

A LOCK DEVICE ENABLING A HANDLE TO BE ROTATED FREELY WHEN IN A LOCK POSITION

The present invention relates to a lock device and more particularly to a lock device which is able to allow a handle rotatably connected to the lock device to be rotated freely when the lock device is in a lock position, so that the internal mechanism of the lock device will not be damaged because of the rotation of the handle.

Referring to Figs. 9 and 10, a conventional lock device generally has a case 10, a pair of flowers 11 pivotally disposed in the case 10 and overlapping one another, a post 12 rigidly mounted onto the case 10 and detachably connected with the pair of flowers 11, a pair of driving members 13 pivotally mounted within the case 10 and respectively connected with a corresponding one of the pair of flowers 11, a tongue 14 movably mounted on a side face of the case 10 and protruding out therefrom and having a driven plate 141 provided with a stop 142 securely connected with the pair of driving members 13, a sliding block 30 movably mounted within the case 10 and having a first end 31 detachably connected with one of the pair of the flowers 11 and controlling means (not shown or numbered) for controlling the sliding block 30 to move between a first position and a second position. The lock device further has a first resilient member 20 compressibly mounted within the case 10 and securely engaged with the pair of flowers 11 to maintain the pair of flowers 11 to have a tendency to return to their original position after any kind of displacement.

Referring especially to Fig. 9, it is to be noted that each one of the pair of the flowers 11 respectively has a through hole 111 defined therein and aligned with each other, such that a first handle

and a second handle (both not shown or labeled) are able to be respectively mounted into one of the through holes 111 to drive the pair of flowers 11 to pivot. Furthermore, each one of the pair of flowers 11 has a plurality of spaced extensions 112 extending outward from a periphery thereof and each one of the extensions 112 of one of the pair of the flowers 11 is superposed with one of the extensions 112 of the other one of the pair of the flowers 11. The post 12 is in secure engagement with an aligned pair of the spaced extensions 112 of the pair of the flowers 11 to limit excessive pivot movement of the pair of the flowers 11 caused by the recoil force generated by the resilient member 20 while being compressed. Still, due to the stop 142 of the driven plate 141 being securely connected with both of the driving members 13, a pivotal movement of both of the driving members 13 caused by the rotation of the pair of the flowers 11 driven by the rotation of either one of the first handle or the second handle will drive the tongue 14 to move inward to the case 10 and thus accomplish the purpose of opening the door (not shown). After the first handle is released by a user, a second resilient member 21, a first end of which is securely connected with the case 10 and a second end of which is securely connected with the tongue 14, is able to provide necessary recoil force to maintain the tongue 14 protruding out from the side face of the case 10 (not shown).

Referring to Figs. 10 and 11, when the sliding block 30 is in a locked position by the control of the controlling means, which is that the sliding block 30 is in a second position, a distal end 31 of the sliding block 30 engages with one of the pair of the driving members 13, such that the user can only open the door from indoors. Meanwhile, the handle mounted outdoors, due to the

secure engagement between of the distal end 31 of the sliding block 30 with one of the pair of the driving members 30, will not be able to be rotated by the user. Thus, the door will remain closed, even the user tries to rotate the handle mounted outdoors when the sliding block 30 is controlled by the controlling means to remain in a second position (locked position).

Referring to Figs. 12, 13 and 14, a conventional lock device is shown. The lock device has a case 40, a sliding member 41 movably mounted to a side of the case 40, a pair of identical and superposed flowers 50 rotatably mounted within the case 40 and having an upper flower 501 and a lower flower 502, a stop 52 movably mounted within the case 40 and securely attached to both of the flowers 501, 502 and a tongue member 53 having at least one post 531 (two are shown in this embodiment) a first end of which is securely engaged with the stop 52, a coil spring 532 mounted around the post 531 and a first end of which is abutted to a plate 533 fixedly mounted onto the case 40 and detachably connected with the stop 52, a second end of which is securely abutted to a tongue 534 movably mounted within the case 40 and securely engaged with a second end of the post 531. It is to be noted that both of the upper flower 501 and the lower flower 502 respectively have a plurality of extensions radially extending outward therefrom. Since both of the pair of flowers 50 are identical in structure and superposed together, a set of the extensions of the respective upper flower 501 and the lower flower 502 are securely connected with the stop 52. The lock device further has a controlling means for controlling the sliding block 41 to move between a first position (open position) and a second position (locked position) and both of the pair of flowers 50 have

an aligned through hole for having securely mounted thereto an indoor handle and an outdoor handle (not shown) .

