

[54] DUAL ACTION NIGHT LATCH AND LOCK

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[57] ABSTRACT

A dual action night latch and lock assembly which is adapted to be secured to the interior surface of a door separate from a knob and latch bolt assembly and acting to latch or lock the door in closed position. The assembly is actuated by a handle on the interior of the door forming an extension of an actuator for a reciprocable bolt or by a key-actuated tumbler lock on the exterior surface of the door. The reciprocable bolt is spring-biased to a normal latched position, and the handle and actuator are movable between three positions: the normal latch position, a bolt retracted position and a dead locked position. The actuator and handle includes a detent to retain the actuator in any one of its three positions.

12 Claims, 25 Drawing Figures

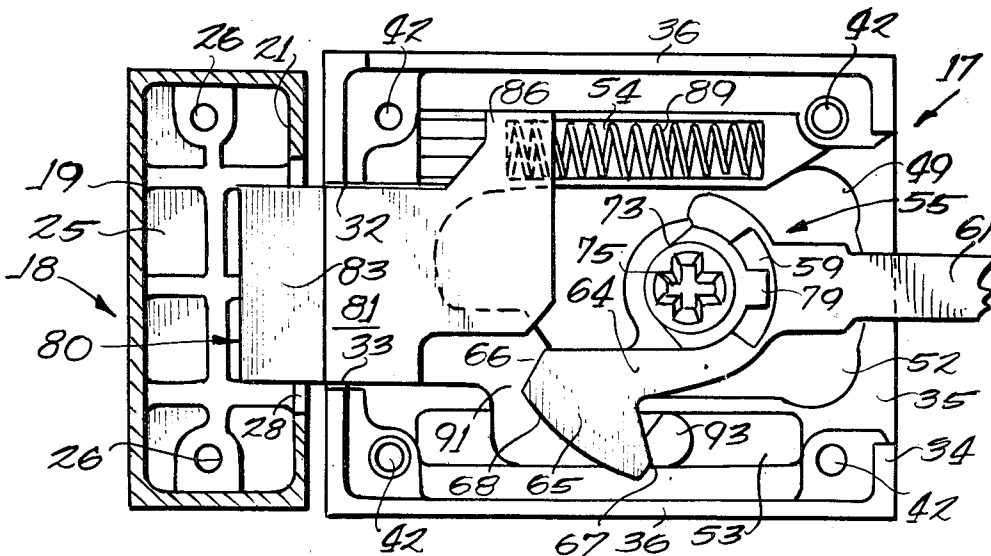


Fig. 6.

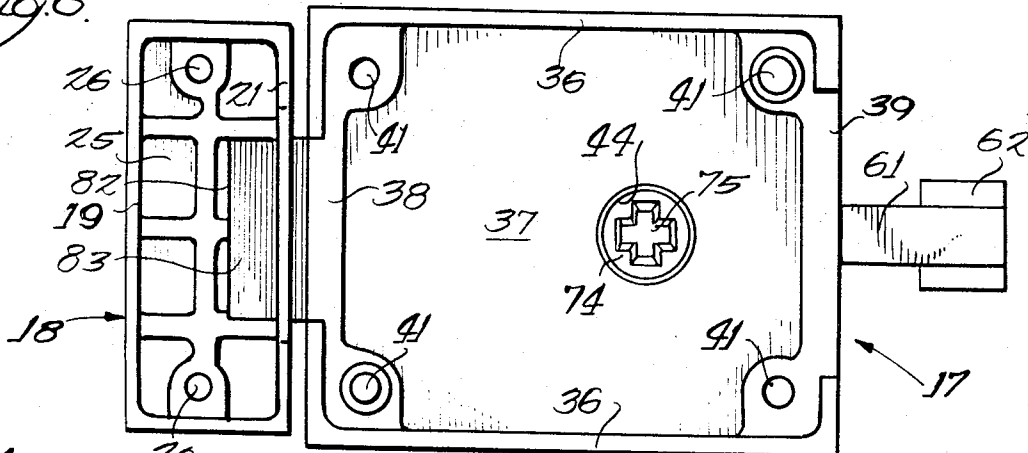


Fig. 7.

