Feb. 25, 1941. K. A. BRAUNING ET AL 2,232,937

NIGHT LATCH

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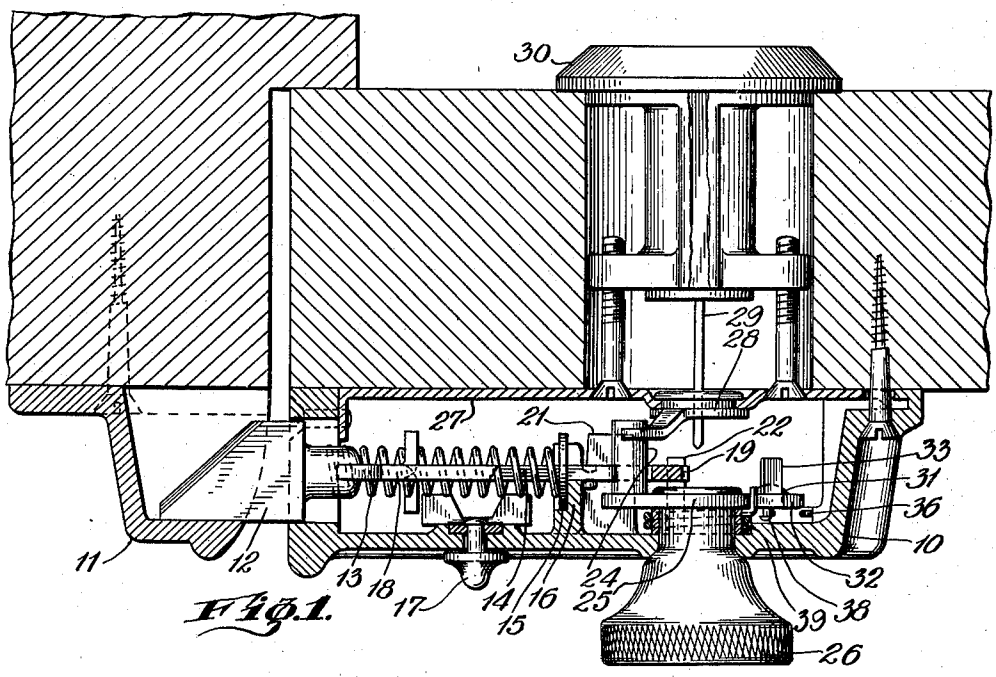


Fig. 1.

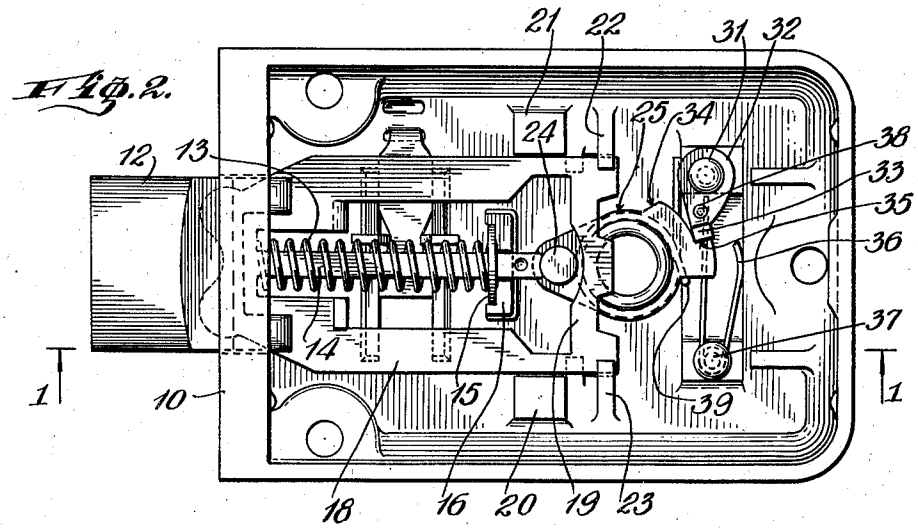


Fig. 2.

INVENTORS
KARL A. BRAUNING.
FRANK E. RAYMOND
BY
ATTORNEY

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Fig. 3.

