Feb. 23, 1971 M. G. OZIER ET AL 3,564,772

PRISON DOOR OPERATING AND LOCKING MECHANISM

Filed Sept. 29, 1969 4 Sheets-Sheet 1

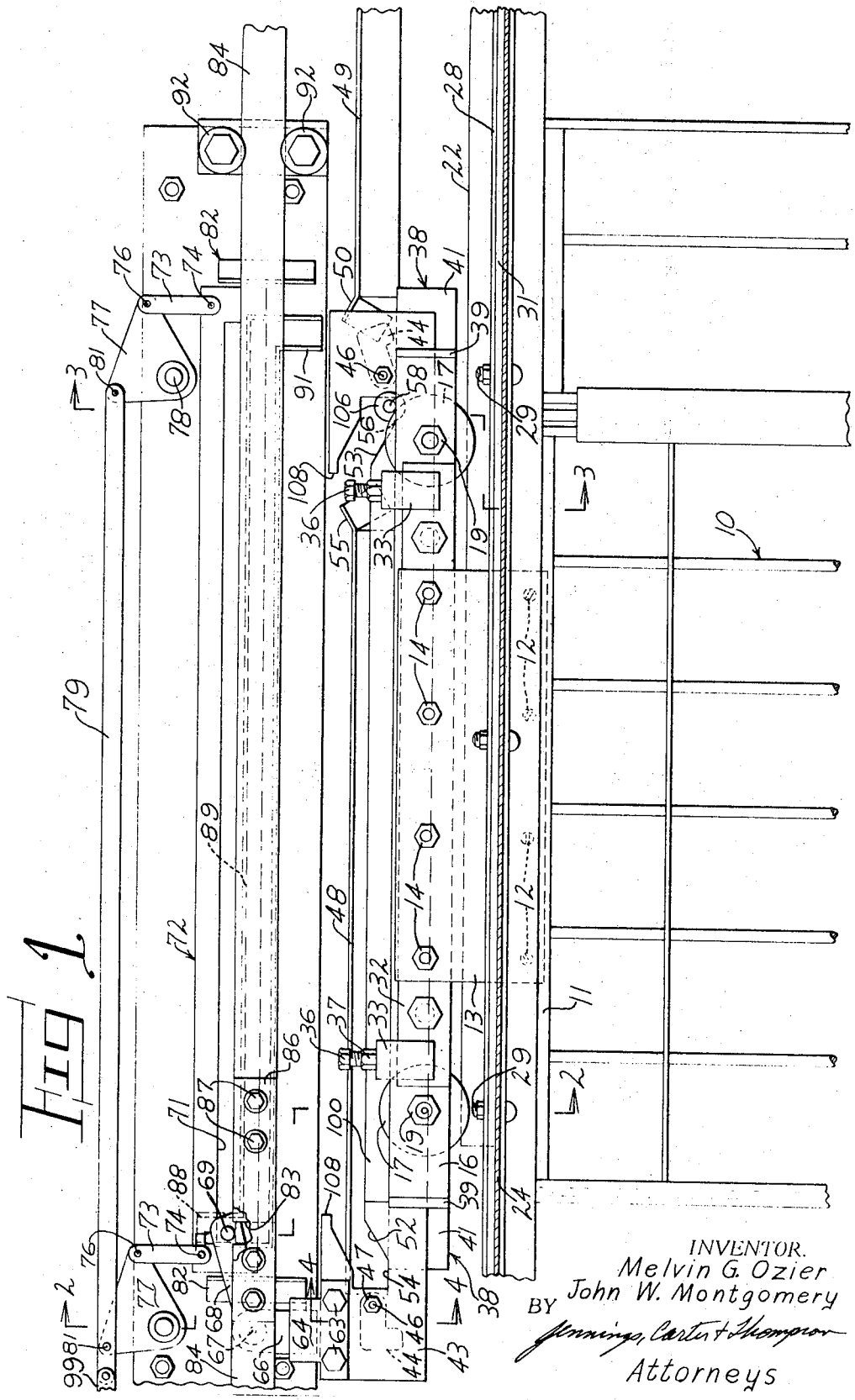


Fig. 1

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PRISON DOOR OPERATING AND LOCKING MECHANISM

