(Model.)

C. A. MOORE.

PADLOCK.

No. 459,499. Patented Sept. 15, 1891.

Fig. 1.

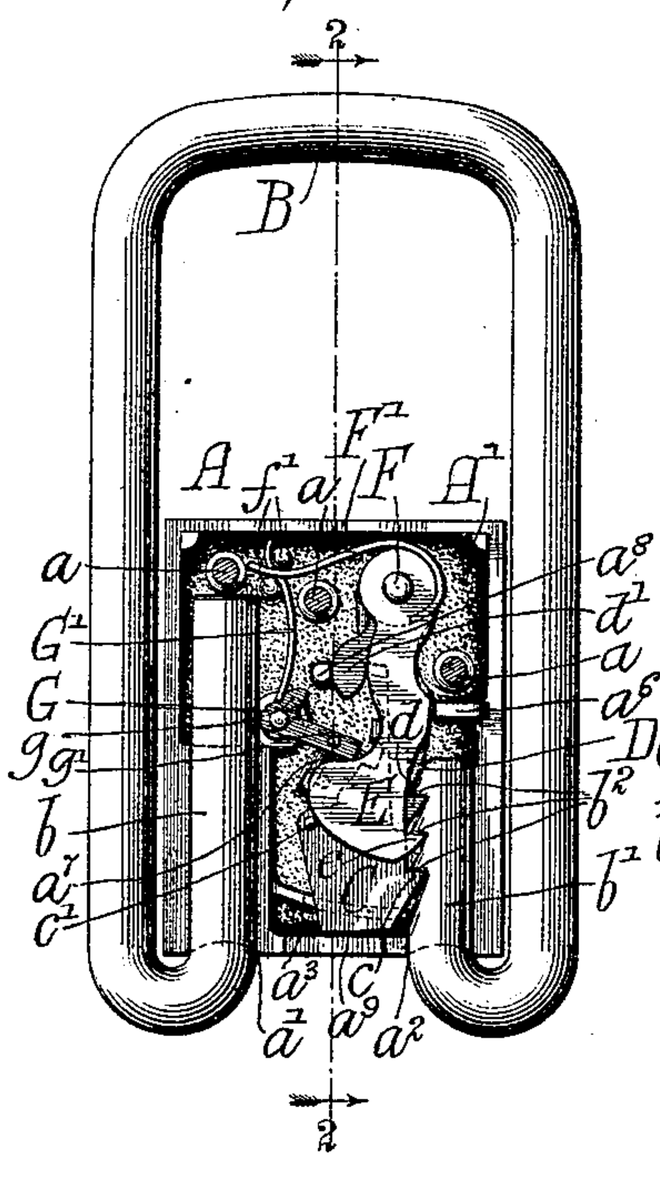


Fig. 2.

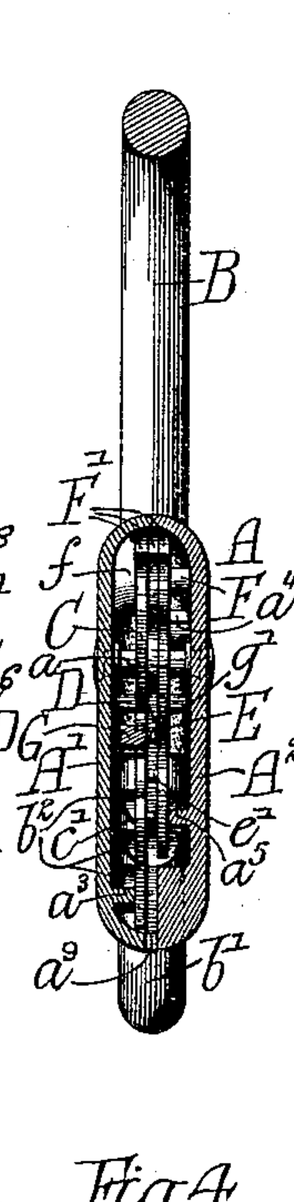


Fig. 3.

