

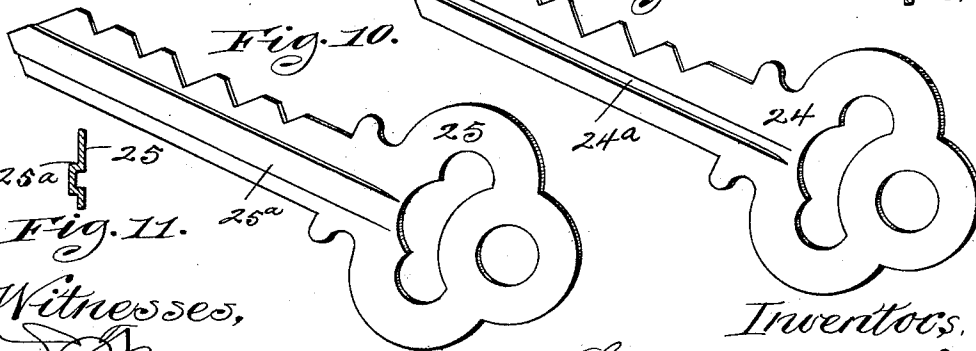
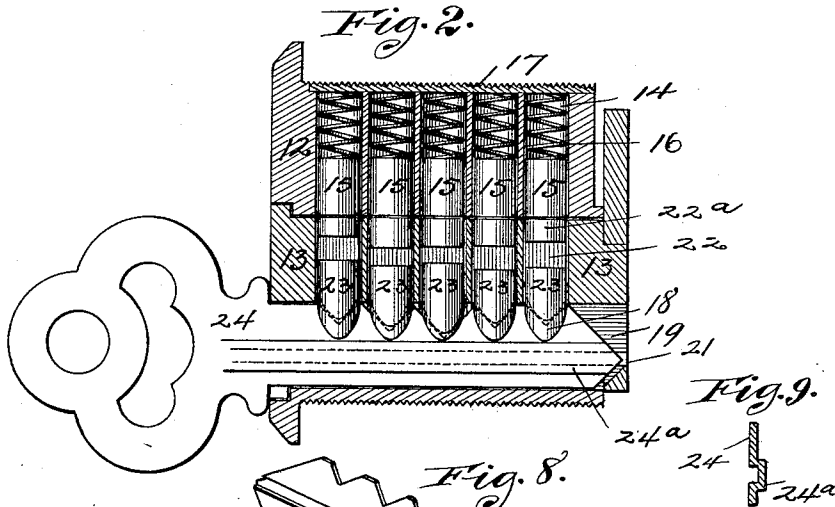
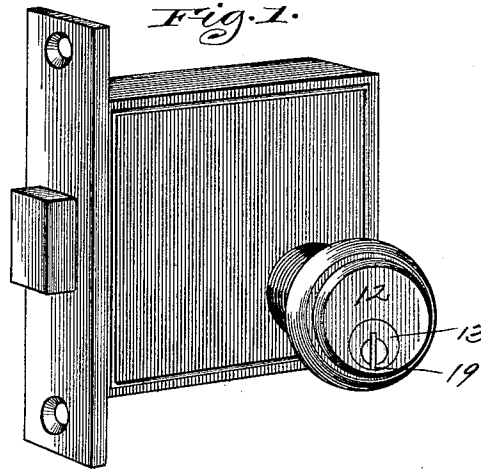
(No Model.)

2 Sheets—Sheet 1.

L. MOUAT, Jr. & E. W. PRATT.  
LOCK.

No. 484,443.

Patented Oct. 18, 1892.



*Fig. 10.*

*Fig. 11.*

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*Fig. 9.*

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(No Model.)