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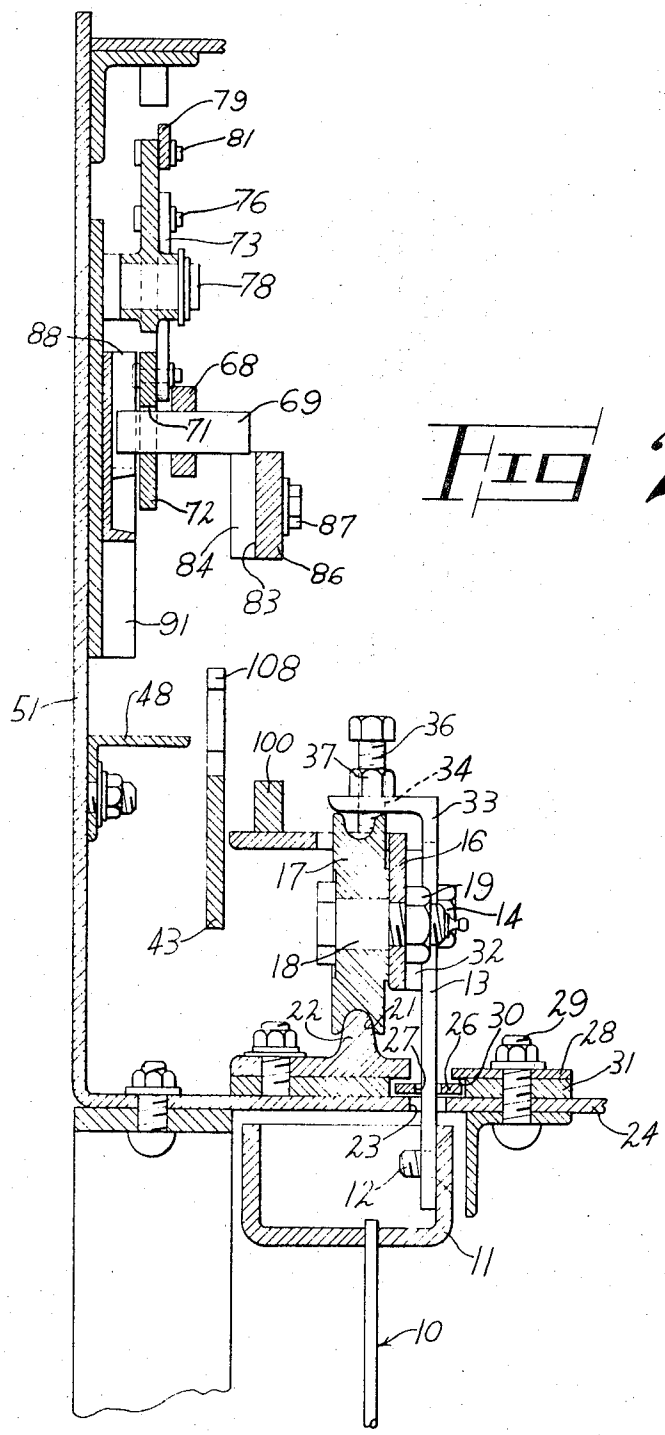


FIG 2.

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PRISON DOOR OPERATING AND LOCKING MECHANISM

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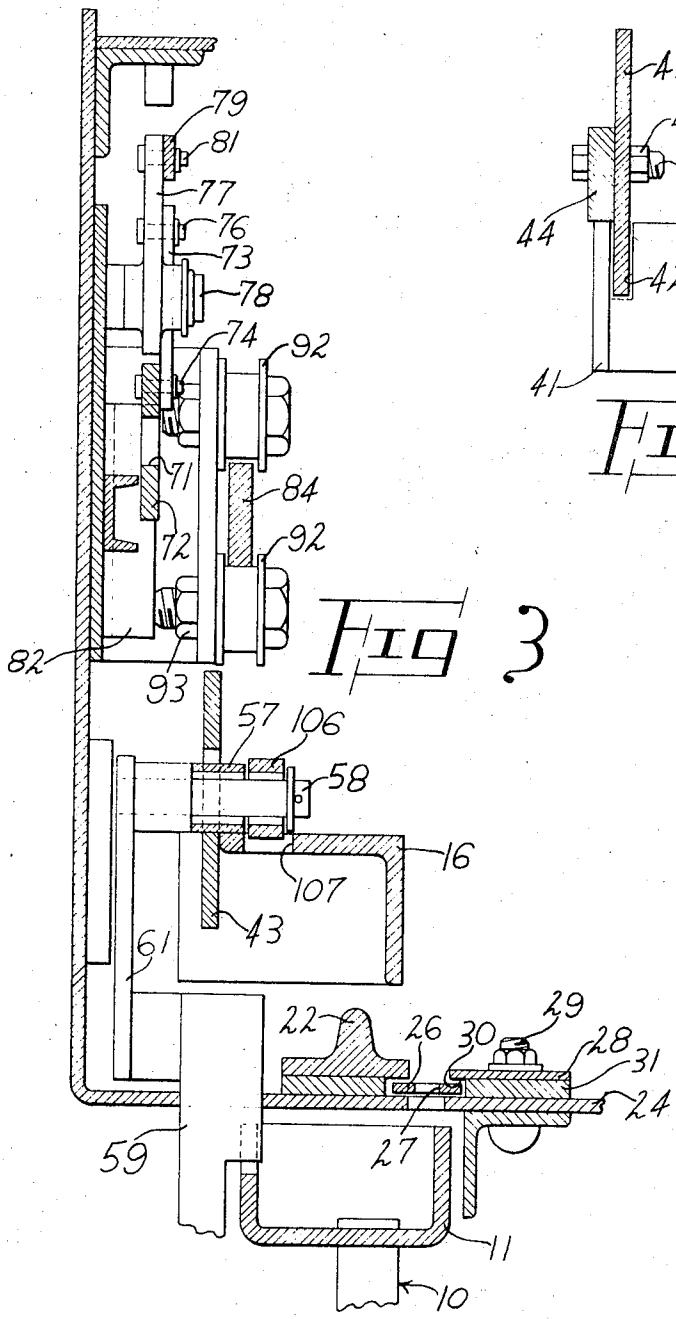


