

(Model.)

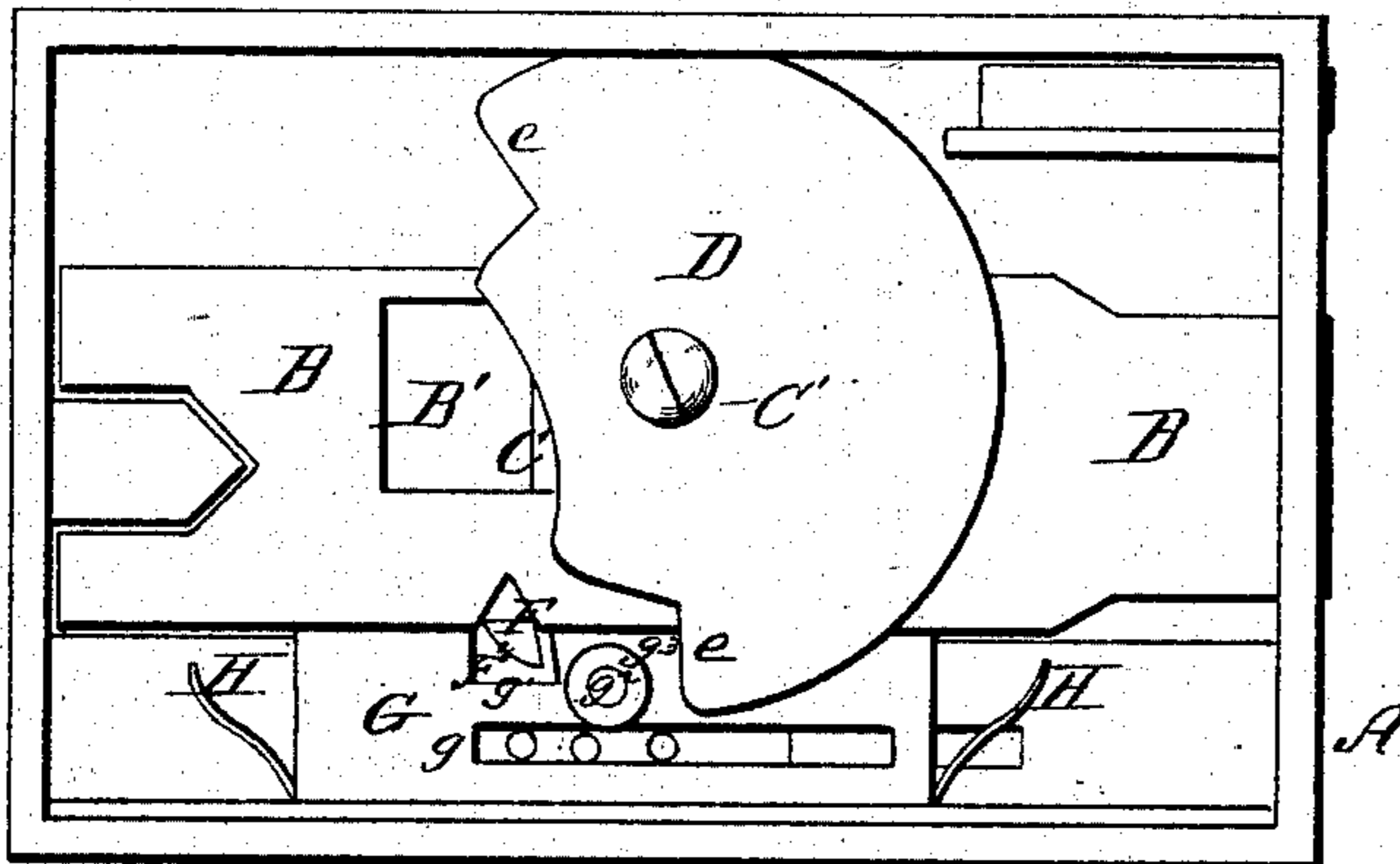
2 Sheets—Sheet 1.

