

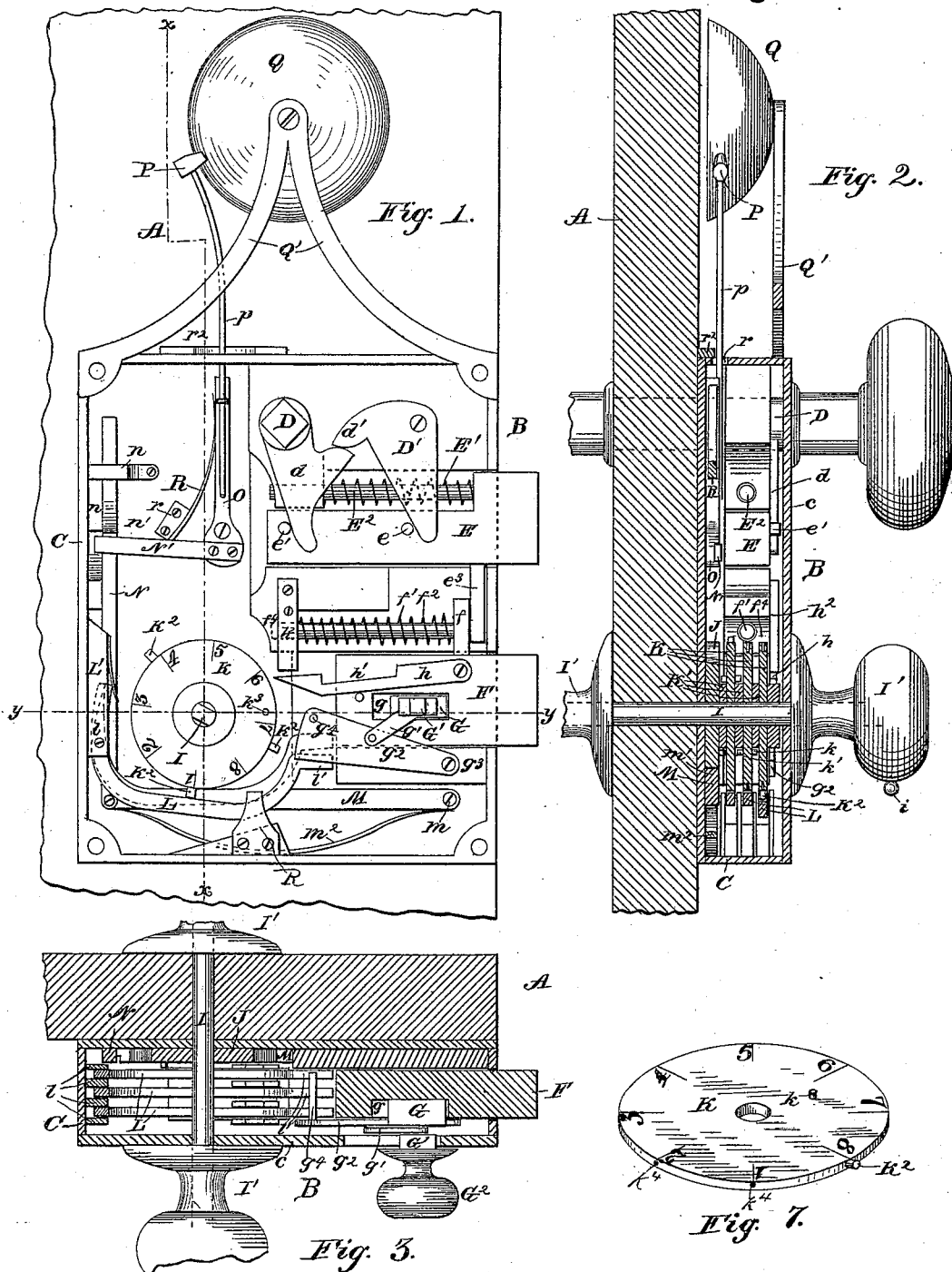
(Model.)

