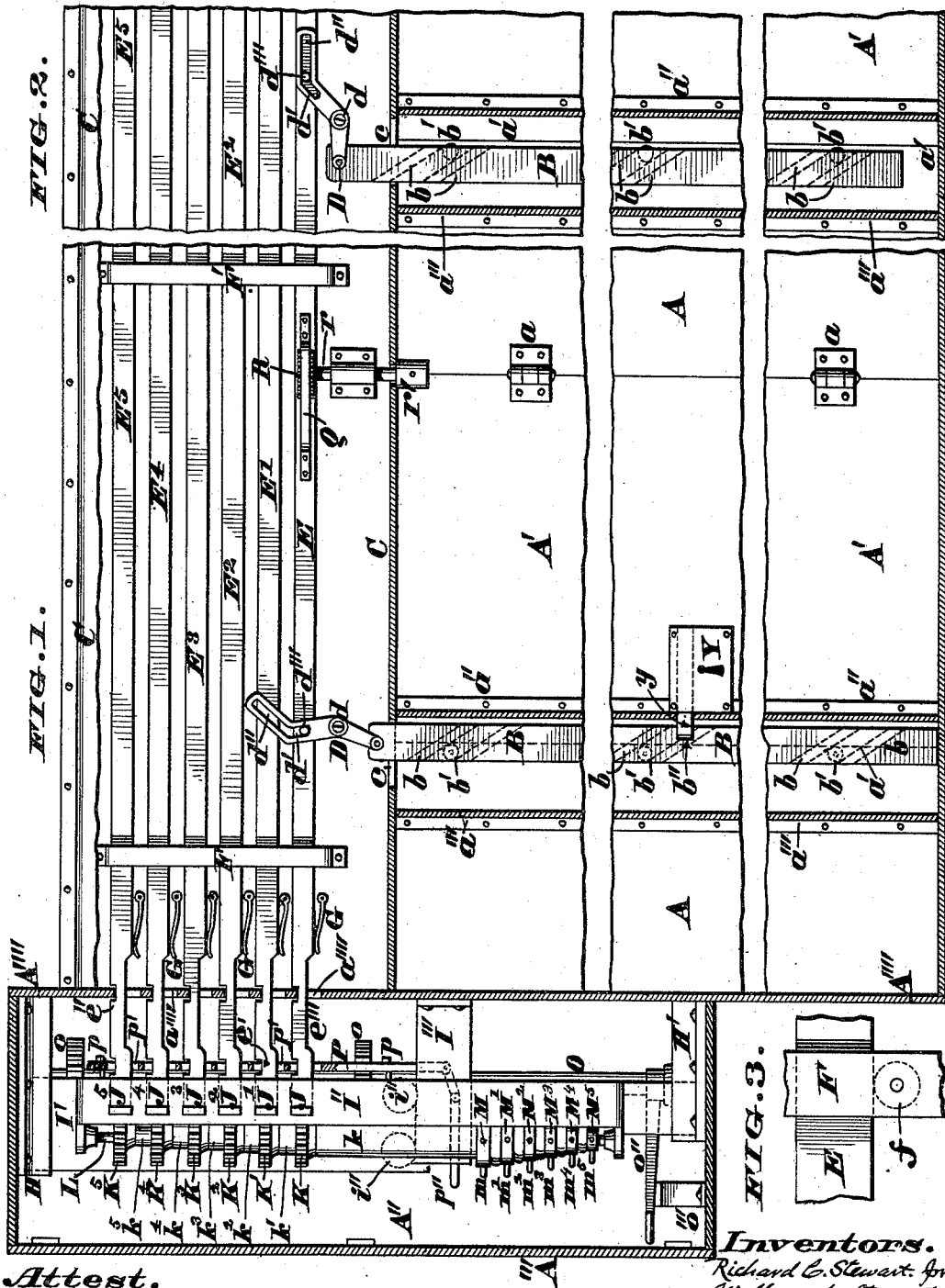


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JAIL.

No. 584,610.

Patented June 15, 1897.



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J. C. Layman.
J. A. Sely.

