July 29, 1941. W. R. SCHLAGE 2,250,727

DOOR LATCH

Filed June 3, 1940 2 Sheets-Sheet 1

Fig. 1.

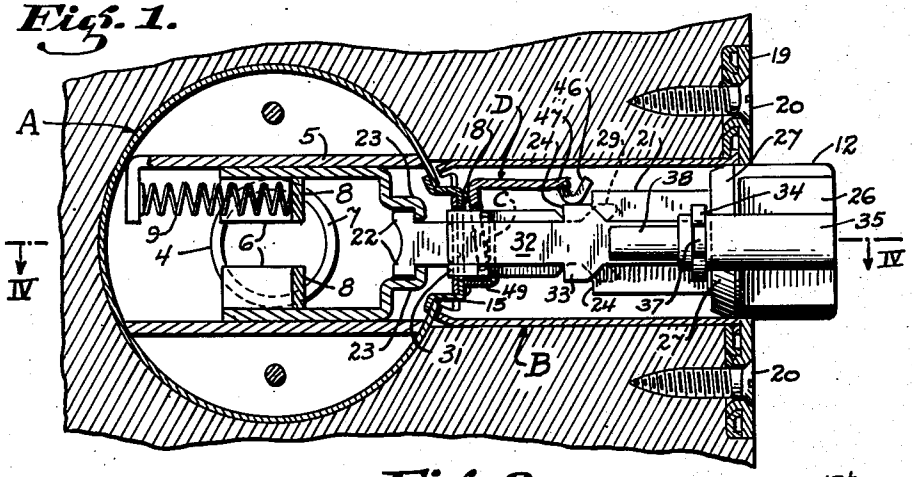

Fig. 2.

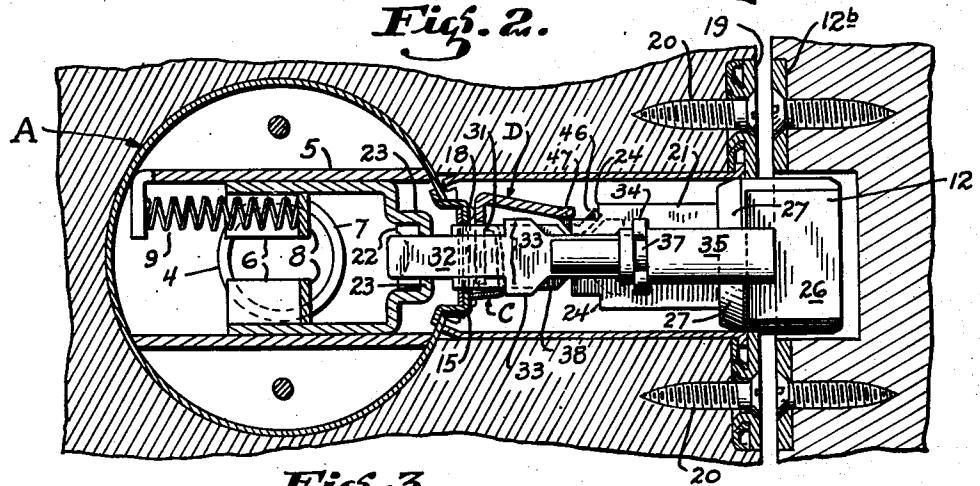

Fig. 3.

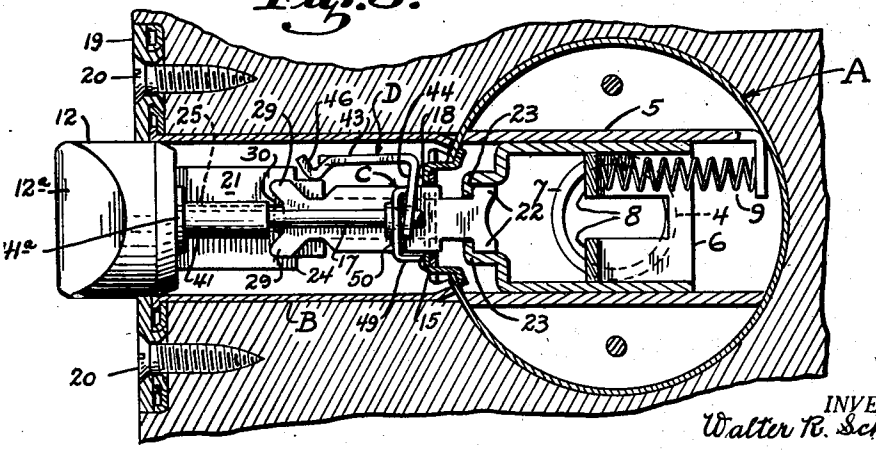

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Fig. 4.