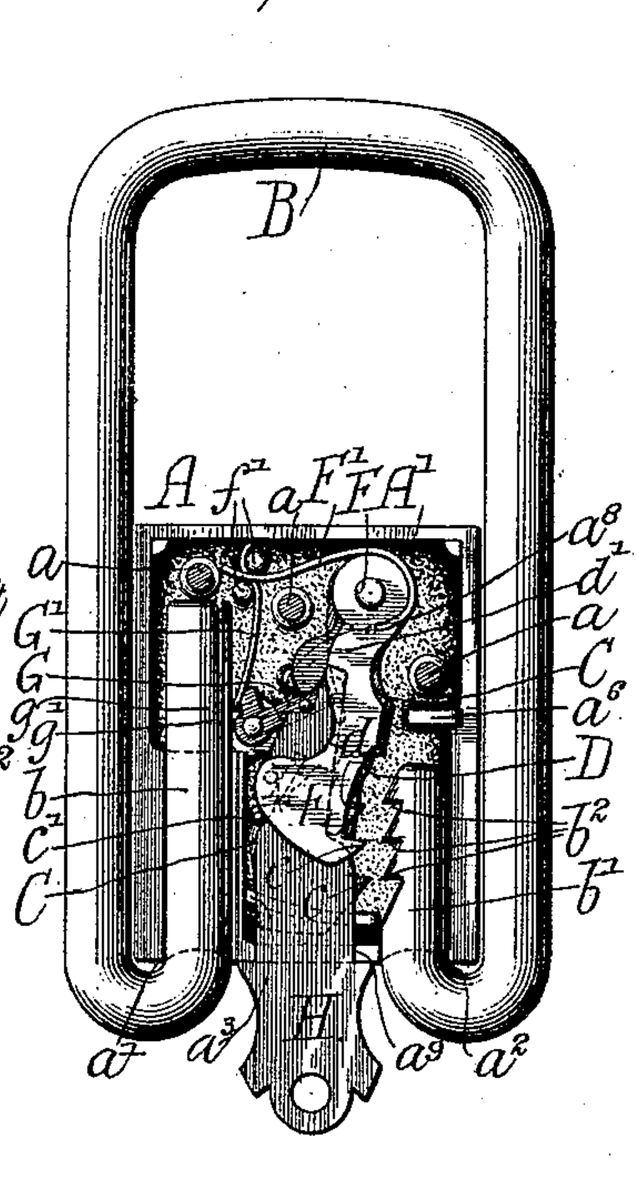


Fig. 4.

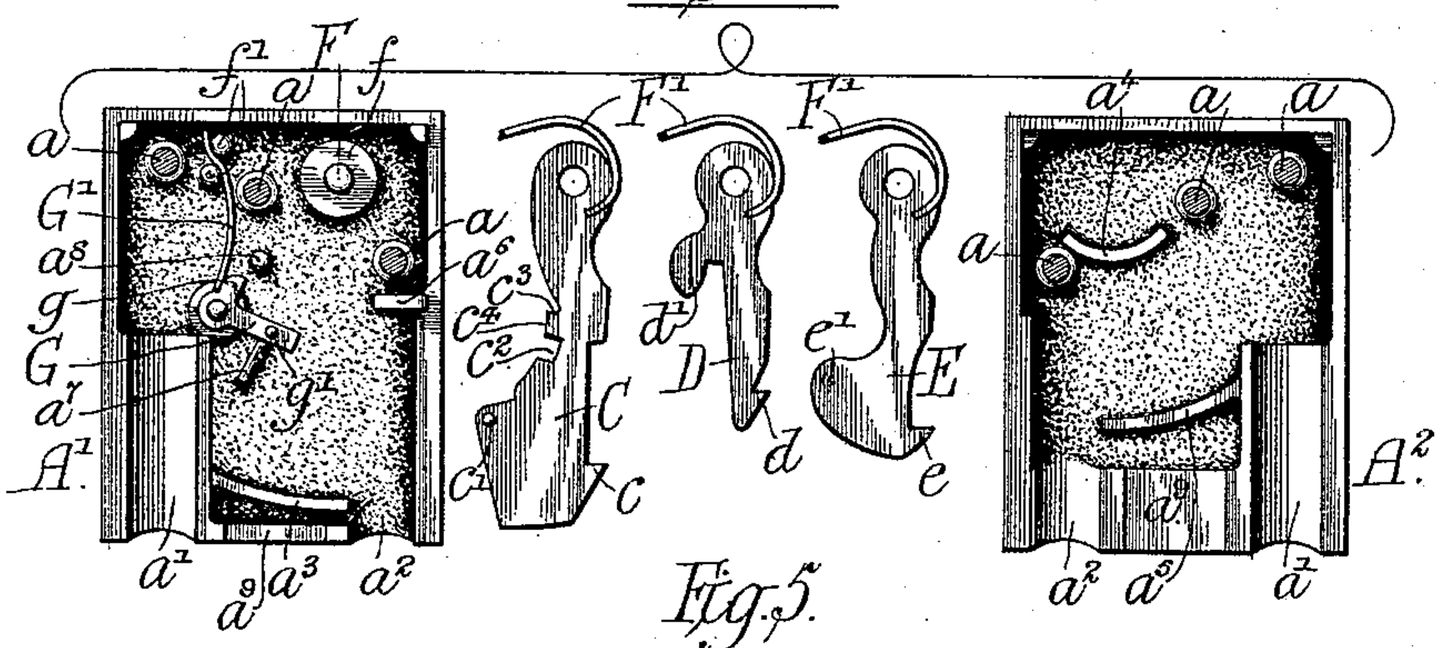
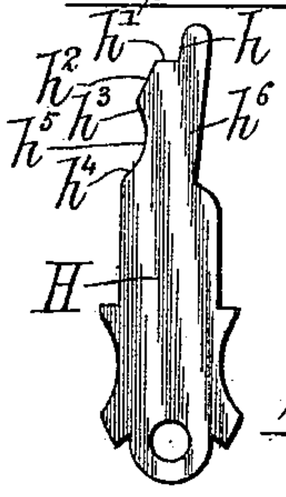


