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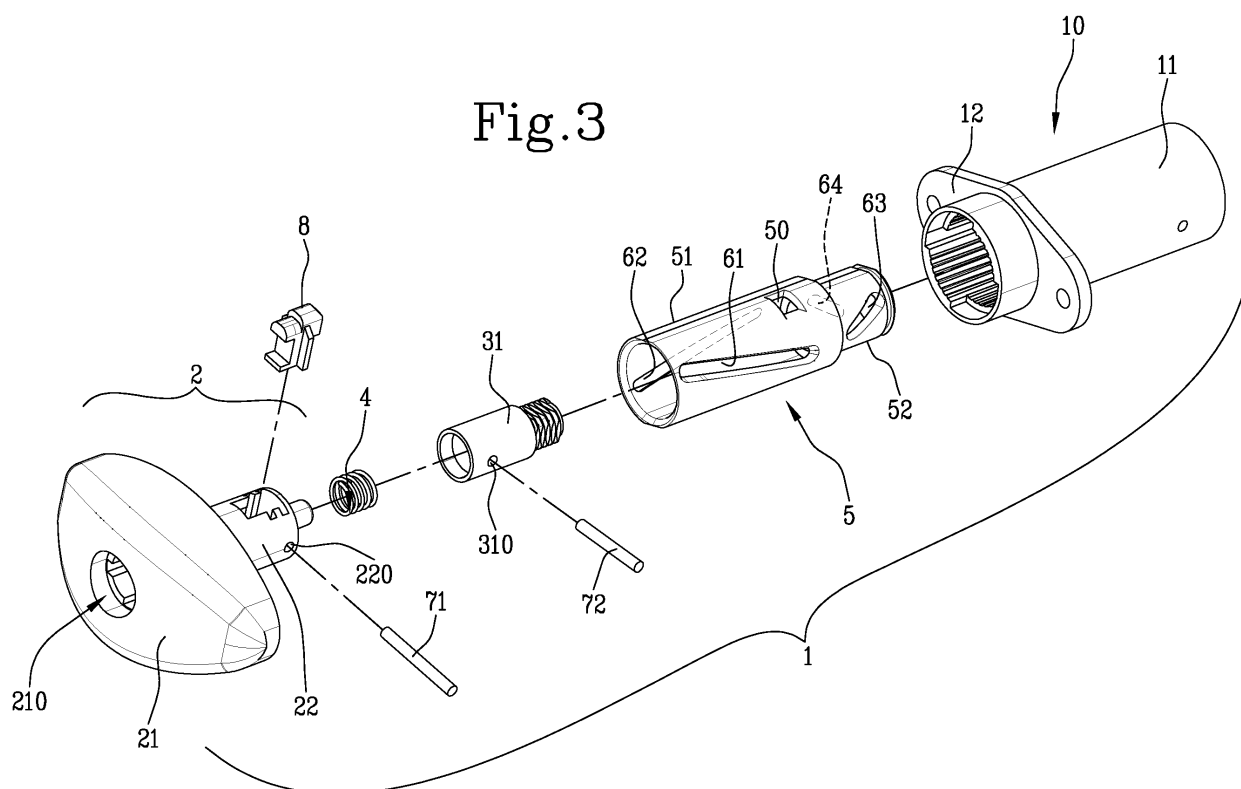
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(54) **A LOCKING DEVICE**

(57) The locking device (1) for doors or the like, comprises: a main body (10) fixable to a door; a rotatable handle (2) relative to the main body (10) and sliding axially thereto; a cylinder for locks coupled to the handle (2) and adapted to lock / unlock the movement of the handle (2); a locking element (31, 32) operable in rotation through the handle (2) between an open position and an intermediate position and slidable axially relative to the

main body (10) between the intermediate position and a locked position; a clamping element (5), housed in the main body (10), mechanically connected to the handle (2) and to the locking element (31, 32) and adapted to move the locking element (31, 32) from the intermediate position to the locked position, following a thrust exerted on the handle (2).

Fig.3



Description

[0001] The present invention relates to a safe locking device, intended for closing and opening doors, especially of caravans or other recreational vehicles. A known type of safe lock for caravan doors comprises an internal cylinder operable by a key, a handle located on the external side of the door and a lever located on the internal side, perpendicular to the axis of the lock.

[0002] In the locked configuration, the lever is oriented so as to be superimposed with the edge of a wall of the caravan on which the door abuts, at a free vertical edge thereof.

[0003] Furthermore, in the same locked configuration, the lever presses against the edge of the wall and the handle is in a retracted position in which it is adjacent to the door and cannot be rotated.

[0004] By operating the mechanism of the cylinder through the key the lock is unlocked, which leads to a configuration in which the handle comes out of the seat.

[0005] At this point, the user turns the handle through ninety degrees in a first direction, causing the axial extension of the lever towards the inside of the caravan.

[0006] After that, the user turns the handle again through ninety degrees, in the same direction, causing the rotation of the lever, allowing the opening of the door.

[0007] To close the door again, the user performs a first rotation through ninety degrees of the handle, in the opposite direction to the mentioned first direction, which returns the lever until it faces the edge of the wall of the caravan and then performs a second rotation through ninety degrees, proceeding in the same direction.

[0008] Through a system of guides internal to the lock, the second rotation brings the lever to press again against the edge of the wall.

[0009] Although this system is effective, it is often considered inconvenient and anti-intuitive by caravan users.

[0010] The technical task underpinning the present invention is therefore to propose a locking device that overcomes the limits of the prior art, allowing the door to be locked more easily, quickly and intuitively.

[0011] The technical task is attained by the device realised in accordance with claim 1.

[0012] Further characteristics and advantages of the present invention will become more apparent from the following indicative, and hence nonlimiting, description of preferred, but not exclusive, embodiments of the device of the invention, as illustrated in the accompanying drawings, in which:

- figure 1 is an axonometric view of the device of the invention;
- figure 2 is an axonometric, partially exploded, view of the device of figure 1;
- figure 3 is an exploded view of the device;
- figures 4 and 5 are axonometric views of the main body of the device;
- figure 6 is a longitudinal sectional view of the body

of figures 3 and 4; and

- figures 7 - 10 are axonometric views of the proposed device that show different operative configurations thereof.

