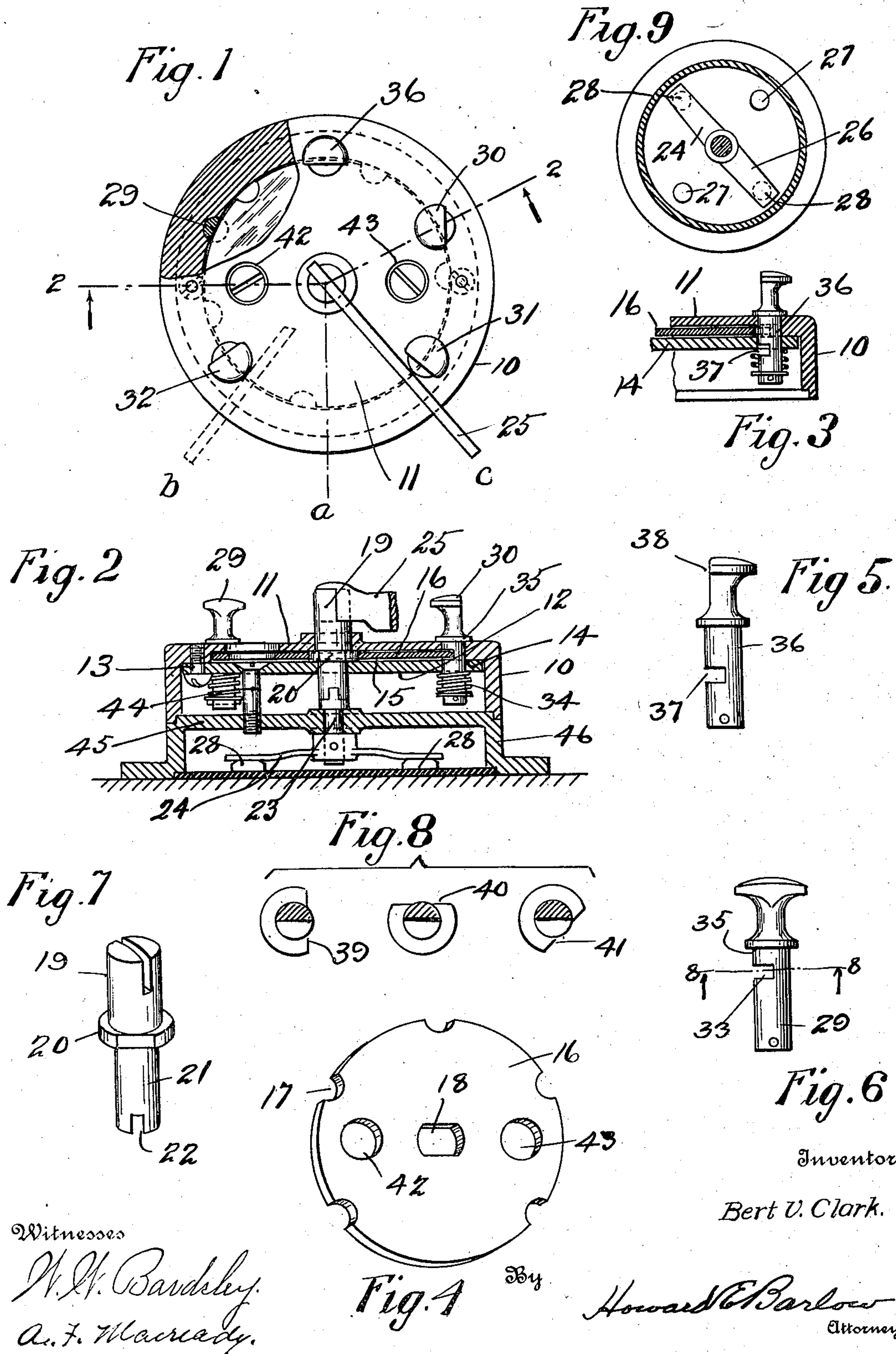


B. V. CLARK.
PERMUTATION LOCK.
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1,166,970.

Patented Jan. 4, 1916.



Witnesses

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PERMUTATION-LOCK.

1,166,970.

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To all whom it may concern:

Be it known that I, BERT V. CLARK, a citizen of the United States, and resident of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Permutation-Locks, of which the following is a specification.

This invention relates to improvements in permutation locks and has for its object to provide an inexpensive and efficient lock of this character capable of being readily set to a multiplicity of combinations and adapted for general use.

A further object of the invention is to provide means in the lock, whereby the same will automatically lock itself upon being moved to predetermined positions.

