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(54) **Mortise lock**

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EP-A- 0 312 654 **US-A- 4 118 056**

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Description

TECHNICAL FIELD

The invention relates to a mortise lock which may include a latch bolt, a deadbolt and an auxiliary bolt. More specifically, the invention relates to such a mortise lock which includes a deadlocking lever for maintaining the latch bolt in its locked condition. The invention also relates to such a mortise lock having a deadbolt tail which includes a camming surface for engagement with a deadbolt hub follower to move the deadbolt into its retracted or extended position.

BACKGROUND ART

Mortise locks are well known in the art as illustrated in, for example, U.S. Patent 1,280,993, Hammer, October 8, 1918; U.S. Patent 2,519,808, Young et al, August 22, 1950; U.S. Patent 3,073,143, Eads, January 15, 1963; U.S. Patent 3,361,462, Foster, January 2, 1968; U.S. Patent 4,950,005, Cudd, August 21, 1990; and U.S. Patent 4,389,061, Foshee, June 21, 1983.

U.S. Patent 1,280,993 teaches a camming member 16 acting on the camming surface of plate 14. In U.S. Patent 2,519,808, auxiliary bolt 3, which is biased outwardly by spring 4, has an abutment 9 which, by blocking movement of cam 8, holds deadbolt latch 6 in its retracted position when auxiliary latch 3 is extended. When auxiliary latch 3 is retracted (as by a strike plate when the door is closed), abutment 9 is moved to unblock cam 8 which rotates counter-clockwise, urged by spring 7, to extend deadbolt 6 and hold it in a locked condition.

U.S. Patent 3,073,143 teaches the use of a cam 61 having an extension 62. The extension engages arm 49 for retracting latch 19.

U.S. Patent 3,361,462 teaches a retractable latch 18, biased outwardly by spring 21, and being connected, via stem 19, to abutment 24. Retractor lever 22, pivoting about pivot point 23, and spring biased in a counter-clockwise direction, rotates with the rotation of hub 31 (and, thereby, with the rotation of a door handle or lever) to push against the abutment 24 to retract the latch 18.

In U.S. Patent 4,389,061, locking of a latch bolt 40 is automatically effected on closing of a door by action of auxiliary bolt 112 on deadlocking lever 100 which, in turn, acts in concert with cam block 52. Deadlocking bolt 22 is not retracted by rotation of inner handle 2, but must be separately retracted by inner turnknob 4 or an emergency key from the outside.

In U.S. Patent 4,950,005, a mortise lock, having a deadbolt 16, a latch bolt 18 and a guardbolt 20 (auxiliary latch) is taught. When the guardbolt 20 is extended, plate 62 is forced upwardly into recess 60 of deadbolt 16 so that deadbolt 16 cannot be extended out of face plate 14 of casing 16 into its locked position.

EP-A-0 312 654 discloses a safety lock according

to the first part of claim 1 and having a latch bolt, a deadbolt and an auxiliary bolt. A deadlocking lever normally prevents retraction of the latch bolt. Under the action of a lever 6, the deadlocking lever is brought into an unlocked position. The lever further engages with engagement means mounted on a latch bolt tail extending from the rear end of the latch bolt to draw the latch bolt into its opening position.

US 4 118 056 also discloses a mortise lock having a latch bolt, a deadlock and an auxiliary bolt in which a deadlocking lever normally prevents retraction of the latch bolt. Rotation of an inner hub 46 brings a rollback surface 54 into engagement with a rollback shoe 64. Motion of the retractor shoe towards the rear plate of the housing forces a retractor 50 rearwards, which brings the deadlocking lever in to an unlocked position and draws the latch bolt back into the housing.

DISCLOSURE OF THE INVENTION

It is an objection of the invention to provide a new mortise lock mechanism.

It is a more specific object of the invention in a preferred embodiment to provide such a mortise lock mechanism which includes a latch bolt, an auxiliary bolt and a deadbolt.

There is an even more specific object of the preferred embodiment of the invention to provide such a mortise lock which includes a deadlocking lever for maintaining the latch bolt in this locked position.

It is a further object of the preferred embodiment of the invention to provide such a mortise lock in which the deadbolt has a tail having a camming surface for interaction with a deadbolt hub follower to retract and extend the deadbolt.

It is a still further object of the preferred embodiment of the invention to provide such a mortise lock mechanism including an emergency lever whereby to provide interaction between the latch bolt and the deadbolt.

The invention provides a mortise lock mechanism for mounting on a door and for use with rotatable handle means mounted on the inside and outside of said door, comprising:

- a housing comprising a back wall, and a front plate to close the housing;
- at least a first opening in said front plate;
- a latch bolt, having a front end and a rear end, and mounted in said housing such that said front end is retractable in to and extendable out of said housing through said first opening;
- a latch bolt tail extending from said rear end of said latch bolt towards said back wall and terminating in a latch bolt tail rear end spaced from said back wall;
- engagement means mounted on said latch bolt tail adjacent the rear end thereof; and
- a deadlocking lever having means for engaging the latch bolt for preventing retraction of the latch bolt

means, having a front end and a rear end and being mounted in said housing for pivoting at the rear end thereof;

characterised in that said lock mechanism further comprises

post means mounted on said deadlocking lever;
hub follower means having a first end and a second end, said hub follower means being mounted in said housing for rotation with said handle means at the first end thereof, said second end of said hub follower means having an abutting edge;
whereby, when said hub follower means is rotated, with the rotation of said handle means, said abutment edge first engages said post means, to cause said deadlocking lever to rotate about said rear end of said deadlocking lever to disengage from the latch bolt, and subsequently engages said engagement means on said latch bolt tail to drive said engagement means, and therefore said latch bolt tail and said latch bolt, towards said back wall whereby to retract said latch bolt into said housing.

In a preferred embodiment, the mechanism further comprises an auxiliary bolt having a front end and a rear end and mounted in said housing such that said front end is retractable into and extendable out of said housing through said second opening, said auxiliary bolt extending towards said back wall and terminating in an auxiliary bolt rear end spaced from said back wall; said housing further comprising a top wall and a bottom wall;

said auxiliary bolt having a top edge facing said top wall, and a recess in said top edge;
finger means extending, at said front end of said deadlocking lever, towards said bottom wall and disposed relative to said recess in said top edge of said auxiliary bolt such that, in a predetermined position of said auxiliary bolt, said finger means extends into said recess; and
claw means at the front end of said deadlocking lever spaced from said finger means.

