June 8, 1965 H. F. DIES 3,187,525

PADLOCK CONSTRUCTED FOR QUICK KEY CHANGE

Filed June 7, 1962 2 Sheets-Sheet 1

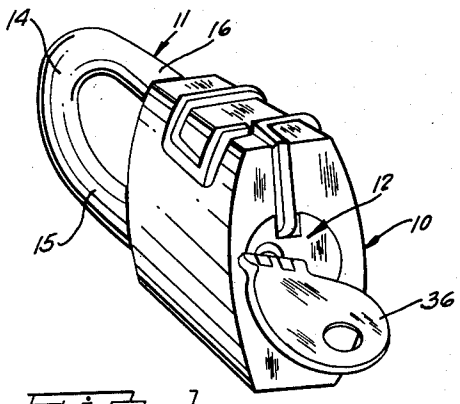


Fig. 1

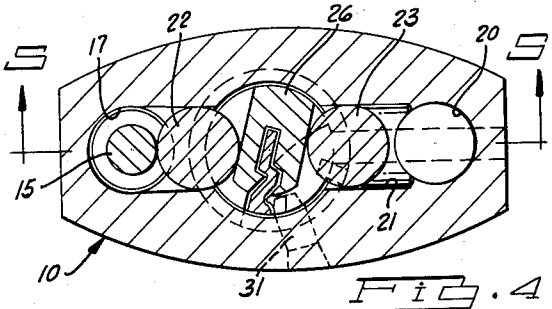


Fig. 4

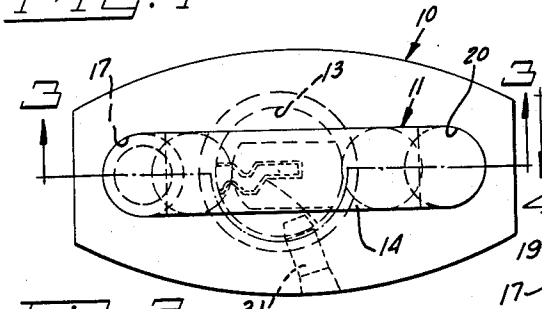


Fig. 2

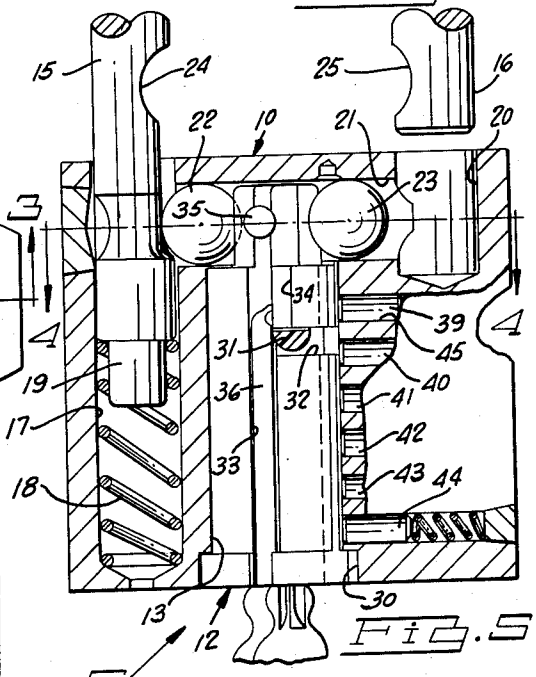


