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2,924,475

SLIDING DOOR LATCH WITH DEAD LOCK

Filed March 26, 1957

2 Sheets-Sheet 1

FIG. 1.

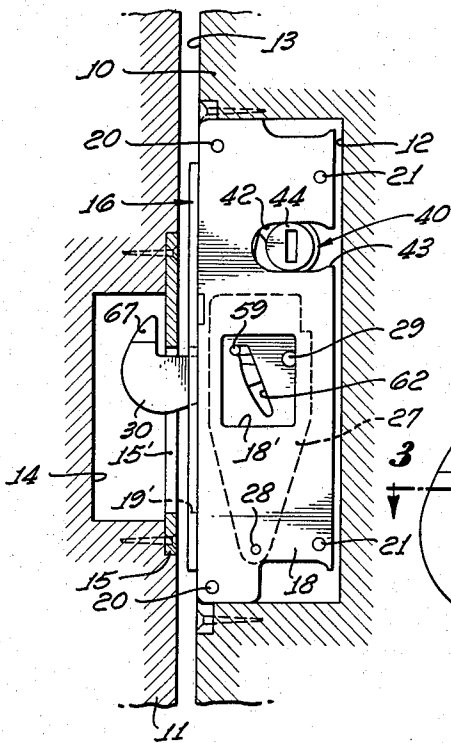


FIG. 2.

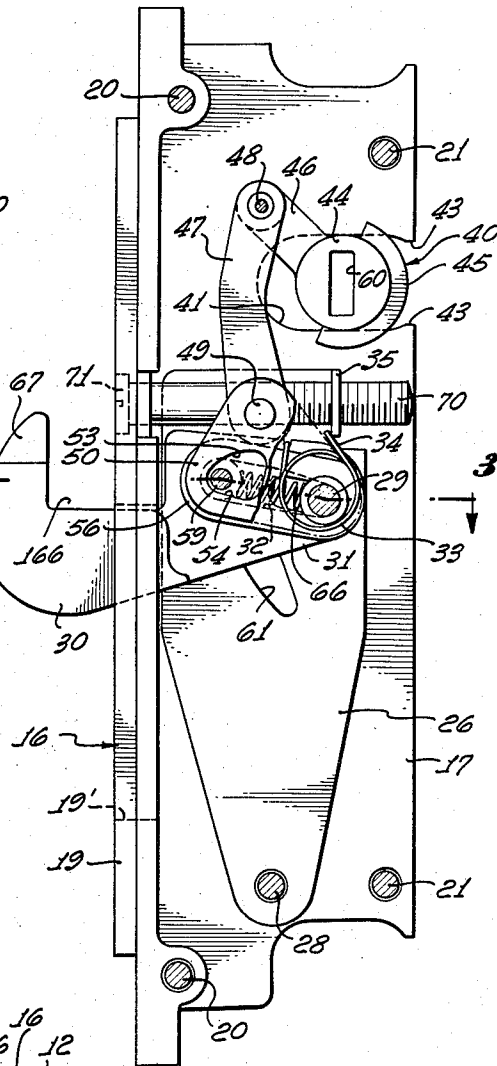
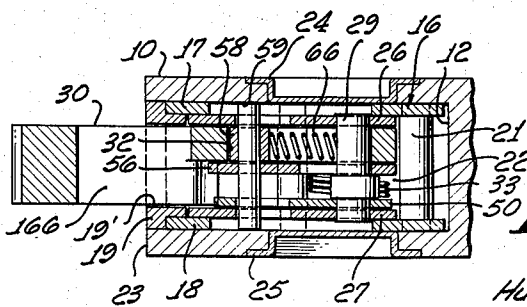


FIG. 3.



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Fig. 4.

