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(54) **SAFETY LOCK**

(57) A lock includes two lock cylinders with a cam located between the two lock cylinders. Each lock cylinder includes a rotary part which has a transmission slot in which a driver is located. Each driver includes a reception portion and a ridge. The two respective drivers are located in a passage of the cam and resiliently biased toward other by two resilient members of the two lock cylinders. The cam includes a path, and the ridge is movable axially in the path. The ridge drives and rotates the cam when the driver rotates. The path includes a restriction unit. When one of the two drivers is damaged and is not biased by the resilient member, another one of the two drivers is biased and moved by the resilient member to engage the restriction unit with the reception portion of the driver, so that the lock functions normally.

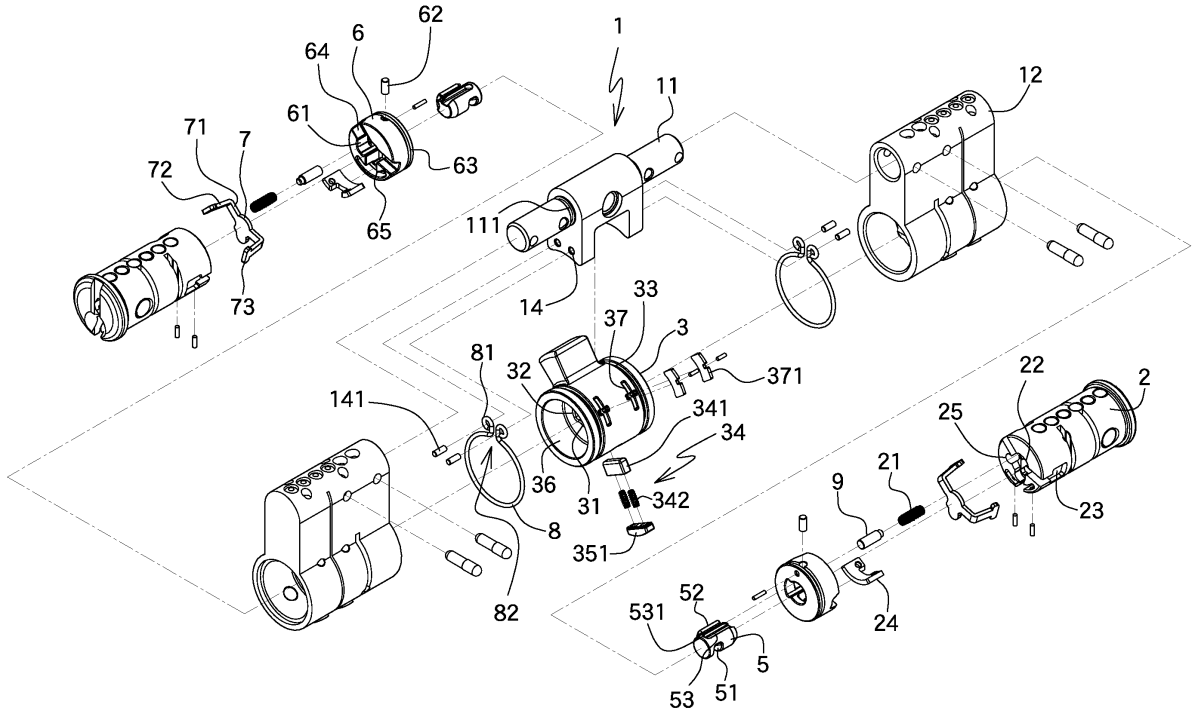

FIG.2

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Description

BACKGROUND OF THE INVENTION

1. Fields of the invention

[0001] The present invention relates to a lock, and more particularly, to a safety lock wherein when one lock cylinder is damaged, the damaged lock cylinder is automatically locked, and the other end of lock cylinder is normally functioned.

2. Descriptions of Related Art

[0002] The conventional lock uses top pins and bottom pins to be correctly arranged to reach the safety purposes. The unauthorized persons try to relocate the top pins and the bottom pins to unlock the lock. However, it is difficult to relocate the top and bottom pins when the arrangement of the top and bottom pins are arranged in a complicated pattern. Some unauthorized persons may directly hit or damage the lock to break the connection between the lock cylinder and the housing of the lock, and the lock cylinder can be pulled out from the lock. Therefore, the lock is easily unlocked without the lock cylinder regardless of the complicity of the arrangement pattern of the top and bottom pins. In other words, as long as the damage force applied to the lock is larger than the strength of the housing of the lock, the lock can be unlocked.

[0003] An improved lock is disclosed in CN 105649408A and includes a first clutch assembly which has a compression spring and a first clutch member. The first clutch member has a rod with stepped outer surface and includes driving parts. An insertion member made by high-strength steel is installed in the axial hole of the first clutch member. The first clutch member includes a locking pin which is biased outward radially by a spring. A second clutch assembly includes a second clutch member which includes a stepped outer surface and a driving member which extends axially from the second clutch member. The second clutch assembly further includes an urging pin which axially contacts a large-diameter portion of the second clutch member. When the second lock cylinder is individually removed, or the second lock cylinder and the second activation member are removed from the housing , the urging pin and the second clutch member drop, so that the compression spring pushes the first clutch member, and the locking pin is biased by the spring and protrudes to be engaged with the pin hole of the first lock cylinder to lock the clutch member. The locking member also protrudes the pin hole and is engaged with another pin hole in the cam shaft. Therefore, the cam is restricted by the first lock cylinder, so that the unauthorized person cannot rotate the cam to unlock the lock, while the person in the room is able to operate the first lock cylinder and unlock the lock.

[0004] It is noted that this feature is able to be applied to one end of the lock, once the first clutch member is damaged, the feature fails to be functioned, so that the lock can unlock the lock. Therefore, the lock can only be used to a door that simply separates the interior and the exterior area. For a safety reason, there is a lock with two lock cylinders which are located at the inside and the outside of the door. The two lock cylinders are both required to be safe, so that the above mentioned lock with the feature does not meet the requirement.

[0005] The present invention intends to provide a safety lock to eliminate the shortcomings mentioned above.

SUMMARY OF THE INVENTION

[0006] The present invention relates to a lock and comprises two lock cylinders with a cam located between the two lock cylinders. Each lock cylinder includes a rotary part in a rotational direction thereof, and each rotary part includes a transmission slot defined axially therein. A driver is located in the transmission slot. Each driver includes a ridge extending radially therefrom. Each of the lock cylinders has a resilient member which axially and resiliently contacts the driver corresponding thereto so as to resiliently push the driver toward the cam. Each driver has a reception portion formed to the outer periphery thereof. The cam includes a passage defined axially therein which communicates with a path defined in the inner periphery of the passage. The path is located such that the ridge is movable axially in the path. The ridge drives and rotates the cam when the driver rotates. The path includes a restriction unit located in the radial direction of the path. The restriction unit is resilient engaged with the reception portion when the restriction unit is aligned with the reception portion. When in an initial position, the two drivers contact directly or indirectly with each other in the passage. The restriction units are not located corresponding to the reception portions. When one of the two drivers is not biased by the resilient member corresponding thereto, the driver that is not biased by the resilient member corresponding thereto is pushed by another one of the resilient members and is pushed away from the path, and the reception portion of another one of the two drivers is engaged with the restriction unit corresponding thereto.

