



(Model.)

B. DELVALLE.

4 Sheets—Sheet 2.

LOCK.

No. 367,963.

Patented Aug. 9, 1887.

Fig. 4

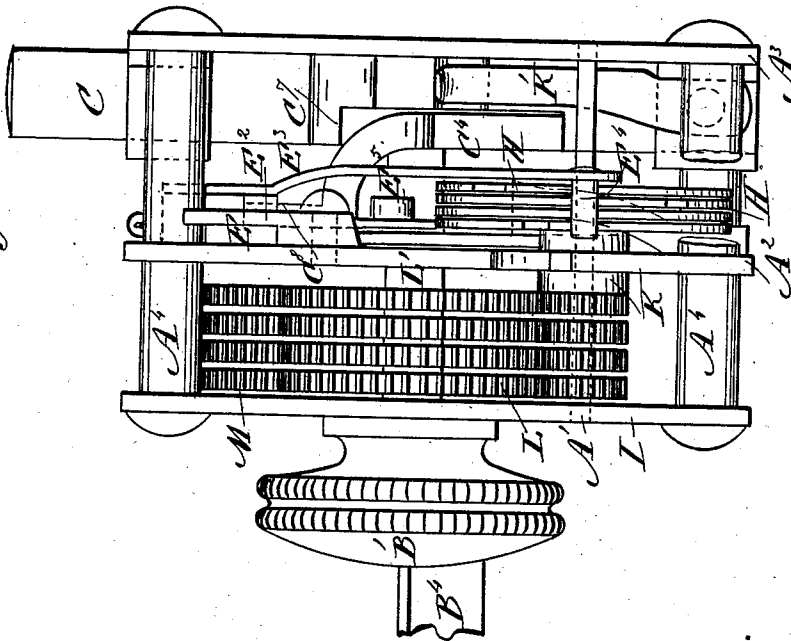
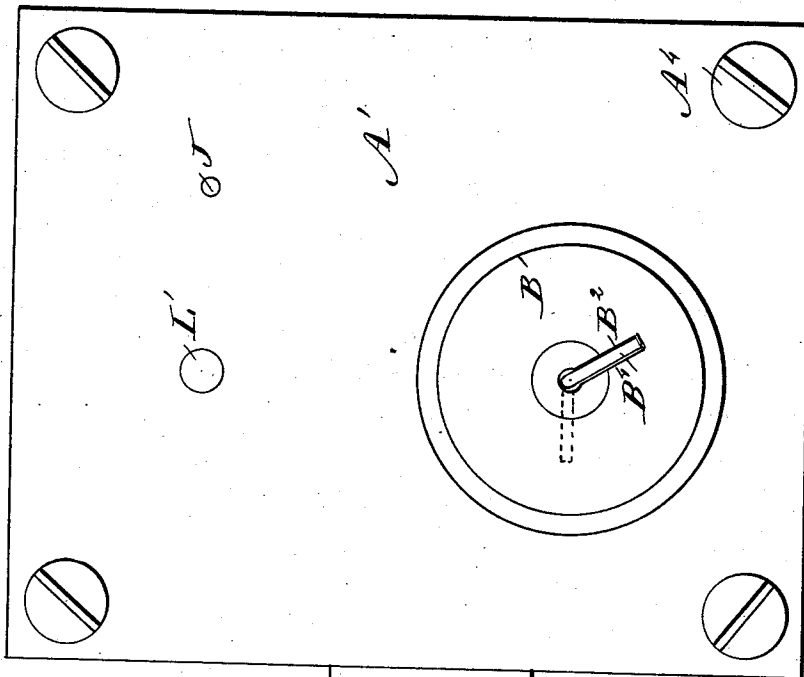


Fig. 5



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(Model.)