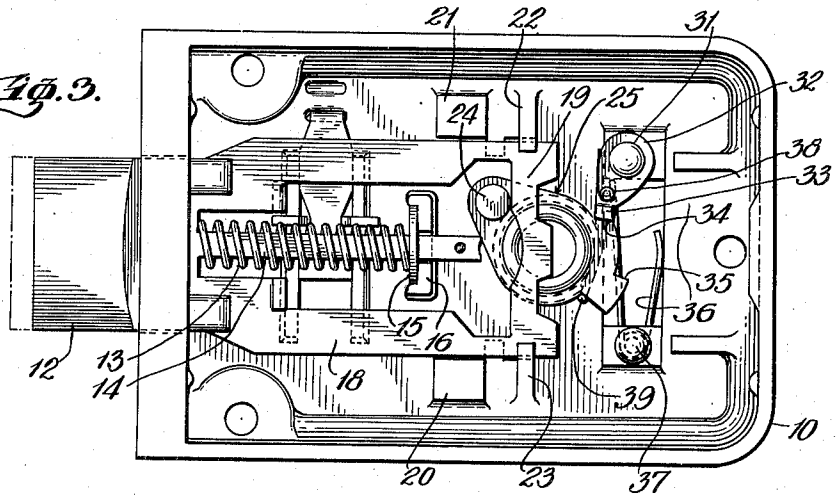


Fig. 4.

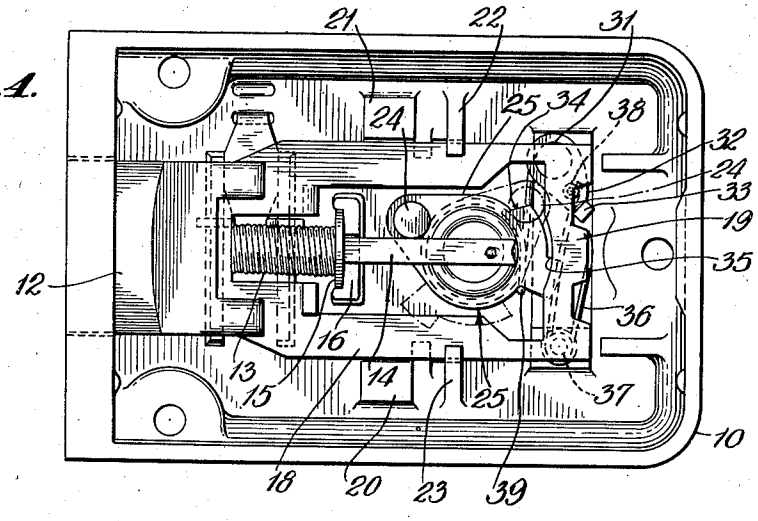
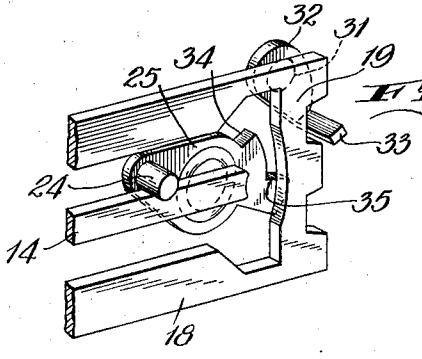


Fig. 5.



INVENTORS
KARL A. BRAUNING
FRANK E. RAYMOND
BY
ATTORNEY

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NIGHT LATCH

Karl A. Brauning and Frank E. Raymond, Stamford, Conn., assignors to The Yale & Towne Manufacturing Company, Stamford, Conn., a corporation of Connecticut

Application May 21, 1938, Serial No. 209,209

11 Claims. (Cl. 292—169)

This invention relates to an automatic deadlocking rim night latch of the type described in the patent to Wicks, No. 1,199,645, issued September 26, 1916.

In the better types of night latches, when the latch bolt is thrown, it is deadlocked automatically against retraction by pressure of an instrument against its latching end. It is necessary, of course, in order to allow closing action of the door, that the latch bolt function as a latch and move back freely as it impinges against the lock strike, the latch bolt spring thereafter impelling it into the strike. It is only when in the strike that it is deadlocked automatically.

In the first developments of the art, there was no automatically deadlocking latch bolt, and it was the practice to use a dead bolt where a deadlocking action was required, and to use a latch where a latching action was required. Later on, means were added to night latches whereby the operator could dog the latch manually either from the inside or the outside of the door. The usual operation was by a knob or dog from the inside, and by key from the outside.

Thereafter, there was developed in the art an automatic type of deadlocking latch bolt in which an auxiliary bolt was used in connection with the main latch bolt. The strike cooperating with the two bolts was so arranged that while it would permit the main bolt to enter therein, the auxiliary bolt would be held back. Means were provided whereby when the auxiliary bolt was held back as indicated, a lever or other means would deadlock the main latch bolt. This action is efficient, but requires the additional bolt and a number of additional parts controlled thereby.

