(No Model.) 3 Sheets—Sheet 1.

R. MOE.

PERMUTATION LOCK.

No. 539,818. Patented May 28, 1895.

Fig. 1.

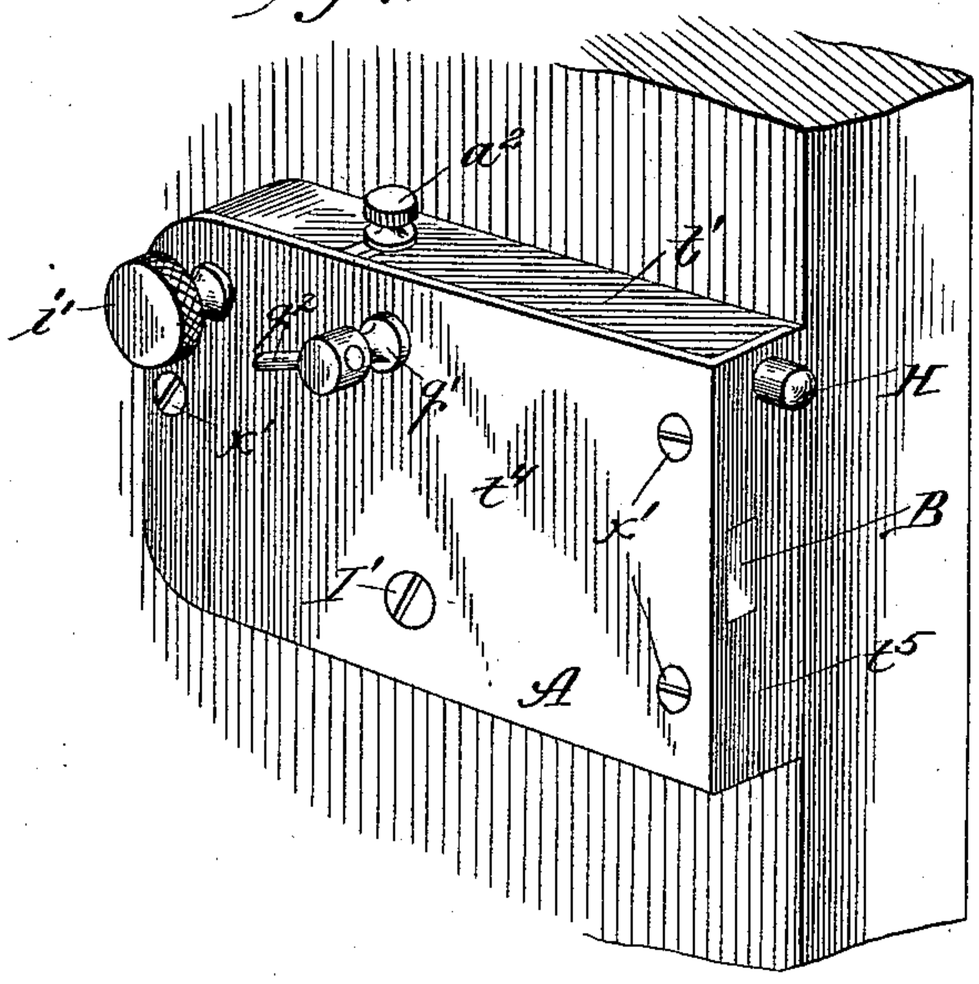


Fig. 2.

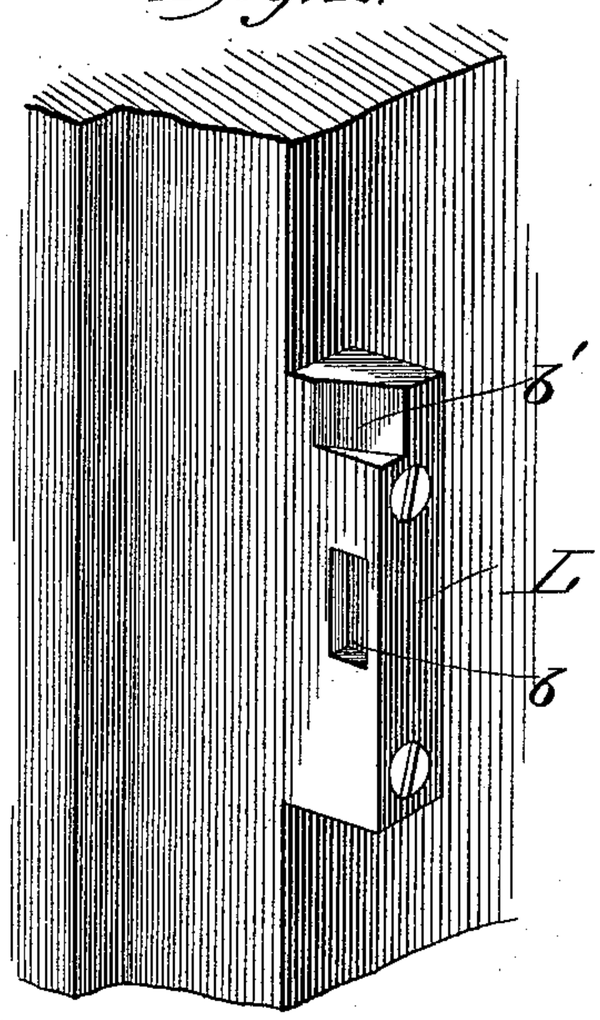
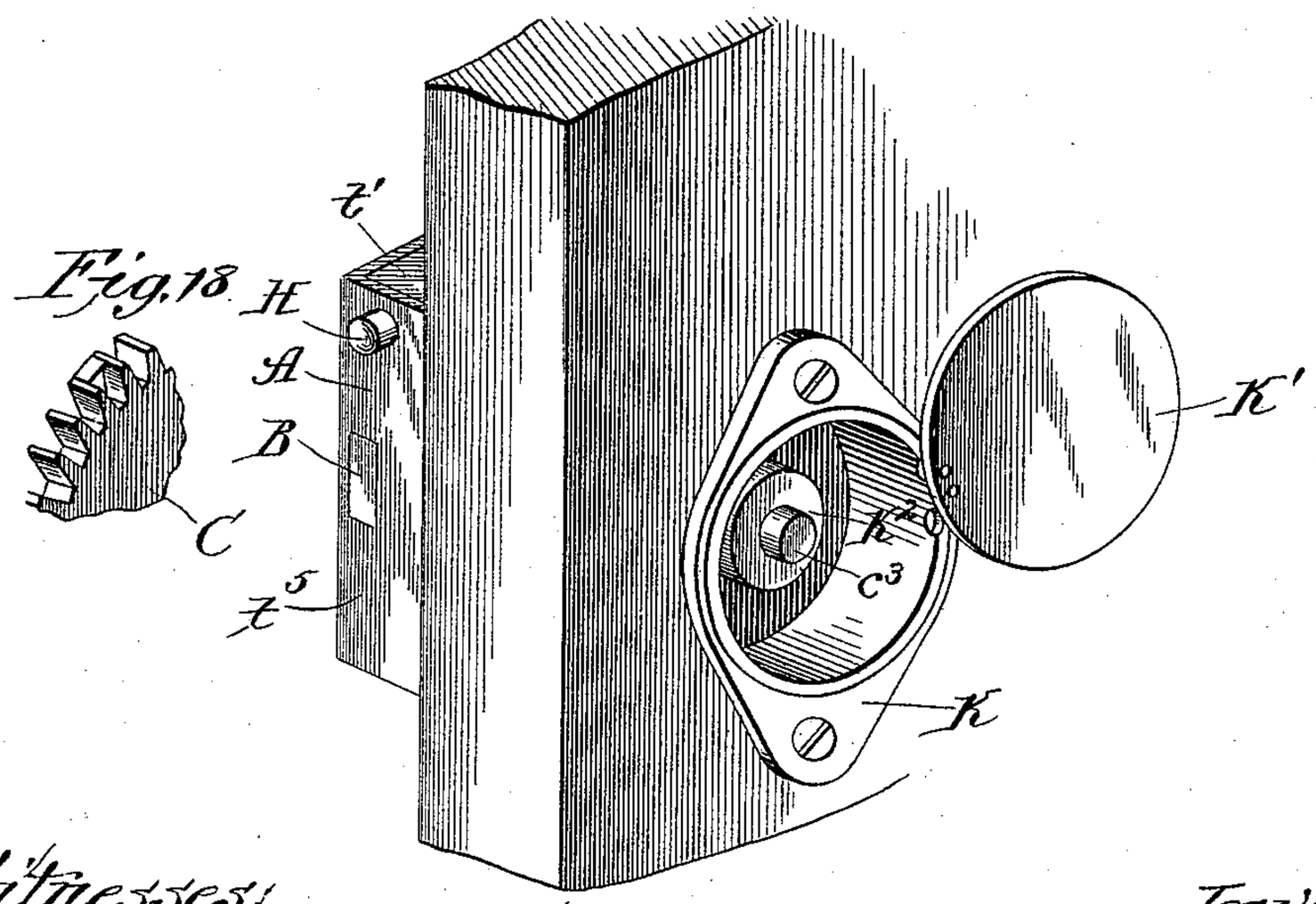


