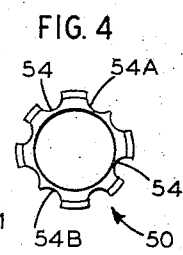
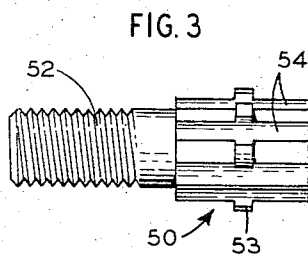
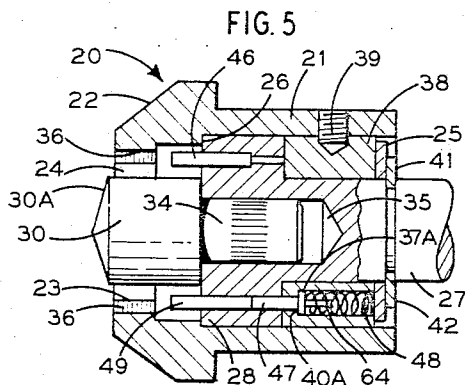
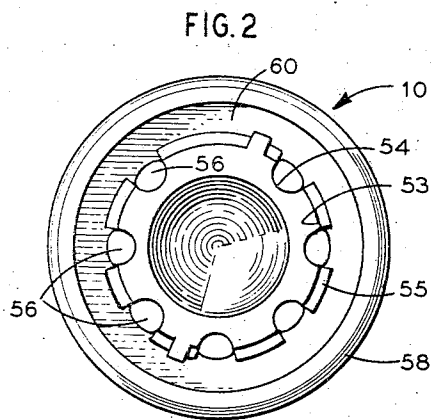
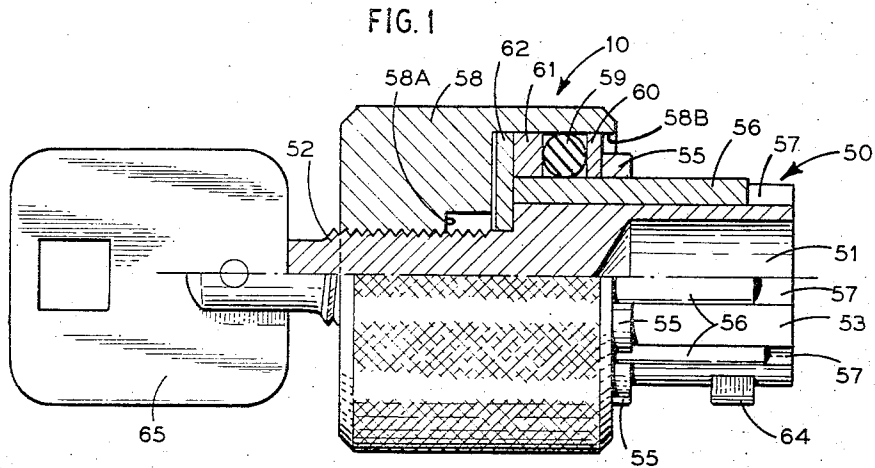


3,330,141

Filed Aug. 25, 1965



INVENTOR.

Harry Greenwald

BY

BY *Irving Seidman*
ATTORNEY

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3,330,141

RESETTABLE KEY

Harry Greenwald, Whitestone, N.Y., assignor of one-third to Louis Wolff and one-third to Harry Silbergait, both of Brooklyn, N.Y.

Filed Aug. 25, 1965, Ser. No. 482,417

10 Claims. (Cl. 70—411)

This invention relates to a resettable key, and more specifically to a key which can be readily adjusted or reset to accommodate the several various code pin combinations which can be set in a given rotary type, tumbler lock; or which can be readily adjusted to accommodate the various code pin combinations of several different locks.

Heretofore whenever the code pin combination of a given rotary type tumbler lock was changed or modified, it was necessary to have a completely new key constructed to accommodate the new tumbler code pin combination. For this reason whenever an operator of a mechanism, as for example a coin operated machine or vending machine on which rotary type tumbler locks are utilized, changed or altered the combination of the lock for reasons of security, it was necessary for the operator to make or secure an entire new key to accommodate the new combination. Consequently, since the operators of mechanisms, which utilized such rotary type tumbler locks, could not readily make or secure such keys, he was subjected to great inconvenience each time the combination of such lock was changed or altered. Because of the inconvenience created by the order of a key each time the combination of such locks were changed, many operators of vending machines have been reluctant to alter the combination thereof. Consequently, the security of these mechanisms would be put in jeopardy in that vandals and other unauthorized personnel would be provided with a greater opportunity in familiarizing themselves with a given lock combination. Also, if an operator owned several machines, each having a tumbler lock with a different code pin combination, he would need a different key for each lock. Consequently, the looking after and carrying of several different keys for the several locks resulted in obvious inconveniences and disadvantages.

