

Nov. 15, 1955

E. L. SCHLAGE

2,723,873

HOLD BACK LATCH

Filed Aug. 25, 1951

3 Sheets-Sheet 1

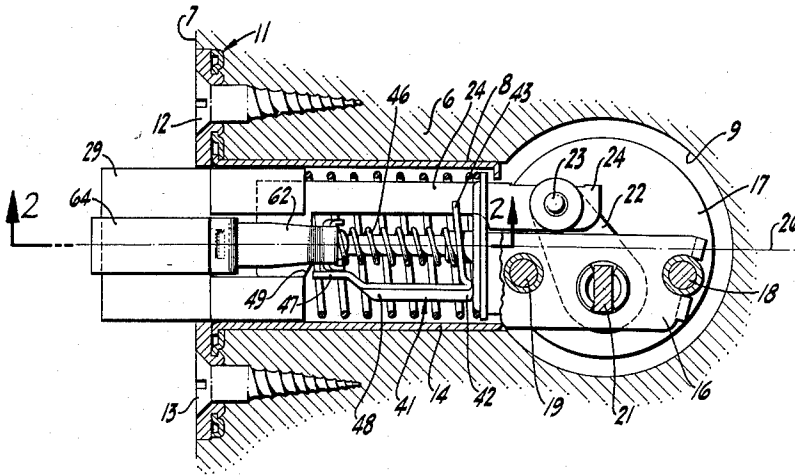


FIG. 1

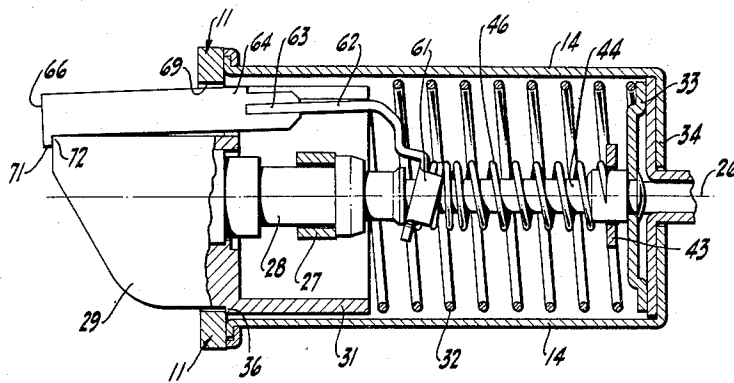


FIG. 2

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FIG. 3

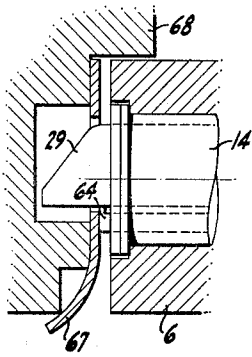


FIG. 4

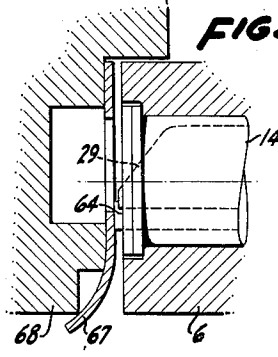


FIG. 6

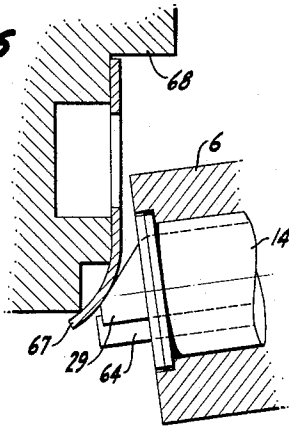


FIG. 5

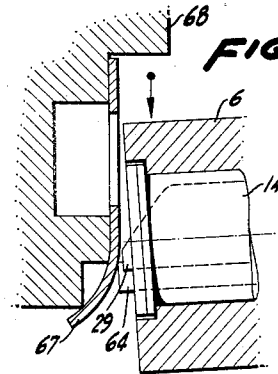


FIG. 7

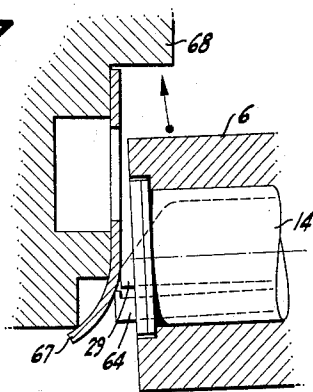
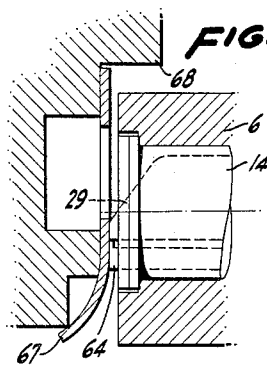


FIG. 8



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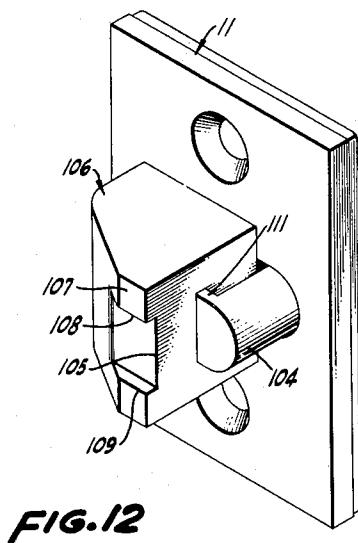
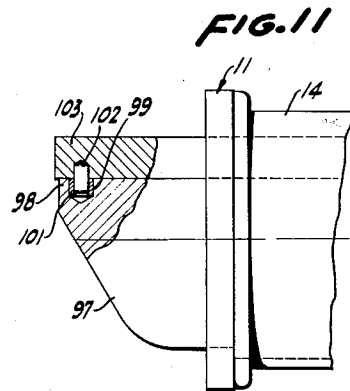
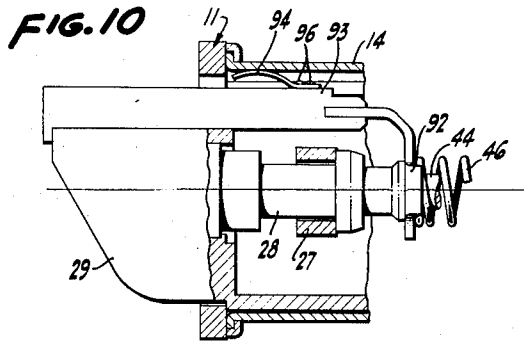
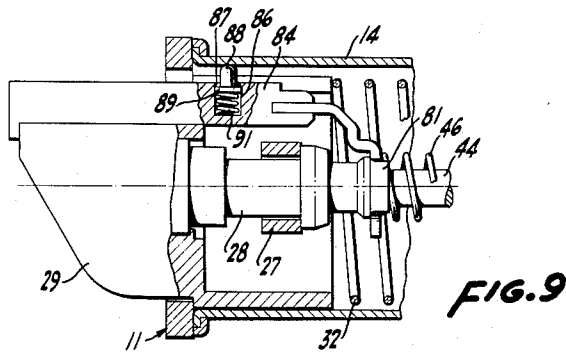
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3 Sheets-Sheet 3



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2,723,873

HOLD BACK LATCH

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Application August 25, 1951, Serial No. 243,620

9 Claims. (Cl. 292—335)

My invention relates to door hardware and particularly to lock sets for use in latching or locking a swinging or hinged door panel in closed position with respect to a door casing. The structure includes a latch bolt usually installed on a door and movable into and out of a strike plate usually installed on the door frame. A structure of this general kind is disclosed in my copending application, Serial No. 76,440, filed February 15, 1949, now Patent No. 2,650,121, issued August 25, 1953, and entitled "Door Lock." In that device, the latch bolt is supplemented by a dead bar which slides alongside the latch bolt and when the door is closed, comes into contact with the strike plate. The arrangement precludes depression of the latch bolt by an instrument operating upon the latch bolt from outside the lock set. In the present instance, substantially the same general functions may be included but additional or alternative advantages are attained.

