April 8, 1969 R. W. WALTERS 3,437,364

SLIDING DOOR LOCK ASSEMBLY

Filed Sept. 21, 1967 Sheet 1 of 3

Fig. 1

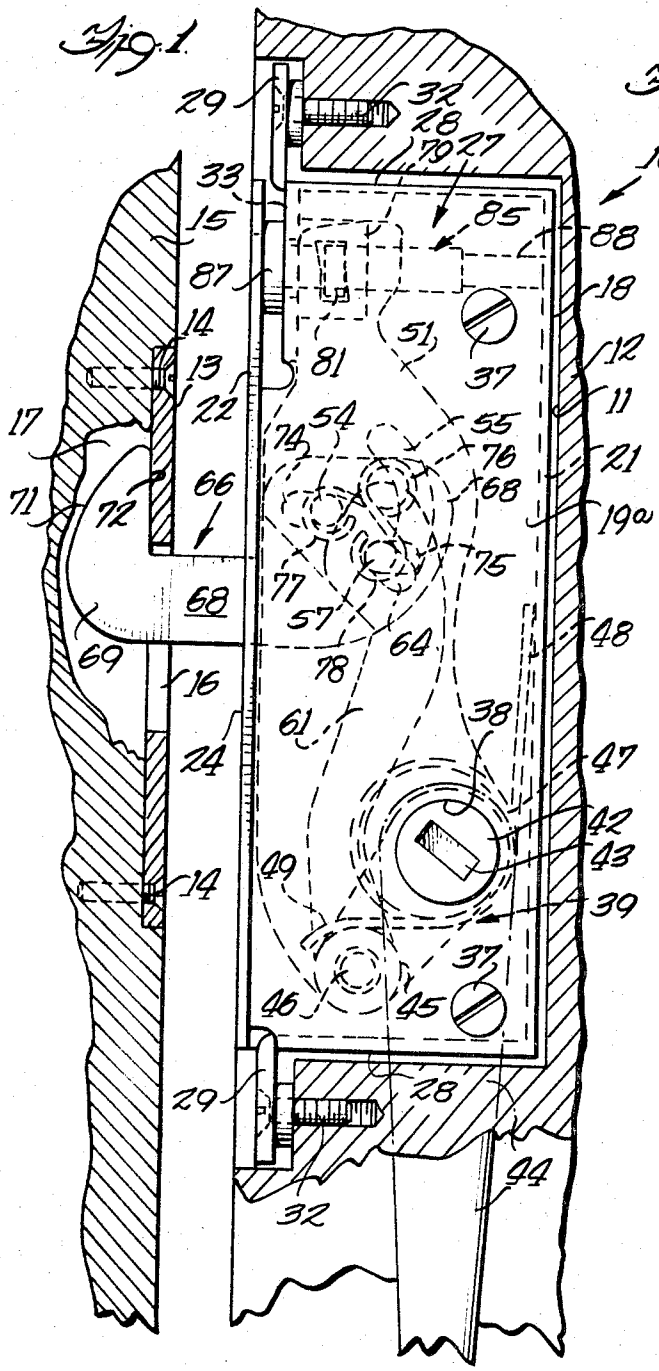
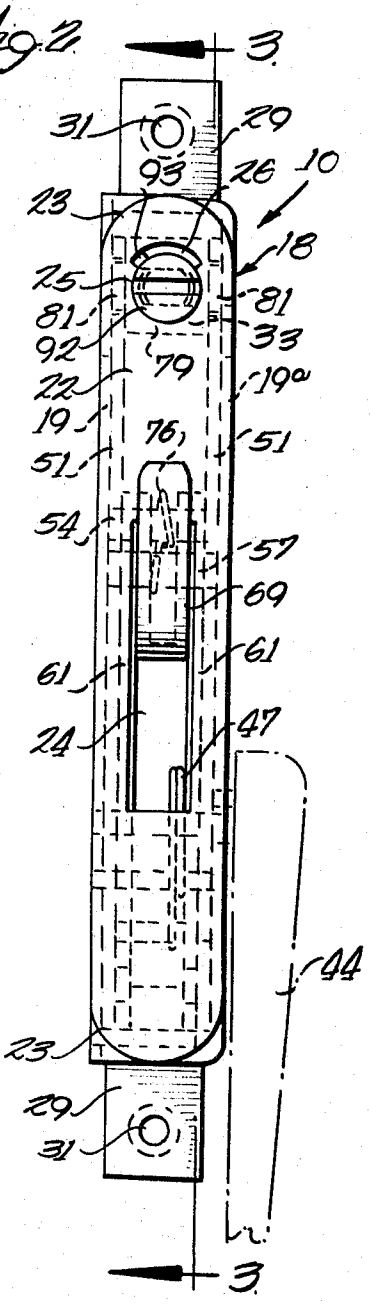