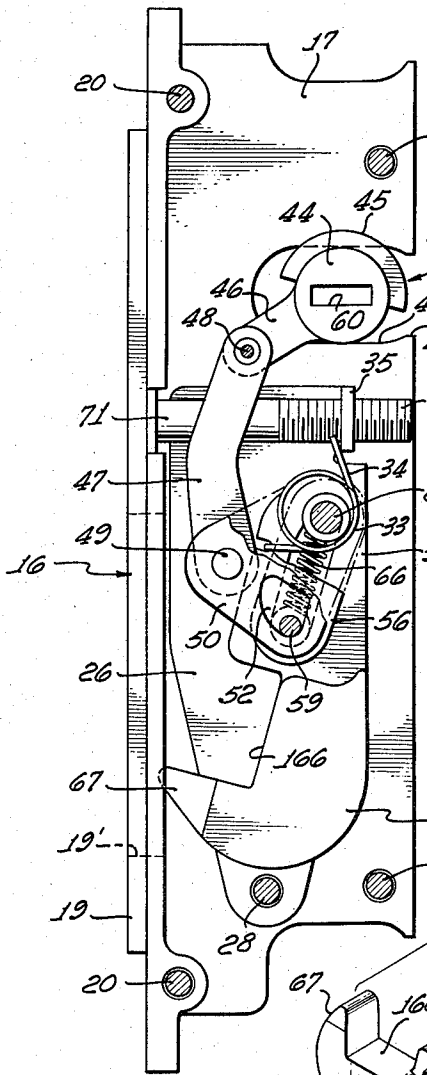


Fig. 5.

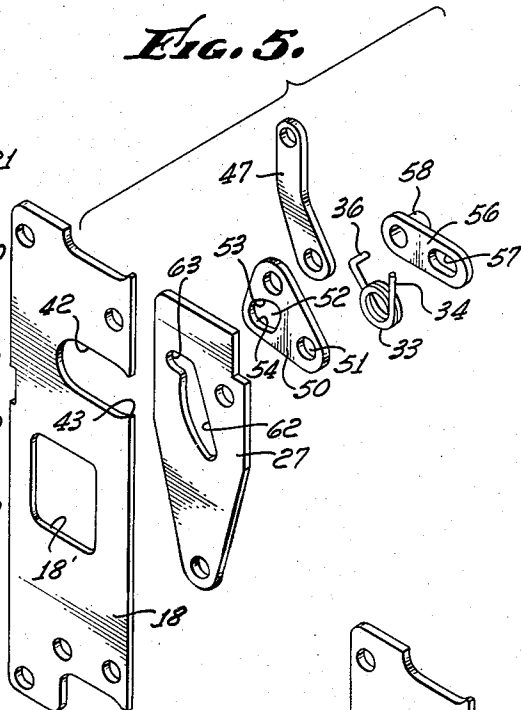
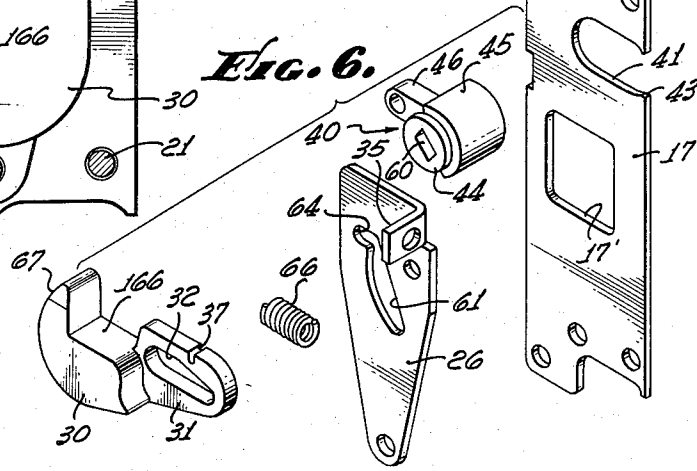


Fig. 6.



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SLIDING DOOR LATCH WITH DEAD LOCK

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11 Claims. (Cl. 292—129)

The invention relates to door locks and has particular reference to a door lock especially designed for a sliding door and which incorporates supplemental features including a dead lock mechanism and a structure such as to permit back-setting the hub.

Recent trends in building construction and especially in the construction of residences has pointed to a very marked degree toward economy in the use of space. Although sliding doors have been known and used for a great many years, there has been a marked increase in the employment of sliding doors in current building projects because of the fact that they make it possible to employ tight spaces to better advantage. As a consequence the accelerating use of sliding doors has given rise to new wants and problems in connection with latches for such doors. To a large extent heretofore sliding doors have been used for passage only and therefore have not needed any more than a flush door opening pull or handle. In some instances simplified passage latch sets have sufficed. With an increasing demand, however, for sliding door latches capable of latching a door in closed position, new demands have pointed to a need for sliding door latches capable of barring the door from being opened on one side. Where such doors need to be barred it also becomes advisable to so construct the latch or lock set that it cannot be opened by unauthorized persons. From the very nature of the sliding door arrangement dead latching sets, though needed, have presented design problems not readily met by techniques heretofore employed.