Under many circumstances and whether or not the dead bar feature is included in the lock, it may be difficult to open the door even after initial retraction of the latch bolt. This is because the lock incorporates a spring for projecting the latch bolt at all times that it is not mechanically depressed. It is therefore necessary for the user not only to retract the latch bolt but also to hold the latch bolt retracted for a considerable interval and at least until the door has been opened enough to keep the latch bolt from springing back into the opening in the strike plate. That is often difficult because the key-operated retracting mechanism and the knob-operated retracting mechanism require two hands for simultaneous operation as the key mechanism alone or the turn piece alone do not afford sufficient grip to swing the door panel.

It is therefore an object of my invention to provide a hold back latch effective to keep the latch bolt withdrawn after it has initially been retracted by the operator at least until such time as the door has been initially opened or the latch bolt freed from the strike plate and without any particular further attention on the part of the operator.

Another object of my invention is to provide a hold back latch readily includable in locks of general applicability and also in locks of the character disclosed in my copending application.

A still further object of the invention is to provide a hold back latch which operates automatically without especial attention on the part of the user.

A still further object of my invention is to provide a hold back latch effective in lock units or lock sets of customary construction and without requiring modification of the strike plate.

Another object of my invention is in general to provide an improved latch or lock set.

Other objects, together with the foregoing, are attained in the embodiments of the invention described in the accompanying description and illustrated in the accompanying drawings, in which

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Figure 1 is a side elevation, parts being shown in cross section on a longitudinal vertical central plane, of a latch bolt unit of a lock set as installed in a door, the door being broken away to reduce the size of the figure.

Figure 2 is a cross section to an enlarged scale, the section being along the lines 2—2 of Figure 1 showing the structure of Figure 1 from below and on a horizontal plane.

Figures 3 to 8 inclusive are diagrammatic showings of a hold back latch constructed in accordance with my invention as it is installed in a door panel and door frame and in the different views occupying successive positions of operation.

Figure 9 is a plan from below, similar to Figure 2 and with portions being broken away on a horizontal plane, to show in cross section a modified form of hold back latch mechanism, parts of the figure being broken away to reduce its size.

Figure 10 is a view similar to Figure 9 but illustrating a still further modified form of hold back latch.

Figure 11 is a view similar to Figure 9 but with a portion broken away to show in section a modified form of hook structure included in the hold back latch.

Figure 12 is an isometric view of a still further modified form of hold back latch, various parts of the structure being omitted for clarity and to reduce the size of the figure.

The hold back latch is designed for installation in a swinging or hinged door panel 6 having a vertical edge 7. An edge bore 8 merges or intersects with a cross bore 9 extending from side to side through the panel. Mortised into the edge 7 is a face plate 11 of composite construction anchored in position by fastenings 12 and 13.

Engaging the face plate 11 is a housing 14, of tubular construction preferably, which fits within the bore 8 and provides an extended anchor 16 projecting into the cross bore 9. Disposed within the cross bore is an actuating mechanism 17 having posts 18 and 19 interengaging with the anchor 16. Part of the actuating mechanism is a spindle 21 rotatable with respect to the remaining structure by any suitable means, not shown, such as a key or turn piece or knob or handle. Rotation of the spindle 21 actuates a crank 22 provided with a pin 23 serving as a connection engaging a duplex retractor 24. Upon rotary oscillation of the crank 22 in response to turning of the spindle 21, the retractor 24 is moved in a direction substantially parallel to the central axis 26 of the tubular housing 14.

