(Model.) 5 Sheets—Sheet 1.

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LOCK.

No. 461,780. Patented Oct. 20, 1891.

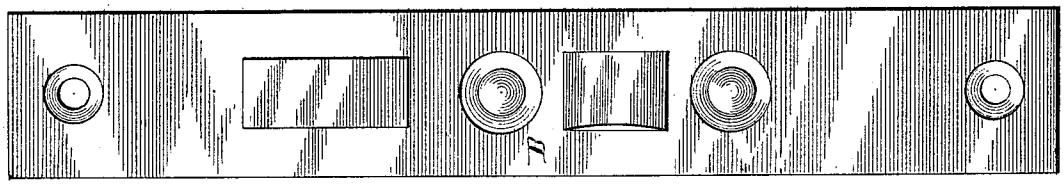

Fig. 3.

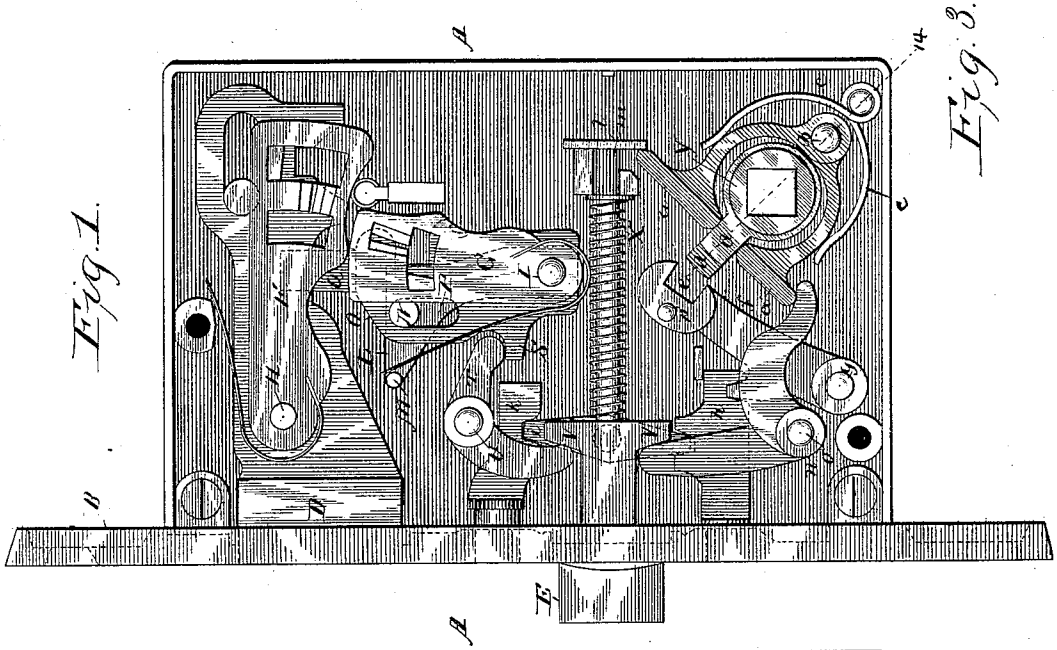

Fig. 1.

