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(54) Assembly for unlocking the door of vehicles

(57) Assembly for unlocking the door of vehicles, of the type of vans, trucks, lorries, semi-trailer trucks, trailers and the like, which comprises a base (2) which can be stably coupled to the door, and a handle (3) which is fixed to at least one bar (4), which in turn can be coupled in a rotatable manner to the door and which rigidly supports respective means of anchoring to the frame of the vehicle. The handle (3) is rotatable at least from a secured configuration, in which it is substantially facing and proximate to the base (2) and in which the anchoring means can be engaged with the frame of the vehicle, to at least one released configuration, in which it is at least partially lifted from the base (2) and in which the anchoring means can be disengaged from the frame of the vehicle, in order to allow the free rotation and the opening of the door, and vice versa. The base (2) is coupled in a rotatable manner to a button (5), which is moveable at least between a first angular position, in which it is elastically kept in interference with the rotation of the handle (3), and a second angular position, in which it is disengaged from the handle (3).

The assembly comprises a securing body (6), which is moveable at least between a first angular configuration, in which, independently of the button (5), it is elastically kept in interference with the rotation of the handle (3), and a second angular configuration, in which it is disengaged from the handle (3).

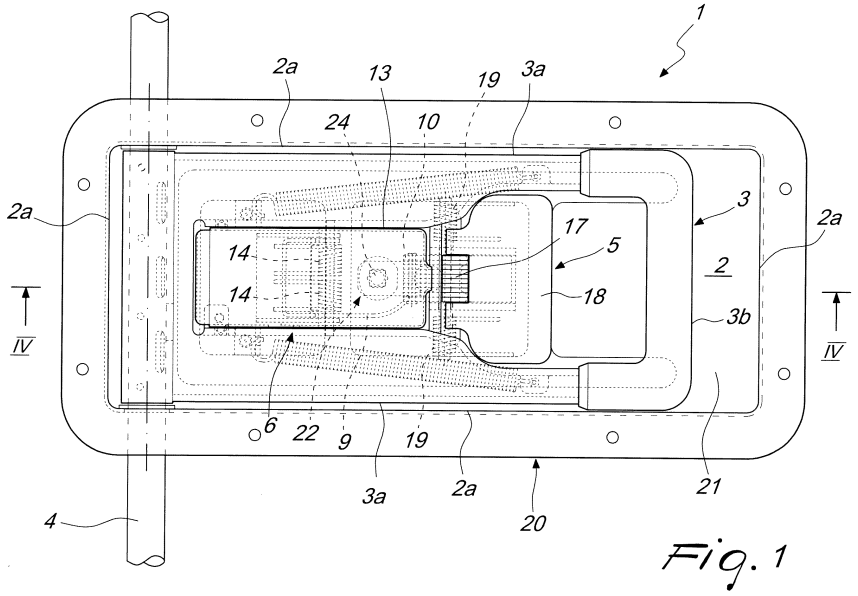

Fig. 1

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Description

[0001] The present invention relates to an assembly for unlocking the door of vehicles, of the type of vans, trucks, lorries, semi-trailer trucks, trailers and the like.

[0002] As is known, in some implementation solutions which are very widespread on the market, the rear doors of vehicles such as vans, trucks, lorries, semi-trailer trucks, trailers and the like have an external handle which is accommodated in a recess, which is formed by a tub recessed in an opening, which in turn is provided along the outward-facing side of the door; such handle can be gripped by an operator to actuate the opening of the door, in order to access the inner compartment of the vehicle.

[0003] More precisely, a vertical bar is mounted in a rotatable manner on the door and rigidly supports, with its upper and lower ends, pawls and/or hooks which are capable of being stably engaged, when the door is closed, in respective locators and retention means, which are secured to the frame of the vehicle, correspondingly above and below the door.

[0004] Therefore, when the operator wishes to gain access to the compartment, he or she can grip the handle, imposing rotation on it, and with it the rotation of the bar, thus causing the disengagement of the pawls and/or of the hooks from the respective retention means, in order to unlock the door and enable the opening thereof.

[0005] In order to prevent the accidental unlocking of the door, especially during the movement of the vehicle (and the obvious, hazardous, consequences for the load and for other vehicles in the vicinity), the free rotation of the handle is prevented (in addition to the usage of any key-operated mechanisms that may be present) by a button, which is in a rotatable manner and elastically associated with the tub that accommodates the handle: a protruding lip of the button in fact rests on the terminal edge of a respective plate, formed by the handle, obstructing its rotation and thus the unlocking of the door.

[0006] Therefore, only with the preliminary pressing of the button is it possible to cause a partial rotation (by overcoming the elastic reaction that keeps it in the configuration described above), which makes it possible to space the protruding lip from the plate, so that it does not prevent its rotation, and, with it, the rotation of the handle.

[0007] Such implementation solution is not however devoid of drawbacks.

[0008] As has been seen, in fact, guarding against accidental openings, in addition to key-operated mechanisms, simply relies on the mutual contact between the protruding lip of the button (which is kept in this position of contact by a spring) and the terminal edge of the plate: as a consequence of prolonged and repeated use of the handle, stresses, concentrated on the aforementioned point of contact, can easily result in damage and breakage.

[0009] Moreover, precisely because of the limited size of the region of contact and mutual engagement, the maximum load that this can support can be contained, thus imposing expensive and cumbersome overdimensioning of the elements involved, in order to prevent the risk of violent shocks or stresses (for example owing to the overturning of the load inside) from forcing the mutual coupling and causing the opening of the door.

[0010] In addition it must be pointed out that any breakage of the spring, which plays the crucial role of keeping the protruding lip of the button resting on the edge of the plate, deprive the entire handle of its functionality described above, and thus of the capacity to prevent accidental unlocking.

[0011] The aim of the present invention is to solve the above-mentioned problems, by providing an assembly that is effectively capable of reducing the risk of accidental unlocking events.

[0012] Within this aim, an object of the invention is to provide an assembly that ensures high mechanical strength, even in the event of accidental and/or violent stresses.

[0013] A further object of the invention is to provide an assembly that is capable of guarding against or reducing the danger of accidental unlocking, also in the event of attempts to break in and/or violent stresses owing to the impact of the load against the inward side of the door.

[0014] A further object of the invention is to provide an unlocking assembly that is safe and ensures a high reliability of operation.

[0015] Another object of the invention is to provide an assembly that can be easily implemented using elements and materials that are readily available on the market.

[0016] Another object of the invention is to provide an assembly that is low-cost and safe in application.

