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(56) Documents Cited:
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(54) Title of the Invention: **Anti-theft and anti-violence lock cylinder**
 Abstract Title: **A secure lock cylinder with sacrificial snapping slot, anti-drill pins and plate**

(57) A lock cylinder comprises a housing 1, a stiffening body 3 and an inner plug 2. The housing includes a mounting hole 16 for installing the inner plug, a sidebar locking slot 17, first pin-tumbler holes 20, anti-drill pin holes 18 disposed between neighbouring pin-tumbler holes, and anti-snap slot 21. The first pin-tumbler holes being provided with a locking pin assembly 34, spring 4, and sealing bead 5. The inner plug is vertically provided with second pin-tumbler holes 22 and laterally provided with third pin tumbler holes 24 above which is provided a sidebar slot 25 in the plug. An anti-drill plate slot 7 is arranged between a keyhole face and the second pin-tumbler holes. The plug is provided with a second anti-snap slot 23. Both ends of the stiffening body are provided with elliptic holes 311 for receiving cylindroid protrusions from the inner end faces of the housing. One end of the inner plug has an open slot 26 and a circlip groove 27 for connection to a rotating part of the stiffening body. The stiffening body may be provided with anti-clamping chamfers.

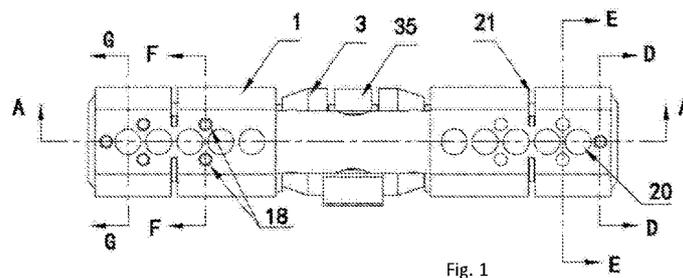


Fig. 1

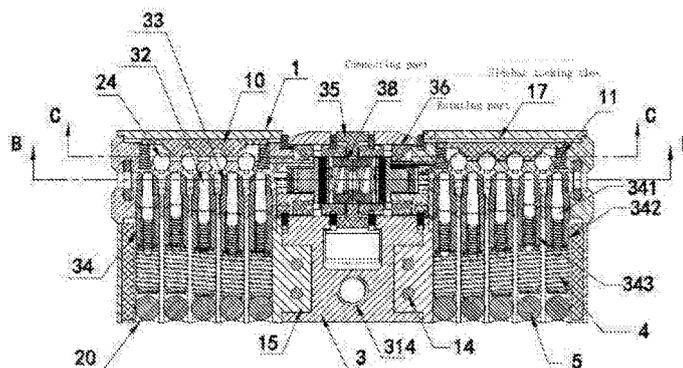


