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(54) Element for locking and unlocking doors of vehicles, and associated assembly and method of installation

(57) An element for locking and unlocking doors of vehicles, of the type of lorries, trucks, semi-trailer trucks, and similar vehicles for professional use, which are provided with an inner compartment that is kept at a preset temperature and is closed by a door (A), which rotatably supports at least one bar (B) for supporting respective means of anchoring to the frame of the vehicle. The door (A) is constituted substantially by a first wall (C), which is directed toward the compartment, and a second wall (D), which is directed toward the outside environment, mutually facing so as to delimit a space (E), which can be filled with a layer of thermally insulating material.

The element is constituted substantially by a body (2) that comprises at least one plate (3) provided with respective raised perimetric side walls (4a, 4b), which can be stably and hermetically applied, before filling the space (E) with the layer, on a first face (F) of the second wall (D) of the door (A), which is directed toward the first wall (C), so as to form a recess (5), which is within the space (E) and is adapted to accommodate a lever (G) for actuating the at least one bar (B), which is in turn accessible by way of a respective opening that can be provided in the second wall (D). The body (2) further comprises two tubes (6) that are perpendicularly and hermetically coupled to two mutually opposite side walls (4a); the at least one bar (B) can be partially and rotatably inserted into the tubes (6), which can both be aligned along the rotation axis of the at least one bar (B), and exits, at the recess (5), with a portion thereof that supports the lever (G).

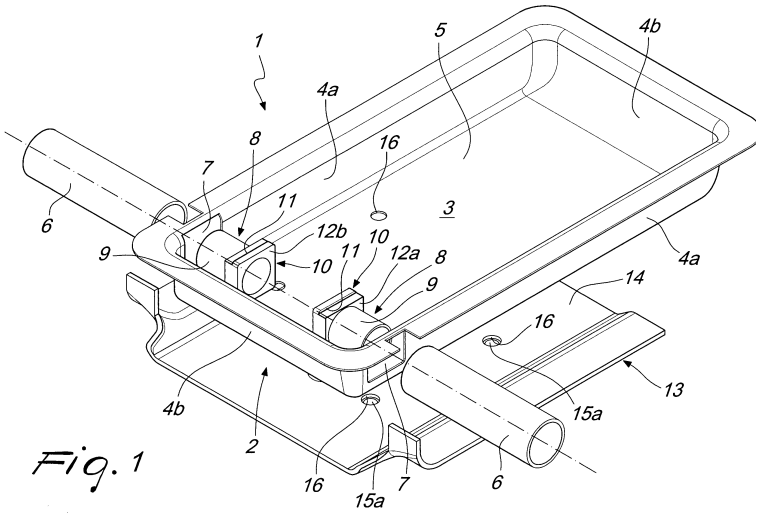


Fig. 1

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Description

[0001] The present invention relates to an element for locking and unlocking doors of vehicles, and the associated assembly and method of installation.

[0002] As is known, of the various types of vans, lorries, trucks, semi-trailer trucks, and similar vehicles for professional use, some have an inner compartment, designed to accommodate the goods transported, which is kept at a preset temperature, for example at a few degrees centigrade, or even appreciably below zero.

[0003] Such implementation solutions are referred to with the term refrigerated vehicles, and are used for transporting foods and beverages, but also medicines and other perishable products.

[0004] In order to achieve the desired isolation from the outside, and thus ensure the conservation of the goods at the desired temperature, specific implementation solutions are adopted for the walls of the vehicle which delimit the compartment, which solutions distinguish them from the walls used in other types of trucks and semi-trailer trucks, and which pose peculiar problems for makers, which are not easy to solve.

[0005] In fact, the rear door for closing the compartment is usually constituted by a double wall, which internally defines a space that is filled, by injection, with a layer of insulating polymeric foam, which is such as to prevent, or appreciably reduce, the conduction of heat between the inside and the outside.

[0006] Furthermore, on the door elements must be installed that are necessary for its locking in the closed configuration and for its subsequent unlocking, in order to allow access to the compartment: in vehicles of the conventional type the use is thus known of a vertical bar that is rotatably mounted on the outside of the door and that rigidly supports, at its upper and lower ends, pawls and/or hooks that are capable of stably engaging (when the door is closed) respective retention means, which are arranged on the frame of the vehicle correspondingly above and below the door, in order to lock it.

[0007] When the operator wants to gain access to the compartment, he or she can grip a handle (a lever) that is integral with the bar, in order to cause its rotation and the simultaneous disengagement of the pawls and/or hooks (and of the bar) from the retention means, in order to allow the free movement of the door and its opening.

[0008] According to conventional methods, in vehicles of the conventional type the bar is sometimes located outside the door, as are the other components described above, which however results in an aesthetic appearance that is often unpleasant, to the point that makers are prompted to offer alternative implementation solutions in which the bar, and the hooks, the pawls and the retention means, are arranged inside the door, on which an opening is provided which is accessible from the outside in order to allow the operator to grip the handle.

[0009] Such implementation solution is not however devoid of drawbacks.

[0010] As previously observed in fact, the doors of refrigerated vehicles have a peculiar inner structure, which makes the adoption of the solution just described, which is necessary in order to ensure a pleasing aesthetic appearance, very difficult and laborious: in order to arrange the bar and the other aforementioned components inside the door, it is necessary to provide the opening on the outer wall only of the door (of the two walls that make it up, as has been seen) and partially break the layer of polymeric foam, in order to obtain the space necessary for their installation.

[0011] Moreover, also by proceeding in this way, during the installation and the subsequent operation of the vehicle, it will be difficult to ensure the hermetic seal of the door, especially at the point of discontinuity between the various components and along the edges of the opening, thus allowing the occurrence of leaks and infiltrations of water, which from the outside can creep into the space filled with the layer of foam, damaging it and resulting, over time, in deterioration and malfunctions.

[0012] The aim of the present invention is to solve the above-mentioned problems, by providing an element for locking and unlocking doors, which can be easily installed on refrigerated vehicles and the like.

[0013] Within this aim, an object of the invention is to provide an assembly for locking and unlocking doors, which can be easily installed on refrigerated vehicles and the like.

[0014] Another object of the invention is to provide a method that makes it possible to install, in a practical and easy manner, assemblies for locking and releasing doors, on refrigerated vehicles and the like.

[0015] A further object of the invention is to provide an element that ensures a high aesthetic value, and an attractive appearance of the door on which it is installed.

[0016] A further object of the invention is to provide an element that ensures a high reliability of operation, while at the same time guarding against the danger of leaks and infiltrations of water.

[0017] Another object of the invention is to provide an element that can be easily implemented using elements and materials that are readily available on the market.

[0018] Another object of the invention is to provide an element that is low-cost and safe in application.

[0019] This aim and these and other objects which will become more apparent hereinafter are all achieved by an element for locking and unlocking doors of vehicles, of the type of lorries, trucks, semi-trailer trucks, and similar vehicles for professional use, which are provided with an inner compartment that is kept at a preset temperature and is closed by a door, which rotatably supports at least one bar for supporting respective means of anchoring to the frame of the vehicle, the door being substantially constituted by a first wall, which is directed toward the compartment, and a second wall, which is directed toward the outside environment, mutually facing so as to delimit a space, which can be filled with a layer of thermally insulating material, **characterized in that** it is substantially

constituted by a body that comprises at least one plate that is provided with respective raised perimetric side walls, which can be stably and hermetically applied, before filling the space with the layer, on a first face of the second wall of the door, which is directed toward the first wall, in order to form a recess, which is within the space and is adapted to accommodate a lever for actuating the at least one bar, which is accessible by way of a respective opening that can be provided in the second wall, said body comprising two tubes that are perpendicularly and hermetically coupled to two of said mutually opposite side walls, the at least one bar being able to be partially and rotatably inserted into said tubes, which can both be aligned along the rotation axis of the at least one bar, and exiting, at said recess, with a portion thereof that supports the lever.

[0020] This aim and these and other objects which will become more apparent hereinafter are all achieved by an assembly for locking and unlocking doors of vehicles, of the type of lorries, trucks, semi-trailer trucks, and similar vehicles for professional use, which are provided with an inner compartment that is kept at a preset temperature and is closed by a door that is substantially constituted by a first wall, which is directed toward the compartment, and a second wall, which is directed toward the outside environment, which are mutually facing so as to delimit a space, which can be filled with a layer of thermally insulating material, **characterized in that** it comprises at least one bar for supporting respective means of anchoring to the frame of the vehicle, which can be rotatably and longitudinally coupled to the door, and a body that is provided with at least one plate provided with respective raised perimetric side walls, which can be stably and hermetically applied, before filling the space with the layer, on a first face of the second wall of the door, which is directed toward the first wall, in order to form a recess, which is within the space and is adapted to accommodate a lever for actuating said at least one bar, which is accessible by way of a respective opening that can be provided in the second wall, said body comprising two tubes that are perpendicularly and hermetically coupled to two of said mutually opposite side walls, said at least one bar being able to be rotatably inserted into said tubes, which are both aligned along the rotation axis of said at least one bar, and partially exiting, at said recess, with an intermediate portion thereof for said lever.

