No. 651,130. Patented June 5, 1900.

L. CARTER.

CYLINDER LOCK.

(Application filed Dec. 26, 1899.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1

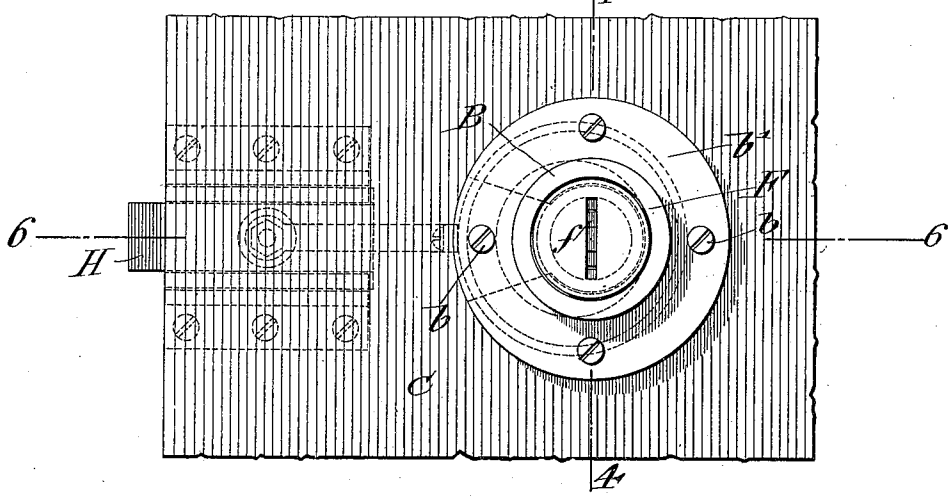


FIG. 2.

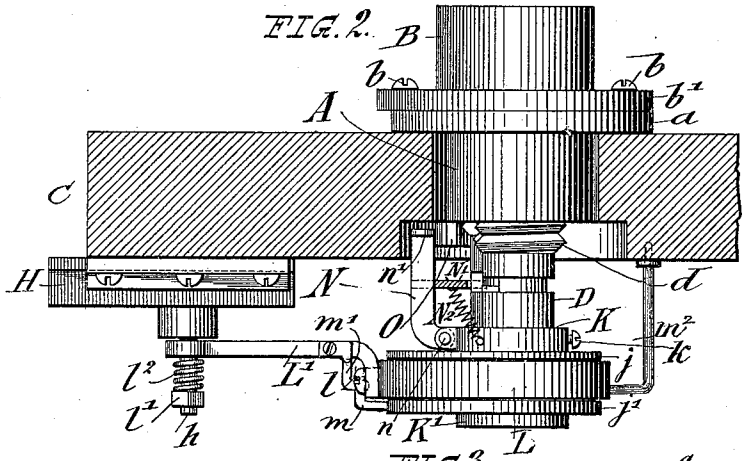
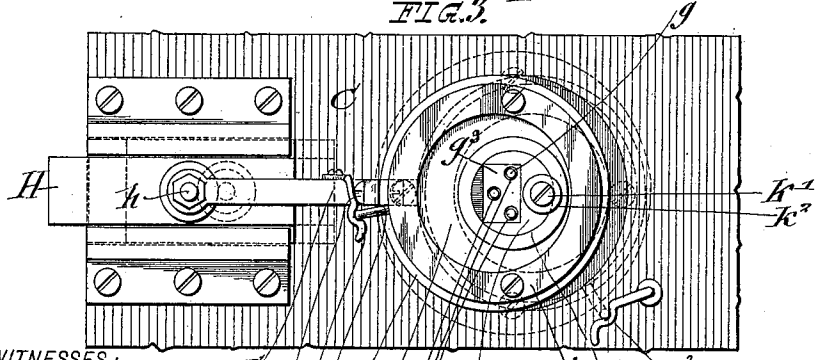


FIG. 3.



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Bruno von Bültzingslowen

M. F. Hurtzfeld

L l m L J g2 D j1 K1 m2

m1

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BY

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(No Model.) 2 Sheets—Sheet 2.

FIG. 4.