It is therefore among the objects of the invention to provide a new and improved sliding door latch of high quality construction which comprises a relatively complete latch in that it is one capable of latching a sliding door in closed position and which can be easily manipulated so as to latch and unlatch the door by means of a handle or lever sufficiently compact to be flush with the door surface and therefore not impair the sliding of such door into its panel when opened.

Another object of the invention is to provide a new and improved sliding door latch which is compact in its structural arrangement thereby making it possible to install the latch in light-weight sliding doors of relatively thin section but which though compact will be positive in its action.

Still another object of the invention is to provide a new and improved sliding door latch which can be shifted to latched and unlatched position and which has built into it a dead locking arrangement such as to bar the door when latched against access from one side.

Still another object of the invention is to provide a new and improved sliding door latch set which is versatile in its arrangement, thereby to permit a back-setting of the hub location throughout a considerable range to facilitate and simplify the accurate installation of such device in a sliding door.

Still further among the objects of the invention is to provide a new and improved sliding door latch which employs a hook capable of being extended to latched position and retracted to a concealed position and which in

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extended position will retract to withdrawn position upon sliding impact of the latch hook when extended to avoid damage to the mechanism.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

10 In the drawings:

Figure 1 is a vertical sectional view of a sliding door and door jamb showing the sliding door latch in elevation.

Figure 2 is a side elevational view of interior portions of the door latch in extended position.

15 Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a view similar to Figure 3 with portions partially broken away and showing the latch in retracted position.

20 Figure 5 is an exploded view of parts of the device on the near side of a vertical center line as viewed in Figure 4.

Figure 6 is an exploded view of parts on the far side of a vertical center line.

25 In an embodiment of the invention chosen for the purpose of illustration there is shown a sliding door 10 adapted to fit against a door jamb 11. The sliding door is provided with an edgewise extending opening 12 at an edge 13 of the door. A recess 14 is located in the door jamb immediately opposite the opening 12 for the accommodation of a latch plate 15 serving its conventional purpose.

The latch mechanism is shown contained in a frame or housing 16 comprising opposite parallel side walls 17 and 18 and a transverse end wall 19. The side walls are shown attached to the end wall by means of pins 20 and are attached to each other by spacing pins 21. The side walls and end walls when assembled form in effect a chamber 22 therebetween for reception of catch means comprising sundry working parts of the device. When in position in the door 10, the end wall 19 is flush with an edge 23 of the door. Recessed trim plates 24 and 25 provide for a finger hold in opening and closing the door and further provide space for a suitable latch handle, not shown.

45 Located in the lower portion of the chamber 22 is a pair of pivot plates 26 and 27. These pivot plates are elongated in character, as is clearly apparent in Figure 2, and are pivotally mounted at lower ends thereof to the side walls 17 and 18 by means of a pivot pin 28.

50 At the upper right portion of the pivot plates, as shown in Figure 2, for example, a latch pivot pin 29 serves to attach a latch hook 30 to the pivot plates. As shown to good effect in Figure 6, the latch hook 30 is provided with an inner extension 31 in which is an elongated pivot slot 32 which is adapted to receive the latch pivot pin 29.

A hair spring 33 having one end 34 pressed against a bracket 35 of the pivot plate 26 has a bent end 36 received in a spring notch 37 in the latch hook. The tension in the spring tends normally to rotate the latch hook 30 in a counterclockwise direction, as viewed, for example, in Figure 2.

In the end wall 19 is an opening 19' through which the hook extends. An opening 15' is provided in the latch plate 15 for reception of the hook in extended position.

65 To move the latch hook between the extended position shown in Figure 2 and the retracted position shown in Figure 4, there is provided a hook actuator linkage comprising a hub member 40 which is received both rotatably and slidably at its opposite ends within hub recesses 41 and 42, respectively, in the side walls 17 and 18. Protrusions 43 serve to prevent the hub member

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from being pushed out of the hub recesses. The hub member has cylindrical projections 44 at the ends between which is an enlargement 45 which assists in positioning the hub member in the recesses.

