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Remarks:

Amended claims in accordance with Rule 137(2)
EPC.

(54) **Lock cylinder**

(57) An apparatus for a lock cylinder is disclosed. The apparatus comprises: a slot (500) between a first support (502) and a second support (504); a lock bit (508)

movable in the slot (500); and means (510) for transmitting a force (106) of an extraction attack against the apparatus from the first support (502) through the lock bit (508) to the second support (504).

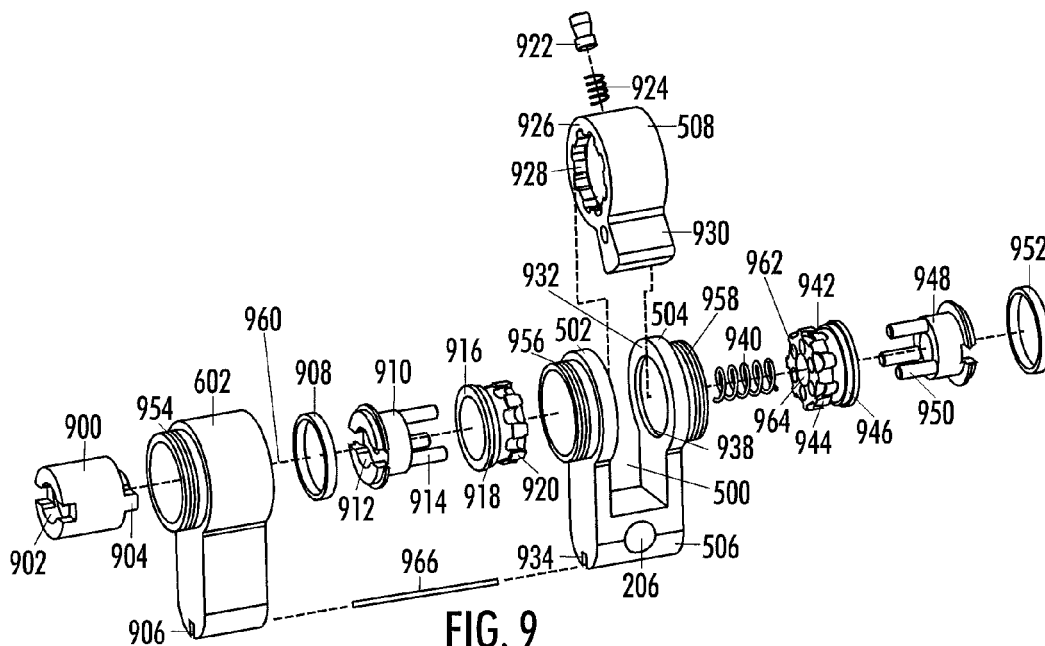


FIG. 9

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Description

Field

[0001] The invention relates to an apparatus of a lock cylinder.

Background

[0002] Lock cylinders are tested against various types of attacks. Such tests are described, for example, in European Standard EN 1303 Building hardware - Cylinders for locks - Requirements and test methods, February 2005. In one of its sections, 4.9.4 Resistance to attack by plug / cylinder extraction, it is defined that a lock cylinder of the highest attack resistance grade 2 must be able to withstand a maximum force of 15 kN (= 1500 newtons = 1500 kgm/s²). Another section, 5.9.4 Resistance to attack by plug/cylinder extraction, defines that a self cutting traction screw of a maximum diameter of 5,5 millimetres is to be screwed into the cylinder and an attempt be made to withdraw the cylinder by means of the appropriate maximum force of 15 kN applied progressively without shock within the time (= five minutes) allowed, the time allowance beginning from the commencement of insertion of the traction screw. Now, in order to be able to withstand such an extraction force without breaking, the lock cylinder must have a relatively strong structure. Even a normal one-piece lock cylinder may have problems with achieving the highest attack resistance grade, but the problems are even more serious with modular profile lock cylinders, as specified, for example, in DIN 18252 Profilzylinder für Türschlösser, September 1999.

Brief description

[0003] The present invention seeks to provide an improved apparatus. According to an aspect of the present invention, there is provided an apparatus as specified in claim 1.

List of drawings

[0004] Embodiments of the present invention are described below, by way of example only, with reference to the accompanying drawings, in which

Figures 1 and 2 illustrate placement of a lock cylinder and a lock case in a door;
 Figures 3 and 4 illustrate placement of the lock cylinder in relation to the lock case;
 Figure 5 illustrates an apparatus;
 Figures 6, 7, and 8 illustrate various configurations of the lock cylinder; and
 Figure 9 illustrates an exploded view of the apparatus.