Fig. 3.



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By Dyrenforth & Dyrenforth
Att'ys.

(No Model.) 3 Sheets—Sheet 2.

R. MOE.

PERMUTATION LOCK.

No. 539,818. Patented May 28, 1895.

Fig. 4.

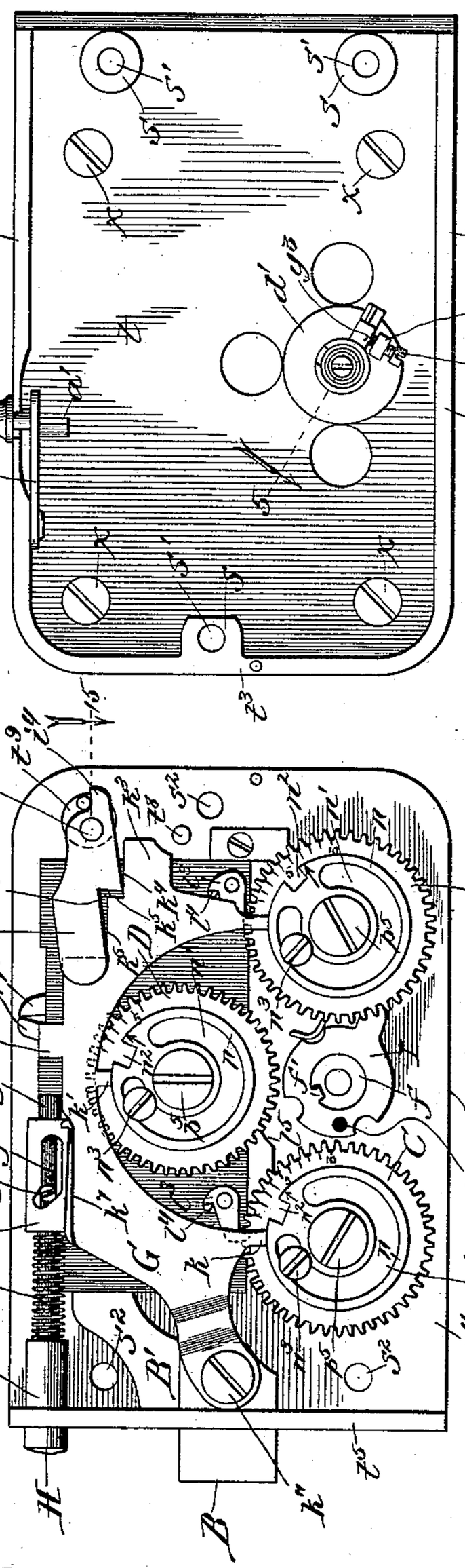


Fig. 5.

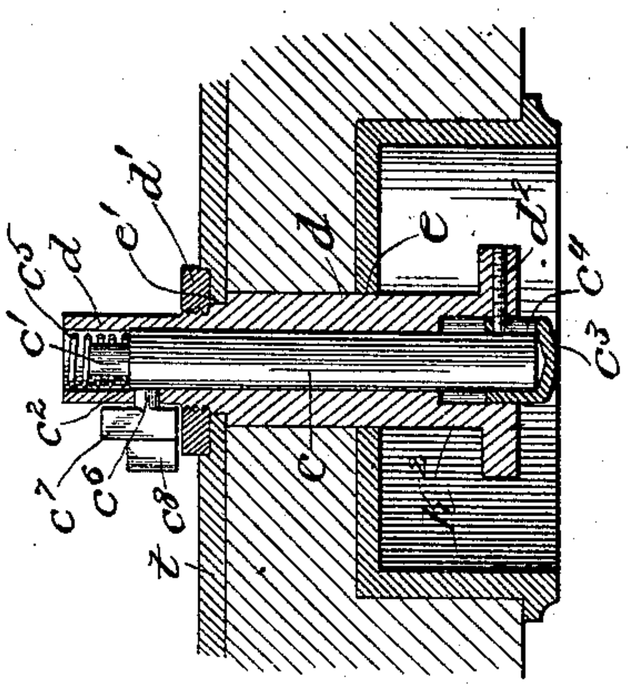


Fig. 6.

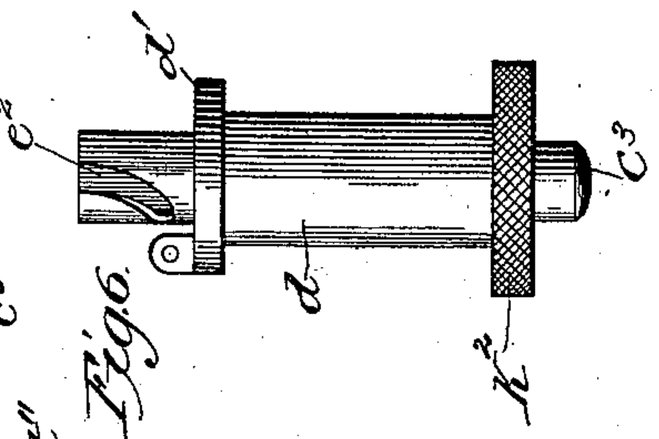


Fig. 7.

