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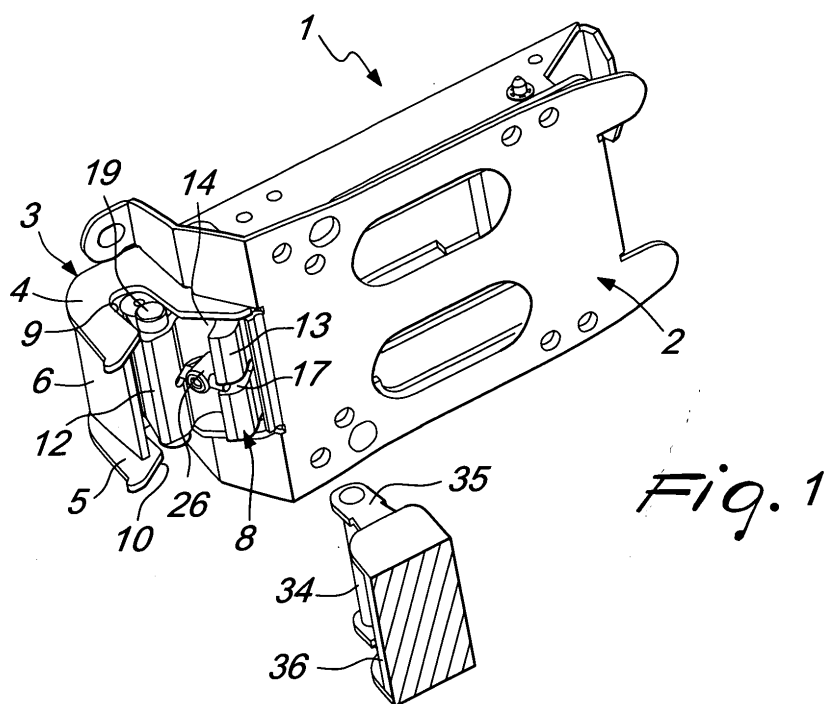
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(54) **Lock with rotary latch**

(57) A lock with rotary latch (8) provided with a slot adapted to engage a bracket (34) fixed to the abutment jamb of a door, the lock comprising a box-like body (1), which can be fixed at the abutment edge of a door and is provided with a portion (3) that protrudes from the edge, in which the latch (8) is mounted so that it can rotate, the slot (14) being shaped so as to produce, when the door closes, the engagement of the bracket (34) in the slot, and therefore the rotation of the latch (8) until it reaches the position for engaging the bracket, a

locking device (37) being further provided for locking the latch (8) in two stable positions that correspond to the closure and opening positions of the door, respectively, the latch accommodating at least one element (18, 19) controlled by a member (25, 26) arranged in the slot, the element (18, 19) being movable between a position for blocking the rotation of the latch (8) when the latch is disengaged from the bracket (34) and a position for enabling the rotation of the latch when the member (26) detects the presence of the bracket (34) in the slot (14).



Description

[0001] The present invention relates to a lock with rotary latch.

[0002] Locks with rotary latch are already known for example from US-2,344,532, US-4,896,908, US-4,988,134, and US-5,142,890, from DE-632,624, from EP-201,244, and from WO-02/059443A1 in the name of this same Applicant. These locks are fixed to the lock stile of the door and comprise a latch provided with a slot in which, when the door is closed, a bracket fixed to the abutment jamb engages. More specifically, after the engagement of the bracket in the slot, the thrust applied to the door produces the rotation of the latch and the engagement of the bracket. Finally, an appropriately provided device locks the latch and retains it in the door closure position. By deactivating the device (for example electrically or manually), the latch is allowed to turn freely and therefore disengage from the bracket when the door is operated in the opening direction.

