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(54) **Antipanic pushbar for mortice locks**

(57) The antipanic pushbar for mortice locks comprises a lock plug (6) fixed in rotation with the spindle of said pushbar, and a first and respectively second actuator element (11,13) of the lock plug (6) fixed in rotation with the pushbar and engaged against a first and respectively second strike plate (8,7) of the lock plug (6) with a first and relatively second force of rotation in the same direction and applied on the opposite side in relation to the hinge pin (12) of the pushbar in a manner so that it generates a first and respectively second same rotation moment adapted to rotate the lock plug (6) from the lock closed position to open position.

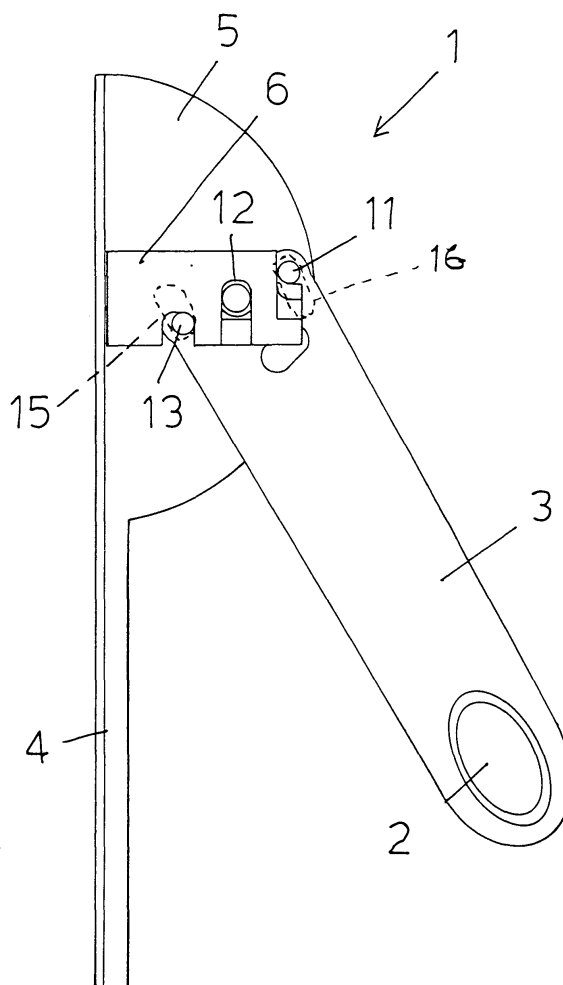


FIG. 1

Description

[0001] The present invention relates to an antipanic pushbar for mortice locks.

[0002] In particular the present invention relates to an antipanic pushbar of the type comprising a horizontal bar adapted to rotate when pushed in order to open a lock.

[0003] Panic pushbars are subject to stringent standards as regards dimension, and in particular to a maximum limit that the horizontal bar is permitted to project when in lock closed position to prevent obstructing any transit, and to a minimum limit that the horizontal bar is permitted to project when in lock open position to prevent injury to the hands and fingers of the user activating the device.

[0004] Current panic pushbars for mortice locks known to the art possess pushbar spindle action mechanisms that while having high rotation torque, also generate extreme internal friction that limits the working life, making maintenance intervention or replacement necessary after a reasonably short period.

[0005] This is often due to the fact that in order to create high rotation torsion, generally a single intense rotation force must be applied on a tangent to the rotating element that incorporates the pushbar spindle.

[0006] Another disadvantage that is criticised in antipanic pushbars for mortice locks currently on the market, is linked with the fact that the pushbar spindle action mechanism varies according to whether the latch-bolt is placed on the right or left hand side of the lock.

[0007] Consequently the pushbar spindle return spring in closed position is also linked to the specific type of mechanism and therefore cannot be separated from it.

[0008] Therefore for pushbar assembly it is always necessary to have two mechanism sets available, one right hand and one left hand type, in order to be able to assemble the type required in the particular circumstances. This situation obviously poses considerable problems associated mainly with pushbar cost due to the fact that one of the two mechanisms mounted will be of no use since it will never be used. The technical aim of the present invention therefore, is to provide an antipanic pushbar for mortice locks that eliminates the technical problems present in state of the art systems.

[0009] Within the context of this technical task, one aim of the invention is to create an antipanic pushbar for mortice locks that remains within the dimensional limits established by current standards, while providing high rotation torque at the same time, reducing internal friction to a minimum in order to prolong its working life as well as permitting its use with a lock with several locking points, in other words, locks that require high torque on the pushbar spindle.

[0010] Another aim of the present invention is to provide an antipanic pushbar for mortice locks having a single type of pushbar spindle mechanism action that can

operate whether positioned on the left or right hand side of the lock in order to reduce pushbar costs considerably.

