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(54) ASSEMBLY FOR LOCKING THE DOOR OF VEHICLES

(57) An assembly for locking the door (A) of vehicles (B), of the type of vans, trucks, lorries, semi-trailer trucks, trailers and the like, which comprises an abutment unit (2), which in turn comprises a plate (3) that can be rigidly applied to the chassis (C) of a vehicle (B) proximate to a door (A) that is normally arranged in the position for closing an access to an internal compartment of a vehicle (B), and an engagement element (4). The element (4) comprises a stem (5) that can be rigidly anchored to one end of a rod (100) which is rotatably supported by the door (A), and a pawl element (6), which is supported rigidly by the stem (5) and can be inserted between the plate (3) and a retaining pin (7), which is supported in a cantilever manner by walls (8) that protrude from respective flanks of the plate (3) itself, in order to define a configuration for locking the door (A) in the closed position.

At least one wall (8) has, along its free edge directed away from the plate (3), a curved slotway (9) which has a profile that corresponds to the cross-section of an end segment of the stem (5) and is configured to stably accommodate the latter, at least when the pawl element (6) is arranged in the configuration for locking the door (A).

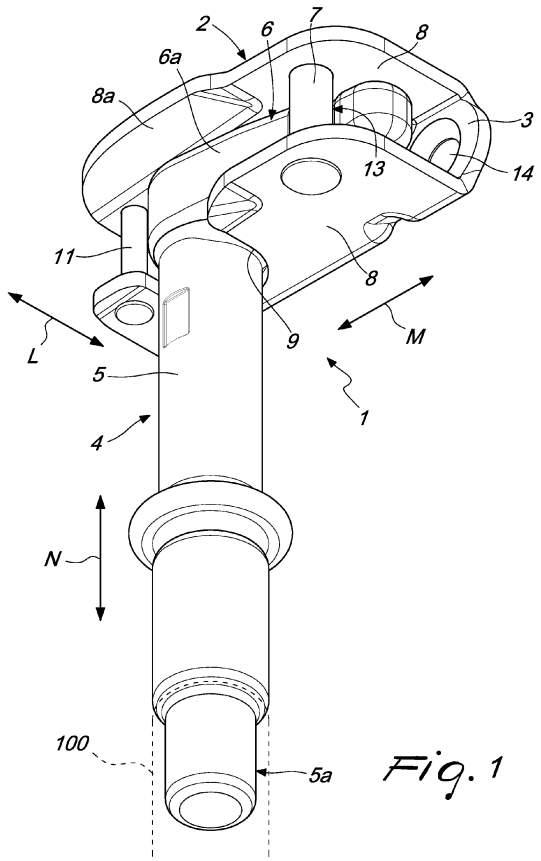

Fig. 1

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Description

[0001] The present invention relates to an assembly for locking the door of vehicles.

[0002] As is known, in vehicles of the type of vans, lorries, trucks, etc., the internal compartment for transporting goods is closed by one or two doors, which are usually arranged on the back of the vehicle.

[0003] According to techniques that are now consolidated, a rod is coupled so that it can rotate along the external facade of each door and extends vertically for the full extent of the door until its respective ends overlap the chassis of the vehicle, at mutually opposing edges of the access opening to the compartment, which is of course closed by the door.

[0004] One or both ends of the rods are provided with coupling elements which, when the door is arranged so as to close the compartment, can be engaged with respective retention elements which are integral with the chassis, thus ensuring the desired locking of the door.

[0005] The disengagement of the coupling elements is achieved by making the rod rotate about its own longitudinal axis, using a lever which is integral with the lower end (if "undersill devices" are present) or a handle keyed on an intermediate portion of the rod, therefore arranged along the door.

[0006] In this context, locking assemblies are therefore well known which comprise a pawl engagement element, fitted to one end of the rotating rod, and an abutment plate, applied stably on the edge of the opening, to which the respective element for retaining the pawl element is coupled. The element is typically constituted by a pin arranged in a cantilever fashion above the plate, underneath which the tip of the pawl element can be slid in order to obtain the mutual engagement thereof and the locking of the door.

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

[0008] In the locked configuration of the door, the tip of the pawl element is effectively arranged and contained between the plate, the pin and the two small side walls that extend from the flanks of the plate in order to rotatably support the pin.

[0009] During the movement of the vehicle, the vibrations and stresses that are transmitted along the chassis can cause small movements of the door, which translate to small oscillations of the rod and of the pawl element in particular.

[0010] Although contained between the plate, the side walls and the pin, the pawl element can therefore move and slam against such components: this evidently constitutes a drawback, in that over time the impacts can compromise the correct functionality of the assembly (and its appearance) or because, more simply, they can be a source of unwanted noise.

[0011] Moreover, if small errors are made in the assembly step or if there are excessive dimensional differences with respect to the design specifications, then impacts and chafing can occur between the pawl element and the walls during the rotation of the rod to lock and unlock the door, again producing unwelcome consequences.

[0012] The aim of the present invention is to solve the above mentioned problems, by providing an assembly that ensures an optimal locking of the door of vehicles, while at the same time ensuring a stable positioning of its components at least in the locked configuration.

[0013] Within this aim, an object of the invention is to provide a system that ensures an optimal locking of the door of vehicles, while at the same time ensuring a stable positioning of its components at least in the locked configuration.

[0014] Another object of the invention is to provide an assembly and a system that ensure the locking of the door of a vehicle with a solution that is structurally strong and highly reliable in operation, over time as well.

[0015] Another object of the invention is to provide an assembly and a system that guards against the danger of impacts or chafing between the components, under the various conditions of use.

[0016] Another object of the invention is to provide an assembly and a system that adopt an alternative technical and structural architecture to those of conventional assemblies.

[0017] Another object of the invention is to provide an assembly and a system that can be easily obtained starting with elements and materials that are readily available on the market.

[0018] Another object of the invention is to provide an assembly and a system that are of low cost and safely applied.

[0019] This aim and these and other objects which will become better apparent hereinafter are achieved by an assembly according to claim 1, by an abutment unit according to claim 14 and by a system according to claim 15.

[0020] Further characteristics and advantages of the invention will become better 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 perspective view of the assembly for locking according to the invention;

Figure 2 is a view from the front of the assembly for locking in Figure 1;

Figure 3 is a view from behind of the assembly for locking in Figure 1;

Figure 4 is a perspective view of the abutment unit of the assembly of Figure 1;

Figure 5 is a view from the front of the unit of Figure 4;

Figure 6 is a cross-sectional view of Figure 5, taken along the line VI-VI;

Figure 7 is a side view of the unit of Figure 4;

Figure 8 is a perspective view of the engagement element of the assembly of Figure 1;

Figure 9 is a view from the front of the engagement element of Figure 8;

Figures 10 and 11 show two possible applications of the assembly and of the system according to the invention, for locking the door of vehicles, seen from the back of a vehicle.

[0021] With particular reference to the figures, the reference numeral 1 generally designates an assembly for locking the door A of vehicles B. Such vehicles B are typically for professional use, and therefore of the type of vans, trucks, lorries, semi-trailer trucks, trailers and the like. As is known, vehicles B of this type are provided with a compartment designed for transporting goods, which is closed by one or two doors A, typically arranged on the back of the vehicle B (as in Figures 10 and 11), although sometimes it is possible to find them on a side.

[0022] The preferred application of the assembly 1 is precisely in the context described above, but the use thereof is not ruled out for other vehicles B and/or in other points of the vehicle B, while remaining within the scope of protection claimed herein.

[0023] The assembly 1 comprises first of all an abutment unit 2, which in turn comprises a plate 3 that can be rigidly applied to the chassis C of the vehicle B proximate to the door A, which as already anticipated is normally arranged in the position for closing an access to the internal compartment of the vehicle B itself.

[0024] The "normal" condition mentioned above refers to the condition during transport or, for example, when the vehicle B is unsupervised; in any case, in such condition (also shown in the accompanying Figures 10 and 11) the door A prevents access to the compartment. The operator who wants to enter the compartment in fact needs to first rotate the door A, according to methods that are well known.

[0025] Furthermore, the assembly 1 comprises an engagement element 4 which in turn comprises a stem 5 and a pawl element 6, which is rigidly supported by the stem 5.

[0026] The stem 5 can be rigidly (and coaxially) anchored to an end of a rod 100 which is rotatably supported by the door A. According to methods that are known per se, each rod 100 (there can be any number of them on the same door A) is arranged with a vertical orientation (perpendicular to the bearing plane) typically outside the door A, extending for all of its height. The stem 5 is arranged as mentioned at the end of the rod 100 so that the pawl element 6 protrudes beyond the door A, so that when the latter is in the closed position the pawl element 6 is facing the chassis C right at the ledge that ideally delimits the access to the compartment. The plate 3 is arranged along precisely this ledge (above or below the access).

