

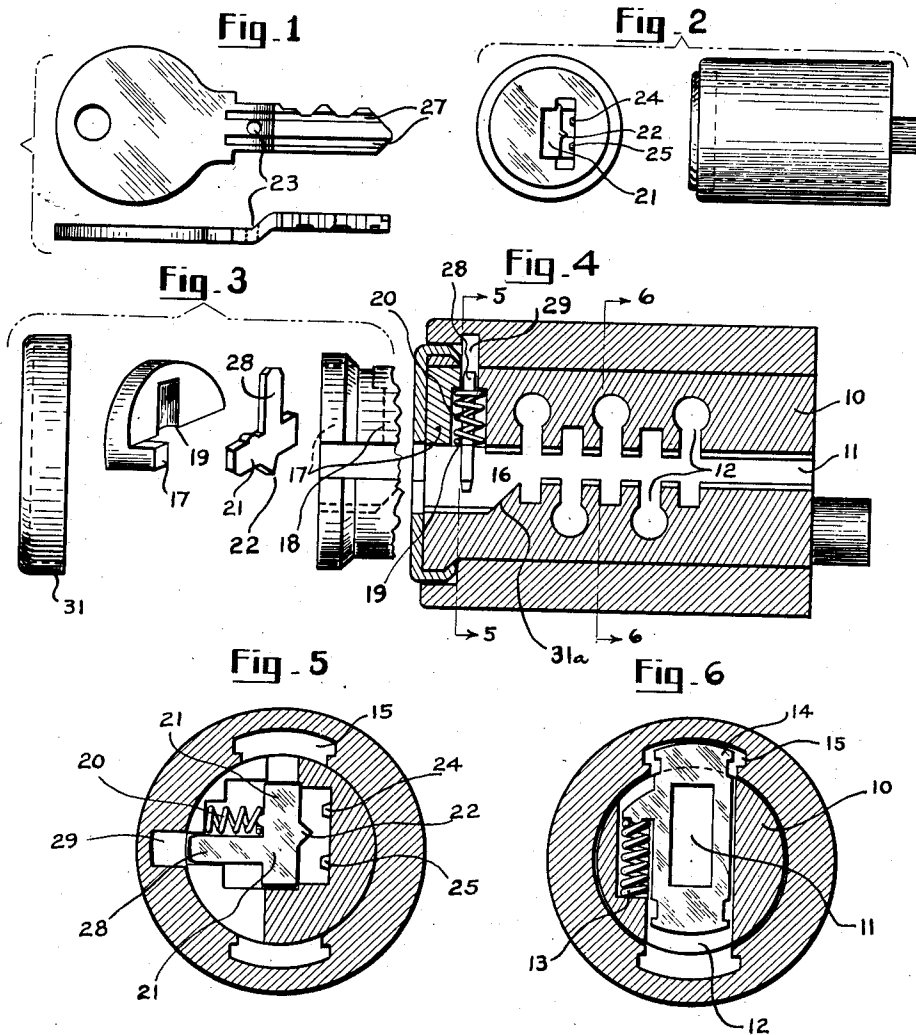
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LOCK

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LOCK

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This invention relates to anti-pick locks, and more especially to means for preventing the picking of cylinder plugs and particularly those of the sliding tumbler type. An object of our invention relates to the arrangement of a shutter adapted to operate in the keyway of a sliding tumbler plug, and to be actuated by a key in that plug, so that unless the proper key is utilized, it will be impossible to set the tumblers and rotate the plug in a conventional manner.

It is a further object of our invention to so design the shutter and the keyway cooperating therewith, that it will be relatively impossible to manipulate a picking tool in the keyway of the plug without forcing the shutter into a deadlocking position relatively to the plug and cylinder.

It is a further object of our invention to design a plug adapted for a key having parallel offset portions, and to preferably arrange the keyway so that it is of normal size in one part of the plug and is abnormally enlarged in another part of the plug, there being a shutter in the enlarged portion acting as a keyway determining member and adapted to limit the shape of the key which may be inserted into the lock to a key having the aforesaid offset parallel leg portions. It is a still further object of the invention to arrange the shutter of our plug so that it will cooperate with a considerable portion of the face of the key to determine the cross section of the key which is required for the plug.