[0017] This aim and these and other objects which will become more apparent hereinafter, are all achieved by an assembly for unlocking the door of vehicles, of the type of vans, trucks, lorries, semi-trailer trucks, trailers and the like, comprising a base which can be stably coupled to the door and a handle which is fixed to at least one bar, which can be coupled to the door in a rotatable manner and which rigidly supports respective means of anchoring to the frame of the vehicle, said handle being rotatable at least from a secured configuration, in which it is substantially facing and proximate to said base and said anchoring means can be engaged with the frame of the vehicle, to at least one released configuration, in which it is at least partially lifted from said base and said anchoring means can be disengaged from the frame of the vehicle, in order to allow the free rotation and the opening of the door, and vice versa, said base being coupled in a rotatable manner to a button, which is moveable at least between a first angular position, in which it is elastically kept in interference with the rotation of said handle, and a second angular position, in which it is disengaged from said handle, **characterized in that** it comprises a securing body, which is moveable at least between a first angular configuration, in which, independently of said button, it is elastically kept in interference with the rotation of said handle, and a second angular

configuration, in which it is disengaged from said handle.

[0018] Further characteristics and advantages of the invention will become more apparent from the description of a preferred, but not exclusive, embodiment of the assembly according to the invention, which is illustrated by way of non-limiting example in the accompanying drawings wherein:

Figure 1 is a front elevation view of the assembly according to the invention;
Figure 2 is a front elevation view of the assembly in Figure 1, with some components shown in dotted lines;
Figure 3 is a view from below of the assembly according to the invention;
Figure 4 is a sectional view of Figure 1 taken along the line IV-IV;
Figures 5 and 6 are partially sectional views from below of the button in two different angular positions of operation;
Figure 7 is a front elevation view of the securing body;
Figure 8 is a partially sectional view from below of the securing body.

[0019] With particular reference to the figures, the reference numeral 1 generally designates an assembly for unlocking the door of vehicles, of the type of vans, trucks, lorries, semi-trailer trucks, trailers and similar vehicles for professional use.

[0020] It should be made clear from this point onward that the use for unlocking doors mounted on means for transport of the type of those indicated above constitutes a preferred application of the assembly 1 according to the invention, and constant reference shall be made to it in the present discussion; but the possibility is not ruled out of using (while remaining within the scope of protection claimed herein) the assembly 1 according to the invention in different areas and/or for different types of vehicles, depending on the specific requirements.

[0021] The assembly 1 comprises a base 2 that can be stably coupled to the door (which may be in a conventional manner) and a handle 3, which is preferably, but not exclusively, U-shaped, so as to define two parallel arms 3a which are connected by an ergonomic cross-member 3b, which can be gripped by the user to rotate the handle 3 and cause the unlocking of the door, in accordance with the methods described in the following paragraphs.

[0022] The handle 3 is fixed (with its arms 3a, at the end opposite to the cross-member 3b) to at least one bar 4 (outside or inside the door), which in turn can be coupled in a rotatable manner to the door and rigidly supports (at its mutually opposite ends) respective means of anchoring (pawls, hooks, and the like) to the frame of the vehicle (for example, as is known, thanks to corresponding brackets, locators, etc., which protrude from the frame above and below the door).

[0023] The handle 3 can rotate at least from a blocked configuration (in which for the purposes of example it is shown in the accompanying Figures 1 and 2), in which it is substantially facing and proximate to the base 2 and the anchoring means can engage the frame of the vehicle, in order to ensure the stable closing of the door, to a released configuration, in which it is at least partially raised from the base 2 and the anchoring means can disengage the vehicle, in order to allow the free rotation and the opening of the door, and vice versa.

[0024] Moreover, the base 2 is coupled in a rotatable manner to a button 5, which is moveable at least between a first angular position (in which it is shown in Figure 5, and also in Figure 7), in which it is elastically kept in interference with the rotation of the handle 3, and a second angular position, in which it is disengaged from the handle 3, in order to allow the rotation thereof.

[0025] As is known in fact, the button 5 prevents (in accordance with the methods that will be described on the following pages) any accidental unlocking, owing to shocks and stresses against the base 2 or the handle 3, which could cause the latter to rotate and thus determine the disengagement of the bar 4 from the anchoring means.

[0026] According to the invention, the assembly 1 comprises a securing body 6, which is moveable at least between a first angular configuration, in which it is shown in the accompanying figures and in which, independently of the button 5, it is elastically kept in interference with the rotation of the handle 3, and a second angular configuration, in which it is disengaged from the handle 3.

[0027] The element 6 thus cooperates with the button 5 in order to prevent the rotation of the handle 3, thus providing greater effectiveness greater effectiveness (with respect to conventional unlocking devices) in reducing the risk of accidental unlocking to the assembly 1 according to the invention , thus already achieving the set aim.

[0028] Conveniently, according to the preferred embodiment, to which constant reference shall be made on the following pages by way of non-limiting example of the application of the invention, the securing body 6 is a rocker arm which is actuated in rotation by the button 5 between the first angular configuration and the second angular configuration: the simple actuation of the button 5, by the user, can thus determine the simultaneous disengagement both of the button 5 and of the rocker arm from the handle 3, thus allowing the free movement thereof in order to open the door.

[0029] In particular, according to an embodiment of important practical interest, cited by way of non-limiting illustration of the application of the invention, the rocker arm comprises a central block 7, which is articulated to the base 2 at a first pivot 8: a tooth 9 extends from the central block 7 and abuts against an elongated protrusion 10 of the button 5 (as can clearly be seen for example in the accompanying Figure 8).

[0030] In this manner, as a consequence of the rotation of the button 5 from the first angular position to the second

angular position, the raising of the tooth 9 is achieved and, as a consequence, the simultaneous forced rotation of the rocker arm from the first angular configuration to the second angular configuration.

[0031] It is thus thanks to the presence of the tooth 9 and of the protrusion 10, and to their mutual contact, that it is possible to simultaneously actuate the rotation both of the button 5 and of the rocker arm 7, in order to achieve the unlocking of the handle 3 and thus the possibility of opening the door, in a practical and easy manner.

[0032] In the preferred, but not limiting, embodiment of the application of the invention, the rocker arm comprises an extension 11, which extends from the central block 7, at the end opposite to the tooth 9, and which defines a shoulder 11a which is kept elastically in abutment, in the first angular configuration, against a first flank 12a of a transverse band 13 of the handle 3 (the band 13 comprised between the arms 3a), in order to obstruct the raising and free rotation of the latter.