2 Sheets—Sheet 1.

W. P. & J. C. MATSON.
ALARM LOCK.

No. 348,026.

Patented Aug. 24, 1886.



WITNESSES

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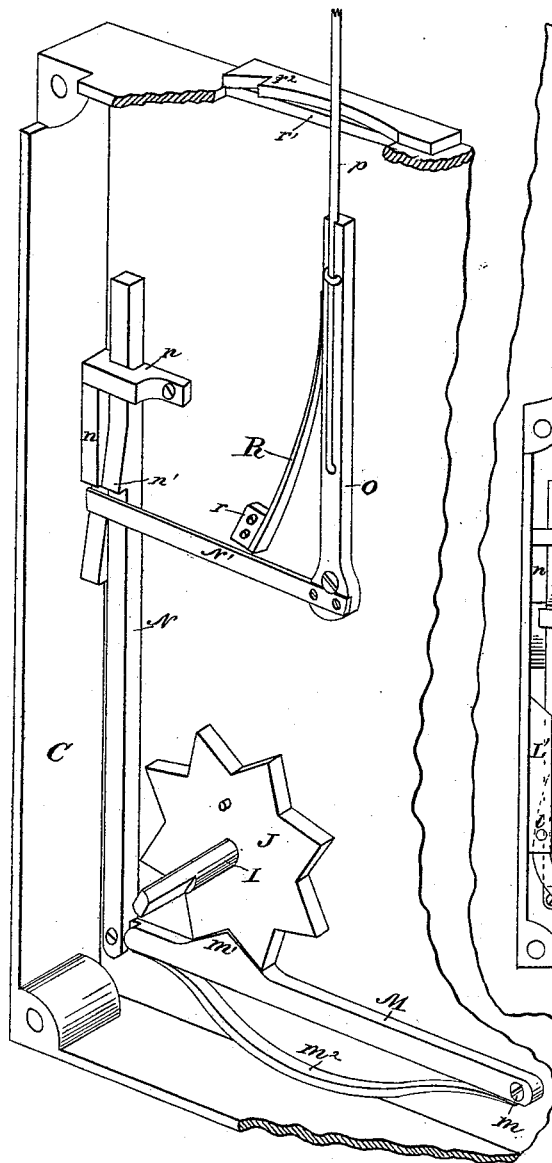


Fig. 5.

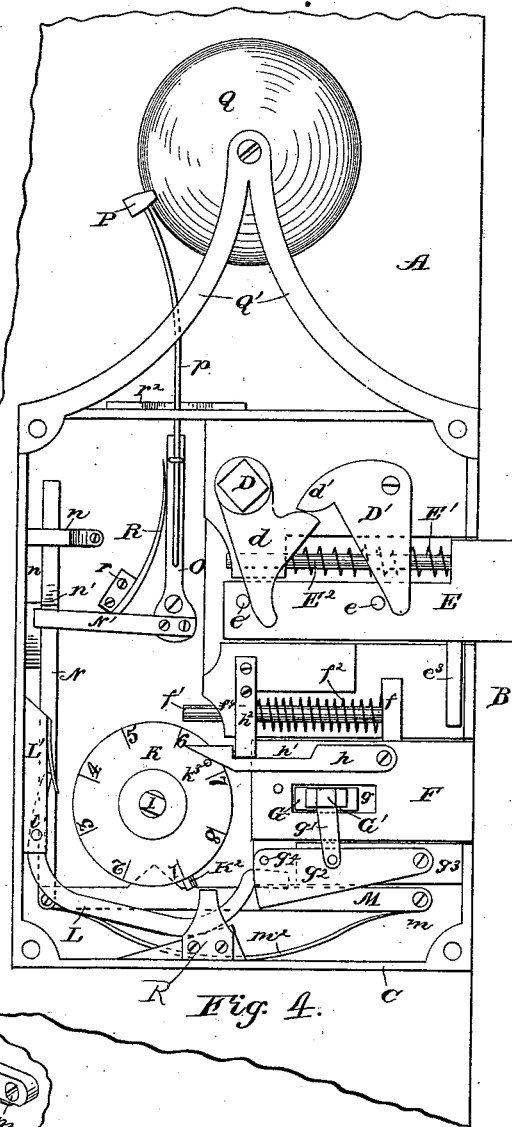


Fig. 4.