Fig. 2

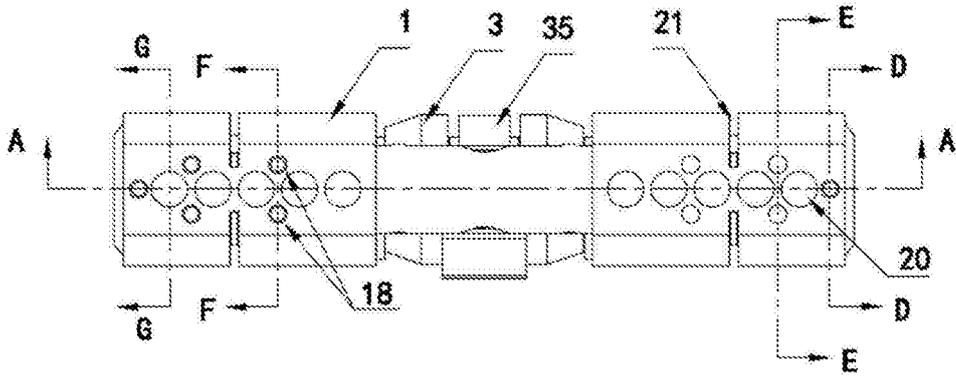


Fig. 1

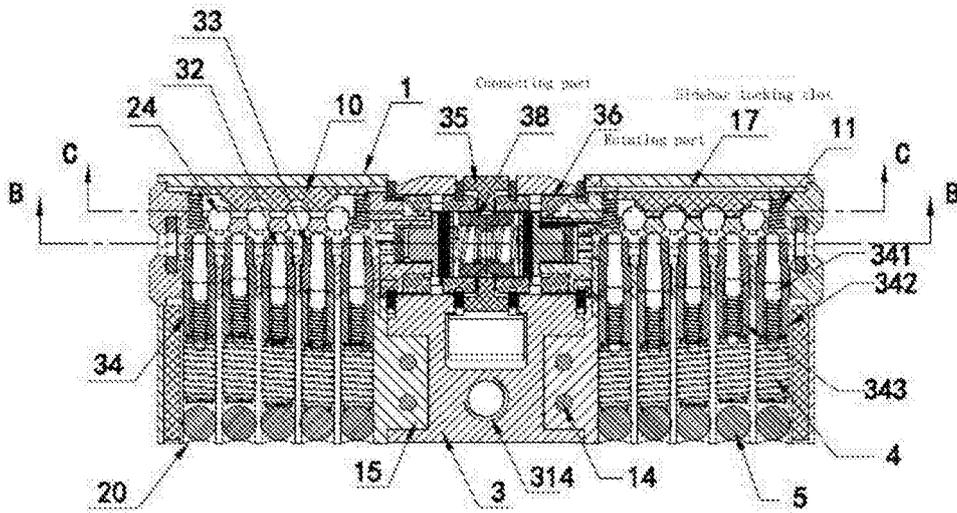


Fig. 2

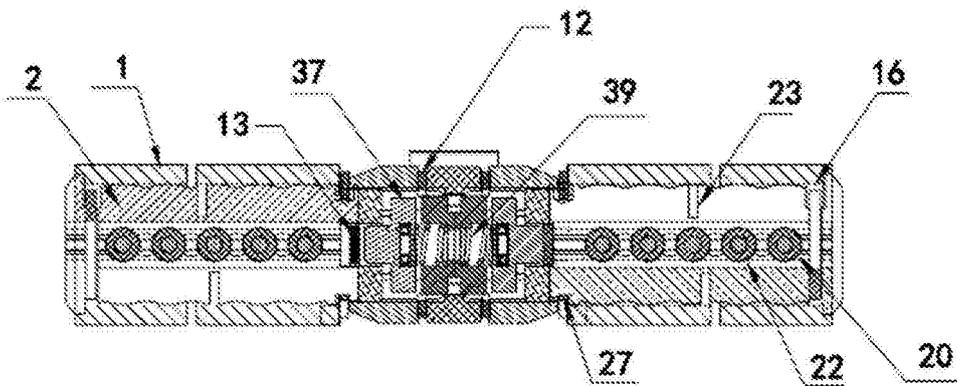


Fig. 3

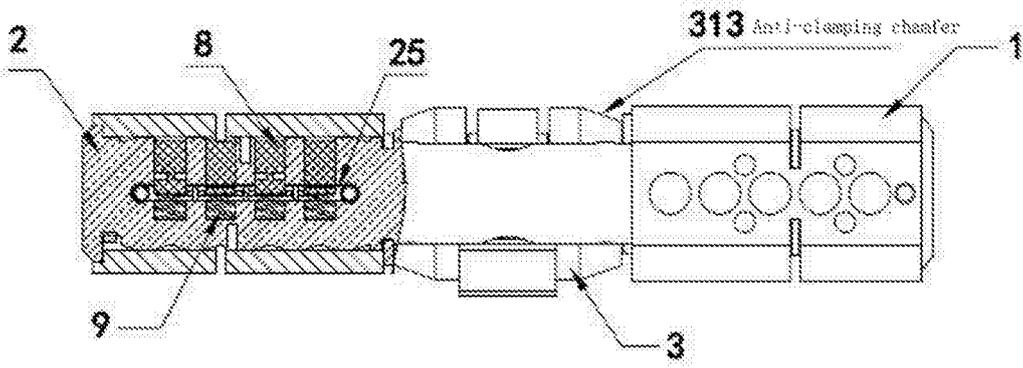


Fig. 4

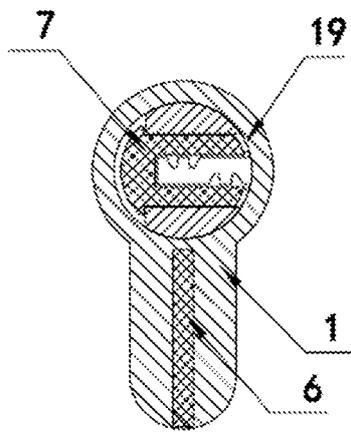


Fig. 5

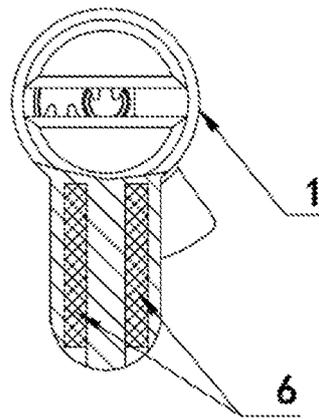


Fig. 6

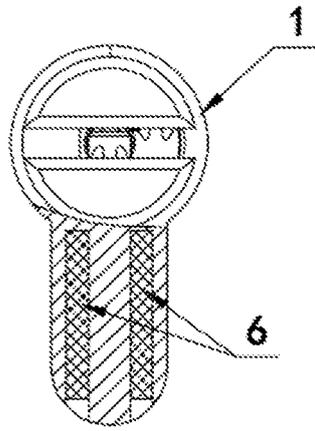


Fig. 7

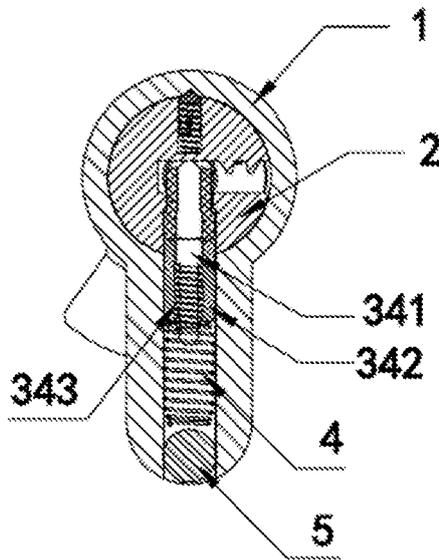


Fig. 8

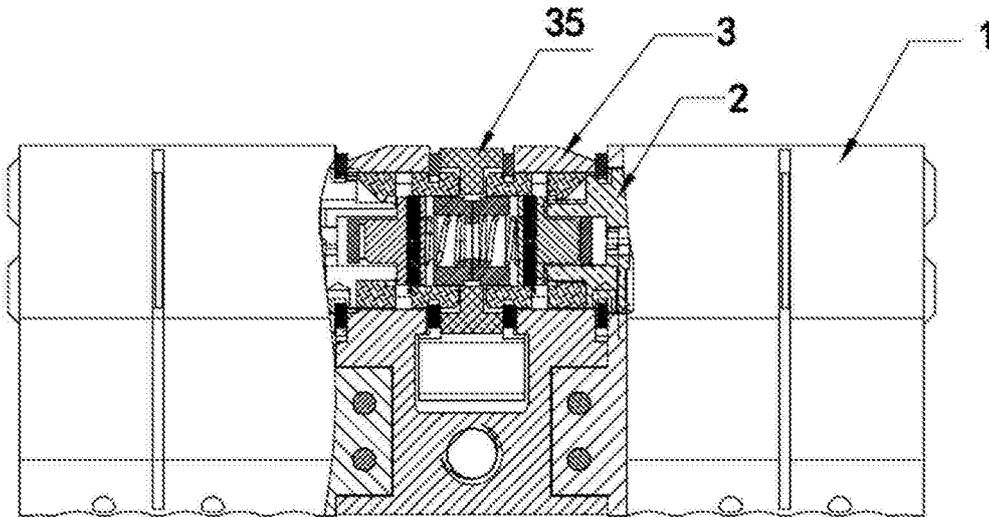


Fig. 9

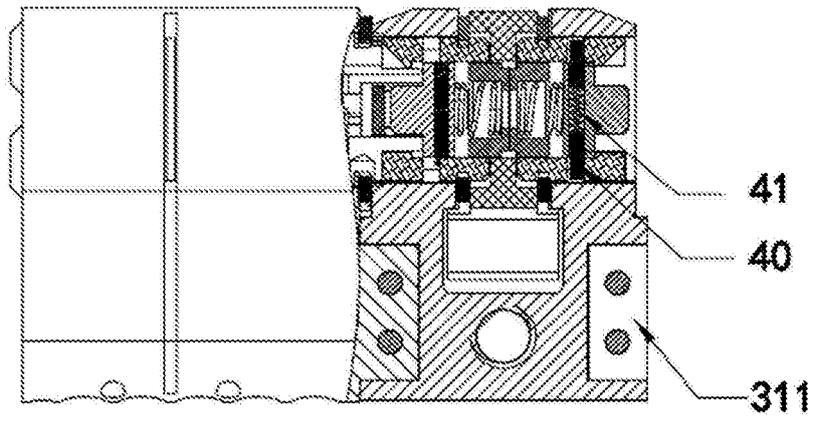


Fig.10

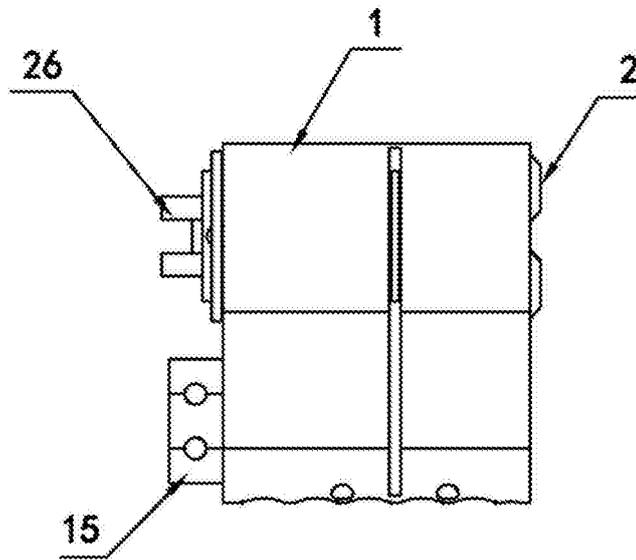


Fig.11

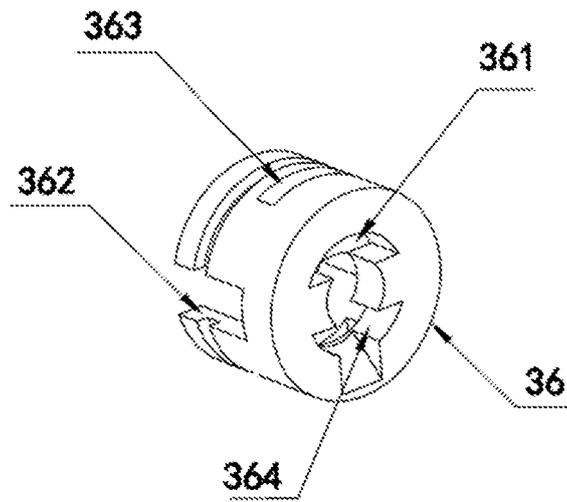


Fig.12

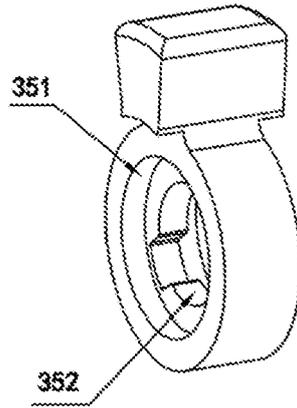


Fig.13

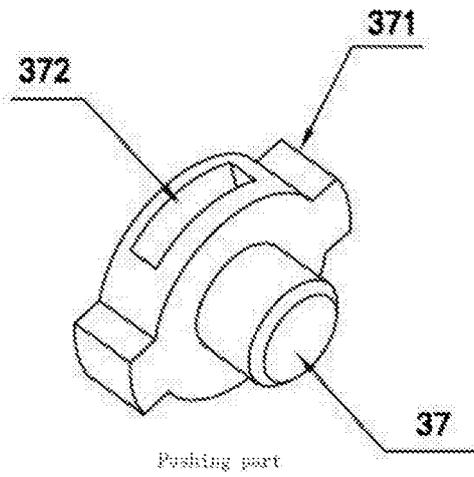


Fig.14

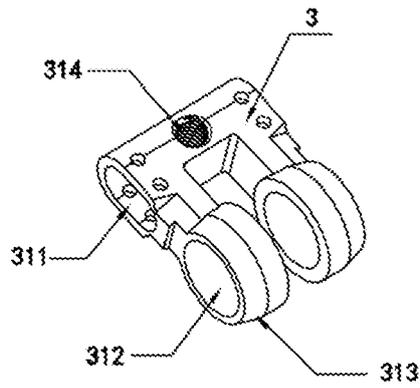


Fig.15

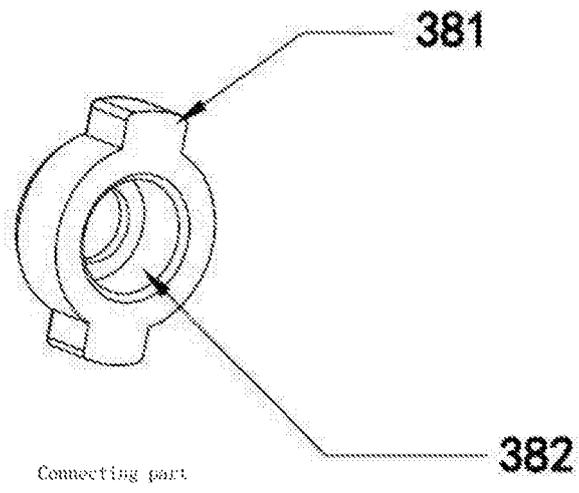


Fig.16

Anti-theft and anti-violence lock cylinder

Technical field of the invention

The present invention relates to the technical field of a lock, in particular to an anti-theft and anti-violence
5 lock cylinder.

Background of the invention

With regard to a set of locks, the most core part is the lock cylinder and the anti-theft performance of the lock
cylinder is vital to the safety of a lock of the door. In the past, thieves used to unlock in following ways:
10 unlocking with a lock picking tool, unlocking by stirring a pin and unlocking with a bump key (or a snap gun).
With the change of technology and processing technic, the difficulty of the lock cylinder opening is also
