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(71) Applicant: **Pastore & Lombardi S.r.l.**
40057 Cadriano di Granarolo dell'Emilia (Bologna) (IT)

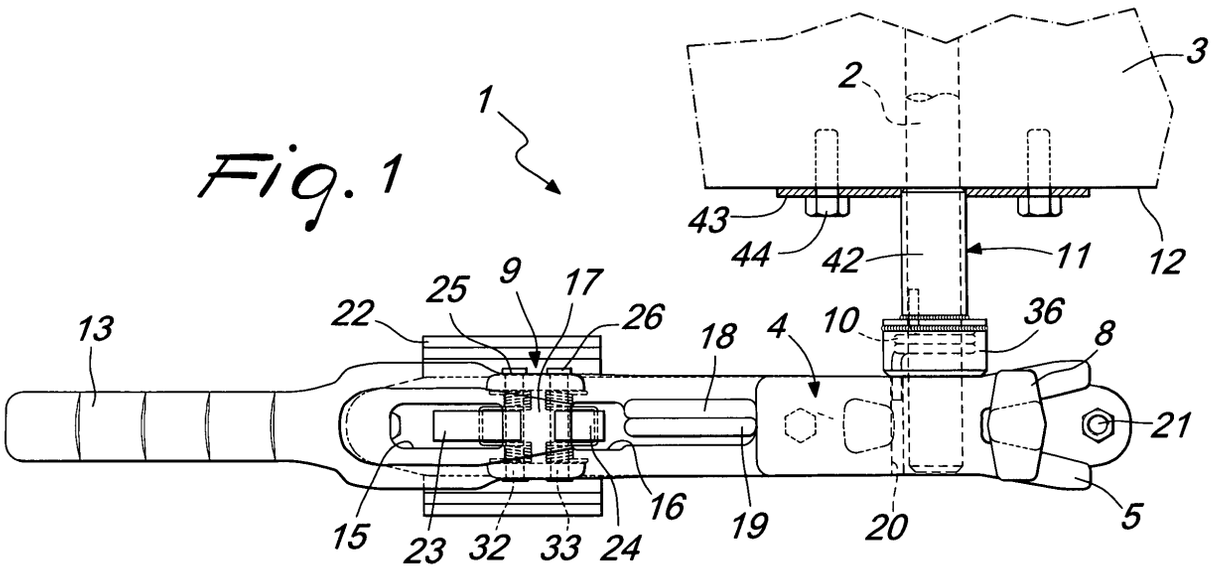
(72) Inventor: **Hilbe, Riccardo**
40125 Bologna (IT)

(74) Representative: **Modiano, Guido, Dr.-Ing. et al**
Modiano & Associati,
Via Meravigli, 16
20123 Milano (IT)

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

(57) A lever-type fastening device particularly for the door of the body of trucks, trailers and the like, comprising at least one rod (2), which is supported so that it can rotate along the door (3) and to which at least one lever (4) for opening and closing the door (3) manually is rigidly coupled at right angles, the lever (4) being able to rotate from a position for closing the door (3), in which it engages, by means of a substantially pawl-shaped lug (5), in a respective locator (8) that is rigidly coupled to the body, to a position for opening the door (3), in which the pawl-shaped lug (5) is disengaged from the locator (8), characterized in that it comprises, coaxially to the rod (2), a spring (10) for retaining the lever (4) in the closure position, which is associated with a spacer (11) that allows precision placement of the lever (4) with respect to the door (3) and allows to support the axial load that bears on the spring (10) during operation.

Fig. 1



EP 1 522 664 A1

Description

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

[0002] Locks for the doors of bodies of trucks are known and widely used which are constituted by at least one articulation rod that is supported so that it can rotate along the door and is provided, at its lower end, with an actuation lever for opening and closing.

[0003] The actuation lever, which is usually arranged horizontally, is provided with a sort of lug that is substantially pawl-shaped: the lever can be turned manually from a closed position, in which it is parallel to the body of the truck and in which the pawl-shaped lug engages in a respective locator that is rigidly coupled to said body, to an open position, in which the lug is disengaged from the locator, thus allowing the free rotation of the door about its pivoting axis and allowing access to the internal compartment of the body.

[0004] During the operations for loading and unloading the body, each one of the doors remains open, and the respective actuation lever can protrude inadvertently with respect to the plane of said door, constituting both a hindrance and a potential danger for operators.

