No. 715,934. Patented Dec. 16, 1902.

J. C. ALMAN.

LOCK AND LATCH.

(Application filed Feb. 19, 1902.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

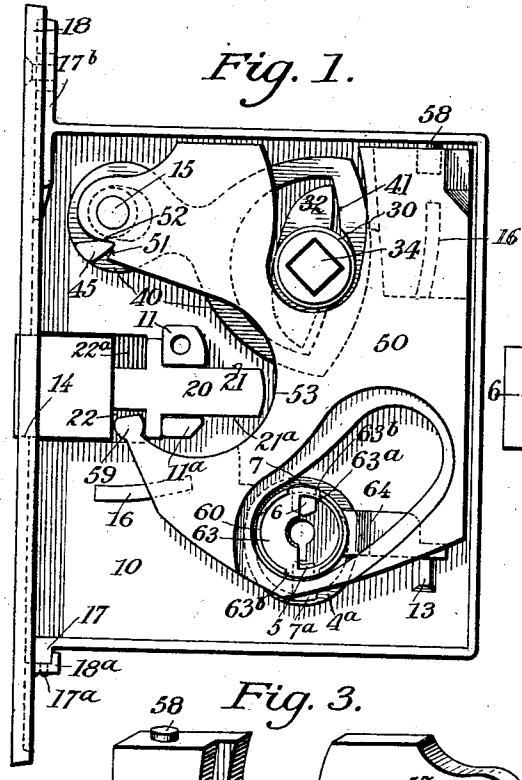


Fig. 2.

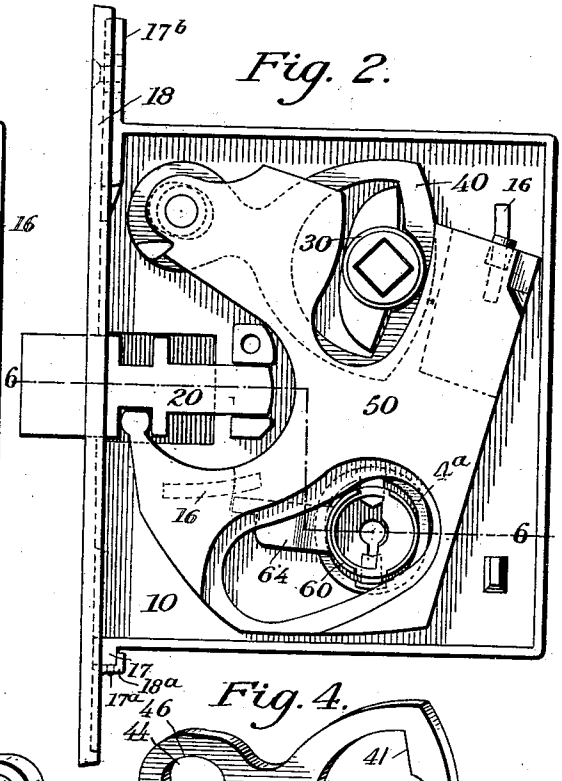


Fig. 3.

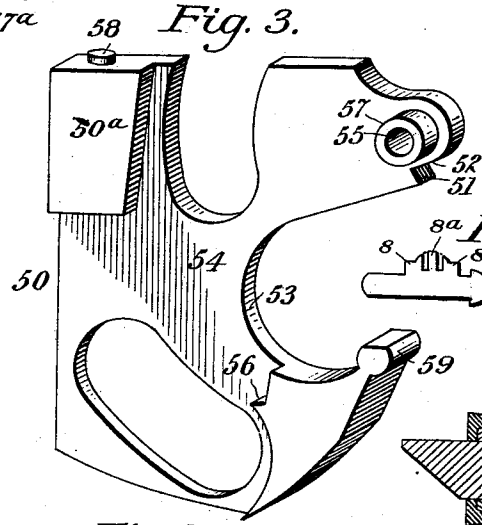


Fig. 4.