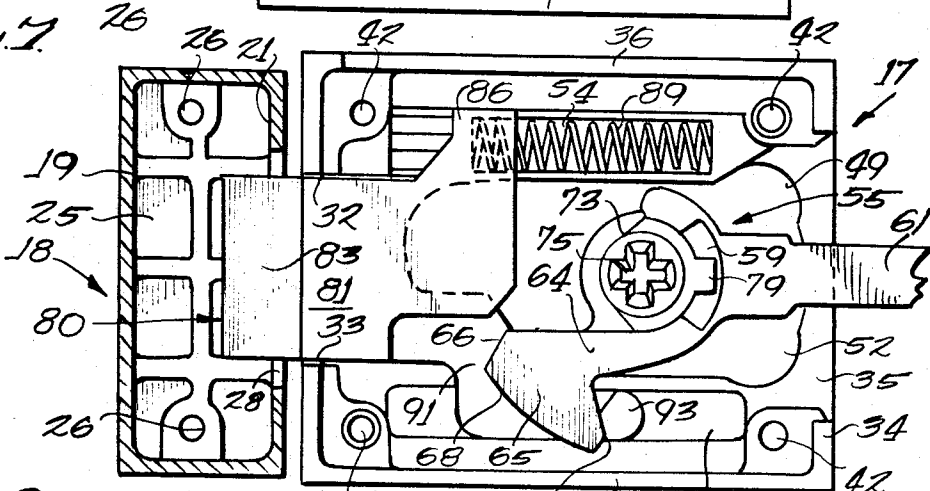
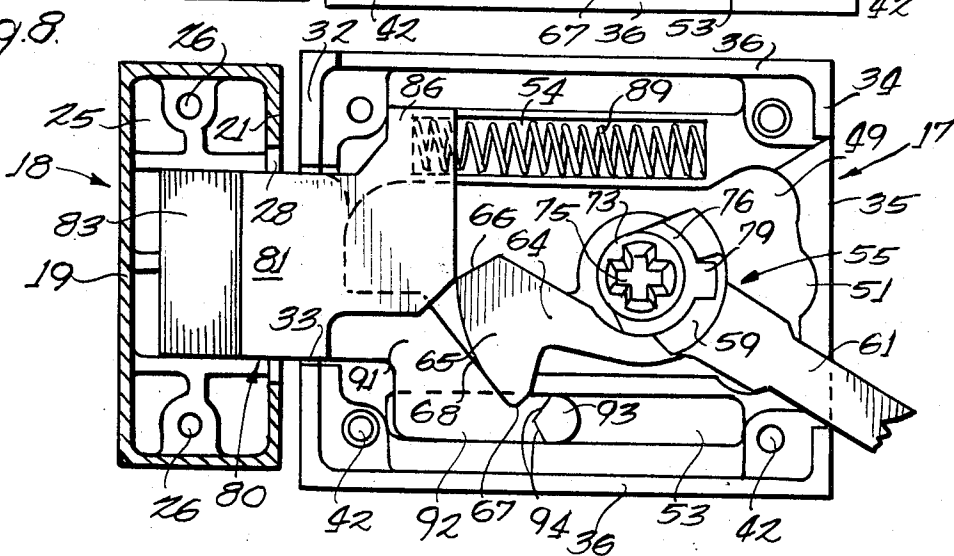
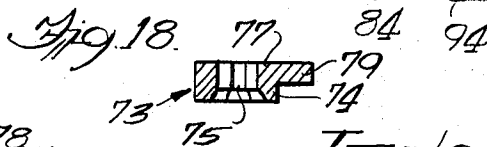
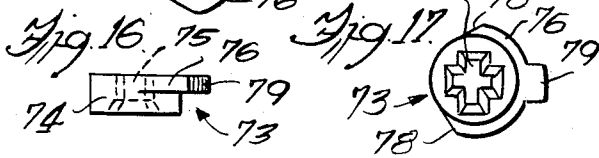
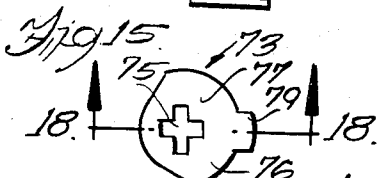
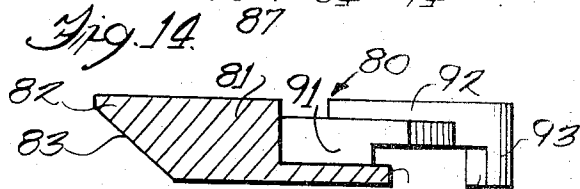
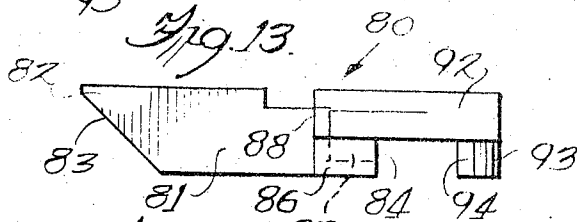
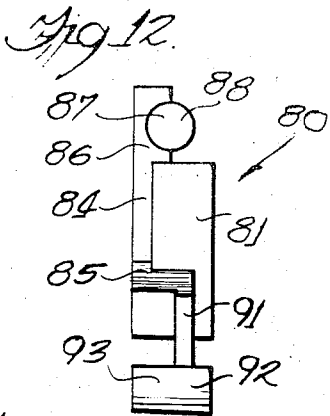
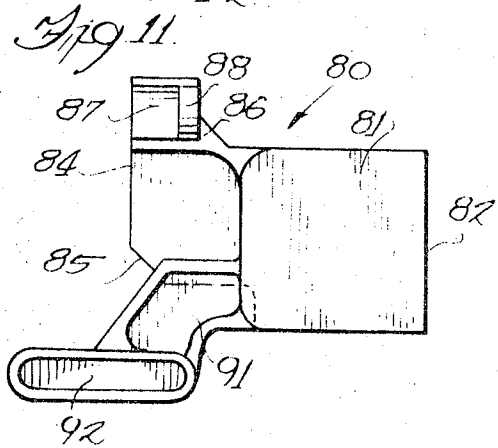
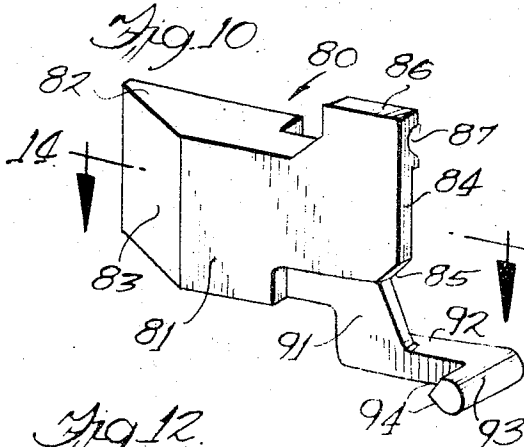
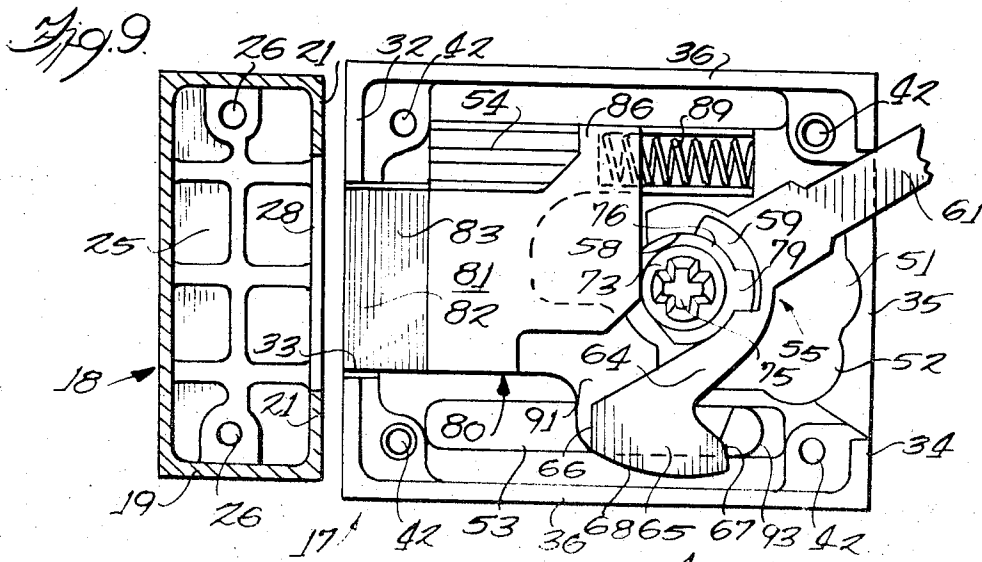