Fig. 5

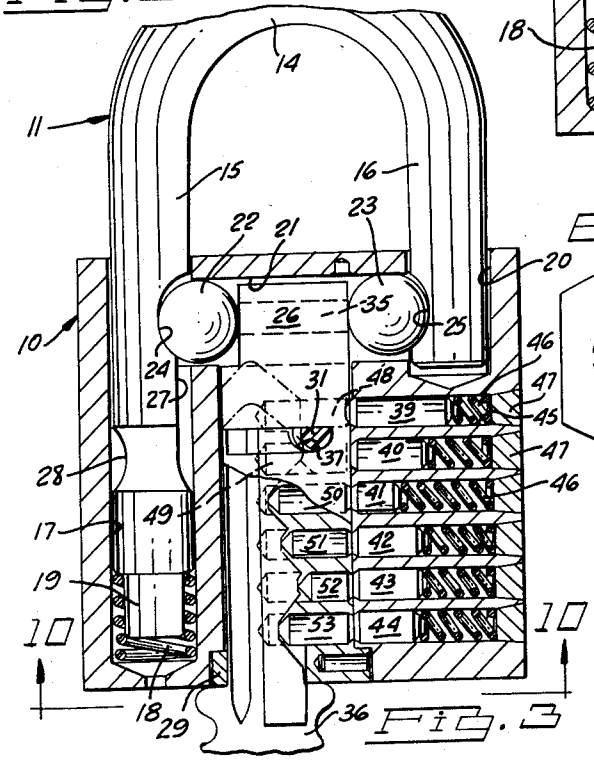


Fig. 3

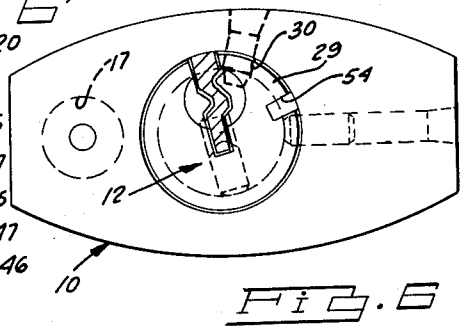


Fig. 6

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PADLOCK CONSTRUCTED FOR QUICK KEY CHANGE

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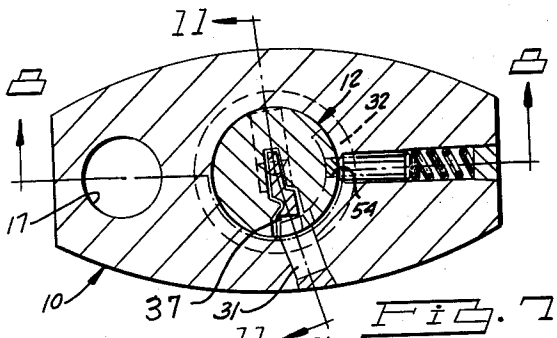