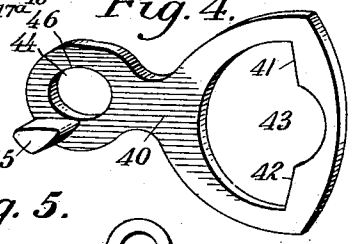


Fig. 5.

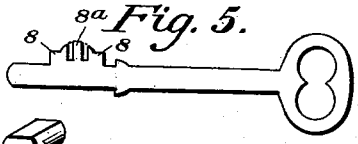


Fig. 6.

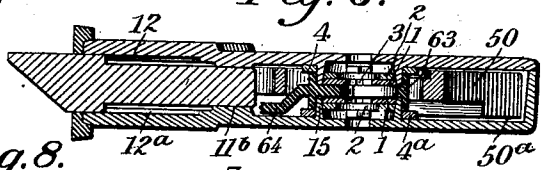


Fig. 7.

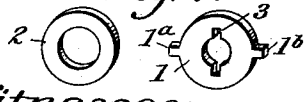


Fig. 8.

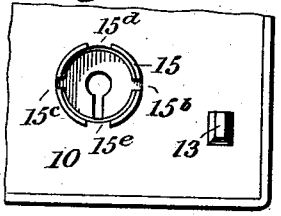
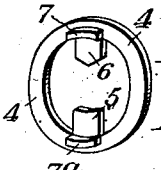


Fig. 9.



Witnesses:

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No. 715,934. Patented Dec. 16, 1902.

J. C. ALMAN.

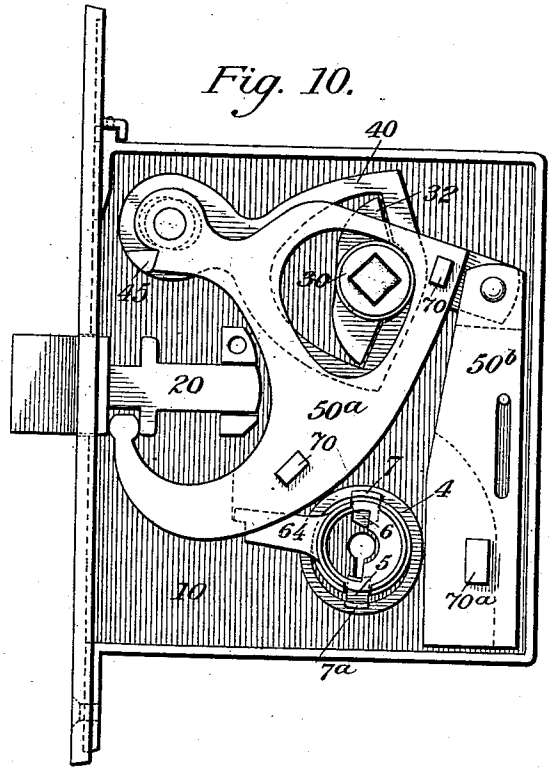
LOCK AND LATCH.

(Application filed Feb. 19, 1902.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 10.



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UNITED STATES PATENT OFFICE.

JOHN C. ALMAN, OF GIBSONTON, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JOHN S. RODGERS, OF CHARLEROI, PENNSYLVANIA.

LOCK AND LATCH.

SPECIFICATION forming part of Letters Patent No. 715,934, dated December 16, 1902.

Application filed February 19, 1902. Serial No. 94,763. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. ALMAN, a citizen of the United States, residing at Gibsonton, in the county of Westmoreland and State of Pennsylvania, have invented a new and useful Improvement in Locks and Latches, of which improvement the following is a specification.

My invention relates to improvements in locks.

The object of my improvement is to make the gravity-lever as light in weight as practicable, to afford powerful facilities for operating the contrivances, to combine them within a customary extent of space, and rendering of the lock more difficult to pick than it ordinarily is.