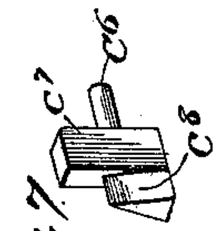
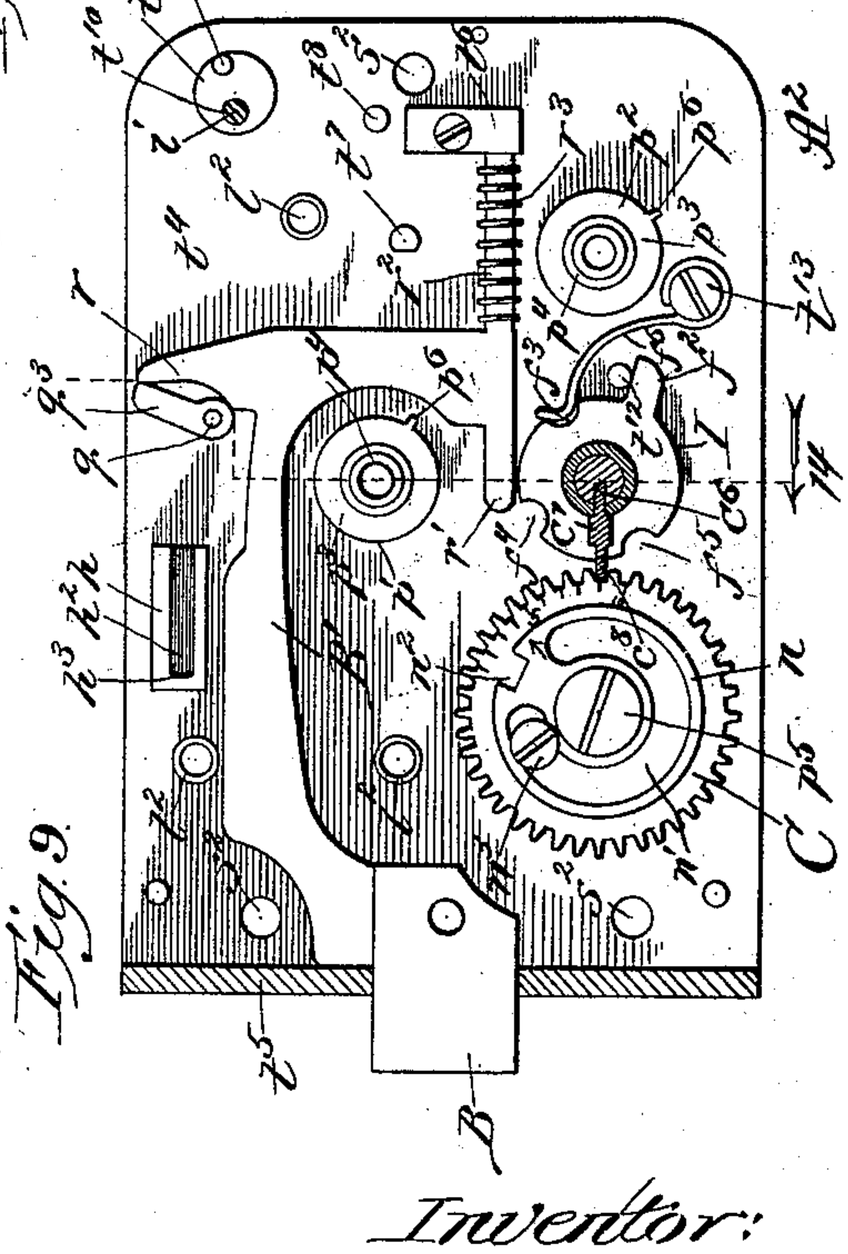


Fig. 8.

Fig. 9.



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(No Model.) 3 Sheets—Sheet 3.

R. MOE.

PERMUTATION LOCK.

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Fig. 10.

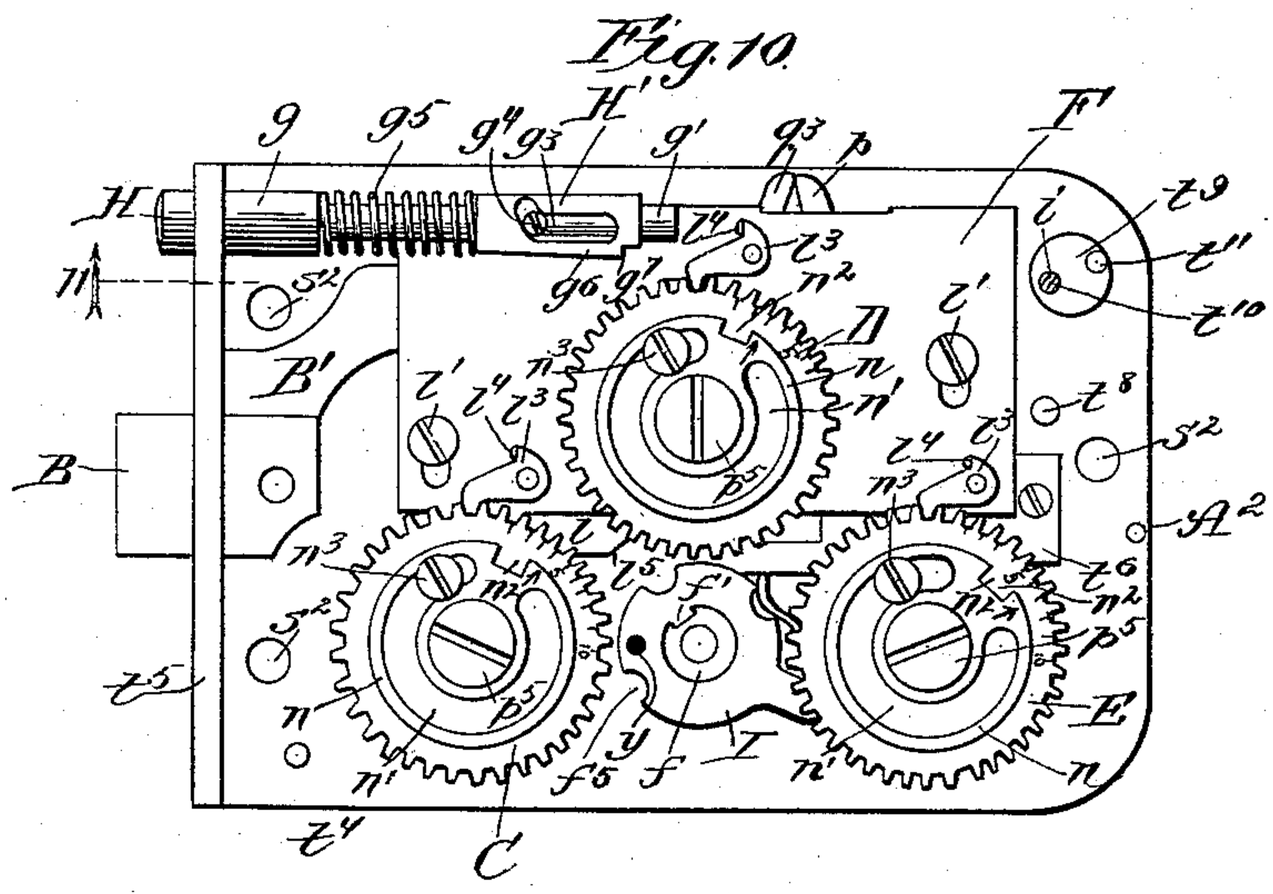


Fig. 11.

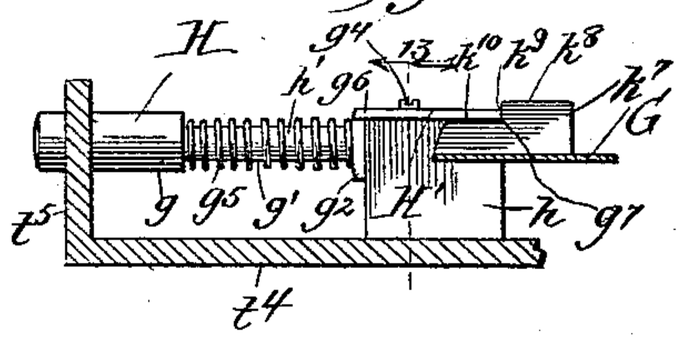


Fig. 13.

