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LOCK-OPERATING DEVICE

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

5 The present invention relates to a lock-operating device for performing a locking operation by which a sash or the like of a sash window can be locked in a state of being shut and performing a unlocking operation by which the sash can be unlocked.

2. DESCRIPTION OF RELATED ART

10 For a sash window in which a sash is attached in a sash window frame such that the sash can be opened and shut, a cremone lock device that locks the sash in a state of being shut is well known in the art.

15 The cremone lock device is designed such that a lock-operating device having a handle and a moving unit and a coupling rod are attached on the sash while a lock-receiving member is attached on a sash window frame. The coupling rod can be moved in one direction with a moving unit by pivoting an handle in one direction. A roller provided on the coupling rod comes into contact with the lock-receiving member to lock the sash in place. On the other hand, when the handle is pivoted in the opposite direction, the coupling rod can be moved in the opposite direction with the moving unit to disengage the roller from the lock-receiving member to unlock the sash.

20 Referring now to Fig. 6, there is shown an example of the moving unit of the cremone lock device well-known in the art. Concretely, the moving unit comprises a base member 1, an oscillating member 2 which is mounted on the base member and is capable of oscillating, and a moving member 3 which is mounted on the base member 1 and is capable of moving in the direction of the arrow a. In the moving unit, the
25 oscillating member includes a pin 4 fitted in a slot 5 formed in a moving member 3, so that the oscillation of the oscillating member 2 allows the pin 4 to slide along the slot 5.

 Furthermore, a handle shaft is fitted in a square-shaped hole 2a of the oscillating member 2, so that the oscillating member 2 can be oscillated by the handle. The moving

member 3 and the coupling rod 6 are connected with each other. As shown in the figure, a roller 7 is mounted on the coupling rod 7 so that the coupling rod 7 comes into contact with the lock-receiving member 8.

Furthermore, in the case of the moving unit described above, if the moving member 3 receives a moving force in the direction of the arrow a, the oscillating member 2 can be oscillated. Therefore, as shown in Fig. 6, when the roller 7 is in a state of being locked with a connection between the roller 7 and the lock-receiving member 8, the sash can be unlocked by intentionally moving the coupling rod 6 from the outside. It is undesirable in the interests of crime prevention.

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SUMMARY OF THE INVENTION

Therefore, the present invention has been accomplished in consideration of the above problems. An object of the present invention is to provide a lock-operating device in which a moving member cannot be moved to an unlocking position when it is in a state of being locked.

A first invention is a lock-operating device in which a moving unit 29 performs a locking operation and an unlocking operation by operating an operating unit 28, wherein the moving unit 29 comprises a base member 40, an oscillating member 50, and a moving member 60, where the oscillating member 50 is mounted on the base member 40 such that the oscillating member 50 is able to oscillate by the operating unit 28, and the moving member 60 is mounted on the base member 40 such that the moving member 60 is capable of moving between a locking position and a unlocking position, where the oscillating member 50 and the moving member 60 are connected to each other such that the oscillating member 50 is prevented from oscillating even if the moving member 60 receives a force for moving to an unlocking position as the oscillating member 50 is further moved after a movement of the moving member 60 by the oscillation of the oscillating member 50 and the movement of the moving member 60 to a locking position.

According to the first invention, the oscillation of the oscillating member 50

allows the moving member 60 to move to the locking position. When the oscillating member 50 is further oscillated after that, the oscillating member 50 cannot be oscillated even if the moving member 60 receives a force for moving to the unlocking position. Thus, the moving member 60 does not move to the unlocking position.

5 Therefore, the moving member 60 cannot be moved intentionally, so that the sash cannot be unlocked intentionally. It is preferable in the interests of crime prevention.

 A second invention is a lock-operating device in accordance with the first invention, wherein the oscillating member 50 includes a pin 52, the moving member 60 having a slot 62 in which the pin 52 can be inserted and having a recessed portion 63
10 connected to the slot 62 and in which the pin 52 can be fitted, the pin 52 moves to be fitted in the recessed portion 63 when the oscillating member 50 is further oscillated after the moving member 60 is moved to the locking position, and when the pin 52 is fitted in the recessed portion 63, the oscillating member 50 cannot be oscillated even if the moving member 60 receives a force for moving to the unlocking position.

