No. 861,531. PATENTED JULY 30, 1907.

C. E. MORRIS.

PERMUTATION LOCK.

APPLICATION FILED MAY 11, 1906.

2 SHEETS—SHEET 1.

Fig. 8.

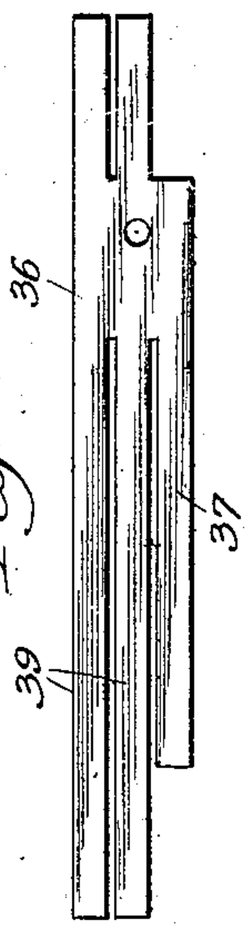


Fig. 2.

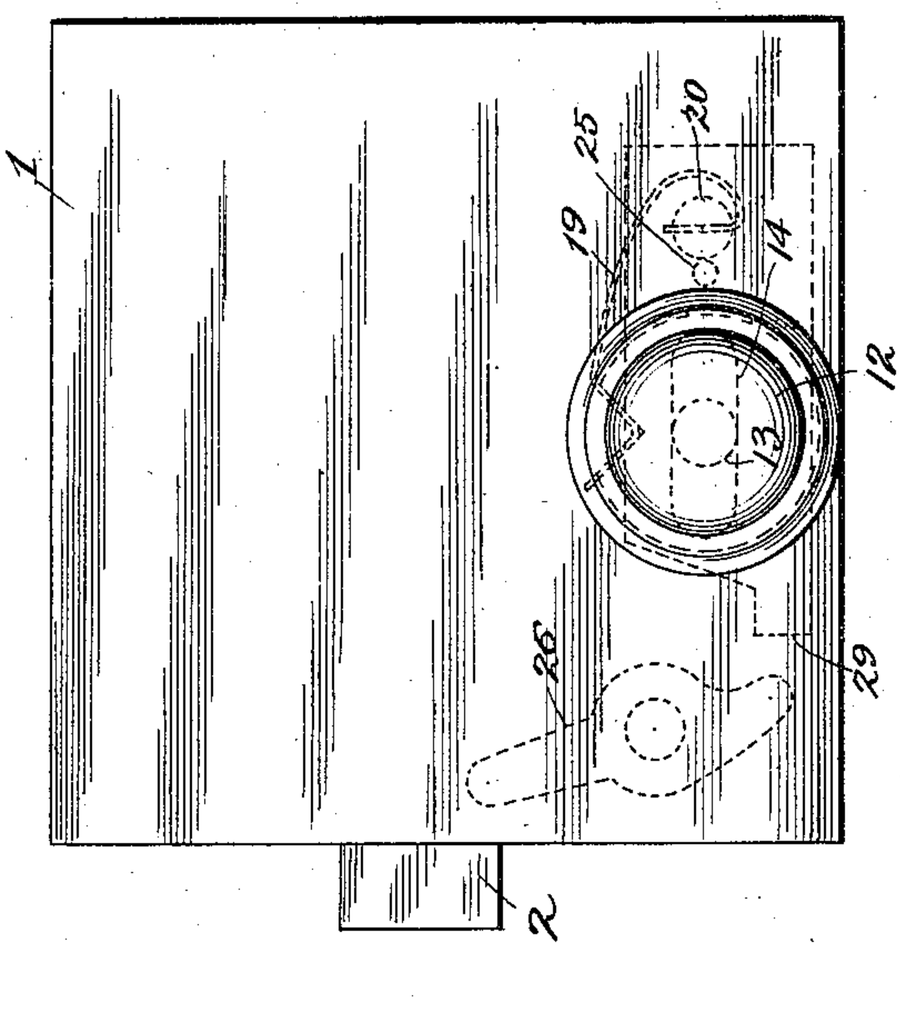


Fig. 7.