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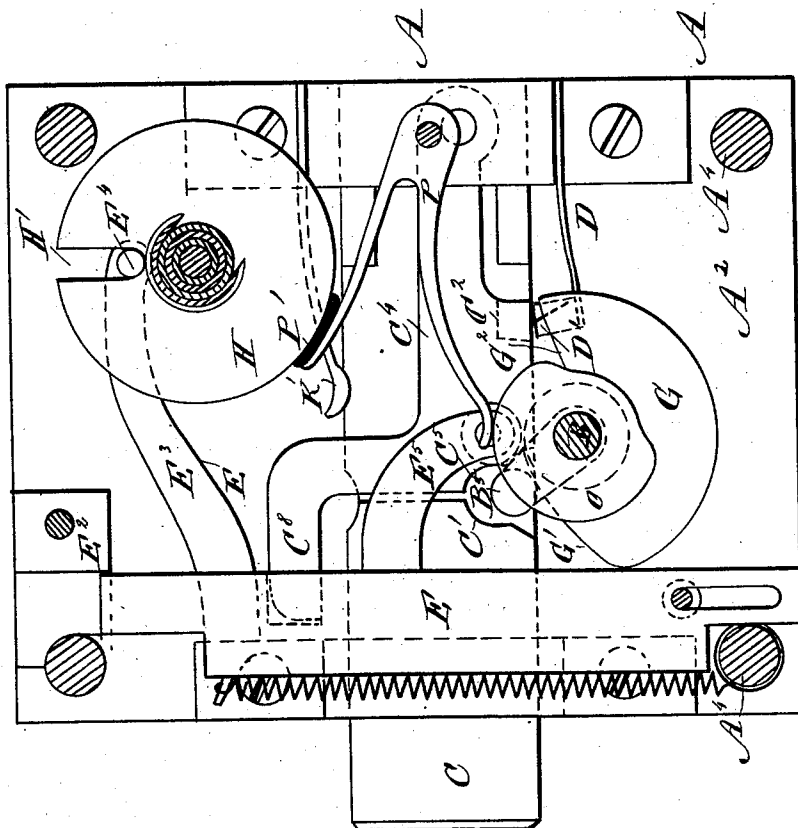
B. DELVALLE.

LOCK.

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Fig. 5



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4 Sheets—Sheet 4.

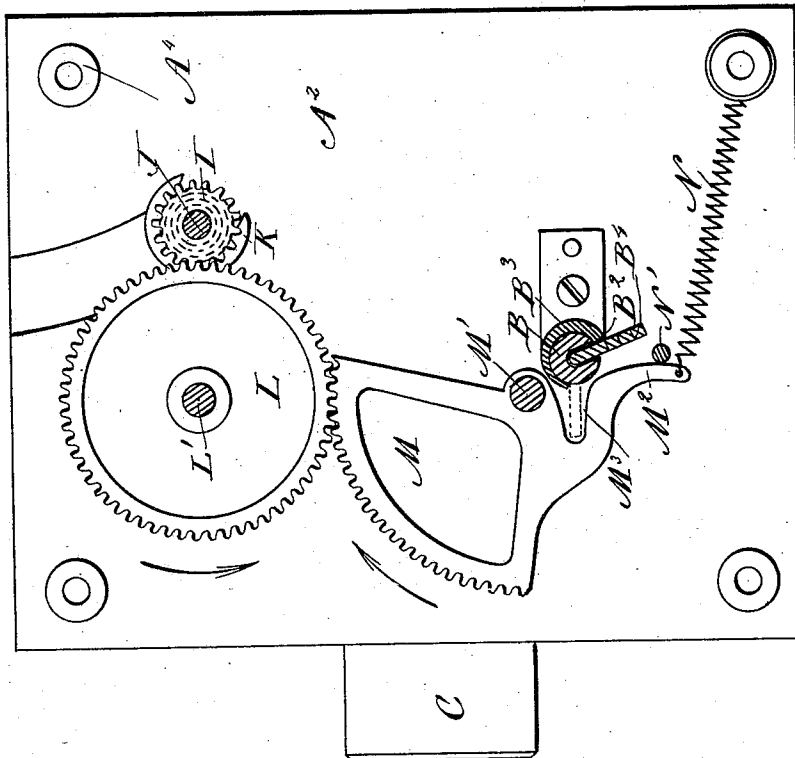
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Fig. 6



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# UNITED STATES PATENT OFFICE.

