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(54) **Drive mechanism for an internal handle of an automotive vehicle**

(57) This invention relates to a drive mechanism for the internal handle of an automotive vehicle, which generally transports children in its back seats, and that provides an effective and reliable safety degree regarding the inhibition of accidental and undesirable activation of

the handle of a hatchback or rear door or the automotive vehicle. According to the invention, said drive mechanism comprises a series of components, such as, a drive shaft (10), a lever (20), a driver (30), a connecting rod (40), a connecting rod support (50), a button (60), a cover (70), and a return spring for drive shaft (10).

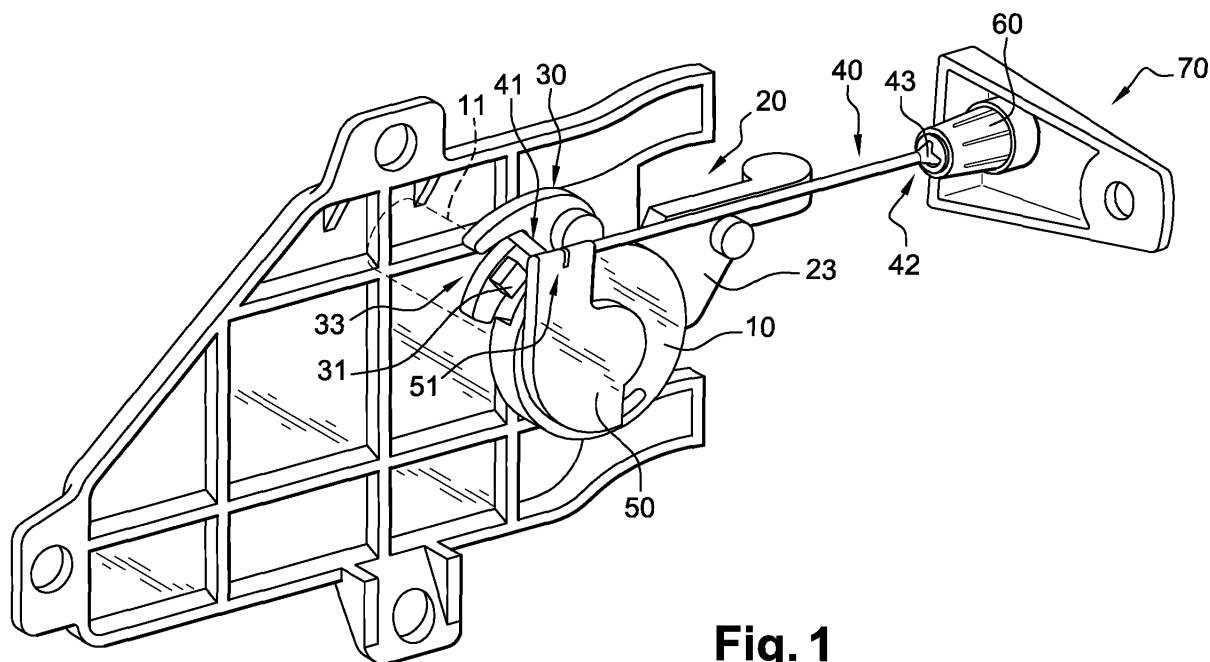


Fig. 1

EP 1 403 455 A1

Description

[0001] This invention relates to a drive mechanism for an internal handle of an automotive vehicle.

Background of the Invention

[0002] The current state of the art comprises several types of drive mechanisms for internal handles generally used in hatchbacks or rear doors of automotive vehicles. They are especially designed to equip vehicles that may transport children on their back seats.

[0003] One type of this mechanism is described, for example, in another patent application filed by the same applicant. It is identified as BR PI 0201516.

[0004] The above-mentioned drive system aims at providing an effective and reliable safety degree regarding the inhibiting of accidental and undesirable activation of the handle of a hatchback or rear door of an automotive vehicle designed to transport passengers. The referred system is especially designed for its incorporation into automotive vehicles that transport children in their back seats.

[0005] One of the main aims of the system proposed by patent application BR PI 0201516 is to obtain a simplified and efficient alternative to allow the rear door of an automotive vehicle to be locked, thus preventing it from being opened from the inside of the vehicle.

[0006] As to another aim, the drive mechanism can be assembled in a new vehicle, but also at the fact that it can be subsequently incorporated into a vehicle that is already in use, being therefore an additional accessory item.

[0007] The sliding component provided in the embodiment of the above-mentioned patent application BR PI 0201516 is wedge-shaped, and it is combined with a resilient catch that has a shoulder on its free end, which shoulder penetrates into a recess on the sliding component and, when it reaches the second position, a snapping sound similar to a "click" is emitted by the device.

[0008] Despite the undeniable advances represented by the embodiment mentioned above, the drive mechanism for the internal handle as proposed by document BR PI 0201516 needs additional improvements.

