March 29, 1966 M. M. CHECK 3,242,706

LOCK WITH DEADLOCKING LATCHBOLT

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Fig. 1.

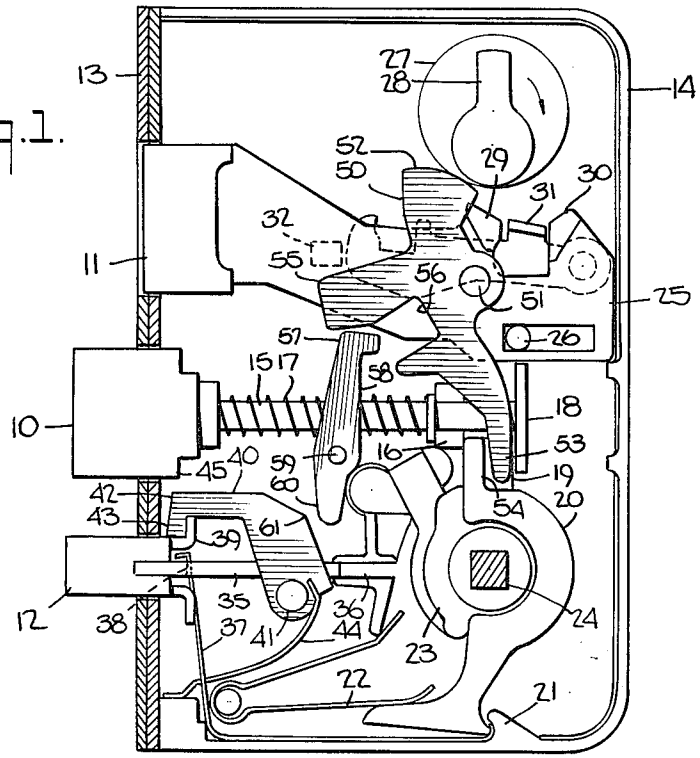
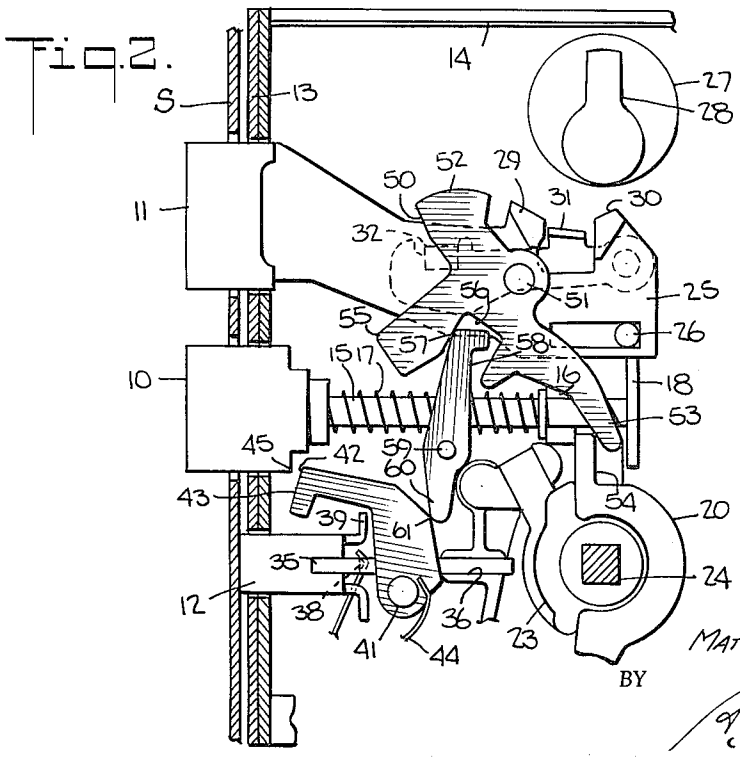


Fig. 2.