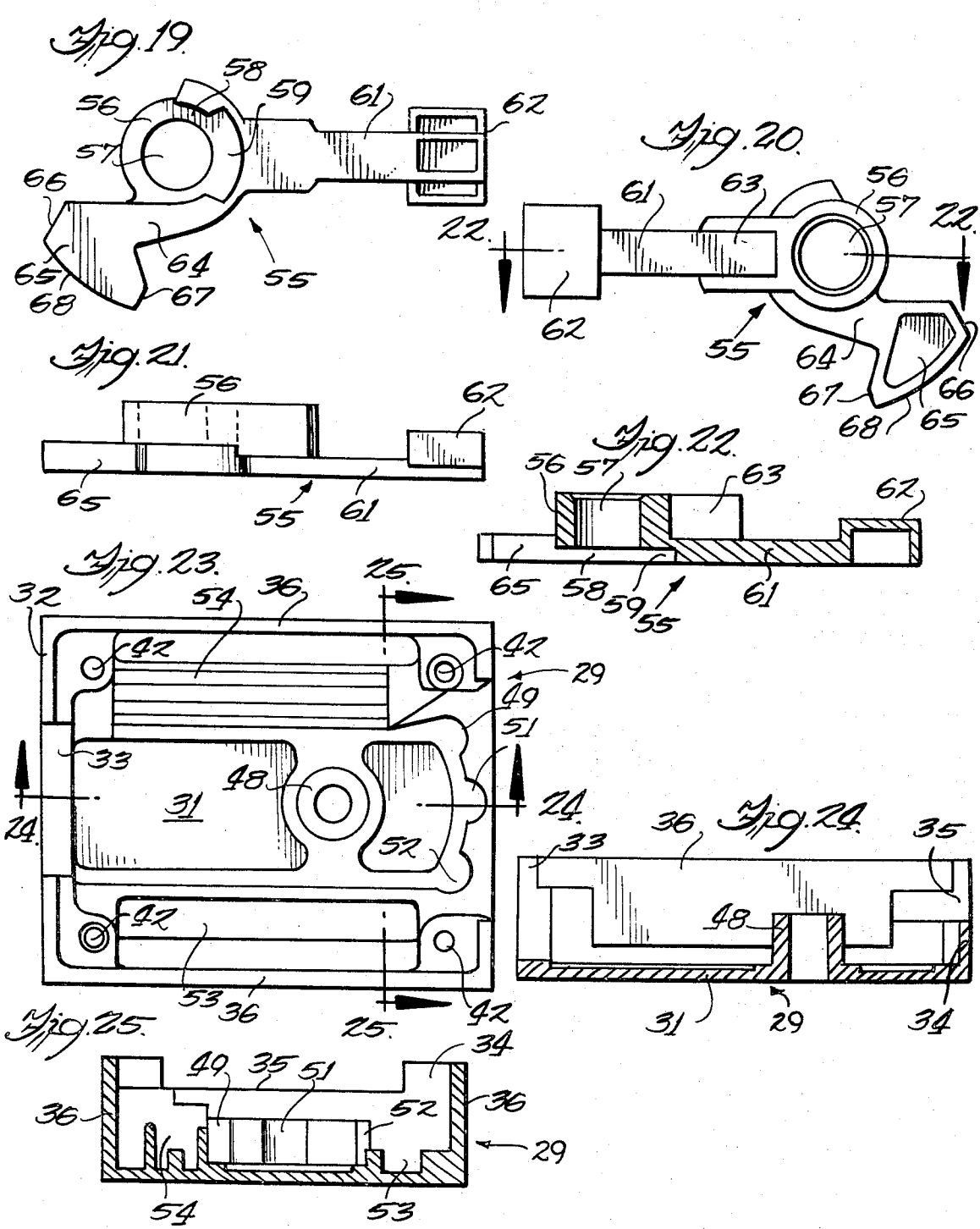
Fig. 8.