One end of the retractor 24 is provided with a forked hook 27 engaging a spool 28 extended from a latch bolt 29. The latch bolt has a tubular skirt 31 slidably disposed within the housing 14 and resting against one end of a projecting coil spring 32. The opposite end of the spring is situated against a plate 33 abutting the closed inner end 34 of the housing 14. The tendency of the spring 32 is to project the latch bolt 29 until a shoulder 36 on the latch bolt abuts the face plate 11. With the structure as so far described, the latch bolt 29 is normally projected along the axis 26 but upon operation of the spindle 21 is retracted and the spring 32 is compressed. When the spindle 21 is released, the spring 32 again projects the latch bolt and restores the parts to their former, normal position.

Although it is often omitted, a dead locking device can be included with the latch unit. This additional structure prevents the depression of the latch bolt 29 by an external force imposed directly on the latch bolt when the door is in closed position. Disposed within the housing 14 is a bell crank lever 41 having a fulcrum 42 resting against the end plate 33 and having an upstanding arm 43 straddling a stationary pin 44 disposed along the axis 26 within the housing 14. A coil spring 46 surrounds the

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pin 44 and is effective to press against the arm 43 and to rock the bell crank lever 41 about the fulcrum 42 so that the terminus 47 of the bell crank arm 43 is lifted into the path of retraction of the spool 28 on the latch bolt 29.

A force against the latch bolt 29 tending to force it inwardly is resisted since the latch bolt immediately encounters the upstanding terminus 47. So that the dead lock will not interfere when the spindle 21 is turned and the opening force is appropriately applied, the forked hook 27 of the retractor 24 is provided with a bevelled face 49. This encounters the terminus 47 before the hook abuts the spool 28 as the retractor is withdrawn and so cams the bell crank 41 out of the path of the latch bolt 29 and slightly compresses the spring 46. The retractor and the spool then ride over the arm 48 and the latch bolt 29 is capable of being fully withdrawn. If the dead locking function is not desired, it is merely necessary to omit the bell crank 41.

When the door panel is standing open away from the door frame, the dead lock, if included, is made temporarily ineffective. A camming collar 61 loosely surrounding the pin 44 is urged by the spring 46 into a position overlying and in abutment with the terminus 47. The dimension of the collar 61 is such that the terminus 47 is depressed out of the path of the latch bolt 29 and consequently the latch bolt can freely be depressed. The collar 61 is part of an arm 62 extending to an anchorage 63 in a dead bar 64 disposed alongside the latch bolt 29 and reciprocable within the casing 14 in approximately the direction of the axis 26. The bar 64 is normally urged into projected position, as shown in Figures 1 and 2, by the coil spring 46.

The dead bar 64 is depressed or forced into the housing 14 by camming abutment between the end 66 of the dead bar and a strike plate 67 on the door frame 68 (Figure 3) as the door swings shut. During this inward movement, the arm 62 translates or moves the collar 61 from abutment with the terminus 47 into a rearward position out of contact with the crank arm 48. Whether or not the bell crank arm 48 is present, the spring 46 is compressed by this action. The bell crank 41, if present, rotates as the collar 61 recedes and the terminus 47 rises (in Figure 1) into the path of the latch bolt 29 which is thereby dead locked. Thus, when the door panel 6 is in closed position against the door frame 68, as shown in Figure 3, the dead bar 64 is depressed and, if the bell crank 41 is used, the lock unit is dead locked.

With the arrangement as so far described, the door panel 6 is ready for opening upon turning of the spindle 21 and retraction of the latch bolt 29. But as soon as the torque is removed from the spindle 21, the latch bolt 29 is impelled to project again under the urgency of the spring 32 and instantly re-latches the door before it can be swung open. To overcome this disadvantage and to afford a hold back latching function, the collar 61 is made a loose fit on the pin 44 and is inclined at an angle, as shown in Figure 2. The spring 46 therefore not only imposes an axial force upon the collar but, being cocked, also imposes a transverse force upon the collar. The transverse component is transmitted through the arm 62 to the dead bar 64.