Fig. 5.



Witnesses:-

Louis H. T. Whitehead.

Irvine Miller.

Inventor:-

Clarence A. Moore.

by:- Dayton Cooler & Brown

his Attorneys.

UNITED STATES PATENT OFFICE.

CLARENCE A. MOORE, OF CHICAGO, ILLINOIS.

PADLOCK.

SPECIFICATION forming part of Letters Patent No. 459,499, dated September 15, 1891.

Application filed April 28, 1891. Serial No. 390,806. (Model.)

To all whom it may concern:

Be it known that I, CLARENCE A. MOORE, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Padlocks; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to padlocks, and more particularly to the locking mechanism thereof, and has for its object to provide a lock which is simple in construction and compact in arrangement, while of superior efficiency as to safety from picking; and to these ends it consists in certain novel features, which will be hereinafter described, and then particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a front elevation of a padlock embodying my invention, one-half of the casing being removed and the parts being shown in their normal position with the shackle locked in position in the lock case or shell. Fig. 2 is a central vertical section of the same, taken on the line 2 2 of Fig. 1 and looking in the direction of the arrows. Fig. 3 is a view similar to Fig. 1, showing the key inserted and the shackle unlocked but not withdrawn from the casing. Fig. 4 is a view showing separately the two halves of the casing and the tumblers arranged in the order in which they are to be assembled. Fig. 5 is a plan view of the key.

In the said drawings I have shown my invention as applied to a padlock of the type set forth in Letters Patent No. 427,754, granted May 13, 1890, to Edwin E. Dunn, to which form of padlock my improved locking mechanism is particularly adapted by reason of its compactness, although it is by no means limited to this particular application. In this construction A indicates the casing or shell of the lock, which is preferably divided into two halves or members A′ and A², permanently united by means of rivets *a* or other suitable means. Two sockets *a′* *a²* extend upward from the bottom of the casing near its outer edges.

B indicates the shackle, which is of inverted-U shape, and has its ends bent upward to form pintles *b* *b′* to fit within the sockets *a′* *a²*. The pintle *b′* is provided with a series of notches *b²*, corresponding in number with the number of tumblers employed, which in the present instance is three. These notches have one inclined wall and one wall at right angles to the axis of the pintle, as shown, for the purposes hereinafter set forth.

