R. SCHOELL.

PIN TUMBLER LOCK.

APPLICATION FILED JULY 16, 1908.

917,365.

Patented Apr. 6, 1909.

Fig. 1.

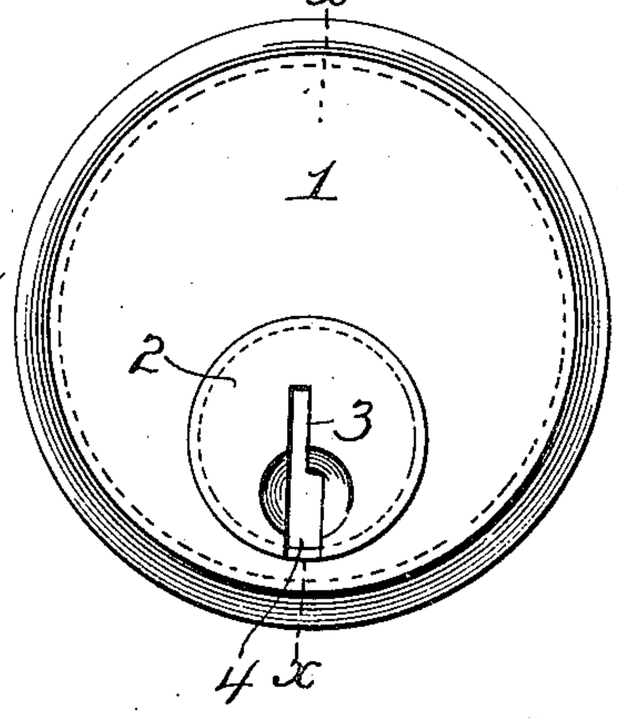


Fig. 2.

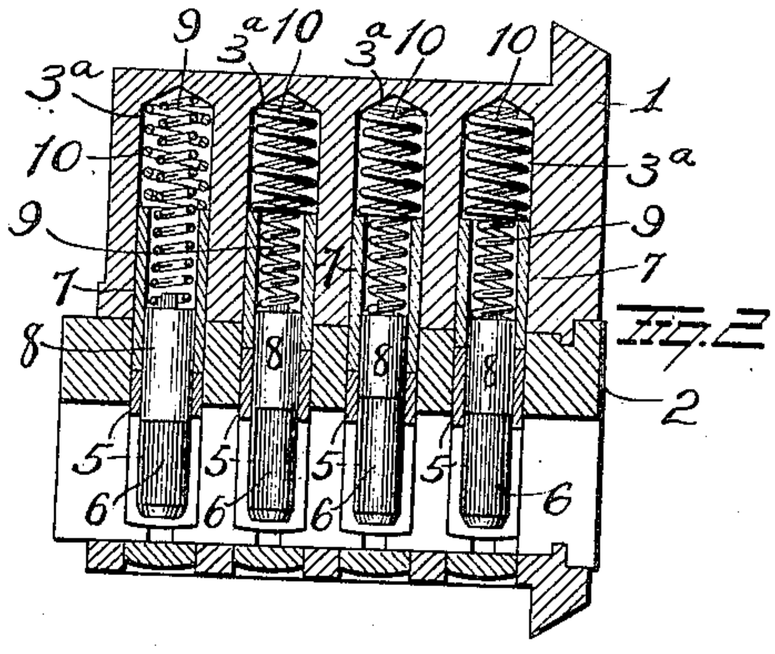


Fig. 3.

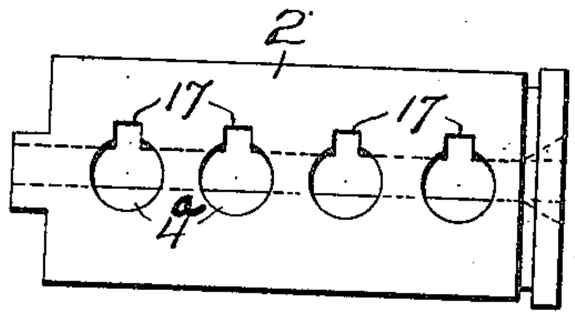


Fig. 4.

