

(No Model.)

2 Sheets—Sheet 1.

J. B. PRICE.
CYLINDER LOCK.

No. 477,021.

Patented June 14, 1892.

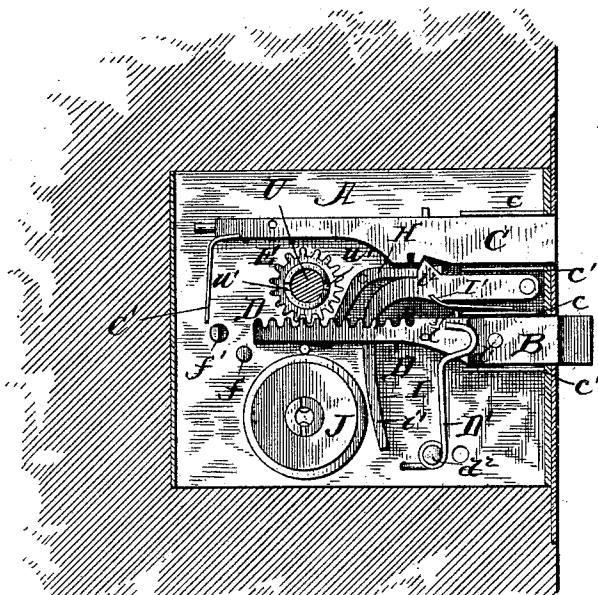


Fig. 1

Fig. 2.

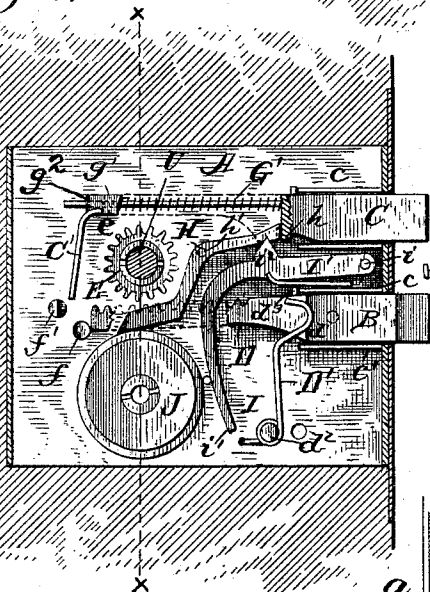


Fig. 4

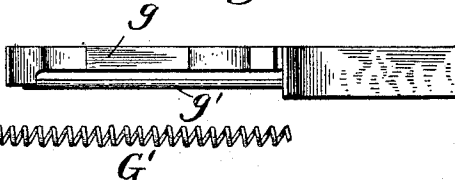
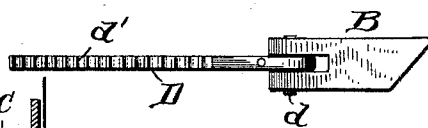


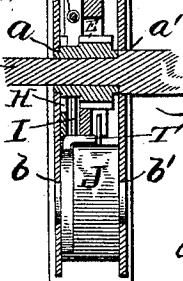
Fig. 5.



Witnesses:

J. B. McGinnis.
H. E. Berthoff

Fig. 3



Inventor:
John B. Price
By his Attorneys,
Edson Bros.

