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(54) **Multi-point lock supplement for use with safe, garage, apartment or other door locks**

(57) The present invention relates to locks and may be used with safe, garage, apartment or other door locks.

Particularly, the invention relates to a safe lock supplement, making up a multi-side safe lock in combination with ordinary single-latch door locks.

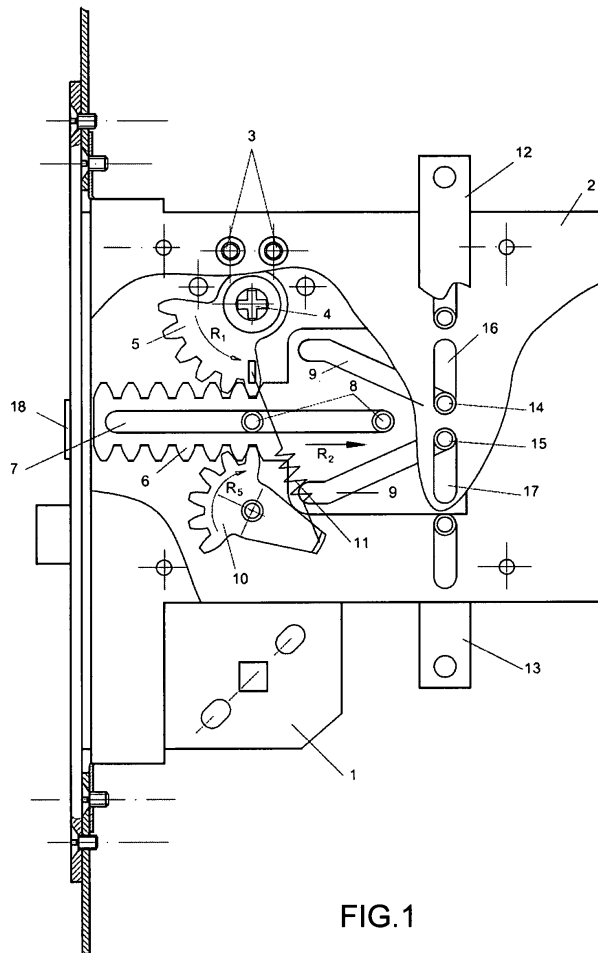


FIG.1

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Description

[0001] The present invention relates to locks and may be used with safe, garage, apartment or other door locks. Particularly, the invention relates to supplement for a safe lock, making up a multi-side safe lock in combination with ordinary single-latch door locks.

[0002] The most popular and known door lock mechanism is a door lock, installed into the door and operated with a key, which pushes out a latch locking the door, or pulling it into the door opening it. The improvement and development of safety and reliability of such devices is related to either a key or a lock construction. However, such locks are not reliable as they fix the door only at one point of one door frame rail.

[0003] Russian patent No. 2164280 describes a garage-safe door lock consisting of a horizontal movable latch associated with two vertical movable pulls. The operating of the lock is carried out with the help of vertical pull bars, fixed at the angle of 45° at the respectable pin bolts and holes, organized so as the reciprocal horizontal movement of the latch initiates the vertical movement of the pull bars up and down. Such a mechanism locks the door at three points of the door frame, i.e. the latch, vertical locking pull bars come correspondingly into the door frame at the same time at vertical, top and bottom horizontal points of the door frame.

[0004] Such multi-locks are considerably more reliable, but unfortunately pretty expensive comparing with ordinary locks. Moreover, while replacing an ordinary lock with a multilock, the old one is to be thrown away, which is not economical.

[0005] Therefore, the supplement seems to be a reasonable solution, as it may be used together with the existing lock. The combination embodies the typical safe lock mechanism features, i.e. fasts the door not at single, but at several points of the door frame.

[0006] The object of present invention is a safe lock supplement, which can be fixed to the existing door lock without the change in construction. Such a supplement is used with an ordinary lock, fixing the door only at one vertical door frame side, and transforms it into a safe lock, which fasts the door at three points: vertical, top and bottom sides of the door frame.

[0007] As it was mentioned before, such a supplement does not change the existing construction of the lock as it is fixed to the side of the lock with screws, using existing thread joints. The operating of the safe supplement is synchronized with the operating of the lock so, that the turn of a key activates not only the latch, but also the vertical pull bars of a supplement, coming into the vertical, top and bottom sides of a door frame with fixating pins.

