

Oct. 26, 1926.

1,604,866

M. WILDRICK

KEYLESS LOCK

Filed August 3, 1925

2 Sheets-Sheet 1

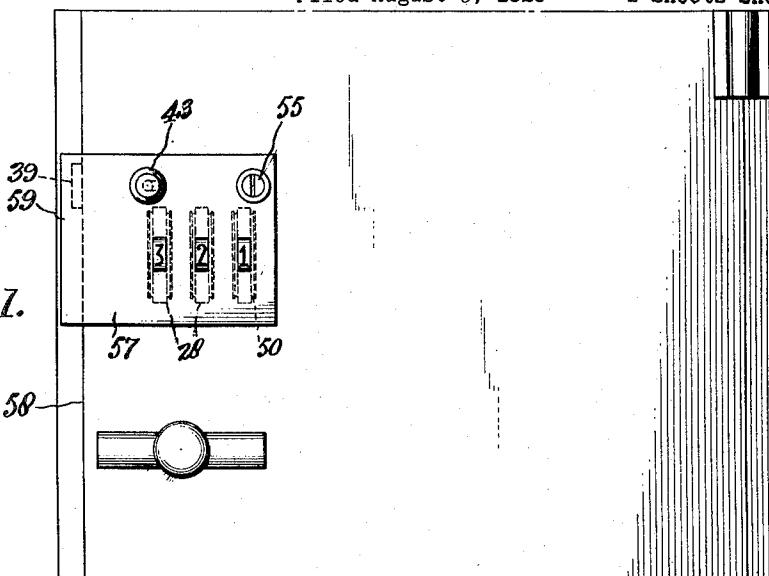


Fig. 1.

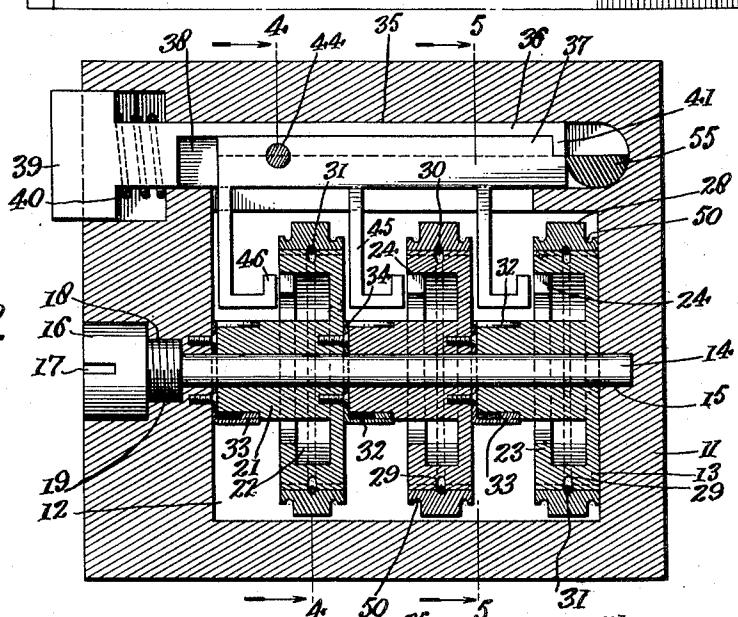


Fig. 2.

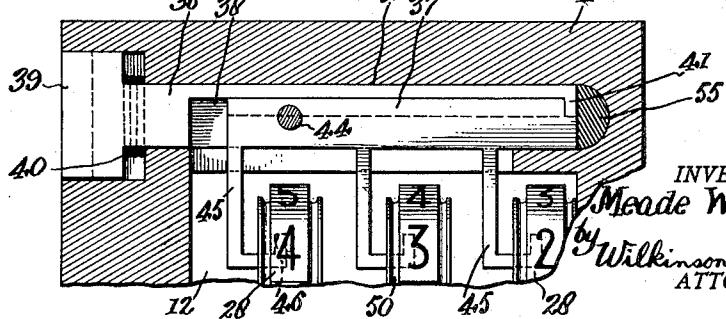


Fig. 3.