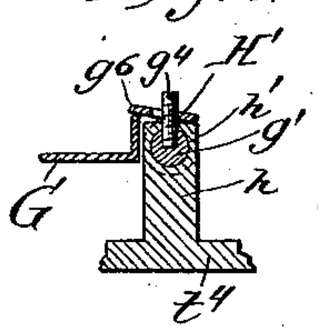


Fig. 14.

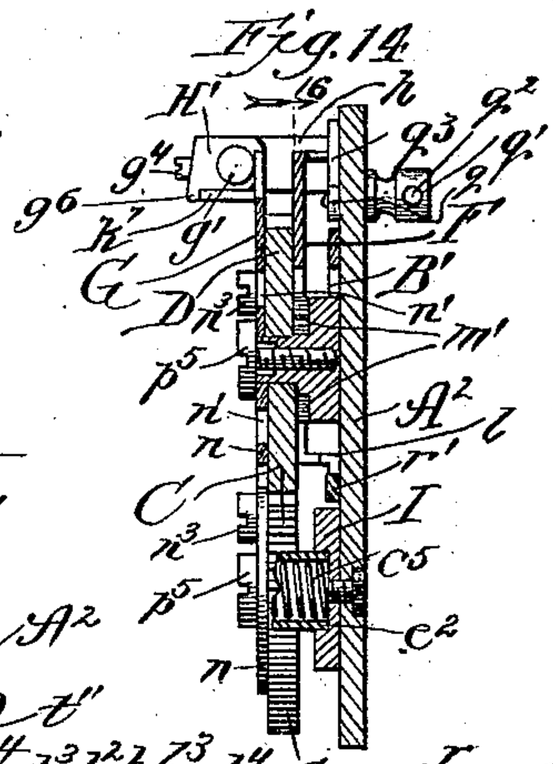


Fig. 12.

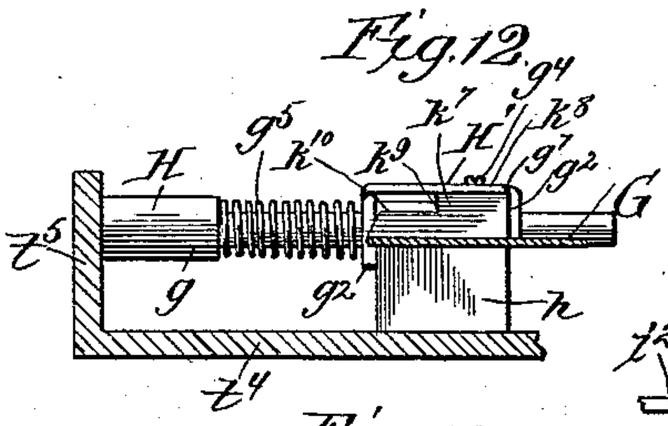


Fig. 15.

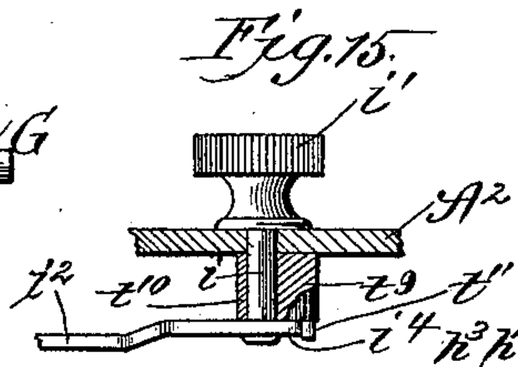


Fig. 16.

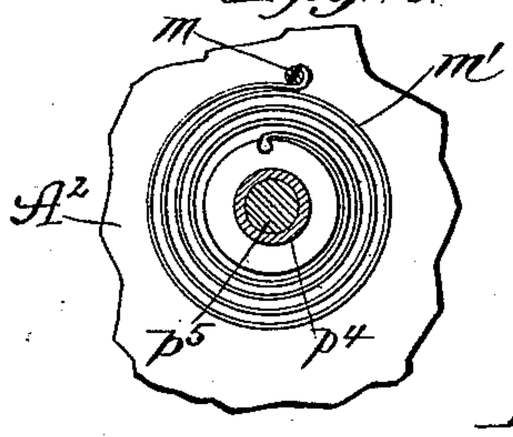
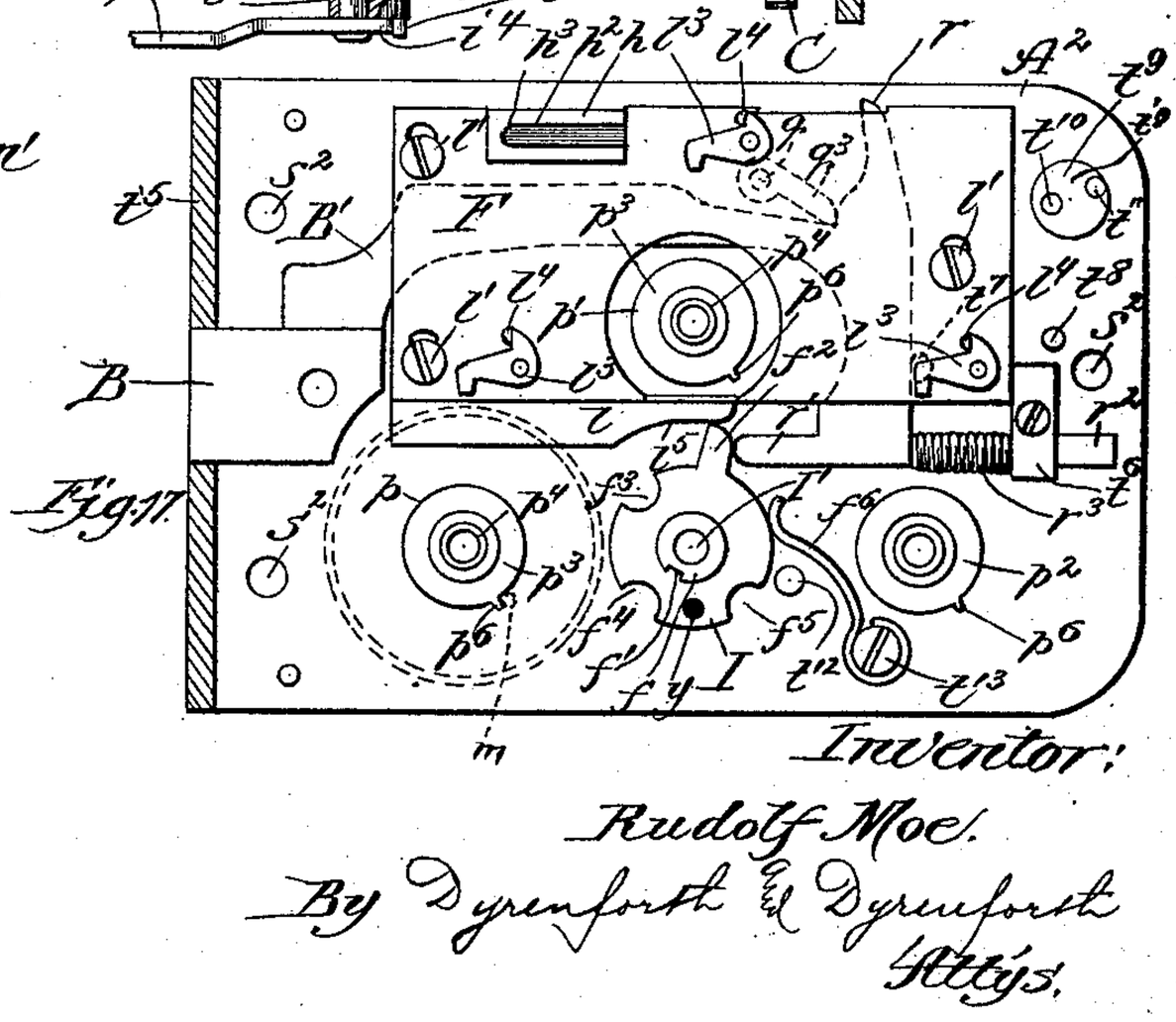


Fig. 17.



