(Model.)

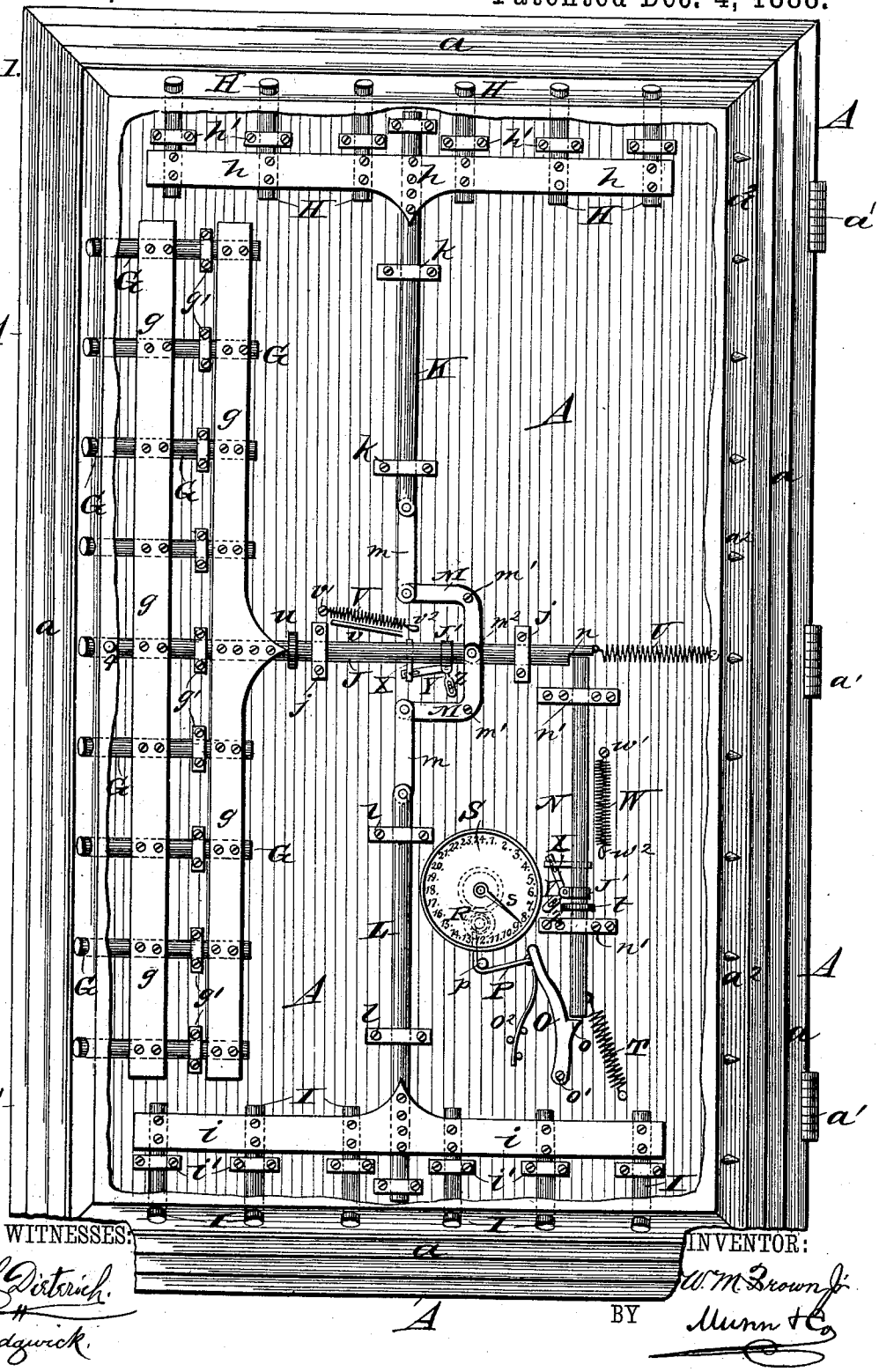
3 Sheets—Sheet 1.

W. M. BROWN, Jr.

SAFE OR VAULT DOOR LOCK.

No. 393,883. Patented Dec. 4, 1888.

Fig. 1.



WITNESSES:

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C. Sedgwick.

INVENTOR:

W. M. Brown Jr.

BY Munn & Co.

ATTORNEYS.