Extending radially outwardly from the hub member is an arm 46 at the outer end of which is attached the upper end of a link 47 means of a pin 48. At its lower end the link is attached by means of a pin 49 to a cam plate 50. The cam plate in turn is pivotally mounted by aid of a pivot aperture 51 to the latch pivot pin 29.

In the cam plate 50 is a cam opening 52 which serves to define intersecting camways 53 and 54. To attach the cam plate to the latch hook there is provided a lock pin retainer block 56 having a slot 57 at one end adapted to receive the latch pivot pin 29. Projecting outwardly from one side of the lock pin retainer block is a boss 58 which is adapted to fit slidably within the pivot slot 32 of the latch hook 30. A pin 59 extends through the boss and also through the cam opening 52 in the cam plate. This same pin 59 also extends outwardly at both ends to a location flush with the outside surfaces of the side walls 17 and 18, as shown in Figure 3. A square aperture 17' in the wall 17 and 18' in the wall 18 provides access to the pin 59 and a space within which the pin can move.

From the retracted position of the latch hook shown in Figure 4 by manipulation of the hub member 40 through the agency of a conventional handle, not shown, inserted in a hub slot 60, the hub is rotated in a clockwise direction. This rotation elevates the link 47 which in turn pulls upon the cam plate 50 causing engagement of the camway 54 with the pin 59. Lifting the pin as described serves to provide a pull upon the boss 58 which fitting in the pivot slot 32 lifts the latch hook to the position shown in Figure 2.

It will be noted that there are provided in the pivot plates 26 and 27, respectively oblique slots 61 and 62. At the upper ends of the slots are intercommunicating dead lock recesses 63 and 64. When the pin 59 is elevated by manipulation of the hub in the manner described to the upper ends of the slots 61 and 62, a coiled spring 66, pressing at one end against the pin 29 and at the other end against the boss 58, tends to urge the pin 59 in a direction from right to left as viewed in Figure 2, thereby to enter the dead locking recesses 63 and 64. It will be appreciated that by reason of the length of the pin 59 it extends at its opposite ends slidably within the oblique slots 61 and 62. Thus positioned in the dead lock recesses the pin 59 prevents rotation of the latch hook 30 in a counterclockwise direction about the latch pivot pin 29. Hence, the latch hook cannot be pried downwardly by manipulation of a screw driver or similar object slid between the door and the door jamb. When the latch hook is in the position shown in Figure 1 with an upwardly open recess 66, it permits a tip 67 of the hook to fall behind an appropriate portion of the latch plate 15, as shown in Figure 1.

When the latch hook is to be returned from extended position to retracted position, the hub member 40 is rotated in a counterclockwise direction. This serves to depress the link 47 and the cam plate 50. As the cam plate is depressed, the camway 53 pressing against the pin 59 tends to cam the pin rearwardly, thereby compressing the spring 65 until the pin 59 is moved from left to right far enough to fall out of the dead lock recesses 63 and 64. Thereafter by continuing rotation of the hub 40, the pin 59 is caused to slide down the oblique slot 61 and 62 aided by action of the hair spring 33. As a consequence, movement of the pin 59 downwardly moves the boss 58 in a similar direction and causes the latch hook 30 to be rotated in a counterclockwise direction from the position of Figure 2 to the position of Figure 4. The hair spring will tend to retain

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the latch hook in the retracted position until lifted therefrom by manipulation of the hub member.

It is to be noted that because of the linkage attached to the hub member it is permissible to shift the hub member to virtually any position between opposite ends of the hub recesses 41 and 42. This permits considerable latitude in the location of the trim plates 24 and 25. Though shifted to a considerable extent as described, the operation of the latch mechanism to shift the latch hook between extended and retracted position is in no way altered or modified.