[0003] In known locks there is the drawback that while the door is open, if the latch is intentionally or inadvertently turned until it reaches the locking position produced by the intervention of the locking device, its slot is oriented so that it cannot be engaged by the bracket. Accordingly, it is no longer possible to engage the latch with the bracket and therefore close the door. In this case, the bracket, instead of engaging in the slot, in fact strikes the latch, with the risk of causing deformations of the internal components of the lock and damage to the elements that anchor the lock to the door and the bracket to the jamb.

[0004] The aim of the present invention is to obviate the above-cited drawback of known locks with rotary latch.

[0005] Within this aim, an object of the present invention is to provide a lock with rotary latch that has a simple structure and is capable of ensuring effective operation and a relatively low cost.

[0006] This aim and this and other objects that will become better apparent hereinafter are achieved by a lock with rotary latch provided with a slot adapted to engage a bracket fixed to the abutment jamb of a door, said lock comprising a box-like body, which can be fixed at the abutment edge of a door and is provided with a portion that protrudes from said edge, in which said latch is mounted so that it can rotate, said slot being shaped so as to produce, when the door closes, the engagement of said bracket in said slot, and therefore the rotation of said latch until it reaches the position for engaging said bracket, a locking device being further provided for locking said latch in two stable positions that correspond to the closure and opening positions of the door, respectively, characterized in that said latch accommodates at least one element controlled by a member arranged in said slot, said element being movable between a position for blocking the rotation of said latch when said latch is disengaged from said bracket and a position for ena-

bling the rotation of said latch when said member detects the presence of said bracket in said slot.

[0007] Further characteristics and advantages of the present invention will become better apparent from the following detailed description of a preferred embodiment thereof, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a lock with rotary latch, without the housing and with the latch oriented so as to engage a bracket;

Figure 2 is a view of the lock, in which the latch has not reached the stable position for engaging the bracket;

Figure 3 is a sectional view of the latch and of the members fitted therein;

Figure 4 is a sectional view, taken along the line IV-IV of Figure 3;

Figures 5, 6 and 7 are views of three successive positions of the latch, of the lock and of the bracket during door closure.

[0008] Figures 1 and 2 refer to a lock with rotary latch of the type disclosed in the above-cited international publication WO-02/059443A1 in the name of this same Applicant, which is referenced here as an integral part of the present description.

[0009] In Figures 1 and 2, the reference numeral 1 designates the box-like body of the lock, which is closed in a lower region by a plate 2 that constitutes the bottom by means of which the lock is fixed to a door at the abutment edge.

[0010] The body 1 has a portion 3 which, when the lock is fully installed, protrudes from the edge of the door. The portion 3 is formed by two side walls 4 and 5 of the box-like body, between which there is a flap 6, which encloses, together with the walls 4 and 5, a compartment 7 for accommodating a rotary latch 8 of the lock.

[0011] Respective identical recesses 9 and 10 are formed in the walls 4 and 5 and are arranged mirror-symmetrically with respect to a centerline plane P of the latch. The recesses 9 and 10 are open toward the bottom 2 of the lock, and have two parallel edges that diverge in a V-like configuration, forming a guide for the engagement bracket, as will become better apparent hereinafter. The latch 8 is supported so that it can rotate on a shaft 11 whose opposite ends are fixed in the walls 4 and 5.

[0012] The latch 8, on the side directed toward the flap 6, forms a sort of fork, between the upper and lower prongs 12 and 13 of which there is a slot 14, which has a substantially semicircular cross-section. In the upper prong 12 there is a cylindrical seat 15, which is parallel to the shaft 11 and is connected to a cavity 16, which is interposed between the seat 15 and the shaft 11.

[0013] The reference numeral 17 designates a gap, which is perpendicular to the shaft 11 and cuts along the

centerline plane P the lower prong 13 and the upper prong 12 as well as the slot 14, the seat 15 and the cavity 16.