The advantages of my invention are to be observed in the absence of springs, which frequently get out of order, the use of draw-bar in connecting the latching and unlatching mechanism and fitting of the face-plate to the case, the durability, compactness, easy working, security, and general adaptability to the wants of the trade by using any of the elements claimed for the specific want in the use of locks. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the lock and latch with cover removed, showing position and arrangement of the contrivances unlatched and unlocked; Fig. 2, when latched and locked. Fig. 3 is an inverted view of the gravity-lever. Fig. 4 is a view of the draw-bar. Fig. 5 is a view of the key. Fig. 6 is a cross-section taken on lines 6 6 of Fig. 2; Fig. 7, stationary disk and washer; Fig. 8, slotted cup on side plate of case. Fig. 9 is a view of the ring supporting the locking-tumblers. Fig. 10 is a modified view of the gravity-lever.

The arrangement and combination in the accompanying drawings is illustrated by the following references and explanations.

Numeral 10 designates the lock-case, which may be of any desired shape or style for rim or mortise use, provided with guide and jar posts 11 and 11^a and shoulder 11^b.

Numeral 20 designates the latch-bolt, centrally located at 14 as to front end wall of casing, adapted to slide in the casing in any suitable manner. In the present instance it moves in recesses 12 and 12^a, found in the side plates, and between guide and jar posts 11^b, 11, and 11^a, formed integral with the lock-case.

Numeral 16 designates the bosses formed on the case 10 to lessen friction on the part of the gravity-lever.

Numeral 18 designates the face-plate. Said face-plate is provided with a hook projection 18^a, perforated or recessed in the center, providing a receptacle for the point 17^a of the projection 17 of the case 10, the said point being adapted to fit in the said receptacle to prevent lateral movement of either part thereto. 17^b is a projection on the other forward corner of the case 10, provided with a face adapted to bear upon the face-plate. The said projection is provided with an elongated perforation, rendering the same more easily fitted. The said described construction of the fitting of the face-plate to the case is intended to reduce labor in accomplishing the same. It is contemplated to use either construction at either forward corner of the case 10 or vice versa. The latch-bolt 20 is provided with the usual beveled and reduced rear portion, moving between guide and jar plates 11^b, 11, and 11^a, and is also found on its upper and lower edge with recesses 22 for engagement with the gravity-operating lever hereinafter described. These recesses in the upper and lower edges of the latch render it reversible, as is well known in the art.

Numeral 30 designates the operating cam or tumbler, mounted on the usual knob-spindle 34. This cam consists of a collar 31 and specially-constructed arms 32 and 33. These arms or wipers are adapted for engagement with tappets 41 and 42 of the draw-bar 40 and are provided with faces of such contour that either one in bearing upon its tappet engages the same on the part near the hub and when fully exerted the engagement-point is brought in line at right angles to pulling-line through the center of the knob-spindle.

Numeral 40 designates the draw-bar connecting the latches with the unlatching mech-

anism. The draw-bar in the present instance is connected by a yoke to the arms 32 and 33 of the operating-cam 30 with the shoulder 51 of the gravity-lever 50. The said draw-bar is provided with the opening 43 in the rear part thereof and an oblong opening 44 in the front part, encircling the sleeve 57 of the eye of the gravity-lever. It will be seen that the opening 43 provides a seat for the operating-cam 30 and economizes space thereby, and the oblong opening 44 permits horizontal action of the draw-bar. The upper edge 46 rides on the said eye-wall 57 of the gravity-lever and keeps the wrist 45 in line of action. The slanting shoulders 41 and 42 form the tappets, adapted to receive the action of the arms 32 and 33 of the cam 30. The said draw-bar 40 is also provided with a reinforced wrist or lug 45, adapted to engage the shoulder 51 of the gravity-lever 50. The said wrist 45 is reinforced by increasing the minor axis thereof in the rear of the engaging point. On fulcrum 15 in the upper forward part of the casing is pivoted the gravity-lever 50, as is frequently done in the art. This gravity-lever 50 has its side walls cut away or recessed at 54 for the reception of the draw-bar 40 and key-operated locking-lever 60, hereinafter described. The recess 54, provided on the gravity-lever 50, it will be seen, provides the seat for the draw-bar and locking-lever, thereby economizing space, since no greater thickness is required than would be required for the usual thickness of the gravity-lever. In the lower edge of the upper forward part of the gravity-lever is formed the shoulder 51, adapted to be engaged by the lug 45 of the draw-bar. The shoulder, it will be observed, is inclined in any degree or contour in order that the lug may be guided toward the fulcrum-pivot. It will also be observed that a segment of the circle of the forward part of the gravity-lever is cut inwardly at 52 in order that the same will not engage the lever and push the said lug downwardly on the shoulder 51 and produce unnecessary friction thereby as the gravity-lever is elevated. The gravity-lever is also provided with a concavity 53 in the middle front thereof, permitting the back travel of the latch-bolt, and an integral latch-operating arm 59, which projects upwardly from the lower part thereof and engages with a recess 22 in the lower edge of the sliding latch. The projection 58 at the upper part of the gravity-lever is of soft material and strikes the upper edge of the case and eases the jar thereof.