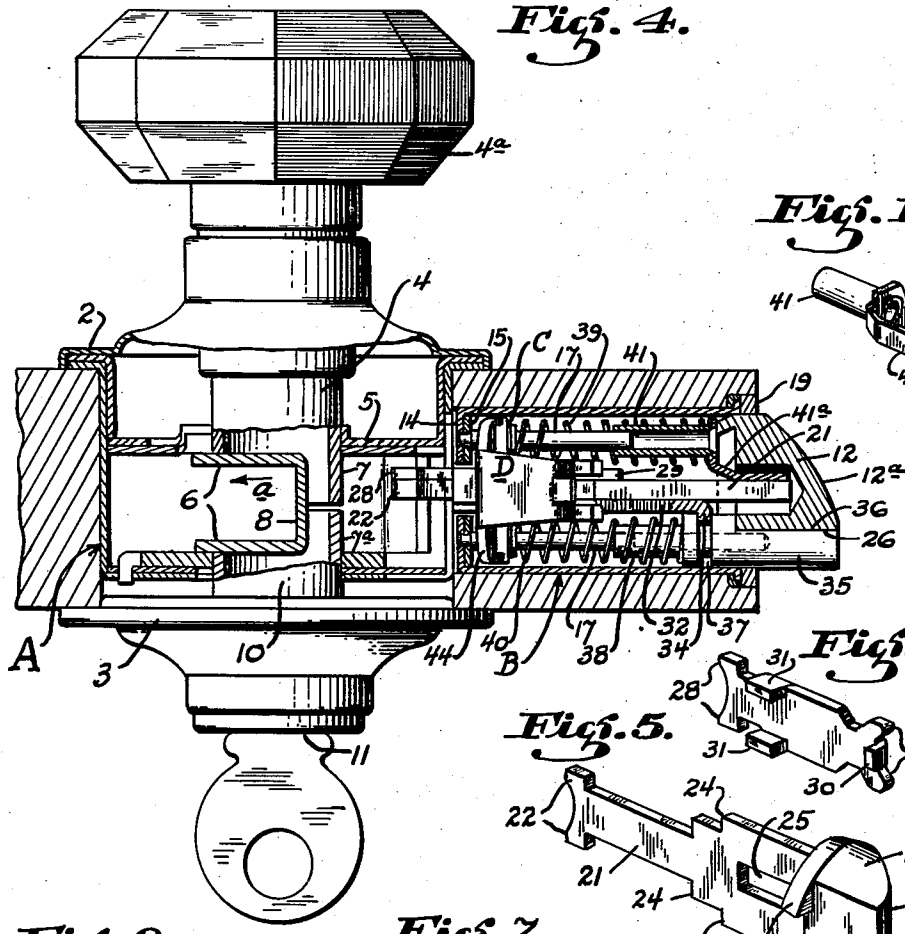


Fig. 12.

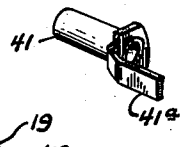


Fig. 6.

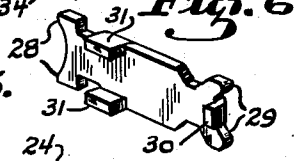


Fig. 5.

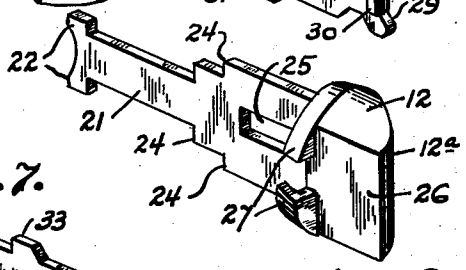


Fig. 9.

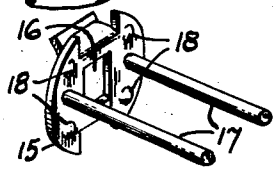


Fig. 7.

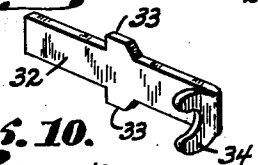


Fig. 8.

Fig. 10.

