

H. ECKHARDT.

LOCK.

APPLICATION FILED MAY 24, 1909.

938,991.

Patented Nov. 2, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

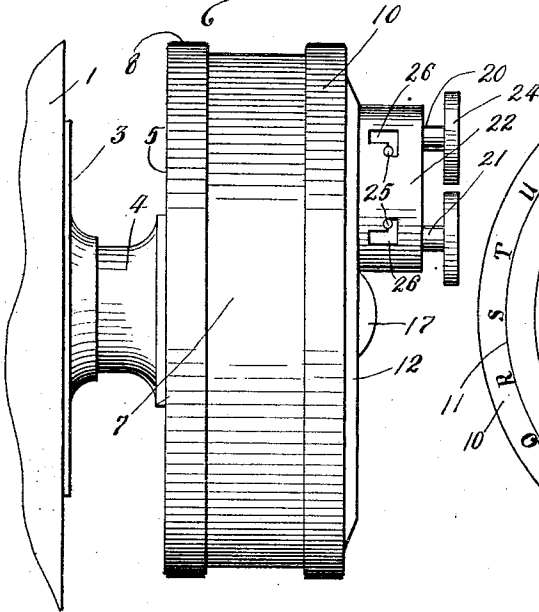


Fig. 2.

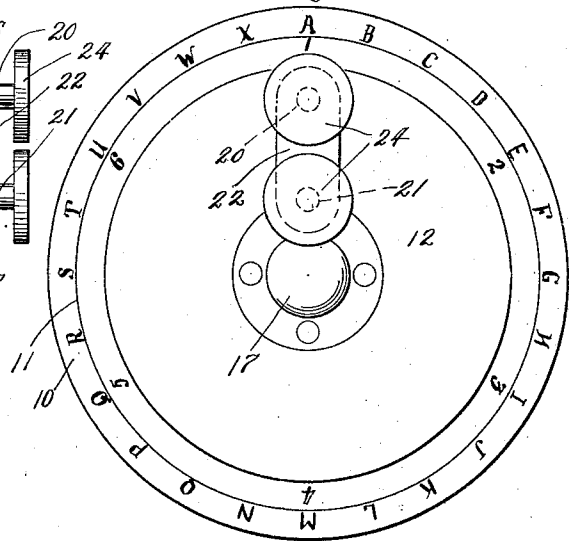


Fig. 3.

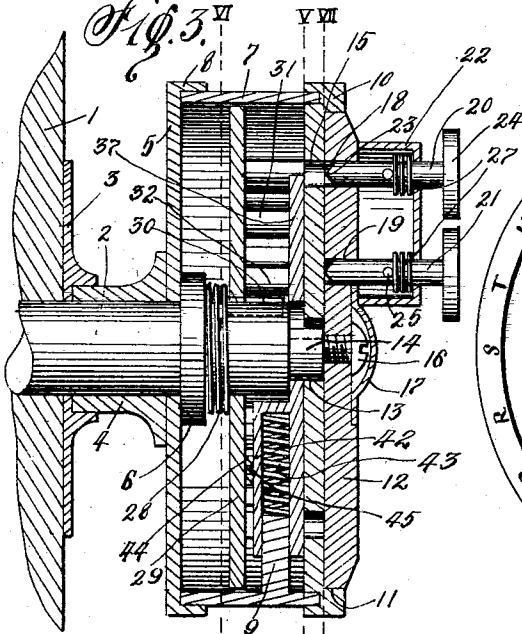
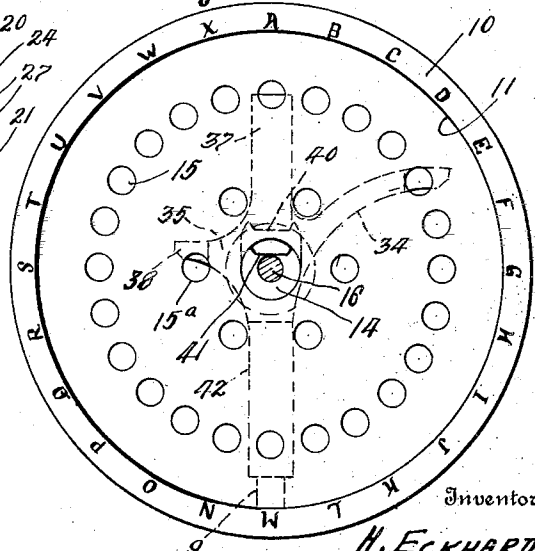


Fig. 4.