[0007] Preferably, a guide slot is defined axially in the outer periphery of the driver. The rotary part includes a stop piece that is located corresponding to the guide slot. The guide slot includes an end wall which faces the cam so that the stop piece restricts the driver.

[0008] Preferably, each of the lock cylinders includes a slot defined axially therein. A stop member is located corresponding to the slot and located between the lock cylinder and the driver. The stop member contacts and covers the driver in the axial direction of the slot.

[0009] Preferably, the stop member includes at least one arm extending radially therefrom, and an extension extends from the at least one arm at an angle. The extension includes an end portion formed to the distal end

thereof. The lock cylinder includes an engaging slot with which the end portion is engaged.

[0010] Preferably the rotary part includes a recess located corresponding to the arm corresponding thereto. The recess communicates with the transmission slot.

[0011] Preferably, the rotary part includes an annular groove defined radially therein. The cam includes a reception groove defined axially therein which is located corresponding to the cam. The cam includes a fixing hole defined radially therein. A restriction plate is inserted into the fixing hole and located corresponding to the annular groove of the rotary part.

[0012] Preferably, the cam includes at least one first annular groove defined radially in the outer periphery thereof. At least one C-clip is engaged with the at least one first annular groove and includes an end part. The lock includes a first hole in which the end part is received.

[0013] Preferably, the reception portion is a rectangular slot. The restriction unit includes a block and at least one spring unit. The block is shaped to be accommodated in the reception portion. The spring unit is biased between the inside wall of the passage and the block so that when the block is located corresponding to the reception portion. The block is resiliently engaged with the reception portion.

[0014] Preferably, the cam includes a recess that is located corresponding to the block. The spring unit and a portion of the block are located in the recess.

[0015] Preferably, the recess of the cam is defined through the wall of the cam. An end piece is located in the recess. The spring unit is biased between the block and the end piece.

[0016] Preferably, there are multiple spring units included in the restriction unit. The block includes connection pieces that accommodate the spring units.

[0017] Preferably, each of the lock cylinders includes a radial slot defined axially therein. The resilient member is located in the radial slot.

[0018] The advantages of the present invention are that thanks to the drivers, the reception portions and the restriction units, when in an initial position, the two drivers contact directly or indirectly with each other in the passage of the cam. The restriction units are not located corresponding to the reception portions. When one of the two lock cylinders is damaged and picked out, the driver corresponding to the damaged cylinder is not biased by the resilient member corresponding thereto, another one of the two drivers is biased and moved by the resilient member corresponding thereto so that the ridge is stopped by the stop piece, and the restriction unit is engaged with the reception portion of the driver that is biased and moved by the resilient member corresponding thereto. The driver of the damaged lock cylinder is separated from the cam so that the driver can only be freely rotated in the passage of the cam and cannot unlock the lock. The lock still functions normally by operating another one of the two lock cylinders to rotate the cam.

[0019] The rotary part and the driver of the damaged lock cylinder are stopped by the restriction plate and the stop piece can cannot be removed from the cam and can only be freely rotatable in the cam. This also protects the other driver from being hit and damaged.

[0020] By the C-clip, the cam is maintained its position and is prevented from being shifted when the lock cylinder is damaged. When the damaged lock cylinder is removed, the reception portion of other driver is engaged with the restriction unit to ensure that the lock is safe and can be operated.

[0021] The two lock cylinders can be different structures or identical structure. The two drivers and the two rotary parts may be different structures or an identical structure. Therefore, when the lock have two identical structure on two ends of the lock, the cost of the production toolings can be reduced. The lock with two identical drivers is easily assembled due to the identical structure and symmetrical allocations.

[0022] The stop members of the lock cover up the drivers from the slots so that unauthorized persons cannot see and access the drivers from the slots to prevent any tool to be inserted into the slot to damage the lock. The stop members protect the drivers and reinforce safety feature of the lock.

[0023] The present invention will become more obvious from the following description when taken in connection with the accompanying drawings which show, for purposes of illustration only, a preferred embodiment in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024]

Fig. 1 is a perspective view to show the lock of the present invention;

Fig. 2 is an exploded view of the lock of the present invention;

Fig. 3 is a cross sectional view, taken along line A-A in Fig. 1, and shows the initial position of the lock;

Fig. 4 is a cross sectional view, taken along line B-B in Fig. 1, and shows the initial position of the lock;

Fig. 5 shows that the ridge of the driver is pushed into the path of the cam when a correct key is inserted into the lock;

Fig. 6 is a cross sectional view, taken along line A-A in Fig. 1 to show the lock is in locked status;

Fig. 7 is a cross sectional view, taken along line B-B in Fig. 1 to show the lock is in locked status, and

Fig. 8 is a partial cross sectional view to show that a correct key is inserted into the slot of the lock of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0025] Referring to Figs. 1 to 3, the lock 1 of the present invention comprises two lock cylinders 2, and a cam 3 is

located between the two lock cylinder ends 2. The lock 1 is installed to an object such as a door (not shown). The lock 1 uses the cam 3 to achieve the safety and anti-theft purposes. The lock cylinder ends 2 in one embodiment can be rotated by using a correct key 4.

[0026] The two lock cylinders 2 are located corresponding two ends of the cam 3. Each lock cylinder 2 includes a rotary part 6 in the rotational direction thereof, and each rotary part 6 includes a transmission slot 61 defined axially therein, and a driver 5 is located in the transmission slot 61. Each driver 5 includes a reception portion 51 formed to the outer periphery thereof, and a ridge 52 extending radially therefrom which is located corresponding to the transmission slot 61 of the rotary part 6. Each of the lock cylinders has a resilient member 21 which axially and resiliently contacts the driver 5 corresponding thereto so as to resiliently push the driver 5 toward the cam 3.

[0027] In one embodiment, each lock cylinder 2 includes a curved transmission plate 24. Each rotary part 6 includes an insertion hole 65 that is located corresponding to the transmission plate 24. The transmission plate 24 increases the transmitting torque that the lock cylinder 2 applies to the rotary part 6. The ridge 52 is curved in the rotational direction of the lock cylinder 2 so as to as to provide required torque of the rotational action of the driver 5. When the temperature of outside of the room and the temperature in the room is different, and the lock 1 is slightly deformed, the curved ridges 52 and the curved transmission plates 24 allow the lock cylinders 2 to be easily rotated.

[0028] The cam 3 includes a passage 31 defined axially therein which is located corresponding to the driver 5. The passage 31 communicates with a path 32 defined in the inner periphery of the passage 31. The path 32 located corresponding to the ridge 52 so that the ridge 52 is movable axially in the path 32, and the ridge 52 drives and rotates the cam 3 when the driver 5 rotates. When a correct key 4 is used to rotate the lock cylinder 2, the rotary part 6 is driven and rotated, and the ridge 52 in the transmission slot 61 drives the driver 5. When the driver 52 is located in the path 32 of the driver 5, the cam 3 is rotated to unlock or lock the lock 1. The path 32 includes a restriction unit 34 located in the radial direction of the path 32. The restriction unit 34 is resiliently engaged with the reception portion 51 when the restriction unit 34 is aligned with the reception portion 51.

