Sheet 1, 2 Sheets.

J. P. Schmucker.

Permutation Lock.

No. 98,523. Patented Jan. 4, 1870

Fig: 1.

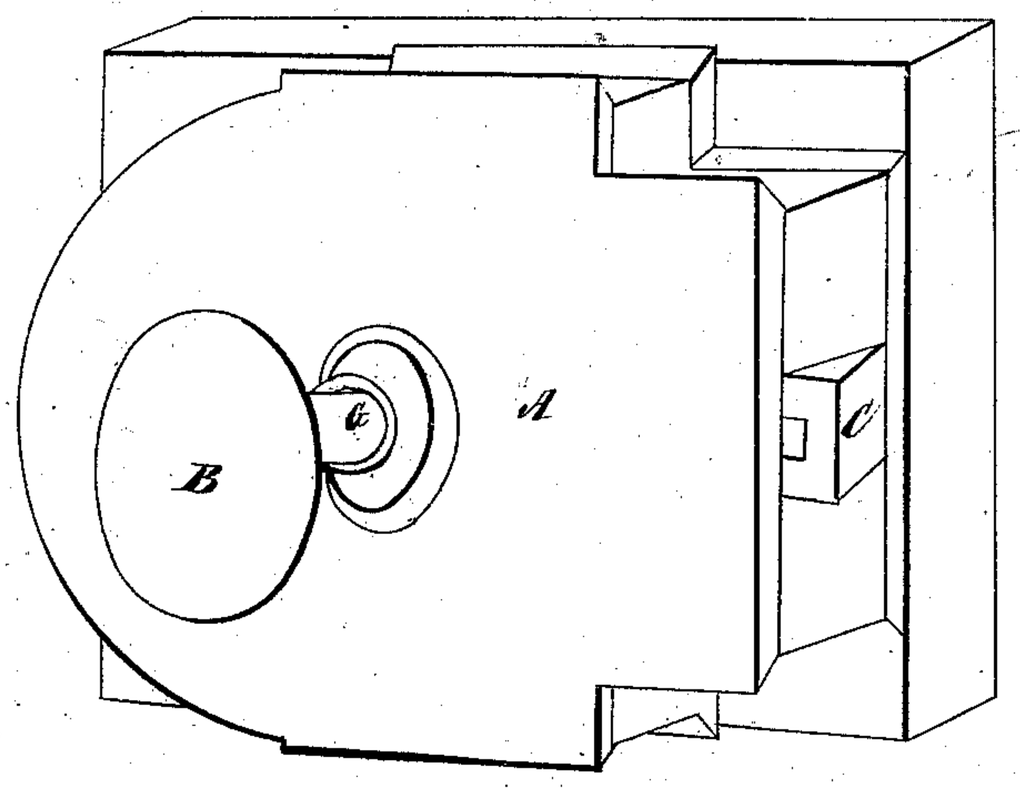


Fig: 2.