[0027] It should likewise be noted that the element 4 is typically provided in a single body (for example by forging, although other practical choices are not ruled out) and is subsequently fixed with its stem 5 to the rod 100, supplied separately. The possibility is not ruled out however of also producing the stem 5 and the pawl element 6 separately, just as it is possible for the rod 100 and the element 4 to be provided in a single piece (the stem 5 coinciding with the end of the rod 100). Likewise, it is possible for the unit 2 to be provided in a single body with the chassis C.

[0028] The pawl element 6 can be inserted (with a part thereof) between the plate 3 and a retaining pin 7, which is supported in a cantilever manner by walls 8 that protrude from respective flanks of the plate 3, in order to define a configuration for locking the door A in the closed position.

[0029] In other words, when the door A is gradually rotated until the access to the compartment is closed, the pawl element 6 can be slid between the plate 3 and the retaining pin 7 (taking care to simultaneously rotate the rod 100 and therefore the pawl element 6 with respect to the door A). In this manner the condition shown for example in Figures 1 and 2 is obtained.

[0030] Once the locked configuration is obtained, the door A is prevented from rotating any further; in order to access the compartment the operator will have to act on the rod 100 in order to rotate the pawl element 6 again while he or she begins to rotate the door A itself.

[0031] It should be noted that the rotation of the rod 100 (with respect to the door A) can be actuated by acting on a handle D which is keyed along the rod 100 (Figure 10) and in such case each end of the rod 100 can be associated with a respective element 4, which is adapted to interact with a corresponding abutment unit 2 (the rod 100 is associated with two assemblies 1).

[0032] In a different embodiment (which in any case does not exhaust the practical choices that remain within the scope of protection claimed herein), the rotation of the rod 100 is obtained using a lever E keyed on the lower end of the rod 100 (Figure 11) and in such case a single element 4 is used, arranged at the upper end. The lever E forms part of the device known in the sector as an "undersill device" (and in such case the rod 100 is associated with a single assembly 1).

[0033] In any case, up to this point the assembly 1 operates according to methods that are known per se, interacting with doors A and rods 100 that are configured in a usual manner well known in the sector.

[0034] According to the invention, at least one wall 8 has, along its free edge directed away from the plate 3, a curved slotway 9 which has a profile that corresponds to the cross-section of an end segment of the stem 5 and is configured to stably accommodate the stem 5 (the end segment), at least when the pawl element 6 is arranged in the configuration for locking the door A.

[0035] In other words, the dimensions of the slotway 9 and its placement along the edge of the wall 8 are chosen so that when the element 4 approaches the unit 2 (as a consequence of the gradual rotation of the door A toward the closed position), the end segment of the stem 5 is received and contained by the slotway 9, obviously con-

tinuing to maintain this condition following the insertion of the pawl element 6.

[0036] Therefore, in the configuration for locking the door A the stem 5 rests stably on the slotway 9 and thus any relative movement of the stem 5 (and of the pawl element 6) with respect to the plate 3 and the unit 2 is prevented: the set aim is thus achieved from this point onward. In more detail in fact, the slotway 9 is found to be particularly effective in opposing stresses and therefore oscillations or translations oriented along a first reference axis L, which corresponds to the direction of travel of the vehicle B and is therefore perpendicular to the door A, as with those oriented with a second reference axis M, parallel to the door A and perpendicular with respect to the stem 5 and to the rod 100 (and to the first axis L). The first axis L and the second axis M are shown for the sake of simplicity in Figure 1 only.

[0037] It must however be observed that the walls 8 contribute to the stability of the assembly 1, in that they contrast movements, and oppose stresses, that are directed along the third reference axis N, which is perpendicular to the first axis L and to the second axis M and therefore oriented like the rod 100.

[0038] The third axis N (vertical axis) is also shown for the sake of simplicity in Figure 1 only.

[0039] In other words, the walls 8 perform a useful "anti-rack" function. This term, commonly used in the sector, is used to indicate the capacity to withstand vertical stresses (i.e. directed along the third axis N).

[0040] In this regard, usefully the dimensions of the walls (length, measured along the second axis M, and height, measured along the first axis L) are chosen so as to fully contain the encumbrance of the pawl element 6 (with the sole point of discontinuity being represented by the slotway 9). This makes it possible to develop an excellent action to oppose stresses, in particular the stresses along the third axis N.

[0041] It should be noted that preferably the slotway 9 is provided along the wall 8 that is directed toward the rod 100 and the door A, but it could be provided along the other wall or on both walls.

[0042] In particular, in the preferred embodiment, illustrated in the accompanying figures for the purposes of non-limiting example of application of the invention, at least the end segment of the stem 5 (and preferably the entire stem 5, and incidentally the rod 100) has a circular transverse cross-section; likewise at least one portion of the profile of the slotway 9 is circular, with dimensions corresponding to those of the transverse cross-section of the end segment, so as to ensure the stable accommodation in an optimal manner.

[0043] In more detail, typically the stem 5 has a cylindrical or in any case an axially symmetric shape. An end portion 5a of the stem 5, at the opposite end from the pawl element 6, can have a reduced cross-section and be configured for insertion into the end of the rod 100 (in order to thus obtain the desired stable coupling between the latter and the element 4).

[0044] In order to increase the stability of the pawl element 6 in the locked configuration, the plate 3 has at least one hump 10, which is interposed between the walls 8 and which is configured to stably support the pawl element 6, at least when the latter is arranged in the configuration for locking the door A.

[0045] In more detail, the hump 10 contributes to stability with respect to stresses and possible movements oriented along the first reference axis L (like the direction of travel of the vehicle B).

[0046] In the preferred embodiment, which in any case does not limit the invention, the hump 10 is constituted by a deformed portion of the plate 3. That is to say, the plate 3 is curved locally, for example using cold deformation, i.e. so that it has a protrusion right in the area that is intended to be facing the pawl element 6 (a part thereof), in order to constitute a support for the latter.

[0047] Usefully, the abutment unit 2 comprises a reinforcement pin 11, which is also supported in a cantilever fashion by the protruding walls 8. The reinforcement pin 11 confers additional stability on the structure of the unit 2, in that it couples the walls 8 to each other and retains them, keeping them mutually parallel and opposing stresses (in particular, stresses directed along the third axis N) which could originate especially during the motion of the vehicle B, for example folding or in any case deforming the walls 8.

[0048] In particular, the retaining pin 7 and the reinforcement pin 11 are arranged mutually parallel (optionally at a different height with respect to the plate 3) proximate to respective mutually opposite sides of the plate 3. In this manner, in the locked configuration the pins 7, 11 are on opposite sides with respect to the pawl element 6 (as can be clearly seen in for example in Figures 1 and 2).

[0049] It should be noted that the retaining pin 7 also confers structural stability, in that it in turn opposes movements and stresses of the pawl element along the first axis L and, in a similar manner to the reinforcement pin 11, it confers a greater capacity for strength to the walls 8, with respect to stresses directed along the third axis N, which otherwise could deform or fold those walls 8. In other words, the pins 7, 11 therefore also perform a useful "anti-rack" function.

[0050] Usefully, the plate 3 and the walls 8 are made of sheet metal; preferably, such components are obtained by cold-deforming, thus obtaining a benefit in terms of reduction of weight, of costs and also in terms of simplicity of the production process, which in conventional solutions entails production by forging (which can still be adopted for the unit 2 of the assembly 1 according to the invention).

[0051] Advantageously, the abutment unit 2 comprises a reinforcement element 12, which is arranged along a corner edge defined between the plate 3 and one of the walls 8, in order to (further) increase the structural stability of the unit 2 (and the capacity to withstand stresses without deformations or, worse, ruptures). It should be noted

that evidently the corner edges between the plate 3 and the walls 8 constitute undoubted critical points for the structure of the unit 2, in that it is evidently more probable that ruptures will occur in them as a consequence of unwanted stresses: the choice to have reinforcement elements 12 right along the corner edges therefore guards against such danger. Precisely because it reinforces the structure and in particular the walls 8, the reinforcement element 12 in turn confers stability with respect to stresses directed along the third axis N.

[0052] In particular, and while not ruling out further practical choices, which in any case remain within the scope of protection claimed herein, the reinforcement element 12 is chosen between a work-hardened and deformed portion of the corner edge itself (as in the accompanying figures) and a triangular ridge (for example obtained by welding), provided in fact along the corner edge.

[0053] Preferably, at least one reinforcement element 12 is arranged along each corner edge and, in such context, the accompanying figures in fact show an embodiment (preferred and not exclusive) that has one reinforcement element 12 along the corner edge between the plate 3 and the wall 8 in which the slotway 9 is located, and two along the other corner edge (Figures 3, 4 and 5 for example).