[0021] This aim and these objects are moreover achieved by a method of installation of an assembly for locking and unlocking doors of vehicles, of the type of lorries, trucks, semi-trailer trucks, and similar vehicles for professional use, which are provided with an inner compartment that is kept at a preset temperature and is closed by a door that is substantially constituted by a first wall, which is directed toward the compartment, and a second wall, which is directed toward the outside environment, which are mutually facing so as to delimit a space, comprising the steps that consist in: providing an opening in the second wall of the door; stably and hermetically applying, at the opening, a body, which is comprised in the assembly for locking and unlocking, on a first face of the second wall of the door, which is directed toward the first wall, in order to form a recess, which is within the space and faces the opening, the body being provided with at least one plate that is provided with respective raised perimetric side walls; filling the space with a layer of thermally insulating material; rotatably inserting at least one bar, which is comprised in the assembly, for supporting respective means of anchoring to the frame of the vehicle, inside two tubes, which are comprised in the assembly and are perpendicularly and hermetically coupled to two mutually opposite side walls, the tubes both being aligned along the rotation axis of the at least one bar, which can be rotatably and longitudinally coupled to the door.

[0022] Further characteristics and advantages of the invention will become more apparent from the description of a preferred, but not exclusive, embodiment of the element, the assembly and the method according to the invention, which is illustrated by way of non-limiting example in the accompanying drawings wherein:

Figure 1 is an exploded perspective view of the element for locking and unlocking according to the invention;
Figure 2 is a perspective view of a first detail of the element according to the invention;
Figure 3 is a front elevation view of the first detail of the element according to the invention;
Figure 4 is a perspective view of a second detail of the element according to the invention;
Figure 5 is a front elevation view of the second detail of the element according to the invention;
Figure 6 is a perspective view of the element for locking and unlocking according to the invention, installed on a door;
Figure 7 is a front elevation view of the element in Figure 6;
Figure 8 is a view from below of the element in Figure 6;
Figure 9 is a side view of the element in Figure 6;
Figure 10 is a perspective view of the assembly for locking and unlocking according to the invention, installed on a door and with further elements;
Figure 11 is a front elevation view of the assembly in Figure 10;
Figure 12 is a view from below of the assembly in Figure 10;
Figure 13 is a side view of the assembly in Figure 10;
Figure 14 is a perspective view of some components of the assembly in Figure 10.

[0023] With particular reference to the figures, the reference numeral 1 generally designates an element for locking and unlocking doors of vehicles, of the type of lorries, trucks, semi-trailer trucks, and similar vehicles for professional use, which are in any case provided with an

inner compartment that is kept at a preset temperature and is closed by a door A that rotatably supports at least one bar B adapted to support, according to conventional methods, respective means of anchoring to the frame of the vehicle.

[0024] For example, keyed on the bar B, and more specifically at its upper and lower end portions, there can be pawls and/or hooks that are capable of stably engaging (when the door A is closed) respective retention means (such as abutments, contoured brackets and the like) that are arranged on the frame of the vehicle correspondingly above and below the door A.

[0025] In any case, in the preferred application of the element 1 according to the invention, and precisely in order to ensure the maintenance of the preset temperature, the door A is constituted substantially by a first wall C, which is directed toward the compartment, i.e. toward the inside of the vehicle, and a second wall D, which is instead directed toward the outside environment: the two walls C and D are mutually facing so as to form a space E, which can be filled with a layer of thermally insulating material, a polymeric foam (polyurethane) for example.

[0026] It should therefore be noted from this point onward that the use of the element 1 on doors A of refrigerated vehicles, which have the above-mentioned peculiarities, constitutes a preferred application of the present invention, and constant reference shall be made to it in the present discussion, although the possibility is not ruled out of using the element 1 according to the invention to ensure the locking (and permit the subsequent unlocking) of different doors A, according to specific requirements, while remaining within the scope of protection claimed herein.

[0027] According to the invention, the element for locking and unlocking 1 is constituted substantially by a body 2 that comprises at least one plate 3 provided with respective raised perimetric side walls 4a and 4b, which can be stably and hermetically applied, before filling the space E with the layer, on a first face F of the second wall D of the door A, which is directed toward the first wall C, so as to form a recess 5, which is within the space E and is adapted to accommodate a lever G for actuating the at least one bar B, which is in turn accessible by way of a respective opening that can be provided in the second wall D.

[0028] Moreover, the body 2 comprises two tubes 6 that are perpendicularly coupled, hermetically, to two mutually opposite side walls 4a: the at least one bar B can thus be partially and rotatably inserted into the tubes 6, which for such purpose can be aligned along the rotation axis of the at least one bar B, and exits from such tubes 6 (at the recess 5), with a portion thereof that is designed to support the lever G.

[0029] It should be noted from this point onward that the possibility is not ruled out, while remaining within the scope of protection claimed herein, of inserting a respective bar B into each tube 6. Thus in such embodiment (which can be freely adopted according to specific requirements of construction), the two bars B are mounted mutually aligned along a common rotation axis and are coupled to each other at a respective first end portion, which exits from the tubes 6 and supports the lever G, while at the opposite end each bar B supports a pawl or a hook that can engage the above-mentioned retention means.

[0030] When an operator is outside the refrigerated vehicle, and wishes to gain access to the inner compartment, he or she can thus grip the lever G (which is variously contoured, according to specific requirements), which is substantially recessed in the recess 5 (within the space E) but is also accessible thanks to the opening provided in the second wall D of the door A, for the purpose of producing the rotation of the bar B and thus the disengagement of the anchoring means from the frame of the vehicle, while the bar B and the other elements affected are kept inside the space E and thus are substantially hidden from view.

[0031] Conveniently, in order to impede and prevent the occurrence of infiltrations and leaks of water into the space E, the body 2 comprises means of hermetic sealing, which are interposed between each tube 6 and respective orifices 7 for insertion of the bar B, which are mutually aligned and provided along the mutually opposite side walls 4a.

[0032] In particular, the above-mentioned sealing means are substantially constituted by a pair of bushings 8, each one of which in turn comprises a cylindrical sleeve 9, which extends outside the recess 5; in order to ensure the seal, the sleeve 9 has a contoured lip 10 at one end, which has a shape that matches a respective orifice 7, so as to enable its hermetic and interlocking coupling (and that of the corresponding bushing 8) with the corresponding side wall 4a.

[0033] Moreover, the sleeve 9 is externally coupled to the respective tube 6 hermetically, by way of the interposition of a substance of the type of mastic, silicone, adhesive and the like.

[0034] Even more specifically, the lips 10 and the orifices 7 (as can be seen for example in Figure 1) have a substantially square matching shape structure and moreover each lip 10 defines a shoulder 11 (a sort of stroke limit) on which the rim of a respective orifice 7 can abut, so as to ensure the optimal insertion and the desired hermetic and interlocking coupling of each bushing 8 in the corresponding orifice 7.

[0035] In addition, when the shoulder 11 abuts on the rim of the respective orifice 7, the inner face 12a of the lip 10, which is directed toward the sleeve 9, abuts against the tube 6, so that any pressure that may be acting on the outer face 12b of the lip 10 (and which is due to external forces) can advantageously be discharged onto the tube 6.

[0036] Positively, the body 2 has a covering and reinforcement housing 13 that in turn comprises at least one platelet 14 (variously contoured, according to specific requirements) that can be applied on the plate 3, on the

side opposite to the second wall D, so as to protect the plate 3 from the thermally insulating layer which will subsequently be injected into the space E and, especially, so as to confer greater mechanical strength and compactness on the whole and on the element 1 according to the invention.

[0037] Conveniently, the body 2 also comprises one or more units for the non-removable fixing of the housing 13 to the plate 3.

[0038] More specifically, as can be seen from the embodiment shown in the accompanying figures for the purposes of non-limiting example of the application of the invention, the fixing units are substantially constituted by bolts 15 that can be inserted in respective holes 16 that are provided in the plate 3 and in the platelet 14 and can be mutually aligned precisely in order to allow the insertion of the bolts 15 (with the respective nuts 15a which are provided already welded directly to the platelet 14). The holes 16 and the bolts 15 are moreover also used for fixing a rigid base H of the actuation lever G.

[0039] It should be noted, with further reference to the accompanying figures, that the possibility exists of providing the platelet 14 and the plate 3 with further holes 17, which are mutually aligned and are such as to provide access to the lever G to an operator who should accidentally find himself or herself inside the compartment with the door A closed, thus ensuring the possibility, by means of a safety pivot or key, of operating the bar B in order to cause its disengagement from the frame of the vehicle and therefore a means of emergency exit from the compartment.

[0040] An assembly for locking and unlocking is generally designated by 100 in the accompanying figures and can be used on doors of vehicles, of the type of lorries, trucks, semi-trailer trucks, and similar vehicles for professional use, which are in any case provided with an inner compartment that is kept at a preset temperature and is closed by a door A substantially constituted by a first wall C, which is directed toward the compartment, and a second wall D, which is directed toward the outside environment, which are mutually facing so as to delimit a space E, which can subsequently be filled with a layer of thermally insulating material.

[0041] According to the invention, the assembly for locking and unlocking 100 comprises at least one bar B for supporting respective means of anchoring to the frame of the vehicle, which can be rotatably and longitudinally coupled to the door A, and a body 2 that is provided with at least one plate 3 that in turn is provided with respective raised perimetric side walls 4a and 4b.