[0013] With reference to the above-mentioned figures reference numeral 1 indicates a locking device according to the invention.

[0014] In detail, the device 1 proposed is especially, but not exclusively, designed for use in safe locks of doors of caravans or other recreational vehicles. The device 1 according to the invention includes first of all a main body 10 that is fixable to the door of the caravan.

[0015] In detail, the main body 10 can be assembled in the door, so as to cross it from one side to the other.

[0016] The main body 10 is preferably tubular, elongated and substantially axisymmetric; in the example illustrated, it comprises a cylindrical muff 11, equipped with a cavity in which, as will be explained below, different components of the invention are acting.

[0017] In practice, the main body 10 is the supporting element of the invention that anchors the device 1 to the door and constitutes a fixed reference for the movements of the other components.

[0018] In even more detail, the main body 10 is assembled at or near to the free vertical edge of the door, opposite the one provided with hinges.

[0019] In this way, the device 1 can act on one edge of a wall of the caravan that laterally defines the access compartment to the caravan that is opened or locked by the door.

[0020] The device 1 then comprises a rotatable handle 2 relative to said main body 10 and sliding axially thereto.

[0021] To be precise, the handle 2 can comprise a knob 21, for example elongated, from the centre of which a shank 22 projects, for example cylindrical, inserted in the main body 10.

[0022] The knob 21, in use, is positioned at the external side of the door to which the device 1 is applied.

[0023] In detail, the handle 2 can be generally T-shaped.

[0024] The invention also envisages a cylinder for locks, of the type that can be operated through a key, coupled to the handle 2; the cylinder is not shown as it can be of the known type.

[0025] Preferably, the cylinder is contained in the handle 2 itself, inserted axially therein, for example in an internal cavity 210.

[0026] The cylinder is adapted to lock / unlock the movement of the handle 2, according to modalities detailed below.

[0027] To be precise, the handle 2 is axially slidable from a retracted safe position to an extended use position.

[0028] In the safe position, the knob 21 of the handle 2 can abut against the main body 10 and possibly against the door; in the use position, the knob 21 projects from the door so as to be able to be easily gripped by the user.

[0029] The device 1 proposed then includes a locking element 31, 32 that can be operated in rotation through said handle 2, between an open position and an intermediate position.

[0030] Furthermore, the locking element 31, 32 is axially slidable, relative to the main body 10, between said intermediate position and a locked position, according to modalities specified in detail below.

[0031] In even more detail, the intermediate position of the locking element 31, 32 is an extended position, in the axial direction, while the locked position is a retracted position.

[0032] As shown in the depicted example, the locking element 31, 32 can comprise a locking lever 32, substantially transversal to the axis of the device 1 (or to the axis of the main body 10), and a coupling member 31 of the lever inserted in the main body 10.

[0033] In this case, the lever 32 projects transversally and laterally to the coupling member 31.

[0034] During use, the lever 32 is arranged at the internal side of the door.

[0035] The coupling member 31 can be a substantially cylindrical block, which has an external threaded end to which the lever 32 is coupled, the latter being able to have an S (or Z) shaped profile.

[0036] In the locked position, the lever 32 abuts against the mentioned edge of the wall of the caravan, alongside the access compartment, so as to press it and define the locking between the door and the wall itself.

[0037] Preferably, the shank 22 of the handle 2 and the members 32 of the locking element are aligned and are substantially coaxial to the main body 10.

[0038] To be precise, in the preferential embodiment of the invention, an elastic contrast means 4 is provided interposed between the handle 2 and the locking element 31, 32.

[0039] In even more detail, the elastic means, comprising for example a spiral spring 4, is interposed between the shank 22 of the handle 2 and the member 32 of the locking element, so as to urge them to mutual axial distancing (see figure 3).

[0040] According to an important aspect of the invention, the device 1 includes a clamping element 5, housed in the main body 10, mechanically connected to the handle 2 and to the locking element 31, 32 and adapted to move the locking element 31, 32 from the intermediate position to the locked position, following a thrust exerted on the handle 2.

[0041] Before explaining preferred embodiments of the clamping element 5, the basic operation of the device 1 according to the invention is illustrated.

[0042] In a locked configuration of the device 1, shown in figure 7, the handle 2 is in the aforementioned safe position and the locking element 31, 32 is in its locked position in which the lever 32 presses against the aforementioned edge of the wall.

[0043] The knob 21 of the handle 2 may comprise a cavity 211 facing towards the main body 10, i.e. towards

the door; in this case, the main body 10 can be provided with a shaped plate 12, for example made as a single piece with the muff 11, adapted to be inserted in the cavity of the knob 21, when it is in the safe position.

[0044] In this way, the knob 21 is subject to a further constraint against rotary movements relative to the main body 10, which prevent at least in part any attempts to force the lock.

[0045] It is to be noted that the plate 12 can be screwed directly onto the door. The user inserts the key into the cylinder and unlocks the lock.

[0046] In this way, the handle 2 is free to slide axially and to rotate with respect to the main body 10.

[0047] After unlocking, the handle 2 translates in the use position, pushed by the elastic means and, at the same time, the locking element 31, 32 translates in the opposite direction, in an extended unlocking position that corresponds to the aforementioned intermediate position (see figure 9).

[0048] In this condition, the handle 2 and the lever 32 are maintained integral (or however constrained) in the rotation movements about the central axis of the device 1, by the reciprocal connection to the clamping element 5.

[0049] Therefore, the user turns the handle 2 in a first direction, for example through ninety degrees, so as to rotate the locking element 31, 32 in an open position, distanced from the intermediate one (see figure 10).

[0050] At this point, the door can be opened and access to the caravan is allowed.

[0051] When the user wishes to close the door, he/she turns the handle 2 in a second direction opposite to the first one, bringing the lever 32 back into the intermediate position which is, in practice, a "pre-locking" position. After this, the user pushes the handle 2 towards the door, bringing it back into the safe position.

