ABSTRACT

An apparatus and method for changing the combination on a cylindrical lock. An adaptor has a blank key with ribs slidably mounted thereto. A keyhole in the adaptor receives an original ribbed key which positions the ribs on the blank key in a manner identical to the positioning of the ribs on the original key. The blank key inserted in the cylindrical lock is then turned and the original key withdrawn from the adaptor. A new key is then inserted in the adaptor relocating the tumblers within the cylindrical lock and changing the combination of the lock. The adaptor and new key are rotated back to an original position and withdrawn from the lock.

7 Claims, 7 Drawing Figures
CYLINDRICAL LOCK COMBINATION CHANGER

BACKGROUND OF THE INVENTION

1. Field of the Invention
This invention is in the field of cylindrical combination locks.

2. Description of the Prior Art
The U.S. Pat. Nos. 2,423,734 and 2,424,514 issued to B. Sterner disclose a ribbed key which is insertable into a cylindrical combination lock. The lock includes a spring biased bits which are positioned by the ribs of the key to a location adjacent tumblers within the lock thereby allowing rotation of the inner cylinder with respect to the outer cylinder of the lock. It is desirable to provide an apparatus and method which will conveniently allow for the change of the combination of the cylindrical lock without necessitating removal of the lock. Disclosed herein is such a method and apparatus.

SUMMARY OF THE INVENTION

One embodiment of the present invention is an adapter insertable into a first keyhole of a cylindrical combination lock to change the combination thereof corresponding from an original longitudinally ribbed key to a different longitudinally ribbed key comprising a main body having a blank key fittable into the keyhole and a key receiving housing attached to the blank key, the housing having a second keyhole sized to receive the original key and subsequent to the removal of the original key to then receive the different key, the blank key having at least one side with channels extending longitudinally thereon, a plurality of bits slidably mounted in said channels, a plurality of pushers connected to the bits and projecting into the second keyhole to contact ends of ribs of a ribbed key inserted into the second keyhole, and means within the main body and in contact with the pushers being operable to position the bits on the blank key in a manner identical to the positioning of ribs on a ribbed key inserted into the second keyhole.

Another embodiment of the present invention is a method of changing the combination on a cylindrical lock from the combination corresponding to an original key to a combination corresponding to a new key, the lock includes a fixed outer cylinder, an inner cylinder rotatably mounted in the outer cylinder and having a first keyhole, tumblers slidably mounted in the outer cylinder, adjustable bits slidably mounted in the inner cylinder, pusher means connected to the bits and projecting into the keyhole to be contacted by ribs of a ribbed key inserted into the keyhole and operable to align the bits with the tumblers to allow rotation of the inner cylinder, comprising the steps of inserting an adaptor having a blank key with movable ribs into the keyhole, inserting the original key into the adaptor aligning the bits with the tumblers, turning the original key from the original position to rotate the inner cylinder and position the bits on the tumblers, withdrawing the original key from the keyhole, inserting the new key into the adaptor to locate the bits and tumblers to a position corresponding to the new combination, turning the new key to rotate the inner cylinder back to the original position, and withdrawing the adaptor from the keyhole.

It is an object of the present invention to provide an apparatus for changing the combination of a cylindrical combination lock.

Related objects and advantages of the present invention will be apparent from the following description.

BRIEF DESCRIPTION OF THE DRAWINGS
FIG. 1 is a side view of a key for use with the lock of FIG. 3.
FIG. 2 is a cross sectional view taken along the line 2-2 of FIG. 1 and viewed in the direction of the arrows.
FIG. 3 is a fragmentary longitudinal section taken through a cylindrical lock with only one pusher and tumbler illustrated for purposes of clarity.
FIG. 4 is a transverse section taken along the lines 4-4 of FIG. 3 and viewed in the direction of the arrows.
FIG. 5 is a side view of an adaptor incorporating the present invention.
FIG. 6 is a top view of the adaptor of FIG. 5.
FIG. 7 is a cross sectional view taken along the line 7-7 of FIG. 5 and viewed in the direction of the arrows with a key shown inserted into the adaptor and the adaptor inserted in the lock of FIG. 3.

DESCRIPTION OF THE PREFERRED EMBODIMENT

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alternations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now to FIGS. 1 and 2, there is shown a key which is disclosed in the U.S. Pat. No. 2,423,734 issued to B. Sterner. Said U.S. Pat. No. 2,423,734 is hereby incorporated by reference. Key 10 includes a handle portion 11 which is connected to the shank portion 12. Shank portion 12 includes a plurality of grooves 13 which are positioned on each side of shank 12. A plurality of ribs 14 are mounted to shank 12 and are positioned within grooves 13. In the embodiment of the key shown in FIGS. 1 and 2, the opposite sides of shank 12 are each provided with 3 separate grooves providing a total of six grooves 13. Each groove is provided with a separate rib 14 providing a total of six ribs. The ribs extend from the handle portion of the key towards end 15 with each rib terminating at a specific location between the ends of the key corresponding to the combination of the lock shown in FIGS. 3 and 4.