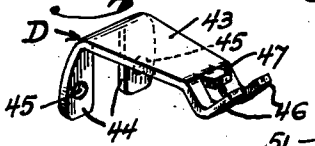
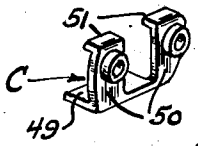


Fig. 11.



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UNITED STATES PATENT OFFICE

2,250,727

DOOR LATCH

Walter R. Schlage, Burlingame, Calif., assignor to Schlage Lock Company, San Francisco, Calif., a corporation of California

Application June 3, 1940, Serial No. 338,458

11 Claims. (Cl. 292—169)

This invention relates to a door latch of the deadlocking type, and especially to improvements in the structure shown in my Patent No. 1,876,081, entitled "Door latch," issued September 6, 1932.

The object of the present invention is generally to improve and simplify the construction and operation of the several parts forming the latch structure and cooperating deadlocking mechanism; to arrange the several cooperating parts with relation to each other so that the assembly operation will be made possible in a comparatively short period of time, with a material saving in labor; and further, to make the parts more fool-proof and dependable in operation.

The door latch is shown by way of illustration in the accompanying drawings, in which

Fig. 1 is a central vertical longitudinal section taken through the latch unit and the latch actuating unit, and showing the same mounted in a door; said view showing the deadlocking bolt in extended or projected position;

Fig. 2 is a similar section showing the deadlocking bolt in retracted or depressed position;

Fig. 3 is a section similar to Fig. 1, but the view is taken from the opposite side of the door and particularly illustrates the retractor link, the dogging member and spring saddle;

Fig. 4 is a horizontal section on line IV—IV of Fig. 1;

Fig. 5 is a perspective view of the latch bolt;

Fig. 6 is a perspective view of the retractor link;

Fig. 7 is a perspective view of the cam bar actuated by the deadlocking bolt;

Fig. 8 is a perspective view of the deadlocking bolt;

Fig. 9 is a perspective view of the reinforcing plate secured at the inner end of the latch bolt housing;

Fig. 10 is a perspective view of the dogging member;

Fig. 11 is a perspective view of the spring saddle; and

Fig. 12 is a perspective view of a removable spring guide and seat.

Referring to the drawings in detail, and particularly Figs. 1 to 4 inclusive, A indicates a housing which contains a latch actuating mechanism and B a housing which contains a latch bolt mechanism. The housing A is closed at its opposite ends by means of escutcheon plates such as indicated at 2 and 3, and these plates, together with the housing A, support a spindle 4, a retractor guide 5 and a retractor 6. The inner end of the spindle is shaped as shown at 7 (see Figs. 1 and 4) and it engages a plate indicated at 8. When rotary motion is transmitted to the spindle 4 by means of a knob, indicated at 4a, the member 7 on the inner end of the spindle will rotate and thereby depress the plate 8, and as this plate is carried by or forms a part of the retractor 6 the retractor will move inwardly in the direction of arrow a. Conversely, when the hand or knob 4 is released, a spring 9 will force the retractor outwardly.

A second spindle is shown at 10 (see Fig. 4). This spindle terminates in an inner end such as indicated at 7a, this end being similar or identical to the spindle end indicated at 7. The spindle 10 is in this instance actuated by a key mechanism indicated at 11, and when a key is inserted and rotary motion is transmitted to the spindle 10, the retractor is retracted. On the other hand, when the key is released spring 9 returns the retractor to normal position. In other words, the retractor may be retracted either by the spindle 4 and its actuating knob 4a, or by means of the spindle 10 and its key-actuated mechanism 11.

Retractive movement of the retractor is transmitted to withdraw a latch bolt, indicated at 12, and when this is retracted the door may be opened. The knob 4a is mounted on the inside of the door and the key-actuated mechanism on the outside; hence the door may be opened from the inside when the knob 4a is rotated, as such rotation is transmitted to retract the latch bolt 12, and from the outside it is similarly retracted by means of the key actuated mechanism 11.