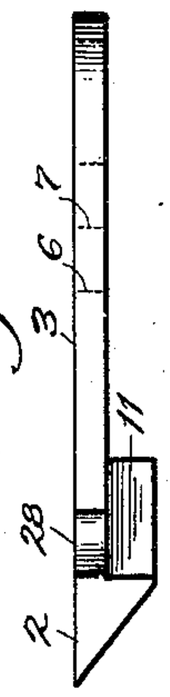
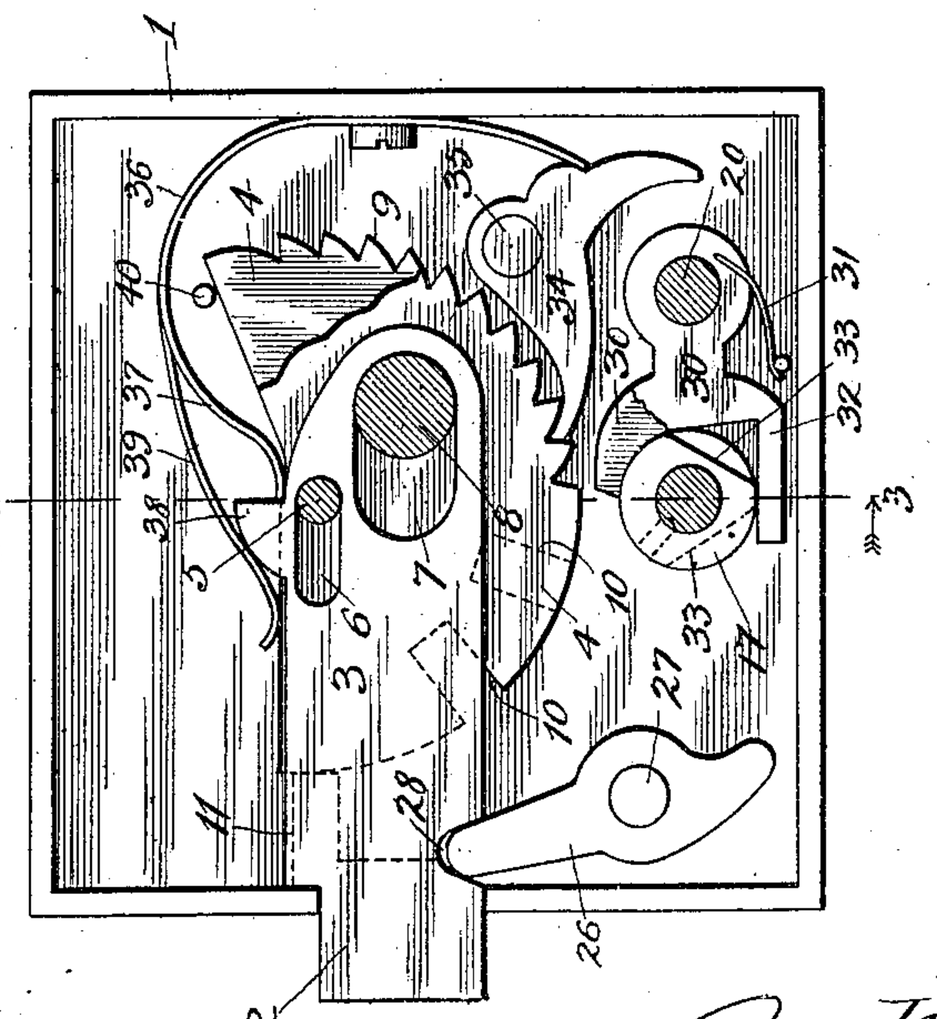


Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 6.

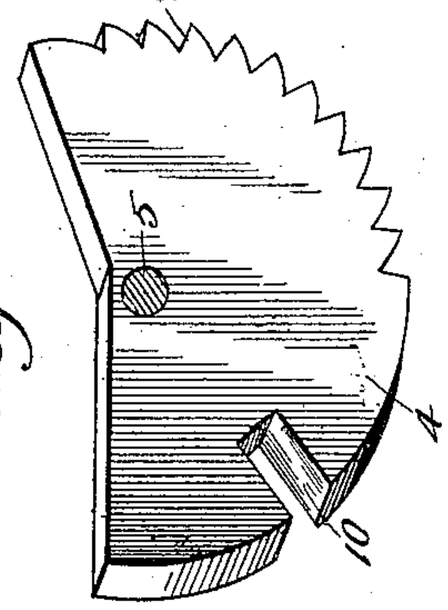


Fig. 4.