[0033] More specifically, the unlocking assembly 1 according to the invention comprises at least one first spring 14 (chosen preferably, but not exclusively, to be of the torsion spring type), which is wound about the first pivot 8: the elastic reaction of the first spring 14 is capable of keeping the shoulder 11a in abutment against the first flank 12a of the transverse band 13, and thus ensures, by means of the rocker arm, interference with the rotation of the handle 3.

[0034] Even more specifically, and as can be seen from the accompanying figures, the assembly 1 comprises a pair of first springs 14, which are coaxially wound around the first pivot 8 and cooperate in order to keep the shoulder 11a in abutment against the first flank 12a of the transverse band 13.

[0035] With further reference to the preferred, but not exclusive, embodiment, the button 5 comprises a central body 15, which is articulated to the base 2 at a second pivot 16: a tab 17 extends from the central body 15, on the side opposite to the protrusion 10, and supports an abutment plate 18, in order to allow an easy manual actuation of the button 5 (by simply pressing the plate 18).

[0036] In the first angular position, as can be seen in particular in Figures 5 and 6, an edge 17a of the tab 17 is elastically kept resting on a respective second flank 12b (at the end opposite to the first flank 12a) of the transverse band 13, so as to in turn obstruct the raising, and the rotation, of the handle 3. The pressure of the plate 18 imposes an oscillation of the button 5 about the second pivot 16, until it is brought to the second angular position, visible in Figure 6, in which the tab 17 is spaced from the second flank 12b and thus the movement of the transverse band 13, and thus of the handle 3, is allowed.

[0037] More specifically, keeping the edge 17a of the tab 17 resting on the second flank 12b of the transverse band 13 (and thus keeping the button 5 in interference with the rotation of the handle 3) is ensured by the elastic reaction of at least one second spring 19 (for example of the type of a torsion spring), which is comprised in the assembly 1 and is wound about the second pivot 16.

[0038] Even more specifically, in the embodiment shown in the accompanying figures for the purposes of non-limiting example of the application of the invention, the assembly 1 comprises two second springs 19, which are coaxially wound around the second pivot 16 in order to keep the button 5 in interference with the rotation of the handle 3.

[0039] In a possible embodiment of the assembly 1 according to the invention, the base 2 is a plate (or the like) which is applied externally to the door, and the handle 3, as as well as the bar 4 and the other components of the assembly 1 according to the invention, are arranged outside the door, and protrude from it.

[0040] In the embodiment proposed in the accompanying figures, which does not exhaust the possible constructional variants for the assembly 1 according to the invention, while remaining within the scope of protection claimed herein, the base 2 has four perimetric raised lips 2a, forming a sort of tub 20 (for example constituted by a conveniently folded steel plate), which can be arranged stably in an opening which is provided along the outer surface of the door and is such as to define a recess 21 for accommodating the handle 3, at least in the secured configuration.

[0041] Conveniently, in order to limit access to the compartment closed by the door to the driver/owner only or in any case to authorized persons, the unlocking assembly 1 according to the invention comprises a key-operated mechanism 22, which can move at least between a first angular arrangement, locking the movement of the handle 3, and a second angular arrangement, allowing the free movement of the handle 3.

[0042] More specifically, the key-operated mechanism 22 comprises a substantially axially symmetric central unit, which can in a rotatable manner be inserted in a slot 23 provided in the transverse band 13: the central unit rotates about an axis which is substantially perpendicular to the base 2 and it is provided with a contoured slit 24 in which a key can be inserted which can be given to the driver of the vehicle or in any case to authorized persons.

[0043] A latch 25 thus extends from the central unit and is interposed, in the first angular arrangement, between the transverse band 13 and the protrusion 10 of the button 5 (as can be seen for example in Figure 4), in order to obstruct the rotation of the button 5 and of the handle 3; in the second angular arrangement (which is reachable via suitable rotation, for example through 90°, of the key inserted in the slit 24) the latch 25 is spaced (because it is in turn rotated by 90°) from the transverse band 13 and from the protrusion 10, in order to allow the free movement of the handle 3 and of the button 5.

[0044] The operation of the unlocking assembly according to the invention is as follows.

[0045] When the door is arranged to close the inner compartment of the vehicle, and the handle 3 is completely accommodated in the tub 20 (or in any case facing and proximate to the base 2), in the secured configura-

tion, the anchoring means supported by the bar 4 can engage the frame of the vehicle, and can thus prevent the opening of the door.

[0046] In order to be able to access the compartment, the user first has to insert the key in the slit 24, in order to rotate, together with the key itself, the latch 25, thus disengaging it from the transverse band 13 and from the protrusion 10 of the button 5, thus enabling the movement of the handle 3.

[0047] The user can then exert a pressure on the plate 18 in order to cause the simultaneous oscillation of the button 5 and of the rocker arm, in order to disengage them from the transverse band 13, and thus grip the handle 3 (for example at the ergonomic cross-member 3b), in order to cause its rotation into the released configuration. In this manner, the simultaneous rotation is caused of the bar 4 (which is integral with the handle 3), in order to cause the anchoring means to disengage the frame, thus unlocking the door and enabling its opening.

[0048] In order to prevent accidental unlocking, for example owing to shocks against the handle 3, or due to impacts against the door, as has been seen, both the securing body 6 (the rocker arm) and the button 5 are elastically kept (mutually independently, by way of separate respective springs 19 and 14) in interference with the rotation of the handle 3. In fact, thanks to the springs 14 and 19, both the shoulder 11a of the extension 11 and the edge 17a of the tab 17 resist the rotation of the transverse band 13 (which is part of the handle 3) and thus they form respective restraints on the rotation.

[0049] Differently from the process that occurs in conventional devices, therefore, at least two separate springs 14 and 19 (or even four, as in the solution shown in the accompanying figures, or even more), both simultaneously operate independently to prevent the unlocking of the handle 3, so that the breakage of one of them will not compromise the safety of the vehicle and the correct operation of the assembly 1 according to the invention.

[0050] The use of a double obstacle to (restraint on) the rotation ensures great effectiveness in preventing accidental unlocking and, moreover, makes it possible to distribute the force to which the handle 3 and the other elements involved are subjected (in the event of impacts and stresses) over a larger number of elements: the assembly 1 according to the invention is thus capable of ensuring high mechanical strength and of resisting loads and stresses, even if they are considerable, without requiring overdimensioning of portions of the handle 3, of the button 5 or of the element 6, while still guarding against (or in any case reducing) the risk that such loads and stresses can cause damage or the opening of the door by forcing the restraints provided.

[0051] It should be noted that the presence of the double restraint, and in particular of the restraint provided by the rocker arm, offers greater protection against accidental unlocking events, even in the event of particularly violent stresses (impact of the load against the inner surface of the door) or of attempts to break in.