The purpose of the present invention, like that of my former Patent No. 1,876,081, is to provide a deadlocking mechanism which is substantially burglar-proof. This mechanism is constructed and operated as follows: The latch bolt housing B is circular in cross section and is tubular and elongated in form. Its inner end is closed by an end section 14 which is strengthened by a reinforcing plate 15 (see Fig. 9). This plate has a central rectangularly shaped opening 16 formed therein, and it carries two guide posts or pins 17, the inner ends of which extend through the end 14 of the housing and function as rivets to secure the reinforcing plate in position. The reinforcing plate is also provided with small bumps or raised portions arranged in pairs, as indicated at 18. These raised surfaces will function as a rocker support for a dogging member hereinafter to be described. The outer end of the housing has a face plate 19 secured thereto, and this, together with the housing, is secured in the door by screws 20.

Slidably mounted in the housing, and normally projecting through the face plate is the latch bolt 12. It is suitably secured on the outer end of a retractor plate or bar 21 (see Fig. 5), and is retracted and guided thereby. That is, the inner end of the bar projects through the inner end of the housing, that is, through the opening 16 of the reinforcing plate, and is provided with a pair of retractor lugs 22 which are

embraced and engaged by two claw-shaped members 23 carried by the retractor 6. Hence, when the retractor is moved in the direction of arrow *a* either by knob or key actuation, the retractor bar will move in unison therewith, and so will the latch bolt 12, as it is secured to the retractor bar; and during such movement it will be guided at the outer end by the face plate 19 and at the inner end of the housing by the central opening 16 formed in the reinforcing plate. The retractor bar has two opposed shoulders 24 formed thereon, and an elongated slot 25 is also formed therein, for a purpose which will hereinafter be described.

The latch bolt 12 presents a flat face 26 on one side, and at the inner end of said face are a pair of spaced right-angularly disposed guide lugs 27, the function of which will later be described.

Cooperating with the retractor bar is a retractor link (see Fig. 6). Like the retractor bar, it is flat, and on its inner end are formed a pair of retractor lugs 28 which are identical to those on the retractor bar and are similarly embraced and engaged by the claws 23 of the retractor 6. The opposite end of the retractor link is provided with a pair of cam lugs 29, and disposed between them and bent at right angles to the link is a lug 30, which extends into the slot 25. Also formed on the link are two right-angularly bent lugs 31 which engage opposite edges of the retractor bar 21 to function as guides for the retractor link.

If the door is closed, for instance by slamming it shut, the bevel face 12*a* of the latch bolt will engage a striker plate 12*b* mounted in the usual manner in the frame or jamb of the door. The latch bolt will thus be depressed or moved inwardly with relation to the housing B. Such movement will take place without permitting any movement of the retractor link, as the lug 30 on the retractor link projects into the slot 25 of the bar. On the other hand, if the door is closed, and it is opened by either the knob or the key mechanism, both the retractor link and the retractor bar will be pulled inwardly in unison, as the retractor lugs 22 and 28 are engaged by the claws 23 of the retractor.

In some door latch structures the lugs 22 on the retractor bar are eliminated, but they are never eliminated on the retractor link. Where the lugs 22 are eliminated, lug 30 engages the inner end 25*a* of the slot, and thus serves the function of retracting the retractor bar and the latch bolt 26 when the lugs 22 are not employed. Thus there is always unitary movement between the retractor bar and the retractor link when actuated by either the knob or the key-actuated mechanism, but the retractor bar may move independently of the retractor link when the latch bolt is depressed by engagement with the striker plate in the jamb of the door. The function of the cam lugs 29 mounted on the retractor link will hereinafter be described.

The retractor link, as will be noted in Fig. 4, is mounted on one side of the flat retractor bar; it is disposed in parallelism therewith and in contact therewith. Similarly arranged on the opposite side of the retractor bar is a cam bar 32 (see Fig. 7). This bar is provided with a pair of opposed cam lugs 33, and the outer end is provided with a right-angularly bent forked lug 34. Also arranged on the same side of the retractor bar is a deadlocking or auxiliary bolt 35 (see Fig. 8). This is substantially half-round in cross section, and thus presents one flat surface 36, which engages the flat surface 26 of the latch bolt. The deadlocking bolt extends between the lugs 27 of the latch bolt and is guided thereby. The inner end of the deadlocking bolt has an annular groove 37 formed therein, and it is also provided with an inner extension 38, which functions as a spring seat and guide, as will hereinafter appear.

The deadlocking bolt 35 and the cam plate 32 cooperate and function in unison. That is, when they are assembled the forked lug 34 of the cam bar extends into the groove 37 of the deadlocking bolt, thus forming a connection between them which causes unitary movement when the latch bolt is extended or retracted, as the case may be.