A further object of the invention is to provide means, whereby an authorized person may readily set the combination to release the lock by the sense of touch or feeling, alone whereby the lock may be operated in the darkness.

A still further object of the invention is the provision of means for securing the lock casing in position, the securing means being covered when the lock is set in certain positions.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims:

In the accompanying drawings:

Figure 1— is a plan view showing the lock casing—partly broken away and the switch lever shown in operative position. Fig. 2— is a section through the casing and mechanism on line 2—2 of Fig. 1 showing the lock as connected to operate an electric switch. Fig. 3— is a sectional view of a portion of the casing and rotatable disk showing the master pin in locked position. Fig. 4— is a perspective view of the rotatable locking plate. Fig. 5— is a view of the master locking pin showing the notch below the normal level of the locking plate. Fig. 6— is a side elevation of one of the other locking pins showing its notched member on a plane to engage the plate by a simple rotation of the pin and without moving the pin endwise. Fig. 7— is a perspective view of the central or operating stud. Fig. 8— is an end view of the different pins sectioned

on line 8—8 of Fig. 6 showing the angle of the flattened portions of the heads relative to the location of the notches in the body of the pins. Fig. 9— is a plan view of the electric switch showing a double set of contact members and the contact bar to which the lock shown is designed to be applied.

Referring to the drawings 10 designates the lock casing which may be made in any suitable form and of any suitable material, but I preferably make the same of metal and in a circular cup shape or form. The top of the casing 11 forming a fixed outer plate and an inner plate 12 is secured by screws 13 to the inner side of the casing to the raised annular shouldered portion 14, thereby leaving an intermediate space 15 between these inner and outer plates. In this intermediate space, I have placed a locking plate 16 which is provided with a plurality of notches 17 on its periphery, see Fig. 4, and is also formed with a substantially rectangular central opening 18.

In order to adapt this particular style of lock to the operation of an electric switch such as that required on automobiles and the like, I have provided a central operating stud 19, which is rotatably mounted in the outer plate 11 and is provided with an enlarged collar 20, see Fig. 7, which is set into the intermediate space between the plates 11 and 14 and enters the opening 18, whereby the rotatable plate is firmly connected to this stud to rotate therewith. The inner end 21 of this stud is shown as being provided with a slot 22 which is adapted to fit over the ordinary key 23 or other member connected to the usual electric switch arm 24, whereby the movement of the handle lever 25 of the lock, swings the switch arm 26 to make the connections to the battery through the contacts 27 or to the magneto through the contacts 28 and through this switch arm 24.

The means by which I obtain a multiplicity of locking combinations is by the use of a plurality of pins, which as illustrated in Fig. 1 extend through both the outer plate 11 and inner plate 12 and one-half of their diameter is adapted to extend into the notches 17 of the rotatable plate 16 when the latter is in position to register with said pins. The combination herein shown is provided with a set of pins 29, 30, 31 and 32, each of which illustrated in Fig. 6 is

provided with a notch 33 cut into their body portion one-half the diameter of the body. Each of these pins is provided with a spring 34 which serves to draw the same downward and press its shouldered portion 35 against the surface of the outer plate to retain the same by friction in any desired position in which it may be set. This form of pin in the combination herein shown has its notch 33 set on the same plane with the rotatable disk so that it may register with the disk by being rotated to the proper position and to this combination, I have added a master pin 36 whose notch 37 is on a plane below that of the rotatable disk requiring the raising of the pin in addition to its rotating movement in order to position the notch to register with this plate to unlock the same and permit it to rotate.

It will be seen that by rotating any one of the pins 29 to 32, inclusive, to move their unnotched portion into the notched portion of the plate, locks the latter effectively against rotation, and also that it requires the notches of all these pins to register with the plate in order to unlock the same and permit it to rotate. It will further be seen that the pins 29 to 32, inclusive, must be rotated into registering position while the master pin 36 must not only be rotated but must be moved end-wise in order to bring its notch to register but any number of these pins may be arranged to move end-wise like the master pin if desired.

Another feature of this invention is the cutting away or forming of a flattened face 38 on each pin which is best illustrated in Fig. 8, whereby it may be caused to indicate to an authorized person the relative position of the slot in the body portion below. In some of the pins the flattened face may be at a right angle to the slot as at 39, in others parallel with the slot as at 40, while with still others it may be at an angle as at 41 to the slot. By changing these pins about in the plate different combinations may be obtained. The main object of forming these flattened faces is to provide simple indicating means on these pins whereby each may be set in the dark by the sense of feeling or touch, only, and operated without requiring any other visual indication.