Lock 20 (FIGS. 3 and 4) is disclosed in the U.S. Pat. No. 2,424,514 issued to B. Sterner. U.S. Pat. No. 2,424,514 is hereby incorporated by reference. Lock 20 is cylindrical in configuration and includes a fixed outer cylinder 21 and an inner cylinder 22 rotatably mounted in the outer cylinder. Inner cylinder 22 is provided with a keyhole 23 for receiving key 10. A plurality of grooves 24 extend longitudinally on the inner surface of outer cylinder 21 and are spaced equally around keyhole 23. A plurality of tumblers 25 are slidably mounted in grooves 24. A plurality of adjustable bits 26...
are slidably mounted to inner cylinder 22 with each adjustable bit being integrally connected by walls 27 to a plurality of pushers 28 slidably mounted to the inner cylinder and projecting into keyhole 23. In the embodiment shown in FIGS. 3 and 4, a total of six tumblers 25, six adjustable bits 26, and six pushers 28 are employed. Likewise, six ribs are provided on key 10 for contacting the six pushers 28 as the key is inserted in keyhole 23 thereby aligning the adjustable bits 26 with the tumblers 25 to allow rotation of the inner cylinder with respect to the outer cylinder as described in the aforementioned U.S. Pat. No. 2,424,514. In the event that only four ribs are provided on key 10, then only four tumblers, four adjustable bits and four pushers are provided in lock 20.

Lock 20 may be locked or unlocked by turning key 10 while the key is positioned within the lock. The ribs 14 of key 10 align the adjustable bits 26 with tumblers 25 to allow rotation of the inner cylinder with respect to the outer cylinder. In the event that ribs 14 are not of the correct length to position adjustable bits 26 adjacent to tumblers 25, then the adjustable bits will contact the tumblers and prevent rotation of the inner cylinder with respect to the outer cylinder.

Shown in FIGS. 5 through 7, is an adaptor 30 which is used to change the positioning of tumblers 25 and thereby allow for the changing of the combination of the cylindrical lock. Adaptor 30 includes a main body having a blank key 31 fitted into keyhole 23 of lock 20. A key receiving housing 32 is attached to blank key 31 and is provided with a second keyhole 33 sized to receive key 10.

Blank key 31 is provided with a pair of opposite sides 34 and 35 with each opposite side having three grooves extending the length thereof. For example, side 35 is provided with three grooves 36 for receiving three slidably mounted ribs 37 which are normally positioned within housing 32. Each rib 37 includes an enlarged head 38 with a helical spring 39 positioned between each head 38 and the inside surface 40 of wall 41 of housing 32. Each rib 37 projects through a spring 39.

Wall 40 is provided with suitable apertures to allow ribs 37 to slide therethrough as springs 39 are compressed. Heads 38 project into keyhole 33 (FIG. 6) so as to contact the ends of the ribs provided on the key inserted into keyhole 33. A separate helical spring 39 is provided for each rib 37. The helical springs normally urge ribs 37 away from blank key 31 and into housing 32. The springs are yieldable to allow the ribs of a ribbed key inserted into keyhole 33 to contact heads 38 and push ribs 37 outwardly in grooves 36. In the embodiment shown in FIGS. 4 through 7, three ribs are provided on each side of blank key 31 to allow use of the adaptor with the lock shown in FIGS. 3 and 4. In the event that the cylindrical lock is provided with only four tumblers and four adjustable bits, then only four ribs are provided on blank key 31 of adaptor 30.