Fig. 7

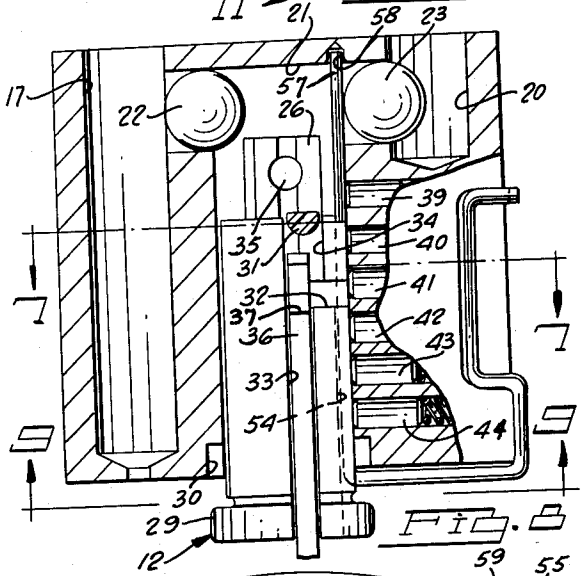


Fig. 8

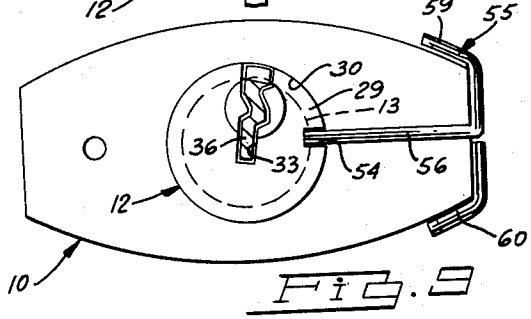


Fig. 9

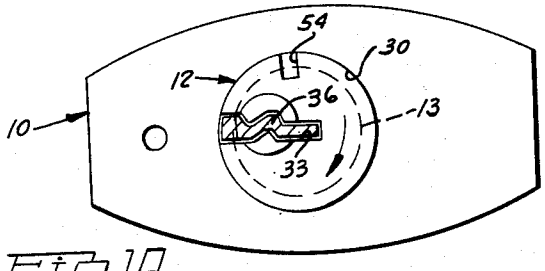


Fig. 10

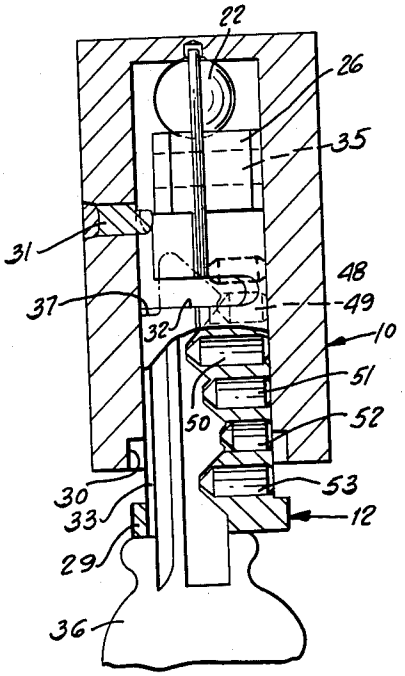


Fig. 11

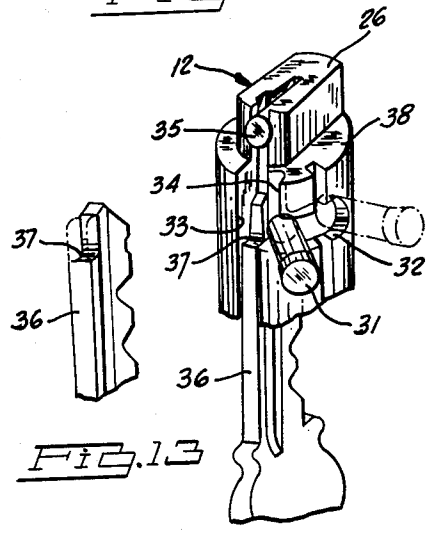


Fig. 13

Fig. 12

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PADLOCK CONSTRUCTED FOR QUICK KEY CHANGE

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2 Claims. (Cl. 70—38)

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 a padlock when it is desired to change keys, and to the method of changing the lock combination of a padlock.

In the past, in order to change the combination of a padlock, it was necessary to remove the old tumbler pins through the side of the body of the padlock in order to replace them with the new tumbler pins for changing the key combination of the padlock. In order to carry out the aforementioned prior art method of changing the key combination, it was necessary to remove a number of metal plugs from the outer ends of the tumbler pin holes in the side of the body of the padlock in order to get the tumbler pins out, and in the act of installing the new tumbler pins, it was necessary to again plug up the outer ends of the tumbler pin holes with new plugs and to grind off the plugs to cover up the appearance and location of the same. The prior art method of changing the tumbler pins to change the key combination is an expensive and time-consuming operation. Accordingly, it is the primary object of the present invention to provide a method of lock construction by means of which a locksmith may quickly and easily change the key combination of a padlock.

It is another object of the present invention to provide a method for changing a key combination of a padlock which incorporates the steps of filing a notch in the old key to allow the key plug of the padlock to be rotated to a key plug pull-out position, inserting said key in the key plug and turning it to a position to disable the key plug retainer pin, inserting a tumbler pin retaining tool in the body of the padlock between the key plug and the tumbler pins in the padlock body, and withdrawing the key plug from the padlock body to replace the tumbler pins therein to change the key combination of the padlock.