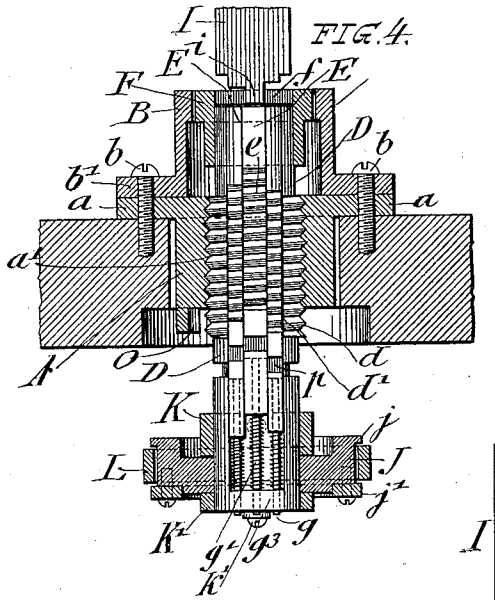


FIG. 5.

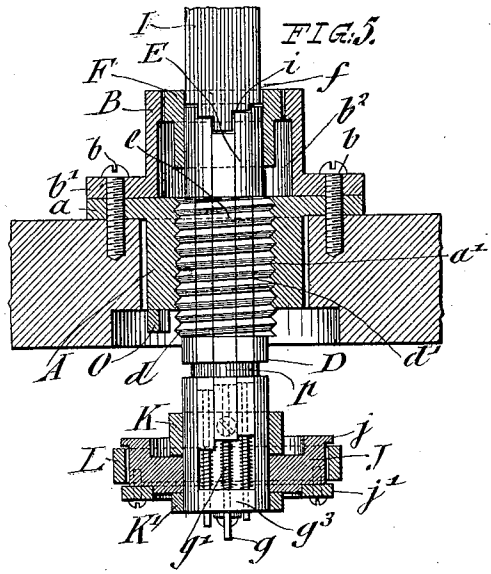


FIG. 6.

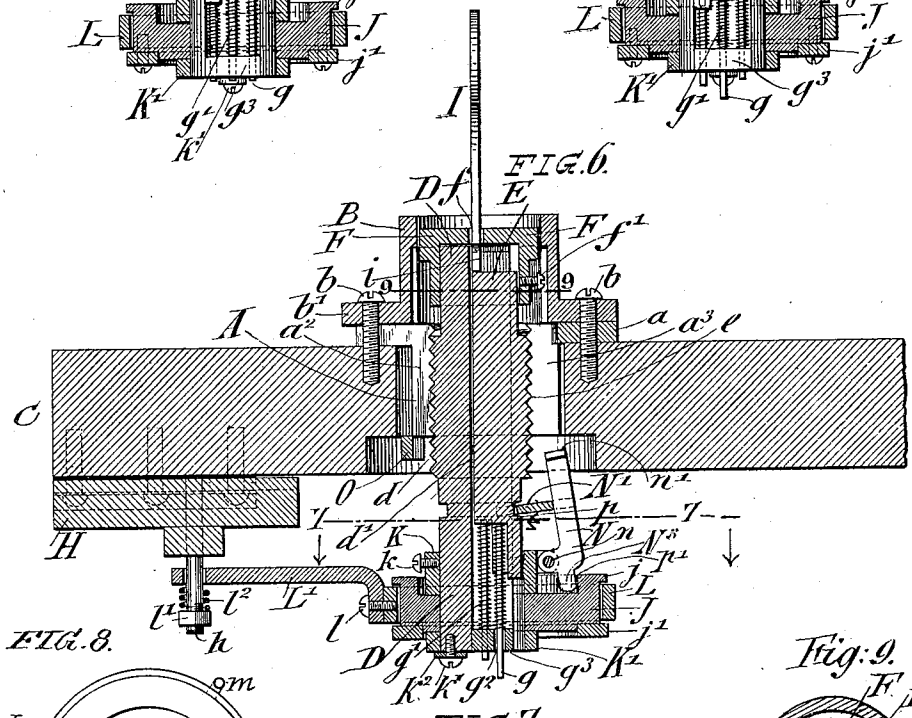


FIG. 8.

