COLLAPSING CYLINDER BOTTOM PIN

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Filed Apr. 22, 1963, Ser. No. 274,752
4 Claims. (Cl. 70—384)

The invention has reference to a selective keying sys-
tem, for example, as might be made use of during the con-
struction period of a building in order that locks can be
installed early during the period of construction and be
permitted to be used by construction workers with keys of
limited applicability, but wherein later the keying can be
easily changed to render the locks operable only by the
owner's key and no longer operable by the construc-
tion keys. Selective systems of the type mentioned are
useful in many and varied types of locks, but have special
application to pin tumbler locks.

Some construction key systems have been devised, but
those hereofore available are to a degree objectionable
because of operating in such fashion that a portion of the
lock structure is mutilated when the changeover is
made. Others have the objection of making it necessary
to provide easily auxiliary apparatus in the lock device
useful only during the construction period, the structure
moreover being such that portions of the added structure
need to be carried permanently by the lock device at
unwanted locations even though they are no longer
useful. Others are susceptible to accidental, unintent-
ional changeover, and still others require a construc-

tion which reduces the security of the lock, especially
after changeover.

It is therefore among the objects of the invention to
provide a new and improved selective key lock system
useful as a construction key lock system, especially
adapted for use in pin tumbler locks, which is of such
character that even though a changeover has been made
from one selected key lock system to another selected key
lock system, the changeover will be such as to incur no
radical change in what is otherwise a substantially stand-
ard lock construction.

Another object of the invention is to provide a new
and improved lock key system wherein no change need
be made in the conventional tumbler casing parts to ac-
commodate the unique principle which encompasses the
invention.

Another object of the invention is to provide a new
and improved selective key lock system, whereby the key-
ing arrangement can be easily altered upon the com-
pletion of some event like completion of construction,
the rekeying of the system being such that it is simple,
positive and inexpensive, and at the same time capable
of making certain that only the authorized use of a re-
keying key can make the changeover from construction
setting to owner setting.

Still another object of the invention is to provide a new
and improved selective key lock system which is
made effective by altering the length of one of the drive
tumbler parts when the changeover from construction
keying to owner keying is brought about, the shortening
being accomplished by a simple tool means momentarily
inserted which thereafter can be removed, leaving the
shortened tumbler part operating in normal fashion but
noted by a new key, such as the owner key, for its
manipulation.

With these and other objects in view, the invention
consists in the construction, arrangement and combina-
tion of the various parts of the device, whereby the ob-
jects contemplated are attained as hereinafter set forth.

In the drawings:

FIGURE 1 is a side elevational view of a cylinder
housing partially broken away to reveal one form of
the invention.

FIGURE 2 is a front elevational view of the device of
FIGURE 1.

FIGURE 3 is a fragmentary side elevational view par-
tially broken away showing the location of parts and ac-
cessory devices immediately prior to changeover from
construction keying to owner keying.

FIGURE 4 is a view similar to FIGURE 3 showing the
next step in the changeover.

FIGURE 5 is a view similar to FIGURES 3 and 4
showing a succeeding and final step in the changeover.

FIGURE 6 is a view similar to FIGURES 3, 4, and 5,
showing the condition of parts after changeover is com-
pleted.

FIGURE 7 is a fragmentary elevational view parially
in section showing a second form of the invention with
the parts in the condition existing during construction
keying.

FIGURE 8 is a view similar to FIGURE 7 showing
accessory parts in position at the locations occupied
upon completion of changeover from construction keying to
owner keying.

FIGURE 9 is a view similar to FIGURES 7 and 8
showing the condition of parts after completion of owner
keying.

FIGURE 10 is a fragmentary longitudinal sectional
view taken on the line 18—18 of FIGURE 7.