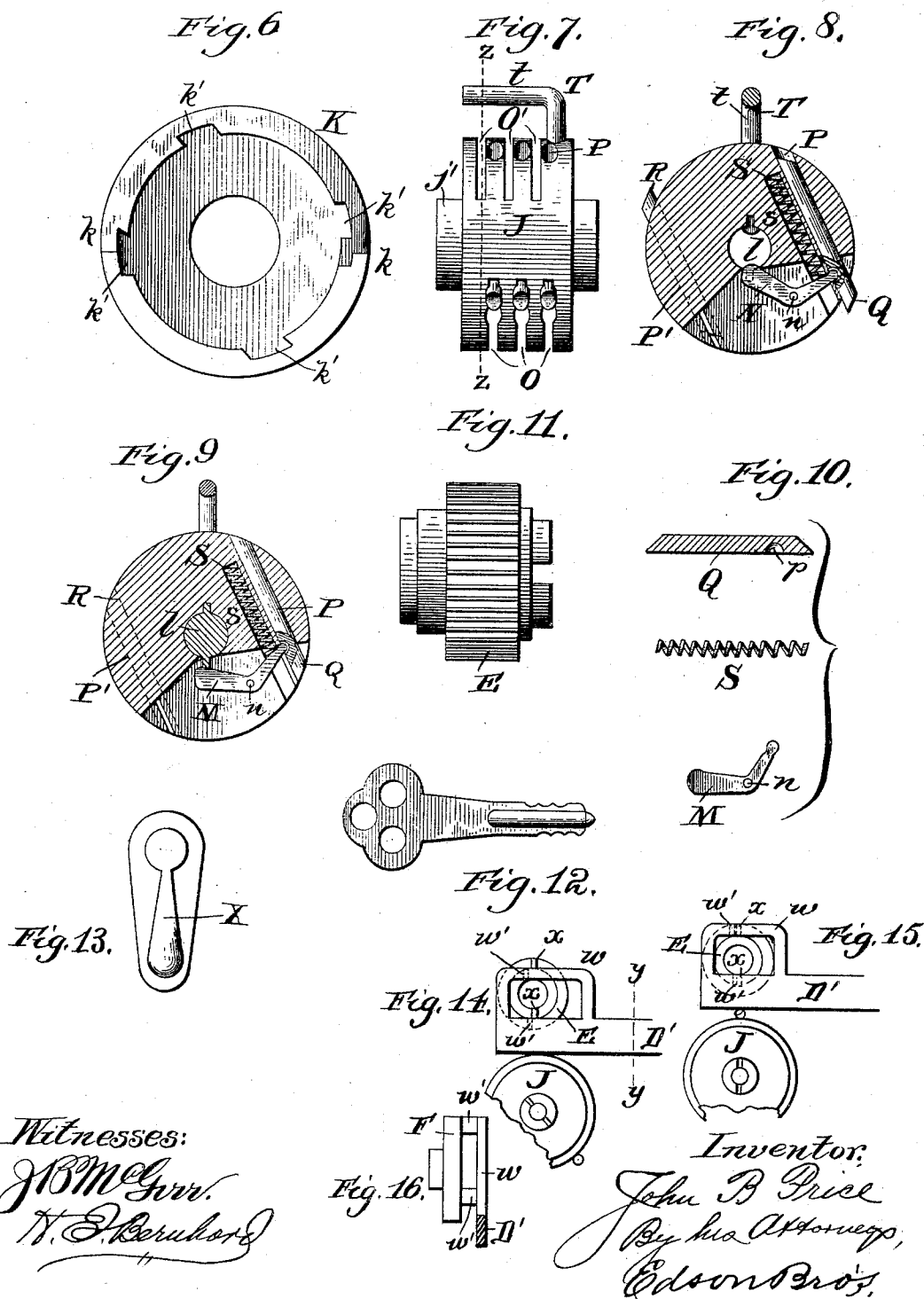
(No Model.)

2 Sheets—Sheet 2.

J. B. PRICE.
CYLINDER LOCK.

No. 477,021.

Patented June 14, 1892.



UNITED STATES PATENT OFFICE.

JOHN B. PRICE, OF WOLLASTON, MASSACHUSETTS.

CYLINDER-LOCK.

SPECIFICATION forming part of Letters Patent No. 477,021, dated June 14, 1892.

Application filed March 30, 1892. Serial No. 427,107. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. PRICE, a citizen of the United States, and a resident of Wollaston, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in a Combined Mortise Lock and Latch; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to a combined lock and latch in which the parts are so organized and arranged that neither the latch nor bolt can be manipulated or moved by turning the spindle when the bolt and latch are projected except by inserting a proper key in the revoluble barrel, which operates to release the bolt from its detaining devices and to throw or adjust the latch into engagement with the operating-spindle. The latch and the bolt when so released and adjusted are adapted to be simultaneously retracted by a simple turn of the operating-spindle, and when the spindle is released the latch is automatically projected or shot by its pressure-spring without reference to the position of the revoluble tumbler-locked barrel or plug.

The invention further consists in the novel combination of devices and peculiar construction and arrangement of parts, as will be hereinafter fully described and claimed.

