March 24, 1925.

1,530,861

H. S. STANDEN

PERMUTATION LOCK

Filed March 20, 1923

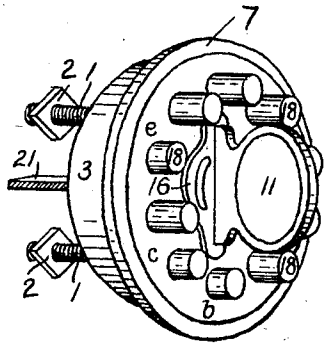


FIG. 1

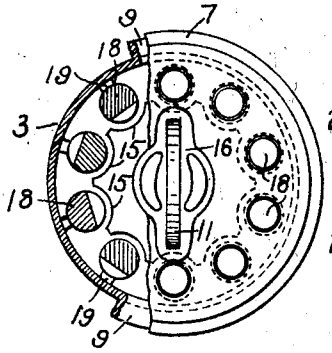


FIG. 2

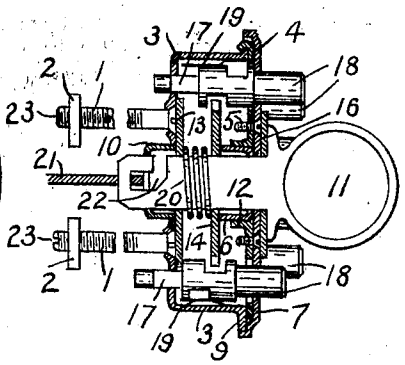


FIG. 3

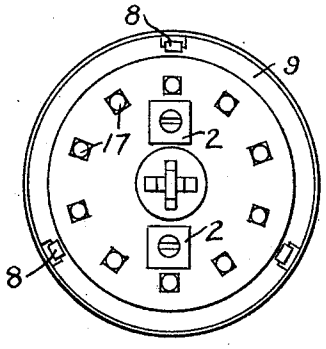


FIG. 4

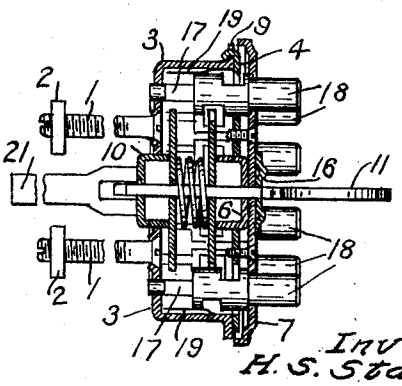


FIG. 5

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Patented Mar. 24, 1925. 1,530,861

UNITED STATES PATENT OFFICE.

HENRY SNOWDON STANDEN, OF WAVERLEY, NEAR SYDNEY, NEW SOUTH WALES, AUSTRALIA.

PERMUTATION LOCK.

Application filed March 20, 1923. Serial No. 626,359.

To all whom it may concern:

Be it known that HENRY SNOWDON STANDEN, a subject of the King of Great Britain and Ireland, residing at "Rocklands", Cross Street, Waverley, near Sydney, New South Wales, Commonwealth of Australia, has invented certain new and useful Permutation Locks, of which the following is a specification.

This invention relates to a permutation lock for doors and the like or for other articles or structures which are to be locked to prevent access thereto or in connection therewith unless the lock has been previously set to permit a key to be turned therein to move a latch or bolt from engagement with a locking plate or staple or other restraining means.

The invention has reference particularly to that type of lock which is provided with a series of buttons, two or more of which may be made to form a combination, to enable a key to be turned when the correct buttons of a required combination have been set in proper position.

Referring to the accompanying drawing, Fig. 1 is a perspective view of the lock, Fig. 2 a front elevation partly in section, Fig. 3 a sectional elevation, Fig. 4 a rear elevation; and Fig. 5 a sectional elevation with the key turned in the lock and the front plate thereof partly removed from the casing.

A casing 3 of metal is preferably provided adapted to be secured to the front of a door or the like by means of the bolts 1 and nuts 2. The heads of the bolts 1 lie in depressions in the casing 3, the latter also carrying the plate 4 to which may be detachably secured by means of the removable screws 5 the front plate 7. The plate 4 may be affixed to the casing 3 by nibs 8 closed over openings in the rim flange 9 of the casing 3. In the plate 4 is an opening to receive a rotatable barrel 6, and in the rear wall of the casing 3 is an opening to receive a slidable rotatable barrel 10. Flanges 12 may be formed on the plate 4 to serve as bearings for the barrel 6. Circular holes are provided in the plates 4 and 7 to enable the key 11 to be turned therein.