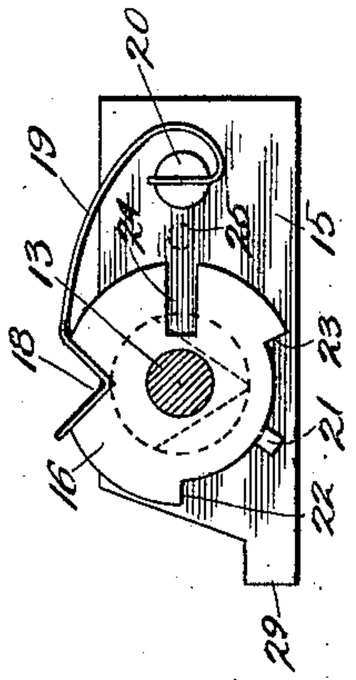


Fig. 5.

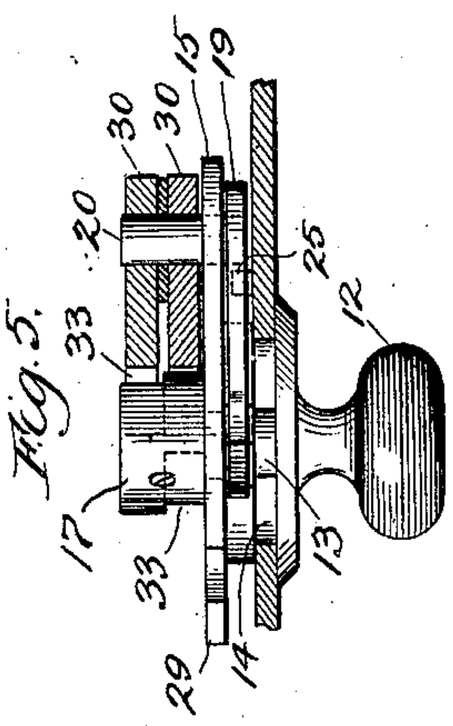
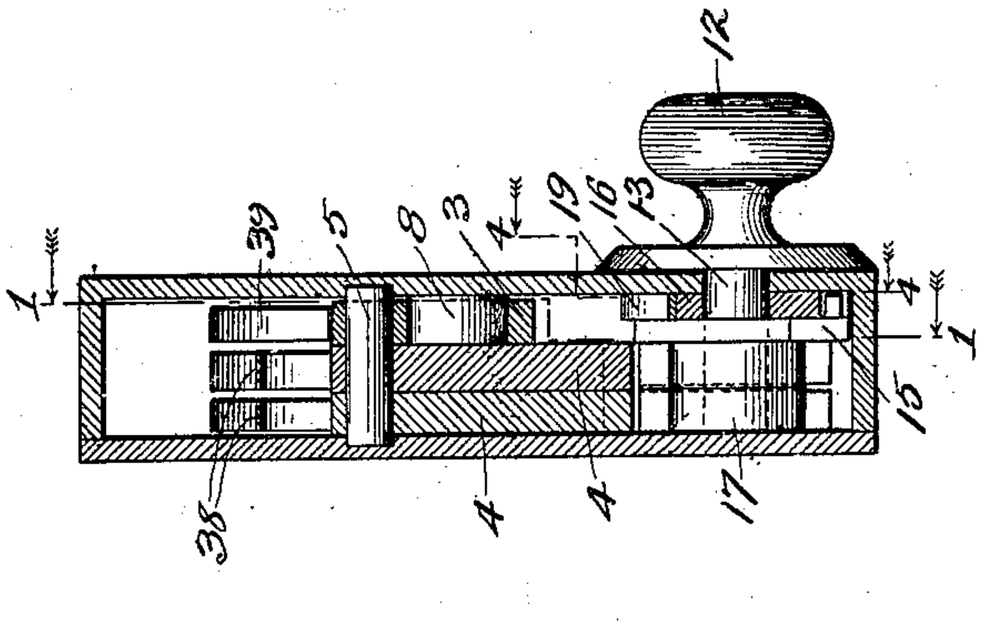


Fig. 3.



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UNITED STATES PATENT OFFICE.

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PERMUTATION-LOCK.