[0052] The forces mentioned above, with the handle 3 in the configuration for locking and the door closed, in fact impose a forced rotation on the bar 4, which substantially twists upon itself: as a consequence, the handle 3 and especially the transverse band 13 are subjected to a deformation that cause their sliding toward the bar 4 itself and thus below the shoulder 11a, consolidating the restraint offered by the element 6 and thus ensuring the maintenance of the secured configuration, even if, following the sliding, the button 5 tends to disengage from the transverse band 13.

[0053] In practice it has been found that the unlocking assembly according to the invention fully achieves the set aim, in that the adoption of a securing body, which is moveable at least between a first angular configuration, in which it is elastically kept in interference with the rotation of the handle, and a second angular configuration, in which it is disengaged, independently of a button, from the handle, which in turn is moveable at least between a first angular position, in which it is elastically kept in interference with the rotation of the handle, and a second angular position, in which it is disengaged from the handle, effectively makes it possible to reduce the risk of accidental unlocking.

[0054] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0055] In the embodiments illustrated, individual characteristics shown in relation to specific examples may in reality be interchanged with other, different characteristics, existing in other embodiments.

[0056] In practice, the materials employed, as well as the dimensions, may be any according to requirements and to the state of the art.

[0057] Where the technical features mentioned in any claim are followed by reference numerals and/or signs, those reference numerals and/or signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference numerals and/or signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference numerals and/or signs.

Claims

1. Assembly for unlocking the door of vehicles, of the type of vans, trucks, lorries, semi-trailer trucks, trailers and the like, comprising a base (2) which can be stably coupled to the door and a handle (3) which is fixed to at least one bar (4), which can be coupled in a rotatable manner to the door and which rigidly supports respective means of anchoring to the frame of the vehicle, said handle (3) being rotatable at least from a secured configuration, in which it is substan-

tially facing and proximate to said base (2) and said anchoring means can be engaged with the frame of the vehicle, to at least one released configuration, in which it is at least partially lifted from said base (2) and said anchoring means can be disengaged from the frame of the vehicle, in order to allow the free rotation and the opening of the door, and vice versa, said base (2) being coupled in a rotatable manner to a button (5), which is moveable at least between a first angular position, in which it is elastically kept in interference with the rotation of said handle (3), and a second angular position, in which it is disengaged from said handle (3), **characterized in that** it comprises a securing body (6), which is moveable at least between a first angular configuration, in which, independently of said button (5), it is elastically kept in interference with the rotation of said handle (3), and a second angular configuration, in which it is disengaged from said handle (3).

2. The unlocking assembly according to claim 1, **characterized in that** said securing body (6) is a rocker arm which is actuated to rotate by said button (5) between said first angular configuration and said second angular configuration.

3. The unlocking assembly according to claims 1 and 2, **characterized in that** said rocker arm comprises a central block (7), which is articulated to said base (2) at a first pivot (8), a tooth (9) extending from said central block (7) and abutting against an elongated protrusion (10) of said button (5), for the raising of said tooth (9) as a consequence of the rotation of said button (5) from said first angular position to said second angular position, with consequent forced rotation of said rocker arm from said first angular configuration to said second angular configuration.

4. The unlocking assembly according to one or more of the preceding claims, **characterized in that** said rocker arm comprises an extension (11), extending from said central block (7) on the side opposite to said tooth (9), said extension (11) forming a shoulder (11a) which is kept elastically in abutment, in said first angular configuration, against a first flank (12a) of a transverse band (13) of said handle (3), in order to obstruct the rotation of said handle (3).

5. The unlocking assembly according to claim 4, **characterized in that** it comprises at least one first spring (14), which is wound around said first pivot (8), the elastic reaction of said at least one first spring (14) keeping said shoulder (11a) in abutment against said first flank (12a), and said rocker arm in interference with the rotation of said handle (3).

6. The unlocking assembly according to claim 5, **characterized in that** it comprises a pair of said first springs (14), which are coaxially wound around said first pivot (8).

7. The unlocking assembly according to claim 1, **characterized in that** said button (5) comprises a central body (15), which is articulated to said base (2) at a second pivot (16), a tab (17) extending from said central body (15), on the side opposite to said protrusion (10), and supporting an abutment plate (18), for the manual actuation of said button (5), in said first angular position an edge (17a) of said tab (17) being kept elastically resting on a respective second flank (12b), which is opposite to said first flank (12a), of said transverse band (13), in order to obstruct the rotation of said handle (3).

8. The unlocking assembly according to claim 7, **characterized in that** it comprises at least one second spring (19), which is wound around said second pivot (16), the elastic reaction of said at least one second spring (19) keeping said edge (17a) of said tab (17) resting against said second flank (12b), and said button (5) in interference with the rotation of said handle (3).

9. The unlocking assembly according to claim 8, **characterized in that** it comprises a pair of said second springs (19), which are coaxially wound around said second pivot (16).

10. The unlocking assembly according to one or more of the preceding claims, **characterized in that** said base (2) has four perimetric raised lips (2a), in order to form a sort of tub (20), which can be stably arranged in an opening provided along the outer surface of the door and which defines a recess (21) for accommodating said handle (3), at least in said secured configuration.

11. The unlocking assembly according to one or more of the preceding claims, **characterized in that** it comprises a key-operated mechanism (22), which is moveable at least between a first angular arrangement blocking the movement of said handle (3), and a second angular arrangement, allowing free movement of said handle (3).

12. The unlocking assembly according to claim 11, **characterized in that** said key-operated mechanism (22) comprises a central unit, which rotates on an axis that is substantially perpendicular to said base (2) and is provided with a contoured slot (24) for the insertion of a key, a latch (25) extending from said central unit and being interposed, in said first angular arrangement, between said transverse band (13) and said protrusion (10) of said button (5), in order to obstruct the rotation of said button (5) and of said handle (3), in said second angular arrangement said

latch (25) being spaced from said transverse band (13) and from said protrusion (10), for the free movement of said handle (3) and of said button (5).

