(No Model.)

I. W. MOORE.

PERMUTATION LOCK.

No. 568,864. Patented Oct. 6, 1896.

Fig. 2.

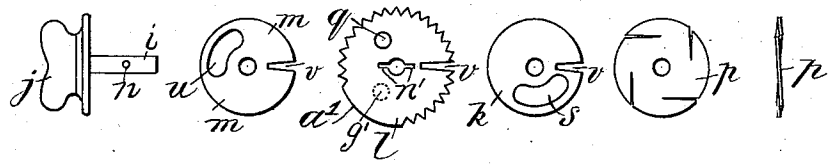


Fig. 1.

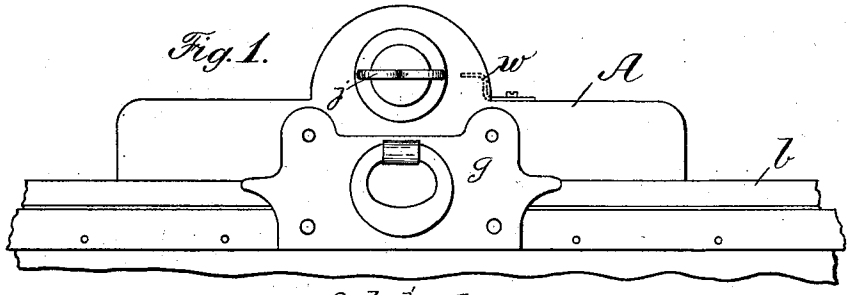


Fig. 3.

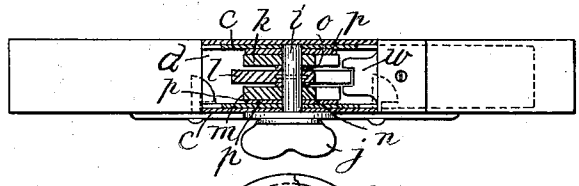


Fig. 4.

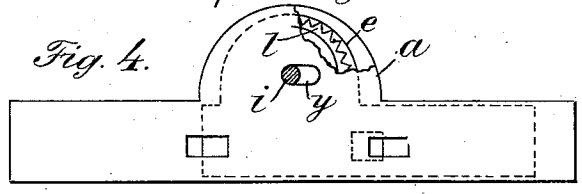


Fig. 5.

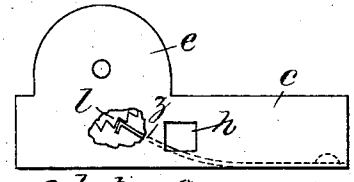
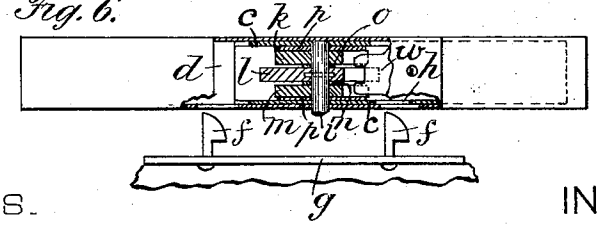


Fig. 6.



WITNESSES.

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Ira W. Moore.

By A. P. Thayer

Atty

UNITED STATES PATENT OFFICE.

IRA W. MOORE, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO EDWARD SIMMONS, OF KEYPORT, NEW JERSEY.

PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 568,864, dated October 6, 1896.

Application filed April 4, 1895. Serial No. 544,377. (No model.)

To all whom it may concern:

Be it known that I, IRA W. MOORE, a citizen of the United States, and a resident of New York city, in the county and State of New York, have invented certain new and useful Improvements in Permutation-Locks, of which the following is a specification.

My invention consists in improvements in the construction of permutation-locks, more particularly for satchels and padlocks, in which the tumblers are mounted on the sliding bolt, but applicable in other forms of locks, as hereinafter fully described, reference being made to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved lock as applied to a satchel-frame. Fig. 2 represents separate views of the tumblers, friction-disk, and knob-spindle. Fig. 3 is a horizontal section of the case and part of the locking-bolt. Fig. 4 is a side elevation of the lock with a part of the case broken out. Fig. 5 is a side elevation of the locking-bolt removed from the case and containing the rest of the working parts. Fig. 6 is a horizontal section of the case and the working parts and a plan view of part of the hasp.

A represents the main portion of the lock-case, which is preferably of rectangular shape in cross-section and of considerable length compared to its transverse dimensions when the lock is adapted for application to satchels, as it is represented in this case, *b* being intended to represent the top part of a satchel-frame.

The bolt consists of a short strip of sheet metal suitably bent up in two side portions *c* of a bottom portion *d* and preferably without top or ends, but with ears *e*, extending upward from the edges of the sides near one end, the cross-section being such that the bolt will fit in the case A snugly and slide lengthwise sufficiently to engage and disengage the hooks *f* of the hasp *g*, for one of which a slot *h* is made through one side of the bolt, permitting the hook to enter and be engaged when the bolt is shifted. The end of said side of the bolt engages the other hook by the same movement. Through these ears of the bolt and also through one side of the upwardly-extended part *a* of the case the stem *i* of a knob or thumb-bit *j* extends to support and actuate the tumblers *k l m*, which consist of metallic disks, two of which, *k* and *m*, are fitted loosely on the knob-stem, and the other, *l*, is keyed thereto, so as to be turned by it, the key consisting in this case of the pin *n*, inserted transversely through the stem and projecting from both sides, to which the disk, correspondingly notched at *n'*, is fitted, so that they may be readily connected and disconnected. Between the middle and the side disks, respectively, there is a small collar or washer *o*, reducing the contact portions of the disks to the smallest practicable radius for correspondingly reducing the friction, and between the side disks and the sides of the bolts between which they are confined there are friction-washers *p*, having sufficiently larger radius of friction-surface to overpower the friction of the collars *o* and hold the disks *k* and *m* at rest while the middle disk is being turned by the knob.