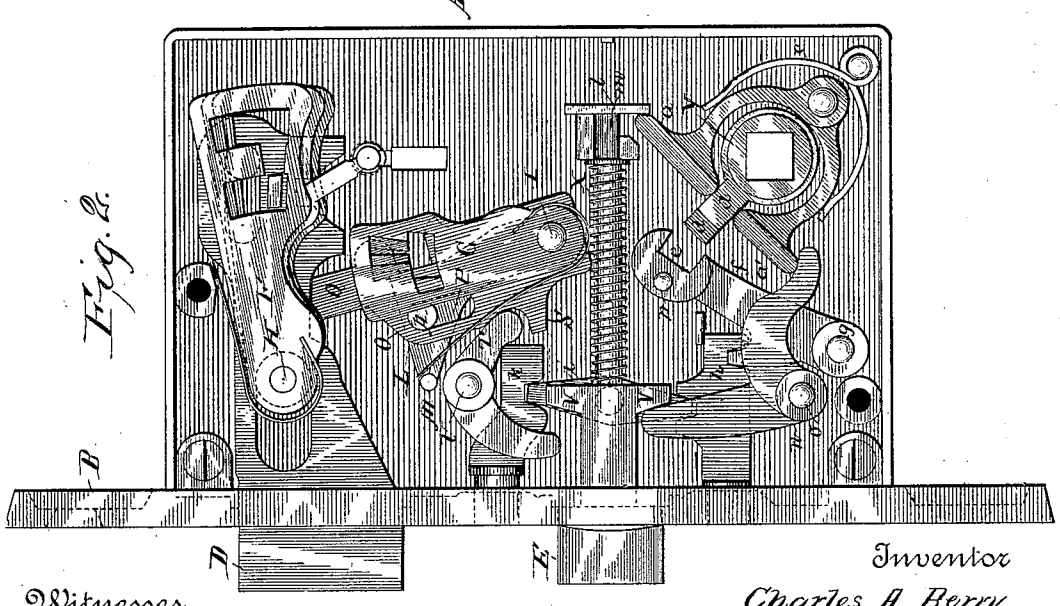

Fig. 2.

Witnesses
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C. P. Elwell.

Inventor
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Attorneys

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(Model.) 5 Sheets—Sheet 2.

C. A. BERRY.

LOCK.

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Fig. 4.

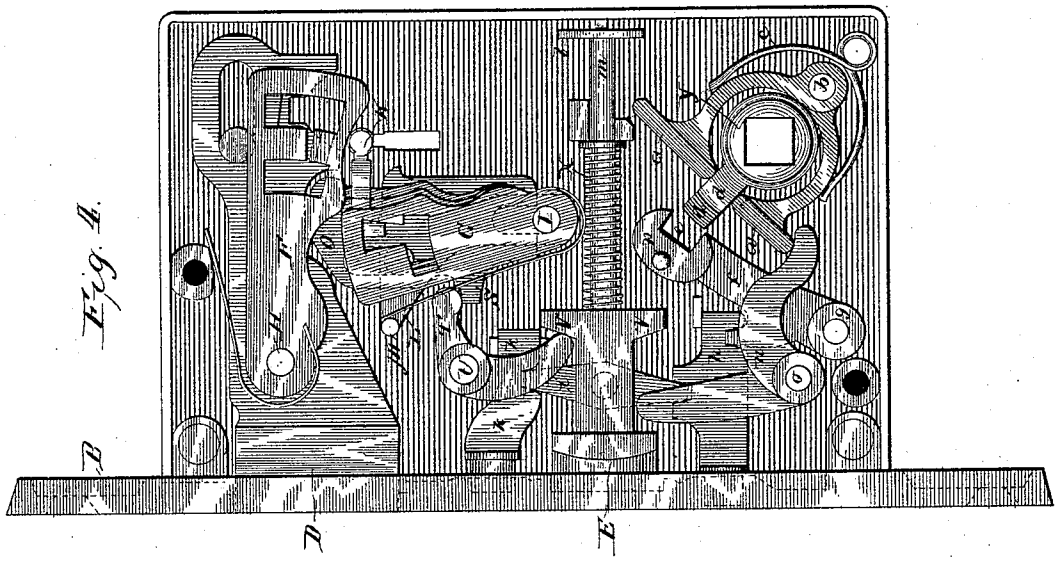


Fig. 5.