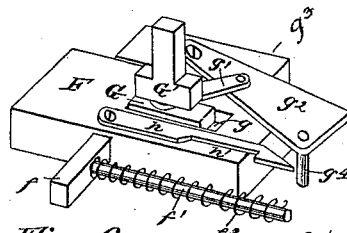


Fig. 6.

WITNESSES

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UNITED STATES PATENT OFFICE.

WILMARTH P. MATSON AND JAMES C. MATSON, OF BROOKVILLE, PENNSYLVANIA, ASSIGNORS OF ONE-HALF TO C. M. MATSON AND D. L. PAINE, BOTH OF SAME PLACE.

ALARM-LOCK.

SPECIFICATION forming part of Letters Patent No. 348,026, dated August 24, 1886.

Application filed September 3, 1885. Serial No. 176,101. (Model.)

To all whom it may concern:

Be it known that we, WILMARTH P. MATSON and JAMES C. MATSON, citizens of the United States, residing at Brookville, in the county of Jefferson and State of Pennsylvania, have invented new and useful Improvements in Alarm-Locks, of which the following is a specification, reference being had to the accompanying drawings.

Our invention has relation to improvements in locks; and the novelty consists in the peculiar construction and in the combination, arrangement, and adaptation of the various parts for service, substantially as hereinafter fully set forth, and particularly pointed out in the claims.

Our invention has especially for its object to provide a permutation or combination lock for doors of offices and residences, &c., which shall give an alarm or serve as an office or store warning-bell during the day, which shall be capable of being thrown out of use during the day to enable the device to perform the office of an ordinarily-constructed lock or catch for the door, and which shall combine strength, simplicity, and durability of construction with effectiveness of operation and cheapness of manufacture.

We have illustrated an embodiment of our invention in the accompanying drawings, in which—

Figure 1 is a plan view of our improved lock with the back plate thereof removed, showing the latch extended and the locking-bolt within the casing. Fig. 2 is a vertical longitudinal section on the line *xx* of Fig. 1. Fig. 3 is a vertical transverse sectional view on the line *yy* of Fig. 1. Fig. 4 is a plan view, similar to Fig. 1, with the latch and locking-bolt extended beyond the case, or locked. Fig. 5 is a detail view of the bell-striking operating mechanism. Fig. 6 is a detail view of the locking-bolt devices; and Fig. 7 is a detail perspective view of one of the tumblers of the permutation part of the device.

Like letters of reference in the several figures of the drawings denote corresponding parts.

Referring by letter to the drawings, A designates a portion of the door-jamb upon which

our improved lock B is secured in the ordinary well-known manner, as in use at present.

The lock is constructed as follows: C designates the case, preferably rectangular in form, similar to ordinary common locks at present in use, and having a removable back plate, *c*, provided with the ordinary means for securing it to the case C.

D designates the knob-shaft, having rounded shank and squared ends, as is usual, and extending through the case C and door-jamb A. The shank of said shaft is provided with a triangular-shaped cam-plate, *d*, rigidly secured thereon and adapted to strike against, when the shaft D is turned, a pivoted dog, D', having a cam-tongue, *d'*, adapted to impinge upon a stud or pin, *e*, of the spring-actuated sliding bolt E. The rear end of said bolt has a similar stud or pin, *e'*, which is operated upon by the cam-plate *d* to withdraw the sliding bolt E within the case C to open the door, said bolt being normally pressed outwardly by means of a coiled or other spring, E', fitting over a stud or rod, E², working in an aperture or socket in the base-piece of the lock-case.

