July 10, 1934. C. F. YOUNG 1,966,422

LOCKING AND OPERATING DEVICE FOR DOORS

Filed Feb. 10, 1932 6 Sheets-Sheet 1

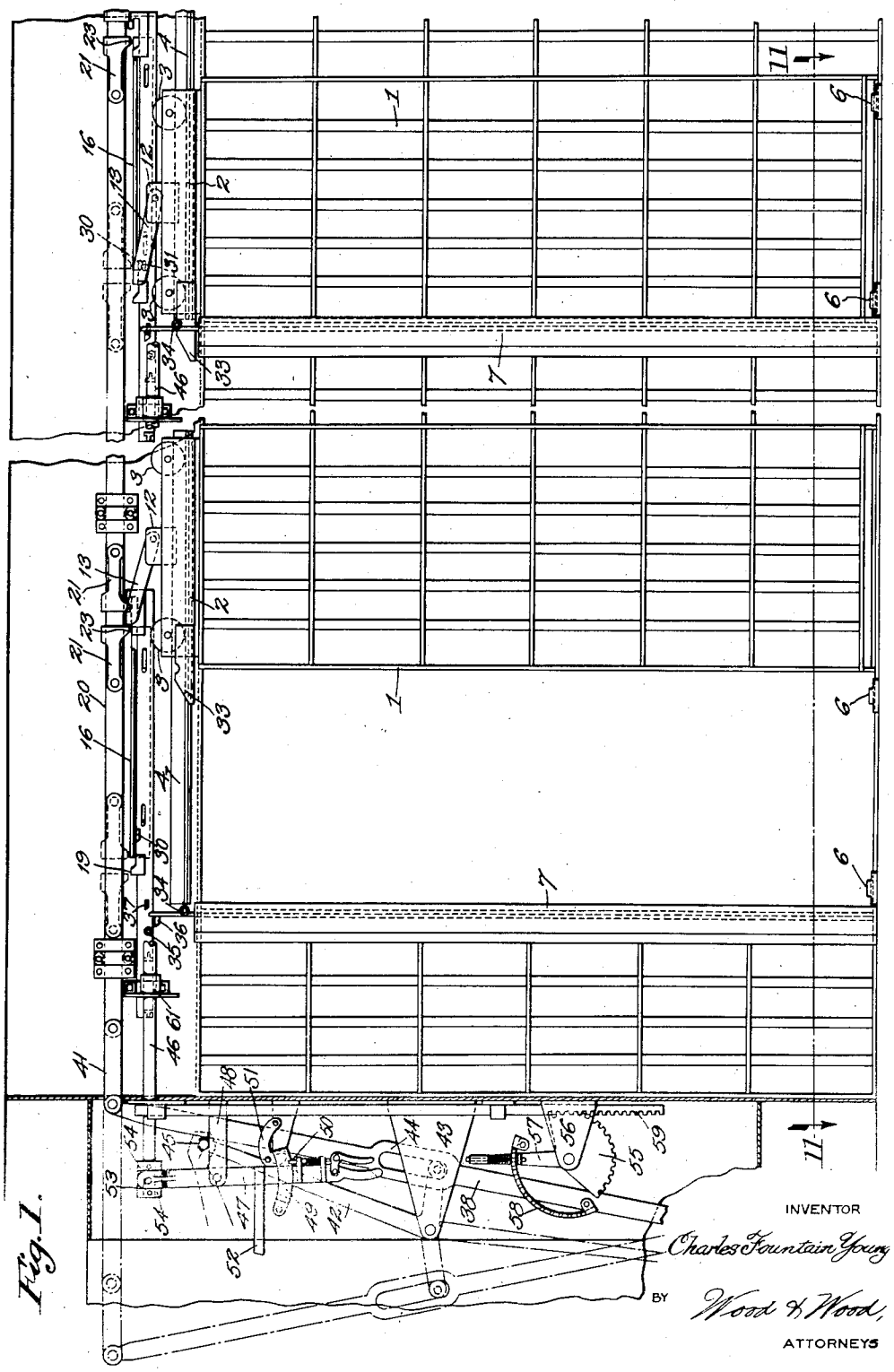


Fig. 1.