15 According to the second invention, the oscillation of the oscillating member 50 allows the pin 52 to slide along the slot 62 to move the moving member 60 between the locking position and the unlocking position.

 In addition, after the moving member 60 is moved to the locking position, the pin 52 can be fitted in the recessed portion 63 when the oscillating member 50 is further
20 oscillated. Thus, the moving member 60 is prevented from moving by a force for moving the moving member 60 to the unlocking position.

 Furthermore, at the time of fitting the pin 52 into the recessed portion 63, the moving member 60 cannot be moved. Thus, the pin 52 can be fitted in the recessed portion with reliability.

25 A third invention is a lock-operating device in accordance with the second invention, further comprising: a stopper 45 is formed on the base member 40, wherein the stopper 45 restricts the oscillation of the oscillating member 50 after the pin 52 is fitted in the recessed portion 63.

According to the third invention, the oscillating member 50 cannot be further oscillated after the pin 52 has fitted in the recessed portion 63. Thus, there is no possibility that the pin 52 is forcefully fitted in the recessed portion 63.

Therefore, the pin 52 can be smoothly separated from the recessed portion 63 when the oscillating member 50 is oscillated in the opposite direction by the operating unit 28.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an introspective diagram of a sash window for illustrating a preferred embodiment of the present invention;

Fig. 2 is an enlarged cross-sectional diagram along the line A-A in Fig. 1 for illustrating the sash window in detail;

Fig. 3 is an exploded perspective diagram for illustrating an operating unit, a moving unit, and a vertical edge member;

Fig. 4 is a front diagram of the moving unit of a lock-operating device;

Fig. 5A to 5G are schematic diagrams for illustrating the steps of the operation of the lock-operating device; and

Fig. 6 is a schematic diagram for illustrating the configuration of the conventional cremone lock device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in Fig. 1, a sash 20 is attached in a sash window frame 10 such that the sash can be opened and shut.

The sash window frame 10 is comprised of an upper frame portion 11, a lower frame portion 12, and right and left vertical frame portions 13, which are jointed together in a square shape. Also, a lock-receiving member 14 is attached on one of the vertical frames 13.

The sash 20 is comprised of an upper edge member 21, a lower edge member 22,

and right and left vertical edge members 23, which are jointed together in a square shape. In the inside of the sash 20, a glass 24 is fitted.

Furthermore, the vertical frame 23 having the lock-receiving member 14 is also provided with a coupling rod 25 which can be moved in a longitudinal direction. A roller
5 26 mounted on the coupling rod 25 is engaged with the lock-receiving member 14 and is disengaged from the same.

The coupling rod 25 can be moved by the lock-operating device 27 attached on one of the vertical edge member 23. A lock mechanism is comprised of the lock-operating device 27, the coupling rod 25, the roller 26, and the lock-receiving member 14. The
10 sash 20 can be locked in a shutting state with such a lock mechanism.

The lock-operating device 27 comprises an operating unit 28 and a moving unit 29. The moving unit 29 moves the coupling rod 25 by actuating the operating unit 28 to perform a locking or unlocking operation.

In the operating unit 28, as shown in Fig. 2 and Fig. 3, a handle 31 is pivotably
15 attached on a base 30. A handle shaft 32 of the handle 31 is protruded from the handle-installing surface 30a of the base 30. In this embodiment, but not limited to, the handle 31 is a lever handle. Alternatively, it may be a round handle or the like.

Tubular parts 33 are provided on the handle-installing surface 30a of the base 30. The base 30 is attached on a room-side vertical plate 23a of the vertical edge member 23
20 through a screw inserted through each of the tubular parts 33. Then, the handle shaft 32 protrudes in the inside of the vertical edge member 23.

