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(11) **EP 1 460 210 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
22.09.2004 Bulletin 2004/39

(51) Int Cl.7: **E05B 65/16, E05C 9/08**

(21) Application number: **03028727.0**

(22) Date of filing: **12.12.2003**

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PT RO SE SI SK TR**
Designated Extension States:
AL LT LV MK

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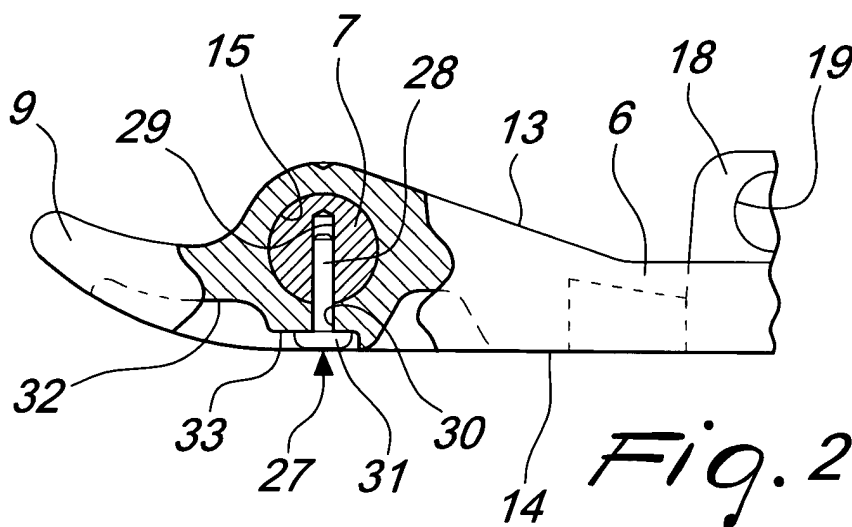
(30) Priority: **17.03.2003 IT BO20030028 U**

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(54) **Lever-type fastening device, particularly for doors of trucks, trailers and the like**

(57) A lever-type fastening device, particularly for doors of trucks, trailers and the like, comprising at least one rod (7), which is supported rotatably in each one of the doors, and at least one manual actuation lever (6), which is affected by a through hole (15) for keying along the rod (7) and has an end that is substantially hook-shaped (9), the lever (6) being able to rotate about the axis of the rod (7) from an angular position for locking the door, in which it lies substantially parallel to the

frame (5) of the body of the truck and in which the hook-shaped end (9) is engaged in a respective locator (11) that is rigidly coupled to the frame, to a released angular position, in which the hook-shaped end (9) is disengaged from the locator (11), allowing the door to open freely; the lever (6) is rigidly coupled at right angles to the rod (7) by way of detachable connecting means (27) that are distributed substantially radially with respect to the rod (7).



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Description

[0001] The present invention relates to a lever-type fastening device, particularly for doors of trucks, trailers and the like.

[0002] The bodies of trucks and the like are traditionally provided with door opening and closing devices, which comprise one or more rods that are preferably parallel to the articulation axis of the respective door, are supported so as to be able to rotate within said door, and are provided, preferably at their lower end, with a manual opening and closure lever. Typically, such lever in fact forms a sort of hook-shaped extension that is adapted to engage within a respective locator that is rigidly coupled to the frame of the body of the truck; correspondingly, a beak-shaped protrusion is provided at the upper end of the rod in order to engage in another locator that is rigidly coupled to the frame. Each lever can in fact be rotated manually by the operator about the axis of the rod from an angular position for closing the door, in which the hook-shaped extension and the upper beak-shaped protrusion are engaged in their respective locators, to an angular open position, in which they are disengaged from the locators, accordingly releasing the door, which can be opened freely.

[0003] The connection between the rod and the lever is generally provided by keying the lever along the rod through an appropriately provided through hole, followed by a rigid mutual locking of the two parts by means of substantially circumferential welding beads. This coupling method, however, is not free from drawbacks, since the presence of welding beads in fact tends to produce a localized weakening of the device, facilitates the onset of oxidation and corrosion phenomena concentrated at said beads, and is also rather expensive in terms of cost and assembly times.