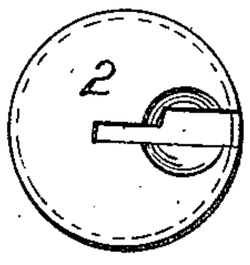


Fig. 5.

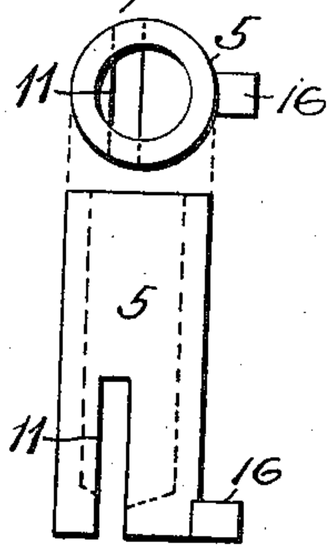


Fig. 6.

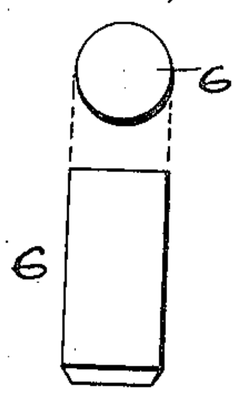


Fig. 7.

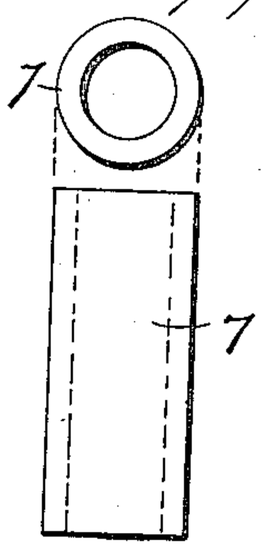


Fig. 8.

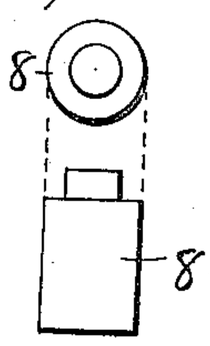


Fig. 9.

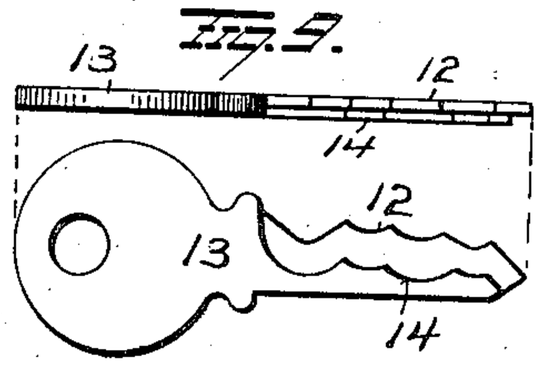


Fig. 10.

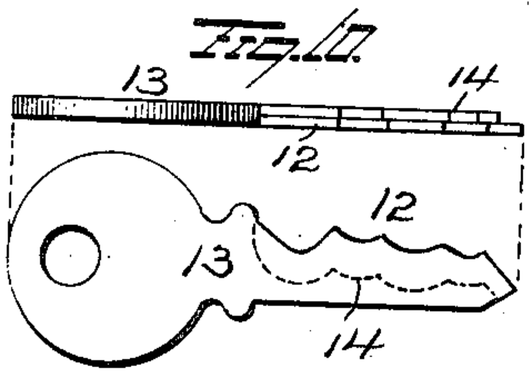
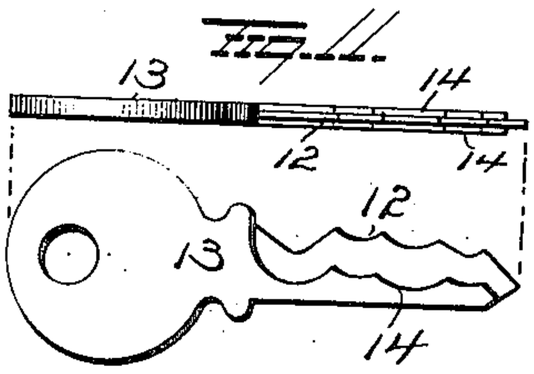


Fig. 11.



