

[54] **DOUBLE SPRING BOLT RE-KEYABLE
PADLOCK**

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[51] Int. Cl. **E05b 67/22**

[58] Field of Search **70/38 A, 38 B, 38 C,**
70/39, 368, 369, 382

[56] **References Cited**

UNITED STATES PATENTS

3,187,525	6/1965	Dies	70/38
2,557,028	6/1951	Deutsch	70/369 X

Primary Examiner—Marvin A. Champion

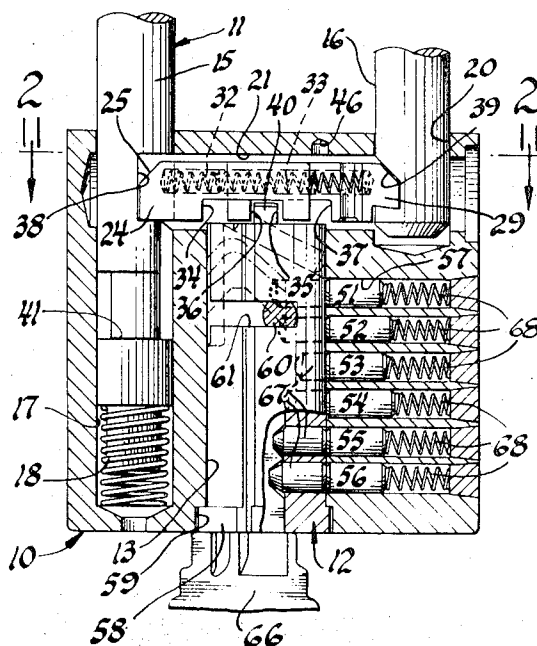
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[57] **ABSTRACT**

A padlock having a body and a pair of latch members in the body which are spring biased into a locked position to hold a padlock shackle in the locked position and which are moved to the unlocked position by a cam member on a key plug. Passage means are provided in the lock construction, and including the latch members, for the reception of a retainer member capable of retaining the outer tumbler pins in the body and for retaining the latch members in the unlocked position to permit the key plug to be removed and the lock re-keyed.