Description of embodiments

[0005] The following embodiments are exemplary. Although the specification may refer to some embodiment in several locations, this does not necessarily mean that each such reference is to the same embodiment(s), or that the feature only applies to a single embodiment. Single features of different embodiments may also be combined to provide other embodiments.

[0006] As illustrated in Figure 1, a lock cylinder 100 and a lock case 104 may be placed in a door 102. A force 106 of an extraction attack is applied along a longitudinal axis of the lock cylinder 100, i.e. on a plane perpendicular to the surface area of the door 102.

[0007] Figure 2 illustrates how the parts may be placed in the door 102. The lock case 104 may be pushed into a hollow from a side of the door 102, whereupon the lock cylinder 102 may be pushed through a hole 200 in the door 102. A hole 204 in the lock case 104 may accommodate a screw 202 that is screwed down into a hole 206 of the lock cylinder 100.

[0008] Figures 3 and 4 illustrate the placement of the lock cylinder 100 in relation to the lock case 104. The lock case 104 is made of two parts: a plate 306 and a case 308. The plate 306 comprises two holes 302, 304 accommodating two fastening screws with which the lock case 104 is bolted to the door 102. A lock bolt 300 is moved 310 in and out within a hole in the plate 306 and by a mechanism accommodated in the case 308. A movement 310 of the lock bolt 300 realizes a locking function: if the lock bolt 300 is in the hole in the plate 306, the lock is open, and if the lock bolt 300 protrudes from the hole in the plate 306, the lock is closed. The in and out movement 310 of the lock bolt 300 takes place along an axis perpendicular to the flat surface of the plate 306.

[0009] Figure 5 illustrates an apparatus. The apparatus comprises a slot 500 between a first support 502 and a second support 504. The first support 502 and the second support 504 may belong to a holder 506 forming the slot 500. As illustrated in Figure 5, the holder 506 may be U-shaped. The first support 502 may be one branch of the U-shaped holder 506, and the second support 504 may be the other branch, parallel with the first support 502.

[0010] The slot 500 accommodates a lock bit 508 movable in the slot 500. The operation of the lock bit 508 will be explained in more detail, but it is a kind of a latch or a cam. The slot 500 may be implemented by any suitable means for accommodating the lock bit 508: as a suitable aperture, bore, cavity, chamber, groove, hole, hollow, opening, passage, or the like. The first support 502 and the second support 504 are to be understood as portions around the slot 500, they 'support' the lock bit 508 at least in the sense that they delimit the movement of the lock bit 508 within the slot 500.

[0011] As illustrated in Figure 5, the lock bit 508 may be rotatable 512 in the slot 500 between a lock open position and a lock closed position. The lock closed po-

sition may be an initial position of the lock bit 508, i.e. 30 degrees in the counterclockwise direction, and the lock open position may be a final position of the lock bit 508 (drawn with a dotted line), i.e. 330 degrees in the counterclockwise direction.

[0012] Furthermore, the apparatus comprises means 510 for transmitting a force 106 of an extraction attack against the apparatus from the first support 502 through the lock bit 508 to the second support 504. Without the means 510 for transmitting the force 106, the first support 502 would bend in the direction of the force 106. Owing to the means 510 for transmitting the force 106, however, the first support 502, the lock bit 508 and the second support 504 appear as if they were one solid piece, making the structure very strong, and the first support 502 will not bend. It is worth noticing that if the force 106 is applied from the opposite direction, the end result is the same: the second support 504 will not bend, as the force is transmitted from the second support 504 through the lock bit 508 to the first support 502. The means 510 for transmitting may be implemented as a mechanical coupling or couplings between the parts 502, 504, 508.

[0013] The means 510 for transmitting may also be coupled to the lock case 104. As shown in Figure 1, the surface area of the case 308 is relatively large so as to distribute the force 106 of the extraction attack over a wide area. The lock case 104 is also coupled to the door 102 by screws in the holes 302 and 304. As the lock cylinder 100 is fitted within the lock case 104, torsion forces against the screw 202 in the hole 206 are small. Consequently, a force 512 is about the same as the force 106 of the extraction attack. The force 512 is transmitted from the means 510 for transmitting via the screw 202 to the lock case 104, so as to keep the means 510 for transmitting coupled to the lock case 104.

[0014] The apparatus of Figure 5 may be a lock cylinder, or it may be a part of a modular lock cylinder 100, such as the one illustrated in Figures 1, 2, 3, and 4. The lock cylinder 100 may be an ordinary mechanical lock cylinder. Additionally, or alternatively, the lock cylinder 100 may be a self-powered electromechanical lock cylinder, such as the lock cylinders produced by iLoq, and protected by several EP applications: 05112272.9, 07112677.5, 07112676.7, and 07112673.4.