Fig. 2



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SLIDING DOOR LOCK ASSEMBLY

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Fig. 3

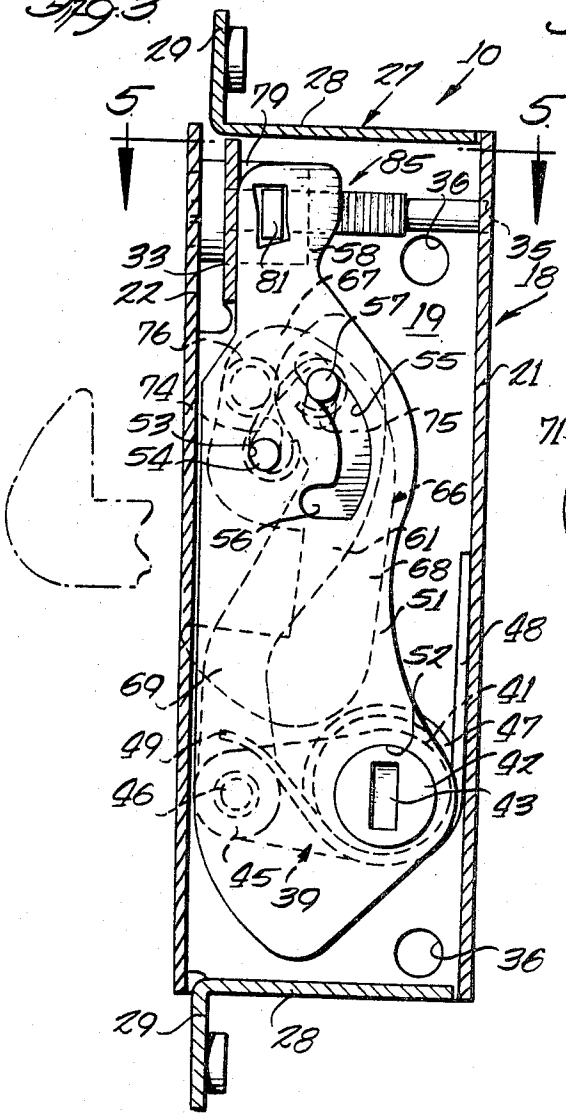


Fig. 4

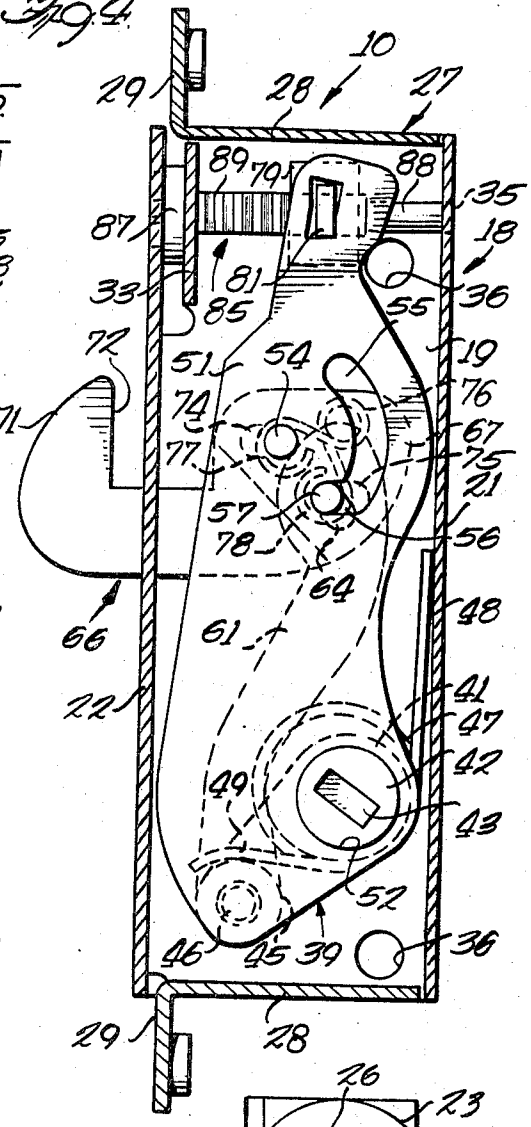


Fig. 5