[0011] Yet another aim of the present finding is to provide an antipanic pushbar for mortice locks that is safe and reliable. The last aim, but by no means the least, is to provide an antipanic pushbar for mortice locks with an extremely compact and simple mechanism, able to perform for a long period.

[0012] The technical scope, as well as these and other aims according to the present invention can be achieved with the creation of an antipanic pushbar for mortice locks characterised in that it comprises a lock plug that rotates and is fixed to the spindle of said pushbar, and a first and a respectively second element to actuate said lock plug fixed to and rotating on said pushbar and engaged to act against a first and respectively second strike plate of said lock plug with a first and respectively second force of rotation in a same direction, and applied on the opposite side of the hinge pin of said pushbar in order to generate a same first and respectively second rotation moment adapted to rotate said lock plug from the closed position to the open position of the lock.

[0013] Moreover, other characteristics of the present invention are defined in the claims below.

[0014] Further characteristics and advantages of the invention will be made clearer by the description of a preferred but not exclusive embodiment of the antipanic pushbar for mortice locks according to the finding, illustrated in an indicative but by no means limitative manner in the appended drawings, wherein:

- Figure 1 shows a side view of a preferred embodiment of the action mechanism of an antipanic pushbar spindle for mortice locks according to the present invention, in the lock's closed position;
- Figure 2 shows a side view of the mechanism of figure 1 - in the lock's open position;
- Figure 3 shows a view in perspective of the mechanism in figure 1 in the lock's closed position;
- Figure 4 shows a view in perspective of the mechanism in figure 1 in the lock's open position;
- Figures 5 and 6 show views in perspective of the lock plug in which the pushbar spindle is inserted; and
- Figure 7 shows a front view of the lock plug shown in figures 5 and 6.

[0015] With reference to the figures described, an antipanic pushbar for mortice locks is identified throughout with the reference numeral 1.

[0016] Pushbar 1 comprises a horizontal bar 2 supported at opposite ends by two brackets 3, each of which is operationally fixed to a corresponding plate 4 for attachment to the lock (not shown).

[0017] In particular, pushbar 1 comprises a rotation pin 12 that is supported by opposed lugs 5 that both ex-

tend at right angles to a corresponding fixing plate 4.

[0018] One of the plates 4 includes a template 14 that can be overlaid on the keyhole of the lock for key insertion.

[0019] Pushbar 1 comprises a lock plug 6 fixed to and rotating on the spindle (not shown) of pushbar 1, and a first and respectively second actuator element of lock plug 6 fixed to and rotating on pushbar 1 and engaged to act against first - and second striker plates 8 and 7 respectively of lock plug 6.

[0020] Lock plug 6 comprises a seat 10 axially set for pushbar 1 spindle insertion.

[0021] In the preferred illustrated embodiment lock plug 6 has a cylindrical form.

[0022] Advantageously the first and respectively second actuators act against the first and respectively second strike plates 8 and 7 of lock plug 6 with a first and respectively second force of rotation in a same direction and applied on the opposite side of the hinge pin 12.

[0023] In this manner the first and respectively second actuator elements generate a first and respectively second same moment of rotation adapted to rotate the lock plug 6 from the closed position of the lock to open position.

[0024] The first and respectively second actuators are formed by first and respectively second pins 11 and 13 aligned with each other.

[0025] In particular the first and respectively second pins 11 and 13 are aligned and coplanar with the hinge pin 12 of pushbar 1.

[0026] The first and respectively second strike plates 8 and 7 are obtained from a first and respectively second release mechanism of the lock plug 6 in which the first and respectively second pins 11 and 13 perform a sliding action.

[0027] The first and respectively second release mechanisms are crosswise to the axis of lock plug 6 and extend at an angle along a first and respectively second sector of the side surface of the lock plug 6 in an axially and offset manner.

[0028] The lock plug 6 also comprises a third release mechanism 9 inside which slides the hinge pin 12.

[0029] The third release mechanism 9 is also set crosswise to the lock plug axis and extends at an angle along a third sector of the side surface of lock plug 6 axially interposed between the first and second sector and at least partially overlaid on the first and second sector in an angular manner.

[0030] Practically speaking, the second release mechanism forms a closed slot along the side surface of lock plug 6, the third release mechanism forms two closed symmetrical slots along the side surface of lock plug 6, while the first release mechanism forms an open slot directly on the end of lock plug 6 opposite to the end that engages the spindle.

[0031] The preferred embodiment shows a pushbar that produces a spindle rotation of 30°. Naturally it is understood that it is possible to produce rotations other

than 30°.

[0032] The first and respectively second sectors are angularly and symmetrically opposite each other while the third sector is angularly and symmetrically overlaid between the first and respectively second sector.

[0033] In particular the first and respectively second sectors extend along the side surface of the lock plug 6 with an angle that is wider than 180° while the third sector extends with an angle of approximately 60°.