Numeral 50^b in the modified drawings, Fig. 10, is an additional minor weight-piece to major part of the gravity-lever, attached to the upper rear end of the said gravity-lever 50, thereby affording greater power from the same weight of material. The attachment of the said piece 50^a is pivotal in order that the same may operate in a vertical position. It is understood that the use of this piece is optional in a certain class of locks. This expediency will be resorted to in deriving sufficient power to operate the latch-bolt and knob-spindle.

Located within the cups 15 and 15^a, formed on the side plates of the case and to each side of the disk 63 of the locking-lever 60, are a series of stationary ward-plates or tumblers. Each tumbler is provided with a projection or projections 1^a and 1^b, which are adapted to fit within suitable slots 15^b 15^c, formed in the cups 15 and 15^a, whereby such tumblers or ward-plates are held from turning. These plates or tumblers are provided with suitable slots corresponding to the bits in the key. Between the tumblers or plates are placed suitable washers or separate plates 2. The key is such—for instance, as shown in Fig. 5—that when inserted in the keyhole it is adapted to turn freely past the ward-plates when used; but the slot formed in the disk 63 of the lock and lever 60 is so shaped as to be engaged by the operating-key, whereby the disk and the locking-lever are turned with such key. It will be observed that the said disk is provided with a flange 63^a, projecting on the said cups and coacting therewith to keep the disk in proper position. Flange 63^a is recessed at 63^b, on both sides of the upper and lower part of the same, to receive the projections 7 and 7^a of the encircling rings 4. Fig. 10 shows a modified view of the said disk arrangement, being within the said cups. The locking-lever 60 when turned into locking position engages by its end with a shoulder 56, formed in the gravity-lever, thoroughly preventing the operation of the said gravity-lever in retracting the bolt. When the locking-lever is not in its locking position, it may rest on projection 13 on the lock-case, as shown. The gravity-lever is provided with bosses 50^a and 50^b to reduce lateral friction with the side plates of the case.

Numeral 4 in Fig. 9 is one of two oppositely-faced rings encircling each cup of the side plate of the case, or one may be used, if desired. The said rings are provided each with two inwardly-directed lugs or tumblers 5 and 6 and two lugs 7 and 7^a, projected at right angles to the ring-surfaces, each lug being formed integral to its ring. The said projecting lug 7 is adapted to fall into the recesses 63^b of the disk, preventing the same from being revolved and disengaging the locking-lever. The inwardly-directed lugs are located in the upper and lower slots 15^d 15^e of the plate of the case. The upper lugs 6 are adapted to receive the shoulders 8 8 of the bit of the key, whereby the said lugs are elevated, thereby raising the lugs 7 up out of the recesses 63^b of the disk, preventing the same from being revolved in unlocking the lock and freeing the same.

