P. EAGLE.

PERMUTATION LOCK.

APPLICATION FILED JAN. 6, 1913.

1,085,894.

Patented Feb. 3, 1914.

2 SHEETS—SHEET 1.

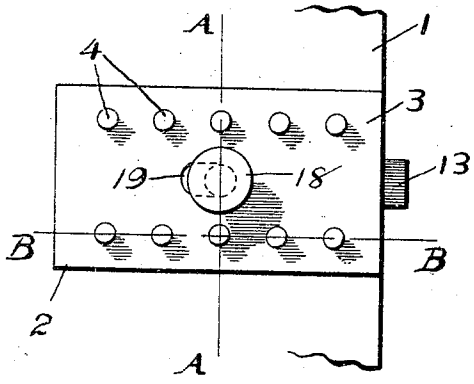


Fig. 1.

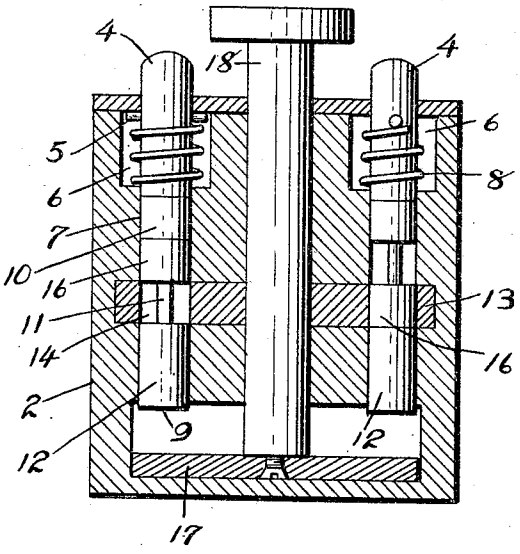


Fig. 2.

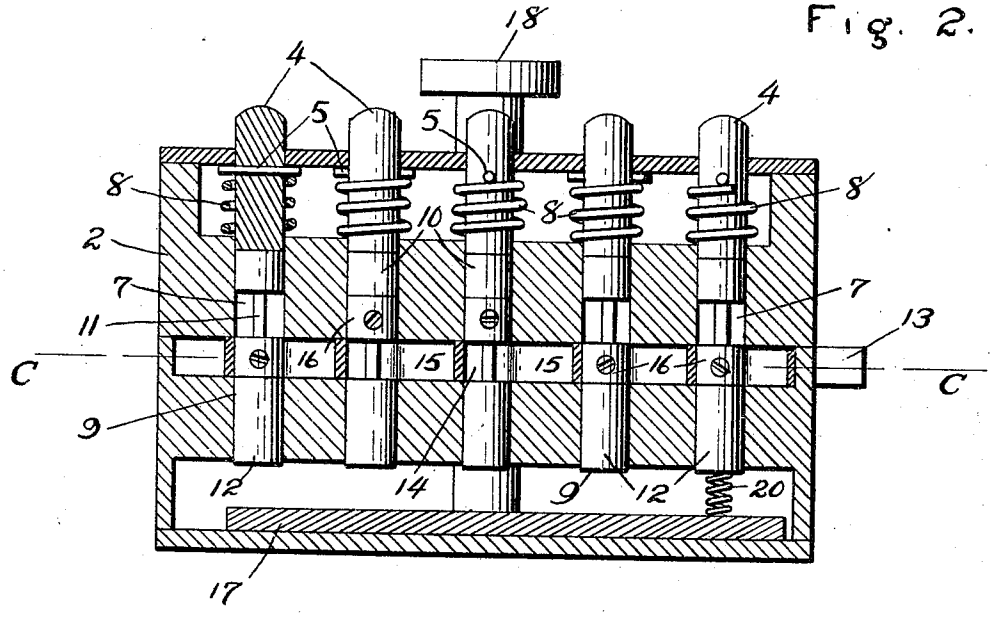


Fig. 3.