[0029] When in an initial position, as shown in Figs. 3 and 4, the two drivers 5 contact directly or indirectly with each other in the passage 31. The restriction units 34 are not located corresponding to the reception portions 51. In one embodiment, the two drivers 5 may contact directly with each other in the passage 31. In another embodiment, the two drivers 5 may indirectly contact with each other in the passage 31 according to practical use need, the axial length requirement or according to the distance between the reception portion 51 and the restriction unit 34. In order to lower the manufacturing cost and enhance efficiency for assembling, preferably, the two drivers 5 contact directly with each other in the passage 31.

[0030] In one embodiment, when a correct key 4 is inserted into the lock cylinder 2 to operate the driver 5, the ridge 52 of the driver 5 is located in the path 32 of the cam 3 so that the lock cylinder 2 drives the rotary part 6, the driver 5 and the ridge 52 to rotate the cam 3. In one embodiment, the lock cylinders 2 each have a slot 22 defined axially therein. A stop member 7 is located corresponding to the slot 22 and located between the lock cylinder 2 and the driver 5. The stop member 7 can be a block-like member or a plate-like member, not limited to. In this embodiment, the stop late 7 is a made by a plate. The stop member 7 contacts and covers the driver 5 in the axial direction of the slot 22. The stop members 7 of the lock cover up the drivers 5 from the slots 22 so that unauthorized persons cannot see and access the drivers 5 from the slots 22 to prevent an elongate tool to be inserted into the slot 22 to damage and unlock the lock 1. The stop members 7 protect the drivers 5 and reinforce safety feature of the lock 1. As shown in Fig. 5, when the correct key 4 is inserted, the stop member 7 is pushed and moves the driver 5. The ridge 52 can be moved into the path 32 of the cam 3. In order to restrict the distance that the stop member 7 moves, the stop member 7 includes at least one arm 71 extending radially therefrom. An extension 72 extends from the at least one arm 71 at an angle. The extension 72 includes an end portion 73 formed to the distal end thereof. The lock cylinder 2 includes an engaging slot 23 with which the end portion 73 is engaged. The engaging slot 23 includes a block portion to restrict the end portion 73 so as to restrict the movement distance of the stop member 7 in axial direction. In order to prevent the rotary part 6 from interfering the movement of the stop member 7, in one embodiment, the rotary part 6 includes a recess 64 located corresponding to the arm 71 corresponding thereto. The recess 64 communicates with the transmission slot 61. When the stop member 7 is pushed by the correct key 4, the arm 71 is inserted into the recess 64 to contact the stop member 7 against the driver 5. As shown in Fig. 5, when the correct key 4 is inserted into the lock cylinder 4, the stop member 7 pushes the driver 5 whose ridge 52 is inserted into the path 32. When the correct key 4 rotates the lock cylinder 2, the lock cylinder 2 drives the rotary part 6 whose transmission slot 61 drives the ridge 52. By the connection between the ridge 52 and the path 32, the cam 3 is rotated to unlock the lock 1.

[0031] As shown in Figs. 6 and 7, when one of the two drivers 5 is not biased by the resilient member 21 corresponding thereto, for example, the lock cylinder 2 is damaged and picked out from the lock 1, because the driver 5 that is not biased by the resilient member 21 corresponding thereto and the lock cylinder 2 is removed. The other driver 5 is pushed by the resilient members 21 corresponding thereto and is moved so that the restriction unit 34 is engaged with the reception portion 51 of the driver 5. The driver 5 that is located corresponding to the

damaged lock cylinder 2 is pushed away from the path 32, this driver 5 can only freely rotate in the cam 3 and cannot operate the cam 3 to unlock the lock 1.

[0032] The driver 5 of the un-damaged lock cylinder 2 is connected with the cam 3 by the engagement of the restriction unit 34 and the reception portion 51, and the un-damaged lock cylinder 2 is usually locked by trap pins so that the un-damaged lock cylinder 2 can only be rotated by using the correct key 4. The damaged lock cylinder 2 cannot rotate the cam 3 because the un-damaged lock cylinder 2 is secured by the engagement of the restriction unit 34 and the reception portion 51. The two drivers 5 are located in the passage 31 of the cam 3, so that driver 5 located corresponding to the damaged lock cylinder 2 cannot be damaged or pushed away from the cam 3 so as to have a good anti-theft feature.

[0033] In one embodiment, when one of the lock cylinders 2 is damaged, the driver 5 located corresponding to the damaged lock cylinder 2 cannot be pushed away from the cam 3 and also blocks the other driver 5 so that the unauthorized person cannot damage the other driver 5. Preferably, the rotary part 6 is freely rotatable relative to the cam 3 and the driver 5 includes a guide slot 53 defined axially in the outer periphery thereof. The rotary part 6 includes a stop piece 62 that is located corresponding to the guide slot 53. The guide slot 53 includes an end wall 531 which faces the cam 3 so that the stop piece 62 restricts the driver 5 in the axial direction. As shown in Fig. 6, when one of the lock cylinders 2 is damaged and removed, because the end wall 531 is located close to one end of the cam 3, and the end wall 531 and the stop piece 62 are located in the removal direction of the lock cylinder 2 to avoid the driver 5 from being removed. As mentioned before, because the driver 5 of the damaged lock cylinder 2 is pushed away from the path 32 so that the driver 5 and the rotary part 6 can only freely rotate relative to the cam 3 and cannot operate the cam 3.

[0034] In one embodiment, the rotary part 6 includes an annular groove 63 defined radially therein. The cam 3 includes a reception groove 36 defined axially therein which is located corresponding to the cam 3. The cam 3 includes a fixing hole 37 defined radially therein. A restriction plate 371 is inserted into the fixing hole 37 and located corresponding to the annular groove 63 of the rotary part 6. Because the lock 1 is installed in a door lock, and the restriction plate 371 is inserted into the annular groove 63 which is defined radially in the rotary part 6, so that the rotary part 6 is restricted in the axial direction. The rotary part 6 is freely rotatable relative to the cam 3. When the lock cylinder 2 is removed, the rotary part 6 is axially positioned to the cam 3 and cannot be removed so as to block the other rotary part 6 and the driver 5 to prevent the lock 1 from damaged by bumping attack.

[0035] In one embodiment, the cam 3 includes at least one first annular groove 33 defined radially in the outer periphery thereof. At least one C-clip 8 is engaged with the at least one first annular groove 33 and includes an end part 81. The lock 1 includes a first hole 13 in which the end part 81 is received. By the C-clip 8, the cam 3 is rotatable within the C-clip 8. By the engagement of the at least one C-clip 8 and the at least one first annular groove 33, the cam 3 is positioned precisely to prevent the cam 3 from being shifted by hitting the lock 1. Therefore, when one of the lock cylinders 2 is removed, the reception portion 51 of the other driver 5 is engaged with the restriction unit 34 to ensure the safety feature of the lock 1. In one embodiment, for securing the at least one C-clip 81, the first hole 13 is located at one end of the lock 1, and at least one second hole 14 is formed in a lateral side of the lock 1. The C-clip 8 includes two end parts 81 with an opening 82 formed between the two end parts 81. The two end parts 81 are pulled away from each other to easily engage the C-clip 8 with the first annular groove 33. When the end parts 81 are received is received in the first holes 13, two pins 141 extend through the second holes 14 and the end parts 81 to secure the C-clip 8.