It is, therefore, an object of this invention to provide a key construction for use in rotary type tumbler locks which are constructed and arranged so that it can be readily adjusted or reset to accommodate any of the various code pin combinations which can be set in a given lock and/or which is capable of functioning as a master key that can be readily set to operate on a number of different locks each having a different code pin combination.

Another object of this invention is to provide an improved resettable key construction adapted for use on a rotary tumbler lock in which the code pins of the lock are set before the key is engaged in driving relationship with the rotary member of the tumbler lock.

Another object of this invention is to provide a key construction for use with rotary type tumbler locks in which the seat portions of the key for effecting axially displacement of the code pins to set a tumbler lock can be readily adjusted to adapt the key to any code pin combination or to the given code combination of several distinct locks.

Another object of this invention is to provide a resettable key for use with rotary type tumbler locks in which the means for adjusting the seat portions of the key can be securely fixed in place in the adjusted position thereof in a relatively simple, expedient, and efficient manner.

Another object of this invention is to provide a re-

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settable key for operating on rotary tumbler type locks which is relatively simple in construction, relatively inexpensive to manufacture, and which is positive in operation.

The foregoing objects and other features and advantages are attained by a resettable key which is adapted to operate on a rotary tumbler type lock for opening and closing the same, that comprises a barrel portion which is received in the key way of the rotary tumbler lock. The barrel portion is provided with a plurality of longitudinally extending flutes circumferentially spaced about the outer surface of the barrel portion. In accordance with this invention a resettable pin is adjustably disposed within the respective flutes of the barrel. There is thus defined between the end of the barrel, adapted to be received in the key way of the lock, and the adjacent ends of the respective resettable pins seats or notches which are adapted to accommodate the respective extended portions of the code pins of an associated lock. The arrangement is such that when the key is inserted into the key way of the lock, the extended portions of the lock code pins are received in the seats defined about the leading end of the barrel. Upon inserting the key to its fullest extent, the corresponding code pins are axially displaced at an amount determined by the various lengths of seats thus formed about the circumference of the barrel.

A means is provided for securing the resettable pins in the adjusted position thereof within their respective flutes. The means for securing the pins comprises a collar which is axially movable along the barrel portion of the key. Cooperatively associated with the collar is a resilient means which is adapted to be confined within the bore of the collar for applying a holding force on the resettable pins in the operative position of the collar. The pins are thus frictionally maintained in the adjusted position thereof.

The means for applying the force comprises a resilient or elastic ring member which when confined is compressed so that it expands in a radially inwardly direction. The force of compression thus exerted holds the pins within the respective flutes thereof in the given adjusted position.

One of the flutes may be provided to effect the drive connection between the key and the rotary member of the tumbler lock whereby the torque in turning the key is transmitted to the lock to effect the operation thereof. Also the barrel portion of the lock may be provided with a means to effect alignment of the key with respect to the code pins of an associated lock.

A feature of this invention resides in a key construction, adapted to be used in a rotary type tumbler lock, having resettable pins to effect a change in the code pins seats which can be readily adjusted to accommodate the various code pins combinations.

Another feature of this invention resides in a relatively simple means by which the respective resettable pins of the key are firmly secured within the respective flutes of the key barrel in the adjusted position thereof.

Another feature of this invention resides in the ease in which the respective resettable pins of the key structure can be adjusted to accommodate a combination of a given lock.

Other features and advantages will become more readily apparent when considered in view of the drawings and specification in which:

FIGURE 1 illustrates a side view of the key construction of the instant invention having portions thereof shown in section.

FIGURE 2 is a front end view of the key construction of FIGURE 1.

FIGURE 3 is a detail side elevation view of a component part of the key structure.

FIGURE 4 is a right end view of FIGURE 3.

