

Cylinder Lock with a Cylinder Housing and A Flat Key for a Cylinder Lock

The invention concerns a cylinder lock with a cylinder housing and a cylinder core, which can be turned, that contains a keyway for a flat key and sensor components for control surfaces on the key and blocking components that block or release the turning of the cylinder core.

In the case of cylinder locks, the inserted key should only be able to be withdrawn in the so-called zero position. The key must be prevented from being withdrawn in any other turned position, especially in the 180° position of the cylinder core. The construction methods up until now have not been effective in all cases.

When the cylinder core is in the zero position, the key should also be able to be withdrawn when tensile force is exerted on the key during turning. This takes place, for example, when the door is pulled shut while the key is turned and then it is attempted to withdraw the key while the tension is retained. In the case of locks it can happen that the tensile force during the turning can jam the blocking components in the interior of the lock, so that these cannot come into the release position, or only then when the key is briefly let loose and then withdrawn. This is often seen as a flaw in the lock construction by the consumer.

The present invention should solve the problem that the key can only be withdrawn in the exactly defined zero position, and the blocking elements provided in the lock are relieved of the tensile force in a turned position, even when there is a tensile load being exerted on the key.

The task is resolved by the present invention in such a way that a sliding catch bow is positioned transversely to and on the same level as the mid-longitudinal plane of the cylinder lock. This bow grasps over a narrow edge of the keyway with a latch leg, whereby the latch leg is moveable between the lock position and release position by means of the control components of the key and the spring resistance, and when the flat key is completely inserted lies opposite a key release recess, and when the key is not completely inserted is held in a blocking position in a catch recess of the cylinder housing by a blocking flank of the key.



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The flat key for the above-mentioned cylinder lock is distinguished by the feature that the key has a release position recess on the top of the blade and adjacent to this a blocking flank in the direction of the key tip.

Further advantageous characteristics can be seen in the claims, the description and the drawings.

In the following the invention is described in more detail on the basis of a performance example. The inventive characteristics can be applied to any lock construction, so that in this regard no limitations are given. The advantage of the tensile force relief on the blocking components of the lock applies to all similar lock constructions.

Fig. 1 shows the cross-section of a cylinder lock of a particular construction type, which is only an example;

Fig. 2 is a schematic drawing of a longitudinal cross-section through a part of the cylinder core with an inserted key in the zero position;

Fig. 3 shows a cylinder core in a turned position;

Fig. 4 is a cross-section corresponding to the Line IV-IV in Fig. 2;

Fig. 5 is the top view of the cylinder core in a cut-open cylinder housing; non-essential lock parts here have been omitted;

Fig. 6 shows the top view of another version;

Fig. 7 shows the top view of a top of a blade of one key version.

According to Fig. 1 the cylinder core 2 is in a turnable position in the cylinder housing 1. The rotation takes place along the cylindrical plane of rotation 3. The key 5 in the form of a flat key is in the keyway 4; the key bit 6 shows the known key notches. In the centre longitudinal plane 7 of the lock are the keyway 4 with the key 5 as well as the core pin boring 8. The core pin 9, which is guided into position by the key notches of the key bit 6, is located in the core pin boring 8.

A guide channel 10 is positioned parallel to the core pin boring 8 in the cylinder core 2, which projects through the cylinder core. A guide piece 11 is positioned in a guide channel 10, which is located laterally to core pin 9. The guide piece 11 has a release groove 13 on the flank 12 opposite the key channel. Furthermore, at the upper end of the guide body there is a take-up clip 14, which catches on a compression spring 15.

In a recess 16 to the side of the guide channel 10 is a sliding blocking component 17 that is pre-loaded in the direction of a catch recess 19 of the cylinder housing by means of the spring 18. In the unturned position of the cylinder core shown in Fig. 1, the catch lip 20 of the blocking component 17 is engaged in the catch recess 19.

The tumbler component 17 shows a sensor gudgeon 21 at its inside end opposite every guide body/piece 11, which is dimensioned in such a way that it can be slid into the release groove 13.

The functioning of the cylinder lock is as follows:

When the key 5 is inserted into the lock the core pin 9 is pushed down in the appropriate position by the key bit 6 against the tension of the spring 15. The guide piece 11 is moved at the same time, whereby with the right key the release groove 13 comes into the position shown, so that it lies opposite the catch lip 20 of the blocking component 17. When the cylinder core is being turned, then the blocking component with its catch lip 20 is forced out of the catch recess, whereby the sensor gudgeon 21 is pushed into the release groove 13. This enables the cylinder core to be turned freely.