[0036] In order to reinforce the connection between the reception portion 51 and the restriction unit 34, the reception portion 51 is a rectangular slot. The restriction unit 34 includes a block 341 and at least one spring unit 342. The block 341 is shaped to be accommodated in the reception portion 51 such that the block 341 contacts the reception portion 51 at a large area to prevent the block 341 from dropping from the reception portion 51 when the driver 5 is bumped. The spring unit 342 is biased between the inside wall of the passage 31 and the block 341. As shown in Figs. 3 and 4, in an initial position, the restriction unit 34 is not located corresponding to the reception portion 51, the block 341 is biased by the spring unit 342 and contacts the outside area of the guide slot 53, and the lock 1 is locked. As shown in Figs. 6 and 7, the when the block 341 is located corresponding to the reception portion 51, the block 341 is resiliently engaged with the reception portion 51. In order to avoid the spring unit 342 from being compressed by the block due to impact, so that the lock 1 includes multiple spring units 342 to that the multiple spring units 342 tend not to be compressed easily. In order to prevent the spring unit 342 from being shifted or twisted due to impact, the block 341 includes multiple connection pieces 343 that accommodate the spring units 342. In one embodiment, the connection pieces 343 can be multiple notches to accommodate the spring units 342 to ensure that the spring units 342 do not tilted and drop out from the notches.

[0037] The cam 3 may have a recess 35 that is located corresponding to the block 341. The spring unit 342 and a portion of the block 341 are located in the recess 35. Preferably, the recess 35 of the cam 3 is defined through the wall of the cam 3. An end piece 351 is secured in the recess 35 at one end of the recess 35 that is located corresponding to the block 341. The spring unit 342 is biased between the block 341 and the end piece 351. In one embodiment, because the cam 3 includes a portion protruding therefrom so that the recess 35 is formed in-

clinedly or formed to be a rectangular recess. The shape of the driver 5 is simple and needs no complicated structure.

[0038] In one embodiment, each of the lock cylinders 2 includes a radial slot 25 defined axially therein, and the resilient member 21 is located in the radial slot 25 to axially contact the driver 5. In one embodiment, a transmission pin 9 is located between the driver 5 and the resilient member 21, wherein a portion of the transmission pin 9 is located in the radial slot 25, so that the transmission pin 9 is able to contact the driver 5 regardless the distance between the resilient member 21 and the driver 5. Therefore, the driver 5 is pushed by the stop member 7, and the transmission pin 9 contacts the driver 5, the transmission pin 9 can be located off from the axis of the driver 5 to directly contact the ridge 52.

[0039] In one embodiment, the lock 1 includes two rods 11 respectively extending from two ends thereof. Each rod 11 is connected with a housing 12, and the lock cylinder 2 is located in the housing 12. The rods 11 are broken when the lock is hit to remove the lock cylinder 2 and the housing 12 such that the rest portion of the lock 1 except for the rod 11 can be protected to maintain the safety feature. It is noted that each rod 11 includes a second annular groove 111 to reduce the structural strength so that the rod 11 is broken at the second annular groove 111 when being hit.

[0040] As shown in Fig. 8, when the lock 1 is locked, the un-damaged lock cylinder 2 and the driver 5 is secured by the engagement between the restriction unit 34 and the reception portion 51, so that the cam 3 can be co-rotated with the un-damaged lock cylinder 2 to unlock the lock 1 by using a correction key 4 to rotate the lock cylinder 2 via the driver 5 and the cam 3. The user on the un-damaged side of the lock 1 is able to unlock the lock 1 as usual and is not trapped.

[0041] Because the lock 1 includes a driver 5, a reception portion 51 and a restriction unit 34 on each end thereof, so that one end of the lock 1 is damaged, the lock 1 can still locked or unlocked from the other end of the lock 1 by using a correct key 4.

[0042] The two lock cylinders 2 can be identical or different from each other. The driver 5, the rotary part 6 and the stop member 7 of each end of the lock 1 can also be identical or different from each other. When they are identical, the manufacturing cost and time for assembling can be reduced. The symmetrical structure on two ends of the lock 1 saves assembly time and increases assembly efficiency. The identical lock cylinders 2 means not only the identical structure, but also the identical combination. It is noted that the lock cylinders 2 can have identical structure and different combination. The structure and the combination of the two lock cylinders 2 can be only one of them identical, or none of the structure and combination is the same, as long as the lock 1 have the above mentioned features and functions.

[0043] While we have shown and described the embodiment in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

Claims

1. A lock (1) comprising:

two lock cylinders (2), a cam (3) located between the two lock cylinders (2);
the two lock cylinders (2) located corresponding two ends of the cam (3), each lock cylinder (2) including a rotary part (6) in a rotational direction thereof, each rotary part (6) including a transmission slot (61) defined axially therein, and a driver (5) located in the transmission slot (61), each driver (5) including a ridge (52) extending radially therefrom, each of the lock cylinders having a resilient member (21) which axially and resiliently contacts the driver (5) corresponding thereto so as to resiliently push the driver (5) toward the cam (3), each driver (5) having a reception portion (51) formed to an outer periphery thereof;
the cam (3) including a passage (31) defined axially therein, the passage (31) communicating with a path (32) defined in an inner periphery of the passage (31), the path (32) located corresponding to the ridge (52) so that the ridge (52) is movable axially in the path (32), the ridge (52) driving and rotating the cam (3) when the driver (5) rotates, the path (32) including a restriction unit (34) located in a radial direction of the path (32), the restriction unit (34) being resilient engaged with the reception portion (51) when the restriction unit (34) is aligned with the reception portion (51);
when in an initial position, the two drivers (5) contact directly or indirectly with each other in the passage (31), the restriction units (34) are not located corresponding to the reception portions (51), when one of the two drivers (5) is not biased by the resilient member (21) corresponding thereto, the driver (5) that is not biased by the resilient member (21) corresponding thereto is pushed by another one of the resilient members (21) and is pushed away from the path (32), and the reception portion (51) of another one of the two drivers (5) is engaged with the restriction unit (34) corresponding thereto.

2. The lock as claimed in claim 1, wherein the driver (5) includes a guide slot (53) defined axially in an outer periphery thereof, the rotary part (6) includes a stop piece (62) that is located corresponding to the guide slot (53), the guide slot (53) includes an end wall (531) which faces the cam (3) so that the stop

piece (62) restricts the driver (5).

3. The lock as claimed in claim 1, wherein each of the lock cylinders (2) includes a slot (22) defined axially therein, a stop member (7) is located corresponding to the slot (22) and located between the lock cylinder (2) and the driver (5), the stop member (7) contacts and covers the driver (5) in an axial direction of the slot (22).

4. The lock as claimed in claim 3, wherein the stop member (7) includes at least one arm (71) extending radially therefrom, an extension (72) extends from the at least one arm (71) at an angle, the extension (72) includes an end portion (73) formed to a distal end thereof, the lock cylinder (2) includes an engaging slot (23) with which the end portion (73) is engaged.