For instance, the tube-inserting hole 35 and the shaft-inserting hole 36 are formed in the room-side vertical plate 23a of the vertical edge member 23 of the sash 20. The tubular part 33 passes through the hole 35 and extends into the hollow portion 23b of the
25 vertical edge member 23. On the other hand, the handle shaft 32 passes through the hole 36 and extends into the hollow portion 23b of the vertical edge member 23.

As shown in Figs. 2, 3, and 4, the moving unit 29 comprises a base member 40, an oscillating member 50, and a moving member 60.

As shown in Fig. 4, furthermore, the oscillating member 50 is attached on the base member 40 such that the oscillating member 50 is capable of oscillating. In other words, the oscillating member 50 can be oscillated by the operating unit 28. For instance, the handle shaft 32 is fitted in a handle-installing hole 51 of the oscillating member 50. In this embodiment, but not limited to, the handle shaft 32 is provided as an angled shaft and the handle-installing hole 51 is provided as an angled hole.

The moving member 60 is attached on the base member 40 such that the moving member is allowed to move between a locking position and an unlocking position in the direction of the arrow b with a predetermined stroke. For instance, a guide 61 mounted on the moving member 60 is slidably fitted in a guiding slot 61 of the base member 40. The stroke of the moving member 60 is restricted such that it is located at a locking position when the guide 61 comes into contact with one end portion 41a of the guiding slot 41 in a longitudinal direction, while it is located at an unlocking position when it is in an unlocking position when the guide 61 comes into contact with the other end portion 41b.

The oscillating member 50 and the moving member 60 are connected with each other such that the moving member 60 moves as the oscillating member 50 oscillates. In addition, when the oscillating member 50 is further oscillated after the oscillation of the moving member 60 to the locking position, and the oscillating member 50 is further oscillated, a force directed to the unlocking position acts on the moving member 60, while preventing the oscillating member 60.

For instance, the pin 52 of the oscillating member 50 is slidably fitted into the slot 62 of the moving member 60. When the oscillating member 50 is oscillated, the pin 52 moves along the slot 62, allowing the moving member 60 to slide between the locking position and unlocking position with a predetermined stroke.

A recessed portion 63 in which the pin 52 can be fitted is also formed in the moving member 60 and is connected to the slot 62. After that the moving 60 is located at the locking position, the pin 52 can be fitted in the recessed portion 63 when the

oscillating member 50 is further oscillated.

Furthermore, when the pin 52 has fitted in the recessed portion 63, the oscillating member 50 cannot be oscillated even though the moving member 60 receives a force for moving toward the unlocking position.

5 Even though the sash is forced to be unlocked by intentionally moving the coupling rod 25 in the state of being locked, the moving member 60 cannot be moved. Therefore, it cannot be unlocked, so that it is preferable in the interests of crime prevention.

Next, the configuration of the moving unit 29 will be specifically described.

10 The base member 40 is a plate-like body and includes a guide slot 41, a supporting hole 42, and a threaded hole 43. These holes pass through the opposite sides of the base member 40. The guide slot 41 is elongated in the direction of moving the moving member 60.

15 An oscillating guide 44 and a stopper 45 are provided on the side surface 40a of the base member 40, which is opposite to the side surface thereof facing to the operating unit 28. The oscillating guide 44 is provided on a peripheral end of the supporting hole 42 and also has a circular recessed portion 44a concentric with the center of the supporting hole 42.

20 The guide slot 41, the threaded hole 43, and the stopper 45 are formed in each of both sides of the moving member 60 in the moving direction, where the supporting hole 42 is provided as a boundary between the both sides.

25 The oscillating guide 44 and the stopper 45 are provided as protruded portions integrally formed on one side surface 40a of the base member 40, respectively. However, these structural components 44, 45 are not limited to. Alternatively, for example, the oscillating guide 44 and the stopper 45 are provided as different parts to be fixed on the side surface 40a by means of screws or fixing with the fit between them.

The base member 40 is not limited to the plate-like body. Alternatively, it may be designed as a pair of plates being connected to each other with a predetermined space

between them.