Slidably attached to the key 11 within the casing 3 are the push plate 13, the stop plate 14, the latter having a series of notches 15 in its periphery; and externally of the front plate 7 of the casing 3 is the cover plate 16 which is attached to the key 11 to be rotated therewith. The barrel 6 is also attached to the key 11 and is rotatable therewith and is slidable longitudinally thereon when the key is moved longitudinally. In the rear wall of the casing 3 are a series of rectangular holes to receive the reduced stems 17 of the buttons 18 also a central opening in which the key 11 may be turned. Each of these buttons is furnished with two slots or grooves disposed in the preferably thickened central portion of the buttons, and portion of the stems 17 of the said buttons is formed rectangular whilst their extreme rear end is circular. Holes are also furnished in the plates 4 and 7 for the buttons 18; the forward portion of each of the latter project beyond the front plate 7, and the rectangular portions of their stems 17 lie in the rectangular holes in the rear wall of the casing 3 when the buttons 18 are in either normal or aligned position (Fig. 1) with their forward ends projecting an approximately equal distance beyond the front plate 7, or when they are depressed.

Secured to the side walls of the casing 3 are a series of leaf springs 19, one for each of the buttons 18; these springs bear against the sides of the buttons 18 and serve to keep them in proper position within the casing. When the front plate 7 is securely fastened to the plate 4 by means of the screws 5 it is not possible to turn the buttons 18 as the rectangular portion of their stems 17 are then within the rectangular holes in the rear wall of the casing 3. If, however, the front plate 7 is partly removed from the casing 3 (see Fig. 5), by loosening the screws 5, the circular portion of the extreme rear end of the stems 17 may be made to lie in the said holes in the rear wall of the casing 3, and the buttons 18 may then be turned as desired.

Located between the plates 13 and 14 on the key 11 is the coil spring 20 which serves to distance said plates from each other, as well as to return such plates and the key 11 to normal position after the said spring has been contracted by pulling on the said key and such pulling force has been relaxed. The push plate 13 is slidably disposed on the rear portion of the key 11 whereas the stop plate 14 is slidably disposed on the forward portion of said key. When any one or more of the buttons 18 have been depressed they

may be returned to normal position by pulling the key 11 and consequently the slidable rotatable barrel 10 towards the front plate 7 whereby the push plate 13 is moved forwardly of the casing 3 and in such movement engages the depressed buttons 18 and moves them to normal position. In such movement of the key 11 the latter slides in the barrel 6, and such barrel bears on the flanges 12 when the key 11 is rotated, and it rotates therewith. The cover plate 16 attached to the key 11 is turned when said key is turned, but when said plate is in normal position (Figs. 2 and 3) it covers the screws 5 which serve to secure the plate 7 to the plate 4, and such screws cannot be removed from either the plate 7 or the plate 4 until the key 11 has been turned (Fig. 5), whereby the screws 5 are uncovered by the turning of the plate 16 with the key 11.

The object of providing the buttons 18 with slots or grooves is to enable the said slots or grooves of any two or more said buttons forming a combination of any particular selection to be brought into register (by depressing the buttons 18 forming the combination) with the notched periphery of the stop plate 14 whereby the key 11 carrying said plate may then be turned therewith. In case, however, the stop plate 14 is not in register with the slots or grooves in the correct buttons 18 of the combination the key 11 or the stop plate 14 cannot be turned as the solid portions of such buttons would engage the notches 15 of the stop plate 14 and rotation of the latter and the key 11 is prevented. Pivotally attached to the key 11 is the tongue or spindle 21 which projects from the key 11 and extends into the casing of the lock carrying the securing bolt or other catch which is to be operated to free it from engagement with a staple or locking plate or other restraining means when the key 11 is turned.

In operation, assuming that the permutation lock is fitted with ten buttons 18 (Fig. 1), and that the buttons marked *b*, *c* and *e* are to form the desired combination, the said buttons must first be depressed to bring the slots or grooves therein into register with the notched periphery of the stop plate 14 before the key 11 can be turned to operate the tongue 21 to release the bolt or latch from the locking means therefor on the door or other structure. Should any of the other buttons 18 (Fig. 1) be depressed the slots or grooves therein would not be brought into register with the notched periphery of the stop plate 14, consequently such plate could not be rotated and it would not be possible to turn the key 11.

Alteration of any previously selected buttons 18 forming a particular combination may be effected to form any other desired combination by turning the key 11 (Fig. 5) to permit the plate 16 to be uncovered from the screws 5 whereby the cover plate 7 may be partly removed from the casing 3 to enable the selected buttons 18 to be turned and changed in such manner that the grooves or slots of such selected buttons may be made to register with the notched periphery of the plate 14, when the said selected buttons have been depressed. Turning of the buttons is effected by moving them outwardly from the casing 3 so that the circular portion of their extreme rear end may lie in the rectangular openings in the rear of said casing.