5. The lock as claimed in claim 4, wherein the rotary part (6) includes a recess (64) located corresponding to the arm (71) corresponding thereto, the recess (64) communicates with the transmission slot (61).

6. The lock as claimed in claim 1, wherein the rotary part (6) includes an annular groove (63) defined radially therein, the cam (3) includes a reception groove (36) defined axially therein which is located corresponding to the cam (3), the cam (3) includes a fixing hole (37) defined radially therein, a restriction plate (371) is inserted into the fixing hole (37) and located corresponding to the annular groove (63) of the rotary part (6).

7. The lock as claimed in claim 1, wherein the cam (3) includes at least one first annular groove (33) defined radially in an outer periphery thereof, at least one C-clip (8) is engaged with the at least one first annular groove (33) and includes an end part (81), the lock (1) includes a first hole (13) in which the end part (81) is received.

8. The lock as claimed in claim 1, wherein the reception portion (51) is a rectangular slot, the restriction unit (34) includes a block (341) and at least one spring unit (342), the block (341) is shaped to be accommodated in the reception portion (51), the spring unit (342) is biased between an inside wall of the passage (31) and the block (341) so that when the block (341) is located corresponding to the reception portion (51), the block (341) is resiliently engaged with the reception portion (51).

9. The lock as claimed in claim 8, wherein the cam (3) includes a recess (35) that is located corresponding to the block (341), the spring unit (342) and a portion of the block (341) are located in the recess (35).

10. The lock as claimed in claim 9, wherein the recess (35) of the cam (3) is defined through a wall of the cam (3), an end piece (351) located in the recess (35), the spring unit (342) is biased between the block (341) and the end piece (351).

11. The lock as claimed in claim 8, wherein there are multiple spring units (342) included in the restriction unit (34), the block (341) includes connection pieces (343) that accommodate the spring units (342).

12. The lock as claimed in claim 1, wherein each of the lock cylinders (2) includes a radial slot (25) defined axially therein, the resilient member (21) is located in the radial slot (25).