[0014] Two cylindrical elements 18 and 19, termed pistons hereinafter for the sake of convenience in description, are guided in the seat 15, and two linkages 22 and 23 are articulated to them by way of respective pins 20 and 21. The ends of the linkages 22 and 23 that lie opposite the pins 20 and 21 are provided with wider regions that are mutually superimposed and are crossed, at the centerline plane P, by a pivot 24, which protrudes from a rod 25 that has a larger diameter and is guided in the gap 17.

[0015] The rod 25 passes diametrically through a cylindrical stem 26, from which a portion 27 having a smaller diameter protrudes and forms, together with the stem 26, a shoulder 28. The stem 26 and the portion 27 are guided in seats 26a, 27a, which are formed in the latch 8 and lead into the slot 14. A spring 29 acts on the shoulder 28 and actuates the stem 26 so that it protrudes into the slot 14.

[0016] A blind hole 30 is formed coaxially in the stem 26 and intersects the rod 25; a grub 31, actuated by a spring 32, can slide in said hole. The grub 31 engages, by means of its end arranged opposite the spring 32, a slot 33 of the rod 25, so as to prevent the rod from sliding in the stem 26 and prevent the pivot 24 from disengaging from the linkages 22 and 23.

[0017] In order to better understand the operation of the described lock, it is convenient to note first of all that the rotary latch 8, differently from what occurs in a conventional lock provided with a latch and a bolt that engage by linear sliding in a so-called selvage, rotates so as to engage on a bracket fixed to the abutment jamb of the door.

[0018] As shown more clearly by Figures 1 and 5 to 7, the bracket is composed of a cylindrical bar 34 which, by means of a pair of arms 35, is articulated to a base 36, which is fixed by means of screws to the abutment jamb of the door. The cylindrical bar 34 has a diameter that is complementary to the diameter of the slot 14, so that it can be accommodated thereby with minimal play and act as an engagement member for the latch 8 when the door is closed. The latch 8 can rotate between two stable active positions, which correspond to the condition in which the door is open and the condition in which the door is closed.

[0019] When the door is open, the latch is in the condition shown in Figure 1, i.e., rotated in an angular position in which the slot 14 is oriented toward the inlet of the recesses 9 and 10. This stable angular position, assumed by the latch 8, is determined by a known locking device, generally designated by the reference numeral 37, which acts on the latch, keeping it in abutment against the box-like body 1 (Figure 5) when the door is open or against the bottom 2 when the door is closed. For the sake of brevity in description, the structure of the locking device 37 is not described in detail, but can

be deduced for example from the structure described in the above-cited international publication WO-02/059443A1.

[0020] It should be noted that in the position shown in Figure 1, the stem 26 protrudes into the slot 14, and accordingly the pistons 18 and 19, by way of the lever system composed of the pin 25 and the linkages 22 and 23, engage in the recesses 9 and 10.

[0021] By closing the door (Figure 5), the bracket 34 can enter the slot 14 and push the stem 26 into its seat 26a. The retraction stroke of the stem 26 causes, by means of the rod 25 and the linkages 22 and 23, the simultaneous retraction into the latch of the pistons 18 and 19 and their disengagement from the recesses 9 and 10, by way of which, before the door abuts against the jamb, the latch can rotate (Figure 6) and engage the bracket 34. When the door has reached the position for abutment against the jamb (Figure 7) and the engagement of the bracket 34 has been completed, the device 37 locks the latch in the stable door closure position.

[0022] As it is evident from what has been described above, the particularity of the invention is that the latch 8, if there is no action on the stem 26 capable of retracting the pistons 18 and 19 into the latch, cannot reach the angular position for abutment on the bottom 2. This particularity provides the advantage that when the door is open it is not possible to turn the latch, for example by acting on it with intentional or inadvertent maneuvers, into the position in which it can be locked stably by the device 37.

[0023] In order to better appreciate the utility of the invention, it is noted that in conventional locks the latch locks also when it is turned while the door is open, and in order to enable it again, i.e., turn it so that the slot 14 can be engaged by the bracket 34, it is necessary to force its rotation by resorting to a suitable tool.