FIGURE 5 illustrates a cross-sectional view of a rotary tumbler type lock on which the key construction of FIGURES 1 to 4 is intended to operate.

Referring to the drawings there is shown in FIGURES 1 through 4 the improved resettable key construction of the instant invention. This key construction is adapted to operate on a tumbler type lock of the type disclosed in a co-pending application, Ser. No. 469,601, filed July 6, 1965.

Referring to FIGURE 5 the rotary tumbler type lock 20 on which the key 10 operates comprises essentially of a tubular housing 21 having a front face portion 22. The face portion 22 terminates in an inturned flange 23 to define a front opening 24. Between the opened ends of the housing 21 is a bore 25 for containing the component parts of the lock. The bore terminates in an internal shoulder 26 that is spaced inwardly from the inturned flange 23 of the front opening 24. Disposed within the bore 25 of the housing is a plug member 27. The plug member 27 is provided with a head end portion 28 and a connected stem portion 29 of reduced cross-section. As shown, the head end portion 28 is provided with an outer periphery which is sized to be received within the bore 25 of the housing with the front face of the head end portion 28 disposed in abutting relationship with the internal shoulder 26 of the housing. The arrangement is such that the plug member 27 is rendered free to rotate within the bore 25 of the housing. Connected to the head end portion of the plug is a key guide 30.

As shown, the enlarged end portion 30A of the key guide 30 is provided with a circumference which is spaced from the circumference defined by the flange 23. Thus an annular space 31 is defined between the exterior circumference of the key guide and the inner circumference of the inturned flange to define the key way or opening for receiving the cylindrical or barrel portion of the key 10, illustrated in FIGURES 1 through 4, and as will be hereinafter described. The shank 34 of the key guide 30 is force fitted into the bore 35 formed in the plug member.

The inturned flange 23 defining the front opening of the housing is further provided with notch portions that define a key way 36. As it will be hereinafter described, the key way 36 provides the means by which the key 10 is orientated with respect to the lock.

An annular type member 38 is mounted on the stem portion 29 of the plug 27 within the tubular housing 21. The arrangement is such that the front facing of the annular pipe member 38 is disposed contiguous to the head end portion 28 of the plug 27. The annular pipe member 38, in turn, is fixed against relative rotation with respect to the housing 21 by means of a set screw 39 which is threaded through a tap opening extending through a wall portion of the housing 21.

The annular pipe member 38 is provided with a plurality of circumferentially spaced bores 40 extending longitudinally therethrough. A washer 41 is positioned on the stem 29 of the plug member 27 contiguous to the rear facing of the pipe member 38 to form a base or bottom for the bores 40 extending through the pipe member. A retainer ring 42 secures the annular pipe member 38 and associated washer 41 in position on the stem 29 of the plug member 27. The extended end portion 29A of the stem 29 may be threaded for receiving a suitable lock washer or lock nut (not shown) by which the lock is secured to the cooperating mechanism of a vending machine which is also not shown.

The head end portion 28 of the plug member 27 is also provided with a plurality of longitudinally extending bores 43. As shown, a pair of opposed bores 44-45 are counter-bored for receiving a drive pin which has the head end portion extending outwardly of the head end portion 28 of the plug. The other bores 43 formed in the head end portion are disposed in axial alignment with the bores 40

of the annular pipe member in the locked position of the lock.

A lock pin 47 is disposed in each of the bores 40 of the pipe member 38. A means is provided for effecting positive retention of the lock pins 47 within each of the respective bores 40. The positive retention of the lock pins 47 in the bores 40 is accomplished by providing the bores 40 with an internal shoulder 40A, as by counterboring, and by providing the pin 47 with a complementary flange 47A adapted to butt against the shoulder 40A so formed. Interposed between the shoulder end 47A of the pin 47 and the washer 41 closing the rear end of the respective bores 40 is a resilient spring means 48 for normally biasing the pins 47. In the illustrated form of the invention, the spring means 48 comprises a coil spring which is utilized to normally urge or project the lock pin 47 into the aligned bores 43 of the head end portion in the locked position of the lock. The ends of the respective pins 47 projecting through the bore 40 of the pipe member and into the aligned bore 43 of the head end member serves to prohibit relative rotation between the plug member 27 and the annular pipe member 38.

