June 15, 1937. E. NORTH 2,083,859

PERMUTATION LOCK

Filed Feb. 20, 1935

Fig. 1.

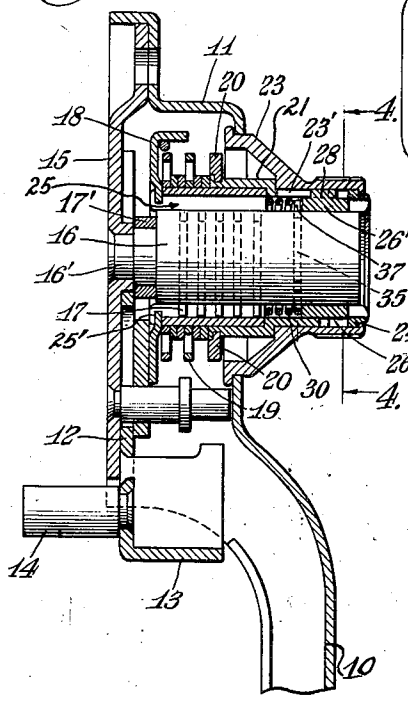


Fig. 2.

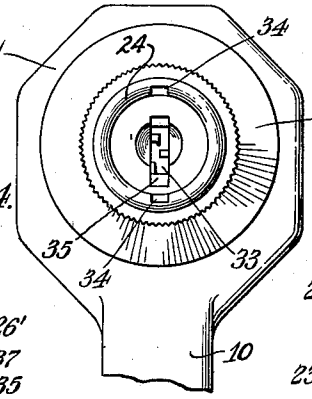


Fig. 4.

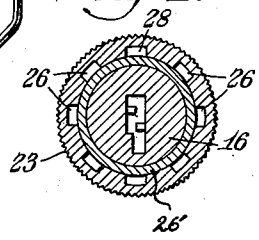


Fig. 3.

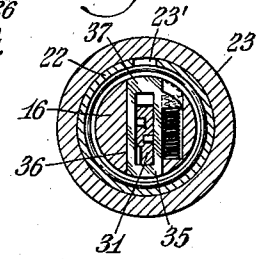


Fig. 6.

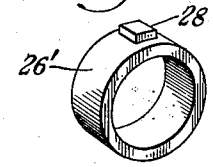


Fig. 5.

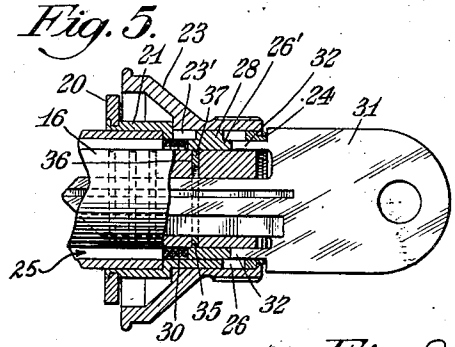


Fig. 7.

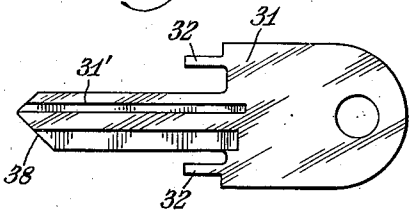
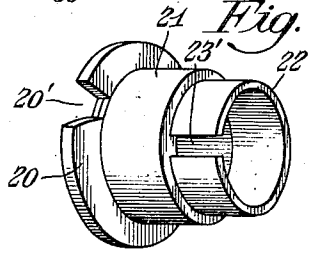


Fig. 8.



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PERMUTATION LOCK

Edwin North, Rockford, Ill., assignor to National Lock Co., Rockford, Ill., a corporation of Illinois

Application February 20, 1935, Serial No. 7,381

13 Claims. (Cl. 70—319)

This invention relates to certain novel improvements in permutation locks and has for its principal object the provision of an improved structure of this character which will be highly efficient in use and economical in manufacture.