The lower inwardly-projecting lugs 5 of the rings 4 are adapted to receive the curved point 8^a of the key-bit to force the said rings 4 downward in case they do not fall of their own weight, thereby giving the same a posi-

tive movement by this specially-formed key. Changes of keys may be made by lengthening the shoulders 8 8ª of the key-bit and correspondingly shortening the lugs 5 and 6 of the rings 4. 7ª represents additional guards to the disk movement, as when the rings are unduly elevated they lock the same. When no disks such as shown by numerals 1 and 2 are used in the cups, then the key-bit would not be incised, as indicated. It is contemplated to use the said locking device with a separate locking-bolt when the usual two bolts are used and use rings with one lug 7, if desired.

The operation of the device is effected by the gravity-lever 50 taking its lower position and resting on the jar-posts 11, thereby protruding the latch-bolt 20 forward in the keeper of the door-jamb. When it is desired to disengage the latch-bolt from the said keeper, the knob-spindle is caused to bring the arms of the operating-cam to bear on the shoulders of the draw-bar, thereby causing the lug on the draw-bar to engage the shoulder 51 of the gravity-lever 50, whereby the gravity-lever is elevated and retracts the latch-bolt. In locking the said device the key-operating lever 60 is revolved on the slotted cups 15 and 15ª and thrown forward and brought into engagement with the shoulder 56 of the gravity-lever, thereby locking the same. It will be observed in the operation the shoulders 8 of the key-bit elevate tumblers 6, thereby causing 7 to free itself from the recess 63ᵇ of the disk 60. In withdrawing the key the curve 8 of the key-bit bears on the upwardly-projecting lug 5 of the ring 4, thereby positively drawing the counterpart lug 7 into the recesses 63ᵇ of the upper part of the disk-flange, thereby avoiding the failure of operation. The bits of the key freely turn past the ward-disks when used in the cups, while one bit engages the disk of the locking-lever in revolving the same for engagement with the shoulder of the gravity-lever.

From the foregoing construction of my invention it will be apparent to those skilled in the art without further description, and it will be understood that various changes and modifications in the size, the proportion, and minor details of construction may be made without departing from or sacrificing any advantages herein described in my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a lock, the combination of a latch-bolt actuated at the under edge by the projecting arm of the gravity-lever, a gravity-lever pivoted in the upper forward corner of the casing, a draw-bar connecting the said gravity-lever with the operating-cam mounted on the knob-spindle, a key-bit, a key-operated stop-lever, mounted on the projections integral with the casing and adapted to engage the gravity-lever, thereby locking the same, a key-operated ring or rings encircling the said projections of the casing, each ring being provided with two inwardly-directed projections adapted to receive the shoulders of the key-bit, and two offstanding projections adapted to engage the shoulders of the flange of the disk of the said stop-lever, substantially as set forth and described.

2. In a lock, the combination, of the casing, operating-cam, gravity-lever, latch-bolt, and draw-bar, the said draw-bar connecting the operating-cam of the knob-spindle with the shoulder-catch in the upper forward part of the gravity-lever.

3. In a lock, the combination with a case, a gravity-lever pivoted thereto in the upper forward part, a draw-bar connected to the said gravity-lever and to the arms of the operating-cam, the operating-cam being mounted in the knob-spindle in the case and the latch-bolt actuated by the said gravity-lever substantially as set forth and described.

4. In a lock, the combination with the case, a gravity-lever pivoted thereto in the upper forward part, a latch-bolt, actuated by said gravity-lever, a draw-bar connecting the said gravity-lever with the arms of the operating-cam, the said draw-bar being provided with a reinforced wrist adapted to engage the gravity-lever and an operating-cam mounted on the knob-spindle as described and set forth.

5. In a lock, the combination of the case, a gravity-lever pivoted thereto, in the upper forward end thereof, the said gravity-lever having a segment of the arc under the eye on the said pivot, cut inwardly, a draw-bar connecting said gravity-lever with the operating-cam, an operating-cam mounted on the knob-spindle and a latch-bolt actuated by said gravity-lever, substantially as described.