[0034] Advantageously the contact point of the first and respectively second actuators with the first and respectively second strike plates when the pushbar 1 is in lock closed position, should be located at the radially external limit of lock plug 6 in order to obtain the maximum leverage possible for the first and respectively second force of rotation.

[0035] Preferably the first and respectively second release mechanisms comprise a first and respectively second flat contact surface 17 and 20 with a first and respectively second flattened portion 19 and 18 of the side surface of the first and respectively second pins 11 and 13.

[0036] The first and respectively second flat portions 17 and 20 are aligned with the first and respectively second flattened portions 19 and 18 of the side surface of the first and respectively second pins 11 and 13 when the pushbar 1 is in the lock open position, and not aligned when the pushbar is in lock closed position.

[0037] Advantageously it is foreseen that the extended flat contact surfaces between the first and second pins and the relative strike plates limits the contact pressure between the parts thus preserving them from rapid wear:

[0038] Also advantageously, the spindle insertion seat 10 comprises a plurality of offset spindle indentations at an angle in order to connect lock plug 6 with the spindle in a selective manner in one of the plurality of relative angular positions. In more detail, the spindle insertion seat 10 comprises at least a first and a second indentation that is rotated at a 30° angle compared to the first indentation.

[0039] Pushbar 1 also comprises arrest means in its closed and open lock positions.

[0040] Such arrest means comprise a first and respectively a second pair of opposite slots 16 and 15 respectively cut in the opposite lugs 5 in which the ends of the first and respectively second pins 11 and 13 perform slide action and are supported.

[0041] The safety aspect of the pushbar of the present invention is considerable. In fact, compared to traditional antipanic pushbars that foresee only one single limit stop for end and start of run, the arrest means described above provide four distinct end of run limits in lock open position and four distinct start of run limits in lock closed position.

[0042] The pushbar 1 function according to the invention is made very clear by the description and illustrations, and in particular the basic concept is conceived

as follows.

[0043] When the user pushes on the horizontal bar 2, the pins 11 and 13 located at the opposite ends in relation to the hinge pin 12, act on lock plug 6 with a thrust of the same strength in - the opposite direction.

[0044] Therefore, lock plug 6 is activated by two rotation torques in the same direction and of the same strength.

[0045] Lock plug 6 activates the rotation of the pushbar 1 spindle that controls the retraction of the latch bolt and therefore the opening of the lock.

[0046] When the user releases the horizontal bar 2, a return spring (not shown) acts on the spindle that activates the lock plug 6 in counter-rotation returning it to the lock closed position.

[0047] The pushbar divides the user's thrust into two forces of rotation applied in a wide leverage and from the opposite side in relation to the rotation pin, in a manner so that the total rotation torque results as very strong, even though the single rotation forces are of relatively limited strength.

[0048] In this way internal friction is reduced to a minimum, the pushbar will perform for a long working life, and is adapted to be applied to locks with more than one locking point.

[0049] Moreover, the same spindle mechanism action of the pushbar can be used in spite of whether the latch bolt is located on the right hand or left hand side of the lock.

[0050] On application, it is sufficient to insert the spindle in an appropriate indentation selected from the two indentations incised in the insertion seat of the lock plug.

[0051] For example, the spindle is inserted in its first indentation when the latch-bolt is on the right hand side of the lock, but inserted in its second indentation rotated to 30° compared to the first indentation, when the latch-bolt is on the left hand side of the lock.

[0052] Lastly, the possibility of using the mechanism action of the universal spindle, in other words, that is identical no matter what the position of the latch-bolt, permits the separation of the return spring from the rest of the mechanism action in such a manner that the total pushbar structure is rendered more compact.

[0053] In particular, the spindle return spring to lock closure position and the rest of the mechanism can be positioned at the opposite ends of the pushbar.

[0054] The antipanic pushbar for mortice locks conceived in this manner can be subject to numerous modifications and variations while remaining within the context of the invention; moreover all elements can be replaced by others that are technically equivalent.

[0055] Basically, the materials employed, as well as their size could be of any kind according to needs and technical conditions.

Claims

1. Antipanic pushbar for mortice locks **characterised in that** it comprises a lock plug fixed in rotation with the spindle of said pushbar, and a first and respectively second actuator element of said lock plug fixed in rotation with said pushbar and engaged against a first and respectively second strike plate of said lock plug with a first and relatively second force of rotation in the same direction and applied on the opposite side in relation to the hinge pin of said pushbar in a manner so that it generates a first and respectively second same moment of rotation adapted to rotate said lock plug from the lock closed position to open position.
2. Antipanic pushbar according to claim 1 **characterised in that** said first and respectively second actuators are configured by a first and respectively a second pins aligned with each other.
3. Antipanic pushbar according to one or more previous claims **characterised in that** said first and respectively second pins are aligned and coplanar with said hinge pin of said pushbar.
4. Antipanic pushbar according to one or more previous claims **characterised in that** said lock plug comprises an axially positioned insertion seat for said spindle.
5. Antipanic pushbar according to one or more previous claims **characterised in that** the point of contact of said first and respectively second actuator with said first and respectively second strike plate is set at the radially external limit of said lock plug when said pushbar is in lock closed position, in order to obtain the maximum leverage possible for said first and respectively second force of rotation.
6. Antipanic pushbar according to one or more previous claims **characterised in that** said first and respectively second strike plates comprise a first and respectively second release mechanism inside which said first and respectively second pins slide, said first and respectively second release mechanisms being set crosswise to the said lock plug axis and extended at an angle along a said first and respectively second sector of the side surface of said lock plug axially and offset at an angle.
7. Antipanic pushbar according to one or more previous claims **characterised in that** said lock plug has a third release mechanism inside which the hinge pin slides, said third release mechanism being set crosswise to the axis of said lock plug and extended at an angle along a third sector of the side surface of said lock plug axially interposed between first and