In an embodiment of the invention illustrated in par-
cular in FIGURES 1, 2, 3, 4, 5, and 6, there is shown a
lock tumbler cylinder assembly which consists of a
housing 19 in which a key plug 11 is rotatably
mounted. The key plug 11 has an outer flange 12 pro-
viding a shoulder 13 fitting over a face 14 of the cylinder
housing 18 and at the opposite or inside end a collar 15
is applied to the key plug 11 to hold it in place. A cylin-
drical opening 16 through the cylinder housing 10 rot-
atably contains a barrel portion 17 of the key plug 11.

Extending from one side of the key plug 11 is a pin
tumbler housing 18 running the length of the key plug 11
for reception of a plurality of sets of pin tumblers like
the set consisting of an inner drive pin 19 and an outer
driver pin 20 pressed into position by a spring 21. Bored
like an inner bore 22 in the key plug 11 and an outer
bore 23 in the cylinder housing 10 are in axial align-
ment and accommodate the pins 19 and 20.

The forwardmost of the sets of pin tumblers consists of
an outer drive pin 25 and its spring 26 located in an
outer bore 27 and a two-piece drive pin consisting of an
inner part 28 and an outer part 29, located in an inner
bore 30 in the key plug 11. In this form of invention,
the inner part 28 is a cylindrical pin having a recess 31
opening outwardly. The outer part 29 is a ball the cir-
cumference of which is slightly greater than the diameter
of the recess 31. The combined length of the inner part
28 and outer part 29 serves during the construction period
keying as one of the pins of the most set of pin tumb-
blers, and the construction key (not shown) is so cut
that when inserted for opening the lock, the point of
engagement of the outer part 29 and the drive pin 25
coincides with a shear line 32 between the key plug 11
and the cylinder housing 10. A construction key (not
shown) is so cut that it will move in a conventional fash-
on all of the sets of tumblers to release position
and at the same time move the two part tumbler 28, 29
to release position by shifting the ball and the drive pin
25 as described, to release position.

When the construction operation is finished and it be-
comes desirable to render all construction keys no longer
operable, use is made of a lock pin 35. For admit-
ting the lock pin 35, there is provided a hole 36 in the key plug 11 which is exposed at a front face 37 of the flange 12. The hole 36 extends inwardly into communication with the inner bore 30, and a continuation 38 of the hole exists on the opposite side of the inner bore 30. The hole 36 and its continuation 38 are so located that when the two part tumblers 23, 29 is in the position it would occupy with no key in place, a pointed end 39 of the lock pin 35 can find its way under the end of the outer drive pin 25 and thereafter separate the outer drive pin 25 from its engagement with the outer part or ball 29 as shown in FIGURES 4 and 5. By extending the lock pin 35 into the continuation 38 of the hole 36, an effective blocking relationship is established.

Thereafter, a reset key 40 is extended into the appropriate conventional keyway 41 in the key plug 11. The reset key 40 has a cam face 42 extending between an innermost end 43 and a flat land 44. The cam face 42 is forced against the adjacent end of the inner part 28 and forces it upwardly. Since, during this operation, the outer part or ball 29 is stopped by the interposition of the lock pin 35, the ball cannot move; and therefore the inner part 28 telescopes over the ball or outer part 29 so that it is forced into the recess 31 as shown in FIGURE 5. This in effect changes the length of the two-piece drive pin of the forwardmost set of pin tumblers, making it a one-piece pin of shorter length. This accordingly changes the keying. Thereafter, the construction key will no longer be capable of unlocking the lock, and a new key such, for example, the extension key, will be required to move the forwardmost set of pin tumblers to release position. Thereafter, this will be the only key capable of unlocking the lock, and there is no prospect of any rekeying, either accidental or intentional, which can change the keying of the lock except by established rekeying methods.