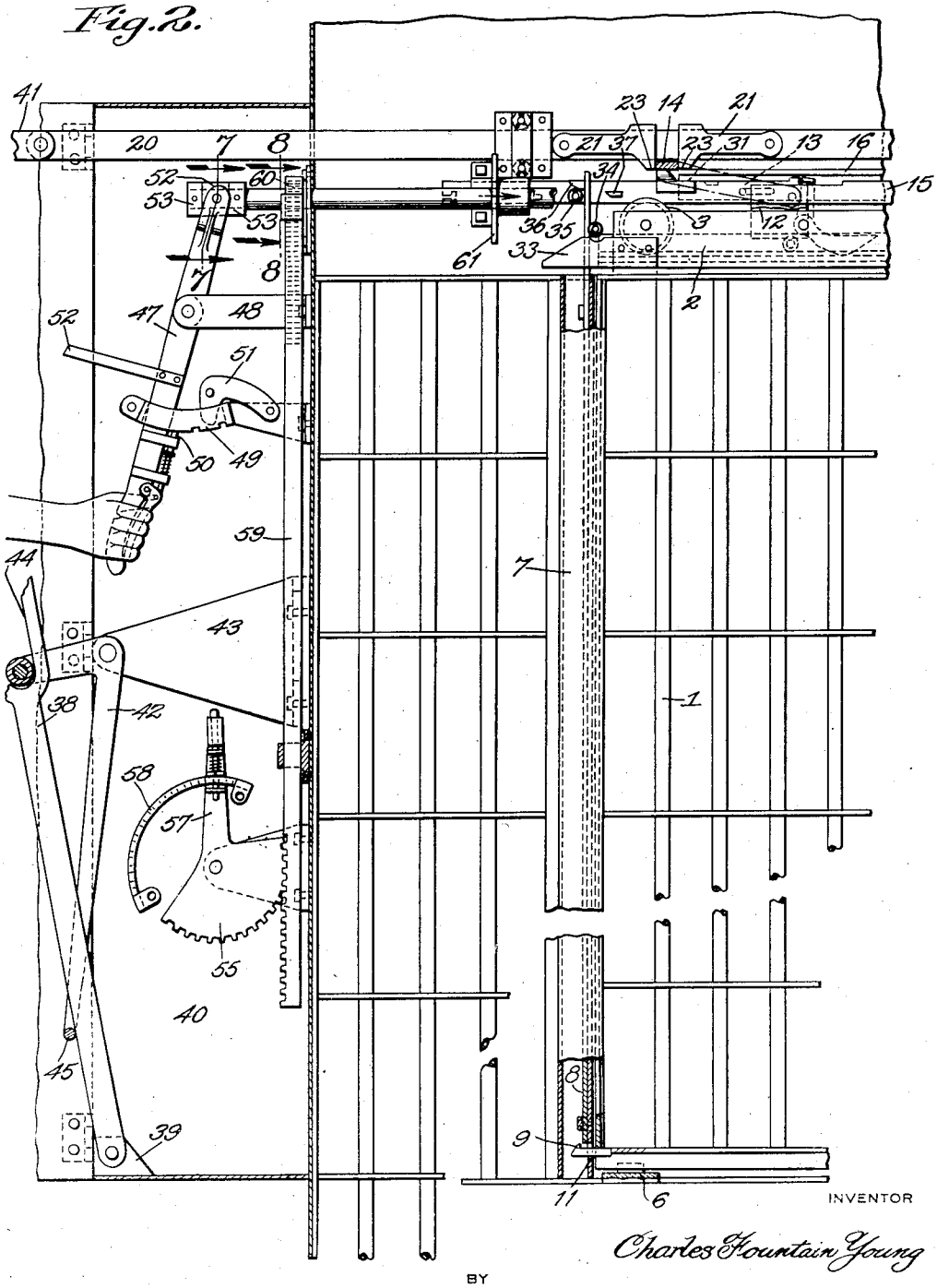
INVENTOR
Charles Fountain Young
BY Wood & Wood,
ATTORNEYS

July 10, 1934. C. F. YOUNG 1,966,422

LOCKING AND OPERATING DEVICE FOR DOORS

Filed Feb. 10, 1932 6 Sheets-Sheet 2

Fig. 2.



INVENTOR

Charles Fountain Young

BY

Wood & Wood,

ATTORNEYS

July 10, 1934. C. F. YOUNG 1,966,422

LOCKING AND OPERATING DEVICE FOR DOORS

Filed Feb. 10, 1932 6 Sheets-Sheet 3

Fig. 3.

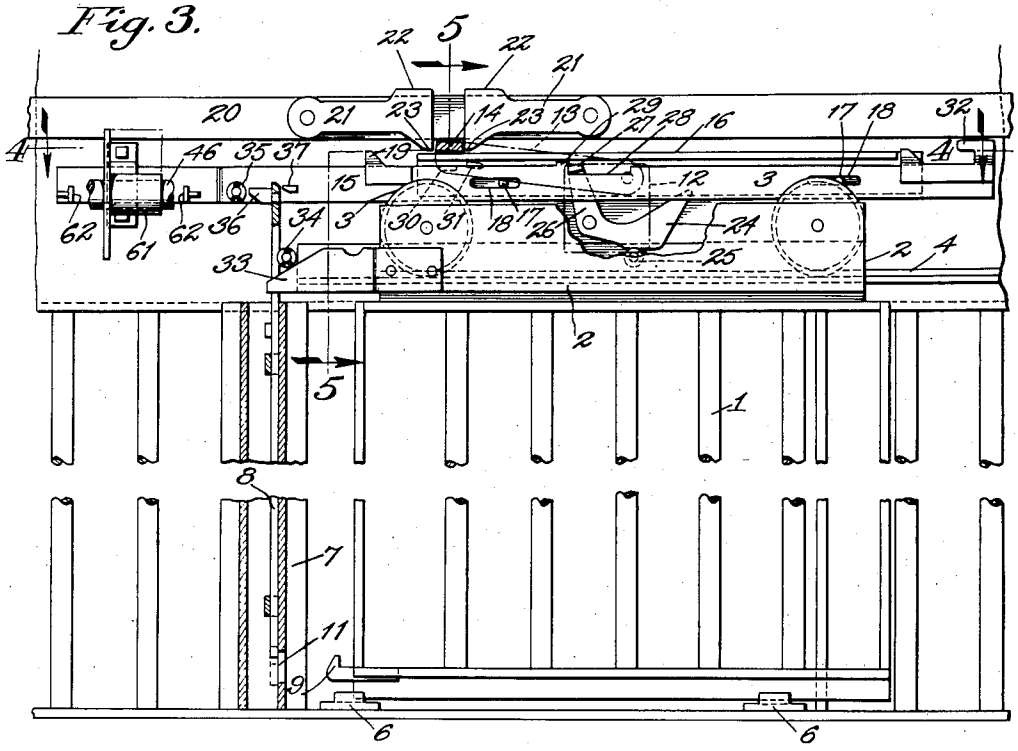
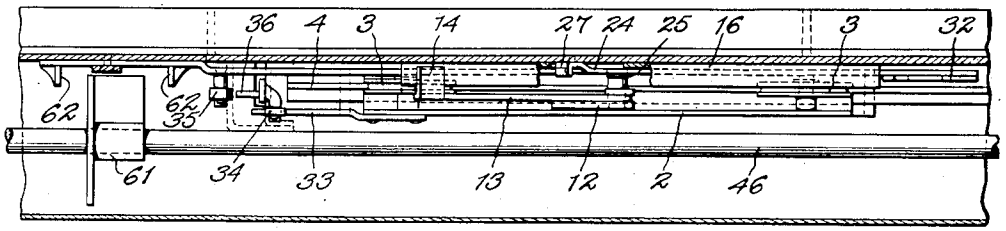