In accordance with a further particular embodiment of the invention there is provided a mortise lock mechanism for mounting on a door and for use with rotatable handle means mounted on the inside and outside of said door, comprising;

a housing comprising a back wall, a top wall, a bottom wall, two side walls, and a front plate to close the housing;
a first opening and a spaced second opening in said front plate;
a latch bolt, having a front end and a rear end, and mounted in said housing such that said front end is retractable into an extendable out of said housing

through said first opening;
a latch bolt tail extending from said rear end of said latch bolt towards said back wall terminating in a latch bolt tail rear end spaced from said back wall;
engagement means mounted on said latch bolt tail adjacent the rear end thereof;
a deadlocking lever having a front end and a rear end and being mounted in said housing for pivoting at the rear end thereof;
finger means extending, at said front end of said deadlocking lever, towards said bottom wall and disposed relative to said recess in said top edge of said auxiliary bolt such that, in a predetermined position of said auxiliary bolt, said finger means extends into said recess;
claw means at the front end of said deadlocking lever spaced from said finger means;
post means mounted on said deadlocking lever;
hub follower means having a first end and a second end, said hub follower means being mounted in said housing for rotation with said handle means at the first end thereof, said second end of said hub follower means having an abutting edge;
whereby, when said hub follower means is rotated, with the rotation of said handle means, said abutment edge first engages said post means, to cause said deadlocking lever to rotate about said rear end of said deadlocking lever, and subsequently engages said engagement means on said latch bolt tail to drive said engagement means, and therefore said latch bolt tail and said latch bolt, towards said back wall whereby to retract said latch bolt into said housing.

In another preferred embodiment there is provided a mortise lock mechanism for mounting on a door and for use with rotatable handle means mounted on the inside and outside of said door, comprising;

a housing comprising a back wall, a top wall, a bottom wall, two side walls, and a front plate to close the housing;
a first opening and a spaced second opening in said front plate;
a latch bolt, having a front end and a rear end, and mounted in said housing such that said front end is retractable into an extendable out of said housing through said first opening;
a latch bolt tail extending from said rear end of said latch bolt towards said back wall and terminating in a latch bolt tail rear end spaced from said back wall;
engagement means mounted on said latch bolt tail adjacent the rear end thereof;
an auxiliary bolt having a front end and a rear end and mounted in said housing such that said front end is retractable into and extendable out of said housing through said second opening, said auxiliary bolt extending towards said back wall and termi-

nating in an auxiliary bolt rear end spaced from said back wall;
 said auxiliary bolt having a top edge facing said top wall, and a recess in said top edge;
 a deadlocking lever having a front end and a rear end and being mounted in said housing for pivoting at the rear end thereof;
 finger means extending, at said front end of said deadlocking lever, towards said bottom wall and disposed relative to said recess in said top edge of said auxiliary bolt such that, in a predetermined position of said auxiliary bolt, said finger means extends into said recess;
 claw means at the front end of said deadlocking lever spaced from said finger means;
 post means mounted on said deadlocking lever;
 hub follower means having a first end and a second end, said hub follower means being mounted in said housing for rotation with said handle means at the first end thereof, said second end of said hub follower means having an abutting edge;
 whereby, when said hub follower means is rotated, with the rotation of said handle means, said abutment edge first engages said post means, to cause said deadlocking lever to rotate about said rear end of said deadlocking lever, and subsequently engages said engagement means on said latch bolt tail to drive said engagement means, and therefore said latch bolt tail and said latch bolt, towards said back wall whereby to retract said latch bolt into said housing.

In yet another preferred embodiment there is provided a mortise lock mechanism for mounting on a door and for use with rotatable handle means mounted on the inside and outside of said door, comprising;

a housing comprising a back wall, a top wall, a bottom wall, two side walls, and a front plate to close the housing;
 a first opening, a spaced second opening, and a spaced third opening in said front plate;
 a latch bolt, having a front end and a rear end, and mounted in said housing such that said front end is retractable into an extendable out of said housing through said first opening;
 a latch bolt tail extending from said rear end of said latch bolt towards said back wall and terminating in a latch bolt tail rear end spaced from said back wall;
 engagement means mounted on said latch bolt tail adjacent the rear end thereof;
 an auxiliary bolt having a front end and a rear end and mounted in said housing such that said front end is retractable into and extendable out of said housing through said second opening, said auxiliary bolt extending towards said back wall and terminating in an auxiliary bolt rear end spaced from said back wall;

said auxiliary bolt having a top edge facing said top wall, and a recess in said top edge;
 a deadlocking lever having a front end and a rear end and being mounted in said housing for pivoting at the rear end thereof;
 finger means extending, at said front end of said deadlocking lever toward said bottom wall and disposed relative to said recess in said top edge of said auxiliary bolt such that, in a predetermined position of said auxiliary bolt, said finger means extends into said recess;
 claw means at the front end of said deadlocking lever spaced from said finger means;
 post means mounted on said deadlocking lever;
 hub follower means having a first end and a second end, said hub follower means being mounted in said housing for rotation with said handle means at the first end thereof, said second end of said hub follower means having an abutting edge;
 whereby, when said hub follower means is rotated, with the rotation of said handle means, said abutment edge first engages said post means, to cause said deadlocking lever to rotate about said rear end of said deadlocking lever, and subsequently engages said engagement means on said latch bolt tail to drive said engagement means, and therefore said latch bolt tail and said latch bolt, towards said back wall whereby to retract said latch bolt into said housing;
 said mechanism further including a deadlocking bolt having a front end and a rear end and mounted in said housing such that said front end is retractable into and extendable out of said housing through said third opening;
 a deadlocking bolt tail extending from the rear end of said deadlocking bolt towards said back wall and terminating in a deadlocking bolt tail rear end spaced from said back wall;
 said deadlocking bolt tail including an upper edge and a lower edge;
 said lower edge defining a camming surface having three arced portions;
 a deadlocking bolt hub having a first end and a second end and mounted in said housing for rotation, with said turnknob, at said first end, said second end of said deadlocking bolt hub comprising a circular engagement means for engaging said camming surface;
 whereby, when said deadlocking bolt hub is rotated in one direction, said deadlocking bolt is retracted into said housing and, when said deadlocking bolt hub is rotated in the other direction, said deadlocking bolt is extended out of said housing.