Witnesses  
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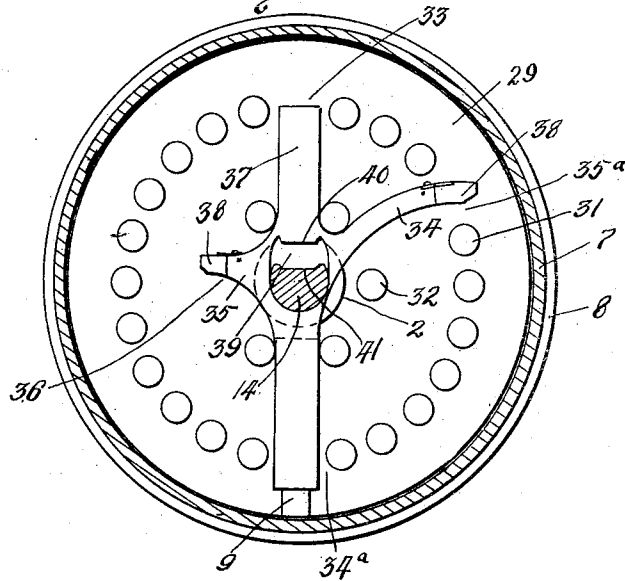
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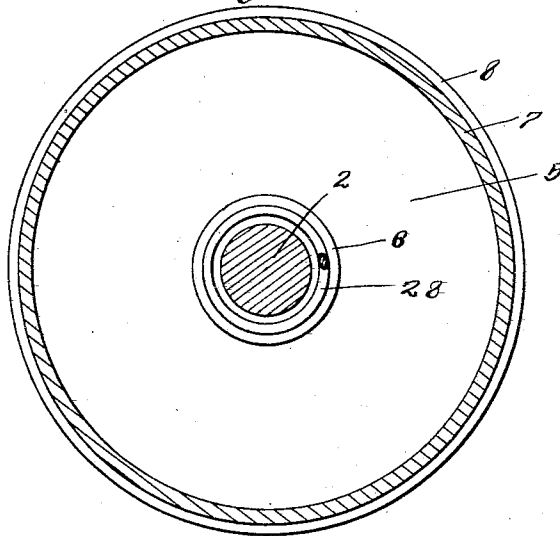
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3 SHEETS—SHEET 2.

*Fig. 5.*



*Fig. 6.*



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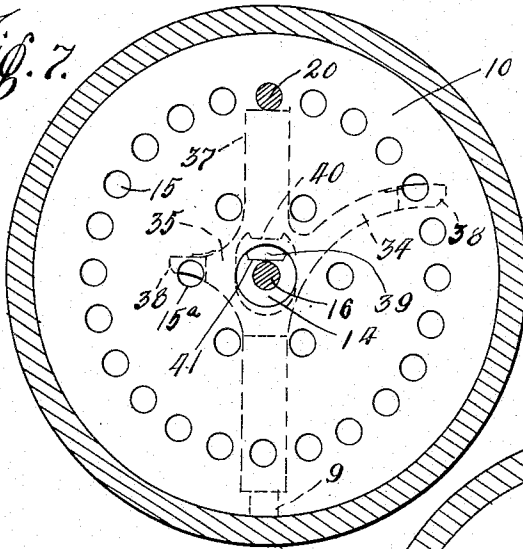
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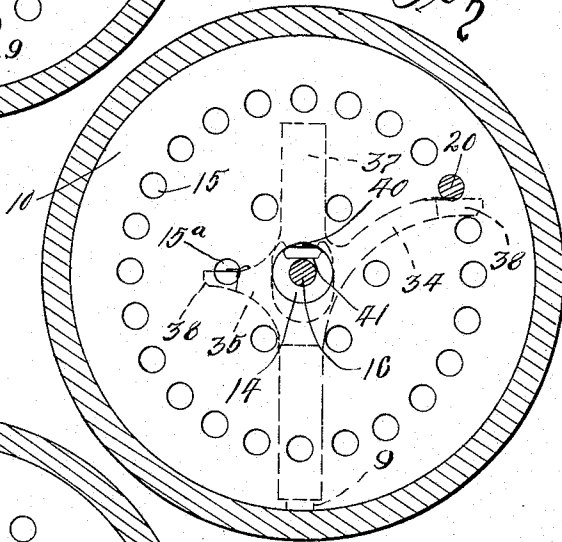
Patented Nov. 2, 1909.