No. 861,531. Specification of Letters Patent. Patented July 30, 1907.

Application filed May 11, 1906. Serial No. 316,356.

To all whom it may concern:

Be it known that I, CHARLES E. MORRIS, a citizen of the United States of America, and a resident of Lane, in the county of Franklin and State of Kansas, have invented certain new and useful Improvements in Permutation-Locks, of which the following is a specification.

The main object of this invention is to provide an improved form of permutation lock especially suitable for use in post office boxes and other places where it is desirable to have a lock which may be readily operated without a key and without requiring the use of the eyes for reading a dial. In post offices, as a rule, many of the lock boxes are too high above the floor, or the light is too dim, or the box is so close to a corner that the usual forms of permutation locks would be unsuitable.

Further objects are to provide permutation lock mechanism in which the tumblers and locking bolt are all operated by the manipulation of a single handle; and to provide an improved form of tumbler operating mechanism whereby each tumbler may be separately moved and whereby all of the tumblers may by a simple movement be returned to their initial position.

These objects are accomplished by the device shown in the accompanying drawings, in which:

Figure 1 is a front elevation of a permutation lock constructed according to this invention, the front cover of the casing and the operating knob being removed, and some of the parts being partly broken away. Fig. 2 is a front elevation of the same with the cover and operating knob in place. Fig. 3 is a section on the line 3—3 of Fig. 1, the lines 1—1 and 4—4, indicating the planes of section from which Figs. 1 and 4 respectively, are viewed. Fig. 4 is a detail showing the slide and the detent collar 16 which controls the movement of the handle and which also indicates to the operator whether either of the pawls is in or out of operative position. Fig. 5 is a detail showing the relative arrangement of the sliding ratchet, operating member and the parts which are mounted thereon, the front cover of the casing being in section. Fig. 6 is a perspective view of one of the tumblers. Fig. 7 is a bottom plan of the latch bolt. Fig. 8 is a detail showing the form of blank from which the spring is formed.

In the construction shown in the drawings, the mechanism of the lock is mounted within a rectangular casing 1. The lock is provided with a sliding locking member or bolt 2 which has a beveled tongue extending through one side of the casing. The bolt has a flat shank 3. A pair of tumblers 4 are pivotally mounted in axial alinement with each other, being carried by a pin 5. The pin 5 also extends through the shank 3 of the bolt and said shank is slotted at 6 to permit the bolt to slide. The shank 3 is also slotted at 7 to receive a stud 8 which projects inward from the casing and serves as an additional guide to the movement of the bolt. One half of the periphery of each tumbler is smooth while the remaining half is provided with an annular series of ratchet teeth 9. The smooth part of each periphery is provided with a recess 10 and said recesses are differently placed in each tumbler. With the exception of the location of the recesses 10, the tumblers are alike and are interchangeable. The bolt 2 is provided with a shoulder 11 directly opposed to the smooth portions of the peripheries of both tumblers 4 and abutting thereon. Said shoulder is of suitable form to enter the recess 10 and permit the retracting of the bolt 2 when all of the recesses register with each other and with the shoulder on the pawl.

The operating knob 12 is mounted on the front of the casing and has a shank 13 extending through a slot 14 in the front of the casing. The shank 13 is journaled in a member which is slidably mounted in the casing. The shank 13 also has rigidly secured thereon two collars 16 and 17 which are located at respectively opposite sides of the plate 15. The collar 16 is provided with a notch 18 at one point of its periphery. A spring 19 carried by a fixed stud 20 on the member 15 is arranged to bear upon the periphery of the collar 16 and falls into the notch 18, when the parts are in the position shown in Fig. 4. A stop lug 21 on the member 15 engages the shoulders 22 and 23 on the collar and limits the rotation of the collar in each direction. The collar 16 is also provided with a recess 24 which is arranged to register with a lug 25 on the casing when the parts are in the position shown in Fig. 4. The position of the lug 25 is indicated by dotted lines in Fig. 4. The collar 16 is of such form that when the stop 21 is in engagement with either of the shoulders 22 or 23, the lug 25 will engage the periphery of the collar 16 and limit the movement of the member 15 toward the right of Fig. 4.