[0005] In order to deal with this drawback, locks have been provided with elastic means for retaining the lever in the closed position when the door is open, so that said lever does not protrude outward. Such elastic means are generally constituted by a torsion spring, which is fitted along the articulation rod of the lock, interposed between the lever and the lower edge of the door. However, the spring, fitted in this position, is subjected to considerable axial stresses, caused in particular by the manner in which the lock is assembled and by the constraining reactions of the frame of the body. These stresses produce an abnormal loading condition on the spring, which compromises its duration, making it break prematurely.

[0006] Moreover, these locks are generally assembled rather inaccurately, particularly as regards the position of the lever with respect to the lower edge of the door.

[0007] The aim of the present invention is to obviate the above-cited drawbacks, by providing a fastening device for doors of trucks that has improved and reliable operation, i.e., is capable of maintaining the efficiency and duration of the spring for retaining the lever in the closed position.

[0008] Within this aim, an object of the present invention is to provide a fastening device that can be assembled accurately and in a versatile manner.

[0009] Another object of the present invention is to provide a fastening device that is simple, relatively easy to provide in practice, safe in use, effective in operation, and has a relatively low cost.

[0010] This aim and these and other objects that will become better apparent hereinafter are achieved by the present lever-type fastening device particularly for the door of the body of trucks, trailers and the like, which comprises at least one rod, which is supported so that it can rotate along said door and to which at least one lever for opening and closing said door manually is rigidly coupled at right angles, said lever being able to rotate from a position for closing said door, in which it engages, by means of a substantially pawl-shaped lug, in a respective locator that is rigidly coupled to the chassis of said body, to a position for opening said door, in which said pawl-shaped lug is disengaged from said locator, characterized in that it comprises, coaxially to said rod, a spring for retaining said lever in said closure position, which is associated with a spacer that allows precision placement of said lever with respect to said door and allows to support the axial load that bears on said spring during operation.

[0011] Further characteristics and advantages of the present 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 the door of the body 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 the fastening device according to the invention;
Figure 2 is a partially sectional bottom view of said device;
Figure 3 is a front view of a detail of the fastening device;
Figure 4 is a transverse sectional view of a detail of the device according to the invention, taken along the line IV-IV of Figure 3.

[0012] 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.

[0013] Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0014] With reference to the figures, the reference numeral 1 generally designates a lever-type fastening device particularly for the door of the body of trucks, trailers and the like.

[0015] The device 1 comprises at least one vertical articulation rod 2, which is supported so that it can rotate along a door 3 of the body of the truck, to which at least one actuation lever 4 is rigidly coupled; the lever is arranged horizontally and forms a sort of substantially pawl-shaped lug 5. The lever 4 can rotate manually from a position for closing the door 3, in which it is accommodated and retained in a base 6 rigidly coupled to the chassis of the body of the truck (by way of the engagement of a protrusion 7 of the base 6 in a recess 7a of

the lever 4) and in which the pawl-shaped lug 5 is engaged in a respective locator 8 that is rigidly coupled to the base 6, to a position for closing the door 3, in which the pawl-shaped lug 5 is disengaged from the locator 8, so that it is possible to turn the door freely about its own pivoting axis and allow access to the loading compartment of the body.

[0016] The base 6 is provided with manually-operated means 9 for locking the lever 4 in the closure position, which are suitable to prevent said lever from disengaging accidentally, leaving the door 3 free to open.

[0017] According to the invention, the fastening device comprises a spring 10 for retaining the lever 4 in the closure position, which is accommodated in a spacer 11 that is fitted coaxially along the articulation rod 2 and is interposed between the lever 4 and the lower edge 12 of the door 3, said spacer being suitable to support the axial load that bears, during operation, on the retention spring 10. Further, by varying the axial dimension of the spacer 11 it is possible to obtain precisely and accurately various assembly configurations that are better suited to the specific applications.

[0018] The actuation lever 4, which is slender and elongated, forms a manual actuation end 13 and is affected, at the opposite end, by a cylindrical transverse through cavity 14, for rigid keying along the lower end of the articulation rod 2. Substantially in the central portion, the lever 4 has a first opening 15 and a second opening 16, which are formed and separated by a sort of bridge 17; moreover, the lever 4 forms, at the second opening 16, an eye 18 for fixing to a complementary eye 19, which is rigidly coupled to the base 6, with customs seals. The lever 4 is affected, proximate to the cavity 14, by a transverse through hole 20, whose axis is parallel to the axis of the cavity 14 and which has a circular cross-section and a smaller diameter.

