

J. ROCHE.
 PERMUTATION LOCK.
 APPLICATION FILED AUG. 31, 1911.

1,025,538.

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Fig. 1.

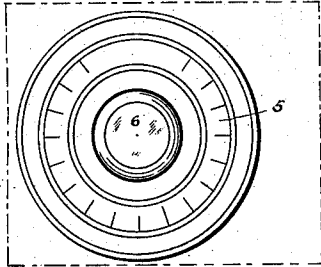


Fig. 2.

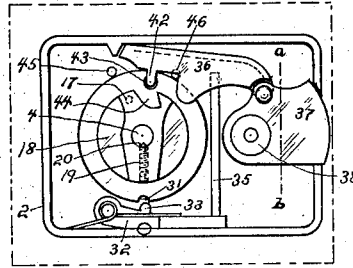


Fig. 3.

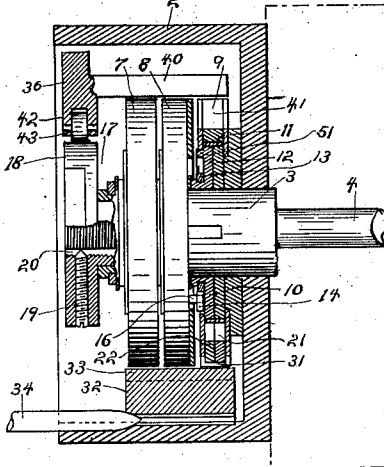


Fig. 4.

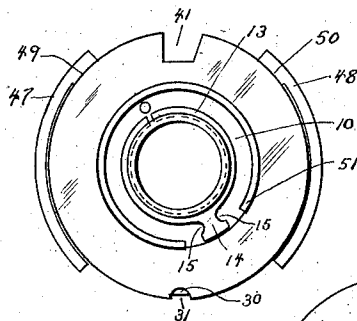


Fig. 5.

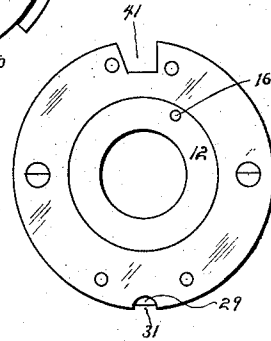


Fig. 6.

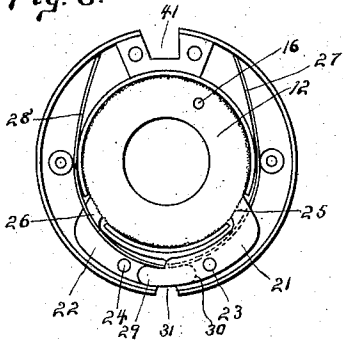


Fig. 8.

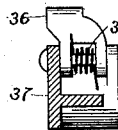
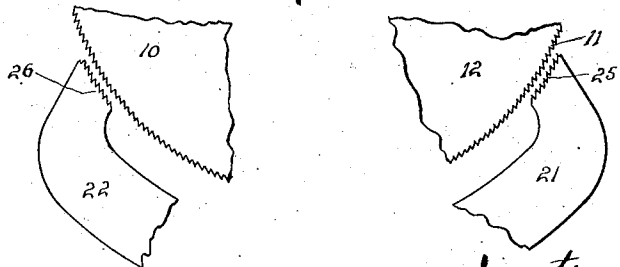


Fig. 7.



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PERMUTATION-LOCK.

1,025,538.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JAMES ROCHE, a citizen of the United States, residing at Terryville, in the county of Litchfield and State of Connecticut, have invented a new and useful Improvement in Permutation-Locks; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1 a front view of a lock constructed in accordance with my invention. Fig. 2 a rear view with the back of the case removed. Fig. 3 a sectional view showing two of the tumblers in side view. Fig. 4 a plan view of one of the tumblers and illustrating a modified form of limiting the upward movement thereof. Fig. 5 a reverse plan view of one of the tumblers. Fig. 6 a similar view with the plate removed. Fig. 7 a broken view on an enlarged scale showing the movable center with the locking pawls. Fig. 8 a sectional view on the line *a-b* of Fig. 2.

This invention relates to an improvement in permutation locks and particularly to permutation locks having wheel tumblers with annular bearing centers with which dogs engage to permit the setting and resetting of the lock. In some places the custodian of the vault or box on which these locks are placed is frequently changed, and it is the custom to reset the tumblers each time the custodian changes and so that the tumblers may be set several times each day. It is therefore desirable that an extraordinary degree of security in the resetting mechanism be provided for and at the same time provide a lock in which the resetting may be easily accomplished; and the object of this invention is to attain these results; and the invention consists in the construction hereinafter described and particularly recited in the claims.