It is another object of the present invention to provide a novel and improved padlock which is constructed and arranged to permit the key plug to be pulled out of the body of the padlock in a quick and easy manner to change the tumbler pins in the key plug to change the key combination of the lock by the use of a notched key and a tumbler pin retaining tool.

It is a further object of the present invention to provide a novel and improved padlock construction which permits quick and easy changing of the key combination of the lock and which is economical to manufacture, simple and compact in structure and efficient in use.

Other objects, features and advantages of this invention will be apparent from the following detailed description and appended claims, reference being had to the accompanying drawings forming a part of the specification wherein like reference numerals designate corresponding parts of the several views.

In the drawings:

FIG. 1 is a perspective view of a padlock made in accordance with the principles of the present invention;

FIG. 2 is a top plan view, slightly enlarged, of the padlock structure shown in FIG. 1;

FIG. 3 is a broken, elevational sectional view of the structure illustrated in FIG. 2, taken along the line **3—3** thereof and looking in the direction of the arrows;

FIG. 4 is a horizontal sectional view of the structure

illustrated in FIG. 5, taken along the line **4—4** thereof, looking in the direction of the arrows, and showing the regular key in the unlock position, stopped against rotation because it hits against the retainer pin, and before the key has been notched at its point to permit it to pass the retainer;

FIG. 5 is a partial, elevational sectional view, with parts broken away, of the structure illustrated in FIG. 4, taken along the line **5—5** thereof and looking in the direction of the arrows;

FIG. 6 is a bottom view of the lock illustrated in FIGS. 1 through 5, and showing the lock in the unlocked position;

FIG. 7 is a horizontal sectional view of the structure illustrated in FIG. 8, taken along the line **7—7** thereof, looking in the direction of the arrows, and showing the key notched and the key plug rotated beyond the unlocked position into removal position;

FIG. 8 is an elevational sectional view of the structure illustrated in FIG. 7, taken along the line **8—8** thereof, looking in the direction of the arrows, and showing the key plug partially removed from the padlock body;

FIG. 9 is a bottom plan view of the structure illustrated in FIG. 8, taken along the line **9—9** thereof and looking in the direction of the arrows;

FIG. 10 is a bottom plan view of the structure illustrated in FIG. 3, taken along the line **10—10** thereof, looking in the direction of the arrows, and showing the lock in the locked position with the key in position to unlock the padlock;

FIG. 11 is an elevational sectional view of the structure illustrated in FIG. 7, taken along the line **11—11** thereof and looking in the direction of the arrows;

FIG. 12 is a fragmentary perspective view of the key plug and retainer pin of the padlock shown in FIGS. 1–11; and,

FIG. 13 is a fragmentary, perspective, outer end view of a key employed in the invention.

Referring now to the drawings and in particular to FIGS. 1 through 5, 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 the shackle member generally indicated by the numeral **11**. The padlock further includes the key plug generally indicated by the numeral **12** which is rotatably mounted in the 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 an inverted U-shaped structure which includes the bight portion **14** 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** in 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 FIGS. 3 and 5, 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 metal balls **22** and **23**. As shown in FIG. 3, the metal balls **22** and **23** are cammed outwardly, sidewardly, into

locking engagement in the arcuate recesses 24 and 25, in the leg portion 15 and 16, respectively, by means of the inner end 26 of the key plug 12 when the padlock is in the locked position. As shown in FIG. 4, the inner end 26 of the key plug is substantially rectangular in overall configuration whereby when the key plug is turned to the position shown in FIGS. 4 and 5, the longer dimension of the key plug portion 26 is turned out of the line of contact with the balls 22 and 23 whereby these balls may be moved inwardly to permit the spring 18 to force the shackle member 11 outwardly to the position shown in FIG. 5. When the shackle member 11 is urged outwardly to the position shown in FIG. 5, the metal ball 22 rides in the elongated slot 27 formed on the inner side of the leg portion 15 until it engages the curved peripheral recess 28. The peripheral recess 28 permits the shackle member 11 to be rotated within the bore 17 without being completely withdrawn from the bore 17.