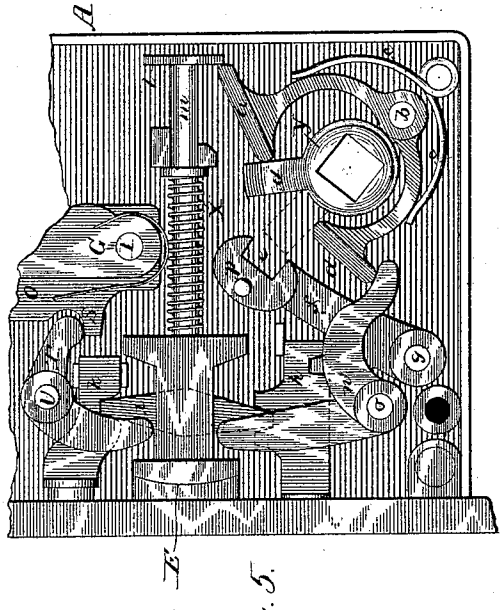
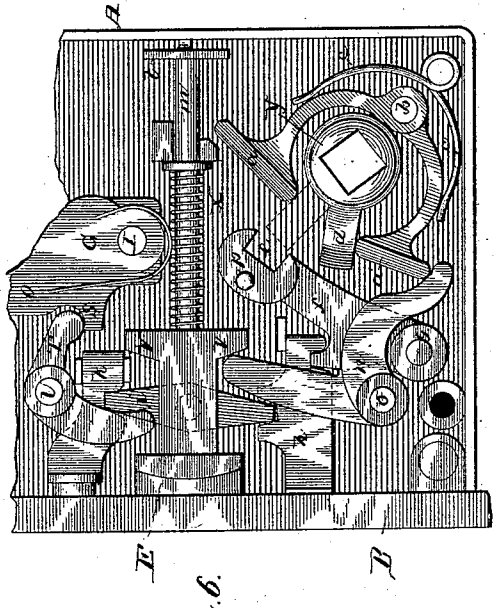


Fig. 6.



Witnesses
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C. P. Elwell.

Inventor
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(Model.)

5 Sheets—Sheet 3.

C. A. BERRY.

LOCK.

No. 461,780. Patented Oct. 20, 1891.

Fig. 7.

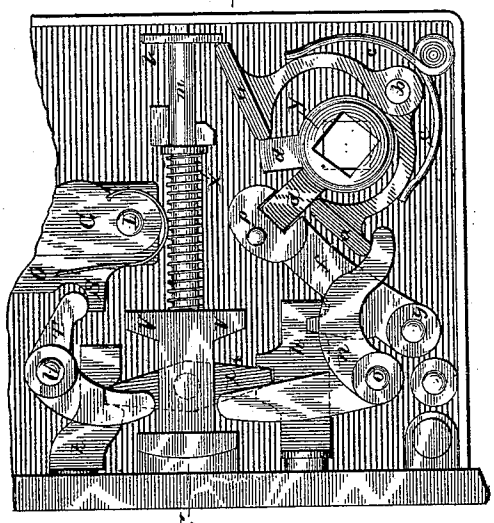
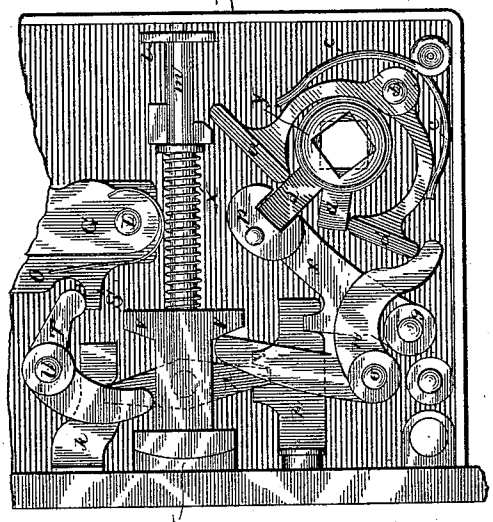


Fig. 8.



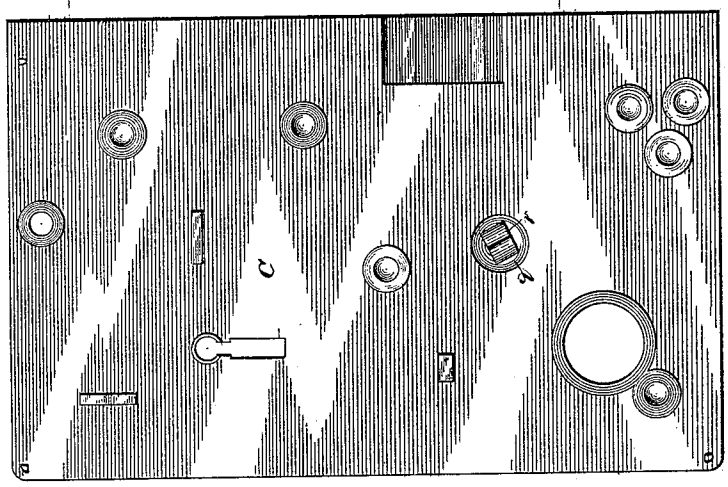


Fig. 9.