[0054] Conveniently, at least one fraction of an inner face 8a of one of the walls 8 is inclined, with a progression that converges progressively toward the other wall 8 as it approaches the plate 3 (i.e., so that the interspace defined between the walls 8 reduces in breadth as it descends in height toward the plate 3).

[0055] In particular, preferably respective areas of the internal faces 8a of each wall 8, which face each other, have this converging progression, and are therefore inclined in a "V", so as to define a guiding portion for the pawl element 6.

[0056] By inclining one or both the internal faces 8a, during the final stage of the rotation to close the door A, the pawl element 6 that approaches the unit 2 is more easily centered between the walls 8, thus doing away with the need to force the seating, which could produce unwanted chafing or impacts (in addition to making the maneuver harder for the operator).

[0057] In the preferred embodiment, which maximizes the practicality of use but does not rule out the possibility of drawing on different choices which in any case remain within the scope of protection claimed herein, the pawl element 6 is substantially shaped like a right prism with bases constituted by triangles with rounded corners (as can be clearly seen for example from Figures 8 and 9). Such tapered shape enables an optimal insertion of the pawl element 6 between the plate 3 and the retaining pin 7 (and the walls 8).

[0058] Specifically, and with further reference to Figure 8 for example, the pawl element 6 has, proximate to the (rounded) corner edge arranged on the opposite side with respect to the stem 5, at least one indentation 13 provided along a side face 6a. Even more specifically, an indentation 13 is provided along each one of the two side faces 6a interposed between the corner edge opposite from the stem 5, as indeed in the solution in the figures.

[0059] The inlets 13 define a point of discontinuity along the pawl element 6 and in particular they determine a narrowing of the transverse cross-section which, by virtue of an adapted dimensioning, can be located along the pawl element 6 right at the retaining pin 7, in order to ensure an optimal coupling between the latter and the pawl element 6 itself.

[0060] In this manner, the retaining pin 7 is effectively seated in the indentation 13 and this contributes to the lateral stability, i.e. with respect to the second reference axis M. Furthermore, obviously the coupling between the retaining pin 7 and the indentation 13 optimizes the perpendicular stability, i.e. with respect to the first axis L.

[0061] Usefully, the plate 3 has three through slots 14 (preferably circular), which are mutually aligned along a direction parallel to the walls 8 (preferably equally spaced apart from them). The slots 14 are configured to receive bolts for fixing to the chassis C. It should be noted that the number of slots 14 can be any, while remaining within the scope of protection claimed herein, but it should in fact be noted that the choice to have exactly three slots 14 is of extreme practical interest, because with exactly three bolts it is possible to obtain optimal resistance to stresses. In this context, one of such slots 14 is arranged substantially under the retaining pin 7, so that right in this region, which is particularly stressed during use, there is a bolt.

[0062] In addition to the assembly 1 described up to this point, another object of the present discussion is the unit 2 on its own, for which independent protection is therefore claimed with the present discussion, in the event it should be produced or marketed separately from the element 4 with which it is designed to cooperate.

[0063] The unit 2, for locking the door of vehicles B of the type already described, thus comprises a plate 3, which can be rigidly applied on the chassis C of the vehicle B proximate to a door A that is normally arranged in the position for closing an access to an internal compartment of the vehicle B, and a retaining pin 7, which is supported in a cantilever manner by walls 8 that protrude from respective flanks of the plate 3. The element 4 with which the unit 2 is configured to cooperate in order to lock the door A in turn comprises a stem 5, which can be rigidly anchored to one end of the rod 100 which is rotatably supported by the door A, and a pawl element 6, which is supported rigidly by the stem 5 and can be inserted between the plate 3 and the retaining pin 7, in order to define a configuration for locking the door A in the closed position.

[0064] According to the invention, at least one wall 8 has, along its free edge directed away from the plate 3, a curved slotway 9 which has a profile that corresponds to the cross-section of an end segment of the stem 5 and is configured to stably accommodate the latter, at least when the pawl element 6 is arranged in the configuration

for locking the door A.

[0065] In addition to the assembly 1 according to the invention (which as mentioned can be marketed and supplied separately from the rod 100 and also from the door A and from the vehicle B) and the plate 2, the present discussion also claims protection for a system 101 for locking the door A of vehicles B, of the type of vans, trucks, lorries, semi-trailer trucks, trailers and the like, which comprises an assembly 1 according to what is described up to this point and the rod 100, which as has been seen can be rotatably supported by the door A.

[0066] It should be noted in this context that the system 101 can comprise a rod 100 made in a single piece with at least one assembly 1 or a rod 100 that bears at least one assembly 1 which is provided separately and subsequently assembled at one of its ends.

[0067] The operation of the assembly according to the invention has effectively already been explained in the foregoing pages.

[0068] It has been seen in fact that the locking of the door A to close the internal compartment of the vehicle B is ensured by the insertion of the pawl element 6 (which is integral with the rod 100 which is rotatably mounted on the door A) between the plate 3 (which is integral with the chassis C of the vehicle B) and the retaining pin 7, which is supported in a cantilever fashion by the walls 8 that extend from (and are integral with) the plate 3. Such locked configuration is obtained by closing the door A and, when the latter is proximate to the complete closure of the compartment, by making the rod 100 rotate (by acting for example on the handle D or on the lever E), in order to enable the pawl element 6 (a part thereof) to slide under the retaining pin 7 while it is arranged between the walls 8, faced toward and proximate to the plate 3.

[0069] To unlock the door A it is subsequently necessary to rotate the rod 100 in order to slide out the pawl element 6 and so allow the rotation of the door A itself.

[0070] In an entirely peculiar manner, when the door A is being closed and so the pawl element 6 gradually approaches the plate 3 in order to then slide with a part thereof under the retaining pin 7, the stem 5 comes to rest against the stroke limit represented by the slotway 9 provided along a wall 8 (preferably but not necessarily the wall directed toward the rod 100) and against the stroke limit represented by the hump 10.

[0071] This compensates any play between the pawl element 6 and the plate 3 which otherwise, in the event of stresses, could cause the pawl element 6 (and/or the stem 5) to move and/or oscillate on a plane perpendicular to the stem 5 and to the rod 100, thus causing unwanted impacts and chafing.

[0072] This enables the invention to achieve the set aim, in that the assembly 1 and/or the system 101 ensure an optimal locking of the door A, while at the same time ensuring a stable positioning of its components (the stem 5 and the pawl element 6) at least in the locked configuration.

[0073] This benefit, already obtainable with the slotway 9, is in fact increased by the action of the hump 10 which, as has seen, opposes any movement or oscillation in the direction of the first axis L.

[0074] The reinforcement pin 11 acts by reinforcing the stability of the unit 2, opposing (as does the retaining pin 7) stresses generated for example during the motion of the vehicle B and which otherwise could deform it, bending the walls 8 for example, thus obtaining an "anti-rack" effect benefit that contributes to obtaining a solution that is structurally strong and highly reliable in operation, over time as well.

[0075] The reinforcement elements 12 also contribute to increasing the structural strength, by acting at normally critical points such as the corner edges between the plate 3 and the walls 8.

[0076] More generally, the walls 8 with the reinforcement elements 12 and the pins 7, 11, effectively define a closed structure, which offers high resistance to stresses along the third axis N.

[0077] The choice to incline one or both the internal faces 8a of the walls 8 increases the practicality of use, because it hinders the danger of impacts or chafing between the components, in the various conditions of use.

[0078] It has furthermore been seen that preferably the unit 2 (the plate 3 and the walls 8 in particular) is made of sheet metal by cold-deforming, thus ensuring practical means of manufacture.

[0079] The pins 7, 11 can be welded to the walls 8 or, in an embodiment of significant practical interest, which contributes to optimizing the production process, they are cold-riveted during the molding of the plate 3 and of the walls 8.

[0080] At the same time, it should be noted that preferably the element 4 is made by forging and the tapered shape already described of the pawl element 6 (reminiscent of a right prism with a triangular base and with rounded corner edges), like that of the stem 5, are also chosen to facilitate the slideability of the material and therefore indeed the manufacture by forging.

[0081] It should be noted finally that the assembly 1 (the unit 2 and the element 4) can be used for any type of vehicle B, be it for professional use or otherwise; purely for the purposes of example it is emphasized however that it can be effectively used on vehicles B termed "isothermal", i.e. adapted to operate at low temperatures.

[0082] 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.

[0083] In the embodiments illustrated, individual characteristics shown in relation to specific examples may in reality be substituted with other, different characteristics, existing in other embodiments.