[0019] The base 6 is, for example, fixed to the chassis of the body by means of bolts 21 and lateral welds, is flat and elongated, and is provided with two side walls 22 at the locking means 9; the locator 8 for the pawl-shaped lug 5 of the lever 4 is preferably constituted by a sort of T-shaped element, which is fixed in a lower region to the surface of the base 6.

[0020] The means 9 for locking the lever 4 in the closure position are constituted by a first rocker 23 and a second rocker 24, which are articulated respectively on a first pivot 25 and a second pivot 26, which are fixed, at their ends, to raised portions 27 of the base 6; the first and second rockers 23 and 24 form respectively a first tooth 28 and a second tooth 29, as well as a first profile 30 and a second profile 31, which are mutually kinematically coupled. The first and second rockers 23 and 24 are associated with respective torsion springs 32 and 33, which are mounted on the first and second pivots 25 and 26 (see Figures 1 and 2).

[0021] With the lever 4 in the closure position, the rockers 23 and 24 are inserted respectively in the first and second openings 15 and 16 and the first and second teeth 28 and 29 stably surround the bridge 17 by way of the action of the torsion springs 32 and 33; the manual pressure applied to the first rocker 23 entails, by way of the coupling of the profiles 30 and 31, the rotation of the first and second rockers 23 and 24 in mutually opposite directions, with consequent disengagement of the teeth 28 and 29 from the bridge 17 and disengagement of the lever 4 from the base 6.

[0022] The spring 10 for retaining the lever 4 (Figure 3) in the closure position, particularly if the door 3 is open during operations for loading and unloading the compartment of the body, is of the helical torsion type, is fitted coaxially to the rod 2, and is preferably constituted by a small number of turns (the elastic force required is relatively modest and furthermore the space occupation must be minimal). The spring has a first end 34, which is rigidly coupled to the spacer 11, and a second end 35, which is rigidly coupled to the lever 4; in particular, the second end 35 is engaged inside the transverse through hole 20. The rotation of the lever 4, performed manually, about the axis of the rod 2 accordingly produces a relative mutual rotation of the first and second ends 34 and 35 of the spring 10; said spring accordingly opposes an elastic action that tends to return the lever 4 to the initial closure position.

[0023] The spacer 11, rigidly connected to the lower edge 12 of the door 3, comprises a substantially bell-shaped portion 36, which is mounted coaxially to the rod 2 and forms internally a receptacle 37, which is open downward, for the turns of the retention spring 10; the bell-shaped portion 36 is, in the operating condition, arranged so that the lower rim 38 is in abutment against the upper side of the lever 4, so as to relieve the retention spring 10 from the axial load due to assembly and to the constraining reactions of the structure of the body. The bell-shaped portion 36 has an abutment surface 39 for the spring, which is perpendicular to the axis of the rod 2 and is affected by a first circular opening 40 and a second circular opening 41 (Figure 4) in which the first end 34 of the retention spring 10 is inserted selectively during the installation of the lever 4 in the right or left configuration, respectively.

[0024] The bell-shaped portion 36 of the spacer 11 is extended upward with a substantially tubular portion 42, which is keyed along the rod 2, which in turn is connected to a rectangular fixing plate 43, for example by means of screws 44, to the lower edge 12 of the door 3. The bell-shaped portion 36, the tubular portion 42 and the plate 43 are preferably mutually connected by welding.

[0025] The method of use of the device according to the invention is as follows. With the door 3 of the body fastened, the lever 4 is accommodated in the base 6 parallel to the chassis of the body, the pawl-shaped lug 5 is engaged below the locator 8, and the teeth 28 and 29 of the rockers 23 and 24 are closed on the bridge 17. By applying manual pressure to the surface of the first rocker 23, said first rocker is turned about the axis of the first pivot 25; the coupling between the first profile 30

and the second profile 31 induces the rotation in the opposite direction of the second rocker 24, with consequent disengagement of the bridge 17 from the teeth 28 and 29. The lever 4 can thus be turned freely from the closure position to the open position, so as to disengage the pawl-like lug 5 from the respective locator 8.