[0008] The supplement device of the present invention for a safe lock consists of a horizontal double side rack bar mounted in a closed box, activated with a lock key through additional control sprocket, and two vertical pull bars, joined in a sliding manner with the rack. Two axles are fixed to the proximal ends of the pull bars coming into

two bevel cuts in the rack bar, therefore a horizontal reciprocal movement of the rack activates a movement of vertical pull bars up or down. At the top ends of the pull bars there are pin-bolts coming into both top and bottom rails of the door frame.

[0009] At the rack bar side opposite to a control sprocket there is another sprocket with a spring, fixating start and end positions of the rack, and at the same time the position of the lock fasting itself.

[0010] Below the invention will be described in details with a reference to the drawings, wherein:

Fig.1 shows the initial position of the safe lock supplement;

Fig.2 shows the intermediate position of the safe lock supplement;

Fig.3 shows the final position of the safe lock supplement.

[0011] As can be seen from the fig.1-3, the safe lock supplement 2 is fixed on the side of the lock 1 with two screws 3. The lock 1 is a standard door lock, it is not an object of the present invention, therefore will not be imaged in details.

[0012] The safe lock supplement 2 of present invention is activated by a cross axle 4 of the lock 1, installed into a control sprocket 5 of a lock supplement 2, rotational movement of which is activated by a key (not shown) of the lock 1.

[0013] The control sprocket 5 of the lock is associated with a double rack bar 6, which has a horizontal cut 7 inside and is mounted in a sliding manner on the pins 8 fixed to the case of the lock supplement 2. Another end of the rack bar 6 is widened and has two bevel cuts 9 arranged symmetrically and in mirror-image way, angled at 30-45° horizontally. At the opposite side of the sprocket 5 of the rack bar 6 there is a sprocket 10 with a pull spring 11, which are supposed for fixating of the rack bar 6 at the end of unlocking (fig.1) or locking (fig.3) positions.

[0014] The top and bottom axles 14 and 15 of pull bars 12 and 13 come into bevel cuts 9 in the double side rack bar 6, and also into vertical guiding bevel cuts 16 and 17 in the case of the lock supplement 2.

[0015] The lock supplement 2 of the present invention operates in the following way: in order to lock the lock supplement 2, what corresponds to a position shown in fig. 1, the key of the lock 1 is being turned in the direction of cursor R_1 . The key being turned in the direction R_1 turns the cross axle 4, which turns the sprocket 5 of the lock supplement 2. The sprocket 5 transfers the rotational movement to the associated double side rack bar 6, which transforms the rotational movement of the sprocket 5 into a horizontal linear movement and moves in the direction of cursor R_2 . The rack bar 6, moving in the direction of the cursor R_2 , transfers the sliding movement by bevel cuts 9 to axles 14 and 15 of pull bars 12 and 13, which move along vertical guiding cuts 16 and 17 up and down in the direction R_3 and R_4 , as shown in fig. 2.

Pull bars 12 and 13 move correspondingly with axles 14 and 15, the pins, fixed at the ends of pull bars 12 and 13 and not shown in the drawing, go into the holes of the top and bottom transoms of the door frame.

[0016] Fig. 3 shows the end locking position, when a double side rack bar 6 moving in the direction of cursor R_2 , reaches the edge position and is blocked by the left pin 8 at the end of horizontal cut 7. At this position the pull bars 12 and 13 are maximum pushed out, i.e. the pins, fixed to their ends and not shown in the drawing, fully come into the holes of the top and bottom transoms of the door frame.

[0017] The lock supplement 2 in edge unlocked (fig. 1) and locked (fig.3) positions is held by a fixating mechanism which consists of a sprocket 10, associated with a double side rack bar 6 at a side opposite to a control sprocket 5, and a pull spring 11. The pull spring 11 in a position shown in the fig.1 is fixed by one end to the lock case 2 and by another one to a centrifugal end of the sprocket 10 and transfers the strain force through the sprocket 10 to the rack bar 6, thus fixating it at the unlocked edge position. When the double side rack bar 6 pushed by a control sprocket 5 moves in the direction of cursor R_2 , it turns by its opposite side a sprocket 10 in the direction of cursor R_5 , overcoming the strain force of the pull spring 11. The end of the pull spring 11 fixed to a centrifugal end of the sprocket 10 moves together with a turning sprocket 10. Thus the spring 11 from one edge position, shown in the fig.1 and coincident to the original position of the lock supplement 2, goes through intermediate position shown in the fig.2 and comes into another edge position shown in the fig.3, coincident to the end locking position of the lock supplement 2.