respectively second sector, and at least partially overlaid on said first and second sector at an angle.

8. Antipanic pushbar according to one or more previous claims **characterised in that** said first and respectively second sector are symmetrically and angularly opposed and that said third sector is symmetrically and angularly overlaid between said first and respectively second sector. 5
9. Antipanic pushbar according to one or more previous claims **characterised in that** said first release mechanism opens on the end of said lock plug opposite that which engages the said spindle. 10
10. Antipanic pushbar according to one or more previous claims **characterised in that** said first and respectively second release mechanisms form a first and respectively second flat contact - surface with a first and respectively second flattened portion of the side surface of said first and respectively second pin. 15
11. Antipanic pushbar according to one or more previous claims **characterised in that** said first and respectively second flat surfaces are aligned with said first and respectively second flattened portion of the side surface of said first and respectively second pin when said pushbar is in said open lock position and not aligned when said pushbar is in said open lock position. 20
12. Antipanic pushbar according to one or more previous claims **characterised in that** said spindle insertion seat includes a plurality of indentations of said spindle offset in an angular manner in order to connect said lock plug to said spindle selectively in one of the plurality of relative angular positions. 25
13. Antipanic pushbar according to one or more previous claims **characterised in that** said plurality of indentations comprise at least one indentation and a second indentation rotated by 30°. 30
14. Antipanic pushbar according to one or more previous claims **characterised in that** it comprises means of arrest for said spindle in both open and closed position of said lock. 35
15. Antipanic pushbar according to one or more previous claims **characterised in that** said means of arrest comprise a first and respectively second pair of opposed slots each cut in a corresponding lug of a pair of opposed lugs that extend at right angles to a corresponding plate of a pair of opposed plates that support said hinge pin, said first and respectively second pair of slots supporting and permitting slide action of the ends of said first and respectively 40
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second pins.

16. Antipanic pushbar according to one or more previous claims **characterised in that** said lock plug has a cylindrical configuration.
17. Antipanic pushbar for mortice locks according to aforesaid descriptions and claims.

