Oct. 26, 1937. M. SPINELLO 2,097,407

LOCK

Filed April 18, 1935 2 Sheets-Sheet 1

Fig. 1.

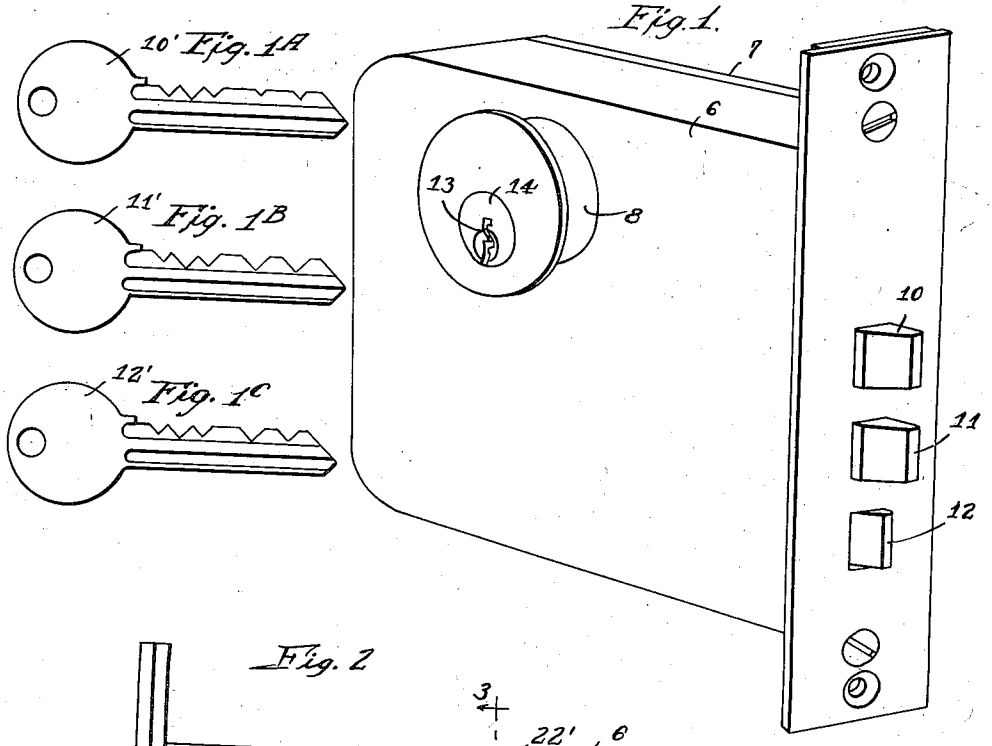
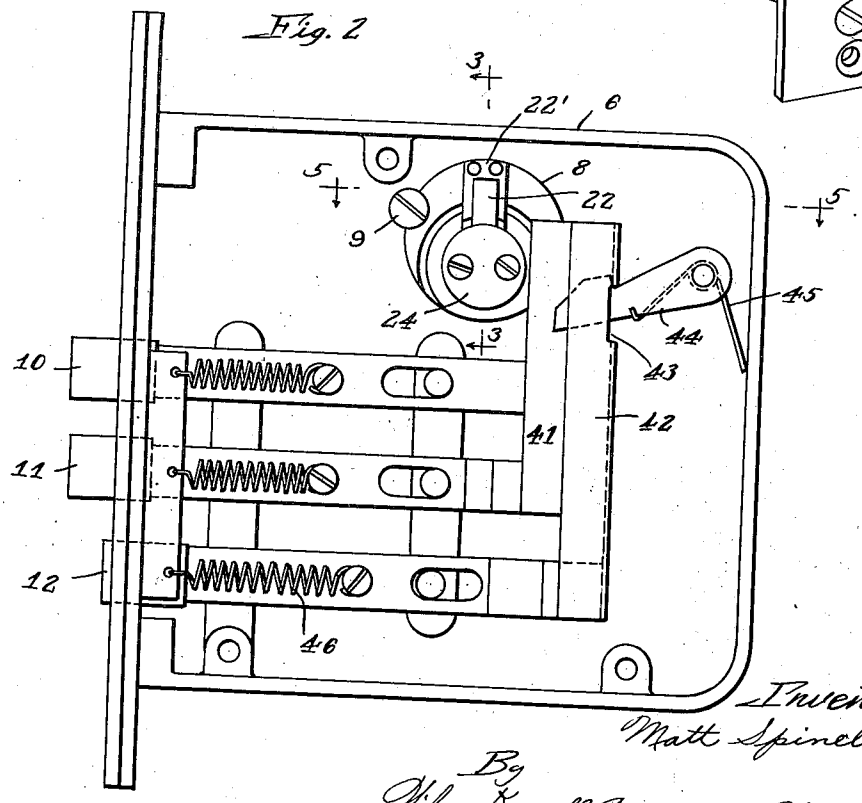