WITNESSES

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Attorney

UNITED STATES PATENT OFFICE.

REINHOLD SCHOELL, OF STAMFORD, CONNECTICUT, ASSIGNOR TO THE YALE & TOWNE MANUFACTURING COMPANY, OF STAMFORD, CONNECTICUT.

PIN-TUMBLER LOCK.

No. 917,365. Specification of Letters Patent. Patented April 6, 1909.

Application filed July 16, 1908. Serial No. 443,864.

To all whom it may concern:

Be it known that I, REINHOLD SCHOELL, of Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Pin-Tumbler Locks; 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 invention relates to an improvement in pin tumbler locks, the object being to provide a construction whereby the number of changes may be increased over the changes possible in the locks as now made, and at the same time provide for greater security against picking the lock.

With these and other objects in view, my invention consists in the parts and combinations of parts as will be more fully described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in end elevation of my improved lock showing the shape of the key slot in the plug. Fig. 2 is a view in vertical section on the line *x*—*x* of Fig. 1. Fig. 3 is a view of the key plug detached. Fig. 4 is an end view of the latter. Figs. 5 and 6 are enlarged views of the pins. Figs. 7 and 8 are enlarged views of the drivers, and Figs. 9, 10 and 11 are views in elevation and plan of various forms of keys designed for use with my improved lock.

1 represents a key cylinder and 2 the plug, of the Yale and Towne type of pin tumbler locks. The plug 2 is provided with a key slot 3 enlarged or widened at its bottom as at 4. In the drawing I have shown the slot widened at one side only, to receive a key as shown in Fig. 9, but it is clearly evident that the slot may be widened on its opposite side to receive a key having the lower set of bittings on the left side as shown in Fig. 10, or the main slot may be widened on both sides to accommodate the key shown in Fig. 11. The cylinder 1 is provided with a series of cylindrical recesses or pin holes 3^a, arranged in line as shown, and also arranged to aline with the recesses or holes 4^a in the plug 2. Located within each recess 4^a in the plug 2 is a hollow pin 5, shown in Fig. 5, and seated within each hollow pin 5 is a pin 6. The pins 5 and 6 are of less length than the depth of the holes or recesses in the plug, consequently when the parts are assembled, the pins rest wholly within the plug 2. The drivers 7 are in the form of cylindrical tubes corresponding in diameter with the outer pins 5, and resting thereon, with the bore of each driver communicating with the bore of its pin, while the drivers 8 rest within the outer drivers 7 and on the pins 6. The drivers 7 and 8 normally rest partly within the cylinder and partly in the plug, and when so located, absolutely prevent the plug from rotating in the cylinder, hence to rotate the plug, the drivers must be elevated by the pins, to simultaneously bring their lower ends and the upper ends of both sets of pins, in line with top of the plug 2. The pins 5 are not uniform as to height, hence have to be moved different distances in order to make them properly aline with the periphery of the plug, and the same is true of the pins 6 which as before explained rest within the pins 5. The outer drivers 7, which as before explained, rest on the tops of the pins 5, are yieldingly held in contact with the pins by the springs 10, while the drivers 8, are yieldingly held in contact with the pins 6 by the springs 9.