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DUAL ACTION NIGHT LATCH AND LOCK

The present invention relates to a latch bolt assembly and more particularly to a dual action night latch and lock assembly to be mounted on a door and actuated from the interior by an actuating handle or by a key-actuated tumbler lock at the exterior of the door.

Among the objects of the present invention is the provision of a novel dual action night latch and lock assembly which will act either as a spring bolt lock or a dead bolt lock. The assembly is secured onto the interior surface of a door with a strike secured to the door jamb. The assembly includes a spring-biased reciprocable latch bolt projecting from one end of a lock housing to enter an opening in the strike. The latch bolt is controlled by an actuator rotatably mounted within the lock housing and having a handle integral therewith and extending from the end of the housing opposite the latch bolt.

Another object of the present invention is the provision of a dual action night latch and lock assembly where the position of the actuator determines the function of the lock. The actuator is rotatable between three positions to provide a normal latch position for the latch bolt, an unlatched position with the bolt being held in retracted position and a dead lock position.

A further object of the present invention is the provision of a dual action night latch and lock assembly providing a positive direct actuation of the latch bolt. The actuator acts directly on the latch bolt to either retract the bolt from its latched position or to advance the latch bolt to a dead-locked position where the bolt is projected farther out of its housing and retained against retraction. The actuator includes a detent cooperating with detent notches in the housing to retain the actuator in any one of its three positions.

The present invention also comprehends the provision of a dual action night latch and lock assembly which is actuated from the exterior of the door by a key-actuated tumbler lock. The tumbler lock includes a rotatable plug rotating a tail piece extending through the door to engage an idler in the lock housing. The idler acts upon the actuator which in turn directly actuates the latch bolt and the idler is provided with a limited amount of lost motion in conjunction with the actuator.