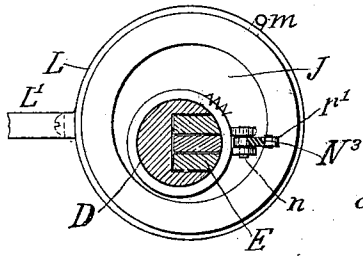


FIG. 7.

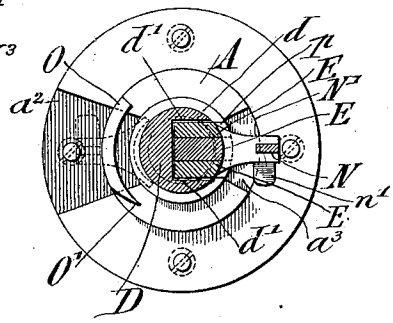
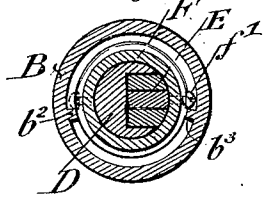


Fig. 9.



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UNITED STATES PATENT OFFICE.

LAWRENCE CARTER, OF RUTHERFORD, NEW JERSEY.

CYLINDER-LOCK.

SPECIFICATION forming part of Letters Patent No. 651,130, dated June 5, 1900.

Application filed December 26, 1899. Serial No. 741,628. (No model.)

To all whom it may concern:

Be it known that I, LAWRENCE CARTER, a citizen of the United States, residing at Rutherford, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Cylinder-Locks, of which the following is a specification.

This invention relates to cylinder-locks of the class in which the tumblers are trapped, one object of the invention being to provide safeguards against the picking of the lock and to also, if desired, furnish telltale means whereby a person with the true key is enabled to know whether the lock has been tampered with or not. Further objects are to provide a lock which is simple and efficient and which is more especially adapted for the doors of safety-vaults, as well as of course to doors in general.

The invention consists of a lock which comprises a cylinder provided with means for trapping the tumblers, a barrel adapted to turn in the cylinder, said barrel and cylinder having intermeshing screw-threads, and threaded tumblers sliding longitudinally in the barrel and adapted to be actuated by the true key, so that the same may be caused to move in such position that the barrel may be turned and the bolt retracted.

The invention also consists of certain other features of construction and combinations of parts to be hereinafter described and then claimed.

In the accompanying drawings, Figure 1 is a front elevation of a lock embodying my invention. Fig. 2 is a top view of the same. Fig. 3 is a rear view. Fig. 4 is a section on line 4 4, Fig. 1, parts being in elevation. Fig. 5 is a similar section showing the tumblers actuated by the true key. Fig. 6 is a longitudinal section on line 6 6, Fig. 1, showing the parts in the position they assume when the bolt is retracted. Fig. 7 is a transverse section on the line 7 7, Fig. 6, looking toward the front end of the barrel. Fig. 8 is a transverse section on the same line looking toward the rear end of the barrel, as indicated by the arrows; and Fig. 9 is a section on line 9 9, Fig. 6.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A indicates the cylinder of the lock, which is set in a mortised opening in the door C or is secured to the lock-case if there be one and is secured thereto by means of set-screws b, which pass through the flange a of the cylinder and into the door and also through the flange b' of the forward cylinder extension B. The said parts may of course be constructed in various ways evident to skilled mechanics, and no particular stress is laid on the construction shown, excepting to show a cylindrical casing adapted to the particular form of lock exhibited in the drawings.

The interior of the main body of the cylinder A is formed with screw-threads a', which are broken out of a portion of the cylinder by a longitudinal trap opening or recess a^2 formed in the cylinder. A longitudinal trap opening or recess a^3 is formed also in the cylinder at a point approximately diametrically opposite to trap-opening a^2. It will therefore be understood that the screw-threads are not continuous around the interior of the cylinder, but are segmental.

D indicates the rotary barrel, which turns within the cylinder A B and is formed with exterior screw-threads d, which mesh with the threads a'. A longitudinal guideway d' is formed in the threaded surface of the barrel D, so as to receive a tumbler or a set of tumblers E, which slide longitudinally therein, and which are provided with threads e, that are adapted to form continuations of the segmental threads d of the barrel. The said tumblers E are in the nature of threaded sections, which are sliced, as it were, from the threaded barrel, so that when the threaded sections are all in proper register a continuous thread is formed. (See Fig. 5.) Said tumblers are adapted to register with the trap a^2 and the trap a^3 for the purpose hereinafter described.

