

SPECIFICATION

Cylinder Lock Mechanism

This invention relates to a cylinder lock mechanism of the kind comprising a cylinder housing which houses a turnable cylinder in which there is a plurality of tumbler discs turnable by means of the key of the lock mechanism, and, between the cylinder housing and the peripheral edges of the tumbler discs, a locking bar for locking the cylinder to the cylinder housing, which bar is movable from a position in which it locks the cylinder, in which position it is located partly in a groove in the internal wall of the cylinder housing, to a position in which it releases the cylinder by entering a channel formed jointly by recesses in the peripheral edges of the tumbler discs when brought into a certain position.

There have been functional disturbances in conventional cylinder lock mechanisms of the kind referred to, for example when a very heavy mechanism is to be moved by a cylinder lock mechanism. Again, faulty releasing of the mechanism may occur. In general, functional disturbances occur because there are clearances in the lock mechanism, which for practical reasons can be quite large in lock mechanisms made by mass production methods, and these clearances can have a harmful influence on the functional accuracy of the lock mechanism. This, in turn, can result, in some cases, in the lock mechanism not being able fully to meet its requirements.

The present invention aims to create an improved cylinder lock mechanism of the kind referred to, in which, among other things, the way in which a force is transmitted from the key of the lock mechanism to a device driven by the lock mechanism has been changed, so that functional accuracy of the lock mechanisms is improved.

According to the invention, a cylinder lock mechanism of the kind referred to is characterised in that the movement of the locking bar from the position in which it locks the cylinder to the position in which it releases the cylinder is laterally guided by means of guiding discs which, at least substantially, are non-rotatable with respect to the cylinder, so that when the lock mechanism is fully released, the turning force transmitted by said key is transmitted from the key to a tumbler disc, thence to the locking bar and from the locking bar to said guiding discs and through them to the cylinder. It has been found that in this way a lock mechanism with a more accurate function is obtained, in which the clearances of the lock mechanism can be better controlled, and which functions perfectly when subjected to a heavy load.

In a lock mechanism in accordance with the invention, conventional so-called spacer discs, placed between the tumbler discs, can with advantage be used, suitably modified, as the guiding discs. The advantage is then obtained that no additional members are needed in the lock mechanism compared with a conventional

cylinder lock mechanism of the kind referred to. In a conventional cylinder lock mechanism of the kind referred to, which is provided with spacer discs, each of the latter has a radial protrusion which is received in an opening in the cylinder wall. In a lock mechanism in accordance with the invention, the same design can be used, but then it is of advantage to have a radial recess guiding the locking bar in the radial protrusion of each spacer disc. A better form is then obtained for the spacer discs, and the whole lock mechanism construction is simplified.

A lock mechanism in accordance with the invention can with advantage be further developed so that the actual force transmission from the lock mechanism to an external device driven thereby is not effected until a small initial rotation has been completed, which brings the parts of the lock mechanism into such a position that the lock mechanism is able to transmit even great turning forces. A lock mechanism functioning in this way is obtained, if the guiding discs for the locking bar are so arranged that they are free to turn through a small angle relative to the cylinder. This angle is at least of such a magnitude as to cause the locking bar to be moved inwardly, due to said turning movement, from the groove in the internal wall of the cylinder housing, so that, due to the influence of the unbroken internal cylinder surface of the cylinder housing, it is locked, in the released position of the lock mechanism, in a channel formed jointly by the recesses in the peripheral edges of the tumbler discs.

For carrying out the initial rotation, a torque transmission from the tumbler discs to the guiding discs of the locking bar is necessary. This can be obtained in a known way, for example by non-rotatably connecting or coupling one of the tumbler discs to a guiding disc of the locking bar, or by means of a slipping clutch as described in Belgian Patent Specification No. 874,288. In some embodiments, merely the internal friction of the tumbler disc set may be sufficient for obtaining the necessary initial torque.

In a conventional cylinder lock mechanism of the kind referred to, there are two openings in the wall of the cylinder, one for the locking bar and the other for radial protrusions of the tumbler discs and the spacer discs. These two openings weaken the cylinder construction considerably, but in a lock mechanism in accordance with the invention, one opening can be entirely eliminated and the other opening can be made considerably smaller. Due to this the cylinder construction will be stronger and considerably less yielding.

In a lock mechanism in accordance with the invention, in which the guiding discs of the locking bar are free to move somewhat relative to the cylinder, as explained above, it is suitable to use a member which yieldingly or completely limits the return movement of the cylinder. This ensures that the key cannot be turned back too far by mistake, so that it exceeds its withdrawal position.