Further objects are to provide a construction of maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

In the drawings:

FIG. 1 is a partial perspective view of a door and jamb with the dual action night latch and lock assembly and strike of the present invention secured thereto.

FIG. 2 is a front elevational view of the lock assembly and strike.

FIG. 3 is a bottom plan view of the lock assembly and strike with the door in cross section.

FIG. 4 is an end elevational view of the lock assembly with the door in cross section and showing the actuating handle.

FIG. 5 is an enlarged horizontal cross sectional view of the lock assembly and strike taken on the line 5—5 of FIG. 2.

FIG. 6 is an enlarged rear elevational view of the lock assembly and strike.

FIG. 7 is an enlarged vertical cross sectional view taken on the line 7—7 of FIG. 3 and showing the lock components in the latched position.

FIG. 8 is a view similar to FIG. 7 but showing the components in the dead locked position.

FIG. 9 is a view similar to FIG. 7 but showing the components in the unlatched position.

FIG. 10 is a perspective view of the reciprocable latch bolt.

FIG. 11 is a rear elevational view of the latch bolt.

FIG. 12 is an end elevational view of the latch bolt taken from the left hand side of FIG. 11.

FIG. 13 is a top plan view of the latch bolt.

FIG. 14 is a horizontal cross sectional view of the latch bolt taken on the line 14—14 of FIG. 10.

FIG. 15 is a front elevational view of the idler.

FIG. 16 is a top plan view of the idler.

FIG. 17 is a rear elevational view of the idler.

FIG. 18 is a horizontal cross sectional view of the idler taken on the line 18—18 of FIG. 15.

FIG. 19 is a front elevational view of the actuator.

FIG. 20 is a rear elevational view of the actuator.

FIG. 21 is a bottom plan view of the actuator.

FIG. 22 is a horizontal cross sectional view of the actuator taken on the line 22—22 of FIG. 20.

FIG. 23 is a rear elevational view of the housing.

FIG. 24 is a horizontal cross sectional view of the housing taken on line 24—24 of FIG. 23.

FIG. 25 is a vertical cross sectional view of the housing taken on the line 25—25 of FIG. 23.

Referring more particularly to the disclosure in the drawings wherein is shown an illustrative embodiment of the present invention, FIG. 1 discloses a door or closure 10 hinged within a door jamb 11 to provide entry into a building or structure or to a room within the structure. A pair of conventional door knobs 12, 12 actuate a latch bolt 13 projecting from the edge 14 of the door to cooperate with a strike plate 15 secured on the door jamb 11. Secured to the interior surface 16 of the door adjacent the edge 14 and spaced above the knob 12 is a dual action night latch and lock assembly 17 adapted to cooperate with a strike 18 mounted on the door jamb 11 in alignment with the assembly 17.

The strike 18 is formed as a generally rectangular hollow housing 19 having one wall 21 extending beyond the housing to form a mounting flange 22 engaging the edge 23 of the door jamb 11. The flange 22 has one or more openings adapted to receive screws 24, extending into the edge 23 of the jamb (FIG. 5), and one or more openings 26 are formed in the top wall 25 of the strike to receive securing screws 27 (see FIGS. 1, 2 and 6-9). The wall 21 is also provided with a large rectangular opening 28 adapted to receive the projecting end of a bolt as will be later described.

The dual action night latch and lock assembly 17 includes a generally rectangular housing 29 having a front wall 31 which can be decorated in any suitable manner to provide an ornamental appearance thereto. The housing includes an end wall 32 facing the strike 18 and having an opening 33 therein aligned with the opening 28 in the wall 21 of the strike. An opposite end wall 34 has an elongated slot 35 therein, and edges 36, 36 join the end walls 32 and 34.

The housing 29 is open toward the door 10 and a base plate 37 is conformably received within and secured to the housing 29 and has oppositely extending tongues 38 and 39 received in the opening 33 and the

slot 35, respectively, to position and locate the base in the housing and to limit the extent of the opening 33 and the slot 35. The base plate has openings 41 at the corners thereof aligned with openings 42 in the housing 29 to receive suitable securing means, such as the screws 43, to secure the assembly to the interior surface 16 of the door or closure 10. The base plate 37 also has an opening 44 to receive an idler as will be later described, and the door 10 has a passage 45 there-through for a tailpiece 47 of a tumbler lock 46 suitably secured within the exterior surface of the door 10.