BENJAMIN DELVALLE, OF NEW YORK, N. Y.

## LOCK.

SPECIFICATION forming part of Letters Patent No. 367,963, dated August 9, 1887.

Application filed May 27, 1887. Serial No. 239,535. (Model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN DELVALLE, a subject of the King of Denmark, residing in the city, county, and State of New York, have invented a certain new and useful Improvement in Locks, of which the following is a full, clear, and exact description.

The object of my improvement is to provide a lock by which greater security is obtained than is ordinarily possible.

I will first describe in detail a lock embodying the improvement, and then point out the various features of the improvement in claims.

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

Figure 1 is a side elevation, partly in section, of a lock embodying my improvement. Fig. 2 is a sectional front elevation of the said lock on the line *x x*, Fig. 1. Fig. 3 is a front elevation of the same. Fig. 4 is a top view of the same. Fig. 5 is a view similar to Fig. 2, with the mechanism, however, in a different position. Fig. 6 is a sectional front elevation on the line *y y*, Fig. 1.

A designates the lock-casing, here shown as constructed of the front, medial, and rear bearing-plates, A' A<sup>2</sup> A<sup>3</sup>, respectively, and the corner spacing and connecting studs A<sup>4</sup>. The spindle B of the knob B' is mounted to turn in the bearing-plates A' A<sup>2</sup> A<sup>3</sup>, and a key-slot, B<sup>2</sup>, extends lengthwise through the knob B' and spindle B, and in Figs. 1 and 6 is shown opening laterally from the spindle between the plates A' and A<sup>2</sup>, and partially surrounded by a fixed guard, B<sup>3</sup>.

The key B<sup>4</sup>, adapted to the lock, can be inserted in the slot B<sup>2</sup> when the latter is turned past the guard B<sup>3</sup>, and, projecting laterally from the slot, is limited by the guard to a turn of about one hundred and twenty degrees, so that the knob B' can be turned through that arc only when the key is seated.

The knob-spindle B, between the plates A<sup>2</sup> and A<sup>3</sup>, has a dog, B<sup>5</sup>, carrying a friction-roller, B<sup>6</sup>, which is adapted to strike a shoulder, C', on and extending to the lower edge of the slide-bolt C and project the same, as best shown in Fig. 5. A spring, K', bears upon and steadies the motion of the slide-bolt C,

and a stop-pin, K<sup>2</sup>, limits the retraction of the same. A spring-catch, D, has a head, D', adapted to a slot, C<sup>2</sup>, in the bolt C, and automatically enters the slot and locks the bolt when the same is projected.