constantly increasing, but the thieves never stop breaking the lock cylinder and they will unlock via brute
force if the technical opening fails. Normally, brute force unlock could be completed by using a drilling bit and
self-tapping screw. What is more violent is to directly cut off the wood or iron plate at the place where the
15 lock cylinder is installed, or to employ special socket or vise grip pliers to clamp the exposed lock housing and
pull it back and forth till the position where the screw is mounted on the housing is broken (and where the
screw is mounted is the weakest position of the housing), so that the whole lock cylinder would fall apart,
then the dial could be turned easily by a screwdriver and the bolt of the lock body could be turned back to
the lock body, thereby opening the door.
20 To sum up, there is an urgent need for an anti-theft and anti-violence lock cylinder to prevent technical
unlocking and brute-force unlocking.

Summary of the invention

In order to overcome the above shortcomings of the existing technology, the purpose of the present
25 invention is to provide an anti-theft and anti-violence lock cylinder which can prevent both the technical
unlock and the violent unlock.

The technical solutions adopted in the present invention to solve the technical problems are as follows: an
anti-theft and anti-violence lock cylinder comprises a housing, a stiffening body and an inner plug, wherein
30 the housing is axially arranged with a housing mounting hole for installing the inner plug; inside the housing

mounting hole is provided a sidebar locking slot, on the housing are provided first pin-tumbler holes, the first pin-tumbler holes penetrate from outer surface of the housing into the housing mounting hole; inside the first pin-tumbler hole are provided a locking pin assembly, a lock cylinder spring and a sealing steel bead; between neighboring first pin-tumbler holes are provided anti-drill pin holes, and the housing is further
5 provided with a first anti-snap slot; the inner plug is vertically provided with second pin-tumbler holes and laterally provided with third pin-tumbler holes, above the third pin-tumbler holes is provided a sidebar slot of inner plug; an anti-drill plate slot is arranged between an end face of keyhole and the second pin-tumbler holes, and the inner plug is further provided with a second anti-snap slot; both ends of the stiffening body are provided with elliptic holes connected to the housing; inner end face of the housing are provided with
10 protruding cylindroids, left and right ends of the stiffening body are connected with the housing through the cylindroids in cooperation with respective elliptic hole, one end of the inner plug is further provided with an open slot and a circlip groove, and the stiffening body is provided with a rotating part connected to the inner plug of the lock cylinder through the open slot and the circlip groove.