To add to the effectiveness of a proper installation resulting in a snug fit of the latch hook in engagement with the latch plate or strike plate, an adjustment is provided to move the latch hook toward or away from the latch plate in extended position. This is accomplished by employment of a bolt 70 which has a head end 71 rotatably mounted in the transverse end wall 19 and has a threaded end threadably secured in the bracket 35. When the bolt is rotated, the head end remains fixed and the bracket 35 in consequence is moved toward the right or left depending upon the direction of rotation of the bolt. If movement be toward the right as viewed in Figures 1 and 2, the pivot plates 26 and 27 as a consequence will be rotated in a clockwise direction about the pin 28. This causes a displacement of the pin 29 toward the right which results in drawing the tip 67 of the latch bolt to a position closer to the transverse end wall 19 of the housing. Conversely, the position of the latch hook can be adjusted whereby to move the tip further toward the left by rotation of the bolt 70 in an opposite direction, causing a displacement of the pin 29 toward the left.

There has accordingly been described herein a complete sliding door latch structure which is capable of being manipulated from either side, if desired. Under those circumstances the conventional handle with an appropriate spindle or shaft would be provided on both sides of the door. The structure, however, is one which, if desired, could employ a handle on one side only, in which event a trim plate on the opposite side would be closed so as to inhibit access to the hub member. In such an arrangement the latch is proof against tampering by action of the dead locking elements which would prevent unlatching the latch hook by some instrument from the outside. It will be appreciated that because of having a structure and arrangement as herein described, the door latch can serve just as readily on either edge of a sliding door, depending upon the direction in which the door is made to slide. Fitting trim plates to the structure need not necessitate any departure from conventional procedure. Further by constructing the latch hook as shown with the extension 31 of about one-half the thickness of the latch hook, space is provided to receive the lock pin retainer block 56 and the cam plate, thereby making possible a very thin structure which permits the latch to be used in relatively thin sliding doors without a weakening of the door adjacent the opening provided for reception of the latch. Sufficient freedom of movement is built into the combined mechanical elements so as to avoid the necessity of close tolerances either with respect to fabrication, assembly, or installation on the door without impairment of positive action over expected long periods of use.

While I have herein shown and described my invention in what I have conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of my invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

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

1. A sliding door latch comprising a housing, said housing including at least one plate member having an

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elongated slot therein lying in one direction, said plate member having a dead locking recess at one side of the slot and in communication with the slot, catch means having a combined slidable and rotatable mounting on said plate member, a hub rotatably mounted in the casing, a linkage operatably connected between said hub and said catch means, said linkage including a pin having a shiftable mounting within said slot and said catch means, resilient means acting between the pin and said housing adapted to impress said pin into said dead locking recess whereby to effect a blocking of movement of said catch means, and a cam connection between said linkage and said pin movable against said resilient means and adapted upon rotation of said hub to shift said pin out of said dead locking recess.

2. A sliding door latch comprising a housing, said housing including a pair of spaced parallel plate members having matched elongated and aligned slots therein lying in one direction, a dead locking recess at one side of each slot and in communication with the slot, catch means having a combined slidable and rotatable mounting on said plate members, a hub rotatably mounted in the casing, a linkage operatably connected between said hub and said catch means, said linkage including a pin having a shiftable mounting within said slots and said catch means, a resilient means acting between the pin and said housing adapted to impress said pin into said dead locking recesses whereby to effect a blocking of movement of said catch means, and a cam connection between said linkage and said pin movable against said resilient means and adapted upon rotation of said hub to shift said pin out of said dead locking recesses.

3. A sliding door latch comprising a housing having opposite side walls, said side walls having aligned hub recesses therein, a pair of parallel spaced pivot plates pivotally mounted at ends thereof to said side walls, a latch hook having a pivot slot and a latch pivot pin through said slot pivotally securing said hook at an end thereof to portions of said pivot plates, a hub having a rotatable mounting in said hub recesses and a hook actuator linkage comprising a radially extending arm on the hub, a link pivotally secured at one end to the arm, a plate pivotally mounted on said latch pivot pin and having a separate pivot connection to the other end of said link, said last plate having an opening therein, said pivot plates having matched oblique slots therein, a pivot pin connection in the pivot slot of the hook and extending through said oblique slots and said opening, said pivot pin connection upon rotation of said hub in the hub recess being adapted to move said hook between extended and retracted positions in response to a shifting of said pin connection by movement of said last plate.

