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(54) **AN IMPROVED STRUCTURE OF KEY CYLINDER**

VERBESSERTE STRUKTUR EINES SCHLIESSZYLINDERS

STRUCTURE AMÉLIORÉE DE BARILLET À CLÉ

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(73) Proprietors:
• **Xu, JuXiang**
Zhejiang 325000 (CN)
• **Magnum Industries Limited**
Central, Hong Kong (HK)

(72) Inventor: **Xu, JuXiang**
Wen Zhou City
Zhejiang 325000 (CN)

(74) Representative: **London IP Ltd**
100 High street
Milford on Sea
Lymington, Hampshire SO41 0QE (GB)

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EP 2 963 209 B1

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Description

Field of technology

[0001] This invention involves a kind of improved structure of a key cylinder

Background technology

[0002] Through applying force to damage a key cylinder on one side of a common door lock, burglars can unlock a door lock through the lock's unlocking cam. In this respect then, the lock's performance is not ideal. To solve this problem, cylinder locks with blocking pins are known, they block the movement of the unlocking cam when the first cylinder body is broken off. European Patent application, EP 2 679 749 A1, discloses such a lock. Furthermore, patent applications CN 203 271 290 and CN 103 615 154 disclose locks with two cylinder bodies and a connection member having two separate connecting blocks and two cylinder bodies with a sliding stop pin in the locking cam and an additional lock shotpin being able to constrain the sliding stop pin in a second position.

Contents of the Invention

[0003] To solve the problem that, in the current technology, the performance of the common door lock under the resistance to force applied by a burglar is not ideal, this invention provides an alternative structure of a key cylinder. It is designed to be compact and more solid and can positively limit the rotating opening of the unlocking cam under certain damage by force, which improves its burglar resistance and has a high reliability.

[0004] According to the present invention, there is provided A key cylinder as defined by claim 1.

[0005] It has advantages including simple and compact design, strong burglar resistance, wide range of application and high reliability.

Brief Description of the Drawings

[0006] The detailed contents of the invention can be illustrated through the drawings and living examples below.

Figure 1 is an exploded diagram of an embodiment of the lock structure;

Figure 2 is a side elevation with partial cutaway showing the assembly structure of the lock structure.

Figure 3 is a side elevation with partial cutaway showing when one side of the cylinder body has been broken by force

Figure 4 is the A-A section view of Figure 2.

Figure 5 is the B-B section view of Figure 2.

Figure 6 is the C-C section view of Figure 3.

Specific mode of execution

[0007] Referring to figure 1, this invention includes a left cylinder body 1 and right cylinder body 2, connected by connection member 3.

[0008] A left barrel of key cylinder 1 and a right barrel 5 of key cylinder 2 are inserted into a left cylinder body or housing 1 and the right cylinder body or housing 2 respectively. Between the left cylinder body 1 and the right cylinder body 2, an unlocking cam 6 is set. An extension from the side of the connection member 3 forms a fixed block 7.

[0009] The fixed block can be set between the left barrel of key cylinder 1 and the unlocking cam 6, or between the right barrel 5 of key cylinder 2 and the unlocking cam 6, depending on the specific requirement. The indication here of right or left, is not to prescribe a limit to the range. The left cylinder barrel 4 and the unlocking cam 6 are connected and driven by the left driving shaft 8 which extends through a bore in the fixed block 7. The unlocking cam 6 and the right barrel 5 of key cylinder 2 are connected and driven by the right driving shaft 9. The connection member 3 is initially positioned in the left key cylinder 1 by a circlip 26 which engages in a slot 27 on the left key cylinder 1 and secured with bolt 25 which extends through bore 24 before engaging with a threaded bore in the left key cylinder 1. The connection member 3 is secured to the right key cylinder 2 in a similar manner.

[0010] The specific structure of the driving shaft described above, is that on the proximal end

[0011] (i.e. the ends nearest the unlocking cam 6) of both the left driving shaft 8 and the right driving shaft 9, there is formed a convex cam surface 19, and the other distal end forms the connection joint having convex profiles as shown, which engages with key cylinder; the end of the convex joint driving shaft 9 can be axially inserted into the barrel of the key cylinder, and is rotationally driven by the barrel of the key cylinder; the end of the convex joint of cam 19 can be axially inserted into the unlocking cam 6 (and held in position by spring 22,23 which fits behind the cam 19) to drive the unlocking cam 6 to rotate it. Compressed spring 10 and lifting pin 11 are set in the right barrel 5 of key cylinder 2. A restraining plug 12 is set inside the fixed block 7.