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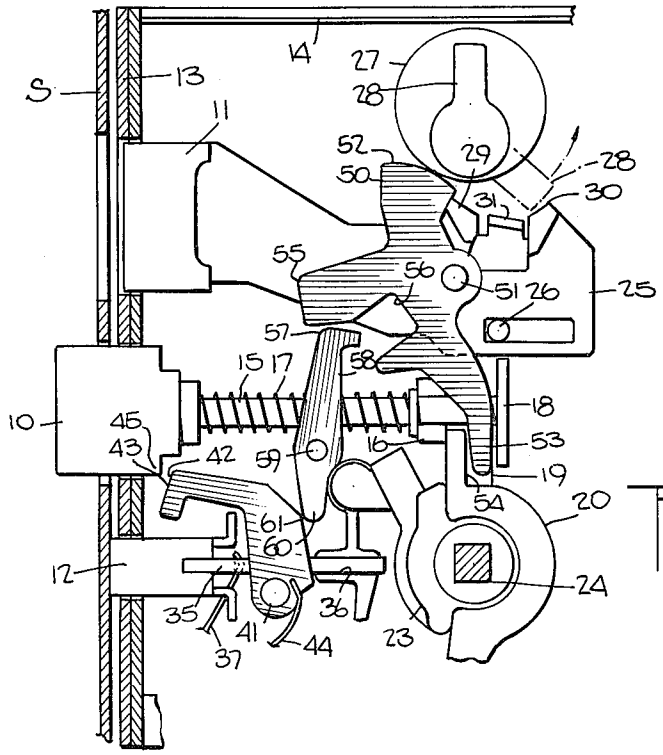


Fig. 3.

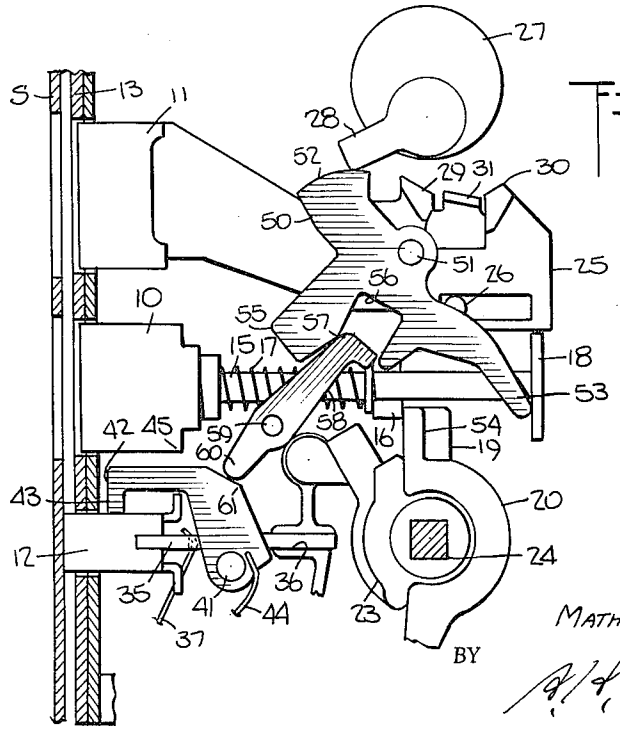


Fig. 4.

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3,242,706

LOCK WITH DEADLOCKING LATCHBOLT

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5 Claims. (Cl. 70—110)

This invention relates to a novel mortise lock having a deadlocking latchbolt.

Those skilled in the art will appreciate that locks often have both a deadbolt and a latchbolt, with means that will allow full manual control of each bolt from both sides of the door. A latchbolt that will automatically be deadlocked is much to be desired, but in many cases there is very considerable difficulty in designing a lock with this type of latchbolt, as when the lock is a hotel lock, due to the fact that the deadlocking latchbolt must have automatic controls that will operate in proper relation to certain manual controls for both the latchbolt and deadbolt. The prior art contains many examples of deadlocking latchbolts, but insofar as I am aware, no one has been able to find a fully satisfactory manner of constructing a mortise lock having the necessary controls for a deadlocking latchbolt and a deadbolt. Through my invention, I have conceived an extremely novel lock that has a deadlocking latchbolt together with a deadbolt, while contributing very well the functions that may be required of a particular type of lock.