Among the many objects of this invention is the provision of means for expeditiously and conveniently changing the combination of a permutation lock without disassembling the same or removing it from its connected position with the structural unit such as a door or the like with which it is associated.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawing, showing the preferred form of construction and in which:

Fig. 1 is a fragmentary sectional detail view of the invention;

Fig. 2 is a fragmentary elevational view of the invention as shown in Fig. 1;

Fig. 3 is a sectional detail view showing the latch member or tumbler 35—37 in lowered or ineffective position and the permutation-changing key 31 in place;

Fig. 4 is a sectional detail view of the same taken substantially on line 4—4 of Fig. 1;

Fig. 5 is a fragmentary detail view similar to that shown in Fig. 1, illustrating the combination changing key in inserted position;

Fig. 6 is a perspective view of the combination changing ring embodied in the invention;

Fig. 7 is a plan view of the combination change key; and

Fig. 8 is a perspective view of the combination permutation disc and dial knob sleeve embodied in the invention.

Construction

As shown in the drawing the permutation lock is shown in association with a handle 10 including a housing 11 within which the permutation lock is mounted.

The handle slidably supports a lift 12 including a finger engaging lip 13 and a latch lift pin 14.

This lift 12 is substantially similar in construction to that shown in my companion applications filed on even date hereof, Serial Nos. 7,383, 7,384 and 7,385 for Letters Patent of the United States on a Combined handle and lock, to which applications reference may be had for a further understanding concerning the functional operation of this lift 12.

The housing 11 includes a removable plate 15 rotatably supporting a stud shaft 16' of a key barrel 16 within which is assembled a plurality of tumbler pins 17 operable by a proper key for rotating a cam lock 17' similar to that shown in my applications hereinbefore mentioned.

A supporting plate is indicated at 18 and this plate is supported from the plate 15 and in turn supports the permutation discs 19 and 20 which are of a structure similar to that shown in my applications hereinbefore mentioned. This support is effected by means of a sleeve 25 which has an end portion peened or flared into an opening in plate 18 as at 25', the opposite (right) end having an inwardly extending rim portion (not apparent in the figures) and against which the inner end of spring 30 bears.

My present invention is principally concerned with the change of the combination of the permutation discs. Therefore only that structure of the permutation lock will be described as is necessary for an understanding of that which concerns this present invention.

In this connection the permutation disc 20 has the usual notch 20' which when in alignment with similar notches (not shown) of the disc 19 will permit the operation of the lift in a manner explained in my applications before mentioned.

This disc 20 is mounted upon and fixed to a sleeve 21 having a lesser diameter than that of the disc 20.

Outwardly of this sleeve and formed integrally therewith is a reduced collar 22. This collar is provided with a longitudinally extending slot 23'.

Carried by the dial knob 23 and rotatable in the key-receiving end thereof, is a bezel ring 24 having a pair of diametrically opposed key-receiving slots 34 opening into the inner periphery thereof, the bezel ring being freely rotatable in the knob when a key 31 is positioned in the key barrel with its fingers 32 in the slots 34 of the bezel ring.

The knob 23 has formed integrally therewith on the inner side thereof adjacent the bezel ring 24, an annular collar portion into which are cut a plurality of circumferentially arranged keying notches 26 spaced at a predetermined distance from one another, and each of which is adapted to be registered by rotation of the knob with the slot 23' of collar 22 (see Figs. 4, 5, and 8).

Between the collar 22 and the knob 23 and slidably mounted upon the barrel 16 is a coupling ring 26'.

This coupling ring 26' as shown in Fig. 6 is

provided with a key block 28 which is adapted to engage in the slot 23' of the collar 22 and partly in one of the interior keying notches 26 of the knob 23 to effectuate operative connection between the knob 23 and the permutation disc 20, that is, in order to releasably latch the dial knob 23 and the permutation disc 20 together for movement as a unit.

The coupling ring 26' is normally held in position to operatively couple or releasably latch the knob 23 and the permutation disc 20 together for simultaneous movement, by means of an expansion spring 30 which is mounted upon the key barrel 16 in bearing relation with the coupling ring 26' and the annular rim portion of the sleeve 25 as shown.