Fig. 4.



INVENTOR

Charles Fountain Young

BY

Wood & Wood,

ATTORNEYS

July 10, 1934. C. F. YOUNG 1,966,422

LOCKING AND OPERATING DEVICE FOR DOORS

Filed Feb. 10, 1932 6 Sheets-Sheet 4

Fig. 5.

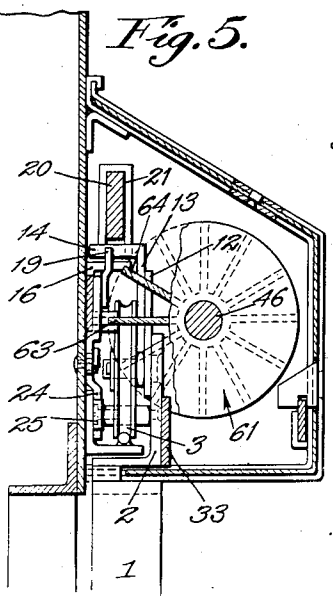


Fig. 7.

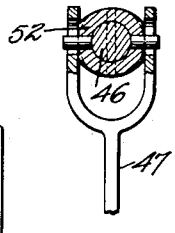


Fig. 6.

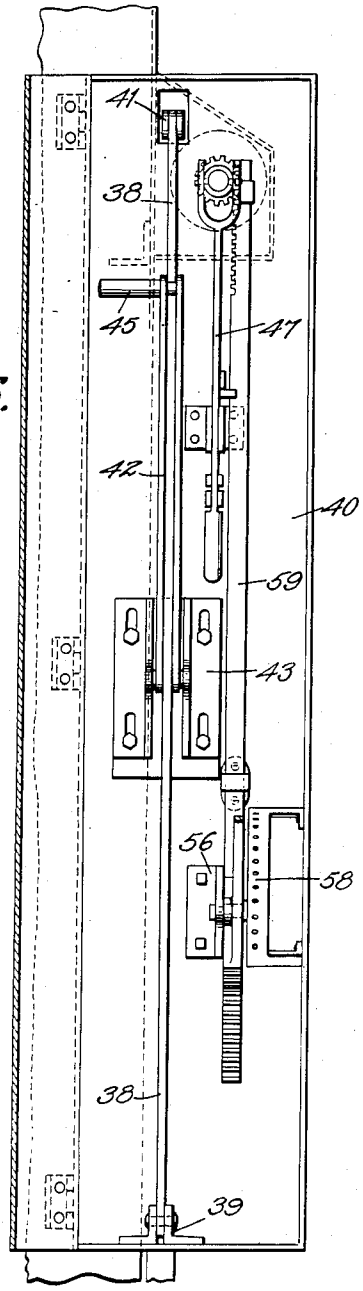


Fig. 8.

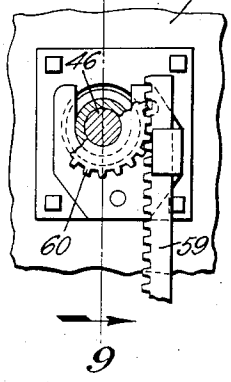


Fig. 9.

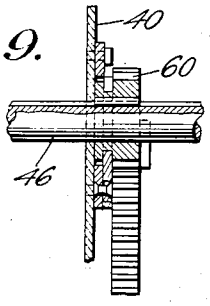
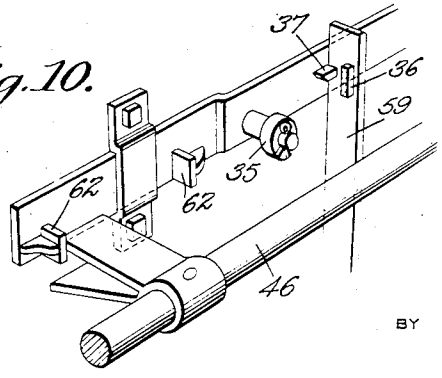


Fig. 10.



INVENTOR

Charles Fountain Young

BY

Wood & Wood,

ATTORNEYS

July 10, 1934. C. F YOUNG 1,966,422

LOCKING AND OPERATING DEVICE FOR DOORS

Filed Feb. 10, 1932 6 Sheets-Sheet 5

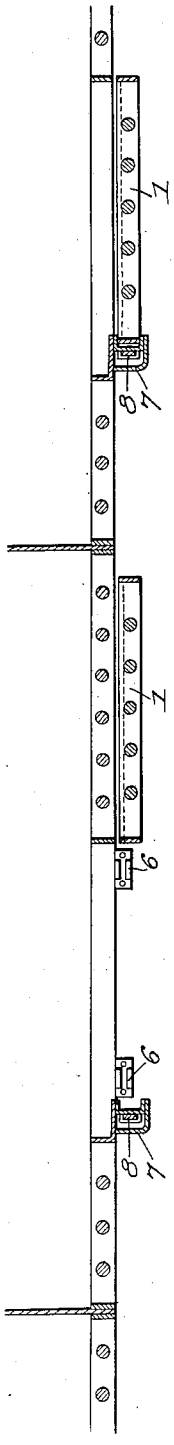


Fig. 11.