FIG 3

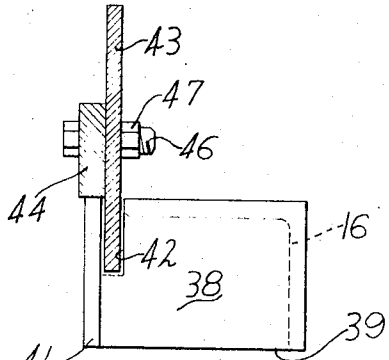


FIG 4

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PRISON DOOR OPERATING AND LOCKING MECHANISM

Filed Sept. 29, 1969 4 Sheets-Sheet 4

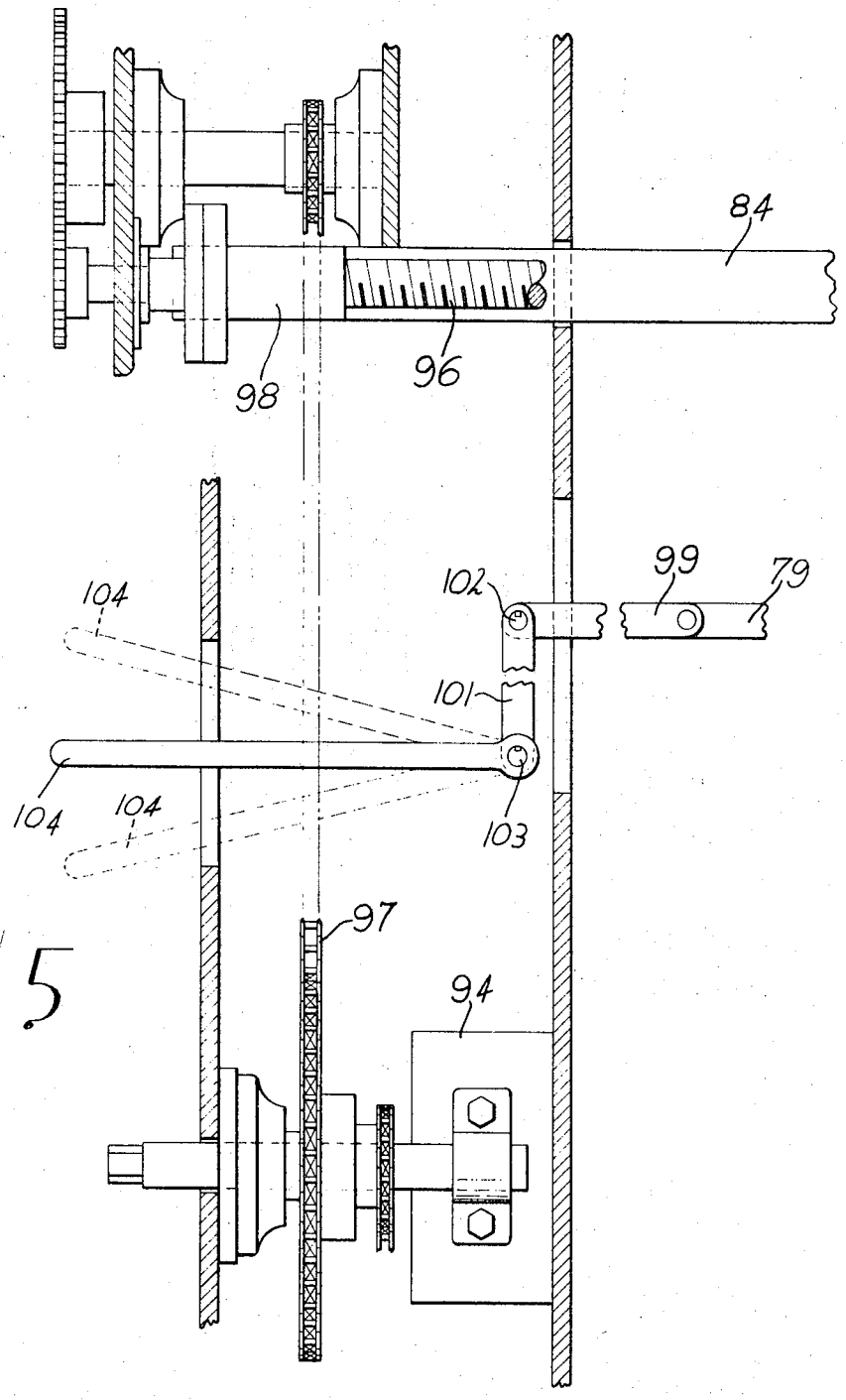


Fig 5

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United States Patent Office 3,564,772 Patented Feb. 23, 1971

3,564,772

PRISON DOOR OPERATING AND LOCKING MECHANISM

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Filed Sept. 29, 1969, Ser. No. 861,722
Int. Cl. E05b 47/00
U.S. Cl. 49—15 9 Claims

ABSTRACT OF THE DISCLOSURE

Slide bar detachably connected to door carriage and movable to door open and closed positions. Cam surfaces at opposite ends of slide bar engage and lower lock bar actuating member when door opened and closed and lift lock bar upon initial movement of slide bar away from door opened and closed positions. Slide bar actuator connected to main bar while in intermediate position and disconnected therefrom while in upper and lower positions, with door in fully open or closed position. Safety member prevents movement of door carriage without corresponding movement of slide bar.

BACKGROUND OF THE INVENTION

This invention relates to apparatus for operating and locking prison doors and more particularly to the provision of apparatus which includes improved means, operable from a remote point from the doors, which shall be effective to lock the doors both in opened and closed positions and to unlock the doors and move them selectively from opened and closed positions.

Heretofore in the art to which our invention relates, difficulties have been encountered with prison doors due to the fact that occupants of prison cells often tamper with the doors while they are in fully opened or closed positions whereby the doors cannot be operated properly from the fully opened or closed positions.