N. PETERS, Photo-Lithographer, Washington, D. C.

(Model.)

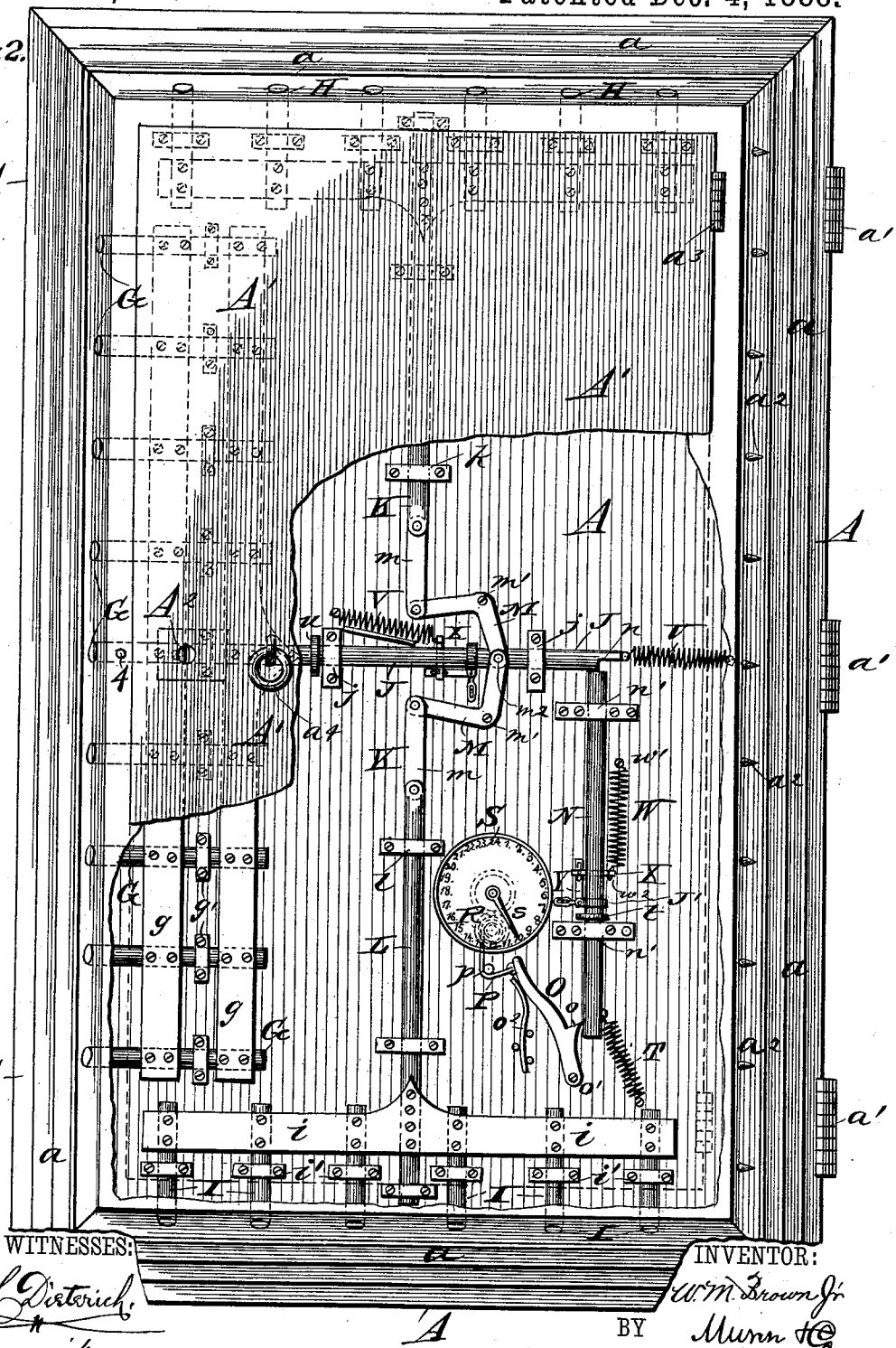
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No. 393,883. Patented Dec. 4, 1888.

Fig. 2.



WITNESSES:

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(Model.)

3 Sheets—Sheet 3.

W. M. BROWN, Jr.

SAFE OR VAULT DOOR LOCK.

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Fig. 3.