6. In a lock, the combination of the case, a gravity-lever pivoted thereto, the said gravity-lever being provided with an inclined shoulder 51, a draw-bar connecting said gravity-lever with the said shoulder, an operating-cam mounted on the knob-spindle and the latch-bolt substantially as described.

7. In a lock, the combination with the case, the gravity-lever pivoted in the upper forward corner thereof, a draw-bar provided with a lug 45 and shoulders 41 and 42 connecting the said gravity-lever with the operating-cam, the said gravity-lever being provided with a depression in the periphery end of the eye on the pivot 15 at 52 and a slanting shoulder 51, an operating-cam mounted on the knob-spindle and a latch-bolt actuated by the arm of the said gravity-lever, substantially as described.

8. In a lock, the combination with the case, the gravity-lever pivoted in the upward forward corner of the said case, said gravity-lever being provided with a concavity in the front part thereof, an actuating-arm engaging the lower edge of the bolt, a draw-bar connecting said gravity-lever with the oper-

ating-cam, an operating-cam mounted on the knob-spindle, and a sliding latch-bolt, substantially as described.

9. In a lock, the combination of a case provided with integrally-slotted cups on each side plate thereof, a locking-lever mounted on said cups, stationary ward-disks contained in said cups, spacing-washers between said ward-disks, a sliding latch, a gravity-latch-operating lever pivoted on the upward forward corner of the casing engaging the latch-bolt, an operating-cam mounted in the knob-spindle and a draw-bar connecting the said lever and cam, substantially as described.

10. In a lock, the combination with a gravity-lever pivoted in the upward forward corner thereof and actuating the latch-bolt, said gravity-lever being provided with bosses or projections, a draw-bar connecting said gravity-lever with the operating-cam, an operating-cam mounted on the knob-spindle and seated in the case, a latch-bolt, substantially as described.

11. In a lock, in combination with the casing, a gravity-lever pivoted in the upper corner thereof, means for operating the same, a latch-bolt, a key-operated locking-lever mounted on the said slotted cups of the side plates of the case, the disk end of the said lever being recessed and provided with a flange coacting with said cups, substantially as described.

12. In a lock, in combination with the casing, the said casing being provided with a cup formed integral therewith, a ring encircling said cup, said ring being provided with inwardly-projecting tumblers or lugs, a key-bit provided with shoulders adapted to operate the same, and a projecting lug coacting in recess of the flange with the disk of the key-operated lever, substantially as described and set forth.

13. In a lock, in combination with the casing, the said casing being provided with cups formed integral therewith and supporting the flange-disk of the key-operated lever coacting thereon, two rings encircling the said cups, the said rings being provided with inwardly-directed tumblers or lugs located in the slots of said cups, and outwardly-projecting lugs interacting in the recesses of the said flange of the lever-disk by means of the shoulders of the key-bit engaging the upper lugs of the said rings and the body of the key-bit engaging the shoulder of the disk of the said locking-lever, substantially as described.

14. In a lock, the combination of the casing, the said casing being provided with projections formed integral therewith and supporting the locking contrivance, two rings encircling the said projections of the casing, each one of the said rings being provided with an inwardly-directed post and a projection at right angles to the face of each of the said rings adapted to interact in the recesses of the disk of the key-operated locking-lever, and a beveled key-bit adapted to bear on either one of the said posts, substantially as described.

15. In a lock in combination with a casing, the said casing being provided with cups formed integral with the side plates, a key-operated flanged disk provided with a locking-lever, coacting therewith, substantially as set forth and described.

16. In a lock, the combination with a sliding latch-bolt, the casing, an operating-cam mounted on the knob-spindle, a draw-bar connecting the operating-cam with the shoulder-catch of the gravity-lever and a gravity-lever, the said gravity-lever being in two parts, one part being attached to the upper rear end of the other part and a key-operated locking-lever for locking the gravity-lever, as set forth.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN C. ALMAN.

In presence of—
A. M. WINNETT,
H. C. DALY.