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Attys.

UNITED STATES PATENT OFFICE.

RUDOLF MOE, OF CHICAGO, ILLINOIS.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 539,818, dated May 28, 1895.

Application filed May 23, 1894. Serial No. 512,205. (No model.)

To all whom it may concern:

Be it known that I, RUDOLF MOE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Permutation-Locks, of which the following is a specification.

My object is to provide a combination lock of improved construction the moving parts of which are actuated through the medium of a push-button to which access may be had by the operator.

In the drawings, Figure 1 is a perspective view of my improved lock fastened upon the inner side of a door, the door being shown in broken perspective; Fig. 2, a perspective view of a catch or keeper for my improved lock fastened upon a door-jamb; Fig. 3, a broken perspective view of a door, showing the push-button mechanism for operating the lock, which latter is shown on the opposite side of the door; Fig. 4, a view in elevation of the inner side of the lock-casing with the back plate, which carries the moving parts, removed; Fig. 5, an enlarged section taken on line 5 of Fig. 4 and showing the push-button-operating mechanism for the lock; Figs. 6 and 7, detail perspective views of parts of the said push-button mechanism; Fig. 8, a view in elevation of the moving parts in the back plate of the lock, the view being taken from the inner side or side next the door in Fig. 1; Fig. 9, a view partly in section and partly in elevation, the section being taken in the vertical plane longitudinally of the lock; Fig. 10, a view substantially the same as Fig. 8, but with details removed to expose parts which are hidden in Fig. 8; Fig. 11, a broken section taken on line 11 of Fig. 10 and viewed in the direction of the arrow; Fig. 12, a view the same as Fig. 11, but showing the moving parts in another position; Fig. 13, a broken section on line 13 of Fig. 11; Fig. 14, a section on line 14 of Fig. 9; Fig. 15, a broken section on line 15 of Fig. 8; Fig. 16, a broken section on line 16 of Fig. 14; Fig. 17, a vertical longitudinal section through the lock, certain parts being indicated by dotted lines; and Fig. 18, a broken perspective view of a disk.

A is the casing of the lock and is made preferably in two parts A′ and A^2. The part A′ consists of the front-plate t, the top-plate or flange t', the bottom-plate or flange t^2 and end t^3; and the part A^2 consists of the back-plate t^4 and face-plate t^5. The front plate t is provided with openings for screws x, by means of which the part A′ may be fastened to the surface of a door; and on the front-plate t are lugs s, provided in their ends with screw-sockets s', the lugs extending to the plane of the edges of the flanges or sides t' t^2 t^3. The part A^2 fits over the part A′, resting at the inner edge-portion of the part t^4 against the sides t' t^2 t^3, and extending at its face-portion t^5 across the front end of the part A′. In the back-plate t^4, are screw-openings s^2, which, when the part A^2 is in place, register with the screw-sockets s' in the lugs s, and screws x' are passed through the openings s^2 into the screw-sockets s' to fasten the parts of the casing securely together. The casing thus completely houses the moving parts of the lock.

B is the bolt which works through the bolt-opening in the face-plate t^5. Integral, or substantially integral, with the bolt B is a sliding bolt-frame or plate B′, of the form shown most plainly in Fig. 9, which moves upon the surface of the back-plate t^4, and is provided with an upward projecting arm r at the top, a forward projecting finger r' toward its lower rear portion, and a backward extending pin r^2 at its lower rear end, which extend and work through an opening in a block t^6 on the back-plate. Surrounding the pin-portion r^2, and confined between the block t^6 and rear end of the plate B′, is a spring r^3, the tendency of which is to press the plate B′ in the direction of the face-plate t^5 and advance or shoot the bolt B. Extending through the back-plate t^4, and journaled therein is a short shaft q, formed on the outer side of the casing with a head q', provided with a crank-pin or handle q^2. Inside the casing adjacent to the surface of the back-plate the shaft q carries a cam-finger q^3 which works against the edge surface of the arm r on the plate B′. By turning the shaft q, the cam q^3 may be turned against the arm r, and force it with the plate B′ and bolt B in the backward direction against the resistance of the spring r^3, to retract the bolt B. Formed upon the back-plate t^4 is a lug t^7 which limits the movement of the plate B′ in the backward direction; and the movement of the plate in the

forward direction is limited by its contact with the inner surface of the face-plate t^5.

On the back-plate t^4, and formed integral therewith, are socket-lugs p p' p^2. Each socket-lug has a base-portion presenting an annular face p^3, and an annular projecting-portion p^4 affording a shaft. Loose upon the shafts p^4 of the socket-lugs are disks C D and E, respectively, having serrated circumferential edges. On the face of each disk C D and E is a flat sided ring n presenting a segmental opening through it n', and a notch or socket n^2 in its edge. The ring in each instance surrounds the shaft p^4, and is adjustably fastened against the disk by a set-screw n^3. The disks and their accompanying rings n are confined upon the shafts p^4 by means of screws p^5 which engage the threaded sockets of the socket-lugs. At the edge of each socket-lug is a stop p^6, and on each disk is a pin m. The stops p^6 are in the paths of the pins m of the respective disks, and fastened at one end to the pins m of the disks, and at their opposite ends to the socket-pieces are helical springs m', which tend to turn the disks on the shafts p^4 until their pins m engage the stops p^6. When the pins of the disks thus engage the stops p^6, the disks are in their normal positions.

F is a vertically-sliding frame or plate which overrides the plate B′ and has flanged edge-portions l, which slide upon the surface of the back-plate t^4. The plate F is held in place by means of screws l' which pass through vertically elongated openings in the said plate into short, threaded socket-lugs l^2 on the back-plate. The plate F may slide up and down a distance limited by the length of the slots through which the screws pass, as described, and it carries pivotal dogs l^3, which when the plate is lowered engage the teeth of the disks C D and E. The downward play of the dogs is limited by stops l^4 on the plate F, and when the plate F is raised, as indicated in Fig. 17, the dogs are disengaged from the said disks. The lower flange-portion l of the plate F is cut away to form a cam-edge l^5 in the position indicated.