Referring especially to Fig. 12, when the sliding block 41 is moved to a first position (open position) due to the controlling means, rotating the indoor handle or the outdoor handle will cause the flowers 50 to rotate, which will drive the tongue 534 to retract into the case 40 and thus accomplish the purpose of unlocking the door (not shown). Due to the plate 533 being securely mounted onto the case 40, the retraction of the tongue 534 will simultaneously compress the coil spring 532. After the door is opened and the indoor handle or the outdoor handle is released, the recoil force of the coil spring 532 will eject the tongue 534 out of the case 40. Also, a resilient device 54 mounted within the case 40 and abutted to the extensions of both of the flowers 50 is able to provide necessary recoil force to the flowers 50 to rotate back to their original positions. However, when the sliding block 41 is moved to the second position (lock position) due to the control of the controlling means, an end 411 of the sliding block 41 engages with the lower flower 502 (as shown in Figs. 13 and 14), and the upper flower 501 is still able to be freely rotated. Due to the engagement between the end 411 of the sliding block 41 with the lower flower 502, the outdoor handle will no longer be able to be rotated, which means that a user outside the door will not be able to drive the tongue 534 to retract into the case 40 to open the door when the door is in the second position (locked position).

From the above description, it is known that either the first embodiment or the second embodiment of the conventional lock device will damage the internal structure when the sliding block (30, 41) is in a locked position and the user outside the door is

trying to rotate the outdoor handle to open the door. Maintenance and/or replacement to the lock device is often necessary when the lock device is damaged due to the force against it when it is in a locked condition.

The present invention provides an improved lock device to mitigate or obviate the above mentioned problems.

The main object of the present invention is to provide a lock device enabling a handle to be rotated freely even when the door is locked.

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 device constructed in accordance with the present invention;

Fig. 2 is a partial exploded view of the lock device of the invention;

Fig. 3 is a schematic side view showing a static status of the lock device of the invention;

Fig. 4 is a partial cross sectional view of the lock device showing a first position of a leverage;

Fig. 5 is a schematic side plane view showing an operation thereof;

Fig. 6 is a schematic top plane view showing an operation thereof;

Fig. 7 is a partial cross sectional view of the lock device showing a second position of the leverage;

Fig. 8 is a schematic side view showing an operation caused by the movement of a sliding block;

Fig. 9 is a schematic side view of a conventional lock device showing a first position of a sliding block;

Fig. 10 is a schematic side view of the lock device of Fig. 9 showing a second position of the sliding block;

Fig. 11 is a cross sectional taken from line 11-11 of Fig. 10 to indicate the relationship between the sliding block and the leverage;

Fig. 12 is a schematic side view of a conventional lock device showing a first position and a second position of a pair of flowers when a sliding block is in an open position;

Fig. 13 is a schematic side view of the lock device of Fig. 12 showing the movement of an upper flower when the sliding block is in a lock position; and

Fig. 14 is a cross sectional view taken from line 13-13 of Fig. 13 to show the movement of the sliding block and the consequence of that movement.

Referring to Fig. 1 and Fig. 2, a lock device constructed in accordance with the present invention is shown. The lock device of the invention comprises a case 60, a first flower 61 rotatably mounted within the case 60 and having a plurality of extensions 612 axially extending out therefrom and a through hole 611 defined therein, a second flower 62 identical in structure and superposed with the first flower 61 and also movably mounted within the case 60, a first handle 63 having a first connector 631 formed therewith and securely connected with the second flower 62 via an interference fit of the first connector 631 into a through hole 621 of the second flower 62, a second handle 64 having a second connector 641 formed therewith and securely connected with the first flower 61 via an interference fit of the second

connector 641 into the through hole 611 of the first flower 61, a presser 66 pivotally mounted within the case 60 and securely connected with the first flower 61 and alternatively connected with the second flower 62, a leverage 67 a first end of which is securely connected with the presser 66 and a second end of which is securely connected with a sliding block 68 and a tongue member 69 slidably mounted to a side of the case 60 and having a plate 693 formed therewith and securely connected with the presser 66. It is to be noted that the sliding block 68 is movably mounted within the case 60 and has a protrusion 681 formed therewith and alternatively connected with the second end of the leverage 67. Furthermore, the tongue member 69 has a first tongue 691 movably mounted within the case 60 and securely connected with the plate 693 and a second tongue 692 also movably mounted within the case 60 and having a locking device 694 securely connected therewith. The lock device of the invention further has a first resilient means 601 for providing necessary resilience to force the first flower 61 and the second flower 62 to return to their original positions, a second resilient means 602 for providing necessary resilience to force the locking device 694 to its original position and a third resilient means 603 for providing necessary resilience to force the second tongue 692 to return to its original position.

Referring again to Fig. 2, the first handle 63 is connected with the second handle 64 through a threaded insertion of a threaded rod 65 into the first connector 631 and the second connector 641, such that either the first handle 63 or the second handle 64 will not be affected by the rotation of either one of the first handle 63 or the second handle 64.

Referring to Fig. 3 and Fig. 4, when the sliding block 68 is in a second position (locked position), which means that the protrusion 681 of the sliding block 68 is not in engagement with the second end of the leverage 67, the presser 66 will only engage with the first flower 61 and not with the second flower 62. Thus, a rotation of either one of the first handle 63 or the second handle 64, which is mounted on an outside of the door, will not activate any related movement or rotation of the parts within the case 60.