[0009] Therefore, one of the aims of present invention is to provide a drive mechanism for the internal handle of an automotive vehicle, and which can be incorporated into the rear doors of an automotive vehicle, such mechanism having the special particularity of permitting to select whether the activation of the internal handle of the vehicle's door can or cannot open the corresponding rear door. In other words, said mechanism permits that, when the door is properly locked in the first position, the rotation of the internal handle results in the opening of the door, while when the door is in a second position, said rotation will not cause the activation of the locking system of the door, thus preventing the effective opening thereof, despite the fact that the internal handle can

be activated in exactly the same manner

[0010] Another aim of the present invention is to protect the locking mechanism, as well as the safety system, from pressure forces, which, when applied on the handle under a specific condition (locked door condition), can eventually cause damage to the respective system, and mainly, can eventually allow the door to be opened if the pressure forces are excessive.

Summary of the Invention

[0011] The above-mentioned aims are achieved, in a drive mechanism for the internal handle of an automotive vehicle in accordance with the present invention, by the fact that it comprises a series of components amongst which are:

- a) a drive shaft, which is responsible for anchoring and transmitting the movement made by the lever of the internal handle;
- b) a lever, which is responsible for activating the locking system of the drive mechanism for the internal handle, said lever being assembled on the external diameter section of the drive shaft;
- c) a driver, which is the component responsible for coupling the drive shaft and the lever, so as to allow that the activation of the internal handle of the vehicle (if the safety device is unlocked) effectively opens the corresponding door;
- d) a connecting rod, which is the component responsible for transmitting the movement to the driver;
- e) a connecting rod support, whose function is to anchor the end of the connecting rod to its working position, and to accomplish this operation, said connecting rod support relying on a channel that partially covers approximately $\frac{3}{4}$ of the connecting rod's perimeter;
- f) a button, which is the component serving as the means of activation so that the user can act on the safety system, said button being directly connected to the other end of the connecting rod; and
- g) a cover, which is the component whose function is to anchor the button and provide the same with a stable and defined housing.

[0012] Preferred embodiments of the present invention are set forth in the dependent claims.

Brief Description of the Drawings

[0013] The drive mechanism for the internal handle of an automotive vehicle according to the present invention will be described next in detail with reference to the attached drawings, wherein:

Figure 1 illustrates a perspective view of the drive mechanism for the internal handle of an automotive

vehicle according to the present invention;

Figure 2 separately illustrates the drive shaft, which is part of the present invention, said drive shaft being illustrated in perspective;

Figure 3 also illustrates the lever separately and in perspective, which lever is assembled on the drive shaft of Figure 2;

Figure 4 illustrates the driver separately and in perspective, which driver is assembled together with the lever on the drive shaft of Figure 2;

Figure 5 illustrates, separately and in perspective, the connecting rod that mechanically connects with the driver of Figure 4;

Figure 6 illustrates the connecting rod support, which component receives the assembly of the operating end of the above-mentioned connecting rod; Figure 7 illustrates, in perspective, the assembly of the flat end of the connecting rod on the button operated by the user, as well as the assembly of the above-mentioned button on the cover, which cover simultaneously provides a suitable positioning for it; Figure 8 illustrates the present mechanism with all of its main components completely assembled, and in a position where the non-transmission condition of the movement set by the drive shaft to the lever is established; and

Figure 9 illustrates the present mechanism with all of its main components completely assembled, and in contrast with the illustration in Figure 8, the respective position shows the engaging condition that promotes the transmission of the movement set by the drive shaft to the lever.

Detailed Description of One Preferred Embodiment of the Invention

[0014] In conformity with what the figures listed above illustrate, the drive mechanism for the internal handle of an automotive vehicle, in accordance with the present invention, is essentially characterised by the fact that it shows an embodiment that allows it to be incorporated into the rear doors of a new or used automotive vehicle, said drive mechanism showing the special particularity of allowing one to select whether the activation of the internal handle of the vehicle's door can or cannot open the respective rear door.

[0015] Due to its embodiment, the present drive mechanism permits that, when the door is properly locked in the first position, the rotation of the internal handle results in the opening of the door, whereas when the door is in the second position, said rotation will not cause the activation of the locking system of the door, thus preventing the effective opening thereof, despite the fact that the internal handle can be activated in exactly the same manner. As stated above, the embodiment herein proposed has yet another aim to be achieved, namely, to protect the locking mechanism, as well as the safety system, from pressure forces, which,

when applied on the handle under a specific condition (locked door condition), can eventually cause damage to the system, and mainly allow the door to be opened if the forces are excessive.

[0016] As it can be observed from the figures illustrating this invention, the drive mechanism comprises a drive shaft 10 (shown separately in Figure 2), which is assembled in such a way that it is activated directly by the internal handle of the vehicle's door (not illustrated).

[0017] Drive shaft 10 is responsible, under a specific condition, for transmitting the movement performed by the internal handle of the vehicle's door to lever 20.

[0018] Lever 20 (shown separately in Figure 3), when activated by drive shaft 10, is responsible for activating the mechanisms incorporated into the locking system of the vehicle's door. These mechanisms have not been illustrated either.

