(No Model.)

T. S. SPIVEY.

PERMUTATION LOCK.

No. 390,528. Patented Oct. 2, 1888.

FIG. 1.

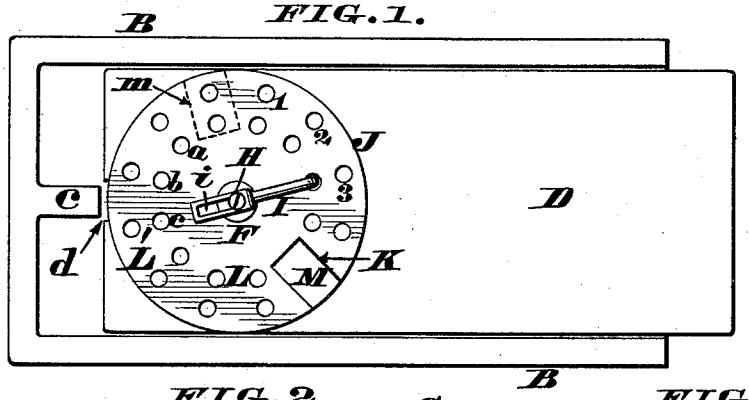


FIG. 2.

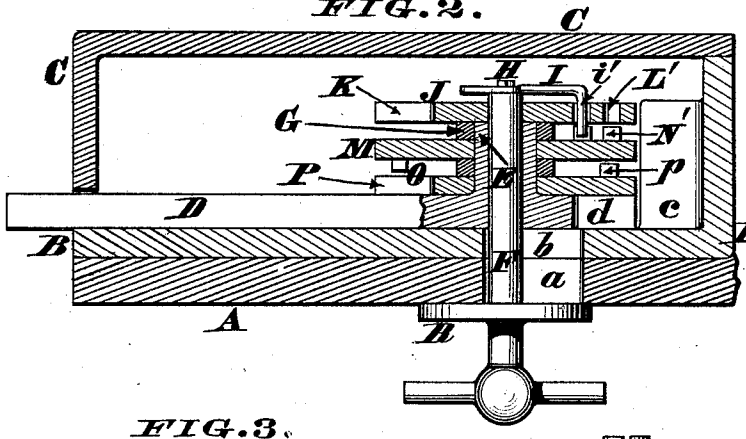


FIG. 5.

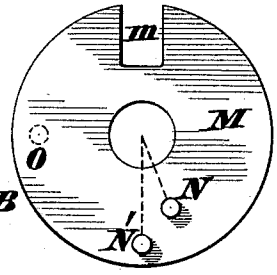


FIG. 3.

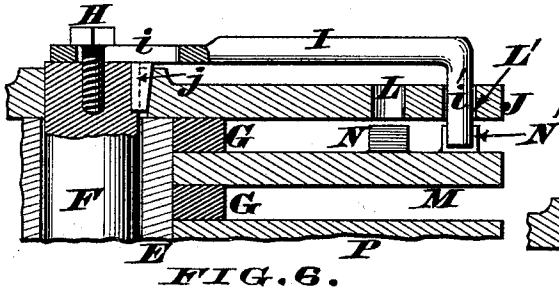


FIG. 4.

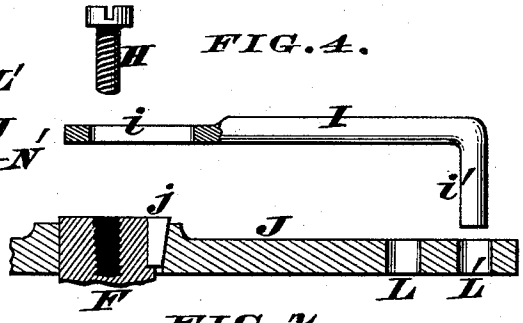


FIG. 6.

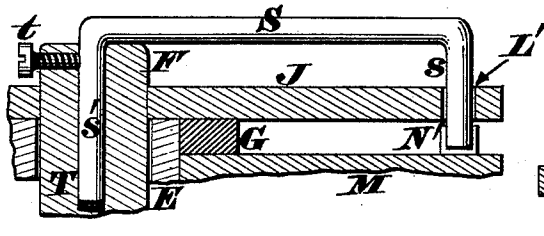
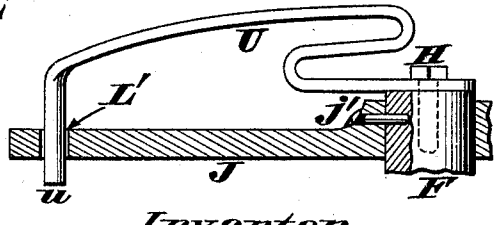


FIG. 7.