[0042] The side walls 4a and 4b can be stably and hermetically applied, before proceeding to fill the space E with the layer of insulating material, on a first face F of the second wall D of the door A, which is directed toward the first wall C, so as to form a sort of recess 5, which is in fact within the space E and within which a lever G (which can be comprised in the assembly 100) can be accommodated for actuating the at least one bar B: access to the recess 5, and thus to the lever G, is ensured by a respective opening that can be provided in the second wall D.

[0043] The body 2 further comprises two tubes 6 that are perpendicularly and hermetically coupled to two mutually opposite side walls 4a of the plate 3, and the at least one bar B can be rotatably inserted into the tubes 6, which for such purpose are both aligned along the rotation axis of the at least one bar B, and partially exits, at the recess 5, with a portion thereof for supporting the lever G.

[0044] The method of installation of an assembly for locking and unlocking doors of vehicles of the type of lorries, trucks, semi-trailer trucks, and similar vehicles for professional use, which are in any case provided with an inner compartment that is kept at a preset temperature and is closed by a door A that is substantially constituted by a first wall C, which is directed toward the compartment, and a second wall D, which is directed toward the outside environment, which are mutually facing so as to delimit a space E, consists first of all, in a first step a., of providing an opening in the second wall D of the door A.

[0045] At the opening, it is thus possible, in a step b., to stably and hermetically apply a body 2, which is comprised in the assembly 100, on a first face F of the second wall D of the door A, which is directed toward the first wall C, which thus makes it possible to form a recess 5, within the space E and directed toward the aforementioned opening.

[0046] Precisely for the purpose of associating the body 2 with the first face F of the second wall D of the door A, the body 2 is provided with at least one plate 3 that is provided with respective raised perimetric side walls 4a and 4b.

[0047] After executing the above steps, the method according to the invention involves filling, in a step c., the space E with a layer of thermally insulating material, which evidently does not affect the recess 5, which is protected by the plate 3 and by the respective side walls 4a and 4b.

[0048] Subsequently, the method according to the invention involves rotatably inserting, in a step d., at least one bar B, which is comprised in the assembly 100, for supporting respective means of anchoring to the frame of the vehicle, into two tubes 6, which are in turn comprised in the aforementioned body 2 and are perpendicularly and hermetically coupled to two mutually opposite side walls 4a: in order to enable the insertion, the tubes 6 are both aligned along the rotation axis of the at least one bar B, which can be rotatably and longitudinally coupled to the door A.

[0049] More specifically, the method according to the invention involves, in a step e. before the step d. of insertion, accommodating a lever G (which can be comprised in the assembly 100) in the recess 5 for actuating the at least one bar B, which can be accessed by way of the opening and which can be supported by a portion of the at least one bar B, partially exiting from tubes 6, at

the recess 5.

[0050] It should be noted that the scope of protection claimed herein includes methods, which are entirely equivalent to the one above, in which the step c. of filling still occurs after the step b. of application but in which the other activities are executed in a different order, according to specific requirements: for example the step d. of insertion (and optionally the step e. of accommodation) can be executed before the step c. of filling.

[0051] The use of the element for locking and unlocking, and of the assembly, according to the invention is as follows.

[0052] Faced with the necessity of ensuring the locking in the closed configuration of the door A of a vehicle (and moreover enabling the subsequent unlocking), it is possible, according to conventional methods, to use a bar B that can be rotatably coupled to the door A and is provided, as has been seen, with respective means of anchoring to the frame of the vehicle, when the door A is arranged so as to close the vehicle.

[0053] More specifically, the operator can grip the actuation lever G in order to cause the rotation of the bar B and hence the disengagement of the latter from the retention means arranged on the frame, thus unlocking the door A and gaining access to the compartment which is kept at a preset temperature.

[0054] In order to install the above-mentioned components on the vehicle, and more precisely the bar B with the lever G, it is possible to use the element for locking and unlocking 1 according to the invention, first applying the side walls 4a and 4b of the plate 3 on the first face F of the second wall D of the door A, which is directed toward the first wall C, and rotatably inserting the bar B into the tubes 6.

[0055] The possibility of coupling the body 2 to the first face F after providing the opening, but before filling the space E, enables an easy installation of the element 1 and of the assembly 100, since fixing the plate 3 to the above-mentioned first face F is evidently practical and quick, without the necessity of first breaking the layer of foam, as happens with conventional doors, in order to obtain the space necessary for the installation of the components.

[0056] The polymeric foam (which is necessary in order to ensure the maintenance of the preset temperature inside the compartment) can in fact be injected into the space E after installation of the plate 3 with the tubes 6, and thus after provision of a recess 5 (which is not affected by the foam), which can accommodate the lever G and at which an intermediate portion of the bar B exits, the remaining part of which is kept inside the tubes 6 (and thus, again, is protected by the foam).

[0057] It is also advantageous to note that, as can be seen for example from Figures 6 and 11, when mounting is complete, almost all of the components of the element 1 and of the assembly 100 are kept hidden from view: the bar B is almost entirely contained in the tubes 6 (and thus in the space E) and the only part of it that is visible is its intermediate portion, which exits from the tubes 6 at the recess 5 only (thanks to the opening provided in the second wall D) and supports the lever G, thus giving a high aesthetic value, and an attractive appearance, to the door A on which it is installed.

[0058] Moreover, thanks to the presence of the sealing means (and to the decision to hermetically associate respectively the side walls 4a and 4b with the first face F and the tubes 6 with the mutually opposite side walls 4a, by way of the bushings 8 and also by the interposition of mastic, silicone, adhesives or the like), the risk of leaks and infiltrations during installation and normal operation is guarded against (thus ensuring high reliability), it being possible for such leaks and infiltrations to occur when using conventional devices, thus affecting the space E.

[0059] In practice it has been found that the element according to the invention (and the assembly and the method) fully achieve the set aim, since the adoption of a body comprising at least one plate that is provided with respective raised perimetric side walls, which can be stably and hermetically applied, before filling the space with the layer, on a first face of the second wall of the door, and tubes that are perpendicularly and hermetically coupled to two mutually opposite side walls, in which the bar can be inserted, enables an easy installation of the element (and of the assembly) for locking and unlocking on refrigerated vehicles and the like.

[0060] 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.

[0061] 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.

[0062] In practice, the materials employed, as well as the dimensions, may be any according to requirements and to the state of the art.

[0063] 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 element for locking and unlocking doors of vehicles, of the type of lorries, trucks, semi-trailer trucks, and similar vehicles for professional use, which are provided with an inner compartment that is kept at a preset temperature and is closed by a door (A), which rotatably supports at least one bar (B) for supporting respective means of anchoring to the frame of the

vehicle, the door (A) being substantially constituted by a first wall (C), which is directed toward the compartment, and a second wall (D), which is directed toward the outside environment, mutually facing so as to delimit a space (E), which can be filled with a layer of thermally insulating material, **characterized in that** it is substantially constituted by a body (2) that comprises at least one plate (3) provided with respective raised perimetric side walls (4a, 4b), which can be stably and hermetically applied, before filling the space (E) with the layer, on a first face (F) of the second wall (D) of the door (A), which is directed toward the first wall (C), in order to form a recess (5), which is within the space (E) and is adapted to accommodate a lever (G) for actuating the at least one bar (B), which is accessible by way of a respective opening that can be provided in the second wall (D), said body (2) comprising two tubes (6) that are perpendicularly and hermetically coupled to two of said mutually opposite side walls (4a), the at least one bar (B) being able to be partially and rotatably inserted into said tubes (6), which can both be aligned along the rotation axis of the at least one bar (B), and exiting, at said recess (5), with a portion thereof that supports the lever (G).

2. The element according to claim 1, **characterized in that** said body (2) comprises means of hermetic sealing, which are interposed between each tube (6) and respective orifices (7) for insertion of the bar (B), and are mutually aligned and provided along said mutually opposite side walls (4a), in order to obstruct water infiltrations and leaks.

3. The element according to claims 1 and 2, **characterized in that** said sealing means are substantially constituted by a pair of bushings (8), each one of said bushings (8) comprising a cylindrical sleeve (9), which extends externally with respect to said recess (5) and has at one end a contoured lip (10), of a shape complementary to said respective orifice (7), for its interlocking hermetic coupling with said side wall (4a).

4. The element according to claim 3, **characterized in that** said sleeve (9) is externally coupled to a respective tube (6) hermetically, by way of the interposition of a substance of the type of mastic, silicone, adhesive, and the like.

5. The element according to claims 3 and 4, **characterized in that** said lips (10) and said orifices (7) have a substantially square matching shape structure, each one of said lips (10) forming an abutment shoulder (11) for the rim of said respective orifice (7), for the insertion and interlocking coupling of each one of said bushings (8) in said corresponding orifice (7), at the abutment of said shoulder (11) on said rim of said respective orifice (7), the inner face (12a) of said lip (10), which is directed toward said sleeve (9), abutting against said tube (6).

6. The element according to one or more of the preceding claims, **characterized in that** said body (2) has a covering and reinforcement housing (13), comprising at least one platelet (14) that can be applied to said plate (3), on the side opposite to the second wall (D).

7. The element according to one or more of the preceding claims, **characterized in that** said body (2) comprises units for the non-removable fixing of said housing (13) to said plate (3).