My novel lock may have a deadbolt that is actuated in a usual way by a manually operated cam, such as a key plug cam or a thumbpiece cam, and a latchbolt that is retracted by a knob actuated retractor. Thus, the construction of my lock may be conventional to a certain extent. I particularly utilize in my invention a latch lever that always will move when the knob actuated retractor moves to retract the latchbolt. That lever also will be moved by the deadbolt actuating cam to retract the latchbolt. There is a trigger controlled dog for deadlocking the latchbolt, and I utilize the movements of the latch lever to apply further control so as to place the dog in release position whether the retraction of the latchbolt is effected through the cam or through the retractor. Thus, as a feature of my invention, I release a deadlocking dog through the movement of a lever that is operated both by a knob of the lock and by the cam that retracts the deadbolt.

I have thus outlined rather broadly the more important features of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of my invention. It is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope of my invention, in order to prevent the appropriation of my invention by those skilled in the art.

In the drawings,

FIG. 1 shows my novel lock with its cover removed to illustrate the lock parts;

FIG. 2 shows the position of the parts when the door has been closed and the deadbolt and latchbolt are in projected position;

FIG. 3 is like FIG. 2 but shows the deadbolt retracted; and

FIG. 4 further illustrates retraction of the latchbolt by the deadbolt operating cam.

Referring now more particularly to FIG. 1 of the drawings, my novel lock includes a bevelled latchbolt **10**, a deadbolt **11**, and a bevelled trigger bolt **12**, each mounted to slide between retracted and projected positions relatively to an opening in the front plate **13** on a lock case **14**. As shown, I prefer to arrange deadbolt **11** and trigger bolt **12** above and below latchbolt **10**. I believe it will suffice to describe briefly the details of the latchbolt **10** and deadbolt **11** because these bolts and their manual controls may utilize a construction that is quite usual in mortise locks. Thus, latchbolt **10** has a tail portion **15** that is mounted to slide on a guide **16** on lock case **14**, and there is a coil spring **17** pressing latchbolt **10** toward projected position. The tail portion **15** has a flange **18** in opposed relation to a surface **19** on a latchbolt retractor **20** that fulcrums on a portion **21** of lock case **14**. A bent spring **22** presses the latchbolt retractor **20** in a direction to coact with a rollback **23** that will be rotated by an inside knob spindle **24**. Thereby the retractor **20** may be actuated by an inside knob, not shown, so as to retract the latchbolt **10**. When the lock is a hotel lock, the retractor **20** can not be actuated by an outside knob, as will be appreciated.

The deadbolt **11** is a tail portion **25** that is mounted to slide on a guide pin **26**. A key actuated lock cylinder **27** is mounted on the lock case **14** and has a rotating cam **28** that is adapted to act between opposed drive portions **29** and **30** on the tail portion **25** of deadbolt **11**, whereby to move the deadbolt between retracted and projected positions. I show incidentally a rather conventional deadlocking tumbler **31** that is pivoted to deadbolt **11** and that normally will coact with a lug **32** on the lock case **14** so as to dog deadbolt **11** in projected and retracted positions. As will be understood, the rotating cam **28** will depress tumbler **31** so that the cam may move deadbolt **11**. There may be a further cam (not shown) which will be rotated by an inside thumbpiece to project and retract deadbolt **11**, but that cam will operate like the cam **28** and I shall merely refer to cam **28** in order to facilitate my description.

I shall now describe in detail the deadlocking controls for the latchbolt **10** in my novel lock. Still referring to FIG. 1, the trigger bolt **12** has a tail portion **35** that slides in a guide **36** on lock case **14**. A spring **37** acts against a surface **38**, shown by a dotted line in FIG. 1, whereby to press the trigger bolt **12** toward projected position. The trigger bolt **12** further has a flange **39** that is formed in a position extending upwardly inside the lock case **14**.

Further, there is a deadlocking dog **40** and I prefer to make somewhat in the shape of an inverted L, and that I mount at its lower and rearward end to rotate about a pivot **41** on lock case **14**. The opposed forward end of dog **40** is formed with a dogging surface **42**, and a lug **43** that extends downwardly in front of the trigger bolt flange **39**. A curved spring **44** is engaged between lock case **14** and deadlocking dog **40** and presses the dog upwardly and rearwardly about its pivot toward the position shown in FIG. 2. That is the deadlocking position of dog **40**, the dogging surface **42** then lying behind a portion **45** on latchbolt **10** so that the latchbolt can not be depressed to retracted position.