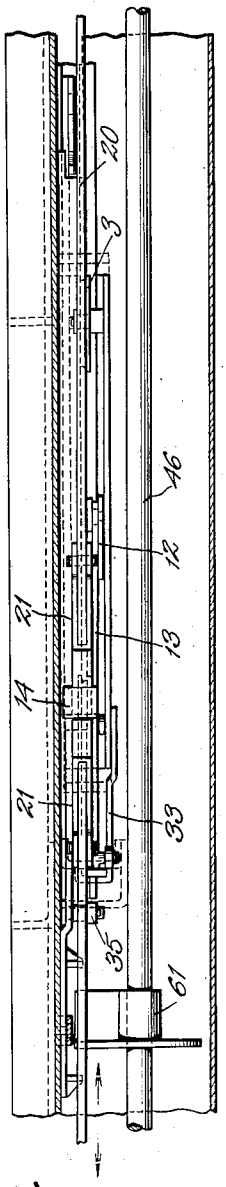


Fig. 12.

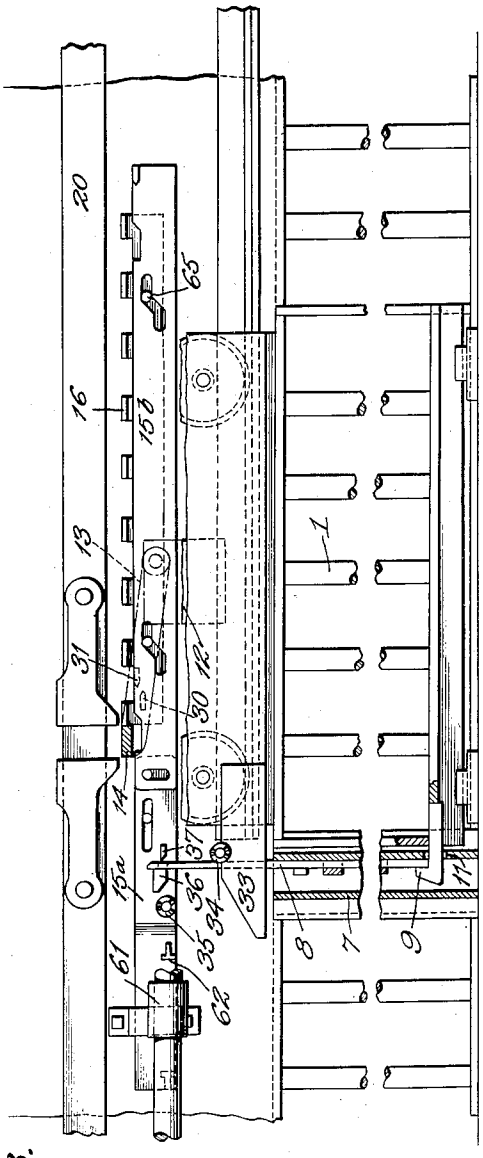


Fig. 13.

INVENTOR

Charles Fountain Young

BY

Wood & Wood,

ATTORNEYS

July 10, 1934. C. F. YOUNG 1,966,422

LOCKING AND OPERATING DEVICE FOR DOORS

Filed Feb. 10, 1932 6 Sheets-Sheet 6

Fig. 14.

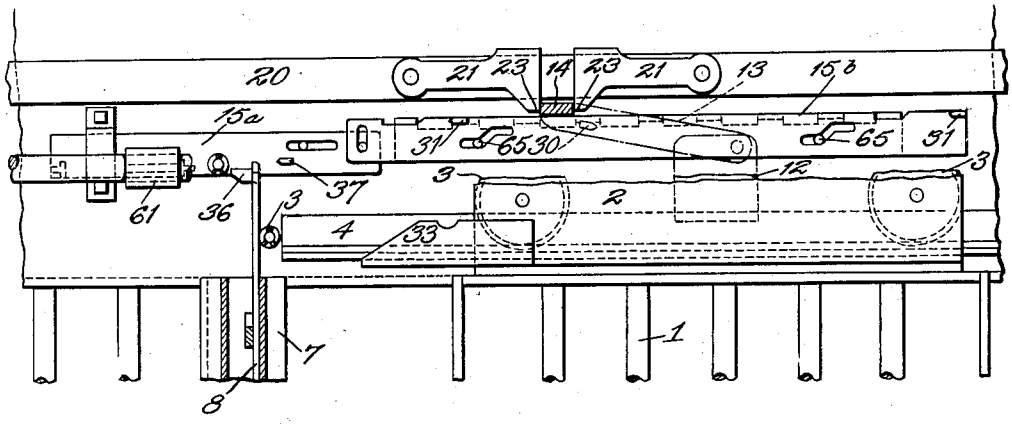


Fig. 15.

