

LOCK

1. Field of the Invention

The present invention relates to a lock, and more particularly to a lock having a drive lever pivotally connected to a deadbolt, a disk rotatably engaged with the drive lever and securely mounted on the deadbolt. With the rotational movement of a cylinder, the corresponding travel of the deadbolt will cause the drive lever to abut the disk that is mounted on the deadbolt. The combination of the drive lever and the disk enables the deadbolt to extend to an outermost position smoothly.

2. Description of Related Art

Conventional locks normally have a major problem that consists of the deadbolt not being able to extend far enough out of the lock frame to have a better locking effect or the deadbolt not being able to extend or retract from the lock frame smoothly. Accordingly, conventional locks have a short deadbolt that does not meet the user's requirements. Some other locks, in order to accomplish the goal of providing a better locking effect, have a long deadbolt and complex structure to overcome the uneven movement of the deadbolt. It is known in the art that a complex structure is synonymous with high cost. Thus, the locks in the market with a very good locking effect are extremely expensive.

To overcome the shortcomings, the present invention tends to provide an improved transmission assembly of a lock to mitigate and obviate the aforementioned problems.

The main objective of the invention is to provide an improved lock, that has a push rod movably received in the deadbolt of the lock, a drive lever pivotally

connected with the deadbolt and a disk rotatably mounted on the deadbolt opposite to a pivot hole for the drive lever. With such an arrangement, the deadbolt is able to extend to an outermost position to achieve a great locking effect. When the deadbolt is retracted, the drive lever abuts the disk to allow the deadbolt to retract inside the lock frame smoothly.

Other objects, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

In the drawings:

Fig. 1 is a perspective view of a lock in accordance with the present invention;

Fig. 2 is an exploded perspective view of the lock in Fig. 1;

Figs. 3A, 3B and 3C are operational side plan views showing the movement of the deadbolt in conjunction with the rotation of a cylinder where the deadbolt is extended; and

Figs. 4A, 4B and 4C are operational side plan views showing the movement of the deadbolt in conjunction with the rotation of a cylinder where the deadbolt is retracted.

With reference to Figs. 1 and 2, the lock in accordance with the present invention has a cylinder (10), a bolt assembly (20), a drive lever (30) and a frame (50).

A boss (11) is formed on the cylinder (10) that is mounted in a keyed hole (53) in the frame (50) so that the boss (11) can rotate inside the frame (50).

The bolt assembly (20) comprises a deadbolt (21), a channel (22), a through

hole (23), a coil spring (24), a push rod (25), a pin (26) and a disk (40). The deadbolt (21) is slidably received in the frame (50). The channel (22) is defined in the deadbolt (21), and a through hole (23) is defined in the deadbolt (21) to communicate with the channel (22). The coil spring (24) is compressibly received in the channel (22). The push rod (25) is movably received in the channel (22) and has a head (251) and a guide rod (252). The guide rod (252) is inserted through the coil spring (24) and into the channel (22). The pin (26) is inserted through the head (251) and the frame (50) to secure the push rod (25) in the frame (50). A recess (202) is defined in the deadbolt (21) and is aligned with the channel (22). A lip (201) is formed on the forward edge of the recess (202) and back edge of the recess (202). The coil spring (24) and the push rod (25) are inserted into the channel (22) through the recess (202), and the head (251) of the push rod (25) is movably received in the recess (202).

The drive lever (30) is pivotally engaged with a side face of the deadbolt (21) by the pin (26) and has an inclined front edge (31) and an inclined rear edge (32).

The disk (40) is rotatably engaged with the deadbolt (21) and is in contact with the inclined rear end (32) of the drive lever (30).

The frame (50) includes a cover (51) and a base (52). When the cover (51) and the base (52) are assembled, a space (not numbered) is defined to accommodate the bolt assembly (20) and drive lever (30). The cover (51) has a first passage (511) and a first slit (512), and the base (52) has a second passage (521) aligned with the first passage (511) and a second slit (522) aligned with the first slit (512). The first passage (511) and the second passage (521) form a path (not numbered) along which the pin (26) moves. The first slit (512) and the second slit (522) define a passageway

(not numbered) to allow the movement of a guide pin (41) which extends through the through hole (23) in the deadbolt (21) and engages with the disk (40).

When the lock is assembled, the coil spring (24) and the push rod (25) are inserted through the recess (202) in the deadbolt (21) into the channel (22) in the deadbolt (21). The deadbolt (21) is then placed inside the frame (50), and the pin (26) is inserted, through the head (251) of the push rod (25) and extends into the first passage (511). With one end of the pin (26) in the first passage (511) and the other end in the second passage (521) in the frame (50), the push rod (25) together with the coil spring (24) are held inside the deadbolt (21). The guide pin (41) extends into the first slit (512) through the through hole (23) of the deadbolt (21) and the disk (40) and again through the second slit (522) of the base (52) to rotatably secure the disk (40) to the deadbolt (21). The cylinder (10) is inserted in the keyed hole (53), and the boss (11) is received in the recess (202), which completes the assembly of the lock.