[0019] Lever 20 is assembled on the external diameter section of drive shaft 10. Furthermore, the effective coupling between drive shaft 10 and lever 20 is only achieved through interference from driver 30 (separately illustrated in Figure 4). Driver 30 is the component responsible for coupling drive shaft 10 and lever 20, and thus permits the activation of the internal handle of the vehicle (if the safety device is unlocked) to effectively open the door from the inside of the vehicle.

[0020] Driver 30 moves from one position to another (from unlocked to locked, with respect to the present mechanism) via the action of connecting rod 40 (illustrated separately in Figure 5).

[0021] On the one hand, connecting rod 40 is assembled on connecting rod support 50 (illustrated separately in Figure 6), whose function is to anchor the end of connecting rod 40 to its working position, as illustrated in Figure 1.

[0022] Connecting rod support 50 is assembled on the rear side of drive shaft 10 and has a site to achieve coupling 51, which coupling incorporates a channel accepting the assembly of orthogonal end 41 of connecting rod 40 by partially covering approximately $\frac{3}{4}$ of the perimeter of the cross section of said orthogonal end 41.

[0023] Connecting rod 40 has its opposite end 42 in the shape of a flat profile 43. Furthermore, end 42 is appropriately assembled on button 60, as illustrated in Figure 7.

[0024] Button 60 is a component serving as a means of activation so that the user can act on the safety system from the (rotating) movement of connecting rod 40.

[0025] Button 60 is assembled so that it can fully twirl on cover 70 (illustrated in Figure 7, in conjunction with button 60 and with end 42 of connecting rod 40).

[0026] Cover 70 is a component whose function is to position button 60 and, at the same time, provide it with a stable and defined housing next to the structure of the vehicle's door.

[0027] Drive shaft 10 is the component having a central projection 11, which accepts the assembly of lever 20. Moreover, this assembly allows lever 20 to twirl com-

pletely free with respect to drive shaft 10. Central projection 11 has its end configured as a hexagonal head 12, which is mechanically connected with the structure of the internal handle of the vehicle's door (not illustrated).

[0028] As a result, hexagonal head 12 enjoys ideal conditions that permit it to be assembled next to the internal handle without any rotation between the two components being possible.

[0029] Moreover, drive shaft 10 relies on a smaller projection 13, which is coaxially arranged with respect to central projection 11. Projection 13 serves as a site to assemble driver 30. This can be better understood from observing Figures 8 and 9.

[0030] As it can better be observed from Figure 3, lever 20 is provided with big circular port 21, whose diameter is compatible with the site for assembly of said lever 20 next to central projection 11 of drive shaft 10.

[0031] Furthermore, lever 20 relies on a gear tooth 22, against which it projects (under a specific condition) locking projection 31, which is part of driver 30.

[0032] Moreover, lever 20 incorporates arm 23, which is responsible for activating the mechanism promoting the opening of the lock of the vehicle's door (not illustrated).

[0033] As stated above, driver 30 presents locking projection 31, which, depending on the position of said driver 30, either interferes or does not interfere with gear tooth 22 of lever 20.

[0034] Driver 30 also incorporates a circular port 32, which permits it to be assembled on smaller projection 13 of drive shaft 10, as it can be observed from Figures 8 and 9.

[0035] In addition, drive 30 has a recess segment 33, which acts as a site to operationally position orthogonal end 41 of connecting rod 40, as it can be observed from Figures 8 and 9.

[0036] The operating principle of the proposed drive mechanism is based on the principle of one being selectively either able or unable to control the coupling between drive shaft 10 and lever 20, bearing in mind the fact that drive shaft 10 is mechanically connected to the internal handle of the vehicle, whereas lever 20 is responsible for activating the mechanisms used to open the vehicle's door.

[0037] Consequently, when the coupling between the two above-mentioned components is achieved, the door of the vehicle can be opened from the inside of the vehicle by activating the handle. On the other hand, even if the internal handle is activated by obviously moving drive shaft 10, this movement does not reach lever 20 when the respective coupling is not established. As a result, the door of the vehicle is not opened from the inside.

[0038] The mechanism that establishes the conditions for either coupling or non-coupling between drive shaft 10 and lever 20 is the set consisting of button 60, connecting rod support 50, connecting rod 40, and driv-

er 30.

[0039] When connecting rod 40 is twirled around its axis as a result of the user's action on button 60, as schematically indicated by arrow A in Figure 9, the respective small twirled distance determines that end 41 of connecting rod 40, which is lodged in recess segment 33 of driver 30, produce a small rotation on driver 30. This is indicated by arrow B in Figure 8.

[0040] The rotation of driver 30 causes its locking projection 31 to take a position where it starts to interfere with gear tooth 22 of lever 20.

[0041] Consequently, when the internal handle of the vehicle's door is operated, it simultaneously twirls drive shaft 10 and the latter drags driver 30, whose locking projection is ready, according to its position, to make contact with gear tooth 22.