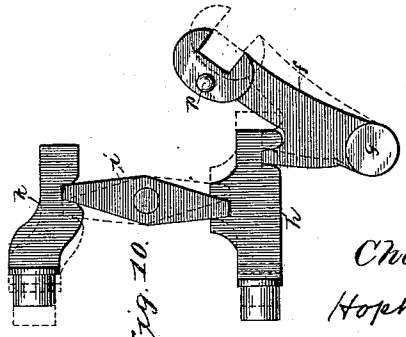


Fig. 10.

Witnesses
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C. A. BERRY.

LOCK.

No. 461,780. Patented Oct. 20, 1891.

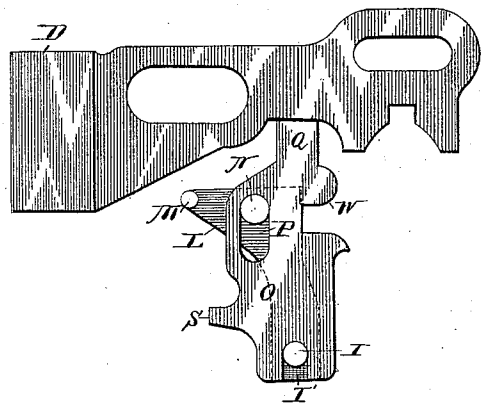

Fig. 11.

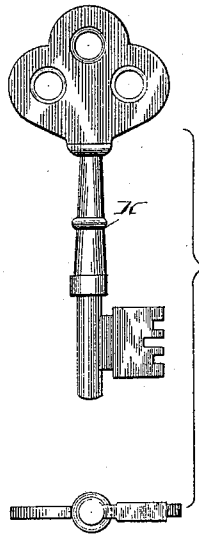

Fig. 12.

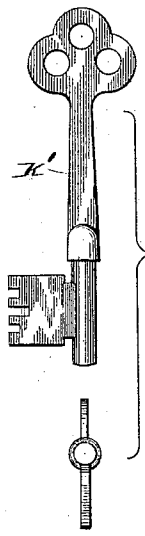

Fig. 13.

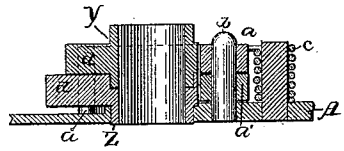

Fig. 14

Witnesses
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(Model.)

5 Sheets—Sheet 5.

C. A. BERRY.

LOCK.

No. 461,780. Patented Oct. 20, 1891.

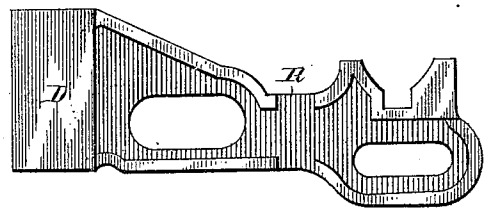


Fig. 15.

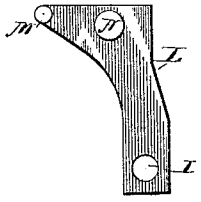


Fig. 16.

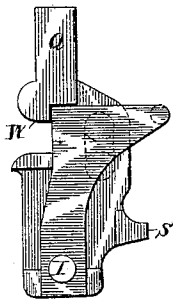


Fig. 18.

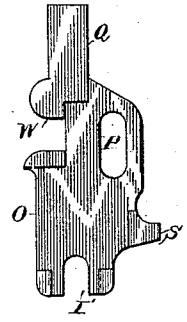
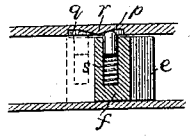


Fig. 17.

Fig. 19.



Witnesses
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C. P. Elwell.