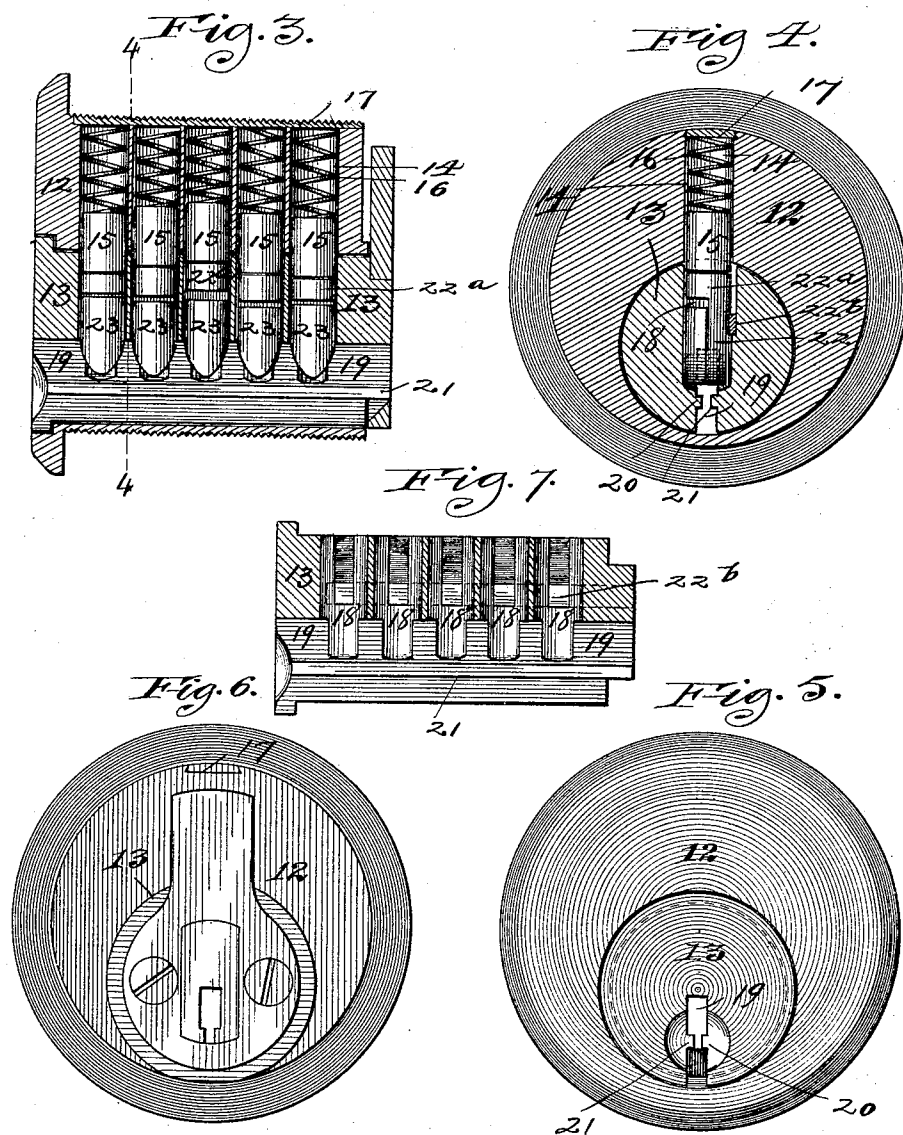
2 Sheets—Sheet 2.

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LOCK.

No. 484,443.

Patented Oct. 18, 1892.



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# UNITED STATES PATENT OFFICE.

LAURENCE MOUAT, JR., AND EDWARD W. PRATT, OF CHICAGO, ILLINOIS,  
ASSIGNORS TO THE CHICAGO HARDWARE MANUFACTURING COMPANY,  
OF SAME PLACE.

## LOCK.

SPECIFICATION forming part of Letters Patent No. 484,443, dated October 18, 1892.

Application filed November 27, 1891. Serial No. 413,246. (No model.)

*To all whom it may concern:*

Be it known that we, LAURENCE MOUAT, JR., and EDWARD W. PRATT, citizens of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Locks, of which the following is a specification.