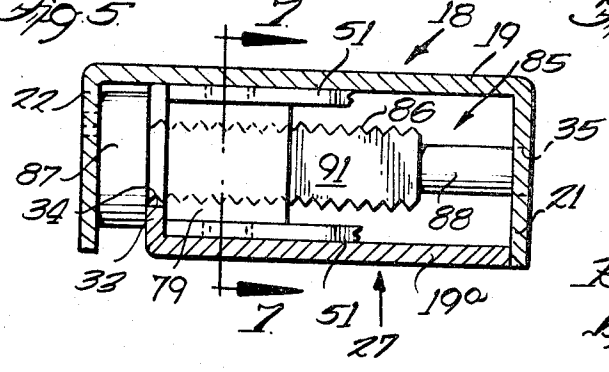
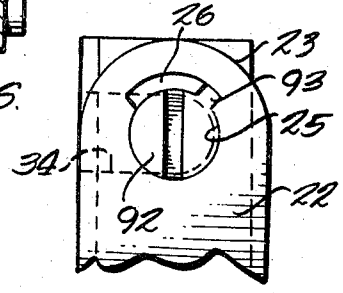


Fig. 6



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Fig. 7.

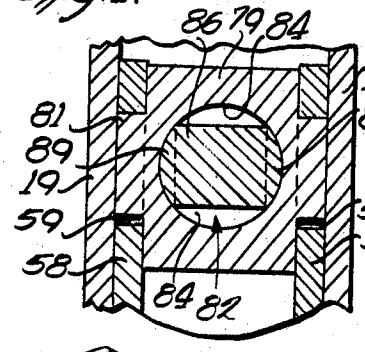


Fig. 8.

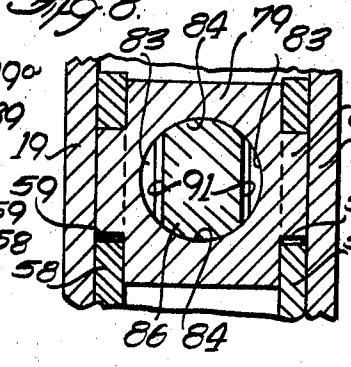


Fig. 9.