Fig. 2



Inventor:
Matt Spinello

By
Wilson, Dowell, McCanna & Hintercorn
Attys.

Oct. 26, 1937. M. SPINELLO 2,097,407

LOCK

Filed April 18, 1935 2 Sheets-Sheet 2

Fig. 4

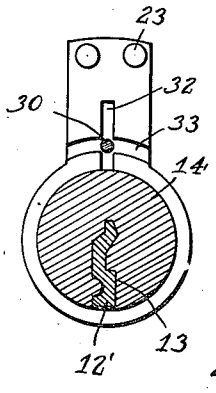


Fig. 3

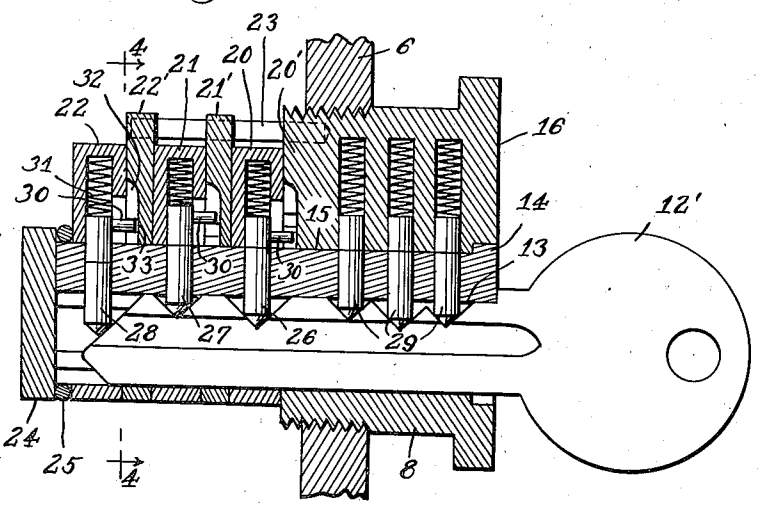
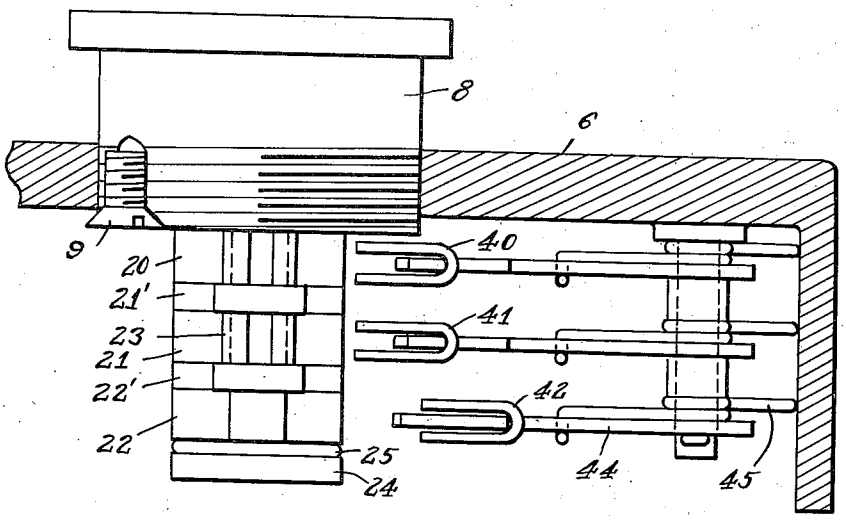


Fig. 5



Inventor:
Matt Spinello

By
Wilson, Dowell, McCanna & Wintercorn
Attys.