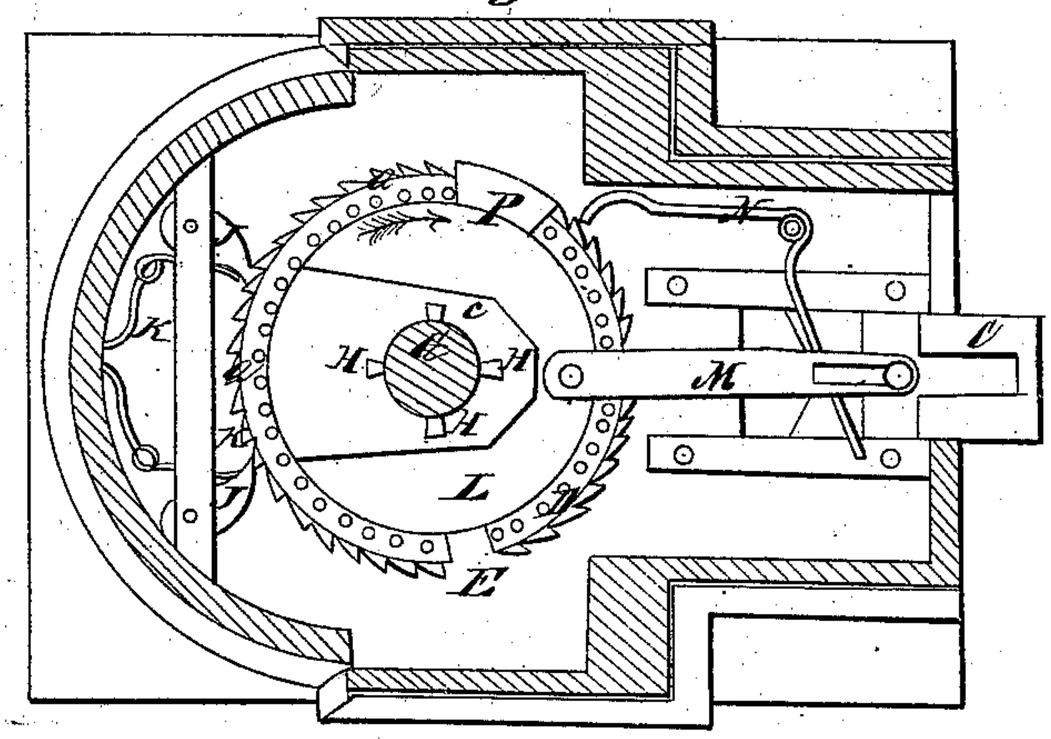
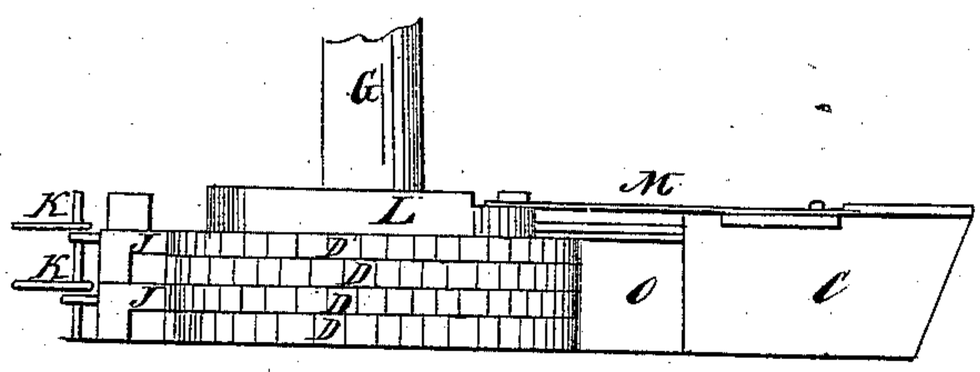


Fig: 3.



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Sheet 2, 2 Sheets.

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Permutation-Lock.

No. 98,523. Patented Jan. 4, 1870.

Fig: 4.

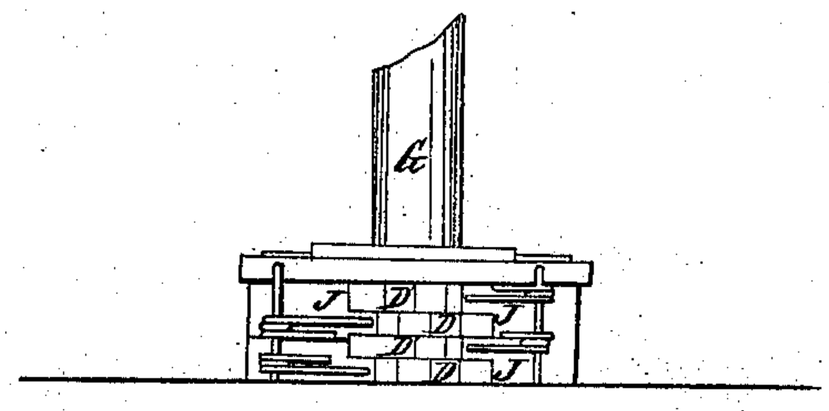


Fig: 5.