The Wicks patent discloses an improvement on this last type of automatic deadlocking bolt in that Wicks dispenses with the auxiliary bolt mechanism referred to above. Wicks has a deadlocking lever which is maintained normally out of deadlocking position. When the latch bolt is retracted by the slamming of the door and independently of its usual retracting mechanism, it releases the deadlocking lever for movement into deadlocking position, so that thereafter when the bolt is thrown, it is automatically deadlocked. The action is such, moreover, that the bolt when thrown into deadlocking position, moves a distance beyond its usual latching position, it being the further function of the deadlocking lever to normally prevent this movement of the latch bolt when the latch bolt is being operated by the usual bolt retracting mechanism.

Our invention contributes to the art a decided improvement over the Wicks construction in that we deadlock our mechanism without the utilization of an auxiliary deadlocking lever and control means therefor. We utilize nothing more than the usual bolt retracting mechanism, which in our preferred modification takes the form of a retracting cam. This retracting cam is arranged to retract the latch bolt from a latching position to an unlocking position. When the latch bolt is retracted, other than by the cam, as when it impinges against the strike of the lock, it effects the movement of the cam toward deadlocking relation to the latch bolt, so that when the latch bolt is thrown thereafter, it is deadlocked by the cam against retractive movement through endwise pressure.

More in detail, we may indicate that in our improved lock, the retracting cam normally prevents the movement of the latch bolt beyond a certain position, which we shall call a latching position. When the cam moves into deadlocking position, it permits an extra movement of the latch bolt into a deadlocking position, so that we obtain a desirable feature in the art, namely, a double throw bolt.

More particularly, in our invention, we utilize a detent mechanism which allows rotation of the bolt retracting cam between predetermined limits, the detent preventing movement of the cam into deadlocking position, which in our lock is in dead center relation to the latch bolt. Therefore, through the coaction between the cam and bolt, we limit the throw of the bolt. It is this detent which is moved to release position when the latch bolt moves backwardly through contact with the strike. Such movement permits the cam to be thrown at once into deadlocking relation to the latch bolt through the normal throw of the latch bolt thereafter as it enters the strike.

We shall now describe the drawings in which a preferred modification of our invention is shown. Fig. 1 is a cross section through our latch illustrating the relation of the same to a usual type of cylinder lock, this section being taken along lines 1—1 of Fig. 2. Fig. 2 is a back view of our night latch with the back casing removed. Figs. 3 and 4 are views similar to Fig. 2 with the parts shown in other positions. Fig. 5 is a perspective view illustrating the use of three important parts of our invention.

Referring now more particularly to the drawings, our lock embodies the usual form of lock casing 10 and a strike 11. A latch bolt 12 is adapted to be projected by a spring 13 mounted about the latch bolt tail post 14 and pressing

against the head of the latch bolt at one end, and against a plate 15 which in turn impinges against a stud 16 integral with the casing 10, at its other end. A thumb piece 17 is used to hold the latch bolt retracted, this being a construction usual in the art which need not be discussed here at length.

The latch bolt 12 has also a tail plate portion 18 terminating in an end bar 19 whereby it is guided through casing studs 20, 21, 22 and 23 for movement on the casing. The end bar 19 is adapted for operation by a pin 24 forming part of a retracting cam 25 which is secured in any desired manner to a hand operated knob 26. The back plate 27 of the lock supports a cam 28 which in turn is operated by the bar 29 of a cylinder lock 30. Rotation of the cylinder lock and the bar 29 will cause the cam 28 to strike the pin 24 of the cam 25, and therethrough retract the latch bolt from the outside of the lock. So far as we have described our invention, all of the parts thereof are old and well known in the art, and need no further description or emphasis.

We shall now describe those parts of our invention which are new in the combination, and which together with the parts already described, contribute unexpected and extremely desirable results. There is pivoted to the casing at 31 a detent 32 having an upstanding lug 33 for cooperation with a shouldered portion 34 of the retracting cam 25 and a further shoulder 35 thereof. A spring 36 mounted at 37 presses against the detent through its pin 38 and maintains it against either of the shoulders 34 and 35, or in the positions of Figs. 3 and 2, respectively.

In the position of the latch bolt in Figs. 1 and 2, the latch bolt is maintained deadlocked through positioning of the pin 24 of retracting cam 25 against the end of the tail post 14. Also, the latch bolt 12 is in its double throw position, as may be seen by comparing the projection of the latch bolt from the casing 10 in Fig. 2 with its projection in solid lines in Fig. 3. The position of the latch bolt in solid lines in Fig. 3 is called its latching position, while its position in dotted lines is its double throw or deadlocked position.