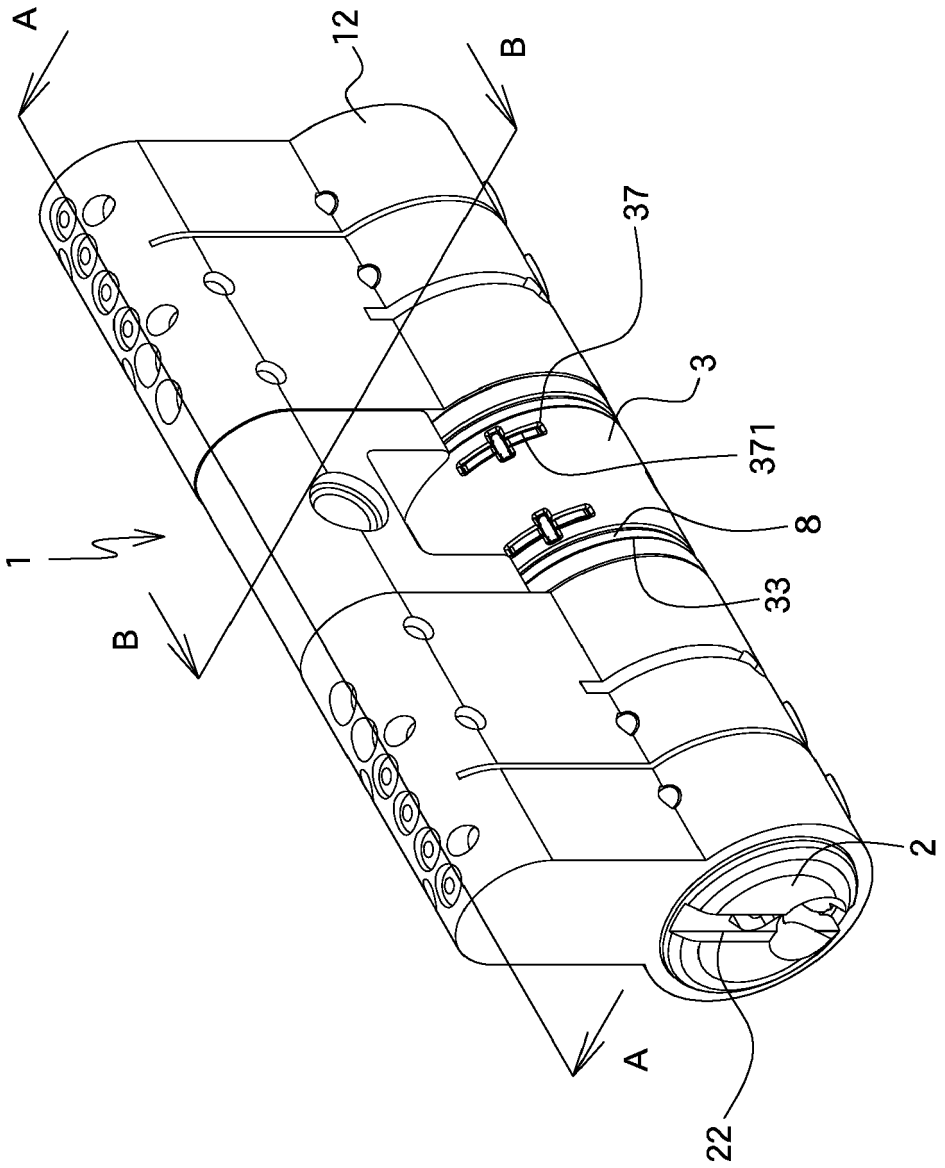

FIG.1

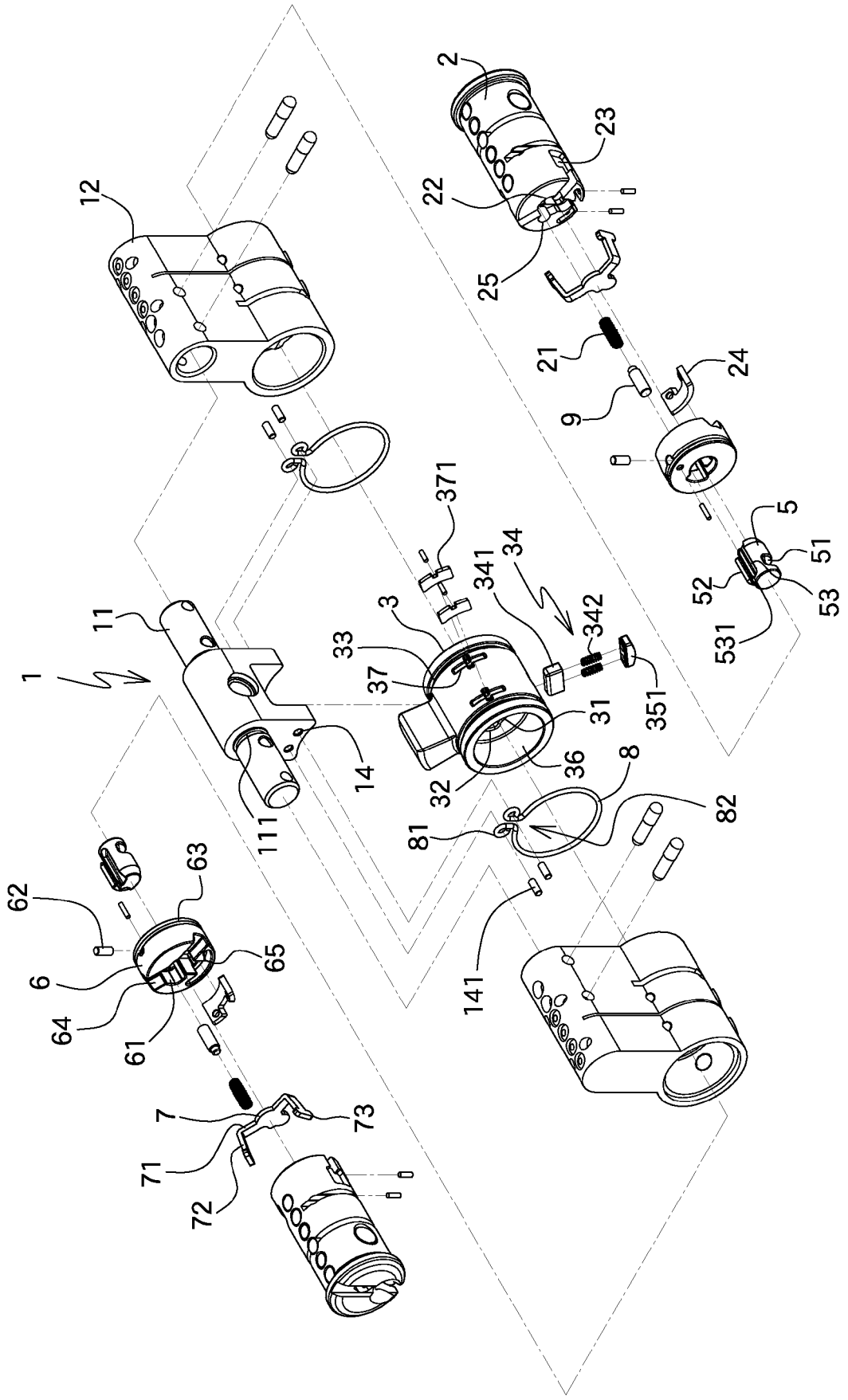
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FIG.2

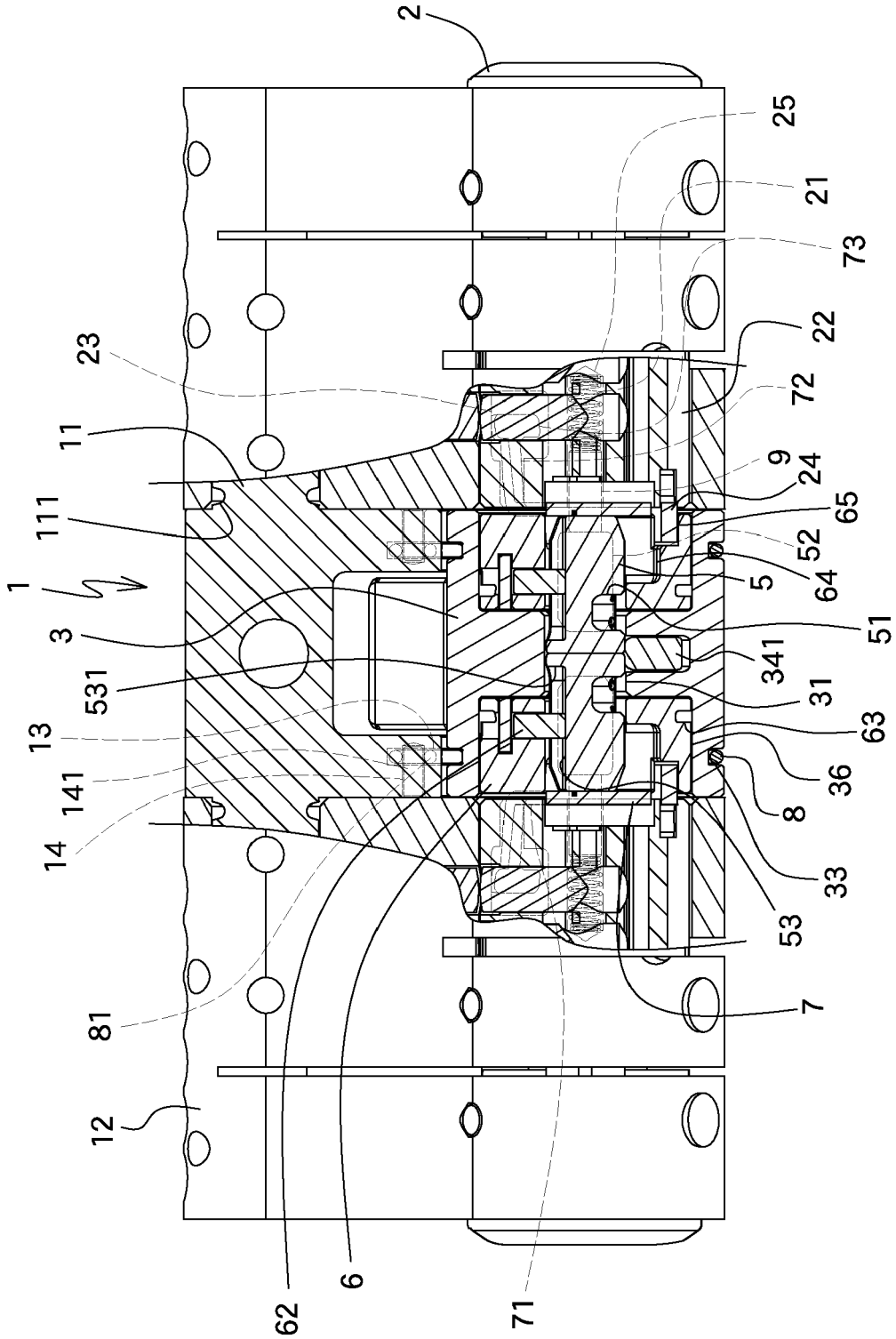
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FIG.3