The middle disk *l* has a stud *g'* on its side next to disk *k*, working in a circumferential slot *s* in said disk for turning when taking effect at the ends of the slot and for moving within certain limits without turning the disk. The said middle disk also has a stud-pin *q* on its side next to disk *m*, similarly engaging a like slot *u* for similarly actuating disk *m* and allowing it to rest during certain movements of disk *l*. Each disk has a radial notch *v*, which, being all set to register with the fixed guard *w*, fronting the faces of the disks, allow the bolt to be shifted back to release the hasp, the disks, knob, and the knob-stem being carried along with the bolt. One side of the case A is slotted at *y* under cover of the knob to permit such movement of the bolt by the knob. When the bolt is returned to the locking position and the disks are shifted to turn their notches *v* out of register with the guard, the said guard prevents opening the lock again until the readjustment of the disks, as before. For this purpose the disk *l* is made somewhat larger in diameter than the others, and is toothed for the most part of its circumference suitably for engagement with a spring-pawl *z*, allowing the disk to turn either way, but with some obstruction,

and preferably adapted to make audible clicks corresponding with the teeth in number; but the teeth may be distinguished by the sense of feeling if it is desired to have the lock work noiselessly. A portion a' of the middle disk is plain on the periphery for interrupting the action of the spring-pawl on the teeth as a means of determining the relative position of the disk and as the point for commencing the reckoning for setting the disks for unlocking the bolt.

As represented in the drawings, the disk k will be set first by turning the knob to the right hand to the extent of ten teeth over the spring-pawl from the starting-point. Disk m will then be set by turning disk l back eight teeth to the left, and disk l will be set by turning it five teeth to the right after setting disk m. All the notches v will then register with the guard w.

For changing the lock to open by other combinations of teeth the stud-pins q q' may be set in different positions in the disk l, which may have different holes to receive them, or the plain part a' of the disk l may be shortened or lengthened or changed in position.

The friction-disks p, for holding the tumbler-disks when set, consist of pieces of thin springy sheet metal, as brass, of about the size of the disks, having slits from the periphery parting them in sections to suitable depth, and the sections are bent in opposite directions, so as to bear on the disks and the portions of the sides of the bolt between which the disks are mounted, and thus produce friction at the outer edges of the disks, which will effectually hold the disks in position against friction of the small collars o during further movements of the middle disk.

It will be seen that, owing to the middle disk having its notch v in the toothed face, attempts to pick the lock by pressing the disks against the guard and feeling for the notches will be effectually defeated, because the teeth of disk l will prevent it from being turned while so pressed. The extension part a of the case has a suitable cover over the top. It will also be seen that by my improved construction the knob-spindle is made to actuate the different tumblers independently of each other by a simple rotatory motion without sliding lengthwise, which it is desirable to avoid in such locks.

I claim—

1. In a permutation-lock having the tumblers mounted on the sliding bolt, said bolt consisting of a skeleton comprising a bottom and side portions with ear extensions of the sides, the knob-spindle mounted in the axis of said ear extensions; the tumblers consisting of a middle toothed disk with a plain peripheral portion, and a smaller plain disk each side of the middle disk; friction-controlling disks between the ears of the bolt and the plain disks, said plain disks having the curved slots, and the middle disk having the stud-pins for actuating the plain disks in combination with the rotating knob-spindle adapted for turning the middle disk and thereby setting either disk independently, and with the tumbler-controlling guard mounted in a fixed position on the lock-case, also with the spring-pawl controlling the toothed disk, said tumblers having the radial slots for engaging the guard substantially as described.

2. In a permutation-lock having the tumblers mounted on the sliding bolt, said bolt consisting of a skeleton composing a bottom plate and side plates with ear extensions of the sides, and seated in the bottom of the case; the knob-spindle mounted in the axis of said ear extensions, the tumblers mounted on said spindle between said ears and consisting of a middle toothed disk with a plain peripheral portion, and a smaller plain disk each side of the middle disk; friction-controlling disks between the ears of the bolt and the plain disks, said plain disks having the curved slots, and the middle disk having the stud-pins for actuating the plain disks respectively, in combination with the rotating knob-spindle mounted in said ears suitably to carry the disks above the bottom of the bolt, and adapted for turning the middle disk and thereby setting either disk independently, and with the tumbler-controlling guard mounted in a fixed position on the case, also with the spring-pawl for controlling the toothed disk, said tumblers having the radial slots for engaging the guard substantially as described.

3. A permutation satchel-lock consisting of the long narrow case adapted to the satchel-frame, and having the extension part a, the skeleton bolt adapted to slide lengthwise in the bottom of the case and having the ear extensions e of the sides, the tumbler-disks mounted on the knob-stem in the ear extensions e, said spindle and disks adapted for setting either disk independently by turning the middle disk, the slotted side of the part a, of the case permitting the sliding of the knob-stem with the bolt, the spring-pawl and the tumbler-guard fixed on the case, all substantially as described.

Signed at New York city, in the county and State of New York, this 16th day of March, A. D. 1895.

IRA W. MOORE.

Witnesses:
W. J. MORGAN,
JOS. S. LOCKWOOD.