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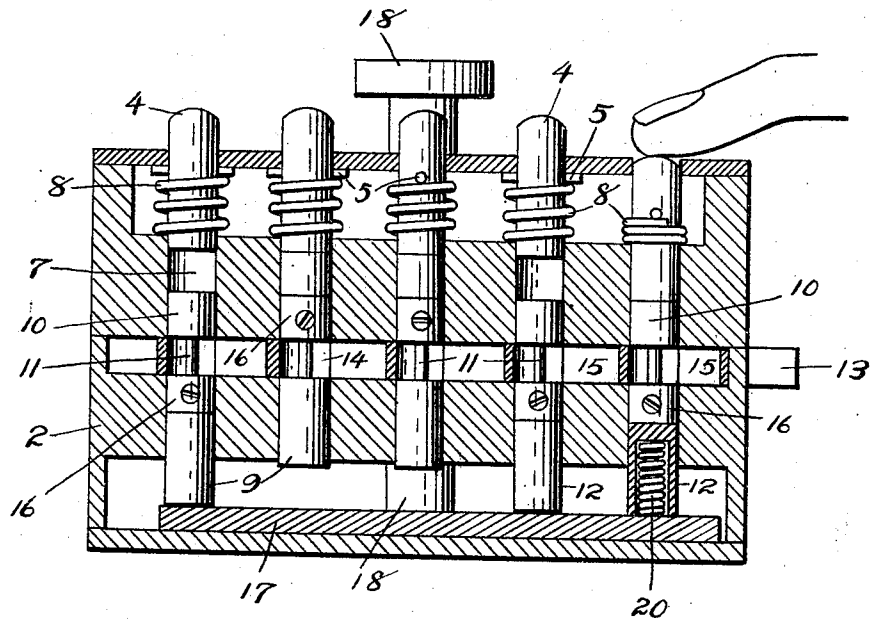
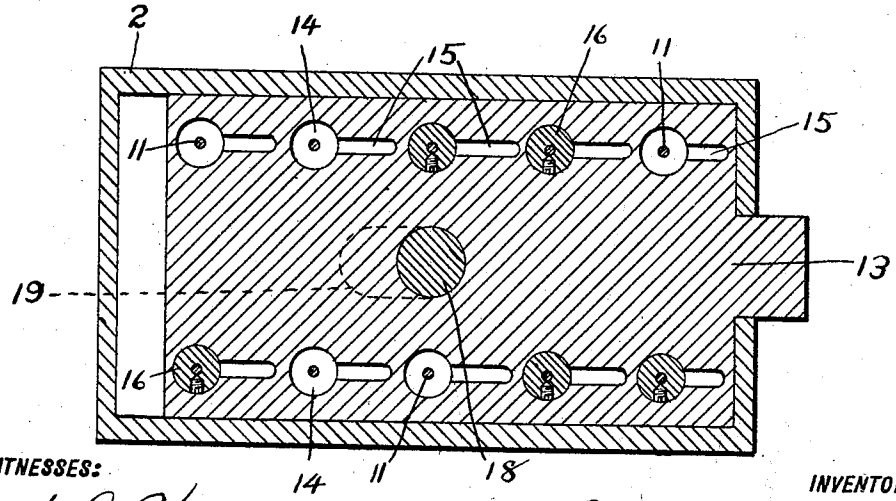


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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PERMUTATION-LOCK.

1,085,894. Specification of Letters Patent. Patented Feb. 3, 1914.

Application filed January 6, 1913. Serial No. 740,290.

To all whom it may concern:

Be it known that I, PETER EAGLE, a subject of the Czar of Russia, residing at Harrison, in the county of Hudson and State of New Jersey, have invented certain Improvements in Permutation-Locks, of which the following is a specification.

The objects of this invention are to provide a permutation lock which is readily operated; to provide such a device which will automatically secure the bolt in locked position; to provide a device which will foil the attempts of unauthorized persons endeavoring to open the same; to provide means in such a lock whereby the combination may be readily changed when desired; to provide such a device which is readily adapted to different shapes of locks; to provide such a lock which will be equally applicable to various kinds and weights of doors; to secure simplicity of construction and operation, and to obtain other advantages and results as may be brought out in the following description.