BRIEF DESCRIPTION OF DRAWINGS

The invention will be better understood by an examination of the following description, together with the ac-

companying drawings, in which;

- FIGURE 1 is a perspective view of the lock mounted in a door;
 FIGURE 2 illustrates the mechanism of the mortise lock when the door is closed and the latch bolt is extended and the deadbolt retracted;
 FIGURE 3 is a view similar to FIGURE 2 but with the latch bolt retracted;
 FIGURE 4 is a view of the mortise mechanism with the door open, the latch bolt extended, the auxiliary bolt extended and the deadbolt retracted;
 FIGURE 5 is a view similar to Figure 2 but with the latch bolt extended, the deadbolt extended and the auxiliary bolt retracted; and
 FIGURE 6 illustrates a split latch bolt hub follower in accordance with the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to Figure 1, the latch bolt mechanism is housed in a box-like housing 1 whose front opening is covered by a front plate 3. As can be seen, the front plate 3 is mounted on an end 5 of a door 7 and attached thereto by screws or the like. The box-like structure, as is well known in the art, extends into an end opening in the door.

The front plate 3 includes a latch bolt opening 9, an auxiliary bolt opening 11 and a deadbolt opening 13. As is well known in the art, the frame in which the door is mounted will include a deadbolt strike opening, a latch bolt strike opening and an auxiliary bolt strike plate. When the door is closed, deadbolt opening 13 is adjacent to the deadbolt strike opening, latch bolt opening 9 is adjacent to the latch bolt strike opening, and auxiliary bolt opening 11 is adjacent to the strike plate. The box-like structure includes a top wall 15, a bottom wall 17, a back wall 19, and side walls 21 and 23. A latch hub opening 25 receives a spindle 27 of a handle means 29. As seen in Figure 6, there is a latch hub opening 25' on the outside of the door as well so that such openings are included on both sides of the door. As also seen in Figure 6, handle means 29' is connected to spindle 27' through an electric combination lock 100 such that, when the correct combination is punched into the lock 100, the spindle 27' will rotate with handle means 29'.

Deadbolt hub opening 31, which is included only on the inside of the door, receives a spindle 33 of a turnknob 35. Indentations 37 and 37' are included in both side walls 21 and 23 respectively and are aligned with each other. The purposes of these slots are described below.

Turning now to Figure 2, it can be seen that the mechanism includes a latch bolt 39, which, in Figure 2 is shown extended. Auxiliary bolt 41 is shown retracted as is also deadbolt 43. The latch bolt 39 includes an anti-friction means 40, as well known in the art. It also includes a front end 45 and a rear end 47. Extending from

the rear end 47 is a latch bolt tail 49 which extends in the direction of the back wall 19 and terminates in a rear end 51 spaced from back wall 19. Mounted on the latch bolt tail 49 is an engagement means 53. Latch bolt 39 is biased outwardly of the housing by a spring illustrated at 50 in Figure 2.

Latch bolt hub follower 57 has a first end 59 which is mounted for rotation with spindle 27 and, therefore, with handle means 29. The latch bolt hub follower 57 has a second end 61 which includes an abutment surface which abuts the engagement means 53 as will be described below.

A deadlocking lever 63 has a first end 65 and a second end 67 and post 66 extends upwardly from lever 63 between ends 65 and 67 thereof. The first end is mounted on pin 69 for rotation thereabout. Included at the second end is a downwardly extending finger 71 and a downwardly extending claw 73 which is spaced from the downwardly extending finger 71. Deadlocking lever 63 is biased downwardly by a spring shown at 60.

Auxiliary bolt 41 has a front end 74 and a top surface 75. A recess 77 is included in the top surface 75 and, under stated conditions, finger 71 will extend into the recess 77. Auxiliary bolt 41 is biased outwardly of the housing by a spring shown at 70.

Deadbolt 43 includes a front end 79 and a rear end 81. Extending from the rear end 81 is a deadbolt tail 83 having a top edge 85 and a bottom edge 87. A camming surface, including arced portions 89, 91 and 93 is defined in the bottom surface of the deadbolt tail 83. Deadbolt hub follower 93 has a first end 97 which is mounted for rotation with spindle 33 of turnknob 35. The deadbolt hub follower 95 also has a second end 99 which includes a circular engagement means 101. The radii of the arced portions 89, 91 and 93 are equal to the radius of the circular engagement means 101. These radii are joined by straight lines 103 and 105.

An emergency lever 107 extends within the housing along the length thereof. The emergency lever has a first end 109 which is mounted for pivoting about a pin 111. The second end, 113, of the emergency lever comprises an abutment end. The emergency lever also includes portions 115, adjacent rear end 81 of the deadbolt 43, and 117, adjacent the rear end 47 of latch bolt 39. Indentation 37 fits into slot 119 in 83 as discussed below.

In operation, the mechanism works as follows:

Assuming that the mechanism is in the state as illustrated in Figure 2, i.e., the door is closed, the latch bolt is locked and the deadbolt is unlocked, in order to unlock and open the door, the handle means has to be turned in a clockwise direction as seen in Figure 2. When the handle is so turned, the spindle 27 will also rotate in a clockwise direction whereupon latch bolt hub follower 57 will also rotate in a clockwise direction. The abutting edge of the second end 61 of the latch bolt hub follower 57 will first abut the post 66 of the deadlocking lever 63 to force the post upwardly. This will cause the deadlocking lever 63 to pivot in a clockwise direction.

As seen in Figure 2, before the deadlocking lever is so pivoted, claw 73 is disposed behind the rear end 47 of the latch bolt 39 so that the latch bolt 39 cannot be retracted into the housing. When the deadlocking lever 63 is pivoted in a clockwise direction, it will assume the position illustrated in Figure 3 so that claw 73 no longer will prevent latch bolt 39 from being retracted into the housing.