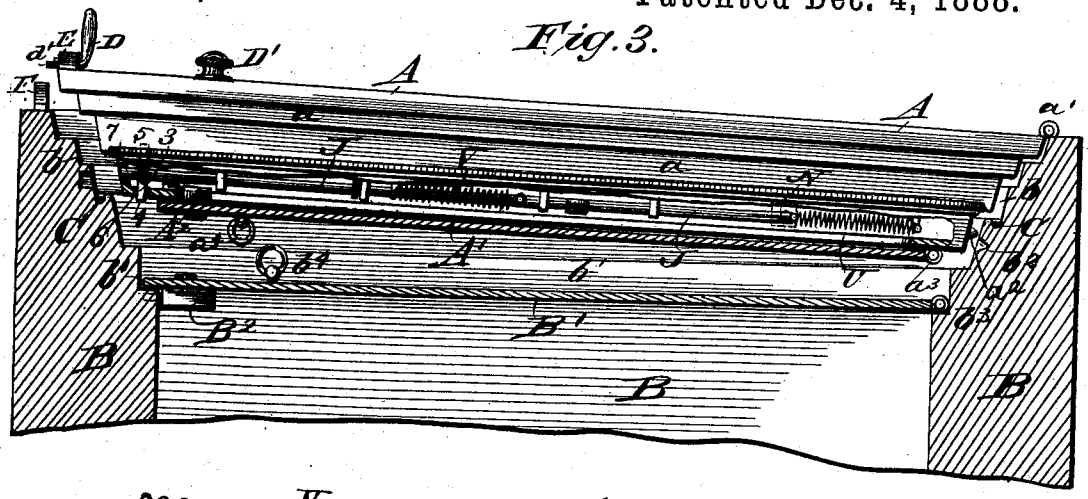


Fig. 4.

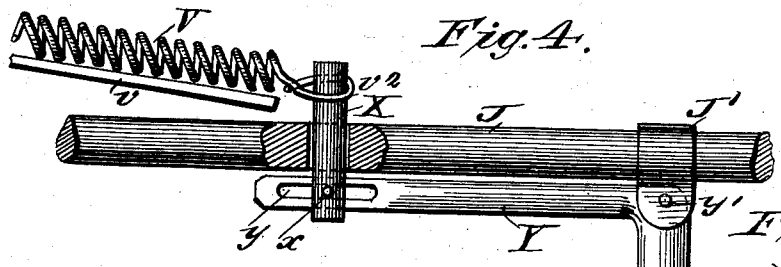


Fig. 9.

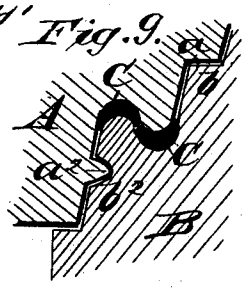


Fig. 5.

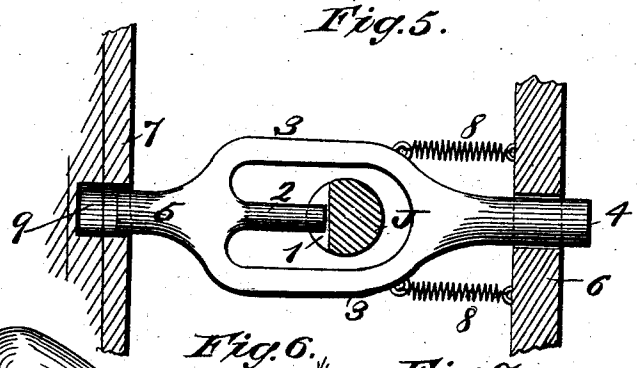


Fig. 6.

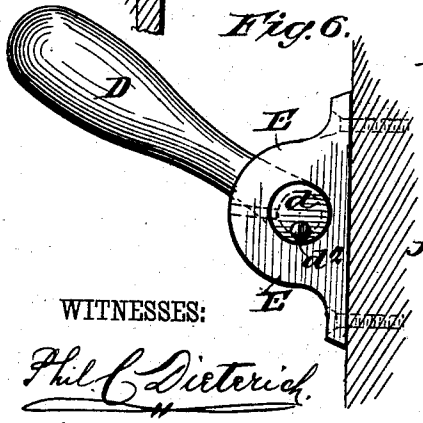


Fig. 7.