The invention will now be described, by way of example, with reference to the accompanying drawing, in which

Figure 1 is an axial sectional view of one embodiment of a cylinder lock mechanism in accordance with the invention,

Figure 2 is a sectional view taken on the line II—II of Figure 1, and

Figure 3 is a sectional view taken on the line III—III of Figure 1.

In the drawing, the numeral 1 designates the cylinder housing of a lock mechanism and the numeral 2 its turnable cylinder. The lock mechanism comprises a locking bar 3, which being partly in a groove 4 in the wall of the cylinder housing 1, locks the cylinder 2 to the housing 1. The cylinder 2 encloses a plurality of tumbler discs 5 and between them spacer discs 6. Every tumbler disc 5 has at least one peripheral notch 7 (Figure 3) and when a key (not shown), inserted into a keyway formed by central openings 8 in the tumbler discs 5, is turned, its combination surfaces turn the separate tumbler discs so that the peripheral notch of each tumbler disc assumes a position under the locking bar 3. The locking bar 3 is then free to move radially inwardly into the channel formed jointly by the aligned notches 7. In this way, the cylinder 2 is released and it can be rotated by further turning of the key in the same direction.

In a lock mechanism in accordance with the invention, there is no direct force transmission between the cylinder 2 and the locking bar 3 at any stage. In the embodiment shown, the locking bar 3 is guided by the spacer discs 6, each of which has a radial protrusion 11 entering an axial opening 12 in the wall of the cylinder 2. Each of the protrusions 11 has a guiding slot 9 for the locking bar 3. In principle, other members which are substantially non-rotatably mounted relative to the cylinder 2 can be used for this purpose, for example a guiding disc at each end of the tumbler disc set. However, since the spacer discs as such are well suited for the purpose and they are used in this type of lock mechanism anyway, their use for this purpose is also of advantage.

In the embodiment shown in the drawing, the spacer discs 6 are free to turn relative to the cylinder 2 a distance a , which is of such a magnitude that the locking bar 3, which is partly in a channel formed by the peripheral notches 7 in the tumbler discs 5, can move radially inwardly under the unbroken internal cylindrical surface of the cylinder housing 1, or, in other words, away from the groove 4. Only after this small initial movement can force be transmitted from the key through the tumbler discs to the locking bar 3 and thence to the spacer discs 6 and through them to the cylinder 2. The axially inner end 10 of the cylinder 2 transmits the torque of the key to a

locking device driven by the lock mechanism. Consequently, when the torque of the key begins to have effect on the cylinder 2, the locking bar 3 has already moved away from the groove 4 and the unbroken internal cylindrical surface of the cylinder housing 1 keeps the locking bar in its position as a member interlocking the whole tumbler and spacer disc set into one unit. In this way a very reliable transmission of force from the key to the cylinder is obtained, which can withstand great loads.

Claims

1. A cylinder lock mechanism comprising a cylinder housing in which there is a plurality of tumbler discs turnable by means of the key of the lock, and, between the cylinder housing and the peripheral edges of the tumbler discs, a locking bar for locking the cylinder to the cylinder housing, which bar is movable from a position in which it locks the cylinder, in which position it is located partly in a groove in the internal wall of the cylinder housing, to a position in which it releases the cylinder by entering a channel formed jointly by recesses in the peripheral edges of the tumbler discs when brought into a certain position, characterised in that said movement of the locking bar is laterally guided by means of guiding discs which, at least substantially, are non-rotatable with respect to the cylinder, so that when the lock mechanism is fully released, the turning force transmitted by said key is transmitted from the key to a tumbler disc, thence to the locking bar and from the locking bar to said guiding discs and through them to the cylinder.

2. A lock mechanism according to claim 1, in which said guiding discs take the form of spacer discs placed between the tumbler discs.

3. A lock mechanism according to claim 1 or 2, in which each guiding disc has a radial protrusion received in an opening in the cylinder wall, each of said protrusions having a radial recess for guiding the locking bar.

4. A lock mechanism according to claim 3, in which, in the cylinder wall, there is only one opening in which both the radial protrusions of the guiding discs and the locking bar are located.

5. A lock mechanism according to claim 4, in which the return movement of the cylinder is limited.

6. A lock mechanism according to any of the preceding claims, in which the guiding discs are free to turn through a small angle relative to the cylinder, which angle is at least of such a magnitude as to cause the locking bar to be moved inwardly, due to said turning movement, from the groove in the internal wall of the cylinder housing.

