Sept. 9, 1969 J. McILVENNY 3,465,556

AXIAL TUMBLER CYLINDER LOCK WITH PICK GUARD

Filed Oct. 12, 1967

Fig. 1.

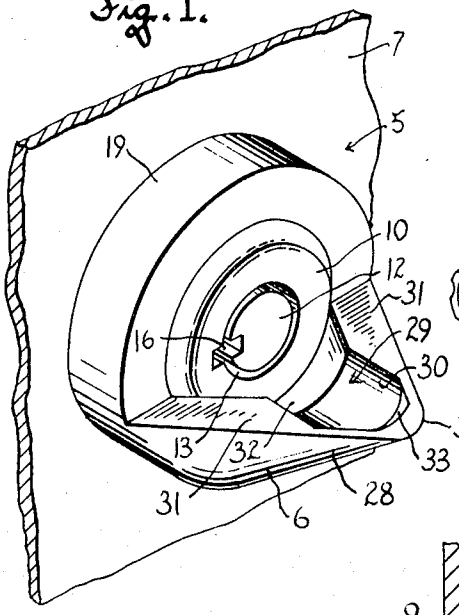


Fig. 2.

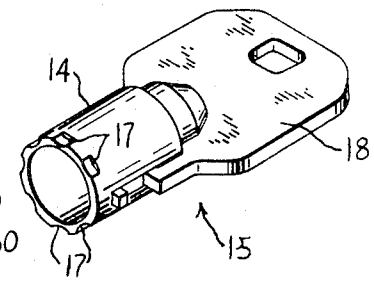


Fig. 3.

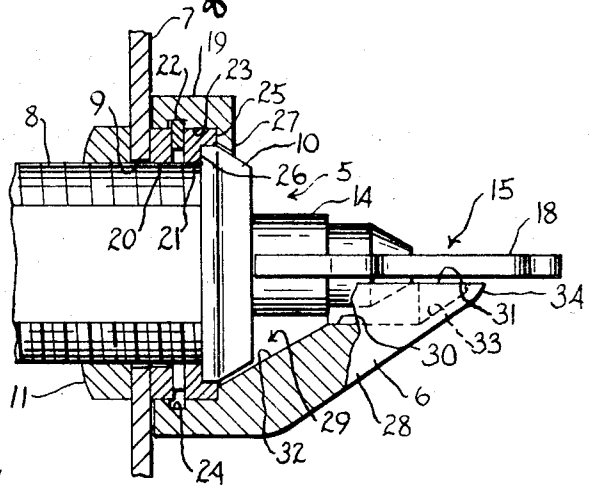
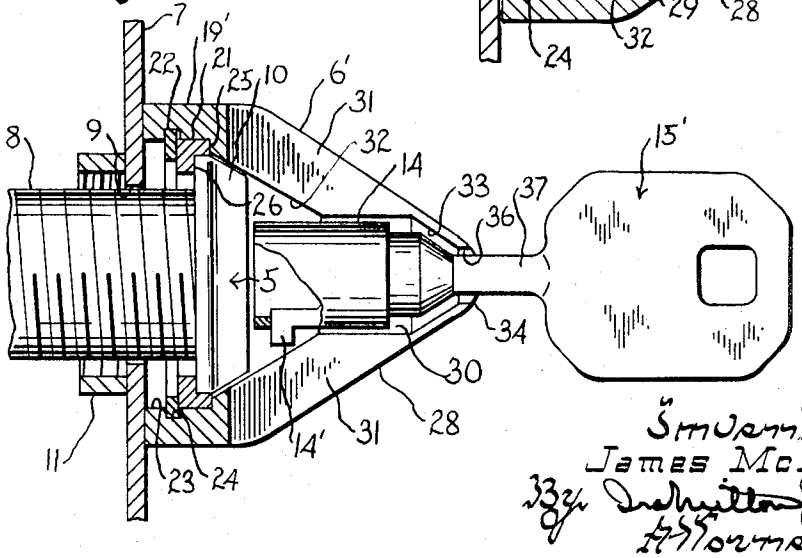


Fig. 4.