Disposed within each of the aligned bores 43 of the head end portion is a code pin 49. It is understood that the code pins 49 are of different lengths. The arrangement is such that each code pin 49 is required to be set or axially displaced a predetermined amount so that each of the corresponding lock pins 47 are axially displaced a corresponding amount. When properly set, the adjacent abutting end portions of the respective cooperating lock pins 47 and code pins 49 are disposed in alignment with the respective contiguous face portions of the head end portion 28 of the plug member 27 and annular pipe member 38. Accordingly, rotation of the plug member relative to the pipe member can be affected upon turning of a key 10, as will be herein described, when the abutting ends of the pins 47, 49 aligned with the contiguous face of members 28 and 38.

Referring to FIGURES 1 through 4, there is shown the improved resettable key 10 which is adapted to be utilized to operate on the lock 20 described with respect to FIGURE 5. The key 10 can be readily reset for use with the lock construction described regardless of the various code pin combinations which can be set in the lock. Conversely, the key construction 10, as will herein after be described, can be also adapted as a master key which can be adjusted to accommodate the code pin combination of several different locks, each having different code pin combinations.

This is attained by providing a key member 50 with a barrel end portion 51 and connected threaded stem portion 52. As best seen in FIGURES 1 and 3, the barrel end portion 51 of the key member is provided with a plurality of longitudinally extending lands 53 and grooves 54 to define a plurality of flutes circumferentially spaced about the circumference of the barrel. Intermediate the ends of the lands 53 and integrally formed therewith are a plurality of raised projections 55 to define an annular stop.

In accordance with this invention, a resettable pin 56 of predetermined length is adjustably disposed in each of the flutes 54 defined about the barrel portion 51 of the key 10. As it will be noted in FIGURE 1, the respective key pins 56 are provided with a length which is less than that of the length of the flute 54. Accordingly, the respective pins 56 may be adjustably positioned longitudinally of its respective flutes 54 to define between the front end of the barrel 51 and the adjacent pin ends 56 a seat or notch 57 adapted to accommodate a corresponding code pin 49 of the associated lock 20. It will thus be noted that by adjustably positioning the respective key pins 56 along the length of their respective flutes 54, that the length of the notch or seat 57 defined adjacent the front end of the barrel 51 can be varied to accommodate the projecting length of the locks code pin 49 in a specific

code pin setting thereof. Also, the arrangement of the respective resettable key pins 10 is such that the outer circumference thereof extends slightly beyond the land portion 53 disposed between adjacent grooves or flute 54.

A clamping collar 58 is threaded to the threaded stem portion 52 of the key 10. As shown, the collar 58 is provided with a hub portion 58A which is integrally threaded to accommodate the external threads of the stem portion 52. The collar 58 is also provided with a bore 58B adapted to enclose the means for securing the respective key pins 56 in their adjusted position. As shown, means for fixedly securing the key pins 56 in their adjusted positions within their respective flutes comprises a resilient ring member 59, as for example an O ring, which is constructed to circumscribe the barrel portion 51 of the key and the resettable key pins 56. Disposed on either side of the ring member 58 are pressure washers 60 and 61. Accordingly, pressure washer 60 is disposed so as to be contiguous or in abutting relationship to the stop means 55. The other pressure washer 61 is disposed in contiguous relationship to a back-up washer 62 which is located adjacent the base or bottom of the bore 58B defined within the lock collar 58. Accordingly, the arrangement is such that whenever the collar 58 is threaded onto the stem 52 of the key 10 to an operative position, the displacement of the collar 58 relative to the stem 51 is such that the resilient member 59 is compressed between the pressure washers 60-61 therein, thus causing the resilient member 59 to be expanded in a radially inward direction to frictionally engage or secure the respective resettable key pins 56 in their respective adjusted position within their respective flutes 54. By loosening the collar 58, as by backing the collar 58 off the threaded shank 52 releases the compression imposed by the resilient member 59 on the pins 56, thereby causing the resettable pins 56 to become loosened within their respective flutes 54. Accordingly, with the lock collar 58 threaded back onto the shank of the key, the respective key pins 56 can be adjusted within their respective flutes 54 to any relative desired position so as to establish the necessary code pin seats 57 about the front portion of the barrel to accommodate the code pins 49 of a given lock accordingly. Thus, with the key pins 56 set, the lock collar 58 as it is screwed toward the barrel end of the key causes the resilient ring 59 to compress and secure the key pins 56 in the adjusted position thereof.