[0026] Once the door 3 has been opened, the retention spring 10 allows to keep the lever 4 stably and safely in the closed position (i.e., parallel to the door 3): one thus prevents it from protruding during the operations for loading and unloading the body, since it might constitute a hindrance and a potential danger.

[0027] It has thus been shown that the invention achieves the intended aim and objects.

[0028] The retention spring 10 constitutes an effective safety measure against accidental angular displacements of the actuation lever 4, which is thus constantly kept substantially parallel to the plane of the door 3 in the correct position of minimum space occupation.

[0029] The spacer 11, in which the retention spring 10 is conveniently accommodated, effectively supports the axial load that bears during operation on said spring and is caused mainly by the installation of the device and by the constraining reactions of the base 6, of the chassis of the body, and of the door 3.

[0030] Further, the spacer 11 can be provided with a variable overall axial length, so that it can be adapted easily to different conditions of application characterized by different assembly configurations and loads.

[0031] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0032] All the details may further be replaced with other technically equivalent ones.

[0033] In practice, the materials used, as well as the shapes and dimensions, may be any according to requirements without thereby abandoning the scope of the protection of the appended claims.

[0034] The disclosures in Italian Utility Model Application No. BO2003U00009 from which this application claims priority are incorporated herein by reference.

[0035] 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 the door of the body of trucks, trailers and the like, comprising at least one rod (2), which is supported so that it can rotate along said door (3) and to which at least one lever (4) for opening and closing said door (3) manually is rigidly coupled at right angles, said lever (4) being able to rotate from a position for closing said door (3), in which it engages, by means of a substantially pawl-shaped lug (5), in a respective locator (8) that is rigidly coupled to said body, to a position for opening said door (3), in which said pawl-shaped lug (5) is disengaged from said locator (8), **characterized in that** it comprises, coaxially to said rod (2), a spring (10) for retaining said lever (4) in said closure position, which is associated with a spacer (11) that allows precision placement of said lever (4) with respect to said door (3) and allows to support the axial load that bears on said spring (10) during operation.

2. The device according to claim 1, **characterized in that** said spring (10) is of the helical torsion type, with a first end (34) that is rigidly coupled to said spacer (11) and a second end (35) that is rigidly coupled to said spring (4).

3. The device according to claims 1 and 2, **characterized in that** said lever (4) is affected by a transverse through hole (20), which has a substantially circular cross-section in which said second end (35) of said spring (10) is engaged.

4. The device according to one or more of the preceding claims, **characterized in that** said spacer (11) comprises a substantially bell-shaped portion (36), which is coaxial to said rod (2), is connected to the edge (12) of said door (3), and forms internally an annular receptacle (37) for said spring (10).

5. The device according to one or more of the preceding claims, **characterized in that** said bell-shaped portion (36) forms an abutment surface (39) for said spring (10), which is affected by a first circular opening (40) and by a second circular opening (41), in which said first end (34) of said spring (10) engages selectively when said lever (4) is installed in the right or left configuration, respectively.

6. The device according to one or more of the preceding claims, **characterized in that** said spacer (11) comprises a substantially tubular portion (42), which is mounted coaxially along said rod (2) and is connected, at one end, to said bell-shaped portion (36) and, at the other end, to a plate (43) for fixing to said edge (12) of said door (3).

7. The device according to one or more of the preceding claims, **characterized in that** said bell-shaped portion (36), said tubular portion (42) and said plate (43) are mutually connected by welding.