Inventor
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Hopkins & Atkins.
Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES A. BERRY, OF STAMFORD, CONNECTICUT, ASSIGNOR TO THE YALE & TOWNE MANUFACTURING COMPANY, OF SAME PLACE.

LOCK.

SPECIFICATION forming part of Letters Patent No. 461,780, dated October 20, 1891.

Application filed August 18, 1890. Serial No. 362,283. (Model.)

To all whom it may concern:

Be it known that I, CHARLES A. BERRY, of Stamford, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Locks, of which the following is a specification, reference being had to the accompanying drawings.

My improvements relate to locks in some respects of the general character shown in the patent of Henry R. Towne, granted January 14, 1890, No. 419,384. They also relate in part to any locks having latch-operating mechanism. In the said Towne patent lock the tumbler mechanism of the secondary bolt is carried by the primary bolt, the secondary tumblers being moved bodily into and out of the path of the lock-key.

In my improved lock the secondary tumblers are pivoted to the case itself, whereby a pivotal oscillating motion of the tumblers is substituted for a sliding motion, which makes my lock easier to operate and causes less frictional wear of the parts. In general it is preferable in a latch-actuating mechanism to have pivotal oscillating instead of sliding motions, and there are locks in which the knob, acting through the hub or roll-back, actuates the latch by means of pivoted levers; but these, so far as I am aware, are provided with two arms, one of which operates upon the latch-bolt at a much greater radial distance from the roll-back than the other. The result is that when the roll-back is turned in one direction the latch-bolt is gradually and easily retracted, while when it is turned in the other direction the latch-bolt is retracted with more difficulty, but with greater rapidity.

One object of my invention is to provide a mechanism of easy action for retracting the latch-bolt and one which will be equally easy to operate in whichever direction the roll-back may be turned.

In the accompanying drawings, illustrating my improvements, Figure 1 is a plan view of my improved lock with the cap-plate removed, the main bolt being shown retracted and the secondary tumblers and other parts in corresponding position. Fig. 2 is a similar view, the main bolt being shown cast and the secondary tumblers and other parts in corresponding position. Fig. 3 is an edge view showing the face-plate of my lock and the parts which project through it. Fig. 4 is another plan view similar to those shown in Figs. 1 and 2, but exhibiting the secondary tumblers thrown back by the key, so as to retract the latch, which is done by turning the key in the opposite direction to that for casting the main bolt. Fig. 5 shows a portion of my improved lock mechanism for operating the latch-bolt, the inside knob (or the outside knob) being supposed to be turned in one direction and to have retracted the latch-bolt. Fig. 6 is a similar view, one of the knobs being supposed to have been turned in the other direction and to have retracted the latch-bolt. Figs. 7 and 8 are views similar to those of Figs. 5 and 6, except that the outer part of the roll-back is shown engaged with a pivoted arm to prevent its movement, so that the latch mechanism can only be operated by the inner knob. In all these figures except Fig. 3 the views are taken from the inner side of the lock mechanism, by which I mean that side to be seen from a position as if behind a door when the cap-plate of the lock is removed. Fig. 9 is a view of the inner face of the cap-plate. Fig. 10 is a detail view of the lever mechanism detached for engagement with the outer part of the roll-back. Fig. 11 is a view of the main bolt in the retracted position and its connected parts detached, the tumblers being removed. Fig. 12 is an illustration of the outside key. Fig. 13 is an illustration of the inside key. Fig. 14 is a section on the line 14 of Fig. 1. Fig. 15 is a view of one side of the main bolt. Fig. 16 is a view of the secondary-tumbler carrier detached. Fig. 17 is a view of the sliding plate of the carrier detached. Fig. 18 is a reverse view of the tumbler-carrier and carrier-plate. Fig. 19 is a section through the lever *f*, the lock-case, and pin *p*.

Referring to the letters on the drawings, A indicates the lock-case; B, its face-plate; C, its cap-plate; D, the main bolt; E, the latch-bolt; F, the main-bolt tumblers, and G the secondary tumblers.

The main-bolt tumblers are pivoted at H to the lock-case and the secondary tumblers are pivoted at I to the lock-case.