Referring now to the drawing wherein a modification of our invention is shown, Fig. 1 shows a key adapted for the particular plug which we prefer to utilize. Fig. 2 illustrates front and side views of a cylinder lock showing the application of our invention. Fig. 3 shows parts of the cylinder constituting our invention in the order in which they are assembled. Fig. 4 is a sectional view of the plug and cylinder with the tumblers removed. Fig. 5 is a section along the lines 5-5 of Fig. 4, while Fig. 6 is a section along the lines 6-6 of Fig. 4.

Referring now more particularly to the drawing, and especially Fig. 4, it will be noted that we employ a plug 10 having a

keyway 11 through the major portion thereof, and a series of tumbler chambers 12 leading into the keyway and having tumblers therein adapted to be actuated by a key in a manner well known to those skilled in the art. Each of the tumblers is spring pressed by a spring 13 in an upward locking direction so that its head portion 14 locks into a groove 15. Preferably, the heads of the tumblers are shaped as shown in the form of a T, and cooperate with similarly formed complementary slots in the main cylinder slot 15, so that surreptitious rotation for picking purposes will interlock the tumblers securely to the cylinder.

The keyway 11 is of normal size for cooperation with the key of Fig. 1, but is enlarged at the front of the plug, so as to form a relatively wide portion 16. Preferably, the front end of the plug is formed by cooperation of an insert section 17 adapted to fit onto a cutaway portion 18 of the plug, so that the two will form the conventional type of plug front. The function of the two parts of the plug front is to form between them, an opening 19, this opening forming the bearing for a shutter 21 and a spring 20, which latter is adapted to press the shutter into the plug, as indicated in Figs. 4 and 5.

The end of the shutter cooperating with the key is equipped with a bit portion 22 which is adapted to ride against the side of the key until the hole 23 in the key comes opposite that bit. While the key is in contact with bit 22, it will force a leg portion 28 of the shutter into a cooperating slot 29 in the cylinder. Similarly, if any other portion of the shutter is contacted by an improperly shaped or manipulated tool or key, the portion 28 will be moved into the slot 29 to interlock the plug and cylinder. This acts to maintain the plug and cylinder against relative rotary movement during the insertion of the key and makes for easy key action because the tumblers do not ride hard against the walls of slot 15 as is the case when the key is inserted with an incidental slight turning of the plug. It also prevents the application of the rotary torque to the plug required to assist in the use of a picking tool

other than one shaped like the key. As will be indicated later, the shutter functions also to prevent the use of a picking tool even if shaped like the key of Fig. 1. Once the key
5 has been fully inserted, the hole 23 will correspond to the bit 22, and the leg portion 28 will be out of the slot 29, so that if the tumblers have been properly positioned, the plug will now be free for rotation relatively to the
10 cylinder.

As will be quite apparent, the operation of the shutter in cooperation with the enlarged portion 16 of the keyway, acts to so limit the longitudinal shape of the keyway
15 as viewed in Fig. 2 that it is necessary to use the offset key shown in Fig. 1. The key will properly be inserted against the bits 24 and 25 which ride in the grooves 26 and 27 of the key, guiding it until the end of the key abuts the sloping portion 31a from which point it
20 is guided into the narrow portion 11 of the keyway. In its final position, the key will have part thereof lying in the narrow opening portion below the shutter illustrated in Fig. 4, while its tumbler setting portion will
25 rest, in the keyway 11, thus forming in effect, a key having parallel leg portions and operating in a keyway of the same shape.

It will be furthermore apparent that the operation of the bit 22, and the bits 24 and 25 cast integrally with the plug will so limit the width of the keyway that the insertion
30 of a tool for surreptitiously setting the tumblers will be very difficult, and operation of that tool will more than probably cause movement of the shutter into a plug locking position thus preventing the application of
35 picking torque as has already been indicated. If a picking tool shaped like the key of Fig. 1 is utilized for picking the tumblers, it is quite obvious that any slight rotation of the plug from its position of Fig. 5, as will necessarily be required to apply picking torque
40 thereto, will lock the shutter 21 in positive offset keyway determining position, since the tongue 28 will be removed from opposite the slot 29. It will then be impossible to withdraw the key shaped picking tool, or to move
45 it backwards and forwards as is necessary if it is to act individually on the tumblers as is understood by those skilled in the art.

