M. J. LOVETT.

PERMUTATION PADLOCK.

APPLICATION FILED JAN. 8, 1914.

1,139,986. Patented May 18, 1915.

Fig. 1.

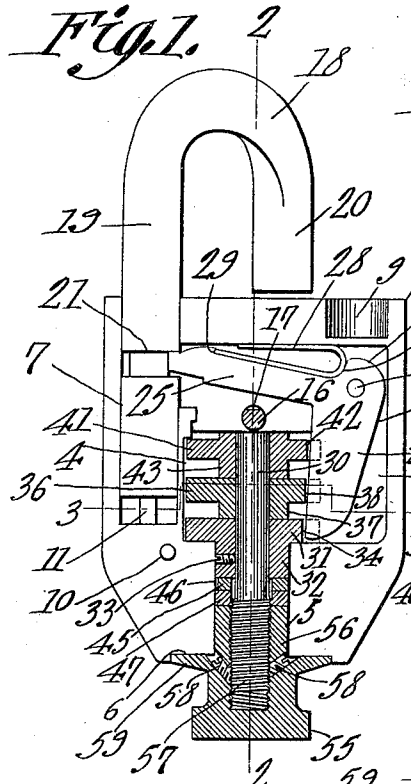

Fig. 2.

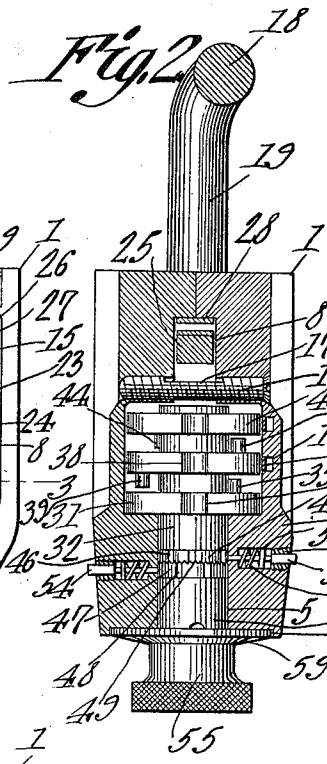

Fig. 7.

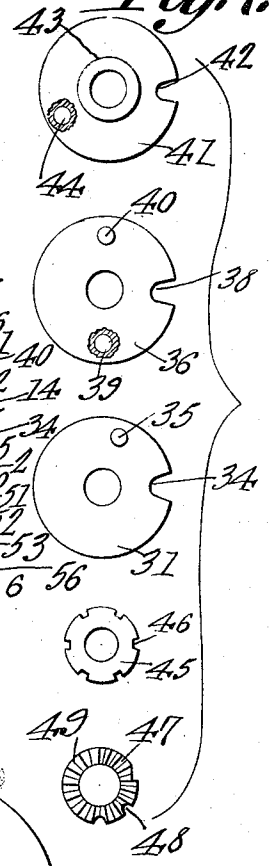

Fig. 4.

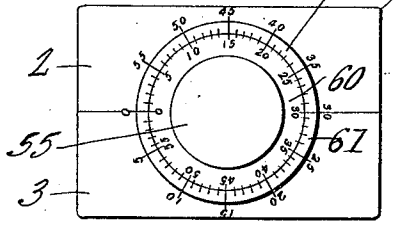

Fig. 3.

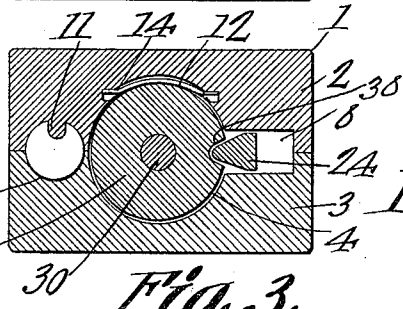

Fig. 6.

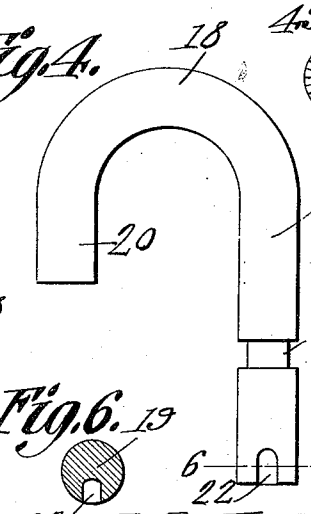

Fig. 5.