[0042] At this stage, all and any force exerted on the internal handle of the vehicle's door will produce an equal movement of lever 20, thus enabling the latter to activate the locking mechanisms of the vehicle's door, and permitting it to be opened.

[0043] This unlocking is represented in Figure 9. Furthermore, it must be understood that the term unlocking refers to the fact that the vehicle's door is unlocked, that is, it can be opened from the inside.

[0044] Inversely, whenever the user wants to lock the door, that is, whenever he wants to inhibit the activation of the internal handle of the vehicle's door from opening it, he will press button 60 once again so that connecting rod 40 will twirl on its axis, as indicated by arrow C in Figure 9.

[0045] This small rotation causes orthogonal end 41 of connecting rod 40 to act on recess segment 33 of driver 30 once again, causing it to twirl in the opposite direction, as indicated by arrow B in Figure 8. Furthermore, this twirl in the opposite direction removes locking projection 31 from the path of gear tooth 22 of lever 20.

[0046] When the internal handle of the vehicle's door is operated in this manner, it simply acts on drive shaft 10 and it even causes driver 30, itself, to drag. Nevertheless, since driver 30 is in a position that avoids locking projection 31 from interfering with gear tooth 22 of lever 20, the coupling condition that would have promoted the effective activation of lever 20 is undone.

[0047] In other words, the internal handle can be activated without this causing lever 20 to move. In addition, since lever 20 is not activated, the locking mechanisms of the door that would have enabled it to be opened are not activated either.

[0048] A last component of the drive mechanism herein proposed is specifically illustrated in Figure 9. This is spring 80, which promotes the return movement of drive shaft 10 to its initial stage.

[0049] The foregoing is illustrative of the present invention, and is not to be construed as a limitation thereof. Although exemplary embodiments of this invention have been described, those skilled in the art will readily appreciate that many modifications are possible in the

exemplary embodiments without materially departing from the novel teachings and advantages of the invention. Accordingly, all such modifications are intended to be included within the scope of this invention as defined in the claims. The invention is defined by the following claims, with equivalents of the claims to be included therein.

Claims

1. Drive mechanism for the internal handle of an automotive vehicle, **characterised by** the fact that it comprises a series of components, such as, a drive shaft (10), a lever (20), a driver (30), a connecting rod (40), a connecting rod support (50), a button (60), a cover (70), and a return spring (80) for drive shaft (10).
2. Drive mechanism for the internal handle of an automotive vehicle, according to claim 1, **characterised by** the fact that drive shaft (10) is assembled in such a way that it is activated directly by the internal handle of the vehicle's door; said drive shaft (10) being responsible, under a specific condition, for transmitting the movement performed by the internal handle of the vehicle's door to lever (20); lever (20) being responsible for activating the mechanisms incorporated into the locking system of the vehicle's door when it is activated by drive shaft (10); lever (20) being assembled on the external diameter section of drive shaft (10), the effective coupling between drive shaft (10) and lever (20) only being achieved through interference from driver (30), which driver (30) is responsible for coupling drive shaft (10) and lever (20), thus permitting the activation of the internal handle of the vehicle to effectively open the door from the inside of the vehicle if the safety device is unlocked; driver (30) moving from one position to another (from unlocked to locked, with respect to the present mechanism) via the action of connecting rod (40), which, on the one hand, is assembled on connecting rod support (50), whose function is to anchor the end of connecting rod (40) to its working position; connecting rod support (50) being assembled on the rear side of drive shaft (10) and relying on a site to achieve coupling (51), which incorporates a channel accepting the assembly of orthogonal end (41) of connecting rod (40) by partially covering approximately $\frac{3}{4}$ of the perimeter of the cross section of said orthogonal end (41); connecting rod (40) having its opposite end (42) defined by presenting a flat profile (43); this end (42) being adequately assembled on button (60), said button (60) acting on the safety system from the (rotating) movement of connecting rod (40); button (60) being assembled so it can fully twirl on cover (70); cover (70) being a component whose func-

tion is to position button (60), and, at the same time, provide it with a stable and defined housing next to the structure of the vehicle's door.

