Feb. 6, 1962 A. C. ROBERSON 3,019,634

KEY EJECTING MEANS

Filed May 22, 1959

Fig. 1

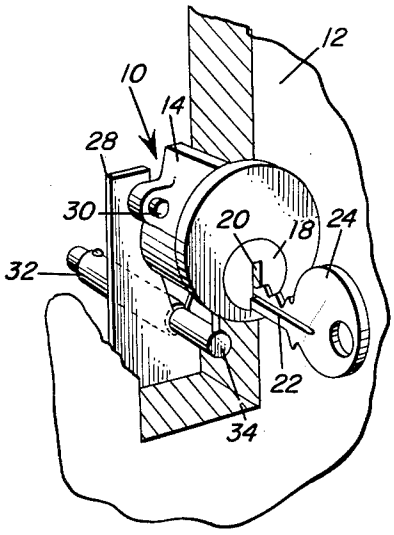


Fig. 2

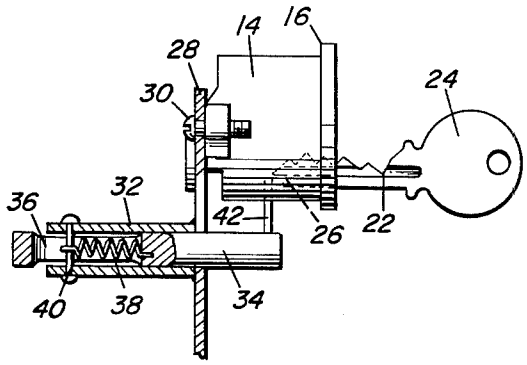


Fig. 7

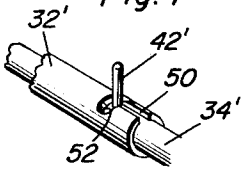


Fig. 3

Fig. 4

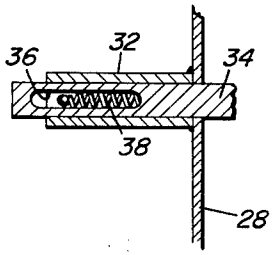


Fig. 5

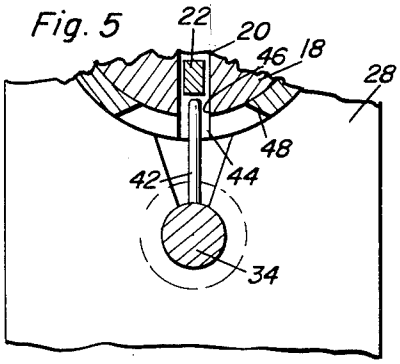
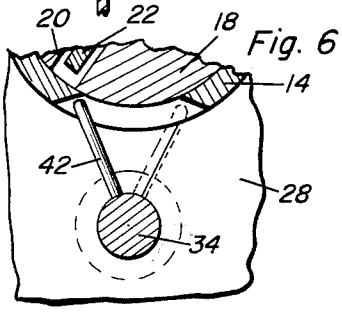


Fig. 6



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KEY EJECTING MEANS

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The present invention generally relates to a lock device and more particularly to a key ejecting lock which incorporates a structure for ejecting the key from the lock when the key is not in operative position.

It is a well known problem that keys are quite often inadvertently left in locks. For example, the ignition keys of automobiles are quite often left in the ignition switch lock which results in unauthorized use of a relatively large number of automobiles. This problem also exists on various other types of locks such as door locks, cabinet locks and the like. Heretofore, there have been attempts to provide a mechanism for forcing the key out of the lock when the key is in a neutral or inoperative condition. These previous devices generally fall into two categories with one category involving a spring mechanism disposed between the face of the lock and the handle portion of the key. The other category is the provision of a spring mechanism engaged with the end of the key with the spring generally being in coaxial alignment with the key. The major objection to these devices and the reason that they are not currently being used extensively is the continuous pressure on the key exerted at all times which causes excessive wear in the key and the mechanism of the lock associated with the key thus causing a relatively short life for the key and lock mechanism. Therefore, it is the primary object of the present invention to provide a key ejection lock in which the pressure of the spring ejecting means engages the inner end of the key when the key is in unlocked or inoperative condition with the pressure being transferred to the body or stationary part of the lock when the key is rotated to operating position thus eliminating the pressure on the key when the key is in operating or working condition.