2 Claims, 6 Drawing Figures



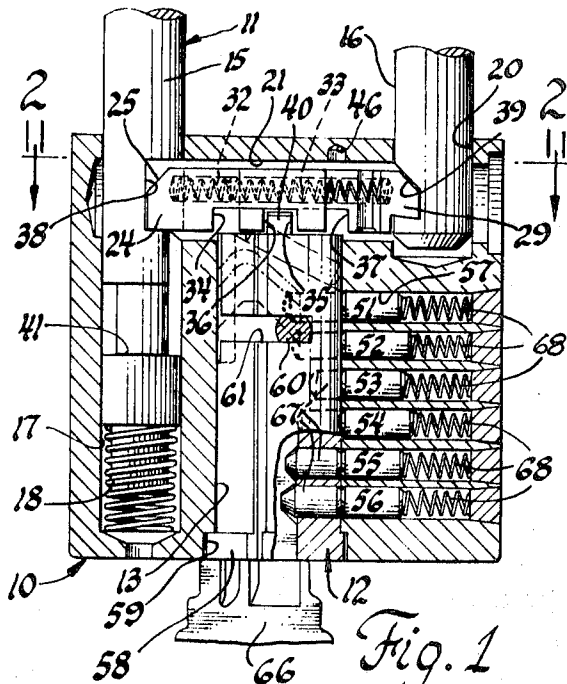


Fig. 1

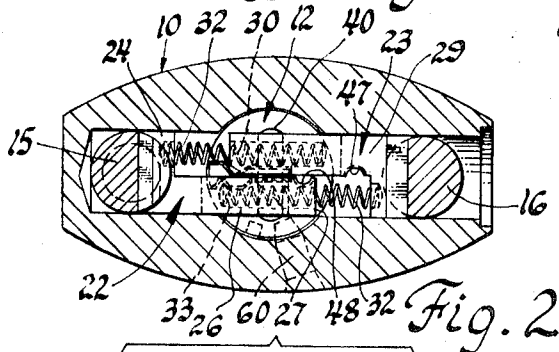


Fig. 2

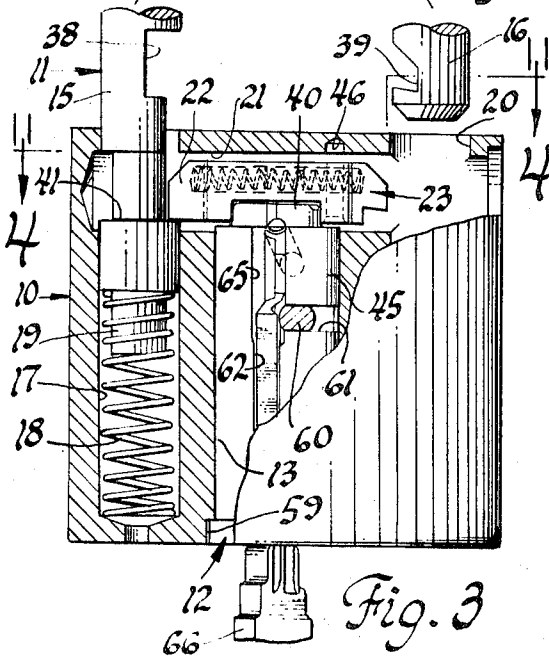


Fig. 3

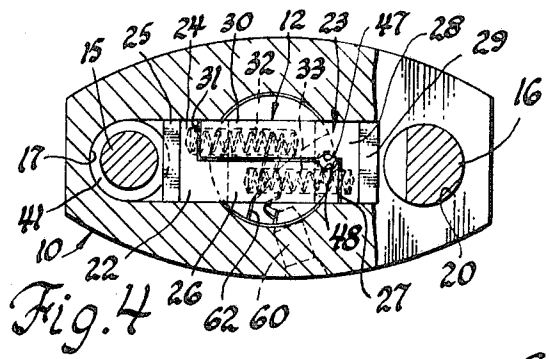


Fig. 4

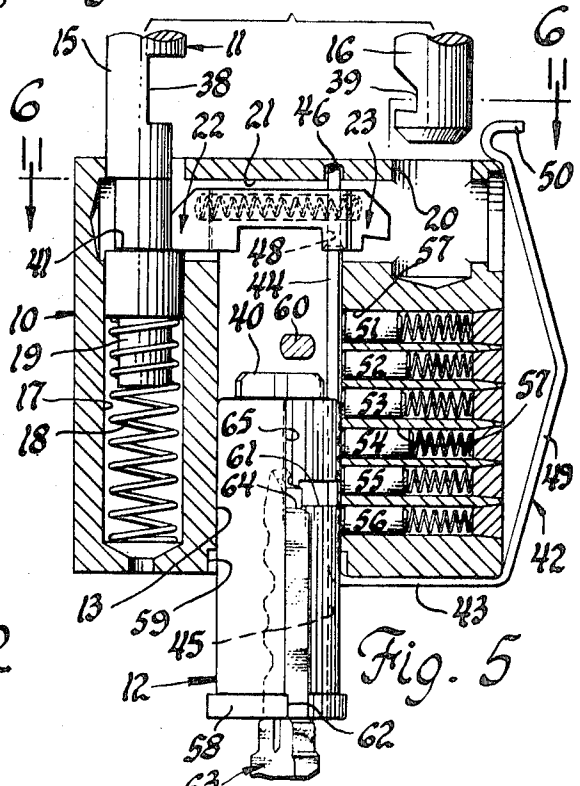


Fig. 5

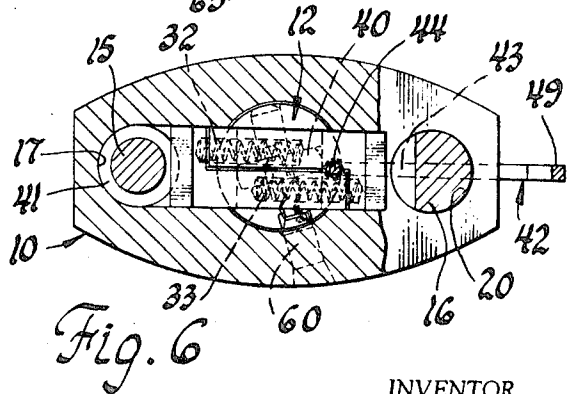


Fig. 6

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DOUBLE SPRING BOLT RE-KEYABLE PADLOCK