Witnesses

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PERMUTATION-PADLOCK.

1,139,986. Specification of Letters Patent. Patented May 18, 1915.

Application filed January 8, 1914. Serial No. 811,067.

To all whom it may concern:

Be it known that I, MORRIS J. LOVETT, a citizen of the United States, residing at Randsburg, in the county of Kern and State of California, have invented a new and useful Permutation-Padlock, of which the following is a specification.

The device forming the subject matter of this application is a permutation padlock and one object of the invention is to provide novel means for holding together, the coöperating parts of the case of the lock, the construction being such that the parts of the case can be separated only when the shackle is in an unlocked position.

Another object of the invention is to provide a padlock of the type described which may be operated in the dark, to effect the combination, by the sense of feeling only.

The invention aims, further, to provide novel means whereby a pair of shiftable rings, used in setting up the combination, may be moved upon the tumbler shaft and be held in adjusted positions upon the tumbler shaft.

It is within the scope of the invention to improve generally and to enhance the utility of, devices of that type to which the present invention appertains.

With the above and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings: Figure 1 shows the invention in longitudinal section, the cutting plane being passed between the constituent parts of the lock casing, parts appearing in elevation; Fig. 2 is a longitudinal section on the line 2—2 of Fig. 1; Fig. 3 is a cross section on the line 3—3 of Fig. 1; Fig. 4 is an end elevation of the case of the lock; Fig. 5 is an elevation of the shackle; Fig. 6 is a cross section of the shackle on the line 6—6 of Fig. 5; Fig. 7 is a collective view illustrating in plan, the tumblers and the combination rings, portions of certain of the tumblers being broken away.

In carrying out the invention there is provided a case which is denoted by the numeral 1. The case 1 comprises two coöperating parts denoted by the numerals 2 and 3. These parts 2 and 3 are duplicates, saving in so far as specifically modified. The lock case 1 generally considered is provided in its interior with a plurality of openings and chambers and as will be understood most clearly from Fig. 2, these openings and chambers lie half and half in the parts 2 and 3 of the case 1.

In the interior of the case 1 there is formed a tumbler chamber 4, reduced in diameter to form a neck 5, terminating at one end of the case 1 in a superficial annular recess 6. Extended into the opposite end of the case 1 is a cylindrical passage 7. A detent chamber 8 extends transversely of the case 1 and is prolonged parallel to the axis of the tumbler chamber 4, the detent chamber 8 communicating with the passage 7 and with one side of the tumbler chamber. In the upper end of the case 1 there is formed a seat 9.

The distinguishing characteristics of the part 2 of the case 1 are that the same is provided with a projecting stud 10 received in a correspondingly shaped recess in the part 3 (which recess is not shown), the stud serving merely to aid in alining the parts of the case; the part 2 being provided at the base of the passage 7 with a radial extended projection 11; there being transverse grooves 12 in the part 2, in the tumbler chamber 4, the grooves 12 receiving tumbler brake springs 14, preferably in the form of concaved, resilient strips; the part 2 carrying a pivot stud 15 which projects into the detent chamber 8. The parts 2 and 3 of the case 1 are held together by a removable element, preferably taking the form of a screw 16, one side of which is flattened as shown at 17.

The shackle is denoted generally by the numeral 18 and comprises a short arm 20 and a long arm 19. The long arm 19 of the shackle is mounted to slide longitudinally and to rotate in the passage 7 and is cir-

cumscribed by a groove 21. In the lower end of the long arm 19 there is a longitudinal slot 22 adapted to receive the projection 11. The end of the short arm 20 is adapted to be received in the seat 9 when the shackle 18 is in a locked position.

The invention further includes an angular detent 23 which is located in the detent chamber 8. The detent 23 includes an upright arm 24 and a transverse arm 25 at the juncture of which is formed a head 26 in which the pivot stud 15 is received, the construction being such that the detent is mounted to swing on the pivot stud. The inner edge of the head 26 of the detent 23 is concaved to form a seat 27 adapted to receive the bend of a U-shaped spring 28, one arm of which lies against the arm 25 of the detent and is received terminally by a shoulder 29 in the arm 25, the other arm of which bears against the upper portion of the lock case 1, as will be understood from Fig. 1. The extremity of the arm 25 of the detent is received in the circumscribing groove 21 in the arm 19 of the shackle.