[0084] In practice, the materials employed, as well as the dimensions, may be any according to requirements and to the state of the art.

[0085] 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. An assembly for locking the door (A) of vehicles (B), of the type of vans, trucks, lorries, semi-trailer trucks, trailers and the like, which comprises an abutment unit (2) comprising a plate (3) that can be rigidly applied to the chassis (C) of a vehicle (B) proximate to a door (A) that is normally arranged in the position for closing an access to an internal compartment of the vehicle (B), and an engagement element (4) comprising a stem (5) which can be rigidly anchored to one end of a rod (100) which is adapted to be rotatably supported by the door (A), and a pawl element (6) which is supported rigidly by said stem (5) and can be inserted between said plate (3) and a retaining pin (7), supported in a cantilever manner by walls (8) that protrude from respective flanks of said plate (3), in order to define a configuration for locking the door (A) in the closed position, **characterized in that** at least one said wall (8) has, along its free edge directed away from said plate (3), a curved slotway (9) which has a profile that corresponds to the cross-section of an end segment of said stem (5) and is configured to stably accommodate said stem (5), at least when said pawl element (6) is arranged in said configuration for locking the door (A).

2. The assembly according to claim 1, **characterized in that** at least said end segment of said stem (5) has a circular transverse cross-section and at least one portion of said profile of said slotway (9) is circular, with dimensions that correspond to those of said transverse cross-section of said end segment.

3. The assembly according to claim 1 or 2, **characterized in that** said plate (3) has at least one hump (10), which is interposed between said walls (8) and is configured to stably support said pawl element (6), at least when said pawl element (6) is arranged in said configuration for locking the door (A).

4. The assembly according to claim 3, **characterized in that** said hump (10) is constituted by a deformed portion of said plate (3).

5. The assembly according to one or more of the preceding claims, **characterized in that** said abutment unit (2) comprises a reinforcement pin (11), which is supported in a cantilever manner by said protruding walls (8).

6. The assembly according to claim 5, **characterized in that** said retaining pin (7) and said reinforcement pin (11) are arranged mutually parallel proximate to respective mutually opposite sides of said plate (3).

7. The assembly according to one or more of the preceding claims, **characterized in that** said plate (3) and said walls (8) are made of sheet metal.

8. The assembly according to one or more of the preceding claims, **characterized in that** said abutment unit (2) comprises a reinforcement element (12), which is arranged along a corner edge defined between said plate (3) and one of said walls (8), in order to increase the structural stability of said unit (2).

9. The assembly according to claim 8, **characterized in that** said reinforcement element (12) is chosen between a deformed and work-hardened portion of said corner edge and a triangular ridge, provided along said corner edge.

10. The assembly according to one or more of the preceding claims, **characterized in that** at least one fraction of an inner face (8a) of one of said walls (8) is inclined, with a progression that converges progressively toward the other said wall (8) as it approaches said plate (3).

11. The assembly according to one or more of the preceding claims, **characterized in that** said pawl element (6) is substantially shaped like a right prism with bases constituted by triangles with rounded corners.

12. The assembly according to claim 11, **characterized in that** said pawl element (6) has, proximate to the corner edge arranged on the opposite side with respect to said stem (5), at least one indentation (13) provided along a side face (6a).

13. The assembly according to one or more of the preceding claims, **characterized in that** said plate (3) has three through slots (14), which are mutually aligned along a direction parallel to said walls (8) and are configured to receive bolts for fixing to the chassis (C).

14. An abutment unit for locking the door of vehicles (B) of the type of vans, trucks, lorries, semi-trailer trucks, trailers and the like, which comprises a plate (3) that can be rigidly applied to the chassis (C) of a vehicle (B) proximate to a door (A) that is normally arranged in the position for closing an access to an internal compartment of the vehicle (B), and a retaining pin

(7), supported in a cantilever manner by walls (8) that protrude from respective flanks of said plate (3), said unit (2) being configured to cooperate, in order to lock the door (A), with an engagement element (4) comprising a stem (5) which can be rigidly anchored to one end of a rod (100) which is rotatably supported by the door (A), and a pawl element (6) which is supported rigidly by the stem (5) and can be inserted between said plate (3) and said retaining pin (7), in order to define a configuration for locking the door (A) in the closed position, **characterized in that** at least one said wall (8) has, along its free edge directed away from said plate (3), a curved slotway (9) which has a profile that corresponds to the cross-section of an end segment of the stem (5) and is configured to stably accommodate the stem (5), at least when the pawl element (6) is arranged in said configuration for locking the door (A).

15. A system for locking the door (A) of vehicles (B), of the type of vans, trucks, lorries, semi-trailer trucks, trailers and the like, which comprises an assembly for locking (1) according to one or more of claims 1 to 13 and a rod (100) which can be rotatably supported by the door (A).

