2 Sheets-Sheet 1.

R. Nerrell,

Lock.

No. 3,747. Patented Sep. 17, 1844.

Fig. 3.

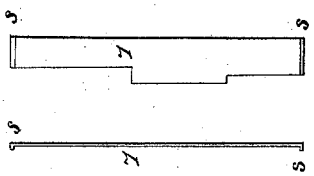


Fig. 2.

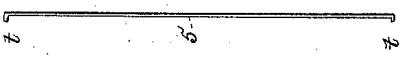


Fig. 1.

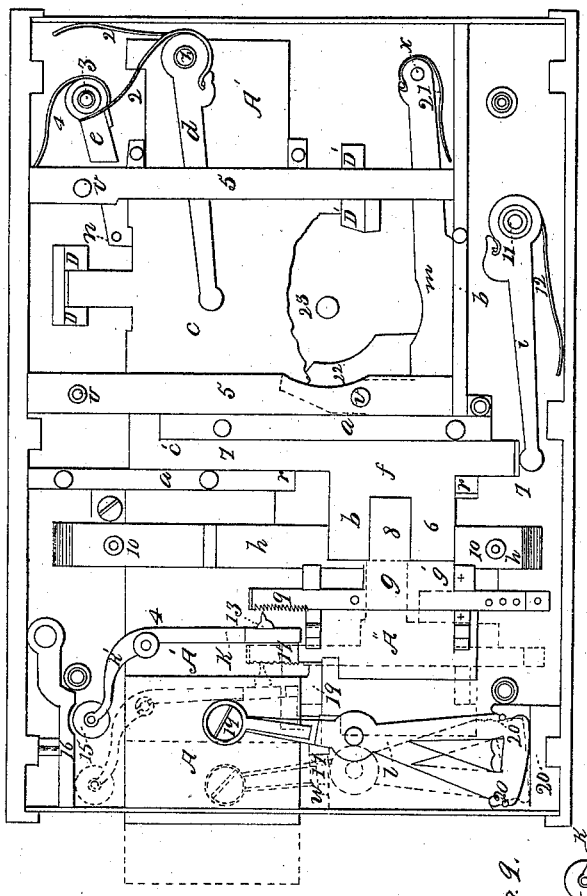


Fig. 5.

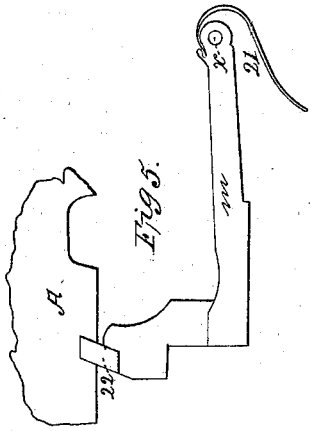


Fig. 4.

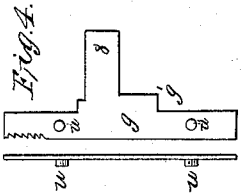


Fig. 7.

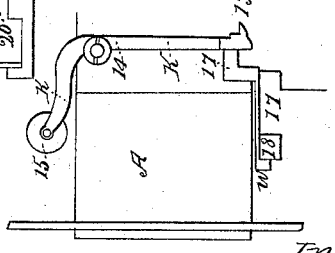
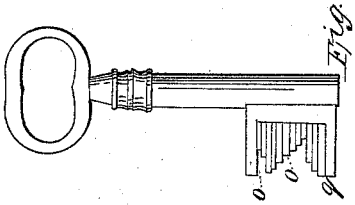


Fig. 6.



Witnesses:
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W. Nerrell

Inventor.
Robert Nerrell

2 Sheets-Sheet 2.

R. Merrell,

Lock.

No. 3,747. Patented Sep. 17, 1844.