[0024] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. All the details may further be replaced with other technically equivalent ones.

[0025] In practice, the materials used, as well as the shapes and dimensions, may be any according to requirements without thereby abandoning the protective scope of the appended claims.

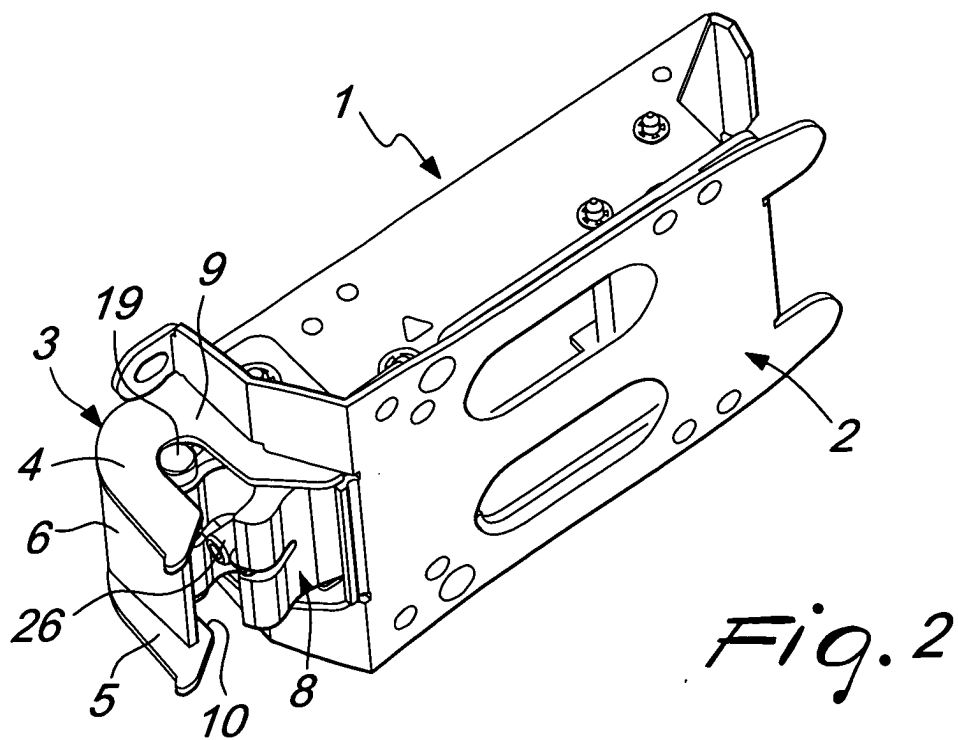
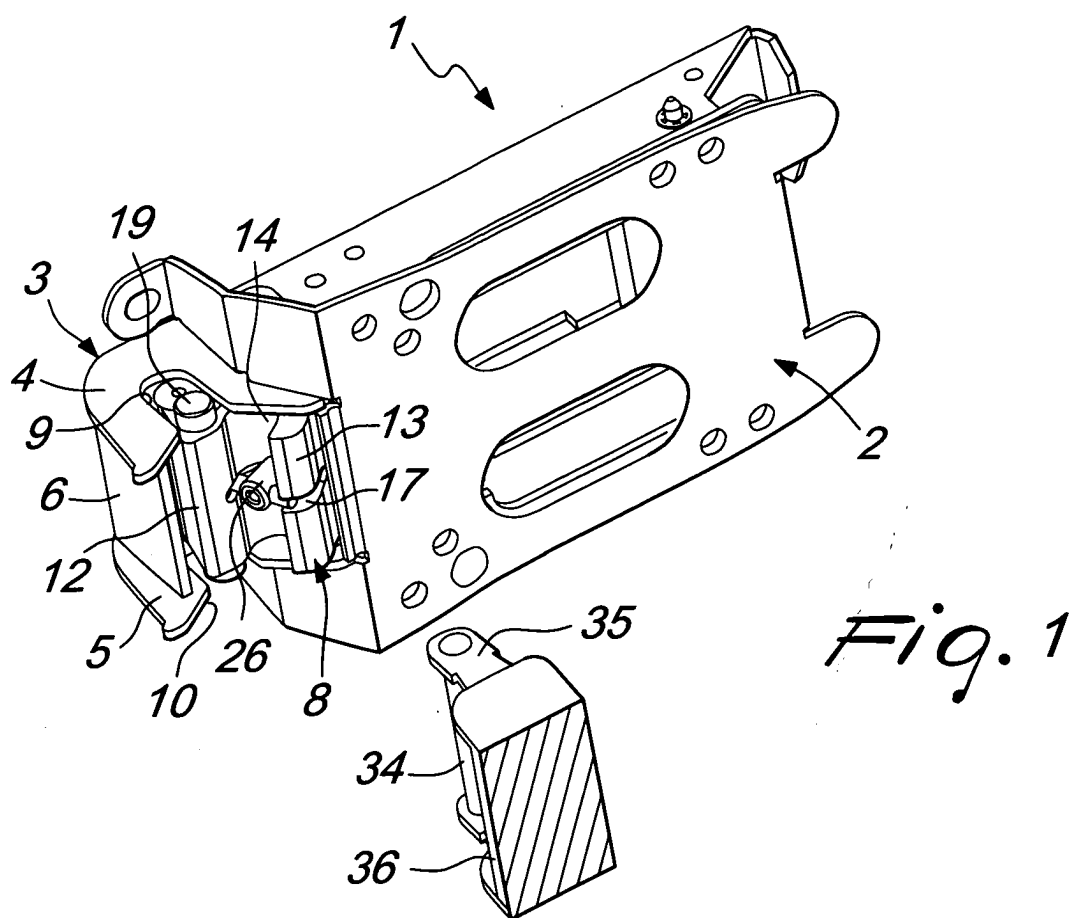
[0026] The disclosures in Italian Patent Application No. BO2003A000482 from which this application claims priority are incorporated herein by reference.