The invention is fully illustrated in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is an elevation of the interior mechanism of the lock, showing the operating-spindle, the lock-casing, and a part of a door in section, the latch being projected. Fig. 2 is a somewhat similar view with part of the bolt and latch broken away to show the detents for preventing the bolt from being retracted, the latch and the bolt both being projected or shot. Fig. 3 is a vertical sectional view through the device on the plane indicated by the dotted line *xx* of Fig. 2, showing the cylinder of the tumbler-locked plug or barrel in elevation. Fig. 4 is a top view of the locking-bolt with the projecting-spring detached. Fig. 5 is a top view of the latch. Fig. 6 is a detail front view of the cylinder with the plug or barrel removed. Fig. 7 is a

side elevation of the revoluble plug or barrel, showing its releasing-arm and the ends of the tumblers. Fig. 8 is a sectional view through the plug or barrel on the line *zz* of Fig. 7, showing the pins or plungers projected, in which positions they normally remain to engage with the stationary cylinder and are adapted to be retracted by a key inserted into said barrel or plug. Fig. 9 is a sectional view of the plug or barrel with a key inserted therein and illustrating the plungers or pins retracted flush with the surface of the barrel or plug. Fig. 10 is a detail view of one of the plungers, the spring therefor, and the bell-crank tumbler. Fig. 11 is an enlarged side view of the hub of the operating-spindle adapted to engage with and retract the latch. Fig. 12 is a detail view of the key. Figs. 13, 14, 15, and 16 are views of a modified form of means for retracting the latch.

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

My improved lock relates more particularly to that class known as "mortise-locks," adapted to be fitted in a mortise formed in the door and to be secured thereto at the edge of the same by means of screws which pass through a face-plate of the lock-casing and into the door, suitable transverse holes being provided in the door for the operating-spindle and the key. The lock-casing *A* may be rectangular, square, or of any other suitable form, and in its walls are provided two pairs of aligned openings *a a'* and *b b'*, the former of which is adapted to receive the circular ends of the latch-retracting hub and the latter receiving the ends of the circular tumbler-locked barrel or plug, said parts being thus journaled or supported to rotate or turn in the lock-casing.

B is the latch, of the well-known bevel-nose variety, operating through a suitable opening in the face-plate of the lock-casing, and *C* is the locking-bolt, also operating through an opening in the face-plate of the lock-casing. The bolt and latch are guided to move in horizontal parallel lines or planes in the lock-casing by means of suitable rigid guides *c c'*, respectively, and the bolt is extended nearly across the lock-casing, while the latch is made quite short to accommodate a

gravity retracting-bar D, which is connected to said latch and is arranged to be operated by the rotating hub E of the knob-spindle and by the revoluble barrel or plug, as will be hereinafter fully described.

The forward end of the latch-retracting bar D is pivotally connected to the inner end of the latch, which is bifurcated to receive said bar, and through the latch and bar passes the pivot-pin d , as indicated in Fig. 5, and this bar or arm has projections or teeth thereon adapted to engage with similar projections or teeth on the spindle-operated hub E. One embodiment of this part of my invention consists in having the latch-retracting bar provided with rack-teeth d' , which mesh with gear-teeth e , formed on the periphery or surface of the hub E, so that by turning the hub and spindle the latch-retracting bar and the latch will be drawn inward into the lock-casing. The latch is normally projected beyond the lock-casing by means of a spring D', having one end thereof coiled around a fixed stud d^2 in the lock-casing, and the other end of said spring bears directly against the rear end of the latch, and the outward movement of the latch is limited by a stop-pin d^3 , which is rigid with the retracting-bar E and is adapted to take or bear against one of the fixed guides c for said latch.

The latch-retracting bar is adapted to drop by gravity out of engagement with the toothed hub E, and the pressure of the spring D' against the latch B causes the pin d^3 to strike against the guide c' , and thus tend to force the latch-bar downward, providing the lock is so arranged that the latch-bar cannot fall by gravity. The downward movement of the latch-bar is limited by the cylinder K, upon which the latch-bar rests when lowered, and said latch-bar is prevented from being moved or pushed inward when in such lowered position by a fixed stud f , which is arranged in the path of the latch-bar when it is lowered, and which also acts as a partial support for the latch-bar when it is engaged with the hub E. In rear of the stud f is another stud f' , adapted to limit the inward movement of the latch-bar and the bolt, and between the stop f' and the rear end of the latch-retracting bar is arranged a pendant C', which is rigid with and lies at right angles to the rear end of the locking-bolt, whereby the inward movement of the latch and its retracting-bar serves to retract the bolt C, and such inward movement of the bolt and latch is limited by the stop f' .