F designates the locking-bolt, having an arm, *f*, which carries a rod, *f'*, having a coiled spring, *f''*, wound thereon and adapted to keep the bolt normally pressed outward by reason of its bearing against a projection, *f'''*, of the lock-case C, and also provided with a seat to enable the free end of the rod *f''* to slide therein. The arm *f* of the locking-bolt F is arranged in rear of a similar arm, *e''*, of the sliding bolt E, and when the locking-bolt is forced outwardly it impinges against and carries with it the arm *e''* and the sliding latch or bolt E, thus causing both bolts to engage the keeper secured to the door-frame.

The locking-bolt F is recessed, as at *g*, and in said recessed portion is fitted a sliding piece or block, G, carrying a standard, G', projecting through the back plate of the lock-case and having a thumb-piece, G², secured thereon, whereby the sliding locking-bolt F may be moved backward out of engagement with the keeper independent of the sliding bolt E, said standard G' working back and forth in a slot in said back plate, *c*.

g' designates an arm pivoted at one end to

the standard G' and at its opposite end to a lever or plate, g^2 , pivoted at one end to a projecting piece, g^3 , of the lock-case, and carrying a pin, g^4 , projecting inwardly and adapted to engage the bent ends l of the pivoted spring-actuated levers L , presently described.

The sliding bolt F carries a locking arm or catch, h , pivoted at one end thereof to said bolt, and having a cut-away portion, h' , at one side adapted to engage an arm, h^2 , secured to the projection f^4 of the lock-case, the outer end of said pivoted locking arm h being beveled and adapted to be operated upon by a pin on one of the tumblers, as will appear more fully hereinafter.

I designates the shaft or arbor of the knob of the permutation-tumblers having knobs I' at each end and provided with indicating nibs or teeth i , said shaft passing through the lock-case and carrying a ratchet disk or wheel, J , rigidly secured thereon, and a series of loosely-mounted tumblers, K , the detailed construction and operation of which will more fully hereinafter appear.

M designates a detent or vibrating tongue pivoted to the case C at one end, as at m , and having a tooth, m' , normally pressed in engagement with one of a series of notches in the ratchet-wheel J by means of a spring, m^2 , secured at one end to the case C and bearing upon said detent at its opposite free end. The forward end of the detent or tongue is provided with a rod, N , moving in guide-blocks n at its front end and having a tooth or projection, n' , adapted to engage in its back and forth sliding movements with the vibrating tongue or detent, with a spring-arm, N' , lying transversely across the line of movement of said projection on the sliding rod and bearing in a notched end of one of the guide-blocks n . (See Fig. 5.) The rear end of said spring-arm N' is secured to a lever, O , pivoted at one end to the lock-case and carrying the rod p of the bell-hammer P , adapted to strike the bell Q , mounted in the outer end of bracket-arms Q' , secured to the lock-case, as shown. The lever O is normally pressed outwardly to keep the bell-hammer in contact with the bell by a spring, R , secured at one end to a block, r , of the lock-case and bearing at its free end against lever O . The rod of the bell-hammer works in a slot, r' , in the upper wall of the case, and in said slot is arranged a projecting tooth, r^2 , with which the bell-hammer rod is adapted to be engaged when it is desired to throw the bell-striking mechanism out of operative position.

From the foregoing it will be observed that each time the tooth of the detent or vibrating tongue slips past one of the notches in the ratchet-wheel, said tongue is forced downward and draws its sliding rod with it, the tooth or projection thereon coming in contact with the spring-arm N' , and operating it and the lever O , and forcing the bell-hammer from engagement with the bell, and when said detent slips into the next tooth of the ratchet-wheel,

the bell-hammer is brought to act or strike against the bell through the medium of the above connections; and, further, that the bell-hammer will be operated each time the ratchet-wheel is moved one notch, thus providing an effective and automatic alarm.