8. The element according to claim 6, **characterized in that** said units for non-removable fixing comprise bolts (15) that can be inserted into respective holes (16) that are provided in said plate (3) and in said platelet (14) and can be mutually aligned.

9. An assembly for locking and unlocking doors of vehicles, of the type of lorries, trucks, semi-trailer trucks, and similar vehicles for professional use, which are provided with an inner compartment that is kept at a preset temperature and is closed by a door (A) that is substantially constituted by a first wall (C), directed toward the compartment, and a second wall (D), directed toward the outside environment, which are mutually facing so as to delimit a space (E), which can be filled with a layer of thermally insulating material, **characterized in that** it comprises at least one bar (B) for supporting respective means of anchoring to the frame of the vehicle, which can be rotatably and longitudinally coupled to the door (A), and a body (2) that is provided with at least one plate (3) that is provided with respective raised perimetric side walls (4a, 4b), which can be stably and hermetically applied, before filling the space (E) with the layer, on a first face (F) of the second wall (D) of the door (A), which is directed toward the first wall (C), in order to form a recess (5), which is within the space (E) and is adapted to accommodate a lever (G) for actuating said at least one bar (B), which is accessible by way of a respective opening that can be provided in the second wall (D), said body (2) comprising two tubes (6) that are perpendicularly and hermetically coupled to two of said mutually opposite side walls (4a), said at least one bar (B) being able to be rotatably inserted into said tubes (6), which are both aligned along the rotation axis of said at least one bar (B), and partially exiting, at said recess (5), with a portion thereof that supports said lever (G).

10. A method of installation of an assembly for locking and unlocking doors of vehicles of the type of lorries, trucks, semi-trailer trucks, and similar vehicles for

professional use, which are provided with an inner compartment that is kept at a preset temperature and is closed by a door (A) that is substantially constituted by a first wall (C), which is directed toward the compartment, and a second wall (D), which is directed toward the outside environment, which are mutually facing so as to delimit a space (E), comprising the steps that consist in:

a. providing an opening in the second wall (D) of the door (A);
b. stably and hermetically applying, at the opening, a body (2), which is comprised in the assembly for locking and unlocking (100), to a first face (F) of the second wall (D) of the door (A), which is directed toward the first wall (C), in order to form a recess (5), which is within the space (E) and faces the opening, the body (2) being provided with at least one plate (3) that is provided with respective raised perimetric side walls (4a, 4b);
c. filling the space (E) with a layer of thermally insulating material;
d. rotatably inserting at least one bar (B), which is comprised in the assembly (100), for supporting respective means of anchoring to the frame of the vehicle, inside two tubes (6), which are comprised in the assembly (2) and are perpendicularly and hermetically coupled to two mutually opposite side walls (4a), the tubes (6) both being aligned along the rotation axis of the at least one bar (B), which can be rotatably and longitudinally coupled to the door (A).

11. The method according to claim 10, **characterized in that** it includes, in a step e. preceding said step d. of insertion, accommodating a lever (G) in the recess (5) for actuating the at least one bar (B), which is accessible by way of the opening and can be supported by a portion of the at least one bar (B), which exits partially from the tubes (6), at the recess (5).