In the case of manifold provision of tumbler pins 9 and guide pieces 11, these must all take the named position, so that the blocking component 17 can reach the release position.

If a wrong key is used, the core pin 9 and the guide piece 11 attached to it end up in a different position, so that the sensor gudgeon 21 is at the flank 12 of the guide piece, whereby the lock is blocked.

On the rotation plane of the guide piece 11, the cylinder housing 1 has a ring groove each that is open toward the cylinder core 2. The width of the ring groove 22 corresponds to the width of the guide piece or is bigger. By means of the ring groove 22 the respective ends of the guide piece 11 and the core pin 9 are released, whereby on the one hand the lift of the stroke is increased and on the other hand both construction components can be made longer, so that the guidance in the guide channel and in the core pin boring 8 is improved. Furthermore, the upper end of the guide piece 11 snaps into the ring groove 22 when no key is inserted, whereby a protection from forced extraction is given. The cylinder core can therefore not be broken open by the common forced extraction method. For the lock characteristics mentioned heretofore, the key 5 can correspond to every suitable

commercially available flat key that is usually used for divided core pins. In the current performance example, it shows longitudinal profile grooves 23 and lateral profile recesses 24 that can be sensed by additional sensor components 25 and offer additional possibilities for variations.

Fig. 1 shows the cylinder housing with the common housing form with the stay 32. As can be seen, this stay 32, however, does not contain any lock components. In this manner this stay 32 can either be omitted, as required by round cylinders, or the space can be used for additional lock and fastening components. The arrangement of the ring grooves 22 is also only an example and these can also be omitted.

Fig. 2 shows a broken-off cut along the centre longitudinal plane 7 through a section of the inside (coupling side) end of the cylinder core and cylinder housing. The key 5 is fully inserted, so that all (not shown here) core pins that are assigned to the individual key notches 36 are shown in such a way that the cylinder core 2 can be rotated vis-à-vis the cylinder housing 1. On the same level transverse to the centre longitudinal plane of the cylinder lock a sliding catch bow 26 is provided, which clasps over the keyway 4 on its narrow side with a latching leg 27.

As can be especially seen in Fig. 4, the upper end of the catch bow 26 with its latching leg 27 in a catch recess 28 of the cylinder housing 1. The key 5 shows its release recess 29 opposite the latching leg 27. As a result of this release recess 29, the cylinder core can be turned freely, as the latching leg 27 is pressed out of the catch recess 28 during the rotation and is released downward to the release recess 29. This movement possibility of the catch bow is only then given, when the key is fully inserted. If the key is not fully inserted, the blocking flank 30 of the key comes to rest under the latching leg 27 so that the latching leg 27 cannot be pushed down and the cylinder core also cannot be turned.

The dimensional situation is approximately such that the total depth of the release recess 29 (Y) is equal to the total height of the latching leg 27. The depth X of the catch recess 28 corresponds approximately to the depth of the release recess 29 opposite the blocking flank 30 toward the key tip.

As seen in Fig. 2, the position of the blocking flank 30 opposite the top of the key blade 31 forms a depression. This depression allows the key tip to be pushed under the latching leg 27. The depression is a further safety feature of the key, as commercially available flat keys without such depressions cannot be fully inserted into the keyway.

The effectiveness of the device is given by the fact that the blocking flank 30 reaches under the latching leg 27 shortly before the complete insertion of the key in the keyway, thereby preventing the premature turning of the cylinder core. This also eliminates the lateral load on the core pins, which are relieved of all rotational movement, as the rotation is only possible when the key is fully inserted.

In a turned position according to Fig. 3, the latching leg 27 holds the completely inserted key fast in its position so that it cannot be withdrawn.

As can be seen in Fig. 4, the catch bow 26 consists of a guide leg 33 that is lodged in a take-up boring 34 under pressure from spring 35.

The outer surface 39 of the latching leg 27, which sits close to the catch recess 28, is constructed so broadly that the latching leg 27 cannot snap into any other catch recess 19, in order to avoid hindrances to the rotation of the cylinder core.