Located in the neck 5 and in the tumbler chamber 4 is a shaft 30. Surrounding the shaft 30 is a fixed tumbler 31 comprising a hub 32 which extends into the neck 5. A set screw 33 passes through the hub 32 and engages the tumbler shaft 30 and thus the tumbler 31 is fixed to the tumbler shaft. In the periphery of the tumbler 31 there is formed a notch 34, the tumbler carrying an upstanding pin 35. Journaled on the tumbler shaft 30 and located above the fixed tumbler 31 is a rotatable tumbler 36 provided with a hub 37 which spaces the tumbler 36 from the tumbler 31. The tumbler 36 is provided with a peripheral notch 38. The tumbler 36 carries a depending pin 39 which coöperates with the pin 35 and carries also an upstanding pin 40. Journaled on the tumbler shaft 30 is a tumbler 41 provided in its periphery with a notch 42, the tumbler 41 being provided with a hub 43 which extends upon both sides of the disk portion of the tumbler and serves to space the tumbler in question from the tumbler 36. A pin 44 projects downwardly from the disk portion of the tumbler 41 and is adapted to coöperate with the pin 40 of the tumbler 36. At this point it may be stated that the brake springs 14 bear against the peripheries of the movable tumblers 41 and 38 and hold the same against rotation, saving when these tumblers are forcibly turned through the interengagement between the pins above referred to.

Surrounding the tumbler shaft 30 and located in the neck 5 is a primary ring 45 provided with notches 46. Any number of notches 46 may be made in the primary ring, seven notches being shown. Surrounding the tumbler shaft 30 and located in the neck 35 is a secondary ring 47 which may be provided with three notches 48. The adjacent faces of the rings 45 and 47 are ribbed as indicated at 49, or are otherwise roughened so that when the rings are pressed together, they will not rotate independently.

In the part 2 of the case 1 there is a transverse opening 50 into which is threaded or otherwise secured a bushing 51 constituting a mounting for a slidable pin 52 pressed outwardly by a spring 53, one end of which abuts against a suitable projection upon the pin the other end of which abuts against the base of the opening 50. The pin 52 is located opposite to the primary ring 45 and is adapted to coöperate with the notches therein. A pin 54 of similar construction, and similarly mounted is carried by the part 3 of the lock case 1 and coöperates with the notches 48 of the secondary ring 47.

The outer end of the tumbler shaft 30 is threaded as indicated at 57 to receive a nut 55 having a tubular extension 56 which projects into the neck 5 and is journaled therein. The inner end of the extension 56 of the nut 55 bears against the ring 47 and presses the ring 47 against the ring 45, the ring 45 being pressed against the hub 32 of the fixed tumbler 31, the serrated surfaces 49 of the rings preventing independent rotation between the rings. The nut 55 is held in place by set screws 58 which engage the tumbler shaft 30 and the nut is provided with an exterior flange 59 rotatably received in the superficial recess 6, the flange 59 being provided with a dial 60 coöperating with a dial 61 inscribed upon the end face of the lock case 1 as will be understood from Fig. 4.

In order to aline the notches 34, 38 and 42 of the tumblers 31, 36 and 41, the tumbler shaft 30 is rotated in opposite directions by means of the nut 35, the combination being read off on the dials 60 and 61. The pin 35 on the fixed tumbler 31 coöperates with the pin 39 on the movable tumbler 36 and the pin 40 on the tumbler 36 coöperates with the pin 44 on the tumbler 41 and thus the notches 34, 48 and 42 may be lined up. There is nothing novel in the foregoing operation and the same will be understood readily by those skilled in the art.

After the notches 34, 38 and 42 have been lined up as above described, the shackle 18 is lifted and rotated, so that the short arm 20 of the shackle no longer is engaged in the seat 9. When the shackle 18 is lifted, the slot 22 in the long arm 19 of the shackle is disengaged from the projection 11 and when the shackle is rotated, the lower end of the arm 19 rests upon the projection 11, the parts then appearing as shown in Fig. 1. When the shackle 18 is lifted, the detent 23

will be swung upon the pivot stud 15, owing to the fact that the extremity of the arm 25 of the detent is engaged in the circumscribing groove 21 in the arm 19 of the shackle. Since the grooves 34, 38 and 42 of the tumblers are in alinement, these grooves will receive the inner edge of the arm 24 of the detent 23, permitting the shackle 18 to be disposed in the open position shown in Fig. 1.

