A. ABELL.

LOCK.

APPLICATION FILED AUG. 31, 1921.

1,433,591.

Patented Oct. 31, 1922.

Fig. 1.

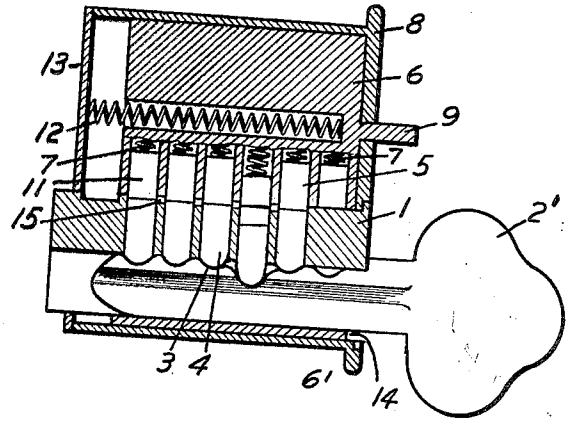


Fig. 2.

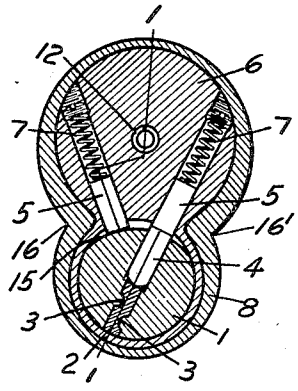


Fig. 3.

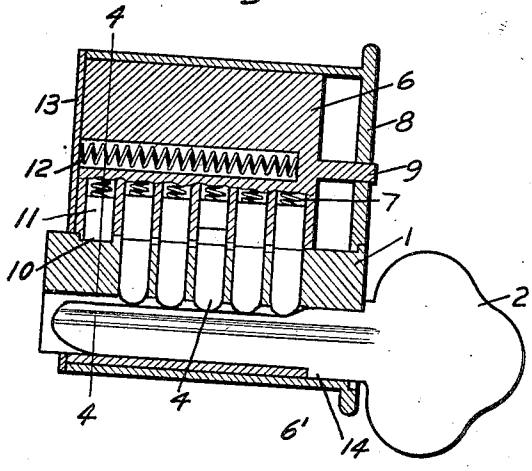
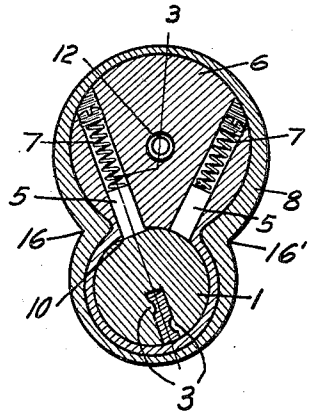


Fig. 4.



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UNITED STATES PATENT OFFICE.

ARTHUR ABELL, OF SALEM, MASSACHUSETTS, ASSIGNOR OF ONE-THIRD TO JESSICA HORTON, OF NEW YORK, N. Y., AND ONE-THIRD TO WILLIAM H. McSWEENEY, OF SALEM, MASSACHUSETTS.

LOCK.

Application filed August 31, 1921. Serial No. 497,152.

To all whom it may concern:

Be it known that I, ARTHUR ABELL, a citizen of the United States, residing at Salem, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Locks, of which the following is a specification.

This invention relates more particularly to locks of the type wherein a service key or employee's key is normally used, and wherein a master key is provided for locking out the service or employee's key when desired.

The primary object of my invention is to provide a master keyed cylinder lock, whereby the number of possible combinations or keys required to open the lock may be increased over that possible with existing locks of similar general type.

Another object of my invention is to provide a cylinder lock with two rows of tumbler holes in the cylinder or lock case, which cooperate with only a single set of tumbler holes in the key plug in combination with a sliding magazine or carrier.

Still another object of the invention is to provide a lock so shaped that it is possible to mount it within a door panel, automobile, or other device, in such a manner that it cannot be easily turned or become loosened in its mounting as is possible with the usual cylindrical contour type of lock as at present employed.

A still further object of my invention is to provide a lock with a sliding magazine or tumbler carrier or case in such movable relation to the key plug lengthwise that the magazine or carrier can be altered in its lengthwise position with reference to the key plug, that the ordinary service key or employee's key will not open it when so altered, and that it can be locked in this altered position by means of a slight depression or groove on the plug which causes the last tumbler pin in the magazine or carrier to so engage therewith that it will prevent the magazine from returning to its normal lengthwise position, unless allowed to do so by means of its release by the master key.