[0004] The aim of the present invention is to provide a lever-type device that does not have the drawbacks that arise from the provision of connections by welding, i.e., has good mechanical and functional characteristics associated with low costs and production times.

[0005] Within this aim, an object of the present invention is to provide a lever-type fastening device that provides assurances of safety against any attempts at forcing or break-in.

[0006] Another object of the present invention is to provide a device that is simple, relatively easy to provide in practice, safe in use, effective in operation, and has a relatively low cost.

[0007] This aim and these and other objects that will become better apparent hereinafter are achieved by the present lever-type fastening device, particularly for doors of trucks, trailers and the like, comprising at least one rod, which is supported rotatably in each one of said doors, and at least one manual actuation lever, which is affected by a through hole for keying along said rod and has an end that is substantially hook-shaped, said lever being able to rotate about the axis of said rod from a first

angular position for locking said door, in which it lies substantially parallel to the frame of the body of the truck and in which said hook-shaped end is engaged in a respective locator that is rigidly coupled to said frame, to a second angular release position, in which said end is disengaged from said locator, allowing said door to open freely, characterized in that said lever is rigidly coupled at right angles to said rod by way of detachable connecting means that are distributed substantially radially with respect to said rod.

[0008] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a preferred but not exclusive embodiment of a lever-type fastening device, particularly for doors of trucks, trailers and the like according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a front view of a detail the device according to the invention;

Figure 2 is a partially sectional bottom view of a detail of the manual actuation lever and of the rod of said device;

Figure 3 is a partially sectional front view of a detail of the lever and of the rod.

[0009] In the embodiments that follow, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other embodiments.

[0010] Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be deleted from the claims.

[0011] With reference to Figure 1, the reference numeral 1 generally designates a lever-type fastening device according to the invention, particularly for doors of trucks, trailers and the like.

[0012] The device comprises, in a known manner, a substantially box-like base 2, which is fixed for example by means of bolts 3 and welding beads 4 to a portion of a frame 5 of the body of the truck, in order to accommodate and retain a lever 6 for opening and closing the door, said lever being associated with an articulation rod 7 that is supported so that it can rotate within said door, and having an axis that is parallel to the pivoting axis (which is generally vertical) of the door with respect to the frame 5. The lever 6 is connected to the rod 7 preferably at its lower end; the rod 7 has, at its upper end, a sort of beak-shaped protrusion for engaging within locator means that are rigidly coupled to the frame 5 of the body (and are not shown in the drawings because they are fully known). The lever 6 has a manual actuation end 8 and forms, at the opposite end, a sort of hook-shaped end 9. The lever 6 can rotate, about the axis of the rod 7, from an angular position for locking the door to a released angular opening position. In the angular locking position, the lever 6 lies substantially parallel to

the frame 5 and is accommodated within the base 2, in which it is retained by retention elements 10 and so that the hook-shaped end 9 is engaged in a respective locator 11 (constituted for example by a pivot engaged in holes 12) that is rigidly coupled to the base 2; in the released angular position, the lever 6 is substantially spaced from the frame 5 and disengaged from the retention elements 10, with the hook-shaped end 9 disengaged from the locator 11. In this last angular position of the lever 6, the door can be rotated freely about its own pivoting axis, allowing access to the compartment of the body.

[0013] The lever 6 has a substantially flat and elongated shape, which forms an outer face 13 and an inner face 14 (when the lever is in the angular locking position, the inner face 14 is substantially adjacent to the surface of the frame 5). The lever 6 is affected, at an expansion located proximate to the hook-shaped end 9, by a circular through hole 15 for keying along the rod 7 and has, substantially in its central portion, two longitudinal slots 16 that form between them a sort of transverse bridge 17. A substantially rectangular protrusion 18 further protrudes at right angles from the central portion of the lever 6 and is affected by an eye 19 for coupling, by way of a seal or other similar means, to a complementary eye 20 that is rigidly coupled to the frame 5 of the body.