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Fig. 4.

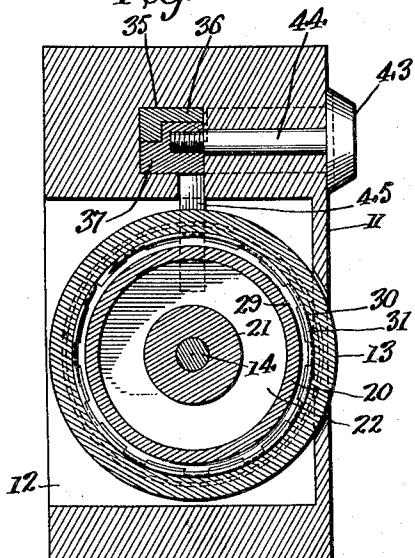


Fig. 5.

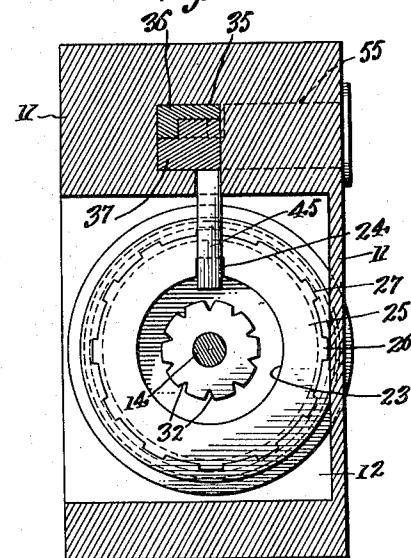


Fig. 6.

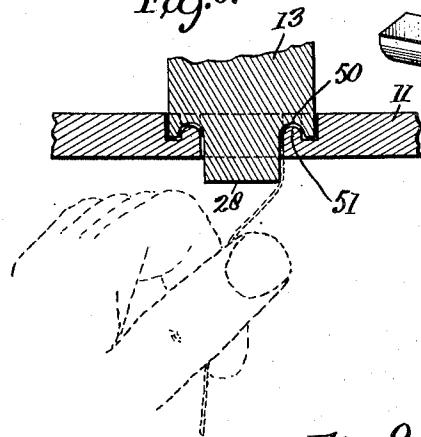


Fig. 8.



Fig. 7.

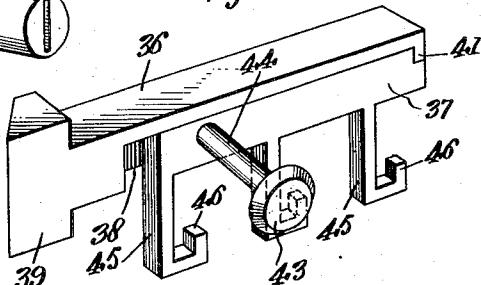


Fig. 10.

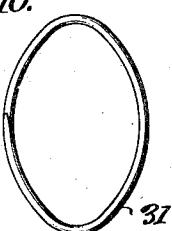
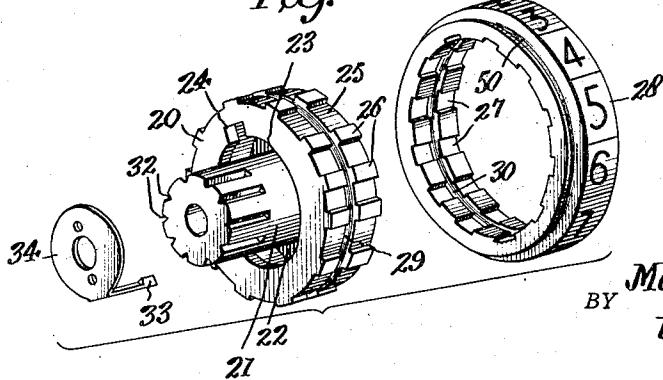


Fig. 9.



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## UNITED STATES PATENT OFFICE.

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## KEYLESS LOCK.

Application filed August 3, 1925. Serial No. 47,979.