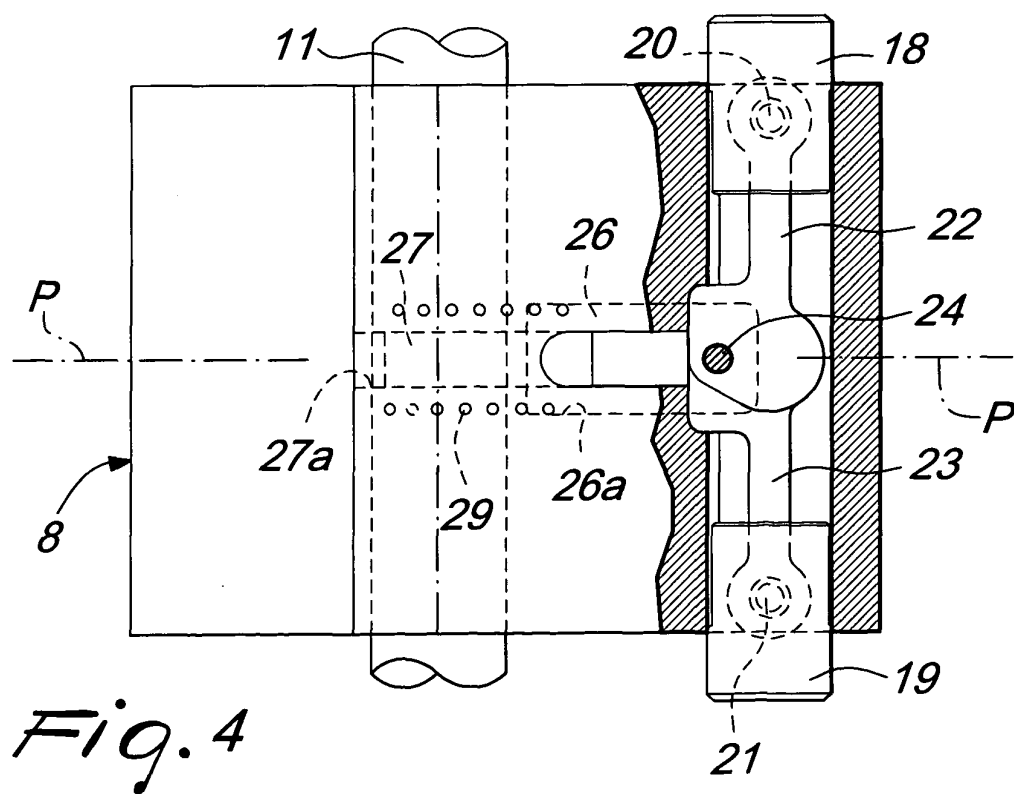
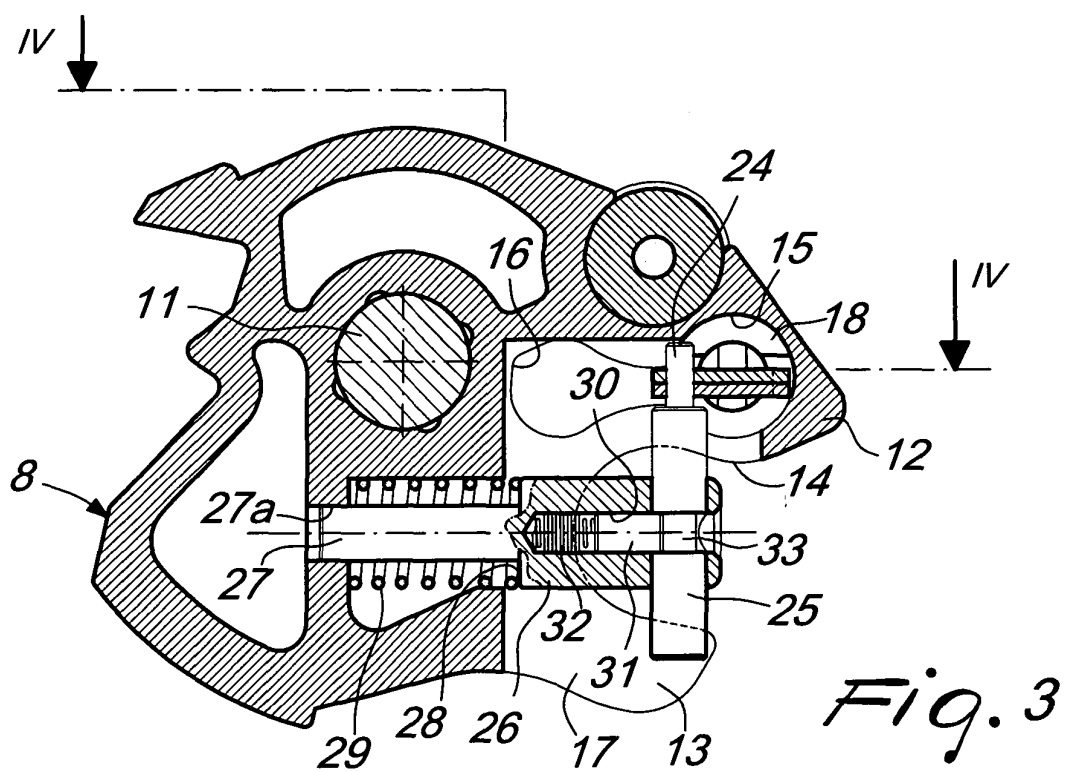
[0027] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