In order to lock the shackle 18, the same is rotated until the end of the short arm 20 is above the seat 9, the slot 22 in the arm 19 being lined up with the projection 11 to receive the same, and the shackle moving inwardly, under the action of the spring 28 which exerts a thrust against the arm 25 of the detent 23. By this operation of the spring 28, the arm 24 of the detent 23 will be swung laterally out of engagement with the alined notches 34, 38 and 42. Then, by rotating the tumbler shaft 30 through the medium of the nut 35, the notches 34, 38 and 42, or one of them, may be moved out of alinement with the edge of the arm 24 of the detent 23 and thus the shackle 18 will be held in a locked position.

The combination may be changed by loosening the set screw 33 and by rotating the tumbler 31 to a new position on the tumbler shaft 30. At times, notably when the lock is manipulated in a dark place, the dials 60 and 61 cannot be observed. Then, the combination desired may be effected through the medium of the pins 52 and 54, the pins being pressed inwardly to coöperate, respectively, with the notches 46 in the ring 45 and with the notches 48 in the ring 47, the tumbler shaft 30 being rotated by means of the nut 55, the operator counting the number of times which each pin pulsates, as the same moves into and out of the notches in the rings, the springs 53 serving to hold the pins retracted out of the notches in the rings under normal conditions.

The combination afforded by the rings 47 and 45 may be changed by loosening the set screws 58 and by rotating the nut 55 on the threaded end 57 of the tumbler shaft 30, thus setting the rings 45 and 47 free, so that they may be shifted circumferentially on the tumbler shaft 30, whereupon, the rings may be bound in their adjusted positions by rotating the nut 35 until the rings are clamped between the nut and hub 32 of the tumbler 31.

One important feature of this invention resides in the fact that the screw 16 which holds the parts 2 and 3 of the case 1 together, can be removed only when the shackle 18 is in an open position. When the shackle is in a closed position, the under edge of the arm 25 of the detent 23 bears against the flat side 17 of the screw 16, and thus a rotation of the screw is rendered impossible. So soon, however, as the parts are positioned as shown in Fig. 1, the screw 16 is set free, and may be rotated readily to effect a separation of the parts of the case 1.

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

1. In a pad lock, a case comprising cooperating parts; a removable element engaging the case parts to hold the same together; a shackle carried by the case; and movable means for locking the shackle in a closed position, said means engaging the removable element independently of the shackle to hold the same in the case when the shackle is in a closed position.

2. In a pad lock, a case comprising cooperating parts; a screw uniting the case parts and having a flat side; a shackle carried by the case; and means for holding the shackle in a closed position, said means engaging the flat side of the screw when the shackle is in a closed position.

3. In a pad lock, a case comprising cooperating parts; a removable element engaging the case parts to hold the same together, a shackle carried by the case; a tumbler journaled in the case; and a detent pivoted in the case and coöperating with the tumbler and the shackle, the detent engaging the removable element to hold the same in the case when the shackle is in a closed position.

4. In a pad lock, a case comprising cooperating parts; a screw connecting the case parts and having a flat side; a shackle carried by the case; a tumbler journaled in the case; a detent pivoted in the case and cooperating with the tumbler and the shackle, the detent engaging the flat side of the screw when the shackle is in a closed position.

5. In a lock, a case; a shaft journaled therein; a tumbler carried by the shaft; locking mechanism coöperating with the tumbler; a pair of rings mounted on the shaft and provided with projections; a nut threaded on the shaft and binding the rings between the tumbler and the nut; and movable elements carried by the case, said movable elements being accessible from the outside of the case and coöperating, respectively, with the projections on the rings.

6. In a lock, a case having a marking; a shaft journaled therein; a nut mounted on the shaft and having a marking coöperating with the marking on the case to set off a combination; a tumbler on the shaft; a pair of rings bound between the tumbler and the nut and provided with projections; and movable members mounted in the case and accessible from the outside of the case, said members coöperating with the projections of the rings; and locking mechanism coöperating with the tumbler.

7. In a lock of the class described, a case; a shaft journaled therein; a tumbler carried

by the shaft; locking mechanism coöperating with the tumbler; rings upon the shaft and provided with interengaging elements upon their abutting edges which elements hold the rings against relative rotation but permit relative circumferential adjustment of the rings when the rings are separated, the rings having projections; means for holding the rings together to cause the interlocking elements to coact; and movable elements accessible from the outside of the case and coöperating individually with the projections of the respective rings.

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

MORRIS J. LOVETT.

Witnesses:
P. T. WEIST,
ALBERT ROURKE.