Aug. 1, 1967 A. L. PELCIN 3,333,878

DOOR CONTROL MECHANISM

Filed June 9, 1965 2 Sheets-Sheet 1

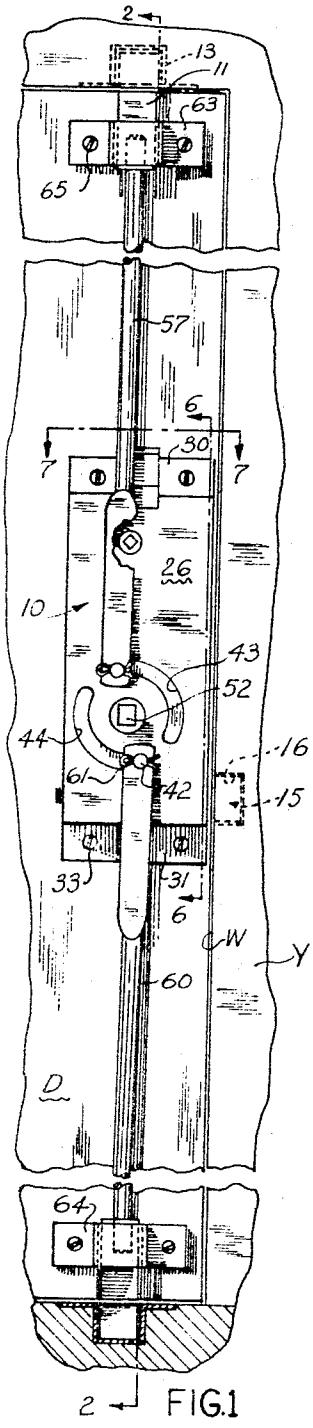


FIG.1

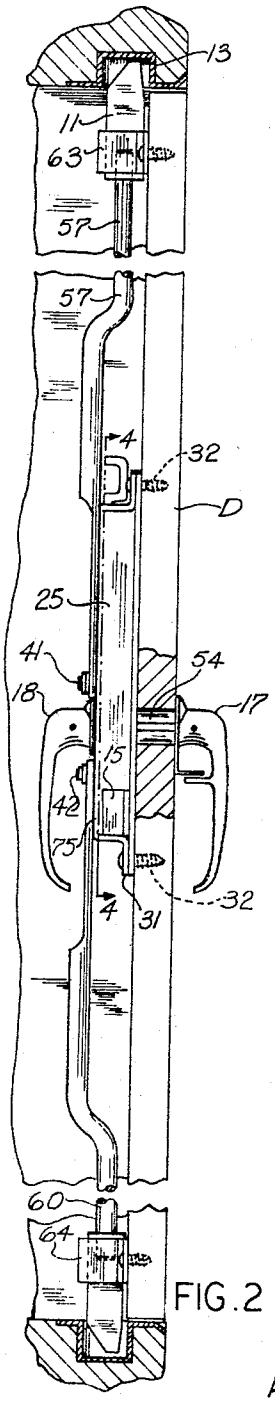


FIG.2

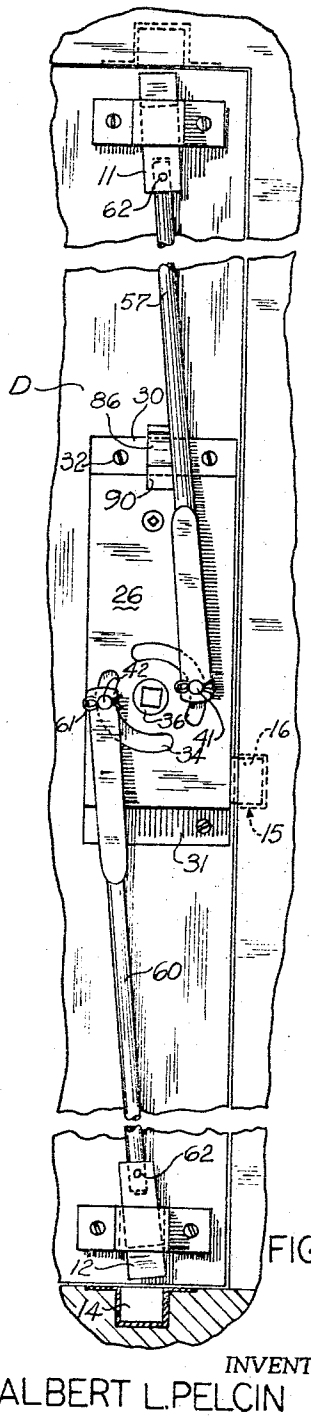