In the relation of the parts in Fig. 2, the retracting cam 25 is in dead center relation to the latch bolt, that is, its center of rotation is in line with the latch bolt tail post 14 and the pin 24. In this position of the cam 25, its shoulder 35 is up against the lug 33 of the detent 32, this cooperation of the parts preventing further counter clockwise rotation of the cam 25 under the influence of a spring 39 coiled about the knob 26, as is best illustrated in Figs. 1 and 2.

With the latch bolt in the position of Figs. 1 and 2, it is deadlocked against endwise pressure, but retraction thereof may be accomplished quite simply through rotation of the cylinder lock 30 or the knob 26. This rotation of the cylinder lock 30 or knob 26 will merely rotate the retracting pin 24 from its position of Fig. 2 to its dotted line position of Fig. 4 retracting the latch bolt. While so rotating to the position of Fig. 4, it is quite obvious that the detent lug 33 will drop in behind shoulder 34 so that when the knob 26 or cylinder 30 is released to allow projection of the latch bolt, the latch bolt and cam will move only as far as to the position of Fig. 3.

Further rotation of the cam 25 will then be prevented by the lug 33 of the detent 32 cooperating with the shoulder 34. The retracting pin 24 will at the same time maintain the latch bolt 12 in its full line position of Fig. 3, and will prevent further projection of the latch bolt into its dotted line position of Fig. 3.

If, in this position of the parts, it is desired to close the door to relock it as in Figs. 1 and 2, the action of the parts will be as follows: The latch bolt 12 on contacting the strike will be moved back to its position of Fig. 4. This action will cause the end bar 19 of the latch plate 18 to strike the detent lug 33, and to move the same out of cooperation with the shoulder 34 of the retracting cam 25. This will immediately allow rotation of the retracting cam 25 from its position of Fig. 3 to its position of Fig. 4 under the influence of the spring 39, and will bring the pin 24 against the latch bolt post 14, as is clearly shown. When the latch bolt is thereafter projected by the pressure of its spring 13, the detent 32 is released by the rear bar 19 and the lug 33 will jump behind shoulder 35 of the retracting cam so that as the bolt is fully projected, the cam will be limited to rotation to the position of Fig. 2. In this position of the parts, the bolt is of course in its double throw position and is deadlocked securely by cam 25 against rearward movement.

In Fig. 5, the coaction of the bar 19 of the latch plate 18 with the lug 33 of the detent 32 is clearly shown. There is also shown the relation of the cam 25, its shoulders 34 and 35 to the detent lug 33 when the cam is released from the lug 33 as by the retraction of the latch bolt when it impinges against the strike. In Fig. 5, the coaction of the retracting pin 24 with the latch bolt tail post 14 is also shown.

The illustration of the operation of the parts of our invention should now appear quite clear. It is thought also that this illustration of the operation will help in an appreciation of the advantages pointed out generally at the beginning of the specification. While we have shown and described a preferred manner of eliminating some of the parts which were required by prior art constructions for obtaining automatic deadlocking action, it should be appreciated that those skilled in the art will readily be able to adapt the concept and principles of operation of our invention to other forms of structures. We therefore do not wish to be limited in our monopoly except as may be required by the state of the art.

We now claim:

1. In a lock of the class described, a latch bolt, a retracting cam having a pin for retracting said latch bolt and said pin being movable into a position to deadlock said latch bolt, spring pressed means for maintaining said cam and its pin out of latch bolt deadlocking position, and means whereby the said latch bolt when retracted by a lock strike moves said spring pressed means to release said cam and its pin for movement into deadlocking position.

2. In a lock of the class described, a latch bolt, a cam for retracting said latch bolt and movable into a position to deadlock said latch bolt, a fixed pivot, a detent separate from said latch bolt mounted on said pivot for maintaining said cam out of latch bolt deadlocking position, and means whereby the retraction of said latch bolt independently of said cam moves said detent on its pivot to release said cam for movement into deadlocking position.

3. In a lock of the class described, a latch bolt, a cam having a pin for retracting said latch bolt, said pin being movable into dead center relation to said latch bolt to deadlock the same, means movable relatively to said cam and said latch bolt for maintaining said cam and its pin out of said dead center relation, said means being movable by retraction of said bolt through contact with a lock strike whereby to release said cam and its pin for movement into dead center relation.