L. BILAN.  
PERMUTATION LOCK.

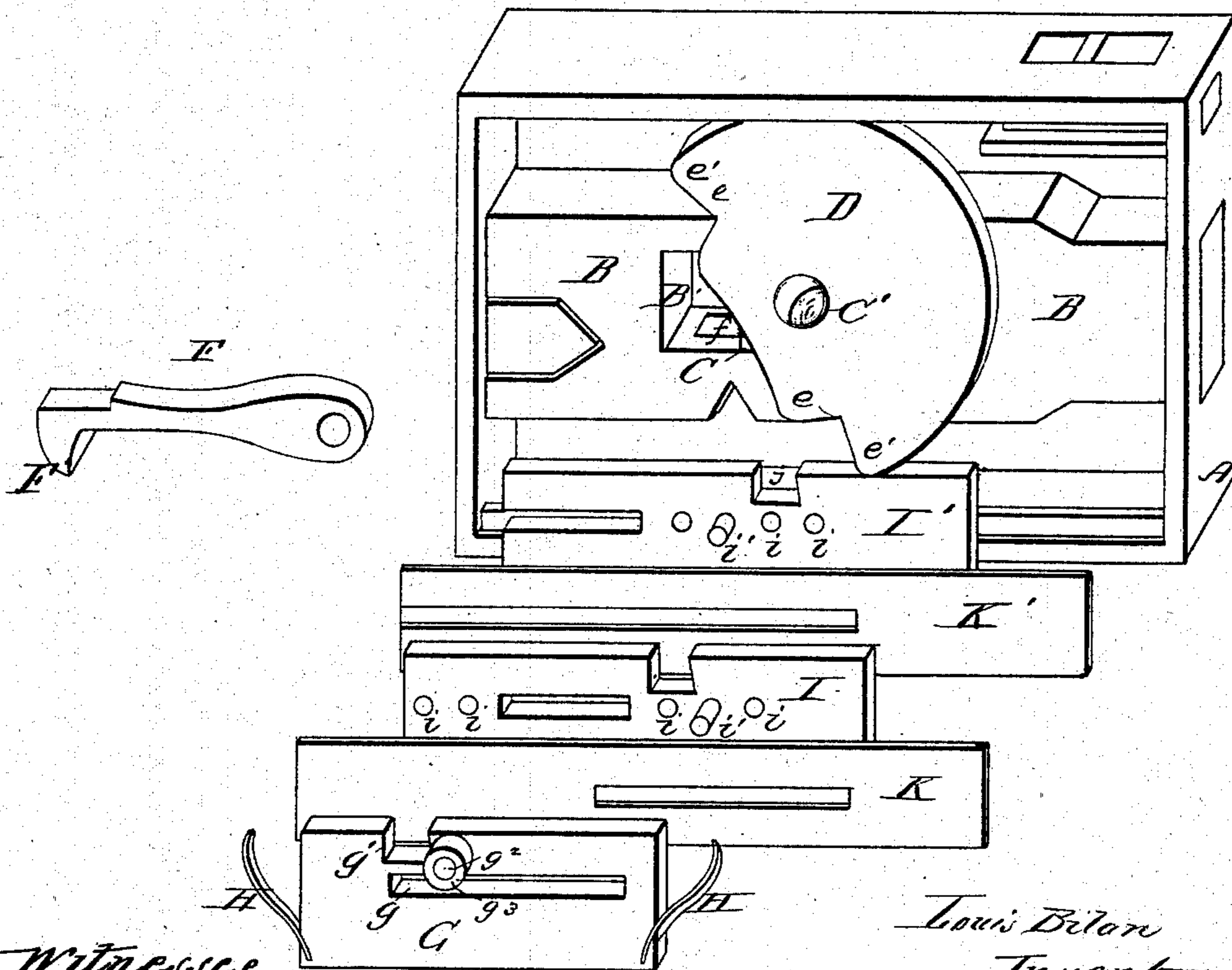
No. 291,467.

Patented Jan. 1, 1884.

*Fig 1*



*Fig. 2*



*Witnesses.*

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D. P. Cowe*

*Louis Bilan  
Inventor*

*By Connolly Bros  
Attys*

(Model.)

