J. F. APPLETON.

COMBINATION LOCK.

APPLICATION FILED JULY 16, 1919.

Patented Aug. 16, 1921.

1,387,750.

Fig. 1.

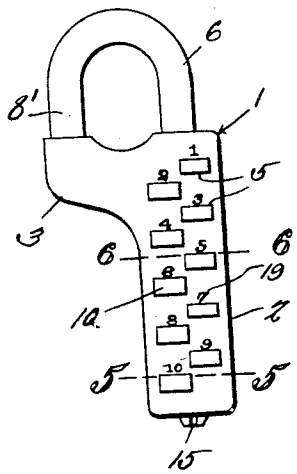


Fig. 2.

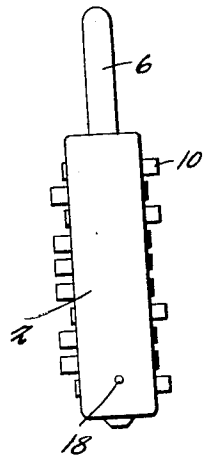


Fig. 3.

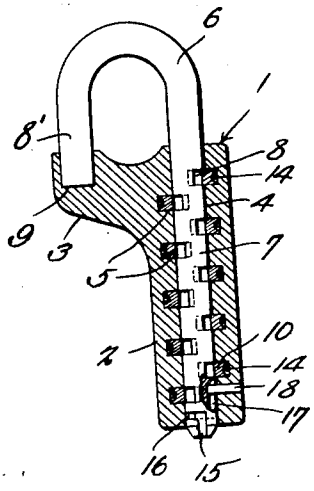


Fig. 4.

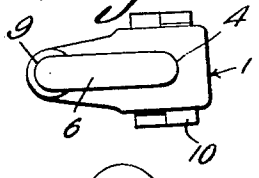


Fig. 5.

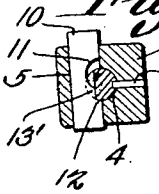


Fig. 6.

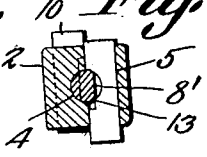


Fig. 8.

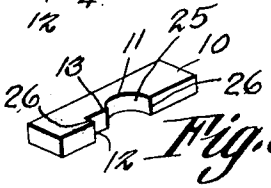


Fig. 7.



Fig. 9.

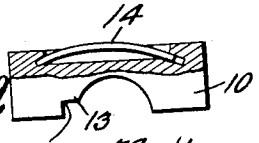


Fig. 10.

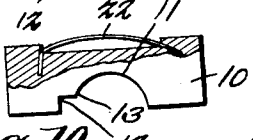
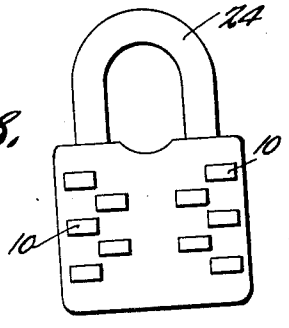


Fig. 11.



Witness

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UNITED STATES PATENT OFFICE.

JAMIE FULLER APPLETON, OF KEOKUK, IOWA, ASSIGNOR TO IOWA LOCK AND MANUFACTURING COMPANY, OF BURLINGTON, IOWA.

COMBINATION-LOCK.

1,387,750. Specification of Letters Patent. Patented Aug. 16, 1921.

Application filed July 16, 1919. Serial No. 311,371.

To all whom it may concern:

Be it known that I, JAMIE FULLER APPLETON, a citizen of the United States, residing at Keokuk, in the county of Lee and State of Iowa, have invented a new and useful Combination-Lock, of which the following is a specification.

This invention relates to keyless locks and more particularly to that class known as permutation or combination locks and has for its object the provision of a simple and practical combination lock of small cost which is easily operated, is not liable to get out of order and cannot be opened by any one not in possession of the combination.

A further object is the provision of a lock in which the shank of the keeper is locked in the case by transverse sliding bars whose opposite ends project outside the case so that the lock may be opened in the dark.

Another object is provision whereby the combination may be readily changed.

With these and other objects in view as will appear as the description proceeds the invention resides in the novel form and arrangement of parts herein described and more particularly pointed out in the appended claims, it being understood that slight changes may be made therein without departing from the spirit or sacrificing any of the advantages of the invention.

Figure 1 is a view in side elevation of the lock.

Fig. 2 is an edge view of the same.

Fig. 3 is a central longitudinal section.

Fig. 4 is a top plan view.

Fig. 5 is a cross section on the line 5—5 of Fig. 1 showing the locking pins in locked position.

Fig. 6 is a cross section on line 6—6 of Fig. 1 showing one of the locking pins in unlocked position.

Fig. 7 is a perspective view of the staple member.

Fig. 8 is a perspective view of one of the locking pins.

Fig. 9 is a plan view partly in section of a locking pin.

Fig. 10 is a view similar to Fig. 9 of a modified form of locking pin.

Fig. 11 is a side elevation of a slightly modified form of lock.

Referring to the drawing by characters of reference the numeral 1 indicates the case of a lock which is a single block of metal having an elongated portion 2 and an upper offset portion 3.

The elongation 2 is provided with a central longitudinal bore 4 intersected by a number of transverse grooves or slots 5, of which latter there may be any desired number, ten being shown in the present instance. The grooves 5 intersect the edge of the bore 4, approximately midway of their width and are arranged alternately on opposite sides of the bore.

