L. Baier,

Safe Lock.

No. 17,714. Patented June 30, 1857.

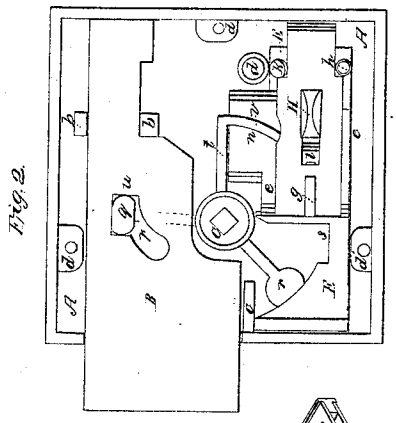


Fig. 2.

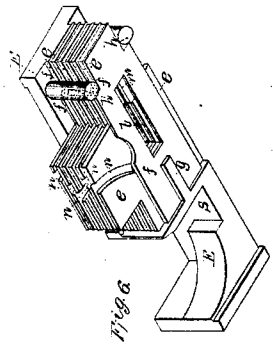


Fig. 6.

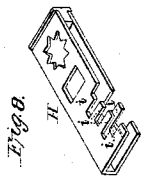


Fig. 8.

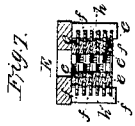


Fig. 7.

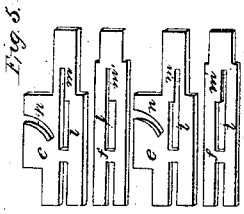


Fig. 5.

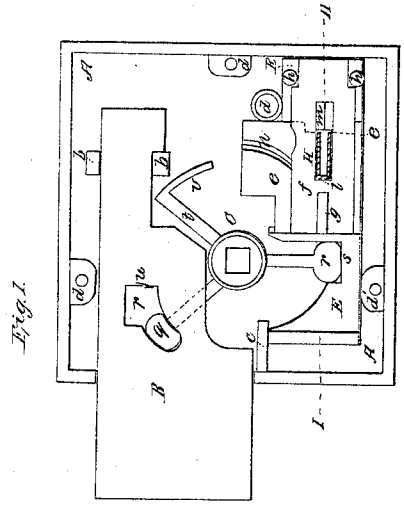


Fig. 1.

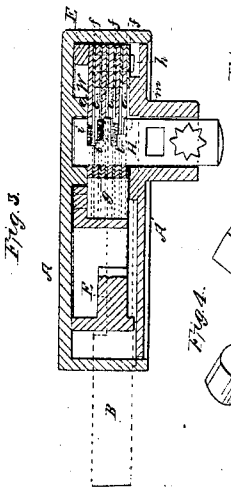


Fig. 3.

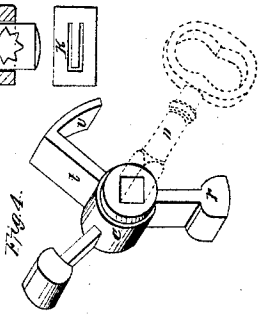


Fig. 4.

AM. PHOTO-LITHO. CO. N.Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

LUDWIG BAIER, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO JOSEPH LIPPINCOTT AND WM. C. BARR, OF PITTSBURGH, PENNSYLVANIA.

LOCK.

Specification of Letters Patent No. 17,714, dated June 30, 1857.

To all whom it may concern:

Be it known that I, LUDWIG BAIER, of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Safe-Locks; and I hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is an interior view of the lock when in locked position; Fig. 2, a similar view of the same when in unlocked position; Fig. 3, a section through the line I—II of Fig. 1. Figs. 4, 5, 6, 7, 8, and 9 are details or detached parts of the lock, which will be described hereafter.

In all these figures the same letters of reference are marked on like parts.

A—A is the lock case.

a, *a*, *a'* are projections on the case, receiving the screws by which the top plate A' of the lock case is fastened to the same.

B is the bolt; *b b*, blocks on the case for guiding the bolt.

C is a three-armed "follower," of which Fig. 4 is a perspective view. It is operated by a wrench D (indicated by dotted lines in Fig. 4).

E is the tumbler-box, which is movable and is guided between the rib *c*, projection *a'* and stud *d*, all of which parts are firmly connected or cast on the case A, A.

e, *e*, are the tumbler plates.

f f are separating plates between the tumbler plates. There are two of each of these plates shown separately in Fig. 5, and the whole set of plates, together with their sliding box E, are shown in the perspective view (Fig. 6), and also a section thereof taken through the line III—IV, (Figs. 1 and 3) is shown in Fig. 7.

The tumblers *e* and plates *f* are kept by the box E, but they are allowed to slide on the same, as will be shown hereafter; they are guided by the tongue *g* and the pins *h*, *h*, which parts are firmly attached to the box.