The locking-bolt is provided on one side with a longitudinal recess g , and in this recess extends a longitudinal guide-bolt g' , which is rigid with the bolt and fits in a fixed stud g^2 in the lock-casing, and around the guide-rod is coiled the projecting spring G', which bears at one end against the stud g^2 and at its other end against a shoulder of the bolt in order to project the latter when freed from the detents. The bolt is provided on its

lower side with a shoulder or ledge h , and the bolt is held against movement in either direction, as when projected and retracted by independently-acting detents H I, one of which detents H is adapted to take in rear of the shoulder h when the bolt is projected to prevent retrograde movement thereof, and the other detent I takes in front of the shoulder when the bolt is retracted to prevent the spring G' from impelling the bolt beyond the lock-casing. The detent H is in the form of a two armed lever, and is fulcrumed or pivoted at a point between its arms, (indicated by h'), and the upper arm of the detent projects above the fulcrum h' into the path of the shoulder h on the bolt while the other lower arm of the detent is in the path of the operating-piece on the revoluble plug or barrel, so that the detent is sustained by said barrel in position for the upper arm to take behind the shoulder h when the bolt is retracted, the revolution of the barrel or plug and its operating-piece serving to throw the detent H so that its upper arm will be depressed below the path of the shoulder h when the bolt is retracted. The other detent I has its front end pivoted in the lock-casing at i , and the rear end thereof is curved downward to form the curved pendant i' , which lies at one side of the barrel or plug and its operating-piece, and this detent is further provided with a prong or lip i^2 , which extends upwardly from the detent to take in front of the shoulder h when the bolt is retracted, the detent being lifted by a spring I', having one end secured to its lower side and its other end bearing on one of the fixed guides c of the latch. The spring normally elevates the detent I, so that the prong or lip i^2 thereof is in rear of the shoulder h on the bolt, and in retracting the bolt the barrel or plug is rotated to cause the operating-piece to throw the curved arm of the detent forward, which depresses the detent and withdraws the lip or prong from the shoulder to permit the bolt to be retracted, and when so retracted the spring lifts the detent to bring the lip or prong in advance of the shoulder and prevent the bolt from being projected.

I will now proceed to describe the preferred form of pin-locking mechanism for the revoluble barrel or plug J. This plug is made of a solid cylindrical piece of metal, and it is fitted snugly within a cylinder or shell K, which is rigidly held or secured between opposite sides or plates of the lock-casing. One end of the cylinder or shell is closed and the other end is open, and the edge of the open end of said shell is cut away to provide the two shoulders k , which serve to limit the play or movement of the operating-piece T, which is rigid with the axially-turning barrel or plug J. In the annular wall of this shell or cylinder, on the inner face thereof, is provided a series of transverse grooves or recesses k' to receive the ends of the plungers or pins when the latter are projected beyond the sur-

face of the plug or barrel. The closed end of the cylinder or shell has a central opening for the passage of one of the trunnions $j' j'$ on the end of the axially-turning barrel or plug. Through the center of the axially-turning plug and the trunnions thereof extends a key passage or way l , and in this passage fits the inner ends of two series of tumblers $M N$, each tumbler of each series being substantially the same in construction and arranged in the same way for operation.

On opposite sides of the plug or barrel are cut the series of tumbler-slots $O O'$, which extend radially from the key way or passage to and through the outer surface of the plug. The plug is further provided with tangential passages $P P'$, one series of which are on one side of the axis of the plug and the other series are on the other side of said axis, the tangential passages P opening into the approximate ends of the radial slots and the other series of tangential passages P' opening into the other approximate ends of said radial slots. In the passages P are fitted a series of plungers Q , which are adapted to be operated by the tumblers M , and in the other series of passages P' are another series of plungers R' , arranged and connected to the tumblers N for operation. Each plunger is adapted to move or slide freely in the tangential passage provided therefor in the plug, and it is of such length that the beveled ends thereof are adapted to lie flush with the face of the plug when retracted. On its inner side the plunger or pin has a socket or recess p , which receives one end of the tumbler, and this tumbler is pivoted or fulcrumed at the juncture of its angular arms, as at n . Against the end of the arm that is connected to the pin or plunger bears a pressure-spring S , which is seated in a socket s in the plug, and this spring serves normally to hold the tumbler in a position where one arm thereof forces one end of the plunger beyond the plug or barrel, and the other arm of the tumbler is projected into the central key passage or way. Normally all of the plungers are projected so that the protruding ends thereof take into the recesses or grooves in the fixed cylinder or shell to restrain the barrel from axial movement, while the free ends of the tumblers are projected into the key way or passage in the path of a key and adapted to be operated by the proper wards on the same to retract the plungers within the surface of the plug or barrel.