In the usual construction, the dead bar 64 is used solely as part of a dead locking feature and is made to fit closely between the latch bolt 29 and the inner margin 69 of the face plate 11. In the present instance, the inner margin 69 of the face plate is enlarged so that the dead bar 64, whether or not the dead locking feature is included, is capable of lateral or transverse movement in addition to an axially translatory movement. In other words, the dead bar 64 has the extra capability of moving substantially perpendicularly to the axis 26 or cross-wise of the housing 14. The bar 64 is normally impelled into a position closely approaching the latch bolt 29 or is biased

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or urged toward the latch bolt even though it can be moved away or displaced by a superior lateral force.

The dead bar 64 not only extends somewhat beyond the terminus of the latch bolt 29 but also is contoured to form a suitable hook 71 contrived to overlie and abut or engage the outer end, or more specifically, the rectangular corner 72 of the latch bolt.

In the ordinary door open or free position of the structure, as illustrated in Figures 1 and 2, the dead bar 64 is disposed with the hook 71 overlying the end of the latch bolt 29. When, as shown in Figure 3, the door panel 6 is in closed position with respect to the frame 68, the latch bolt 29 is projected through the opening in the strike plate 67 but the dead bar 64 is in abutment with the strike plate and the hook 71 lies alongside the latch bolt 29. When the door is to be opened, the spindle 21 is rotated by any suitable means such as a key. The latch bolt 29 is correspondingly retracted into the position shown in Figure 4. As the latch bolt is retracted, its corner 72 rides under the hook 71 on the stationary dead bar.

When the corner of the latch bolt clears the dead bar hook, the spring 46 is effective to move the dead bar 64 laterally or sideways, sliding transversely over the strike plate 67, so that the hook engages over the end of the latch bolt 29. The hook is therefore interposed between the end of the latch bolt and the strike plate 67. It will be understood that full retraction of the latch bolt 29 results in the dead bar 64 also being retracted slightly away from the strike plate 67 so that spring 46 is not necessarily relied on to move the dead bar 64 laterally while it is in frictional engagement with the strike plate 67. The dead bar 64 thereupon performs or serves as a guide or retainer or runner for supporting the latch bolt 29 in retracted position on the strike plate 67 against the urgency of the spring 32, even though the door is still shut. Consequently, as soon as the user has withdrawn the latch bolt 29 into the position shown in Figure 4 and as soon as the dead bar has sprung transversely to hook over the end of the latch bolt, then the latch bolt is itself latched in withdrawn position and cannot project again even under the urgency of the spring 32 and even though the user releases the force on the spindle 21 and grasps some other part of the door hardware to open the door. The parts may be indefinitely retained in the Figure 4 position.

The door 6 is free to swing toward open position, especially as shown in Figure 5, during which time the end 66 of the dead bar 64 cams against or rides over the strike plate 67. Since the latch bolt 29 concurrently passes beyond the opening in the strike plate, it is no longer effective to latch the door even if somehow released from the hook 71. This hold back feature therefore permits the door to be opened with one hand at any time after the user has turned the key or turn piece or knob and has once withdrawn the latch bolt into position shown in Figure 4. Continued opening movement of the door, as illustrated in Figure 6, permits the dead bar end 66 to ride away from the strike plate 67 in the customary way. When the door is fully opened, the parts are in the position shown in Figures 1 and 2 with the dead bar hooked over the end of the latch bolt.

When, on the return motion, the door starts to close, the parts begin their return movement in the customary way with the latch bolt abutting the strike plate 67 and being partially depressed by that contact. In addition, the hook 71 on the dead bar 64 itself comes against and frictionally rides on the strike plate 67 and so trails behind and is laterally displaced away from the latch bolt against the urgency of the spring 46. The hook 71 is hereby disengaged from the corner 72 of the latch bolt 29 as the parts proceed, as shown in Figure 7, toward closed position. Just before closed position is attained, as shown in Figure 8, the latch bolt cams freely over the strike plate 67 in the normal way and the dead bar hook 71 presses or rests against the side of the latch bolt.

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During the next few degrees of closing movement, the parts attain again the position illustrated in Figure 3 with the latch bolt 29 projected forwardly by the spring 32 through the aperture in the strike plate 67 and with the dead bar 64 abutting the strike plate 67 as before.