[0052] This action ensures that the clamping element 5 drags the locking element 31, 32 into axial translation, so as to bring it into the locked position, wherein the lever 32 presses on the edge of the wall of the caravan, firmly locking the door (figure 11).

[0053] In this configuration of the device 1, the elastic means 4 is pre-loaded again.

[0054] To lock the lock in this configuration, the user turns the cylinder through the key which he/she can then extract, leaving the caravan locked. Therefore, already from this partial explanation of the operation of the proposed device 1, it is clear that the invention is more simple and immediate to use with respect to the prior art, while still offering at least the same degree of effectiveness.

[0055] In fact, the user does not need to make any double turns of the handle 2 to lock the door but only one turn to arrange the lever 32 in the pre-locking position and a simple push of the handle 2.

[0056] In the preferential embodiment of the invention, the clamping element comprises a clamping sleeve 5, inserted in the main body 10 so as to be coaxial thereto (see in particular figure 3).

[0057] The clamping sleeve 5 is rotatable in the main

body 10 but is constrained against axial sliding.

[0058] The clamping sleeve 5 is equipped with a first end into which the shank 22 of the handle 2 is inserted, with the possibility of axial sliding, and a second end, opposite the first one, into which the coupling member 31 of the locking element 31, 32 is inserted with the possibility of axial sliding.

[0059] Preferably, the clamping sleeve 5 comprises a first and a second longitudinal portion 51, 52, one being the continuation of the other.

[0060] The first portion 51 of the sleeve ends with the first opening of the end into which the shank 22 of the handle 2 is inserted, while the second portion 52 ends with the second opening of the end where the coupling member 31 of the locking element 31, 32 is inserted.

[0061] In the example shown, the second portion 52 has a smaller external diameter than that of the first portion 51, however this is not a mandatory aspect.

[0062] Preferably, in each of the two portions 51, 52 of the clamping sleeve 5, a pair of guide slots 61, 62, 63, 64 is afforded.

[0063] Therefore, the lateral wall of the first portion 51 comprises a first pair of elongated through slots 61, 62, while the lateral wall of the second portion 52 comprises a second pair of elongated through slots 63, 64.

[0064] The slots 61, 62 of the first portion 51 guide the reciprocal movements between the shank 22 and the sleeve 5 while the slots 63, 64 of the second portion 52 constrain reciprocal movements between the coupling member 31 and the sleeve 5.

[0065] In detail, in each pair, the slots 61, 62, 63, 64 may be arranged in diametrically opposite positions to the respective portion 51, 52 of the clamping sleeve 5 and be symmetrical with respect to an ideal plane that passes through the axis of the sleeve 5 itself.

[0066] To be precise, the slots 61, 62, 63, 64 may be oblique with respect to an ideal plane that passes through the axis of the clamping sleeve 5 and through the slots themselves.

[0067] It is then to be noted that, preferably, the slots 61, 62, 63, 64 of the first and of the second portion 51, 52 are consecutive two by two with respect to the longitudinal extension direction of the clamping sleeve 5.

[0068] In this case, a slot 61, 62 of the first portion 51 has an opposite inclination direction to the consecutive slot 63, 64 afforded in the second portion 52. The slots 61, 62, 63, 64 of the clamping sleeve 5 can be rectilinear or curved, with different curvatures and variable lengths.

[0069] On this aspect, more detail will be provided below.

[0070] In general terms, the invention envisages at least a first slot 61, 62 afforded in the first longitudinal portion 51 of the sleeve 5, to which the shank 22 of the handle 2 is constrained, and at least a second slot 63, 64, afforded in the second portion 52 to which the coupling member 31 is constrained.

[0071] Returning to the preferred embodiment, the first pair of slots 61, 62 is crossed and slidably engaged by a

pin 71 solidly connected to the shank 22 of the handle 2, while the second pair of slots 63, 64 is crossed and slidably engaged by a pin 72 solidly connected to the coupling member 31. In practice, the shank 22 and the coupling member 31 can be hollow and envisage respective through holes 220, 310 in which the related pin 71, 72 is inserted.

[0072] Furthermore, each pin 71, 72 is slidably inserted into a respective rectilinear guide 13, 14, located internally to the main body 10 and preferably defined by a groove afforded on the internal surface of the muff 11 (see figures 4, 5 and 6).

[0073] In detail, there may be four guides 13, 14, which may be placed opposite in the internal surface of the muff 11 of the main body 10 and have a longitudinal extension parallel to the axis of the muff 11 itself.

[0074] To be precise, for each pin 71, 72 two opposite guides 13, 14 may be provided, whose length is proportional to that of the slots 61, 62, 63, 64 in which the related pins are inserted.

[0075] Therefore, as shown in figure 9, when the lock is unlocked by the user through the key, the handle 2 and the locking element 31, 32 translate in opposite directions, dragging with them the respective pins 71, 72 which are constrained to slide in the rectilinear guides 13, 14 of the muff 11 of the main body 10.

[0076] In virtue of the conformation of the slots 61, 62, 63, 64 of the clamping sleeve 5, the pins 71, 72 that slide therein produce a rotation of the sleeve itself.

[0077] As shown in figures 3, 4 and 5, at the distal ends, the guides 13, 14 of the muff 11 have a transversal extension 131, 141, having the shape of an arc of a circle, in which the pins 71, 72 can slide once the handle 2 and the locking element 31, 32 are brought into the reciprocal extended position. This expedient allows the user to turn the locking lever 32 through the rotation of the knob 21 of the handle 2, through a certain angular stroke, preferably ninety degrees, bringing it for example into a vertical position (see figure 10).

[0078] In fact, in this condition, the shank 22 of the handle 2 and the coupling member 31 are rotationally connected to one another through the pins 71, 72 that engage the clamping sleeve 5 in the slots 61, 62, 63, 64.

[0079] Once the user has brought the lever 32 into the horizontal position or however into its intermediate "pre-closing" position where the pins 71, 72 are again positioned at the end of the linear part of the guide 13, 14, the knob 21 is pressed, causing the insertion of the shank 22 into the clamping sleeve 5.