The arrangement is such that a pair of oppositely disposed flutes 54A, 54B may be utilized to engage the drive pins 46 of the lock 20 whenever the key 10 is inserted into the key way 24 of the lock.

To orientate the respective code pin seats 57 formed about the barrel portion 51 of the key 10 to the corresponding code pins 49 of the lock, a radially extending lug 64, is provided. The key is properly orientated when the lug is received in the guide way 36 of the lock 20. If desired, a handle 65 may be secured to the end of the threaded shank 52 to facilitate ease in turning the key.

As described in co-pending application, Ser. No. 469,601, filed July 6, 1965, the arrangement is such that the engagement of the opposed seats, defined by opposed flutes 54A, 54B, of the key, with the drive pins 46 of the plug member is not affected until each of the respective seats 57 of the key 10 makes engagement with corresponding code pins 49 of the lock to set the same. Thus, the torque applied to the key 10 upon turning thereof cannot be imparted to the rotary portion 28 of the lock 20 until all of the lock code pins 49 have been set.

While the instant invention has been described as providing drive pins 46 cooperating with corresponding flutes 54A, 54B formed in the barrel portion 51 of the key 10 to affect the drive of the lock member, it will be apparent that in lieu of the drive pins 46, the drive between the key 10 and the rotary member 28 of the lock 20 can be affected by providing one or more of the lock code pins 49 with an extended length, and utilizing this extended

length as a means for effecting the drive between the key 10 and the lock 20. In this manner, a given lock may be provided with a greater number of possible combinations in that the number of code pins possible is increased.

From the foregoing, it will become readily apparent that whenever the combination of a given lock 20 has been changed by an operator of a vending machine on which such locks are utilized, the vendor need not require the manufacturer of the lock to supply new keys. All that the vendor now has to do is to reset the key pins 56 to accommodate the new or reset code pin 49 combination of the lock. This is readily attained simply by backing off the lock collar 58 to release the key pins 56 and thereby adjusting the key pins 56 in accordance with the changed code pin combination of the lock. With the pins 56 of the key so set the collar 58 is threaded onto the stem to fixedly secure the respective key pins in place within their respective flutes. Thus, a relatively simple and easily adjusted key is provided which can be readily set to the given combination of a lock.

The key construction 10 described may be further utilized as a master key to open any number of locks having different code pin combinations simply by adjusting the resettable pins 56 of the key to the code pin combination of a given lock. With the code combinations of any given lock known, the resettable pins 56 of the described key can be readily set and fixed in position to operate on the lock.

While the instant invention has been described with reference to a particular embodiment thereof, it will be readily appreciated and understood that variations and modifications of the same may be made without departing from the spirit or scope of the invention.

What is claimed is:

1. A resettable key for operating on a rotary tumbler type lock having code pins, said key comprising:

(a) a barrel portion adapted to be received in the keyway of a rotary tumbler lock,

(b) said barrel portion having a plurality of longitudinally extending flutes formed in the surface thereof,

(c) said flutes being circumferentially spaced about said barrel portion,

(d) a plurality of similarly constructed resettable pins, one of said resettable pins being adjustably disposed in each of said flutes of said barrel portion whereby ends of said pins can be individually spaced from the end of said barrel portion to define therebetween variable length seats adapted to accommodate the code pins of said lock, and

(e) securing means for securing said resettable pins within their respective flutes in their respective set positions, said securing means including a compressible means for frictionally securing each of said resettable pins in their respective set position.

2. The invention as defined in claim 1 wherein said securing means includes:

(a) a clamping collar mounted for axial movement along said barrel portion between an operative and inoperative position, and

(b) and said compressible means being confined within said collar applying a force on said resettable pin in the operative position of said collar to frictionally secure the respective resettable pins in their adjusted position.