A turning knob provided with a projecting stem, serving the purpose of the stem of the key 11, may be substituted for the latter. In the drawings the tongue 21 is shown attached to the key 11 through a slot 22 in the rear portion of the key; such key cannot be removed from the casing 3 whilst said tongue is attached thereto, but if the tongue 21 is detached from the key 11, the latter may then be withdrawn from the said casing. Upon detaching the key 11 from the tongue 21 the barrel 10 may be detached from the said key and the latter may then be withdrawn by sliding it longitudinally through the slots provided therefor in the plates 13 and 14 and the barrel 6 and the circular holes in the front plates 4 and 7. The plates 13 and 14 and barrel 6 remain in position in the casing 3 when the key 11 is withdrawn, through the action of the spring 20, and said key may thus be readily re-inserted in place in said casing when desired. Notches 23 may be provided in the ends of the bolts 1 to enable such bolts to be held stationary whilst the nuts 2 are being secured thereon.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A permutation lock comprising a casing, a slidable rotatable barrel in said casing, a key attached to said barrel and movable therewith, a barrel bearing attached to said key and rotatable therewith in which said key is movable longitudinally, a stop plate having a notched periphery slidable on said key and rotatable therewith, a push plate slidable on said key and rotatable therewith, spring means associated with said key and plates to distance them apart and to allow return of said key to normal position, means for securing said lock to a structure, means associated with said key to operate a securing bolt when said key is turned, and fitted to said casing a series of press buttons with slots therein two or more of which slots are capable of being brought into register with the notched periphery of said stop plate to form a combination to permit said key to be turned when said combination buttons are depressed.

2. A permutation lock comprising a cas-

ing, a barrel fitting the rear of said casing and rotatable and slidable therein, a bearing barrel at the forward part of said casing, a detachable front plate for said casing, an intermediate plate secured to said casing to which said front plate is detachably secured, means fitting the rear wall of the casing to enable the latter to be attached to a structure, a key to which said barrels are attached, one of said barrels being movable therewith and the other being adapted to allow longitudinal movement of said key therein as well as to rotate with said key, a tongue pivotally attached to the rear end of said key and rotatable therewith adapted to operate a securing bolt when said key is turned, a cover plate secured to said key adapted to prevent removal of said front plate from said casing unless said key is turned from normal position, a stop plate having a notched periphery secured to and slidable on said key, a series of press buttons disposed in said casing having reduced stems at the rear end and slots in their intermediate portion, said slots being adapted to be brought into register with said stop plates as required to form a combination with any two or more of such buttons when the latter are depressed to permit said key to be turned, a series of springs secured to said casing, one for each said buttons, a push plate slidably secured to said key and adapted to return said buttons to normal position after depression thereof when said key is moved longitudinally, and a spring associated with said key adapted to distance said latter plate and stop plate from each other and to permit said key barrel fitting the rear of said casing, and said push plate to be returned to normal position after longitudinal movement thereof.

3. In a permutation lock having a casing to which is fitted a series of depressible buttons with intermediate portions thereof provided with slots, the combination of a key, a rotatable and slidable barrel affixed to said key, a bearing barrel on said key and rotatable therewith adapted to permit longitudinal movement of said key therein, a plate secured on said key, a plate slidably secured to said key and notched on its periphery, a tongue pivotally attached to said key adapted when said key is turned to operate a securing bolt, and a spring disposed between said plates adapted to distance them apart and to enable return of said rotatable and slidable barrel, key, and push plate to normal position.

4. A permutation lock comprising in combination a casing, a series of depressible buttons with intermediate portions thereof furnished with slots, a key, a plate notched on its periphery non-rotatably mounted on said key and adapted to cooperate with said buttons so that it may be rotated relatively thereto when the buttons are adjusted so that the slots therein register with said plate, means whereby said buttons are normally held from rotating, means whereby a semi-rotation of such buttons varies the combination of the lock, and means operable from outside the lock casing whereby said buttons may be rotated to effect such variation in the combination.

5. A permutation lock comprising in combination a casing, a series of depressible buttons each being furnished with two slots such slots being situated on opposite sides of said buttons and at different distances from the ends thereof, a key, a plate notched on its periphery non-rotatably mounted on said key and adapted to cooperate with said buttons so that it may be rotated relatively thereto when the buttons are adjusted so that the slots therein register with said plate, means for normally preventing rotation of the buttons and means operable from outside the lock casing whereby said buttons may be rotated so that one or other of said slots in each of said buttons may be positioned to cooperate with said notched plate so that the combination of said lock may be varied.