The latch bolt, together with the deadlocking bolt 35, is so mounted in the latch bolt housing B that both of them will normally project through the face plate 19, and they are normally maintained in this projected position by a pair of springs indicated at 39 and 40. The inner ends of the springs surround the guide pins 17, and they engage a spring saddle member generally indicated at C (see Figs. 4 and 11), disposed at the inner end of the latch bolt housing. The outer end of the spring 40 is seated on an guided by the extension 38 formed on the inner end of the deadlocking bolt, and exerts an outward pressure to normally project the deadlocking bolt. The guide 38 is drilled out to permit the adjacent pin 17 to extend into it; hence the deadlocking bolt, during extending and retracting movement, slides on and telescopes with relation to the adjacent guide pin 17.

A tubular guide member 41 receives the outer end of the spring 39. This tubular guide member also telescopes with relation to the adjacent pin 17. It is carried by the latch bolt 12 and is removable therefrom as it is secured on the end of a metal lug 41*a* which is insertable in the rear end of the latch bolt.

In the manufacture of small parts such as employed in a latch structure of the type here shown, precision work is maintained, as practically all parts are formed by die operation. But even so, there should be a certain amount of flexibility in the alignment of certain parts. It is for this reason that guide tube 41 and the lug 41*a* are detachable and flexibly supported with relation to the latch bolt. That is, a certain amount of play is permitted between the lug 41*a* and the latch bolt, so that the tube 41 may adjust and align itself with relation to the adjacent pin 17. This is the same reason as for the forked connection 34 between the cam plate 32 and the deadlocking bolt 35. That is, a certain amount of play is permitted between the two by means of the fork 34 and the groove 37, so that the parts may align themselves without binding. In other words, the deadlocking bolt may align itself with the flat surface 26 of the latch bolt, and the cam plate 32 may align itself with the flat surface of the retractor bar which it contacts. Such alignments are maintained without any binding action.

The springs 39 and 40 serve three main functions: first, that of normally maintaining the latch bolt 12 and the deadlocking bolt 35 in projected position; secondly, that of reprojecting them after they have been retracted; and third, that of actuating a dogging member, generally indicated at D (see Fig. 10). The dogging member consists of an arm 43, the inner end of which

is provided with two right-angularly bent rocker lugs 44. These lugs are spaced apart, and each of them is perforated as shown at 45 to permit the lugs to pass over the guide pins 17. The opposite end of the arm 43 is provided with a pair of spaced cam lugs 46, and between them is disposed a dog 47.

The dogging member D is probably best illustrated in Figs. 1 to 3 and Fig. 10. The rocker lugs 44 formed on the dogging member are supported by one or another of the pair of raised surfaces or rocker supports 18 formed on the reinforcing plate. Due to this support, the dogging member may rock on the supports 18 to assume either the position shown in Fig. 1 or that shown in Fig. 2. This movement is caused either by spring action or by cam action. Spring action is imparted by the spring saddle C (see Fig. 11). The saddle consists of a foot lug 49 which rests on the reinforcing plate; formed integrally with the foot lug, or secured thereto, are a pair of spaced saddle arms 50 which are perforated to permit them to slip over the guide pins 17. The opposite ends of the saddle arms are bent at right angles to form presser lugs 51, and these lugs engage the rocker lugs 44 of the dogging member, the point of engagement being such that when the pressure of the springs 39 and 40 is exerted on the spring saddle, or the arms 50 thereof, they tend to tilt about the foot lugs, as clearly shown in Fig. 2, causing the presser lugs 51 to exert pressure on the rocker lugs 44 at a point adjacent the rocker supports 18, thereby swinging the dogging member towards the retractor bar as shown in Fig. 2; and this position would always be maintained, as the spring pressure is constant, if it were not for the fact that the cam lugs 46 of the dogging member are at certain times engaged either by the cams on the cam plate or by the cams on the retractor link and forcibly swung outwardly to assume the position shown in Fig. 1. This is accomplished as follows.