It is to be noted that the second tongue 692 will be forced to move into the case 60 when the door (not shown) is closed (as shown in Fig. 5), and the movement of the second tongue 692 will force the locking device 694 to move in a direction such that a first end of the locking device 694 engages with a portion of the first tongue 691. After the first end of the locking device 694 engages with the first tongue 691, a user inside the door or outside the door will not be able to open the door without rotating the first handle 63 or the second handle 64. When the first end of the locking device 694 engages with the first tongue 691, a second end of the locking device 694 engages with a portion of the presser 66. The pivotal movement of the presser 66 caused by the rotation of the first handle 63 will force the second end of the locking device 694 to disengage with the portion of the first tongue 691 to allow the retraction of the first tongue 691 and thus accomplish the purpose to unlock the door when the sliding block 68 is in the second position (locked position).

Referring again to Fig. 6, when the sliding block 68 is in a first position (open position), which means that the protrusion 681 of the sliding block 68 is in engagement with the second end of the leverage 67, the leverage 67 will be forced to pivot in a direction

such that the first end of the leverage 67 will force the presser 66 to be in full contact with both of the first flower 61 and the second flower 62. Therefore, referring to Figs. 7 and 8, when the presser 66 is in full contact with both of the first flower 61 and the second flower 62 due to the compression of the leverage 67, a user is able to rotate either the first handle 63 or the second handle 64 indoors or outdoors, and the rotation of either the first handle 61 or the second handle 62 will cause the first flower 61 and the second flower 62 to rotate, which will also drive the presser 66 to activate the movement of the plate 693. The movement of the plate 693 will cause the first tongue 691 to move into the case 60 due to the secured engagement between the first tongue 691 and the plate 693 and thus accomplish the purpose of unlock the door.

To sum up, it is notable that when the sliding block 68 is in the locked position, which means that the protrusion 681 of the sliding block 68 is not in engagement with the second end of the leverage 67 and the presser 66 is not pressed downward to be in contact with the second flower 62, the first handle 63 pivotally mounted onto the case 60 and corresponding to the second flower 62 is still able to drive the second flower 62 to rotate. However, since the second flower 62 is not in contact with any other object, the rotation of the first handle 63 handle which corresponds to the second flower 62 can only drive the second flower 62 to rotate freely and will not engage in any related operation, such that the internal structure of the lock device will not be damaged when a force is applied to open the door when the sliding block is in a lock position.

If the sliding block 68 is in an open position, which means that the protrusion 681 of the sliding block 68 is in engagement

with the second end of the leverage 67 and the presser 66 is moved downward to be in engagement with the second flower 62 due to the pressure caused by the first end of the leverage 66, the second handle 64 pivotally mounted onto the case 60 and corresponding to the first flower 61 and the second flower 62 respectively will be able to drive the first flower 61 or the second flower 62 to rotate. The pivotal movement of the first flower 61 or the second flower 62 is able to drive the presser 66 to pivot. The pivotal movement of the presser 66 is then able to drive the plate 693 to move therewith, such that the first tongue 691 is driven to move inward in the case 60 and thus accomplish the purpose of unlocking the door.

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 device enabling a handle thereof to be rotated freely when the lock is in a locked position comprising:

a case;

a first flower and a second flower respectively and pivotally mounted within said case and each having a through hole defined therein and a plurality of extensions axially extending out therefrom;

said first flower and said second flower being superposed together;

a sliding block movably mounted within said case and having a protrusion formed thereon;

controlling means for controlling said sliding block to move between a first position and a second position;

a presser movably mounted within said case and a part of which is in secure engagement with said extension of said first flower and in alternative engagement with said extension of said second flower;

a leverage having a first end in secure engagement with said presser and a second end in alternative engagement with said protrusion of said sliding block; and

a tongue member movably mounted on a side of said case and having a plate securely connected therewith and movably engaged with said presser.

2. The lock device as claimed in claim 1, wherein said tongue member further has a first tongue securely connected with said plate and a second tongue having a locking device movably connected therewith.



3. The lock device as claimed in claim 1 further having a first resilient means for providing necessary recoil force to said first flower and said second flower to return to their original positions.

4. The lock device as claimed in claim 1 further having a second resilient means for providing necessary recoil force to said locking device to return to its original position.

5. The lock device as claimed in claim 1 further having a third resilient means for providing necessary recoil force to said second tongue to return to its original position.

6. The lock device as claimed in claim 2, wherein a first end of said locking device alternatively engages with a portion of said first tongue to limit movement of said first tongue and a second end of said locking device alternatively engages with a portion of said presser.

7. The lock device as claimed in claim 1 further has a first handle fitted into said through hole of said first flower and a second handle fitted into said through hole of said second flower.