[0012] A sliding stop pin 13 is set at an eccentric position from the axis of rotation of the unlocking cam 6 sets. Referring also to figure 2, one end of sliding stop pin 13 abuts a lifting pin 11, the other end cooperates with the restraining plug 12. Around the sliding stop pin 13, two circumferential grooves 14 are symmetrically formed. Two lock-stopping channels 15 are formed in a radial direction in the unlocking cam 6, the lock-stopping channels 15 each being equipped with a lock-stopping spring 16 and a lock shotpin 17, packed by the sealing covers 21, and the lock shotpin 17 corresponds with the circular grooves 14. The effect of the cooperation between the lock shotpin 17 and the circular grooves 14 is to prevent burglars from removing the sliding stop pin 13 in

order to rotate the unlocking cam 6. When one side of the lock body and the restraining plug 12 are taken away or fall apart under force, the lock shotpin 17 maintains an engagement with the sliding stop pin 13 through the circumferential groove 14.

[0013] Limit lugs 18 are set on the two sides of walls of the fixed block 7, which prevents the whole key cylinder being knocked into the lock body by force while the key cylinder as a whole is installed in the lock body.

[0014] Referring also to figure 3, when the left cylinder body 1 is damaged by force, the right compressing spring 10 will no longer be resisted, and it will push (through the lifting pin 11) the sliding stop pin 13 leftwards. One left end of the sliding top pin 13 will knock the restraining pin 12 to enter the fixed block 7, making the unlocking cam 6 and the fixed block 7 locked, so that the unlocking cam 6 can no longer rotate. In this way, the lock structure prevents unlocking through force. Referring to figure 4, when the sliding stop pin 13 is moved to this position, the lock shotpin 17 under the urging of the lock-stopping spring 16 enters the circumferential groove 14 of the sliding stop pin 13 through the zigzag profile of the sliding stop pin 13, which prevents further movement of the sliding stop pin 13. With the stop pin constrained in this way, the burglars cannot rotate the unlocking cam through taking the sliding stop pin out, further enhancing the lock's ability to guard against burglary.

[0015] The embodiment above is just to describe the optimized mode of execution of an improved structure of key cylinder of this invention, not a conception of this invention nor to limit the range of it. Provided the principles of the invention are not departed from, all the changes of the appearance and improvement of the technical proposals of this invention made by the technicians in this field should belong to the scope of protection of the improved structure of the key cylinder of this invention. In particular, the mechanism could be adapted using the same principles so that rotation of the unlocking is prevented when either key cylinder is removed by force. It will also be realised that though both cylinders shown here are key operated barrel locks, the principles may be extended to other barrel types, such as electronic operated locks, or one side may have a thumb turn, and other variations as is known in the art.

[0016] Many variations are possible without departing from the scope of the present invention as defined in the appended claims.

Claims

1. A key cylinder lock including:

a first cylinder body (1) and second cylinder body (2), connected by a connection member (3), the first cylinder body (1) housing a first barrel (4), and the second cylinder body (2) housing a second barrel (5);

an unlocking cam (6) located between the first cylinder body (1) and the second cylinder body (2);

the connection member (3) featuring a fixed block (7) extending from its side;

the fixed block (7) set between the first barrel (4) of the key cylinder (1) and the unlocking cam (6);

the key cylinder additionally including:

a first driving shaft (8) which extends through a bore in the fixed block (7) and torsionally connects the first cylinder barrel (4) and the unlocking cam (6) such that the first cylinder barrel (4) can drive the unlocking cam (6) between a locked and an unlocked position;

a second driving shaft (9) which torsionally connects the second cylinder barrel (4) and the unlocking cam (6) such that the first cylinder barrel (4) can drive the unlocking cam (6) between a locked and an unlocked position; and

a sliding stop pin (13),

the sliding stop pin (13) being located within the unlocking cam (6) initially set in a first position which allows the unlocking cam (6) to rotate, and restrained in that position by the presence of the first cylinder body (1), and

biased to a second position by a resilient member (10) in which the unlocking cam (6) preventing the rotation of the unlocking cam (6) to an unlocked position, such that the sliding stop pin (13) is urged to this second position in the case that the first cylinder body (1) is broken off from the remainder of the key cylinder;

wherein the sliding stop pin (13) features at least one circumferential groove (14); and the unlocking cam (6) features at least one lock-stopping channel (15) formed in a radial direction in the unlocking cam (6), the lock-stopping channel (15) being equipped with a lock-stopping resilient member (16) and a lock shotpin (17);

such that on the movement of the sliding stop pin (13) from the first position, the lock shotpin (17) engages with the lock-stopping channel (15) and constrains the sliding stop pin (13) in the second position.