SUMMARY OF THE INVENTION

This invention relates generally to the padlock art, and more particularly, to an improved padlock construction which permits a locksmith to quickly and easily change the combination of the padlock when it is desired to change keys for the lock.

Padlocks have been provided heretofore which may be re-keyed, and an example of a padlock of this type is shown and described in U.S. Pat. No. 3,187,525, issued on June 8, 1965. A disadvantage of the padlock shown in said patent is that the key can not be removed when the padlock is open. This is a disadvantage to some users when they wish to leave the lock open to permit other people who do not have keys to enter the building with which the lock is being used. For example, utility companies employing such locks have work crews working in relays and it is required that they have a lock which the last crew member can snap shut without a key, and yet a lock which may be re-keyed, if desired. Accordingly, it is an important object of the present invention to provide a padlock which can be re-keyed and which can be left in the unlocked position and the key removed and wherein the lock shackle may be moved to the locked position without the use of a key.

It is still a further object of the present invention to provide a novel and improved re-keyable padlock which includes a lock body, a shackle member having a pair of shackle legs slidably mounted in said body, said body being provided with a transverse slot in which is slidably mounted a pair of latch members, each of said shackle legs being provided with recesses for the reception of one of said latch members, means for normally biasing said latch members outwardly into locking engagement with the recesses in said shackle legs for holding the shackle in a locked position, a key plug rotatably mounted in a chamber in said body and being rotatable between locked, unlocked and removal positions and being provided with a longitudinal keyway and a transverse peripheral slot on the inner end thereof which communicates at one end with the keyway, said key plug having an inner end engageable with said latch members for moving them to an unlocked position free of said shackle legs against the action of said biasing means, a fixed retainer pin in said body and normally engageable with the key plug peripheral slot to prevent longitudinal movement of the key plug, said pin may be by-passed when the key plug is moved by a change key to a position to permit the pin to pass through an enlarged inner end of the keyway slot, and passageway means in said lock construction including said latch members for the reception of means capable of retaining the outer tumbler pins in their respective bores in the body when the key plug has been removed and for retaining said latch members in the unlocked position.

Other objects, features and advantages of this invention will be apparent from the following detailed description, appended claims, and the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an elevational section view of a padlock made in accordance with the principles of the present invention, with parts broken away, showing the regular

key inserted and with the tumbler pins in the unlocked position and the key plug ready for rotation to the unlocked position.

FIG. 2 is a horizontal section view of the structure illustrated in FIG. 1, taken along the line 2—2 thereof, and looking in the direction of the arrows.

FIG. 3 is a fragmentary, elevational view, similar to FIG. 1, of a padlock made in accordance with the principles of the present invention, and showing the regular key rotated to the normal stop for releasing the shackle.

FIG. 4 is a partial, horizontal section view of the structure illustrated in FIG. 3, taken along the line 4—4 thereof, and looking in the direction of the arrows.

FIG. 5 is an elevational view of the padlock of the present invention, similar to FIG. 1, and showing the method for removing the key plug for changing key combinations.

FIG. 6 is a fragmentary, horizontal section view of the structure illustrated in FIG. 5, taken along the line 6-6 thereof, and looking in the direction of the arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing and in particular to FIGS. 1 through 3, the numeral 10 generally indicates the body of a padlock made in accordance with the principles of the present invention and which is provided with a conventional shackle member generally indicated by the numeral 11. The padlock further includes a key plug generally indicated by the numeral 12 which is rotatably mounted in a key plug chamber 13. Wherever the terms "horizontal" or "vertical," or variations thereof, are used in the specification and claims, the datum plane is the base end surface of the body 10.