Patented Oct. 26, 1937 2,097,407

UNITED STATES PATENT OFFICE

2,097,407

LOCK

Matt Spinello, Rockford, Ill.

Application April 18, 1935, Serial No. 16,983

14 Claims. (Cl. 70—337)

This invention relates to locks, and has particular reference to one adapted for use on safety deposit boxes and vaults, or special doors for club rooms, hotel rooms, and other places, the admittance to which is to be specially guarded.

The principal object of my invention is to provide a lock of the pin tumbler type having a plurality of separately locked latch bolt operators, each of which is arranged to be turned with the key plug independently of the others when unlocked.

In accordance with my invention, the rotatable key plug has in connection therewith not only the customary spring pressed tumblers, but additional tumblers which when properly racked will permit of operation of a selected latch bolt.

A special feature of this lock lies in the provision of latch bolt operators in which the tumblers are reciprocable and the provision on these tumblers of pin projections each arranged when its tumbler is moved to the proper position to come into alignment with an arcuate groove concentric with the key plug provided therefor in a keeper plate disposed in abutment with the operator, whereby to permit rotation of the operator with the key plug. The pins are movable in radial grooves provided in the keepers and will, therefore, prevent turning of an operator with respect to its keeper when the tumbler is in any other position. This very securely guards the actuation of the various latch bolts, as will presently appear.

The invention will be better understood as reference is made in the following description to the accompanying drawings, wherein—

Figure 1 is a perspective view of a mortise lock embodying my invention, showing three latch bolts operable from a single cylinder lock;

Figs. 1A, 1B and 1C show three keys for use with the lock of Fig. 1;

Fig. 2 is a view of the mortise lock with the back plate removed;

Fig. 3 is a longitudinal section through the cylinder lock on an enlarged scale taken on the line 3—3 of Fig. 2;

Fig. 4 is a cross-section on the line 4—4 of Fig. 3, and

Fig. 5 is a horizontal section through the case of the mortise lock on an enlarged scale taken on the line 5—5 of Fig. 2.

The same reference numerals are applied to corresponding parts throughout the views.

The reference numeral 6 designates the case of the mortise lock having the usual removable back plate 7. The cylinder lock 8, made in accordance with my invention, projects from the front of the case, being threaded in the wall thereof, as shown, and fastened on the inside of the case by a set screw 9. Three latch bolts 10, 11, and 12 are provided in the case 6 operable by keys 10', 11' and 12', respectively. These keys all fit in the slot 13 in the key plug 14 rotatable in the off-center bore 15 in the cylindrical body 16 of the lock 8. The latch bolt 12 is shown in unlocked position, the key 12' having been entered in the lock 8 and turned. The door, however, cannot be opened until the latch bolts 10 and 11 have been likewise actuated by means of keys 10' and 11', respectively. Thus, for example, this lock may be used on a safety deposit box or vault, and one of the three keys be kept by the attendant and the two other keys by tenants, as, for example, the president and secretary or other authorized officers of a corporation or association, whereby to insure against unauthorized opening. Another example where a lock of this kind is of special advantage is in the case of an insurance company having certain officials who must all approve the opening of a vault for withdrawal of securities, in which case each will be entrusted with one of the keys and the vault cannot be opened except by the concerted action of all of these officials. Another example is that of club rooms which it is desired to keep closed except when the caretaker or some designated officer is present, in which case the caretaker or officer will have, in addition to a member key, a special key, and each of the members will have a member key. The caretaker upon entering can see to it that the latch operated by his special key is left in unlocked position so as to permit opening of the door later by club members. It will soon appear that, while I have shown three latch bolts, the invention is not by any means to be regarded as limited to three, but is applicable wherever two or more latch bolts with individual keys therefor is desired.