In accordance with our invention, we provide operating and locking mechanism wherein the prison cell door is securely locked top and bottom by a lock bar that is inaccessible to the prisoner. The operating and locking mechanism is completely controlled from a control box at the end of a row of cell doors whereby one or more doors can be selected for opening at one operation. The doors can be locked open or may be closed again without changing the selector bar. Also, if desired, one or more of the doors may be locked in open position and the remainder of the doors can be returned to a closed position and locked, the position of the operating handle inside the control box indicating whether the door is closed and locked; selected for closing or opening; or, open and locked. Our improved mechanism also provides full, positive control of the door in any partial open position whereby the prisoner cannot move, change or restrain the door sufficient to prevent it from being closed or opened. Furthermore, all parts of our improved door control mechanism are operated mechanically, thus eliminating the necessity of depending upon spring or gravity actuated members.

Apparatus embodying features of our invention is illustrated in the accompanying drawings, forming a part of this application in which:

FIG. 1 is a side elevational view, partly broken away and in section showing the position of the mechanism while the cell door is in closed and locked position;

FIG. 2 is an enlarged, sectional view taken generally along the line 2—2 of FIG. 1;

FIG. 3 is an enlarged sectional view taken generally along the line 3—3 of FIG. 1;

FIG. 4 is an enlarged, sectional view taken generally along the line 4—4 of FIG. 1; and,

FIG. 5 is a fragmented, sectional view, partly broken away and in section showing the power means for reciprocating the main bar and the selector bar control handle for a cell door.