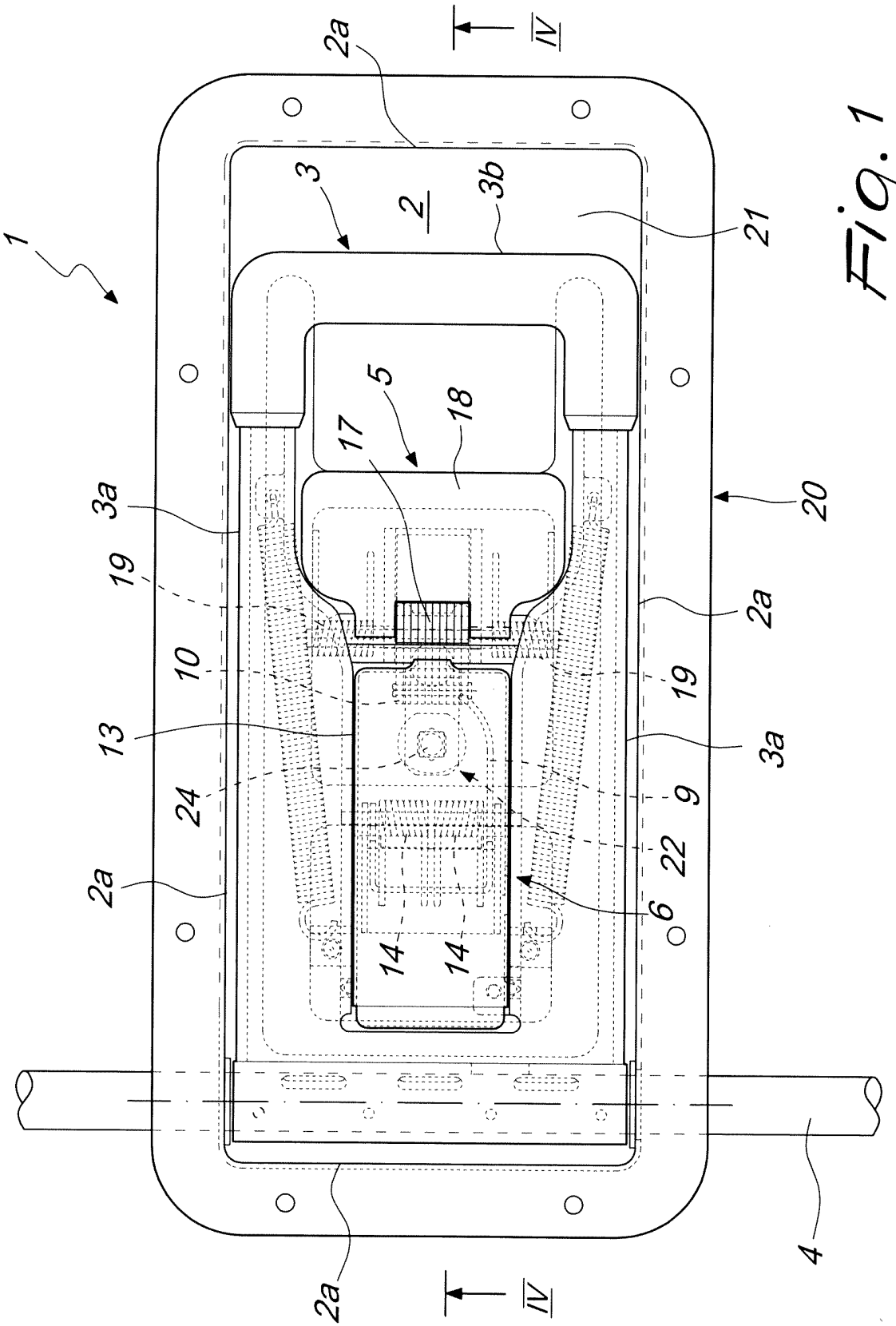

Fig. 1

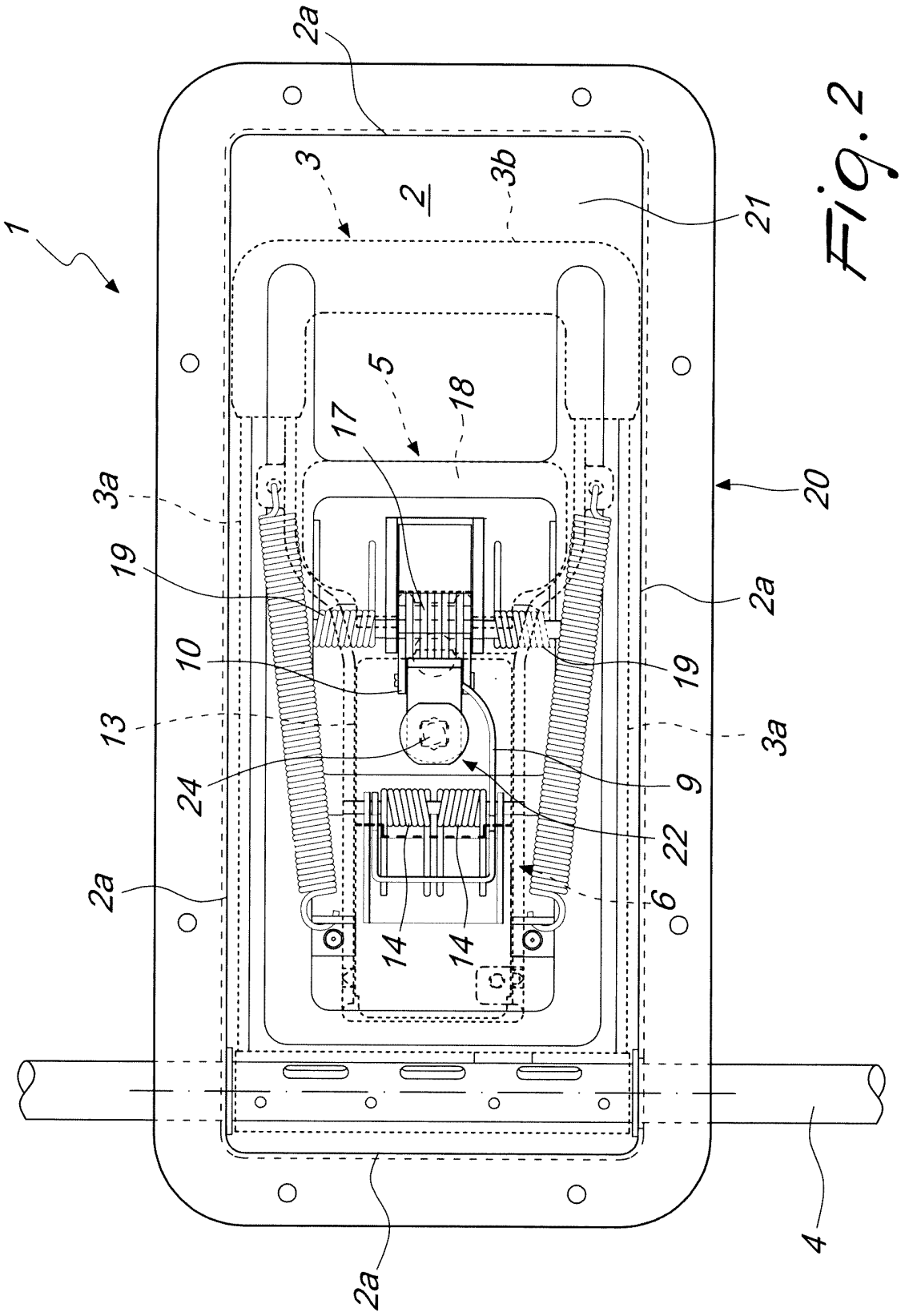

Fig. 2

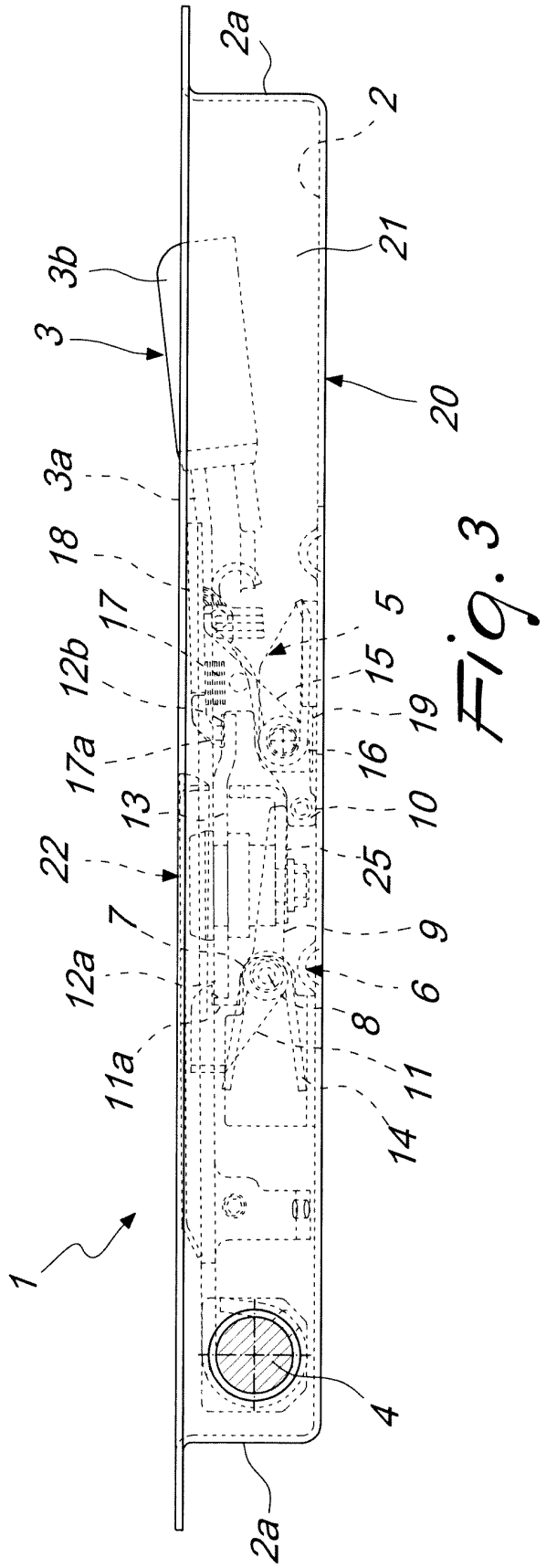