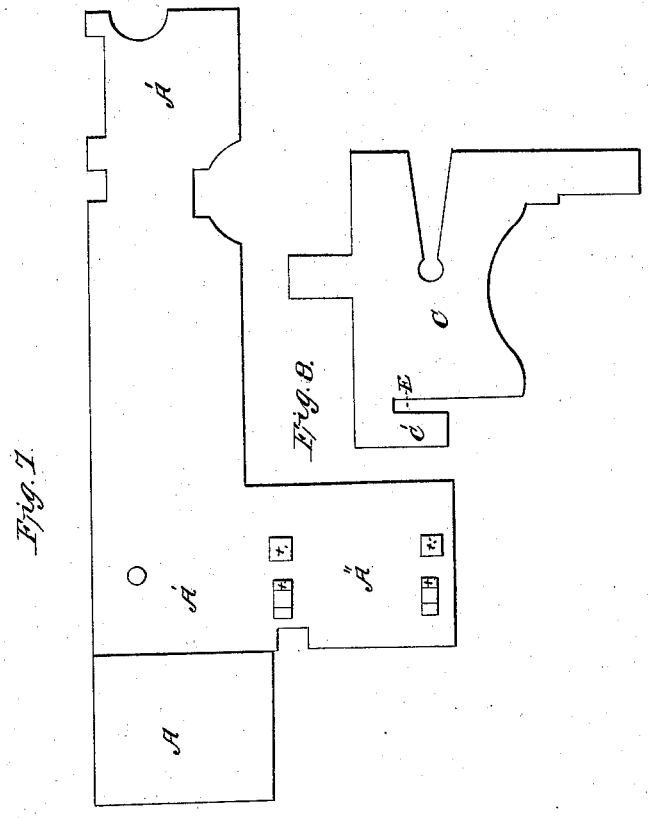

Fig. 1.

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UNITED STATES PATENT OFFICE.

ROBERT NEWELL, OF NEW YORK, N. Y.

COMBINATION-LOCK FOR DOORS, SAFES, &c.

Specification of Letters Patent No. 3,747, dated September 17, 1844.

To all whom it may concern:

Be it known that I, ROBERT NEWELL, of the city of New York, in the State of New York, have made certain new and useful improvements in the manner of constructing locks of the kind used for the doors and vaults of banks or for other articles and places where the utmost security is required, which improved lock I denominate "Newell's paroutoptic, toikon, permutation lock;" and I do hereby declare that the following is a full and exact description thereof.

A main object of my improvements is to prevent the discovery of the position of the parts on which the security of the lock depends, either by the use of lights, or reflectors, introduced through the key hole, or by any indication obtained by the lifting of the tumblers for the purpose of ascertaining the positions in which the followers and slides have been left by the operation of the key and bits at the time of the last locking. This I effect, in part, by the manner in which I have formed, arranged and combined, a series of followers, slides, follower levers, and their appendages, and in part by the aid of what I have called guard plates, which form two distinct departments or separate chambers in the lock thereby cutting off all visible communication with the said followers, slides, follower levers, and other parts to be presently described.

This improved lock differs materially from that for which I obtained Letters Patent of the United States under date of the twenty-fifth day of September 1838. A part of what were denominated tumbler in that lock have become followers in that which I am about to describe, said followers being detached from the tumblers, although subject to their action; their arrangement being such as that an attempt to force the bolt would be received by the followers, and would confine them in place without, in any way, interfering with the action of the tumblers. By this arrangement, the ascertaining of the position or arrangement, of the sets of slides by means of pressure, is rendered impossible. The followers and slides are also placed beyond the reach of any instrument introduced into the key-hole of the lock, they not being lifted by the key; the slides have, in fact, been taken entirely from the tumblers and placed in connection with the followers at the extremity of the lock, the tumblers being simply auxiliaries to the key, for the purpose of giving to the followers their form, so as to match and coöperate with the slides. This lock, therefore, is not to be considered as a mere improvement on that formerly patented by me, but, essentially, as a new lock, involving new principles of action.

In the accompanying drawings, Figure 1, represents the interior of my improved lock, the covering plates being removed, and the respective parts being represented, by continuous lines, in their proper positions, supposing the main bolt to be retracted; the dotted lines show the positions assumed by them when said bolt is thrown out.

In the other figures, where the same parts are represented as in Fig. 1, they are designated by the same letters of reference.