Referring now to the drawings for a better understanding of our invention, we show a prison cell door generally at 10 connected at its upper end to a hanger bracket 11. The upper end of hanger bracket 11 is secured by retaining screws 12 to the lower end of a door hanger plate 13. The upper portion of hanger plate 13 is secured by suitable bolts 14 to an angle member 16 which defines an elongated, supporting carriage for the door 10. Grooved rollers 17 are mounted for rotation on stub shaft-like members 18 adjacent each end of the carriage angle 13 with the stub shaft being secured in place by suitable retaining nuts 19. Annular grooves 21 are provided in the rollers 17 for engagement with a supporting track 22.

As shown in FIG. 2, the hanger plate 13 extends through a suitable opening 23 provided in a supporting frame indicated generally at 24. An elongated plate 26 having a longitudinally extending slot 27 therein receives the hanger plate 13 with a sliding fit. The elongated plate 26 rides in a guideway 30 which is defined by a guide plate 28 which is secured in spaced relation to the frame member 24 by securing bolts 29. A spacer element 31 is positioned between the frame member 24 and the guide plate 28, as shown.

The position of the door and its hanger relative to the carriage angle 16 is adjusted by providing an adjusting bar 32 between the hanger plate 13 and the carriage angle 16 and securing an adjusting angle bracket 33 rigidly to the adjusting bar. A threaded opening 34 is provided through the upper flange of angle bracket 33 for receiving an adjusting screw 36 which engages the upper surface of carriage angle 16 to thus vary the position between angle bracket 33 and the carriage angle 16. A suitable lock nut 37 secures the angle bracket 33 at selected, adjusted positions.

Secured to opposite ends of the carriage angle 16 is an angle member 38 having a transverse portion 39 and a rearwardly extending portion 41, as shown in FIG. 4. An upwardly opening recess 42 is provided in the transverse portion 39 adjacent the rearwardly extending portion 41 for receiving the lower end of an elongated slide bar 43. A pawl 44 is pivotally mounted on the slide bar 43 inwardly of each end thereof, by suitable means, such as a pivot pin 46 having a retaining nut 47. Each pawl 44 is in alignment with the adjacent, rearwardly extending portion 41 of the member 38 whereby the pawl is adapted to engage the rearwardly extending portion 41 while the pawl 44 is pivoted to a lower position, as shown at the left side of FIG. 1. Elongated angle members 48 and 49 are secured to a vertical supporting member 51 with the lower edge of the horizontal flange of angle member 48 being in position to engage the top of the subjacent pawl 44 whereby the pawl is held in its lower position so long as the pawl engages its associated angle member 48 or 49, as the case may be. Each pawl is urged in an upward direction by suitable means, such as a torsion spring, whereby upon moving out of engagement with the angle member 48 or 49, the pawl 44 moves to the raised position, as shown at the right side of FIG. 1.

As shown in FIG. 1, the inner ends of the angle members 48 and 49 are spaced from each other and are turned upwardly as at 50 and 55, respectively whereby the subjacent pawl 44 is released as it moves inwardly and out

of engagement with the angle member **48** or **49**, as the case may be.

As shown in FIG. 1, the upper surface of the elongated slide bar **43** is provided with downwardly and outwardly sloping surfaces **52** and **53** to define slots **54** and **56** adjacent opposite ends of the slide bar **43**. Extending across the upper surface of slide bar **43** in position to engage the slots **54** and **56** is a roller **57** which is mounted for rotation on a shaft-like member **58** which in turn is connected to a depending lock bar **59** by a suitable connection indicated generally at **61** whereby the shaft **58** and lock bar **59** are positively connected to each other. The lock bar **59** is adapted to securely lock the cell door **10** at both the top and bottom in a manner well understood in the art to which the invention relates. Upon lifting the lock bar **59**, the cell door **10** is unlocked and upon lowering the lock bar **59**, the cell door is locked.

Secured rigidly to an upstanding portion adjacent one end of the slide bar **43** by suitable bolts **63** is an upstanding slide bar drive plate **64** which in turn is rigidly secured to an upstanding bracket **66**. Pivotally connected to the bracket **66** by a pivot pin **67** is an elongated drag link **68**. The outer end of the drag link **68** carries a transverse drag pin **69** which extends through an elongated opening **71** provided in a selector bar indicated generally at **72**.