As shown in FIGS. 1, 3 and 5, the shackle member 11 comprises the usual inverted U-shaped structure which includes bight portion (not shown) and the integral spaced apart vertical leg portions 15 and 16. The leg portion 15 is longer than the leg portion 16 and is adapted for swingably mounting the shackle member 11 in the padlock body 10. The leg portion 15 is rotatably mounted in the vertical bore 17 in the padlock body 10 and is normally biased outwardly of the body 10 into the unlocked position by means of the spring 18, as shown in FIG. 5. The lower end of the leg portion 15 is reduced as indicated by the numeral 19 so as to form a shoulder against which the upper end of the spring 18 abuts. The reduced end 19 of the leg portion 15 is adapted to be seated inside of the spring 18. As shown in FIG. 3, the other leg portion 16 is adapted to be slidably mounted in the vertical bore 20 which is formed in the body 10 at a position diametrically opposite to the bore 17.

As shown in FIGS. 3, 4 and 5, the vertical bores 17 and 20 in the padlock body 10 are interconnected by means of the horizontal passage 21 in which are mounted the latches 22 and 23. As shown in FIGS. 2 and 4, the latch 22 is L-shaped in plan cross section and includes the transverse head portion 24 which is provided with a chamfered upper shoulder 25. Integrally formed with the latch transverse head portion 24, and extending longitudinally away from the head portion 24, is an offset arm portion 26 which terminates at the point indicated by a numeral 27. The latch 23 is also L-shaped in plan cross section and includes the transverse head portion 28 which is provided with a cham-

ferred upper shoulder 29 and the offset longitudinally extended arm portion 30 which terminates at the point 31. As shown in FIGS. 2 and 4, the latch arm portions 26 and 30 are slidably mounted against each other on their inner sides, and the head portions of one latch overlaps the arm portion of the other latch.

As shown in FIG. 2, the latches 22 and 23 are normally biased apart to the locked position by a pair of latch springs 32 and 33. The spring 32 is mounted in a suitable bore in the outer end of the latch arm portion 30 and it is extended outwardly into a suitable bore in the head portion 24 of the latch 22. The latch spring 33 is similarly mounted. As shown in FIG. 1, a longitudinally extended notch is formed in the lower side of the latch arm portion 26, and this notch extends between the points indicated by the numerals 34 and 35. A similar notch is formed in the lower side of the latch arm portion 30 of the other latch 23, and it extends between the points indicated by the numerals 36 and 37 in FIG. 1.

As shown in FIG. 3, the latch heads 24 and 29 are biased outwardly in the sideward direction into locking engagement in the recesses 38 and 39 in the shackle leg portions 15 and 16, respectively, by means of the latch springs 32 and 33. The inner end 40 of the key plug 12 is substantially rectangular in over-all configuration, as shown in FIG. 2. When the key plug 12 is in the locked position, as shown in FIGS. 1 and 2, the longer dimension of the key plug end 40 is turned into a transverse position to permit the springs 32 and 33 to move the latches 22 and 23 outwardly into the locking position.

When the key plug 12 is turned so as to dispose the longer dimension of the inner end 40 in alignment with the longitudinal axes of the latch arm portions 26 and 30, as shown in FIG. 3, the key plug inner end 40 engages the outer ends 36 and 35 of the notches in the lower end of the latch arms to cam the latches 22 and 23 inwardly to the unlocked position shown in FIG. 3. When the latches 22 and 23 are cammed into the unlocked position as shown in FIG. 3, the spring 18 operates to force the shackle 11 upwardly to the unlocked position shown in FIGS. 3 and 5. When the shackle member 11 is urged outwardly to the unlocked position, the head portion 24 of the latch 22 engages the shoulder 41 formed on the shackle leg portion 15. The latch head 24 bears downwardly on the shoulder 41 against the pressure of the spring 18. It permits the shackle member 11 to be rotated within the bore 17 without being completely withdrawn from the bore 17.