It is found in practice necessary to provide simple and effective means for readily attaching this lock casing in position and the attaching means to be such that it cannot be tampered with. In order to do this, I have bored two holes 42 and 43 in the outer plate and through the rotatable plate of sufficient size to permit the heads of the attaching screws 44 to be passed there-through. I then drill the inner plate 12 and through this plate I pass the screws 44 and thread them into the retaining plate 45 on the switch casing 46. By this con-

struction, it will be seen that when the switch lever is moved to operating position, which is shown in the present instance as being on the magneto side of the switch, the rotatable plate registers with the holes in the outer plate and the inner plate 12, whereby the screws may be passed through and set into position, but when the lever 25 is moved to the neutral or unlocked position which is that in which the car is usually left, the screw holes 42 and 43 in the rotatable plate are moved so as not to register with those in the outer plate and, therefore, all screw heads are covered and protected against being tampered with.

In the operation of my improved switch when the lever 25 is set in the central position *a*, the switch is at neutral and when swung to the left at *b* it is on the battery and to the right at *c* it is on the magneto. Before this switch lever can be moved from the point *a* all of the pins must be set into the proper position to cause their notches to register with the rotatable plate and the master pin is then raised to also register its slot with the plate, then this lever may be moved in either direction to points *b* or *c*, when the master pin automatically drops back under influence of its spring into position to again lock this plate. Some of the other pins may now be rotated so that the combination is set and the lock, therefore, cannot be tampered with and operated by any unauthorized person, but ordinarily instead of setting the combination when the lever is at either *b* or *c*, it is only desired to set the combination against the moving of the lever when it is in neutral or position *a* which is when the engine is stopped and the car is being left unattended.

The authorized person when returning to start the car, whether in day-light or dark being, of course, familiar with the setting of the different pins, he simply moves them about by the sense of touch until the different slots are in position to permit the plate to rotate, then the master pin is raised and the switch thrown into position to start the car.

I claim:

1. A lock of the character described comprising a casing, a rotatable operating stud supported thereby, a locking plate rotatable with said stud, movable locking pins engaging said locking plate, and a master pin controlling said locking plate, said master pin being capable of rotary and longitudinal movements.

2. A lock of the character described comprising a casing, a rotatable operating stud supported thereby, a locking plate rotatable with said stud, locking pins having portions for providing clearance for the periphery of said locking plate, said pins being rotatable, whereby movement of the locking plate may be prevented and a master pin controlling

said locking plate, said master pin being capable of rotary and longitudinal movements.

3. A lock of the character described comprising a casing, a rotatable operating stud supported thereby, a locking plate rotatable with said stud, movable locking pins engaging said locking plate, a master pin controlling said locking plate, said master pin being 10 capable of rotary and longitudinal movements, and means for yieldingly maintaining said master pin at the inner limit of its longitudinal movement.

4. A lock of the character described comprising a casing, a rotatable operating stud supported thereby, a locking plate for preventing rotation of said stud, rotatable locking pins provided with cut away portions to permit rotation of said locking plate, each 20 locking pin having a head and means for yieldingly holding the heads of said locking pins against said casing to normally prevent rotation of said pins.

5. A lock of the character described comprising a casing, a rotatable operating stud supported thereby, a locking plate for preventing rotation of said stud, rotatable locking pins provided with annular shoulders, and having cut away portions to permit rotation of said locking plate, and springs encircling the respective pins and acting to maintain a frictional engagement between said shoulders and said casing. 25

6. A lock of the character described comprising a casing, a rotatable operating stud 35

supported thereby, a locking plate for preventing rotation of said stud, rotatable locking pins provided with cut away portions to permit rotation of said locking plate, each locking pin having a head means for yield- 40 ingly holding the heads of said locking pins against said casing to normally prevent rotation of said pins, one or more of said locking pins being movable longitudinally.

7. A lock of the character described comprising a casing, an operating stud supported thereby, a locking plate rotatable with said stud, movable locking pins engaging said locking plate, said pins being each provided with a releasing notch and a head having a 50 cut-away portion in juxtaposition therewith, said locking pins being rotatable to adjust the releasing notches with respect to said locking disk.

8. A lock of the character described comprising a casing having an inner and an outer plate, a rotatable operating stud, a locking plate between the inner and outer plates and attached to said stud to rotate therewith, movable locking pins engaging 60 said locking plate, and means for securing the casing in position, said securing means being covered by the locking plate when the latter is moved to a predetermined position.

In testimony whereof I affix my signature 65 in presence of two witnesses.

BERT V. CLARK.

Witnesses:

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A. F. MACREADY.