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AXIAL TUMBLER CYLINDER LOCK WITH PICK GUARD

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Int. Cl. E05b 17/14
U.S. Cl. 70—423 3 Claims

ABSTRACT OF THE DISCLOSURE

A pick guard on the body of an axial tumbler tubular key cylinder lock, at its front, projects forwardly therefrom at one side of the cylinder axis and has a cavity opening to the other side of said axis to enable a proper short tubular key to be moved sidewise into the cavity to a key inserting position directly ahead of the key slot in the mechanism. The front portion of the guard provides a barrier that precludes the longer tubular shank of a picking tool from the axial alignment with the key slot necessary for insertion of the tool into the slot.

This invention refers generally to key operated lock mechanisms, and has more particular reference to improvements in cylinder lock mechanisms of the axial tumbler type, which are controlled by a key having a short tubular shank with bitting on its extremity.

Tubular key cylinder locks of the type herein concerned are sold under the trademark "Gem" and "Ace," and are widely used on vending machines, for example, to prevent unauthorized access to the merchandise stored therein and/or to the coin boxes on such machines.

In emergencies, locksmiths are called upon to open locks of this type with picking tools designed especially for that purpose. Such tools, as disclosed in Gruber Patent No. 3,251,206 issued May 17, 1966, comprise a tubular shank several times longer than that of the keys for axial tumbler locks, and a number of elongated spring fingers corresponding to the number of tumblers in the lock and lengthwise manipulatable in slots extending along the periphery of the tubular shank.

It is inevitable, of course, that picking tools such as disclosed in Patent No. 3,251,206 eventually fall into the hands of unauthorized persons, or are made from the disclosure of the patent without the patentee's knowledge. In either instance, substantial losses by theft of coins and/or merchandise from vending machines usually results.

With this problem in mind, it is a general object of the present invention to provide an improved tubular key cylinder lock of the "Gem" and "Ace" type, which features a pick guard designed especially to defeat attempts at picking the lock with a tool such as described.

More specifically, it is a purpose of this invention to provide a pick guard for tubular key cylinder locks of the character described, which guard is in the nature of an attachment that can be applied to the locks without necessitating structural changes therein.

With these observations and objects in mind, the manner in which the invention achieves its purpose will be appreciated from the following description and the accompanying drawing. This disclosure is intended merely to exemplify the invention.

The drawing illustrates two complete examples of the physical embodiment of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

FIGURE 1 is a perspective view of a tubular key cylinder lock mechanism equipped with the pick guard of this invention, showing the mechanism mounted upon a panel;

FIGURE 2 is a perspective view of the tubular key by which the cylinder of the lock mechanism is actuated;

FIGURE 3 is a view of the lock mechanism, partly in side elevation and partly in longitudinal section, with the key in the lock, and showing how the pick guard is mounted on the front of the mechanism; and

FIGURE 4 is a view similar to FIGURE 3, but illustrating a modified embodiment of the invention, with a special key ready for insertion into the lock mechanism.

Referring now to the accompanying drawing, the numeral **5** generally designates a tubular key operated cylinder lock of the "Gem" and "Ace" type, having the pick guard **6** of this invention in place thereon. The lock mechanism has been shown mounted on a flat panel **7**, as is customary, with the body **8** of the lock projecting rearwardly through a hole **9** in the panel, and an enlarged head **10** on the body disposed at the front of the panel. A nut **11** threaded onto the body from its rear holds the mechanism in place on the panel. The body is held against rotation on the panel as by flattening opposite sides thereof and correspondingly shaping the panel hole **9**.

The lock mechanism includes a cylinder **12** which is rotatably mounted in the lock body coaxially of its head **10**, and which at the front of the lock mechanism, is spaced radially from the wall of a bore in the head to define an annular key receiving slot **13**. Axially movable tumblers, not shown, normally coact with the cylinder to prevent rotation thereof out of a locking position. As is usual, however, the tumblers are moved to a cylinder releasing position upon insertion of the tubular shank **14** of a proper key **15** into the key slot. The key has an internal lug **14'** such as seen in FIGURE 4, which engages in a keyway **16** extending lengthwise in the exterior of the cylinder, to enable rotation to be transmitted to the cylinder by the key.

The conventional key **15**, for a cylinder lock such as described, has a substantially short tubular shank of a diameter to loosely telescope over the cylinder **12**, and its bitting **17** is located around the periphery of its shank at the free end thereof. A flat handle **18** is fixed to the opposite end of the tubular shank to facilitate rotation of the cylinder by the key.