The axially-turning plug or barrel carries an L-shaped operating-piece T , which has its shank rigidly secured in the plug, and its head t arranged a short distance at one side of the plug parallel with the axis of the same. This operating-piece serves to release the detents from engagement with the bolt and to throw or elevate the gravity-latch-retracting bar into engagement with the spindle-operated hub.

U is the operating-spindle, which passes

through an axial passage in the hub E , and said spindle and hub are coupled or connected by means of lugs $u u$ on the spindle, which fit in the recesses or notches u' in the end of the hub.

This being the construction of my lock and latch, the operation may be briefly described as follows: When locked the latch and bolt are projected by their respective springs, the barrel or plug is turned so that its detent-releasing piece T is in the position indicated in Fig. 2, so that the same does not act on or influence the detents in the path of the releasing-piece T , the retracting-bar D being lowered out of engagement with the operating-hub, so that the latter and spindle can be turned freely without in any manner affecting the position of either the latch or bolt, and the plungers in the barrel or plug are projected into engagement with the stationary cylinder or shell. To release the bolt and retract the latter and latch, the proper key must be used and inserted into the key-passage in the barrel or plug, which acts on all the tumblers to retract the plungers, to free the barrel or plug from the shell, after which the barrel is turned part way around which causes the releasing-piece T to move the two detents $H I$ from the path of the bolt and lifts the retracting-bar D into engagement with the hub E . Now by turning the knob-spindle the hub is rotated to retract the latch and the rear end of the bar D strikes the pendant on the bolt, thus affecting the simultaneous withdrawal of the latch and bolt from engagement with the keepers, and when the bolt is retracted the detent I is lifted, so that the lip or prong thereon takes in front of the shoulder h of the bolt, thereby confining the latter in the lock-casing; but when the knob-spindle is released the latch is projected by its spring. With the barrel or plug in the position indicated in Fig. 1, the locking-bolt is confined in the casing and the spindle can be turned to move the latch without affecting the bolt, and to project the bolt it is only necessary to turn the key and barrel to the position shown in Fig. 2, whereby the releasing-piece acts on the arm of the detent I to withdraw the latter. The spring G' impels the bolt and the detent H again drops in rear of the shoulder h on the bolt to hold it in its projected position. It will be seen that when the bolt and latch are projected the spindle can be turned freely without in any way affecting either the bolt or latch, and thus obviate wrenching any of the parts of the lock by force applied to the knob-spindle, and that latch and bolt can be simultaneously withdrawn by simply turning the spindle after the barrel or plug has been turned, while only the latch is projected on releasing the spindle from pressure.

In Figs. 14, 15, and 16 of the drawings I show mechanism for actuating the latch by the spindle-operated hub without employing the rack-and-spur gear-teeth on the retract-

ing-bar and the hub. In this embodiment I provide the upper part of the retracting-bar at the inner end thereof with a yoke w , having two shoulders or nibs w' , and through this yoke passes a part of the hub E , which, in this instance, is provided with diametrically-located shoulders x . When the plug is turned to bring its releasing-piece out of contact with the gravity retracting-bar, the latter drops to a position where its shoulders w' are out of the path of the shoulders x on the hub and the spindle and hub can be turned freely in the lock; but when the plug is rotated to bring its releasing-piece into position to raise the free end of the retracting-bar the shoulders w' lie in the path of the shoulders on the hub, and by turning the latter and spindle the retracting-bar and its connected latch can be withdrawn. In the use of this means for moving the latch-retracting bar by the operating spindle and hub it is necessary to indicate to the operator when the latch-retracting bar is free from engagement with the hub E , and to do this I provide the spindle with a knob having an index upon same or a weighted handle X , as indicated in Fig. 13, which has sufficient weight to hang down in a vertical position when the spindle and knob are free from the latch-retracting bar.

It is evident that further modifications and changes in the form and proportion of parts can be made without departing from the spirit or sacrificing the advantages of my invention; and I therefore reserve the right to make such changes as fairly fall within the scope of my invention.