In the embodiment of the invention shown in FIGURES 7, 8, 9, and 10, the cylinder housing 10 and key plug 11 are of the same construction and relationship as has been described in the form of invention of FIGURES 1, 2, 3, 4, 5, and 6. In this form of invention, however, there is a difference in construction with respect to the two-piece pin tumbler of the outermost set of pin tumblers which consists of an inner part 50 and an outer part 51 (see FIGURE 10). The inner part 50 has a substantially cylindrical recess 52 on the circumference of which are spaced annular increased heads 53 and 54. Preferably, the inner part 50 is of some appropriate firm but to a degree yieldable material such as one of the currently available synthetic plastic resin materials such, for example, as nylon or Delrin. The outer part 51 (see FIGURE 10) is preferably of metal and is provided with an extension 55 of special construction. A flanged end 56 of the extension 55 in initial position is adapted to lodge between the beads 53 and 54, there being provided an annular recess 57 in the extension 55 adapted to receive the bead 54. Immediately adjacent is a flange 58 which overlies an end edge 59 of the inner part 50. With the inner and outer parts 50 and 51 in the relationship shown in FIGURE 10, the two-piece pin tumbler of the endmost set of pin tumblers, is relatively long as shown in FIGURES 7 and 10. This is the length suitable to be manipulated to release position by use of a construction key (not shown). The construction key, as previously noted, is keyed so that it will lift all of the remaining sets of pin tumblers (not shown) to release position.

When this form of device is to be changed over from construction keying to owner keying, the lock pin 35 is inserted in the same manner as has already been described in connection with FIGURES 1 through 6. Once the same reset key 40 is forced into the keyway 41 as previously described. On this occasion, the cam face 42 cams against the adjacent end of the inner part 50, forcing it upwardly into telescoping engagement with the outer part 51 which is blocked from movement by the interposition of the locking pin 35. Forcing of the inner and outer parts 50, 51 together, as described, causes the inner part 50 and the beads 53 and 54 to yield sufficiently to permit the flange 56 to override the bead 53 and lodge in the bottom of the recess 52. At the same time, the outer drive pin 25 strikes the head 51. With the flange 56 hitting the bottom of the recess 52, the outer and inner parts will be collapsed to the newly shortened length as shown in FIGURES 8 and 9. The reset key 40 is then withdrawn, as is also the lock pin 35. Thereafter, the construction key (not shown) will no longer be capable of unlocking the lock. Accordingly, a new key, as for example, the owner's key (not shown) will be employed. The new key is cut so that it is capable of lifting the shortened two-piece tumbler 50, 51 to release position when the other sets of tumblers are moved to release position, thereby to unlock the lock.

From the foregoing description it will be clear that all the portions of the lock are maintained of substantially standardized construction, the only variation being the provision of one two-piece pin tumbler. This merely changes in length at the changeover from construction keying to owner keying and becomes permanently a shorter pin without it being necessary to mutilate the lock in any fashion or to leave unwanted extra parts in the lock.

While the invention has herein been shown and described in what is conceived to be its most practical and useful form, it is not to be understood that the invention is to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having described the invention, what is claimed as new is in support of Letters Patent:

1. A lock tumbler cylinder assembly of the kind including a cylinder housing, a key plug rotatable in the cylinder housing and having a keyway therein, said cylinder housing and key plug having a plurality of sets of holes and a set of movable tumblers in each hole for locking said key plug against rotation and adapted to be moved by a key inserted through the keyway at the face of the key plug, said sets of tumblers allowing rotation of the key plug when each set of tumblers is in a release position, one of said sets of tumblers including an outer part and two-piece inner pin having an axially telescoping engagement with each other under pressure, said two-piece pin being adapted to contract in length upon insertion of a compressing key member into the keyway to a location in endwise compressing engagement with the two-piece inner pin when the stop member is in place, whereby to change the keying and prevent unlocking said assembly except by a new key operable to move the shortened two-piece inner pin to a release position.