[0015] In the above-mentioned DIN 18252 it is said that: "Der Schliessbart des Profilzylinders bewegt bei Drehung des Schlüssels den Schlossriegel und - bei Vorhandensein eines Wechsels im Schloss - mittelbar auch die Schlossfalle". In the present context, this may be translated as: The lock bit 508 of the profile lock cylinder 100 moves the bolt keeper as the key is turned, and consequently, the lock bolt 300 is moved between lock open position and lock closed position. It can be seen in Figure 2 that the lock bit 508 is illustrated therein: the lock bit 508 acts as an interface between the lock cylinder 100 and the lock frame 104. The bolt keeper (not illustrated) is in the case 308 of Figure 3, and it moves the lock bolt 300.

[0016] Figures 6, 7, and 8 illustrate various configurations of the lock cylinder 100.

[0017] Figure 6 illustrates the same configuration of the lock cylinder 100 as Figures 1, 2, 3, and 4. The double cylinder 100 of Figure 6 comprises four parts:

- a first cylinder 600 for receiving a key from one side of the door 102;
- an extension part 602;
- the apparatus of Figure 5: the holder 506 with the first support 502 and the second support 504, and the lock bit 508; and
- a second cylinder 604 for receiving the key from the other side of the door 102.

[0018] Figure 7 illustrates a second configuration. While Figure 6 illustrates a double cylinder, i.e. a lock cylinder that may be operated with a key from both sides of the door 102, Figure 7 illustrates a half cylinder 100, i.e. a lock cylinder that may be operated with a key only from one side of the door 102. The half cylinder 100 of Figure 7 comprises the following four parts:

- a cylinder 600 for receiving the key from one side of the door 102;
- an extension part 602;
- the apparatus of Figure 5: the holder 506 with the first support 502 and the second support 504, and the lock bit 508; and
- a cover part 700.

[0019] Figure 8 illustrates a third configuration, operable from the both sides of the door 102 but differing from the configuration of Figure 6 in that no key is needed for the operation from the other side of the door 102. The knob cylinder 100 of Figure 8 comprises the following four parts:

- a cylinder 600 for receiving the key from one side of the door 102;
- an extension part 602;
- the apparatus of Figure 5: the holder 506 with the first support 502 and the second support 504, and the lock bit 508; and
- a knob part 800 with which the lock cylinder 100 may be operated by turning the knob.

[0020] Figure 9 illustrates a further embodiment of the apparatus of Figure 5, where the central parts are in the middle: the holder 506 with the first support 502 and the second support 504, and the lock bit 508 in the slot 500.

[0021] The force of the extraction attack against the apparatus comes along a longitudinal axis 960 of the apparatus, which corresponds with the force vector 106 illustrated in Figure 1. The apparatus is also assembled along the axis 960.

[0022] No means 510 for transmitting the force of the extraction attack against the apparatus from the first sup-

port 502 through the lock bit 508 to the second support 504 are illustrated with a single reference sign in Figure 9.

[0023] Figure 9 further shows the U-shaped holder 506. Since the first support 502, the lock bit 508, and the second support 504 move as one piece under the force of the extraction attack, the structure may actually become O-shaped. The means 510 for transmitting may comprise an interlocking mechanism, i.e. a mechanism that mechanically couples the first support 502, the lock bit 508, and the second support 504 together.

[0024] The means 510 for transmitting may be positioned and dimensioned in such a manner that tolerances between said parts 502, 504, 508, 510 of the apparatus are closed under the force 106 of the extraction attack, and contacting surfaces 926, 932 (it is to be noted that there are also two further invisible contacting surfaces: one on the right-hand side of the first support 502, and the other on the right-hand side of the lock bit 508) of said parts 502, 504, 508, 510 of the apparatus bear on each other while transmitting the force 106 of the extraction attack.

[0025] The means 510 for transmitting may comprise two brackets: a first bracket 916 placed at a side of the first support 502 facing away from the slot 500, and a second bracket 942 placed at a side of the second support 504 facing away from the slot 500. Each bracket 916, 942 may comprise an interlock mechanism 920, 944, and the lock bit 508 may comprise two counterpart interlock mechanisms 928 (the other interlock mechanism is not visible as it is on the right-hand inner side of the lock bit 508) mating with the interlock mechanisms 920, 944 of the brackets 916, 942.

[0026] The means for transmitting 510 may further comprise a collar 918, 946 in each bracket 916, 942 with a matching collar 938 in each support 502, 504. The collar 918, 946 and the matching collar 938 may be positioned and dimensioned in such a manner that the bracket 916, 942 does not slide past the support 502, 504 due to the force 106 of the extraction attack.