This invention relates to keyless locks and has for one of its objects to provide a lock construction of the class described, which while susceptible for use in many different 5 places, is particularly adapted for use on the doors of country club lockers, safes, safety deposit boxes and the like.

A further object of the invention is to provide a keyless lock in which provision is 10 made for readily changing the combination necessary to be set to control the lock.

A still further object of the invention is to provide a means for effectively preventing 15 picking of the lock.

A still further object of the invention is to provide a keyless lock in which the latching bolt is movable independently of the locking bolt whereby it will be possible to merely slam the door or other closure and 20 lock the same even when the proper combination is not set.

With the above and other objects in view which will appear as the description proceeds, the invention consists in the novel 25 details of construction and combination of parts more fully hereinafter described and particularly pointed out in the appended claims.

Referring to the accompanying drawings, 30 forming a part of this specification in which like reference characters designate like parts in all the views;

Fig. 1 is a front elevational view of a portion of a door, such for example, as a safe 35 door with a lock constructed in accordance with the present invention, in place thereon;

Fig. 2 is a longitudinal vertical sectional view through the lock shown in Fig. 1, the parts being shown in the locked positions;

Fig. 3 is a fragmentary view similar to Fig. 2 with the parts shown in the unlocked positions;

Fig. 4 is a transverse sectional view taken approximately on the plane indicated by the line 4—4 of Fig. 2, looking in the direction of the arrows;

Fig. 5 is a similar view taken approximately on the plane indicated by the line 5—5 of Fig. 2;

Fig. 6 is a fragmentary detail sectional view through a portion of one of the permutation wheels and the adjacent casing illustrating the anti-picking feature;

Fig. 7 is a detail perspective view of the locking and latch bolts;

Fig. 8 is a detail perspective view of a key controlled cylinder which may be employed in some instances, as for example, in a safety deposit box lock in conjunction with the permutation lock;

Fig. 9 is an expanded perspective view of 60 one of the permutation wheel assemblies; and,

Fig. 10 is a perspective view of a split locking ring which may be employed to 65 maintain the permutation wheel assemblies in their assembled positions.

Referring more particularly to the said drawings, the numeral 11 indicates the lock casing which is recessed as at 12 to receive 70 the permutation wheels 13. These said wheels of which three are shown, are rotatably mounted upon a transversely extending shaft 14 received in a bore 15 provided in the casing 11 and the said shaft is provided 75 with an enlarged head 16 having a screw driver slot 17 and a threaded portion 18 which latter is adapted to engage a threaded counter bore 19 also provided in the casing 11. It results from the construction just described that the locking wheels may be readily assembled within the casing by merely inserting them in the recess 12 in axial alignment and then introducing the shaft 14 through their respective bores until its 80 threaded portion 18 engages the threaded counter bores 19 as will be readily understood.

Each of the permutation wheels as is best shown in Figs. 2 and 9, comprises a body 90 member 20 which is provided with an axially extending hub 21 preferably integral with the said body member or disc. The said body member is also provided with an annular recess 22 surrounding the said hub 95 and with an inwardly projecting annular flange or rib 23 which is notched or cut away at one point in its circumference as indicated at 24, to accommodate a toe of the locking bolt as will presently be described. The external circumference of the body or disc member 20 is notched or recessed longitudinally as indicated at 25 to provide 100 arcuately spaced lugs or teeth 26 which are adapted to be received in corresponding recesses 27 formed on the periphery of the indicia bearing ring member 28. The body member 20 is also provided with an external circumferentially extending groove 29 while the indicia bearing ring member is provided 105

with a companion groove 30, which grooves are adapted to register when the parts are assembled and which are adapted to receive a split resilient ring member 31 whereby 5 relative axial movement of the members may be normally prevented as will be readily understood.

The hub portion 21 of the body member 20 preferably extends somewhat to one side 10 of the body member and is provided with a series of detent notches 32 arcuately spaced around its circumference, which notches are adapted to be engaged by a detent member 33 carried by a disc 34 which discs in turn 15 are secured either to an adjacent wheel 13 or to the casing 11 as clearly shown in Fig. 2.