The pick guard **6** of this invention comprises a collar **19** which loosely encircles the head **10** and is mounted on the lock body for rotation coaxially of the cylinder **12** by means of a pair of washers **20** and **21** of equal diameter, and a spring ring **22**. The washers **20** and **21** are assembled over the body **8** from its rear, and both are received in a bore **23** in the collar, opening to its rear. The collar **21** abuts the underside of the head **10**, and the spring ring **22** is flatwise confined between the washers **20** and **21** with its peripheral portion loosely engaged in a groove **24** in the collar that opens to its bore. Accordingly, the washer **21** and the spring ring **22** behind it prevent forward displacement of the collar from the mechanism.

As best seen in FIGURE 3, the nut **11** threaded onto the rear of the lock body holds the washers **20–21** and the spring ring **22** between them, tightly axially confined

between the front of the panel **7** and the underside of the head **10** on the lock body without, however causing any clamping force to be exerted upon the collar. This leaves the collar free to rotate about the head **10**, in an orbit defined by the engagement of the spring ring **22** in the groove **23** of the collar.

The forward end of the bore **23** in the collar terminates at a shoulder **25** which faces rearwardly toward but does not necessarily have engagement with the adjacent washer **21**. As shown, however, the washer **21** can have a shallow counterbore **26** in its outer face to receive a portion of the enlarged head **10** on the lock body, and to bring its outer face into contiguity with the shoulder **25** on the collar.

On one longitudinal half of the collar, the shoulder **25** thereof comprises the rear surface of a short radially inwardly projecting flange **27** which extends over the forwardly tapered periphery of the head and defines the reaward limit of motion of the collar on the head. On its other longitudinal half, the collar is provided with a forwardly convergent wall or extension **28** that constitutes substantially one longitudinal half of a cone. The extension **28** has a cavity **29** therein coaxial with the cylinder, which opens toward the axis thereof and is shaped to nestingly receive the key **15**. This is to say that the key can be readily translated sidewise into the cavity from its open side, to a defined key inserting position at which its tubular shank is directly ahead of the front of the lock mechanism and coaxial with the cylinder thereof.

The key inserting position of the key is defined partly by a semicylindrical portion **30** of the cavity which is only slightly larger in diameter than the tubular shank **14** of a key received therein, and partly by coplanar surfaces **31** on the conical extension **28** at opposite sides of the cavity, which are adapted to be flatwise engaged by one flat side of the handle **18** on the key. The coplanar surfaces **31** are disposed in a plane spaced slightly from the cylinder axis, by a distance equal to about one-half the thickness of the key handle, so as to support the key with its tubular shank **14** coaxial with the cylinder **12** and key slot **13**.

The semicylindrical cavity portion **30** in the pick guard opens rearwardly to a conically shaped recess **32** which, in turn, opens rearwardly to the bore **23** in the collar. Hence, it will be seen that the conically shaped recess defines the inner edge of the flange **27** at the front of the collar. The semicircular portion **30** of the cavity also communicates with a forwardly convergent recess **33** at the front extremity of the pick guard, shaped to fit the reduced and substantially bullet-shaped end of the key shank at its junction with the handle **18**.

It is important to note the the flat surface areas **31** on the guard extend around and across the front end **34** of the pick guard to have engagement with one flat side of the key handle at a location slightly forwardly of the adjacent bullet-shaped end of the key shank **14**. The end **34** of the pick guard thus not only provides a barrier that prevents straight coaxial insertion into and/or removal of a proper tubular key **15** from the lock mechanism, but more important, the barrier precludes any possibility of coaxially aligning the much longer tubular shank of a picking tool with the cylinder and key slot. This results from the fact that the surface **31** at the front **34** of the guard is so close to the axis of the cylinder that it will cause the longer tubular shank of any improper key or picking tool to be disposed at such an angle to the cylinder axis as to most effectively prevent its insertion into the key slot.

It will also be noted that the flat key handle **18**, by its engagement with the flat surfaces **31** on the pick guard, is able to transmit rotation to the guard during locking or unlocking of the mechanism.