FIG.3

INVENTOR
ALBERT L. PELCIN

BY Hoffmann and Yount
ATTORNEYS

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DOOR CONTROL MECHANISM

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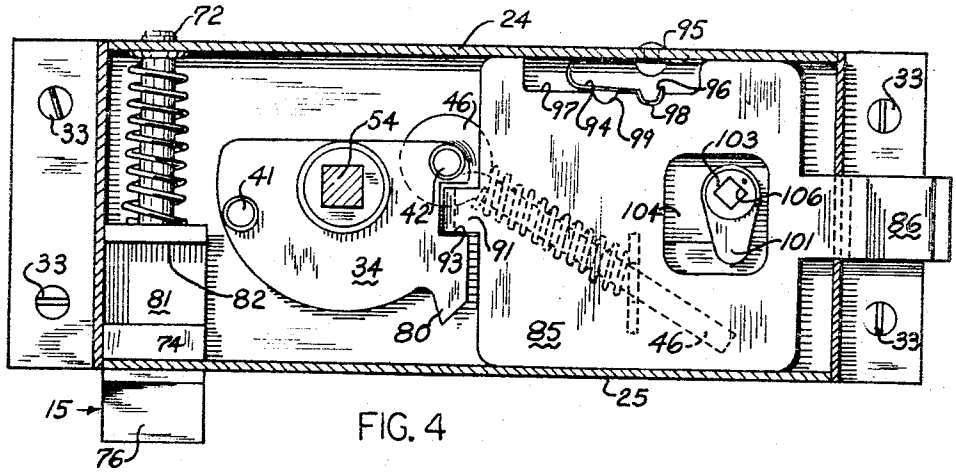