2. A key cylinder lock according to claim (1) **characterised in that** one end of sliding stop pin (13) abuts a lifting pin (11) biased by the resilient member (10) set in the second barrel (5) of key cylinder (2); and the other end of the sliding stop pin (13) cooperates with a restraining plug (12) set inside the fixed block

(7);

such that in the case of the first a first cylinder body (1) being broken off from the remainder of the key cylinder, the restraining plug (12) is released, allowing the resilient member (10) and lifting pin (11) to move the sliding stop pin (13) into the second position.

3. A key cylinder lock according to either previous claim **characterised in that** the sliding stop pin (13) is housed in an eccentric position from the axis of rotation of the unlocking cam (6). 5
4. A key cylinder lock according to any previous claim **characterised in that** the sides of walls of the fixed block (7) feature one or more limit lugs (18) which constrain the axial movement of the fixed block (7) relative to the key cylinder. 10
5. A key cylinder lock according to any previous claim **characterised in that** the ends of the first driving shaft and/or the second driving shaft (9) feature convex cam profiles (19) which engage the unlocking cam (6). 15
6. A key cylinder lock according to any previous claim **characterised in that** the ends of the first driving shaft and/or the second driving shaft (9) feature convex profiles which engage with the first barrel (4) and/or second barrel. 20

Patentansprüche

1. Eine Schließzylinderverriegelung, die Folgendes beinhaltet: 25

ein erstes Zylindergehäuse (1) und ein zweites Zylindergehäuse (2), verbunden durch ein Verbindungselement (3), das erste Zylindergehäuse (1) beinhaltet einen ersten Zylindermantel (4) und das zweite Zylindergehäuse (2) beinhaltet einen zweiten Zylindermantel (5); 30

eine Entriegelungsnocke (6), die zwischen dem ersten Zylindergehäuse (1) und dem zweiten Zylindergehäuse (2) platziert ist; 35

das Verbindungselement (3) besitzt einen festen Block (7), der sich von der Seite erstreckt; 40

der feste Block (7) ist zwischen dem ersten Zylindermantel (4) des Schließzylinders (1) und der Entriegelungsnocke (6) angebracht; 45

der Schließzylinder beinhaltet zusätzlich Folgendes:

eine erste Antriebswelle (8), die sich durch eine Bohrung in dem festen Block (7) erstreckt und drehelastisch den ersten Zylindermantel (4) mit der Entriegelungsnocke 50

(6) verbindet, so dass der erste Zylindermantel (4) die Entriegelungsnocke (6) zwischen einer verriegelten und einer entriegelten Position antreiben kann; eine zweite Antriebswelle (9), die drehelastisch den zweiten Zylindermantel (4) mit der Entriegelungsnocke (6) verbindet, so dass der erste Zylindermantel (4) die Entriegelungsnocke (6) zwischen einer verriegelten und einer entriegelten Position antreiben kann; und einen Gleitanschlagstift (13), der Gleitanschlagstift (13) ist in der Entriegelungsnocke (6) anfangs in einer ersten Position untergebracht, die es der Entriegelungsnocke (6) erlaubt, sich zu drehen, und in dieser Position durch die Präsenz des ersten Zylindermantels (1) gehalten wird, und in einer zweiten Position durch ein elastisches Element (10) vorgespannt, in dem die Entriegelungsnocke (6) die Rotation der Entriegelungsnocke (6) in eine entriegelte Position verhindert, so dass der Gleitanschlagstift (13) in diese zweite Position gedrängt wird, wenn der erste Zylinderkörper (1) vom Rest des Schließzylinders abgebrochen wird; wobei der Gleitanschlagstift (13) mindestens eine umlaufende Nut (14) aufweist; und die Entriegelungsnocke (6) mindestens einen die Verriegelung stoppenden Kanal (15) aufweist, der in radialer Richtung in der Entriegelungsnocke (6) gebildet ist, der die Verriegelung stoppende Kanal (15) ist mit einem die Verriegelung stoppenden elastischen Element (16) und einem einziehbaren Verriegelungs-Fixierstift (17) ausgestattet; so dass sich bei der Bewegung des Gleitanschlagstifts (13) aus der ersten Position der einziehbare Verriegelungs-Fixierstift (17) mit dem die Verriegelung stoppenden Kanal (15) verbindet und den Gleitanschlagstift (13) in der zweiten Position hält.