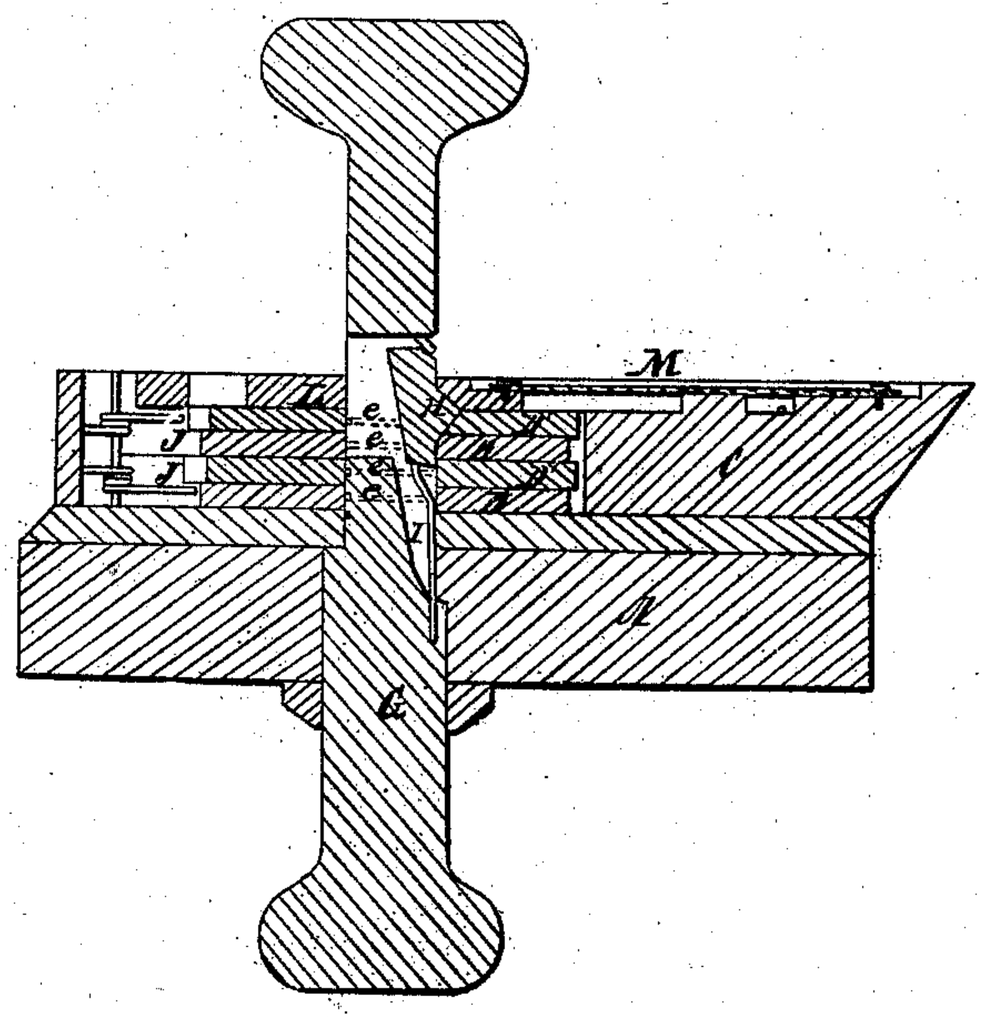
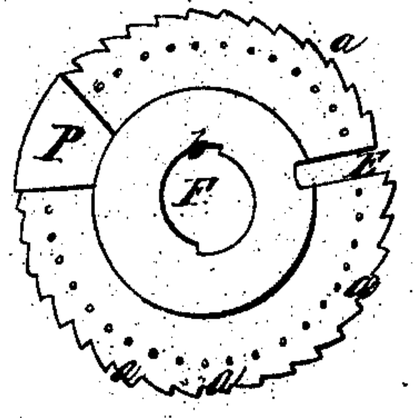


Fig: 6.



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JOHN P. SCHMUCKER, OF ASHLAND, OHIO, ASSIGNOR TO HIMSELF AND J. D. WILLIS, OF SAME PLACE.

Letters Patent No. 98,523, *dated January* 4, 1870.

IMPROVEMENT IN PERMUTATION-LOCKS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JOHN P. SCHMUCKER, of Ashland, in the county of Ashland, and State of Ohio, have invented a certain new and useful Improvement in Door-Locks; and I do hereby declare that the following is a full and complete description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, plate 1, is a perspective view of the lock.

Figure 2, a view of the inside.

Figures 3, 4, and 6, are detached sections.

Figure 5 is a vertical section.

Like letters of reference refer to like parts in the different views presented.

This invention relates to a combination safety-lock, to be applied to safes and vaults; and

It consists of a combination of devices, whereby the lock is set for or changed to any desired number or combination, as may be desired, for successfully operating the lock.

In fig. 1—

A′ represents the case of the lock, of which B is the knob, and C, the bolt.

D D′, fig. 3, is a system of four wheels or disks, having a regular series of teeth or notches, *a*, cut in their periphery.

The two disks D have their teeth all pointing in the same direction, but reversely to those of the disks D′, the purpose of which will be presently shown.

The number of teeth in each wheel is about forty, which, however, may be more or less, if so desired.

In each disk is cut a deep radial notch, E, fig. 6; also, in each disk is a central hole, F, in which the shaft or stem G of the knob or handle is received, as shown in fig. 5. In the sides of said hole are formed notches or shoulders, *b*, in which the point of the catch or lug H engages, for the purpose of turning the wheel, as will hereinafter be shown.

I is a spring, whereby said lug is forced from the shaft into engagement with the shoulders *b*, on being presented in proper relation to said shoulders.

Each wheel is provided with a pawl, J, fig. 2, whereby said wheels are prevented from being turned backward.