15 As a further improvement of the present invention, the second pin-tumbler holes are successively equipped with inner pin tumblers and outer pin tumblers from outside to inside, the third pin-tumbler holes are irregular pin-tumbler holes, inside the irregular pin-tumbler holes are successively equipped irregular and coded stainless steel beads, the sidebar slot of inner plug above the irregular pin-tumbler holes is provided with a sidebar latch, and both ends of sidebar latch are provided with sidebar springs.

20 As a further improvement of the present invention, inside the anti-drill plate slot is provided an anti-drill plate which has a thickness of 1.2mm and a quenching hardness of HRC 52-58.

25 As a further improvement of the present invention, the axis of the stiffening body is provided with a dial, a rotating part, a driven part and two connecting parts, middle slot part on the stiffening body is axially provided with the dial, the stiffening body is provided with an axial hole, both left and right ends of the axial hole are installed with the rotating part, both ends of the rotating parts are installed with driven part which are installed inside respective rotating part, and the driven part drives the connecting parts to move the dial.

30 As a further improvement of the present invention, the dial is in a shape of a round wheel, the width of the

dial at the position of the round wheel is 5.6mm, each end of the dial is provided with a stepped circular hole, a central circular hole is formed in the center of the dial, and a connection part is installed at the central circular hole; the rotating part is of a cylindrical shape, provided with a stepped hole inside and two grooves symmetrical to its center axis plane, two rectangular holes are formed on the curved surface perpendicular to the grooves, and the two rectangular holes are symmetrical to center line of the grooves, the outer end of the rotating part is provided with a "8" shaped hole, which is connected with step on inner end of the inner plug; the driven part is a stepped post with positioning bulges on both sides, and the positioning bulges are sleeved into the symmetrical grooves of the rotating part to fix them, a rectangular through hole (hole for steel sheet) is provided on curved surface thereof, two locking steel sheets and two locking springs are installed in the through hole, the locking steel sheet is made of SUS304 and its thickness is 1.0mm; the connecting part is cylindrical, on two sides thereof are provided positioning bulges same as those in the driven part, and in axis center is provided a stepped hole for mounting the push-pull spring(s).

As a further improvement of the present invention, the stiffening body, the rotating part and the driven part are all quenching parts, and the hardness is HRC 45-52.

As a further improvement of the present invention, inside the anti-drill pin hole is provided an anti-drill pin, the outer diameter of the anti-drill pin is 2mm, and the distance between the two adjacent anti-drill pins is less than 3mm.

As a further improvement of the present invention, the stiffening body is in a gourd-shape which is the same as the shape of the housing, both left and right ends are provided with elliptical holes, lower part of the stiffening body is provided with M5 screw mounting holes, the circular surface and the lower part are provided with an anti-clamping chamfer, and the anti-clamping chamber is 4° .

As a further improvement of the present invention, the locking pin assembly comprises an inner locking pin, an outer locking pin and a driven bead spring.

As a further improvement of the present invention, the first anti-snap slot is arranged in the middle part of the housing and the second anti-snap slot is arranged in the middle part of the inner plug.

Comparing with the prior art, the present invention has following beneficial effects:

1. In the present invention, the second pin-tumbler hole on the cylinder inner plug is equipped with two coded pin tumblers, the first pin-tumbler hole is equipped with two driven pin tumblers and a spring
5 inside, which is good to prevent those unlocking ways like unlocking by pulling pins ,and unlocking via a bump key, a snap gun or tinfoil, further, the inner plug is laterally provided with irregular and coded stainless steel beads, above the pin-tumbler hole is provided a sidebar latch, the sidebar latch is locked
10 inside the sidebar locking slot of the housing, sidebar latch would get moved into the irregular and coded stainless steel beads only when the irregular and coded stainless steel beads match up with each other, and the increase on the number of pins could greatly reduce the mutual opening rate of the core cylinders.
2. In the present invention, between the inner end face of the inner plug and the first pin-tumbler hole is arranged an anti-drill plate, and three anti-drill pins are arranged among the front end of the housing, the first pin-tumbler holes and the second pin-tumbler holes, which is beneficial to prevent the bit from
15 breaking the housing and prevent the self-tapping screw from pulling the inner plug.
3. In the present invention, the pin-tumbler holes on both housing and the inner plug are provided with anti-snap slots, When the thief breaks the front segment of the housing with a vise grip plier, the pin tumblers of inner plug are still locked in the lock cylinder, furthermore, the housing is provided with anti-drill pins between the pin-tumbler holes, which is helpful in prolonging the unlock time of the thief.
20 Even if the lock cylinder exposed outside of the lock is all broken, the driven part in the rotating part will be locked by the locking steel plate after breaking the lock cylinder. Then the driven part cannot push the connecting part into the hole of the dial, the rotating part will not drive the connecting part to turn the dial, so as to make the rotating part idling. Moreover, the curved surface and extension plane of the stiffening body have a chamfer of 4° to 20° , and the vise grip plier will not be able to generate force on the
25 inclined plane, so as to completely prevent the possibility of breaking the screw hole of the lock cylinder through brute force.