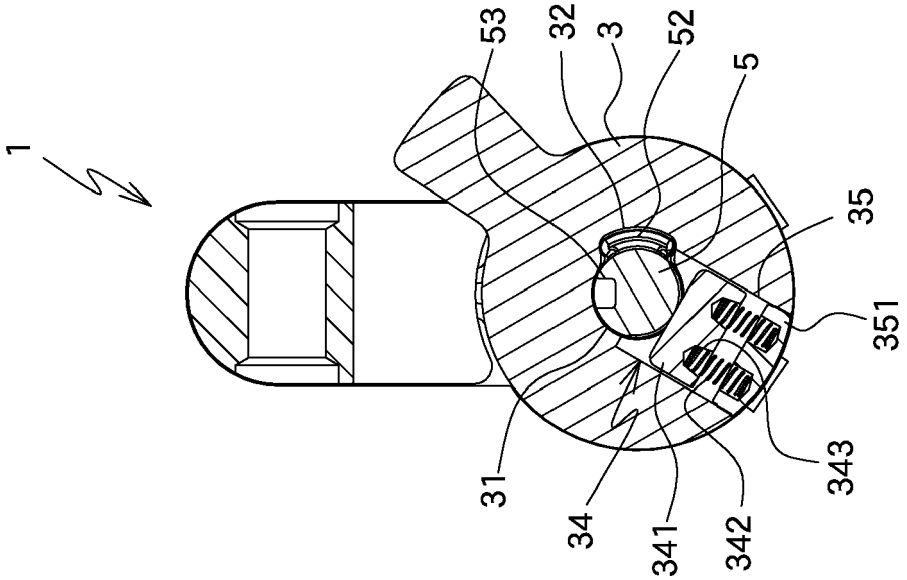

FIG.4

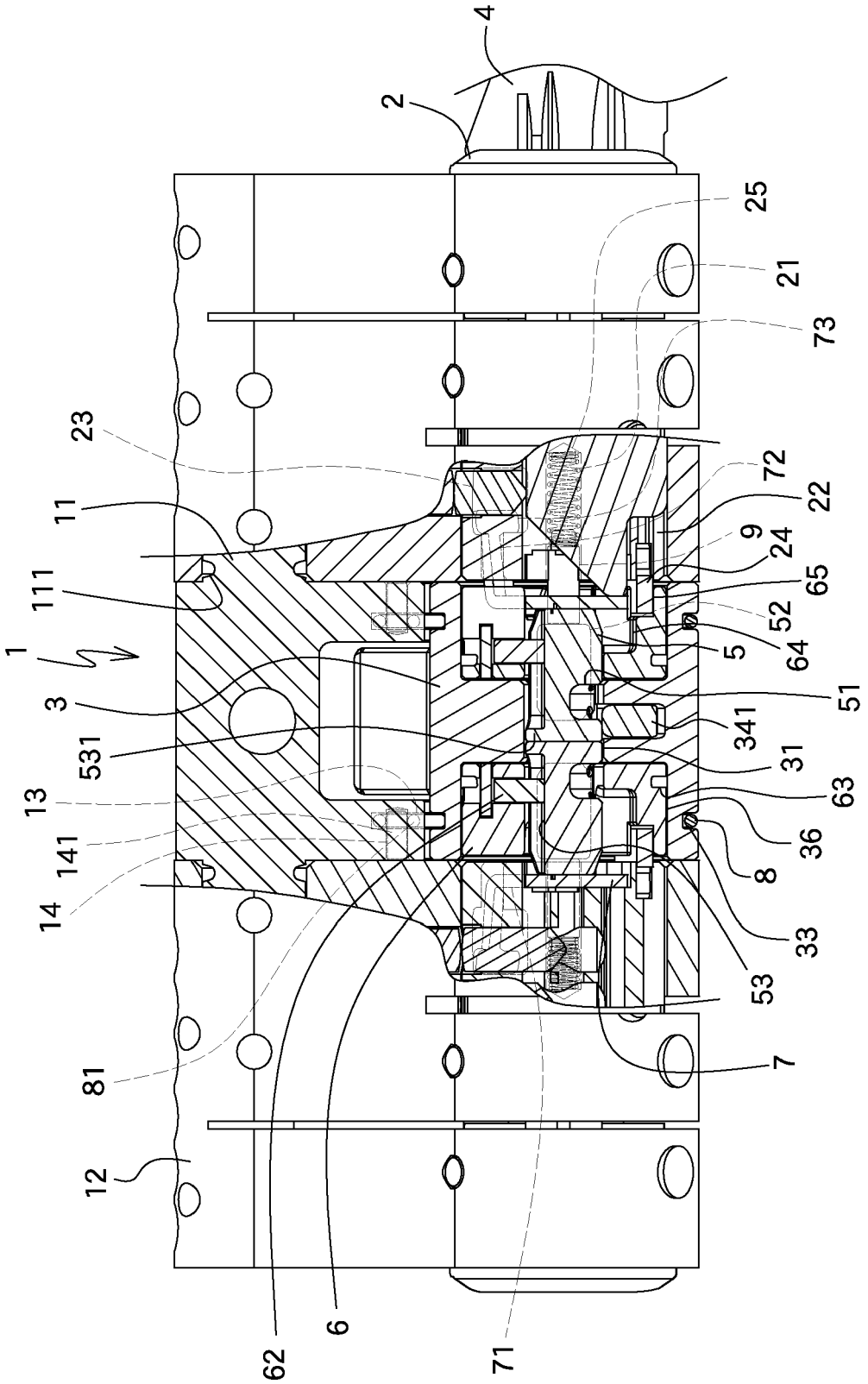
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FIG.5