G is a tumbler or tumbler-plate most plainly illustrated in Fig. 8, and provided with notch-engaging stumps k k' k^2, respectively; a backward-extending part k^3 with a cam-edge at its under side, and a straight surface or lower step k^4 at its upper edge; a stop k^5 and an upper step k^6 in the positions shown; and a laterally-extending flange-portion k^7 which extends at right-angles to the surface of the plate, and presents an outer straight surface k^8, a stop or shoulder k^9, and an inner straight surface k^{10}. See, for example, Figs. 11 and 12. At its forward end the tumbler-plate is pivotally connected by means of a screw k^{11} with the bolt B. When the notches in the rings n of the disks are out of register with the stumps k k' k^2, and the bolt is shot, the tumbler-plate rests at its stumps upon the rings n; while when the notches n^2 register with the stumps the tumbler-plate drops at its stumps into the said notches. On the back-plate t^4 in the position shown is a stud t^8, which, when the bolt is shot, and the tumbler-plate is in its forward position, is just beyond the end of the cam k^3. In the movement of the bolt and tumbler-plate in the backward direction the lower edge of the cam k^3 slides upon the stud t^8. On the back-plate t^4 is a lug t^9, and extending through the lug and back-plate, is a bearing-opening t^{10}. Journaled in the bearing-opening t^{10} is a pin or shaft i provided on the outer side of the back-plate with a thumb-piece or handle i', and at its inner end with an arm or catch-piece i^2 formed with a shoulder i^3. At the rear end of the catch-piece i^2 is a projection i^4, and on the lug t^9 is a pin or stop t^{11} in the path of the projection i^4, which limits the downward swinging of the catch-piece i^2. When the bolt is retracted the catch-piece i^2 rests upon the step or surface k^6 of the tumbler-plate, and when the bolt is shot the catch i^2 rests upon the step k^4, and, unless swung out of the way by turning of the thumb-piece i', its shoulder i^3 will extend in the path of the shoulder k^5 and prevent the retracting of the bolt. On the back-plate t^4 in the relative positions shown, for example in Figs. 9 and 13, is a lug h, provided with a longitudinally extending opening h' through it, and an elongated slot h^2 in its upper side, which intersects the opening h', and extends somewhat short of the forward edge of the lug h, to afford a stop h^3.

H is a plunger-rod having a head-portion g, which moves through an opening in the face-plate t^5, and a reduced shank-portion g', which extends through the opening h' in the lug h.

H′ is a swinging catch-plate having flanged and perforated end-portions g^2 g^2, which extend down the opposite end-portions of the lug h. The perforations in the ends g^2 receive the shank-portion g' of the plunger at opposite ends of the lug, and the catch-plate is thus held pivotally in place. In the catch-plate is a cam-slot g^3; and extending through the said cam-slot and slot h^2 is a pin or screw g^4 fastened rigidly to the shank-portion of the plunger. Surrounding the shank-portion of the plunger, and confined between the head thereof and the lug h, is a spring g^5, which tends to force the plunger forward to the position shown in Fig. 11, wherein the pin g^4 engages the stop h^3 and is at the forward end of the cam-slot g^3. The catch-plate is formed at its lower edge portion with a projecting longitudinally extending lip g^6, terminating at the rear end in a shoulder or stop g^7. When the bolt is shot the catch-plate rests at its lip-portion upon the surface k^8 of the flange of the tumbler-plate G, and when the bolt and tumbler-plate are retracted, the engagement of the pin or screw g^4 with the slanting end of the cam-slot g^3, under the action of the spring g^5, which presses the plunger forward, forces the lip-portion to the surface k^{10} of the

said flange, whereby the shoulder or stop g^7 of the catch-plate engages the shoulder or stop k^9 of the flange, and prevents the shooting of the bolt under the action of the spring r^3. When the bolt and plunger are thus locked by the catch-plate H′ in their retracted position, inward pressure exerted against the outer end of the plunger H, forces the pin g^4 along the inclined edge of the cam-slot g^3, and swings the catch-plate out of engagement with the shoulder k^9 of the plunger-plate, whereby the latter is released and the bolt will be shot by its spring r^3.

I is a turn-piece or plate mounted upon a screw I′ which passes through the back-plate and fastens the turn-piece pivotally in place against the back-plate. At the center of the turn-piece is a socket f into which projects a short tongue f'. The turn-piece is disk-shaped and provided with a radial cam-projection f^2. In the relative positions shown are peripheral sockets f^3 f^4 and f^5. Projecting from the back-plate, and in the path of the cam-projection f^2, in the relative position shown, is a pin or stop t^{12}. Fastened at one end by means of a screw t^{13} to the back-plate t^4, is a finger-spring f^6, which rides upon the circumferential surface of the turn-piece I, and engages the sockets f^3 f^4 and f^5.

Countersunk in the outer face of the door, and fastened in place by screws, is a cup or socket-plate K, which may be provided, as shown, with a swinging cover K′. In the socket-plate K is a central opening or perforation e, and extending through the body of the door, and journaled in the opening e at one side, and in an opening e' in the front-plate t of the lock-casing, is a sleeve-shaft d, fastened in place by a nut d', which moves upon the inner surface of the front-plate t. Integral with the sleeve in the socket of the socket-plate is an operating-knob or handle K^2. In the inner end portion of the sleeve d is a cam-slot e^2. The inner end of the sleeve fits into the socket f of the turn-piece I, the end of the cam-slot e^2 fitting over and engaging the tongue f', whereby turning of the sleeve d turns the turn-piece I. Extending through the sleeve d is a plunger-rod c having a reduced inner end-portion c', around the base of which it presents a shoulder c^2. Over the outer end of the plunger c is a cap-piece or push-button c^3, which moves in the opening of the knob K^2, and is held in place by means of a screw d^2, which passes through the rim of the knob into an elongated slot c^4 in the cap-piece. Surrounding the reduced portion c' of the plunger-rod, and confined between the shoulder c^2 and the base of the socket f, is a spring c^5, which tends to press the plunger and its cap-piece c^3 outward. Pressure exerted against the cap-piece moves the plunger inward against the resistance of the spring c^5. On the inner end-portion of the plunger c is an arm c^6, which extends through the cam-slot e^2 in the sleeve, and carries on the outer side of the sleeve a head or block c^7 formed with a tongue or pawl c^8. When the plunger or push-button is forced inward, by pressure exerted against the cap c^3, the arm c^6 slides in the cam-slot c^2, whereby the plunger is moved on its axis a partial revolution, thus giving to the pawl c^8 an inward and lateral movement.

When the knob K^2 is turned to the position which causes the projection f^2 to engage the stop t^{12}, and the spring f^6 to engage the peripheral socket f^3 in the turn-piece, the pawl c^8 is adjacent to the teeth of the disk C. Inward pressure exerted against the push-button moves the pawl c^8 into engagement with a tooth of the said disk, and as the arm c^6 slides in the cam-slot e^2, the pawl moves laterally the distance of one tooth of the disk until the end of the plunger c strikes the base of the socket f. Thus each time the push-button is pressed inward the pawl c^8 will engage and turn the disk C the distance of one notch. The dog l^3 at the disk C is lifted on its pivot in the positive movement of the disk under the action of the push-button as described, but resists turning of the disk in the reverse direction under the action of the spring m'. When the knob K^2 is turned part of a revolution from the position last described, the spring f^6 engages the socket f^4 in the turn-piece I, and the pawl c^8 is brought to a position adjacent to the teeth of the disk D. When in this position inward pressure upon the push-button causes the teeth of the disk D to be engaged by the pawl c^8, and the disk to be turned on its axis the distance of one tooth against the resistance of its spring m', and held against return under the action of its spring by the respective dog l^3. When the knob K^2 is turned to cause the socket f^5 of the turn-piece to be engaged by the spring f^6, the pawl c^8 is adjacent to the teeth of the disk E, and when the push-button is actuated, the latter disk will be turned on its axis the distance of one tooth with each operation, and held against return, under the action of its spring m', by the respective dog l^3.