The modified pick guard **6'** shown in FIGURE 4 features a collar **19'** that is fixed against rotation relative to the head **10** of the lock mechanism, and requires a special key **15'**. As therein seen, the collar **19'** can be tightly non-rotatably clamped against the front of the panel **7** merely by elimination of the washer **20**. In this case also, the guard has a small semicylindrical recess **36** which opens through its front **34**, to freely rotatably receive a cylindrical stem part **37** on the key that joins its handle to the tubular shank thereof. The handle, of course, always lies entirely forwardly of the flat surfaces **31** on the guard in this embodiment of the invention, to allow the key to rotate relative to the pick guard.

From the foregoing description, together with the accompanying drawing, it will be readily apparent to those skilled in the art that this invention provides a pick guard that most effectively prevents unauthorized unlocking or picking of a tubular key cylinder lock of the "Gem" or "Ace" types by picking tools presently available.

What is claimed as my invention is:

1. An axial tumbler cylinder lock mechanism having a body in which the cylinder is mounted, and wherein a key having a short tubular shank is insertable into an annular key slot, in telescoping relation to the front of the cylinder, to free the cylinder for rotation to an unlocking position, characterized by:

(A) a collar encircling and mounted on the front portion of the body;

(B) means on the front portion of the body supporting the collar for free rotation relative thereto about an axis substantially coincident with that of the cylinder;

(C) cooperating abutment defining means on the front portion of the body and on the collar to prevent forward displacement of the collar from the body;

(D) and wall means fixed on the collar and projecting forwardly therefrom at one side of the cyilnder axis to provide a pick guard having a key receiving cavity therein which is coaxial with the cylinder and which opens laterally to the opposite side of the cylinder axis,

said wall means having a barrier portion at its front which extends crosswise of and close to the cylinder axis at a distance from the front of the lock mechanism only slightly greater than the length of the tubular shank of a proper key so as to require sidewise movement thereof into said key receiving cavity from the open side thereof and to block axial motion into the key slot of a picking tool having a tubular shank longer than that of a proper key,

said pick guard comprising one longitudinal half of a hollow cone having the collar as its base, and having forwardly convergent edge portions lying in a common plane parallel to and spaced from the cylinder axis a distance sufficient to accommodate a flat handle on a proper key for the mechanism and to support the key handle with the tubular shank of the key substantially coaxial with the cylinder,

whereby rotation will be transmitted to the collar by the key through the flat handle thereon.

2. The lock mechanism of claim **1**, wherein said collar has means thereon to engage the front portion of the body and prevent rearward displacement of the collar therefrom.

3. An axial tumbler cylinder lock mechanism having a body in which the cylinder is mounted and which, in turn, is securable in a hole in a panel upon tightening of a nut on the body against the rear of the panel, and wherein a key having a short tubular shank is insertable into an annular key slot, in telescoping relation to the front of the cylinder, to free the cylinder for rotation to an unlocking position, characterized by:

(A) a collar encircling and freely rotatably mounted on the front portion of the body;

(B) cooperating abutment defining means on the front portion of the body and on the collar to prevent forward displacement of the collar from the body,

portions of the abutment defining means on the body projecting rearwardly beyond the collar for engagement with the front of a panel on which the lock mechanism is mounted to prevent the collar from being nonrotatably clamped to the panel upon tightening of the nut securing the lock body to the panel;

(C) wall means fixed on the collar and projecting forwardly therefrom at one side of the cylinder axis to provide a pick guard having a key receiving cavity therein which is coaxial with the cylinder and which opens laterally to the opposite side of the cylinder axis,

said wall means having a barrier portion at its front which extends crosswise of and close to the cylinder axis at a distance from the front of the lock mechanism only slightly greater than the length of the tubular shank of a proper key so as to require sidewise movement thereof into said key receiving cavity from the open side

thereof and to block axial motion into the key slot of a picking having a tubular shank longer than that of a proper key; and

(D) force receiving means on said picked guard positioned to be engaged by a part on a key in place in the lock mechanism to have rotation transmitted thereto by the key.

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U.S. Cl. X.R.

70—452, 454

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(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,465,556 Dated September 9, 1969

Inventor(s) J. McIlvenny

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 2 "picking having" should read -- picking tool having --. Column 6, line 4 "picked" should read -- pick-

SIGNED AND
SEALED
FEB 17 1970

(SEAL)
Attest:

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Commissioner of Patents