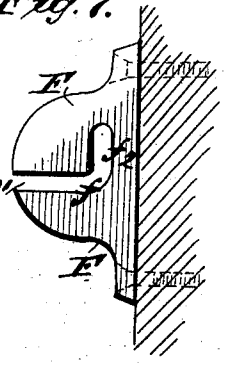
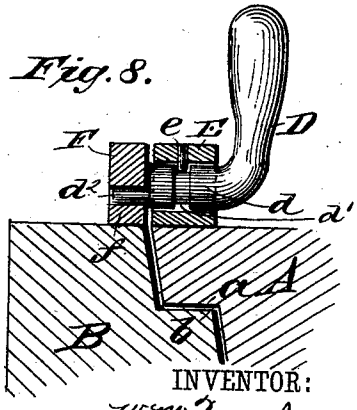


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM MAINLAND BROWN, JR., OF SACRAMENTO, CALIFORNIA.

SAFE OR VAULT DOOR LOCK.

SPECIFICATION forming part of Letters Patent No. 393,883, dated December 4, 1888.

Application filed February 8, 1888. Serial No. 263,391. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM MAINLAND BROWN, Jr., of Sacramento, in the county of Sacramento and State of California, have invented certain new and useful Improvements in Safe or Vault Door Locks, of which the following is a full, clear, and exact description.

My invention relates to safe or vault door locks and fastenings, and has for its principal object to provide a simple, inexpensive, and efficient lock and set works of this character by which a safe or vault door will be automatically locked when it is closed, and will be unlocked automatically at any predetermined time at which a clock mechanism of the lock set-works may be set prior to closing the door, the construction and operation of the lock and set-works being such as to give no clue to their location or arrangement on the safe-door, and thus frustrate burglarious intent.

The invention consists in certain novel features of construction and combinations of parts of the lock and set-works and fitting of the door, all as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters and figures of reference indicate corresponding parts in all the views.

Figure 1 is an inside face view of a safe-door partly broken away, and with its inner door removed and with my improved bolt and set works applied, the bolts being shown in positions for holding the door locked. Fig. 2 is an inside face view of the door partly broken away, and shows the bolt-works in the positions they have when the door is open and just prior to closing it. Fig. 3 is a horizontal section through the door and the front portion of a safe or vault to which the door is fitted, the door being open a little. Fig. 4 is an enlarged detail view of the main shifting bolt or bar and its elbow-lever and connected spring. Fig. 5 is an enlarged detail vertical sectional elevation of the detent devices by which the bolt-works are held prior to the closing of the door. Figs. 6, 7, and 8 are detail views showing the cam-lever devices employed for forcing the safe-door tightly closed, and Fig. 9 is a detail sectional view across the joint of the safe-door with the body of the safe.

The safe or vault door A is made, principally, of a series of steel and iron plates laid in alternate layers and firmly bolted together to constitute a fire and burglar proof structure, which at the edges is provided with a series of rabbets, *a*, fitting into corresponding rabbets, *b*, at the front of the body B of the safe or vault. Into rabbets on the door A and safe-body B are fitted two strips, C C, made, preferably, of rubber, and which, when the door is closed, press tightly against opposing metal faces of the door and safe-jamb to assure a very tight joint, which is both water and powder proof. These packing-strips C are shown most clearly in Fig. 9 of the drawings. The door is hinged to the safe-body by suitable hinges, *a'*, and at its free edge is provided with a cam-lever device for forcing it tightly closed, and which will be next described. This door-closing device consists, mainly, of a handle, D, which has a wrist, *d*, which is journaled in a suitable bearing, E, fixed to the outer face of the door. This handle D *d* is provided with a groove, *d'*, into which enters a pin, *e*, passed through the bearing E to hold the handle to the door. In its extremity the handle-wrist is provided with a pin, d^2, which is set eccentrically, and as the door is closing, and while the handle D is held in the position shown in Fig. 6 of the drawings, enters the horizontal part *f'* of a slot, *f*, made in a plate or keeper, F, and as the door about closes the handle-pin d^2 enters the vertical part f^2 of the slot *f*, and when the handle D is forced downward to turn its wrist *d* in the bearing E the eccentric-pin d^2 will, by action in the part f^2 of the slot *f*, force the door A tightly closed, and especially so at the packing C of the door-joint. As the door A closes, a series of fixed studs, a^2, on its hinged edge enter a corresponding series of recesses, b^2, in the door-jamb to act as holdfast-bolts at this edge of the closed door. (See Figs. 1, 2, 3, and 9 of the drawings.) I also provide the door A with a knob, D', which extends but an inch or two into the door, and may be grasped to assist in opening the door.