A further object of the present invention is to provide a key ejection lock in which a spring urged plunger is mounted in parallel relation to the rotatable barrel or cylinder of the lock and includes a projecting pin extending laterally through a slot into engagement with the notched inner end of a key with the body of the lock having a transverse groove that will receive the pin when the pin is swung laterally thus receiving the pressure exerted by the pin as soon as the lock cylinder or barrel is rotated with the return rotation of the lock cylinder or barrel picking up the pin and swinging it back into position so that the key will be automatically ejected when the lock cylinder or barrel reaches a neutral or inoperative position.

Another object of the present invention is to provide a key ejection lock which is relatively simple in construction, easy to use, long lasting, well adapted for its particular purposes and generally inexpensive to manufacture.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawing forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of the key ejection lock of the present invention illustrating the same mounted in a closure member;

FIGURE 2 is a side elevation of the construction of the key ejection lock with portions thereof broken away

for illustrating the structural details of the device in key ejecting position;

FIGURE 3 is a view similar to FIGURE 2 but with the key pushed all the way inwardly for rotation and operation of the lock;

FIGURE 4 is a longitudinal sectional view of the spring urged plunger illustrating the construction thereof;

FIGURE 5 is a transverse sectional view illustrating the orientation of the spring urged plunger, pin, and key;

FIGURE 6 is a sectional view similar to FIGURE 5 illustrating the positions of the spring urged pin when the lock barrel or cylinder in the key are moved to operating position; and

FIGURE 7 is a fragmentary perspective view of a modified form of the ejector.

Referring now specifically to the drawings, the numeral 10 generally designates the key ejection lock of the present invention which for purposes of description are illustrated as being mounted in a closure member 12 which may be a door or the like but may also be any other type of supporting mechanism depending upon the use for which the key ejection lock is intended.

The key ejection lock 10 includes a housing 14 having a peripheral flange 16 at one end thereof and provided with a rotatable cylinder or barrel 18 which has a slot 20 for receiving the notched and grooved shank 22 of a key 24. The shank 22 of the key 24 is provided with a notch 26 in the outer end thereof with the notch 26 being disposed on the edge of the key remote from the transverse notches and recesses. As illustrated, the body 14 is attached to a backing or carrying plate 28 by screw fasteners 30 with the carrier plate 28 being secured and supported in any suitable manner.

The plate 28 is provided with a cylindrical member 32 extending in parallel relation to the body 14 and spaced vertically therebelow. The cylindrical member 32 slidably receives a plunger 34 having an elongated slot 36 therein. A coil spring 38 is anchored to a transverse member 40 carried by the cylindrical member 32 and extending through the slot 36. The other end of the spring 38 abuts the inner end of the closed end slot 36 thus resiliently urging the plunger 34 towards the body 14. As shown in FIGURE 3, the inner end of spring 38 has an offset longitudinal projection 39 received in a socket in plunger 34 whereby the spring urges the plunger to a normal angular position. The free end of the plunger 34 is provided with a radially extending pin 42 which extends through a longitudinal slot 44 in the bottom of body 14 and through a longitudinal slot 46 in the bottom of the barrel or cylinder 18 whereby the pin 42 may extend into the slot 20 and engage the recessed end 26 of the key 24.

The inner end of the body 14 is provided with a transverse slot 48 communicating with slot 44 for allowing swinging movement of the pin 42. Thus, when the key 24 is moved inwardly, the notch 26 will engage the pin 42 and force the plunger 34 in thus compressing the spring 38. When the key and the lock barrel 18 are turned, the pin 42 will swing arcuately out of the slot 46 and into the transverse slot 48 and engage the body 14 for transmitting the resilient force thereto during normal operation of the key. Thus, no pressure is exerted on the key except for during the initial swing of arcuate movement of the pin 42. Turning of the plunger 34 also tensions the torsion spring 38 about its longitudinal axis which urges the pin 42 towards a vertical position. This allows the pin to move completely out of the slot 46 which enables the barrel or cylinder 18 to turn to any angular position but still have the pin 42 re-enter the slot 46 when the barrel and key are moved to inoperative position.