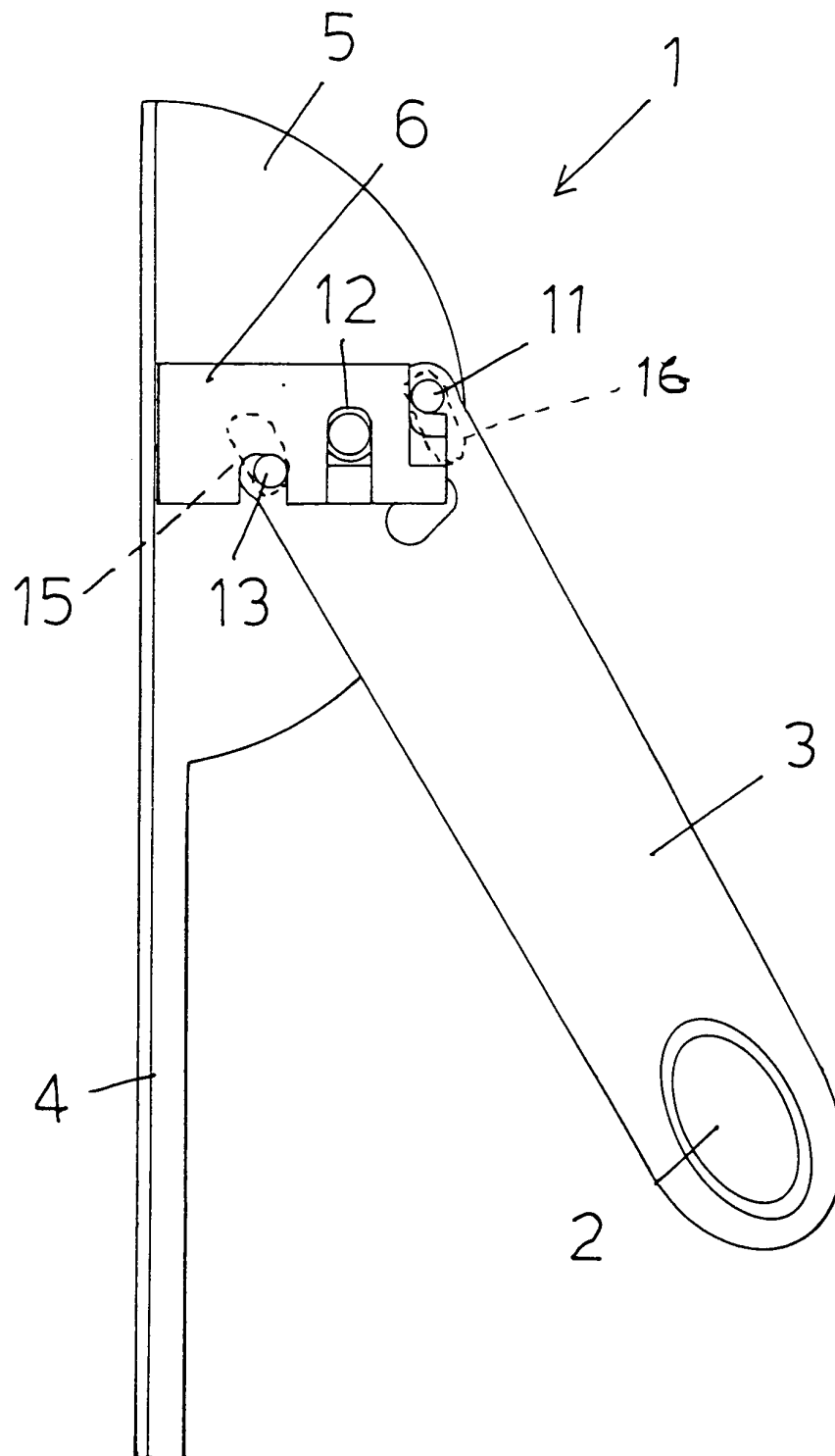


FIG. 1

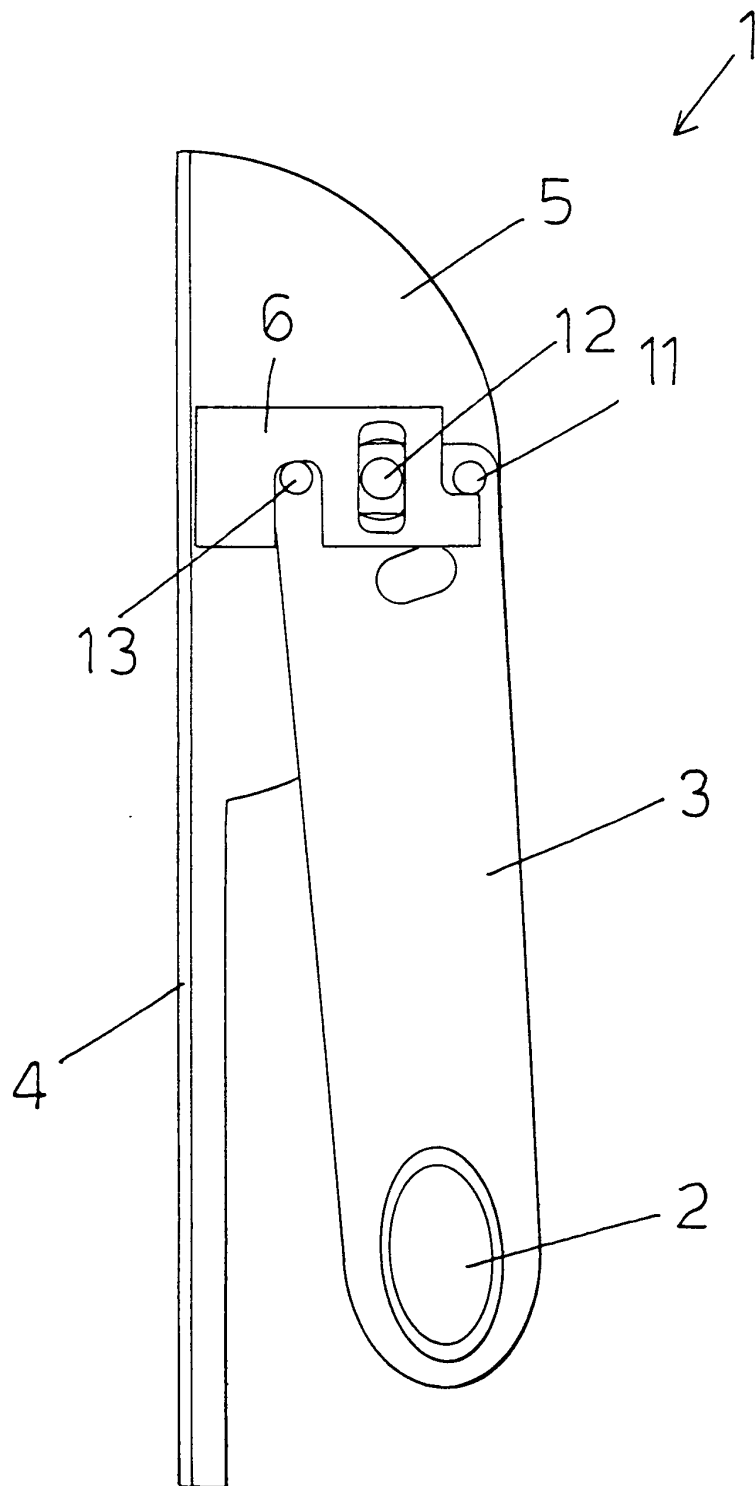


FIG. 2