While the abutting edge of the latch bolt hub follower 57 is still maintaining contact with post 66, to thereby keep deadlocking lever 63 in its upward position, the abutting edge of latch bolt hub follower 57 engages the engagement means 53 to drive it towards back wall 19 and to thereby drive latch bolt tail 49 and latch bolt 39 in the same direction. Accordingly, the latch bolt 39 is retracted into the housing. The spacings of post 66 and latch bolt pusher 53 are so arranged that, when the abutting edge of latch bolt hub follower 57 no longer contacts the post 66, so that deadlocking lever 63 will not be held in its upward position by the latch bolt hub follower 57, the top surface of latch bolt 39 will underlie the bottom surface of claw 73 thus maintaining latch bolt hub follower 57 in its upward position.

When the latch bolt 39 is fully retracted into the housing, the door can be opened. The handle means will be spring loaded so that the handle will return to its original position by rotating in a counter-clockwise direction when it is released after the door is opened. Accordingly, the latch bolt hub follower 57 will also rotate in a counter-clockwise direction. Spring means 50 will therefore force latch bolt tail 49 towards front plate 3 so that latch bolt 39 will be extended once again out of the housing. At the same time, spring 70 will force auxiliary bolt 41, which is no longer restrained by the strike plate, out of the housing. The spacings of the various elements is so arranged that, before the top surface of latch bolt 39 no longer underlies the bottom surface of claw 73, the top surface 76 of auxiliary bolt 41 will underlie the finger 71 of the deadlocking lever 63 as shown in Figure 3. With the deadlocking lever in this position, it will of course be possible to retract the latch bolt 39 into the housing even without rotation of the handle means. At this time, the position of the mechanism will be as illustrated in Figure 4.

When the door is now closed, the latch bolt will first be retracted, with the aid of the antifriction 40, and, when the door is fully closed and the latch bolt is aligned with the latch bolt strike opening, the latch bolt will once again be extended out of the housing, as shown in Figure 2, by the action of spring 50. At the same time, the auxiliary bolt will cam against the auxiliary bolt strike so that it will be retracted into the housing, against the action of spring 70, in the position as shown in Figure 2. At this time, spring 60 will force deadlocking lever 63 downwardly so that finger 71 of deadlocking lever 63 will fall into the recess 77 of the auxiliary bolt 41 and claw 73 will once again prevent the latch bolt 39 from being retracted into the housing. Accordingly, the door will be automatically

locked when it is closed.

To effect a privacy lock out, the deadbolt 43 is extended into its deadbolt strike opening. For this purpose, and starting once again with the mechanism in the position illustrated in Figure 2, the turnknob 35 is rotated in a counter-clockwise direction to thereby rotate deadbolt hub follower 95 in a counter-clockwise direction. As the deadbolt hub follower 95 rotates, the circular engagement means 101 of the deadbolt hub follower 95 will engage the arced portions 93, 91 and 89 respectively of the camming surface to drive deadbolt tail 83 leftwardly whereby deadbolt 43 is extended out of the housing as shown in Figure 5. The emergency lever 107 will be forced into the position shown in Figure 5 and the circular engagement means 101 will abut the abutment edge of the second end 113 of the emergency lever 107. Accordingly, portion 115 of the emergency lever will abut the rear end 81 of the deadbolt, and portion 117 of the emergency lever will abut the rear end 47 of the latch bolt. Accordingly, it will not be possible to force the latch bolt 39 or the deadbolt 43 into the casing into their retracted positions.

At the same time that the deadbolt is extended, a switch (not shown) will be activated to automatically change the combination of the electronic combination lock and to set up instead an emergency combination. Accordingly, anyone inserting the ordinary combination will not be able to connect the handle means 29' with the spindle 27' under these conditions. However, anyone having the emergency combination (for example the Management of a hotel in which the lock may be installed) will be able to connect the handle 29' with the spindle 27'. As will be seen, by using the emergency combination, it is possible to defeat the privacy connection and to unlock the door.

To unlock the door when in the privacy mode from the inside, handle 29 is rotated in a clockwise direction. Latch bolt 39 will be retracted into the housing as above described. When the latch bolt is retracted into the housing, the rear end 47 of latch bolt 39 will push against the portion 117 of the emergency lever 107 to cause the emergency lever to rotate in a clockwise direction. The abutting edge of the end 113 of the emergency lever 107 will push against the circular engagement means 101 of the deadbolt hub follower 95 forcing the deadbolt hub follower 95 to rotate in a clockwise direction. Accordingly, the circular engagement means 101 will engage the arced portions 89, 91 and 93 respectively to force the deadbolt hub tail 83 rightwardly to thereby retract the deadbolt 43 into the housing. Accordingly, both the latch bolt and the deadbolt will be unlocked and in the position as illustrated in Figure 3. The door can now be opened.

To defeat the privacy lock out from the outside, the emergency combination is punched into the electronic combination lock and the handle 29' is rotated in a counter-clockwise direction. The same thing will now happen as happened when the inner handle means 29 was rotated in a clockwise direction.

In a particular embodiment, the hub 57 comprises a split hub as illustrated in Figure 6. As can be seen in Figure 6, the split hub comprises the parts 57 and 57' disposed on either side of the latch bolt tail 49. The engagement means 55 will also be split in two parts, 55 and 55', disposed about the deadlocking lever 63. The deadlocking lever will include a post 66 on one side and a post 66' on the other side as seen in Figure 6. The operation of the split hub arrangement is identical to the operation as above described.

Although a particular embodiment has been described, this was for the purpose of illustrating, but not limiting, the invention. Various modifications, which will come readily to the mind of one skilled in the art, are within the scope of the invention as defined in the appended claims.