FIG. 4

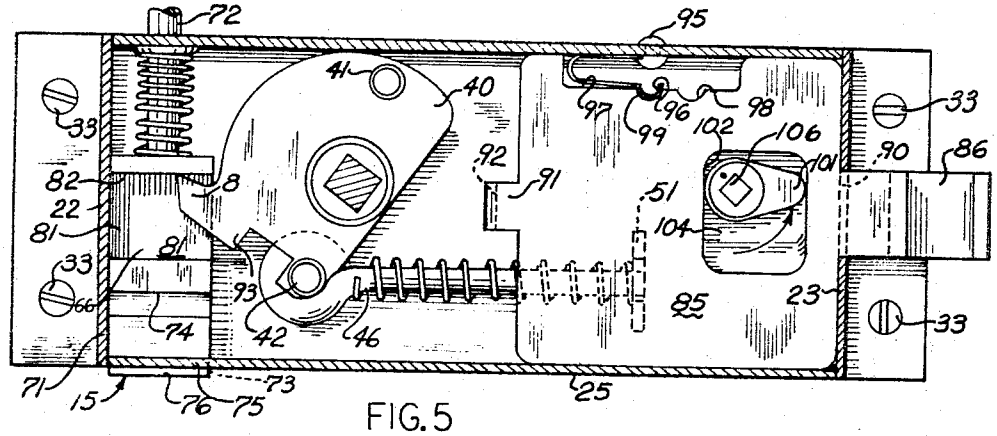


FIG. 5

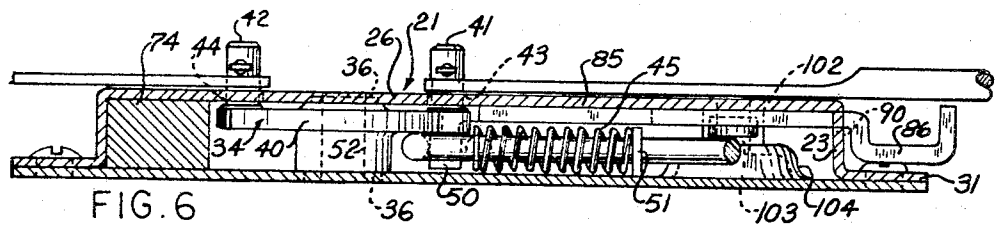


FIG. 6

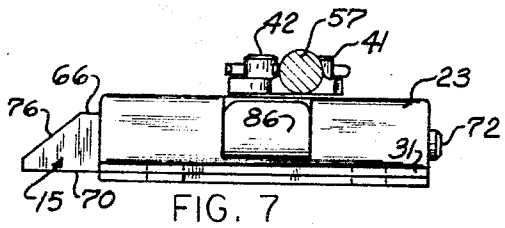


FIG. 7

INVENTOR
ALBERT L. PELCIN

BY Hoffmann and Yount

ATTORNEYS

United States Patent Office

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DOOR CONTROL MECHANISM

Albert L. Pelcin, Bedford, Ohio, assignor to The Eastern Company, Cleveland, Ohio, a corporation of Connecticut

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6 Claims. (Cl. 292—37)

The present invention relates to a door control mechanism and more particularly to an improved multiple-point locking mechanism for doors and the like.

The principal object of the present invention is the provision of a new and improved multiple-point locking mechanism for doors and the like, which is of simple and reliable construction and in which at least one of the locking points is a dead bolt lock and another a slam or spring bolt lock, both locks being operated by a manually moveable actuating member which is operative in a given sector of its range of movement to actuate the dead bolt lock only and is operative in another sector of its range of movement to actuate the slam bolt lock, the construction being such that there is no mechanical connection between the actuating member and the slam bolt lock until after the dead bolt lock has been actuated to its released position.

A more specific object of the invention is the provision of a new and improved multiple-point locking mechanism of the character mentioned comprising a frame supporting a manually rotatable member to which a dead bolt lock actuating rod is attached, which rod is moved in opposite directions by rotation of the member and which actuates a dead lock bolt, a slam lock bolt slidably supported on the frame and biased in a direction to provide a slam bolt lock, and connecting means between the rotatable member and the slam lock bolt to move the slam bolt in opposition to its biasing spring, said connecting means becoming operable after the rotatable member has moved the dead lock bolt actuating rod to its dead bolt releasing position.

Other objects and advantages of the invention will be apparent from the following description of a preferred form of the invention, reference being made to the accompanying drawings wherein:

FIG. 1 is a fragmentary, front elevational view of a three-point lock mechanism embodying the invention and applied to a door of an automotive panel truck, certain parts of which mechanism and truck have been omitted or broken away, and the mechanism is shown in its door locking position;

FIG. 2 is a fragmentary, side view of the locking mechanism and truck taken substantially along line 2—2 of FIG. 1, and showing operating handles on the lock-actuating mechanism;

FIG. 3 is a view similar to FIG. 1, showing the locking mechanism in its release position;

FIG. 4 is a sectional view of the locking mechanism taken substantially along line 4—4 of FIG. 2, but shown on a larger scale and rotated 90°;

FIG. 5 is a view similar to FIG. 4, showing certain parts of the locking mechanism in different positions;

FIG. 6 is a sectional view of the locking mechanism taken along line 6—6 of FIG. 1; and

FIG. 7 is a sectional view taken along line 7—7 of FIG. 1.