C, D, and E represent three tumblers, which, from the position they occupy when the lock is suspended in its normal position, I term the "rear," "middle," and "front" tumblers, respectively. These tumblers are flat in shape and are arranged one immediately in front of the other in parallel planes and preferably in contact, as shown, to economize space. They are shown as mounted on a pivot-pin F, common to all three of the tumblers, formed on or attached to the interior of the member A′ of the casing, and having a laterally-extended plane-base *f*, which, in conjunction with an arc-shaped rib *a³*, near the lower end of the member A′ of the casing, serves to support and guide the rear tumbler C in a plane at right angles to the pivot-pin F. Similar ribs *a⁴* and *a⁵* on the member A² serve to similarly guide and support the front tumbler E, while the middle tumbler D is supported and guided by its contact with the tumblers C and E. Each tumbler is forced normally toward the pintle *b′* by means of a suitable spring F′, the several springs being held at one end between posts *f′*, formed on or attached to the member A′ of the casing, while their other ends are suitably attached to the respective tumblers. A stop *a⁶* on the member A′ serves to limit the movement of the tumblers toward the pintle *b′* and prevent their being projected too far across the path of said pintle. The rear tumbler C is provided with a tooth *c* to engage the lowest notch *b²* of the pintle *b′* when the parts are fully locked. The middle tumbler D has a similar tooth *d* to engage the upper notch *b²*, while the front tumbler E has a tooth *e* to engage the middle notch *b²*. Each of these teeth is beveled on its lower side and at a right angle to the pintle on its upper side. By reason of this beveling of the teeth and notches the tumblers will yield when the pintle is inserted in the casing, and will then engage the said notches and hold the pintle from movement. The rear tumbler C is pro-

vided with a forwardly-projecting pin c', by means of which it is operated through the medium of a suitable incline on the key. The front tumbler E is provided with a rearwardly-projecting pin e', by means of which it is similarly operated. The middle tumbler D, which is shorter than the other two tumblers, and which is cut away on the side farthest from the pintles b', is provided on said side near its upper end with a laterally and downwardly inclined arm d', with which the end of the key engages, as hereinafter set forth, to actuate said tumbler.

As an additional safeguard I may employ a dog G, pivoted on the member A′ in the same plane with the rear tumbler C. This dog is held normally in the position shown in Figs. 1 and 4 by means of a spring G′, one end of which bears against a projection g on the dog. The other end of said spring is held between the posts f'. A stop a^7 limits the movement of the dog G in one direction, the dog being held normally against said stop by the spring G′, while a stop a^8 limits the motion of the dog in the opposite direction. The said dog is provided with a forwardly-projecting pin g', which is engaged by a suitable shoulder on the key to actuate said dog. The rear tumbler C is provided on the edge opposite that on which the tooth c is located with two notches c^2 and c^3 and an intermediate projection c^4 to co-operate with the dog G, which stands normally opposite the notch c^2, as shown in Fig. 1.

H represents the key, which is a flat key of a thickness equal to or somewhat less than the space between the front and rear tumblers formed by reason of the shortness and lateral cutting away of the middle tumbler. The said key is provided at its end with a projection h, preferably slightly inclined, as shown, to engage with the arm d' of the middle tumbler D. Immediately below this projection is a lateral shoulder h' to engage with the pin g' of the dog G, and from the shoulder h' an incline h^2 extends downward and outward, being joined at this point to a downward and inward incline h^3, following by a downward and outward incline h^4, extending outward farther than the incline h^2. The inclines h^3 and h^4 are preferably joined in the form of an easy curve, as shown, forming a notch or depression h^5. The other edge of the key H is cut away, as shown at h^6, to accommodate the tumbler D, as hereinafter set forth. There is formed in the bottom of the casing A a slot a^9, to permit the key H to be inserted in and withdrawn from the lock.

The operation of the mechanism is as follows: The parts being in the position shown in Fig. 1, with the shackle locked in the casing, and it being desired to release the shackle, the key H is inserted in the slot a^9 and pushed upward in the space between the front and rear tumblers until the incline h^2 of said key comes in contact with the pin c' on the tumbler C, when the farther advance of the key will move the tumbler C laterally away from the pintle b' and will disengage the tooth c of the tumbler. This first receding movement of the tumbler C is permitted by reason of the notch c^2, which the end of the dog G enters as the tumbler recedes. The incline h^2 on the key H next engages the pin e' of the tumbler E, and as the key advances causes said tumbler to recede from the pintle b', thereby withdrawing its tooth e from the notch b^2 of the pintle. In the further advance of the key the shoulder h' engages the pin g' of the dog G and moves the dog upward. In the meantime, however, the pin c' of the tumbler C has reached the reversed incline h^3 and is traveling thereon, so that the spring-actuated tumbler C again advances as the dog G moves, this advance being sufficient, when the pin c' is at the bottom of the notch h^5, to permit the dog G to clear the projection c^4. Further advance of the key causes the pin c' to ride on the incline h^4, and thereby finally retract and disengage the tumbler C, this further movement being permitted by the notch c^3 and by the turning back of the dog G on its pivot. As the key H approaches the limit of its upward motion, the projection h on the end thereof comes into contact with the inclined arm d' of the middle tumbler D, and as the key advances this engagement retracts the tumbler D and disengages its tooth d from the notch b^2 of the pintle b'. The cutting away of the key H at h^6 permits this recession of the tumbler D, which when fully withdrawn lies in said cut-away portion in the manner indicated in Fig. 3. When the key has reached the limit of its motion, the several parts are in the position shown in Fig. 3, with all the tumblers disengaged from the pintle b', and the shackle may be withdrawn from the casing in an obvious manner. As the key is withdrawn, the several springs return the moving parts to which they are connected to their normal positions, as shown in Fig. 1, ready for the reinsertion of the shackle. It will be noted that the notch c^2 permits the recession of the tumbler C as the shackle is inserted, the other tumblers being in front of the plane of the dog G, and being therefore free to recede.