2. Eine Schließzylinderverriegelung nach Anspruch (1) **gekennzeichnet dadurch, dass** ein Ende des Gleitanschlagstifts (13) an einem Aufnahmedorn (11) anliegt, der durch das elastische Element (10) vorgespannt ist, das in den zweiten Mantel (5) des Schließzylinders (2) eingesetzt ist; und das andere Ende des Gleitanschlagstifts (13) mit einem dämpfenden Verschlusspfropfen (12) zusammenwirkt, der in dem festen Block (7) eingesetzt ist; so dass im Falle des ersten ein erstes Zylinderge-

häuse (1) von dem Rest des Schließzylinders abgebrochen wird, der dämpfende Verschlusspfropfen (12) wird freigegeben, wodurch das elastische Element (10) und der Aufnahmedorn (11) den Gleitanschlagstift (13) in die zweite Position bewegen.

3. Eine Schließzylinderverriegelung nach einem der vorhergehenden Ansprüche, **gekennzeichnet dadurch, dass** der Gleitanschlagstift (13) in einer ausmittigen Position von der Rotationsachse der Entriegelungsnocke (6) untergebracht ist.
4. Eine Schließzylinderverriegelung nach einem der vorhergehenden Ansprüche, **gekennzeichnet dadurch, dass** die Seiten der Wände des festen Blocks (7) einen oder mehrere Begrenzungsösen (18) aufweisen, die die axiale Bewegung des festen Blocks (7) im Verhältnis zum Schließzylinder halten.
5. Eine Schließzylinderverriegelung nach einem der vorhergehenden Ansprüche, **gekennzeichnet dadurch, dass** die Enden der ersten Antriebswelle und/oder der zweiten Antriebswelle (9) konvexe Nockenprofile (19) aufweisen, die sich mit der Entriegelungsnocke (6) verbinden.
6. Eine Schließzylinderverriegelung nach einem der vorhergehenden Ansprüche, **gekennzeichnet dadurch, dass** die Enden der ersten Antriebswelle und/oder der zweiten Antriebswelle (9) konvexe Profile aufweisen, die sich mit dem ersten Mantel (4) und/oder dem zweiten Mantel verbinden.

Revendications

1. Serrure à cylindre à clé comportant :

un premier corps de cylindre (1) et un second corps de cylindre (2), reliés par un élément de liaison (3), le premier corps de cylindre (1) hébergeant un premier barillet (4) et le second corps de cylindre (2) hébergeant un second barillet (5) ;

une came de déverrouillage (6) située entre le premier corps de cylindre (1) et le second corps de cylindre (2) ;

l'élément de liaison (3) présentant un bloc fixe (7) s'étendant depuis son côté ;

le bloc fixe (7) placé entre le premier barillet (4) du cylindre à clé (1) et la came de déverrouillage (6) ;

le cylindre à clé comportant de plus :

un premier axe d'entraînement (8), qui s'étend à travers un alésage dans le bloc fixe (7) et relie en rotation le premier barillet de cylindre (4) et la came de déverrouillage

(6), de sorte que le premier barillet de cylindre (4) peut entraîner la came de déverrouillage (6) entre une position verrouillée et déverrouillée ;

un second axe d'entraînement (9) qui relie en rotation le second barillet de cylindre (4) et la came de déverrouillage (6), de sorte que le premier barillet de cylindre (4) peut entraîner la came de déverrouillage (6) entre une position verrouillée et déverrouillée ; et

une goupille d'arrêt coulissante (13), la goupille d'arrêt coulissante (13) étant située à l'intérieur de la came de déverrouillage (6) initialement placée dans une première position qui permet à la came de déverrouillage (6) de tourner et retenue dans cette position par la présence du premier corps de cylindre (1) et sollicitée vers une seconde position par un élément élastique (10) dans lequel la came de déverrouillage (6) empêchant la rotation de la came de déverrouillage (6) vers une position déverrouillée, de sorte que la goupille d'arrêt coulissante (13) est poussée vers cette seconde position dans le cas où le premier corps de cylindre (1)

est séparé du reste du cylindre à clé ; dans lequel la goupille d'arrêt coulissante (13) présente au moins une gorge périphérique (14) ; et

la came de déverrouillage (6) présente au moins un canal d'arrêt de verrou (15) formé dans une direction radiale dans la came de déverrouillage (6), le canal d'arrêt de verrou (15) étant muni d'un élément élastique d'arrêt de verrou (16) et d'une goupille de positionnement de verrou (17) ;

de sorte que lors du déplacement de la goupille d'arrêt coulissante (13) à partir de la première position, la goupille de positionnement de verrou (17) entre en prise avec le canal d'arrêt de verrou (15) et limite la goupille d'arrêt coulissante (13) dans la seconde position.