The oscillating member 50 is shaped like a plate and a handle-installing hole 51 is formed in its one end portion of the plate and is opened through from one side to the other of the oscillating member 50. In addition, one end surface 50a of the oscillating
5 member 50 is a circular surface concentric with the hole 51. There is provided the protrusion 53 around the hole 51 on 50b, one side of the oscillating member 50.

The above pin 52 is provided on the other end portion of the oscillating member 50. The pin 52 protrudes from the other side surface 50c of the oscillating member 50.

The protrusion 53 fits in the supporting hole 42 of the base member 40.

10 Simultaneously, the circular end surface 50a of the oscillating member 50 comes into contact with the circular recessed surface 44a of the base member 40, while the other side surface 50b comes into contact with the other side surface 40a of the base member 40. Consequently, the oscillating member 50 can be supported by the base member 40 such that the oscillating member 50 can be oscillated.

15 The moving member 60 comprises a first member 60a which is an elongated member on which a short member (i.e., a second member) 60b is fixed on a longitudinally middle portion thereof.

The coupling rod 25 is connected to the first member 60a.

On the other hand, the second member 60b has a plate 64 facing to one side
20 surface 40a of the base member 40.

The plate 64 is clinched to form a middle part 64a and both side parts 64b. The middle part 64a contacts with the other side surface 50c of the oscillating member 50 and the both side parts 64b are separated from such a side surface 50c.

The slot 62 and the recessed portions 63 are formed in the middle part 64a. That
25 is, the recessed portions 63 are both sides of the middle part 64a in the moving direction. Therefore, the slot 62 and two recessed portions 63 are connected to each other to form a hole shaped like a snowman.

The guides 61 are provided on the both side parts 64b, respectively.

The guide 61 is a collar pin. The pin is inserted through the guide slot 41 and is then riveted on each of both side parts 64b of the moving member 60 such that the moving member 60 is movably attached on the base member 40. In addition, the middle part 64a is contacted to the other side surface 50c of the oscillating member 50.

5 Therefore, the oscillating member 50 is attached on the base member 40 without pulling off of the base member 40.

Next, the mounting of the moving unit 29 will be described.

As shown in Fig. 2 and Fig. 3, an opening 37 is formed in the outer vertical plate 23c of the vertical edge member 23.

10 The base member 40 of the moving unit 29, the oscillating member 50, and the second member 60b of the moving member 60 are inserted into the hollow portion 23b from the outside of the vertical edge member 23 through the opening portion 37 to place the first member 60a of the moving member 60 outside from the vertical edge member 23.

Then, the handle shaft 32 is fitted in the handle-installing hole 51 from the
15 supporting hole 42.

The screw 34 being inserted through the tubular part 33 of the base 30 is screwed in the threaded hole 43 of the base member 40. Then, the other side surface 40b of the base 40 is pressed against the protruded plate 23d of the vertical edge member 23 and the opening part 37 to fix it on them.

20 Here, we will describe the locking and unlocking operations.

When the handle 31 is pivoted 90° to direct in a horizontal direction from the state of being locked as shown in Fig. 1, the coupling rod 25 moves downward so that the roller 26 is separated from the lock-receiving member 14, resulting in a state of being unlocked.

25 During the state of being unlocked, the pin 52 fits in one of the recessed portions 63 at one of the oscillating end at which the oscillating member 50 comes into contact with one of the stopper 45 in the moving unit 29 as shown in Fig. 5(a).

As the guide 61 comes into contact with the other end portion 41b of the guide

slot 41, the moving member 60 cannot move furthermore at the unlocking state.

In the above state, even if the moving member 60 attempts to move to the locking position as indicated by the arrow c, the moving member 60 cannot be moved to the locking position as the oscillating member 50 does not oscillate in the opposite direction
5 because of the presence of the pin 52 being fitted in the recessed portion 63.

By the way, in a state of being unlocked, there is no problem in the interests of crime prevention even though the coupling rod 25 is moved by intension. Therefore, there is no need to provide one of the above recessed portions 63.

If the handle 31 is turned in the opposite direction from the above state of being
10 unlocked, the oscillating member 50 oscillates in the opposite direction. As shown in Fig. 5(b), the oscillating member 50 is separated from one of the stoppers 45, while the pin 52 is separated to one of the recessed portions 63 to become facing to the slot 62.