Although the locking mechanism of the present invention could be employed for locking any suitable closure, in the preferred form shown in the drawings it is applied to a door D of a so-called panel delivery truck which is arranged to close a doorway W formed in a wall Y of the truck which may be either the rear or one of the sides. The locking mechanism, indicated generally at 10, is attached to the door adjacent the free vertical edge thereof and includes two dead lock bolts 11, 12 which engage in recessed catches 13, 14 installed in the truck body wall and floor at the top and bottom of the doorway, respectively, and a slam or spring lock bolt 15 which is adapted to be received in a recessed catch 16 in the vertical edge of the doorway. The three-point locks are operated by an actuating mechanism including rotatable handles 17, 18, seen in FIG. 2.

The lock-actuating mechanism comprises a frame or casing 16 which is formed by a metal base plate 20 and a sheet metal cover 21 which has end walls 22, 23, side walls 24, 25, and a front wall 26. The end walls 22, 23 have laterally projecting end flanges 30, 31 provided with openings adapted to register with similar openings through the back plate 20 so that the cover can be placed over the back plate and secured thereto by screws 32, which also secure the casing to the door.

A member or tumbler 34 is rotatably or pivotally supported inside the casing 21, and it comprises a hub 35, the ends of which are of reduced diameter and form bearings 36 which are received in aligned circular openings through the back plate 20 and front wall 26 of the casing to rotatably support the tumbler. The tumbler has a fan-shaped section 40 extending normal to the hub and to which two pivot pins 41, 42 are rigidly secured thereto to project normal to the section and to extend through two arcuate slots 43, 44, formed through the front wall 26 of the casing. The pins 41, 42 are substantially diametrically opposite one another and spaced equally from the hub.

The tumbler 34 is spring biased in one direction or the other about its axis when it is in one sector of its angle of rotation by a compression spring 45 which surrounds the stem of an eye bolt 46, the eye of which loosely encircles a pin 50 which is integral with the section 40 of the tumbler 34 and is axially aligned with pin 41. The opposite end of the eye bolt 46 extends through an opening in a supporting lug 51 which is struck up from a cut-out portion of the back plate 20, and spring 45 is compressed between the eye of the bolt and the lug. When the pin 50 is above a line through the axis of the hub 35 and the center of the end of the spring abutting the support lug 51, as seen in FIG. 4, for example, the force of spring 45 urges the tumbler counterclockwise, and when the pin 50 is below this line, the spring urges the tumbler about its axis in the opposite direction.

The hub 35 of the tumbler has an axial opening 52 therethrough which is square in cross section for receiving a correspondingly formed shank 54 of the lock handle 17. The handle 17 is on the outside of door D, and the second handle 18 is on the inside of the door and has a socket, square in cross section, for receiving the inner end of the shank 54 so that the tumbler 34 can be rotated by either handle. The handle 17 could be secured to the door by a suitable escutcheon plate or the like, if desired.

The tumbler 34 actuates the dead lock bolts 11, 12 through rods 57, 60, the inner ends of which are flattened and have openings therethrough which receive the tumbler pins 41, 42, the rods being retained on the pins by cotter keys 61. The outer ends of the rods 57, 60 are received in sockets formed in the inner ends of the dead lock bolts 11, 12 and are secured thereon by pins 62 driven into openings formed through the walls of the sockets and the rods. The dead bolts 11, 12 are guided in a vertical direction to enter their respective catches by U-shaped brackets 63, 64 having their open sides secured to the door D by screws 65 extending through openings in upturn flanges formed on the brackets. It will be seen that rotation of the tumbler causes the pins 41, 42 to impart longitudinal movement to the rods to either move the dead bolts outwardly to their projected catch-engaging

positions or inwardly to withdraw the bolts from their catches and into their retracted or catch-releasing positions.