K are springs, by means of which said pawls are kept in engagement with the wheels.

L is a supplementary wheel, placed on the shaft G, and lies close, or upon the first toothed wheel D, and operated by said shaft, for the purpose of throwing the bolt C, to which it is connected by the link M.

N is a spring, whereby said bolt is thrown out, for locking the door.

The practical operation of this lock is as follows:

The lock, as represented in fig. 2, is such as when the door of the safe is locked.

Now, in order to withdraw the bolt, or unlock the safe, the shaft or spindle G is pushed in until the lug H springs into the shoulders *b* of the first wheel or disk D′ referred to, and as shown in fig. 5. This lodgement of the lug in the shoulder is known by the click, occasioned by a spring, indicated by the dotted line *c*, fig. 2, as it falls into either of the grooves indicated by the dotted lines *c*, cut in the circumference of the spindle, said grooves corresponding in number to the number of wheels.

The spring referred to is located on one side, and partially across the hole in the side of the case, which, as the spindle is pushed in or pulled out, falls into a groove, and is thereby held while turning the wheel, in order to bring the radial slot E around, in direct relation to the inner end O, fig. 3, of the bolt, which is of such a size and shape as to fit therein.

In order to determine how far to turn the wheel, so as to bring the slot in position for the reception of the bolt, the wheel is turned a certain known number of notches, counting from the end of the guard P, a similar guard being provided for each wheel. This guard or shield P is constructed of thin sheet-metal, and of the proper shape to slide on the periphery and face of the toothed wheel or wheels, and has projecting pins on its inner side, or the side next the face of the toothed wheel, so that, when it is desired to make or change a combination in the series of toothed wheels, the guard P is moved around to the desired position, when the projecting pins will enter into the holes in the face of the wheel, and be firmly held in the desired place; then, by turning the wheels, as hereafter described, the correct position of each wheel in the series of wheels will be obtained, for allowing the bolt to be thrown back.

Thus, it being resolved that 22 be the number of the combination of notches or teeth, from the slot, the guard or shield is then adjusted to that number distant from the slot, as shown in fig. 2. Now, on turning the wheel in the direction of the arrow, the pawl J will click as it passes over each successive tooth, until it reaches the guard or shield, over which it slides without noise, until it falls into the first tooth with a click, 1, from which, counting each successive click, as the wheel is continued to be turned, until the twenty-second, which will be that nearest the slot; said slot will then be in direct relation with the end O of the bolt. This being done, the spindle is so far withdrawn that the lug will engage in the second wheel D. This wheel, having its shield adjusted at tooth 22, as that above described, is turned in like manner, but in the contrary direction, counting from the shield twenty-two clicks, which will bring the slot in the same position to the bolt as that in the first wheel. This being done, the spindle is again

drawn out, until the lug H engages in the shoulder of the third wheel D′, as it engaged with the first two; the exact distance to draw the spindle is known by the click occasioned by the spring *c* falling into the third groove on the spindle.

This third wheel is turned, as were the others, but in the direction of the first, as indicated by the arrow, the shield on this wheel being adjusted as were the others at No. 22. The counting of the clicks commences at the same point, immediately after the interval occasioned by the pawl sliding over the shield, counting the first click, and so on to the twenty-second, which will bring the slot in this wheel in open relation to the slots in the wheels above.

Again, the spindle is drawn out, bringing the lug into the shoulder of the last or fourth wheel, on which the shield has been adjusted, as were the others, the wheel is turned in the same direction as the second one D, until the slot comes in range with that in the other wheels.

All the slots, on being thus arranged for the admission of the bolt, it is forced back therein, by pushing the spindle in until the lug is in range with the supplementary wheel L, where it becomes engaged in one of the notches H, fig. 2. Now, on giving a turn to the spindle, the wheel will turn, thereby drawing back the bolt, by means of the link M, which being done, the door is free to be opened. The bolt is again thrown out, as shown in the drawing, by the spring N, above referred to.

It will be obvious that any number of changes in the combination of the wheels can be made by simply shifting the position of the guard, so that one or more teeth or numbers will range between the slot and guard. The numbers may be alike in each wheel, as in the illustration, or each may have a different number, or two or more wheels have the same number, and the fourth a different one, &c.

It will be apparent that these changes are susceptible of great variation, at the will of those having charge of the lock; hence the combination can be made all the more difficult to those not knowing the exact numbers, thereby making the lock of greater security.

What I claim as my improvement, and desire to secure by Letters Patent, is—

The movable guard P, in combination with the toothed wheel or wheels, having slot E, when constructed to operate in the manner and for the purpose substantially as described.

JOHN P. SCHMUCKER.

Witnesses:
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