The operation and structural details of the key and

lock are substantially conventional except for the notch **26** in the key shank and the plunger **34**, pin **42** and associated mechanism and the slots for receiving the pin **42**.

It is pointed out even when the spring **38** is fully extended as illustrated in FIGURE 2, there is still a relatively long bearing area of the plunger **34** within the cylindrical member **32** thereby preventing canting and binding of the plunger **34** when the plunger **34** moves longitudinally from the position illustrated in FIGURE 2 to the position illustrated in FIGURE 3.

FIGURE 7 illustrates a modified form of the device in which the cylindrical member **32'** has a longitudinal slot **50** therein which receives the pin **42'** on plunger **34'**. The inner end of slot **50** communicates with a transverse or arcuate peripheral slot **52** which receives the pin **42'** when the barrel **18** is rotated whereby the cylindrical member **32'** will take the longitudinal force exerted by the compressed spring. The length of the plunger and cylindrical member may vary as required.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A key ejection lock comprising a stationarily supported lock body, a rotatable lock barrel received within said body and including mechanism for preventing rotation of the barrel until a key is inserted into the barrel for releasing this mechanism, said lock body and barrel having a longitudinal slot therein, a spring urged plunger supported in parallel relation to the longitudinal axis of the barrel and body, a pin extending laterally from said plunger and projecting through said slots for engagement by the key when the key is inserted into the barrel and for ejecting the key from the barrel when the key is in inoperative position, said body having a transverse slot at the inner end of the longitudinal slot for receiving the pin when the barrel is rotated in either direction whereby the spring pressure will be transferred from the plunger to the body as long as the key is in operative position, spring means connected to said plunger and biasing said pin toward said barrel whereby the slot in the barrel will pick up the pin when the key is rotated to inoperative position thereby transferring the pressure to the key when the key is rotated to inoperative position.

2. The structture as defined in claim 1 wherein said plunger is supported in a longitudinally elongated cylindrical member with a portion of the plunger having substantial bearing engagement with the cylindrical member throughout the length of movement of the plunger, said spring means including a coil spring having one end anchored to the plunger, the other end of the spring being anchored to the cylindrical member thereby resiliently biasing the plunger and pin towards the face of the lock body, said coil spring tortionally biasing said plunger about its longitudinal axis and urging said pin towards said barrel.

3. In a lock mechanism having a rotatable barrel receiving a key, a spring biased pin extending radially into the barrel for engagement with the key and for ejection of the key when the key is in inoperative position within the barrel, means supporting said pin for movement in an arcuate swinging pattern for movement laterally away from the key and barrel when the key is rotated to operative position, said pin being spring biased about its axis of arcuate movement toward the barrel for movement into the barrel for engaging and ejecting the key when the key is moved to inoperative position.

4. A key ejection lock mechanism comprising a lock body having a rotatable cylinder therein and mounted to preclude longitudinal movement, said cylinder slidably receiving an operating key, spring operated means supported from the body and including a pin disposed in perpendicular relation to the axis of rotation of the cylinder, said body and cylinder having a longitudinal slot therein for movably receiving the pin with the pin extending into the path of the key thereby normally spring biasing the key outwardly of the cylinder, said body having a transverse slot at the inner end of the longitudinal slot whereby the pin may be swung laterally into the transverse slot for releasing the key and cylinder from the pin when the key is rotated to a functioning position thereby freeing the key and cylinder from axial spring pressure, said pin being spring biased towards the cylinder for urging the free end thereof into engagement with said slot in the cylinder when the key and cylinder are returned to neutral position.

5. The combination of claim 4 wherein said spring operated means includes a plunger carrying said pin, a longitudinal sleeve guide for said plunger, and slot means on the guide for engaging the pin when swung laterally out of the transverse slot and receiving the axial pressure exerted by the pin and relieving the lock mechanism from axial spring pressure when in operative position.

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