[0080] The thrust exerted on the handle 2 produces a translation of the pin 71 of the shank 22 in the direction of the door, which in turn produces a rotation of the clamping sleeve 5, due to the engagement between the pin 71 and the first pair of slots 61, 62 (figure 11).

[0081] The rotation of the clamping sleeve 5 causes the translation of the pin 72 of the coupling member 31 in the opposite direction to that of the handle 2, due to the inclinations of the second slots 63, 64.

[0082] In this way, the coupling member 31 moves towards the inside of the clamping sleeve 5 and, therefore, the locking lever 32 passes from the intermediate position to the locked position.

[0083] It is to be noted that the slots 61, 62 of the first pair are longer than those of the second pair 63, 64 according to a ratio chosen so as to make sure that the thrust exerted on the knob 21 of the handle 2 is multiplied when it is translated into the clamping thrust exerted by the lever 32 on the edge of the caravan wall.

[0084] In the preferential embodiment of the invention, the aforementioned cylinder, which is solidly constrained to the handle 2, is adapted to be locked in a releasable way to the clamping sleeve 5 defining the locking and unlocking of the handle 2 in the device 1.

[0085] In detail, the clamping sleeve 5 can be equipped with a shaped through hole 50, afforded at its lateral wall, in which, in the locked configuration, a shaped plug 8 is inserted, connected to the internal kinematic mechanisms of the cylinder.

[0086] Therefore, when the plug 8 is inserted into the shaped hole 50 of the sleeve 5, the handle 2 and the clamping sleeve 5 are reciprocally locked and cannot perform reciprocal translatory or rotatory movements.

[0087] Given that the pin 72 of the coupling member 31 is in the end stroke position in the relative slots 63, 64 and the clamping sleeve 5 is stationary, the member 31 is also locked, despite being urged by the aforementioned elastic means 4.

[0088] Once the user has operated the cylinder using the key, so that the plug 8 is retracted within the clamping sleeve 5, the handle 2 is unlocked, i.e. it is free to translate due to the action of the elastic means 4.

[0089] When the shaped hole 50 and the plug 8 are aligned again, it is then possible to lock the device 1 again in the locked configuration.

Claims

1. A locking device (1) for doors or the like, comprising:

a main body (10) fixable to a door;
a rotatable handle (2) relative to said main body (10) and sliding axially thereto;
a cylinder for locks coupled to the handle (2) and adapted to lock/ unlock the movement of said handle (2); and
a locking element (31, 32) operable in rotation by means of said handle (2) between an open position and an intermediate position and slidable axially with respect to the main body (10) between said intermediate position and a closed position;

characterized in that it comprises a clamping element (5) housed in the main body (10), that is mechanically connected to the handle (2) and to the locking element (31, 32) and capable of

moving the locking element (31,32) from the intermediate position to said closed position as a result of a thrust exerted on the handle (2).

2. A device (1) according to the preceding claim comprising elastic contrast means (4) interposed between the handle (2) and said locking element (31, 32).
3. A device (1) according to at least one of the preceding claims, wherein the handle (2) is suitable for axially translating from a safe retracted position to an extended use position, said clamping element (5) being capable of rotationally constraining the handle (2) to the locking element (31, 32) once the handle (2) is in the use position and the locking element (31, 32) in the intermediate position thereof.
4. A device (1) according to at least one of the preceding claims, wherein the clamping element (5) is rotatable within the main body (10).
5. A device (1) according to at least one of the preceding claims, wherein said clamping element (5) is solidly constrained relative to axial displacements within the main body (10).
6. A device (1) according to at least one of the preceding claims, wherein the clamping element comprises a clamping sleeve (5) having a first end, wherein a shank (22) is inserted that is capable of axially sliding, which shank (22) is comprised within said handle (2), and a second opposite end, wherein a part (31) of the locking element is inserted, which is capable of axially sliding.
7. A device (1) according to the preceding claim, wherein said clamping sleeve (5) comprises a first longitudinal portion (51), which includes at least a first guide slot (61, 62) to which said shank (22) of the handle (2) is solidly constrained, and a second longitudinal portion (52), which includes at least a second guide slot (63, 634) to which said part (31) of the locking element is solidly constrained.
8. A device (1) according to the preceding claim, wherein said guide slots (61, 62, 63, 64) are oblique relative to an ideal plane passing through the axis of the sleeve (5), said first slot (61, 62) having a direction of inclination opposite to that of said second slot (63, 64) relative to a direction of axial reference.
9. A device (1) according to the preceding claim, in which the clamping sleeve (5) includes a first pair of guide slots (61, 62) for the shank (22) of the handle (2), the slots of said first pair being disposed in diametrically opposite positions in said first portion (51) of the clamping sleeve (5) and being symmetrical

relative to an ideal plane passing through said axis.

10. A device (1) according to claim 8 or claim 9, in which the clamping sleeve (5) includes a second pair of guide slots (63, 64) for said part (31) of the locking element, the slots of said second pair being disposed in diametrically opposite positions in said second portion (52) of the clamping sleeve (5) and being symmetrical relative to an ideal plane passing through said axis. 5 10
11. A device (1) according to at least any one of claims 7 to 10, wherein each slot (61, 62, 63, 64) is crossed and constrains the movement of a pin (71, 72) rigidly connected to the shank (22) or to said first part (31) of the locking element (31, 32). 15
12. A device (1) according to the preceding claim, wherein each pin (71, 72) is slidably inserted in at least one linear guide (13, 14) formed inside the main body (10). 20
13. A device (1) according to the preceding claim wherein, in proximity of at least one end, the linear guide (13, 14) exhibits a transverse extension (131, 141) wherein said pin (71, 72) can slide. 25