K indicates the outside and K′ the inside

key, operating through the key-hole against the tumblers to throw the main bolt and to work a part of the latch-operating mechanism.

My lock is so constructed that the key will cast and retract the main bolt, as is usual, and will also, when turned in the direction opposite to that for casting the main bolt, retract the latch-bolt. It is also so constructed that the latch-bolt may be retracted by turning either the outside or inside knob in either direction, or so that at will the parts can be adjusted to prevent the latch-bolt from being operated at all by the outside knob, while it can be freely operated by the inside knob and turned in either direction, a swivel-spindle and a roll-back composed of two parts being employed. The tumblers, the spring-latch bolt, the main bolt, and also the knobs and knob-spindles to be employed in practice (but which are not illustrated) are all in general character like those ordinarily used in this class of locks, and therefore need not be described in detail.

L indicates what I call the "secondary-tumbler carrier," pivoted at I and provided with a stop M to form a bearing for the springs of the secondary tumblers and with a projecting guide N.

O indicates what I call a "sliding carrier-plate," also pivoted at I by means of an open end slot I′ and provided with a slot P, through which the guide N projects. This sliding plate has an extension Q, which projects into a recess R, Fig. 15, made in one side of the main bolt, so that as the main bolt is cast and retracted the sliding plate and the tumbler-carrier will be oscillated together from the center formed by the pivot I.

S indicates a lug or projection on one side of the sliding plate adapted to engage with one arm of a bell-crank lever T, pivoted to the lock-case at U. The other arm of this bell-crank lever engages with one of the lugs or projections V upon the latch-bolt. By this construction, (the main bolt being retracted,) when the key is further turned in the direction for retracting the main bolt, so as to operate upon the secondary tumblers and the bearing W of the sliding carrier-plate, the latch-bolt will be retracted, because the operation of the key will force the sliding carrier-plate in the direction of the main bolt and so operate the parts just described to retract the latch-bolt. When the key is removed or turned out of engagement with the secondary tumblers, the force of the latch-bolt spring X will cast the latch-bolt and restore the bell-crank lever and sliding plate to the position shown, for example, in Fig. 1.

Referring to the mechanism for operating the latch-bolt by means of knobs and ordinary swivel-spindle, (not illustrated,) Y indicates one part of a roll-back, through which in practice the swivel-spindle passes, and Z indicates the other part. That part of the roll-back Y which is located on the inner side of the lock is operated by the inner knob of a door and bears against either one of two arms *a a′*, pivoted at *b*, and provided, respectively, with springs *c*, tending to clamp them around the divided roll-back. Each part of the roll-back has a wing or sweep *d*, that of the part Z being longer than that of the part Y and adapted to enter a recess *e* in the lever *f*, pivoted at *g* to the lock-case. When this lever *f* is in the position indicated in Fig. 7, for example, and the sweep of the outer part of the roll-back is within its recess *e*, the outer knob cannot be operated to retract the latch-bolt; but the inner knob can be turned in either direction for that purpose. In this situation, however, the key can be operated so as to retract the main bolt and also retract the latch-bolt.

Referring to the mechanism for oscillating the lever *f* and engaging it by its recess with the sweep of one part of the roll-back or disengaging it therefrom, *h* indicates a slide projecting through the face-plate of the lock and having a limited movement out and in. This slide is pivotally connected with the lever *f*, and also on its opposite side with a lever *i*, which in turn is pivotally connected to another similar slide *k*, projecting through the face-plate. When the slide *k* is pushed inward, the lever *f* will be disengaged from the sweep, and when the slide *h* is pressed inward the lever will be engaged with the sweep.

l indicates a plate secured to the spring-rod *m* of the latch-bolt and forming an extension of the latch-bolt, against which plate the arm *a* bears to retract the bolt.

n indicates a bell-crank lever pivoted at *o*, against one arm of which the arm *a′* bears. The other arm of the bell-crank lever bears against one of the lugs V upon the latch-bolt. By means of this mechanism the latch-bolt when the lever *f* is disengaged can be retracted by turning either outside or inside knob in either direction. When the lever *f* is engaged by its recess with the long sweep of the outer part of the roll-back, then only the inner knob will operate to retract the latch-bolt.

p indicates a spring-detent within a socket in the free end of the lever *f*. The cap-plate of the lock is provided with a recess *q*, in the center of which is a projection *r*, being a double inclined plane or somewhat of an inverted-V shape. The spring *s* of the detent tends to press it into this recess and against the projection *r*. The oscillatory movements of the lever *f* cause the detent to travel over the ridge of the projection *r*, and this projection forms a stop to hold the lever *f* in engagement with the wing of the roll-back or in disengagement therewith, accordingly as the slides *k* and *h* are respectively operated.