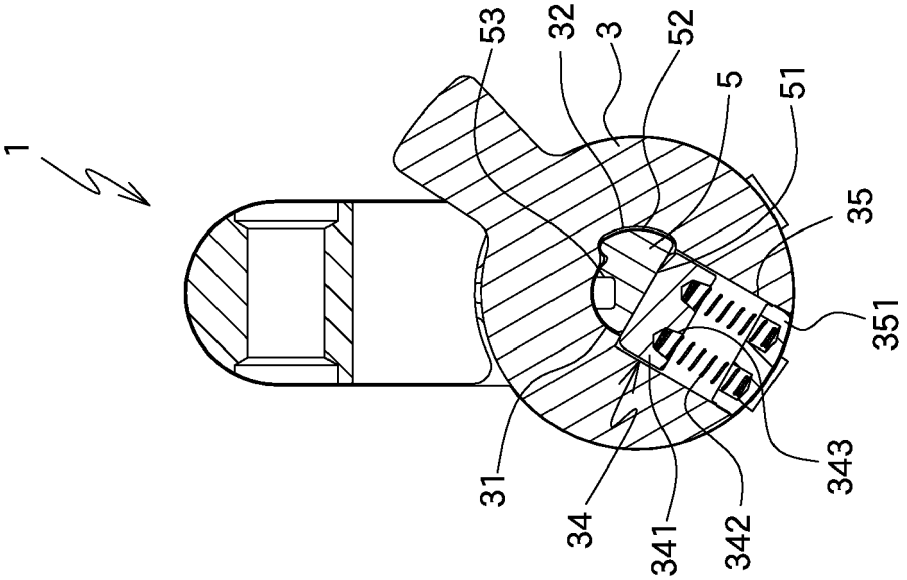

FIG.6

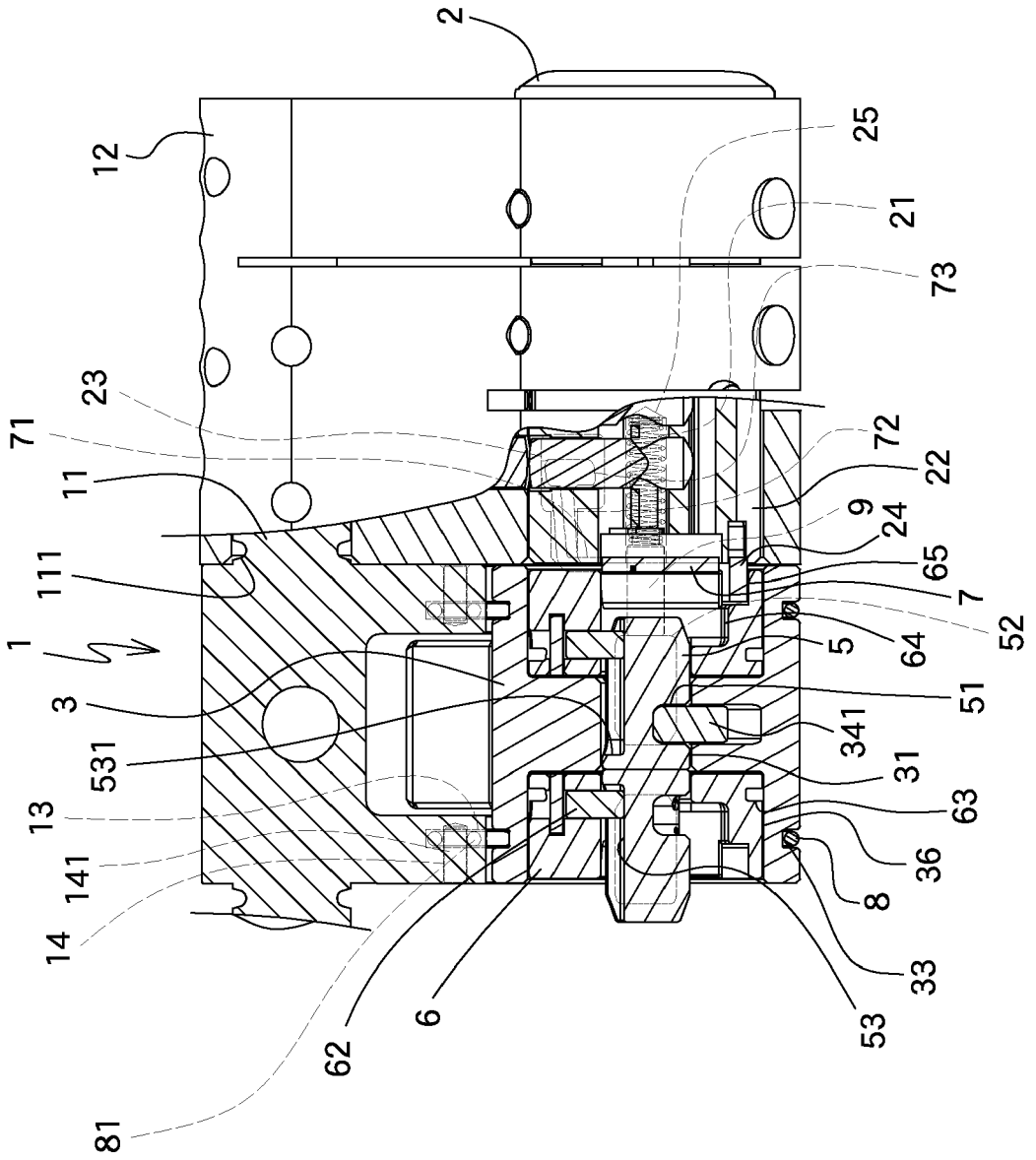
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FIG.7

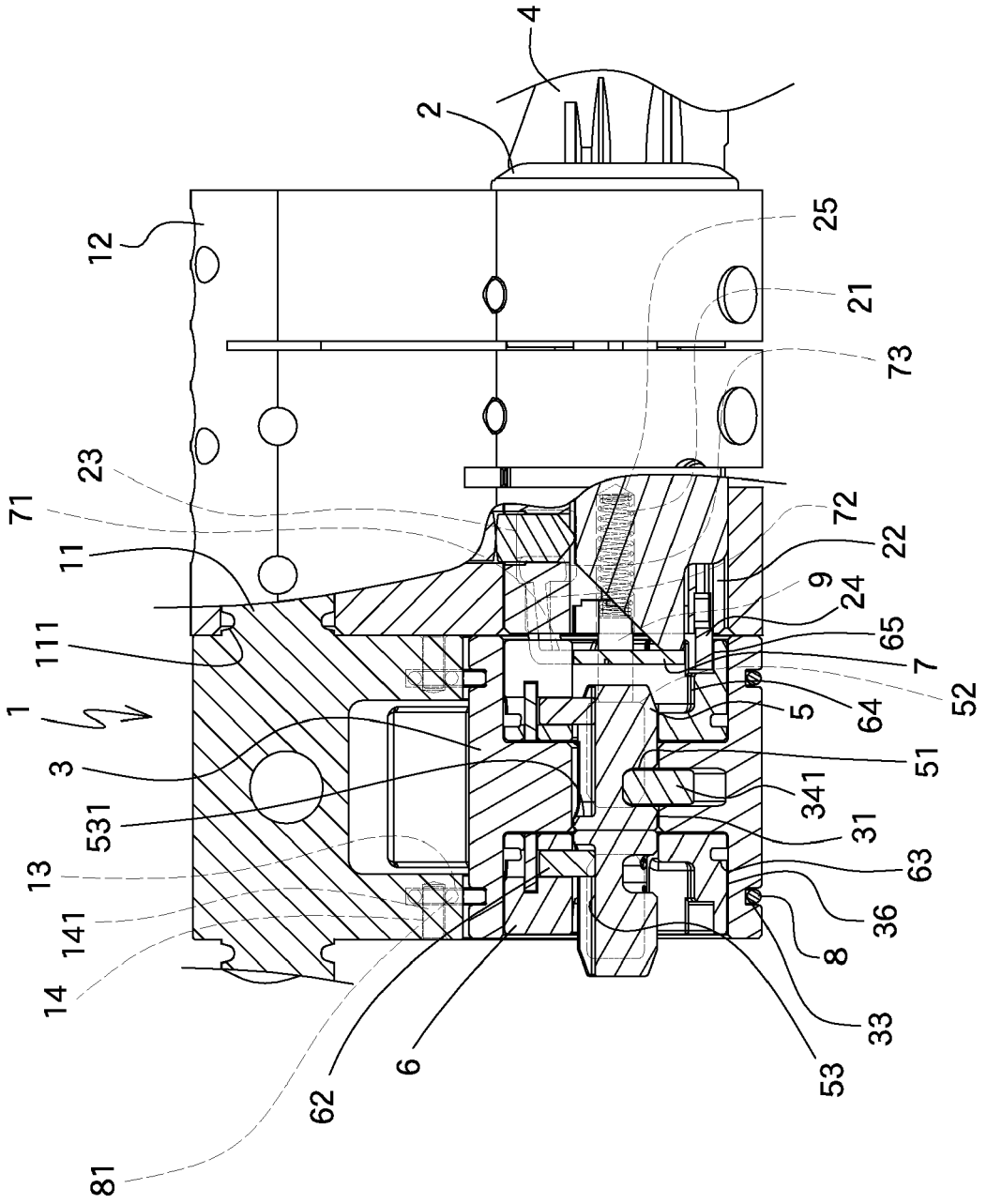
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FIG.8

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EUROPEAN SEARCH REPORT

Application Number
EP 21 18 9527

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	23 December 2021	Westin, Kenneth

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