[0014] The elements 10 for retaining the lever 6 in the angular door closure position comprise, in a known manner, two rockers 21, 22, which are articulated to the base 2 along respective parallel pivots 23, 24 that form teeth that are suitable to abut on opposite sides against the bridge 17 so as to prevent the free rotation of the lever 6 about the axis of the rod 7. The rockers 21, 22 are associated with the heads of respective coiled springs 25, 26, which are keyed along the pivots 23, 24; such springs keep the rockers stably in a configuration in which the respective teeth abut against the bridge 17. The rockers 21, 22 have respective coupling profiles such that manual pressure on only one of the two allows to turn both about the respective pivots 23, 24, disengaging the teeth from the bridge 17 and accordingly releasing the lever 6, which can be turned from the angular closure position to the angular open position.

[0015] According to the invention, the lever 6 is rigidly coupled at right angles to the rod 7 by way of detachable connection means 27 that are distributed substantially radially with respect to the rod and are located at the inner face 14 of the lever so that when the lever 6 is in the angular locking position they are concealed and protected against any attempts at forcing.

[0016] The connecting means 27 comprise at least one pin 28 (Figure 2) in which the stem is engaged with interference in a respective substantially radial hole 29 provided in the rod 7, said stem passing through a corresponding opening 30 that is formed within the thickness of the lever 6 and is substantially radial with respect to the circular through hole 15 for keying along the rod 7.

[0017] The pin 28 is provided with a respective head

that has a flat surface 31 that abuts against the inner face 14 (not accessible from outside) of the lever 6. The pin 28 is advantageously made of metallic material that is highly resistant to oxidation and corrosion.

[0018] At the inner face 14, the lever 6 is affected by a sort of hollow 32 that forms a flat portion 33 that is suitable for the precision abutment of the head 31 of the pin 28.

[0019] Advantageously, the connecting means 27 preferably comprise two pins 28 (Figure 3), which are aligned side by side longitudinally with respect to the axis of the rod 7, are inserted in respective blind holes 29, and pass through respective openings 30.

[0020] Compatibly with the dimensions of the head 31, with the width of the lever 6 and with design specifications (which relate in particular to the torque strength of the coupling), it is possible to use a plurality of pins 28 that are aligned longitudinally or are distributed radially.

[0021] The method of use of the fastening device according to the invention is intuitive. When the body is fastened, the lever 6 is in the angular locking position, accommodated in the respective base 2 and retained thereat by the retention elements 10, while the hook-shaped end 9 is engaged in the respective locator 11. Manual pressure on the retention elements 10 (typically after removing the seal engaged in the eye 19 and the complementary eye 20) allows to disengage the teeth of the rockers 21, 22 from the bridge 17, accordingly disengaging the lever 6, which can be rotated in the released angular opening position; this rotation allows to disengage the hook-shaped end 9 from the locator 11.

[0022] It has thus been shown that the invention achieves the proposed aim and objects. The use of radial detachable connecting means 27 allows to achieve a safe and strong coupling between the lever 6 and the rod 7 which is also free from drawbacks such as the onset of localized oxidation and corrosion phenomena. Elimination of the welding beads, moreover, ensures substantial advantages in terms of cost, assembly times, and adjustment of the device. Moreover, the connecting means 27 are located at the inner face 14 of the lever 6, i.e., are perfectly protected against any attempts at forcing.

[0023] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0024] In a first alternative embodiment of the device according to the invention, the detachable connecting means 27 comprise at least one rivet that is inserted in a respective radial receptacle provided in the rod 7 and through the thickness of the lever 6 at the inner face 14.

[0025] A second alternative embodiment has detachable connecting means 27 that are constituted by at least one pin that is cylindrical, or of the elastic type, and is inserted with interference in a respective radial receptacle formed in the rod 7 and through the thickness of the lever 6 at the inner face 14.

[0026] In a third alternative embodiment, the detachable connecting means 27 comprise at least one screw that is engaged in a respective radial female thread provided in the rod 7 and through the thickness of the lever 6, at the inner face 14.

[0027] All the details may be replaced with other technically equivalent ones.

[0028] In practice, the materials used, as well as the shapes and the dimensions, may be any according to requirements without thereby abandoning the scope of the protection of the appended claims.

[0029] The disclosures in Italian Utility Model Application No. BO2003U000028 from which this application claims priority are incorporated herein by reference.