Onto the forward end of the barrel D is fixed a cap F, which is provided with a keyhole f to admit the key I, so that its bitted end i, cut true to produce the proper sliding movements of the tumblers E, may engage the outer ends of the said tumblers. f' indicates a set-screw, which secures the said cap F to the barrel D, and the head of which serves as a contact projection for striking the stops b^2 b^3, which limit the movements of the

key in turning in both directions, and define thereby the locked and unlocked positions.

The tumblers E are provided at their inner ends with longitudinal pins g, around which helical springs g', which press the tumblers into their forward position, (shown in Fig. 4,) are arranged, said springs being retained by and the said pins being guided through holes g^2 in an abutment or shoulder g^3, closing the inner end of the guideway d' in the barrel D. These springs are compressed by the tumblers when the key is pushed against the tumblers.

Bolt H, guided on the door, is suitably connected with the barrel for projection and retraction thereby. The means shown for moving the bolt, by the construction substantially as described, are susceptible of various modifications, which will suggest themselves to persons skilled in the art, and I do not therefore limit myself to the construction now to be described.

J indicates an eccentric which is mounted loosely on the inner end of the barrel D, it being confined against motion longitudinally of the barrel by means of a collar K, secured to the barrel at one side of the eccentric by a set-screw k and a collar K', which is secured to the barrel at the opposite side of the eccentric by a set-screw k', screwing directly into the end of the barrel and passing through a washer k^2, which clamps down upon said collar K', and thereby confines it. A strap L passes loosely around the eccentric J, it being arranged between the flange j and a flange-ring j' of the eccentric, an arm L', secured to the eccentric-strap by a screw l, connecting the said strap with the bolt H, which is provided with a screw-threaded stud or pin h, which passes through a hole in the arm L' and onto which is screwed a nut l', between which and the arm a helical spring l^2, coiled around said pin h, is confined.

Eccentric J has on its flange j' a bent finger or projection m, which hangs over the outer periphery of the strap L and rides thereupon, and inasmuch as the eccentric has a certain turning movement, to be described, the finger m limits such movement in one direction by striking and being retained by a snap-spring m', secured to the strap L, and in the other direction by striking and being retained by a snap-spring m^2.

A dog N, pivoted at n to the eccentric-confining collar K, is of elbow shape and projects forwardly, so that its toe n' may ride over a curved or segmental track O, provided with a beveled end O' and arranged concentric with the axis of the barrel D and spanning the inner end of the trap-opening a^2. The said dog carries an interfering-piece N' of yoke shape, the broad engaging end of which is adapted to take into notches p in the sliding tumblers. The proper registration of the notches p is only possible when the true key is inserted into the lock, and then the said interfering-piece will take thereinto an actuating-spring N^2, serving to that end. When the dog N is turned with the barrel to the end of the track O, its latch end N^3 is caused to take into a notch p' in the under side of the eccentric, located at a certain distance from the finger m.

The operation is as follows: To draw the bolt, the true key I is inserted into the key-hole f and the ends of the tumblers E, engaged by the bitted end of the key, the tumblers being pushed in as far as permitted by the end of the barrel D, with which the key comes in contact. The tumblers will thus be slid in longitudinally of the barrel and their segmental threads e caused to register properly with the segmental threads d of the barrel, so that a circumferential helical thread—that is to say, a screw-thread—is formed. By turning the key for the purpose of unlocking the threaded portions of the tumblers will be engaged with the threaded surface of the cylinder A, and when the key is turned so far as that all the tumblers are engaged they will be retained by the intermeshing threads in inward position, so that their springs cannot return them to their normal position. The bridge or track O is preferably of such length as that its tapering or beveled end is located at a point corresponding with the point when the last tumbler engages with the threaded cylinder A for the purpose of permitting the dog N when it moves to such end to be acted on by its spring N^2 in such way as to cause its latch end N^3 to take into the notch p' of the eccentric J. The moment the dog interlocks, as it were, with the eccentric J it disengages the finger or projection m from its retaining-spring m', and as the key is turned still farther to the right the eccentric is carried around, which, acting on the strap L and arm L', retracts the bolt. The bolt will be fully retracted when the set-screw f' strikes the stop b^3 and the finger m engaged by snap-spring m^2. (See Figs. 6 to 9.) When the key is turned back to lock the door, the bolt is projected, the finger m again engaged by spring m', the dog caused to enter upon the track O and be disengaged from the eccentric, and when the parts are turned so that set-screw f' will strike stop b^2 and the key has been withdrawn the springs g', acting on the tumblers, will return them to normal position, and the door or other closure cannot be opened, as by picking the lock, until the proper or true key has been used again.