With reference to Figs. 3A, 3B and 3C, to operate the lock, the user rotates the cylinder (10) to press the boss (11) against the head (251) of the push rod (25). Continued rotation movement of the cylinder (10) causes the boss (11) to press the head (251) of the push rod (25) toward the channel (22), which allows the boss (11) to press against one of the lips (201) and push the deadbolt (21).

With reference to Fig. 2, the aligned first and second passages (511,521) are arcuate. Consequently, when the lock pin (26) together with the deadbolt (21) reaches a point A in the aligned first and second passages (511,521), the force of the coil spring (24) will push the head (251) down in the recess (202), and thus the boss (11) of the cylinder (10) is pushed to rotate further. The force of the coil spring (24)

will then drive the deadbolt (21) to extend further out of the frame (50), and the pin (26) will be driven to point B without the application of any external force, which completes the locking sequence of the lock. While the pin (26) moves along the aligned first and second passages (511,521), the guide pin (41) simultaneously moves along the aligned first and second slits (512,522). Due to the limitations of the aligned first and second passages (511,521) and the aligned first and second slits (512,522) to the pin (26) and the guide pin (41) respectively, the movement of the deadbolt (21) is smooth inside the frame (50).

With reference to Figs. 3C, 4A, 4B and 4C, when the lock is being unlocked, the user rotates the cylinder (10), and the boss (11) presses the head (251) into the recess (202) in the deadbolt (21). The boss (11) engages the other lip (201) of the recess (202) to drive the deadbolt (21). At the initial movement of the deadbolt (21), an uneven movement of the deadbolt (21) will cause the deadbolt (21) to be blocked inside the frame (50). In order to overcome the blockage of the deadbolt (21) inside the frame (50), the downward and sideways movement of the deadbolt (21) will cause the drive lever (30) to pivot. While the drive lever (30) pivots, the abutment of the inclined front end (31) with an inner face of the frame (50) and the abutment with the disk (40) will drive the deadbolt (21) evenly to move inward in the frame (50) (see Fig. 4B). Once the deadbolt (21) evenly moves inside the frame (50), continued rotation of the cylinder (10) will then move the deadbolt to a point C in the aligned first and second passages (511,521). After the deadbolt (21) reaches the point C, the force from the coil spring (24) will push the head (251) down inside the channel (22), which will push the boss (11) of the cylinder (10) and cause to rotate further to

complete the unlocking sequence, as shown in Fig. 4C.

With the conventional lock assembly, if the hole in the doorframe is jammed by chewing gum, the deadbolt can still partially extend into the hole, which leaves the impression to the user that the door is locked. However, when the door is pushed again, the deadbolt will retract inside the frame and the door will open. With the lock in accordance with the present invention, should the hole in the doorframe be jammed with chewing gum and the deadbolt partially extends into the hole, the deadbolt (21) will not retract inside the frame (50) when the door is pushed again because the head (251) presses against the boss (11) of the cylinder (10). Therefore, the safety of the user increases.

It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

CLAIMS:

1. A lock comprising:
 - a frame having a cover with a first passage and a base with a second passage aligned with the first passage, wherein the cover and the base define a space;
 - a cylinder received in the frame and having a boss formed on the cylinder and rotatable within the frame;
 - a deadbolt slidably received in the space in the frame and driven by the cylinder, the deadbolt having a channel, a recess communicating with the channel and two opposed lips defined on each side of the recess, wherein the boss on the cylinder respectively engages each of the lips;
 - a push rod movably received in the deadbolt to abut the boss on the cylinder;
 - a drive lever pivotally attached to the deadbolt; and
 - a disk mounted on the side face of the deadbolt and rotatably abutting a side face of the drive lever.
2. The lock as claimed in claim 1, wherein the first and second passages in the cover and the base are arcuate, such that the deadbolt is able to move spontaneously from a first position to a second position by means of a force moving from a coil spring received in the channel.
3. The lock as claimed in claim 2, wherein the push rod has a head received in the recess and a guide rod inserted through the coil spring to maintain an orientation of the coil spring within the channel.
4. The lock as claimed in claim 1, 2 or 3, wherein the drive lever has an inclined front edge and an inclined rear edge, the front edge abutting an inner face of the frame when the deadbolt is moving inside the frame and the rear edge abutting the disk.



5. The lock as claimed in claim 1, 2, 3 or 4, wherein the cover has a first slit and the base has a second slit aligned with the first slit, such that a guide pin extending through the deadbolt to secure the disk onto the deadbolt is able to extend through the aligned first and second slits to guide and limit the movement of the deadbolt inside the frame.

6. The lock as claimed in any one of the preceding claims, wherein a pin extending through the head of the push rod to secure the push rod inside the deadbolt is able to extend through the aligned first and second passages to guide and limit the movement of the deadbolt inside the frame.