[0027] The interlock mechanism 920, 944 of the bracket 916, 942 may comprise grooves and claws, and the counterpart interlock mechanism 928 of the lock bit 508 may comprise counterpart grooves and claws. The grooves and claws may interlock with the counterpart grooves and claws when the bracket 916, 942 is rotated in relation to the lock bit 508. A basic position of the lock bit 508 in relation to the supports 502, 504 may be adaptable by interlocking the grooves and claws with the counterpart grooves and claws into the basic position. As shown in Figure 9, the bracket 916, 942 may comprise eight grooves and eight claws, and correspondingly, each counterpart interlock mechanism 928 of the lock bit 508 may comprise eight grooves and eight claws.

[0028] The apparatus may further comprise parts 908, 910, 940, 948, 952 moving in a coaxial direction of the longitudinal axis 960 of a lock cylinder inside the lock bit 508 transmitting a rotational force rotating the lock bit 508 from the side of the first support 502 through the lock

bit 508 to the side of the second support 504, so that the lock bit 508 rotation is selected from a side of the lock in an open position, and the rotational force is transmitted to the other side of the lock in order to pull out a key.

5 These parts are: a roller 908, a shaft 910, a spring 940, another shaft 948, and another roller 952. There are three fingers 914, 950 in each shaft 910, 948. Each bracket 916, 942 has six radial small holes 962 (the holes of the first bracket 916 are not shown), and one centre hole 10 964. The fingers 914 of the first shaft 910 pass through three holes of the first bracket 916, and also through three holes 962 of the second bracket 942, and, correspondingly, the fingers 950 of the second shaft 958 pass through the remaining three free holes 962 of the second 15 bracket 942, and also through the remaining three free holes of the first bracket 916. The spring 940 is in the centre holes 964 of the brackets 916, 942 between the shafts 910, 948. A small coaxial movement, about two millimetres, is thus enabled for the shafts 910, 948 in 20 both directions. Each shaft 910, 948 has a groove 912: the idea here is that the actual lock cylinder 600, 604, as illustrated in Figure 6, has a counterpart ridge mating with the groove and thus transmitting the rotational force.

[0029] A pin 922 and a spring 924 are used to lock the brackets 916, 942 with the lock bit 930.

[0030] Figure 9 illustrates a part of a modular lock cylinder, which may comprise a threaded portion 956, 958, positioned and dimensioned in such a manner that it is screwable together with a matching threaded portion of a lock cylinder 600, 604 as in Figure 6, or also with the cover part 700 of Figure 7, or with the knob part 800 of Figure 8.

[0031] As illustrated in Figure 9, there may also be an extension part 602 comprising a threaded portion 954 (the right-hand side of the extension part 602 may also 35 comprise a threaded portion in its inner wall) positioned and dimensioned in such a manner that it is screwable together with the matching threaded portion of the lock cylinder and/or the matching threaded portion of the part of the modular lock cylinder, so that a length of the modular lock cylinder is adaptable along the longitudinal axis 960 of the modular lock cylinder. There may be extension parts 602 of various lengths, in steps of five millimetres, for example. A matching extension shaft 900 may be 40 needed for the extension part 602. One end of the extension shaft 900 has a ridge 904 matching with the groove 912 of the shaft 910. The other end of the extension shaft 900 has a groove 902 that is similar to the groove 912 of the shaft 910.

[0032] In an embodiment, the apparatus further comprises means 906, 934, 966 for holding the extension part 602 and a part of the modular lock cylinder in alignment with each other after the extension part 602 has been screwed together with the part of the modular lock cylinder. The part of the modular lock cylinder may be the holder 506, for example, or some other part, such as 600 or 800. The means for holding may be implemented such that the extension part 602 may have a groove 906, 55

and the holder 506 may have a similar groove 934. A locking pin 966 may be inserted into the grooves 906, 934 after the extension part 602 has been screwed together with the holder 506 so that these two parts 602, 506 remain in alignment with each other.

[0033] It is to be noted that the extension mechanism, described in Figures 1, 2, 3, 4, 6, 7, 8, and 9, comprising threads to connect the various pieces together, may also be used without the mechanism described in Figure 5 to implement a modular lock cylinder.

[0034] It will be obvious to a person skilled in the art that, as technology advances, the inventive concept can be implemented in various ways. The invention and its embodiments are not limited to the examples described above but may vary within the scope of the claims.