The end walls of slots **43, 44**, through which the tumbler pins **41, 42** extend, limit rotation of the tumbler and are located relative to the line of force of the spring **45** so that when the tumbler is in a position in which the rods **57, 60** force the dead lock bolts **11, 12** outwardly, as seen in FIGS. 1 and 2, the force of the spring urges the tumbler counterclockwise to the limit of its rotation, as seen in FIG. 1, and maintains the dead bolts in their locking positions. When the tumbler **34** is rotated clockwise by handles **17** or **18** through an angle which moves pins **41, 50** to the other side of a line through the axis of the tumbler and the line of force of the spring **45**, the dead lock bolts **11, 12** are withdrawn from their catches and the spring **45** will then urge the tumbler clockwise in the dead bolt release position. In the form of the invention shown, the tumbler operates the dead lock bolts from their fully locked positions to their release positions by rotation through a sector of about 105°.

The slam lock comprises a spring-biased bolt **15** having a rear side **70** at right angles to its lower side **71** and which sides engage the lower inner side of the casing wall **22** and the front of back plate **20** respectively. A stem **72**, integral with the bolt **15**, projects from one end thereof and extends through a guide opening through the side wall **24** of the casing, and it will be seen that the bolt **15** is guided for sliding movement transversely of the casing by the back plate and lower end wall of the casing as well as by the stem **72** sliding in its guide opening.

The end of the bolt **15** opposite the end having stem **72** projects through an opening **73** in the side wall **25** of the casing, and the outward movement of the bolt is limited by a ledge **74** formed across the bolt and which engages a lip **75** along the edge of the opening adjacent the casing wall **26**. The bolt **15** is urged outwardly of the opening **73** by a spring **75** surrounding the stem **72** and reacting on the inside of the casing wall **24**.

The outer end surface **76** of the bolt is at an acute angle with the back side **70** thereof so that when the door is moved to its closed position, the surface **76** will engage a striker plate, not shown, on the catch **16** which wedges the bolt inwardly of the casing until the bolt is aligned with the recess of the catch at which time the bolt moves into the catch to its lock position.

The slide bolt **15** is withdrawn from the catch **16** and moved to a retracted position substantial within the casing **21** by rotation of the tumbler **34** through a sector of its lock-releasing movement beyond the initial 105° rotation thereof which released the dead lock bolts **11, 12** by a lug or finger **80** formed on the section **40** of the tumbler **34** and which is adapted to move into a recess **81** formed in the bolt. The recess **81** includes an end wall **82** which forms a shoulder or abutment facing in the direction of the bias of the slide bolt by the spring **74** so that clockwise rotation of the tumbler **34**, as viewed in FIGS. 4 and 5, causes the abutment surface or finger **80** to engage the shoulder **82** and shift the slide bolt against the action of the spring and out of the catch **16**. In the form of the invention shown, this unlocking movement of the slide bolt is effected by movement of the tumbler through about a 23° sector. It will be noted that the lug **80** will not be in engagement with the bolt **15** when the tumbler is rotated through the sector of its movement in which the dead lock bolts **11, 12** are moved into and out of their catches. Thus, the door may be latched by the slam lock bolt only which can be unlatched by rotation of the tumbler by the operating handles at one end sector of their range of rotation.

It is to be noted that the length of the spring **45** is such that its force has been spent when the tumbler is rotated to engage finger **80** with the abutment **82** and has no affect on slide bolt **15**.

The tumbler **34** can be locked against rotation from its dead lock bolt locking position by a locking bolt comprising a plate **85**, generally rectangular in form, and which lies beneath and parallel to the front wall **26** of the casing and extends substantially from one side wall of the casing to the other so that it is guided by the side walls for sliding movement toward and away from the tumbler. The plate **85** has a tongue **86** formed on the right-hand end thereof, as viewed in FIGS. 4–6, which extends through a slot-like opening **90** in the end and front walls **23, 26** of the casing, and the protruding end in reversely bent to provide a finger grip by which the plate may be conveniently moved. The edge of the plate **85** adjacent the tumbler **34** has a tongue **91** thereon which has a downwardly turned end portion **92** which is adapted to be received in a U-shaped notch **93**, formed in the edge of section **40** of the tumbler, when the tumbler is at the extremity of its movement in which the dead lock bolts are in their locking positions, thereby blocking rotation of the tumbler to prevent release of the lock points.