The head D' of the spring-catch projects beyond the side of the bolt in position to be engaged by the projection C<sup>3</sup> of a releasing-lever, C<sup>4</sup>, pivoted to the rear end of the bolt C, so as to swing vertically on the side of the same, and here shown sunken flush in a recess in the side of the bolt. When the lever C<sup>4</sup> is depressed, its projection C<sup>3</sup> forces the head D' of the spring-catch out of the slot E<sup>2</sup> in the bolt and leaves the bolt free to be retracted. The lever C<sup>4</sup> is also formed with a shoulder, C<sup>5</sup>, which, when the lever is depressed, as just described, is at the rear of the shoulder C' on bolt C, as shown in Fig. 5, and is arranged to be struck similarly thereto by a reverse movement of the dog B<sup>5</sup> for retracting the bolt C with said lever. The reaction of the spring-catch D tends to raise the lever C<sup>4</sup>, so as to hold the bolt-retracting shoulder C<sup>5</sup> out of the path of the dog B<sup>5</sup>, so that then the bolt cannot be retracted by turning the knob B'. The lever C<sup>4</sup> has an upward extension, C<sup>6</sup>, which is arranged to strike a shoulder, C', on the bolt, and thus limit the downward throw of the lever, and also a forwardly-projecting arm, C<sup>8</sup>. The end of the arm C<sup>8</sup> enters a lateral slot, E', in a vertical slide-bar, E, guided and its movement limited by projections E<sup>2</sup>, fixed on the rear face of the casing-plate A<sup>3</sup>. A spring, F, connecting the upper end of the slide-bar E with a part of the casing, tends to draw the bar down, and thus, by the shoulder at the top of the slot E' acting on the arm C<sup>8</sup> of the releasing-lever C<sup>4</sup>, to depress said lever and allow of the retraction of the bolt C by the knob, as before mentioned. A semicircular cam, G, on the knob-spindle B has an inclined approach, G', on one end, and is adapted to engage a rigid curved arm, E<sup>3</sup>, (here shown with a friction-roller,) on the slide-bar E, and thereby raise the bar to its upper position, as shown in Fig. 2. The other end of the cam G terminates in a sharp shoulder, G<sup>2</sup>, which, when it has passed the arm E<sup>3</sup> and the latter has fallen with the bar E, will prevent the knob from being turned backward.

The bar E has at its upper end a second rigid arm, E', carrying at its extremity a laterally-projecting pin, E', which, when the bar E is raised by the cam G, projects across and is just out of contact with the peripheries of a number of disks, H, (here shown as four,) of equal size and mounted on the same axis, and is vertically above said axis. Each disk H is formed with a like radial slot, H', adapted to receive the said pin E'. When the slots in the several disks are all brought to a register beneath the pin, it can enter the slot, and thus, if the semicircular cam G is out of engagement with the arm E', allow the bar E to fall, and, its actuating-spring F being stronger than the spring-catch D, depress the releasing-lever C'. With each disk H is rigidly connected a pinion, I, between the plates A' A', the outer pinion and disk by the shaft J, mounted to turn in the casing-plates A' A', and the other corresponding pinions and disks by concentric sleeves J'.

K is a split spacing-collar for holding the disks and pinions in position with respect to the plate A'. The several pinions I are here shown in gear with a like number of spur-wheels L, mounted to turn independently of each other on the same arbor, L', and the spur-wheels L in gear with corresponding segmental racks, M, also mounted to turn independently of each other on a single arbor, M'.

Each rack M has a rigid curved lever-arm, M', projecting oppositely thereto in position to be struck by the corresponding projection of the bit of the key B' when seated, and when said key is properly turned will be swung in the direction of the arrow in Fig. 6, thereby, through the gearing, rotating the disks H. The several lever-arms M' are formed at their inner ends with like tapering slots, M', into which the respective projections of the key-bit pass at the end of the movement of the key.

The arcs through which the several racks M will be swung, and hence the disks H turned, will vary with the depth of the projections of the key-bit in engagement with the respective lever-arms M' of the racks.

The disks H in their normal position have none of their slots H' beneath the pin E', but the arc of distance of each slot H' from the pin E' is equal to that through which the disk will be turned by the corresponding projection of the key-bit. Thus when the key is fully turned the slots H in the several disks will be brought to a register beneath the pin E'.

The cam G is so adjusted on the spindle B that it will engage the arm E' on the sliding bar E, and thus hold the pin E' slightly away from the disks during this turning of the key to allow the disks to turn easily; but just as the slots H' are brought to a register, as described, the shouldered end of the cam is arranged to reach the arm E', leaving the bar E free to fall and be drawn down by its spring F, its pin E' entering the registering-slots H'. The bolt C being in a projected position and locked by the spring-catch D, the bar E in fall-

ing will depress the lever C', disengaging the catch D from the bolt and bringing and holding the retracting-shoulder C' in position to be struck by the dog B'. The key B must now be withdrawn, as the knob-spindle B cannot be turned while containing the key, owing to the guard B'. The dog B' being then turned by the knob B', the bolt C will be retracted and the lock opened, the cam G at the same time acting to raise the pin E' from the slots H' and leaving the disks H free to be returned to their normal position. Springs N, connecting the extremities of the lever-arms M' with part of the casing, accomplish this, a transverse pin or stop, N', limiting the return of the lever-arms and leaving them in position abreast of each other to be engaged by the key-bit, as before.