Opposite ends of the selector bar **72** are pivotally connected to the lower ends of depending links **73** by suitable pivot pins **74**. The upper ends of links **73** are pivotally connected by pins **76** to bell crank-like levers **77** which are mounted for rotation about stub shaft members **78**. The crank-like levers **77** are pivotally connected to an elongated link **79** by pivot pins **81** whereby upon reciprocating the link **79**, the members **77** are rotated about the shafts **78** whereby the links **73** and the selector bar **72** supported thereby are raised and lowered. Vertical, angle guides **82** are provided at each side of the selector bar **72** to cause vertical movement of the selector bar as it is moved by the links **73**.

As shown in FIGS. 1 and 2, the drag pin **69** is in position to engage a vertical recess **83** which is provided between spaced apart portions of a main bar indicated at **84**. That is, the main bar **84** comprises sections having ends which are spaced from each other to define the recess **83**. Adjacent sections of the main bar **84** are connected to each other by a splice plate **86** which is secured in place by suitable bolts **87**.

From the foregoing, it will be seen that the drag pin **69** is adapted to move from an uppermost position above the main bar **84** to an intermediate position where it engages the recess **83** and to a lower position beneath the main bar **84**. In FIG. 1, the cell door is shown in closed, locked position wherein the drag pin **69** is elevated above the main bar by moving the link **79** toward the left, as viewed in FIG. 1. While in this position, the drag pin **69** rides between spaced apart flanges of a vertical channel member **88** whereby there is no movement of drag pin **69** while in a position above the main bar **84**.

Communicating with the lower end of the groove in channel member **88** is a horizontal channel member **89** which is adapted to receive the drag pin **69** while the drag pin is moved to the intermediate position in position to engage the recess **83** in the main bar **84** whereby the drag pin **69** ridges in between the flanges of channel member **89** and in the elongated opening **71** to thus move the drag link **68** and the slide bar **43** operatively connected thereto toward the right, as viewed in FIG. 1.

Communicating with the groove in the channel member **89** at the opposite end thereof from the end communicating with channel member **88** is a depending, vertical channel-like member **91** having spaced apart, vertical flanges for receiving the drag pin **69**. Accordingly, upon movement of the main bar **84** a distance to position the drag pin **69** in alignment with the groove in the channel member **91**, the door is moved to fully open position. To lock the door in open position, the link **79** is moved toward the

right to thus cause drag pin **69** to move downwardly into the groove in channel member **91** and beneath the main bar **84**.

As shown in FIGS. 1 and 3, the main bar **84** is supported between guide rollers **92** which are mounted at longitudinally spaced intervals. The guide rollers **92** are supported by suitable stub shaft-like members which are secured in place by nuts **93**. The main bar **84** is driven by suitable power means, such as by a motor **94** which is operatively connected to a threaded shaft **96** by a suitable drive connection indicated generally at **97**. A threaded sleeve **98** is mounted on the threaded shaft **96** and is connected rigidly to the main bar **84** whereby upon rotation of the threaded member **96**, the main bar **84** is moved longitudinally in selected directions.

Also, as shown in FIG. 5, the end of the link **79** is pivotally connected to a link **99** which in turn is pivotally connected to the outer end of a lever arm **101** by a pivot pin **102**. The inner end of lever arm **101** is rigidly connected to a shaft **103** which is secured to a selector bar control handle **104** which is adapted to be moved to an upper position, an intermediate position and a lower position, as shown. While in the upper position, the door is in locked open position. While in the intermediate position, the drag pin **69** is in recess **83** whereby it moves with the main bar **84**. When the selector bar control handle **104** is moved to the lower position, the door is in locked closed position, as shown in FIG. 1. That is, in this position, the link **79** is moved toward the left, as viewed in FIGS. 1 and 5 whereby the drag pin **69** is elevated out of contact with the main bar **84** and rides upwardly between the flanges of the channel member **88**.

A lock bar safety roller **106** is mounted on the shaft **58** carrying the roller **57**, as shown in FIG. 3. The roller **106** ridges in a cut-out opening **107** in the carriage flange **16** while the roller **57** is in the recesses **54** or **56**, as the case may be. The safety roller **106** is of a diameter to engage an inwardly extending lip **108** carried by the slide bar **43** in the event the carriage angle **16** is moved independently of the slide bar **43**. That is, upon movement of the door **10** and the carriage angle **16** without corresponding movement of the slide bar **43**, the safety roller **106** lifts the lock roller **57** against the inwardly extending lip **108** thereby preventing the door from being opened without having control through the main bar and its operating mechanism. It will thus be seen that the safety roller **106** prevents jamming of the mechanism by a prisoner or any other obstruction or force against the door after the door is unlocked and the slide bar is not completely engaged with the carriage angle **16**.