When trigger bolt **12** is projected by its spring **37**, as in FIG. 1, the flange **39** on that bolt will engage behind lug **43** and will rotate the deadlocking dog **40** against its spring pressure to the release position shown in FIG. 1. So long as trigger bolt **12** remains in trigger projected position, the spring pressure of that bolt will be effective to hold dog **40** in release position. That naturally allows the latchbolt **10** to be pressed through contact with the strike as the door moves toward closed position. When the door is fully closed, latchbolt **10** will project into an opening in strike S as shown in FIG. 2, and strike S will hold trigger bolt

12 depressed so that the dog 40 normally will deadlock the latchbolt 10.

To describe further control that I apply to the deadlocking dog 40, I shall first indicate that I utilize a latch lever 50 well shown in FIG. 1. The latch lever 50 is mounted through a pivot 51 on the tail portion 25 of deadbolt 11, so as to move bodily with deadbolt 11 as indicated in FIG. 2, and also to rotate relatively to the deadbolt as shown in FIG. 4. I form the latch lever 50 with an upper end portion having a drive surface 52, and a lower end portion 53 arranged in front of the latchbolt tail flange 18. The drive surface 52 is so arranged that it will be in position for engagement by the cam 28 when deadbolt 11 is in retracted position.

Thus, if we assume that cam 28 is rotated from the FIG. 1 or FIG. 3 position counterclockwise while deadbolt 11 is retracted, cam 28 will move against the drive surface 52 as shown in FIG. 4, depressing that surface so as to rotate latch lever 50 and causing the lower end 53 of latch lever 50 to retract latchbolt 10. Further, I form the knob actuated retractor 20 with a surface 54 that is arranged in front of the lower end 53 of latch lever 50. Thereby the retractor 20 when moving to retract latchbolt 10 also will rotate the latch lever 50. It will be understood, therefore, that latch lever 50 will rotate whether the latchbolt is retracted by knob operation or by operation of the cam that moves the deadbolt.

I form a medial portion of the latch lever 50 with a side arm 55, and also with a slot 56 just below the side arm 55, as well shown in FIG. 1. For reasons that will appear, I form the slot 56 so as to have a considerable depth. I further utilize a control member 58 having an upper end portion 57 that is juxtaposed to the lower surface of the side arm 55 on latch lever 50, and that may be accepted in the slot 56. Control member 58 is mounted to rotate about a pivot 59 on lock case 14, and has a lower end portion 60 that is adapted to coact with a surface 61 on the latchbolt deadlocking dog 40.

The operation of the control member 58 will be best understood if we now consider FIGS. 3 and 4 of the drawings. If we assume that the latch lever 50 starts to rotate from the FIG. 3 position, incidental to retraction of the latchbolt 10, the side arm 55 will act against the upper end 57 of control member 58 to rotate that member on its pivot. Thereby the control member 58 will move the deadlocking dog 40 to release position, as shown in FIG. 4, whereby to allow full retraction of the latchbolt 10. Since the latch lever 50 will rotate whether latchbolt 10 is retracted by knob or key operation, as I have already described, it will be seen that either type of operation will cause control member 58 to place deadlocking dog 40 in release position. Of course, should the trigger bolt 12 already hold deadlocking dog 40 in release position, as in FIG. 1, the control member 58 need not move the dog 40 when latchbolt 10 is retracted, and will merely rotate idly.

Referring again to FIG. 4, it will be seen that the operation of latch lever 50 and control member 58 has caused the slot 56 to engage the upper end portion 57 on member 58. When the latchbolt 10 again is projected by its spring 17, the spring pressure will act through the tail flange 18 of latchbolt 10 to rotate latch lever 50 from the FIG. 4 position, causing slot 56 to move control member 58 toward normal position as shown in FIG. 3. That naturally enables the dog 40 to return by its spring pressure to deadlocking position, so that trigger bolt 12 again will control automatic deadlocking of the latchbolt 10.