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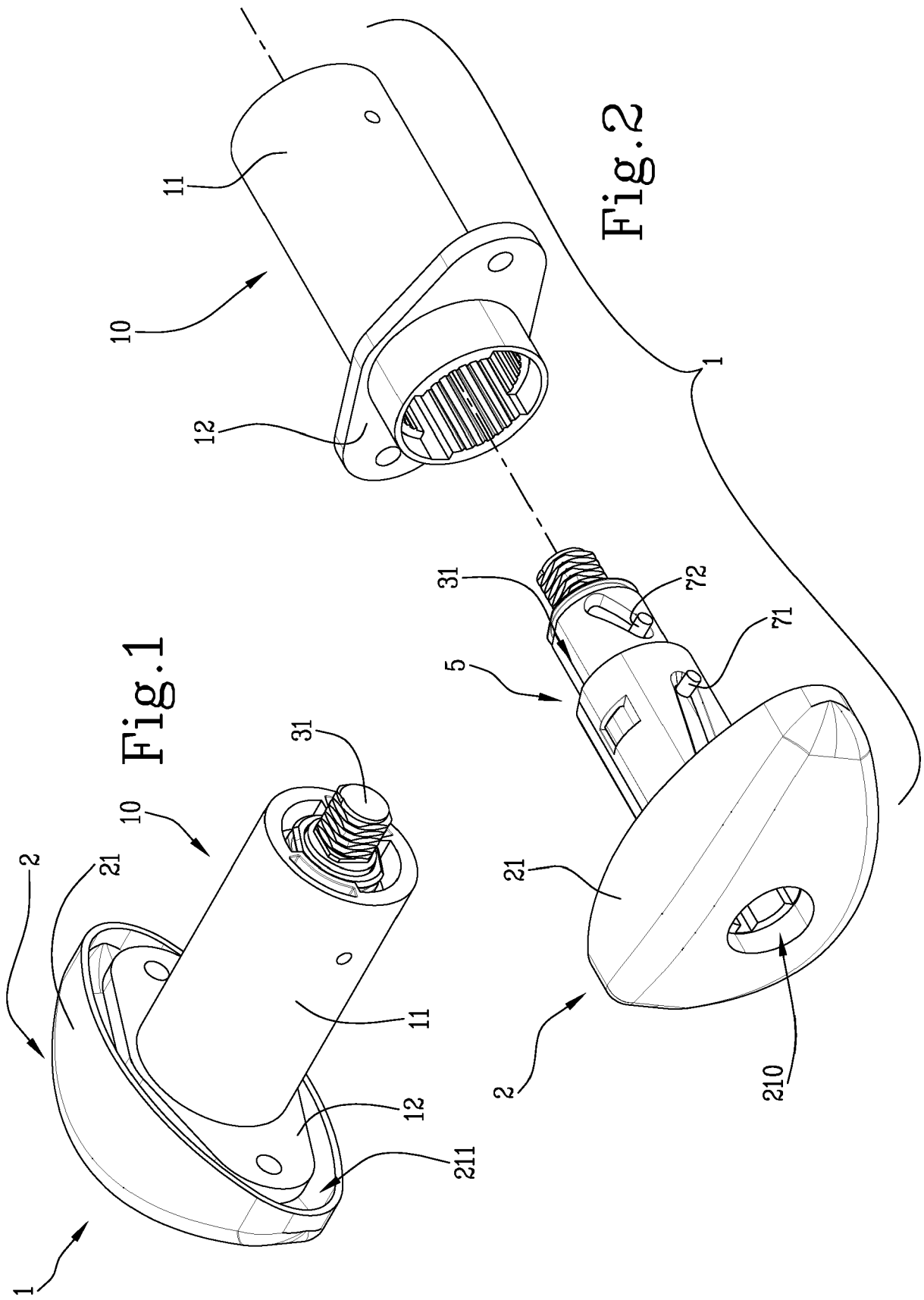
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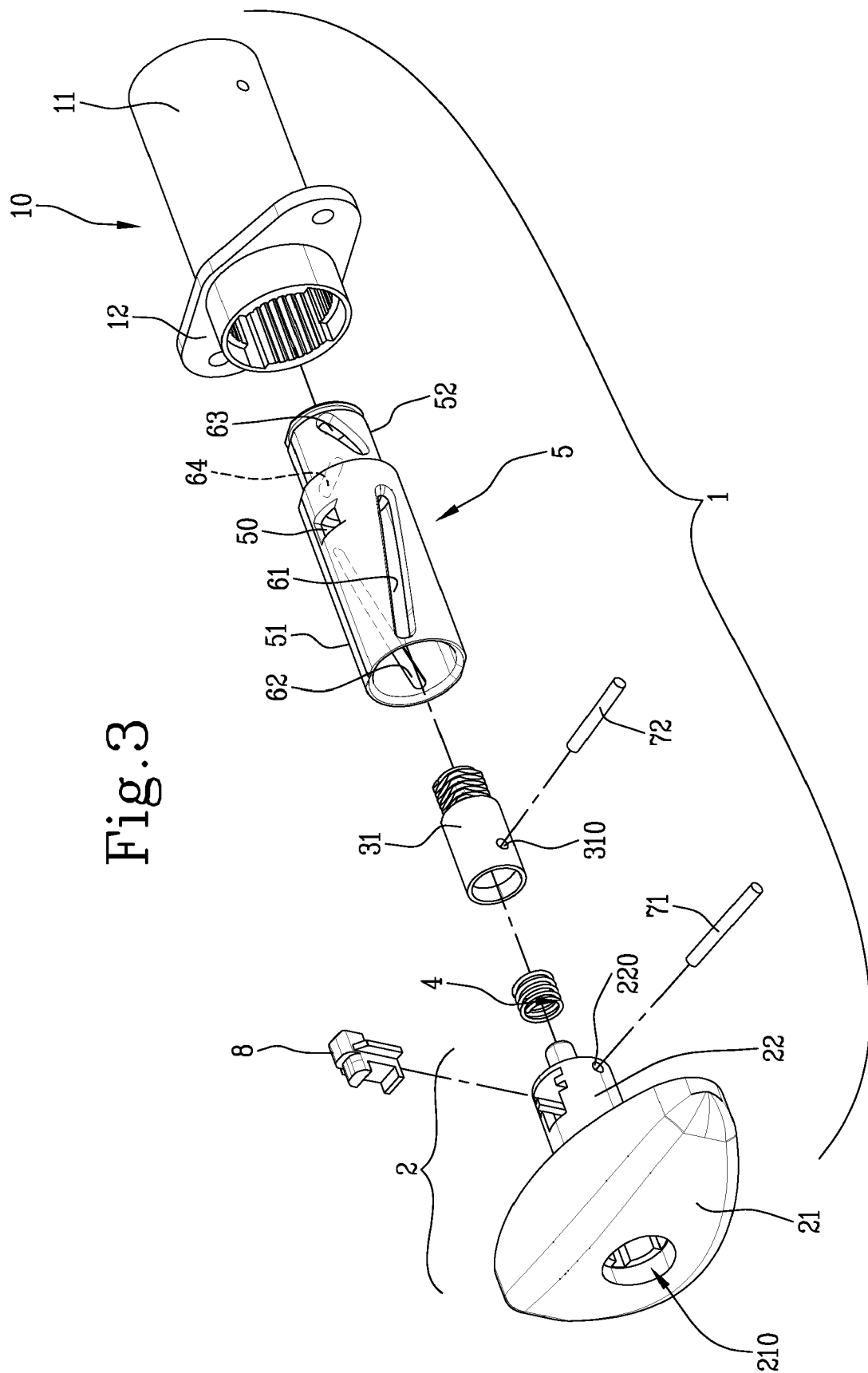