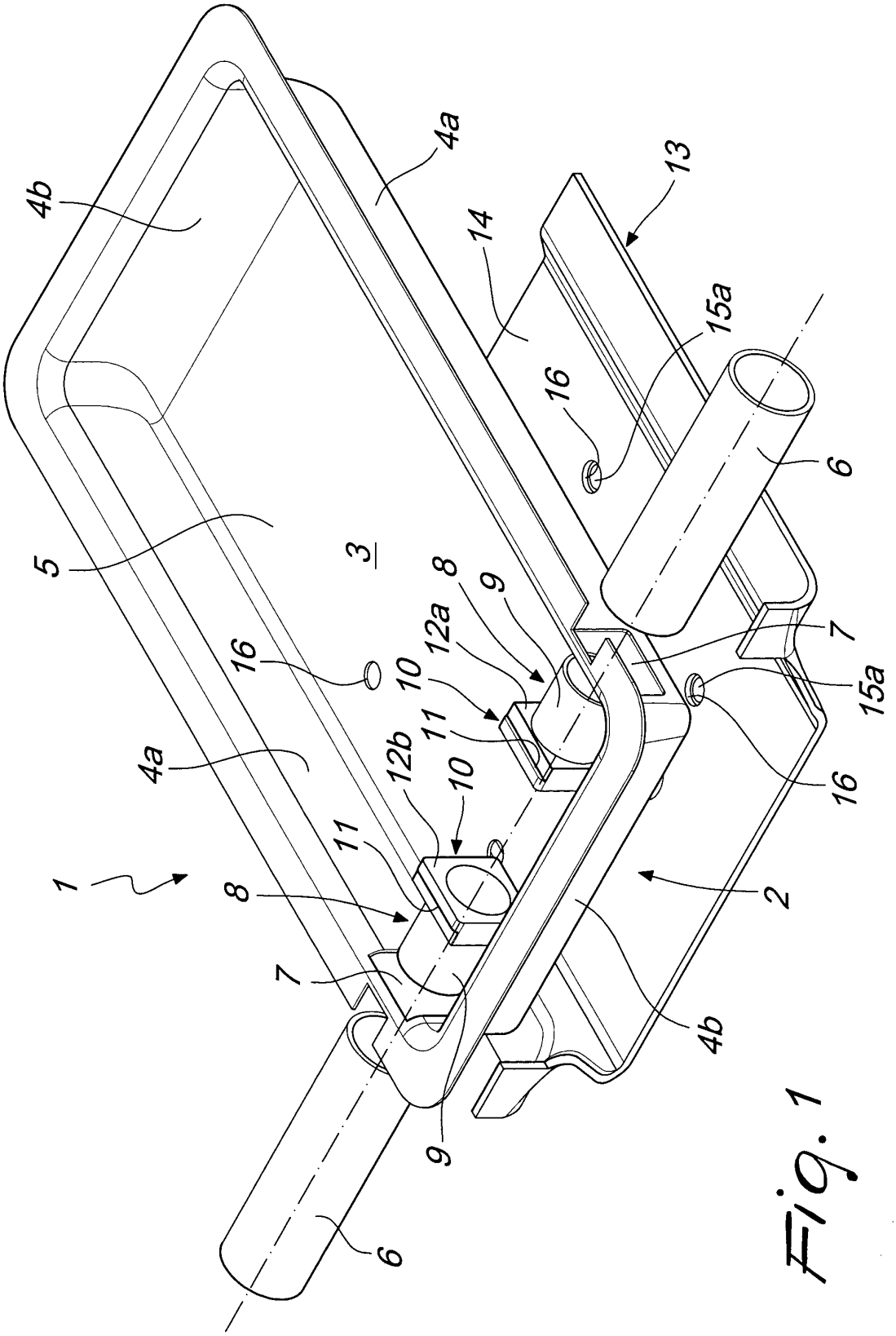


Fig. 1

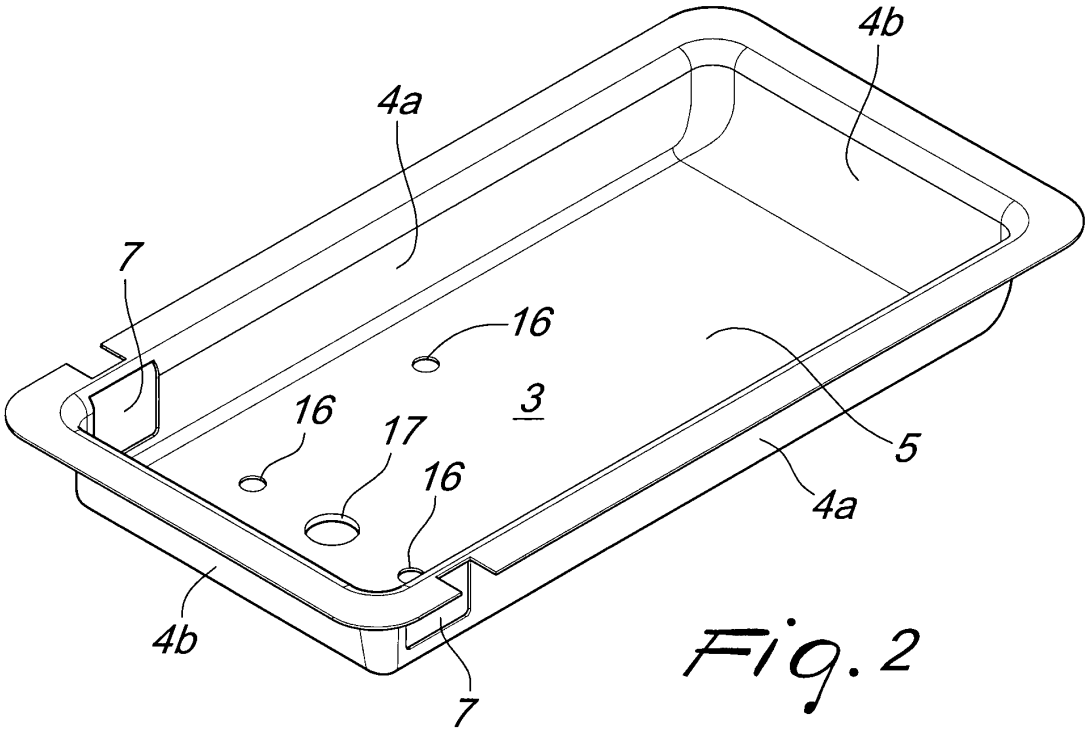


Fig. 2

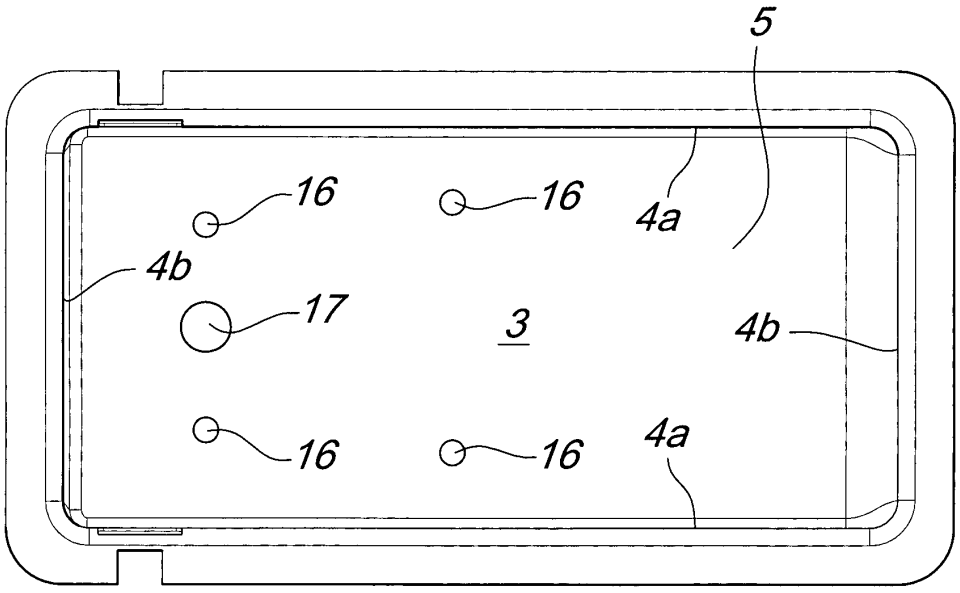


Fig. 3

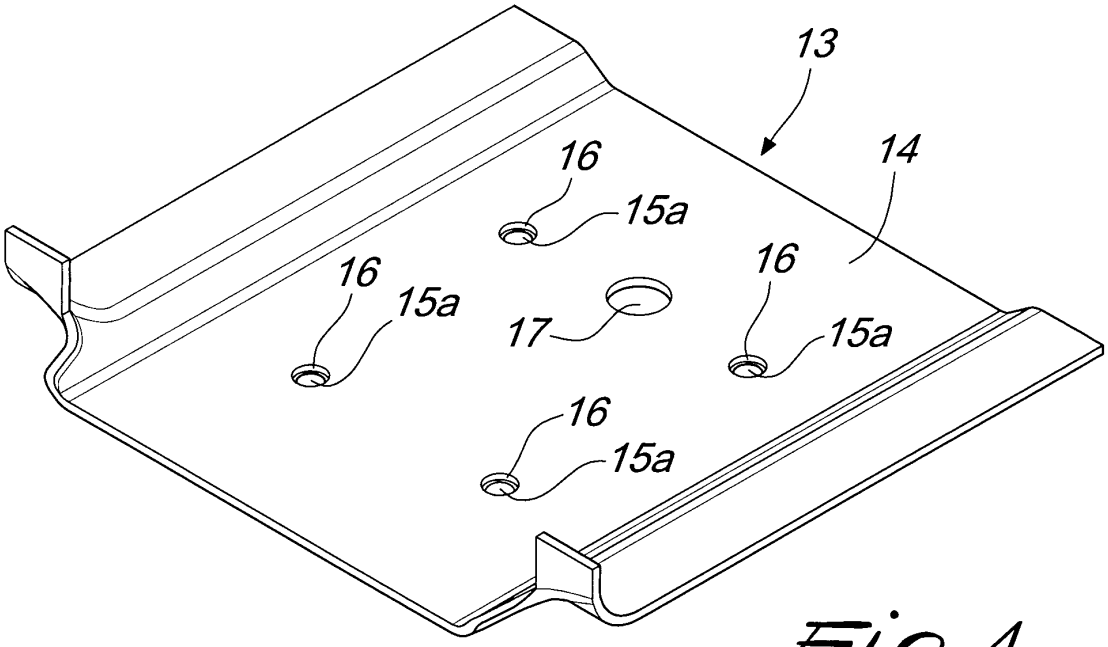

13
14
16
15a
16
15a
17
16
15a
16
15a

Fig. 4

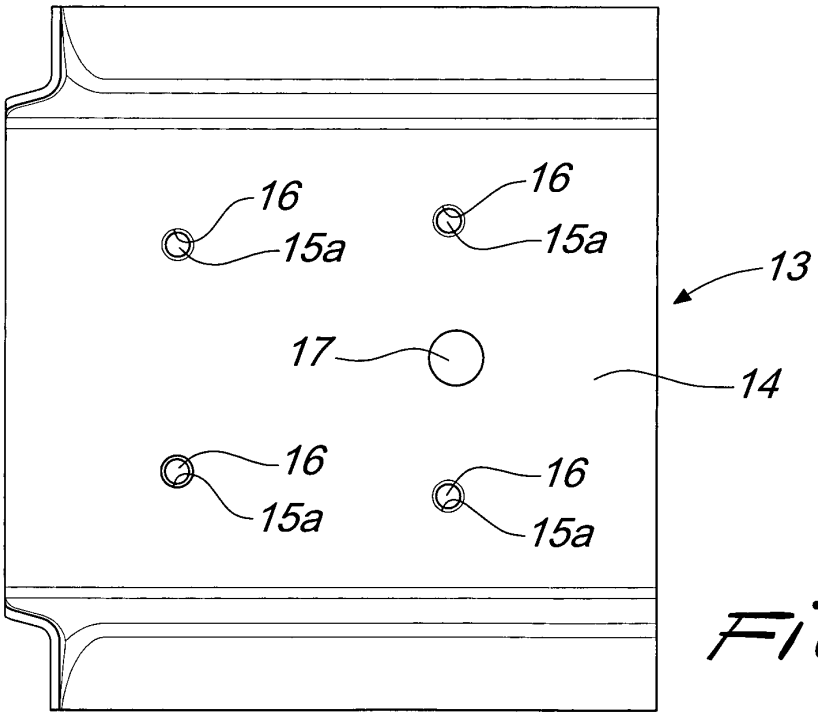

16
15a
16
15a
13
17
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16
15a
16
15a