2 Sheets—Sheet 2.

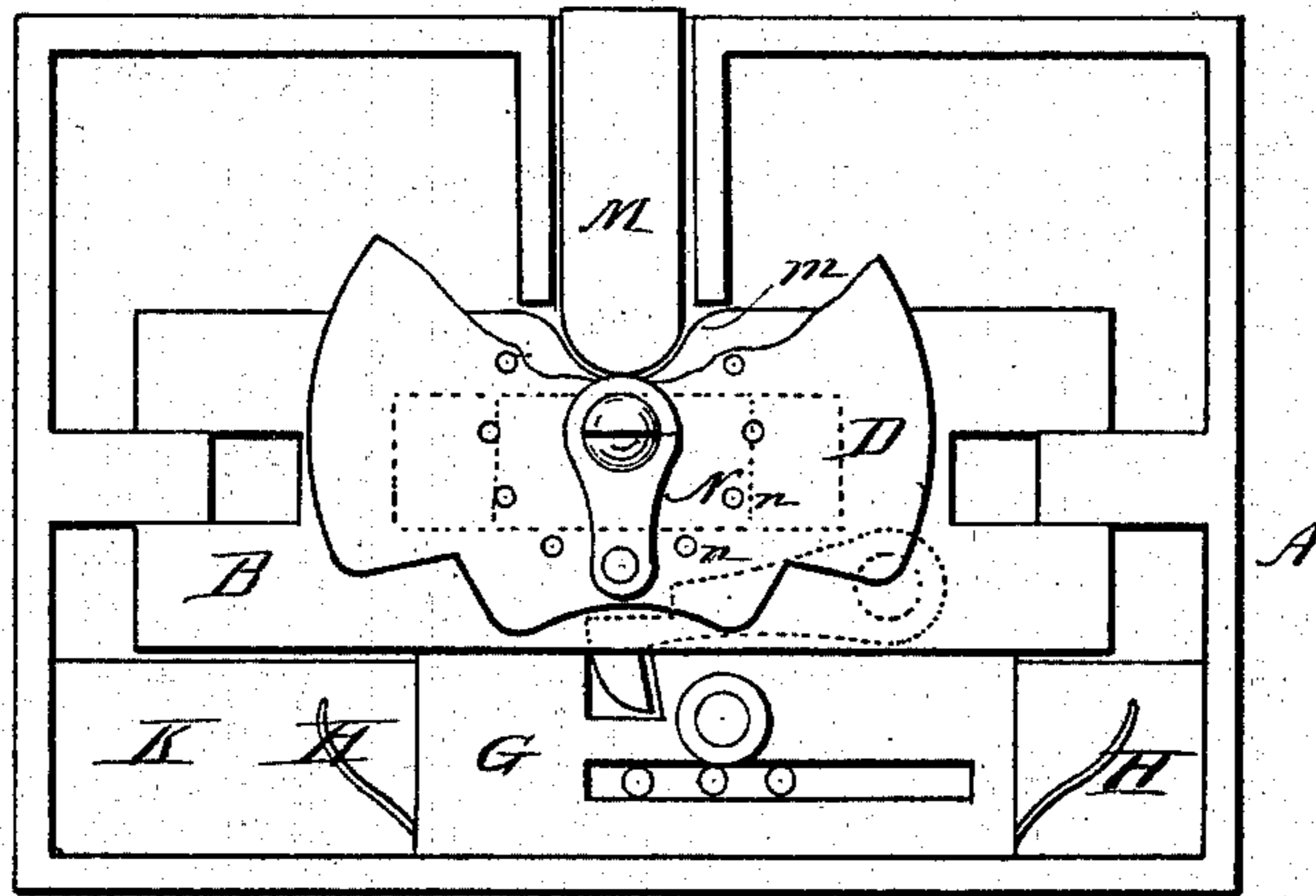
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