3 SHEETS—SHEET 3.

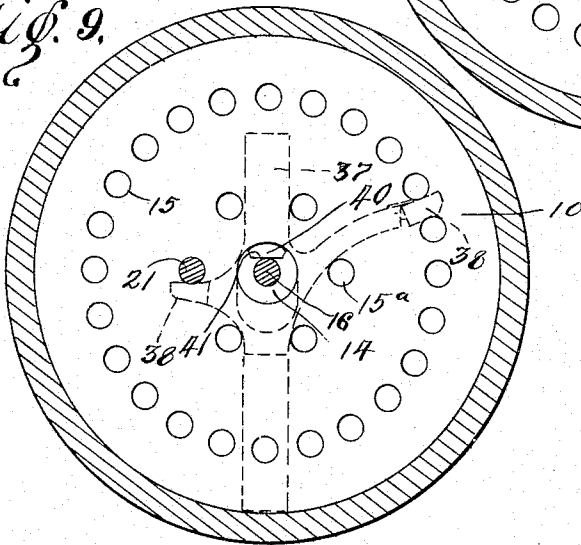
*Fig. 7.*



*Fig. 8.*



*Fig. 9.*



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# UNITED STATES PATENT OFFICE.

HERMAN ECKHARDT, OF PITTSBURG, PENNSYLVANIA.

LOCK.

938,991.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed May 24, 1909. Serial No. 497,942.

*To all whom it may concern:*

Be it known that I, HERMAN ECKHARDT, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Locks, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to locks, and more particularly to that type of safe and burglar proof locks commonly styled permutation or combination locks.

The invention has for its primary object to provide a lock of the above type, containing a simple and durable mechanism, that cannot be tampered with or disarranged by continuous use.

Another object of the invention is to provide a permutation lock that can be advantageously used as a door knob or handle, the lock controlling the movement of the latch bolt or spindle of a lock.

These and such other objects as may hereinafter appear are attained by a lock that will be hereinafter considered in detail and then claimed, and reference will now be had to the drawings forming part of this application, wherein there is illustrated a preferred embodiment of the invention, but it is to be understood that the structural elements thereof can be varied or changed, as to the size, proportion and manner of assemblage without departing from the spirit and scope of the invention.

In the drawings, Figure 1 is a side elevation of the lock, Fig. 2 is a front elevation of the same, Fig. 3 is a vertical longitudinal sectional view of the lock, Fig. 4 is a front elevation of the lock partly broken away and partly in section, Fig. 5 is a cross sectional view taken on the line V—V of Fig. 3, Fig. 6 is a similar view taken on the line VI—VI of Fig. 3, Fig. 7 is a cross sectional view taken on the line VII—VII of Fig. 3, showing the tumbler thereof in the first position, Fig. 8 is a similar view with the tumbler thereof in the second position, and Fig. 9 is a similar view with the tumbler in a third position.

In the drawings 1 denotes a portion of the door having a spindle 2, extending through an escutcheon plate 3 mounted upon the door.

4 designates a sleeve loosely mounted upon the spindle 2 and extending into the

escutcheon plate 3. Connected to the sleeve 4 is a circular head 5, which can be brazed or otherwise fastened to the sleeve 4 or made integral therewith. The sleeve 4 is retained in engagement with the escutcheon plate 3 by a collar 6 forming part of the spindle 2 and bearing against the head 5.

7 designates a cylindrical shell carried by the flanged edges 8 of the head 5. Said shell having an inwardly extending guide post 9 adjacent to the front edge thereof, said post being disposed radially relative to the longitudinal axis of the shell 7 and the spindle 2.

10 designates a dial head mounted upon the front edges of the shell 7, said head having the front side thereof provided with an annular recess 11 for a rotatable plate 12. The dial head 10 is provided with a central longitudinal opening 13 for the contracted end 14 of the spindle 2, and with a plurality of circumferentially arranged longitudinal openings 15 and 15<sup>a</sup>, the object of which will presently appear.