Fig. 5

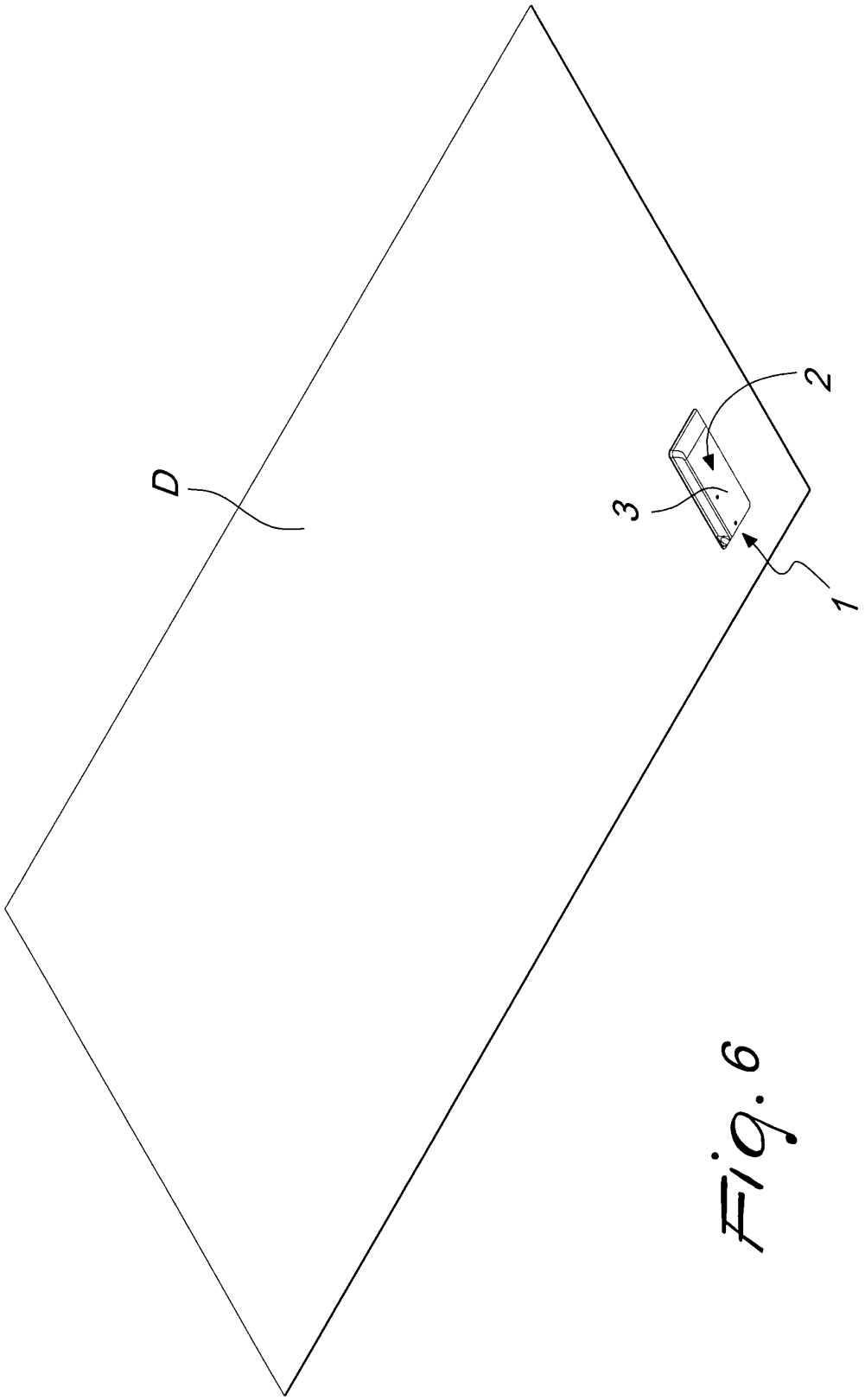
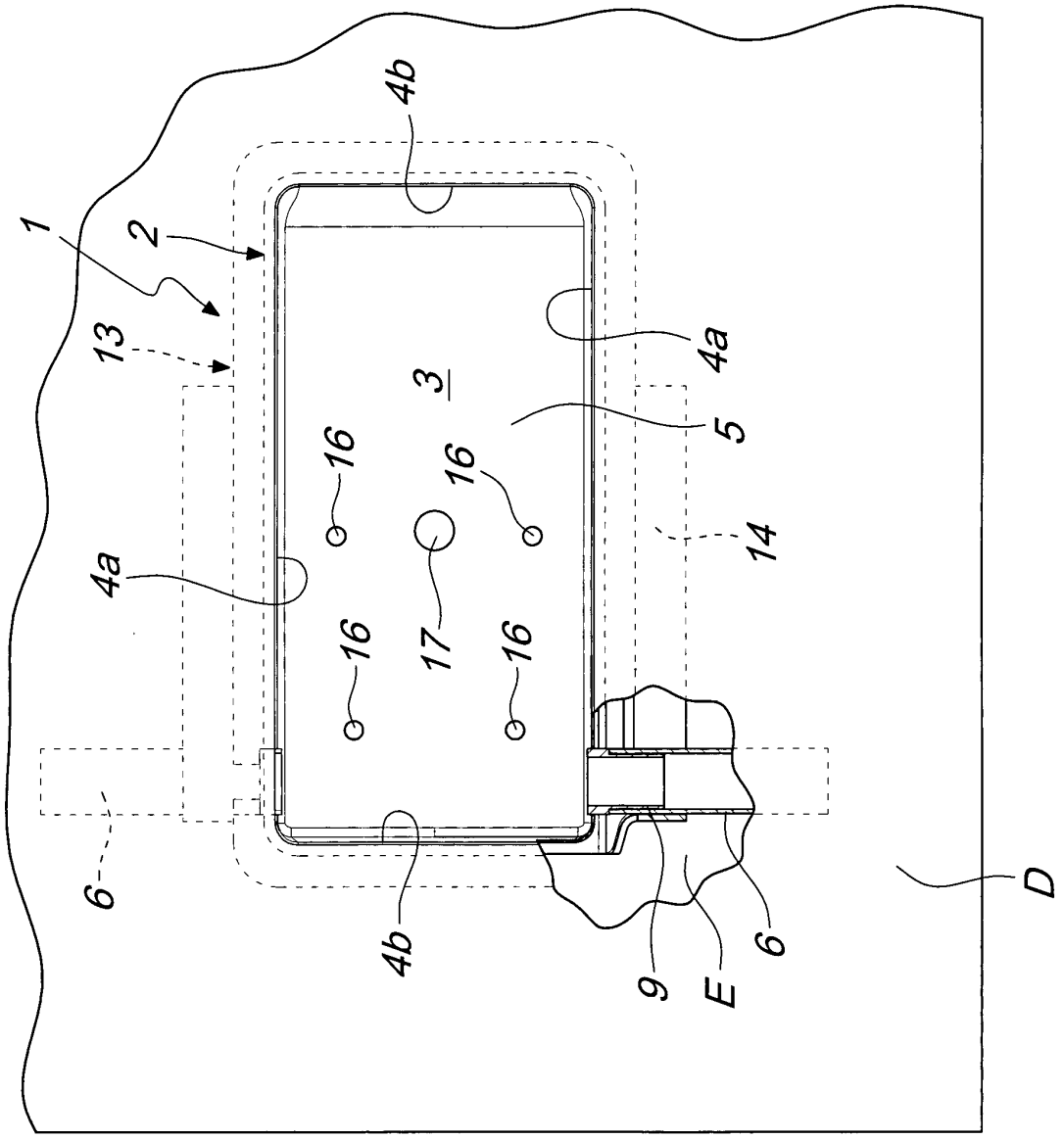