I purpose fitting an inner door, B', within

an inner rabbet, b', of the safe-body, and preferably by hinging it at b^3 at one side edge, and at its opposite edge this door B′ will be provided with a lock, B^3, which may be a combination-lock, or one not easily picked in a short time, and which can be opened only by the proper person. This door B′ closes the inner safe or vault against unauthorized persons should the main outer door, A, open or unlock automatically before the person operating the lock B^2 arrives. A ring, b^4, on the door B′ facilitates opening of it.

I will next describe the bolt and set works on the main door A, and which are the principal features of my invention, as follows: The bolt and set works are arranged within a chamber formed at the inner face of the door A, the bolts being arranged in three series, one series, G, of them extending down the free side edge of the door, and the two other series, H I, ranging along the top and bottom of the door, respectively. The bolts G H I are fixed to plates g h i, respectively, to cause each series to move together, or as one bolt. The outer ends of all the bolts are fitted for projection through the edge of the door into the jamb of the safe or vault, and their inner parts are fitted in suitable guides or keepers, g' h' i', fixed to the door. One of the series of bolts G is preferably prolonged inward horizontally to form a bar, J, which I call the "main locking-bar," and which slides in keepers j, fixed to the door. This bar J may, however, be made separate from the bolts G, and may be fixed to the plates g, connecting said bolts, and in substantially the same manner as the vertically-ranging bars K L are fixed to the top and bottom series of bolts H I, respectively. Said bars K L slide in keepers k l, fixed to the door, all as most clearly shown in Fig. 1 of the drawings. Links m m, which are pivotally connected at one end to the inner ends of the bolt-bars K L, are pivoted at their other ends to one end of elbow-levers M M, which are fulcrumed at m' at their angles to the door A, and at their other ends are connected pivotally, preferably by the same bolt, m^2, with the main locking-bar J, and whereby as this bar J is moved endwise to project or withdraw the bolts G the other series of bolts H I will simultaneously be projected or withdrawn.

A bar, N, which is fitted to slide in keepers n' n' on the door A and at right angles to the main bar J, is adapted to enter or lock behind a shoulder, n, at the inner end of the bar J, and is also adapted to rest at its lower end upon a shoulder, o, formed on a trip-lever, O, which is fulcrumed at o' at its lower end to the safe-door A, and at its upper end is connected to a tape or cord, P, the other end of which is attached to a spring-barrel device, R, operated by the works of clock mechanism S, fixed to the safe-door. A roller or pin, p, guides the tape or cord P from the lever to the spring-barrel, and a spring, o^2, held at one end to the door A between pins or otherwise, presses by its free end on the lever O, to normally hold it over into position to support the bar N, as shown in Fig. 1 of the drawings.

The clock mechanism S has a dial preferably divided or graduated into hours from 1 to 24, and its hand s may be set to cause the spring-barrel R at any predetermined time to draw on the cord P and lever O, to pull the lever-shoulder o from under the bar N and allow a spring, T, which is connected at one end to this bar and at the other end to the door A, to draw the bar downward or clear of the shoulder n of the main bolt-bar J, to allow a spring, U, connected to the bar J and the door A, to draw the bar inward and simultaneously withdraw the bolts G H I from the jamb of the safe or vault door to unlock the door. Collars l u on the bars J and N respectively strike bearings of said bars to limit the throw of the bars by their springs T U, as will be understood from Fig. 2 of the drawings, which shows the bolts withdrawn in the manner last above described.