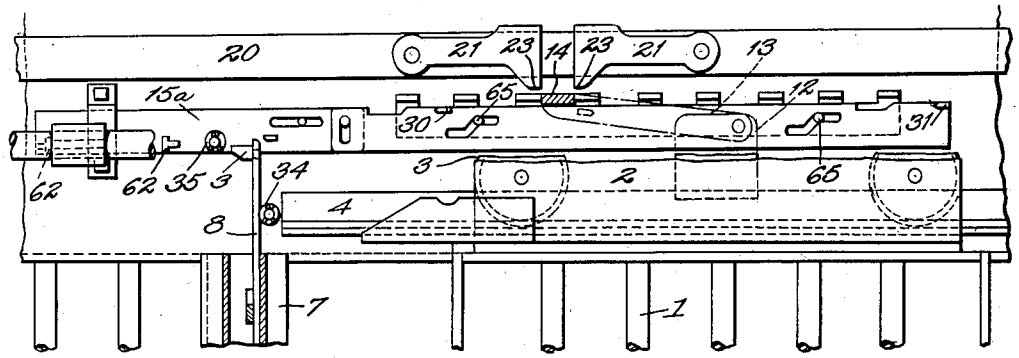
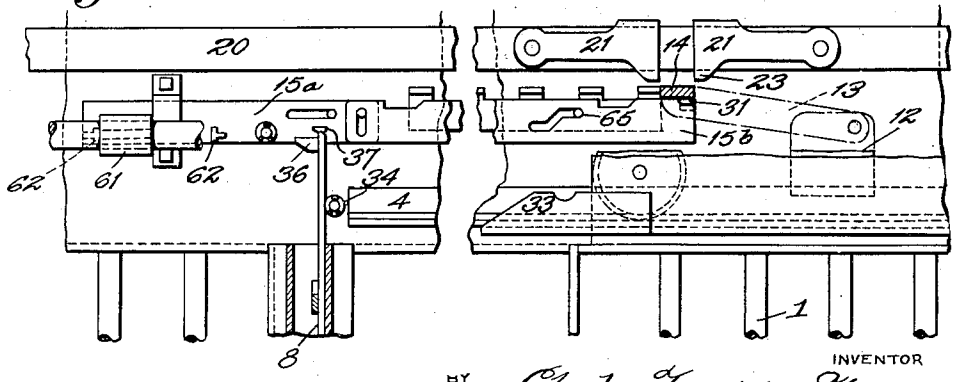


Fig. 16.



INVENTOR

BY Charles Fountain Young

Wood & Wood, ATTORNEYS

Patented July 10, 1934 1,966,422

UNITED STATES PATENT OFFICE

1,966,422

LOCKING AND OPERATING DEVICE FOR DOORS

Charles Fountain Young, Covington, Ky., assignor to The Stewart Iron Works Company, Covington, Ky., a corporation of Kentucky

Application February 10, 1932, Serial No. 591,979

6 Claims. (Cl. 189—7)

The invention relates to locking and operating mechanism for sliding doors, preferably operable from a remote point or station and primarily for controlling a plurality of doors of cells or compartments of penal and other institutions.

An object of the invention is to provide a sliding door operating and locking mechanism of greater durability and tamper proof, within the region of the door and which safeguards against oversight or negligence on the part of an attendant against any ineffective locking of the doors which might result through any incomplete operation of the control mechanism.

Another object of the invention is to provide a sliding door operating and locking mechanism for a plurality of doors of a row of cells or compartments, operable from a station preferably at one end of the row for either selectively or simultaneously unlocking, opening, closing, and relocking any and all of the doors, and the doors automatically locked at the extremes of door slide.

Other features and advantages of the invention will be more fully set forth in the description of the accompanying drawings, in which:

Figure 1 is a front elevation of a pair of cell sliding doors, one in open position and the second closed with the improved mechanism for sliding the doors either selectively or simultaneously, and locking the same either open or closed by an actuating and control mechanism located at one end of a row of cells.

Figure 2 is an enlarged view similar to Figure 1 showing only one door with the parts in position for opening the door.

Figure 3 is an enlarged front elevation of the control mechanism for one of the doors illustrating a step in the operation of opening the door.

Figure 4 is a section on line 4—4, Figure 3.

Figure 5 is a section on line 5—5, Figure 3.

Figure 6 is a front elevation of the control and door actuating mechanism, housed within a casing at one end of a row of doors.

Figure 7 is an enlarged section on line 7—7, Figure 2.

Figure 8 is an enlarged section on line 8—8, Figure 2.

Figure 9 is a section on line 9—9, Figure 8.

Figure 10 is a perspective view of a door control bar including the shaft carrying a key for a selected control of said door.

Figure 11 is a section on line 11—11, Figure 1.

Figure 12 is a view similar to Figure 4, showing the position of the parts when the door is in transit.

Figure 13 is a front elevation of a modified section of door control.

Figures 14 to 16 inclusive, are views similar to Figure 13, illustrating various steps in the operation of the door.

In jails, prisons, or other like institutions, the cells or compartments are usually placed in rows, each cell of the row opening to a common corridor or passageway, with a sliding door as a closure for the opening. The doors usually are operated from a remote point or station, generally at the end of a row, for opening and closing, and to lock the doors either in open, partially open, or closed positions.

With the present invention, it is possible to operate any one of the doors of a series individually and at random, for the series, several or all simultaneously and in selective groups.

The operating and locking mechanism for each of the doors of a series is of duplicate construction and connected with a common actuating bar or rod extending along the row of doors.

Referring to the drawings, 1 indicates a door, its upper end having an angle plate hanger 2, fixed thereon, the hanger carrying a pair of rollers 3—3, rolling upon a track 4, the track constituting an angle iron bar suitably fixed to the frame-work or front wall of the cell. The hanging fixtures for the door may be of any type of construction for a free sliding of the door and to secure it against vertical displacement.