A lever 26 is pivotally mounted on a stud 27 in the casing and has one arm extending into a notch 28 in the bolt. A second arm of the lever 26 extends into position for engagement with a shoulder 29 on the member 15. The lever 26 limits the throw of the member 15 toward the left except in cases when both of the recesses 10 of the tumblers register with each other and with the shoulder 11 on the bolt. In this case a movement of the knob toward the extreme left will swing the lever 26 and retract the bolt 2.

The stud 20 on the member 15 extends entirely

through said member and has pivoted thereon at the rear of the member 15 a pair of pawls 30 which are normally urged into engagement with the ratchet teeth on the tumblers by means of springs 31. Each of the pawls 30 is provided with an arm 32 which rests upon the periphery of the collar 17. This collar is provided with two notches 33 each of which is located so as to receive the arm 32 of the respective pawl 30 when either shoulder 22 or 23 of the collar 16 is in engagement with the stop 21. A second set of pawls 34 is mounted on a stud 35 on the casing and each of said pawls is arranged to engage its respective tumbler and prevent the same from shifting in a backward direction.

A spring 36 serves the triple function of normally urging the bolt 2 outward of the lock, of urging the tumblers toward their initial position as shown by full lines in Fig. 1, and of urging the pawls 34 into engagement with the ratchet teeth 9. The upper portion of the spring 36 is split into three tongues. The tongue 37 engages a shoulder 38 on the bolt 2 and each of the tongues 39 bears upon the upper edge of one of the tumblers and urges the same toward its initial position. The lower part of the spring 36 is split into two tongues, one for each pawl 34. A stop lug 40 on the casing limits the movement of the tumblers under the action of the springs.

The operation of the device shown is as follows: The knob 12 is first turned to the middle position which is indicated to the operator by the entrance of the spring 19 into the recess 18 on the collar 16. This is readily felt on account of the yielding resistance of the spring 19 to rotation of the knob in either direction and the tendency of the said spring to center the knob when the spring enters any part of the recess 18. This position of the knob insures that both of the pawls 30 are out of engagement with their respective tumblers. A movement of the knob 12 to the extreme right will now release the pawls 34 and permit the springs 39 to return both tumblers to their initial positions. The knob is then turned to the left as far as it will go, that is, until the shoulder 22 engages the stop 21 and prevents further rotation of the knob. This position of the knob brings one of the recesses 33 into position for receiving the arm 32 of the respective pawl 30 and permits said pawl to swing into operative engagement with its respective tumbler. The operator now presses the knob toward the right to insure that the pawl is in proper position for engaging the ratchet teeth on the tumbler and then he slides the knob to the left and back moving it as far as it will go in each direction. This forward and back shifting of the knob is repeated a certain definite number of times to bring the recess 10 into proper position to register with the shoulder 11. The knob is then rotated to the right as far as it will go thus throwing out the pawl 30 which has operated the first tumbler and permitting the second pawl 30 to engage its tumbler. The knob is again shifted toward the left and back while the operator counts the second number of his combination. After the recess 10 of the second tumbler is brought into position to register with that of the first tumbler and with the shoulder 11, the knob may be slid a still further distance to the left, causing the shoulder 29 of the member 15 to swing the lever 26 and withdraw the bolt.

The tongue 37 of the spring 36 normally urges the bolt 2 outward of the lock so that, when the knob is released, the bolt springs into locking position. The lock may now be operated as an ordinary spring lock, the bolt being retracted by sliding the knob 12 toward the left. When the operator wishes to throw the tumblers to their initial or locking position, he sets the knob to its middle position as shown by the full lines in the drawings and shifts the knob toward the right to withdraw the pawls 34 as has been hereinbefore described.

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

1. In a lock, the combination of a sliding bolt having thereon a shoulder, a plurality of pivotally mounted tumblers arranged in the path of said shoulder, each of said tumblers having therein a recess for receiving said shoulder to permit the shifting of the bolt, a series of ratchet teeth on each of said tumblers, a handle movably mounted near said tumblers, a plurality of pawls, one for each tumbler, each adapted to engage the teeth on its respective tumbler and shift the same through a certain movement of said handle, and means actuated by said handle for shifting said bolt when all of said recesses register with said shoulder.