From the foregoing description, the operation of our improved apparatus for operating and locking a prison door will be readily understood. With the door in closed and locked position, as shown in FIG. 1, the selector bar control handle **104** inside the control box is in the down position and will be indicated "locked closed." To select a door to be opened, the selector handle will be moved to an intermediate position which by mechanical means will move the link **79** toward the right, as viewed in FIG. 1, whereupon the drag link pin **69** drops into the slot **83** in main bar **84**, thus connecting the main bar directly to the side bar **43** through the plates **64** and **66** and link **68**. With the main bar **84** connected to drag pin **69**, the motor **94** drives the threaded member **96** to move the main bar and the slide bar **43** connected thereto toward the right, as viewed in FIG. 1.

The slide bar **43** travels a predetermined distance, such as two inches, before the depending pawl **44** engages the rearwardly extending end portion **41**. This initial, predetermined movement of the slide bar **43** raises the lock bar actuating roller **57** which in turn lifts the lock bar **59** whereupon the door **10** is unlocked before the pawl **44** engages the rearwardly extending end portion **41** to move the carriage angle **16** and the door **10** connected thereto. Continued movement of the slide bar **43** engages

pawl 44 with the rearwardly extending portion 41 whereupon the entire door carriage unit is moved toward the right, as viewed in FIG. 1 or toward open position. The pawl 44 is held in the down position by its engagement with the angle 48 until it passes from beneath the upwardly and inwardly extending lip 55, whereupon the pawl 44 rotates to an elevated position to disengage the rearwardly extending portion 41. At the time the pawl 44 disengages the member 41, the door 10 is in completely opened position. Since the pawl 44 has disengaged the member 41 and is no longer connected to the door carriage mechanism, the slide bar 43 continues to travel after the door is opened completely thereby dropping the roller 57 into the recess 54. That is, the roller 57 moves down the inclined surface 52 into slot 54 whereupon the roller 57 lowers the locking bar 59.

With the roller 57 in the slot 54, the selector handle 104 may be pushed completely to the up position whereupon the link 79 would be moved toward the right as viewed in FIG. 1, to thus move the selector bar 72 downwardly whereby the drag link pin 69 is moved downwardly between the flanges of the channel member 91 to thus separate the drag link pin 69 from the main bar whereby the main bar may be moved independently of pin 69 and the mechanism operatively connected thereto. This completes the opening and locking in open position of the cell door 10 together with the step of disengaging the operation of the particular door 10 from the main bar 84. In this position, the selector handle 104 indicates that this particular door is locked in open position.

With the cell door in opened and locked position, the main bar can now be operated without changing the position of this particular door. However, it must be returned to the fully opened position before the particular door 10 can be selected to close again. To close the door 10, the above operation is reversed whereby the roller 57 moves the predetermined distance before engagement with the rearwardly extending portion 41 at the right of FIG. 1. This initial movement lifts the roller 57 up the inclined surface 62 to thus lift the lock bar 59 before pawl 44 at the right side of FIG. 1 engages the member 41.

The lock bar safety roller 106 being on the same shaft as lock roller 57 prevents jamming of the mechanism by a prisoner or any other obstruction or force against the door after the door is unlocked and the pawl 44 carried by the slide bar is not completely engaged with the portion 41 of the door carriage. That is, if a prisoner pushes the door while in this position, the safety roller 106 will raise the lock roller 57 against the inwardly extending lip 108 carried by slide bar 43, thereby preventing the door from being opened without having control through the main bar 84. After the roller 57 moves up the inclined surface 52 or 53, as the case may be, the roller 106 then engages and rides along an elongated trackway 100 which is mounted on the carriage angle 16 in parallel relation to the slide bar 43, as shown in FIG. 2.

From the foregoing, it will be seen that we have devised an improved operating and locking mechanism for prison doors. By providing mechanism which is completely controlled from a control box at the end of the row of cell doors, one or more doors can be selected for opening at one operation and these doors may be locked open or may be closed again without changing the selector bar. Also, one or more of the doors 10 may be locked in open position and the remainder of the doors can be returned to closed position and locked. The position of the handle 104 inside the control box indicates whether the door is either closed and locked, selected for closing or opening or opened and locked. Furthermore, our improved mechanism provides full control of the door in any partial open position and the prisoner canot move, change or restrain the door sufficiently to keep the door closed or open. Furthermore, all parts of our improved control door mechanism are operated mechanically whereby the door is securely locked by the lock bar 59 and the locking mechanism associated therewith, which is inaccessible to the prisoner, thus eliminating the necessity of depending upon gravity or springs for closing the door.