Inventors.
Richard C. Stewart, Jr.
Wallace A. Stewart.
By James H. Layman
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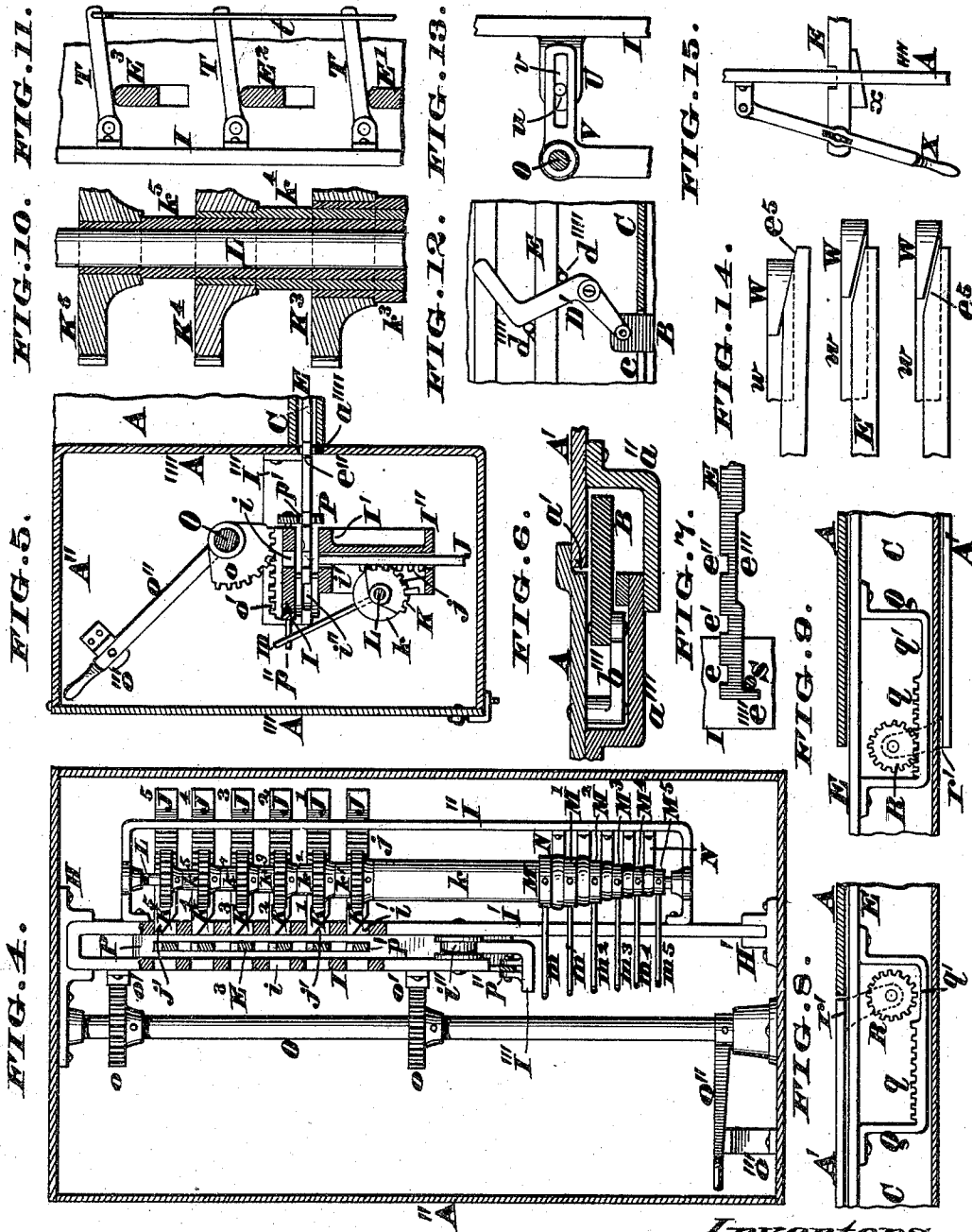
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2 Sheets—Sheet 2.

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Attest.
M. E. Layman
Ida Steitz

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Wallace A. Stewart
By James H. Layman.

UNITED STATES PATENT OFFICE.

RICHARD C. STEWART, JR., AND WALLACE A. STEWART, OF COVINGTON,
KENTUCKY.

JAIL.

SPECIFICATION forming part of Letters Patent No. 584,610, dated June 15, 1897.