2. A lock tumbler cylinder assembly of the kind including a cylinder housing, a key plug rotatable in the cylinder housing and having a keyway therein, said cylinder housing and key plug having a plurality of sets of holes and a set of movable tumblers in each hole for locking said key plug against rotation and adapted to be moved by a key inserted through the keyway at the face of the key plug, said sets of tumblers allowing rotation of the key plug when each set of tumblers is in a release position, one of said sets of tumblers including an outer part and a two-piece inner pin comprising axially aligned outer and inner parts, said cylinder plug having a hole extending inwardly from the face into the bore which houses said two-piece pin, a stop member adapted to be inserted into said hole whereby to provide a divider and stop between said outer pin and the two-piece inner pin, said parts of the two-piece pin having an axially telescoping engagement with each other under pressure, said two-piece pin being adapted to contract in length upon insertion of a compressing key member into the keyway to a location in endwise compressing engagement with the two-piece inner pin when the stop member is in place, whereby to change the keying and prevent unlocking said assembly except by a new key operable to move the shortened two-piece inner pin to a release position.
the outside end of the outer part of said two-piece inner pin, a stop member adapted to be inserted into said hole whereby to provide a divider and stop between said outer pin and the outer part of said two-piece inner pin, said axially aligned parts of the two-piece pin having an axially telescoping engagement with each other under pressure, said two-piece inner pin being adapted to contract in length upon insertion of a compressing key member into the keyway to a location in endwise compressing engagement with the inner part of said two-piece inner pin when the stop member is in place, whereby to change the keying and prevent unlocking said assembly except by a new key operable to move the shortened two-piece inner pin to a release position.

3. A lock tumbler cylinder assembly of the kind including a cylinder housing, a key plug rotatable in the cylinder housing and having a keyway therein, said cylinder housing and key plug having a plurality of sets of bores and a set of movable tumblers in each bore for locking said key plug against rotation and adapted to be moved by a key inserted through the keyway at the face of the key plug, said sets of tumblers allowing rotation of the key plug when each set of tumblers is in a release position, one of said sets of tumblers including an outer pin and a two-piece inner pin comprising outer and inner parts, one of said two-piece inner pin parts being of yieldable material and comprising a substantially cylindrical pin having a recess open at the outer end, said other of said two-piece inner pin parts comprising a ball having a diameter slightly larger than the diameter of said recess, said cylinder plug having a hole extending inwardly from the face into the bore which houses said two-piece inner pin, a stop member adapted to be inserted into said hole whereby to provide a divider and stop between said outer pin and said two-piece inner pin, said two-piece inner pin being adapted to contract in length upon insertion of a compressing key member into the keyway to a location in endwise compressing engagement with the two-piece inner pin when the stop member is in place, whereby to change the keying and prevent unlocking said assembly except by a new key operable to move the shortened two-piece inner pin to a release position.

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4. A lock tumbler cylinder assembly of the kind including a cylinder housing, a key plug rotatable in the cylinder housing and having a keyway therein, said cylinder housing and key plug having a plurality of sets of bores and a set of movable tumblers in each bore for locking said key plug against rotation and adapted to be moved by a key inserted through the keyway at the face of the key plug, said sets of tumblers allowing rotation of the key plug when each set of tumblers is in a release position, one of said sets of tumblers including an outer pin and a two-piece inner pin comprising outer and inner parts, one of said parts being of yieldable material and comprising a substantially cylindrical pin having a recess open at the outer end and configuration means in said recess, the other of said parts comprising a substantially cylindrical pin having an inwardly extending extension engageable with said one part, said extension having configuration means thereon complementary to the configuration means in said recess, said configuration means being in engagement with each other at extended and at contracted positions of said two-piece inner pin, said cylinder plug having a hole extending inwardly from the face into the bore which houses said two-piece inner pin, a stop member adapted to be inserted into said hole, whereby to provide a divider and stop between said outer pin and the outer part of said two-piece inner pin, said parts of said two-piece inner pin being moved from said extended position to said contracted position upon insertion of a compressing key member into the keyway to a location in endwise compressing engagement with the two-piece inner pin when the stop member is in place, whereby to change the keying and prevent unlocking said assembly except by a new key operable to move the shortened two-piece inner pin to a release position.