At this time, the moving member 60 is being stopped at the unlocking position.

Furthermore, the oscillating member 50 that moves the handle 31 in the opposite
15 direction is oscillated in the opposite direction to allow the pin 52 to slide along the slot 62, so that the moving member 60 is subsequently moved to the locking position as shown in Figs. 5(c), (d), and (e).

As shown in Fig. 5(f), when the guide 61 comes into contact with one end portion 41a of the guiding slot 41, the moving member 60 is located at the locking position, while
20 the pin 52 is located at the end portion of the slot 62.

The roller 26 moves together with the coupling rod 25, and then the roller 26 comes into contact with the lock-receiving member 14 as shown in Fig. 1, resulting in a state of being locked.

From the above state, the handle 31 is further operated to allow the oscillating
25 member 50 to further oscillate in the opposite direction. As shown in Fig. 5(g), the pin 52 is fitted in the recessed portion 63, while the oscillating member 50 comes into contact with the other stopper 45, becoming the other oscillating end.

Therefore, even if the moving member 60 receives a force for moving to the

unlocking position as indicated as the arrow b, the oscillating member 50 cannot be oscillated in one direction and thus the moving member 60 cannot be moved to the unlocking position.

Furthermore, the coupling rod 25 cannot be intentionally moved in the unlocking
5 direction, so that the sash cannot be intentionally unlocked.

For instance, as shown in Fig. 2, even if a tool is pushed from the outside of the room into a space between the vertical frame portion 13 and the vertical edge member 23 to intentionally move the coupling rod 25 in the unlocking direction, it cannot be moved as the oscillating member 50 cannot be oscillated.

10 Therefore, it is preferable in the interests of crime prevention.

Furthermore, after the moving member 60 is located at the locking position, the oscillating member 50 is further oscillated in the opposite direction to allow the pin 52 to be fitted in the other recessed portion 63. At this time, the moving member 60 cannot be moved, so that the pin 52 can be fitted in the other recessed portion 63 with reliability.

15 The embodiment described above has been described with respect to the cremone lock device where the sash can be locked by contacting the roller 26 to the lock-receiving member 14. According to the present invention, it is not limited to such a lock.

Alternatively, for example, the lock rod may be connected with the coupling rod, and the lock rod is inserted into a lock hole of the upper or lower frame portion to lock the
20 sash in place.

WHAT IS CLAIMED IS:

1. A lock-operating device in which a moving unit 29 performs a locking operation and an unlocking operation by operating an operating unit 28, wherein

5 the moving unit 29 comprises a base member 40, an oscillating member 50, and a moving member 60, where

the oscillating member 50 is mounted on the base member 40 such that the oscillating member 50 is able to oscillate by the operating unit 28, and

10 the moving member 60 is mounted on the base member 40 such that the moving member 60 is capable of moving between a locking position and a unlocking position, where

the oscillating member 50 and the moving member 60 are connected to each other such that the oscillating member 50 is prevented from oscillating even if the moving member 60 receives a force for moving to an unlocking position as the oscillating member
15 50 is further moved after a movement of the moving member 60 by the oscillation of the oscillating member and the movement of the moving member 60 to a locking position.

2. A lock-operating device as claimed in Claim 1, wherein

the oscillating member 50 includes a pin 52,

20 the moving member 60 having a slot 62 in which the pin 52 can be inserted and having a recessed portion 63 connected to the slot 62 and in which the pin 52 can be fitted, the pin 52 moves to be fitted in the recessed portion 63 when the oscillating member 50 is further oscillated after the moving member 60 is moved to the locking position and

25 when the pin 52 is fitted in the recessed portion 63, the oscillating member 50 cannot be oscillated even if the moving member 60 receives a force for moving to the unlocking position.

3. A lock-operating device as claimed in Claim 2, further comprising:
a stopper 45 is formed on the base member 40, wherein
the stopper 45 restricts the oscillation of the oscillating member 50 after the pin
52 is fitted in the recessed portion 63.