Referring to Fig. 3, the key plug 14 extends beyond the inner end of the body 16 and has three latch bolt operators 20, 21, and 22 mounted thereon identified with the latch bolts 10, 11 and 12, respectively. The inner end 20' of the body 16 forms a keeper for locking the operator 20 against turning, and at 21' and 22' are two other keepers for the operators 21 and 22, respectively, in the form of plates made rigid with the body 16 by means of pins 23 entered through holes in the ends of the plates and entered in holes in the end of the body. An end plate 24 fastened suitably by screws, appearing in Fig. 2, to the inner end of the plug 14 retains a ring 25 in abutment

with the operator 22 to complete the assembly. Now, there are spring pressed tumblers 26—28 provided in the operators 20—22 operable in aligned radial bores in the plug 14 and the respective operators, in a manner similarly as the group of three tumblers 29 of the conventional lock mechanism. The special tumblers 26—28, however, have their outer segments each provided with a pin 30 projecting through a radial slot 31 in the operator into a radial groove 32 in the associated keeper. Each keeper also has an arcuate groove 33 intersecting the radial groove, as best appears in Fig. 4. So long as the pin 30 of an operator is disposed anywhere in the groove 32, except in exact register with the arcuate groove 33, the operator cannot be turned. That is true of the operators 20 and 21 in Fig. 3 which are held against turning, as just stated. The operator 22 in that figure has its pin 30 moved into alignment with the arcuate groove 33 by the properly profiled end of the key 12', and hence, when the key is turned, the operator will turn with the key plug 14. Rotation is permitted under these circumstances because of the fact that the tumblers 26, 27, and 29 have all been properly racked, so that the parting line of the segments thereof coincides with the periphery of the plug 14, as shown in Fig. 3. In a similar manner, when the key 10' is entered, the tumbler 26 will be actuated to bring the pin 30 of the operator 20 into alignment with the arcuate groove 33 in the keeper portion 20' of the body 16 to permit turning the operator 20, while the other operators 21 and 22 are locked by their pins 30 against turning and their tumblers 27 and 28 have the parting line of their segments in line with the parting line of the segments of the tumblers 29 to permit turning of the plug 14 so as to actuate the operator 20. Obviously, when key 11' is entered, the operator 21 will be selected for operation, and the operators 20 and 22 left undisturbed. It should be clear that the operation of any one of the three latch bolts by an unauthorized person presents sufficient difficulties to make such operation unlikely, because in addition to having to "pick" the conventional lock mechanism at 29, such person would have to devise means to not only pick two of the three other tumblers, but also arrange for such movement of the remaining tumbler as would bring the pin 30 thereof into exact alignment with the arcuate groove 33 associated therewith. A person sufficiently skilled in the matter of picking a tumbler lock would more than likely be baffled when it came to devising means of bringing the pin 30 of one of the special tumblers 26—28 into exact alignment with the arcuate groove associated therewith. The logical object for such person would be to pick all of the tumblers with a view to enabling the turning of the key plug, and it is manifest that none of the latch bolts could be operated when that was accomplished, because if all of the special tumblers 26—28 were racked with their parting lines in alignment with the periphery of the key plug, none of the operators 20—22 could be turned. Even assuming that an unauthorized person were successful in operating one latch bolt, there would still remain repeating this laborious process for each of the remaining latch bolts before the door could be opened. The security afforded by this lock with its peculiar operation of tumblers must, therefore, be self-evident.

The operators 20, 21, and 22 are in alignment with arms 40, 41, and 42 extending upwardly from the inner ends of the latch bolts 10, 11 and 12, respectively, whereby to move either of these latch bolts to unlocked position according to which key is used and which operator is accordingly actuated. The arms 40—42 are of channel-shaped cross-section and each is slotted, as at 43, to receive a pawl 44 normally urged in a clockwise direction by a torsion spring 45. The latch bolts 10—12 are all normally urged toward locked position by coiled tension springs 46, but are arranged to be held releasably in unlocked position by the pawls 44, as indicated by the latch bolt 12 in Fig. 2. The operation is simple: In the unlocking of the latch bolt 12, its operator 22 is turned in a clockwise direction (counterclockwise as viewed in Fig. 2). The pawl 44 catches the arm 42, as shown in Fig. 2, thus holding the latch bolt in. The latch bolt will remain so until the key is again turned to turn the operator 22 in a counterclockwise direction (clockwise as viewed in Fig. 2), in which operation the operator 22 engages the pawl 44 to release the arm 42, and thus permit the latch bolt 12 to be moved to locked position by its spring 46.