When the tumbler-plate G rests at one or more of its stumps upon one or more of the rings n of the disks, and the catch i^2 is down, the shoulder or stop i^3 of the catch is in the path of the shoulder k^5 of the tumbler-plate. When the notches n^2 are caused to register with the stumps of the tumbler-plate, the latter drops on its pivot with its stumps into the notches, and the shoulder k^5 of the tumbler-plate extends in a plane below the stop i^3. Thus when the tumbler-plate is down, turning of the knob K^2, to cause the turn-piece I to move with its cam-projection f^2 against the projecting part r' of the sliding-plate B′, causes the said plate, bolt and tumbler-plate to be moved in the backward direction to retract the bolt. As the tumbler-plate moves in the backward direction, its cam-shaped end k^3 engages the stud t^8, whereby the tumbler-plate is lifted on its pivot. In this movement of the turn-piece the cam-projection f^2 also en-

gages the cam-edge l^5 of the sliding-plate F and lifts the latter until the pawls l^3 are carried out of engagement with the teeth of the disks. Therefore, when the tumbler-plate is raised in its backward movement by engagement of its cam with the stud t^8, and its stumps are lifted out of the notches n^2 of the disks, the disks are released and returned by their springs to their normal positions.

L is a catch or keeper for the lock fastened upon the door-jamb. It has an opening or socket b, into which the bolt is shot when the door is closed, and a cam-surface b' in the path of the plunger H. As before stated when the bolt is retracted the shoulder on the catch-plate H', engages the shoulder k^9 on the tumbler-plate and holds the bolt in its retracted position. In closing the door the plunger H is engaged by the cam b' of the keeper L, and forced inward, thereby turning the catch-plate H' out of engagement with the tumbler, and permitting the bolt to be shot by its spring into the opening b to lock the door.

In practice the combination of the lock may be changed when desired by removing the back-plate t, which carries the face-plate t^5, as before stated, and adjusting the rings n on the disks. The notch of the disk, which is in line with the arrow shown upon the ring n when the notch or socket n^2 registers with the respective stump of the tumbler while the disk is in normal position, being numbered "0," the next notch to the right in Fig. 8, numbered 1, and so on around each disk. The ring n of each disk is adjusted to change the combination by loosening the screw n^3, turning the ring on its axis, and then tightening the screw.

In Fig. 8 it will be seen that the arrow on the ring n of the disk C registers with mark No. 4 of the said disk, and this indicates that it will require four movements of the push-button to turn the disk C to cause the notch or socket n^2 thereon to register with the stump of the plunger. The arrow on the ring n of the disk D registers with mark No. 3 on the said disk, which indicates that it will require three movements of the disk under the action of the push-button to move the disk from its normal position to the position of registering at its notch n^2 with the respective stump of the tumbler; and at the disk E the arrow registers with mark No. 7, which will require seven movements of the push-button to move the disk from normal position to the position of registering at its notch n^2 with the respective stump of the tumbler. As set, therefore, the combination will be 4—3—7.

To operate the lock from the outside of the door to open the latter, the operator grasps the knob K^2 and turns it to the left until the stop-projection f^2 on the turn-piece strikes the stop t^{12}, as indicated in Fig. 9. The push-button mechanism is then in position to operate on the disk C. The operator presses the push-button four times which causes the disk to be moved from its normal position to that of registering at its notch n^2 with the tumbler-stump k. The operator then turns the knob K^2 to the right until the notch or socket f^4 is engaged by the spring f^6. This engagement can be readily felt by the operator. The push-button is then operated three times, which causes the disk D to be moved from its normal position to the position of registering at the notch n^2 with the tumbler-stump k'. The knob K^2 is then turned until the socket f^5 is engaged by the spring f^6 when the push-button mechanism will be in position to operate upon the disk E. The push-button is operated seven times, which carries the disk from its normal position to that of registering at its notch n^2 with the stump k^2. When this has been done the tumbler-plate G will drop with its stumps into the notches n^2 and will therefore be below the shoulder i^3 of the catch-piece. The knob K^2 is then turned still farther to the right to cause the cam-projection f^2 to engage the cam-edge l^5 of the plate F, and move the latter upward to disengage the dogs from the disks; and then to engage the part r' of the plate B' and force the latter, the bolt and the tumbler-plate to the position indicated in Fig. 17. The bolt is thus retracted and the door may be opened. The upward movement of the plate F, and backward movement, and consequent rise of the tumbler-plate through its engagement with the stud t^8, releases the disks, and they will be returned by their springs to normal position. It will be understood, of course, that the combinations may be changed as desired, the number of such changes being only limited by the law of permutation as applied to the three disks and number of teeth thereon.

In the lock illustrated over sixty thousand different combinations may be made.

The lock may be readily manipulated from the inside of the door. Thus by turning the thumb-piece i' the catch i^2 may be lifted out of the path of the tumbler-plate, permitting the bolt to be retracted by turning the handle q^2 to cause the finger q^3 to bear against the arm r. The bolt may be retained in its retracted position against being shot when the door is closed, through contact of the plunger H with the beveled surface b' of the keeper, by turning the handle q^2 to cause the finger q^3 to extend in the position shown by dotted lines in Fig. 17, whereby it engages the plate B' at the arm r.

On the upper edge of the tumbler-plate G is a projection k^{12}, and pivoted against the under surface of the top plate or flange t' of the casing is a latch a having a downward projecting lip a', and an upward projecting handle-portion a^2 which extends through a slot in the part t'. The latch a may be turned by the handle a^2 to extend at its lip a' in the path of the projection k^{12}. When the bolt is retracted and the catch a is turned the lip a' will extend in front of the projection k^{12} and prevent the tumbler-plate from moving in the

forward direction and the bolt from being shot. When the bolt is shot, and the catch a is turned it will extend at its lip a' behind the projection k^{12} and prevent the bolt from being retracted from the outside of the door by any one knowing the combination. This feature is desirable where the lock is employed upon house doors as a safeguard at night against the possibility of the lock being opened from the outside.

The cap-piece c^3 of the push-button mechanism is provided to relieve the plunger c from the friction of the finger of the operator which otherwise would tend to retard the turning of the plunger under engagement with the cam-slot e^2.

The disks being always returned to normal position when the bolt is retracted there is no danger of the door being locked and the tumbler mechanism left "open" to permit opening of the door by the mere turning of the knob K^2.

One of the notches between two of the teeth of each disk is plugged as shown in Fig. 18, whereby it cannot be engaged by the dog l^3, though the plug does not interfere with engagement of the notch by the pawl c^8 of the push-button mechanism. The plugged notch is in the relative position on the disk, which causes it to register with the dog l^3 when the disk has been turned against the resistance of its spring completely around to engage the stop p^6 with its pin m. When in this last position the dog l^3 is prevented from holding the disk so that the latter springs back again one notch. Thus if a disk is turned nearly a complete revolution and further efforts are made to turn it by means of the push-button, it will move under the action of the push-button, and spring back again; and while there will be no increased resistance against the operation of the push-button the disk will be turned no farther.

Let into the face of the turn-piece I in the position shown is a rubber cushion y; and on the collar d' of the sleeve d is a lug y' (see Fig. 4) through which extends a set-screw y^2 having a rubber tip y^3. In operation when the push-button is pressed inward the block or head c^7 carrying the pawl c^8 strikes the cushion y and when the push-button is returned by its spring the block c^7 strikes the cushion y^3. The operation of the push-button is thus rendered noiseless.