With this arrangement, therefore, there is provided a lock set not only having the customary latching and, if desired, dead locking feature, but also having in addition a hold back feature so that the latch bolt itself is latched in retracted position by the mere turning of the spindle 21 and remains in its retracted, latched position until the initial opening movement of the door has been accomplished.

There are various ways of imposing a transverse or lateral spring urgency upon the dead bar 64 in order to press it into a hooking relationship with the latch bolt. The cocked collar 61, as shown in Figures 1 and 2, can be replaced by an arrangement as shown in Figure 9. All of the parts in this figure are generally the same as previously described and while the collar 81 is loose on the pin 44 it is not cocked with respect thereto. Rather, the dead bar 84, otherwise substantially the same as previously constructed, is provided with a cavity 86 narrowed by crimping over at its outer margin 87. Retained in the cavity is a thrust button 88 bearing upon the inner wall of the housing 14 and having a flange 89 resting against a spring 91 confined within the cavity 86. The effect of this mechanism is to impose a transverse urgency or bias on the dead bar to press it toward the latch bolt 29, the button 88 sliding along the inside of the housing 14 as the dead bar is translated parallel to the axis 26. By differently proportioning the parts, the button 88 can be made to ride out of the housing 14 when the bar is projected, thus relieving the lateral or transverse pressure.

Another version of a means for imposing a transverse force is disclosed in Figure 10 in which the collar 92 is disposed somewhat loosely on the pin 44, as before. The dead bar 93 is constructed exactly as shown in connection with the Figures 1 and 2 modification except that it is also provided with a leaf spring 94 held in place by suitable fastenings 96. The spring rubs against the inside of the housing 14 during the translation of the dead bar but is effective in all positions to impose on the dead bar a transverse bias toward the latch bolt 29.

With any of the spring mechanisms, there is also permissible a variant form of hook. As illustrated in Figure 11, the latch bolt 97 is in all respects like the latch bolt 29 except that near its corner 98 it is provided with a cavity 99 lined with a hardened bushing 101 into which fits a hardened pin 102 extending transversely from a dead bar 103 otherwise like the dead bar previously described. In this instance, the overhang of the dead bar beyond the end of the latch bolt 97 is not as much as previously illustrated. The end of the dead bar can even be flush with or below the end of the latch bolt if the contour of the strike plate 67 is appropriate to provide a transverse separating action by camming or by friction or both as the door is being closed.

As a further modification of the hook, there is illustrated in Figure 12 an arrangement in which the end of the dead bar 104 is constructed exactly as illustrated in connection with Figures 1 and 2, but in which the dead bar is somewhat shorter, being adapted to engage a corner 105 of the latch bolt 106. This corner is indented or cut into the normal front face 107 of the latch bolt and leaves an upper ledge 108 and a lower ledge 109 which lie either side of the hook 111 on the dead bar 104 to afford a vertical support below and above the dead bar when it is in hooked position. That prevents undue vertical displacement of the dead bar.

What is claimed is:

1. A hold back latch for use with a strike plate having an opening therein comprising: a housing having an axis, a latch bolt in said housing, means for mounting said latch bolt for movement axially in a path between a first

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position projected into said opening and a second position retracted from said opening, a main spring for urging said latch bolt into said first position, means for urging said latch bolt into said second position, means movable into and out of a position holding said latch bolt in said first position, a deadlocking bar in said housing, means for mounting said deadlocking bar for movement axially for operating said movable means and in a position axially to abut said strike plate, a hook on said deadlocking bar, and a spring for moving said hook transversely into a position partially overlying said opening in the path of movement of said latch bolt from said second position toward said first position for preventing such movement, said deadlocking bar being engageable by said strike plate upon closing movement of the door on which said latch is mounted, whereby said hook is disengaged from said latch bolt to permit movement of the latter to said first position.