Fig. 6

Fig. 7



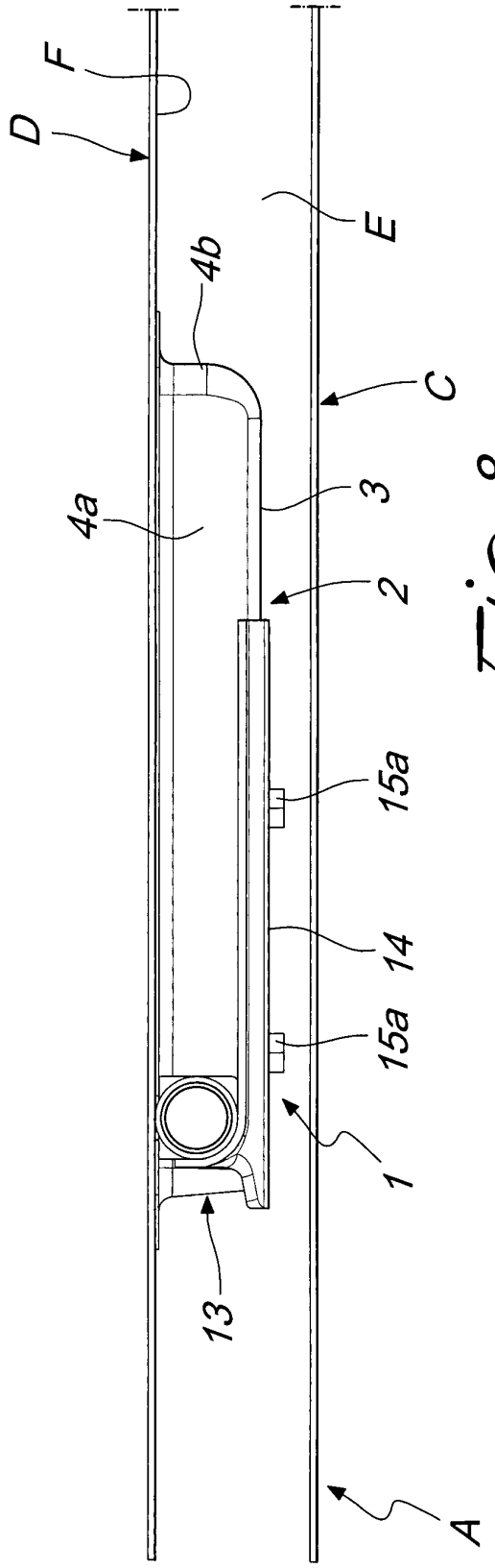


Fig. 8

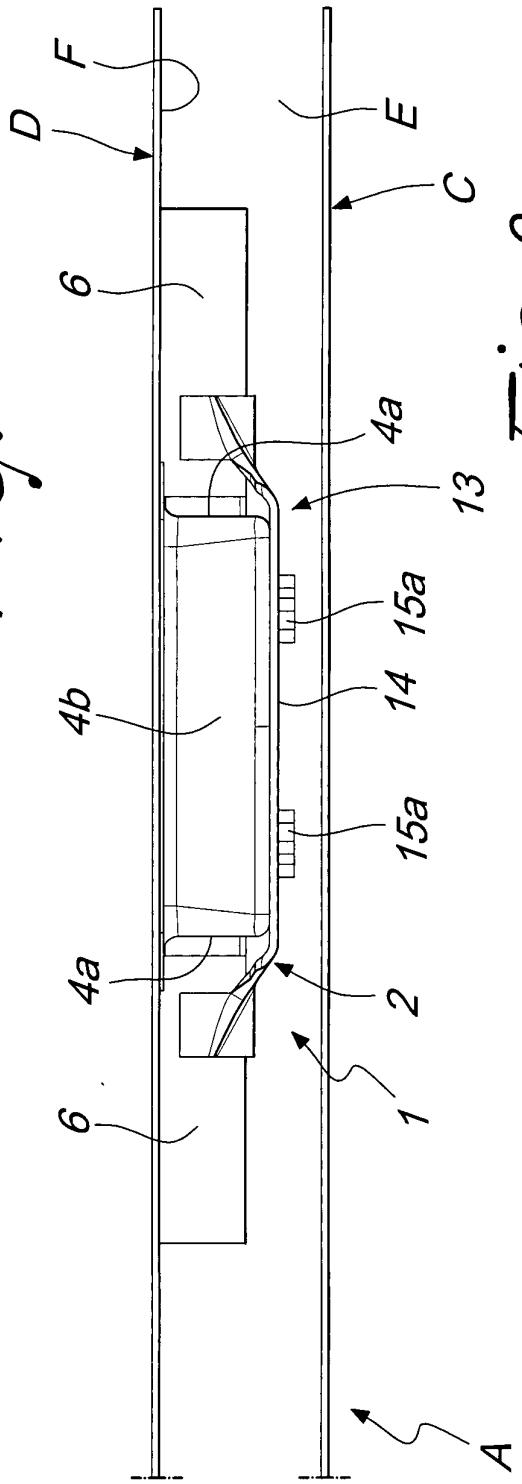


Fig. 9

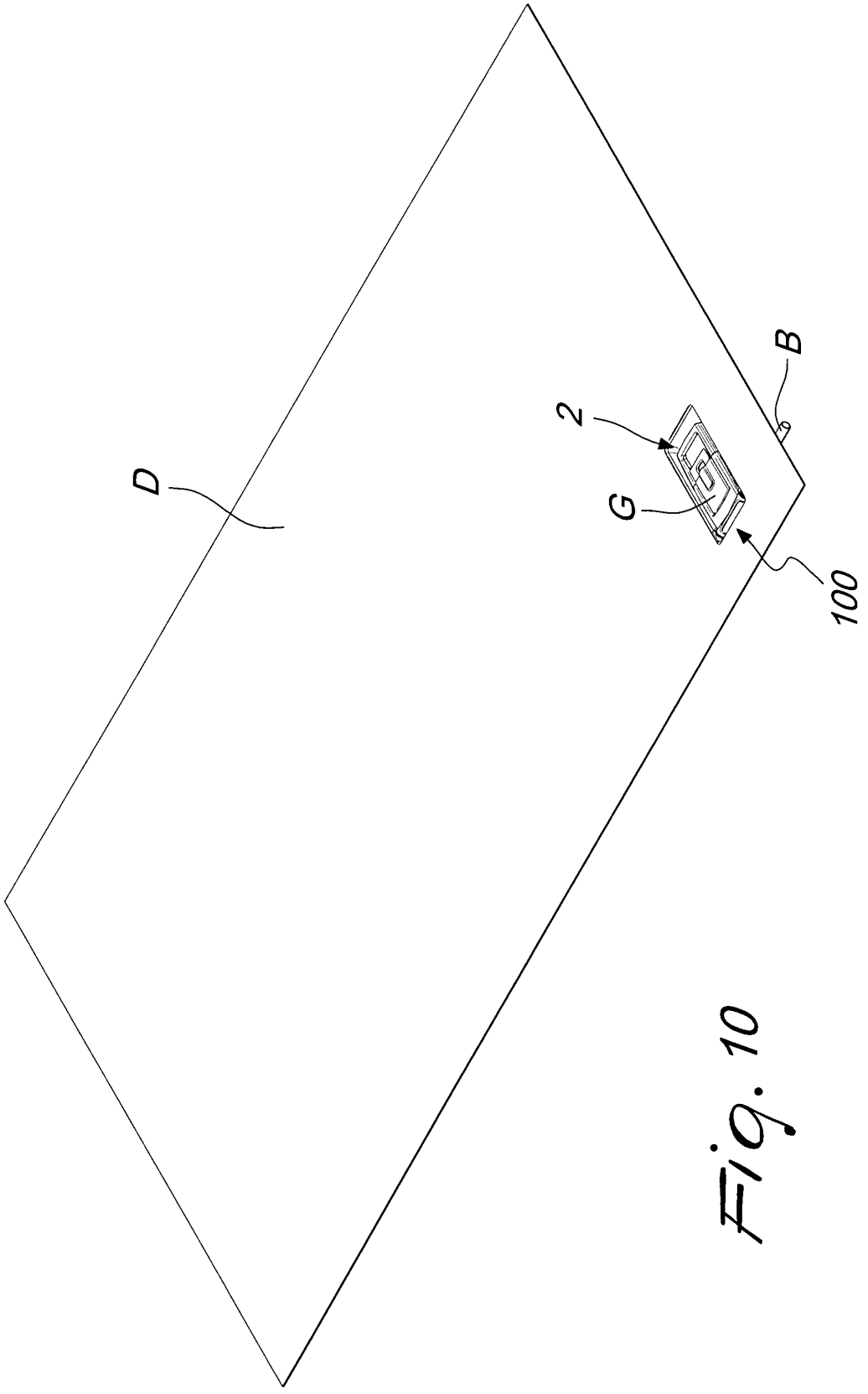
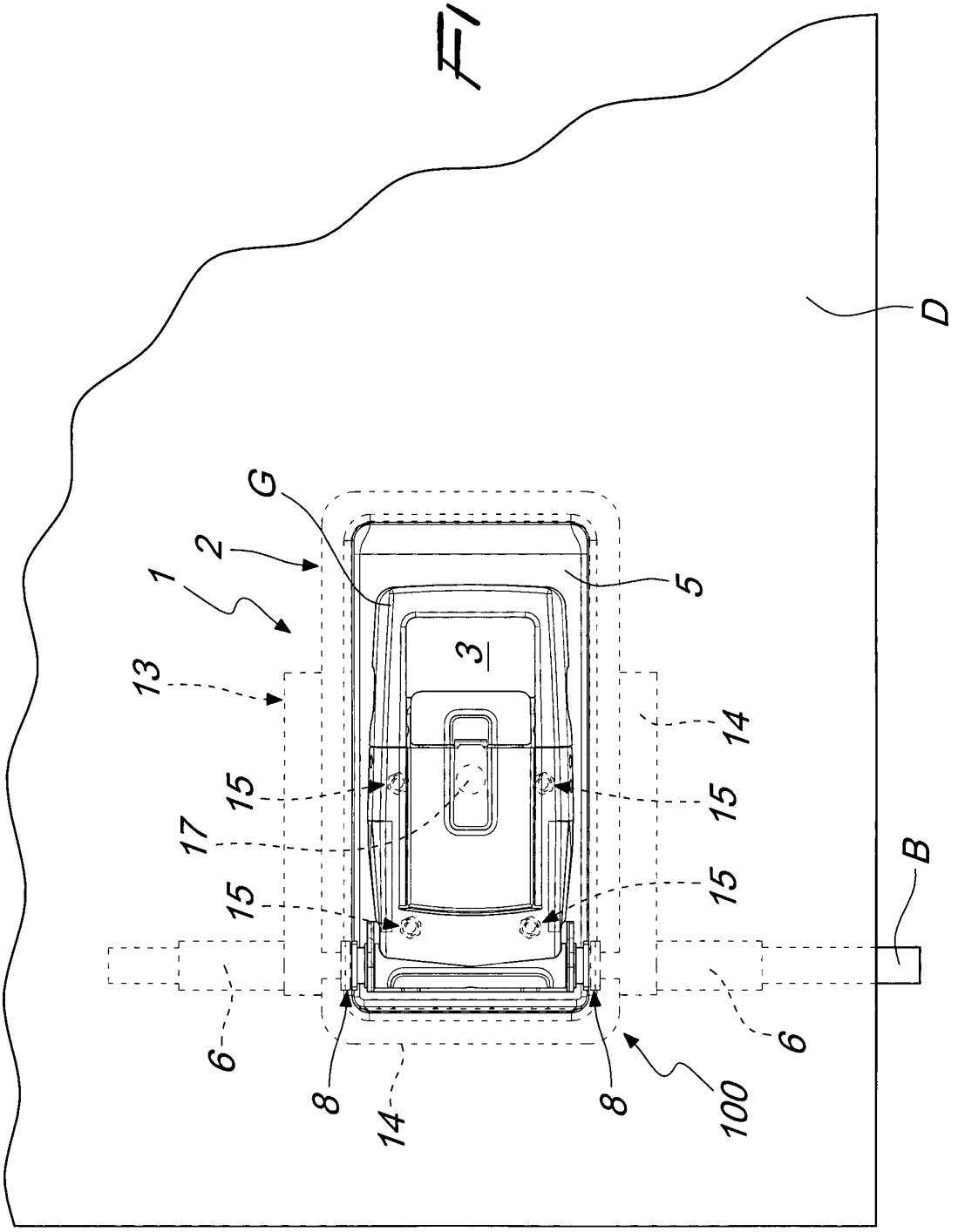