Each of the tumblers or disks K is provided with a series of ordinals or numerals, from 1 to 8, and the ratchet-wheel J has a similar number of teeth. Each tumbler is separated from its adjacent tumbler and the ratchet-wheel by means of interposed disks K' , which are adapted to take up wear and friction on the parts, and are loosely mounted on the shaft I , and each disk carries a projecting pin on its upper and lower surface, as at k k' , arranged at the upper and lower surfaces of the disks K' , and adapted to impinge or bear against each other to rotate the disks or tumblers K to open the lock. The tumblers K are rotated by the arbor I by means of a pin, j , that is secured on the ratchet-wheel J , which is rigidly secured on and carried by the said arbor, and when the arbor is rotated by hand the pin j of the ratchet-wheel J thereon comes in contact with the pin k of the tumbler adjacent thereto, and the pins of the tumblers engage with each other to bring the same into position to unlock the lock. At its periphery each disk has a series of apertures or holes, k^4 , corresponding in number to the ordinals on its face and the teeth of the ratchet, and in one of the series of apertures in each disk is fitted a removable pin, K^2 , adapted to impinge against one of the levers L when the tumbler is rotated, and to be adjusted in any one of its series of holes in its disk. The upper disk or tumbler K is provided with a pin, k^3 , which, when the disks are turned, strikes against the beveled end of the locking-lever, h , and forces it in engagement with the arm h^2 , and holds the sliding locking-bolt F from movement.

Each of the levers L is pivoted independently of each other, and at one end thereof is a spring-actuated plate, L' , having a series of arms, l , separated from each other by intermediate spaces, and in these spaces are arranged the ends of the levers L . The spring-plate L' is secured to one of the vertical walls of the lock-case, and when said levers are actuated upwardly by the spring-plate L' , and the rear ends of the pivoted levers bear against the lock-case to limit the outer end of said levers, which are provided with projecting nibs or lips l' , adapted to bear or impinge against the pin of the pivoted lever g^2 , and the rear end of the bolt F , and when the projecting pins K^2 of the tumblers are in alignment or register to open the lock, the front ends of the levers L are all bearing against the pin of said plate g^2 , whereby, when the locking-bolt is slid back by means of the thumb-piece, the lever g^2 will be moved downwardly and impinge against the bent ends l' of the levers L , to force the ends of the levers below the rear end of the locking-bolt F , so that the pin k^3 will force the beveled end of said locking-arm h forward, so

that its notched side will engage the arm h^2 , the locking-bolt having been moved rearwardly, as will be very readily understood.

In practice we prefer to employ three tumblers K, and a corresponding number of pivoted levers L, and to provide said tumblers with eight apertures at its periphery, and the ratchet-wheel with a corresponding number of teeth—namely, eight.

To illustrate the operation of a lock constructed in accordance with our invention and having the number and arrangement of the tumblers and the pins located thereon, as herein shown and described, we will suppose one or the first tumbler to be set on number six, (6,) the second or middle tumbler on number two, (2,) and the third or last tumbler on number five, (5.) The arbor should now be turned to the starting-point, which is indicated by the pin i on the knob I' of the arbor I, and the arbor is revolved by the hand to the right three (3) times, and as the ratchet-wheel J is provided with eight (8) teeth in the present instance, the bell-hammer will strike the bell twenty-four times, and the pin j thereon will engage with the pin k to rotate the tumbler adjacent thereto. The arbor is then turned to the left so as to completely revolve it twice, which will cause the bell-hammer to strike the bell sixteen (16) times, and the second or middle tumbler will be actuated by the pins of the first tumbler engaging the same, and the arbor is finally turned or revolved again to the right until it has made one complete and a part of a second revolution, when the bell-hammer will strike the bell fourteen (14) times, thus actuating all of the tumblers to bring the pins K^2 thereof in alignment and in position to force the front ends of the levers L away from and below the rear end of the locking-bolt F. The locking-bolt can now be moved rearwardly or retracted within the lock-case by grasping the handle or knob G^2 , which will carry with it the notched lever h , the beveled end of which will be brought into the path of movement of the pin K^3 on the outer tumbler, and by rotating the knob or arbor to force the same upwardly, whereby the notched portion of the said pivoted lever will engage with the free end of the block h^2 , and the bolt F will be prevented from forward movement or projected beyond the lock-case. To project the locking-bolt beyond the case, the arbor is rotated to actuate the tumblers, so that the pin K^3 will be drawn away from the beveled end of the lever h , which will then drop by gravity, and the spring f^2 will force the bolt F beyond the case.