4. A sliding door latch comprising a housing having opposite side walls, said side walls having aligned hub recesses therein, a pair of parallel spaced pivot plates pivotally mounted at lower ends thereof to said side walls, a latch hook having a pivot slot and a latch pivot pin through said slot pivotally securing said hook at an inner end thereof to portions of said pivot plates, a hub having a rotatable mounting in said hub recesses and a hook actuator linkage comprising a radially extending arm on the hub, a link pivotally secured at one end to the arm, a cam plate pivotally mounted on said latch pivot pin and having a separate pivot connection to the other end of said link, said cam plate having a cam opening therein, said pivot plates having matched oblique slots therein, a pivot pin connection in the pivot slot of the hook and extending through said oblique slots and said cam opening, said pivot pin connection upon rotation of said hub in the hub recess being adapted to move said hook between extended and retracted positions in response to a shifting of said pin connection by movement of said cam plate.

5. A sliding door latch comprising a housing having opposite side walls, said side walls having aligned elongated

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gated hub recesses therein, a pair of parallel spaced pivot plates pivotally mounted at ends thereof to said side walls, a latch hook having a pivot slot and a latch pivot pin through said slot pivotally securing said hook at an end thereof to portions of said pivot plates, a hub having a slidable and rotatable mounting in said hub recesses and a hook actuator linkage comprising a radially extending arm on the hub, a link pivotally secured at one end to the arm, an intermediate plate pivotally mounted on said latch pivot pin and having a separate pivot connection to the other end of said link, said intermediate plate having an opening therein, said pivot plates having matched oblique slots therein, a pivot pin connection in the pivot slot of the hook and extending through said oblique slots and said opening, said pivot pin connection upon movement of said hub when in any position thereof in the hub recess being adapted to move said hook between extended and retracted positions in response to a shifting of said pin connection by movement of said intermediate plate.

6. A sliding door latch comprising a housing having opposite side walls and a transverse wall between said side walls having a latch opening therein, said side walls having aligned elongated hub recesses therein, a pair of parallel spaced pivot plates pivotally mounted at lower ends thereof to said side walls, a latch hook having a pivot slot and a latch pivot pin through said slot pivotally securing said hook at an inner end thereof to inward portions of said pivot plates, said hook having an upwardly open recess when extended, a hub having a slidable and rotatable mounting in said hub recesses and a hook actuator linkage comprising a radially extending arm on the hub, a link pivotally secured at one end to the arm, a cam plate pivotally mounted on said latch pivot pin and having a separate pivot connection to the other end of said link, said cam plate having a cam opening therein forming a camway, said pivot plates having matched oblique slots therein, a pivot pin connection in the pivot slot of the hook and extending through said oblique slots and said cam opening, said pivot pin connection upon movement of said hub when in any position thereof in the hub recess being adapted to move said hook between extended and retracted positions in response to a shifting of said pin connection by movement of said cam plate.

7. A sliding door latch comprising a housing having opposite side walls, said side walls having hub recesses therein, at least one pivot plate pivotally mounted to one of said side plates, a latch hook having a pivot slot and a latch pivot pin through said slot pivotally securing said hook at an inner end thereof to a portion of said pivot plate, a hub having a rotatable mounting in said hub recesses, a hook actuator linkage, a cam plate pivotally mounted on said latch pivot pin and having a separate connection to the linkage, said pivot plate having a slot therein and a communicating dead lock recess at an end of said slot, a lock pin retainer block having a slot in a position of engagement with the latch pivot pin, a pivot pin connection on said block extending through said slot, spring means acting between said pivot pin connection and said pivot plate adapted to releasably force said pivot pin connection into said dead lock recess whereby to inhibit downward rotation of said hook from extended position, and a camming connection between said linkage and said pivot pin connection adapted upon movement in response to hub rotation to release the pivot pin connection from the dead lock recess.