The lock bolt plate **85** is maintained in its plane of movement by the relatively confining edges of the opening **90** which limit lateral movements of the tongue **86** and therefore the plate, and the lug **51** limits movement of the plate toward the back plate **20**.

The lock bolt plate **85** is yieldingly held in its tumbler locking position and its inoperative position by a detent arrangement comprising a U-shaped flat spring **94** which has the outer end of one leg thereof riveted to the side wall **24** of the casing **21** by a rivet **95**, and the opposite leg of the spring has a semi-cylindrical section **96** which rides against an edge **97** of a rectangular notch formed in one side of the plate **85**. The edge **97** has a pair of spaced semicircular recesses **98, 99** therein into which the section **96** nests when the plate is in the tumbler locking position or its inoperative position, respectively, as seen in FIGS. 4 and 5, and yieldingly restrains shifting movement of the plate.

In addition to operation of the locking bolt or plate **85** by the handle or tongue **86**, the bolt can be shifted by a pillar lock comprising a locking cam **101** rotatably supported in the casing within a rectangular opening **102** through the plate and which cooperates with the edges of the opening to block movement of the plate. The locking cam **101** includes a hub portion **103**, the ends of which are of reduced diameter and are closely received in aligned openings through the front wall **26** of casing **21** and the center of a dish-like indentation **104** in the back plate **20**. The throw of the cam **101** is such that when it is rotated to the position shown in FIG. 5, it engages the right-hand edge of opening **102** and the plate may be moved thereby, if it is in the position shown in FIG. 4, to a position in which tongue **86** thereof is withdrawn from the notch **90** of the tumbler **34** so that the tumbler is free to rotate, as seen in FIG. 5. In the position of the cam just described, the plate **85** is locked against movement toward the tumbler **34**. When the cam **101** is rotated clockwise 180° from the position shown in FIG. 5, it engages the left-hand edge of the opening **102** and moves the plate **85** into locking position with respect to the tumbler **34**. When the cam **101** is moved to the intermediate position, as seen in FIG. 4, the plate **85** can be shifted by the handle **86**.

The cam **101** may be rotated by any suitable key or handle means, not shown; for example, a key barrel could be located in an opening through the door D and in alignment with a rectangular in cross section axial opening **106** through the cam hub **103** for receiving a key rotated actuating rod so that the lock plate **85** can be actuated from the exterior of the truck by a key.

It is to be noted that the lug or finger **80** of the tumbler **34** is positioned relative to the pins **41, 42** so that when the tumbler is in its range of rotative movement in which it either shifts the dead bolts into or out of their respective catches, the lug is entirely free of the shoulder

82 on the spring bolt 15 and the bolt cannot possibly be actuated until the two dead locks have been completely released.

It will be seen that the invention provides a relatively simple and rugged three-point locking mechanism in which the two dead lock bolts are actuated by movement of the manual operating handles through one sector of the range of movement thereof and completely independently of the slam lock bolt which is actuated by moving the operating handles through another sector of the range of movement thereof. It will be apparent that although but one form of the invention has been disclosed, other forms, modifications, and adaptations could be made all falling in the scope of the claims which follow.

I claim:

1. In a locking mechanism for doors and the like, a pivotally supported member, an overcenter spring means biasing said member in one direction or the other about its pivot, a lock bolt reciprocable between a first position and a second position, rod means operatively connected to said member eccentrically of the axis about which said member is pivotally supported and to said lock bolt for controlling movement of said lock bolt from said first position to said second position upon angular movement of said member about its pivotal support from a first angular position to a second angular position, manual means for oscillating said member about its pivotal axis between said one angular position and said second angular position and between said second angular position and a third angular position, a slide bolt reciprocable between a projected position and a retracted position, spring means biasing said slide bolt to its said projected position, and means operatively connecting said member and said slide bolt for moving said slide bolt in the direction of its said retracted position only upon angular movement of said member from said second angular position to said third angular position.