I claim:

1. A cylinder lock comprising a body, a key plug rotatable therein having tumblers slidable in the plug and body, the key plug extending from the body, and a plurality of separately locked latch bolt operators on said extension each arranged to be turned with the plug independently of the others when unlocked.

2. In a cylinder lock comprising a body, a key plug rotatable therein having tumblers slidable in the plug and body, the key plug extending from the body, a plurality of latch bolt operators on said extension each arranged to be turned with the plug independently of the others, keeper means for said operators fixed with respect to said body, and tumblers slidable in said extension and the respective latch bolt operators, said tumblers having means cooperating with the operators and their associated keeper means, whereby to hold each of the operators against turning while rotation of the key plug with respect to the operators is permitted, or permit turning of an operator with respect to its keeper means and independently of the other operators when said operator is rotatable with the key plug extension.

3. A cylinder lock having a plurality of separately locked latch bolt operators intermediate the ends thereof, said operators being rotatable individually each independently of the others when unlocked, substantially as described.

4. In a cylinder lock, the combination of a stationary body, a key plug rotatable therein, a group of tumblers for locking the key plug to said body, a latch bolt operator on an extension of the key plug, a single tumbler for locking said operator to the key plug to rotate therewith, keeper means for said operator fixed with respect to said body, said tumbler having a locking pin projecting through a radial slot provided in the operator and received in a radial groove provided in said keeper means, whereby to hold said operator against turning relative to the body, the keeper means having an arcuate groove provided therein concentric with the key plug and intersecting the radial groove in the keeper means at a predetermined radius with respect to the axis of said key plug, whereby to permit turning of the operator with the key plug when the tumbler is moved so as to bring its locking pin into register with said arcuate groove.

5. A lock as set forth in claim 4 including another latch bolt operator on the key plug extension, another tumbler for locking said operator to the key plug for rotation therewith, said tumbler having a locking pin projecting therefrom through a radial slot provided in said operator, and a keeper plate fixed with respect to the body having a radial groove provided therein receiving said locking pin, whereby to hold the operator against turning with respect to the keeper plate, and said keeper plate having an arcuate groove provided therein concentric with the key plug at a predetermined radius with respect to the axis of said plug intersecting the radial groove arranged to receive the pin when the tumbler is moved to the proper position, whereby to permit turning of the operator with the key plug relative to the keeper plate.

6. In a lock comprising a stationary body, a key plug rotatable therein and means operable by a key inserted in the plug for locking the plug to the body, a latch bolt operator on an extension of the key plug, a single tumbler for locking said operator to the key plug to rotate therewith, keeper means for said operator fixed with respect to said body, said tumbler having a locking pin projecting through a radial slot provided in the operator and received in a radial slot provided in said keeper means, whereby to hold said operator against turning relative to the body, the keeper means having an arcuate groove provided therein concentric with the key plug and intersecting the radial groove in the keeper means at a predetermined radius with respect to the axis of said key plug, whereby to permit turning of the operator with the key plug when the tumbler is moved so as to bring its locking pin into register with said arcuate groove.

7. A lock as set forth in claim 6 including another latch bolt operator on the key plug extension, another tumbler for locking said operator to the key plug for rotation therewith, said tumbler having a locking pin projecting therefrom through a radial slot provided in said operator, and a keeper plate fixed with respect to the body having a radial groove provided therein receiving said locking pin, whereby to hold the operator against turning with respect to the keeper plate, and said keeper plate having an arcuate groove provided therein concentric with the key plug at a predetermined radius with respect to the axis of said plug intersecting the radial groove arranged to receive the pin when the tumbler is moved to the proper position, whereby to permit turning of the operator with the key plug relative to the keeper plate.