2. A hold back latch for use with a strike plate having an opening therein comprising: a latch bolt having an end, means for mounting said latch bolt to move into and out of said opening, a bar, means for mounting said bar to move away from and toward said strike plate into abutment with said strike plate alongside said opening, a hook on said bar, and means for moving said bar to cause said hook to project over a portion of said opening and said end of said latch bolt to prevent said latch bolt moving into said opening when said latch bolt is retracted.

3. A hold back latch for use with a strike plate having an opening therein comprising: a latch bolt, means for mounting said latch bolt to move between a withdrawn position out of said opening and a projected position in said opening, a bar, means for mounting said bar to move parallel to said latch bolt between a first position away from and a second position in abutment with said strike plate alongside said opening, and interengaging elements on said bar and latch bolt for holding said latch bolt in said withdrawn position when said bar is in abutment with said strike plate.

4. A hold back latch for use with a strike plate having an opening therein comprising: a latch bolt, means for mounting said latch bolt to move longitudinally into said opening, a bar, means for mounting said bar to move longitudinally independently of said latch bar and into abutment with said strike plate, and means effective upon relative transverse movement of said latch bolt when the latter is withdrawn and said bar for interconnecting said latch bolt to said bar to preclude independent longitudinal movement thereof.

5. A hold back latch for use with a strike plate having an opening therein comprising: a latch bolt adapted to be received in said opening and having an outer end, a bar reciprocally mounted alongside said latch bolt and having an outer end adapted to abut said strike plate adjacent said opening, a projection on said bar adjacent its outer end, means for urging said bar laterally toward said latch bolt whereby said projection hooks on said outer end of said latch bolt when the latter is retracted to prevent outward movement of said latch bolt.

6. A hold back latch for use with a strike plate having an opening therein comprising: a latch bolt adapted to be received in said opening and having an outer end, a bar reciprocally mounted alongside said latch bolt and having an outer end adapted to abut said strike plate adjacent said opening, a projection on said bar adjacent its outer end, a spring for urging said bar laterally toward said latch bolt whereby said projection hooks on said outer end of said latch bolt when the latter is retracted to prevent outward movement of said latch bolt.

7. A hold back latch adapted to be mounted on a door for use with a stationary strike plate having an opening therein, comprising: a latch bolt, means for urging said latch bolt to an outer position at all times for reception in said opening when said door is closed, said latch bolt being adapted to be retracted to a position withdrawn from

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said opening to leave a space between the outer end of said latch bolt and said strike plate, a member having a projection adapted to extend into said space, means for urging said member toward said latch bolt for inserting said projection into said space when said latch bolt is retracted for preventing said latch bolt from moving to said outer position, said member being positioned to engage said strike plate upon closing movement of said door whereby said projection is withdrawn from said space upon such engagement, thereby permitting movement of said latch bolt to said outer position.

8. A hold back latch for use with a strike plate having an opening therein comprising: a latch bolt, means for mounting said latch bolt to move longitudinally into and out of said opening and to slide transversely over said strike plate, a bar mounted alongside said latch bolt, means for mounting said bar to move longitudinally relative to said latch bolt and to slide transversely over said strike plate, a hook on said bar, a spring for sliding said bar transversely relative to said latch bolt to engage said hook with said latch bolt when the latter is retracted for preventing movement of said latch bolt into said opening, said bar being engageable by said strike plate upon closing movement of the door on which said latch is mounted, whereby said hook is disengaged from said latch bolt to permit movement of the latter into said opening.

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9. A hold back latch for use with a strike plate having an opening therein and a lip thereon comprising: a latch bolt, means for mounting said latch bolt to move into and out of said opening and to slide over said lip, a bar mounted alongside said latch bolt, means for mounting said bar to move toward and away from said strike plate, a hook on said bar, said bar being movable to engage said hook with said latch bolt when the latter is retracted for preventing movement of said latch bolt into said opening, said bar being engageable by the lip on said strike plate upon closing movement of the door on which said latch is mounted, whereby said hook is disengaged from said latch bolt to permit movement of the latter into said opening.

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