A tumbler pin retaining tool 42 is provided and it includes the horizontal arm portion 43 which is integral with a vertical leg portion 44 that is shown in FIG. 5. The retaining tool leg portion 44 is adapted to be inserted into a slot 45 formed in the key plug 12 and to have the inner end thereof inserted into a recess 46 formed in the upper end of the padlock body 10. As shown in FIG. 2, the latch 23 has a half-round recess 47 formed along the inner side of its arm portion 30 adjacent its head 29. A mating half-round recess 48 is also formed on the inner side of the leg portion 26 of the latch 22 adjacent its outer end. As shown in FIG. 4 the half-round recesses 47 and 48 form a circular hole when the latches 22 and 23 are moved to the unlocked position. Accordingly, when the retaining tool leg 44 is moved upwardly through the key plug slot 45, its inner end passes through the two half-round recesses 47 and 48 before it enters the recess 46. It will be seen that

when the retaining tool inner leg 44 is extended through the semi-circular recesses 47 and 48, as shown in FIG. 6, that the latches 22 and 23 will be retained in the unlocked position as shown in FIG. 6. As shown in FIG. 6, the cross section of the retaining tool leg 44 is square.

The tumbler pin retaining tool 42 includes an outer leg portion 49 which extends upwardly and rests at its upper end against the upper outer side of the lock body 10. The upper end of the outer leg portion 49 is turned at right angles to provide a handle portion 50. It will be seen that when the tumbler pin retaining tool 42 is mounted in place in the padlock body 10, as shown in FIGS. 5 and 6, that the key plug 12 may be removed from the body 10. The retaining tool inner leg 44 holds the outer tumbler pins 51 through 56 in their respective slots 57.

As shown in FIGS. 1 through 6, the key plug 12 is generally cylindrical in over-all configuration and it is provided with the enlarged flange 58 on the outer end thereof which is adapted to be seated in the enlarged stepped portion 59 of the chamber 13. The key plug 12 is normally retained in the padlock body 10 by means of the retainer pin 60 which is horizontally mounted in the body 10 and which has the inner end thereof extended into the horizontal peripheral slot 61 in key plug, as shown in FIG. 1. As shown in FIG. 4, the key plug 12 is provided with the elongated key slot 62 along one side thereof and this slot opens to the periphery of the key plug 12.

As shown in FIG. 5, a change key 63 is provided with a notch 64 which is filed on its inner end and which permits rotation of the key 63 past the retainer pin 60. As shown in FIG. 3, the key way 62 is enlarged at its inner end as indicated by the numeral 65 and this enlarged key way portion 65 communicates with the key plug peripheral horizontal slot 61 and permits the rotation of the notched change key 63 and passage of the retainer pin 60 through the slot 61, whereby when the key plug 12 is turned to the position shown in FIGS. 6 and 7, the key plug may be withdrawn from the chamber 13. The inner end of the retainer pin 60 would pass through the enlarged key way slot 65. The key plug 12 may not be removed until the tumbler pin retaining tool 42 has been inserted into the slot 45 and into the latch retainer position shown in FIGS. 5 and 6.

As shown in FIGS. 1 and 3, the numeral 66 indicates the old key which was used with the lock before changing the combination. The old key 66 may be used to make the change key 63 by merely filing the notch 64 in the end thereof for use in withdrawing the key plug 12, as described hereinbefore. After the tumbler pin retaining tool 42 has been placed in the position shown in FIGS. 5 and 6, the key plug 12 is removed in the same manner as described in detail in the aforementioned prior art U.S. Pat. No. 3,187,525. The details of the notch 64 on the inner end of the change key 63, and the peripheral horizontal slot 61 and the enlarged inner end key slot 65 are described in detail in said aforementioned patent.