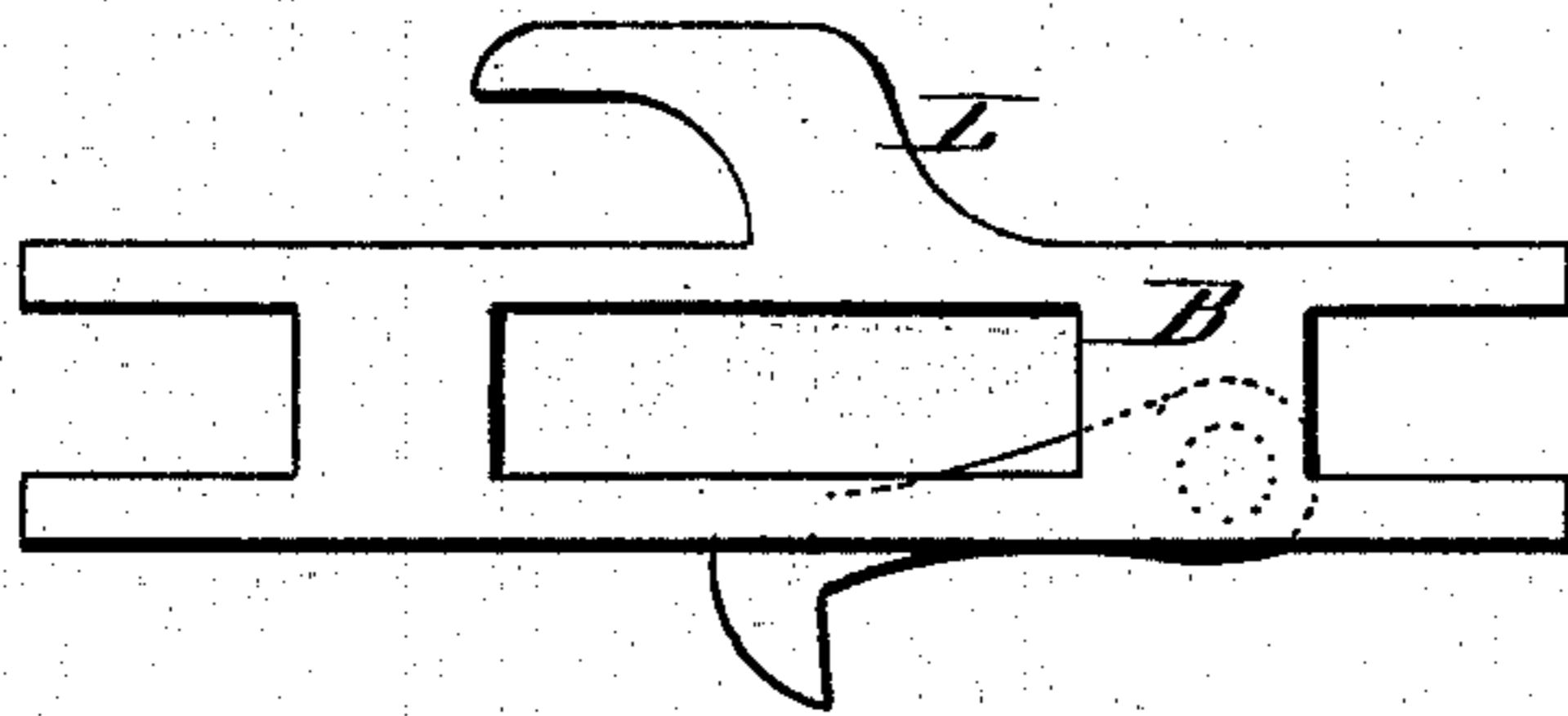
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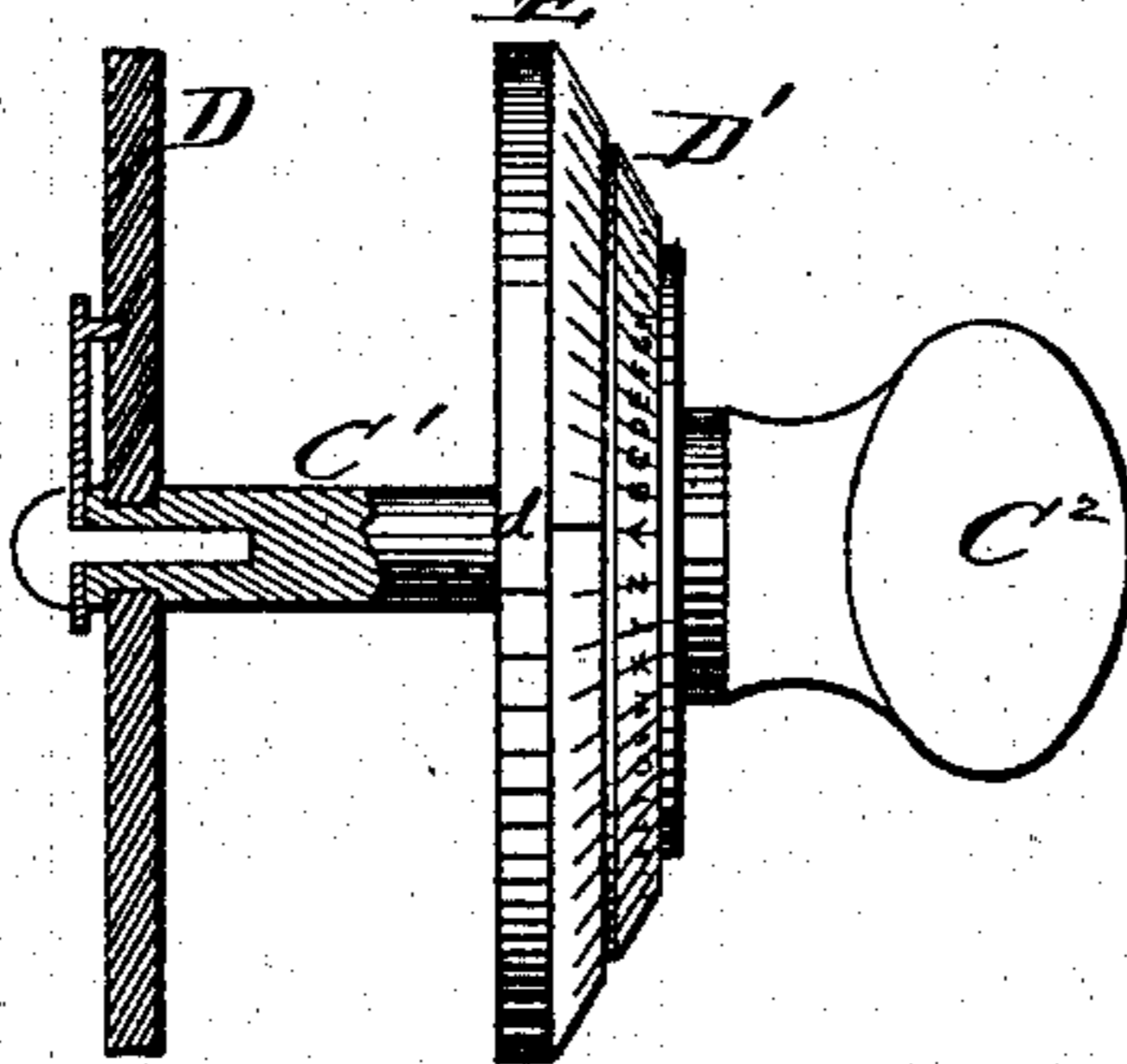
*Fig. 3*