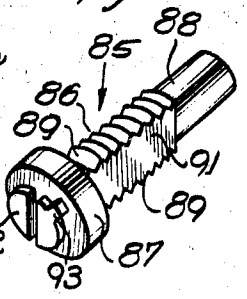
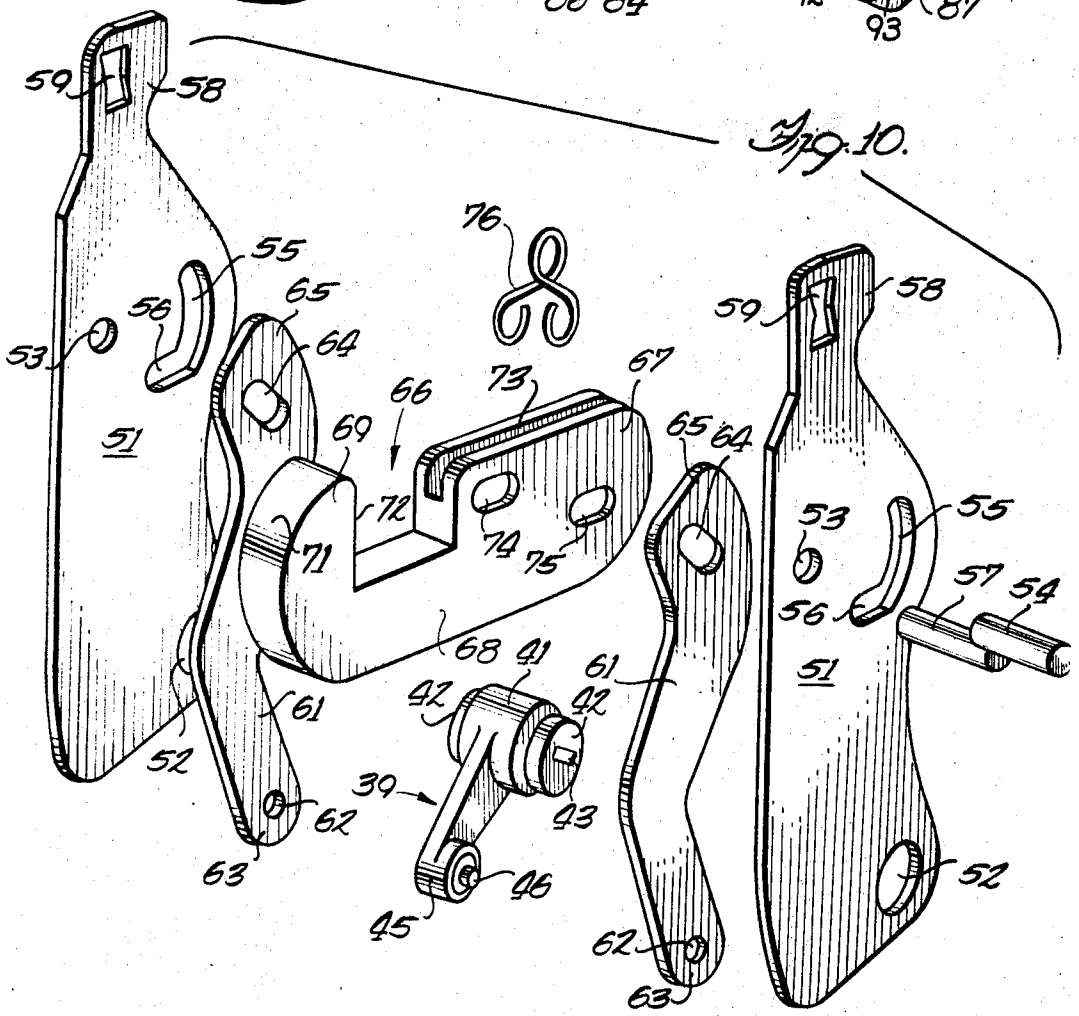


Fig. 10.



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3,437,364

SLIDING DOOR LOCK ASSEMBLY

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Int. Cl. E05c 19/12, 5/00, 1/04
U.S. Cl. 292—113 7 Claims

ABSTRACT OF THE DISCLOSURE

A lock assembly utilized on a sliding door and having a rotatable bolt providing an exposed hook end cooperating with a locking plate mounted in the edge of the door jamb and having an opening receiving the hook end of the bolt. The lock assembly is mounted within the edge of the door and has a rotatable hub adapted to be actuated by a suitable handle operatively connected thereto; the hub having a pivot arm normally biased to locked position. A pair of locking arms are operatively connected at one end to the pivot arm opposite the hub and at the opposite ends to a control pin extending through the rotatable lock bolt. A pair of adjusting plates encompass the locking arms and lock bolt, being mounted at one end on the hub and at the opposite end to an adjusting yoke cooperating with an adjusting rod; the plates having arcuate slots receiving the control pin to define the path of movement thereof to swing the bolt between locked and unlocked position about a pivot pin.