It will be understood that the latch can be turned or reversed, and thus adapt it for use on either right or left hand doors, it being only necessary to change the position of the latch in the lock, which can be accomplished without disarranging any of the operating parts.

What I claim as new is—

1. In a combined lock and latch, the combination, with a bolt and a latch, of an independent knob-spindle normally disconnected from the latch, a detent in engagement with the bolt, means movable with the latch and adapted to be engaged with the knob-spindle, and a key-actuated turning plug or barrel adapted to free the detent from the latch and adjust the latch-retracting means into engagement with the operating spindle, substantially as and for the purpose described.

2. In a combined lock and latch, the combination of a spring-propelled bolt, two independent detents arranged to engage respectively with said bolt when it is retracted and projected, a latch, an operating-spindle therefor, and a key-actuated turning plug or barrel adapted to release one detent from the bolt prior to retracting the same and to release the other detent when the bolt is projected, as and for the purpose described.

3. In a combined lock and latch, the combination, with an operating-spindle and a bolt,

of a latch having means normally disconnected from said spindle and a turning plug or barrel for adjusting the latch-retracting means into engagement with the operating-spindle, as and for the purpose described.

4. In a combined lock and latch, the combination of an operating-spindle, a latch having retracting means normally disconnected from the operating-spindle, an independent locking-bolt arranged to be retracted by the latch, and a key-operating turning plug or barrel for connecting the latch-retracting means to the operating-spindle, substantially as described.

5. In a combined lock and latch, the combination of an operating-spindle, a latch, a removable retracting-bar connected to said latch and having means to engage with the operating-spindle, a spring-projected bolt having a projection in the path of the latch to withdraw the bolt as the latch is retracted, a detent for the bolt, and a key-actuated turning-plug arranged to release the bolt-detent and move the latch-retracting bar into engagement with the operating-spindle, substantially as described.

6. In a combined lock and latch, the combination of an operating-spindle, a latch having retracting means disconnected from said spindle, a bolt adapted to be retracted by inward movement of the latch, two independent detents for respectively holding the bolt in its projected and retracted positions, and a key-actuated turning-plug arranged to release the two bolt-detents and adjust the latch-retracting means into engagement with the operating-spindle, as and for the purpose described.

7. In a combined lock and latch, the combination of an operating-spindle having a hub provided with projections, a latch, a retracting-bar pivoted to the latch and having means adapted to be adjusted into engagement with the projections on said spindle-hub, a key-actuated plug having a piece moving therewith to elevate the latch-retracting bar, and a locking-bolt, substantially as described.

8. In a combined lock and latch, the combination of a spring-projected locking-bolt, a gravity-detent adapted to engage said bolt when it is projected, a spring-controlled detent to engage the bolt when retracted, a key-actuated plug having a moving part to release both detents from the bolt, and a latch and its operating-spindle, substantially as described.

9. In a combined lock and latch, the combination of an operating-spindle, a latch, a key-actuated turning plug or barrel having a moving detent-releasing piece, a retracting gravity-bar pivoted to the latch and arranged in the path of the releasing-piece to be elevated thereby into engagement with the spindle, a locking-bolt in the path of the latch-retracting bar, and the independent bolt-detents, both arranged in the path of the releasing-piece on the turning barrel or plug, substantially as described.

10. The combination, with a fixed cylinder,

of an axially-turning plug having the tangential passages and the radial slots opening into said passages and a central key-passage, the endwise-movable plungers fitted in said passages, and the tumblers connected to said plungers and projecting into the key-passage, substantially as and for the purpose described.

11. The combination, with a fixed cylinder, of an axially-turning plug or barrel fitted therein and having the intersecting passages and slots, the pivoted tumblers arranged in the slots and each having one end extending into the key-passage, the plungers fitted in the tangential passages and having one end of the tumblers connected thereto, and the springs bearing on said tumblers, substantially as described.

12. The combination, with a fixed recessed

cylinder or shell, of a radially-slotted and longitudinally-perforated plug or barrel, the endwise-movable plungers fitted in tangential passages near the periphery of said plug, the pivoted angular tumblers, each having one arm connected to a plunger and its other arm arranged in the key passage or way, and a spring bearing on each tumbler between its fulcrum and the point of connection of the tumbler to the plunger, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN B. PRICE.

Witnesses:

CHAS. F. THAYER,
HENRY J. THAYER.