Fig.4

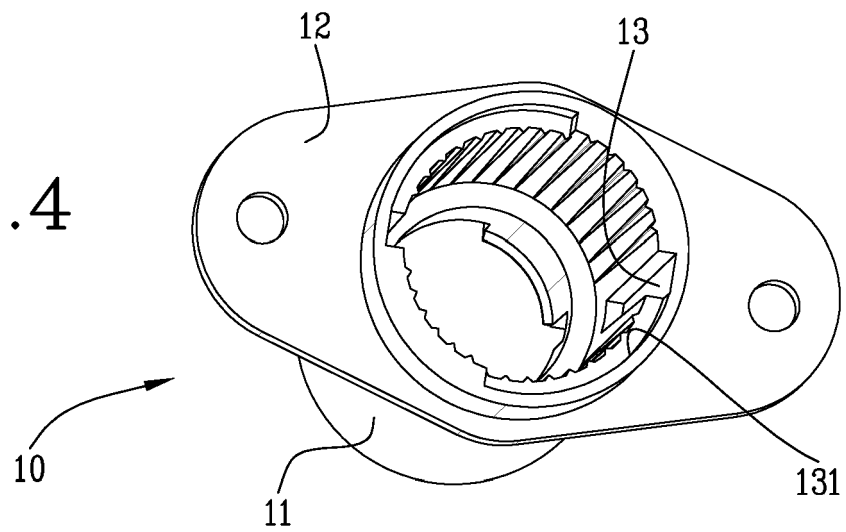


Fig.5

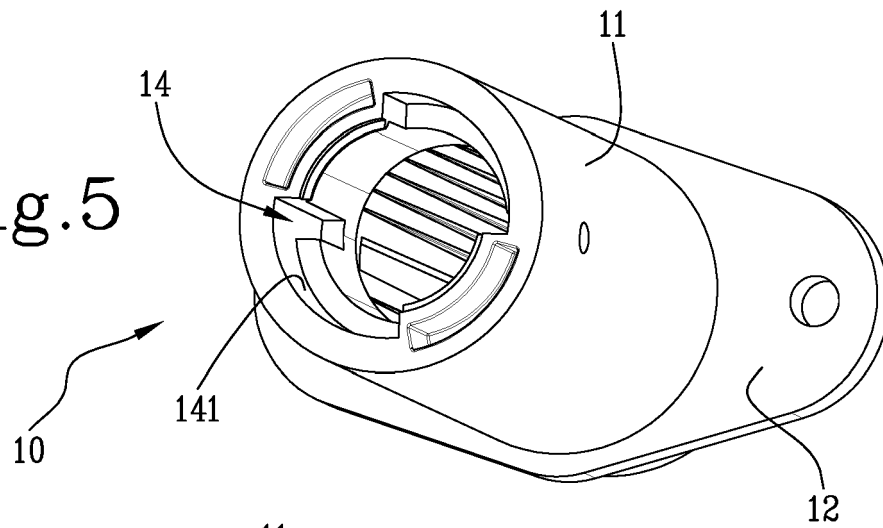


Fig.6

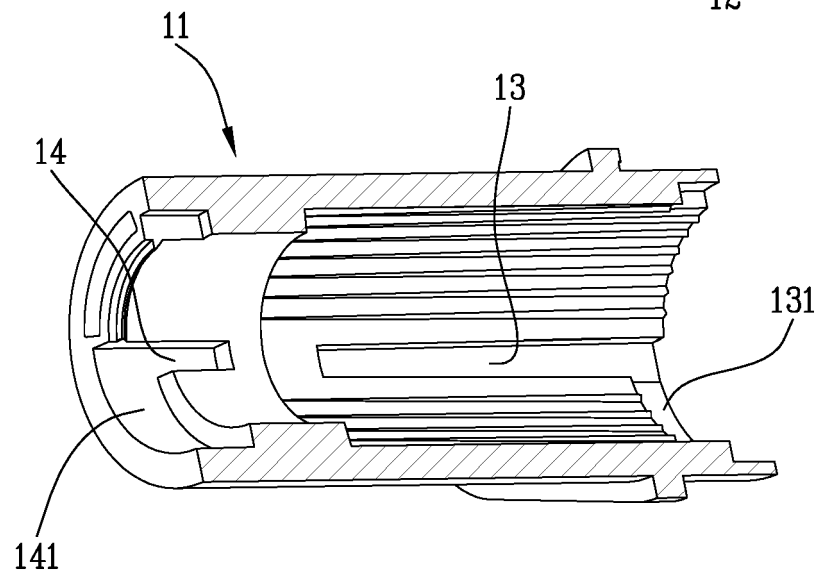


Fig. 7

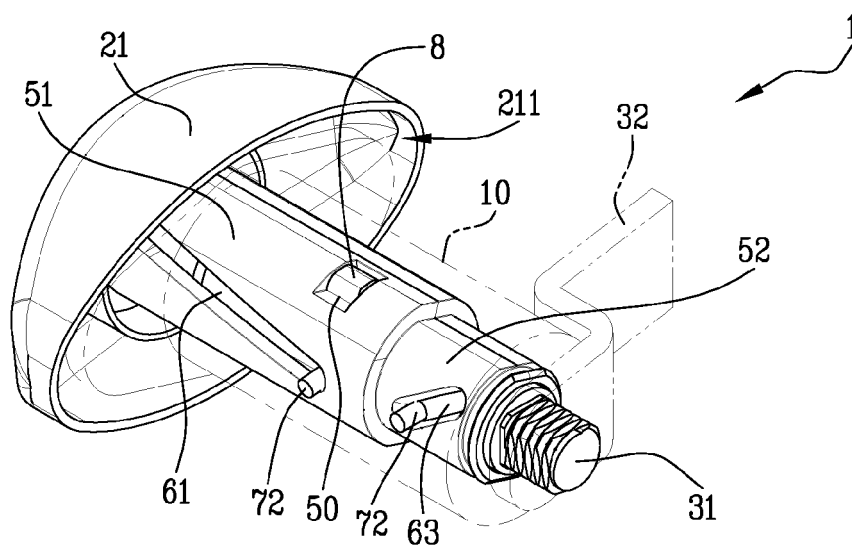