2. Serrure à cylindre à clé selon la revendication (1) **caractérisée en ce qu'**une extrémité de la goupille d'arrêt coulissante (13) vient en butée avec la goupille de soulèvement (11) sollicitée par l'élément élastique (10) placé dans le second barillet (5) du cylindre à clé (2) ; et l'autre extrémité de la goupille d'arrêt coulissante (13) coopère avec un bouchon de retenue (12) placé à l'intérieur du bloc fixe (7) ; de sorte que dans le cas du premier, un premier corps de cylindre (1) étant séparé du reste du cylindre à clé, le bouchon de retenue (12) est libéré, permettant à l'élément élastique (10) et à la goupille de

soulèvement (11) de déplacer la goupille d'arrêt coulissante (13) dans la seconde position.

3. Serrure à cylindre à clé selon une quelconque revendication précédente **caractérisée en ce que** la goupille d'arrêt coulissante (13) est hébergée dans une position excentrée à partir de l'axe de rotation de la came de déverrouillage (6). 5
4. Serrure à cylindre à clé selon une quelconque revendication précédente **caractérisée en ce que** les parois du bloc fixe (7) présentent un ou plusieurs ergots de limitation (18) qui limitent le déplacement axial du bloc fixe (7) par rapport au cylindre à clé. 10
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5. Serrure à cylindre à clé selon une quelconque revendication précédente **caractérisée en ce que** les extrémités du premier axe d'entraînement et/ou du second axe d'entraînement (9) présentent des profils de came convexes (19) qui entrent en contact avec la came de déverrouillage (6). 20
6. Serrure à cylindre à clé selon une quelconque revendication précédente **caractérisée en ce que** les extrémités du premier axe d'entraînement et/ou du second axe d'entraînement (9) présentent des profils convexes qui entrent en contact avec le premier barillet (4) et/ou le second barillet. 25

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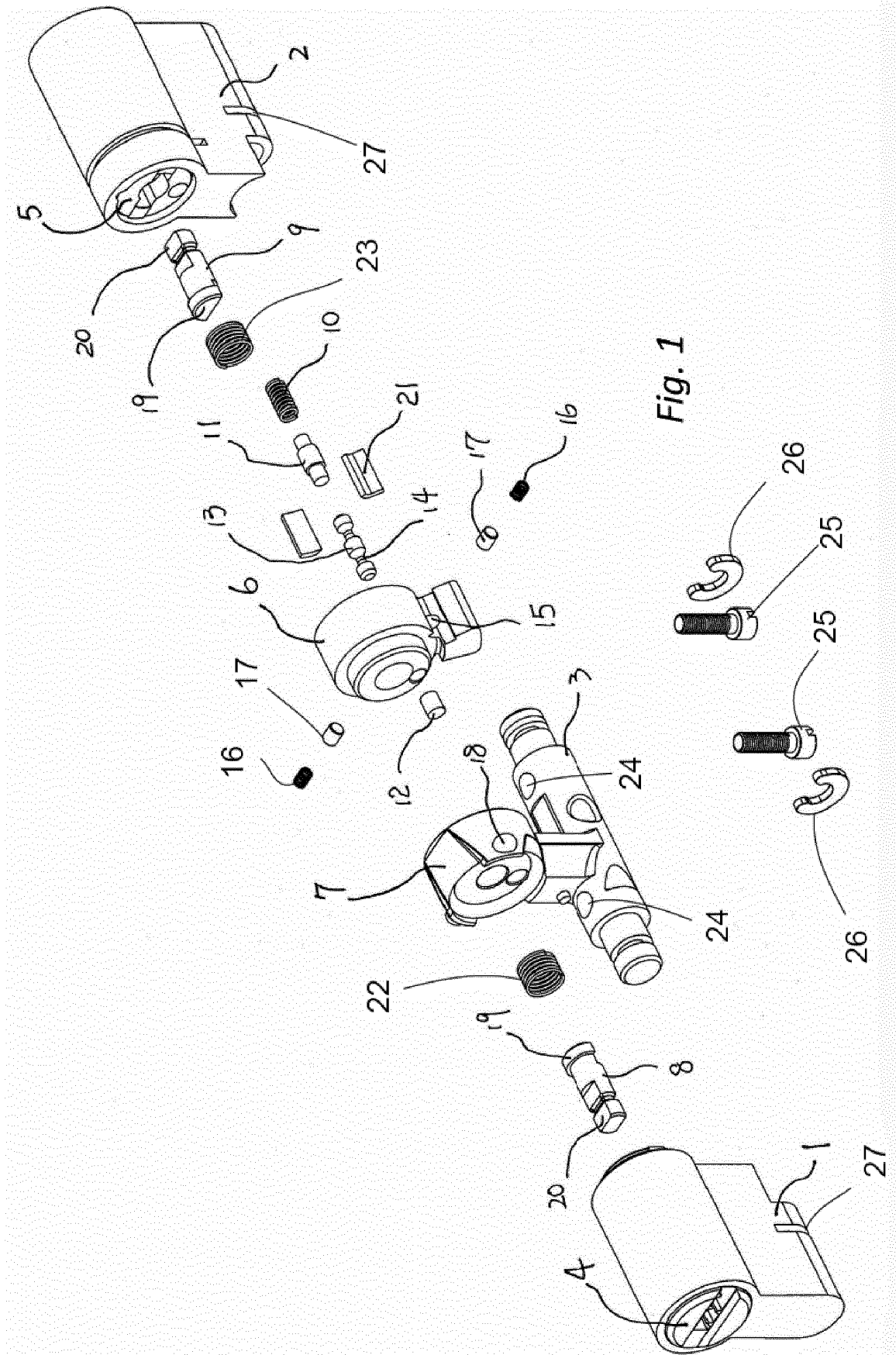