While we have shown our invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications, without departing from the spirit thereof.

What we claim is:

1. In apparatus for operating and locking a prison door movable laterally across a door opening:
   (a) a supporting carriage connected to said door and movable therewith across said door opening,
   (b) a slide bar movable longitudinally in opposite directions selectively to a door open position and a door closed position and having first and second downwardly and outwardly disposed cam-like surfaces extending longitudinally of said slide bar and spaced longitudinally from each other,
   (c) a lock bar actuating member mounted for vertical movement in position to engage and move down said first cam-like surface upon movement of said slide bar relative to said actuating member to said door closed position and to engage and move down said second cam-like surface upon movement of said slide bar relative to said actuating member to said door open position so that said lock bar actuating member is lowered each time said slide bar is moved to said door closed and door open positions and is raised each time said slide bar is moved a predetermined distance away from said door closed and door open positions,
   (d) a lock bar operatively connected to said lock bar actuating member and movable to a lower locked position in response to downward movement of said lock bar actuating member and movable to an upper unlocked position in response to upward movement of said lock bar actuating member,
   (e) means operatively connecting said slide bar to said supporting carriage after movement of said slide bar said predetermined distance relative to said lock bar actuating member to raise said lock bar actuating member to said upper unlocked position so that said supporting carriage moves with said slide bar after said lock bar is moved to said upper unlocked position,
   (f) an elongated main bar extending generally parallel to at least one slide bar,
   (g) a slide bar actuator member operatively connected adjacent one end to said slide bar with the other end thereof being movable selectively to an upper position above said main bar, to an intermediate position in alignment with said main bar and to a lower position below said main bar,
   (h) means operatively connecting said other end of said actuator member to said main bar while said other end is in said intermediate position so that said actuator member and the slide bar connected thereto move with said main bar and said main bar moves independently of said other end while said other end is in said upper and lower positions; and
   (i) means to move said main bar longitudinally a distance to move said slide bar selectively to said door open position and said door closed position.

2. Apparatus for operating and locking a prison door as defined in claim 1 in which said other end of said slide bar actuator member carries a transverse pin which engages a vertical recess in said main bar while said other end is in said intermediate position.

3. Apparatus for operating and locking a prison door as defined in claim 2 in which said transverse pin is operatively connected to an elongated, movable selector bar, there being an elongated opening in said selector bar re-

ceiving said pin while said other end of the slide bar actuator member is in said intermediate position so that said pin travels in said opening as it moves with said main bar.

4. Apparatus for operating and locking a prison door as defined in claim 3 in which vertical guides are provided at opposite ends of said selector bar permitting vertical movement of said selector bar and restraining horizontal movement thereof.

5. Apparatus for operating and locking a prison door as defined in claim 3 in which bell crank-like levers are pivotally connected to said selector bar for moving said selector bar to selected vertical positions.

6. Apparatus for operating and locking a prison door as defined in claim 3 in which spaced, horizontal guides are mounted in position to receive the end of said transverse pin opposite the end thereof within said elongated opening and the ends of said horizontal guides communicate with longitudinally spaced vertical guides which receive said transverse pin while said pin is above and below said main bar.

7. Apparatus for operating and locking a prison door as defined in claim 1 in which said lock bar actuating member is a roller mounted on a shaft which is operatively connected to said lock bar.

8. Apparatus for operating and locking a prison door as defined in claim 7 in which an inwardly extending lip-

like member is carried by each end of said slide bar in spaced relation to said downwardly and outwardly extending cam-like surfaces and the surfaces adjacent thereto and a second roller is carried by said shaft in position to lift the first mentioned roller into engagement with said lip-like member upon movement of the door without corresponding movement of said slide bar.

9. Apparatus for operating and locking a prison door as defined in claim 8 in which an elongated track is carried by said supporting carriage for receiving said second roller as said supporting carriage and the door carried thereby is moved between open and closed positions.

References Cited

UNITED STATES PATENTS

1,222,821	4/1917	Van Dorn et al.	49—15X
1,648,248	11/1927	Tracy	49—15
2,290,114	7/1942	Metzler	49—15
2,792,917	5/1957	Smith et al.	49—18X
3,009,545	11/1961	Young	49—16X
3,271,901	9/1966	Bedner	49—17
3,343,302	9/1967	Browning et al.	49—18

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U.S. Cl. X.R.

49—18