8. A sliding door latch comprising a housing having opposite side walls, said side walls having hub recesses therein, at least one pivot plate pivotally mounted to one of said side plates, a latch hook having a pivot slot and a latch pivot pin through said slot pivotally securing said hook at an inner end thereof to a portion of said pivot plate, a hub having a rotatable mounting in said hub recesses, a hook actuator linkage, a cam plate pivot-

ally mounted on said latch pivot pin and having a separate connection to the linkage, said cam plate having a camway therein, said pivot plate having a slot therein and a substantially horizontal communicating dead lock recess at an end of said slot, a lock pin retainer block having a slot engaging over the latch pivot pin, a pivot pin connection on said block extending to a position adjacent said cam opening and through said slot, spring means acting between said pivot pin connection and said pivot plate adapted to releasably force said pivot pin connection into said dead lock recess whereby to inhibit downward rotation of said hook from extended position, said camway being adapted upon movement in response to hub rotation to release the pivot pin connection from the dead lock recess.

9. A sliding door latch comprising a housing having opposite side walls and a transverse wall between said side walls having a latch opening therein, said side walls having aligned hub recesses therein, a pair of parallel spaced pivot plates pivotally mounted at lower ends thereof to said side plates, a latch hook having a pivot slot and a latch pivot pin through said slot pivotally securing said hook at an inner end thereof to inward portions of said pivot plates, said hook having an upwardly open recess when extended, a hub having a slidable and rotatable mounting in said hub recesses, a hook actuator linkage comprising a link pivotally secured at one end to said hub off center relative to the hub rotation axis, a cam plate pivotally mounted on said latch pivot pin and having a separate pivot connection to the other end of said link, said cam plate having a camway therein, said pivot plates having matched slots therein and substantially horizontal communicating dead lock recesses at corresponding ends of said slots, a lock pin retainer block having a slot engaging over the latch pivot pin, a pivot pin connection on said block extending to a position adjacent said cam opening and through said slots, spring means acting between said block and said pivot plates adapted to releasably force said pivot pin connection into said dead lock recesses whereby to inhibit downward rotation of said hook from extended position, said cam plate and camway being adapted upon movement in response to hub rotation to release the pivot pin connection from the dead lock recesses and to move said hook between extended and retracted positions.

10. A sliding door latch comprising a housing having opposite side walls and a transverse member between said side walls having a latch opening therein, said side walls having aligned hub recesses therein, at least one pivot plate pivotally mounted on said side wall, a latch hook having a pivot slot and a latch pivot pin extending through said slot pivotally securing said hook at an inner end thereof to said pivot plate, a hub having a rotatable mounting in said hub recesses and a hook actuator linkage, a cam plate pivotally mounted on said latch pivot

pin and having a separate pivot connection to the linkage, said cam plate having a camway thereon, said pivot plate having a slot therein, a pivot pin connection in the pivot slot of the hook and extending through said slot and to a position adjacent said camway, said pivot pin connection upon movement of said hub in the hub recess being adapted to move said hook between extended and retracted positions in response to a shifting of said pin connection by movement of said cam plate, a bracket member on said pivot plate having an opening therein and having the axis thereof parallel to permitted pivotal movement of said pivot plate, and a screw opening in said transverse member, and a screw rotatably mounted in one of said members having a threaded engagement with the other of said members whereby upon rotation to shift the extended position of the hook in response to displacement of said latch pivot pin in a corresponding direction.

11. A sliding door latch comprising a housing having opposite side walls and a transverse wall between said side walls having a latch opening therein, said side walls having aligned elongated hub recesses therein, a pair of parallel spaced pivot plates pivotally mounted on said side walls, a latch hook having a pivot slot and a latch pivot pin extending through said slot pivotally securing said hook to portions of said pivot plates, a hub having a slidable and rotatable mounting in said hub recesses and a hook actuator linkage, a cam plate pivotally mounted on said latch pivot pin and having a separate pivot connection to said linkage, said cam plate having a camway thereon, said pivot plates having matched oblique slots therein, a pivot pin connection in the pivot slot of the hook and extending through said oblique slots and adjacent said camway, said pivot pin connection upon movement of said hub when in any position thereof in the hub recess being adapted to move said hook between extended and retracted positions in response to a shifting of said pin connection by movement of said cam plate, a bracket on at least one of said pivot plates having a threaded opening therein and having the axis thereof substantially parallel to the direction of permitted pivotal movement of said pivot plates, and a screw rotatably mounted in the transverse wall of said housing having a threaded engagement with said bracket whereby to shift the extended position of the hook in response to displacement of said latch pivot pin in a corresponding direction.

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