*Fig. 4*



*Fig. 5*



Witnesses

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# UNITED STATES PATENT OFFICE.

LOUIS BILAN, OF IOWA CITY, IOWA, ASSIGNOR OF ONE-HALF TO F. J. HORAK AND J. K. BERANEK, BOTH OF SAME PLACE.

## PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 291,467, dated January 1, 1884.

Application filed September 10, 1883. (Model.)

*To all whom it may concern:*

Be it known that I, LOUIS BILAN, a citizen of the United States, residing at Iowa City, in the county of Johnson and State of Iowa, have  
5 invented certain new and useful Improvements in Permutation-Locks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-  
10 pertains to make and use the same, in which—

Figure 1 is a rear elevation of the door-lock with back plate removed. Fig. 2 is a perspective view of same dissected. Figs. 3 and 4 are modifications. Fig. 5 is a side view of the  
15 knob.

This invention has relation to a permutation or combination lock of that class in which the turning of a lettered or numbered disk to the right and left alternately certain distances, indicated by a combination of letters or numbers, so adjusts the "tumblers" or slides by which the bolt is retained that the latter may be withdrawn and the lock opened. Permutation-locks of this description are usually provided with a number of rotary tumblers notched  
25 on their peripheries, and all the notches are made to coincide when the combination is properly worked, so as to provide a space for the click, pawl, or other device through which the retraction of the bolt is effected.  
30

My invention contemplates the employment, in lieu of rotary disks or tumblers, of straight slides, which are notched in such a way that when all the notches are made to coincide the  
35 bolt may be retracted by turning the knob. The knob-shaft carries a cam, which, being turned alternately, moves a setting-slide in opposite directions and to distances regulated by the relative positions of the letters or figures of the "combination." As this slide moves, it successively adjusts the tumbler-slides until all their notches coincide. The knob being then turned in the opposite direction to its last combination movement, causes  
40 the bolt to be withdrawn.

My invention consists in the construction and novel combination of parts essential to such a lock, and in the provision of expedients whereby the lock is adapted to various uses,  
50 such as on trunks, room-doors, tills, and all ordinary receptacles of valuables.

Referring to the accompanying drawings, in which Figs. 1 and 2 illustrate a permutation-lock adapted for use on an ordinary door, A designates the lock-case, containing the sliding  
55 bolt B, which is constructed with a rectangular slot, B', for the reception of a block, C, upon which the bolt slides. Through this block passes the shank or stem C' of the knob C<sup>2</sup>, Fig. 5, carrying the cam-plate D and the  
60 lettered disk D'. The lock-case may be fitted in a mortise in the edge of the door or attached to the inner face of the door, in which case the lettered plate D' is arranged on the outer  
65 face. A ring, E, encircles the disk D, and has a mark at d, with which the letters of the opening-combination are made to successively coincide. This ring is secured to the door. The  
70 cam D is formed with two shoulders, e e, nearly diametrically opposite each other, and these shoulders terminate at the periphery of the disk in rounded angles e'.