The present invention relates to a lock assembly and more particularly to a lock assembly utilized for a sliding door such as a glass door leading from a house to a patio or porch.

Among the objects of the present invention is the provision of a lock assembly for a sliding door or panel where the lock assembly is received in an edge of the door and cooperates with a locking plate aligned therewith on the door frame or jamb. The lock assembly includes a rotatable hub adapted to be actuated by a suitable tool or handle and having a pivot arm connected to one end of each of a pair of locking arms which are operatively connected at their opposite ends through a control pin to a swinging lock bolt. A pair of adjustment plates controls the movement of the locking arms and control pin for swinging movement of the bolt. The bolt is mounted to swing on a pivot pin retained in position by the adjustment plates.

Another object of the present invention is the provision of a lock assembly for a sliding door where the lock bolt in locked position has a deadlocking position necessitating a short horizontal movement rearward prior to the swinging of the bolt to unlocked position. The deadlocking position and the path of movement of the swinging bolt is provided by aligned arcuate slots in the adjustment plates having aligned deadlocking recesses at one end of each arcuate slot. The control pin carried by the locking arms projects through the lock bolt, locking arms and into the slots in the adjustment plates and coperates with the plates to provide the swinging movement of the bolt. A coil spring within the bolt is connected to both the control pin and the pivot pin and tends to draw these pins togeher.

A further object of the present invention is the provision of a lock assembly for sliding doors having an adjustment means to adjust the lock bolt in the lock assembly housing relative to the lock plate in the door frame so that engagement of the hook end of the bolt with the locking plate properly retains the door against the door frame. The adjustment means includes an adjusting yoke mounted between the ends of the adjustment plates opposite the hub and having opposed sets of grooves therein. A rotatable adjusting rod is mounted in the housing to project through the yoke and has opposed serrated or grooved surfaces adapted to engage the grooved surfaces in the yoke. A 90° arc of rotation either engages or disengages the adjusting rod with the yoke.

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:

FIGURE 1 is a side elevational view of the lock assembly mounted in a door and the locking plate mounted on the door frame with the lock bolt in locked position, spacing between the door and frame being shown for bolt adjustment and for inclusion of a sealing means or gasket (not shown).

FIG. 2 is an edge elevational view of the lock assembly removed from the door.

FIG. 3 is a vertical cross sectional view of the lock assembly taken on the line 3—3 of FIG. 2 and showing the lock components in unlocked position with the lock bolt withdrawn.

FIG. 4 is a vertical cross sectional view similar to FIG. 3 but showing the lock bolt in locked position and the structure in a second position of adjustment.

FIG. 5 is an enlarged horizontal cross sectional view taken on the line 5—5 of FIG. 3 and showing the adjustment means for the lock assembly.

FIG. 6 is a partial enlarged edge elevational view of the adjusting rod in the housing.

FIG. 7 is a partial vertical cross sectional view taken on the line 7—7 of FIG. 5 showing the adjusting means in engaged adjusted position.

FIG. 8 is a partial vertical cross sectional view similar to FIG. 7 but showing the adjusting means in disengaged position.

FIG. 9 is an enlarged perspective view of the adjusting rod.

FIG. 10 is an enlarged exploded perspective view of the lock assembly structure removed from the housing.

Referring more particularly to the disclosure in the drawings wherein is shown an illustrative embodiment of the present invention, FIG. 1 discloses a lock assembly **10** mounted in a slot **11** formed in the edge of a sliding door **12** and having a bolt adapted to engage a locking plate **13** secured by suitable securing means **14** to a door frame or jamb **15**; the locking plate having a slot or opening **16** aligned with a recess **17** in the frame receiving the locking bolt to lock the door in closed position. The lock assembly **10** includes a housing **18** having a side wall **19** and a parallel rear wall **21** and front wall **22**. The front wall is provided with rounded ends **23**, a rectangular generally central slot **24** and a circular opening **25** having an enlarged diameter arcuate portion **26** therein.