As I have previously mentioned in connection with FIG. 1, the depth of the slot 56 allows considerable clearance between the upper end 57 of control member 58 and the main portion of latch lever 50. That in effect allows lost motion between latch lever 50 and control member 58 when the lever 50 moves bodily with the deadbolt 11, as between the FIG. 2 and the FIG. 3 positions. Thus, while latch lever 50 may effectively control the deadlocking dog through control member 58, the movements of deadbolt 11 will not affect the position of the deadlocking dog 40, and the latchbolt 10 may remain deadlocked while deadbolt 11 is projected and retracted.

To review briefly the operation of my novel lock, let us consider that the lock first is in the normal door-open position shown in FIG. 1, and that the door is moved to closed position. Latchbolt 10 then enters an opening in strike S, as shown in FIG. 2, and the surface of strike S holds triggerbolt 12 depressed so that deadlocking dog 40 deadlocks the latchbolt 10. Should it be desired to project the deadbolt 11, the cam 28 (or a thumbpiece cam) will be rotated clockwise so as to move the deadbolt from the FIG. 1 to the FIG. 2 position. That movement of deadbolt 11 has caused latch lever 50 to move bodily, and incidentally to rotate somewhat, but control member 58 has not moved because the slot 56 has allowed the latch lever 50 to move with lost motion relatively to the control member 58. Naturally, the dog 40 remains in position deadlocking the latchbolt 10.

If we now assume that the door is to be opened, the cam 28 first will be rotated in a counterclockwise direction to move deadbolt 11 to the retracted position shown in FIG. 3. Again, the lost motion between latch lever 50 and control member 58 has allowed the lever 50 to move bodily without affecting the position of member 58 or deadlocking dog 40, and latchbolt 10 remains deadlocked. The drive surface 52 on latch lever 50 now is in position to be engaged by a further counterclockwise rotation of cam 28, as indicated in FIG. 4, which will depress the surface 52 so as to rotate latch lever 50. That rotation of lever 50 will move the control member 58 so as to place the deadlocking dog 40 in release position, and further will cause the end portion 53 on the lever 50 to retract the latchbolt 10, all as shown in FIG. 4.

Let us now consider that the deadbolt 11 has been retracted, as in FIG. 3, but that knob operation is to be utilized to retract latchbolt 10. Thus, rotation of the knob spindle 24 will move latchbolt retractor 20, which now will act through surface 54 to rotate latch lever 50. That lever again will act through control member 58 to place the deadlocking dog 40 in release position ,so that retractor 20 may effect full retraction of latchbolt 10.

When the retracting flange 18 on latch bolt 10 is relieved of retracting pressure, whether the retraction has been through the knob actuate dretractor 20 or through the latch lever 50, the spring pressure of latchbolt 10 will project the latchbolt, as in FIG. 1 or FIG. 3, while also acting through flange 18 to rotate latch lever 50. The slot 56 on lever 50 thereby will move the control member 58 toward normal position, allowing the trigger bolt 12 again to control the deadlocking dog 40 for automatically deadlocking the latchbolt 10.

I believe it will now be understood that the deadlocking dog 40 of my novel lock will be so controlled as to allow retraction of latchbolt 10 by either key or knob operation, while contributing the necessary deadlocking control through the triggerbolt 12. Moreover, the deadlocking control will not be affected when the key operation is utilized to project and retract the deadbolt 11. The novel concept of my invention actually enables me to construct a lock that will contribute exceedingly effective deadlocking of a latchbolt, while also achieving the deadbolt operation that may be required in a particular type of lock. I believe, therefore, that the very considerable value of my novel lock will be undesrtoood, and that the merits of my invention will be fully appreciated by those skilled in the art.

I now claim:

1. In a mortise lock of the class described, a spring projected latchbolt, a latchbolt deadlocking dog, a knob actuated retractor for retracting the latchbolt, a deadbolt, a cam for projecting and retracting the deadbolt, a latch lever pivoted on the deadbolt, said latch lever being rotatable on its pivot to retract the latchbolt when

the deadbolt is in retracted position, means whereby the knob actuated retractor rotates the latch lever on the deadbolt, means whereby said latch lever moves the deadlocking dog out of latchbolt deadlocking position as said lever rotates incidental to retraction of the latchbolt, and means through which said deadbolt operating cam coacts with the latch lever for rotating said latch lever on the deadbolt when the deadbolt is in retracted position, so that said cam will be effective for moving said dog from deadlocking position and retracting the latchbolt.