One of the chief features of my invention is the arrangement of the lock to automatically throw the bolts G H I into the safe or vault jamb as the door is closed, to securely lock the door, and at the same time allow the automatic setting of the trip-lever O to prevent opening of the door until the desired time, when it opens of itself, and all this is accomplished without the use of an outside knob or device which could in any way disclose the arrangement of the bolt-works of the door. To effect these workings of the bolt and set works of the door, I employ two springs, V W, each of which acts in connection with a sliding pin and elbow-lever device, made alike and connected one device with the main bolt-bar J and the other device with the bar N, the spring V working at the bar J and the spring W at the bar N, as presently described. This sliding pin and elbow-lever device is shown most clearly in Fig. 4 of the drawings, and in connection with the bar J and the spring V, which spring rests on a shelf, r, fixed to the door A. This spring is fastened at one end, r', to the door A, and at its other end is provided with a loop or eye, r^2, which is adapted to be slipped upon one end of a pin, X, which is fitted loosely in a transversely-ranging hole made in the bar J, and is provided at its other end with a pin, x, which enters a slot, y, in the end of the long arm of an elbow-lever, Y, which is fulcrumed at y' at its angle to a split ring or collar, J′, clamped to the bar J. The short arm of the elbow-lever is provided with a slot, y^2, ranging at a right angle to the slot y, and into which is passed a pin, Z, which is fixed to the safe-door A.

It is obvious that as the bar J is moved endwise and outward the elbow-lever Y will be operated to lower its long arm and draw the pin X down or partly through the bar J, and withdraw it from the loop r^2 of the spring

V to release this spring at proper time. A like elbow-lever Y and pin X and fixed pin Z are provided at the bar N, in connection with a spring, W, held at one end, w', to the door A, and having at its other end a loop, w^2, which may be engaged with the horizontally-moving pin X, and from which pin the spring is released as the bar N is moved endwise and upward.

Near the outer end of the bar J, which, as shown, forms one of the bolts G, it is provided with a notch, 1, into which a pin, 2, on a sliding yoke or frame, 3, is adapted to enter. This yoke 3 is fitted at its opposite end portions, 4 5, into the inside plate, 6, and one of the outer plates, 7, of the door A, and springs 8, connected to the yoke or bar 3 and door-plate 6, normally project the end 4 of the yoke beyond the face of the plate 6, so that the yoke may be forced outward as the door A closes by contact of its protruding end 4 with the door-jamb, the end 5 of the yoke then moving in a recess, 9, made in the door-plate 7 as a guide to the yoke. This outward movement of the yoke or bar 3 withdraws its pin 2 from the notch 1 of the bar J and leaves it free for movement inward by the spring U, as presently explained. These detent devices are most clearly shown in Fig. 5 of the drawings.

A door, A′, is hung by hinges a^3 at the inner face of the main door A to cover or close the chamber containing the lock and set works, and said door A′ is provided with a suitable lock, A^2, to prevent opening it and frustrate tampering with the safe-lock mechanism. A ring, a^4, on the door A′ facilitates opening of it.

The operation of the lock and set works is as follows: When the door A is open, its bolts G H I are withdrawn within it, and the bars J N and trip-lever O are in the position shown in Fig. 2 of the drawings, and the pin 2 of the detent yoke or bar 3 is engaged in the recess 1 of the bar J. When the lock and set works are to be adjusted prior to closing the door A, its inner door, A′, will be opened and the hand s of the clock mechanism S will be set at the time the door is to open. The springs V W will now be engaged with the pins X of their respective levers Y Y at the bars J N, the tension of these springs V W being greater than the tension of the springs U T, connected to said bars J N. When all the parts are adjusted, as shown in Fig. 2 of the drawings, the door A′ will be closed and locked, and the main door A will then be closed, and while it is about closing the pin 2 of the detent-yoke 3 will be disengaged from the bar J by contact of the yoke with the door-jamb, which leaves the spring V free to draw the bar J outward, and thereby shoot all the bolts G H I into the door-jamb, and the spring W also draws the bar N upward and engages it behind the shoulder n of the bar J, to prevent withdrawal of it or of the bolts G H I, and the spring o^2 will throw the shoulder o of the lever O under the bar N, to prevent falling of it from the shoulder n of the bar J. Endwise movements of the bars J N sufficient to shoot the bolts and set the bar N behind the shoulder n, as above described, will also withdraw the pins X of the levers Y and release or drop the springs V W, which no longer act on the bars J N, thus leaving the springs U T free to act when the lever O is tripped from under the bar N. When the proper time arrives for the door A to open, the mechanism of the clock S will cause the spring-barrel R to wind the tape or cord P on itself and pull the lever O to one side and trip it from beneath the bar N, which then will be instantly drawn downward by the spring T to release the bar J, thus leaving the spring U free to draw the bar J backward and withdraw the bolts G H I from the door-jamb, thus unlocking the door, which may then be opened after the handle D is turned to clear its pin d^2 of the slot f of jamb-plate F had it been used to tighten the door A when it was closed. The bolt and set works now occupy the positions shown in Fig. 2 of the drawings, except that the springs V W will be disengaged from the pins X of the levers Y, as shown in Fig. 1, and will remain so until the lock mechanism is to be again set prior to closing the door, and in a manner readily understood from the aforesaid description.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In safe and vault door locks, the combination, with a bar, J, movable endwise on the door and connected to its bolts to project or withdraw them, of a bar, N, movable on the door and adapted to engage the bar J, to prevent its movement, a clock mechanism on the door, a spring-pressed lever, O, fulcrumed on the door and provided with a shoulder, o, adapted to prevent disengagement of the bar N from the bar J, a pull-cord or device connected to the lever O, and the clock mechanism for tripping said lever from the bar N at any time to which the clock mechanism had been set, and springs U T, connected to the door and to the bars J N, respectively, and operating to disengage the bars N J and withdraw the door-bolts, substantially as described, for the purposes set forth.