A cover **27** for the housing **18** has a side wall **19a** and end walls **28** having mounting tabs or flanges **29** integral therewith and extending outwardly from the housing. The flanges **29** have openings **31** therein to receive suitable securing means **32** to mount the housing in the door. The cover **27** also provides a flange **33** extending across the front of the housing adjacent the upper flange **29** and having an open-ended slot **34** therein; the slot **34** in the flange **33** being aligned with the opening **25** in the front wall **22** and with an opening **35** in the rear wall **21**. The side walls **19**, **19a** have aligned openings **36** for suitable securing means, such as screws **37**, to retain the housing **18** and cover **27** together, and aligned enlarged openings **38**.

A pivot arm **39** has a rotatable hub **41** (see FIG. 10) at one end with reduced ends **42** extending into and conformably received in the aligned openings **38** in the side walls **19**, **19a**. The hub **41** has a slot or other suitable opening **43** extending axially therethrough to receive the shank of a suitable handle **44** (FIGS. 1 and 2). The opposite end of the pivot arm **39** has a hub portion **45** on one side and oppositely extending projections **46** on each side of the arm. A coil spring **47** is positioned with the coils thereof encompassing the rotatable hub **41** of the pivot arm with one extended spring arm **48** bearing against the rear wall **21** of the housing **18** and the other or second spring arm **49** having its curled end biased against the hub portion **45** so as to rotatably bias the pivot arm **39** in the counterclockwise direction as shown in FIGS. 1 and 4.

A pair of spaced elongated irregularly shaped adjusting plates **51**, **51** are mounted in parallel relation on either side of the pivot arm **39** in the lock assembly **10**, with each plate **51** having an enlarged opening **52** adjacent one end thereof complementally receiving the hub **41** of the pivot arm. Each plate **51** is also provided with an opening **53** to receive a pivot pin **54** and an adjacent arcuate slot **55** having a recess or offset **56** at one end, the slot **55** receiving a control pin **57** to be described later. The plates **51**, **51** each have a narrowed end or neck **58** having an irregular opening **59** therein for a purpose to be described later; the openings **52**, **53** and **59** and the slots **55** in the two plates each being aligned to operate together.

A pair of elongated irregularly shaped locking arms **61**, **61** are mounted in parellel spaced relation within or at the interior of the adjusting plates **51**, **51** (see FIGS. 2 and 10). Each locking arm **61** has an opening **62** adjacent one end **63** receiving a projection **46** therein of the pivot arm **39** and an angularly positioned slot **64** in the opposite enlarged end **65** to receive the control pin **57**. A lock bolt **66** has an enlarged body **67** with an offset arm **68** terminating in a lateral hook end **69** having a rounded outer camming surface **71** and a locking surface **72**. The body **67** is slotted as at **73** and is provided with a pair of parallel but offset or staggered slots **74** and **75** therein; the slot **74** receiving the pivot pin **54** and the slot **75** receiving the control pin **57**. The slot **73** of the body houses a coil spring **76** having a central coil and curled ends **77** and **78** with the curled end **77** encompassing the pivot pin **54** and the curled end **78** encompassing the control pin **57**; the coil spring **76** tending to draw the pins **54** and **57** together.

At the upper end of the lock assembly is an adjusting device for the lock bolt **66** which includes a generally square adjusting yoke **79** (see FIGS. 7 and 8) having oppositely disposed rectangular projections **81** which are received in the aligned irregular openings **59**, **59** in the adjusting plates **51**, **51**. The yoke **79** is provided with a central generally cylindrical opening or passage **82** therethrough having oppositely disposed serrations or grooves **83** and oppositely disposed smooth surfaces **84**.