4. In a lock of the class described, a latch bolt, a retracting cam having a pin for retracting said latch bolt, means whereby said cam and its pin move into dead center position to deadlock said latch bolt, spring pressed detent means separate from said latch bolt releasably holding said cam in a predetermined position against movement with its pin into dead center position, and means whereby said pin limits the projection of said latch bolt when said cam is in said predetermined position.

5. In a lock of the class described, a latch bolt, a rotatable retracting cam for retracting said latch bolt, means whereby said cam is moved into dead center position to deadlock said latch bolt, a fixed pin in said lock, spring pressed detent means separate from said latch bolt mounted on said pin and releasably holding said cam in a predetermined position against movement into dead center position, means whereby said cam limits the projection of said latch bolt when said cam is in said predetermined position, said cam when released by said detent means being movable into dead center position.

6. In a lock of the class described, a latch bolt, a retracting cam having a pin for retracting said latch bolt, means whereby said cam is moved with its pin into dead center position to deadlock said latch bolt, spring pressed detent means separate from said latch bolt releasably holding said cam in a predetermined position against movement into dead center position, said cam pin lying against a portion of said latch bolt to limit the projection of said latch bolt when said cam is in said predetermined position, said cam when released by said detent means being movable to bring said pin to dead center position and thereby permitting added projection of said latch bolt into a position in which it is deadlocked by said pin.

7. In a lock of the class described, a latch bolt, a retracting cam having a pin for retracting said latch bolt, a spring for rotating said cam and its pin into dead center position to deadlock said latch bolt, spring pressed detent means separate from said latch bolt releasably holding said cam in a predetermined position against movement into dead center position, means whereby said cam pin limits the projection of said latch bolt when said cam is in said predetermined position, said cam when released by said detent means being movable by its spring to said dead center position, and means whereby said detent is operated by a portion of said latch bolt when retracted as by contact with a lock strike to release said cam for movement to dead center position.

8. In a lock of the class described, a latch bolt, a retracting cam, a spring for projecting the bolt into latching position, said cam having a portion cooperable with said bolt to limit its projection by said spring to said latching position, a spring tending to rotate said retracting cam into a dead center position, in which position it allows additional projection of said bolt and deadlocks said bolt, a fixed pivot, a detent separate from said latch bolt and mounted on said fixed pivot, means whereby said detent limits the movement of said retracting cam to a position corresponding to the latching position of said latch bolt, means whereby the retraction of said latch bolt as by contact with a strike moves said detent into a position releasing said cam, whereby said cam rotates under the pressure of its spring toward dead center position and against a portion of said latch bolt, said latch bolt being projected thereafter to its deadlocking position in which position said latch bolt portion releases said cam for further rotation and into its latch bolt deadlocking position.

9. In a lock of the class described, a spring pressed latch bolt, a rotatable cam having a pair of stop surfaces and rotatable to retract said latch bolt, said cam having a portion thereof adapted to limit the projection of said latch bolt to the latching position, a spring tending to rotate said cam into a dead center position, in which position it releases said latch bolt for additional projection, a spring pressed detent cooperable with one of said stop surfaces to limit the movement of said cam to a position corresponding to the said latching position of said latch bolt, and means whereby the retraction of said latch bolt as by contact with a strike moves said detent out of engagement with said stop surface, whereby said cam rotates under the pressure of its spring toward dead center position, whereby when said latch bolt is projected thereafter it moves to its deadlocking position in which position it is deadlocked by said cam, said cam being held against movement beyond dead center position through cooperation of said detent with the other of said stop surfaces.

10. In a lock of the class described, a latch bolt, a latch bolt retracting cam having two spaced movement limiting shoulders, a spring tending always to rotate said cam in a direction corresponding to projection of said latch bolt, a spring pressed detent cooperable normally with one of said shoulders to limit the rotation of said cam, and means whereby the retraction of said latch bolt as when it impinges against a strike moves said detent to release said cam for rotation by said spring in a direction adapted to bring the second shoulder against said detent.

11. In a lock of the class described, a spring projected latch bolt, a cam having a single projection extending therefrom for retracting said latch bolt and for limiting its degree of projection, a spring for moving said cam and its projection into a position to release said latch bolt for full projection, said cam projection thereafter cooperating with a portion of said latch bolt to deadlock said latch bolt, a spring pressed detent for maintaining said cam against movement to a latch bolt releasing and deadlocking position, and means whereby the retraction of said latch bolt independently of said cam releases said cam from said detent for movement toward said latch bolt releasing and deadlocking position.

KARL A. BRAUNING.
FRANK E. RAYMOND.