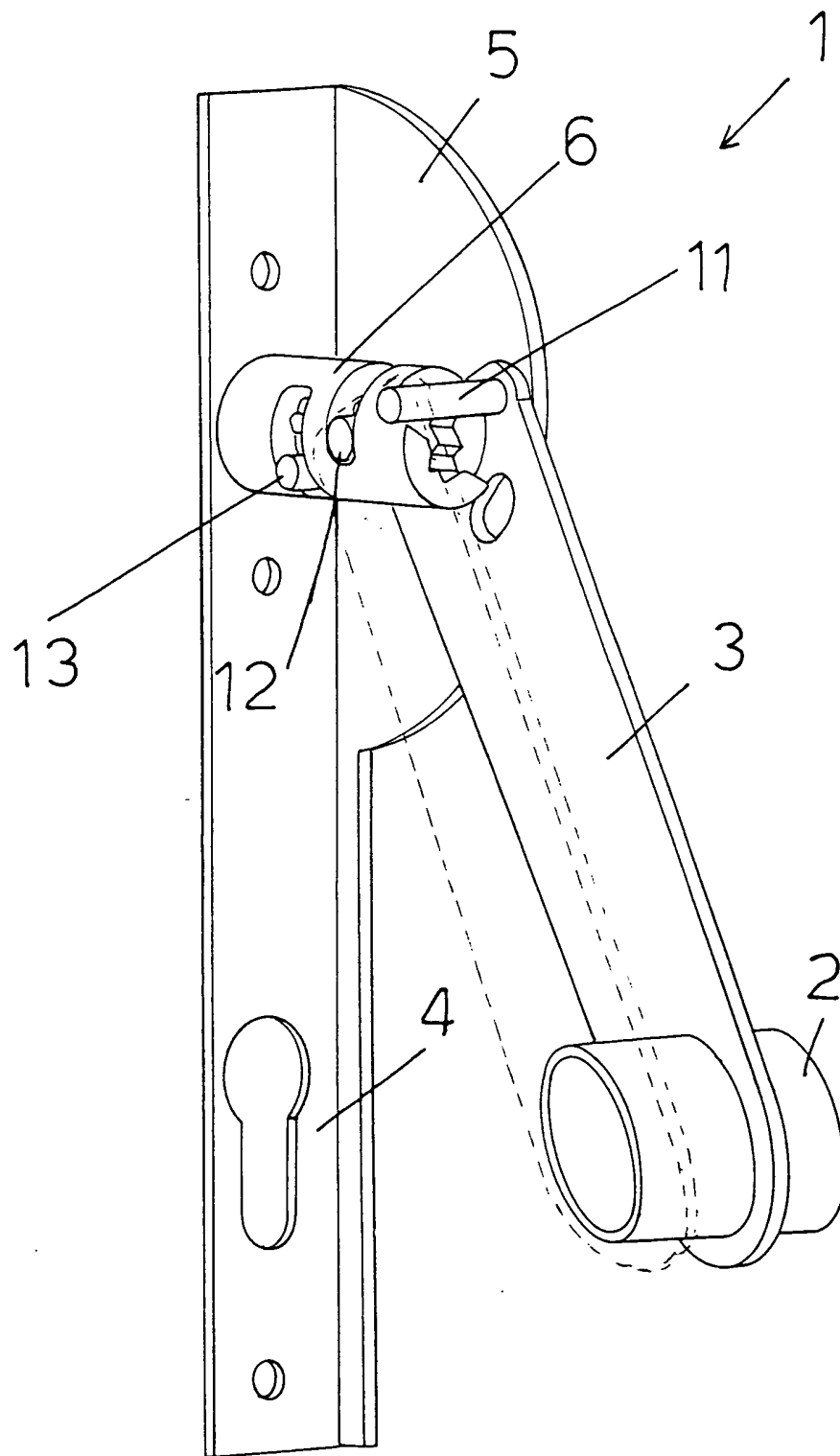


FIG. 3

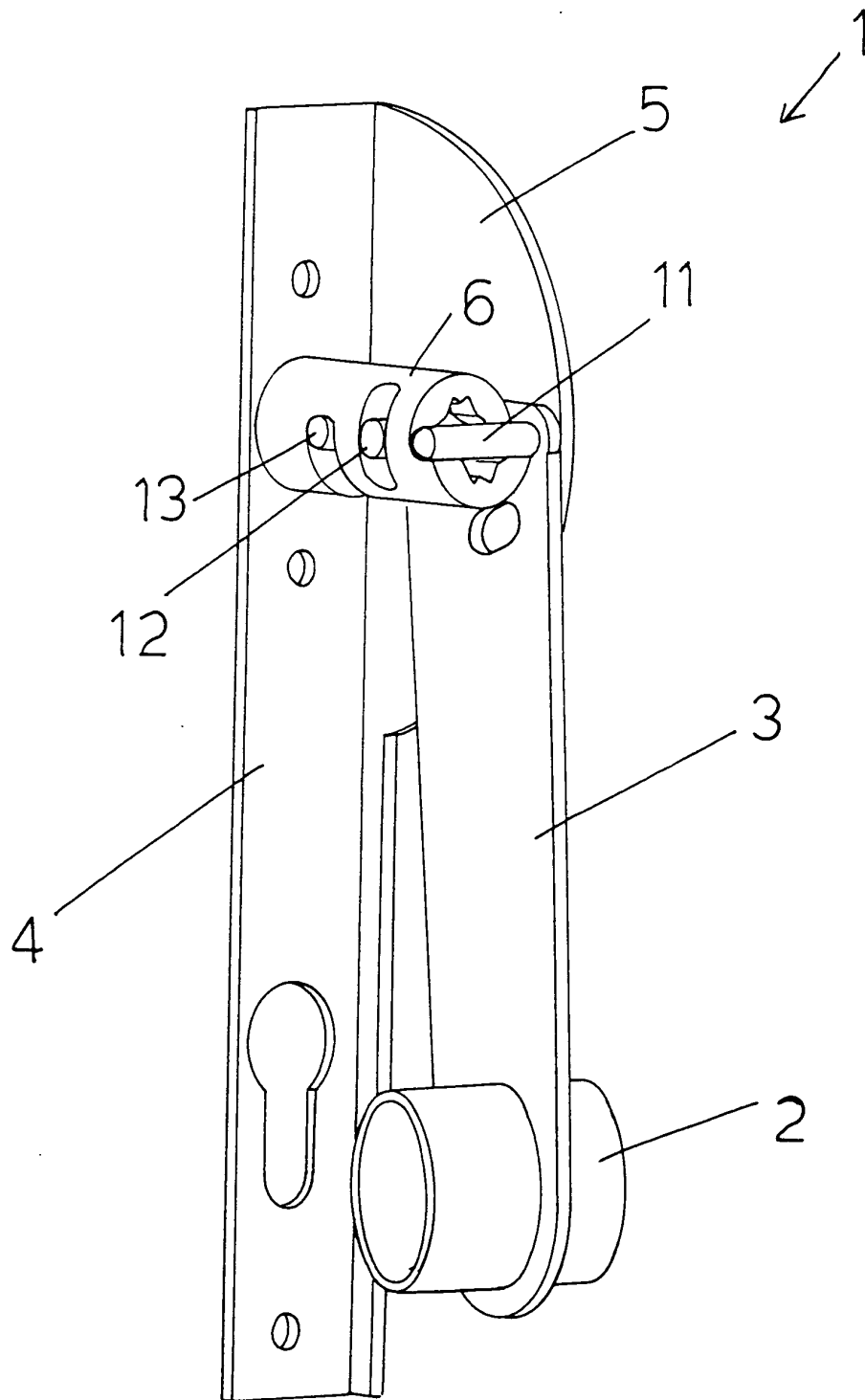