Cooperating with the yoke **79** is an adjusting rod **85** (see FIG. 9) having an elongated shank **86** with an enlarged head **87** at one end and a reduced diameter cylindrical end **88** at the other. The shank **86** is provided with oppositely disposed grooves or serrations **89** separated by oppositely disposed flattened surfaces **91**. The grooves **89** cooperate with the serrations **83** in the yoke to retain the rod **85** and yoke **79** in an adjusted position (FIG. 7) and, upon a 90° rotation of the rod **85**, the flattened sides **91** are aligned with the serrations **83** in the yoke (FIG. 8) to allow longitudinal movement of the yoke **79** relative to the rod **85**.

The enlarged head **87** of the rod **85** has a slotted front projection **92** of a reduced diameter which is complementally received in the opening **25** in the front wall **22** of the housing **18**, and the projection **92** has a radially extending tab **93** received in the cooperating with the

arcuate portion **26** of opening **25** to limit rotation of the rod **85** to a 90° arc. The rear reduced end **88** of the rod is received in the aligned opening **35** in the rear wall **21**. The open-ended slot **34** in the flange **33** receives the shank **86** of the rod **85** adjacent the enlarged head **87**; the head **87** being positioned rearwardly of and between the front wall **22** of the housing **18** and the flange **33** of the cover **27**.

Considering the operation of the lock assembly **10**, the assembly is normally in the position of FIGS. 1, 2 and 4 as the pivot arm spring **47** biases the pivot arm **39** in a counterclockwise direction which moves the bolt **66** to its normal locking position. To retract the bolt **66** into the housing **18** and cover **27**, the handle **44** is manually rotated clockwise which in turn rotates the pivot arm **39** in a clockwise direction against the force of spring arm **49**. Rotation of the pivot arm **39** causes the locking arms **61**, **61** to move in an upward direction and, as the slots **64** in the ends **65** of the arms **61** are slanted, as seen in FIGS. 1, 3 and 4, the initial upward movement of the arms **61** causes movement to the right of the control pin **57** within the slot **75** of the bolt and out of the deadlocking recess **56** into the arcuate slot **55** of the adjusting plates **51**. Further movement of the arms **61** moves the control pin **57** in the arcuate slots **55** to rotate the bolt **66** around the pivot pin **54** until the bolt is completely retracted within the housing and cover (see FIG. 3). Release of the handle **44** allows the spring **47** to rotate the pivot arm **39** in a counterclockwise direction and return the assembly to its initial condition and position with the control pin **57** in its deadlocking recesses **56**.

If the door **12** is moved toward the jamb or frame **15** so that the bolt engages the locking plate **13**, the bolt **66** will not be damaged but will retract into the housing **18**. To cause this retraction, the camming surface **71** of the bolt **66** engages the strike plate **13** and moves the bolt to the right, as seen in FIG. 1 with the bolt moving relative to the pivot pin **54** due to the slot **74**. Movement of the bolt to the right causes the slot **75** to move the control pin **57** out of the deadlocking recesses **56** into the arcuate slots **55** so that the bolt can be cammed to rotate and be retracted into the assembly **10**. When the door engages the frame, the spring **47** will cause the parts to resume their normal position with the hook end **69** of the bolt **66** received in the recess **17** behind the strike plate **13** and the latching surface **72** of the bolt cooperating with the interior surface of the plate **13**.

When the bolt is in locked position as shown in FIG. 1, it can only be retracted by a handle **44** or other equivalent actuating means. The bolt cannot be retracted by the use of a tool inserted between the edge of the door **12** and the frame **15** as the bolt **66** must be initially moved horizontally before being rotated when the handle **44** or other means causing rotation of the pivot arm **39** is not used.