3. Drive mechanism for the internal handle of an automotive vehicle, according to claims 1 and 2, **characterised by** the fact that drive shaft (10) has a central projection (11), which accepts the assembly of lever (20); this assembly allowing lever (20) to twirl completely free with respect to drive shaft (10); said central projection (11) having its end configured as hexagonal head (12), which is mechanically connected with the structure of the internal handle of the vehicle's door; drive shaft (10) also relying on smaller projection (13), which is coaxially arranged with respect to central projection (11); said projection (13) serving as a site to assemble driver (30).
4. Drive mechanism for the internal handle of an automotive vehicle, according to claims 1 and 2, **characterised by** the fact that lever (20) presents big circular port (21), whose diameter is compatible with the site for assembly of said lever (20) next to central projection (11) of drive shaft (10); said lever (20) relying on gear tooth (22), against which (under a specific condition) it is projected locking projection (31) which is part of driver (30); lever (20) incorporating arm (23), which is responsible for activating the mechanism promoting the opening of the lock of the vehicle's door.
5. Drive mechanism for the internal handle of an automotive vehicle, according to claims 1 and 2, **characterised by** the fact that driver (30) presents locking projection (31), which, depending on the position of driver (30), interferes or does not interfere with gear tooth (22) of lever (20); driver (30) also incorporating circular port (32), which permits it to be assembled on smaller projection (13) of drive shaft (10); said driver (30) incorporating a recess segment (33) that acts as a site to operationally position orthogonal end (41) of connecting rod (40).
6. Drive mechanism for the internal handle of an automotive vehicle, according to claims 1 and 2, **characterised by** the fact that the operating principle of the proposed drive mechanism is based on the principle of one being selectively able or unable to control the coupling between drive shaft (10) and lever (20) so that, consequently, when the coupling between said two components is achieved, the door of the vehicle can be opened from the inside of the vehicle by activating the handle; and, on the other hand, even if the internal handle is activated by moving drive shaft (10), this movement does not reach lever (20) when this coupling is not established, and, as a result, the door of the vehicle is not opened from its inside.

7. Drive mechanism for the internal handle of an automotive vehicle, according to claim 6, **characterised by** the fact that the mechanism that establishes the conditions of either coupling or non-coupling between drive shaft (10) and lever (20) is the set consisting of button (60), connecting rod support (50), connecting rod (40), and driver (30). 5