Claims

1. A mortice lock mechanism for mounting on a door and for use with rotatable handle means mounted on the inside and outside of said door, comprising:

a housing (1) comprising a back wall (19), and a front plate (3) to close the housing;
at least a first opening (9) in said front plate;
a latch bolt (39), having a front end (45) and a rear end (47), and mounted in said housing such that said front end is retractable into and extendable out of said housing through said first opening (9);
a latch bolt tail (49) extending from said rear end of said latch bolt towards said back wall (19) and terminating in a latch bolt tail rear end (51) spaced from said back wall;
engagement means (53) mounted on said latch bolt tail (49) adjacent the rear end thereof; and
a deadlocking lever (63) having means for engaging the latch bolt for preventing retraction of the latch bolt means (39), having a front end (67) and a rear end (65) and being mounted in said housing for pivoting at the rear end thereof;

characterised in that said lock mechanism further comprises

post means (66) mounted on said deadlocking lever (63);
hub follower means (57) having a first end (59) and a second end (61), said hub follower means being mounted in said housing for rotation with said handle means (29) at the first end thereof, said second end of said hub follower means having an abutting edge;
whereby, when said hub follower means (57) is rotated, with the rotation of said handle means, said abutment edge first engages said post

means (66), to cause said deadlocking lever (63) to rotate about said rear end (65) of said deadlocking lever (63) to disengage from the latch bolt, and subsequently engages said engagement means (53) on said latch bolt tail (49) to drive said engagement means (53), and therefore said latch bolt tail (49) and said latch bolt (39), towards said back wall whereby to retract said latch bolt into said housing.

2. A mechanism as defined in Claim 1, comprising an auxiliary bolt (41) having a front end and a rear end and mounted in said housing such that said front end is retractable into and extendable out of said housing through a second opening (11) therein, said auxiliary bolt extending towards said back wall (19) and terminating in an auxiliary bolt rear end spaced from said back wall;

said housing (1) further comprising a top wall (15) and a bottom wall (17);
said auxiliary bolt having a top edge (76) facing said top wall (15), and a recess (77) in said top edge;

finger means (71) extending at said front end of said deadlocking lever (63), towards the bottom of the housing and disposed relative to said recess in said top edge of said auxiliary bolt (41) such that, in a predetermined position of said auxiliary bolt, said finger means extends into said recess; and
claw means (73) at the front end of said deadlocking lever (63) spaced from said finger means (71).

3. A mechanism as defined in any preceding claim, and including a deadlocking lever spring means (60) for biasing said deadlocking lever (63) towards the bottom of the housing.
4. A mechanism as defined in Claim 2 or Claim 3 and including auxiliary bolt spring means (70) for biasing said auxiliary bolt (41) outwardly of said housing.

5. A mechanism as defined in any preceding claim, including latch bolt spring means for biasing said latch bolt outwardly of said housing.

6. A mechanism as defined in any preceding claim, wherein said hub follower means (57) comprises a split-hub follower means having an inside hub follower means (57) and an outside hub follower means (57')

said inside hub follower means being mounted for rotation with said handle means (29) on the inside of said door and said outside hub follower means being mounted for rotation with said handle (29') on said outside of said door.

7. A mechanism as claimed in any one of Claims 2-6, further comprising;

a third opening (31) in said front plate;
 a deadlocking bolt (43) having a front end (79) and a rear end (81) and mounted in said housing such that said front end is retractable into and extendable out of said housing through said third opening (31);
 a deadlocking bolt tail (83) extending from the rear end of said deadlocking bolt (43) towards said back wall and terminating in a deadlocking bolt tail rear end spaced from said back wall; said deadlocking bolt including an upper edge (85) and a lower edge (87);
 said lower edge defining a camming surface having three arced portions (89, 91, 93);
 a deadlocking bolt hub (95) having a first end (97) and a second end (99) and mounted in said housing for rotation, with said turnknob, at said first end, said second end of said deadlocking bolt hub comprising a circular engagement means (107) for engaging said camming surface;
 whereby, when said deadlocking bolt hub is rotated in one direction, said deadlocking bolt is retracted into said housing and, when said deadlocking bolt hub is rotated in the other direction, said deadlocking bolt is extended out of said housing.

8. A mortise lock as defined in Claim 7 and including an emergency lever (107) disposed within the housing and extending along the length of the housing;

said emergency lever having a first end (109) disposed adjacent to the bottom wall of said housing and being mounted at the first end for pivoting thereabout;
 said emergency lever having a second end (113) including an abutment portion, said abutment portion being located to abut said circular engagement means (101);
 said emergency lever further including a deadbolt rear end abutment portion (115) and a latch bolt rear end abutment portion (117);
 whereby, when said mechanism is in a lockout condition, said second end of said emergency lever abuts said circular engagement means, said deadbolt rear end abutment portion (115) abuts said deadbolt rear end (81) and said latch bolt rear end abutment portion (117) abuts said latch bolt (39);
 whereby, said latch bolt and said deadbolt cannot be retracted into said housing.

Patentansprüche

1. Einstecksschloßmechanismus zur Anbringung an einer Tür und zur Verwendung zusammen mit drehbaren Handgriffmitteln, die an der Innenseite und Außenseite der genannten Tür angebracht sind, mit:

einem Gehäuse (1) mit einer Rückwand (19) und einer Frontplatte (3) zum Schließen des Gehäuses;
 mindestens einer ersten Öffnung (9) in der genannten Frontplatte;
 einem Schnäpper (39) mit einem Frontende (45) und einem Rückende (47), der im genannten Gehäuse so angebracht ist, daß das genannte Frontende durch die genannte erste Öffnung (9) in das genannte Gehäuse hinein einziehbar und aus diesem heraus ausfahrbar ist;
 einer Schnäpperverlängerung (49), die sich vom genannten hinteren Ende des genannten Schnäppers zur genannten Rückwand (19) hin erstreckt und in einem Schnäpperverlängerungs-Rückende (51) endet, das zur genannten Rückwand beabstandet ist;
 Eingriffsmitteln (53), die an der genannten Schnäpperverlängerung (49) nahe deren Rückende angebracht sind; und
 einem Riegel (63) mit Mitteln zum Eingreifen in den Schnäpper, um das Zurückziehen der Schnäppermittel (39) zu verhindern, mit einem Frontende (67) und einem Rückende (65), der im genannten Gehäuse zur Schwenkbewegung an seinem Rückende angebracht ist;

dadurch **gekennzeichnet**, daß der genannte Schloßmechanismus ferner die folgenden Merkmale aufweist:

Stielmittel (66), die am genannten Riegelhebel (63) angebracht sind;
 Naben-Mitnehmermittel (57) mit einem ersten Ende (59) und einem zweiten Ende (61), wobei die genannten Naben-Mitnehmermittel im genannten Gehäuse zur Drehung zusammen mit den genannten Handgriffmitteln (29) an ihrem ersten Ende angebracht sind, wobei das genannte zweite Ende der genannten Naben-Mitnehmermittel eine Anschlagkante aufweist;
 wodurch dann, wenn die genannten Naben-Mitnehmermittel (57) gedreht werden, zusammen mit der Drehung der genannten Handgriffmittel, die genannte Anschlagkante zuerst in die genannten Stielmittel (66) eingreift, um den genannten Riegelhebel (63) zu veranlassen, zusammen mit dem genannten Rückende (65) des genannten Riegelhebels (63) zu schwen-

ken, um den Eingriff vom Schnäpper zu lösen, und nachfolgend in die genannten Eingriffsmittel (53) an der genannten Schnäpperverlängerung (49) eingreift, um die genannten Eingriffsmittel (53) und deshalb auch die genannte Schnäpperverlängerung (49) und den genannten Schnäpper (39) zur genannten Rückwand zu bewegen, um hierdurch den genannten Schnäpper in das genannte Gehäuse hinein zurückzuziehen.

2. Mechanismus, wie umrissen im Anspruch 1, mit einem Zusatzbolzen (41) mit einem Frontende und einem Rückende, der im genannten Gehäuse so angebracht ist, daß das genannte Frontende durch eine zweite Öffnung (11) im genannten Gehäuse in dieses hinein einziehbar und aus diesem heraus ausfahrbar ist, wobei der genannte Zusatzbolzen sich zur genannten Rückwand (19) hin erstreckt und in einem Zusatzbolzen-Rückende endet, das zur genannten Rückwand beabstandet ist;

wobei das genannte Gehäuse (1) ferner eine Oberwand (15) und eine Unterwand (17) aufweist;

wobei der genannte Zusatzbolzen eine Oberkante (76), die der genannten Oberwand (15) zugewandt ist, und eine Aussparung (77) in der genannten Oberkante aufweist;

wobei Fingermittel (71) sich am genannten Frontende des genannten Riegelhebels (63) zur Unterseite des Gehäuses hin erstrecken und relativ zur genannten Aussparung in der genannten Oberkante des genannten Zusatzbolzens (41) so angeordnet sind, daß in einer vorbestimmten Lage des genannten Zusatzbolzens die genannten Fingermittel sich in die genannte Aussparung hinein erstrecken; und mit Klauenmitteln (73) am Frontende des genannten Riegelhebels (63) mit Abstand zu den genannten Fingermitteln (71).

3. Mechanismus, wie umrissen in jedem vorangehenden Anspruch, und mit Riegelhebel-Federmitteln (60) zum Belasten des genannten Riegelhebels (63) in Richtung zur Unterseite des Gehäuses.

4. Mechanismus, wie umrissen in Anspruch 2 oder Anspruch 3 und mit Zusatzbolzen-Federmitteln (70) zum Belasten des genannten Zusatzbolzens (41) aus dem genannten Gehäuse heraus.

5. Mechanismus, wie umrissen in jedem vorangehenden Anspruch, mit Schnäpper-Federmitteln, um den genannten Schnäpper aus dem genannten Gehäuse nach außen zu belasten.

6. Mechanismus, wie umrissen in jedem vorangehen-

den Anspruch, worin die genannten Naben-Mitnehmermittel (57) geteilte Naben-Mitnehmermittel umfassen, mit innenseitigen Naben-Mitnehmermitteln (57) und außenseitigen Naben-Mitnehmermitteln (57'),

wobei die genannten innenseitigen Naben-Mitnehmermittel zur Drehung zusammen mit den Handgriffmitteln (29) an der Innenseite der genannten Tür und die genannten außenseitigen Naben-Mitnehmermittel zu der Drehung zusammen mit dem Handgriff (29') an der Außenseite der genannten Tür angebracht sind.

7. Mechanismus, wie beansprucht in einem der Ansprüche 2-6, ferner mit:

einer dritten Öffnung (31) in der genannten Frontplatte;

einem Riegelbolzen (43) mit einem Frontende (79) und einem Rückende (81), der im genannten Gehäuse so angebracht ist, daß das genannte Frontende durch die genannte dritte Öffnung (31) hindurch in das genannte Gehäuse hinein zurückziehbar und aus diesem heraus ausfahrbar ist;

einer Riegelverlängerung (83), die sich vom Rückende des genannten Riegels (43) zur genannten Rückwand hin erstreckt und in einem Riegelverlängerungs-Rückende endet, das zur genannten Rückwand beabstandet ist;

wobei der genannte Riegel eine Oberkante (85) und eine Unterkante (87) umfaßt;

die genannte Unterkante eine Steuerfläche festlegt, die drei bogenförmige Abschnitte (89, 91, 93) aufweist; und

eine Riegelnabe (95) ein erstes Ende (97) und ein zweites Ende (99) aufweist und im genannten Gehäuse zur Drehung zusammen mit dem Drehknopf am genannten ersten Ende angebracht ist, wobei das genannte zweite Ende der genannten Riegelnabe kreisförmige Eingriffsmittel (107) zum Eingriff in die genannte Steuerfläche aufweist;

wodurch dann, wenn die genannte Riegelnabe in die eine Richtung gedreht wird, der genannte Riegel in das Gehäuse hinein zurückgezogen wird, und wenn die genannte Riegelnabe in die andere Richtung gedreht wird, der genannte Riegel aus dem genannten Gehäuse heraus ausgefahren wird.