The housing 29 is provided with an annular projection 48 (FIG. 5) providing an axis of rotation for the actuating mechanism, which axis is aligned with the opening 44 in the base plate 37. In the end wall 34 are formed three arcuately spaced detent recesses 49, 51, 52 (FIGS. 7 and 8). A longitudinally extending guide recess 53 extends parallel adjacent one edge 36, and a second longitudinal recess 54 is parallel to the opposite edge 36.

The actuating mechanism includes a rotatable actuator 55 (FIGS. 7, 8, 19-22) provided with a central generally circular portion 56 having an opening 57 receiving the annular projection 48 in the housing, and provided on the side facing the base 37 with a generally circular recess 58 (FIG. 22) having an arcuate extension 59 on one side of an arc of approximately 60°. Extending from the portion 56 and aligned with the arcuate extension 59 is an elongated handle 61 terminating in an enlarged end 62. On the side of the handle opposite the recess 58 is a generally U-shaped recess 63 receiving a spring-biased detent 69 (FIG. 5). Extending from the circular portion 56 at an obtuse angle from the handle 61 is a camming arm 64 (FIGS. 19, 20) terminating in an enlarged end 65 having a camming surface 66 and a retracting surface 67 joined by a curved outer surface 68.

The spring-biased detent 69 includes a detent ball 71 located at the open end of the recess 63 and a compression spring 72 positioned within the recess. The ball 71 is of a size to be retractable within the recess 63 but is normally urged into engagement within one of the three detent recesses 49, 51 or 52 formed in the housing 29. The handle 61 of the actuator 55 extends through the slot 35 in the end wall 34 where the enlarged end 62 can be manually grasped to actuate the lock assembly.

Received within the recess 58 in the actuator 55 is an irregularly shaped idler 73 shown in FIGS. 6, 7, 8, 15 through 18. The idler 73 has a circular body 74 with a generally cruciform or cross-shaped passage 75 there-through to receive the rear end of the tailpiece 47 (FIG. 5). The body 74 is conformably received within the opening 44 so as to be rotatable therein. An enlarged arcuate flange 76 is formed adjacent one face 77 of the body 74 and extending over an arc of approximately 180°. At a point intermediate the ends 78 of the flange 76 is provided a radially extending tongue 79; the flange 76 being received in the recess 58 and the tongue 79 received in the arcuate extension 59. Thus, there is a limited amount of lost motion between the idler 73 and the actuator 55 through the tongue 79 and the arcuate extension 59.

A latch bolt 80 (FIGS. 10-14) is reciprocally mounted in the housing 29 having a bolt body 81 with an outer end 82 provided with an inclined camming surface 83 which normally projects through the open-

ing 33 in the end wall 32 and the opening 28 in the wall 21 into the strike 18 to cooperate therewith in latching or locking the door. The rear edge 84 of the bolt body 81 has an inclined camming surface 85 adapted to cooperate with the actuator 55 in a manner to be later described. Laterally extending from the body 81 opposite to the camming surface 85 is a spring arm 86 having a semi-circular recess 87 therein with an end wall 88. This arm is aligned with the elongated recess 54 within the arcuate portion of the end wall 88 received in the recess. A compression spring 89 is positioned in the recess 54 and extends into the recess 87 to abut the end wall 88 and bias the bolt 80 to its latched position shown in FIG. 7.

Laterally extending from the bolt body 81 opposite to the spring arm 86 is an offset guide arm 91 terminating in an elongated guide 92 parallel to the bolt 80 and received within the guide recess 53 in the housing 29. Extending inwardly toward the base plate 37 and located at the free end of the guide 92 is a camming abutment 93 having angular intersecting camming surfaces 94, 94 facing the end wall 32 of the housing.

Assembling the latch structure, the compression spring 89 is positioned in the recess 54 and the latch bolt 80 seated in the housing 29 with the spring 89 entering the recess 87 and abutting the end wall 88, and the elongated guide 92 is located in the guide recess 53. The spring 72 and detent ball 71 are positioned in the recess 63 in the actuator 55, and the actuator is located on the projection 48 in the housing with the front housing wall 31 acting to retain the spring 72 and ball 71 in the recess 63. Then the idler 73 is positioned on the actuator 55 with the flange 76 in the recess 58 and the tongue 79 in the arcuate extension 59. Lastly, the base plate 37 is inserted into the open side of the housing 29 with the tongue 38 positioned in the opening 33 and the tongue 39 in the slot 35. The assembled unit 17 is then secured to the door 10 by the screws 43 passing through the openings 41 and 42, and the strike 18 is aligned and secured to the door jamb 11.