[0018] The fixating device, consisting of a sprocket 10 and pull spring 11, is a double purpose device. Firstly, as it was mentioned above, it fixates the lock supplement 2 of the present invention at unlocked (fig.1) and locked (fig.3) edge positions. Furthermore, this device, operated by a strain force of the pull spring 11, promotes the second part of the locking or unlocking phase, when the spring 11 goes one or another direction through the intermediate position shown in the fig.2, providing the correspondent push to the rack bar 6.

[0019] The safe lock supplement 2 of the present invention is a useful addition to the original lock 1 with a single latch 18, making up a safe lock, locking the door leaf at two additional points, i.e. at the top and bottom transoms of the door frame.

Claims

1. A safe lock supplement to be used with existing standard door lock, comprising two vertical pull bars and a control mechanism thereof, **characterised by** comprising:

a control sprocket (5), connected to the cross

axle (4) of the lock (1) and operated by a key; a horizontally movable double-side rack bar (6) with bevel cuts (9) arranged in mirror-image way, associated by one side with the control sprocket (5);

a rack bar (6) position fixating mechanism, consisting of a sprocket (10) and pull spring (11), associated with another side of the rack bar (6); pull bars (12, 13), associated by axles (14, 15) with bevel cuts (9) of the rack bar (6).

2. Safe lock supplement according to claim 1, **characterising in that** bevel cuts (9) are angled at 30-45° horizontally.