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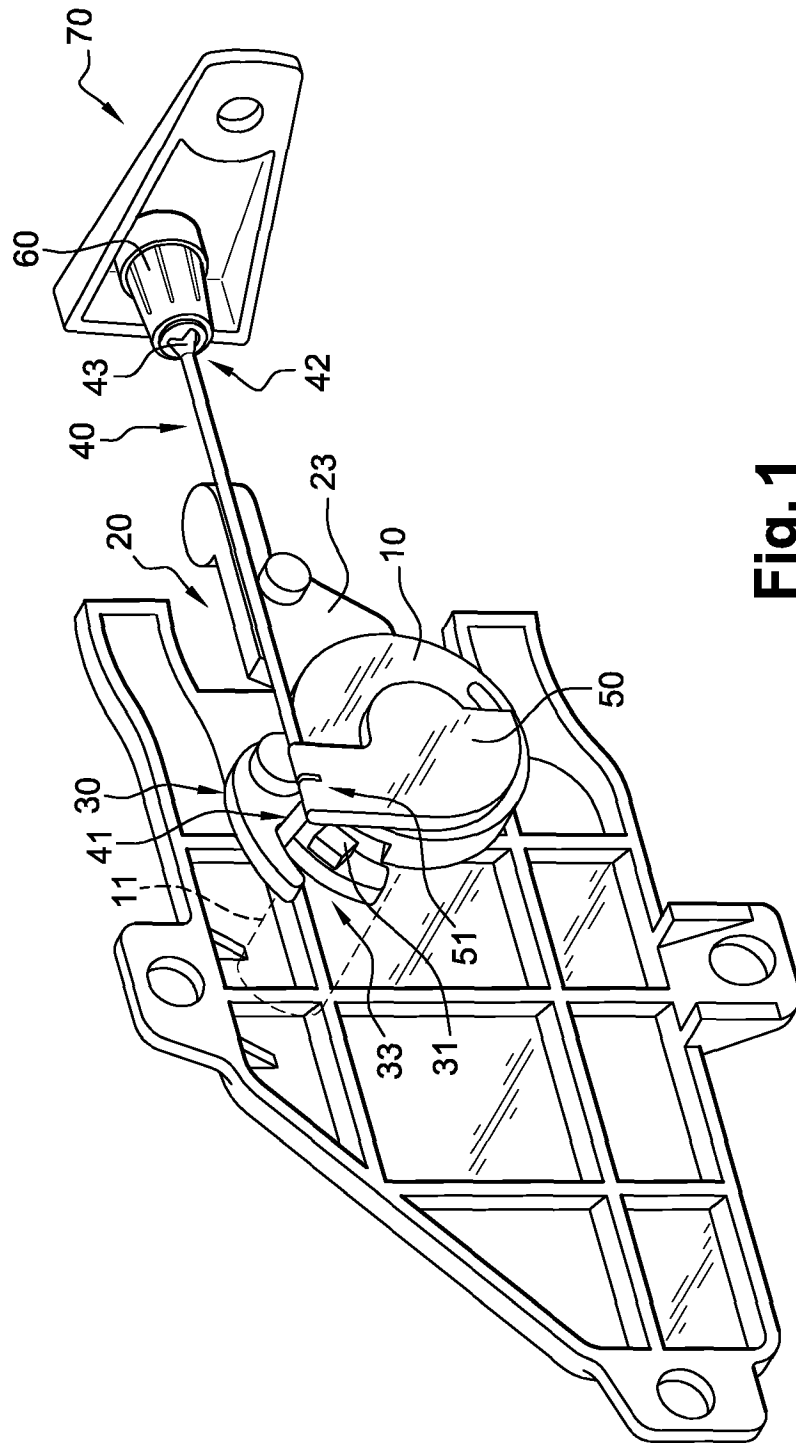
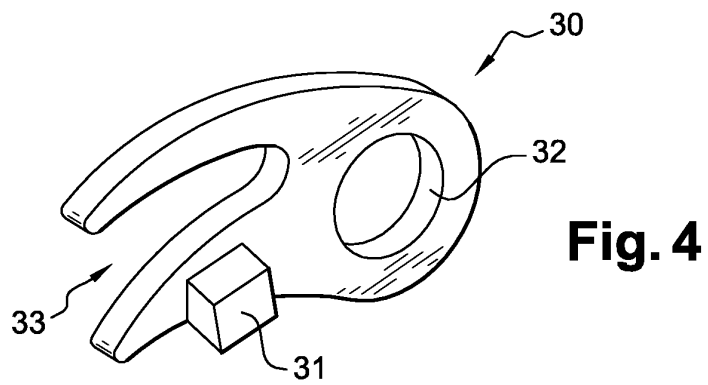
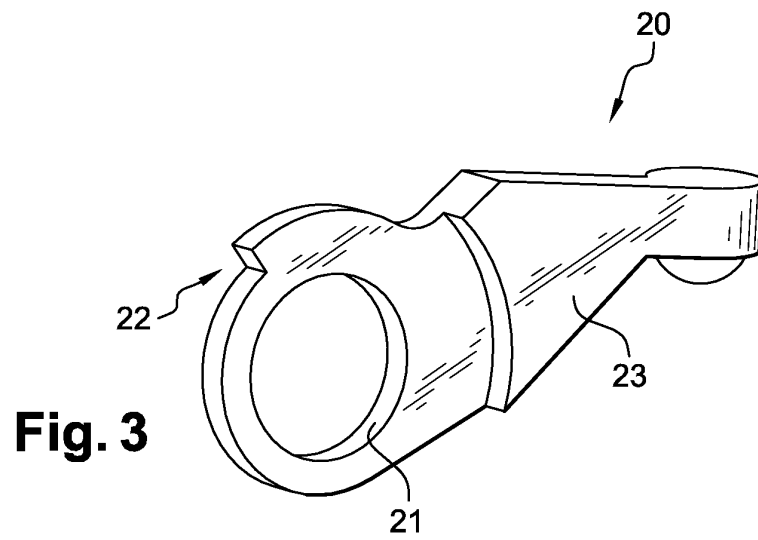