2. In a locking mechanism for doors and the like, a pivotally supported member, an overcenter spring means urging said member in one direction or the other about its pivot, a lock bolt reciprocable between a first position in which it is adapted to engage in a recess and a second position in which it is clear of said recess rod means operatively connected to said member eccentrically of the axis about which said member is pivotally supported and to said lock bolt for moving said lock bolt between said first position to said second position upon angular movement of said member about its pivotal support between a first angular position and a second angular position, manual means for oscillating said member about its pivotal axis between said one angular position and said second angular position and between said second angular position and a third angular position, a slide bolt reciprocable between a projected position in which it is adapted to engage in a recess and a retracted position in which it is clear of said recess, spring means biasing said slide bolt to its said projected position, and means operatively connecting said member and said slide bolt for moving said slide bolt from its said projected position to its said retracted position only upon angular movement of said member from said second angular position to said third angular position.

3. In a locking mechanism for doors and the like, a pivotally supported member, an overcenter spring means urging said member in one direction or the other about its pivot, a lock bolt reciprocable between a first position and a second position, rod means pivotally connected to said member eccentrically of its axis of rotation and to said lock bolt for moving said lock bolt from said first position to said second position upon angular movement of said member about its pivotal support from a first angular position to a second angular position, manual means for oscillating said member about its pivotal axis between said one angular position and said second angular position and between said second angular position and a third angular position, a slide bolt reciprocable between a projected position and a retracted position, spring means biasing said slide bolt to its said projected position, and cooperating abutment means on said member and said slide bolt for moving said slide bolt from said projected position to said retracted position only during angular movement of said member from said second angular position to said third angular position.

4. In a locking mechanism for doors and the like, a casing, a member pivotally supported in said casing, an overcenter spring means urging said member in one direction or the other about its pivot, a lock bolt reciprocable between a first position in which it is adapted to engage in a recess and a second position in which it is clear of said recess, rod means operatively connected to said member eccentrically of its axis of rotation and to said lock bolt for controlling movement of said lock bolt from said first position to said second position upon angular movement of said member about its pivotal support from a first angular position to a second angular position, manual means for oscillating said member about its pivotal axis between said one angular position and said second angular position and between said second angular position and a third angular position, a slide bolt in said casing and reciprocable between a projected position and a retracted position with respect to said casing, spring means biasing said slide bolt to its said projected position, means operatively connecting said member and said slide bolt for moving said slide bolt in the direction of its said retracted position only upon angular movement of said member from said second angular position to said third angular position, a locking member supported in said casing for movement into and out of a position in which it prevents rotation of said handle when said lock bolt is in its said first position, and key-controlled means for moving said locking means.

5. In a locking mechanism for doors and the like comprising a casing including parallel front and back walls interconnected by side walls, one of said walls having a pair of arcuate slots therein, a tumbler member comprising a hub pivotally supported at opposite ends in said front and back walls, said tumbler member including a pair of pins spaced from the axis of said tumbler member and projecting through said arcuate slots, an overcenter spring means for urging said tumbler member in one direction or the other about its pivot, a pair of lock bolts supported for reciprocable movement in opposite directions between first and second positions, two rods having their adjacent ends pivotally attached to one of said pins on the exterior of said casing and their opposed ends connected to said lock bolts for moving said lock bolts between said first and second positions upon angular movement of said tumbler member between first and second positions, a slide bolt supported for reciprocable movement in said casing and having one end adapted to move through an opening in a side wall of said casing, a spring biasing said slide bolt to a projected position relative to said casing, said slide bolt including an abutment engageable with a portion of said casing for limiting movement of said slide bolt outwardly of said casing, said slide bolt having a recess facing said tumbler member and one side thereof forming a shoulder facing said opening in said side wall through which said slide bolt extends, a lug on said tumbler member adapted to enter said recess in said slide bolt and engage said one side thereof and move said slide bolt inwardly of said casing when said tumbler member is rotated in one direction between said second position and a third position, said lug being moved out of said recess in said slide bolt when said tumbler member is moved between said first and second positions in the direction to actuate said rods outwardly of one another, a locking member in said casing at the side of said tumbler member opposite said slide bolt and movable toward and from said tumbler member, said locking member having a tongue projecting therefrom