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UNITED STATES PATENT OFFICE.

THOMAS S. SPIVEY, OF CINCINNATI, OHIO, ASSIGNOR TO THE VICTOR SAFE AND LOCK COMPANY, OF SAME PLACE.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 390,528, dated October 2, 1888.

Application filed January 14, 1888. Serial No. 260,690. (No model.)

To all whom it may concern:

Be it known that I, THOMAS S. SPIVEY, a citizen of the United States of America, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Permutation-Locks, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention comprises a novel combination-changing device for those permutation-locks which include a gated driving-disk that actuates one or more revolving tumblers, said device being composed of a short rod having a longitudinal slot traversed by a screw or bolt wherewith said rod is adjustably coupled to the inner end of the spindle or to an attachment of the same. The opposite end of this rod has a lateral bend or shank adapted to pass through one of a series of holes in the driving-disk and actuate a pin of the first or primary tumbler, the disk being preferably provided with two separate series of such holes arranged in circles concentric with the spindle. After the screw has been loosened the rod can be raised so as to withdraw its shank from one hole and allow it to be inserted in another aperture; or said rod can be shifted longitudinally for the purpose of engaging said shank either with the outer or inner circle of perforations, thereby affording numerous changes in the combinations, as hereinafter more fully described; but in a more simple form of lock a single row of holes may be made in the driving-disk, in which event the slot in the rod will be omitted and a stem will be arranged at the inner end of said rod, which stem will be capable of being turned and shifted longitudinally of a socket in the spindle; or this longitudinal shifting can be dispensed with by rendering the rod elastic, so as to be bent away from the driving-disk in the act of withdrawing the shank, as hereinafter more fully described.

In the annexed drawings, Figure 1 is a rear elevation of a permutation-lock embodying my improvements, the cap of the case being removed, the bolt being shot, the driving-disk and tumblers being turned to scatter the combinations, and the shank of the slotted rod being engaged with one of the inner series of holes in said disk. Fig. 2 is a horizontal section of the lock, said section being taken in the plane of the spindle. Fig. 3 is an enlarged section through a portion of the spindle, driving-disk, and tumblers, the shank of the rod being engaged with one of the outer series of holes in said disk. Fig. 4 is a section showing said rod separated from the spindle and disk. Fig. 5 is a front elevation of the primary tumbler. Figs. 6 and 7 are modifications of my invention.

The slotted safe door A *a*, slotted lock-case B *b*, cap C, flange *c*, slotted bolt D *d*, tubular stump E, spindle F, and fixed washers G, being the same as seen in the patent granted to me November 1, 1887, No. 372,498, require no further description in this specification. Tapped into the spindle F is a screw or bolt, H, that traverses the longitudinal slot *i* of a short rod or wire, I, the opposite end of this rod being bent laterally to form a shank, *i'*, which passes completely through the driving-disk J and projects a sufficient distance below the same. This disk must be attached to the spindle in some suitable manner, a key, *j*, being seen in Figs. 3 and 4, a pin, *j'*, in Fig. 7, while the disk represented in Fig. 6 is supposed to be soldered to said spindle. Furthermore, said disk is provided with a gate, K, and two distinct series of holes, L L', said holes being arranged in circles concentric with the spindle. These holes should be identified by suitable characters, the numerals 1 2 3 being applied to the outer series, L', while letters *a* *b* *c* designate the inner series of apertures, L. These numbers and letters are merely suggestive, however, the right being reserved of varying said characters as circumstances may suggest.