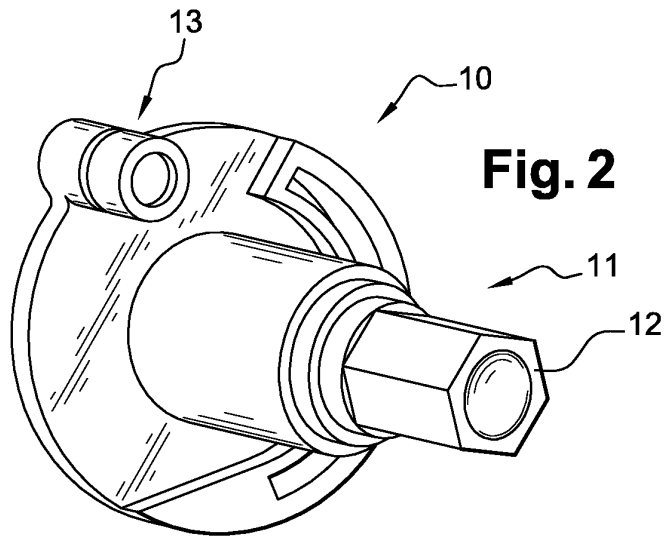
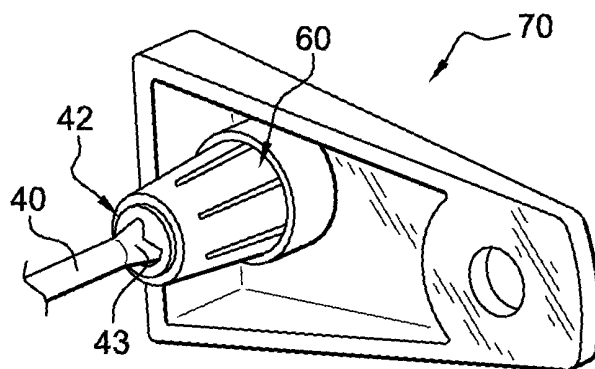
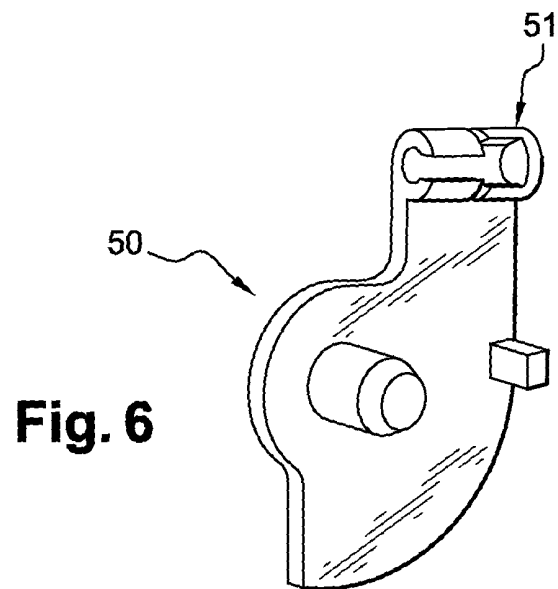
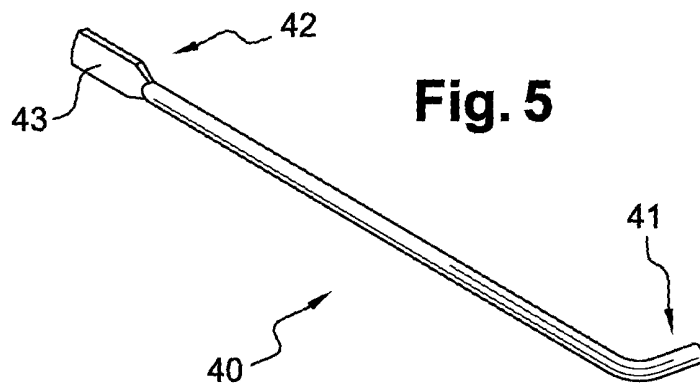


