(Model.)

J. L. HALL.

ANGLE BAR FOR PERMUTATION LOCKS.

No. 247,250. Patented Sept. 20, 1881.

Fig. 1.

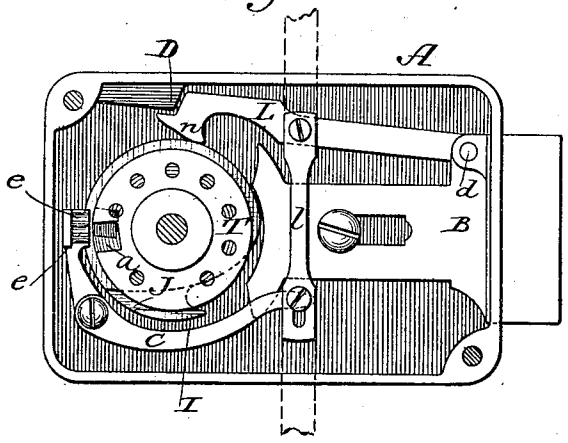


Fig. 3

Fig. 2

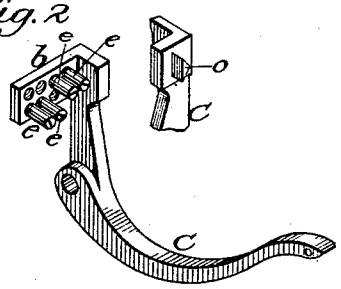


Fig. 4.

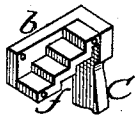


Fig. 5.

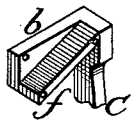
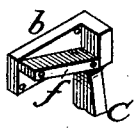


Fig. 6



Witnesses.

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UNITED STATES PATENT OFFICE.

JOSEPH L. HALL, OF CINCINNATI, OHIO.

ANGLE-BAR FOR PERMUTATION-LOCKS.

SPECIFICATION forming part of Letters Patent No. 247,250, dated September 20, 1881.

Application filed May 31, 1881. (Model.)

To all whom it may concern:

Be it known that I, JOSEPH L. HALL, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain Improvements in Combination Locks, of which the following is a specification.

This invention relates to permutation-locks designed more especially for use in connection with time attachments, though the invention may, if desired, be applied to permutation-locks which are to be used separately or in the usual manner; and the invention consists in providing the angle-bar with a series of adjustable pins or projections, which can be adjusted or arranged in various positions, and which will enter the notches of the rotating tumblers when said notches are not arranged in line with each other, as hereinafter more fully described.

Figure 1 is a face view of the lock with the back plate removed. Fig. 2 is a perspective view of the angle-bar detached; and Fig. 3 is a rear-face view of the same, showing the cam or projection on which the disk operates to release the dogging-latch or the time attachment, as the case may be. Figs. 4, 5, and 6 represent modifications of the projections used on the angle-bar.

In the drawings I have represented my invention as applied to an ordinary permutation-lock, as that will suffice to illustrate the invention fully.

In Fig. 1, A represents the case, and B the bolt of the lock, while T indicates the tumblers and L the dogging-latch, which is provided with the usual hook or shoulder, *n*, to engage with the hook J of the spindle-disk to withdraw the bolt, as is usual in this class of locks, these parts being made in the usual manner.

The angle-bar C is made as shown in Fig. 2—that is, with a laterally-projecting arm, *b*, which is provided with a series of holes in which are fitted a number of screws, pins, or studs, *e*, corresponding in number with the tumblers used in the lock. The holes, it will be observed, are more numerous than the pins or studs, and are so arranged that the pins or studs *e* may be set to form irregular rows or parts of rows, so as to compel the setting of the tumblers in such a position that their notches shall not be in a right line in order to have the pins or studs enter the notches of the tumblers. By this construction it will be seen that not only will the notches of the tumblers be made to occupy different positions in relation to each other, but also that by changing the position of the pins or studs *e* on the arm *b* the combination on which the lock can be opened will also be changed, thus imparting to the lock an additional capacity and security.

While I have shown but two rows of holes for adjusting the pins, it is obvious that by making the arm *b* wider a much greater number of holes may be provided, and thus a greater number of changes or combinations be effected by means of the adjustable pins on the angle-bar; and as these changes are entirely independent of those which are usually produced by adjusting the tumblers on their hubs, it follows, necessarily, that a lock constructed on this plan will be susceptible of a much greater number of changes or combinations than is the ordinary permutation-lock having the same number of tumblers. So, too, it will be seen that by this construction a given number of changes or combinations can be produced with a less number of tumblers than in the ordinary locks of this class.

In this case I have shown the angle-bar C as being pivoted below the tumblers instead of above them, as is usual; but that is simply because it is so located for convenience when the lock is to be provided with two separate angle-bars, both operating in connection with the same set of tumblers, as described and illustrated in the Patent No. 212,610, granted to Kook and Hall February 25, 1879. This location of the angle-bar is also more convenient when the lock is to be used in connection with a time attachment, as illustrated in said patent, and for which purpose this lock is more especially designed. It is, however, obvious that when it is desired to make a lock on this plan to be used separately as ordinary permutation-locks are used, the angle-bar C may be located above the tumblers in the usual manner, in which case the connecting-bar *l* may be omitted, as in that case the angle-bar and the dogging-latch L will be connected in the usual manner. When, however, it is desired to use this lock in connection with a time attachment for the purpose of disconnecting the latter in

case of accident or stoppage, then the bar *l* will be made to extend up or down through an opening in the case, as indicated by the dotted lines in Fig. 1, to any distance required to form a suitable connection with the time attachment, one form of such connection being shown in Patent No. 212,610, hereinbefore mentioned.

The projection *o* (shown in Fig. 3) is designed to operate in connection with a cam-groove made in the face of the spindle-disk for operating the angle-bar C in the same manner as that described in Patent No. 212,610; but this, of course, will not be required in those cases where the angle-bar C is located above the tumblers in the ordinary manner, and is used without the addition of a second angle-bar.

With reference to the pins or projections *e*, I would further remark that instead of using a series of separate pins a single detachable lug or projection, *f*, may be substituted, as shown in Figs. 4, 5, and 6, it being arranged to be detached and to have its position changed or reversed, as shown in Figs. 5 and 6. This is but a modification of the plan shown in Fig. 2, and is not preferred, because it is not capable of as great a variety of changes or adjustments, and is only added for the purpose of more fully illustrating my invention.

I am aware that a lock has been patented in which a series of tongues or projections are attached rigidly to the sliding bolt of the lock, and so arranged or located as to require the notches of the tumblers to be brought to different positions in order to open the lock, and therefore I do not claim that; but,

Having thus fully described my invention, what I claim is—

The combination, in a lock, of two or more rotating tumblers, with an angle-bar, provided with adjustable pins or equivalent device, substantially as described, whereby the combination may be changed and the lock opened only when the notches of the tumblers are out of line with each other, as set forth.

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Witnesses:
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