Adapted to turn freely around the tubular stump E is the first or primary tumbler, M, having a gate, *m*, and a pair of pins, N N', projecting toward the driving-disk J, which pins are not radially in line with each other. (See Fig. 5.) Projecting from the under side of this tumbler is a pin, O, that drives the pin *p* of the secondary tumbler P when more than one tumbler is used. R is a customary dial attached to spindle F, said dial being used in conjunction with a suitable pointer on the front of the safe-door. As the method of ad-

vancing, locking, and retracting the bolt D differs in no respect from the operations described in my old patent, further explanation of these movements is unnecessary, although it may be stated that the proper turning of spindle F causes the shank *i'* of rod I to drive either the pin N or N', and thereby actuate the train of tumblers. In Figs. 1 and 2 this shank is seen inserted within one of the holes in the inner circle, L, and adapted to actuate the pin N; but the screw H can be slackened at any time to permit the rod I being raised until said shank is withdrawn from said hole. The rod is then swung around either to the right or left and the shank inserted in another one of the inner circle of holes, after which act the screw H is again tightened, thus affording a new combination. These operations can be repeated until the shank has been engaged with every hole of the inner circle, each new engagement producing a different combination, and after said inner circle has been utilized the outer circle can be brought into service in the following manner:

The rod I is detached, as seen in Fig. 4, and is shifted longitudinally until its shank *i'* is in line with one of the holes of the outer circle, L'. Said shank is then passed down through said hole, and the rod is again secured in place by engaging the screw H with the thread cut within the spindle F, as seen in Fig. 3. It is evident the shank *i'* will now actuate the outer pin, N', of the primary tumbler, and as said pin is not radially in line with the other pin, N, a new combination is produced. By again slackening the screw, drawing the shank out of the hole, and reinserting said shank in another one of the outer apertures, L', another change of combination is effected, and so on until all the outer perforations have been utilized.

The above is a description of the more complex form of my combination-changing device; but the invention may be simplified, as seen in Fig. 6, wherein the driving-disk has only the outer circle of holes, L', and the rod S has a shank, *s*, and stem *s'*, the latter being adapted to turn and slide freely within an axial socket, T, of the spindle when not locked by the screw *t*. Furthermore, in this modification the primary tumbler M has but a single pin, N', for the shank *s* to act against, which shank can be withdrawn from one of the holes in the single circle and inserted in another hole of the same after the screw *t* has been slackened, which act permits the stem *s'* to slide and then turn freely within the unthreaded socket T. After the shank has been inserted in a new hole, the rod S is secured in place by simply tightening the screw against the stem.

In the other modification (seen in Fig. 7) the outer circle of holes, L', is used, and the shank *u*, that drives the first tumbler, forms part of or is coupled to one end of a suitable spring-bar, U, the opposite end of said bar being pivoted to the spindle F by the screw H. With this form of combination-changing device the yielding bar U is readily sprung to enable the shank *u* being withdrawn from one hole and inserted within another aperture, said bar turning freely on the pivot H whenever such a change of combination is made.

From the above description it is evident these modifications embody the leading feature of my invention—that is to say, a driving-disk secured to the spindle and having one or more series of perforations, and a swinging device coupled to said spindle or to an attachment of the latter, and provided at its free end with a shank that passes through one of said perforations and drives the primary tumbler, whereby a change of combinations is effected in a few moments without removing or otherwise interfering with any of the operative parts of the lock. Finally, the invention is not limited to the precise construction of lock herein shown and described, as it is apparent the combination-changer can be applied to any lock having a spindle, a driving-disk secured thereto, and one or more tumblers actuated by said disk.

I claim as my invention—

1. The combination, in a permutation lock, of a spindle, a series of gated tumblers turning around the same, a perforated gated disk secured to said spindle, and a circularly-adjustable combination-changer, the outer or free end of which is provided with a lateral shank that passes through a perforation of said disk and actuates the first tumbler when said disk is set in motion, substantially as herein described.

2. The combination, in a permutation-lock, of spindle F, slotted and shanked rod I *i i'*, screw H, gated driving-disk J K, having an inner series of holes, L, and an outer series, L', and the gated tumbler M *m*, provided with a pair of pins, N N', for the purpose described.

3. The combination, in a permutation-lock, of a spindle, a series of gated tumblers turning around the same, a perforated gated disk secured to said spindle, and a circularly-adjustable and longitudinally-shiftable combination-changer, the inner end of which is pivoted to the spindle, and its outer or free end has a lateral shank that passes through a perforation of said disk and actuates the first tumbler when said disk is set in motion, substantially as herein described.

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

THOMAS S. SPIVEY.

Witnesses:

JAMES H. LAYMAN,

SAML. S. CARPENTER.