Application filed September 21, 1896. Serial No. 606,522. (No model.)

To all whom it may concern:

Be it known that we, RICHARD C. STEWART, Jr., and WALLACE A. STEWART, citizens of the United States, residing at Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in Jails; and we do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the annexed drawings, which form a part of this specification.

This invention relates to those jails or prisons wherein the cell-doors open outwardly into a corridor and are unlocked and then opened by means of reciprocating bars arranged above the doors and controlled solely by a jailer or other guard stationed in some secure place, and the first part of our improvements includes a special combination of devices for communicating motion from the bars to the unlocking and opening mechanisms, as hereinafter more fully described.

The second part of our improvements consists in housing the engaging ends of these bars within a box containing a peculiarly-constructed shifting mechanism, which latter is capable of being set in such a manner as to advance or retract either one of said bars singly or to move all of them simultaneously, either back or forth, as hereinafter more fully described.

Our invention further comprises certain details of construction that enable the aforesaid improvements to be carried out in the simplest and most effective manner, as hereinafter more fully described.

In the annexed drawings, Figure 1 is a sectional elevation of a jail or prison embodying our various improvements, six reciprocating bars and one closed and locked door being shown and portions of said door and the cell to which it is applied being broken away. Fig. 2 is an elevation of sufficient of said mechanism to show how it unlocks the door. Fig. 3 is an enlarged detail view of a guide and antifriction roller used in connection with the reciprocating bars. Fig. 4 is a vertical section of a box that incloses the shifting mechanism, a set of bolts housed within said box being fully retracted. Fig. 5 is a horizontal section of the box, taken in the

plane of one of said retracted bolts. Fig. 6 is an enlarged horizontal section through a casing at the lock edge of a door and cell. Fig. 7 is a detail view of the engaging end of a reciprocating bar. Fig. 8 is a sectionized plan of a device for swinging a cell-door, the latter being closed. Fig. 9 is a similar plan, but showing the door opened. Fig. 10 is an enlarged axial section through a portion of the gearing that operates the bolts. Figs. 11, 12, 13, 14, and 15 show five different modifications of our invention.

Referring to Figs. 1 and 2, A represents an end or side of one of any suitable number of cells arranged along a corridor or other passage in a jail or prison, and A' is a door hinged to said cell at a and adapted to open outwardly or into said passage.

a' in Figs. 2 and 6 is the lock edge of the door, and a'' is a casing that assists in concealing said edge, a portion of this casing being broken away in Figs. 1 and 2. a''' is a counterpart of the casing, attached to the cell A. Housed within this double casing and adapted to be readily shifted both vertically and laterally is a lap-plate B, of sufficient width to completely cover the joint where the lock edge of the door fits into the door-frame of the cell, which plate may be applied to said cell by a set of swinging links, one of the latter being seen at b''' in Fig. 6. We prefer, however, to effect this vertical and lateral shifting of said plate by securing to its rear surface a pair of inclined bars b b', adapted to travel on small rollers b', journaled to the exterior of the cell A. These strips should be inclined at such an angle as to launch the plate B toward the closed door A' the instant said plate is permitted to drop down. b'' is a notch in one edge of said plate for a purpose that will presently appear.

Secured above the cell-doors and running along the corridor is a metallic casing C, containing all the reciprocating bars and their attachments for operating the lap-plates B, said casing being slotted at c to permit the proper vertical and lateral play of said plates. These plates are suspended from the short arms of bell-cranks D, pivoted to the cells at d and having their longer arms slotted at d' d''. Said slots communicate with each other,

are arranged about at the angle shown, and the slot d'' is relatively shorter than the slot d''' . Adapted to traverse these slots is a pin d'''' , projecting horizontally from a reciprocating bar E, confined to a proper path by guides F F' and usually carried by rollers f , as seen in Fig. 3. This bar is sufficiently long to remain at all times within the guide F when sufficiently advanced, and its engaging end has on its upper edge three notches $e' e'' e'''$ and on its lower edge a cut-away portion e'''' . e'''' is a hook at the extreme end of this bar, as seen in Fig. 7. Furthermore, this notched or engaging end of the bar is housed within a box A'', having a hinged lid A''', provided with a secure lock, the box being located in a guard-room at one end of the corridor.