Brief Description of the Drawings

FIG. 1 is a structural diagram of the anti-theft and anti-violence lock cylinder according to an embodiment of
30 the invention;

FIG. 2 is a structural diagram of the section taken along A-A direction in FIG. 1;

FIG. 3 is a structural diagram of the section taken along B-B direction in FIG. 2;

FIG. 4 is a partial section view taken along C-C direction in FIG. 2.

FIG. 5 is a partial section view taken along D-D direction in FIG. 1.

5 FIG. 6 is a partial section view taken along E-E direction in FIG. 1.

FIG. 7 is a partial section view taken along F-F direction in FIG. 1.

FIG. 8 is a partial section view taken along G-G direction in FIG. 1.

FIG. 9 is a sectional view of internal structure of the stiffening body in readily assembled state.

10 FIG. 10 is a schematic diagram of state of the locking steel sheet jumping from the square hole of the driven part to the square hole of the rotating part after connection between the locking shell and the stiffening body is discontinued;

FIG. 11 is a schematic diagram of the fractured part on the housing in FIG. 9;

FIG. 12 is a structural diagram of the rotating parts;

FIG. 13 is a structural diagram of the dial;

15 FIG. 14 is a structural diagram of the driven part;

FIG. 15 is a structural diagram of the stiffening body;

FIG. 16 is a structural diagram of the connecting part.

The drawings of the present invention includes following integers:

20 1-housing; 2-inner plug; 3-stiffening body; 311-elliptic hole of the stiffening body; 312- rotating part mounting hole; 313-anti-clamping chamfer; 314-screw mounting hole; 4-lock cylinder spring; 5-healing steel bead; 6-anti-drill pin; 7-anti-drill plate; 8-irregular coded stainless steel bead; 9- irregular coded bead spring; 10-sidebar latch; 11-sidebar spring; 12-circlip; 13-cushion block; 14-connecting pin; 15-elliptic bar of the housing; 16-housing mounting hole; 17-sidebar locking slot; 18-anti-drill pin hole; 19-anti-drill plate; 20-first pin-tumbler hole; 21-first anti-snap slot; 22-second pin-tumbler hole; 23-second anti-snap slot; 24-third

25 pin-tumbler hole; 25- sidebar slot of inner plug; 26-open slot; 27-circlip groove; 32-inner pin tumbler; 33-outer pin tumbler; 34-locking pin assembly; 341- inner locking pin; 342-outer locking pin; 343-driven bead spring; 35-dial; 36-rotating part; 361-inner stepped hole; 362-symmetric groove; 363- rectangular hole; 364-"8" shaped hole; 37-driven part; 371-positioning bulge; 372-steel plate hole; 38-connecting part; 381-positioning bulge; 382- stepped mounting hole for push-pull spring; 39-push-pull spring; 40-locking steel

30 plate; 41-locking spring.

Detailed Description of the Illustrated Embodiments

The present invention will be further described in combination with the appended drawings and embodiments. And the specific description of the present invention is as follows:

5 In reference to the FIG.1-14, an anti-theft and anti-violence lock cylinder comprises a housing 1, an inner plug 2 and a stiffening body 3, wherein the housing 1 is axially arranged with a housing mounting hole 16 for installing the inner plug 2, inside the housing mounting hole 16 is provided a sidebar locking slot 17, the housing 1 is provided with a row of first pin-tumbler holes 20, the first pin-tumbler holes 20 penetrate from the outer surface of the housing 1 into the housing mounting hole 16, inside the first pin-tumbler hole 20 are provided with a locking pin assembly 34, a lock cylinder spring 4 and a sealing steel bead 5 from the outside to the inside, the locking pin assembly 34 includes inner locking pin 341, outer locking pin 342 and driven bead spring 343 which is in the middle, between neighboring first pin-tumbler holes 20 are provided anti-drill pin holes 18, inside the anti-drill pin holes 18 are provided anti-drill pins 6, the housing 1 is further provided with an first anti-snap slot 21, and the first anti-snap slot 21 is arranged in the middle part of the housing 1.

15 The inner plug 2 is in a cylinder shape and is vertically provided with a row of second pin-tumbler holes 22, from the outside to the inside, the second pin-tumbler holes 22 are equipped with inner pin tumblers 32 and outer pin tumblers 33, the inner plug 2 is laterally provided with third pin-tumbler holes 24, the third pin-tumbler holes 24 are the irregular pin-tumbler holes, inside the irregular pin-tumbler holes are successively provided irregular and coded stainless steel beads 8, and above irregular and coded stainless steel beads hole is provided a sidebar slot 25 of inner plug, inside the sidebar slot 25 of inner plug is provided a sidebar latch 10, both ends of the sidebar latch 10 are equipped with a sidebar spring 11, an anti-drill plate slot 19 is further arranged between an end face of keyhole and the second pin-tumbler holes 20, inside the anti-drill plate slot 19 is provided anti-drill plate 7, the inner plug is further provided with an second anti-snap slot 23, and the second anti-snap slot 23 is arranged in the middle part of the inner plug 2.