Claims

1. An apparatus comprising:

a slot (500) between a first support (502) and a second support (504);
a lock bit (508) movable in the slot (500); and
means (510) for transmitting a force (106) of an extraction attack against the apparatus from the first support (502) through the lock bit (508) to the second support (504).

2. The apparatus of claim 1, wherein the means (510) for transmitting comprise an interlocking mechanism (916, 920, 928, 942, 944).

3. The apparatus of claim 1 or 2, wherein the means (510) for transmitting are positioned and dimensioned in such a manner that tolerances between said parts (502, 504, 508, 510) of the apparatus are closed under the force (106) of the extraction attack, and contacting surfaces (926, 932) of said parts (502, 504, 508, 510) of the apparatus bear on each other while transmitting the force (106) of the extraction attack.

4. The apparatus of any preceding claim, wherein the means (510) for transmitting comprise a first bracket (916) placed at a side of the first support (502) facing away from the slot (500), and a second bracket (942) placed at a side of the second support (504) facing away from the slot (500), each bracket (916, 942) comprising an interlock mechanism (920, 944), and the lock bit (508) comprises two counterpart interlock mechanisms (928) mating with the interlock mechanisms (920, 944) of the brackets (916, 942).

5. The apparatus of claim 4, wherein the means for transmitting (510) further comprise a collar (918, 946) in each bracket (916, 942) with a matching collar (938) in each support (502, 504), the collar (918,

946) and the matching collar (938) being positioned and dimensioned in such a manner that the bracket (916, 942) does not slide past the support (502, 504) due to the force (106) of the extraction attack.

6. The apparatus of claim 4 or 5, wherein the interlock mechanism (920, 944) of the bracket (916, 942) comprises grooves and claws, and the counterpart interlock mechanism (928) of the lock bit (508) comprises counterpart grooves and claws, the grooves and claws interlocking with the counterpart grooves and claws as the bracket (916, 942) is rotated in relation to the lock bit (508), and a basic position of the lock bit (508) in relation to the supports (502, 504) is adaptable by interlocking the grooves and claws with the counterpart grooves and claws into the basic position.

7. The apparatus of any preceding claim, wherein the first support (502) and the second support (504) belong to a holder (506) forming the slot (500).

8. The apparatus of claim 7, wherein the holder (506) is U-shaped.

9. The apparatus of claim 8, wherein the first support (502) is one branch of the U-shaped holder (506), and the second support (504) is the other branch, parallel with the first support (502).

10. The apparatus of any preceding claim, wherein the lock bit (508) is rotatable (512) in the slot (500) between a lock open position and a lock closed position.

11. The apparatus of any preceding claim, further comprising parts (908, 910, 940, 948, 952) moving in a coaxial direction of a longitudinal axis (960) of a lock cylinder inside the lock bit (508) transmitting a rotational force rotating the lock bit (508) from the side of the first support (502) through the lock bit (508) to the side of the second support (504), so that the lock bit (508) rotation is selected from a side of the lock in an open position, and the rotational force is transmitted to the other side of the lock in order to pull out a key.

12. The apparatus of any preceding claim, wherein the apparatus is a lock cylinder (100), or a part of a modular lock cylinder.

13. The apparatus of claim 12, wherein the part of the modular lock cylinder comprises a threaded portion (956, 958), positioned and dimensioned in such a manner that it is screwable together with a matching threaded portion of a lock cylinder.

14. The apparatus claim 13, further comprising an extension part (602) comprising a threaded portion

(954) positioned and dimensioned in such a manner that it is screwable together with the matching threaded portion of the lock cylinder and/or the matching threaded portion of the part of the modular lock cylinder, so that a length of the modular lock cylinder is adaptable along the longitudinal axis (960) of the modular lock cylinder.

15. The apparatus of claim 14, further comprising means (906, 934, 966) for holding the extension part (602) and the part (506, 600, 800) of the modular lock cylinder in alignment with each other after the extension part (602) has been screwed together with the part (506, 600, 800) of the modular lock cylinder.

Amended claims in accordance with Rule 137(2) EPC.

1. An apparatus comprising:

a slot (500) between a first support (502) and a second support (504);
 a lock bit (508) movable in the slot (500); and
 means (510) for transmitting a force (106) of an extraction attack against the apparatus from the first support (502) through the lock bit (508) to the second support (504);
 wherein the apparatus is a lock cylinder (100), or a part of a modular lock cylinder;
characterized in that a part of the modular lock cylinder comprises a threaded portion (956, 958), positioned and dimensioned in such a manner that it is screwable together with a matching threaded portion of a lock cylinder.

2. The apparatus of claim 1, wherein the means (510) for transmitting comprise an interlocking mechanism (916, 920, 928, 942, 944).