The method of changing the combination of lock 20 from the combination corresponding to an original key to a combination of a new key has as a first step the insertion of adaptor 30 into keyhole 23 of the lock. The original key is then inserted into adaptor 30 positioning ribs 37 along the length of blank key 31 in a manner identical to the positioning of the ribs along the original key such as shown in FIG. 7. As a result, the adjustable bits 26 will be aligned with tumblers 25 in a manner identical to the alignment existing if the original key were inserted directly into cylindrical lock 20 instead of being inserted into adaptor 30 which has been inserted into the cylindrical lock. The original key is then turned along with adaptor 30 to rotate the inner cylinder and position the adjustable bits 26 on tumblers 25 as shown in FIG. 7. The original key is then withdrawn from adaptor 30 and a new key is inserted into the adaptor. Prior to the insertion of the new key, the helical springs (FIG. 3) within lock 20 will force tumblers 25 and adjustable bits 26 to a position immediately adjacent the forward wall 43 of the lock thereby erasing the combination existing within the lock corresponding to the original key. Thus, when a new key is inserted into the adaptor, ribs 37 will move to a position along blank key 31 identical to the positioning of the ribs of the new key. Ribs 37 will contact pushers 28 and move the adjustable bits 26 and tumblers 25 to a new position corresponding to the new combination of the new key inserted into the adaptor. The new key and adaptor may then be rotated back to the original position and the adaptor withdrawn from keyhole 23 thereby locking the new combination within the lock corresponding to the positioning of the ribs on the new key. The new key may be withdrawn from adaptor 30 immediately prior to withdrawing the adaptor from the lock and immediately subsequent to rotating the new key and adaptor back to the original position.

Blank key 31 is attached to surface 47 of wall 41 and is provided with opposite edges 44 and 45 with aligned notches 46 formed thereon. Notches 46 engage a disc 47 surrounding the keyhole 23 of lock 20. The disc is not shown in FIG. 3. It is slotted at the opposite edges of the keyhole to allow insertion of the key and to prevent removal of the key other than when the key inserted into keyhole 23 is in the original position.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention are desired to be protected.

The invention claimed is:

1. An adaptor insertable into a first keyhole of a cylindrical combination lock to change the combination thereof corresponding from an original longitudinally ribbed key to a different longitudinally ribbed key comprising:

a main body having a blank key fitted into said keyhole and a key receiving housing attached to said blank key, said housing having a second keyhole sized to receive said original key and subsequent to the removal of said original key to then receive said different key, said blank key having at least one side with channels extending longitudinally thereon;

a plurality of bits slidably mounted in said channels;

a plurality of pushers connected to said bits and projecting into said second keyhole to contact ends of ribs of a ribbed key inserted into said second keyhole; and,

means within said main body and in contact with said pushers being operable to position said bits on said blank key in a manner identical to the positioning of ribs on a ribbed key inserted into said second keyhole.
3,868,838

2. The adaptor of claim 1 wherein:
said means includes a plurality of helical springs
mounted in said housing normally urging said pushers
away from said blank key and said bits into said housing but yieldable to allow ribs of a ribbed key
inserted into said second keyhole to contact said pushers and push said bits outwardly in said channels.

3. The adaptor of claim 2 wherein:
said blank key has a side opposite said one side with
additional channels extending longitudinally thereon and further comprising:
a plurality of additional bits slidably mounted in said additional channels;
a plurality of additional pushers connected to said additional bits and projecting into said second keyhole to contact ends of ribs of a ribbed key inserted into said second keyhole; and,
additional helical springs within said main body and
in contact with said additional pushers, said additional helical springs normally urging said additional pushers away from said blank key and said additional bits into said housing but yieldable to allow ribs of a ribbed key inserted into said second keyhole to contact said additional pushers and push said additional bits outwardly in said additional channels.

4. The adaptor of claim 3 wherein:
said blank key has opposite edges each with an
aligned notch formed thereon adjacent said housing,
said pushers and said additional pushers are each an
enlarged button head each integrally mounted to an inner end of a separate one of said bits, said bits each project through one of said helical springs whereas said additional bits each project through one of said additional helical springs, said helical springs and said additional helical springs are positioned between a button head and said blank key.

5. A method of changing the combination on a cylindrical lock from the combination corresponding to an original key to a combination corresponding to a new key, said lock includes a fixed outer cylinder, an inner cylinder rotatably mounted in said outer cylinder and having a first keyhole, tumblers slidably mounted in said outer cylinder, adjustable bits slidably mounted in said inner cylinder, pusher means connected to said bits and projecting into said keyhole to be contacted by ribs of a ribbed key inserted into said keyhole and operable to align said bits with said tumblers to allow rotation of said inner cylinder, comprising the steps of:
inserting an adaptor having a blank key with movable ribs into said keyhole;
inserting original key into said adaptor aligning said bits with said tumblers;
turning said original key from the original position to rotate said inner cylinder and position said bits on said tumblers;
withdrawing said original key from said keyhole;
inserting said new key into said adaptor to locate said bits and tumblers to a position corresponding to said new combination;
turning said new key to rotate said inner cylinder back to said original position; and,
withdrawling said adaptor from said keyhole.

6. The method of claim 5 wherein:
said inserting step of said original key includes pushing ribs of said original key against said pusher means; and,
said inserting step of said new key includes pushing ribs of said new key against said pusher means.

7. The method of claim 6 comprising the additional step of withdrawing said new key from said adaptor subsequent to the step of turning said new key.