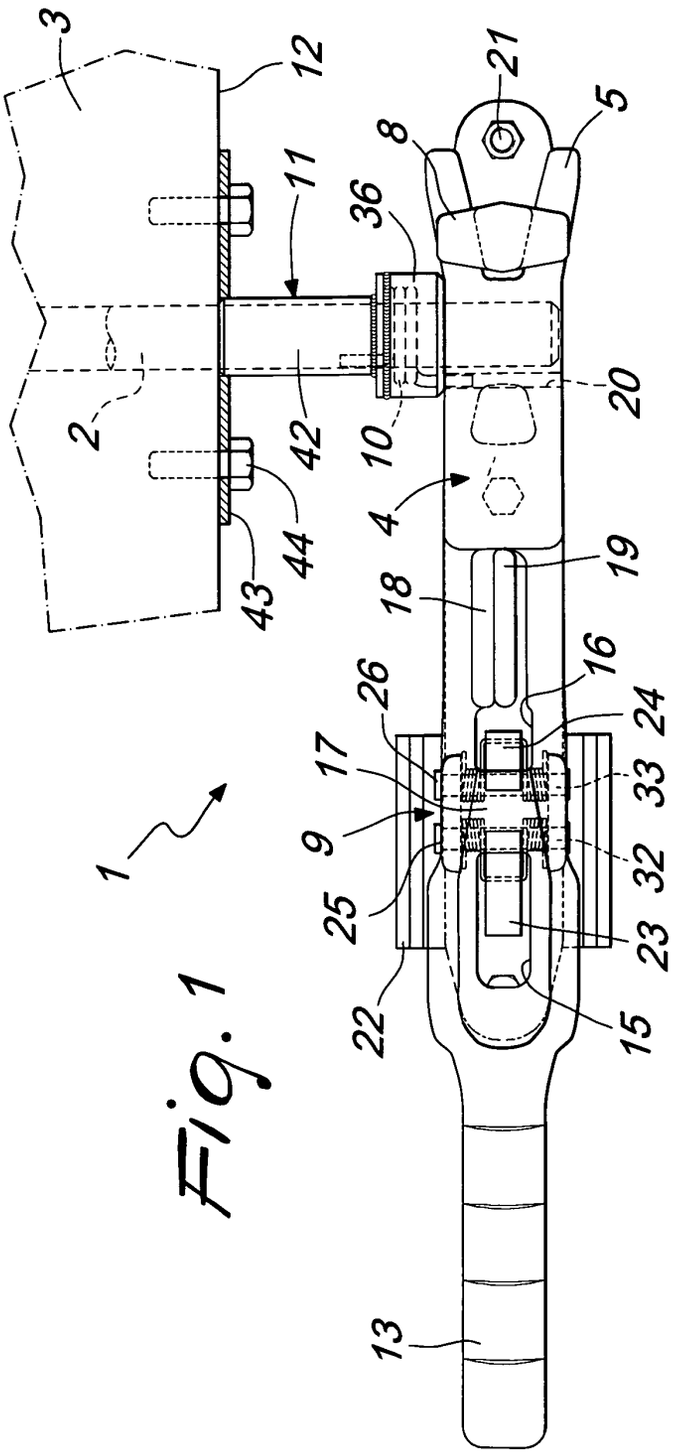

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Fig. 1

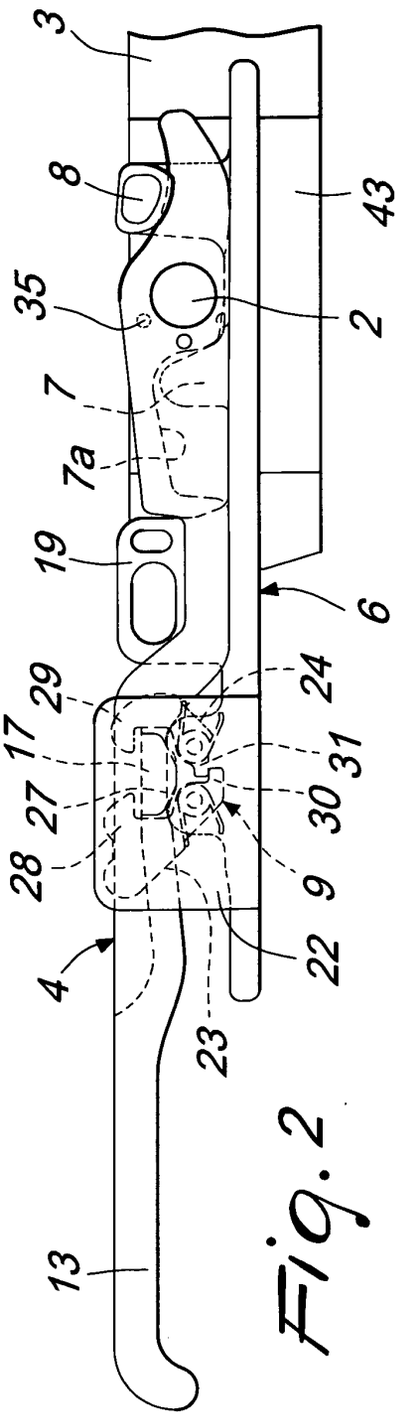
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Fig. 2