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Fig. 3

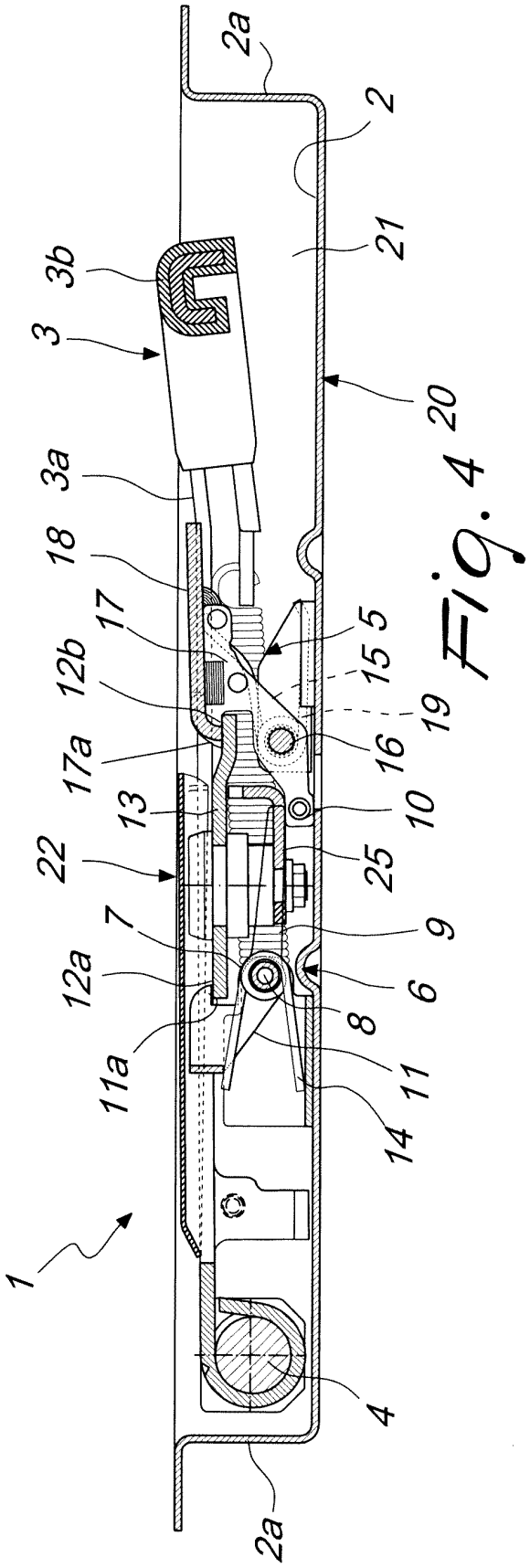
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Fig. 4