2. In a lock, the combination of a plurality of tumblers pivotally mounted in axial alinement with each other and each having thereon an annular series of ratchet teeth, a member movably mounted near said tumblers and having thereon a plurality of pawls each respectively adapted to engage the teeth on one of said tumblers for shifting the same through the movement of said member, means for individually preventing the operation of said pawls, and means for imparting a reciprocating movement to said member for rotating said tumblers when engaged by their respective pawls.

3. In a lock, the combination of a movable part having thereon a shoulder, a pivoted tumbler mounted in the path of said shoulder and adapted to prevent a certain movement of said part, said tumbler being normally urged toward a certain angular position, a handle movably mounted at one side of said tumbler, a pawl carried by said handle, ratchet teeth on said tumbler arranged to be engaged by said pawl for shifting said tumbler through a certain movement of said handle, a second pawl engaging said ratchet teeth and adapted to hold said tumbler and prevent the return to said normal position, and means actuated by said handle for releasing both of said pawls to permit said tumbler to return to its normal position.

4. In a lock, the combination of a movable member having thereon a shoulder, a tumbler movably mounted in the path of said shoulder, and adapted to normally prevent a certain movement of said member, said tumbler having therein a recess adapted when brought into alinement with said shoulder through the shifting of said tumbler to permit such certain movement of said member, a series of ratchet teeth on said tumbler, a handle movably mounted near said tumbler, a pawl carried by said handle and normally urged into engagement with said ratchet teeth, said pawl being adapted to shift said tumbler in one direction through a reciprocating movement of said handle, said tumbler being normally urged to move in the opposite direction, a second pawl mounted near said tumbler and normally urged into engagement with said ratchet teeth and adapted to prevent such opposite movement of the tumbler, said handle being rotatable with respect to said first pawl and being adapted to shift said pawl out of engagement with said ratchet teeth when said handle is turned to a certain position.

5. In a lock, the combination of a casing, a movable member mounted therein, a series of tumblers adapted to normally prevent a certain movement of said member and to permit of such movement when set to certain relative positions, a handle arranged for shifting said tumblers relatively of each other, a stop on said casing, and a part on said handle adapted to engage said stop for limiting the movement of said handle, said part being adapted to be shifted away from said stop through the rotation of the

handle and permit of a greater range of movement thereof, and said handle being adapted to shift said member when moved through such greater range after said tumblers have been set for permitting such movement.

6. In a lock, the combination of a movable member having thereon a shoulder, a tumbler movably mounted in the path of said shoulder and adapted to normally prevent a certain movement of said member, said tumbler having therein a recess adapted when brought into alinement with said shoulder through the shifting of said tumbler to permit such certain movement of said member, said tumbler being normally urged to a certain normal position, a series of ratchet teeth on said tumbler, a handle movably mounted near said tumbler, a pawl carried by said handle and normally urged into engagement with said ratchet teeth, said pawl being adapted to shift said tumbler in one direction through a reciprocating movement of said handle, a second pawl mounted near said tumbler and normally urged into engagement with said ratchet teeth and adapted to prevent a return movement of the tumbler, said handle being rotatable with respect to said pawl, a stop on the casing, a part on said handle adapted to engage said stop to limit the movement of the handle, said part being adapted through the rotation of said handle to be shifted toward one side and permit a greater range of movement to said handle, and means for releasing said second pawl from said ratchet teeth to permit the tumbler to return to its normal position when said handle is shifted through such greater range of movement.

7. A lock comprising a series of tumblers, a handle having separate pawl and ratchet connection with each tumbler for individually shifting the same and adapted when rotated to different positions to successively throw the pawls into or out of mesh with their respective ratchets, and means for indicating to an operator when either of said pawls is free to operate its respective tumbler.

8. A lock comprising a series of tumblers, a handle having separate pawl and ratchet connection with each tumbler for individually shifting the same and adapted when rotated to different positions to successively throw the pawls into or out of mesh with their respective ratchets, a stop for limiting the rotation of said handle and adapted to indicate to the operator when said handle is in position to operate a certain one of said tumblers.

9. In a lock, the combination of a plurality of tumblers pivotally mounted in axial alinement with each other and each having thereon an annular series of ratchet teeth, a member slidably mounted at one side of said tumblers and having thereon a plurality of pawls corresponding to said tumblers and each normally urged into engagement with the teeth on its respective tumbler, means for shifting said member for rotating said tumblers, a part normally limiting the movement of said member in one direction, said part being adapted to be shifted to permit a certain increased movement to said member, and locking means adapted to be operated through such increased movement when said tumblers occupy certain relative positions.