A, A, is the main bolt, shown as detached from the lock in Fig. 7. The part A″, is a plate which descends from, and is in one piece with, the part A′, of the shank of the bolt; the part A″, sustains the slides, *g*, which are retained in place by, and slide vertically between, the four stumps, or guide pieces, ∔ ∔ ∔ ∔, which are riveted into the plate A″, and, of course, traverse back and forth with the bolt. One of these slides is shown separately in Fig. 4. When the bolt is retracted, the shoulders, *g′*, of the slides rest on the stump, ∔. These slides correspond in number with the tumblers, and with the changeable bits, *o*, *o*, of the key.

Each of the slides carries a tongue, 8, which when the bolt is drawn back passes between the jaws, 6, 6, of one of the followers *f;* said followers, like the slides, *g*, corresponding in number with the tumblers. The followers, *f*, slide up and down, being guided by the stumps, *r*, *r*, riveted to the lock plate, and a guard plate *a*. This, and two other guard plates. *a*, and *b*, extend, edgewise, from one of the lock plates to the other, so as to cut off all communication, either by light, or by instruments, with the slides *g*, with the followers, *f*, with the tumbler elbows, C′, (Fig. 1.) and with the follower levers, *i*.

C, is the uppermost of the tumblers, of which there may be any desired number, as in other permutation locks. They are lifted vertically by the bits, *o*, *o*, of the key, Fig. 6. One of these tumblers is shown separately in Fig. 8; they are guided up and down by sliding against the guard plate, *a*,

and against the guides, or stump, D, D. The elbow C′, of each tumbler passes over and behind the guard plate, *a*, being notched for that purpose, as shown at E, in Fig. 8.

Each of the followers, *f*, slides with, and upon, an auxiliary follower plate, 7, shown separately, flatwise and edgewise, in Fig. 3. These auxiliary followers have a lip, *s*, turned up at each end, against the upper end of which the lower end of the knee of a follower C′, Fig. 1, bears, while a lever, *i*, borne up by a spring, 12, bears on its lower end; the number of each of these auxiliary followers corresponding with the number of tumblers. The tumblers are borne down by levers, *d*, working on a fulcrum stud, *z*, each lever being acted on by a spring, 2; these springs must be so much stronger than those acting on the follower levers, *i*, as that these latter can rise only when the tumblers are lifted by the key. They then serve to raise the auxiliary followers, 7, and the followers, *f*, contained in them, keeping the upper ends of the auxiliary followers in continued contact with the knees of the tumblers.

No. 3, is a stud which forms the fulcrum of the detent lever and dog, *e;* this is fitted to act in a notch on the shank of the bolt, A, and has on it a lifting pin, *n*, which is raised by the ascent of the tumbler, *c*, and is returned by the keeper spring, L, in the usual manner. The tumblers are made to slide freely up and down by passing between dividing plates, 5, 5, one of which is shown, edgewise, at Fig. 2. These have a lip, *t*, *t*, at their ends to keep them at a suitable distance apart, so as to allow the tumblers to move up and down, unobstructedly. The plates, 5, 5, are held in place by the guides, D′, D′, and the studs, *v*, *v*. The tongues, 8, of the slides, *g*, and the jaws 6, 6, of the followers, *f*, are likewise received between plates, *h*, *h*, which are furnished with lips at their ends like the plates, 5, 5; they are kept in place by passing over the studs 10, 10; the slides, *g*, are kept apart by studs or pins, *u*, *u*, Fig. 4, projecting from them, which enable them also to slide with little friction, so that they fall, readily, by their own weight. Each of the slides, *g*, is furnished at its upper end with rack teeth, 9, with which a detent tooth, 13, on a bent lever, *k*, is to engage when the bolt is protruded.