6. A permutation lock comprising in combination a casing, a series of depressible buttons with intermediate portions thereof furnished with slots, a leaf spring associated with each button and adapted to frictionally engage such buttons so as to maintain them in the positions in which they may be placed, a key, a plate notched on its periphery non-rotatably mounted on said key and adapted to cooperate with said buttons so that it may be rotated relatively thereto when the buttons are adjusted so that the slots therein register with said plate, and means whereby said buttons are reversible so as to vary the combination of said lock.

7. A permutation lock comprising in combination a casing, a series of depressible buttons each being furnished with two slots such slots being situated on opposite sides of said buttons and at different distances from the ends thereof, a key, a plate notched on its periphery non-rotatably mounted on said key and adapted to cooperate with said buttons so that it may be rotated relatively thereto when the buttons are adjusted so that the slots therein register with said plate, stems on the rear ends of said buttons adapted to engage within square holes located within the rear wall of said casing such stems being cylindrical at their extreme rear portions and rectangular on their other portions, means whereby said buttons are normally maintained in a non-rotatable condition with the rectangular portions of their stems in engagement with said rectangular openings and means whereby said

buttons may be positioned so that the cylindrical portions of their stems engage in said openings whereby such buttons may be reversed so that one or other of said slots in each of said buttons may be positioned to cooperate with said notched plate so that the combination of said lock may be varied.

8. A permutation lock comprising in combination a casing, a series of depressible buttons each being furnished with two slots such slots being situated on opposite sides of said buttons and at different distances from the ends thereof, a key, a plate notched on its periphery non-rotatably mounted on said key and adapted to cooperate with said buttons so that it may be rotated relatively thereto when the buttons are adjusted so that the slots therein register with said plate, stems on the rear ends of said buttons adapted to engage within square holes located within the rear wall of said casing such stems being cylindrical at their extreme rear portions and rectangular on their other portions, a plate maintaining said buttons with the square portions of their stems engaging in said square holes and means whereby said plate may be adjusted relatively to said casing to allow of said buttons being moved into such positions that the cylindrical portions on their stems engage within said openings whereby such buttons may be reversed so that one or other of said slots in each of said buttons may be positioned to cooperate with said notched plate so that the combination of said lock may be varied.

9. A permutation lock comprising in combination a casing, a series of depressible buttons each being furnished with two slots such slots being situated on opposite sides of said buttons and at different distances from the ends thereof, a key, a plate notched on its periphery non-rotatably mounted on said key and adapted to cooperate with said buttons so that it may be rotated relatively thereto when the buttons are adjusted so that the slots therein register with said plate, stems on the rear ends of said buttons adapted to engage within square holes located within the rear wall of said casing such stems being cylindrical at their extreme rear portions and rectangular on their other portions, a plate normally positioned so as to maintain such buttons with their square portions engaging in said square holes, screws fixing said plate to said casing in such position, a plate mounted on said key and adapted to cover said screws when said key is in its normal position and adapted to uncover said screws when said key is moved to its non-normal position whereby the aforesaid plate may be loosened from said casing and moved relatively thereto so that said buttons may be moved into such positions that their cylindrical ends engage within said openings whereby such buttons may be reversed so that one or other of said slots in each of said buttons may be positioned to cooperate with said notched plate so that the combination of said lock may be varied.

10. In a permutation lock having a casing, a front plate detachably secured to said casing, a key attached to two barrels one of which is rotatable and slidable therewith in said casing, and the other is rotatable with said key and permits longitudinal movement of said key therein, and a cover plate secured on said key and rotatable therewith, the said cover plate being adapted to prohibit detachment of said front plate from said casing unless said key is turned from normal position.

11. In a permutation lock having a casing with two rotatable barrels fitted therein, the combination of a key slotted at its rear end attached to said barrels and rotatable therewith one of said barrels being movable longitudinally with said key and the other barrel being adapted to permit longitudinal movement of said key therein, and a tongue pivotally attached to said key through said slot therein adapted to operate a securing bolt when said key and tongue are turned.

12. In a permutation lock, a circular metal casing, the rear wall of said casing having openings therein to receive means whereby said casing may be detachably secured to a structure, and a central opening in which the rear end of a key is turnable, together with a series of rectangular openings surrounding said circular opening; a plate detachably securable to the front of said casing having a central flanged opening therein in which a key is turnable and a series of openings surrounding said central opening; and a front plate for said casing detachably securable to said former plate and casing and having a central key turning opening and a series of openings surrounding said central opening, all said openings registering with the openings in the said first mentioned plate.

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

HENRY SNOWDON STANDEN.

Witnesses:

W. J. DAVIS,

ETHEL CARROLL.