The bottom of the door is held in alignment by a suitable channel guide 6 and the front edge of the door when the door is closed, engages into a channel of a jamb 7. The jamb is of hollow post construction to enclose a sliding lock bar 8, the lock bar engaging with one or several lock lugs 9, extending from the forward edge of the door and engaged through a lock slot 11 in the door jamb when the door is closed.

As shown in Figure 3 of the drawings, the door at its lower edge has a lock lug 9 fixed thereto and extending horizontally therefrom adapting the same to enter a slot 11 in the door jamb, upon closing the door, and be engaged by the lock bar 8. The lock lug has its forward end upturned to overlap the lock bar 8, the lock bar resting upon the lug, when the parts are locked and when the door is opened the lock bar serves as a closure plate for the lock slot in the jamb.

A bracket plate 12 is rigidly attached to the door hanger 2, approximately intermediate of the door guide rollers to which a door locking and coupling

link 13 is pivoted, the link extending forwardly and its forward end provided with a laterally extended lug 14 in a lowermost position engaging or resting upon the horizontal slide bar 15 and in an alternate or upward position for sliding upon a stationary rail 16. The rail is of angle iron form fixed to the frame-work or front wall of the cell, and the slide or coupling operating bar 15 is mounted upon the vertical limb of the angle iron rail by means of studs 17, each engaged through an elongated slot 18 in the slide bar to allow the bar to be reciprocated. The slide bar 15 is provided with a cam tooth 19 projecting from the upper edge of the bar for engaging the laterally extending lug of the coupling link to swing the link upwardly, elevating the lug to a plane with the slide rail, unlatching the door and allowing the door to be slid for opening.

In the elevated position of the latch and coupling link 13, the laterally extended lug 14 is in a position for coupling to a shifter bar 20 parallel with the slide bar 15 as a medium for sliding the door and common to all of the doors of a series or row.

The shifter bar 20 is slidably mounted on the cell front and for each door of the series is provided with a pair of oppositely disposed latch lugs or pawls 21—21, pivotally mounted on the shifter bar, with the forward ends of the pawls spaced apart to engage the laterally extended lug 14 of the latch and coupling link 13 therebetween when the link has been elevated to bring its lug at a plane of the guide-way. The latch pawls 21—21, each is provided with a laterally extending lug 22 overlapping the upper edge of the shifter bar forming a stop for limiting the downward swing of the pawl. The forward end of the latch pawl is provided with a cam edge 23 for automatically lifting the pawl when engaging with the coupling link, and allowing the link to be engaged between the pawls.

A tripper dog 24 is pivotally mounted on the cell front, having an arm at the lower side of the pivot, adapted to rest upon the track or rail 4 and in the path of a roller 25 mounted upon the door hanger for actuating the dog in the opening and closing travel of the door. The dog is provided with an upwardly extending arm 26 with its upper free end having a laterally extending lug 27 projecting within a notch 28 in the upper edge of the slide bar 15. A lug 29 extends upwardly from the slide bar 15 at the forward end of the notch and therewith provides a shoulder against which the laterally extending lug of the dog engages to connect with the slide bar for shifting or sliding the slide bar forwardly with each actuation of the dog, bringing the slide bar to a neutral position, and advancing the tooth a suitable distance from the end of the slide-way or rail 16 to allow the link 13 to drop off of the end of the slideway or rail when the door has reached either open or closed positions, thereby locking the door in either extreme of travel.

To positively lock the link in its downward position below the plane of the guide-rail in either extreme, open or closed position of the door, the slide bar 15, for locking the link against upward movement when the door is closed, is provided with a laterally extending lug 30 at an elevation to be brought in registry over a laterally extended lug 31 on the link 13 when the slide bar 15 is brought to an extreme forward position. When the door is at its extreme open position, the link is locked down by a latch lug 32 on the rear end of the slide bar 15 which hooks over the lateral lug of the link 13, securing the same against vertical lift.

When the door is closed, as shown for the second door in Figure 1, the slide bar 15 for that door, is in an extreme forward position, the link 13 resting on the top edge of the slide bar and adjacent the forward edge of the rail 16 thereby locking the door against opening. The link 13 is locked against vertical lift by the registration of the lugs 30—31, respectively on the slide bar and link. Upon shifting the slide bar to the right, lug 30 of the slide bar will be advanced, clearing the lug 31, leaving the link 13 free to be raised by the cam tooth 19, the cam tooth elevating the link to an elevation with the rail 16 and engaging the laterally extended lug 14 on the link between the coupling pawls 21—21 of the actuating or shifting bar 20 connecting the link with the bar 20 and moving therewith upon reciprocating the bar for sliding the door.

As the door is opened by the shifter bar 20, the roller 25 on the hanger bracket, will engage the lever 24, shifting the slide bar 15 to a neutral position to the left, bringing the tooth 19 at the opposite end of the slide bar 15 inward of the end of the rail 16 so that the link can drop off of the right end of the rail upon the slide bar, engaged and locked down by the hook 32 at the extreme right end of the slide bar. The link 13, as it drops off of the end of the rail 16, is released or retreats from its engagement between the pawls of the shifter bar, so as to again require the slide bar 13 to be shifted to the right to elevate the link before the link can be recoupled to the shifter bar for a door closing operation.