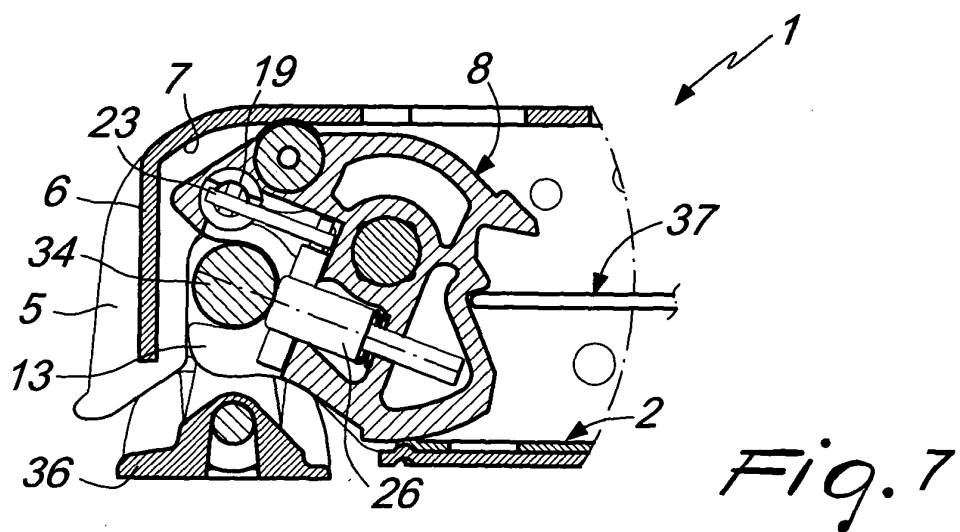
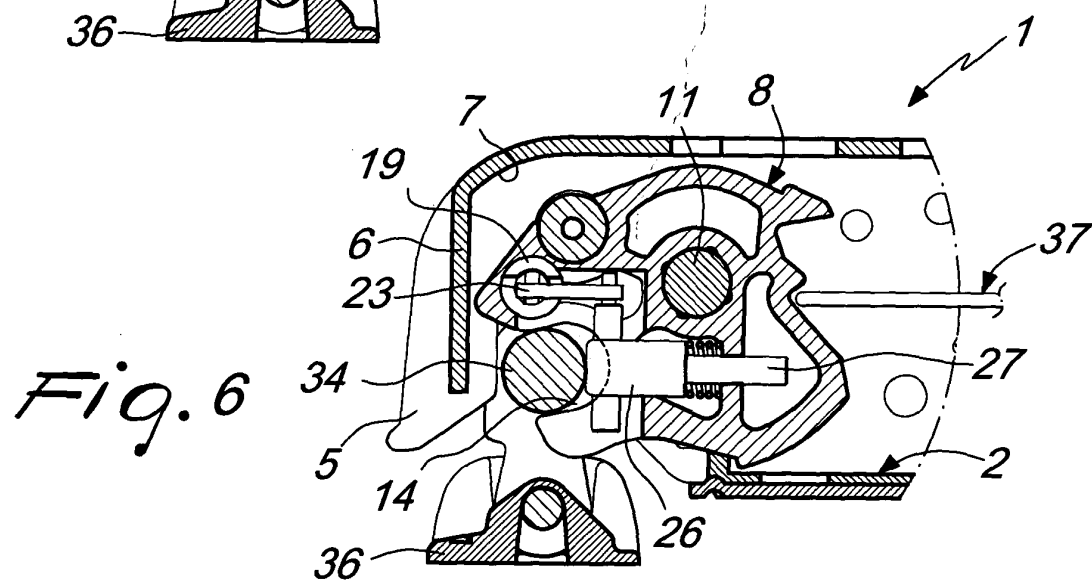
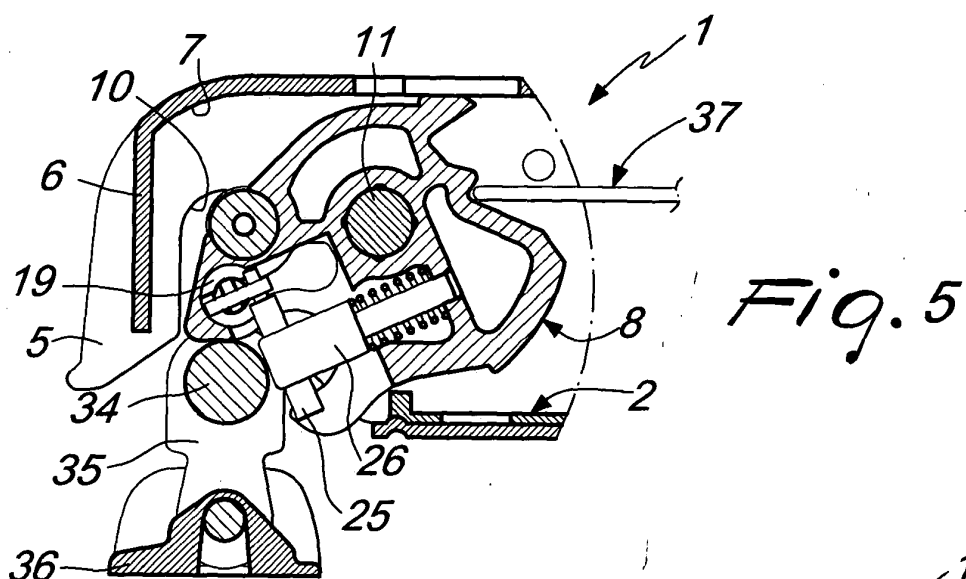
Claims