The lever *k*, has its fulcrum at 14, on the shank, or plate, A′, of the bolt A; its bent arm, *k′*, carries a roller, 15, which bears against a stationary guide piece 16; this guide piece has a depression in it to receive the roller, which depression it is represented as occupying, the bolt being retracted; but when the bolt is protruded, the roller 15, will move on the straight part of the guide 16, and the tooth 13, will engage with one of the rack teeth, 9, of the slides *g*, and will hold them at the height to which they have been raised along with the followers in the act of locking, the levers *i*, causing all these to rise as far as the tumblers to which they appertain have been respectively lifted. To the lower and outer end of the lever *k*, is attached an arm, 17, 17, which projects forward under the bolt; and when the bolt is fully protruded the outer end of this arm is brought into contact with the rim of the lock, so as to force the tooth 13, fully into the rack teeth of the slides, *g;* they will thus become fixed in place at the points to which they have been lifted, their tongues, 8, not being at this time embraced by the jaws, 6, 6, of the followers.

In protruding the bolt, the tongues, 8, escape entirely from between the jaws, 6, 6; it will be manifest, therefore, that these jaws must each be lifted to the exact height at which they escaped, to enable the tongues, 8, to return between them, and if anything but the proper key be applied to lift one, or more of the tumblers, the followers and the auxiliary followers will rise freely with the tumblers without regard to the position of the tongues; under this condition of things, on applying pressure to the talon of the bolt, the tumbler, or tumblers, being released, the auxiliary followers will descend with the tumblers, but while the pressure is continued, the followers will remain at rest, the outer end of the jaws pressing against those of the tongues, and effectively preventing the withdrawal of the bolt; the guard plates at the same time defying every effort to inspect the situation of the parts concerned; but on applying the proper key, the respective parts will all reassume the proper position to admit of the readily opening of the lock. As the bolt is retracted, an offset on the outer end of the arm, 17, shown in dotted lines at *w*, in Fig. 1 and separately with the lever *k* in Fig. 9, catches against a stud, or pin, 18, and disengages the tooth, 13, from the rack teeth 9, the roller 15, passing at the same time into the hollow on the guide 16, all the parts will be left at liberty to be again used as before, or with any variation of the permutation.

In Fig. 9, I have shown the lever *k*, with its arm 17, and the offset *w*, that catches against the stud or pin 18, separate from the lock, the offset being in contact with the stud, as when the bolt is retracted.

A sector lever *l*, attached to the bolt by a joint pin at 19, rests and rolls on a foot plate, and is kept in place by studs 20, serving to sustain the weight of the bolt A, and of the parts attached to it.

No. 23, is the key shaft, and *m*, is a guard arm beneath this shaft, which is set on a stud *x*, and is fitted with a detent dog, 22; it has a balance spring, 21, as shown more distinctly in the detached Fig. 5; but this

spring is not quite strong enough to overcome its gravity. The arm, *m*, lies on the guard plate, *b*, when the lock is in a vertical position; but if its position is changed, the spring 21, will then act with sufficient force to throw the detent dog, 22, into a notch on the under side of the bolt shank when unlocked, and against the talon of the bolt when locked; thus effectually preventing the moving of the bolt in either direction, even by the proper key. This device is applicable only to such articles as chests, or safes, which may be made to undergo a change of position.

Having thus, fully described the manner in which I construct my improved lock, and shown the operation of the same, I do hereby declare that I do not intend to claim as of my invention the whole of the devices herein set forth, many of the individual parts having been before known and used; but

What I do claim as new, and desire to secure by Letters is—

1. The manner of arranging and combining the followers, *f*, with their jaws 6, 6, the tumblers with their elbows *c'*, and the auxiliary followers with their lips, *s*, and the slides, *g*, with their tongues, 8; by which arrangement and combination the action of the tumblers C, and of the auxiliary followers, becomes independent of, and does not indicate, the position of the followers and slides when any pressure is made to act on the talon for that purpose: not intending by this claim to limit myself to the precise form and arrangement of the respective parts, but to vary these as I may think proper, while the said arrangement and combination remain substantially the same with those herein set forth.

2. I claim the manner of arranging and applying the guard plates, *a*, and *b*, which form two distinct departments in the lock which is for the express purpose of preventing any discovery, by the agency of light, of the position of the main acting parts hereinbefore named, upon which the security of the lock is dependent; or of effecting the same by means of picks, or otherwise; such guard plates being arranged substantially as herein made known.

ROBERT NEWELL. [L. S.]

Witnesses:

HENRY PALMER,

GEO. W. MORTON.