FIGS. 5 and 7 disclose the position of the actuator 55 with the bolt 80 in its latched position. The recesses 49, 51 and 52 are spaced apart by equal angles of approximately 30°, and the detent 69 is engaged in the center recess 51. In the latched position, the bolt 80 can be urged inward into the housing 29 against the force of the spring 89 without any obstruction by the actuator 55, as when the door is moved to closed position and the camming surface 83 engages the strike 18 to retract the bolt until the opening 28 is aligned with the opening 33 and the bolt. This position then is the normal latching position for the assembly 17.

To positively retract the bolt 80 to its unlatched position shown in FIG. 9, the handle 61, 62 is rotated approximately 30° counterclockwise so that the detent 69 engages the detent recess 49 and retains the actuator 55 in that position. As the handle and actuator are rotated, the camming arm 64 and end 65 are rotated downward so that the retracting surface 67 engages the lower camming surface 94 on the abutment 93 of the elongated guide 92 to urge the guide 92 and integral bolt 80 rearwardly with the guide 92 moving in the guide recess or track 53. The spring arm 86 also moves rearwardly to compress the spring 89. When retracted, the bolt 80 will remain in the unlatched position as the spring 89 cannot overcome the retaining force of the detent 69 engaging the recess 49. To return the bolt 80

to its latched position, the handle 61 and actuator 55 must be manually rotated clockwise until the detent 69 again engages the recess 51; the spring 89 acting on the arm 86 urging the bolt to its projected position.

The bolt 80 can also be projected an additional distance beyond the latching position to a dead locked position as seen in FIG. 8. To move to the dead locked position, the handle 61 and actuator 55 are rotated approximately 30° in a clockwise direction so that the detent 69 engages the recess 52. The cam arm 64 and end 65 move arcuately upward with the camming surface 66 on the end 65 engaging the camming surface 85 on the bolt body 81 to cam the bolt 80 forwardly to an advanced position. The end of the curved surface 68 moves partially behind the rear edge 84 of the bolt 80 to prevent the bolt from being retracted from the advanced deadlocked position.

As an example, if the bolt end 82 is projected approximately nine-sixteenths inch beyond the housing 29 in the latched position, the bolt in the dead locked position may be projected as much as 1 inch beyond the housing. This also provides that the camming surface 83 is moved entirely within the strike 18 where it cannot be engaged by a lock picking tool to retract the bolt from the exterior side of the door 10. To retract the bolt 80 from the deadlocked position, the handle 61 and actuator 55 must be manually rotated counterclockwise until the detent 69 again engages the recess 51 in the housing.

Operation of the latch bolt 80 to either the unlatched or the deadlocked position may also be effected by key actuation of the tumbler lock 46 at the exterior of the door. Rotation of the lock plug and the tailpiece 47 will directly rotate the idler 73 in either direction. The idler 73 is shown in its neutral position in FIGS. 7, 8 and 9 with the tongue 79 generally horizontally aligned with the detent recess 51. Considering FIG. 7, rotation of the idler 73 and its integral tongue 79 in a counterclockwise direction will cause the tongue to engage the upper edge of the arcuate recess extension 59 to rotate the actuator 55 in a counter-clockwise direction to the position of FIG. 9 to retract the bolt 80 to its unlatched position.

As the actuator 55 is only rotated approximately 30° and the arcuate length of the recess 59 is approximately 60°, the idler 73 can be rotated in the opposite direction to return to its neutral position without affecting the actuator 55; the position of the actuator 55 and the neutral position of the idler being shown in FIG. 9. Rotation of the idler 73 from its neutral position in a clockwise direction will cause the tongue 79 to engage the lower edge of the recess 59 and rotate the actuator 55 back to the position of FIG. 7, at which time the idler 73 can be rotated in the opposite direction to its neutral position due to the lost motion arrangement between the tongue 79 and the arcuate recess extension 59 in the actuator.

From the position shown in FIG. 7, rotation of the idler 73 in the clockwise direction will rotate the actuator 55 to advance the bolt 80 to its deadlocked position as seen in FIG. 8; the tongue 79 engaging the lower end of the arcuate extension 59. The lost motion arrangement allows return of the idler 73 to its neutral position as shown in FIG. 8, and counterclockwise rotation of the idler from the position of FIG. 8 will return the actuator 55 and the bolt 80 to the latching position of FIG. 7. In all positions of the actuator 55, whether mo-

tivated by the handle 61 or by the idler 73 through the tailpiece 47 and key-actuated tumbler lock 46, the detent 69 and cooperating with any one of the three detent recesses 49, 51 or 52 positively retains the actuator in the selected position.