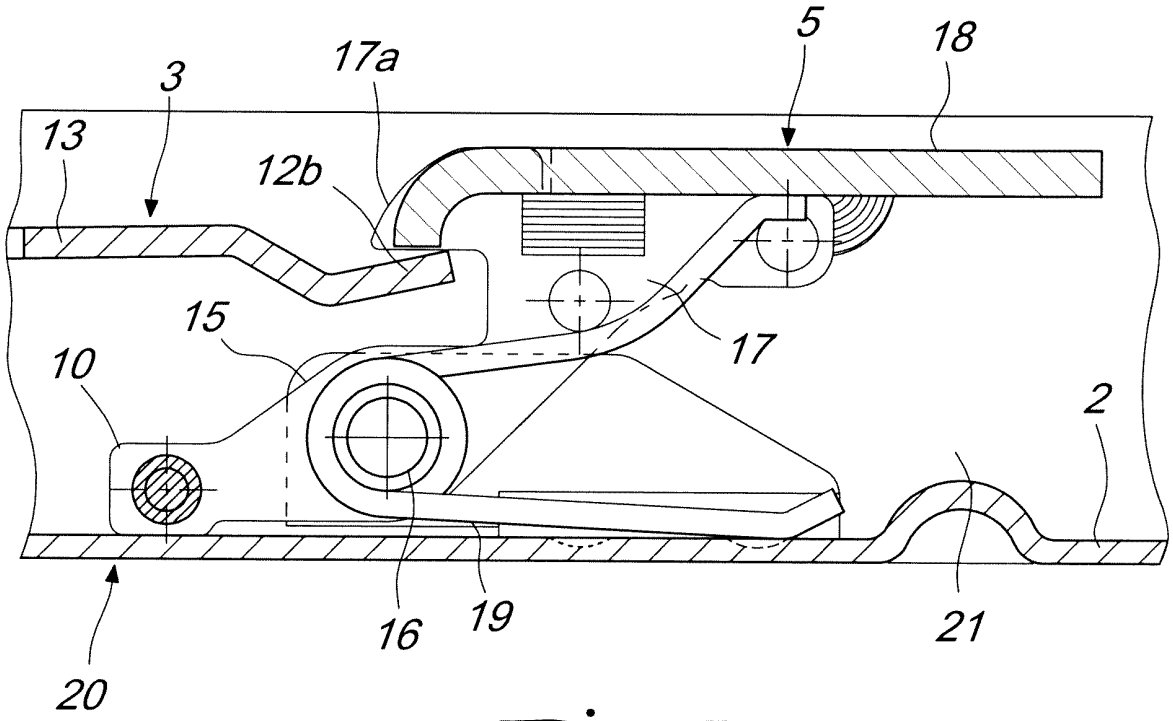
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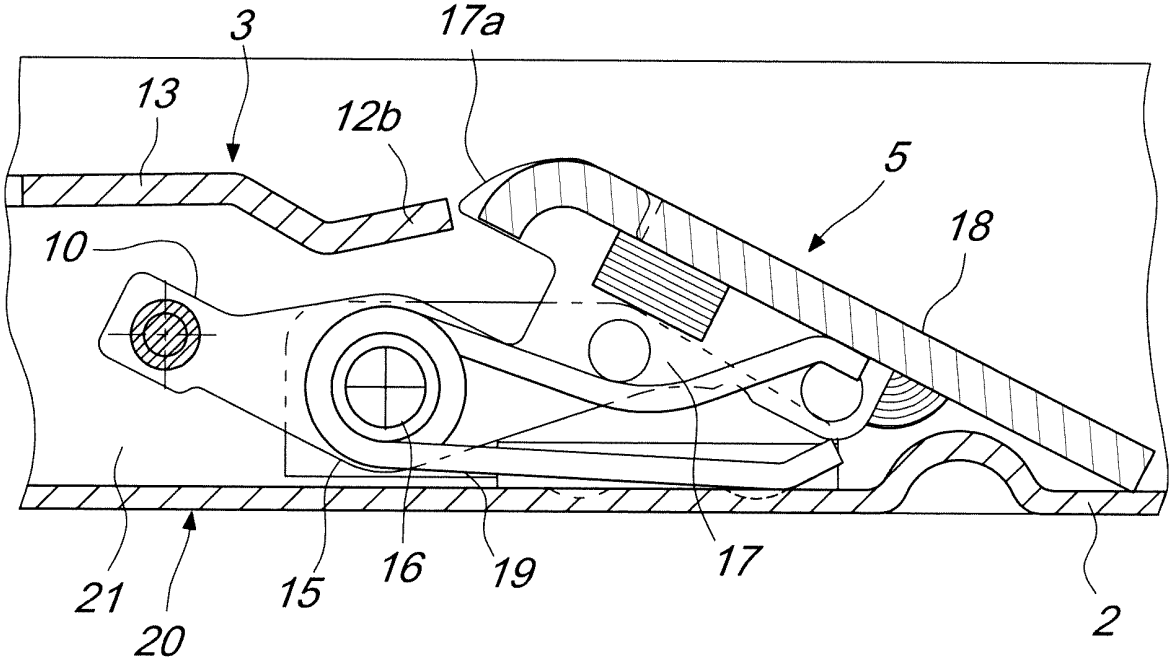
Fig. 5


3
17a
13
12b
5
18
10
21
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16
19
17
2