2. In safe and vault door locks, the combination of bars J N, adapted for engagement for holding projected the door-bolts connected to the bar J, springs U T, adapted, respectively, to disengage the bars J N and withdraw the lock-bolts when a retaining device is tripped from said bar N, a detent yoke or bar, 3, engaging the bar J and projecting for contact with the door-jamb to disengage the detent from the bar J as the door closes, springs V W, connected to the door, pins X X, fitted in the bars J N, and to which pins the springs V W may be detachably connected, and levers Y Y, fulcrumed on the bars J N and engaging the pins X to withdraw them when

the bars are moved endwise to release or drop the springs V W and allow the springs U T to act, substantially as described, for the purposes set forth.

3. In safe and vault door locks, the combination, with bars J N, adapted for engagement to hold projected the door-bolts connected to the bar J, springs U T, adapted, respectively, to disengage the bars J N and withdraw the lock-bolts, a detent yoke or bar, 3, engaging the bar J and projecting for contact with the door-jamb when the door closes, springs V W, connected to the door, pins X X, fitted in the bars J N, and to which the springs V W may be detachably connected, levers Y Y, fulcrumed on the bars J N and engaging the pins X to withdraw them when the bars are moved endwise to release or drop the springs V W and allow the springs U T to act, a spring-pressed lever, O, fulcrumed on the door and provided with a shoulder, *o*, adapted to prevent disengagement of the bar N from the bar J, a clock mechanism on the door, and a pull-cord or device connected to this mechanism and to the lever O to trip the lever at a predetermined time, all constructed and arranged for operation substantially as described, for the purposes set forth.

4. In safe and vault door locks, the combination, with a bar, J, movable endwise on the door and connected to its bolts in a manner to project or withdraw them, of a spring, U, connected to the door and bar for pulling the bar and withdrawing the bolts, a detent device engaging the bar J and projecting from the door for contact with the door-jamb as the door closes, a spring, V, held to the door, a pin, X, fitted to the bar J and adapted for engagement by the spring V, a lever, Y, fulcrumed to the bar J and adapted to engage a pin, *x*, in the pin X, and a pin, Z, in the door and engaging the lever Y, substantially as described, for the purposes set forth.

5. In safe and vault door locks, the combination, with a bar, N, fitted to slide on the door and adapted to retain a bar operating the lock-bolts, of a spring, T, connected to the door and to the bar N, a detent device for the bar N, and to which the spring T holds said bar in a manner allowing tripping of said detent device, a spring, W, held to the door, a pin, X, fitted to the bar N and adapted to engage the spring W, a lever, Y, fulcrumed to the bar N and adapted to engage a pin, *x*, in the pin X, and a pin, Z, in the door and engaging the lever Y, substantially as described, for the purposes set forth.

6. In safe and vault door locks, the detent device for the main bolt-throwing bar of the lock-works, consisting of a yoke or bar, 3, fitted to slide in the door and having a stem or pin, 2, adapted to a notch, 1, of the bar J, and springs 8, normally throwing the yoke inward to engage the bar-notch and to project the end 4 of the yoke beyond the inner face of the door to assure its contact with the jamb to release the bar J as the door closes, substantially as described, for the purposes set forth.

WILLIAM MAINLAND BROWN, JR.

Witnesses:
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