In the accompanying drawings, in which like numerals of reference indicate the same parts throughout the several views, Figure 1 is a front view of the lock embedded in position in a door; Fig. 2 is a sectional view of the lock, taken on line A—A of Fig. 1; Fig. 3 is a similar sectional view taken on line B—B of Fig. 1; Fig. 4 is a similar sectional view showing the parts in position for the withdrawal of the bolt from its keeper, and Fig. 5 is a sectional view through the said bolt on line C—C of Fig. 3.

In the specific embodiment of the invention illustrated in said drawings, the numeral 1 designates a door or the like in which is embedded, as usual, the body portion 2 of the lock. Covering the front of said body portion is a key plate 3 suitably secured to prevent its removal when the lock is mounted in place. Projecting perpendicularly through the said key plate 3, with a sliding fit, are a plurality of keys or buttons 4 each of which is retained against outward removal by a transverse pin 5 which laterally engages the inner side of the key plate 3 and limits the movement of the button in an outward direction. A recess 6 is preferably formed in the body portion 2 behind the key plate 3 about the said buttons 4; however, the buttons are sufficiently long to project across said recess 6 into appropriate holes 7 in the body portion, wherein they are guided. Surrounding each of the buttons 4 within the recess 6 is a spring 8, withheld against displacement at its inner end by engagement with the body portion 2, and at its outer end or end next adjacent the front of the lock engaging the transverse pin 5 so as to actuate the same to its outward position.

Slidably mounted within the holes 7 into which project the buttons 4, are a plurality of tumblers 9, one tumbler in each hole and comprising preferably a cylindrical head 10 from which projects rearwardly a stem 11 and joins a preferably tubular end piece 12 therewith. Within the body portion 2 and parallel to the key plate 3 is a flat bolt 13 through which the tumblers 9 pass, the play of said tumblers being twice as great as the thickness of the bolt. The length of the stem 11 of the tumbler is also twice the thickness of the bolt, the stem being so arranged as to be always within the aperture through which the tumbler passes, whereby the head 10 and the end piece 12 may come immediately adjacent to the bolt 13 but can never enter the aperture therethrough. The said aperture preferably comprises a circular portion 14 from which extends a slotted portion 15. A collar 16, adjustably held upon the stem 11 of the tumbler, and of the same thickness as the bolt, is adapted to slidably enter the enlarged or rounded portion 14 of the aperture, but cannot enter said slotted portion 15. It will be noted that the introduction of the collar 16 reduces the exposed length of the stem 11 to a length corresponding to the width of the bolt. When the tumblers are all positioned so that the exposed portions of the stem 11 are within the apertures of the bolt, (see Fig. 4), the bolt is free to be slid in a direction which introduces the said exposed stems 11 into the slotted portions 15 of the apertures in the bolt. Hence, by placing the collars at different ends of the stems any desired permutation may be secured.

By pressing in on one of the buttons 4, its tumbler is correspondingly carried to its rearward or depressed position and remains there, although the button will return independently to its outer position when released by the operator, because of the spring. In order to return any of the tumblers to the forward position for any rea-

son, I provide a plate 17 at the inner side of the lock, parallel to the key plate 3 and adapted to be engaged by the free extremity of the end piece 12 of the tumblers. When said tumblers are depressed, they engage said plate 17, and may therefore be returned outward by shifting said plate outward. This shifting of the plate 17 is accomplished by means of a handle 18 secured thereto and extending through the body portion 2 to the front of the lock so as to be convenient to manipulation. Evidently drawing outwardly upon the handle draws the plate forward and as a result returns any of the depressed tumblers forward.

The handle 18 slidably passes through the bolt 13 and is transversely stationary therewith, whereas through the body portion there is a slot 19 in which the said handle is free to move transversely as well as longitudinally of itself, whereby a lateral movement of the handle results in a similar movement of the bolt. Therefore, when the tumblers are properly set, the bolt is withdrawn from the keeper by the above described lateral movement of the handle as will be readily understood, it being noted that lateral movement of the handle and bolt is restricted to that which will either introduce the bolt into its keeper (not shown) or withdraw it therefrom.