The plate 12 is retained in engagement with the contracted end 14 of the spindle 2 by a headed screw 16 having the head thereof inclosed by a cap 17 suitably connected to the dial plate 12 with the edges thereof countersunk. The dial plate 12 is provided with openings 18 and 19, the opening 18 being arranged to register with the openings 15 of the dial head, while the opening 19 is adapted to register with the openings 15<sup>a</sup> of said head.

20 and 21 designate pins extending into the openings 18 and 19 respectively, said pins extending through an oblong casing 22, carried by the rotatable dial plate 12. The inner ends of the pins 20 and 21 are beveled, as at 23, and the outer ends thereof are provided with buttons 24. The pins 20 and 21, intermediate the ends thereof are provided with lugs 24 adapted to engage in the bayonet shaped slots 26 formed in the sides of the casing 22. Encircling the pins 20 and 21 within the casing 22 are coil springs 27, the function of these springs being to either hold the lugs 25 in the vertical portions of the bayonet shaped slots 26, or in the longitudinal portions of said slots, with the pins 20 and 21 protruding into or against the dial head 10. The lugs 25 and the slots 26 permit of one of the pins being held in an inactive position while the other pin is active, for the purposes for which it is used.

28 designates a coil spring encircling the spindle 2 adjacent to the collar 6 and bearing against said spring is a disk 29 slidably mounted upon the spindle 2; but keyed, as at 30, to rotate with said spindle. The front side of the disk 29 is provided with a plurality of circumferentially arranged forwardly projecting posts 31 and 32 adapted to longitudinally align with the openings 15 and 15<sup>a</sup> of the dial head 10. The posts 31 are preferably detachably connected to the disk 29 whereby the posts can be rearranged, to change the combination of the lock, as will presently appear.

The arrangement of the posts as shown in Fig. 5 is such that vertical alining tumbler spaces 33 and 34<sup>a</sup> are provided and a branch tumbler space 35<sup>a</sup>. The arrangement of the posts 32 is such that a branch tumbler space 36 is provided, and the object of these spaces will presently appear.

37 designates a vertical tumbler having a long curved branch 34 and a short branch 35, these branches being provided with pivoted spring-held tips 38. The tumbler 37 is provided with a central oblong opening 39 and a spindle gripping tongue 40, said opening 39 providing clearance for the contracted end 14 of the spindle, and this contracted end of the spindle is cut away, to provide a tongue seat or groove 41. The rear side of the tumbler, at the lower end thereof, is provided with a housing 42 for a coil spring 43 and the upper end of the post 9, said spring bearing upon the upper end of said post and normally supporting the tumbler in an elevated position, as shown in Fig. 5 of the drawings.

The front edges of the dial head 10 are provided with characters and the front sides of the dial plate 12 with numerals, these characters and numerals representing numerous combinations, but one combination is used in connection with the posts 31 and 32 for opening the lock herein shown.

44 designates a plurality of teeth carried by the front side of the disk 29, said teeth meshing with teeth 45 carried by the housing 42, these teeth maintaining the tumbler in an adjusted position until released by movement of the disk 29.

Operation: As shown in Fig. 5 of the drawings, certain of the posts 31 and 32 are removed, to provide clearance for the tumbler 37 and the branches thereof. The posts 31 removed correspond to the characters A and E, of the dial head, while the posts 32 removed correspond to the numeral 6 of the dial plate, consequently, the combination of the lock is "A, E and 6."

When the pin 20 is turned to the right, to release the lug 25 thereof from the vertical portion of the bayonet shaped slot 26, the pin 20 is forced into the opening 15 of the dial head registering with the opening 18 of

the dial plate. When the beveled end 23 of the pin 20 engages the upper end of the tumbler 37, said tumbler is lowered to the position shown in Fig. 7 of the drawings. As the tumbler is lowered, the spring 43 is placed under tension, while the disk 29 recedes to allow the teeth 28 of the housing 42 to obtain a fresh grip in connection with the teeth 44 of the disk 29. The dial plate is now shifted to the right, until the pin 20 is opposite the character E of the dial head, by again actuating the pin 20, the branch 34 of the tumbler is engaged by said pin, and the tumbler lowered for a second time. The dial is then turned, after which the pin 21 is manipulated by the operator, and upon being pushed inwardly, engages the branch 35 of the tumbler and further lowers said tumbler. The tumbler is now in engagement with the contracted end of the spindle 2, and by rotating the lock in its entirety the door 1 can be opened.