10. In a lock, the combination of a series of tumblers rotatably mounted and each having thereon a series of ratchet teeth, a member movably mounted near said tumblers and having thereon a series of pawls each respectively adapted to engage the ratchet teeth on one of said tumblers, each being normally urged into engagement with its respective tumbler and adapted to rotate said tumbler through a backward and forward reciprocation of said member, a handle for moving said member, and means for individually holding said pawls out of operative position through a certain movement of said handle with respect to said member.

11. In a lock, the combination of a series of tumblers rotatably mounted and each having thereon a series of ratchet teeth, a member movably mounted near said tumblers and having thereon a series of pawls each respectively adapted to engage the ratchet teeth on one of said tumblers, each being normally urged into engagement with its respective tumbler and adapted to rotate said tumbler through a backward and forward reciprocation of said member, a handle rotatably mounted on said member and having means adapted to individually hold said pawls out of operative engagement with their respective tumblers when said handle is turned to certain respective angular positions on said member.

12. In a lock, the combination of a casing, a bolt mounted therein and movable into and out of locking position, a shoulder on said bolt, a tumbler pivotally mounted on said casing and having its periphery opposed to said shoulder to prevent the shifting of said bolt, said tumbler having a recess in its periphery adapted to permit the retracting of said bolt when said recess is in alinement with said shoulder, said tumbler being normally urged to a certain initial position with said recess out of alinement with said shoulder, an annular series of ratchet teeth on said tumbler, a member mounted to reciprocate in said casing and having thereon a pawl normally urged into engagement with said ratchet teeth and adapted to rotate said tumbler through the reciprocation of said member, a second pawl pivotally mounted in said casing and normally urged into engagement with said ratchet teeth and adapted to prevent said tumbler from returning to its initial position, said second pawl being adapted to be moved out of engagement with said ratchet teeth through a certain movement of said member.

13. In a lock, the combination of a casing, a bolt mounted therein and movable into and out of locking position, a shoulder on said bolt, a tumbler pivotally mounted on said casing and having its periphery opposed to said shoulder to prevent the shifting of said bolt, said tumbler having a recess in its periphery adapted to permit the retracting of said bolt when said recess is in alinement with said shoulder, said tumbler being normally urged to a certain initial position with said recess out of alinement with said shoulder, an annular series of ratchet teeth on said tumbler, a member mounted to reciprocate in said casing and having thereon a pawl normally urged into engagement with said ratchet teeth and adapted to rotate said tumbler through the reciprocation of said member, a second pawl pivotally mounted in said casing and normally urged into engagement with said ratchet teeth and adapted to prevent said tumbler from returning to its initial position, a handle for shifting said member, said handle being rotatable with respect to said first pawl, being adapted to shift said first pawl out of engagement with said tumbler through a certain rotation of said handle and being adapted to shift said second pawl out of engagement with the tumbler through a certain other movement of said handle.

14. In a lock, the combination of a sliding bolt having thereon a shoulder, a pair of tumblers pivotally mounted in axial alinement with each other and having their peripheries opposed to said shoulder for normally preventing the retracting of said bolt, each of said tumblers having a recess in its periphery adapted to receive said shoulder and permit the retracting of said bolt when said recesses register with each other and with said shoulder, an annular series of ratchet teeth on each of said tumblers, a member slidably mounted at one side of said tumblers and having pivotally mounted thereon a pair of pawls each respectively adapted to engage the ratchet teeth on one of said tumblers and being normally urged into such engagement, a handle rotatably mounted on said member and adapted when turned to certain respective positions to individually control the engagement of said pawls with their respective ratchets, a second set of pawls engaging the ratchet teeth on said tumblers and adapted to normally prevent the return of said tumblers to their initial position, a shoulder on said member adapted to engage the pawls of said second set and shift the same out of engagement with said tumblers through a certain movement of said member, and a lever pivotally mounted in the casing and adapted to retract said bolt when said lever is shifted through engagement with said member after said recesses are brought into registering position with said shoulder.

Signed at Lane Kans. this 7th day of May 1906.

CHARLES E. MORRIS.

Witnesses:
JOHN C. LOCH,
W. D. CALDWELL.