Before describing the operation, it should be stated that inward movement of the latch bolt 12 will always cause inward movement of the deadlocking bolt, as the lugs 27 on the latch bolt engage the forked lug 34 of the cam bar 32. Hence, whether the latch bolt is retracted by means of the knob or by means of the key-actuated mechanism, or is depressed by slamming the door, the deadlocking bolt will move inwardly in unison therewith, but the moment the door is fully closed, the latch bolt will be automatically projected by the springs 39 and 40, while the deadlocking bolt will be maintained in retracted or depressed position by the striker plate, as there is no opening in the striker plate which permits it to project. When the latch bolt is extending into the striker plate and the deadlocking bolt is maintained depressed, cams 33 on the cam plate 32 will assume their innermost position, thereby permitting the dogging member D to assume the position shown in Fig. 2. In this position the latch bolt can not be depressed by jimmy action or otherwise, as the moment pressure is exerted on the outer end of the latch bolt such pressure will be resisted as the dogging lug 47 will engage one or another of the shoulders 24 of the retractor bar.

When the door is closed and the latch bolt projected, it is impossible to depress the latch bolt by a jimmy or similar tool, as has already been stated, as the shoulder 24 will be engaged by the dog 47; however the latch bolt may be retracted by means of either the knob or the key mechanism, through means of the retractor. Such retraction would seeemingly not be possible, as the cams 33 are out of engagement with the lugs 46, and the dog 47 would engage the shoulder 24. By reference to Fig. 2 it will be noted that dog 47 is not in direct engagement with the shoulder 24; hence the retractor bar 21 and the retractor link may move inwardly until engagement is attained. During that movement cam lugs 29 engage cam lugs 46 and thereby the dog 47 is raised out of engagement with the shoulder 24, and retraction is thus possible.

If the door is open, both the deadlocking bolt and the latch bolt will assume projected position. In this position the cams 33 on the cam plate 32 will engage the cam lugs 46 of the dogging member and swing it into the position shown in Fig. 1, thus holding the dogging lug 47 out of engagement with the shoulder 24, hence permitting depression of both the deadlocking bolt and the latch bolt when this position is assumed, and also permitting retraction by either spindle or the key mechanism.

It will be noted in Figs. 5, 6 and 7 that a duplicate arrangement of cams and shoulders is provided. That is, in Fig. 6 it will be noted that the retractor link is shown as provided with two cam lugs 29, in Fig. 5 the retractor is shown as provided with two shoulders 24; and similarly, in Fig. 7 the cam plate is provided with two cams 33. This permits either right hand or left hand arrangement of the mechanism, depending upon whether the lock is to be employed for a left- or right-hand mounted door. Also it permits the use of a single dogging member D, and it permits the dogging member to be arranged on either side of the latch bolt housing, that is, on the side shown in Figs. 1 to 3 or on the side opposite thereto. Similarly, it permits the saddle member C to face in either one direction or the other, regardless of right- or left-hand mounting. This materially simplifies assembly of the parts, and thereby reduces the cost of labor in assembling. Also, by providing play or flexibility between the several parts, binding of the parts is eliminated, and free play and spring action, as well as self-alignment, is insured. Furthermore, the parts are simple to manufacture, and are substantial and wear-resisting in use.

While certain features of my invention have been more or less specifically described and illustrated, I nevertheless wish it understood that changes may be resorted to within the scope of the appended claims, and that the materials and finish of the various parts employed may be such as the manufacturer desires, or varying conditions of use dictate.

Having thus described and illustrated my invention, what I claim and desire to secure by Letters Patent is:

1. In a latch structure of the character described an elongated auxiliary bolt having a groove formed therein adjacent the inner end, a cam plate, and a forked lug on said plate extending into the groove in the auxiliary bolt and forming a laterally movable connection between the two, said connection permitting longitudinal movement of the auxiliary bolt to be transmitted to the cam plate.

2. In a latch structure of the character described an auxiliary bolt having a groove formed adjacent its inner end, an elongated plate, a

pair of cams on said plate, and a pair of right-angularly bent lugs on one end of the plate, said lugs extending into the groove in the auxiliary bolt and forming a connection to transmit movement of the auxiliary bolt to the plate.

3. In a latch structure of the character described a latch bolt housing, a latch bolt slidably mounted therein and projecting outwardly from one end thereof, said latch bolt having a flat surface on one side, an auxiliary bolt slidably mounted in the housing and projecting outwardly from the same end as the latch bolt, said auxiliary bolt also having a flat surface and said surface engaging the flat surface of the latch bolt, and a pair of spaced lugs on the inner end of the latch bolt, said lugs limiting outward movement of the latch bolt and the auxiliary bolt with relation to the housing, and also forming a guide for the auxiliary bolt.

