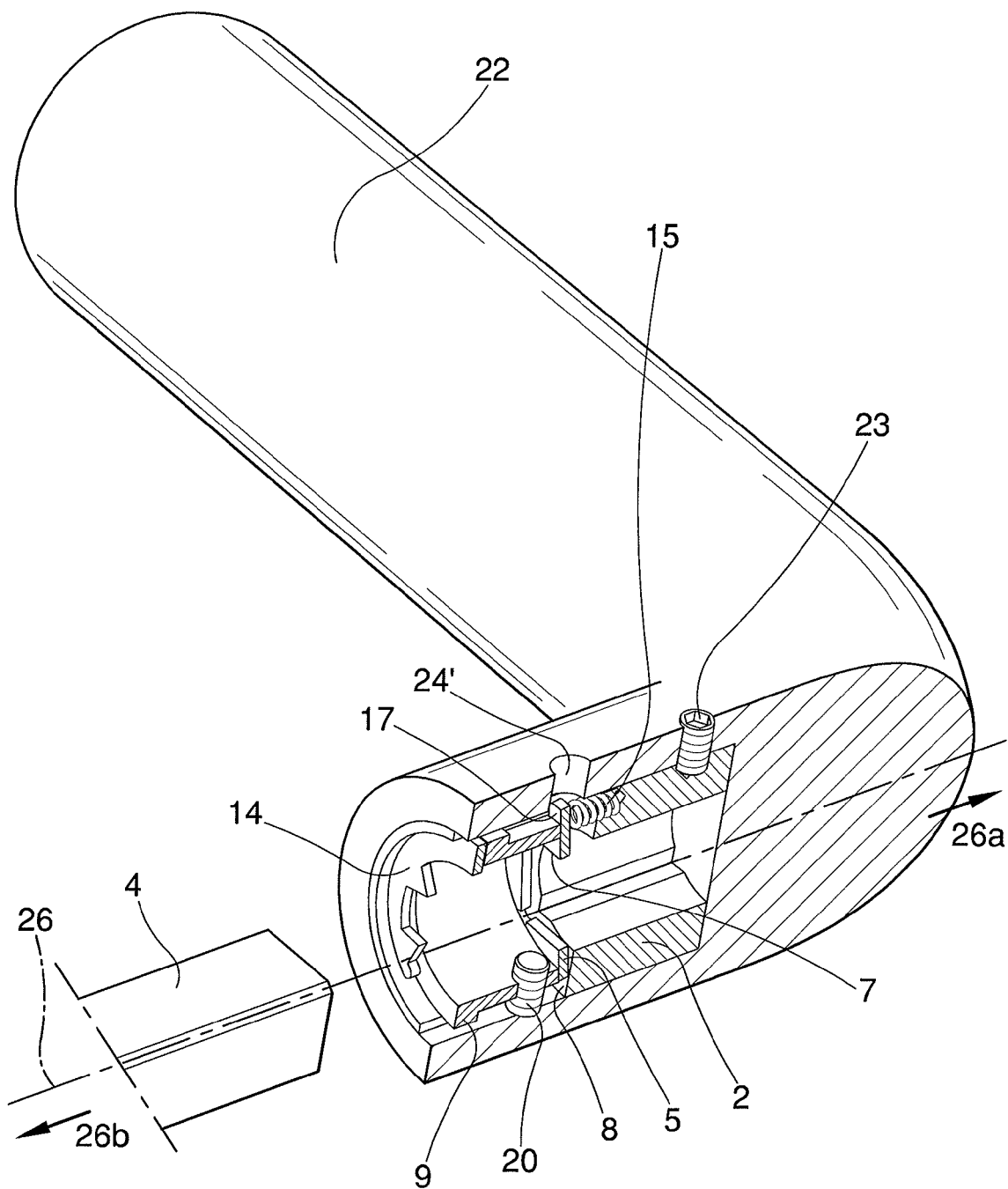


Fig. 3

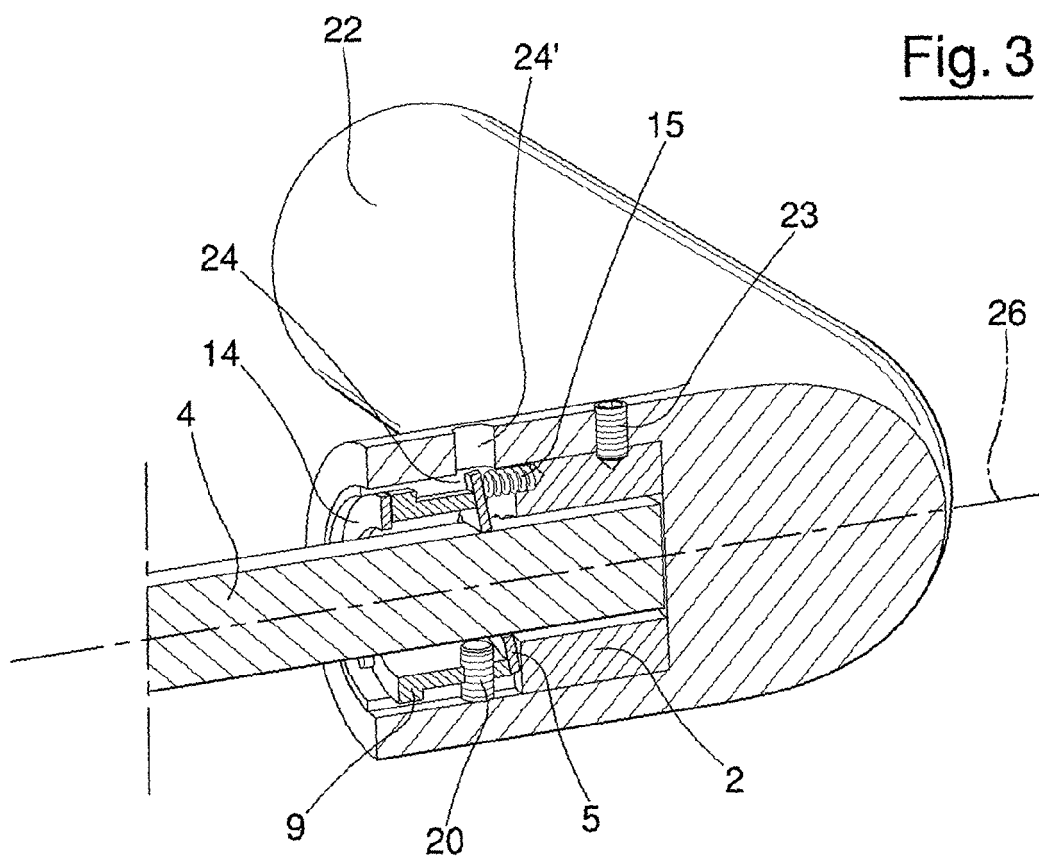


Fig. 4

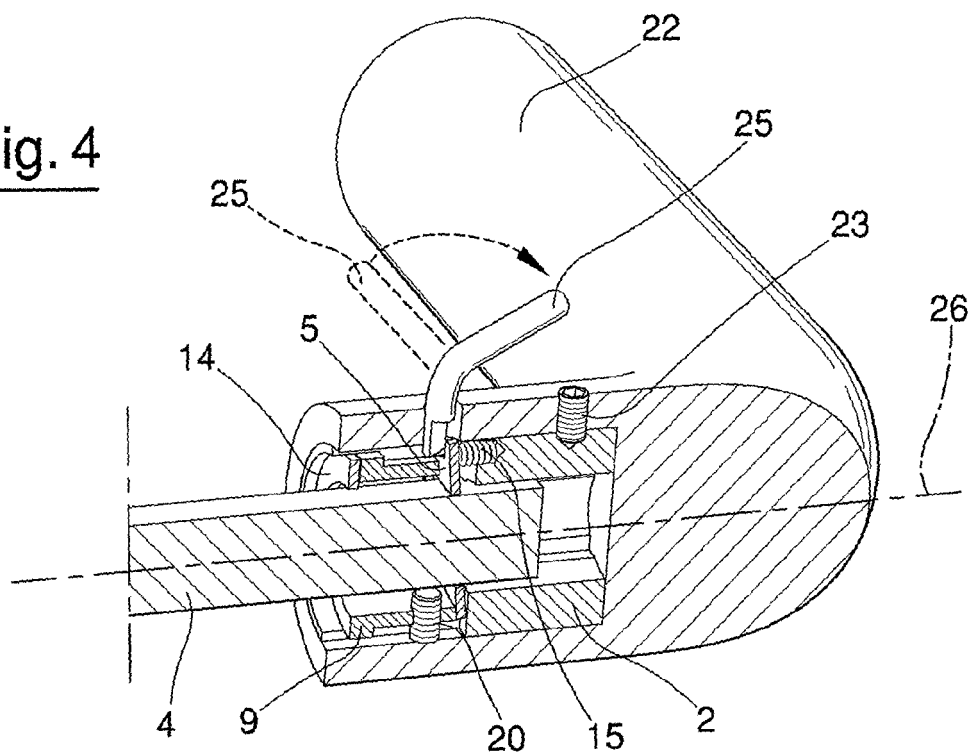


Fig. 5

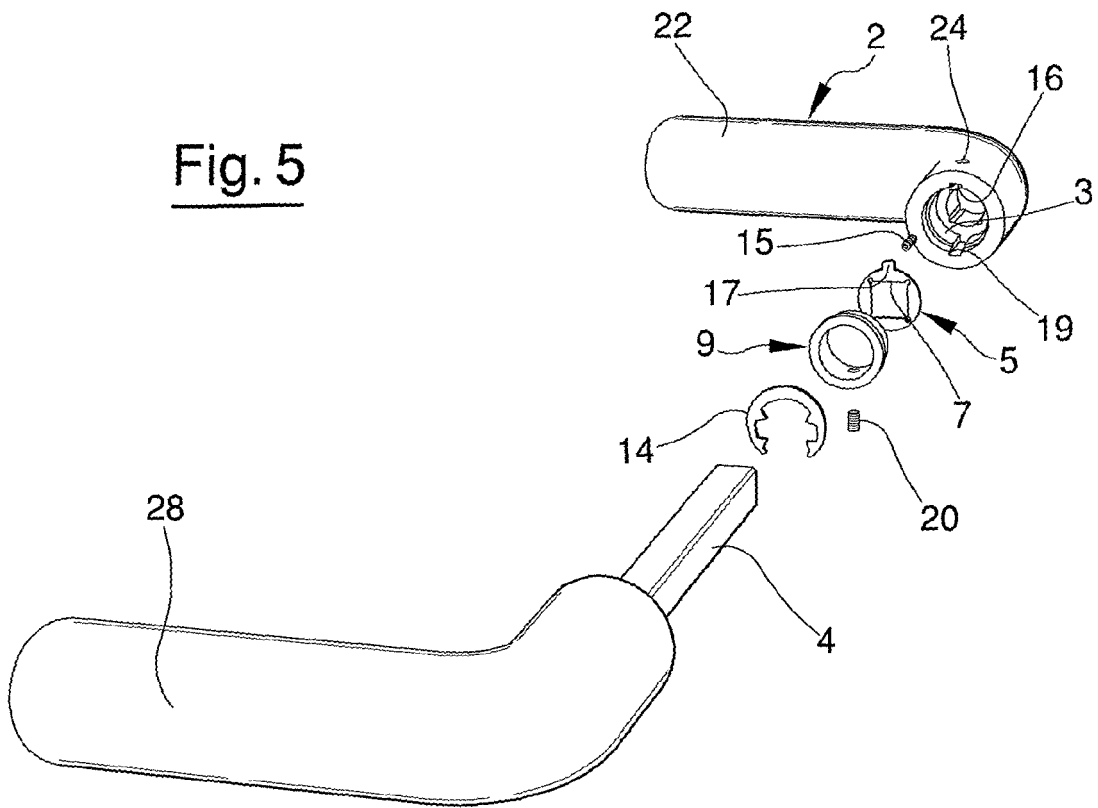
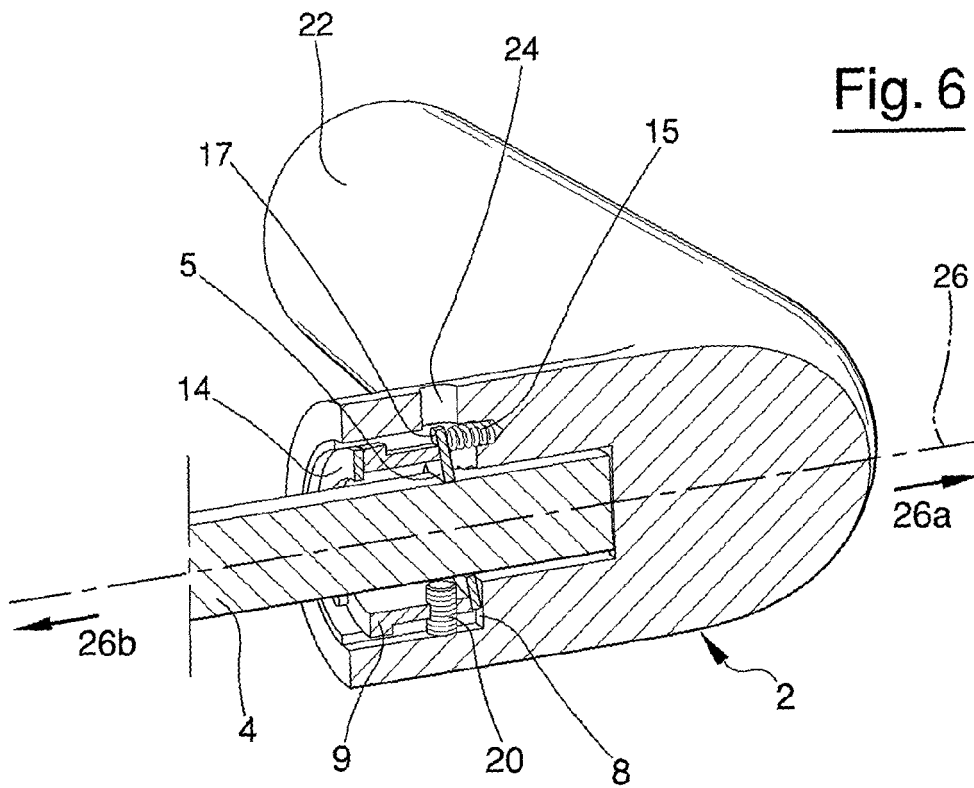


Fig. 6





EUROPEAN SEARCH REPORT

Application Number
EP 10 16 0068

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	JP 08 232511 A (NAGASAWA SEISAKUSHO) 10 September 1996 (1996-09-10) * abstract; figures *	1-10	INV. E05B3/04
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			TECHNICAL FIELDS SEARCHED (IPC)
			E05B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		2 June 2010	Westin, Kenneth
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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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 16 0068

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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02-06-2010

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