The contour of the stiffening body 3 is the same as that of the housing 1, the left and right ends of the stiffening body 3 are arranged as two circular surfaces, the lower part of stiffening body is provided with a M5 screw mounting hole 314, both the circular surface and lower part are provided with anti-clamping chamfers 313, both two ends of the stiffening body are provided with elliptic holes 311 connected to the housing, the

inner end face of the housing 1 is provided with a protruding cylindroid 15, both left and right ends of the stiffening body 3 are connected with the housing 1 through the cylindroid 15 in cooperation with the elliptic hole 311, the axis of the stiffening body 3 is provided with a dial 35, a rotating part 36, a driven part 37 and a connecting part 38, the middle slot position on the stiffening body 3 is axially provided with the dial 34, the stiffening body is provided with an axial hole 312, and both left and right ends of the axial hole 312 are installed with the rotating parts 36, and the rotating parts 36 on the both two ends are installed with the driven parts 37 which are installed inside the rotating parts 36, and the driven part 37 drives the connecting part 38 to move the dial 35, one end of the inner plug 2 is provided with an open slot 26 and a circlip groove 27, and the inner plug 2 is connected with the rotating part 36 through the open slot 26 and the circlip groove 27.

The dial 35 is in a shape of a round wheel, the width of the dial 35 at the position of the round wheel is 5.6mm, each end of the dial 35 is provided with a stepped circular hole 351 which has a central circular hole 352 in the inner plane, the central circular hole 352 is installed with a connecting part 38, the rotating part 36 is cylindrical shape, provided with a stepped hole 361 inside and two grooves 362 symmetric to the center axis of the circle, two rectangular holes 363 are formed on the curved surface perpendicular to the grooves 362, and the two rectangular holes 363 are symmetrical to the center of the grooves 362, the outer end is provided with a "8" shaped hole 364, which is connected with the step on the inner end of the inner plug 2, the driven part 37 is a stepped post with positioning bulges 371 on both sides, and the positioning bulges 371 are sleeved in the symmetrical grooves 362 of the rotating part to play a fixed role, a rectangular through hole 372 is provided on the curved surface, two locking steel sheets 40 and two locking springs 41 are installed in the through hole 372, the locking steel sheet 40 is made of SUS304 and its thickness is 1.0mm; the connecting part 38 is cylindrical, on two sides thereof are provided positioning bulges 381 same as the driven part, and in the center of the axis is provided a stepped hole 382 for mounting the push-pull spring 39.

Embodiment 1

In the present embodiment, the outer diameter of the anti-drill pin 6 is 2mm, and the distance between the two adjacent anti-drill pins 6 is less than 3mm, the thickness of the anti-drill plate 7 is 1.2mm, the quenching hardness is HRC 52-58; the material which makes up the locking steel sheet 40 is SUS304, and its thickness is 1.0mm; the stiffening body 3, the rotating part 36 and the driven part 37 are all quenched parts, the hardness

is HRC 45-52 and the anti-clamping chamfer of the stiffening body 313 is $4^{\circ}20'$.

In the present invention, the second pin-tumbler hole is equipped with two coded pin tumblers, the first pin-tumbler hole is equipped with two driven pin tumblers and a spring inside, which is good to prevent those
5 unlocking ways like unlocking by pulling pins ,and unlocking via a bump key, a snap gun or tinfoil, further, the inner plug is laterally provided with irregular and coded stainless steel beads, above the pin-tumbler hole is provided a sidebar latch, the sidebar latch is locked inside the sidebar locking slot of the housing, sidebar latch would get moved into the irregular and coded stainless steel beads only when the irregular and coded stainless steel beads match up with each other, and the increase on the number of pins could greatly reduce
10 the mutual opening rate of the core cylinders.

The inner end face of the inner plug and the first pin-tumbler hole is arranged an anti-drill plate, and three anti-drill pin s are arranged among the front end of the housing, the first pin-tumbler hole and the second pin-tumbler, which is beneficial to prevent the bit from breaking the housing and prevent the self-tapping
15 screw from pulling inner plug.

The anti-snap slots are arranged among the housing and the second and third pin-tumbler holes of the inner plug, when the thief breaks the front segment of the housing with a vise grip plier, the fourth and fifth pin tumblers of inner plug are still locked in the lock cylinder, furthermore, the housing is provided with anti-drill
20 pins between the third and fourth pin-tumbler holes, which is helpful in prolonging the unlock time of the thief. Even if the lock cylinder exposed in the outside of the lock is all broken, the driven part in the rotating part will be locked by the locking steel plate after breaking the lock cylinder. Then the driven part cannot push the connecting part into the hole of the dial, the rotating part will not drive the connecting part to turn the dial, so as to make the rotating part idling. Moreover, the curved surface and extension plane of the stiffening
25 body have a chamfer of $4^{\circ}20'$, and the vise grip plier will not be able to generate force on the inclined plane, so as to completely prevent the possibility of breaking the screw hole by force.

In summary, after reading the document of the present invention, a person of ordinary skill in the art can make various other corresponding transformation schemes without creative brain work according to the
30 technical solutions and technical ideas of the present invention, which all fall within the protection scope of

the present invention.