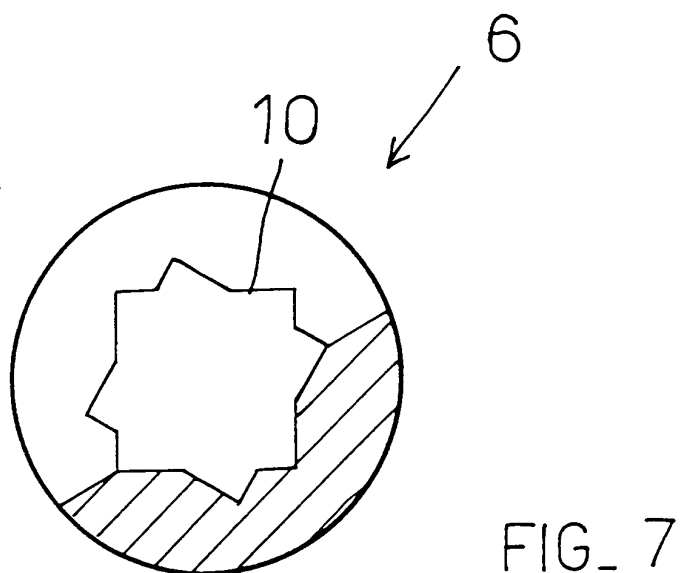
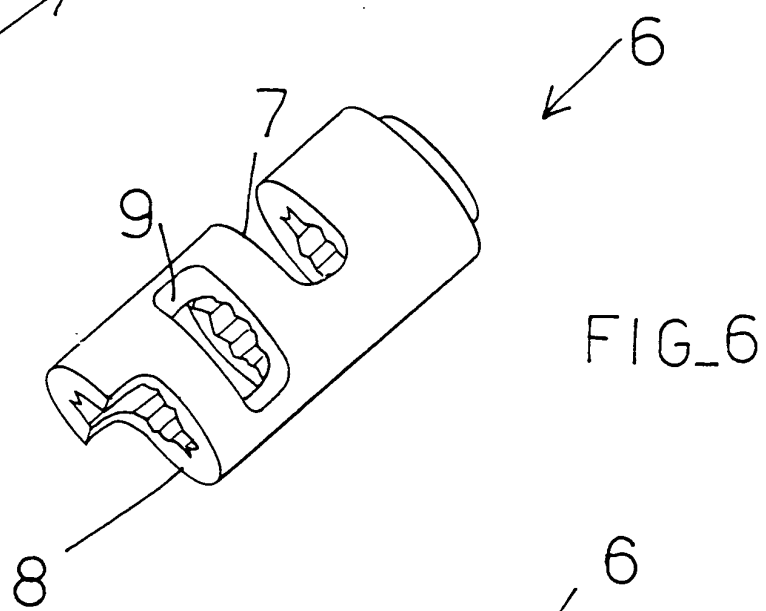
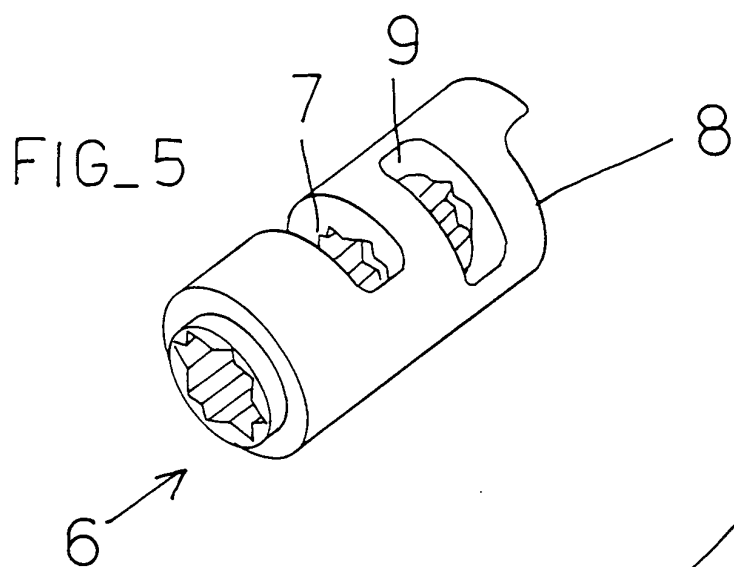


