

UNITED STATES PATENT OFFICE.

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LOCK.

SPECIFICATION forming part of Letters Patent No. 293,885, dated February 19, 1884.

Application filed October 9, 1883. (Model.)

To all whom it may concern:

Be it known that I, MILTON JACKSON, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Locks, of which the following is a specification.

One object of my invention is to construct a lock which, while simple and durable in construction, is such as to defeat any attempt to open the lock by picking, a further object being to so construct the locking-dog and tumblers that the latter will have no tendency to eject the dog until it is brought into line with the recess in the casing which it has to enter.

In the accompanying drawings, Figure 1 is a face view of my improved lock; Fig. 2, a longitudinal section of the lock on a larger scale; Figs. 3 to 9, detached perspective views of parts of the lock on a smaller scale; Figs. 10, 11, and 12, transverse sections, illustrating the operation of the lock; Figs. 13 and 14, enlarged diagrams, showing one of the features of construction; and Fig. 15, a view of a modification.

A is the cylinder or casing of the lock, and B the spindle, which is adapted to turn freely in bearings in the casing A, but is confined longitudinally thereto. The casing A is in the present instance secured to a flanged plate, A', the structure being intended for a chest or desk lock, and the bolt D is suitably guided in the casing, and is actuated by a pin, *a*, on a cylinder, F, the pin being adapted to a slot, *a'*, in the bolt, and the cylinder fitting snugly, but so as to turn freely, in the casing A. It should be understood, however, that the construction of the casing and the method of operating the bolt form no essential part of my invention, and may be modified in different ways. The tumblers G fit snugly within the cylinder F, and are separated by the usual washers, *b*, so that the movement of one tumbler will not influence the others.

Within a slot, *d*, in the cylinder F is pivoted a lever, J, carrying a dog, *e*, which swings in an enlargement of said slot *d*, the outer portion of the dog being adapted to enter the recess *f* in the casing A, and the inner end being adapted to the notches *g* of the tumblers when said notches are brought into line, as hereinafter set forth. The lever is acted upon by a spring, *h*, which tends to throw the rear end

of the lever outward into a slot, *i*, in the casing A, and hence to depress the dog *e* into the notches of the tumblers, a portion of the recess *i* being reduced in depth, so as to form a cam, *m*, and a recess, *f'*, being formed in the casing A adjacent to the recess *f*, for a purpose described hereinafter. Each tumbler has a central opening, for the reception of the key-spindle B and key *x*, the latter being inserted into a slot, *x'*, in the spindle. One edge, *y*, of the opening in each tumbler is acted upon by a wing, *n*, on the spindle, and the other edge, *y'*, is notched or otherwise irregularly shaped, to form a bearing for the bitted key.

The operation of the lock is as follows: When the parts are in the position shown in Fig. 10, the lock is closed, the outer end of the dog *e* projecting into the recess *f* of the casing A, so as to prevent any rotation of the cylinder F. In order to open the lock, the key is inserted and turned to the right, the bits of the key acting upon the edges *y'* of the openings in the tumblers, and serving to adjust said tumblers so as to bring their notches *g* into line. As the movement is continued, the series of tumblers turns with the key until the notches are brought under the dog, the inner end of which is forced part way into the notches by the action of the spring *h* on the lever J, the rear end of the latter entering the contracted portion of the slot *i*, as shown in Fig. 11. The cylinder F is now free to turn with the key-spindle and tumblers, the outer portion of the dog *e* traversing the recess *f'*; but before the dog reaches the end of said recess the rear end of the lever J is thrust outward into the main slot *i*, so as to permit the entrance of the dog fully into the notches *g*, as shown in Fig. 12, and thus prevent it from interfering with the rotation of the cylinder F necessary to retract the bolt. It is on the locking operation, however, that the recess *f'* and cam *m* are mainly of importance, as they provide for the raising of the dog to a certain extent before the tumblers act upon the same to project it, the latter operation being thus effected with less exertion and less wear upon the dog and tumblers than when the projection of the dog is effected wholly by the action of the inclined notches of the tumblers thereupon. Moreover, while the cylinder is being turned by the action of the tumblers upon the dog, a flat

face, *s*, of said dog bears upon a flat face, *s'*, presented by the edges of the tumblers, as shown in the diagram, Fig. 13, the beveled face *t* of the dog not being brought into line with the beveled faces *t'* of the tumbler-notches until it becomes necessary to eject the dog, as shown in Fig. 14. Instead of beveling both the dog and tumbler-notches, the dog only or the tumbler-notches only may be beveled, as will be readily understood. In the locking operation, the tumblers are turned to the left from the position shown in Fig. 12, the wing *n* of the spindle B acting upon the edges *y* of the tumbler-openings. The first effect of the movement is to bring the end of the lever J under the control of the cam or shoulder *m*, so that the said lever is depressed, the dog *e* being thereby lifted into the recess *f'*. The cylinder F continues to turn with the tumblers until the outer end of the dog strikes the shoulder formed by the recess *f*, as shown in Fig. 11, when the movement of the cylinder is arrested, and further rotation of the tumblers causes the projection of the said outer end of the dog into the recess *f*, by the action of the beveled edges of the tumbler-notches upon the beveled inner end of the dog. As shown, the lever J is independent of the dog *e*, the latter being notched for the entrance of the end of the lever; but, if desired, the lever and dog may be made in one piece; or the lever may be dispensed with entirely, and the dog hung to a spring in the cylinder F, and controlled by a slot in the back of the casing A, said slot having a shoulder or cam, *m*, as shown in Fig. 15.

My invention is applicable to that class of locks known as "safe-deposit locks," in which two keys are used, one being held by the attendant at the vault and the other by the owner of the box. In this case, one or more of the tumblers would be constructed for adjustment by the custodian's key, after the removal of which the remainder of the tumblers would be adjusted by the owner's key, the locking of the box by the latter key disarranging all of the tumblers.

The partial lifting of the dog before the action of the tumblers thereupon to eject it is,

it will be evident, a feature which can be used in combination-locks, or locks having permutation wheels or tumblers instead of tumblers to be actuated by a bitted key, as described; and instead of using a spindle slotted for the reception of the key, the latter may be adapted to bearings in or on the case, as is common in other classes of locks.

As pressure upon the bolt cannot affect the bearing of the dog upon the tumblers, any attempt to determine the position of the notches in the tumblers by turning the same while the dog is pressed forcibly upon their peripheries is prevented; and I am thus enabled to defeat the picking of the lock in this way, the pressure exerted by the spring *h* not being sufficient to enable any one tampering with the lock to determine when a tumbler-notch passes beneath the dog.

I claim as my invention —

1. The combination, in a lock, of the casing having a recess, *f*, and a shallower recess, *f'*, adjacent thereto, the cylinder carrying the locking-dog, the tumblers having notches for the entrance of the dog, and a cam, *m*, adapted to lift the dog before the action of the tumblers thereupon to force it into the recess *f*, as set forth.

2. The combination, in a lock, of the casing having the recess *f f'*, the cylinder having a dog, and a pivoted lever, J, connected thereto, the tumblers having notches for the entrance of the dog, and a cam, *m*, adapted to act upon the lever J, to effect the elevation of the dog prior to the action of the tumblers thereupon, as set forth.

3. The combination of the spindle B, slotted for the reception of the key, and having a wing, *n*, with the tumblers fitted to said spindle, and having openings with edges *y* for the action of said wing, and notched or bitted edges *y'* for the action of the key, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MILTON JACKSON.

Witnesses:

JOHN E. PARKER,
HARRY SMITH.