The keeper comprises a staple 6 one leg of which forms an elongated shank 7 which slides in and fits the bore 4 and is provided with a series of notches 8, corresponding in size, number and position to the grooves in the case and when entirely forced in the case its notches 8 coincide with the grooves in the case 1. The other leg 8′ of the staple, seats when in locked position in a socket 9 in the offset 3.

The locking bars 10 are all alike and comprise a rectangular bar, having an arcuate groove 11 formed in one side of the bar, the groove being cut on the same radius as that of the bore 4, so that when the grooves in all of the locking bars are in register with the bore 4 the shank 7 is free to move in or out of the case 1. The bar is cut away at one side of the groove 11 to form a notch 12, the notch 12 being cut in the bar 10 deep enough to permit the portion 13 of the bar to enter the notch 8 in the shank to lock the same as indicated at 13′, Fig. 5. The bar 10 is provided on the side opposite the groove 11 with a spring 14, which is adapted to frictionally engage the wall of the slot 5 and hold the bar in any position to which it may be moved.

A longitudinal groove 15 is cut in the lower end of the shank 7 and opens into a circumferential groove 16 which extends approximately through 270 degrees of the circumference of the shank, extending to a second longitudinal groove 17. A screw or pin 18 is fixed in the case 2, extending into the bore to be engaged by the several slots.

To assemble the lock the bars 10 are inserted in the slots 5 the corresponding ends of all the bars being inserted from one side of the case, for instance from the face side which may be provided with numerals 19 to distinguish the several bars in the combination. By inserting the bars in this way and moving them all to one side of the case the

grooves 11 will register with the bore 4 and the shank 7 may be readily inserted, the groove 15 first engaging the pin 18, a three quarter rotation of the shank then locates the groove 17 over the pin and the leg 8′ of the staple over the socket 9. With the staple moved into the case, by pushing any one or a number of the bars to the opposite side of the case the shank will be securely locked in the case.

To set the combination or to change the same it is only necessary to remove the shank from the case and reverse the ends of the bars desired for the combination. In this way the combination may be changed each time the lock is opened, if the operator so desires.

The bars 10 may be constructed as shown in Fig. 9 having a round spring 14 or may be made as in Fig. 10 with a leaf spring 22. In each case the spring is secured in the bar at one end, the other end of the spring being free to move.

In Fig. 11 is shown a modified form of lock in which both legs of the shackle 24 may be engaged by the bars 10.

Briefly considered, the lock forming the subject matter of this application comprises a casing 1 having a bore 4, and provided with transverse slots 5 intersecting the bore, a shackle 6 comprising a shank 7 mounted for right line sliding movement in the bore 4 and supplied with notches 8 adapted to be brought into registration with the slots 5, the slots 5 extending into the bore 4 to a point beyond the bases of the notches 8 as indicated at 8′, and tumblers 10 mounted for right line sliding movement in the slots 5, into and out of engagement with the notches 8 of the shank 7. The tumblers 10 have seats 11 adapted to be brought into and out of registration with the bore 4, there being a notch 12 in each tumbler, at one end of the seat, the notch 12 and the opposite wall 25 of the seat 11 defining shoulders 26 engageable with opposite sides of the shank 7, inwardly of the notches 8 of the shank 7, as indicated in Figs. 5 and 6, to prevent the withdrawal of the tumblers.

Having thus described the invention, what is claimed is:—

1. A lock having an integral casing provided with a longitudinal bore, and a transverse slot intersecting the bore, a shackle movable in said bore, the shackle having a transverse groove registering with the slot in the casing, the shackle at the base of the groove extending into the slot and a tumbler having right line movement in the slot into and out of engagement with the shackle.

2. A permutation lock comprising a casing; a shackle having right line movement in the casing and a tumbler having right line movement in the casing into and out of engagement with the shackle, the tumbler and the shackle each having a notch for the reception of the other, that portion of the shackle which lies at the base of the notch thereof extending into the notch of the tumbler to prevent the removal of the tumbler.

3. A permutation lock comprising a casing provided with a bore and a transverse slot intersecting the bore, a shackle having right line movement in the bore, the shackle having a transverse groove registering with the slot, the shackle at the base of the groove extending into the slot and a tumbler having right line movement in the slot, said tumbler having a seat and a notch, the wall of the seat being adapted to engage the shackle when the tumbler is moved in one direction and the wall of the notch being adapted to engage the shackle when the tumbler is moved in the opposite direction.

4. A permutation lock comprising a casing having a bore and provided with transverse slots intersecting the bore; a shackle comprising a shank mounted for right line sliding movement in the bore and supplied with notches adapted to be brought into registration with the slots, the slots extending into the bore to a point beyond the bases of the notches; and tumblers mounted for right line sliding movement in the slots into and out of engagement with the notches of the shank, the tumblers having seats adapted to be brought into and out of registration with the bore, there being a notch in each tumbler at one end of the seat, the notch and the opposite wall of the seat defining shoulders engageable with opposite sides of the shank, inwardly of the notches of the shank, to prevent the withdrawal of the tumblers.

5. A permutation lock constructed as set forth in claim 4 and further characterized by the fact that the seats are located nearer to one end of the tumblers than to the other end thereof, to provide for a change of the combination when the tumblers have been turned end for end, after the shank has been withdrawn from the casing to permit an end for end reversal of the tumblers.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JAMIE FULLER APPLETON.

Witnesses:
EDWARD J. SCHLOTTER,
CHARLES GAMBREL.