The operation of our invention will be very readily understood from the foregoing description, taken in connection with the drawings.

It will be observed that when the disks or tumblers register to open the lock or permit the sliding bolt to slide freely back and forth, that when the sliding bolt is turned by the handle D, it will carry the locking-bolt back with it into the case by reason of the arm e^3

engaging the arm f of said locking-bolt, that the locking-bolt F can be retracted or drawn within the case independently of the bolt D 70 by moving the thumb-piece secured to the standard G' , and that, when desired, it can be retained by the locking-arm h engaging the arm h^2 .

The bell serves as an efficient burglar-alarm in the night to notify the occupant or watchman of an attempt at burglary, and also serves as an alarm-bell during the day. The bell-hammer can be thrown out of engagement with the rod of the operating-detent 75 when desired, and the bell mechanism is operated independently of the locking-bolts D F. By reason of the ratchet J turning with the arbor and operating the bell-striking mechanism, and the tumblers being mounted 85 on the arbor and operated by the latter, the bell will be operated or struck each time the notch escapes from the detent, and thus the signal or combination is struck or indicated by the bell, thus permitting the lock to be 90 opened in the night without the aid of a light, the number of times the bell is struck indicating the number of revolutions and part of revolution of the ratchet-wheel J. The locking bolt can instantly be retracted from the 95 inside in case of fire or accident, to permit the occupant to escape.

Various changes in the form and proportion of parts and details of construction may be made without departing from the principle or 100 sacrificing the advantages of our invention, the essential features of which will be readily understood from the foregoing description, taken in connection with the drawings.

A guide, R, (see Figs. 1 and 4,) is provided 105 with a series of arms, between which the levers L are arranged to keep the ends of the levers L free from contact or engagement with each other.

Having thus fully described our invention, 110 what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the locking-bolt carrying a pivoted latch, a shaft carrying a ratchet, a series of tumblers loosely mounted 115 thereon and carrying pins adapted to engage each other, a series of independently-pivoted levers adapted to each engage a pin on one of the tumblers, and a pivoted arm carrying a pin and a locking-lever pivoted on said bolt 120 and adapted to engage a rigid arm, substantially as described.

2. The combination, with the locking-bolt carrying a pivoted notched lever, a pivoted arm, g^2 , a sliding piece carrying a stud and 125 pivotally connected with the arm g^2 , a sliding spring-pressed bolt carrying an arm, e^3 , adapted to engage a similar arm, f , of the locking-bolt and a rigid arm with which the pivoted lever of the sliding bolt is adapted to engage, 130 substantially as described.

3. In a lock, the combination, with an arbor, of the tumblers having the pins K^3 at their peripheries, the sliding locking-bolt, and the

pivoted spring-actuated levers having their free ends arranged in the path of movement of the locking-bolt when the latter is projected beyond the lock-case, and adapted to be acted
5 upon by the pins of the tumblers, substantially as described.

4. The combination of an arbor carrying a ratchet, a pivoted detent normally engaging the ratchet and having an arm, a pivoted
10 bell-crank lever actuated by the rod, a bell, and a hammer mounted on one arm of the bell-crank lever, substantially as described.

5. The combination of a rotating arbor carrying a ratchet, the bell-striking mechanism
15 actuated by the ratchet, the tumblers carried by the arbor and having the projecting pins

at their peripheries, the sliding locking-bolt F, and the pivoted spring-actuated levers L, having their free ends *l* normally arranged in the path of movement of the locking-bolt
20 and adapted to be independently depressed out of the plane of movement of the locking-bolt by the pins of the tumblers, substantially as described.

In testimony that we claim the foregoing as
25 our own we have hereto affixed our signatures in presence of two witnesses.

WILMARTH P. MATSON.
JAMES C. MATSON.

Witnesses:

JAMES STEELE,
JOHN MATSON.