Fig. 2

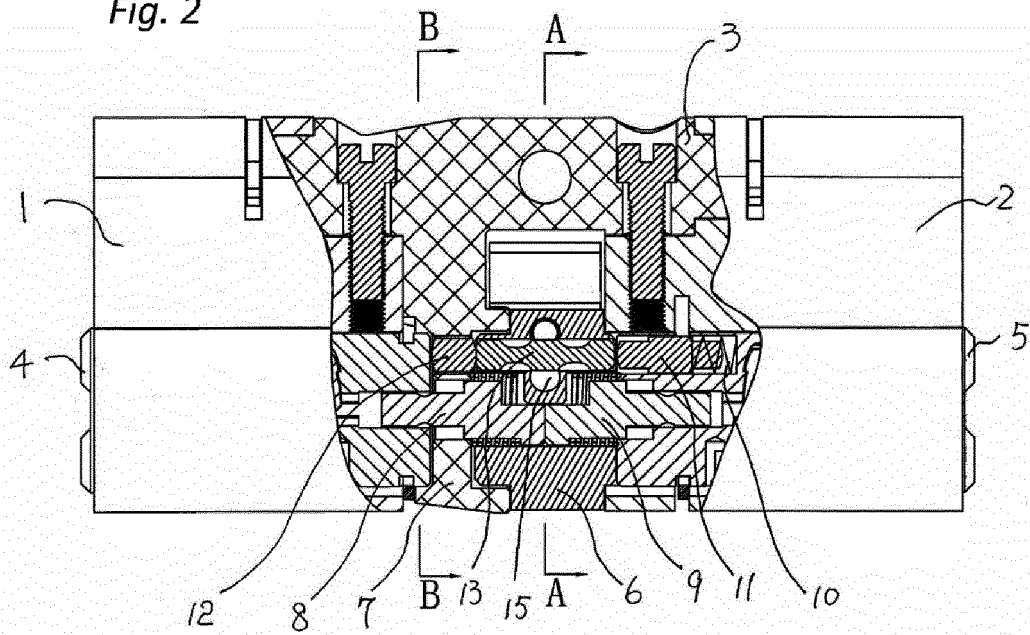
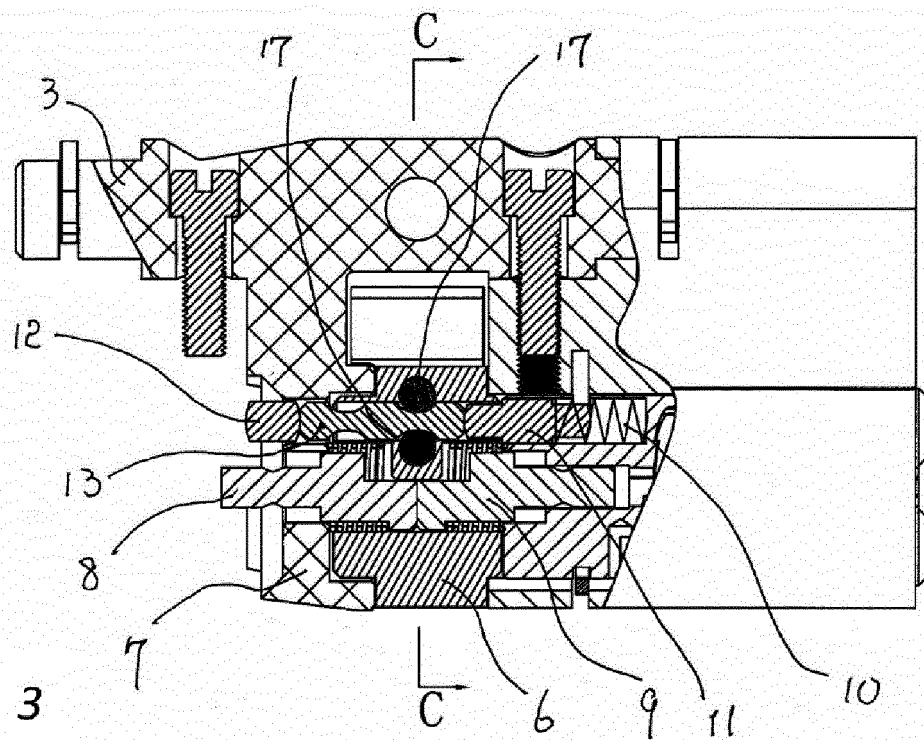