The above arrangements permit of securing four times the number of key combinations that is possible with ordinary pin tumbler locks, and this is possible because of the fact that the double row of tumbler holes or tumblers in the carrier or magazine in combination with the sliding feature of the magazine with reference to the key plug quadruples the possible combinations, as will be seen by careful reference to the figures. As two combinations are secured by the sliding relation with reference to each set of tumbler holes in the carrier or magazine, and two more combinations by the fact that the plug can be rotated with accurate relation to the line of tumbler holes with which it may be normally engaged, and thus caused to line up with the second line of tumbler holes in the magazine, and permit of the tumblers in said magazine to drop into the single line of tumbler holes in the plug.

The manner in which the sliding magazine is operated is as follows: The master key may be provided with a special abutting lug appended to the key at the bottom, which, as the key is inserted in the key slot and pushed in, eventually engages the magazine or carrier and slides the latter endwise against the compression of a spiral spring, retained in place by the rear casing plate of the lock, and when the magazine reaches the end of its travel lengthwise with reference to the plug, the last pin in the magazine or carrier drops into a groove or depression in the plug in such a manner as to lock the latter from resuming its normal forward position, which it would otherwise do, because of the pressure of the spiral spring, and now the magazine or carrier cannot be returned to such normal position until the master key again is operated to cause the release of said locking pin and allow the magazine to be returned under the impulse of the spiral spring.

In studying this lock mechanism, it might normally occur to one not skilled in the particular mechanism of the lock of my invention, that the insertion of the master key would cause interference of the tumblers with the key projections in a manner to prevent the lengthwise motion of the key in the plug when pushed in to cause the lengthwise displacement of the movable magazine. However, this is obviated by providing a master key with practically a straight line edge although the key may be serrated on its edge to a very slight extent, just sufficient not to cause the tumblers in the plug to be raised above the line of the plug surface

sufficiently to cause interlocking with the tumblers in the magazine above it. This result is very neatly accomplished by making a little groove or clearance between the plug surface and the under line of the magazine, as will be seen by more specific references to Fig. 4. This is an important feature of my invention, as otherwise the lock would not work.

Another feature of my invention is found in the provision of a special projecting pin or push rod on the magazine or carrier which normally extends through a hole in the front casing of the lock, by means of which the magazine may be pushed in. This can only be done, however, by first inserting the master key in the lock, as otherwise the magazine cannot be moved.

It is to be understood that in this improved lock construction the standard key plug may be used without having to provide a special plug, and any standard roll-back attached to the end of the plug. The magazine itself, while it contains two rows of tumbler holes, need not be made in separate compartments, as is the case in some locks in the art. This complication is eliminated because of the fact that the two sets of tumbler holes have been carefully worked out in such relation to the tumbler holes in the plug that separate or distinct magazine chambers for each set of tumbler holes are not necessary. It merely requires two sets of drilled holes or recesses in an ordinary cylindrical magazine.

These and other detailed features of my invention will be pointed out more specifically by referring to the accompanying drawings, in which Fig. 1 represents a vertical section on the line 1—1 of Fig. 2 of my improved lock with the push rod projected through the stationary casing; Fig. 2 represents a transverse vertical section of Fig. 1; Fig. 3 represents a vertical section on the line 3—3 of Fig. 4 showing indicating pin in retracted position, and Fig. 4 represents a transverse section on line 4—4 of Fig. 3.

Referring more particularly to Fig. 1, 1 represents a lock plug in which, for the purpose of illustration, is inserted the key 2, having the usual line of serrations 3 for throwing the tumbler pins 4 in the plug and complementary pins 5 in the magazine 6. Behind or on top of each pin in the magazine 6 is a spring 7. A casing 8 is provided which contains the magazine 6 and plug 1. The magazine 6 contains two rows of tumblers angularly related to a single row of tumblers in the plug 1, as shown in Figs. 2 and 4.

The arcual relation of both magazine and plug tumbler holes is such that the tumblers in either row of magazine holes will readily drop into place in the corresponding plug holes.