8. In a tumbler lock comprising a body, a rotary key plug therein and pin tumblers slidable in the body and plug for locking the plug against turning except when the tumblers are properly racked, a plurality of latch bolt operators on an extension of said plug, a single pin tumbler slidable in each of said operators and in said plug, all of said last-mentioned tumblers permitting rotation of the plug relative to the operators when said tumblers are properly racked, and each of said last-mentioned tumblers affording a driving connection between its operator and the key plug when otherwise racked, and means for preventing turning of said operators with the key plug except in predetermined positions of radial adjustment of said last-mentioned tumblers.

9. A cylinder lock comprising a body, a plurality of latch bolt operators arranged to be turned with respect to said body, and a single key plug for turning all of said operators independently of one another, each of said operators having a single pin tumbler slidable relative thereto in the plug arranged to permit turning of the plug relative to an operator when the segments of the tumbler of said operator are properly arranged but to provide otherwise a driving connection between the operator and the plug for rotation of the operator with the plug, and means cooperating with each of said tumblers for preventing turning of the associated operator except in a predetermined position of radial adjustment of the tumbler.

10. In a lock comprising a body and a rotary key plug therein, a plurality of latch bolt operators on an extension of said plug, a single pin tumbler slidable in each of said operators and in said plug, all of said tumblers permitting rotation of the plug relative to the operators when said tumblers are properly racked, and each of said tumblers affording a driving connection between its operator and the key plug when otherwise racked, and means for preventing turning of said operators with the key plug except in predetermined positions of radial adjustment of said tumblers.

11. In a lock comprising a stationary body, a key plug rotatable therein and extending from the body and means operable by a key inserted in the plug for locking the plug to the body, a latch bolt operator on said extension of the key plug, a single tumbler for locking said operator to the key plug to rotate therewith, keeper means for said operator fixed with respect to said body, said tumbler having a locking pin projecting through a radial slot provided in the operator and received in a radial slot provided in said keeper means, whereby to hold said operator against turning relative to the body, the keeper means having an outlet groove provided therein intersecting the radial slot at a predetermined distance from the axis of the key plug, whereby to permit turning of the operator with the key plug when the tumbler is moved to a position where the locking pin can enter the outlet groove.

12. A lock as set forth in claim 11 including another latch bolt operator on the key plug extension, another tumbler for locking said operator to the key plug for rotation therewith, said tumbler having a locking pin projecting therefrom through a radial slot provided in said operator, and a keeper plate fixed with respect to the body having a radial groove provided therein receiving said locking pin, whereby to hold the operator against turning with respect to the keeper plate, and said keeper plate having an outlet groove provided therein intersecting the radial groove at a predetermined distance from the axis of said plug arranged to receive the pin when the tumbler is moved to the proper position, whereby to permit turning of the operator with the key plug relative to the keeper plate.

13. In a lock comprising a stationary body and a key plug rotatable therein and extending from the body, a latch bolt operator on said extension of the key plug, a two-unit tumbler for locking said operator to the key plug to rotate therewith, the plug being rotatable relative to said operator when the two units of the tumbler are properly racked, a keeper for said operator fixed with respect to said body, the outer unit of the tumbler having a lateral projection extending through a radial slot provided in the operator and received in a radial slot provided in said keeper, whereby to hold said operator against turning relative to

the body, the keeper having an outlet opening provided therein communicating with the radial slot at a predetermined distance from the axis of the key plug, whereby to permit turning of the operator with the key plug when the outer unit of the tumbler is moved to a position where the locking projection can enter the outlet opening.

14. A lock as set forth in claim 13, including a second latch bolt operator on the key plug extension, a second two-unit tumbler for locking said operator to the key plug for rotation therewith, the outer unit of said tumbler having a lateral projection extending through a radial slot provided in said operator, and another keeper fixed with respect to the body having a radial slot provided therein receiving said lateral projection, whereby to hold the operator against turning with respect to the keeper, and said keeper having an outlet opening provided therein communicating with the radial slot at a predetermined distance from the axis of said plug, whereby to permit turning of the operator with the key plug when the outer unit of the tumbler is moved to a position where the locking projection can enter the outlet opening.

MATT SPINELLO.