8. Einsteckschloß, wie umrissen im Anspruch 7 und mit einem Nothebel (107), der innerhalb des Gehäuses angeordnet ist und sich längs der Längenerstreckung des Gehäuses erstreckt;

wobei der genannte Nothebel ein erstes Ende (109) aufweist, das neben der Bodenwand des

genannten Gehäuses angeordnet ist und an dem ersten Ende zur Schwenkbewegung um dieses angebracht ist;
 der genannte Nothebel ein zweites Ende (113) aufweist, mit einem Anschlagabschnitt, wobei der genannte Anschlagabschnitt so angeordnet ist, daß er gegen die genannten kreisförmigen Eingriffsmittel (101) anschlägt; und
 der genannte Nothebel ferner einen Riegel-Rückende-Anschlagabschnitt (115) und einen Schnäpper-Rückende-Anschlagabschnitt (117) aufweist;
 wodurch dann, wenn sich der genannte Mechanismus in einem Verriegelungszustand befindet, das genannte zweite Ende des genannten Nothebels gegen die genannten kreisförmigen Eingriffsmittel anschlägt, wobei der genannte Riegel-Rückende-Anschlagabschnitt (115) gegen das genannte Riegel-Rückende (81) anschlägt und der genannte Schnäpper-Rückende-Anschlagabschnitt (117) gegen den genannten Schnäpper (39) anschlägt;
 wodurch der genannte Schnäpper und der genannte Riegel nicht in das genannte Gehäuse hinein zurückgezogen werden können.

Revendications

1. Mécanisme de serrure à larder, pour montage sur une porte et utilisation avec un dispositif de poignées tournantes montées du côté intérieur et du côté extérieur de ladite porte, qui comprend :
 un boîtier (1) comportant une paroi arrière (19), et une plaque avant (3) de fermeture du boîtier ; au moins un premier passage (9) ménagé dans ladite plaque avant ;
 un pêne à demi-tour (39), ayant une extrémité avant (45) et une extrémité arrière (47), monté dans ledit boîtier de sorte que ladite extrémité avant peut être rétractée à l'intérieur dudit boîtier et sortie dudit boîtier à travers ledit premier passage (9) ;
 une queue de pêne à demi-tour (49) s'étendant à partir de ladite extrémité arrière dudit pêne à demi-tour, vers ladite paroi arrière (19), et se terminant à une extrémité arrière de queue de pêne à demi-tour (51) espacée de ladite paroi arrière ;
 un élément de contact (53) monté sur ladite queue de pêne à demi-tour (49) près de l'extrémité arrière de celle-ci ; et
 un levier de verrouillage (63) comportant un élément de retenue du pêne à demi-tour pour empêcher la rétraction du pêne à demi-tour (39), ayant une extrémité avant (67) et une extrémité arrière (65) et étant monté dans ledit

boîtier pour pivotement à son extrémité arrière;
 caractérisé en ce que ledit mécanisme de serrure comprend en outre :

une colonnette (66) montée sur ledit levier de verrouillage (63) ;
 un bras de moyeu (57) ayant une première extrémité (59) et une deuxième extrémité (61), ledit bras de moyeu étant monté dans ledit boîtier pour rotation avec ledit dispositif de poignées (29) à la première extrémité du bras, ladite deuxième extrémité dudit bras de moyeu présentant un bord de butée ;
 de sorte que, lorsque ledit bras de moyeu (57) tourne du fait de la rotation dudit dispositif de poignées, ledit bord de butée attaque d'abord ladite colonnette (66), pour provoquer un pivotement dudit levier de verrouillage (63) autour de ladite extrémité arrière (65) dudit levier de verrouillage (63) afin de le dégager du pêne à demi-tour, et il attaque ensuite ledit élément de contact (53) sur ladite queue de pêne à demi-tour (49) de manière à entraîner ledit élément de contact (63), et donc ladite queue de pêne à demi-tour (49) et ledit pêne à demi-tour (39), vers ladite paroi arrière afin de rétracter ledit pêne à demi-tour à l'intérieur dudit boîtier.

2. Mécanisme suivant la revendication 1, qui comprend un pêne auxiliaire (41) ayant une extrémité avant et une extrémité arrière et monté dans ledit boîtier de sorte que ladite extrémité avant peut être rétractée à l'intérieur du dit boîtier et sortie de celui-ci à travers un deuxième passage (11), ledit pêne auxiliaire s'étendant vers ladite paroi arrière (19) et se terminant à une extrémité arrière de pêne auxiliaire espacée de ladite paroi arrière :
 ledit boîtier (1) comprenant en outre une paroi supérieure (15) et une paroi inférieure (17) ;
 ledit pêne auxiliaire ayant un bord supérieur (76) en regard de ladite paroi supérieure (15), et un évidement (77) ménagé dans ledit bord supérieur ;
 un doigt (71) s'étendant à ladite extrémité avant dudit levier de verrouillage (63), vers la paroi inférieure du boîtier, et disposé par rapport audit évidement dudit bord supérieur dudit pêne auxiliaire (41) de sorte que, dans une position prédéterminée dudit pêne auxiliaire, ledit doigt pénètre dans ledit évidement ; et
 une griffe (73) prévue à l'extrémité avant dudit levier de verrouillage (63) et espacée dudit doigt (71).
3. Mécanisme suivant une quelconque des revendications précédentes, et comprenant un ressort de le-

vier de verrouillage (60) pour rappeler ledit levier de verrouillage (63) vers la paroi inférieure dudit boîtier.

4. Mécanisme suivant la revendication 2 ou la revendication 3 et comprenant un ressort de pêne auxiliaire (70) pour rappeler ledit pêne auxiliaire (41) vers l'extérieur dudit boîtier.

5. Mécanisme suivant une quelconque des revendications précédentes, comprenant un ressort de pêne à demi-tour pour rappeler ledit pêne à demi-tour vers l'extérieur dudit boîtier.

6. Mécanisme suivant une quelconque des revendications précédentes, dans lequel ledit bras de moyeu (57) est un bras de moyeu subdivisé comportant un bras de moyeu intérieur (57) et un bras de moyeu extérieur (57'),

ledit bras de moyeu intérieur étant monté pour rotation avec ladite poignée (29) placée du côté intérieur deladite porte, et ledit bras de moyeu extérieur étant monté pour rotation avec ladite poignée (29') placée du côté extérieur de ladite porte.