The upper portion of the casing 11 is further recessed as indicated at 35 to receive the transversely slideable latching bolt 20 36 and the locking bolt 37 associated therewith. The said latching bolt 36 as will be clear from Figs. 2, 3 and 7, is cut away as at 38 to accommodate the locking bolt 37 25 and the parts are so constructed as to permit a relative sliding movement between the two bolts as will be readily understood. The latching bolt 36 is also provided with an enlarged head 39 behind which is mounted a spring 40 which normally urges the said 30 latching bolt outwardly to latching position, as shown in Fig. 2. The opposite end of the latching bolt 36 is provided with a downwardly extending lug 41 which is adapted to be engaged by the end of the bolt 37, when 35 the latter is moved toward the right as viewed in Fig. 2, by means of the finger member 43 and its stud or pin 44, whereby the said latching bolt may be withdrawn to the position shown in Fig. 3.

40 The locking bolt 37 is provided with a plurality of depending legs 45 which are substantially L-shaped and which are provided with the upturned locking toes 46 which toes are adapted to pass through the 45 slots or recesses 24 in the wheel members 20 as will be readily understood from the drawings. The said toes may, of course, occupy the positions shown in Fig. 2 in which case by rotating one or more of the permutation 50 wheels 13, it is possible to lock the parts in the latched position and it is also possible that the said toes may be passed through the slots 24 into the recesses 22 of the wheels and the wheels then rotated, in which event 55 the parts may be locked in the unlatched positions shown in Fig. 3.

In order to provide against the picking of the lock through the insertion of a thin 60 instrument or feeler through the small apertures between the permutation wheels and the casing whereby the position of the slots 24 might be ascertained, I prefer to provide the indicia bearing rings 28 with circumferentially extending grooves 50, (see Figs. 3, 65 6, and 9) which in effect provides a pair of

shoulders upon the said rings. These grooves 50 are adapted to receive similarly shaped lugs or ribs 51 provided upon the interior of the casing 11, whereby the apertures between the wheels 13 and the casing 70 walls are made tortuous, as clearly shown in Fig. 6, thus making it substantially impossible to introduce a thin wire or other instrument along side of the wheels and thereby ascertain the location of the toe accommodating slots 24.

This peculiar relationship between the permutation wheels and slotted portion of the casing also serves to strengthen the lock 80 since the shoulders on the rings form supports for the face plate. It also serves as a relatively dust-proof closure between the wheels and the slotted wall of the casing.

In the case of safe deposit boxes, for example, it may sometimes be desirable to employ a key controlled lock in conjunction with the permutation or keyless lock above described, the master key to such key controlled lock, being always retained by the bank attendant. The present construction 90 readily lends itself to such use, for by merely providing a cylinder member 55 at the right hand end of the latching and locking bolts, as shown in Fig. 2, which cylinder member is controlled by the attendant's key, 95 in the usual manner, the movements of the locking bolt 37 may be accomplished only when both the permutation lock is set and the key lock actuated by the said master key. In order to prevent the picking of the 100 latch by inserting an instrument adjacent the latching bolt head 39, the front plate 57 of the lock may be made to project over or beyond the edge 58 of the door, as clearly indicated at 59, in Fig. 1.

105 It will be noted from the foregoing that even though the parts are in the locked positions shown in Fig. 2, that if the door carrying the lock is open it may be closed and locked without the necessity of setting the combination, by merely slamming the same, inasmuch as the latching bolt 36 is free to move longitudinally independent of the locking bolt 37, and that when the door is thus slammed, the said latching bolt will be 110 merely pressed back against the action of the spring 40 and after the bolt head 39 has passed the keeper, the said spring will force the bolt back to operative position to lock the door. In this position it can only be 115 moved, however, by setting the proper combination and then manually moving the locking bolt 37 toward the right, as viewed in Fig. 2, which through its engagement with the lug 41 will retract the latching bolt 120 and permit the door to be opened.

125 While one form of the invention has been illustrated and described, it is obvious that those skilled in the art may vary the details of construction as well as the arrangement 130

of parts without departing from the spirit of the invention and therefore, it is not wished to be limited to the above disclosure except as may be required by the claims.