This invention relates to certain improvements in that class of locks known as "pin-tumbler" or "cylinder" locks. In this class of locks there is employed a cylinder longitudinally bored and a plug fitted to rotate within the bore of the cylinder. The cylinder is provided with a series of holes arranged in line and longitudinally of the cylinder, and within them is fitted a series of sliding pins, which are normally depressed by springs. The plug is provided with a corresponding series of holes, the lower ends of which communicate with a longitudinal slot or aperture in the plug, forming a keyway. In order to render a series of these locks amenable to a single key, commonly known as a "master-key," and also to provide each particular lock with its particular key, commonly called a "change-key," there is fitted within the holes in the plug pins, which in some instances have had their lower ends bifurcated, and having dissimilar operative surfaces, these dissimilar surfaces responding, respectively, to the master-key and to the change-key. It has also been proposed to provide two sets of lower pins, one set of which would respond to the master-key and the other set of which would respond to the change-key.

This invention provides an improved lock of the class described.

In carrying out the invention there is employed, by preference, the usual cylinder and plug, the cylinder having the usual upper pin-holes and the plug having corresponding pin-holes registering or communicating with the keyway. The lower pins are of peculiar and novel construction. Two sets of lower pins are employed, one set being provided with heads of substantially the same diameter as the lower pin-holes, and with shanks or legs integral with said heads, which bottom in the holes and are operated upon by the change-key. The other set of lower pins are shorter than the first set described, being of such

length as will adapt them to move freely with suitable clearance below the heads of the longer set, and this shorter set of pins respond to the master-key. The long set of pins therefore have cylindric heads with semicylindric legs, while the shorter set of pins have semicylindric bodies and the lower ends of both sets of pins are curved or rounded, so as to adapt them to be moved by the serrations of the bit of the key.

In operation the upper set of pins will be raised by the raising of the longer of the lower sets by the direct contact of the change-key with the lower ends thereof, while in using the master-key the short set of pins will be raised thereby until they come in contact with the overhanging heads of the longer set of pins, when the latter will be raised, thus lifting the upper set of pins until the contacting surfaces of the upper and lower pins register at the contact-point of the cylinder and plug, thus leaving the latter free to rotate to withdraw the bolt. The keyway is provided on each of its sides with opposing ribs or flanges projecting into the space, and these ribs enter corresponding grooves in the respective keys which are used with the lock. The rib which enters the groove therefore forms a guide for the key, preventing the vertical vibration of the latter, while the rib upon the opposite side of the keyway holds the key to the proper side of the keyhole to cause it to engage the set of pins which it is intended to operate.

The invention will be hereinafter described by reference to the accompanying drawings, and particularly pointed out in the claims.

In the drawings, Figure 1 is a perspective view of a dead-lock fitted with a cylinder embodying the invention. Fig. 2 is a longitudinal sectional view through the cylinder and plug, showing the pins, springs, and change-key in elevation, the key being home and the plug unlocked. Fig. 3 is a similar view showing the key removed. Fig. 4 is a transverse sectional elevation on the line 4 4 of Fig. 3. Figs. 5 and 6 are front and rear elevations, respectively. Fig. 7 is a detail view of the plug. Figs. 8 and 9 show the change-key in perspective and cross-section, and Figs. 10 and 11 show the master-key in similar views.

In the drawings, 12 represents the cylinder or case, which is eccentrically and longitudinally bored to receive the hub 13. The cylinder is provided with radial apertures 14, forming wells or holes to receive the upper set of pins 15, which latter are normally depressed by the springs 16, the latter being confined by the slide 17. The plug is provided with the holes or apertures 18, extending from its periphery to and registering with a longitudinal keyway 19. This keyway is provided on its opposite upright walls with the longitudinal ribs or flanges 20 21, located opposite each other, and the holes 18 terminate slightly above these ribs, as shown in Fig. 4.

22 represent the longer set of lower pins, which have cylindric heads 22<sup>a</sup> of a cross-sectional area equal to that of the holes 18. The pins 22 are slightly flattened on one side, and a key 22<sup>b</sup>, resting in a groove formed in the plug parallel to the row of holes, impinges on the flat surface and prevents the pins from turning in the holes. The bodies are semi-cylindrical, excepting the flattening referred to, and the lower ends are rounded in line with the operative faces of the bit of the key, so as to be readily moved thereby. The shorter set of lower pins is marked 23 and they have semicylindric bodies and rounded lower ends but are headless, and are overhung by the heads 22<sup>a</sup> of the pins 22. In the normal condition of the lock—that is, when the key is removed—both sets of pins bottom or rest on the bottom of the holes 18, and the lower ends of both sets of pins lie in the same horizontal plane.