The lower closed ends of the outer pins 5 are slotted to one side of the center as shown at 11, for the passage of the upper bittings 12 of the key 13 which bittings engage the lower ends of the inner pins, while the lower bittings 14 of the key engage the lower ends of the pins 5. The lower bittings 14 are cut from the body of the key in a plane below the bittings 12, thus forming a key, the shank of which is wider at the bottom than at the top, the key slot 3 in the plug 2 being shaped to conform to the cross section of the key. If the key be provided with lower bittings on both sides as shown in Fig. 11, the key slot 3, would of course, be enlarged at both sides of its lower edge, for the reception of the key. A key with two or more independent sets of bittings located in different planes is necessarily made of thicker metal than a key having one set of bittings on one edge only, hence the key is stronger and not so liable to be broken in the event the plug should stick, as the keys now in common use.

It is essential of course that the slots 11 in pins 5 be maintained in line with the slot 3 in the key plug, so as to permit the upper bittings 12 of key to enter the slots 11, when the key is inserted. This is accomplished by providing each pin 5 with a projection 16

which rests and moves in a corresponding groove 17 in the plug 2, the said grooves communicating with the pin holes as shown in Fig. 3.

By inserting the key in the slot, the upper bittings 12 enter the slots 11 and engage the lower ends of the inner pins 6, and move them up to aline with the periphery of the plug, while the lower bittings engage the lower ends of the outer pins 5 and move their upper ends into alinement with the upper ends of the inner pins. The movement of the pins forces the drivers into the cylinder and when the key is fully inserted the upper edges of all the pins of the two series will aline, thus freeing the plug from the cylinder. As the key is withdrawn the springs acting through the drivers force the pins down thus again locking the plug against rotation.

In this construction, the inner pins are shorter than the outer pins and the joint between the outer drivers and outer pins is bridged by the inner drivers, hence it is not only necessary to move both inner and outer pins in order to free the plug, but they must be moved different distances thus producing a lock which is more difficult to pick than the locks having but a single set of exposed pins. Again the duplication of keys is made practically impossible except by special machinery for that purpose.

It is evident that many slight changes might be resorted to in the relative arrangement of parts shown and described without departing from the spirit and scope of my invention hence I would have it understood that I do not wish to confine myself to the exact construction shown and described, but

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

1. As a new article of manufacture, a pin tumbler cylinder lock comprising a cylinder and plug, two independently movable pins carried by the plug, one pin being within and carried by the outer pin, and drivers for normally holding the pins down in the plug and for locking the plug against rotation in the cylinder.

2. As a new article of manufacture, a pin tumbler lock comprising a cylinder and a plug, a hollow pin, a second pin within and resting on the lower end of said hollow pin, a driver for each pin, and yielding means for holding the drivers in contact with their respective pins.

3. In a tumbler lock, the combination with a cylinder and plug of an outer hollow pin within the plug, a second pin within the hollow pin and carried by the latter, a tubular driver engaging the hollow pin, an inner driver engaging the inner pin and means for holding both drivers in contact with their respective pins.

4. In a pin tumbler lock, the combination with a cylinder and plug, of a hollow pin located in the plug, a pin located in and carried by the hollow pin, drivers for the pins, and a key having bittings for engaging both pins.

5. In a pin tumbler lock the combination with a cylinder and a plug, of a hollow pin slotted at its lower end, a pin within the hollow pin, a driver for each pin, and a key constructed to engage the outer pin, and also the inner pin through the slot in the outer pin.

6. The combination with a cylinder and a plug of a hollow pin slotted at its lower end, means for preventing said pin from turning, a pin within the hollow pin, a driver for each pin and a key constructed to engage the lower end of the hollow pin and also the inner pin through the slot in the outer pin.

7. In a pin tumbler lock, the combination with a cylinder and plug, of a series of pins each comprising two independently movable members, one within the other, a driver for each member of each pin, and a key having two series of bittings arranged side by side in different planes, for engaging the two members of the several pins.

8. A flat key for a pin tumbler lock having two sets of bittings, one set being in one edge of the key and the other in the body of the key in a plane below the first mentioned set.

9. A key for sliding, or pin tumbler locks having two or more sets of bittings in different planes, one set extending across the edge of the key, and the other set only part way across the body of the key.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

REINHOLD SCHOELL.

Witnesses:

ELLIS H. JONES,

W H. TAYLOR.