A retainer tool 55 includes the horizontal arm portion 56 which is integral with the vertical leg portion 57 as shown in FIG. 8. The retaining tool leg 57 is adapted to be inserted into the slot 54 formed in the key plug 12 and to have the inner end thereof inserted into the recess 58 formed in the upper end of the padlock body 10. The tumbler pin retaining tool 55 includes the outer leg portions 59 and 60 which are adapted to be seated against opposite sides of the padlock body 10, as shown in FIGS. 1, 8 and 9. It will be seen that when the tumbler pin tool 55 is mounted in place on the padlock body 10 as shown in the last mentioned figures, the key plug 12 may be removed from the body 10. The retaining tool inner leg 57 holds the outer tumbler pins 39 through 44 in their respective slots 45.

As shown in FIGS. 3, 5, 8, 11 and 12, the key plug 12 is generally cylindrical in overall configuration and is provided with the enlarged flange 29 on the outer end thereof which is adapted to be seated in the enlarged stepped portion 30 of the chamber 13. The key plug 12 is normally retained in the padlock body 10 by means of the retainer pin 31 which is horizontally mounted in the body 10 and has the inner end thereof extended into the horizontal peripheral slot 32 as shown in FIG. 12. The key plug 12 is provided with the elongated key slot 33 along one side thereof and this slot opens to the periphery of the key plug. As shown in FIG. 12, the old key 36 with its filed notch 37 that permits rotation past the retainer pin 31 is mounted in the key plug keyway 33, and the keyway 33 is enlarged at the inner end thereof as indicated by the numeral 34 and this enlarged portion 34 communicates with the key plug peripheral horizontal slot 32 and permits the rotation of the notched key 36 and passage of the retainer pin 31 through the slot 32, whereby when the key plug 12 is turned to the position shown in FIG. 7, the key plug 12 may be removed from the chamber 13. The key plug 12 may not be removed until the tumbler pin retainer tool 55 is inserted into the slot 54.

Operatively mounted in the inner end of the key plug 12 and disposed across the inner end of the key slot 33 is the transverse hardened stainless steel pin 35 which is adapted to operatively engage balls 22 and 23 which may be made from stainless steel, bronze or any other suitable material. As shown in FIGS. 3, 11, 12 and 13, the key 36 which is to be replaced by the new key adapted to fit the new combination, may be used to withdraw the key plug 12. The inner end corner of the key 36 is cut away by means of filing, or any other suitable method, to form the relieved corner indicated by the numeral 37, whereby when the key plug 12 is turned to the position shown in FIG. 7, the relieved corner 37 will pass over the retainer pin 31 and will permit the key plug to be turned to a position so that the retainer pin 31 will communicate with the enlarged key slot portion 34 on the inner end of the key plug, and the key plug may then be withdrawn from the chamber 13 when the aforedescribed tumbler pin retainer tool 55 is inserted in the passageway means or slot 54.

As shown in FIGS. 3, 5 and 8, the inner end of the retainer pin 31 is substantially hemispherical in shape. As shown in FIG. 12, the enlarged key slot portion 34 is open at the inner end of the key plug 12 and terminates at the shoulder 38 which surrounds the reduced inner end 26 of the key plug 12. The key plug 12 may be withdrawn from the chamber 13 because of the aforedescribed key relieved corner 37 and the key plug slot 34, and the following described tumbler pin construction and tumbler pin retaining tool.

As best seen in FIG. 3, the padlock of the present invention is provided with a plurality of outer tumbler pins 39 through 44 which are slidably mounted in vertically spaced apart horizontal bores as 45. A spring 46 is mounted in each of the bores 45 on the outer side of the pins 39 through 44 for urging the pins inwardly toward the key plug chamber 13. The outer ends of the bores 45 are enclosed by suitable plugs as 47 which are press-fitted in place. The outer ends of the plug 47 may be ground in the usual manner to cover up the appearance and location of the same as viewed from the outside of the body 10.