The bolt C can be projected without using the key by turning the knob B' in a reverse direction, the dog B' striking the stationary shoulder C' of the bolt; but if the knob is then turned in a reverse direction, the bar E being elevated and the retracting-shoulder C' raised out of the path of the dog by the reaction of the spring-catch D upon the lever C', the dog will not engage and hence not retract the bolt. A cam, O, is also fixed on the operating-spindle B, and is adapted to engage one arm of a pivoted spring angle-lever, P, the other arm of which carries a rubber, leather, or equivalent frictional shoe, P', in position to engage the peripheries of the several disks.

The cam is so adjusted that it will cause the brake thus constructed to be applied to all the disks as soon as their slots are brought to a register, as before described, so that the key can be readily withdrawn, the lever-arms M' being prevented from bearing upon the key by the action of the brake.

The action of the brake is arranged to continue until the pin E' has been fully raised out of the slots H', so that the edges of the slots will not bind upon the pin and hinder its movement. The brake is then released, thereby allowing the disks to be returned to their normal non-registering position by the action of the springs N upon the respective gears.

With this construction the bolt, its projecting and retracting shoulders, the bolt-catch, the unlocking slide-bar, and its releasing-disks are all out of reach of the key, so that it is impossible to pick the lock or open the same with a false key.

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

1. In a lock, the combination of a slide-bolt, a dog, a lever connected to the bolt and having a bolt-retracting shoulder movable into and out of the path of the dog, and a spring acting on the lever to hold the bolt-retracting shoulder out of the path of the dog, substantially as described.

2. In a lock, the combination of a slide-bolt, a dog, a lever connected to the bolt and having a shoulder movable into and out of the path of the dog, and mechanism operated by

the key for holding the shoulder on the lever in the path of the dog, substantially as described.

3. In a lock, the combination of a lever connected to the bolt and having a shoulder for retracting the same, a spring acting on the lever to hold its shoulder out of the path of the dog, another spring stronger than the first, mesne connections for throwing the said shoulder into the path of the dog, and means for holding the stronger spring out of action and for releasing the same, substantially as described.

4. In a lock, the combination of a slide-bolt, a spring-catch for locking the same, a lever pivoted to the bolt, arranged to engage the locking-catch of the same, and having a shoulder, C<sup>5</sup>, and means for operating said lever to release the bolt from its catch and throw the shoulder C<sup>5</sup> into the path of the dog, substantially as described.

5. In a lock, the combination of a bolt, a spring-actuated bar, E, carrying a pin, E<sup>4</sup>, devices whereby the action of the bar E adapts the bolt for retraction, a number of disks

mounted upon the same axis, having slots adapted to the pin E<sup>4</sup>, connecting-gearing, and a number of pivotal lever-arms arranged to be operated by the key-bit to bring the slots in the disks to a register with the pin E<sup>4</sup>, substantially as described.

6. In a lock, the combination of revoluble disks H, a spring-actuated slide-bar, E, carrying a pin or projection, E<sup>4</sup>, adapted to bear upon the disks, and a cam, G, acting on the slide-bar E against the tension of its spring to withdraw the pin or projection E<sup>4</sup> from the disks H, as and for the purpose set forth.

7. In a lock, the combination of a movable bar, E, carrying a pin, E<sup>4</sup>, a number of spring-actuated disks, H, mounted upon the same axis, slotted to receive the pin E<sup>4</sup>, a brake-lever, P, a cam, O, acting on the same, and the knob-spindle carrying the cam O, substantially as described.

BENJAMIN DELVALLE.

Witnesses:

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E. M. CLARK.