Preferably, also, an armor cap 31 is adapted to fit over the insert 17 and the plug 10
50 and to be pressed over as shown in Fig. 4 to protect the front of the plug, and hold the parts in assembled relation.

While we have shown a preferred modification of our invention, it should be understood that we consider it to be broad in character and believe ourselves entitled to dominate the modifications of the same which are
60 within the scope of the appended claims and which will readily occur to those skilled in the art.

We claim:

1. In a lock, a key plug having a keyway, said keyway being formed of laterally off-set parallel portions, and an angular communicating passage connecting said portions. 70

2. In a lock, a key plug having a keyway, said keyway being formed for cooperation with a key having laterally off-set parallel portions, and an angular communicating portion connecting said portions, a series of
75 tumbler chambers in said plug having tumblers operable by contact with one of said key portions, and a shutter located in said keyway and operable by the other of said key portions. 80

3. In a lock, a key plug having a keyway, said keyway having an opening extension of relatively greater cross-section than the main keyway, a movable shutter covering the
85 major portion of said enlarged opening, said lock being operable by a key adapted to enter said keyway through said opening, means on said shutter extending into the key, and means on said shutter adapted to lock the
90 plug when improperly positioned by said key.

4. In a lock, a key plug having a keyway, an enlarged front opening leading to said keyway, an obstruction in said enlarged opening adapted to control the admission of
95 a key into the keyway, and forming in effect, a plug keyway having laterally offset parallel portions, and an angular communicating passage connecting said portions. 100

5. In a lock, a key plug having a keyway, an enlarged front opening leading to said keyway, a movable obstruction in said enlarged opening adapted to control the admission of a proper key into the keyway and operable to prevent movement of said plug
105 if improperly positioned, said obstruction forming said keyway and enlarged opening, in effect, into a keyway having offset portions and an angular communicating passage connecting said portions. 110

6. In a cylinder lock, a key plug having a keyway, an enlarged front opening leading to said keyway, a series of tumbler chambers leading into said keyway, tumblers in said
115 chambers, a shutter in the enlarged opening of said keyway, means on said shutter adapted to lock the plug to the cylinder when actuated by an ordinary key or other instrument in the keyway, whereby said shutter acts to prevent effective operation of said tumblers
120 by any key other than one conforming to an opening into the keyway as defined by the shutter when it is in plug releasing position. 125

7. In a cylinder lock, a key plug having a keyway, a series of tumbler chambers leading into said keyway, tumblers in said chambers adapted to be set by a key in said keyway, an opening at the front of the plug leading into
130 said keyway, a spring pressed shutter for said opening adapted to confine the key entrance 135

so as to form in combination with the main keyway a composite keyway having portions of different configuration, and means on said shutter adapted to lock the plug to the cylinder when the key does not conform to the keyway entrance as defined by said shutter.

8. In a cylinder lock, a die cast key plug, a portion of the head of said plug being cut away, an insert adapted to fit against said cut away portion to complete the head, said insert and key plug forming at their junctions an opening for the operation of a shutter, a key operated shutter in said opening, and an armor cap over said insert and fitting the head of the plug to hold the insert, the shutter, and the plug in assembled relation.

9. In a lock, a key plug having a keyway, said keyway being formed of laterally offset parallel portions and an angular communicating passage connecting said portions, and key set locking elements in each of said parallel portions.

10. In a lock, a key plug having a keyway, said keyway being in the form of a continuous passage having portions thereof in different vertical planes, and key operated locking elements in each of said portions.

11. In a cylinder lock, a key plug having a keyway, said keyway having a front communicating portion leading into the main keyway, a series of tumbler chambers leading into said main keyway, tumblers in said chambers, a shutter in said front communicating portion, means on said shutter adapted to lock the plug to the cylinder when actuated by an ordinary key or other tool in the keyway, whereby said shutter acts to prevent effective operation of the tumblers by any key other than one conforming to an opening in the front communicating portion as defined by the shutter when in its plug releasing position.