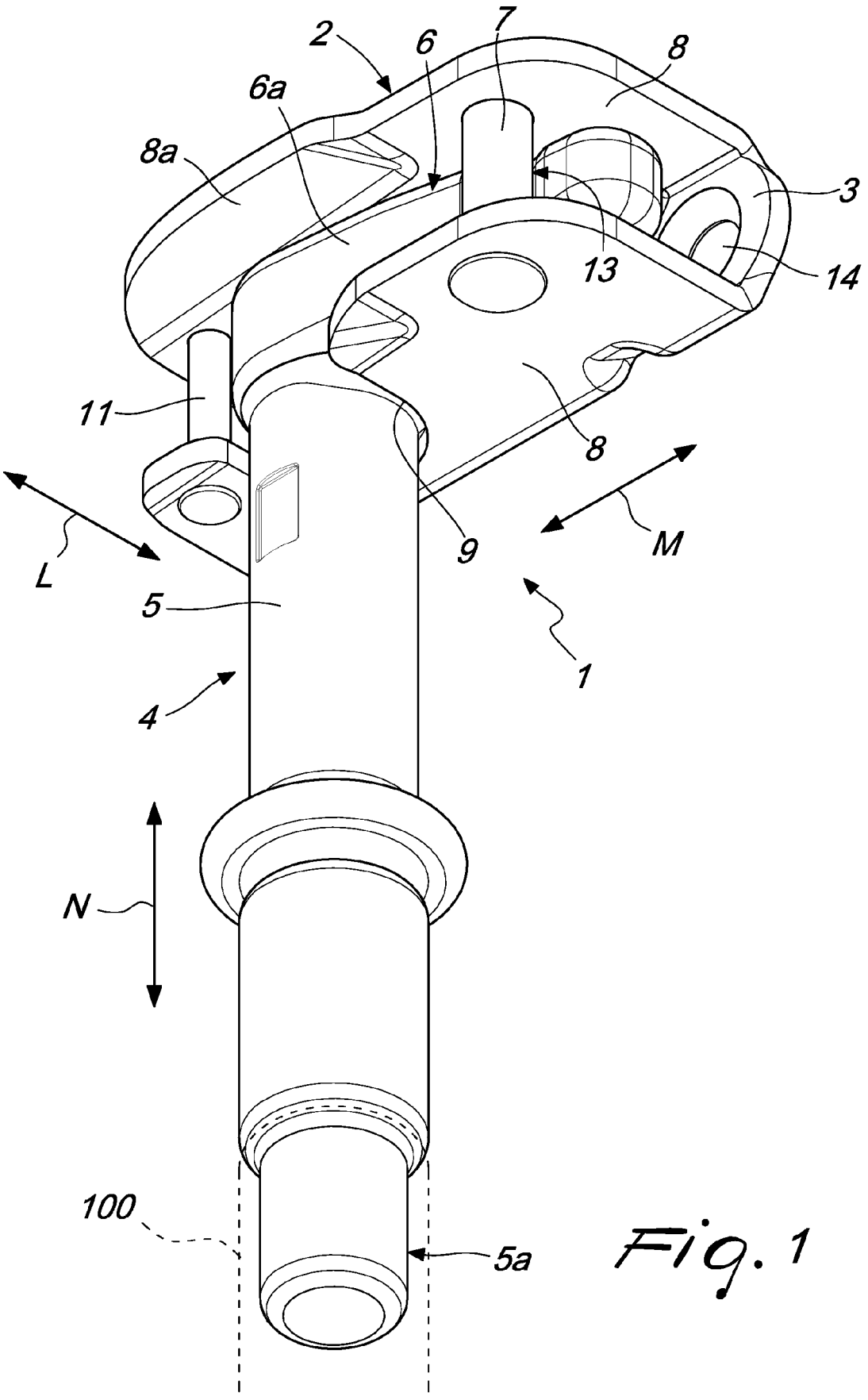

Fig. 1

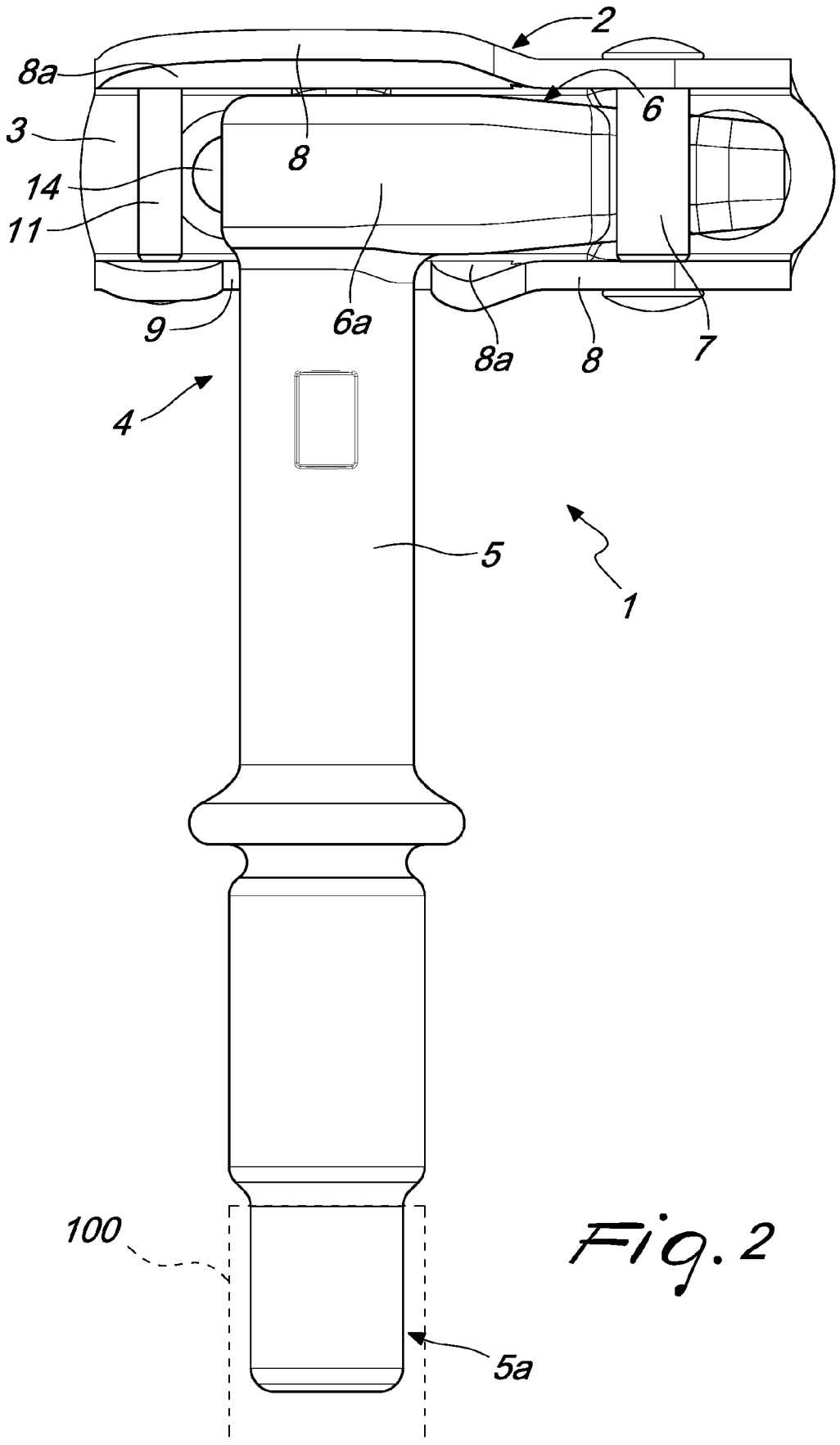

Fig. 2

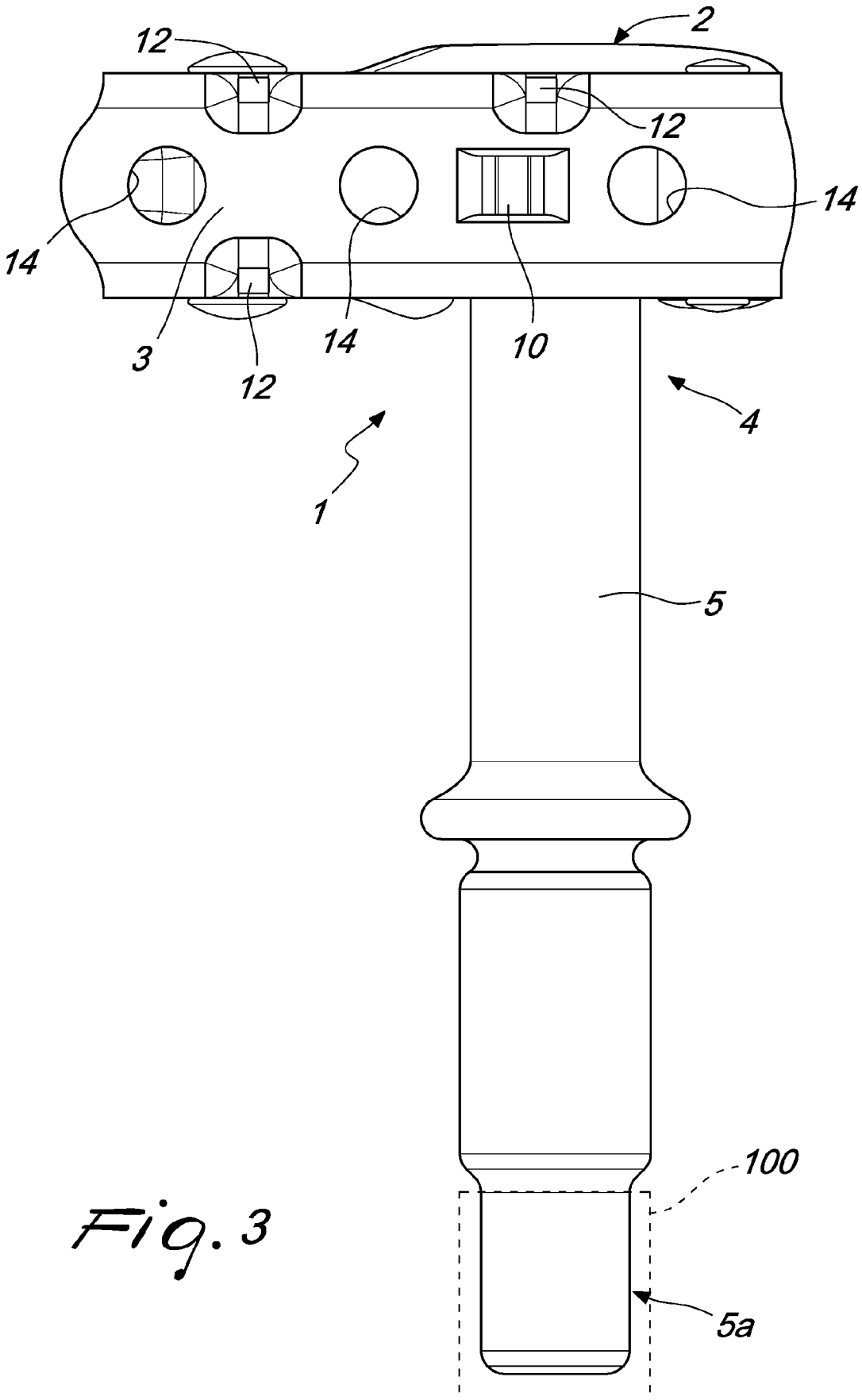

Fig. 3

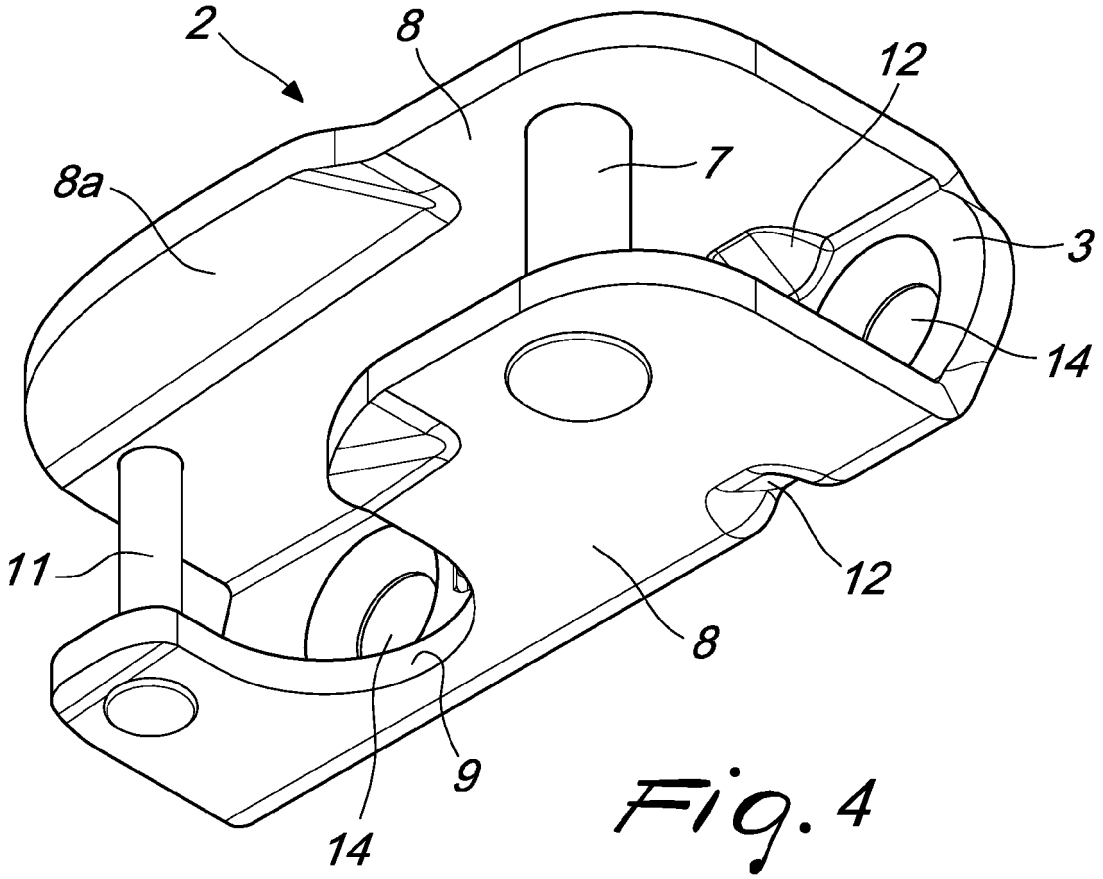

Fig. 4

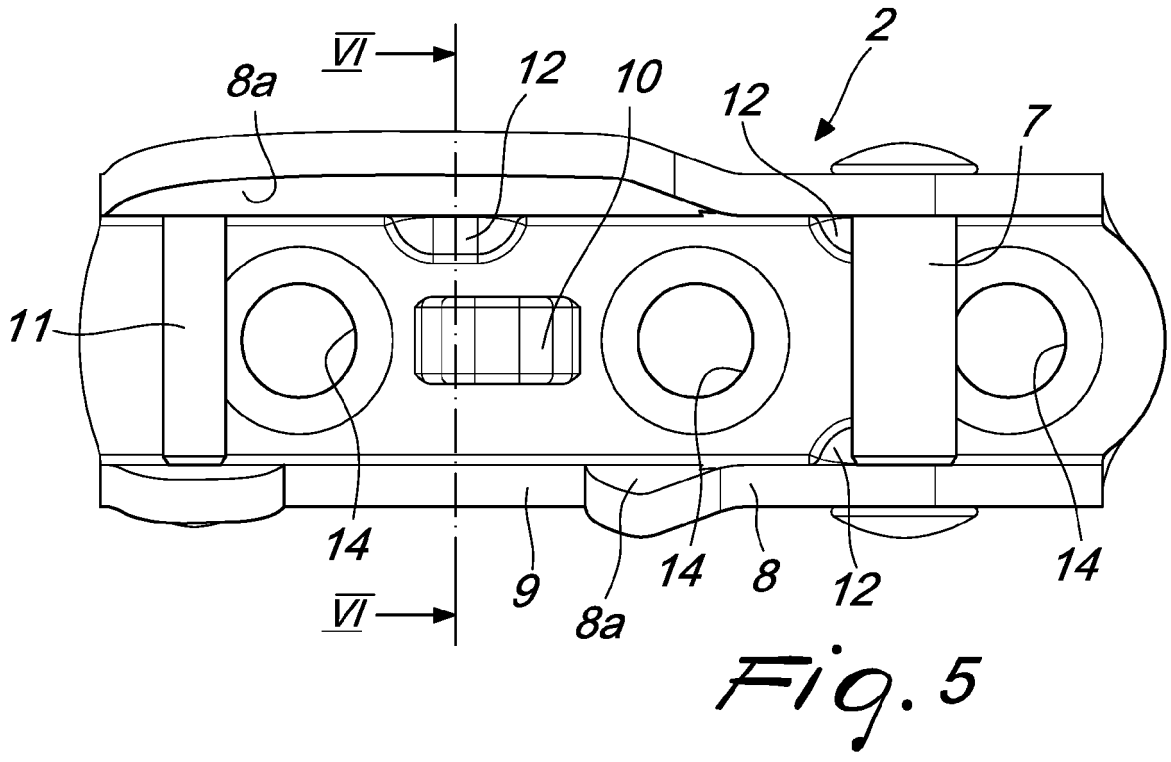

Fig. 5

