A. Hardy, F. L. & G. A. Walker,

Lock.

No. 52,995. Patented Mar. 6, 1866.

Fig. 1

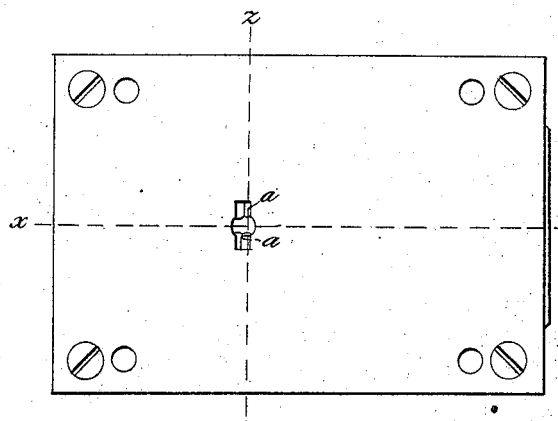


Fig. 2.

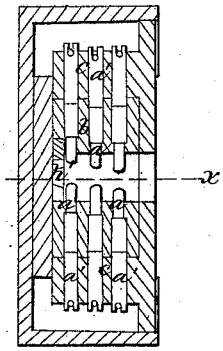


Fig. 3.

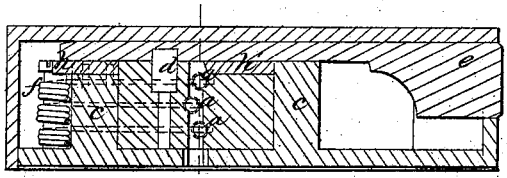


Fig. 4.

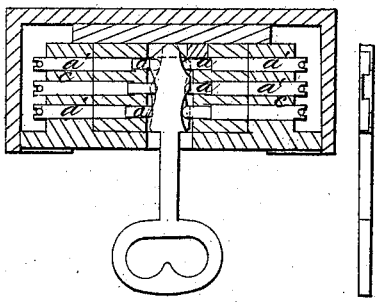
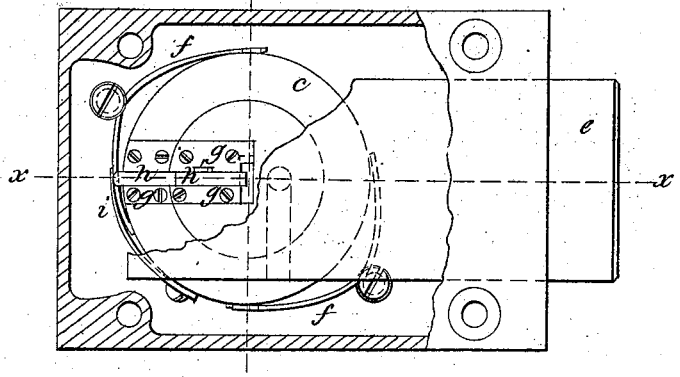
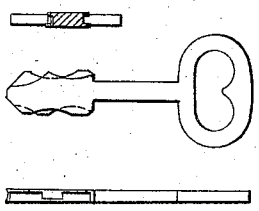


Fig. 5.





Witnesses:
Francis Gould
S. W. Kidder

Inventor.
Anson Hardy
By his Atty
W. B. Crosby

UNITED STATES PATENT OFFICE.

ANSON HARDY, F. L. WALKER, AND G. A. WALKER, OF BOSTON, MASS.

IMPROVEMENT IN LOCKS.

Specification forming part of Letters Patent No. **52,995**, dated March 6, 1866; antedated February 28, 1866

To all whom it may concern:

Be it known that we, ANSON HARDY, F. L. WALKER, and G. A. WALKER, all of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Locks; and we do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of our invention sufficient to enable those skilled in the art to practice it.

This invention relates to improvements in that class of locks employing a cylinder which can be turned in a ring by the key whenever the plungers, which work in both ring and cylinder, are properly placed, each of these plungers being in two parts—one in the cylinder and one in the ring—so that the former cannot be turned in the latter, except when the abutting joint of the two parts of each of the plungers used is in the line of the joint between the cylinder and the ring. In such locks the key-hole has heretofore been cylindrical, and the plungers have extended into the key-hole radially in direct lines or ranges—that is to say, the centers of any one row of plungers were all in one plane. The objection to the cylindrical key-hole is that it affords facility for blowing the lock to pieces by powder, because it is easily tapped, so that a plug can be screwed into the mouth of the key-hole, thus making a perfect powder-chamber, which can be easily loaded and exploded.

Part of this invention consists in making the key-hole of such locks as have been referred to and the key thereof in a thin rectangular form, which enables me to use a key of much less size and weight than the old cylindrical one had, while the key-hole affords less room for a charge of powder, and cannot be tapped out without being first counterbored.