H is the key, forming a double bit plate, as shown in the perspective view thereof in Fig. 8. Fig. 9 shows the key hole (*k*), which corresponds to the shape of the key.

i, *i*, are the bits of the key, cut in to more or less depth at random.

l, *l'* are openings through the tumbler plates *e* and intermediate plates *f*, through which the key passes when inserted into the lock.

m, *m'*, are prolongations of the openings *l*, *l'*, of uniform length and nearly half as wide as the openings *l*, *l'*, and cut out alternately on the one or the other side of said openings, as is clearly shown in Fig. 5.

n, *n*, are slots cut in the tumbler plates *e*, *e*. They are of similar circular shape, but are cut in at different places in relation to each other, so as not to fit on or correspond to each other when the tumbler plates are in one range (as shown in Figs. 6 and 1). These differences in their relative location are such as to correspond to the differences of the depth to which the bit notches *i*, *i*, of the key are cut in such a manner that when the tumbler plates are acted upon by the key the said slots *n*, *n*, are brought in one line, when the hook *v* of the "follower" is allowed to enter the same (as is shown in Fig. 2), which allows the follower to draw the bolt back or to unlock the same, as will be more fully set forth hereafter.

The arrangement of the three-armed follower C, bolt B and box E, in relation to each other, is as follows: The arm *q* of the follower C, passing under the bolt, projects at its extremity into the opening *p* of the bolt, and the arm *r* sets (when the lock is in its locked position) into the notch *s* of the sliding tumbler box E. The arm *t* forms at its extremity the circular hook *v*, which enters into the slots *n* of the tumbler plates when the bolt is being drawn back.

The operation of the described lock is as follows: To unlock the bolt, the follower C is turned by its wrench D in the direction as indicated by arrow in Fig. 1. The arm *r* will move the box E until it leaves (in describing its circle) the notch *s*. The arm *q* will not move the bolt until it strikes the side *u* of the opening *p*. By this time, however, the hook *v*, has arrived at the top of the tumbler plates *e*, and will be prevented from entering into the slots *n* of the same, unless all the tumbler plates are brought into such a position that their slots are all precisely opposite the butt-end of the hook *v*. If this is the case the "follower" is allowed to be moved farther on, until the hook has fully entered the slots. By this continued motion of the follower the bolt is drawn back by being acted upon by the arm *q*. If however the tumbler plates were

not in the position as to allow the hooks to enter the slots *n*, *n*, the butt end of the hook *v* would strike the tumbler plates and prevent thus the follower from being moved that portion of its revolution which produces the motion of the bolt. Now in order to bring the tumbler plates into the required position in relation to the hook *v*, the key H has to be inserted into the lock before the follower C is moved any (viz., when the lock is in the position as shown in Fig. 1). The key being inserted and the tumbler box, together with the set of tumblers *e*, *e*, being moved forward (by turning the follower,) each of the tumblers will strike its respective bit *i*, *i*, of the key, and will be kept back thereby, more or less, according to the depth of the respective bits. Now the bits being made to correspond properly with the position of their respective slots *n*, *n*, as above stated, they cause each one of the tumblers to be arrested in such a manner that all the slots come precisely in one range opposite the hook *v*, whereby the follower is allowed to combine its motion and to draw the bolt back, as above shown.

The arrangement of the sliding tumbler box E, carrying the tumblers, as described, forms one of the principal features of my improvement. It has the advantage that thereby the use of springs, which are commonly used to act on the tumblers, is dispensed with, and that it simplifies the construction and produces an easy and yet sure operation of the parts.

In locking or throwing the bolt forward (by turning the follower in reversed direction) the sliding box E is also thrown back again by the arm *r* and the tumbler plates, in striking in their return motion therewith the stud *d*, are pushed thereby into their original position again (as shown in Fig. 1.)

The bits (*i*) of the key H are cut out in such a manner in relation to the set of plates (*e*, *e*, and *f*, *f*) that each of the bits, though it arrests its respective tumbler plate *e* as described, will not operate on any of the intermediate plates *f*, *f*. Thereby these plates acquire a more or less forward position in relation to the tumbler plates and overlap thus the points of the tumblers, which are in contact with the bits of the key. This arrangement makes the lock highly burglar-proof, as it is thereby made very difficult to have access to and operate on the tumblers by means of any wire or other instrument. The ordinary method of picking the lock, by trying the tumblers can therefore not be practiced herein, and the difficulty of picking the described lock is further increased by the peculiar arrangement of the key in forming a double bit-plate. This requires that the "trying" of the tumblers, in attempting to pick the lock, has to be done on the two sides of the key hole, which renders the operation greatly more complicated and difficult.

Having thus fully described my improved safe lock, what I claim herein as new and desire to secure by Letters Patent is:

1. The sliding tumbler box E, carrying the tumblers *e*, *e*, which by the sliding motion of the box are brought into contact with the bits of the key, when arranged and constructed substantially as and for the purpose described.

2. The three-armed "follower" C, when arranged, constructed and operating on, and in combination with the tumbler box E, bolt B and tumblers *e*, *e*, with their slots *n*, *n*, substantially as, and for the purpose herein set forth.

I am aware that bit plates of various shapes are used and a well known device, but the same have been in all cases simple. I do not claim these, but,

What I do claim is—

3. The key H when constructed so as to form a double bit plate, and operating on the tumblers in the manner, substantially as herein described.

LUDWIG BAIER.

Witnesses:
P. H. LAUFMAN,
AND. M. MASTER.