Claims

1. An anti-theft and anti-violence lock cylinder, comprising a housing, a stiffening body and an inner plug, wherein the housing is axially arranged with a housing mounting hole for installing the inner plug; inside the housing mounting hole is provided a sidebar locking slot, on the housing are provided first pin-tumbler holes, 5 the first pin-tumbler holes penetrate from outer surface of the housing into the housing mounting hole; inside the first pin-tumbler hole are provided a locking pin assembly, a lock cylinder spring and a sealing steel bead; between neighboring first pin-tumbler holes are provided anti-drill pin holes, and the housing is further provided with a first anti-snap slot; the inner plug is vertically provided with second pin-tumbler holes and laterally provided with third pin-tumbler holes, above the third pin-tumbler holes is provided a sidebar slot of 10 inner plug; an anti-drill plate slot is arranged between an end face of keyhole and the second pin-tumbler holes, and the inner plug is further provided with a second anti-snap slot; both ends of the stiffening body are provided with elliptic holes connected to the housing; inner end face of the housing are provided with protruding cylindroids, left and right ends of the stiffening body are connected with the housing through the cylindroids in cooperation with respective elliptic hole, one end of the inner plug is further provided with an 15 open slot and a circlip groove, and the stiffening body is provided with a rotating part connected to the inner plug of the lock cylinder through the open slot and the circlip groove.
2. The anti-theft and anti-violence lock cylinder according to the claim 1, wherein the second pin-tumbler holes are successively equipped with inner pin tumblers and outer pin tumblers from outside to inside, the third pin-tumbler holes are irregular pin-tumbler holes, inside the irregular pin-tumbler holes are successively 20 equipped irregular and coded stainless steel beads; the sidebar slot of inner plug above the irregular pin-tumbler holes is provided with a sidebar latch, and both ends of sidebar latch are provided with sidebar springs.
3. The anti-theft and anti-violence lock cylinder according to the claim 1, wherein inside the anti-drill plate slot is provided an anti-drill plate which has a thickness of 1.2mm and a quenching hardness of HRC 52-58.
- 25 4. The anti-theft and anti-violence lock cylinder according to the claim 1, wherein the axis of the stiffening body is provided with a dial, a rotating part, a driven part and two connecting parts; middle slot part on the stiffening body is axially provided with the dial; the stiffening body is provided with an axial hole, and both left and right ends of the axial hole are installed with the rotating parts, and both ends of the rotating parts are installed with the driven parts which are installed inside respective rotating part, and the driven parts 30 drives the connecting parts to move the dial.

5. The anti-theft and anti-violence lock cylinder according to the claim 4, wherein the dial is in a shape of a round wheel, the width of the dial at the position of the round wheel is 5.6mm, each end of the dial is provided with a stepped circular hole, a central circular hole is formed in the center of the dial, and a connecting part is installed at the central circular hole; the rotating part is of a cylindrical shape, provided with a stepped hole inside and two grooves symmetrical to its center axis plane, two rectangular holes are formed on the curved surface perpendicular to the grooves, and the two rectangular holes are symmetrical to center line of the grooves, the outer end of the rotating part is provided with a "8" shaped hole, which is connected with step on inner end of the inner plug; the driven part is a stepped post with positioning bulges on both sides, and the positioning bulges are sleeved into the symmetrical grooves of the rotating part to fix them, a rectangular through hole (hole for steel sheet) is provided on curved surface thereof, two locking steel sheets and two locking springs are installed in the through hole, the locking steel sheet is made of SUS304 and its thickness is 1.0mm; the connecting part is cylindrical, on two sides thereof are provided positioning bulges same as those in the driven part, and in axis center is provided a stepped hole for mounting the push-pull spring(s).
6. The anti-theft and anti-violence lock cylinder according to the claim 4, wherein the stiffening body, the rotating part and the driven part are all quenching fabricated parts, and the hardness is HRC 45-52.
7. The anti-theft and anti-violence lock cylinder according to the claim 1, wherein inside the anti-drill pin hole is provided an anti-drill pin, the outer diameter of the anti-drill pin is 2mm, and the distance between the two adjacent anti-drill pins is less than 3mm.
8. The anti-theft and anti-violence lock cylinder according to the claim 4, wherein the stiffening body is in a gourd-shape which is the same as shape of the housing, both left and right ends thereof are provided with elliptical holes, lower part of the stiffening body is provided with M5 screw mounting holes, both circular surface and lower part are provided with an anti-clamping chamfer, and the anti-clamping chamfer is 4° .
9. The anti-theft and anti-violence lock cylinder according to the claim 1, wherein the locking pin assembly comprises an inner locking pin, an outer locking pin and a driven bead spring.
10. The anti-theft and anti-violence lock cylinder according to the claim 1, wherein the first anti-snap slot is arranged in the middle of the housing and the second anti-snap slot is arranged in the middle of the inner plug.



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Claims searched: 1-10

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Patents Act 1977: Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X,Y	1-4, 6, 7, 9 & 10	CN204850731 U (NINGBO YINZHOU LKS LOCK CO LTD) See figures 1-6.
X,Y	1-4, 6, 7, 9 & 10	GB2553812 A (APECS CONSULT LTD) See figures 1 & 2.
X,Y	1-4, 6, 7, 9 & 10	CN208650663 U (YING AN) See figures 1 & 2.
Y	1-4, 6, 7, 9 & 10	CN106836975 A (WENZHOU GUANGDA LOCK IND CO LTD) See figures 1 & 3

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
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Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^X :

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Worldwide search of patent documents classified in the following areas of the IPC

E05B

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC, Patent Fulltext



International Classification:

Subclass	Subgroup	Valid From
E05B	0009/10	01/01/2006
E05B	0009/04	01/01/2006
E05B	0015/16	01/01/2006
E05B	0017/00	01/01/2006
E05B	0017/20	01/01/2006
E05B	0027/00	01/01/2006
E05B	0027/10	01/01/2006