7. Mécanisme suivant une quelconque des revendications 2 à 6, comprenant en outre :

un troisième passage (31) ménagé dans ladite plaque avant ;

un pêne dormant (43) ayant une extrémité avant (79) et une extrémité arrière (81) est monté dans ledit boîtier de sorte que ladite extrémité avant peut être rétractée à l'intérieur dudit boîtier et sortie de celui-ci à travers ledit troisième passage (31) ;

une queue de pêne dormant (83) s'étendant à partir de l'extrémité arrière dudit pêne dormant (43), vers la dite paroi arrière, et se terminant à une extrémité arrière de queue de pêne dormant espacée de ladite paroi arrière ;

ledit pêne dormant ayant un bord supérieur (85) et un bord inférieur (87) ;

ledit bord inférieur définissant une surface de came qui comporte trois parties arquées (89,91,93) ;

un bras de moyeu de pêne dormant (95) ayant une première extrémité (97) et une deuxième extrémité (99) et monté dans ledit boîtier pour rotation avec ledit bouton tournant, à ladite première extrémité, ladite deuxième extrémité dudit bras de moyeu de pêne dormant comportant un élément de contact circulaire (101) pour contact avec la dite surface de came ;

de sorte que, lorsque ledit bras de moyeu de pêne dormant tourne dans une première direction, ledit pêne dormant est rétracté à l'intérieur dudit boîtier et, lorsque ledit bras de moyeu de

pêne dormant tourne dans l'autre direction, ledit pêne dormant s'étend à l'extérieur dudit boîtier.

8. Serrure à larder suivant la revendication 7, et comprenant un levier de secours (107) disposé à l'intérieur du boîtier et s'étendant sur la longueur du boîtier ;

ledit levier de secours ayant une première extrémité (109) disposée près de la paroi inférieure dudit boîtier, et étant monté à la première extrémité pour pivotement autour de celle-ci ;

ledit levier de secours ayant une deuxième extrémité (113) qui présente une partie de butée, ladite partie de butée étant située de manière à buter contre le dit élément de contact circulaire (101) ;

ledit levier de secours présentant en outre une partie de butée d'extrémité arrière de pêne dormant (115) et une partie de butée d'extrémité arrière de pêne à demi-tour (117) ;

de sorte que, lorsque ledit mécanisme est dans un état verrouillé, ladite deuxième extrémité dudit levier de secours bute contre ledit élément de contact circulaire, ladite partie de butée d'extrémité arrière de pêne dormant (115) bute contre ladite extrémité arrière de pêne dormant (81) et ladite partie de butée d'extrémité arrière de pêne à demi-tour (117) bute contre ledit pêne à demi-tour (39) ;

de sorte que ledit pêne à demi-tour et ledit pêne dormant ne peuvent pas être rétractés à l'intérieur dudit boîtier.

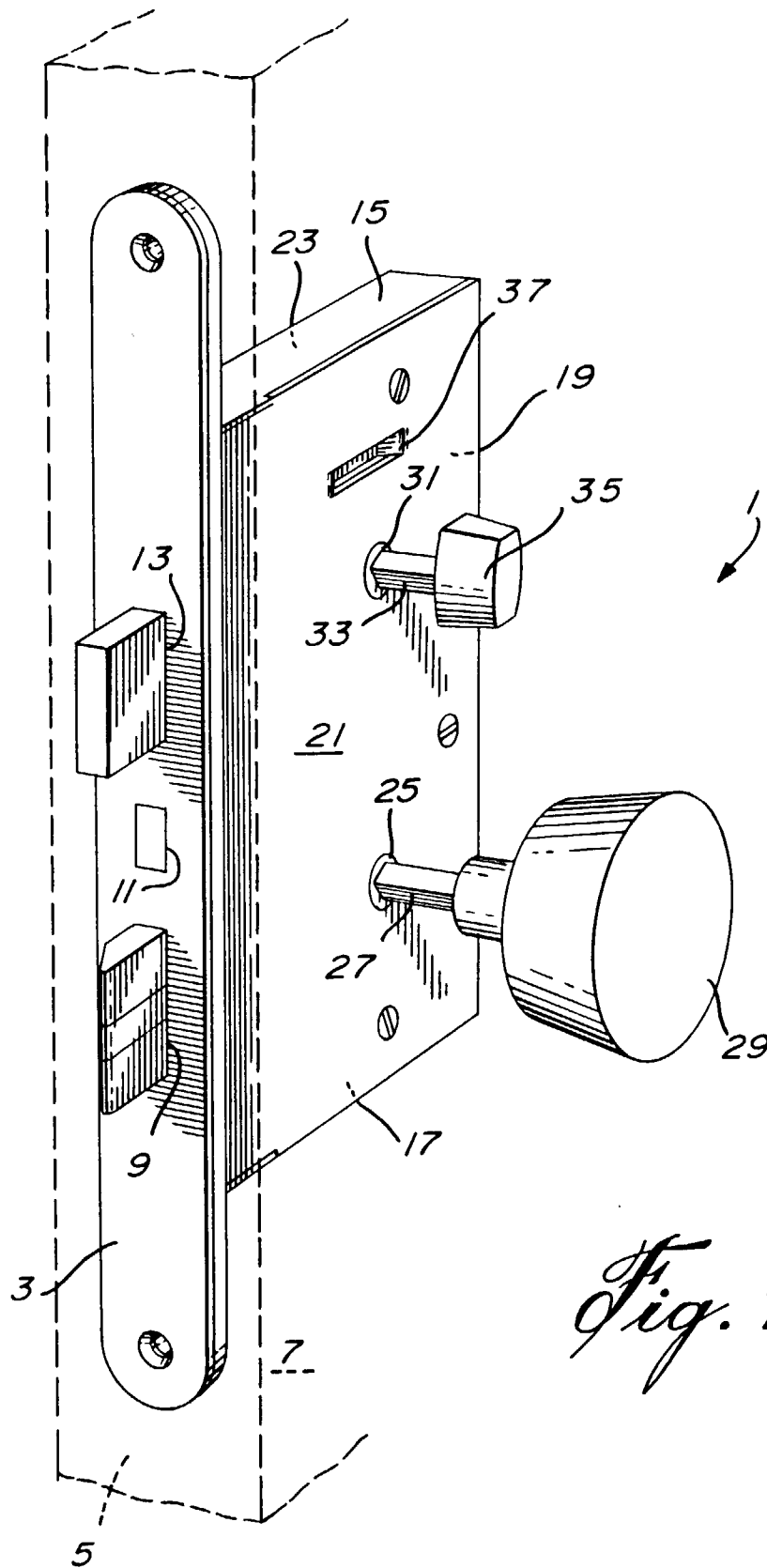


Fig. 1