Fig. 6

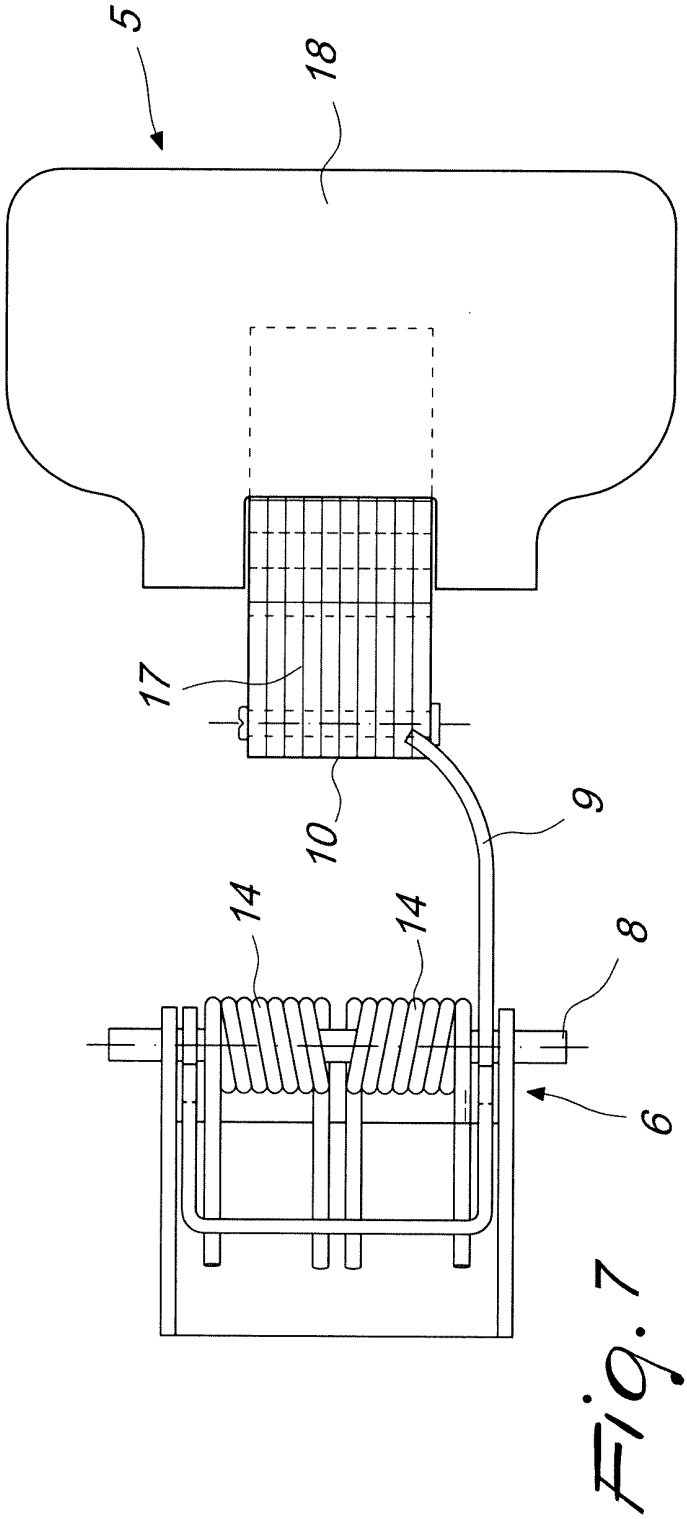
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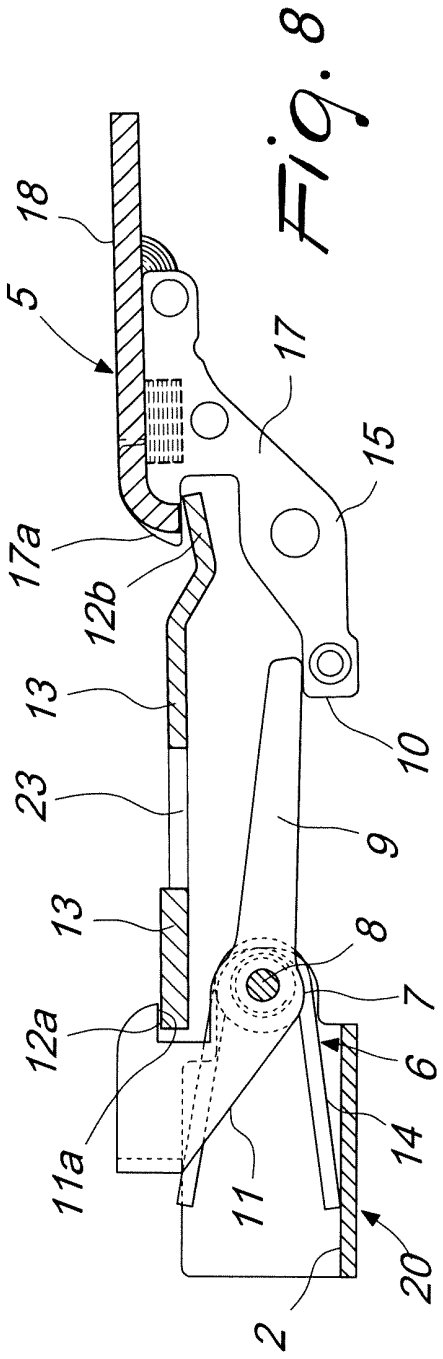
Fig. 7


18
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17a
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12a
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Fig. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 13 42 5033

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	EP 0 893 558 A2 (PASTORE & LOMBARDI SRL [IT]) 27 January 1999 (1999-01-27)	1-4,7	INV. E05B13/00
Y	* column 2, line 17 - column 3; figures	10-12	E05B13/10
A	1-7 *	5,6,8,9	E05C9/08 E05B65/12
X	EP 1 548 215 A2 (PASTORE & LOMBARDI SRL [IT]) 29 June 2005 (2005-06-29) * paragraph [0013] - paragraph [0023]; figures 1,2 *	1-9	
X	EP 1 460 210 A1 (PASTORE & LOMBARDI SRL [IT]) 22 September 2004 (2004-09-22)	1,2	
A	* paragraph [0011] - paragraph [0021]; figures 1-3 *	3-9	
X	EP 1 840 304 A2 (HESTERBERG & SOEHNE GMBH & CO [DE]) 3 October 2007 (2007-10-03)	1	
A	* paragraph [0032]; figure 9 *	2-5,7,8	
X	JP H09 32385 A (TAKIGEN MFG CO) 4 February 1997 (1997-02-04) * abstract; figures 1-9 *	1	
Y	EP 1 764 463 A2 (PASTORE & LOMBARDI SRL [IT]) 21 March 2007 (2007-03-21)	10-12	
A	* paragraph [0012] - paragraph [0033]; figures 1-9 *	1,7-9	

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	15 October 2013	Pérez Méndez, José F

CATEGORY OF CITED DOCUMENTS

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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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15-10-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0893558 A2	27-01-1999	AT 233358 T	15-03-2003
		DE 69811572 D1	03-04-2003
		DE 69811572 T2	04-09-2003
		DK 0893558 T3	02-06-2003
		EP 0893558 A2	27-01-1999
		ES 2190557 T3	01-08-2003
		IT BO970110 U1	22-01-1999
		PT 893558 E	30-06-2003
EP 1548215 A2	29-06-2005	AT 428038 T	15-04-2009
		DK 1548215 T3	08-06-2009
		EP 1548215 A2	29-06-2005
		ES 2323639 T3	23-07-2009
		IT BO20030122 U1	29-05-2005
EP 1460210 A1	22-09-2004	EP 1460210 A1	22-09-2004
		IT BO20030028 U1	18-09-2004
EP 1840304 A2	03-10-2007	DE 102006014811 A1	04-10-2007
		EP 1840304 A2	03-10-2007
JP H0932385 A	04-02-1997	JP 2704861 B2	26-01-1998
		JP H0932385 A	04-02-1997
EP 1764463 A2	21-03-2007	NONE	

EPO FORM P0459

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