5. What is claimed is:

1. In a keyless lock, a locking bolt having a plurality of legs each having a locking toe; and a plurality of permutation wheels associated with and controlling said bolt, each having an internal recess and an inwardly projecting annular flange adjacent thereto, each of said flanges being provided with a slot therethrough communicating with said recess through which one of said 10 toes may pass.

2. In a keyless lock, a locking bolt having a plurality of depending L-shaped legs each having an upturned locking toe; and a plurality of permutation wheels associated with 20 and controlling said bolt, each having an internal annular recess and an inwardly projecting annular flange adjacent thereto, each of said flanges being provided with a slot therethrough communicating with said recess through which one of said toes may pass.

3. A permutation wheel for keyless locks, comprising a disc-like portion and an inwardly flanged cylindrical portion extending laterally therefrom, said parts serving as 30 inclosing walls for an internal annular recess, the flanged portion of said wheel having a radial slot therein extending from the exterior of said wheel to said recess.

35. 4. A permutation wheel for keyless locks, comprising a lock-controlling member, a surrounding indicia-bearing member axially movable relatively thereto, and resilient retaining means interposed between the inner 40 surface of said indicia-bearing member and the outer surface of said lock-controlling member normally but yieldably opposing such relative axial movement.

45. 5. A permutation wheel for keyless locks, comprising a disc member and an indicia bearing member axially movable thereon; and yielding means interposed between said members for normally preventing relative axial movement between the two.

50. 6. A permutation wheel for keyless locks, comprising a disc member having a circumferential groove and a plurality of axially extending ribs on its external periphery; an indicia bearing ring member having a circumferential groove and a plurality of axially extending recesses on its inner periphery; and a resilient split ring member seated in said circumferential grooves, adapted to 55 normally prevent relative axial movement between said disc and indicia bearing members.

60. 7. A permutation wheel for keyless locks having a plurality of circumferential grooves on its outer periphery, adapted to 65 coact with a portion of a lock casing to pro-

vide tortuous passages therebetween to prevent the insertion of a picking instrument.

8. In a keyless lock, a plurality of permutation wheels having circumferential grooves on their outer peripheries adjacent the indicia bearing surfaces; and a casing having portions entering said grooves, whereby tortuous passages are provided which prevent the insertion of a picking instrument adjacent said wheels. 70

9. In a lock construction, a locking bolt having a plurality of locking toes; a plurality of discs, each having a slot through which one of said toes may pass only when the correct combination is set; a latching bolt associated with said locking bolt, adapted to be moved in one direction by said locking bolt when the latter is moved; and independent key controlled means for controlling the movement of said locking bolt. 80

10. A combined key and keyless lock comprising a locking member and means whereby it may be retracted, a permutation mechanism preventing the retraction of said locking member except when its parts are set in a predetermined relation, and a key lock by which the retraction of said locking member by said retracting means may be prevented irrespective of the setting of said permutation mechanism, whereby the retraction of said locking member may be effected only as a result of the prior setting of the parts of said permutation mechanism and a prior releasing operation of said key lock. 90

11. A combined key and keyless lock comprising a spring latch, a manipulator whereby said latch may be retracted, a permutation mechanism to prevent a retracting movement of said manipulator except when its parts have been set in a predetermined relation, and a key lock whereby a retracting movement of said manipulator may be prevented irrespective of the setting of the parts of said permutation mechanism, whereby said latch may be retracted only as a result of the conjoint setting of the parts of said permutation mechanism and a releasing operation of said key lock, said latch being movable in one direction independently of the movement of said manipulator, whereby it may be snapped into engaging relation with a keeper irrespective of the condition of other parts of said lock. 100

12. A permutation wheel comprising, as a self-contained unit, a lock-controlling element and a setting element, relatively movable axially into assembled relation in any one of a number of different relative positions, means tending to prevent relative rotational movement of said parts when thus assembled, and resilient retaining means to yieldingly oppose relative axial movement, thereby tending to maintain said parts in any position in which assembled. 110

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