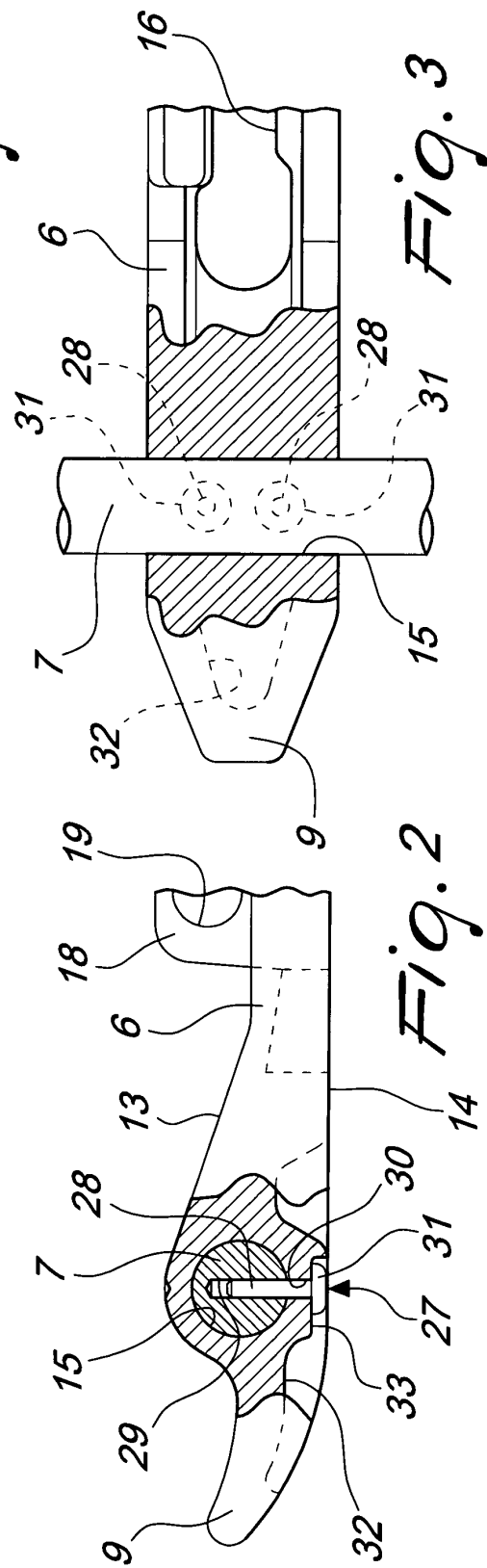
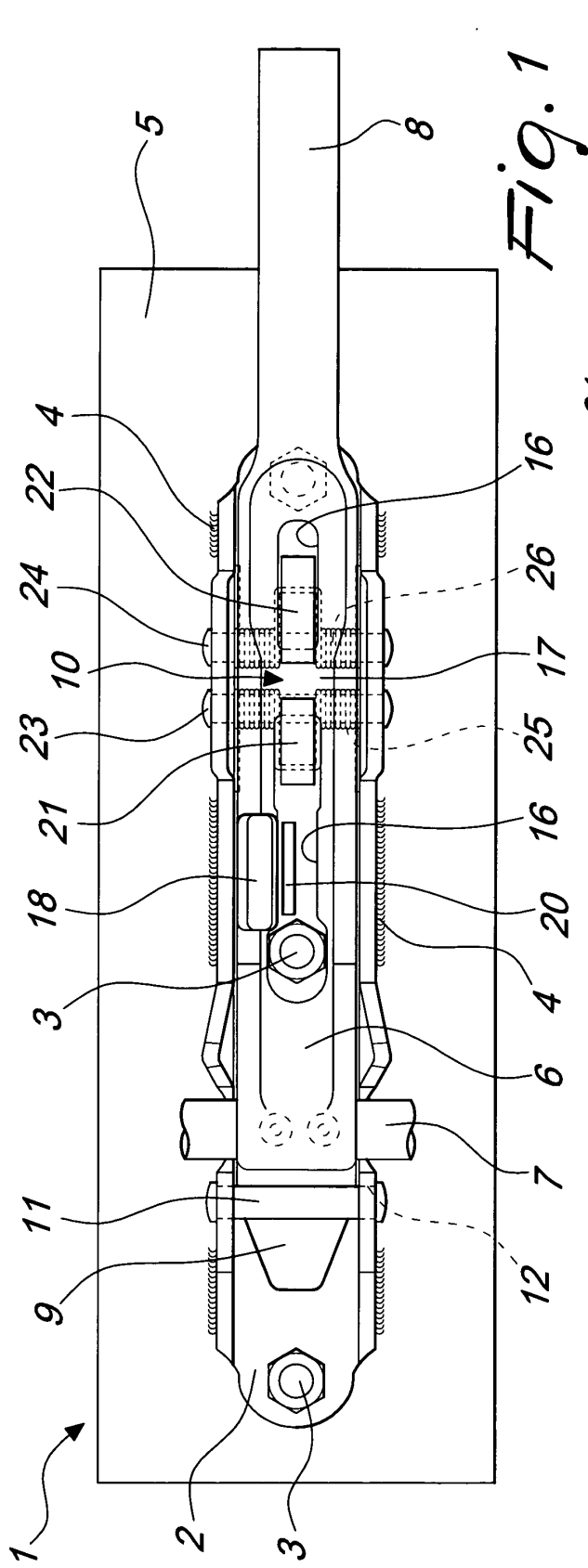
[0030] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A lever-type fastening device, particularly for doors of trucks, trailers and the like, comprising at least one rod (7), which is supported rotatably in each one of said doors, and at least one manual actuation lever (6), which is affected by a through hole (15) for keying along said rod (7) and has an end that is substantially hook-shaped (9), said lever (6) being able to rotate about the axis of said rod (7) from an angular position for locking said door, in which it lies substantially parallel to the frame (5) of the body of the truck and in which said hook-shaped end (9) is engaged in a respective locator (11) that is rigidly coupled to said frame, to a released angular position, in which said hook-shaped end (9) is disengaged from said locator (11), allowing said door to open freely, **characterized in that** said lever (6) is rigidly coupled at right angles to said rod (7) by way of detachable connecting means (27) that are distributed substantially radially with respect to said rod (7).
2. The device according to claim 1, **characterized in that** said detachable connecting means (27) are located at the inner face (14) of said lever (6), said inner face (14) being, when said lever (6) is in said angular locking position, substantially adjacent to said frame (5) and not accessible from the outside, so as to protect said connecting means (27) against attempts at forcing.
3. The device according to claims 1 and 2, **characterized in that** said connecting means (27) comprise at least one pin (28) in which the stem is engaged