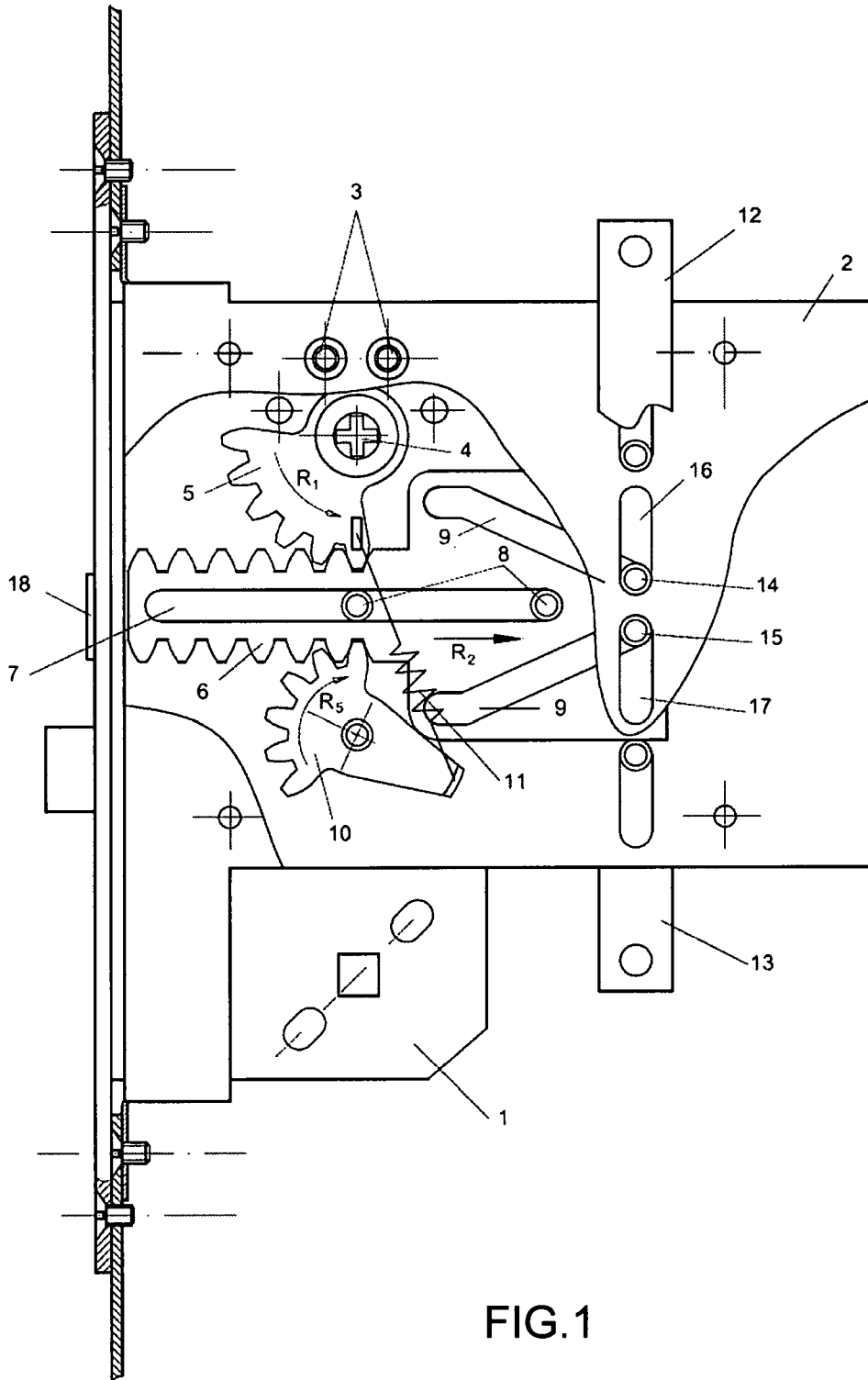
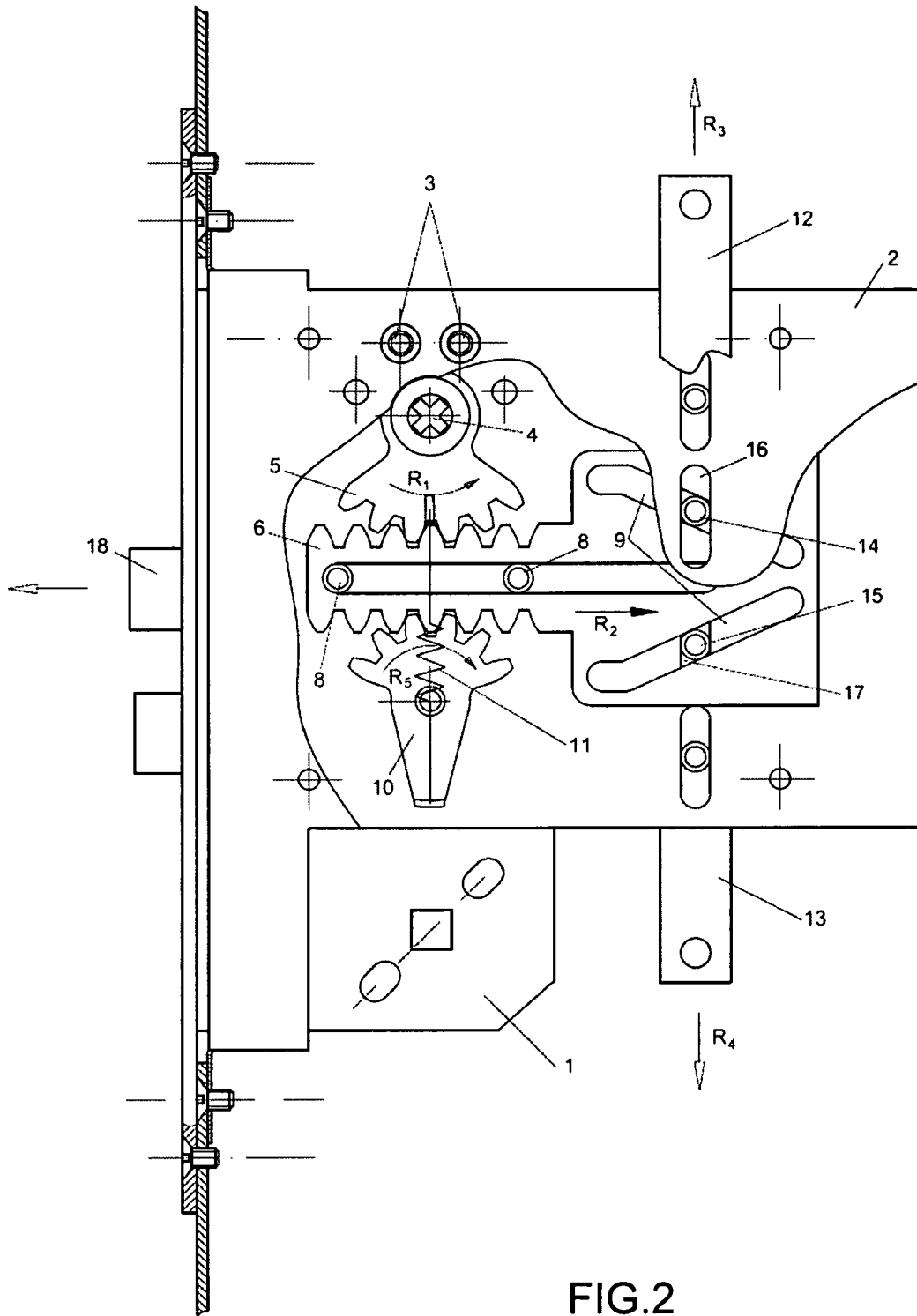