7. A lock mechanism constructed and arranged

The invention will now be described, by way of example, with reference to the accompanying drawing, in which

Figure 1 is an axial sectional view of one embodiment of a cylinder lock mechanism in accordance with the invention,

Figure 2 is a sectional view taken on the line II—II of Figure 1, and

Figure 3 is a sectional view taken on the line III—III of Figure 1.

In the drawing, the numeral 1 designates the cylinder housing of a lock mechanism and the numeral 2 its turnable cylinder. The lock mechanism comprises a locking bar 3, which being partly in a groove 4 in the wall of the cylinder housing 1, locks the cylinder 2 to the housing 1. The cylinder 2 encloses a plurality of tumbler discs 5 and between them spacer discs 6. Every tumbler disc 5 has at least one peripheral notch 7 (Figure 3) and when a key (not shown), inserted into a keyway formed by central openings 8 in the tumbler discs 5, is turned, its combination surfaces turn the separate tumbler discs so that the peripheral notch of each tumbler disc assumes a position under the locking bar 3. The locking bar 3 is then free to move radially inwardly into the channel formed jointly by the aligned notches 7. In this way, the cylinder 2 is released and it can be rotated by further turning of the key in the same direction.

In a lock mechanism in accordance with the invention, there is no direct force transmission between the cylinder 2 and the locking bar 3 at any stage. In the embodiment shown, the locking bar 3 is guided by the spacer discs 6, each of which has a radial protrusion 11 entering an axial opening 12 in the wall of the cylinder 2. Each of the protrusions 11 has a guiding slot 9 for the locking bar 3. In principle, other members which are substantially non-rotatably mounted relative to the cylinder 2 can be used for this purpose, for example a guiding disc at each end of the tumbler disc set. However, since the spacer discs as such are well suited for the purpose and they are used in this type of lock mechanism anyway, their use for this purpose is also of advantage.

In the embodiment shown in the drawing, the spacer discs 6 are free to turn relative to the cylinder 2 a distance a , which is of such a magnitude that the locking bar 3, which is partly in a channel formed by the peripheral notches 7 in the tumbler discs 5, can move radially inwardly under the unbroken internal cylindrical surface of the cylinder housing 1, or, in other words, away from the groove 4. Only after this small initial movement can force be transmitted from the key through the tumbler discs to the locking bar 3 and thence to the spacer discs 6 and through them to the cylinder 2. The axially inner end 10 of the cylinder 2 transmits the torque of the key to a

locking device driven by the lock mechanism. Consequently, when the torque of the key begins to have effect on the cylinder 2, the locking bar 3 has already moved away from the groove 4 and the unbroken internal cylindrical surface of the cylinder housing 1 keeps the locking bar in its position as a member interlocking the whole tumbler and spacer disc set into one unit. In this way a very reliable transmission of force from the key to the cylinder is obtained, which can withstand great loads.

Claims

1. A cylinder lock mechanism comprising a cylinder housing in which there is a plurality of tumbler discs turnable by means of the key of the lock, and, between the cylinder housing and the peripheral edges of the tumbler discs, a locking bar for locking the cylinder to the cylinder housing, which bar is movable from a position in which it locks the cylinder, in which position it is located partly in a groove in the internal wall of the cylinder housing, to a position in which it releases the cylinder by entering a channel formed jointly by recesses in the peripheral edges of the tumbler discs when brought into a certain position, characterised in that said movement of the locking bar is laterally guided by means of guiding discs which, at least substantially, are non-rotatable with respect to the cylinder, so that when the lock mechanism is fully released, the turning force transmitted by said key is transmitted from the key to a tumbler disc, thence to the locking bar and from the locking bar to said guiding discs and through them to the cylinder.
2. A lock mechanism according to claim 1, in which said guiding discs take the form of spacer discs placed between the tumbler discs.
3. A lock mechanism according to claim 1 or 2, in which each guiding disc has a radial protrusion received in an opening in the cylinder wall, each of said protrusions having a radial recess for guiding the locking bar.
4. A lock mechanism according to claim 3, in which, in the cylinder wall, there is only one opening in which both the radial protrusions of the guiding discs and the locking bar are located.
5. A lock mechanism according to claim 4, in which the return movement of the cylinder is limited.
6. A lock mechanism according to any of the preceding claims, in which the guiding discs are free to turn through a small angle relative to the cylinder, which angle is at least of such a magnitude as to cause the locking bar to be moved inwardly, due to said turning movement, from the groove in the internal wall of the cylinder housing.
7. A lock mechanism constructed and arranged



substantially as herein described with reference to, and as illustrated in, the accompanying drawing.

8. A lock comprising a locking device actuable
5 by the lock mechanism claimed in any of the preceding claims.

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