Fig.8

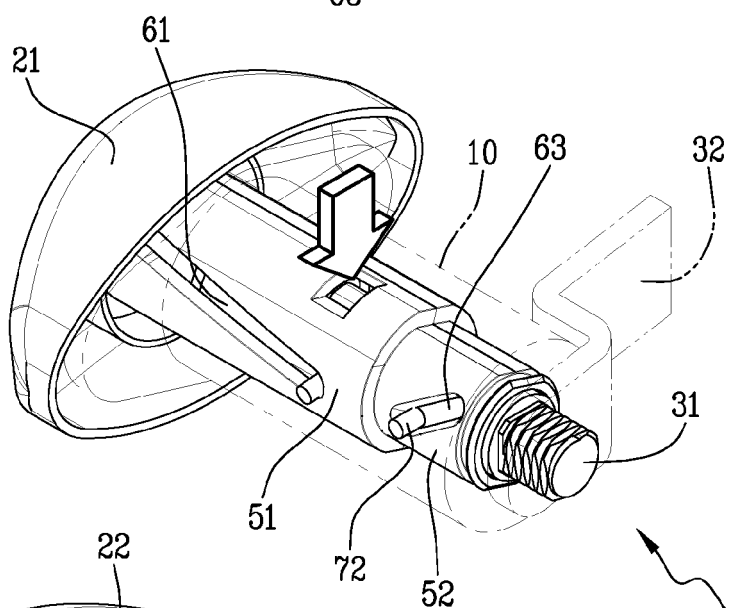
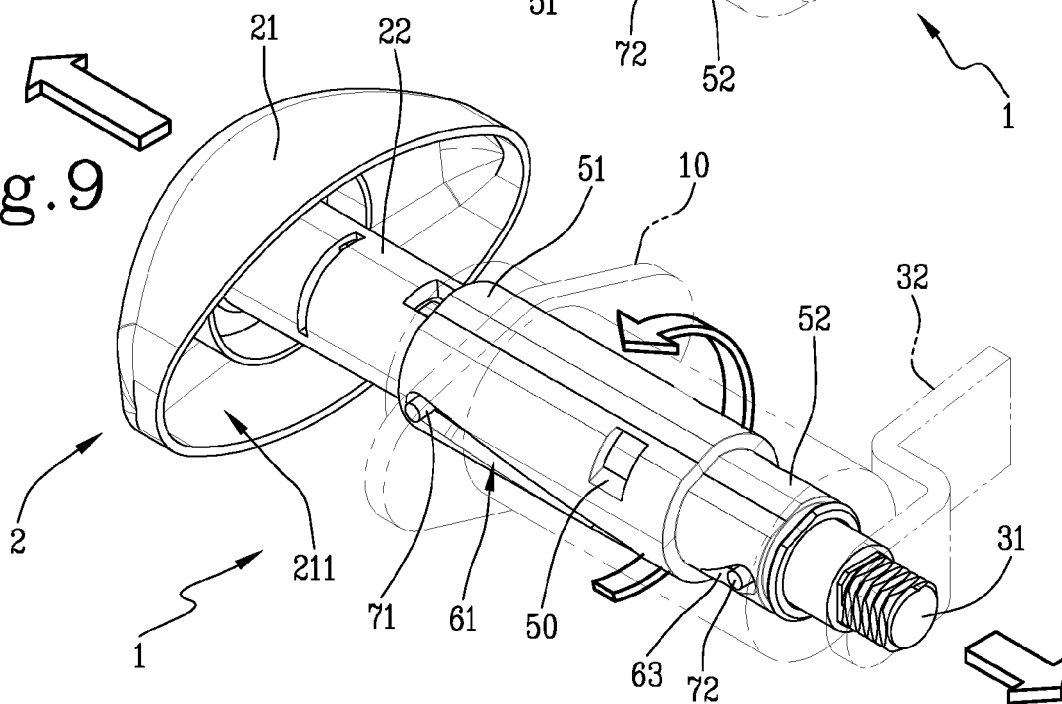
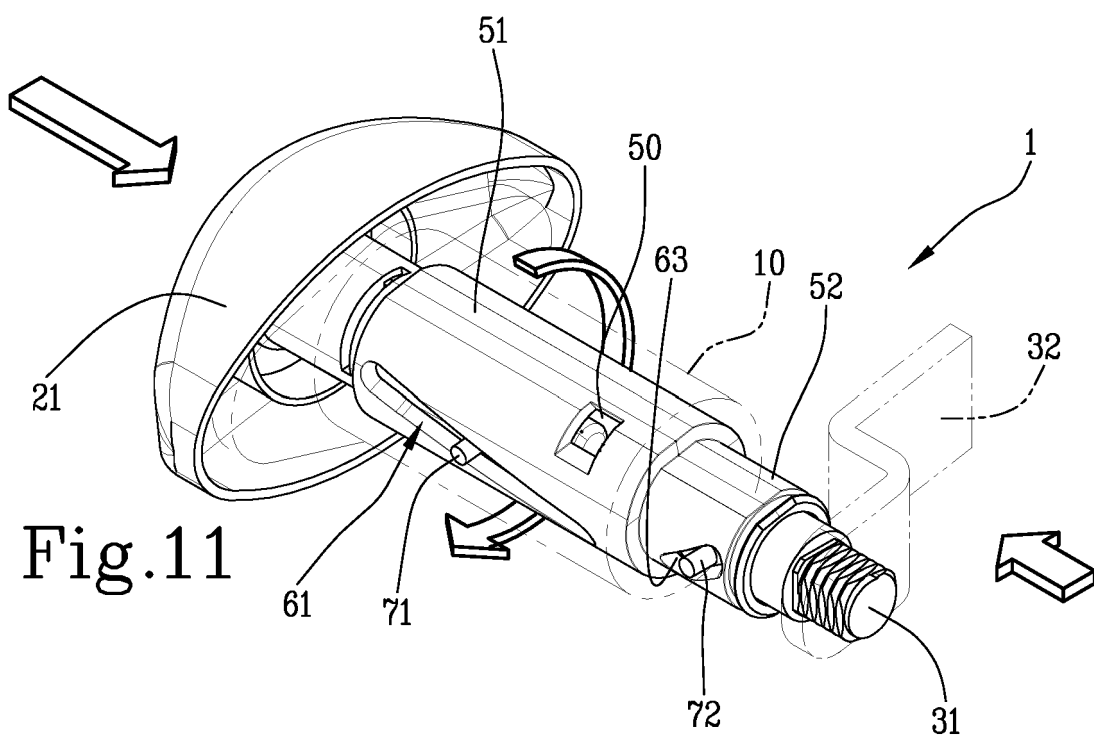
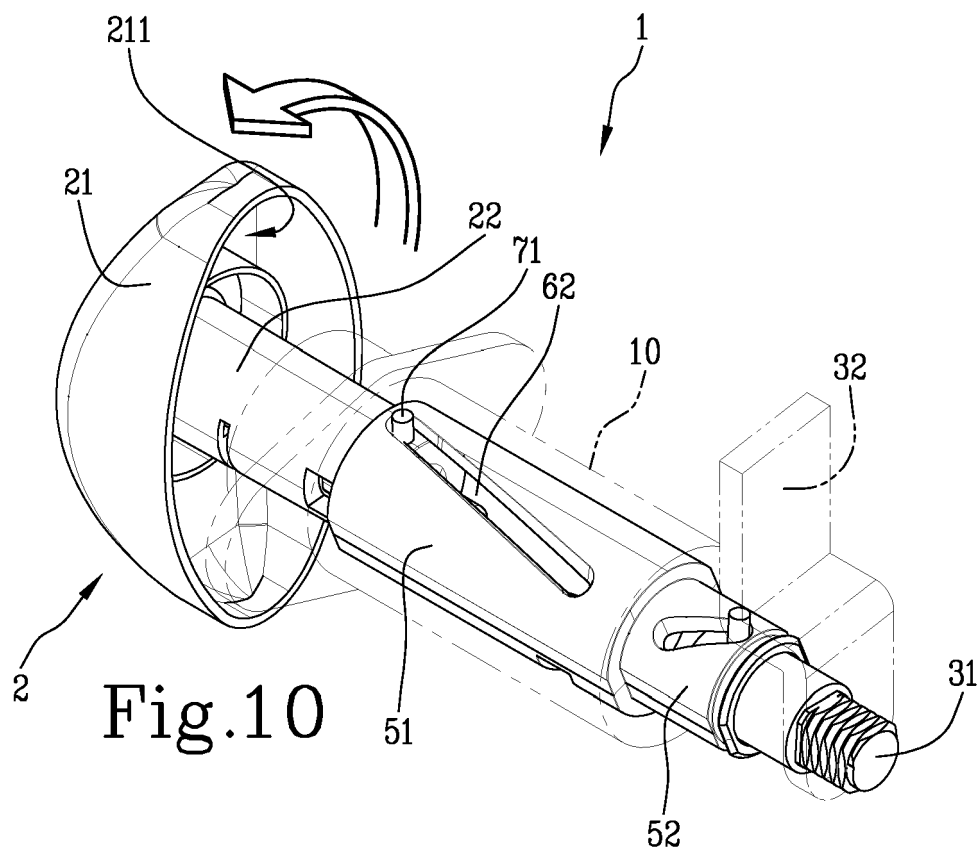