3. A resettable key for operating on a rotary tumbler type lock having code pins, said key comprising:

a barrel portion adapted to be received in the keyway of a rotary tumbler lock,

said barrel portion having a plurality of longitudinally extending flutes formed in the surface thereof,

said flutes being circumferentially spaced about said barrel portion,

a plurality of resettable pins, one of said resettable pins being adjustably disposed

in each of said flutes of said barrel portion whereby the ends of said pins can be individually spaced from the end of said barrel portion to define therebetween variable length seats adapted to accommodate the code pins of said lock, and

means for securing said resettable pins within their respective flutes in their respective set positions, said latter means including a clamping collar mounted for axial movement along said barrel portion between an operative and inoperative position, and means confined within said collar for applying a force on said resettable pins in the operative position of said collar to frictionally secure the respective resettable pins in their adjusted position, said force applying means including:

a resilient ring member circumscribing said barrel and the pins adjustably positioned in the flutes thereof, stop means formed on said barrel portion against which said resilient ring is urged in the operative position of said collar so that the confinement of said ring between the stop means and the collar as said collar is moved toward operative position causes said ring to expand in a radially inward direction to exert force on the pins in said flutes.

4. The invention as defined in claim 3 and including:

(a) a threaded stem connected to said barrel, and

(b) said collar being threaded to said stem for movement between operative and inoperative position.

5. The invention as defined in claim 4 and including a lug extending radially of said barrel to facilitate aligning said key relative to the key way of a lock so that the code pin seats defined about the end of the barrel are properly orientated with respect to the complementary code pins of a given lock adapted to be received in said seats.

6. The invention as defined in claim 5 and including a handle means secured to the end of said threaded stem.

7. A resettable key adapted to be used in opening and closing a rotary tumbled lock having code pins, said key comprising:

(a) a shank having a barrel portion formed with a plurality of longitudinally extending flutes circumferentially spaced about the outer surface of said barrel portion,

(b) first means adjustably disposed in each of said flutes to define variable length pin seats about the end of said barrel portion adapted to receive and accommodate the code pins of said lock, and

(c) second means including a collar and a resilient means confined therein for fixedly securing the adjusted position of said first means within their respective flutes.

8. The invention as defined in claim 7 wherein one of said flutes defines a means for effecting a drive between said key and the rotary portion of a lock adapted to open with said key.

9. A resettable key adapted to be used in opening and closing a rotary tumbler lock having code pins, said key comprising:

a shank having a barrel portion formed with a plurality of longitudinally extending flutes circumferentially spaced about the outer surface of said barrel portion,

first means adjustably disposed in each of said flutes to define variable length pin seats about the end of said barrel portion adapted to receive and accommodate the code pins of said lock, and

second means for fixedly securing the adjusted position of said first means within their respective flutes, said first means includes:

a resettable pin in each of said flutes, said pin having a circumference wherein a portion thereof extends slightly beyond the circumference of said barrel portion,

and said second means includes a resilient ring circumscribing said pins and barrel adjacent the rear end of said barrel portion, and

a collar for wedging said ring against said pins to frictionally secure said pins within their respective flutes in the adjusted position of said pins.

10. A resettable key for operating on a rotary tumbler lock having code pins and a drive member, said key comprising:

(a) a key member including a barrel end portion and a connected threaded shank portion,

(b) said barrel portion having a plurality of longitudinally extending lands and grooves defining a series of axially extending flutes circumferentially spaced about the exterior surface thereof,

(c) a pin disposed in each of the flutes of said barrel portion,

(d) said pins having a length which is less than the length of its respective flute and a thickness sufficient to have the circumferential portion of said pins extending slightly beyond the land circumference of said barrel portion,

(e) an annular stop means connected to the barrel portion,

(f) said pins being adjustably set within their respective flutes whereby the end of said barrel portion and the adjacent ends of said pins are spaced to define a seat adapted to accommodate the extended length of the code pins of said lock,

(g) said means for aligning the flutes of said barrel portion with the code pins of a given lock,

(h) and second means for securing the adjustment of said resettable pins within their respective flutes,

(i) said second means including a pair of spaced apart pressure washers circumscribing the barrel portion and the resettable pins,

(j) one of said washers abutting against said annular means,

(k) a resilient ring wedged between said pressure washers,

(l) and a clamp collar threaded to a threaded shank portion of said key member,

(m) said collar having a bore arranged to confine said resilient ring therein between said pressure washers,

(n) said collar when operative causing said resilient ring to expand when wedged between said pressure washers to frictionally secure the resettable pins within their flutes,

(o) one of said flutes being adapted to engage the drive member of said lock to transmit a torque there-to when the key is turned, and

(p) a handle connected to the end of said threaded shank portion.

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MARVIN A. CHAMPION, *Primary Examiner*.

EDWARD C. ALLEN, *Examiner*.

P. TEITELBAUM, *Assistant Examiner*.