as to engage a slot (33) of said rod (26).

1. A lock with rotary latch (8) provided with a slot (14) adapted to engage a bracket (34) fixed to the abutment jamb of a door, said lock comprising a box-like body (1), which can be fixed at the abutment edge of a door and is provided with a portion (3) that protrudes from said edge, in which said latch (8) is mounted so that it can rotate, said slot (14) being shaped so as to produce, when the door closes, the engagement of said bracket (34) in said slot (14), and therefore the rotation of said latch (8) until it reaches the position for engaging said bracket (34), a locking device (37) being further provided for locking said latch (8) in two stable positions that correspond to the closure and opening positions of the door, respectively, **characterized in that** said latch (8) accommodates at least one element (18, 19) controlled by a member (25, 26) arranged in said slot, said element (18, 19) being movable between a position for blocking the rotation of said latch (8) when said latch is disengaged from said bracket (34) and a position for enabling the rotation of said latch when said member (26) detects the presence of said bracket (34) in said slot (14).
2. The lock according to claim 1, **characterized in that** it comprises two cylindrical elements (18, 19), which are accommodated so that they can slide in said latch (8) parallel to the rotation axis (11) thereof, and are connected, by means of a lever system (22, 23, 25), to said member (26) so that they can move between a position that is internal to said latch and an external position in which said elements engage recesses (9, 10) of said portion (3) when said member (26) is actuated by said bracket (34).
3. The lock according to claim 2, **characterized in that** said member is constituted by a stem (26), which is guided in a seat (26a) of said latch (8) that leads into said slot (14) and is connected to said cylindrical elements (18, 19) by said lever system (22, 23, 25), spring means (29) being provided which actuate said stem (26) into a position in which it protrudes into said slot (14).
4. The lock according to claim 3, **characterized in that** said lever system comprises a rod (25), which is fixed to said stem (26) and is guided in a gap (17) of said latch (8), which intersects said slot (14), said rod (25) being connected to said cylindrical elements (18, 19) by two respective linkages (22, 23).
5. The lock according to claim 4, **characterized in that** said rod (25) is coupled diametrically to said stem (26) by a grub (31) that is guided in an axial hole (30) of said stem (26) and is actuated by a spring (32) that is accommodated in said hole, so









European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 04 01 6341

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Place of search Munich		Date of completion of the search 7 December 2004	Examiner Friedrich, A
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
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 01 6341

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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