The pin 20 is positioned to enter any of the openings 15 while the pin 21 is positioned to enter either of the openings 15<sup>a</sup>. The pins 20 and 21 will be limited in their inward movement by the posts 31 and 32, consequently said pins can only actuate the tumbler when the posts are removed.

The spring pressed pivot tips 38 are provided to serve functionally as posts until after the first action of the combination has been discovered. This is best shown in Fig. 5 of the drawings, where it will be observed that the tips take the place of posts, and after the first action of the combination, as shown in Fig. 7, the tips assume a position to be actuated by the pins 20 and 21.

The first action of the pins 20 and 21 after the lock has been opened or closed, causes either of the pins to engage one of the posts of the dial 29, and move said dial rearwardly, disengaging the teeth 44 and 45, and allowing the tumbler to assume its normal position. It is then impossible for the lock to be placed in a locked position until the combination has been gone through with, as above described.

Having now described my invention what I claim as new, is:—

1. In a lock for doors, the combination with a spindle, of a shell rotatably supported by said spindle, a dial plate revolvably supported by said shell, a tumbler within said shell and adapted to be moved into engagement with said spindle to rotate with said spindle, and pins carried by said dial plate and adapted to extend into said shell for moving said tumbler.

2. In a permutation lock for doors, the combination with a spindle, of a shell rotatably mounted upon said spindle and adapted to rotate therewith, a disk mounted on said spindle, a plurality of circumferentially arranged posts detachably connected to said

disk, a dial head carried by said shell and having a plurality of openings formed therein, a dial plate provided with a plurality of openings adapted to register with some of the openings of said dial head, a tumbler movably supported by said dial head and adapted to be moved into engagement with said spindle to move therewith, and pins carried by said dial plate and adapted to move into said shell for moving said tumbler into engagement with said spindle.

3. A lock for doors, comprising a spindle, a shell rotatably mounted upon said spindle, a dial plate movably carried by said shell, a tumbler movably mounted in said shell and adapted to be moved into engagement with said spindle to rotate therewith, and pins carried by said dial plate and adapted to extend into said shell for moving said tumbler into engagement with said spindle.

4. In a lock for doors, the combination with a spindle, of a shell movably mounted upon said spindle, a dial plate movably carried by said shell, a tumbler arranged within said shell and adapted to be moved into engagement with said spindle to rotate therewith, pins carried by said dial plate and adapted to extend into said shell for moving said tumbler, and means arranged within said shell for holding said tumbler as the same is adjusted to engage said spindle.

5. A lock for doors, comprising a spindle, a shell carried by said spindle and adapted to be fixed relative thereto for rotation, a dial plate carried by said shell, a tumbler arranged within said shell for engaging said spindle, pins carried by said dial plate and adapted to be moved into said shell to move said tumbler into engagement with said spindle, and a disk within said shell for con-

trolling the entrance of the pins of said dial plate into said shell.

6. In a lock for doors, the combination with a spindle, of a shell carried by said spindle, a movable dial plate carried by said shell, a tumbler arranged within said shell and adapted to be moved into engagement with said spindle for fixing said shell relative to said spindle, pins carried by said dial plate for moving said tumbler into engagement with said spindle, a disk movably supported by said spindle, and detachable posts carried by said disk for controlling the operation of the pins of said dial plate.

7. In a lock for doors, the combination with a spindle, of a shell rotatably mounted upon said spindle, a dial head carried by said shell, said dial head having a plurality of openings formed therein, a dial plate rotatable relative to said dial head and having openings formed therein adapted to register with the openings of said dial head, a tumbler arranged within said shell and adapted to be moved into engagement with said spindle to rotate therewith, pins carried by said dial plate and adapted to extend through the openings of said plate, and the openings of said dial head to engage said tumbler and move said tumbler into engagement with said spindle, a disk movably mounted upon said spindle, and means carried by said disk for controlling the movement of said pins through the openings of said dial plate and said dial head, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

HERMAN ECKHARDT.

Witnesses:

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VERNON FAHNESTOCK.