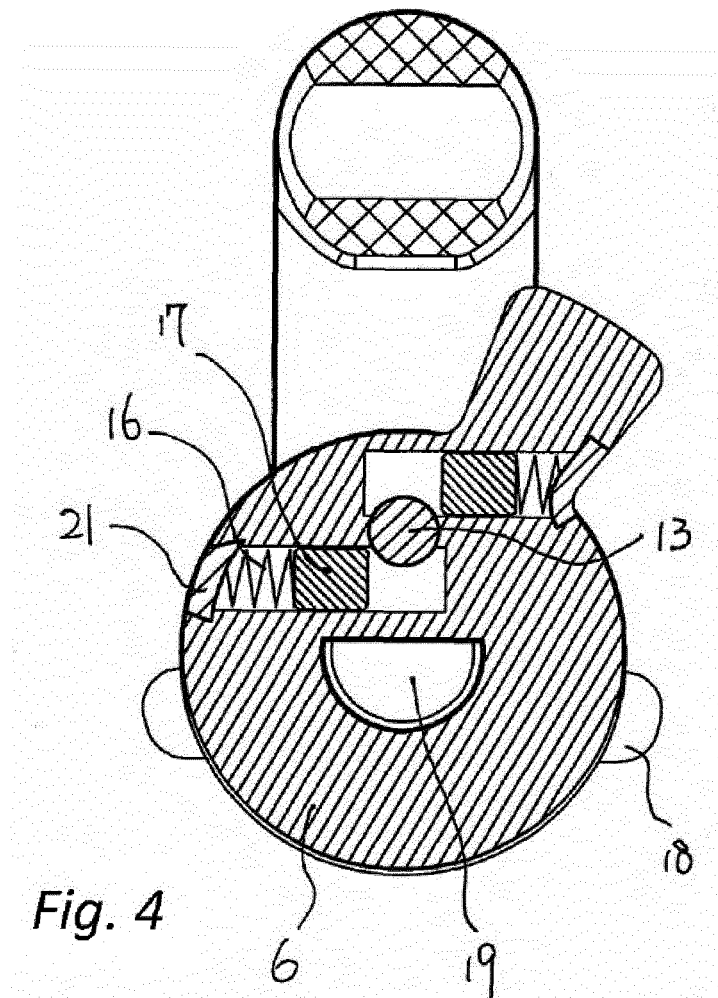
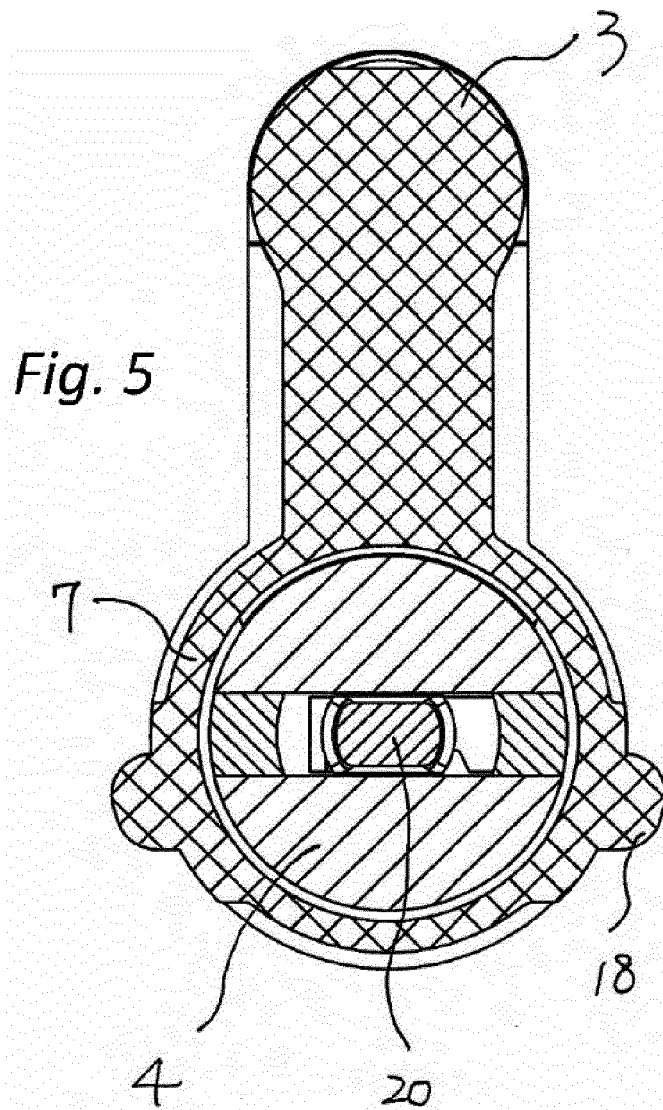
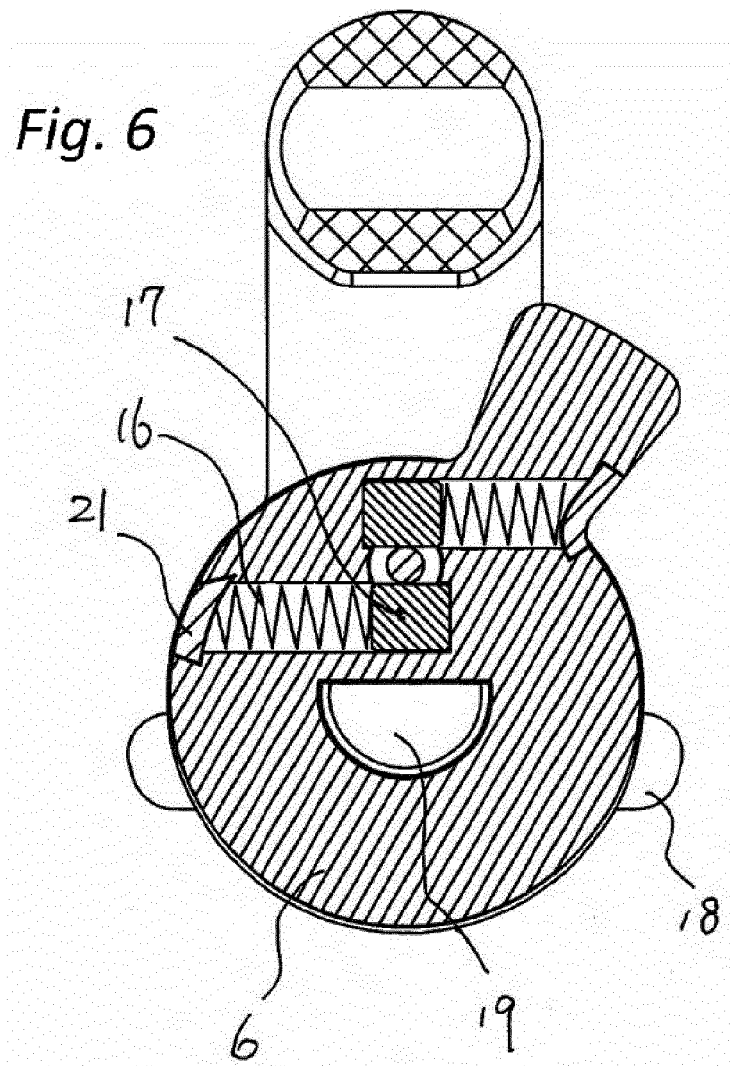


Fig. 3









REFERENCES CITED IN THE DESCRIPTION

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