Fig. 10

Fig. 11



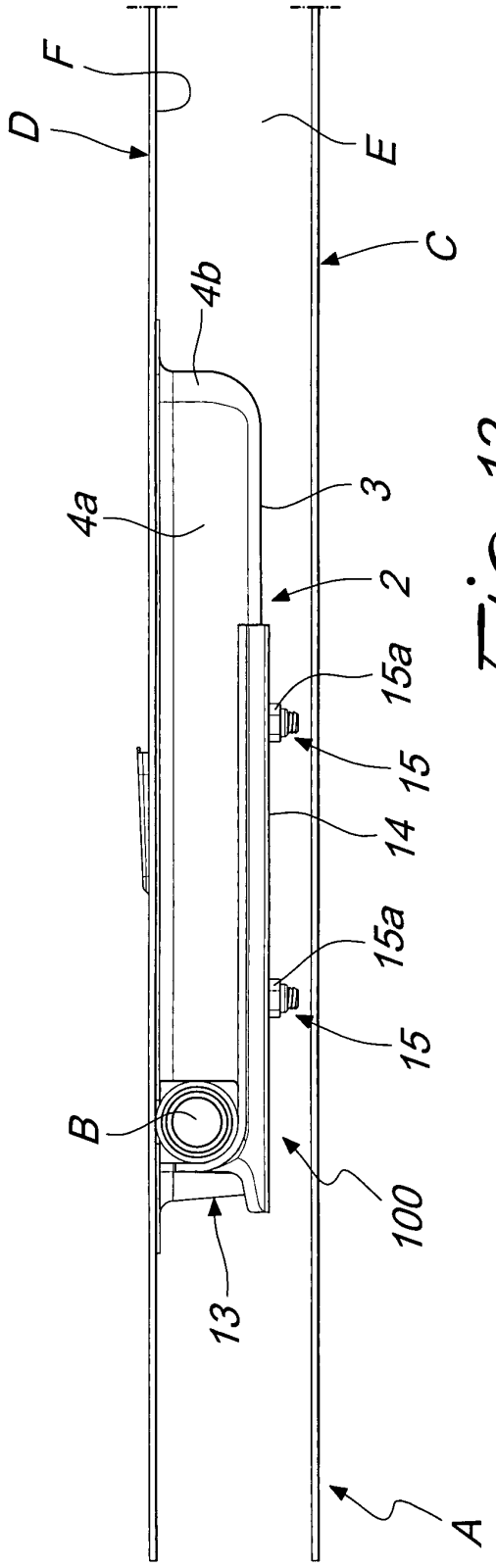

F
D
E
C
4b
4a
3
2
15a
15
14
15a
15
B
100
13
A

Fig. 12

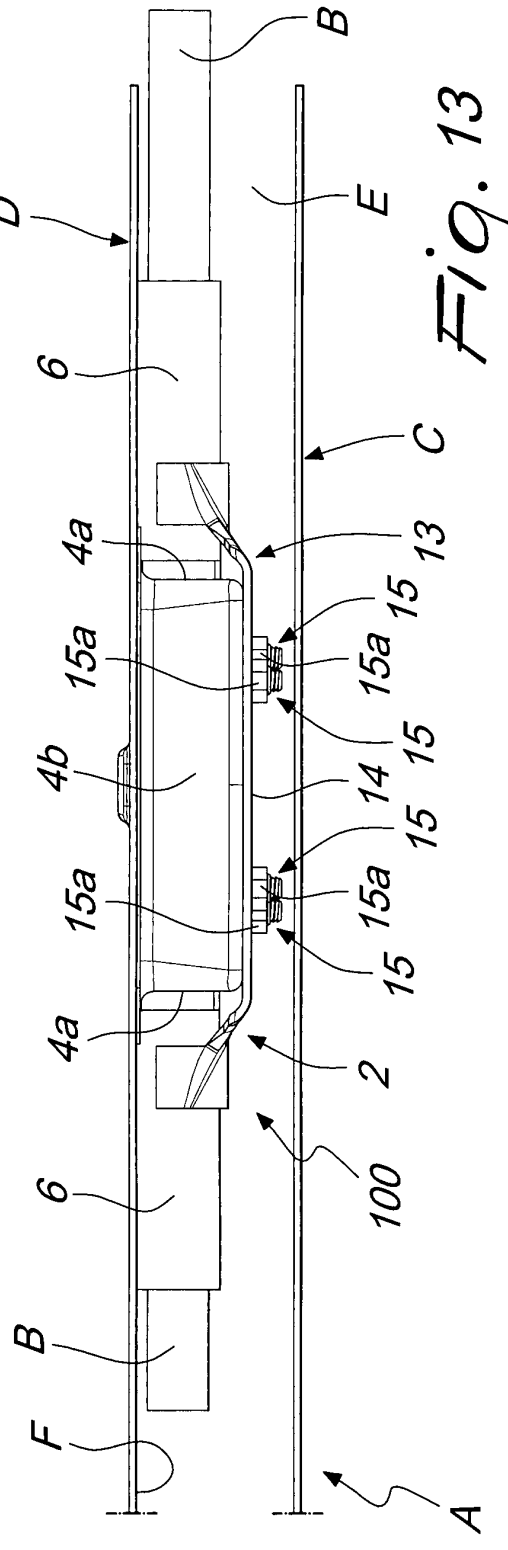

B
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6
B
F
A

Fig. 13

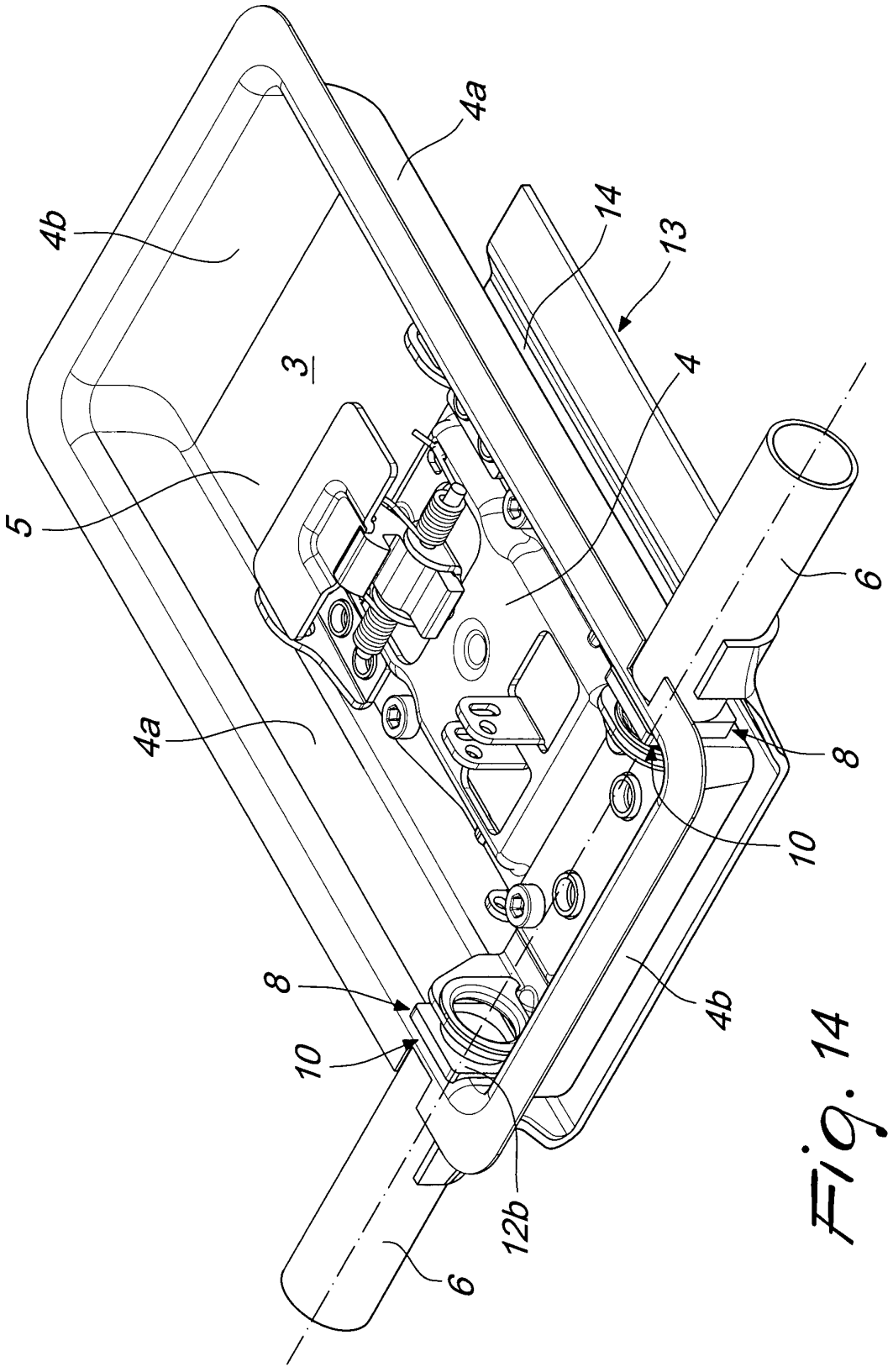


Fig. 14

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EUROPEAN SEARCH REPORT

Application Number
EP 13 42 5001

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 A	US 2005/110283 A1 (WITIAK ET AL) 26 May 2005 (2005-05-26) * paragraphs [0026], [0027]; figures *	1,2,9 3,10	INV. E05B65/12
A	ES 2 294 954 A1 (MECANIZADOS RODRÍGUEZ FERNÁNDE) 1 April 2008 (2008-04-01) * the whole document *	1,9,10	
A	FR 2 898 929 A1 (POMMIER FURGOCAR SRL) 28 September 2007 (2007-09-28) * the whole document *	1,9,10	
			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	17 June 2013	Van Beurden, Jason

CATEGORY OF CITED DOCUMENTS

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17-06-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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ES 2294954 A1	01-04-2008	NONE	
FR 2898929 A1	28-09-2007	NONE	

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