toward said tumbler member, said tumbler member having a notch therein for receiving said tongue when said tumbler member is in a position in which said rods are in their extended positions, said locking member having an opening therethrough, a cam rotatably supported between said front and back walls and disposed inside said opening through said locking member, said cam being movable into and out of engagement with the edges of said opening through said locking member for shifting said locking member in one direction or the other when said cam is rotated, and key-controlled means for rotating said cam.

6. In a locking mechanism for doors and the like comprising a rectangular casing including parallel front and back walls interconnected by two parallel side walls and two parallel end walls, said front wall having a pair of arcuate slots therein, a tumbler comprising a hub pivotally supported at opposite ends in said front and back walls, said tumbler including a pair of pins equally spaced from the axis of said tumbler and projecting through said arcuate slots, an overcenter spring means for urging said tumbler in one direction or the other about its pivot, two rods, each rod having an inner end pivotally attached to one of said pins on the exterior of said casing, a lock bolt attached to the outer ends of said rods, means to guide said lock bolts for reciprocable movement in opposite directions, a slide bolt having two adjacent sides in sliding engagement with the inside of one of said end walls of said casing and said back wall of said casing, said slide bolt including a stem integral therewith and projecting through an opening in a side wall of said casing, said slide bolt being adapted to move through an opening in the opposite side wall of said casing, a spring surrounding said stem and disposed intermediate said slide bolt proper and the first-mentioned side wall of said casing, said slide bolt including a projecting shoulder thereon engageable with an edge portion of said opening in said side wall of said casing through which said slide bolt moves for limiting movement of said slide bolt outwardly of said casing, said slide bolt having a recess therein having an opening facing said tumbler and one side thereof forming a shoulder facing said opening in said side wall through which said slide bolt extends, a lug on said tumbler adapted to enter said recess in said slide bolt and engage said one side thereof for moving said slide bolt inwardly of said casing when said tumbler is rotated in one direction, said lug being moved outwardly of said recess in said slide bolt when said tumbler is moved in the opposite direction to actuate said rods outwardly of one another, a plate

in said casing adjacent the end opposite the end in which said slide bolt is located and having edges cooperating with the insides of said side walls of said casing for guiding said plate toward and from said tumbler, said plate having a tongue projecting therefrom toward said tumbler, said tumbler having a notch therein for receiving said tongue when said tumbler is in a given position, said plate having a notch in one side thereof, the open side of which notch is adjacent to one of said side walls of said casing, a U-shaped spring having the end of one leg thereof attached to the last-mentioned side wall and having the other leg thereof in engagement with an edge of said notch in said plate, the last-mentioned notch having a semi-circular recess, said last-mentioned spring leg having a semi-cylindrical section adapted to engage in the last-mentioned recess when said plate is in a given position, said tumbler having a notch for receiving said tongue projecting from said plate when said tumbler is in a position in which said rods are in their extended positions, a handle attached to said plate and extending through an opening in the end wall of said casing adjacent to one edge of said plate, said handle cooperating with an edge of the last-mentioned opening through said casing for supporting said plate inside said casing, said plate having an opening therethrough intermediate the sides thereof, a cam rotatably supported between said front and back walls and disposed inside the last-mentioned opening through said plate, said cam being movable into and out of engagement with the edges of said last-mentioned opening for shifting said plate in one direction or the other when said cam is rotated, and means for rotating said cam.

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MARVIN A. CHAMPION, *Primary Examiner.*

EDWARD C. ALLEN, *Examiner.*

J. R. MOSES, *Assistant Examiner.*