The door, at its upper forward end, is provided with a rigid lift wedge 33 for engaging with a roller 34 journalled and extending from the vertical lock bolt or bar 8 within the jamb, to raise the lock bolt until the bottom latch lug 9 clears the lower end of the lock bolt and as the door continues to close, the roller 34, enters a notch in the lift wedge, allowing the lock bar to descend to its door locking position, bringing the lower end of the bolt in engagement with the lock lug 9.

The lock bolt or bar 8 is also raised by the slide bar 13 through a roller 35, journalled on said bar, engaging with a cam lug 36, extending laterally from the upper end of the lock bolt 8. It is necessary to initially release the lock bolt 8 by the slide bar 13 before the door can be released from the lock bolt in its engagement with the latch bolt 9. The lock bolt is also adapted to be locked in its door locking position by a lug 37 extending laterally from the slide bar, engaging with the upper end of the lock bolt 8, when the slide bar is in its extreme left position. This makes it impossible to raise the lock bolt 8 by any drift inserted through the latch opening 11 beneath the lock bolt or by any other tampering method.

The shifter bar is reciprocated by a lever mechanism housed within a casing or cabinet at one end of a row of cells, the mechanism preferably comprising a vertically disposed lever 38 pivoted at its lower end to a bracket 39 fixed to the floor or bottom of the casing 40. The upper end of the lever is pivotally connected to a link 41, the link in turn being pivotally connected with the forward end of the shifter bar 20. The lever 38 is actuated by a bell crank lever 42 of double construction to straddle the lever 38, and the two sections, as a unit, are pivoted to a bracket 43 fixed to a vertical base wall of the casing 40. The short arms of the bell crank lever 42 are joined by a stud carrying the roller engaged through an elon-

gated slot 44 in the lever 38. The upper ends of the long arms of the bell crank lever are connected by a handle 45 projecting side-wise for ready grasp by the hands of the operator. The bracket 43 is arranged for vertical adjustment to change the stroke of the lever, to compensate for wear, in the lever and parts attached thereto. With the bell crank lever 42 in this upward position as shown in Figure 1, the shifter bar has been moved to an extreme right or door opening position, and when in a position as shown in Figure 2, to a position for a complete closing of the door. When the bell crank lever 42, in a position as shown in Figure 1, is swung downwardly the lever 38 is pulled downwardly, causing the bar 20 to be moved forwardly to close the doors. An operation of the bell crank lever in a reverse direction moves the shifter bar 20 in a direction for opening the doors. This lever mechanism provides for a convenient and easy operation and without undue exertion on the part of the operator to move a large number of doors, the door in some instances being of considerable number, carrying considerable weight, imposing a heavy load.

The several extreme positions of the bell crank lever renders the lever mechanism self-locking, making it impossible to shift the bar 20 from any point along the row of cells for which the bar serves. The slide bar 15 for individually controlling the operation of the several doors of the cells of a row or series is manually reciprocated by a rod or shaft 46 extending longitudinally parallel with the shifter bar 20 with its forward end extending into the casing 40, and coupled to the upper end of a hand lever 47 mounted upon a bracket 48, fixed to the base wall of the casing. The hand lever moves within a stationary quadrant 49 rigidly fixed to the base wall of the casing 40, and the wall is provided with a plurality of notches on its under side to receive a spring pressed latch or detent 50, mounted upon the hand lever in its adjusted or set position, at either a neutral or a locking position. At the neutral position the hand lever is locked by a swinging hasp or pawl 51 to block or limit the movement of the hand lever in one direction, preventing the hand lever from being inadvertently pushed into its locking position. The hasp or latch is manually releasable and must be held out while the hand lever is shifted to its locking position.

To insure that an operator will not fail to positively lock the door, a spur 52 is rigidly attached to the hand lever and extends at right angles therefrom and forwardly to engage with the door of the casing or cabinet, and prevent the door from being closed while the hand lever is in an outward or neutral position. The spur is proportioned, requiring that the door of the casing can only be closed when the hand lever 47 is in its positive locked position.

The upper end of the hand lever 47 terminates into a fork and engages with a collar 53, free upon the rod or shaft 46 and between a pair of collars 54—54, fixed to the shaft, which enables the shaft to be revolved. The shaft is revolved by a hand actuated gear segment 55, journalled upon a bracket 56, fixed to the rear wall of the casing, the gear segment carries a handle 57, equipped with a spring pressed detent for engagement into apertures in a stationary quadrant 58 for locking the gear segment in any one of its several positions of adjustment. The gear segment 55 is in mesh with the lower end of a vertically disposed rack bar 59, slidably supported upon the rear wall of the casing with the upper end of the rack bar in mesh with a pinion 60, splined upon the shaft 46. The shaft 46 is provided with a key 61, one for each door of the series and located on the shaft to lie between a pair of spaced lugs 62—62, projecting from the slide bar 15.

The keys 61 in the form of a flanged collar, are provided with a pair of wings or bits 63, 64, one of the wings, say 63, is arranged to be in alignment with a corresponding wing of the keys 61 of each of the doors of a series, for a unit or simultaneous control of all the doors. The annular flange provides for shifting all of the slide bars, to a neutral position, irrespective of the selected positions of the keys.

A second wing is in a relatively different position from the corresponding wings of the keys for the other doors of the series for an individual or selective door control, when adjusted or set to an intermediate registry with the lugs 62—62 of the slide bar of a selected door, to contact with the lugs upon reciprocation of the shaft, 46.

Additional wings may be added to each key for operating the doors in two or more groups or combinations.

The quadrant 58 serves as an indicator, carrying index marks for the various doors of the series and setting positions of the wings for operatively connecting the shaft with the selected slide bars of the several doors.