In carrying out my invention I have shown it applied to a permutation lock of substantially usual form comprising a case 2 in which the lock mechanism is arranged, a hub 3 fixed in the case and through which a central spindle 4 passes, the spindle being connected with a dial plate 5 through a knob

6 by which it may be turned, the dial having marks or graduations indicating the extent to which it is to be turned for the movement of the permutation tumblers. Mounted upon the hub 3 are a series of permutation wheel tumblers 7, 8 and 9. In each tumbler is a fly carrier 10 the edge 11 of which is serrated, and secured to this fly carrier is a center disk 12 the edge of which is serrated and corresponds in diameter to the serrated portion of the fly carrier but the teeth on the fly carrier are turned in the opposite direction from the teeth on the center disk. Mounted on the fly carrier is a fly 13, and the opposite sides of the lug 14 will be formed with semi-circular notches 15 to be engaged by a pin 16 carried by the next adjacent center disk or by a pin 17 carried by a drive-wheel 18 which is turned onto the spindle 4 with which it is engaged by a set screw 19 entering a locking groove 20 formed in the spindle. The fly is limited in its movement by the ends of a flange 51. In each tumbler are a pair of pawls 21 and 22 respectively mounted on studs 23, 24, and formed with locking ends 25, 26, to engage respectively with the center disk 12 and the fly carrier 10. The locking ends of these pawls are normally pressed against the fly carrier and center disk by springs 27, 28, and the tails 29, 30, across each other over a notch 31 formed in the tumbler. Mounted in the case below the tumblers is a lever 32 formed in its upper face with a rib 33 adapted to engage with the ends of the pawls when the notches 31 are brought into line with the rib. This lever is adapted to be raised by a round or flat key or pin 34 which may be formed from sheet-metal or wire and adapted to be inserted, through a clearance opening formed for it in the case, between the case and the lever so as to lift or crowd the lever upward. This lever carries a post 35 which engages with a locking dog 36 pivotally connected to the locking bolt 37 mounted in the case upon a stud 38. Between the locking dog and bolt is a spiral spring 39 the tendency of which will be to move the outer end of the locking dog downward. This locking dog carries an inwardly extending arm 40 which is adapted to enter notches 41 formed in the peripheries of the several tumblers when such tumblers are brought into predetermined position. The

locking dog also has a finger 42 which carries an anti-friction roller 43 to engage with a notch 44 in the drive-wheel 18.

To prevent jamming, the underside of the hub 3 is cut away, or in other words, the hub is made eccentric to a very slight degree not perceptible in drawing, and in the case are two bearing posts 45, 46, which prevent the upward movement of the tumblers by the movement of the lever 32. If desired, the tumblers might be inclosed by segmental walls 47, 48, the upper ends of which will be formed with bearing blocks 49, 50, which have the same effect as the posts 35, 36, to prevent the upward movement of the tumblers and without friction against the remaining portions of the walls. In this way the tumblers are limited in their upward movements without applying undue friction and at the same time it prevents so much pressure being applied to the hub when the key is inserted to change the combination as to make it impossible to revolve the center. When the tumblers are brought into position so that the notches 31 are all in line at the bottom and the notches 41 at the top in line with the arm 40, the key 34 may be inserted into the casing below the lever 32 and so as to lift or crowd the lever upward and cause the rib 33 to engage with the tails of the pawls 21, 22, so as to move their locking ends 25, 26, away from the fly carrier 10 and the center disk 12. At the same time the post 35 has lifted the locking dog 36 so as to move the finger 42 out of the notch 44. The lock can then be set to any desired numbers and then if the key is removed the pawls 21, 22 can come into locking engagement with the center disk and fly carrier, again resetting the lock.

I claim:—

1. In a permutation lock, the combination with a hub, of a series of revolving wheel tumblers mounted thereon, a movable center for each tumbler said center having two portions formed with reversely turned serrations, and a pair of reversely arranged pawls mounted in the tumblers and adapted respectively to engage with the said teeth, and means for moving said pawls out of engagement with said teeth.

2. In a permutation lock, the combination with a hub, of a series of revolving wheel tumblers mounted thereon, a fly carrier, and a center disk in each tumbler the edges of the carrier and disk formed with oppositely turned teeth, a pair of pawls mounted in the tumbler and having their ends respectively engaged with the edges of the fly carrier and center disk, and means

for moving said pawls whereby the fly carrier and center disk may be turned independently of the tumblers.

3. In a permutation lock, the combination with the hub, of a series of revolving tumblers mounted thereon, a fly carrier in engagement with each tumbler, said tumblers carrying pins, a fly on each of said carriers, said flies each formed with a lug, and the said lugs formed on opposite sides with a notch to be engaged by the pin on the next adjacent tumbler.

4. In a permutation lock, the combination with a hub, of a series of revolving wheel tumblers mounted thereon, movable centers in each tumbler said centers having reversely turned teeth, a pair of pawls mounted in said tumbler to engage with said centers the inner ends of the pawls crossing each other and over a notch formed in the tumbler, a lever mounted in the case and formed in its upper face with a rib adapted to enter said notch and engage with said pawls whereby said pawls will move out of engagement with the movable centers.

5. In a permutation lock, the combination with a hub, of a series of revolving tumblers mounted thereon and so as to have a slight amount of lateral play, and means in the case to limit the upward movement of the tumblers whereby clamping on the hub is avoided.

6. In a permutation lock, the combination with a hub, of a spindle extending through the said hub, a drive-wheel fixed to the said spindle, a series of revolving wheel-tumblers mounted on the said hub and adapted to be turned by said drive-wheel, movable centers carried by said tumblers, said centers having reversely turned teeth, a pair of oppositely arranged pawls carried by the tumblers for engagement with said teeth, a lever mounted in the case below said tumblers and adapted when raised to engage with said pawls to lift them out of engagement with the centers, a locking bolt, a spring locking dog connected therewith, a finger carried by said dog and adapted to engage with said tumblers, and a post carried by said lever and adapted to engage with said locking dog whereby when the lever is raised the dog will be lifted out of engagement with the drive-wheel.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

JAMES ROCHE.

Witnesses:

OTIS B. HOUGH,
GEO. LANGDON.