4. In a latch structure of the character described a dogging member comprising an arm, a pair of spaced legs at one end thereof and disposed at substantially right angles thereto to form a support for the arm, a pair of spaced cam members on the opposite end of the arm, and a dogging member disposed between them.

5. In a latch structure of the character described a latch housing, a latch bolt slidably mounted in the housing and projecting from one end thereof, a retractor bar secured to the latch bolt and extending through the opposite end of the housing, said retractor bar having a shoulder formed thereon, a dogging member within the housing, a pair of right-angularly bent legs on the dogging member straddling the retractor bar, a rocker support for said legs, a spring saddle also straddling the retractor bar, a foot lug on one side of the saddle and resting on an end portion formed at the inner end of the housing, a pair of lugs on the opposite side of the saddle, said lugs engaging the legs of the dogging member, and a pair of springs exerting outward pressure on the latch bolt to maintain it projected and inward pressure on the saddle and the legs of the dogging member to swing said member about its rocker support to maintain the dogging member in engagement with the shoulder on the retractor bar.

6. In a latch structure of the character described a latch housing, a latch bolt slidably mounted in the housing and projecting from one end thereof, a retractor bar secured to the latch bolt and extending through the opposite end of the housing, said retractor bar having a shoulder formed thereon, a dogging member within the housing, a pair of right-angularly bent legs on the dogging member straddling the retractor bar, a rocker support for said legs, a spring saddle also straddling the retractor bar, a foot lug on one side of the saddle and resting on an end portion formed at the inner end of the housing, a pair of lugs on the opposite side of the saddle, said lugs engaging the legs of the dogging member, a pair of springs exerting outward pressure on the latch bolt to maintain it projected and inward pressure on the saddle and the legs of the dogging member to swing said member about its rocker support to maintain the dogging member in engagement with the shoulder on the retractor bar, an auxiliary bolt, and means actuated by said bolt for swinging the dogging member out of engagement with the shoulder.

7. In a latch structure of the character described a latch housing, a latch bolt slidably mounted in the housing and projecting from one end thereof, a retractor bar secured to the latch bolt and extending through the opposite end of the housing, said retractor bar having a shoulder formed thereon, a dogging member within the housing, a pair of right-angularly bent legs on the dogging member straddling the retractor bar, a rocker support for said legs, a spring saddle also straddling the retractor bar, a foot lug on one side of the saddle and resting on an end portion formed at the inner end of the housing, a pair of lugs on the opposite side of the saddle, said lugs engaging the legs of the dogging member, a pair of springs exerting outward pressure on the latch bolt to maintain it projected and inward pressure on the saddle and the legs of the dogging member to swing said member about its rocker support to maintain the dogging member in engagement with the shoulder on the retractor bar, a retractor link slidably mounted on the retractor bar, a retractor connected with the retractor bar and the retractor link, and adapted to retract both in unison, and means on the retractor link for swinging the dogging member out of engagement with the shoulder on the retractor bar.

8. In a latch structure of the character described a spring saddle comprising a foot lug, a pair of spaced arms connected at one end with said foot lug and disposed at right angles thereto, said arms forming spring seats, and a right-angularly bent lug on the opposite end of each arm.

9. In a latch structure of the character described a spring saddle comprising a foot lug, a pair of spaced arms connected at one end with said foot lug and disposed at right angles thereto, each arm having a perforation formed therein for the reception of a guide rod, and each arm having a spring seat, and a right-angularly bent lug on the opposite end of each arm.

10. In a latch structure of the character described a latch bolt housing having an outer and an inner end, a latch bolt projecting through the outer end thereof, an elongated flat retractor bar secured at one end to the latch bolt and having its other end projecting through the inner end of the housing, a flat elongated link disposed parallel to the retractor bar and in contact therewith and having one end projecting through the inner end of the housing, said link forming a retractor link, a pair of lugs on said link engaging opposite edges of the bar to guide the link with relation to the bar, a pair of cam lugs on the link, and a right-angularly bent lug on the link projecting into an elongated slot formed in the retractor bar to permit a limited independent movement between the link and retractor bar, and also movement in unison of the link and retractor bar.

11. In a latch structure of the character described a retractor link comprising an elongated link plate having an inner and an outer end, a pair of retractor lugs on the inner end of the link, a pair of guide lugs on the link and bent at right angles thereto, a pair of spaced cam lugs on the outer end of the link, and a right-angularly bent lug disposed between them.

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