FIG. 4





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EUROPEAN SEARCH REPORT

Application Number
EP 04 02 3754

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	FR 1 024 836 A (P.ASTRE) 7 April 1953 (1953-04-07) * page 1, column 2, line 12 - page 2, column 1, line 27; figures *	1-6,9-17	E05B65/10
X	DE 35 33 361 A (ECHT & CO NACHF SCHULTE GMBH &) 14 August 1986 (1986-08-14) * page 8, lines 8-23; figures 4-6 *	1-6,9-17	
A	EP 0 113 655 A (PAWELCZAK FRIEDRICH ; KABELE JOHANN (AT)) 18 July 1984 (1984-07-18) * abstract; figures *	1,4-6, 16,17	
A	US 5 547 235 A (DZIUK RICHARD ET AL) 20 August 1996 (1996-08-20) * abstract; figures *	1,4,16, 17	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E05B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 16 December 2004	Examiner Vacca, R
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 02 3754

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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16-12-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 1024836	A	07-04-1953	NONE	
DE 3533361	A	14-08-1986	DE 3533361 A1	14-08-1986
EP 0113655	A	18-07-1984	AT 377572 B	10-04-1985
			AT 4683 A	15-08-1984
			AT 25735 T	15-03-1987
			DE 3370045 D1	09-04-1987
			EP 0113655 A2	18-07-1984
US 5547235	A	20-08-1996	DE 4201070 A1	22-07-1993
			AT 143450 T	15-10-1996
			CA 2087369 A1	18-07-1993
			DE 59303911 D1	31-10-1996
			DK 556553 T3	13-01-1997
			EP 0556553 A1	25-08-1993
			ES 2095502 T3	16-02-1997