2. In a mortise lock of the class described, a spring projected latchbolt, a latchbolt deadlocking dog, a trigger bolt automatically controlling said dog for deadlocking the latchbolt when the door closes, a knob actuated retractor for retracting the latchbolt, a deadbolt, a cam for projecting and retracting the deadbolt, said deadbolt being equipped with means actuated by said cam for locking said deadbolt in a projected position, a latch lever pivoted on the deadbolt and rotatable on its pivot to retract the latchbolt when the deadbolt is in retracted position, means through which said latch lever when so rotating acts for moving said dog out of latchbolt deadlocking position, and means through which both the knob actuated retractor and said deadbolt projecting and retracting cam rotate said lever for moving said dog from deadlocking position independently of the trigger bolt while retracting the latchbolt.

3. In a mortise lock of the class described, a spring projected latchbolt, a latchbolt deadlocking dog, a knob actuated retractor for retracting the latchbolt, a deadbolt, a cam for projecting and retracting the deadbolt, a latch lever pivoted to the deadbolt and moving bodily with said deadbolt, said latch lever being rotatable on the deadbolt to retract the latchbolt, means whereby the knob actuated retractor rotates the latch lever, means through which said latch lever acts for moving the deadlocking dog out of latchbolt deadlocking position as said lever rotates incidental to retraction of the latchbolt, a lost-motion connection between said dog and latch lever whereby the bodily movement of said lever with the deadbolt does not move the deadlocking dog, and means whereby said deadbolt operating cam is effective for rotating the latch lever when the deadbolt is in retracted position, so that said cam may move the dog from deadlocking position and retract the latchbolt.

4. In a mortise lock of the class described, a spring projected latchbolt, a latchbolt deadlocking dog, a trigger bolt automatically controlling said dog for deadlocking the latchbolt when the door closes, a knob actuated retractor for retracting the latchbolt, a deadbolt, a cam for projecting and retracting the deadbolt, a latch lever pivoted to the deadbolt and moving bodily with said deadbolt, said lever being rotatable on the deadbolt to retract the latchbolt, means whereby the knob actuated retractor rotates the latch lever, a control member through which said latch lever acts for moving the deadlocking dog out of latchbolt deadlocking position independently of the trigger bolt as said lever rotates incidental to retraction of the latchbolt, means whereby said deadbolt operating cam is effective for rotating the latch lever when the deadbolt is in retracted position, so that said cam may move the dog from deadlocking position and retract the latchbolt, and a lost-motion connection between said latch lever and control member so that said cam when projecting and retracting the deadbolt does not move the deadlocking dog.

5. In a mortise lock of the class described, a spring projected latchbolt, a dog for deadlocking said latchbolt, a trigger bolt for controlling said dog, a deadbolt, a cam for moving said deadbolt between retracted and projected positions, said deadbolt being equipped with means actuated by said cam for locking said deadbolt in a projected position, a latch lever pivoted on the deadbolt and rotatable on its pivot by said cam for retracting the latchbolt, a knob actuated retractor, means whereby the knob actuated retractor retracts the latchbolt while also rotating said latch lever, and means through which the latch lever acts for moving the deadlocking dog to a release position when the latch lever is rotated by the knob actuated retractor or the cam while the deadbolt is in retracted position.

References Cited by the Examiner

UNITED STATES PATENTS

1,126,560	1/1915	Page	70—151
1,188,805	5/1916	Mason	70—151
1,508,668	9/1924	Pringler	70—151
1,961,483	6/1934	Goldberg	70—110
2,303,624	12/1942	Edwards et al.	70—110
2,638,770	5/1953	Gutman	70—107
3,129,579	4/1964	Bellantuono	70—110

FOREIGN PATENTS

63,812	8/1941	Norway.

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