I have described the two parts of the split hub or roll-back as having definite relations, as shown in the drawings; but their positions might be reversed, the part Y taking the place of the part Z. Again, I might employ an or-

dinary roll-back made of one piece with an arm to engage in the recess of the lever F. In that event I might employ an ordinary spindle; but I prefer to employ a split hub and a swiveled spindle, as described.

I have described the arms *a a'* as pivoted at the same point *b*, but obviously they might be pivoted at different points and have different centers of motion without departing from my invention; but preferably their centers of motion should be the same distance from the center of the hub. It will be seen that one of these arms acts directly upon the extension of the latch-bolt, while the other through intermediate mechanism acts upon one of the lugs V at another point on the latch-bolt; but the radial distance of the center of motion of the arm *a* from the point where it acts upon the latch-bolt should be substantially the same as the radial distance of the center of motion of the bell-crank lever *n* from the point where it acts on the latch-bolt. By this arrangement substantially the same extent of oscillatory movement of each part is secured, and the latch-bolt is therefore retracted as easily and with the same velocity of movement by turning the knob in one direction as by turning it in the other. The movements of the parts are entirely pivotal and not sliding, and the hub moves through the same arc of a circle and requires practically the same force to operate it to retract the latch-bolt, whether it is turned in one direction or the other.

My construction allows the hub in its longitudinal dimension to be equal to the entire thickness of the lock-case and also allows the arms *a a'* to be of nearly like thickness. This gives a large bearing on the important rubbing-faces, which serves to diminish the wear of the parts and increases the durability of the lock.

When ordering locks of this general class, it is usually necessary for the purchaser to specify whether they are intended for left-hand or right-hand doors; but an advantage of my improved lock, when a split hub is used, is that it may be carried in stock by a dealer and can be adjusted to either a right-hand or left-hand door by adjusting the parts of the hub according to the swinging of the door upon which the lock is to be placed, the part of the split hub having the longer wing always being placed upon the side corresponding to the outside of the door.

What I claim is—

1. In a lock, the combination of a primary bolt, a tumbler-carrier pivoted to the lock-case, and a set of secondary tumblers carried by said carrier and which by the action of the primary bolt are oscillated into and out of the path of the key, substantially as described.

2. In a lock, a hub or roll-back provided with a wing, in combination with two pivoted arms, the movement of either of which by the wing will retract the latch-bolt, substantially as set forth.

3. In a lock, a hub provided with a wing, in combination with two arms, one of which acts directly upon the extension of the latch-bolt and the other through intermediate mechanism so arranged that the pivoted part acting on the latch-bolt has substantially the same extent of oscillation as the arm acting directly on the extension, whereby the movement of each arm retracts the latch-bolt with equal ease, substantially as set forth.

4. In a lock, stop-work consisting of two slides, an intermediate connecting-lever, and a lever with spring-detent at its free end to prevent slipping of the stop, substantially as set forth.

5. The combination, with the main bolt having its tumblers pivoted to the lock-case, of a pivoted tumbler-carrier and sliding carrier-plate, and secondary tumblers also pivoted to the lock-case, substantially as set forth.

6. The combination, with the main bolt having its tumblers pivoted to the lock-case, of a pivoted tumbler-carrier, a sliding carrier-plate, secondary tumblers also pivoted to the lock-case, bell-crank lever T, and the spring latch-bolt, substantially as set forth.

In testimony of all which I have hereunto subscribed my name.

CHAS. A. BERRY.

Witnesses:
SCHUYLER MERRITT,
E. D. OGDEN.