Fig. 1





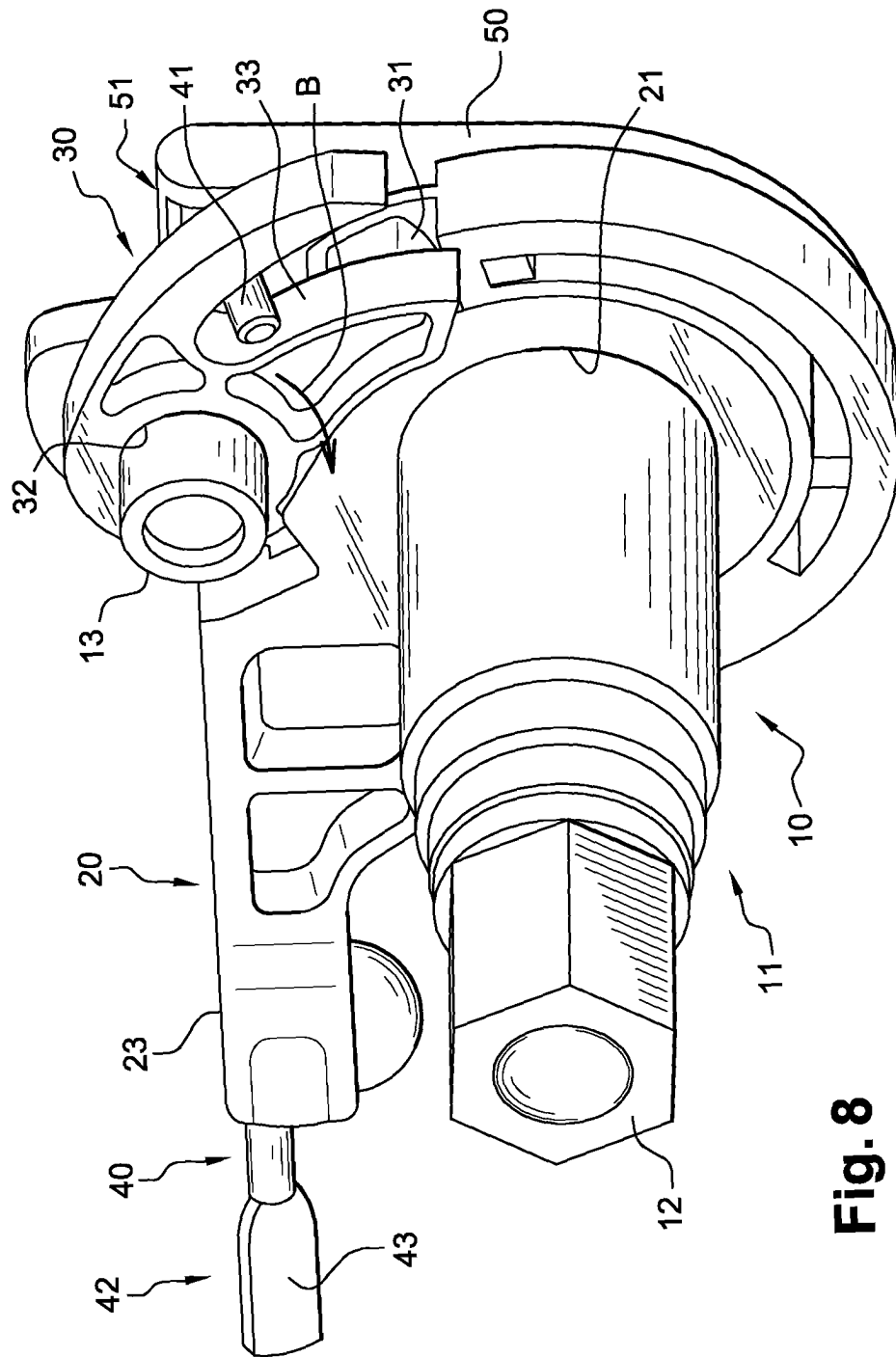


Fig. 8

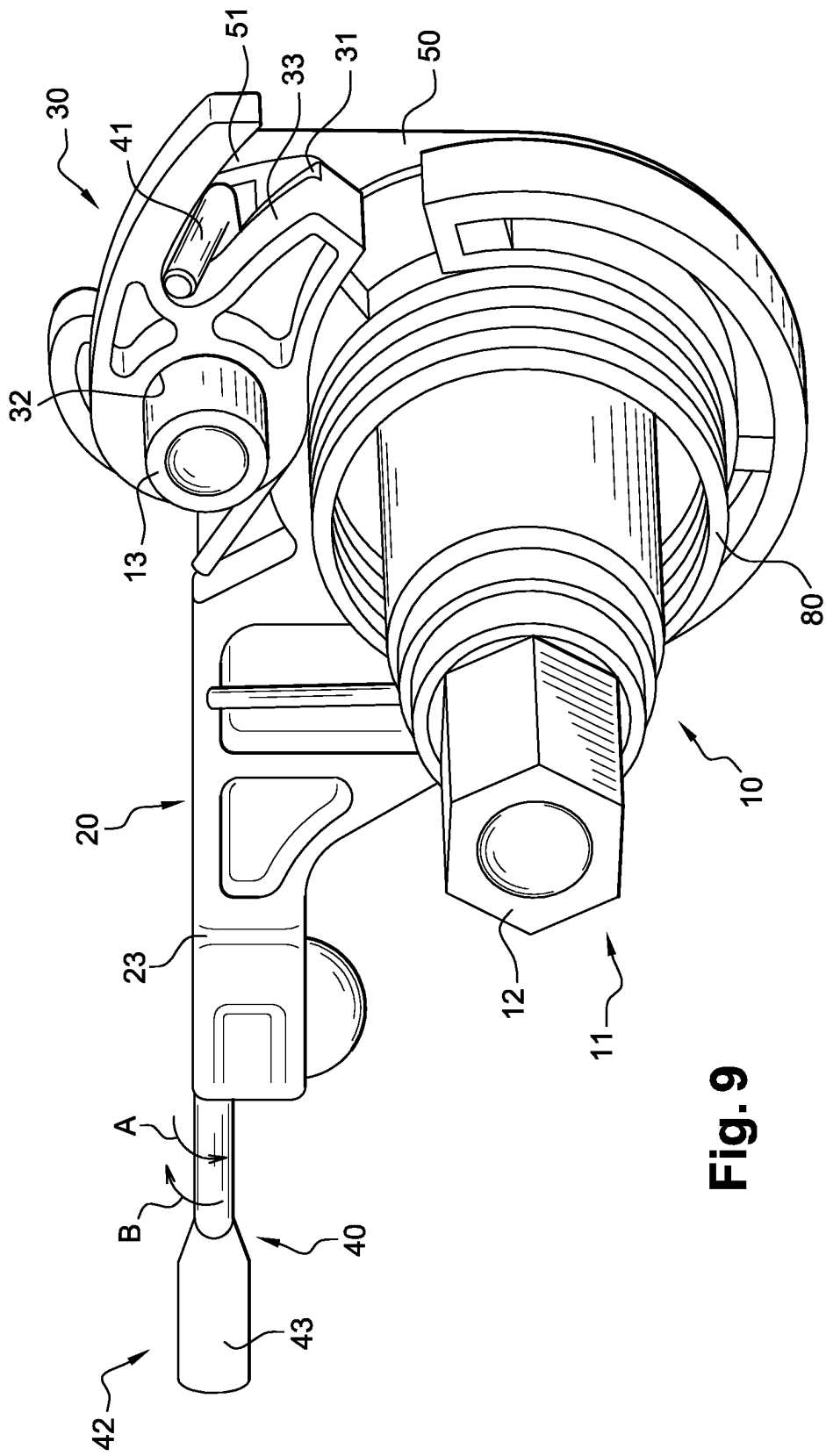


Fig. 9



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EUROPEAN SEARCH REPORT

Application Number
EP 03 10 3552

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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E05B
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 27 January 2004	Examiner Vacca, R
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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EP 03 10 3552

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27-01-2004

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