3. The apparatus of claim 1 or 2, wherein the means (510) for transmitting are positioned and dimensioned in such a manner that tolerances between said parts (502, 504, 508, 510) of the apparatus are closed under the force (106) of the extraction attack, and contacting surfaces (926, 932) of said parts (502, 504, 508, 510) of the apparatus bear on each other while transmitting the force (106) of the extraction attack.

4. The apparatus of any preceding claim, wherein the means (510) for transmitting comprise a first bracket (916) placed at a side of the first support (502) facing away from the slot (500), and a second bracket (942) placed at a side of the second support (504) facing away from the slot (500), each bracket (916, 942) comprising an interlock mechanism (920, 944), and the lock bit (508) comprises two counter-

part interlock mechanisms (928) mating with the interlock mechanisms (920, 944) of the brackets (916, 942).

5. The apparatus of claim 4, wherein the means for transmitting (510) further comprise a collar (918, 946) in each bracket (916, 942) with a matching collar (938) in each support (502, 504), the collar (918, 946) and the matching collar (938) being positioned and dimensioned in such a manner that the bracket (916, 942) does not slide past the support (502, 504) due to the force (106) of the extraction attack.

6. The apparatus of claim 4 or 5, wherein the interlock mechanism (920, 944) of the bracket (916, 942) comprises grooves and claws, and the counterpart interlock mechanism (928) of the lock bit (508) comprises counterpart grooves and claws, the grooves and claws interlocking with the counterpart grooves and claws as the bracket (916, 942) is rotated in relation to the lock bit (508), and a basic position of the lock bit (508) in relation to the supports (502, 504) is adaptable by interlocking the grooves and claws with the counterpart grooves and claws into the basic position.

7. The apparatus of any preceding claim, wherein the first support (502) and the second support (504) belong to a holder (506) forming the slot (500).

8. The apparatus of claim 7, wherein the holder (506) is U-shaped.

9. The apparatus of claim 8, wherein the first support (502) is one branch of the U-shaped holder (506), and the second support (504) is the other branch, parallel with the first support (502).

10. The apparatus of any preceding claim, wherein the lock bit (508) is rotatable (514) in the slot (500) between a lock open position and a lock closed position.

11. The apparatus of any preceding claim, further comprising parts (908, 910, 940, 948, 952) moving in a coaxial direction of a longitudinal axis (960) of a lock cylinder inside the lock bit (508) transmitting a rotational force rotating the lock bit (508) from the side of the first support (502) through the lock bit (508) to the side of the second support (504), so that the lock bit (508) rotation is selected from a side of the lock in an open position, and the rotational force is transmitted to the other side of the lock in order to pull out a key.

12. The apparatus claim 1, further comprising an extension part (602) comprising a threaded portion (954) positioned and dimensioned in such a manner

that it is screwable together with the matching threaded portion of the lock cylinder and/or the matching threaded portion of the part of the modular lock cylinder, so that a length of the modular lock cylinder is adaptable along the longitudinal axis (960) of the modular lock cylinder. 5

13. The apparatus of claim 12, further comprising means (906, 934, 966) for holding the extension part (602) and the part (506, 600, 800) of the modular lock cylinder in alignment with each other after the extension part (602) has been screwed together with the part (506, 600, 800) of the modular lock cylinder. 10

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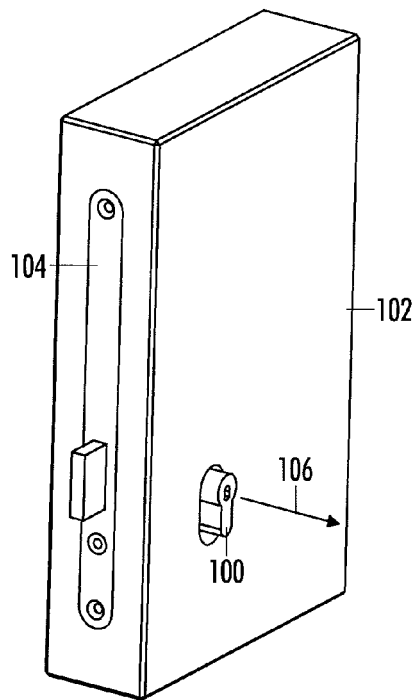