As the dimensions of sliding doors and frames will vary as will the type of sealing gaskets used thereon, the bolt **66** is capable of adjustment relative to the assembly **10** and the door **12** to assure proper locking and retention of the door in the frame **15** and proper engagement therebetween. FIGS. 1, 3 and FIG. 4 show two positions of adjustment of the bolt. To vary the adjustment of the bolt **66**, the adjusting rod **85** is rotated 90° using a screwdriver or other tool in the slotted head **92** to disengage the serrations **89** on the rod **85** from the serrations **83** in the yoke **79** as seen in FIG. 8. Then by grasping the hook end **69** of the bolt **66**, it is manually moved in or out relative to the housing with the yoke **79** moving relative to the rod **85** and causing rotation of the adjusting plates **51**, **51** around the hub **41** of the pivot arm **39**. When the proper adjusted position is achieved, the adjusting rod **85** is rotated 90° to reengage the serrations **89** on the rod **85** with the serrations **83** in the yoke **79**

(FIG. 7) and retention in the newly adjusted position of the bolt.

While the improvement has been shown and described as being advantageously applicable to a sliding door lock assembly, it is not my desire or intent to unnecessarily limit the scope or the utility of the improved features by virtue of this illustrative embodiment.

Having thus disclosed my invention, I claim:

1. A door lock mechanism cooperating with a strike plate in the frame for the door, comprising a housing mounted in the edge of a door, a laterally movable and rotatable lock bolt mounted in the housing and having a hook end adapted to project beyond the housing for engaging the strike plate, said hook end having a camming surface and a latching surface, a pivot arm rotatable in said housing around a hub formed at one end of the arm, resilient means biasing the pivot arm in one direction of rotation, a pair of spaced parallel locking arms each rotatably mounted at one end on the end of the pivot arm opposite the hub, a control pin extending through the lock bolt and received in the opposite ends of the locking arms, a pair of spaced parallel adjusting plates in said housing and rotatably mounted adjacent one end on each side of the hub, adjusting means operatively connected to the opposite ends of the adjusting plates to retain the plates in adjusted position in the housing, said adjusting plates each having an aligned opening and an aligned arcuate slot, and a pivot pin extending through the bolt and received in the aligned openings in the adjusted plates, said control pin extending into the aligned arcuate slots for movement therein, each slot terminating at one end in a deadlocking recess receiving the first mentioned pin in the normal position of the pivot arm and locking arms, said lock bolt having a pair of parallel offset slots therein receiving the control pin and the pivot pin.

2. A door lock mechanism as set forth in claim 1, in which said lock bolt is laterally slotted, and a coil spring received in the slot in the bolt and provided with one end engaging the control pin and an opposite end engaging the pivot pin tending to draw the pins together.

3. A door lock mechanism as set forth in claim 1, in which each locking arm has a slot at one end receiving the control pin, said slot in the normal position of the locking arm being inclined to the deadlocking recess and the slots in the lock bolt.

4. A door lock mechanism as set forth in claim 1, in

which said adjusting means includes an adjusting yoke operatively connected to the adjusting plates and having a central passage therethrough having longitudinally extending alternate serrated portions and smooth arcuate portions, and an adjusting rod rotatably mounted in the housing and projecting through the passage, said rod having longitudinally extending alternate serrated portions and flattened sides cooperating with the serrated portions and smooth arcuate portions in the yoke.

5. A door latch mechanism as set forth in claim 4, in which said adjusting rod includes an enlarged end having a reduced diameter slotted projection, a radially extending tab formed on said projection, and said housing having a front wall with an opening receiving said slotted projection, said opening having an enlarged arcuate portion receiving the tab and limiting rotation of the rod to an arc of 90°.

6. A door latch mechanism as set forth in claim 5, in which said rod and said yoke are each provided with a pair of oppositely disposed serrated portions, and said yoke has a pair of oppositely disposed smooth arcuate surfaces and the rod has a pair of oppositely disposed flattened sides such that a 90° rotation of the rod engages or disengages the serrated portions on the rod with the serrated portions in the yoke.

7. A door latch mechanism as set forth in claim 3, in which rotation of the pivot arm against the resilient means causes movement of the locking arms to move the first mentioned pin out of the deadlocking recess and into the arcuate slot to pivot and retract the bolt in the housing about said pivot pin.

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U.S. Cl. X.R.

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