FIG. 1



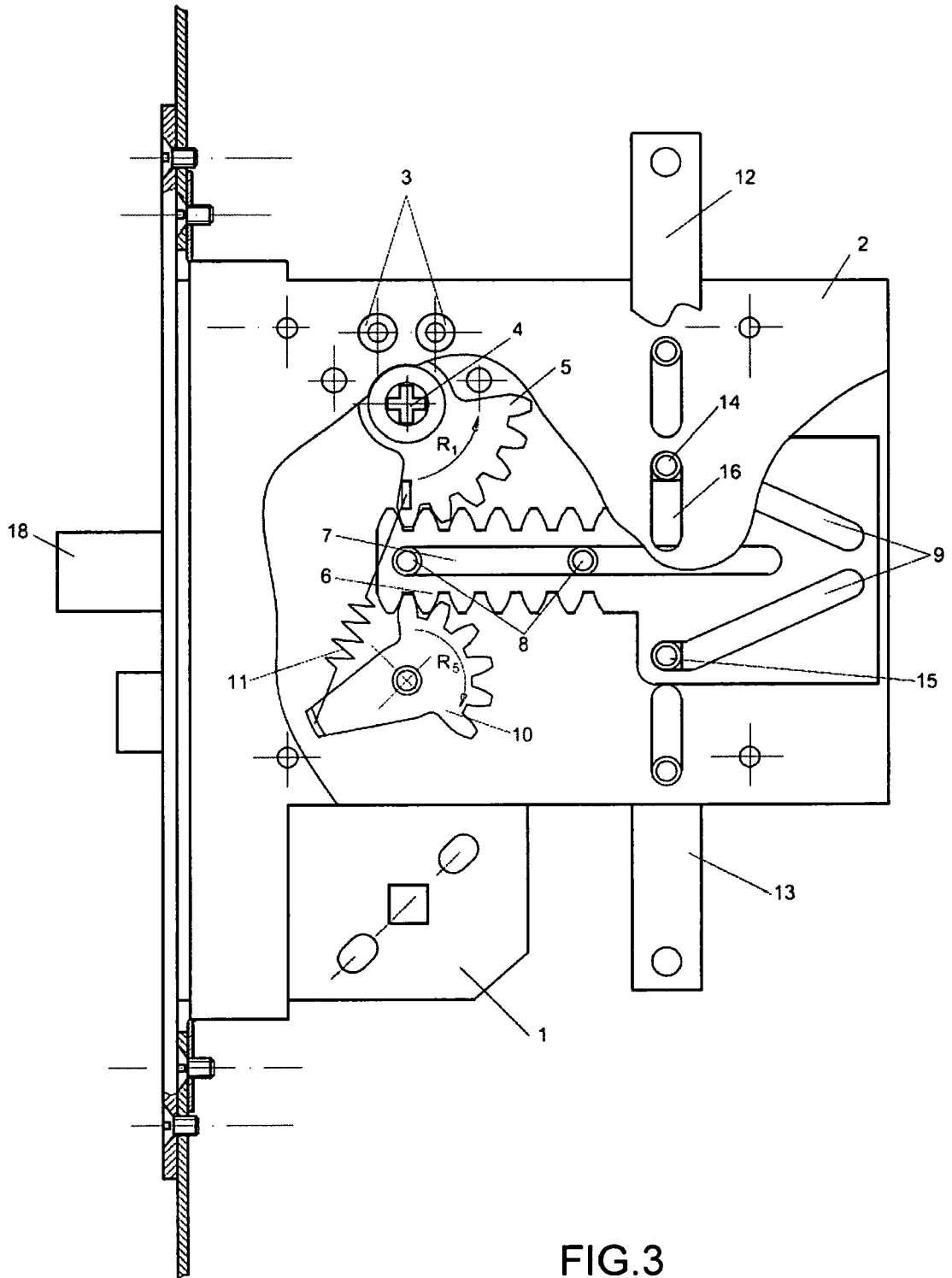


FIG.3



DOCUMENTS CONSIDERED TO BE RELEVANT			
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E05C E05B
Place of search		Date of completion of the search	Examiner
The Hague		23 October 2007	Westin, Kenneth
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EPO FORM 1503 03/82 (P04/C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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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 The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-10-2007

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

REFERENCES CITED IN THE DESCRIPTION

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