Although I have described a way of opening the lock by turning the push-button mechanism first to the disk C, then to the disk D and then to the disk E, this order is not necessary because the disks are operated independently of each other. Thus when the combination is set as described the door may be opened by turning first to the disk E, operating the push-button seven times; then to the disk C operating the push-button four times; then to the disk D operating the push-button three times. A person having the numbers of the combination without knowing the order of the turns to be given the knob would find great difficulty in manipulating the lock. If desired only two disks may be provided for simple locks. To still further increase the combinations more than three disks may be employed, the lock being increased in size for the purpose if desired.

While I prefer to construct my improvements as shown and described, they may be modified in the matter of details of construction without departing from the spirit of my invention as defined by the claims.

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

1. In a permutation lock, the combination with the bolt, bolt-moving means and tumbler, of separate moving parts which co-operate with the tumbler in locking the bolt against movement and in releasing it, comprising rotary pieces which when in one position cause such positioning of the tumbler as to release the bolt, and in other positions cause such positioning of the tumbler as to lock the bolt, a single push-button operating-mechanism for said moving parts, and shifting means for the push-button mechanism for moving the same into engaging position successively with the respective moving parts, substantially as described.

2. In a lock, the combination with the casing, of bolt locking and releasing mechanism, comprising tumbler-mechanism, two or more movable parts each having a depression for the tumbler mechanism to enter when the depressions register therewith, a single push-button operating mechanism for the said movable parts, and shifting means for the push-button mechanism for moving the push-button mechanism into engaging position successively with the respective movable parts, substantially as described.

3. In a lock, the combination with the casing, of tumbler-mechanism, two or more rotary disks having depressions to receive the tumbler mechanism when the depressions register therewith, and a single push-button turning-mechanism for the disks movable into engagement with the disks successively, substantially as described.

4. In a lock, the combination with the casing, of tumbler-mechanism, two or more rotary disks having depressions to receive the tumbler-mechanism when the depressions register therewith, and located in the arc of a circle, turning mechanism for the said disks located at the center of said arc and operated from without the casing, and means for turning the said operating mechanism into engagement successively with the respective disks, substantially as described.

5. In a lock, the combination with the casing, of tumbler-mechanism, two or more rotary disks provided with teeth and having depressions to receive the tumbler-mechanism when the depressions register therewith, the said disks being located in the casing in the arc of a circle, and push-button turning-

mechanism for the disks operative from without the casing, located at the center of said arc, and movable on its axis to engage the teeth of the said disks, respectively, substantially as described.

6. In a permutation lock, the combination with the casing, bolt and pivotal tumbler connected with the bolt, of two or more rotary disks provided with peripheral teeth, and adjustable socket pieces, the disks being movable to register at the sockets of their socket-pieces with the tumbler, and push-button turning-mechanism for the disks operative from without the casing, and movable into engagement with the teeth of the disks respectively, substantially as described.

7. In a permutation lock, the combination with the tumbler, of two or more rotary disks mounted in the arc of a circle and having peripheral teeth, a socket-piece adjustably attached to each disk to register at its socket with the tumbler in the turning of the disk, springs on the disks tending to hold them in certain initial or normal positions, turning-mechanism for the disks, operated from without the casing, and movable into engagement with the peripheral teeth of the disks respectively, to engage the said teeth and turn the disks against the resistance of their springs, a sliding frame carrying dogs which engage the peripheral teeth of the disks and hold the disks against return by their springs, the frame being movable to release the dogs from the disks, substantially as described.

8. In a permutation lock, the combination with the tumbler, of two or more rotary disks mounted in the arc of a circle and having peripheral teeth, a socket-piece adjustably attached to each disk to register at its socket with the tumbler in the turning of the disk, springs on the disks tending to hold them in certain initial or normal positions, push-button turning-mechanism for the disks, operated from without the casing, and movable into engagement with the peripheral teeth of the disks respectively, to engage the said teeth and turn the disks against the resistance of their springs, a sliding frame carrying dogs which engage the peripheral teeth of the disks and hold the disks against return by their springs, the frame being movable to release the dogs from the disks, substantially as described.

9. In a permutation lock, the combination with the tumbler, of two or more rotary disks having depressions to receive the tumbler when the depressions register therewith, and provided with peripheral teeth, and push-button turning-mechanism for the disks, comprising a sleeve d having a cam-socket d^2, a spring controlled plunger in the sleeve carrying a pawl projecting through said cam-slot, whereby inward pressure upon the plunger causes it to turn on its axis and move the pawl in a lateral direction, the sleeve being movable to move the pawl into engaging position with the teeth of the respective disks, substantially as described.

10. In a permutation lock, the combination with the tumbler, of two or more rotary disks having serrated edges and provided with adjustable socket-pieces which register with the plunger in the turning of the disks, the said disks being located in the arc of a circle, and push-button operating mechanism for the disks at the center of said arc, comprising a sleeve d having a cam e^2, a spring-controlled plunger mounted in the said sleeve and having a projection forming a pawl at said cam, whereby inward pressure against the plunger causes the projection to engage the cam and turn the plunger on its axis, and the sleeve being movable on its axis to carry the pawl into engaging position with the teeth of the respective disks, to operate substantially as described.

11. In a permutation lock, the combination with the bolt and tumbler, of a stop in the normal path of the tumbler, two or more rotary disks provided with adjustable depressions to receive the tumbler in the turning of the disks, whereby the tumbler is moved to one side of said stop, and having serrated edges, the disks being located in the arc of a circle, springs upon the disks tending to hold the latter in certain normal positions, a bolt-frame, a spring on the bolt-frame tending normally to move the latter to shoot the bolt, a stop r' on the bolt-frame, a sliding frame carrying dogs which normally engage the teeth of the disks and hold the latter against the action of their springs, a turn-piece at the center of said arc having peripheral sockets, and a projection f^2 to move the sliding-plate and bolt-frame, a spring f^6 at the said turn-piece engaging the notches in the latter, an operating handle for said turn-piece, and push-button turning-mechanism for the disks at the said handle and movable with the handle to occupy engaging positions with the teeth of the respective disks when the spring f^6 engages the respective notches of the turn-piece, the parts being constructed to operate substantially as described.

12. The combination with the lock casing, bolt, tumbler, disks having depressions to receive the tumbler in the turning of the disks, and operating mechanism for the disks, of a stop in the normal path of the tumbler, and out of the path of the tumbler when the latter enters the said depressions, a handle on the outer side of the lock casing and connected with the said stop for moving it out of the normal path of the tumbler, and bolt retracting mechanism connected with and operated by a handle on the outside of the casing, to retract the bolt when the said stop is out of the normal path of the tumbler, substantially as described.

13. The combination with the lock casing, bolt, tumbler, disks having depressions to receive the tumbler in the turning of the disks,

and operating mechanism for the disks, of a catch for holding the bolt against being shot when retracted, an operating plunger for releasing said catch projecting beyond the face-plate of the casing, and a keeper for the bolt having a cam-surface, whereby when the lock is upon a door, the keeper on the door-jamb and the bolt of the lock is retracted, closing of the door causes the said plunger to engage the cam on the keeper and be retracted to release the catch from the bolt, substantially as and for the purpose set forth.

RUDOLF MOE.

Witnesses:
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