Having thus disclosed my invention, I claim:

1. A dual action night latch and lock assembly for a door hingedly mounted in a frame therefor, comprising a housing secured to the interior of the door and having an opening at one end and an elongated slot at the opposite end, a strike secured to the door frame having an opening facing the opening in said housing, a bolt reciprocally mounted in the housing and resiliently biased to project through said opening in the housing and enter the opening in said strike in a latched position, an actuator rotatably mounted in said housing and cooperating with said bolt to either retract the bolt to an unlatched position or advance the bolt to a dead locked position, a handle integral with said actuator and extending through said slot in the housing for manual actuation thereof, three arcuately spaced recess means in said housing adjacent said slot, said handle including spring biased detent means facing said recesses for engagement with any one of said recesses to selectively position and retain said actuator in any one of the three positions for said bolt.

2. A dual action night latch and lock assembly as set forth in claim 1, in which said bolt has a forward end with a camming surface thereon, and a rear edge, a laterally offset spring arm integral with said bolt, and a compression spring engaging said spring arm to bias said bolt to latched position.

3. A dual action night latch and lock assembly as set forth in claim 1, in which said bolt has a generally laterally extending guide arm terminating in an elongated guide extending parallel to said bolt, said housing having an elongated recess therein to receive said guide, and a cam projection on said guide cooperating with said actuator for retraction of said bolt.

4. A dual action night latch and lock assembly as set forth in claim 3, in which said actuator has a camming arm thereon terminating in an enlarged end, a retracting surface on said end adapted to engage said cam projection upon rotation of said actuator to retract said bolt to the unlatched position.

5. A dual action night latch and lock assembly as set forth in claim 4, in which said enlarged end has a forward camming surface, and said bolt has a rearward camming surface thereon adapted to be engaged by said actuator camming surface to advance said bolt to the deadlocked position upon rotation of said actuator in the opposite direction.

6. A dual action night latch and lock assembly as set forth in claim 5, in which said bolt in the dead-locked position is retained against retraction except upon rotation of said actuator, and in the latched position is allowed to be retracted into said housing without rotation of said actuator.

7. A dual action night latch and lock assembly as set forth in claim 1, in which said actuator has a circular recess with an arcuate extension therein, and an idler rotatably mounted in said housing and received in said recess, a tongue on said idler received in said arcuate extension to provide limited lost motion for said idler.

8. A dual action night latch and lock assembly as set forth in claim 7, in which said idler has a central passage therethrough, a key-activated tumbler lock

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mounted in said door, and a tailpiece rotated by said lock and extending through said door and into said passage in the idler.

9. A dual action night latch and lock assembly as set forth in claim 8, in which actuation of said tumbler lock will rotate said idler and cause rotation of said actuator to shift said bolt between the latched, unlatched and deadlocked positions.

10. A dual action night latch and lock assembly as set forth in claim 1, in which said strike includes a hollow housing receiving the end of said bolt and secured to the interior surface of said frame, and a flange on said strike housing extending onto and secured on the edge of said frame facing the door.

11. A dual action night latch and lock assembly for a door hingedly mounted in a frame therefor, comprising a housing secured to the interior of the door and having an opening at one end and an elongated slot at the opposite end, a strike secured to the door frame having an opening facing the opening in said housing, a bolt reciprocably mounted in the housing and biased to project through said opening in the housing and enter the opening in said strike in a latched position, an actuator rotatably mounted in said housing and cooperating with said bolt to either retract the bolt to an unlatched position or advance the bolt to a dead locked position, said bolt having a generally laterally extending guide arm terminating in an elongated guide extending parallel to said bolt, said housing having an elongated recess therein to receive said guide, said guide includ-

ing a cam projection thereon for cooperation with said actuator to retract said bolt, a handle integral with said actuator and extending through said slot in the housing for manual actuation thereof, and means to selectively position and retain said actuator in any one of three positions for said bolt.

12. A dual action night latch and lock assembly for a door hingedly mounted on a frame therefor comprising a housing secured to the interior of the door and having an opening at one end, an elongated slot at the opposite end, a strike secured to the door frame having an opening facing the opening in said housing, a bolt reciprocably mounted in the housing and biased to project through said opening in the housing and enter the opening in said strike in a latched position, an actuator rotatably mounted in said housing and cooperating with said bolt to either retract the bolt to an unlatched position or advance the bolt to a dead locked position, said actuator including a circular recess with an arcuate extension therein, a handle attached to said actuator and extending through said slot in the housing for manual actuation thereof, means to selectively position and retain said actuator in any one of a plurality of positions for said bolt, and idler means rotatably mounted in said housing and received in said actuator recess, said idler means including a tongue received in said arcuate extension to provide limited lost motion for said idler means.

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