In Fig. 7 I have shown a key 31 for moving the coupling ring 26' against the action of the spring 30 whereby to dispose the key block 28 from engagement with one of the notches 26 to permit independent rotation of the knob 23 and the disc 20 so as to effectuate a change in the combination of the permutation lock, that is to say, to change the relative position of knob 23 and a particular combination number thereon in its relation to the permutation slot 20' of disc 20.

As shown this key 31 in addition to including a properly cut intermediate portion 31' for operating the tumbler pins 17 includes oppositely disposed push fingers 32 which are adapted, when the key is inserted through the key slot 33 of the barrel 16, to pass through the openings 34 into engagement with the coupling ring 26'. In this position of the key 31 inward movement of the coupling ring 26' may be effectuated against the action of the expansion spring 30 thereby disposing the key block 28 out of engagement with the notch 26 in knob 23 with which it was engaged and disposing the same completely in the slot 23' of the collar 22.

With the coupling ring 26' in this position, the knob 23 may be rotated to dispose one of the remaining notches 26 in position to receive the key block 28 upon return of the coupling ring 26' by action of the spring 30 upon withdrawal of the key 31 from key barrel 16.

Slidably mounted in a transversely extending slot 36 which is provided in the barrel 16 is a latch bar 35 and this latch bar 35 is normally disposed in a position such that its upper end portion 37 is positioned or disposed radially below (Fig. 5) the slot 23' in the collar 22, thereby permitting the lug 28 on the coupling 26' to enter into the slot 23' in the collar 22 so as to latch the knob 23 and the permutation disc 20 together. However, when the permutation changing key 31 is inserted into position in the key slot 33 of the barrel 16, the end portion 38 thereof acts as a cam to depress the latch bar 35 from its position in the slot 23' down in the collar 22, thereby permitting the lug 28 of the coupling ring 26' to be forced by the push fingers 32 of the key 31 into the slot 23' when the key 31 is inserted into position in the key slot 33 to change the permutation of the disc 20. In this manner the latch bar 35 (after insertion of the key) prevents the coupling ring 26' from coupling the collar portion 22 of the permutation disc 20 with the knob 23 during the operation of changing the combination.

In this manner a simple and expeditious provision is obtained for changing the combination of the permutation lock without disassembling the same or removing the lock from the unit with which it is associated, which unit in the present invention is the housing 11 of the handle 10.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification, without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention what I claim as new and desire to protect by Letters Patent is:

1. A lock structure comprising a plurality of permutation discs and one of the same having a portion providing a support, a knob rotatable on said support, and means providing a key-operated coupling between the said support and the said knob to permit changing the normal operative position of the said knob and the said one of the discs relative to each other.

2. A lock structure comprising a plurality of permutation discs and one of the same having a portion providing a support, a knob receivable on said support, means providing a releasable coupling between the said support and the said knob to permit changing positions of the said knob and the said one of the discs relative to each other, and said coupling being key operable to effectuate disconnection between the said support and said knob.

3. A lock structure comprising a plurality of permutation discs and one of the same having a portion providing a support, a knob movably mounted on said support, a coupling member movable relative to the said support for releasably toothing the said one of the discs and said knob together, said coupling member being movable by a key in a direction to release the said coupling member from toothing engagement with the said knob so as to permit the said knob to be freely rotated relative to the said one of said discs.

4. A lock structure comprising a plurality of permutation discs and one of the same having a portion providing a support, a knob movable on said support, a coupling member movable relative to the said support for releasably keying the said support and said knob together, said coupling member being movable by key means independently of said knob in a direction to move the same out of keying engagement with said knob so as to permit said knob to be freely rotated relative to the said one of said discs, and means for moving said coupling member back into coupling relation with respect to the said support and knob.