As can be seen further in Fig. 2, the position of the catch bow 26 is preferably before the first key notch 36 as seen from the key tip.

The distance Z is, however, basically variable, so that the catch bow can also lie farther from the key tip.

The distance Z from the key tip can be varied, whereby the number of variation possibilities increases, which signifies a further advantage of the invention.

In Figs. 2 to 5 the latching leg 27 and the release recess 20 on the top of the key blade 38 are constructed so laterally, that they are vertical to the centre longitudinal axis. The alignment can, however, also be angled in an advantageous way, as can be seen in Figs. 6 and 7.

Fig. 5. shows the alignment of the catch bow 26 from the top view of the cylinder core. The core pin borings 8 are drawn schematically without showing the core pins on hand. By means of the slot 37 the room for movement necessary to the function of the latching leg in the cylinder core is guaranteed, as can also be seen in Fig. 4.

The provision of the catch bow and the construction of the key are largely independent of the rest of the lock construction.

According to Fig. 6 the cylinder lock can be modified so that the latching leg 27 of the catch bow 26 can be positioned diagonally to the centre longitudinal plane 7 of the lock. It follows that in this case the slot 37 of the cylinder core is also aligned diagonally. The angle to the vertical is drawn somewhat increased and in practice will be approximately 30°.

Correspondingly, the release recess 29 according to Fig. 7 is also aligned diagonally on the top of the key blade 38, which also serves to increase the number of variations and the post-locking security.

Alternatively, the vertical alignment of the latching leg 27 in the lock according to Fig. 2 can also be combined with the diagonal alignment of the release recess 29 on the top of the key blade, in that a diagonal rib is assigned to latching leg 27, which senses the diagonal release recess.

PATENT CLAIMS

1. Cylinder lock with cylinder housing and a therein enclosed turnable cylinder core, that has the properties of a keyway for a flat key and sensor components for key control surfaces as well as blocking components, which either block or release rotation of the cylinder core, characterised by that in the cylinder core (2) on one plane transverse to the centre longitudinal plane (7) of the cylinder lock, a sliding catch bow (26) is provided, which clasps over the narrow end of the keyway (4) with a latching leg (27), whereby the latching leg is moveable between the locking and release positions by means of control areas of the key (5) and spring force (35) and, when the flat key is fully inserted, lies opposite a release recess (29) and when the key is not fully inserted, is held fast in a catch recess (28) of the cylinder housing by a blocking flank (30) of the key.
2. Cylinder lock according to Claim 1, characterised by the fact that the catch bow (26) has a moveable guide leg (33) aligned in a take-up boring (34) of the cylinder core and a laterally protruding catch leg (27).
3. Cylinder lock according to Claims 1 and 2, characterised by the fact that the catch bow (26) is provided on one plane, whose distance (Z) from the inner end of the cylinder lock is variable, whereby the plane preferably is placed before the first core pin.
4. Cylinder lock according to Claims 1 through 3, characterised by the fact that a slot (37) for guiding and sliding ability of the catch bow (26) is provided in the cylinder core (2).
5. Cylinder lock according to the Claims 1 through 4, characterised by the fact that the latching leg (27) is aligned in an angle to the vertical on the centre longitudinal plane (7) (Fig. 6).
6. Cylinder lock according to Claim 5, characterised by the fact that the angle amounts to about 30°.
7. Cylinder lock according to Claims 1 through 4, characterised by the fact that the latching leg (27) stands vertically on the centre longitudinal plane and a rib diagonal to it, that clasps into a release recess (29) on the key.

8. Flat key for a cylinder lock according to Claims 1 through 7, whereby the key has properties of variable elements, such as key notches and/or longitudinal profile grooves and lateral profile recesses, characterised by the fact the top of the key blade has a release recess (29) and a blocking flank adjacent to it in the direction of the key tip.
9. Flat key according to Claim 8, characterised by the fact that the depth (Y) of the release recess (29) from the top of the key blade corresponds to the height of the latching leg (27) and the height (X) of the release recess (29) of the blocking flank (30) is smaller (Y).
10. Flat key according to Claim 8 or 9, characterised by the fact that the position of the release recess (29) as seen from the key tip is variable, preferably in front of the first key notch (36).
11. Flat key according to Claims 8 through 10, characterised by the fact that the release recess (29) on the top of the key blade (38) is aligned vertically (Fig. 7).