Should an attempt be made to pick the lock, the parts will act in the following manner: The picking-tool will be pushed, say, against the first tumbler, if there be more than one tumbler, and an attempt made to turn the barrel, so that the manipulated tumbler will be retained. Now as all the tumblers have a sliding movement beyond the registering position for the threads the person picking does not know positively whether the tumbler has engaged in the right position or not; but he may suppose, owing to the partial ro-

tation he has succeeded in obtaining, that he is successful so far. The picking-tool is now pressed against the next tumbler, the barrel turned, and then against the next and the barrel turned, until all the tumblers are retained and the springs have no action on them. Now it is almost beyond the bounds of possibility that he has pushed all the tumblers to their right position. If they are not in such position, then the dog N will not engage with the eccentric J, owing to the fact that the interfering-piece N′ cannot engage with the notches p. Instead, however, the interfering-piece N′ will bear upon those portions of the tumblers located at one or the other side of the notches p, and the spring N^2 cannot force the dog into the notch p', this being absolutely necessary in order to retract the bolt. The person picking will now turn the barrel around as far as possible, and when it has reached the limit of its motion the tumblers will register with trap-opening a^3, corresponding with trap-opening a^2. The manipulator will probably receive the impression that he can now open the door, but the springs of the tumblers have forced them back to their normal position and he is barred against turning the barrel in either direction. Should a person with a true key now endeavor to turn the barrel to unlock the door it will not turn, as it has already been turned from locked to unlocked position; but it can be turned back to proper position, and then when a reverse turn is given the lock will operate. In this way warning will be given that the lock has been tampered with.

I desire it understood that I do not limit myself to the exact construction shown, as the invention resides mainly in constructing a screw-threaded barrel with tumblers having corresponding thread portions, which barrel turns within a screw-threaded cylinder and is suitably connected with the bolt.

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

1. In a lock, the combination with a cylinder, interiorly screw-threaded and having a trap-opening, of a rotary barrel, exteriorly screw-threaded, and tumblers guided in the barrel and having thread portions, for completing the circumferential helical thread, that is to say the screw-thread around the barrel, said barrel being suitably connected with the bolt, substantially as set forth.

2. In a lock, the combination with an interiorly-screw-threaded cylinder constructed with means to trap the tumblers, of an exteriorly-screw-threaded barrel, provided with a longitudinal guideway, and tumblers guided in said way and provided with thread portions for completing the screw-thread of the barrel, substantially as set forth.

3. In a lock, the combination with an interiorly-screw-threaded cylinder constructed with means for trapping the tumblers, of a barrel exteriorly screw-threaded, spring-actuated tumblers guided longitudinally along said barrel, and provided with thread portions for completing the screw-thread of the barrel, the bolt, and mechanism connecting the barrel and bolt, whereby the bolt is adapted to be retracted, substantially as set forth.

4. In a lock, the combination with an interiorly-screw-threaded cylinder, constructed with means to trap the tumblers, of an exteriorly-screw-threaded barrel, provided with sliding tumblers, having thread portions for completing the screw-thread of the barrel, the bolt, mechanism connecting the barrel and bolt, for retracting the said bolt, means controlled by the tumblers for causing the operation of the retracting mechanism upon the insertion of the true key, and means for interfering with the said controlling means and thereby the operation of said retracting mechanism, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

LAWRENCE CARTER.

Witnesses:
M. H. WURTZEL,
GEO. L. WHEELOCK.