A'''' is a thick plate partition separating the box from the adjoining cell, the plate being slotted at a'''' for the free passage of the reciprocating bars, whose engaging ends are normally elevated a sufficient distance to cause their notches e'' to interlock with the upper ends of said slots a'''' , this raising of said bars being preferably effected by springs G. The fixed ends of these springs are secured within the casing C, and their free ends are quite near the trailing ends of the cut-away portions e''' of the bars E when said bars are completely advanced, as seen in Fig. 1. In the present instance six of these bars E E' E² E³ E⁴ E⁵ are shown, and the mechanism for shifting them back and forth is arranged as follows:

Attached to the top and bottom of the box A'' are horizontal guides H H', traversed by a carriage composed of three parallel vertical plates I I' I'', suitably fastened together, the plates I I' being slotted at $i' i''$ and rollers i'' being fitted between said plates, as seen in Fig. 4 and indicated by dotted circles in Fig. 1. These rollers run upon an angle-iron track I''', projecting horizontally from the partition A'''. Again the carriage is provided with six sliding bolts J J' J² J³ J⁴ J⁵, one for each of the bars E, and each bolt has a rack j and beveled advancing end j' .

K K' K² K³ K⁴ K⁵ are gear-wheels engaged with the bolt-racks and carried by sleeves $k k' k^2 k^3 k^4 k^5$, fitted within each other in the manner indicated in Fig. 10, the inner sleeve k^5 being adapted to revolve around a fixed shaft L, secured to the carriage I I' I''. Attached to the lower ends of these sleeves are collars M M' M² M³ M⁴ M⁵, having handles $m m' m^2 m^3 m^4 m^5$, wherewith either sleeve can be turned independently of its associates. N are brackets that separate these collars and assist in supporting the various sleeves.

O is a vertical rock-shaft journaled within the box A'' and having one or more gear-wheels o engaged with racks o' of the carriage, the shaft being operated by a lever o'' after being unlocked from a stop o''' , secured within the box A''.

Attached to the back of the carriage by

guides p is a vertically-sliding plate P, having slots p' to engage with the notches e' in certain emergencies, the plate being raised and lowered by a lever p'' , pivoted upon the track I'''.

Projecting from the outer surface of each bar E is a frame Q, having a rack q and an untoothed portion q' , a pinion R being located in the path of said frame, as more clearly seen in Figs. 8 and 9, and said pinion being secured upon a shaft r .

Shaft r is journaled in a suitable bearing and has its lower end fastened to a lug r' , projecting rigidly from the upper part of the door A' and axially in line with its hinges a .

S in Fig. 7 is a pin connecting together the plates I I' of the carriage and serving as a stop for the hook e'''' to bear against.

The normal positions of all the above-described operative parts are seen in Figs. 1, 4, and 5, reference to which illustrations shows that all the reciprocating bars E are now advanced and their notches e brought in line with the slots $i' i''$ of the carriage. Consequently the other slots e' occupy the slots p' of the vertically-acting plate P. The other notches e'' of the bars are engaged with the slots a'''' of the partition A'''' on account of the upward pressure of the springs G or their equivalent devices. Again, the bolts J are now drawn completely back, their beveled ends j' being housed within the carriage-slots i' and therefore being in line with the opposing notches e and slots i . Furthermore, in this advanced position of the various bars E their pins d'''' are at the lower ends of the short slots d' of the bell-cranks D, and for this reason the lap-plates B are lowered, so as to cover the meeting joint a' of the cell and door, it being understood that the latter is now closed and locked. In this advanced position of the bars E the untoothed portions q' of their frames Q are opposite the pinions R. (See Fig. 8.)

An inspection of Fig. 6 shows it would be very difficult for a prisoner to pry open the joint a' and obtain access to the lap-plate B; but even then he could not raise it, because the pin d'''' prevents the bell-crank D turning on its pivot, and until such a turning is effected said plate will remain immovable in its normal position. Neither can a prisoner pull down the end of a bar and then force it back, because the very instant said bar is sufficiently depressed to free its notch e'' from the slot a'''' the hook e'''' of said bar comes in contact with the pin S of carriage I, and the latter is now a fixture on account of its operating-lever o'' being locked to the stop o''' . (See Figs. 5 and 7.) It will thus be seen that a cell-door cannot be opened until an officer first unlocks the box-lid A''', releases the free end of lever o'' , and then couples the proper bar to carriage I I' I''.