5. A lock mechanism including a permutation knob and a movable permutation disc having a part supportably engaging said knob, and means providing a releasable key-operated coupling between the said knob and the said disc to permit independent rotation of the said knob relative to the said disc for effectuating change in a predetermined and normally fixed relation between the said disc and the said knob, and spring means urging said coupling means back into coupling relation with the said knob and the said disc.

6. A lock mechanism including a permutation knob and a permutation disc having a sleeve portion rotatably supporting said knob, means providing a releasable coupling between the said knob and the said disc to permit independent

rotation of the said knob relative to the said disc for effectuating change in a predetermined combination between the said disc and the said knob, and spring means urging said coupling means into coupling relation between the said knob and said disc.

7. A lock mechanism including a permutation disc having a supporting sleeve provided with an open slot, a knob including an integral ring portion having a circumferentially arranged row of notches formed therein, a barrel element supporting the said disc, and a coupling member movably supported by said barrel element and including a key block portion for effecting toothing engagement between the said sleeve and the said notched ring portion of said knob when the said key block portion is disposed partly in the said slot and partly in one of said notches.

8. A lock mechanism including a permutation disc having a supporting sleeve provided with an open slot, a knob including a ring portion having a circumferentially arranged row of notches formed therein, a barrel element supporting the said disc, a coupling member movably supported by said barrel element and including a tooth portion for releasably toothing the said sleeve and the said ring portion of said knob together when the said tooth portion is disposed partly in said slot and partly in one of said notches.

9. A lock mechanism including a permutation disc having a supporting sleeve provided with an open slot, a knob including an interior ring portion having a circumferentially arranged row of notches formed therein, a barrel element supporting said disc, a coupling member movably supported by said barrel element and including a key block portion for releasably toothing the said sleeve and the said notched ring portion of said knob together when the said key block portion is disposed partly in said slot and partly in one of said notches, said coupling member being adapted to be moved in a direction to dispose the said key block portion thereof out of toothing engagement with said notched ring portion, and spring means for returning the said key block portion back into toothing engagement with the said notched ring portion of the knob.

10. A lock mechanism including a permutation disc having a supporting sleeve, a knob, rotatable upon said sleeve and including a notched annular portion interiorly thereof, a barrel element supporting the said disc, and a coupling member movably supported by the said barrel element for effecting releasable toothing engagement between the said sleeve and the said notched portion of said knob.

11. A lock mechanism including a permutation disc having a supporting sleeve provided with an open slot, a knob including an internal annular part having a plurality of notches formed therein, a barrel element supporting the said disc, and a ring movably supported by the said barrel element and having a key block portion normally disposed partly in said slot and partly in one of said notches in said annular part of the knob, said second-named ring being adapted to be moved upon the said barrel element in a direction to move the said key block portion thereof out of toothing engagement with the said one of the notches, and spring means for resisting movement of the said second-named ring.

12. A lock mechanism comprising: a key barrel having a slot formed therein extending transversely of its long axis; a permutation disc including a sleeve arranged upon said key barrel and having an axially extending slot formed therein; a combination dial shell having an annular row of notches provided interiorly thereof; a coupling ring slidably mounted upon said key barrel and having a lug on its peripheral surface normally positioned in said notches and said axial slot in said sleeve and movable selectively out of said notches; yieldable means resisting the movement of said coupling ring away from said notches; and a member slidably mounted in the said radial slot in said key barrel and having a radial end portion movable toward the inner periphery of said sleeve and the said axial slot therein so as to prevent the said lug from entering the latter and thus preventing the said lug from uncoupling the said permutation disc and combination dial.

13. A permutation lock comprising with a supporting member permutation discs operable to release said lock, a key barrel on said supporting member and one of said discs having a sleeve portion rotatable on said key barrel, a permutation knob rotatably carried on said sleeve, and means releasably keying said knob for rotation with said sleeve and releasable by a key member insertable in said key barrel, whereby said knob may be rotated indepenedntly of said sleeve and the said permutation disc thereof for changing the combination of said lock.

EDWIN NORTH.