Another part of this invention consists in the location or arrangement of the plungers in key-holes of long and narrow formation in such locks as have been before generally referred to, they being placed out of line or direct range or in a zigzag manner, by which the key-hole is more filled up and obstructed, as to the operation of pick-locks, than it would be if the plungers were placed in range, and by which also a key can be made with flanges on alternate sides of the inclines, which operate the plungers, this rendering it impossible to take any single impression, which alone will form a guide from which a false key can be made; and another part of this invention consists in the employment at the inner end of the key-hole, and beyond all of the plungers therein, of a safety check or slide arranged to be operated by the end of the key, and fitted so closely as to prevent enough rotation of the cylinder in the ring to cause the plungers to bind therein, thus guarding the lock from indicative binding of the plungers, by which experts have heretofore shown the old cylinder-and-plunger lock to be pickable.

Of the drawings, Figure 1 is an elevation of my improved lock, showing the key-hole side and the plungers within the key-hole, the bolt being represented as withdrawn or fully back. Fig. 2 shows a cross-section of the lock, taken in the line *z z* through the key-hole, and showing the position of the plungers when the key is withdrawn, and the location of the slide at the rear of the key-hole. Fig. 3 shows a longitudinal section through the lock on the line *x x*, Figs. 1, 2, and 5, showing the position of the parts of the lock with the bolt drawn back, and especially showing the zigzag location of the plungers. Fig. 4 is the section seen in Fig. 2 in all respects, except that the key is shown in place, illustrating the position of the plungers when so placed that the bolt can be thrown. Fig. 5 is an elevation of the lock, showing the side opposite that exhibited in Fig. 1, part of the lock-case being broken away to disclose the check-slide, which is shown in the position it has when the bolt is thrown forward.

The key is shown in Fig. 4 and in the detailed views not numbered.

It will be seen that the thickness of the key is equal to the width of the key-hole, while the diameter of the plungers in the key-hole is less than its width. This permits the formation of flanges on one side of each incline of the key, by which the plungers are lifted, and as the zigzag arrangement of the plungers admits of the flanges being on opposite sides of the key, it will appear that no single impression of the key in plastic material will give a correct model from which a burglar can construct a duplicate key.

a a are the plungers, which are formed with shoulders, to prevent them from dropping too far into the key-hole, these plungers being free

to slide in the cylinder *b* and to drive their counterparts *a' a'* in the ring *c* outward, so that when moved just the right amount, as by the key of the lock, the joints between *a a* and *a' a'* come just in the joint between *b* and *c*, and in this condition, when the bolt is back, there is nothing to prevent rotation of the cylinder *b*, which carries the stud *d*, and this, working in a slot in the bolt *e*, throws it forward.

The bolt *e* is fitted to slide closely across the inner end of the cylinder, and the relation of the stud *d* and the slot in the bolt in which the stud works is such that there is no communication from the inner end of the key-hole with the interior of the lock-case, by which powder could be introduced therein when the bolt is unlocked, as in Fig. 3, or is locked or thrown forward, as in Fig. 5.

The position and relation of the stud *d* and its slot in the bolt with reference to the key-hole is clearly shown in Figs. 3 and 5.

The springs *f f* serve to keep the plungers *a a a' a'* pressed inward, and act in conjunction with the key.

When the bolt is thrown forward the guides *g g*, in which the check-slide *h h'* is fitted, assume the position shown in Fig. 5, and when the key is withdrawn the spring *i* forces *h* across the joint between the cylinder and the ring and forces *h'* into the key-hole, a small pin in the side of *h'* preventing too great range of inward motion to *h'*. The reversed position of *h* and *h'* when the bolt *e* is thrown back is shown in Fig. 3, and in Fig. 4 may be seen in dotted lines beyond the inner end of the key, when in place in the lock, the piece *h*, which, it will be evident, will, when the bolt *e* is forward, be pushed outward by the end of the key till the joint between *h* and *h'* coincides with the joint between *b* and *c*.

The purpose of the check-slides, which, from its peculiar location, can only be reached with great difficulty by any instrument other than the key, is to prevent all play of the cylinder, both rotative and lateral, or endwise, which otherwise might be had from misfitting the parts of the lock, or otherwise, and thus prevent or check all indicative binding of the plungers, rendering the lock secure against the methods hitherto employed by experts in illustrating how locks embodying the cylinder-and-plunger construction might be picked.

We claim—

1. The key constructed as described, viz: with its operative portion of a thickness equal only to about the diameter of that part of the plungers which enters the key-hole, plus the amount needed for a flange on either side, when provided with inclines on its edges, each of which has a flange, said flanges being part on one side and part on the other of each edge of the key.

2. In such a lock, provided with such a key-hole as described, the arrangement of the plungers so as to enter the key-hole in a zig-zag manner, substantially as and for the purpose specified.

3. In a lock with a cylinder, ring, and plungers, the employment of the check-slide, when arranged at the inner end of the key-hole, and operating substantially as specified.

In witness whereof we have hereunto set our hands this 15th day of June, A. D. 1865.

ANSON HARDY.
F. L. WALKER.
G. A. WALKER.

Witnesses:
J. B. CROSBY,
F. GOULD.