24 represents the change-key having a portion of its body offset to provide the groove 24<sup>a</sup>, which is adapted to receive the rib 21, by which the key is prevented from vertical vibration, while the rib 20 will impinge on the rear surface of the offset portion of the key, so as to hold it to the proper side of the keyhole and insure its contact with the set of pins 22, as shown in Fig. 2 of the drawings. When the key 24 is home, it has raised the longer set of pins, thus lifting the upper set so that the contacting points of the operating and operated sets of pins register at the contact-point of the cylinder and plug, as shown in Fig. 2. The plug is thus left free to revolve.

25 shows the master-key, and its bit will be varied, as to its operative surfaces, from the change-key, and its body is also offset, but oppositely, from the change-key above described. This offset portion 25<sup>a</sup> provides a longitudinal groove which receives the rib 20, while the rib 21 holds the key over to the proper side of the keyway, so as to make it engage the lower ends of the shorter set of pins, which when the key is home will be raised, sliding upon the longer set of pins until they come in contact with the under sides of the overhanging heads of the latter, whereupon the longer set will be raised, thus lift-

ing the upper set of pins until they register at the contact-point of the cylinder and plug, and the latter is free to rotate, as before described.

It will be noticed that the longer set of pins are in their operation entirely independent of the shorter set and there is a distinct utility and advantage in providing this longer set with heads of the same diameter as the holes which contain them, as they are thereby guided in their movements and have contact over the entire surface of the lower ends of the upper pins.

Another advantage obtained by making the heads of the longer set of lower pins of the same diameter as the holes is that the lock is much more secure, or, in other words, more difficult to pick. The shorter set of pins are not affected in any way by the movements of the longer set, and as the longer set respond to the change-key and this key is the one most frequently used therefore the longer set of pins are the ones which are the most frequently brought into requisition.

By a very slight variation in the relative length of the two sets of pins or by like variation as to the individual pins of the change-key series an indefinite number of changes in the locks may be produced, and the same is true as to the changes on the master-key. The supporting and guiding of the keys so as to prevent either their vertical or lateral vibration or movement is of the utmost importance in the practical use of locks of this class, as there is thereby insured uniformity of force upon the lower sets of pins in inserting or removing the key, and when the key is home uniformity of position is at all times maintained. The positions of the two opposing flanges in the keyway make it exceedingly difficult to pick the lock, as said opposing ribs or flanges so narrow the working space in the keyway as to almost entirely preclude the possibility of inserting an instrument whereby the pins might be raised. It will also be noticed that the vertical plane of the opening between the ribs passes between the two rows of pins, so that the lock is further protected.

It will be apparent that the change-key may be made to operate on the short set of pins and the master-key on the long set, instead of the present arrangement, and the means for holding the lower set of pins against rotation may be varied.

Without limiting ourselves to precise details of construction, we claim—

1. In a lock of the class described, two sets of lower pins, said sets being of unequal length and the longer set provided with heads overhanging the shorter and adapted to be operated without moving the shorter set and also adapted to be raised by the shorter set when the latter are operated, substantially as described.

2. In a lock of the class described, two sets of lower pins of unequal length, one set hav-

ing heads overhanging the other, and the sets being arranged in planes parallel to each other and to the keyway, substantially as described.

- 5 3. In a lock of the class described, the combination, with a cylinder provided with a keyway having parallel side walls each provided between its top and bottom with an inwardly-projecting angular rib, said ribs being op-  
10 positely located, of keys each having their edges in the same plane and their bodies off-

set to provide longitudinal grooves angular in cross-section and corresponding, respectively, with the ribs of the keyway, whereby said keys are adapted for entrance upon op- 15  
posite sides thereof, substantially as described.

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