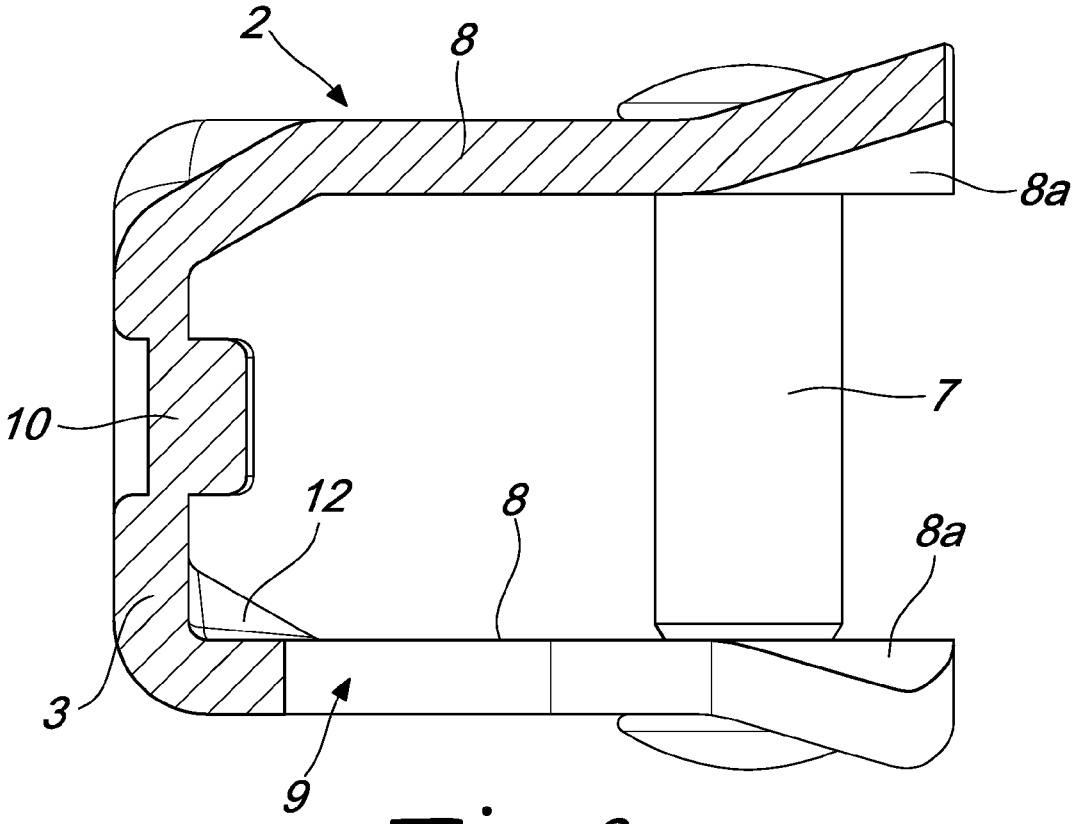

Fig. 6

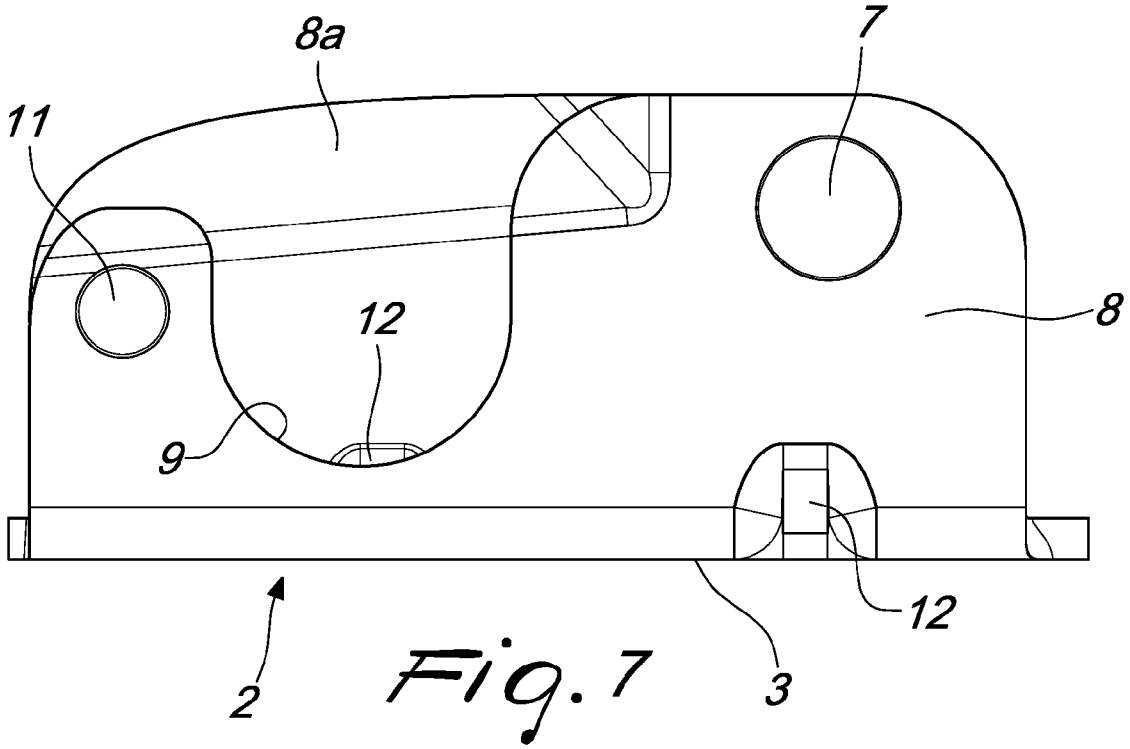

Fig. 7

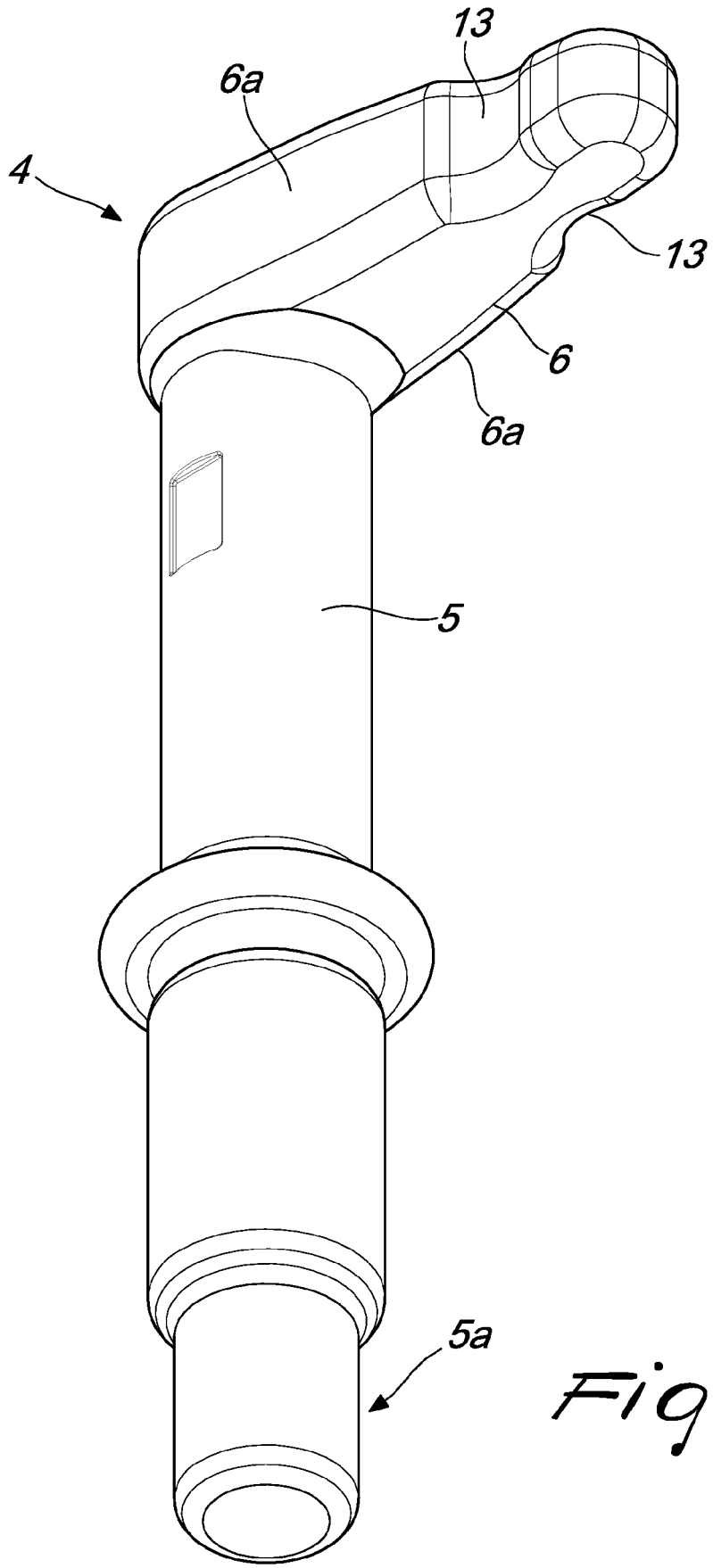

Fig. 8

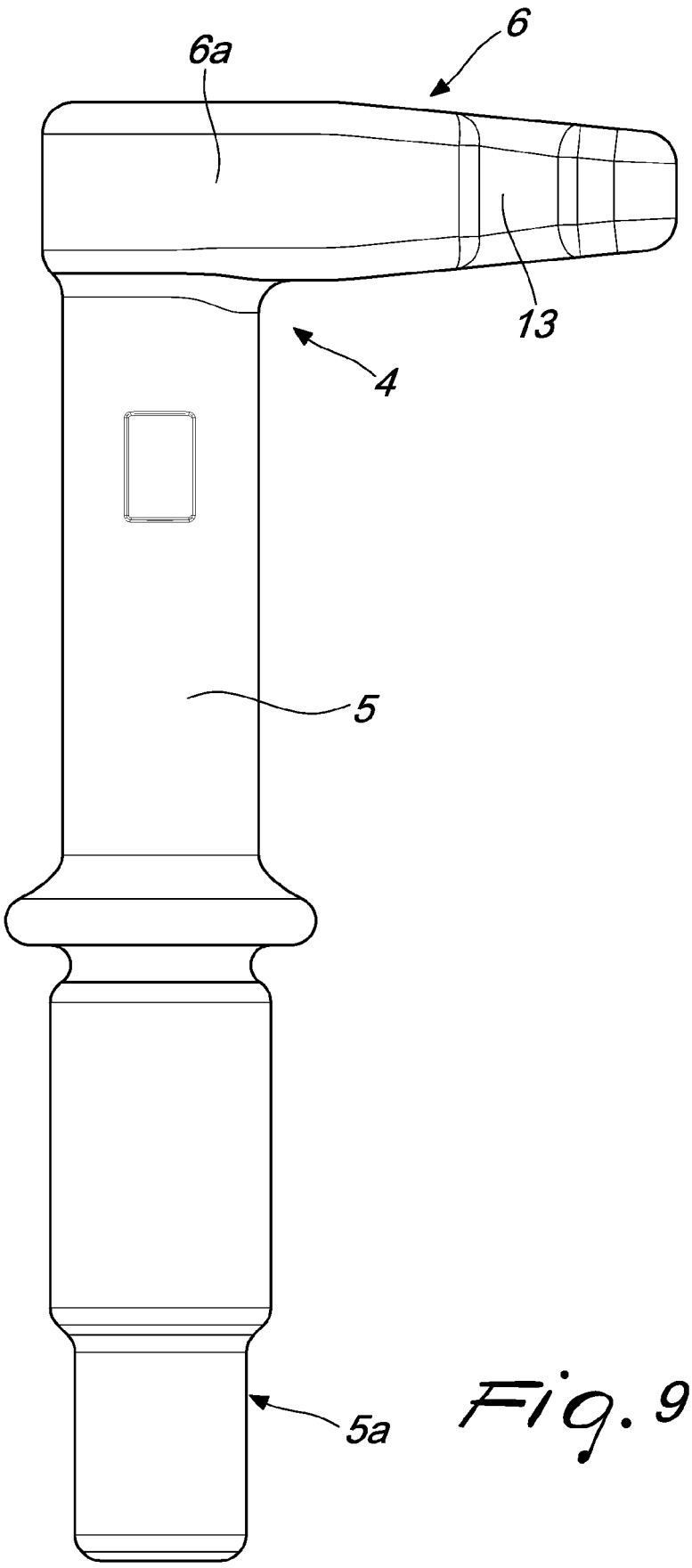

Fig. 9

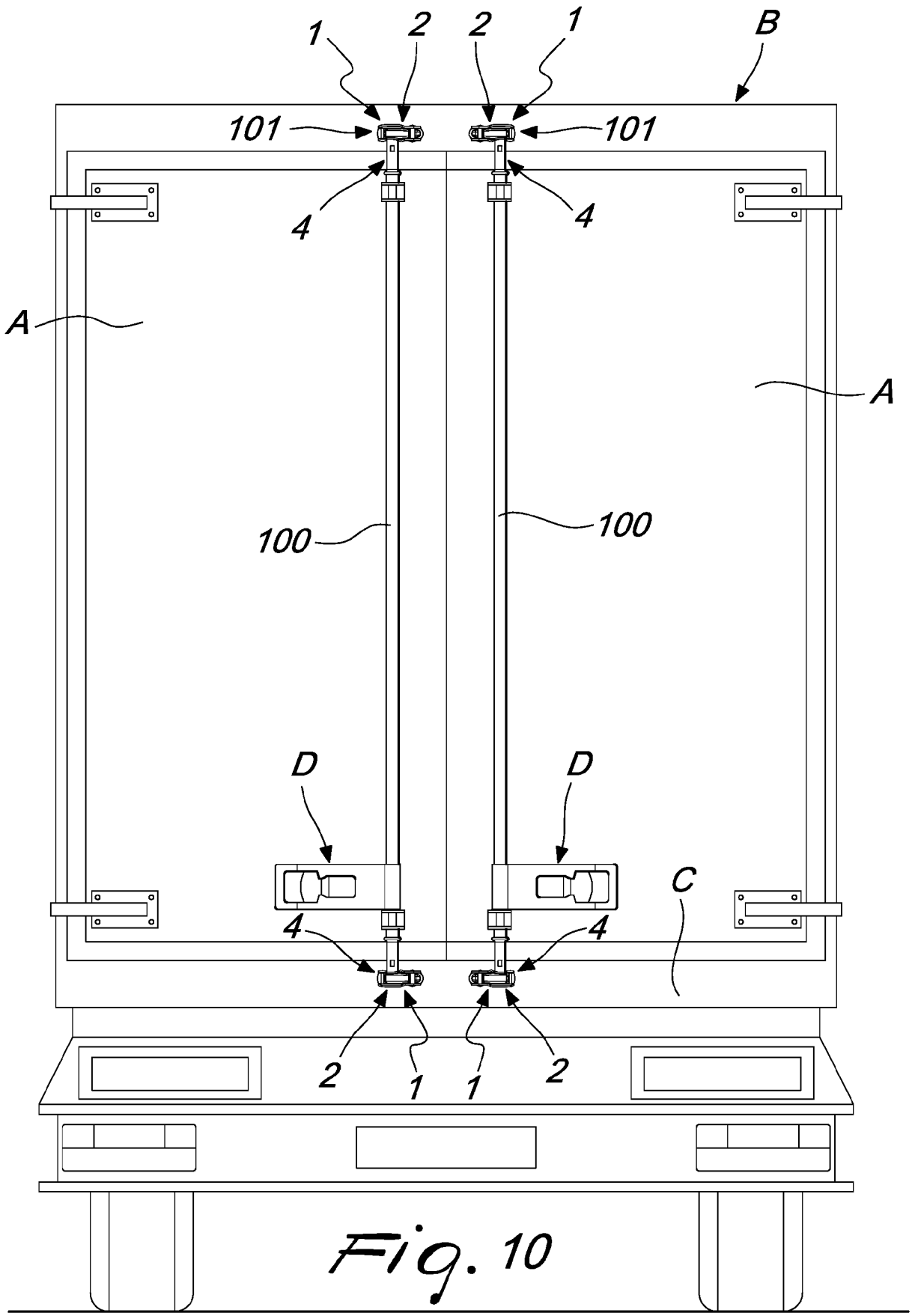

Fig. 10