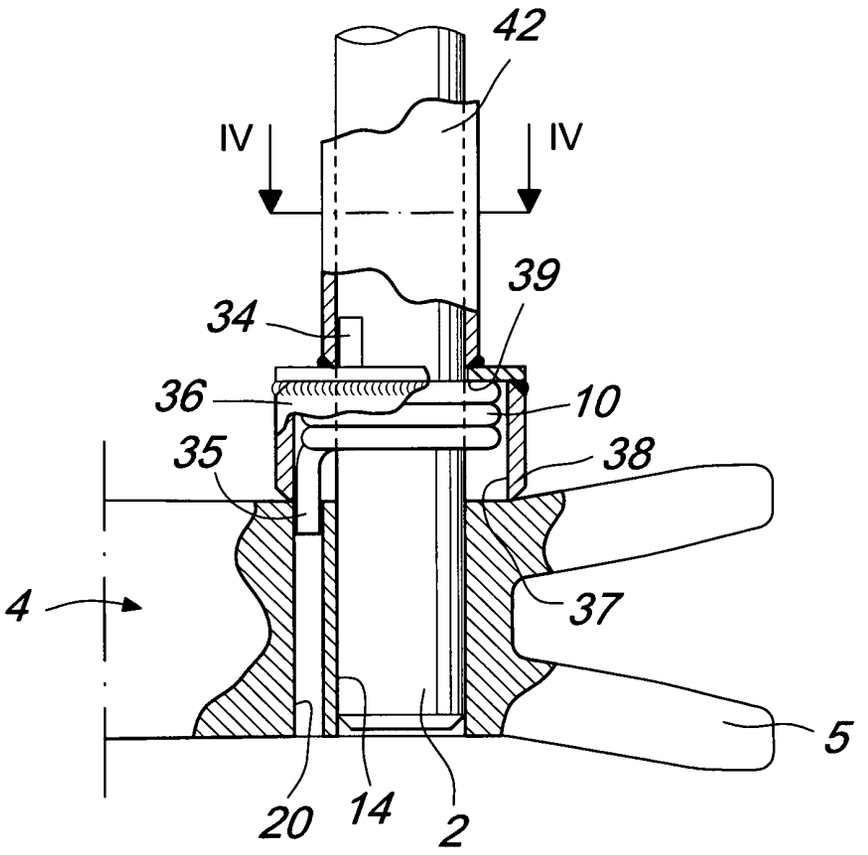

Fig. 3

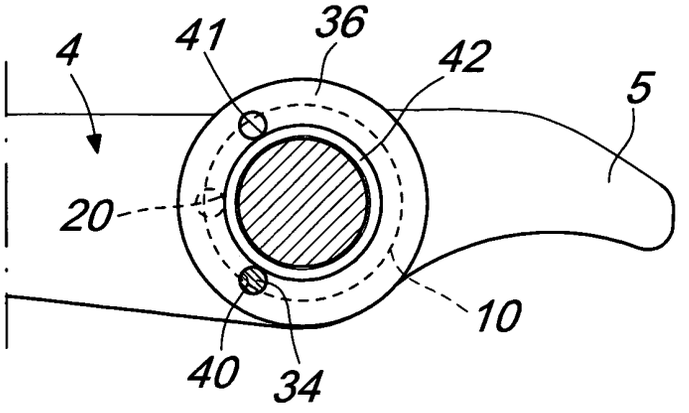

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 04 02 2943

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 1 835 100 A (SYMINGTON THOMAS H) 8 December 1931 (1931-12-08) * page 3, lines 22-49; figures 7,8 * -----	1,2,4,6,7	E05B65/16 E05B15/04 E05B7/00
X	US 4 134 281 A (PELCIN ALBERT L) 16 January 1979 (1979-01-16) * column 6, lines 31-68; figure 8 * -----	1,2,6	
X	EP 1 013 855 A (PWP SA) 28 June 2000 (2000-06-28) * paragraph [0039]; figures 11,16 * -----	1-3,6	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 October 2004	Vacca, R

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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1

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 02 2943

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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26-10-2004

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