The magazine 6 is normally forward against the casing 8, and has an extension or push rod 9 which extends through the face of the lock 8 as shown. In the plug 1 is a depression or groove 10 (Fig. 3) into which the last pin 11 in the magazine may drop. 12 represents a spring which has a bias such as to urge the magazine 6 forward against the front of the casing 8. This spring presses at its rear end against the plate 13. The master key 2 for permitting the magazine to be pushed backward is provided with a depending lug 14. This lug engages with the magazine 6 at 6′ and pushes the magazine backward against the back plate 13 when desired. The slight undercut or clearance between the plug 1 and the magazine 6 previously referred to earlier in the specification is illustrated at 15. The outside casing 8 of the lock is shaped as shown in Figs. 2 and 4 something after the manner of a figure 8 having a reentrant portion 16, 16′. It will thus be seen that when the lock is mounted in any door or panel to which it is to be applied, this peculiar shape prevents the lock from turning around in the hole made for its reception, as is often the case with the usual type of tumbler lock. Such annoyance, therefore, is overcome by my improved lock, it only being necessary to drill two holes corresponding to the outer contour of the magazine casing and the plug contour respectively for the reception of the lock of course, a slight amount of cutting or finishing between the holes being necessary.

The operation of my invention is as follows: Assuming that the lock is in the position, Fig. 3 with the master key 2 in the lock, and it is desired to change the combination so that a service key will be locked out, the magazine is pushed back against the action of the spring 12 by means of the push rod 9 or by the lug 14 on the key if it is elected to provide the key with such a lug. Now the last tumbler pin in the magazine drops into place in the depression 10 (Fig. 3) of the plug, thus locking the latter in place, and the master key withdrawn. A service key 21 which is subsequently inserted in the lock will not open the lock while the plug is in this position unless the service key is made specially to fit this arrangement or combination, especially since the tumbler of the second pocket has been transferred from the position shown in Figure 1 aligning with second plug hole to the third hole by pushing the casing rearwardly. The plug is so designed at the depression 10 that in order to return the plug to the foward position by means of the master key when the plug is turned by the latter the locking pin rides up out of the depression 10 on a sort of cam surface. Thus, various combinations of keys are afforded for the lock in

excess of locks which do not have a forward and back position as provided by the improved means of my invention. While, for the purpose of simplicity of illustration, a multiplicity of varying lengths of tumbler pins has not been shown, it is understood that such provisions are old in the art and need not be illustrated in detail here.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention may be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. The combination of a tumbler case and a key-cylinder plug revolving therein, the case containing two series of tumbler-recesses and the key cylinder plug having one series of tumbler recesses, which latter may be made to coincide with either series of recesses in the case by the revolution of the plug, tumblers of varying lengths in the recesses, and means for sliding the tumbler case relatively lengthwise of the cylinder plug whereby a properly fitted service key will operate any one combination and the master-key may lock out all service keys against a large number of different combinations.

2. In a cylinder lock, the combination of a tumbler case with a key cylinder plug revolving therein, means for sliding the tumbler case on the key plug lengthwise of the latter, whereby the number of key combinations may be increased, tumbler recesses and pins in both the plug and case, and means for restraining the case in retracted position and returning it to the normal forward position as desired.

3. In a cylinder lock, the combination of a tumbler case with a key cylinder plug revolving therein, means for sliding the tumbler case on the key plug lengthwise of the latter, whereby the number of key combinations may be increased, tumbler recesses and pins in both the plug and case, a recess in the plug end into which the last pin in the tumbler case may drop whereby the tumbler case may be held retracted until released.

4. In a cylinder lock, the combination of a tumbler case with a key cylinder plug revolvable therein, means for sliding the tumbler case on the key plug lengthwise of the latter whereby the number of key combinations may be increased, tumbler recesses and pins in both the plug and case, a recess in the plug end into which the last pin in the magazine may drop and lock said magazine in retracted position towards the roll-back of the lock, a spring which actuates the magazine to return it to its normal position when the restraining pin for the magazine is released, and a master-key for releasing the tumbler case.

5. The combination of a tumbler case with a key cylinder plug revolvable therein, means for sliding the tumbler case on the key plug relatively lengthwise of the latter whereby the number of key combinations may be increased, tumbler recesses in both the plug and case, a tumbler for restraining the magazine in the inward position, controlled by a master key, whereby any service key may be locked out, and a spring for actuating the magazine to return it to its respective normal forward positions.

6. In a cylinder lock, in combination a revolvable tumbler plug or receiver, a magazine or carrier cooperatively related thereto, tumbler recesses and pins in both the revolvable plug and magazine, a key slot for the reception of an operating key in the plug, and an outer retaining casing for the whole shaped as a figure 8 to prevent movement of the outer casing in the door or other device to which it may be attached for lock purposes.

ARTHUR ABELL.