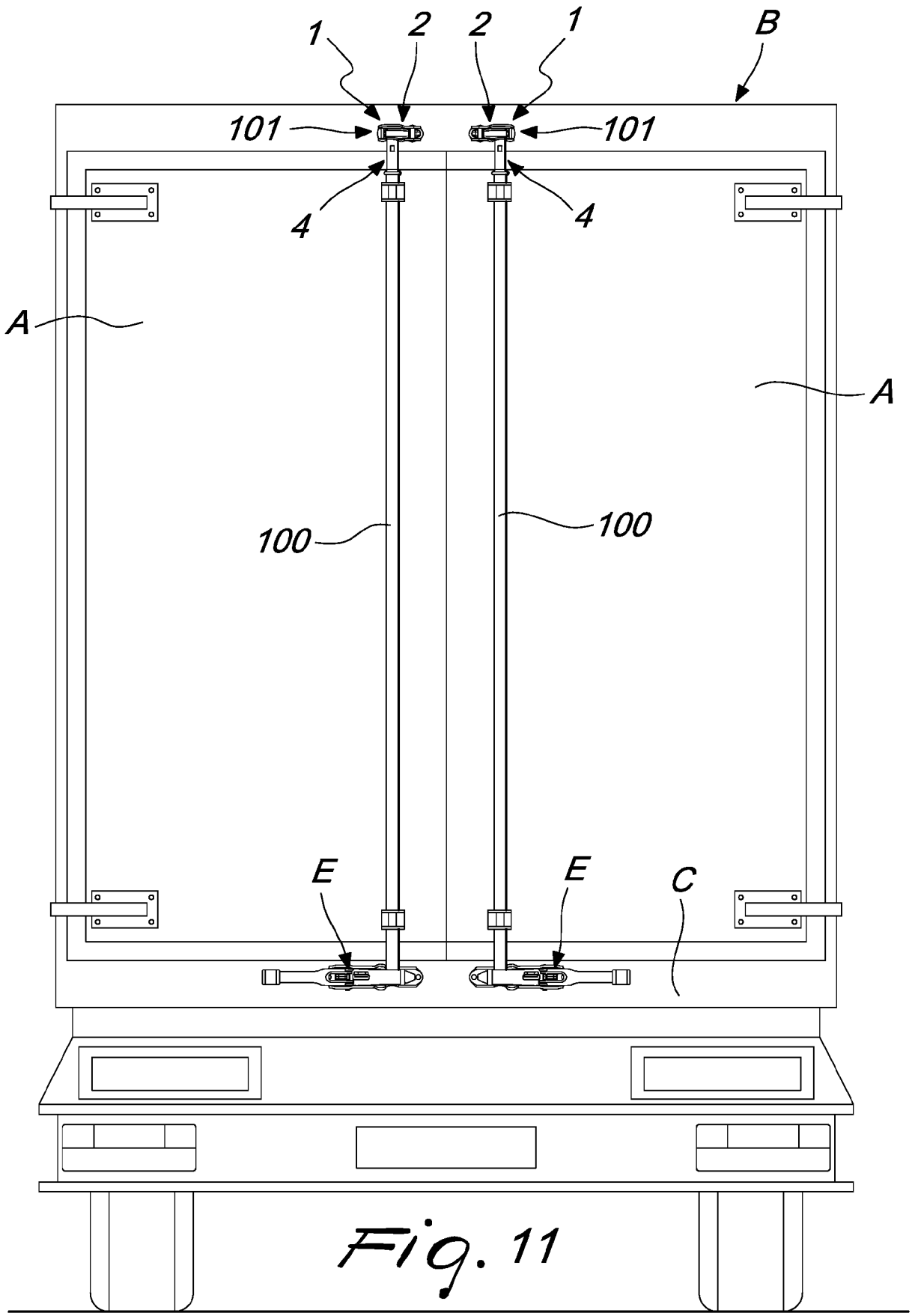

Fig. 11

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EUROPEAN SEARCH REPORT

Application Number
EP 21 16 3207

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 103 61 825 A1 (SCHMITZ CARGOBULL AG [DE]) 4 August 2005 (2005-08-04) * the whole document *	1-15	INV. E05B77/36 E05B83/10 E05B85/04
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	8 September 2021	Robelin, Fabrice

CATEGORY OF CITED DOCUMENTS

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