Assuming now that the lower bar E is the one to be coupled to the carriage, the guard or other officer grasps the upper handle m and

swings it around in such a way as to turn the wheel K, thereby advancing the bolt J and forcing it through the notch *e* of the bar and slot *i* of the carriage. Consequently the beveled end *j'* of the bolt acts as a wedge that depresses the bar E far enough to disengage its notch *e''* from slot *a''''* of the plate A''', as above described. Evidently the bar E is now temporarily coupled to the carriage I I' 10 I'' and will partake of any retracting motion imparted to the latter. This retraction is effected by simply swinging forward the free end of lever *o''*, the result being to run the carriage back on its track I''' and cause the 15 following movements to take place: As soon as the bar starts back the free end of spring G enters the cut-away portion *e'''*, thereby greatly diminishing the pressure of said spring and enabling the mechanism to be operated without the exertion of much power. 20 Simultaneously with this retraction of the bar its pin *d''''* bears against one side of the shorter slot *d'* of the bell-crank D and swings the latter far enough to raise the plate B and shift it to one side until it reaches the position seen in Fig. 2, in which position the lock edge of the door A is exposed. The continued retraction of bar E causes the pin *d''''* to traverse the now horizontal slot *d''* of the bell-crank, 30 and on this account no further motion is imparted to said device D. As soon, however, as said pin begins to travel along this slot *d''* the rack *q* commences its engagement with the pinion R, thereby initiating the opening of the door A', which will reach the position seen in Fig. 9 when said rack has completed its stroke. Hence it will be seen that the bar E performs the twofold duties of first unlock- 40 ing the door and then opening it, and it acts in a precisely reverse manner in shutting and fastening said portal A'. To close and secure said door, the lever *o''* is so swung around as to advance the carriage I and draw forward with it the bar E, during which act the rack *q* and pinion R turn the door around on its hinges *a*, and then when the untoothed portion *q'* of the frame Q is opposite said pinion the lap-plate B gradually slides down on the rollers *b'* and resumes its normal position. Bolt J is next retracted, so as to relieve 50 bar E from all downward pressure and permit the spring G to elevate it and thereby reengage the notch *e''* with the slot *a''''* of partition A''''.

Evidently either one of the six bars can be reciprocated in the above-described manner after turning the proper handle so as to couple the desired bar to the carriage; but by swinging all of these handles around successively every one of said bars will be engaged by their respective bolts. Consequently if the carriage is now retracted every door in the corridor will be unlocked and thrown wide open. There may be emergencies, however, as in the event of a fire, when there would not be time enough to operate the handles separately, and in such a case

the plate P is brought in service by simply forcing it down and causing its slots *p'* to engage with the notches *e'* of all the bars. By 70 this simple expedient all the bars are tied together by said plate, and then when either one of them is coupled to the carriage and the latter retracted said bars run back and instantly unlock and open the cell-doors. 75

As previously stated, the lower bar E extends back only far enough to operate the first door A', but the next bar E' must be somewhat longer, so as to actuate the second door, and so on for as many bars as may be 80 used in one casing. Therefore the second bar and all those above it should have vertical rods connecting their bell-cranks to the lap-plates B, so as to avoid any unnecessary lengthening of the latter. 85

The above is a description of the preferred form of our invention, but it is evident the details of construction can be greatly varied, one self-evident change being seen in Fig. 11, where levers T are shown for depressing the 90 bars E. *t* are rods for holding down said levers, the lower ends of said rods being engaged with pins or other fixtures of the carriage I.

In Fig. 12 an unslotted bell-crank D' is 95 shown, and a pair of pins *d''''* *d''''* project from the bar E for the purpose of rocking said crank.

In Fig. 13 the carriage I has a lateral lug U, provided with a stud *u*, that traverses a 100 slot *v* of a bell-crank V, secured to the shaft O, in order that the swinging of said crank will advance and retract said carriage.

Here it may be mentioned that in Figs. 1 and 4 the pinions K and *o* are shown as being 105 complete circles, but in Fig. 5 said devices appear as segments, thereby indicating that the carriage may be operated from the shaft O in any desired manner.