It will be noted that the locking mechanism is extremely compact, the tumblers being arranged immediately adjacent to each other and the key moving in the space between the outermost tumblers, so that the space occupied by the mechanism from front to rear is very small and the dimensions of the casing may be correspondingly reduced. It will also be observed that the key is not located at one side of the tumblers, but practically in line with their longitudinal axes, thereby reducing the width of the mechanism. Although these features are advantageous in their general application, they are, as I have already pointed out, especially desirable in a padlock

of the type shown, which calls for a casing narrow enough laterally to fit between the arms of the shackle without unduly increasing the width or spread of these latter. The casing is, moreover, of a thickness but little greater than the shackle, and is inclosed and protected thereby.

The employment of the dog gives practically all the security of a four-tumbler lock without exceeding the dimensions of the three-tumbler lock, although this feature may be dispensed with when not desired.

The particular relative arrangement and dimensions of the co-operating parts on the key and tumblers may obviously be varied, as desired, and various modifications in the details of the construction shown and described may be made without departing from the principle of my invention.

What I claim is—

1. The combination, with a plurality of tumblers arranged immediately adjacent to each other in parallel planes, one of said tumblers being of smaller dimensions than the others, of a flat key adapted to be inserted in the space thus formed between said other tumblers to engage and actuate all of said tumblers, substantially as described.

2. The combination, with three tumblers arranged immediately adjacent to each other in parallel planes, the middle tumbler being of smaller dimensions and provided with an inclined arm, and the front and rear tumblers being respectively provided with rearwardly and forwardly projecting pins, of a key adapted to engage the inclined arm of the middle tumbler and provided with inclines to engage the pins of the front and rear tumblers, substantially as described.

3. The combination, with a plurality of tumblers arranged immediately adjacent to each other in parallel planes, one of said tumblers being of smaller dimensions than the others and the outer tumblers being provided with pins projecting into the space thus formed, of a flat key adapted to be inserted into the space thus formed to engage said pins to operate the tumblers and a dog arranged in the plane of one of said tumblers and provided with a pin projecting into the key-space and adapted to be engaged by the key to operate said dog, substantially as described.

4. The combination, with a tumbler provided on its rear edge with two notches and an intermediate projection, of a second tumbler, a dog arranged in the plane of the first tumbler, and a key provided with inclines to operate the tumblers and with a shoulder to engage the dog and carry the same past the projection on the first-mentioned tumbler, substantially as described.

5. The combination, with a tumbler provided on its rear edge with a projection, of a dog arranged in the plane of said tumbler and a key provided with a shoulder to engage and actuate the dog, an incline to engage and retract the tumbler, and a reversed incline to permit the tumbler to advance to allow the dog to clear the projection, substantially as described.

6. The combination, with three spring-controlled tumblers arranged immediately adjacent to each other in parallel planes, the front tumbler being provided with a rearwardly-projecting pin, the middle tumbler being shorter than the other tumblers, laterally cut away and provided with an inclined arm, and the rear tumbler provided with a forwardly-projecting pin and having on its rear edge a projection, of a spring-controlled dog arranged in the plane of the rear tumbler and provided with a forwardly-projecting pin, and a key adapted to fit between the front and rear tumblers, cut away at one side to accommodate the middle tumbler and having a point projection to engage the inclined arm of the middle tumbler, inclines to engage the pins of the front and rear tumblers, a reversed incline to permit the rear tumbler to advance, and a shoulder to engage the pin of the dog to carry the same past the projection of the rear tumbler while said tumbler is so advanced, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

CLARENCE A. MOORE.

Witnesses:

C. CLARENCE POOLE,

IRVINE MILLER.