In order to render it more difficult to accidentally set the proper tumblers in proper position, one or more of the end pieces 12 may be supplied with a spring 20, seated within the tubular portion of the end piece 12 and bearing against the shift plate 17. The tendency of said spring 20 is to return the tumbler to the forward end of its recess, and therefore, in order to obtain the desired result, the collar 16 must be at the inner end of the stem 11 so as to lock the bolt against lateral movement when said tumbler is forward.

The present invention is not limited to the particular shape of lock here shown, but is readily applicable to circular locks such as used on sliding doors, and is even applicable to padlocks and the like, as will be readily appreciated by those skilled in the art.

It will be understood that in opening the lock, the buttons of those tumblers whose collars 16 lie in the path of the bolt 13, must be depressed so as to slide said tumblers and carry their collars out of the way of the sliding bolt, and furthermore the finger must be held upon the button or buttons of those tumblers which are provided at their inner ends with springs normally holding them in the path of the bolt, all as will be understood upon an inspection and comparison of Figs. 3 and 4. Obviously, if the wrong buttons are pressed the tumblers will be slid so that their collars 16 lie in the path of the bolt, and also if the proper button or buttons are not held depressed the bolt will not be released, so that there is only a very small chance of anyone operating the buttons properly unless he knows the combination. Especially is operation of the lock by an unauthorized party rendered difficult because the buttons all look just alike and are also made to feel substantially alike to the touch whether they move idly or slide a tumbler when they are pressed. My improved lock, therefore, while simple and inexpensive is extremely efficient and affords great security.

Having thus described the invention what I claim is—

1. In a permutation lock, the combination with a body portion providing a bolt slideway and a series of parallel holes of uniform diameter through said body portion substantially perpendicular to said slideway and extending on both sides thereof, cylindrical tumblers in said holes each having end portions adapted to lie on opposite sides of said bolt slideway and a middle portion connecting said end portions, a bolt in said slideway apertured to receive said tumblers, a key-plate parallel to said bolt and spaced from one side of that part of the body portion having the said tumbler holes, said key-plate having apertures in alinement with said tumbler holes and of the same diameter, cylindrical buttons in said key-plate apertures projecting each into the tumbler hole which is in alinement with its key-plate aperture and thus having slidable bearings at both its ends in said key-plate and body portion, a transverse pin extending through each button intermediate of the key-plate and body portion and projecting at opposite sides of said button, helical springs one on each of said buttons between its transverse pin and the body portion adapted to force said pin against the key-plate, and means for returning said tumblers toward the buttons.

2. In a permutation lock, the combination with a body portion providing a bolt slideway and a series of parallel holes through itself substantially perpendicular to said slideway and extending on both sides thereof, of tumblers in said holes each having end portions adapted to lie on opposite sides of said bolt slideway and a middle portion connecting said end portions and an adjustable collar on said middle portion, a bolt in said slideway having key-hole slots adapted to receive in their larger portions said collars and in their smaller portions said middle parts of the tumblers, and means for sliding said tumblers.

3. In a permutation lock, the combination of a body portion providing a bolt slideway and a series of holes substantially perpendicular to said slideway, tumblers in said holes each having a reduced portion pro-

jecting into the bolt slideway, adjustable collars on said reduced portions, a bolt in said slideway having key-hole slots adapted to receive in their larger portions said collars and in their smaller portions said reduced parts of the tumblers, and means for sliding said tumblers.

4. In combination with a lock having an apertured bolt with slots extending from the apertures, of tumblers adapted to enter said apertures, said tumblers each having a reduced stem which alone can enter said slot, adjustable collars on said stems adapted to change the relative positions of the exposed portions of the stems in said tumblers, and means to actuate said tumblers in one direction and return to normal position independent of said tumblers.

PETER EAGLE.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."