In Fig. 14 the ends of the reciprocating bars 110 E are beveled off at *e⁵*, so as to be readily acted on by inclined planes or cams W at the end of arms *w*. These arms should be attached to the sleeves *k*, in order that the proper turning of said sleeves will swing around said 115 arms and cause their cams to depress the bars.

Fig. 15 shows that the bar E may be shifted by a simple lever X after a wedge *x* has been pulled out of a slot in the partition A''', the carriage I and bolt mechanism J K being dis- 120 pensed with in this simple form of our invention, but the bell-crank, lap-plate, and door-operating devices being retained. Finally, a lock Y may be attached to the door and have a bolt *y*, capable of being shot into the notch 125 *b''* of the lap-plate B when said door is to be temporarily fastened.

We claim as our invention—

1. A door provided with locking and opening devices; a single reciprocating bar that 130 successively operates said devices; an advancing and retracting carriage; and means for coupling said bar to said carriage, for the purpose described.

2. A series of doors provided with locking and opening devices; reciprocating bars that successively operate said devices; an advancing and retracting carriage; appliances for couplingsaid bars to said carriage; and means for independently operating either of said appliances, for the purpose stated.
3. A series of doors provided with locking and opening devices; reciprocating notched bars that successively operate said devices; an advancing and retracting carriage; rack-bolts that couple said bars to said carriage; gears engaged with said racks; and means for independently revolving either of said gears, for the purpose stated.
4. A series of doors provided with locking and opening devices; reciprocating notched bars that successively operate said devices; an advancing and retracting carriage, having transverse slots; rack-bolts that traverse said notches and slots; gears engaged with said racks; and means for independently operating either of said gears, for the purpose described.
5. A series of doors provided with locking and opening devices; reciprocating notched bars that successively operate said devices; an advancing and retracting carriage; a slotted tie-plate applied vertically to said carriage; and means for shifting said plates, so as to couple together the entire set of bars, for the purpose described.
6. A series of doors provided with locking and opening devices; reciprocating notched bars that successively operate said devices; means for advancing and retracting said bars; a slotted fixed plate through which the latter pass; and springs that normally retain said bars in engagement with said plate, for the purpose described.
7. A door provided with locking and opening devices; a reciprocating notched bar that successively operates said devices; means for advancing and retracting said bar; a slotted fixed plate through which the latter passes; a spring that retains said bar in engagement with said plate; and a cut-away portion on the under side of said bar, for the purpose described.
8. A jail-door; a vertically and laterally shiftable lap-plate B, that locks said door; a double-slotted bell-crank D d' d'' , from which said plate is suspended; and a reciprocating bar E, having a pin d''' , that traverses said slots, in the manner described, and for the purpose stated.
9. A door provided with locking and opening devices; a reciprocating bar that successively operates said devices, and has two notches on its upper edge, and a cut-away portion on its under edge; an advancing and retracting carriage; a device that couples said bar to said carriage; a slotted fixed plate traversed by said bar; and a spring that normally engages one of said upper notches with said slotted plate, for the purpose described.
10. A jail-door; a vertically and laterally shiftable lap-plate B, that locks said door; a double-slotted bell-crank D d' d'' , from which said plate is suspended; a shaft R secured to said door, and in line with the axis of its hinges; a pinion R, attached to said shaft; a frame Q, having a rack q , and untoothed portion q' , and a reciprocating bar E carrying said frame, and having a pin d''' , that traverses said slots d' , d'' , said bar E, and its attachments, being so arranged with reference to the other operative parts as to unlock the door before opening it, and to lock it after being closed, all as herein described.
11. A jail-door provided with locking and opening devices; a single reciprocating bar that successively operates said devices, and plays up and down at one end; means for normally raising said bar; and a stop that prevents its clandestine retraction, when lowered, as herein described.
12. The cell A, having a casing a''' secured to it; the door A', having a casing a'' fastened to it, and overlapping the other casing a''' ; and a plate B playing within said casings, for the purpose described.

In testimony whereof we affix our signatures in presence of two witnesses.

RICHARD C. STEWART, JR.
WALLACE A. STEWART.

Witnesses:

JAMES H. LAYMAN,
JOHN C. ROGERS.