As best seen in FIGS. 3 and 11, the key plug 12 carries six tumbler pins which may be termed the inner tumbler pins and which are aligned with the outer tumbler pins when the key plug 12 is fully inserted into the body 10. The inner tumbler pins in the key plug 12 are indicated by the numerals 48 through 53. When a key is not inserted into the key plug, the springs 46 urge the outer tumbler pins inwardly against the inner tumbler pins and move the inner tumbler pins to the dotted line position shown in FIG. 3. When the key 36 is inserted into the key plug, the inner tumbler pins are moved to the solid line position shown in FIG. 3 and the outer tumbler pins are moved to the solid line position shown in FIG. 3. It will be seen that when the key 36 is inserted into the lock, the outer tumbler pins 39 through 44 are moved into the bores 45 in the body so as to be fully seated therein to permit the key plug to be rotated in the chamber 13.

When the key 36 with its filed off corner 37 is inserted into the key plug, the key plug may be turned to the position shown in FIG. 7. It will be seen that when the key plug is turned to the position shown in FIG. 7, the outer tumbler pins 39 through 44 will be moved outwardly into their respective bores 45. As shown in FIGS. 6, 7, 9 and 10, the key plug 12 is provided with an axially extended slot 54 which is adapted to be disposed in alignment with the outer tumbler pins 39 through 44 when the key plug is turned to the withdrawal position shown in FIG. 7. A retaining tool generally indicated by the numeral 55 is adapted to be mounted on the side of the body 10 of the padlock as shown in FIGS. 1, 8 and 9.

It will be seen that when a padlock constructed in accordance with the present invention is used and it is desired to change keys therefor, that the key changing operation may be carried on in a quick and efficient manner. The old key 36 which is to be abandoned is ground-off at the outer corner as indicated by the numeral 37 in FIG. 13 and then it is mounted in the lock, and the key plug is turned to the position shown in FIG. 7. The outer tumbler pin retaining tool 55 is inserted in position with its inner leg 57 inserted in the slot 54 and the key plug 12 is then slid downwardly out of the chamber 13 as indicated by the showing of FIGS. 8 and 11. It will be understood that the combination of the lock may then be easily and quickly changed by inserting a new set of inner tumbler pins 48 through 53 in their respective slots in the key plug 12 so as to match the contour of the new key for the new lock combination. The key plug with the new inner tumbler pins may then be inserted back into the chamber 13 without the use of a key. After the key plug 12 has been inserted into the chamber 13, the outer tumbler pin retainer tool 55 is then removed, the shackle 11 is depressed into the bores 17 and 20, and key plug 12 is rotated with the point of a key to the locked position at

which time all pins will snap to the locked position. The new key may then be used to open the padlock.

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 without departing from the proper scope or fair meaning of the subjoined claims.

What I claim is:

1. In a lock construction, the combination comprising:
(a) a body,
(b) a shackle member operatively mounted in the top end of said body,
(c) an elongated chamber formed in the lower end of the body and being open at the outer end thereof,
(d) 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,
(e) a plurality of longitudinally aligned, spring biased outer tumbler pins mounted in said body in spaced bores communicating with said chamber,
(f) 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,
(g) 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,
(h) slot means in said key plug communicating with said keyway 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 slot means, to permit replacing said inner tumbler pins to change the key combination of the lock construction, and,
(i) passageway means in said lock construction 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.

2. In a lock construction, the combination comprising:
(a) a body,

(b) a shackle member operatively mounted in the top end of said body,
(c) an elongated chamber formed in the lower end of the body and being open at the outer end thereof,
(d) 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,
(e) a plurality of longitudinally aligned, spring biased outer tumbler pins mounted in said body in spaced bores communicating with said chamber,
(f) 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,
(g) 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,
(h) 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, and,
(i) passageway means in said lock construction 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.

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