Attached to the bolt, and located within a recess or mortise, f, is a dog, F, having a beveled head, F', for a purpose hereinafter specified.  
75

G designates a setting-slide, consisting of a metal plate slotted at g and notched at g', and carrying upon a pin, g<sup>2</sup>, an anti-friction roller, g<sup>3</sup>. When the knob is turned around, one of  
80 the shoulders e of the cam D comes in contact with the roller g<sup>3</sup>, and pushes the plate G forward or backward, according to the direction in which the knob is turned.

At either end of the slide G is a spring, H, 85 which, being pressed against the end wall of the lock by the action of the cam, forces the slide back to its normal position when released from the cam.

I I' are slotted and notched slides lying parallel with the slide G, and separated from each other by the slotted guide-plates K K'. Each of the slides I I' is formed with a number of  
90 holes, i, for the reception of a pin, i', the position of which is regulated by the combination. 95

As the parts are shown in the drawings, the combination is, for instance, I D J, which is used in the following way: Supposing the bolt to be projected and the door locked, the knob is turned to the left once or twice, so as to  
100 throw the setting-slide into position. It is then turned to the right to letter I, then to the

left to letter D, and then again to the right to letter J. This completes the working of the combination. By then turning the knob to the left the lock will be drawn back and opened.

5 The effect of the above-specified manipulation of the knob on the lock mechanism is that, as the setting slide is pushed to the left, (looking toward the same from the knob side,) the end of its slot takes hold of the pin  $i'$  in  
10 slide I, and the latter in turn catches the pin on slide I', and thus the slide I' is pushed to the left far enough to bring the notch  $j$  to the middle of the lock. The next movement of the combination pushes the slide I back to the  
15 right, and the final movement brings it to a coinciding position with slide I'. The knob being now turned to the left, all the notches in the slides are made to coincide, whereupon the dog F falls into the recess thus provided, and  
20 engages the slide G, and, as the latter moves, the bolt is moved with and through it. To project the bolt, the knob is turned to the right once or twice and then indefinitely to the left and right, so as to disarrange the combination.

25 By a modification in the construction of the bolt, the lock may be adapted for trunks or drawers. Thus, for trunk purposes, the bolt, instead of projecting through the end of the lock-case, should have a hook, L, Fig. 4, which  
30 will enter a staple or keeper depending from the trunk-lid. For use on a drawer, a supplementary vertically-sliding bolt, M, may be employed, the main bolt being recessed at  $m$ , and the supplementary bolt rounded on its  
35 lower end, so as to automatically fall into and rise from the recess. For trunks a pivotal ring, instead of a knob, may be used, as a knob is liable to be broken when the trunk is roughly handled.

40 In the drawings I have shown but two slides or tumblers, I I', but as many may be used as is desired—the more slides the more intricate the combination.

To add still further to the combination, I employ the expedients shown in Fig. 3 of the  
45 drawings. Instead of fastening the cam D directly to the knob-stem, I arrange it loosely thereon, and secure to the knob-stem a hand or index, N. In the cam I provide a number of screw-holes,  $n$ , suitably lettered or num-  
50 bered in keeping with the outside numbering or lettering on the knob-disk. I can now turn the cam to any position I require, and set it by inserting a screw through the index and  
55 into one of the holes.

By means of the letters on the cam, I am shown what letters to take on the outside.

To prevent the door-lock from being locked unintentionally from the outside, or when not  
60 desired, a catch or hook may be arranged under the plate, which will fall or press into a recess in the bolt, so that the same cannot be moved forward without first pressing a spring under said hook:

What I claim as my invention is—

1. In a permutation-lock, the combination, with the bolt B and the pivotal dog F, carried thereby, of the straight slotted and  
65 notched slides or tumblers I I', lying alongside of and parallel with said bolt, the setting-  
70 slide G, the knob C, having a stem, C', and cam-disk D, substantially as described.

2. In a permutation-lock, the combination, with the knob through which the combination  
75 is worked, and the notched and slotted permutation-slides, of the cam-disk attached to the knob-stem and the setting-slide located below or beside said disk and at right angles to the knob-stem, substantially as described.

In testimony whereof I affix my signature in  
80 presence of two witnesses.

LOUIS BILAN.

Witnesses:

L. J. PALDA,  
JOS. BARBATTÀ.