Fig.9







EUROPEAN SEARCH REPORT

 Application Number
 EP 17 18 3411

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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	US 2009/256368 A1 (LE TAM THANH [US] ET AL) 15 October 2009 (2009-10-15)	1-7	INV. E05B83/44
A	* paragraph [0001] - paragraph [0004]; figures 1-3, 26-31 *	8-13	E05C5/00 E05C3/04
	* paragraph [0037] - paragraphs [0043], [0053] *		ADD. E05B1/00
A	DE 20 2007 013514 U1 (EMKA BESCHLAGTEILE [DE]) 6 December 2007 (2007-12-06)	1-13	
	* paragraph [0001] - paragraph [0002] *		
	* paragraph [0018] - paragraph [0023]; figures 1-3 *		
A	US 1 907 625 A (VOGT ENGELBERT J) 9 May 1933 (1933-05-09)	1,4,5	
	* page 1, line 15 - line 19; figures 1-3 *		
	* page 2, line 101 - line 106 *		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E05B E05C
Place of search		Date of completion of the search	Examiner
The Hague		17 January 2018	Koster, Michael
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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 EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 18 3411

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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17-01-2018

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009256368 A1	15-10-2009	NONE	

DE 202007013514 U1	06-12-2007	AT 479002 T	15-09-2010
		DE 202007013514 U1	06-12-2007
		EP 2106488 A1	07-10-2009
		WO 2009043420 A1	09-04-2009

US 1907625 A	09-05-1933	NONE	

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