in a respective substantially radial hole (29) that is provided in said rod (7) and passes through a corresponding opening (30) provided within the thickness of said lever (6), at said inner face (14) and substantially radially with respect to said through keying hole (15).

4. The device according to one or more of the preceding claims, **characterized in that** said pin (28) has a head that forms a flat surface (31) that abuts against said inner face (14) of said lever (6).
5. The device according to one or more of the preceding claims, **characterized in that** said lever (6) is affected, along said inner face (14) and at said through opening (30), by a sort of flat hollow (32) that is suitable for the abutment of said head.
6. The device according to one or more of the preceding claims, **characterized in that** said pin (28) is made of metallic material with a high resistance to corrosion and oxidation.
7. The device according to one or more of the preceding claims, **characterized in that** it comprises two of said pins (28) that are aligned side by side longitudinally with respect to the axis of said rod (7).
8. The device according to one or more of the preceding claims, **characterized in that** it comprises a plurality of said pins (28) that are distributed radially.
9. The device according to claims 1 and 2, **characterized in that** said connecting means (27) comprise at least one rivet that is inserted in a respective radial receptacle that is provided in said rod (7) and through the thickness of said lever (6).
10. The device according to claims 1 and 2, **characterized in that** said connecting means (27) comprise at least one pin that is inserted in a respective radial seat that is provided in said rod (7) and through the thickness of said lever (6).
11. The device according to claims 1 and 2, **characterized in that** said connecting means (27) comprise at least one screw that is engaged in a respective radial female thread that is provided in said rod (7) and through the thickness of said lever (6).





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EUROPEAN SEARCH REPORT

Application Number
EP 03 02 8727

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Place of search THE HAGUE		Date of completion of the search 22 January 2004	Examiner Westin, K
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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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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