12. In a lock, a key plug having a keyway, said keyway being formed of laterally offset parallel portions and an angular communicating passage connecting said portions, key set locking elements lying in chambers communicating with each of said parallel portions, said plug being cooperable with a key having also a pair of parallel portions and an angular portion connecting said parallel portions, each of said parallel portions being adapted for cooperation with said key set locking elements.

13. In a lock, a key plug having a keyway, said keyway being in the form of a continuous passage having parallel portions in different vertical planes, key operated locking elements in said portions, said elements being cooperable with a key having also parallel portions and an angular portion connecting said parallel portions, each of said parallel key portions being adapted for cooperation with said key operated locking elements.

14. In a lock, a key plug having a keyway

and an enlarged front opening leading to said keyway, a movable obstruction in said enlarged opening adapted to lock the plug against movement when improperly positioned and thereby adapted to control the admission of a proper key into the keyway, said obstruction forming said main keyway and enlarged opening, in effect, into a composite keyway having offset portions and an angular passage connecting said portions, means whereby said shutter is movable in the locked position of the plug to permit entrance of a key or tool having the offset shape of said keyway, and means whereby said shutter is locked in its keyway determining position upon even slight rotation of said plug so as to prevent outward movement of said key or tool.

15. In a cylinder lock, a key plug having a keyway, said keyway having a front communicating portion leading into the main keyway, a series of tumbler chambers leading into said main keyway, tumblers in said chambers, a shutter in said front communicating portion, means on said shutter adapted to lock the plug to the cylinder when actuated by an ordinary key or other tool in the keyway, said lock being cooperable with a key having a pair of portions one of which conforms to the keyway as defined by said shutter, the other of said key portions being adapted to ride in the main keyway and having a contour cooperable with the tumblers communicating with said main keyway.

16. In a lock, a key plug having a keyway and an enlarged front opening leading to said keyway, an obstruction in said enlarged opening adapted to control the admission of a key into the keyway, and forming said main keyway and enlarged opening, in effect, into a plug keyway having laterally offset parallel portions and an angular communicating passage connecting said portions, key set locking elements in the rearward of said parallel portion, said plug being cooperable with a key having a portion cooperable with said obstruction in said enlarged opening and a further portion cooperable with said key set locking elements for operating said key plug.

17. In a lock, a cylinder, a key plug in said cylinder having a main keyway and an enlarged front opening leading into said keyway, a key set element in said enlarged opening adapted to interlock with said cylinder except when in a predetermined releasing position, said element when in releasing position forming said plug keyway and enlarged opening in effect into offset portions connected by an angular portion, said element being readily movable to permit free access to the main keyway beyond the enlarged opening, when the plug is in locked position, said element being adapted to be locked in its offset keyway determining position when said plug is rotated even slight-

ly for the application of picking torque thereto.

18. In a lock, a cylinder, a key plug in said cylinder having a main keyway and an enlarged front opening leading to said keyway, tumblers in said main keyway interlocking with said cylinder, a movable key set element in said enlarged opening, a tongue on said element adapted to enter a slot in said cylinder to interlock said cylinder and plug except when said element is in predetermined releasing position, said element when in said releasing position forming said enlarged opening and said main keyway into a composite keyway having in effect offset portions connected by an angular portion, said element being readily movable to permit access to said main keyway for operating the tumblers therein, said movement being operable to force the tongue of said element into the cylinder slot, whereupon it prevents even such slight rotation of the plug as is required to apply picking torque thereto.

19. In a lock, a cylinder, a key plug in said cylinder having a main keyway and an enlarged front opening leading to said keyway, tumblers in said main keyway interlocking with said cylinder, a movable key set element in said enlarged opening, a tongue on said element adapted to enter a slot in said cylinder to interlock said cylinder and plug except when said element is in predetermined releasing position, said element when in said releasing position forming said enlarged opening and said main keyway into a composite keyway having in effect offset portions connected by an angular portion, whereby to permit operation of said plug tumblers by only a key or tool conforming to the offset shape required by said element, said element being movable to permit entrance of an offset key or tool into said composite keyway, the tongue of said element being removed from opposite its slot and acting to lock the element in its keyway determining position upon even such slight rotation as will be permitted by the normal play between the tumblers and the cylinder.

Signed at Stamford, in the county of Fairfield, and State of Connecticut, this 3rd day of December, 1931.

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