FIG. 1

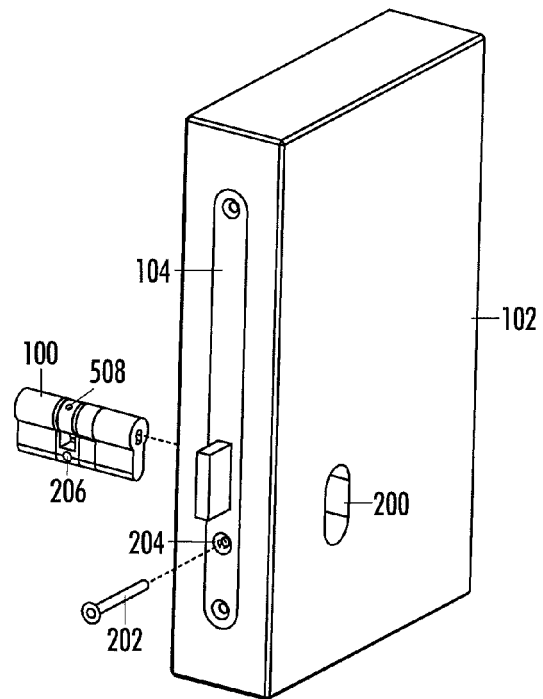


FIG. 2

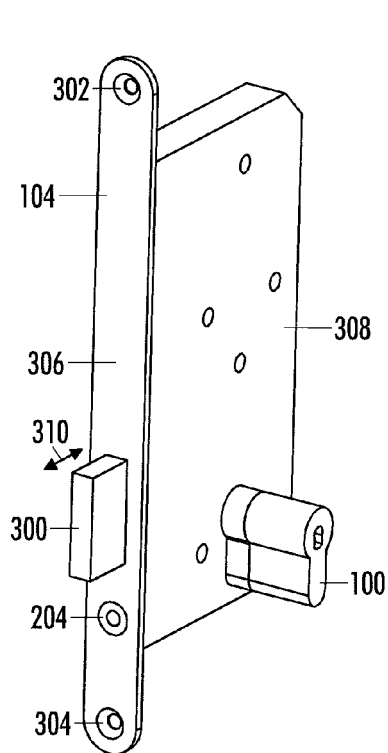


FIG. 3

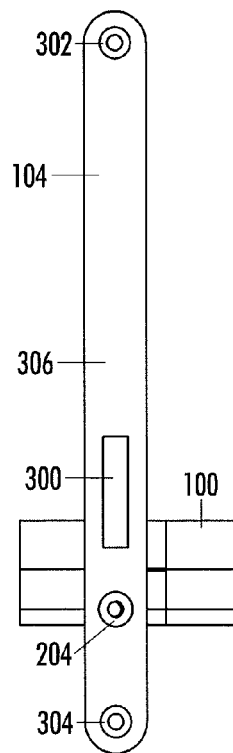


FIG. 4

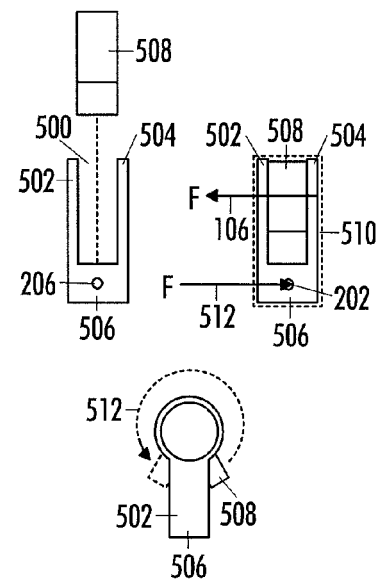


FIG. 5

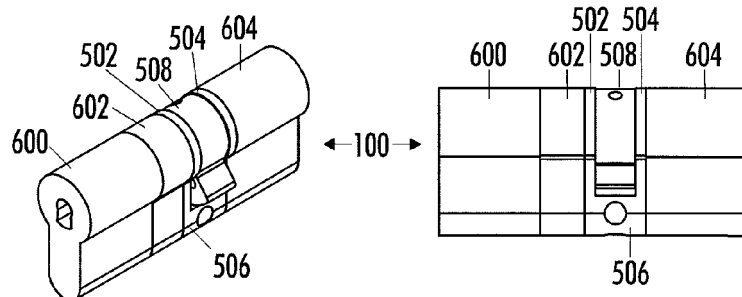


FIG. 6

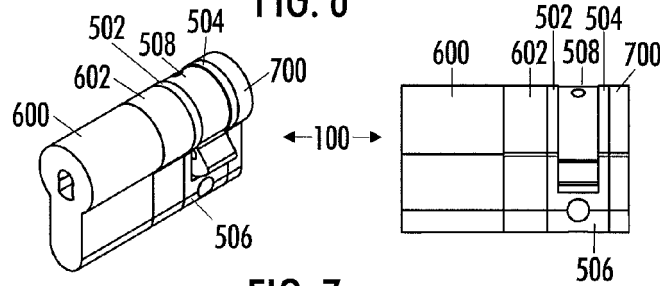


FIG. 7

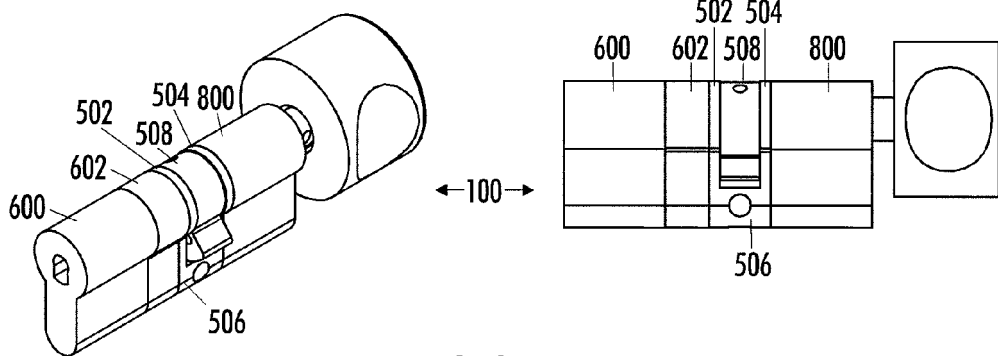


FIG. 8

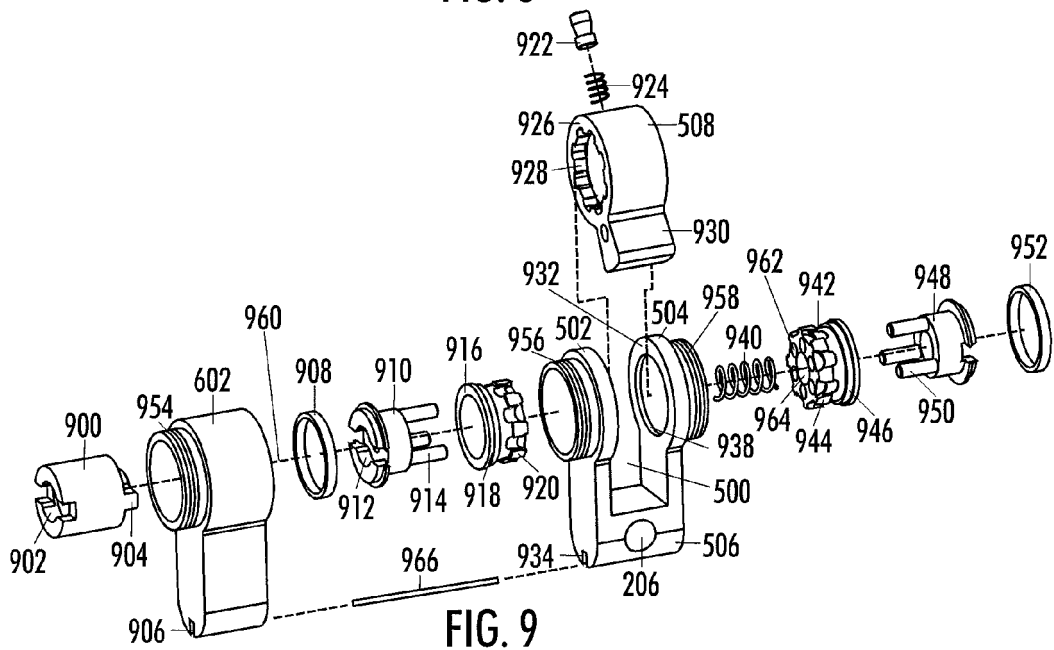


FIG. 9



EUROPEAN SEARCH REPORT

Application Number
EP 09 18 0117

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CH 674 543 A5 (BAUER KABA AG) 15 June 1990 (1990-06-15) * page 3, column 1, line 10 - page 4, column 2, line 31; figures 1-6 *	1-4,6-12	INV. E05B9/04 E05B17/04
X	EP 0 874 113 A1 (MERLE ANDRE [FR]; JPM CHAUVAT SA [FR]) 28 October 1998 (1998-10-28) * column 3, line 36 - column 6, line 4; figures 1-9 *	1-5, 7-10,12	
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A	EP 0 413 964 A1 (GRETSCH UNITAS GMBH [DE]) 27 February 1991 (1991-02-27) * figures 1-4 *	1,7-10	TECHNICAL FIELDS SEARCHED (IPC) E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 3 May 2010	Examiner Perez Mendez, J
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