Adjustment of the gear segment translates the rack 59 for selectively coupling the slide bars 15 to the shaft 46 for reciprocating the slide bars to bring about a control of the door locking and operating mechanism heretofore described as elevating the link 13 to connect the same with the shifter bar 20 and to release the lock bolt or bar 8 to release the door for opening upon actuation of the shifter bar 20.

The mechanism upon the doors is suitably enclosed within housing to prevent any tampering and is preferably made in sections, and the sections interlocked, and the whole housing held in place and locked without the use of bolts, screws, or other visible means of fastening, which, however, is subsidiary to the locking mechanism of the several doors.

In Figures 10 and 13 to 16 inclusive, a modified form of door control mechanism is disclosed. This form permits a door to be cut out or disengaged from the shifting bar 20, while the door is in transit or in intermediate positions, as in the event movement of the door is obstructed by a prisoner, the movement to the unobstructed doors may continue.

The slide bar for actuating the link 13 is of sectional construction, constituting a section 15*a* longitudinally slidable and corresponding to the forward end of the slide bar 15 previously described. The bar section 15*a* is coupled to a second section 15*b* slidable both longitudinally and vertically. Section 15*b* is supported by a pair of studs 65 respectively engaged through diagonal slots in the bar for raising or lowering the bar to bring the link 13 supported thereon, either into or out of coupling connection with the shifter bar 20. The bar can be dropped at any point in the door transit, individually disconnecting it from the shifter bar 20, so as not to interfere with the continued movement of the shifter bar. The bar section 15*b* in its elevated position serves as a guide or slide-way for the link 13, substituting for the stationary slide-way of the construction heretofore described.

The stationary slide-way may be utilized for

locking the door at any intermediate position, by providing it with one or a series of notches into which the link 13 engages when the bar section is set in its lowermost position or elevation.

Having described my invention, I claim:

1. A remote control sliding door operating and locking mechanism, comprising, a plurality of sliding doors arranged in a row, a shifter bar for translating said doors selectively or simultaneously, each door having a link at its upper end adapted to be coupled to said shifter bar, a slide bar for each door for moving said link into coupling connection with said shifter bar, each link when uncoupled from said shifting bar, locking the door against transit, a bar for shifting said slide bars of a series carrying a key member, one for each slide bar of the series rotatable with the bar for selectively controlling a door opening connection of said rod and slide bars, and means respectively for each door for maintaining the coupling connection of shifter bar and link while the door is intermediate of its extremes of translation.

2. A remote control sliding door operating and locking mechanism, comprising, a plurality of sliding doors respectively for compartments arranged in a row, a shifter bar for translating said doors extending longitudinally thereabove, each door at its upper end having a hinged link for connection with said shifter bar, a slide bar for each door, cooperating with the link for moving the same into coupling connection with said shifter bar, each link when uncoupled from said shifter bar, locking its door against transit, a bar for shifting said slide bars of a series carrying a key member, one for each slide bar of the series rotatable with the bar for selectively controlling a door opening connection of said rod and slide bars, and means respectively for each door for maintaining the coupling connection of shifter bar and link while the door is intermediate of its extremes of translation.

3. A sliding door operating and locking mechanism, comprising, a sliding door, a shifter bar mounted longitudinally with the front door transit for translating said door in alternate directions, a link connected with said door, adapted to be coupled to said shifter bar, a slide bar for swinging the said link into coupling connection with said shifter bar, a rod longitudinally parallel with said shifter bar, reciprocable for actuating said slide bar, means carried by said rod rotatable therewith for connecting and disconnecting said rod and slide bar, a lock bolt for locking the door in its closed position, controlled by said slide bar, and means for maintaining the coupling connection of shifter bar and link while the door is intermediate of its extremes of translation.

4. A remote control sliding door operating and locking mechanism, comprising, a plurality of sliding doors respectively for compartments arranged in a row, a shifter bar for translating said doors extending longitudinally thereabove, each door at its upper end having a hinged link for connection with said shifter bar, a slide bar for each door, cooperating with the link for moving the same into coupling connection with said shifter bar, each link when uncoupled from said shifter bar, locking its door against transit, the slide bar, when shifted to an extreme position cooperating with the link to lock the same against coupling connection with said shifter bar, means respectively for each door for maintaining the coupling connection of shifter bar and link while the door is intermediate of its extremes of translation, and a bar for shifting said slide bars of a series carrying a key member, one for each slide bar of the series rotatable with the bar for selectively controlling a door opening connection of said rod and slide bars.

5. A remote control sliding door operating and locking mechanism, comprising, a sliding door, a shifter bar mounted longitudinally with the door transit for translating said door to alternately open and close the same, a link pivotally connected with said door, adapted to be coupled to said shifter bar, a slide bar for swinging said link into coupling connection with said shifter bar, the slide bar cooperating with the link for locking the door against transit when the link is disengaged from the shifter bar, and a stationary guide sustaining the link in coupling connection with the shifter bar upon a slight translation of the door in either opening or closing directions.

6. A remote control sliding door operating and locking mechanism, comprising, a sliding door, a shifter bar mounted longitudinally with the door transit for translating said door to alternately open and close the same, a link pivotally connected to the door, adapted to be coupled to said shifter bar, a reciprocal bar cooperating with the link at definite points for coupling control of said shifter bar and link, a stationary guide for maintaining said link in coupling connection with the shifter bar when intermediate of said control points, and means actuated by the door for neutralizing said shifter bar.

CHARLES FOUNTAIN YOUNG.