As illustrated in FIG. 1, the lock of the present invention is provided with a plurality of outer tumblers 51 through 56 which are slidably mounted in vertically spaced apart horizontal bores, as 57, in the same manner as the lock in the aforesaid patent. A spring 68 is mounted in each of the bores 57 on the outer side of said pins for urging the pins inwardly toward the key

plug chamber 13. The outer ends of the bores 57 are enclosed by suitable plugs which are press-fitted into place. The key plug 12 carries a plurality of tumbler pins as 67, in the same manner as described in the aforementioned patent. The inner tumbler pins 67 function with the outer tumbler pins 51 through 56 in the usual manner, and as described in said prior patent. In the prior art lock structure illustrated in U.S. Pat. No. 3,187,525, the regular key cannot be removed in the unlocked position. This is a disadvantage since some users wish to leave the lock in an open position to permit others without a key to get into the structure with which the lock is being used. The lock of the present invention solves this problem with the spring biased latches 22 and 23. However, the spring biased latch structure of the present invention still permits the lock to be re-keyed, and accordingly, it offers advantages and functions which are not achievable by the aforementioned prior art lock.

It will be understood that once the retaining tool 42 is in the position shown in FIG. 5, the key plug 12 may be removed and the pins changed, and a new key made in order to re-key the lock in the same manner as described in the aforementioned prior art U.S. Pat. No. 3,187,525.

While it will be apparent that the preferred embodiment of the invention herein disclosed is well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change.

What I claim is:

1. In a lock construction, the combination comprising:

- a. a lock body having a pair of spaced apart longitudinal bores extended into the top end of said body;
- b. a shackle member having a pair of shackle legs slidably mounted in said bores;
- c. said body being provided with a transverse slot communicating at its ends with said bores and in which is slidably mounted a pair of latch members;
- d. each of said shackle legs being provided with recesses on either end thereof for the reception of one of said latch members;
- e. means for normally biasing said latch members outwardly into locking engagement with the recesses in said shackle legs for holding the shackle in a locked position;
- f. an elongated chamber formed in the lower end of the body and being open at the outer end thereof;
- g. a key plug rotatably mounted in said chamber and being rotatable between locked, unlocked, and removal positions, and being provided with a longitudinal keyway and a transverse peripheral slot on

the inner end thereof which communicates at one end with the longitudinal keyway;

- h. said key plug having an inner cam end engageable with said latch members for camming them to an unlocked position free of said shackle legs against the action of said biasing means when the key plug is turned to the unlocked position;
 - i. a plurality of longitudinally aligned, spring biased outer tumbler pins mounted in said body in spaced bores communicating with said chamber;
 - j. a plurality of inner tumbler pins mounted in said key plug in spaced bores which are aligned with the bores in said body when the key plug is rotated to the locked position;
 - k. a fixed retainer pin mounted in said body and having the inner end thereof extended into the peripheral slot in said key plug to prevent longitudinal movement of the key plug to normally retain the same in the body, and to limit the normal rotative movement of the key plug between the locked position and the unlocked position by engagement with a key in the key plug keyway when the key plug is turned to the unlocked position and by engagement with the other end of the peripheral slot when the key plug is turned to the locked position;
 - l. a longitudinal slot in said key plug which is open at the inner end thereof and which communicates with said keyway and peripheral slot for passage therethrough of said retainer pin from said peripheral slot to permit longitudinal movement of the key plug and removal of the key plug from said chamber when said key plug is turned by a key in said keyway which has the inner end notched to permit the retainer pin to pass into the longitudinal slot, to permit replacing said inner tumbler pins to change the key combination of the lock construction;
 - m. passageway means in said lock construction, and including said latch members, for the reception of means capable of retaining the outer tumbler pins in their respective bores in the body when the key plug has been removed and for retaining said latch members in the unlocked position; and,
 - n. the passageway means in the latch members comprises a semi-circular recess in each of said latch members which are moved to an aligned position to form a cylindrical passage when the latch members are cammed to the unlocked position.
2. A lock construction as defined in claim 1, wherein:
- a. said means for biasing said latch members outwardly comprises spring means.

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