

(Model.)

O. E. PILLARD.
PERMUTATION LOCK.

No. 270,114.

Patented Jan. 2, 1883.

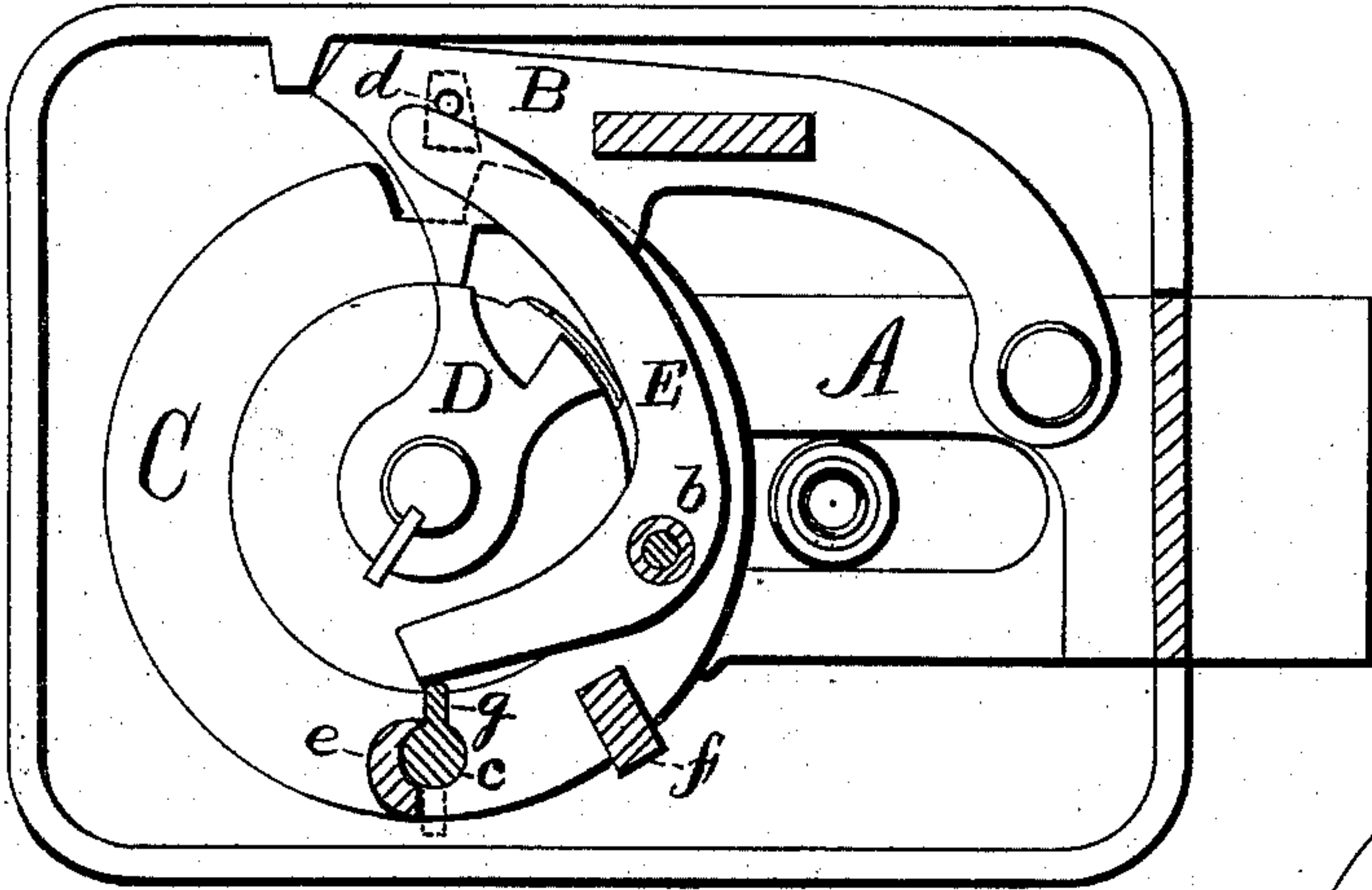


Fig. 1.

Fig. 4.

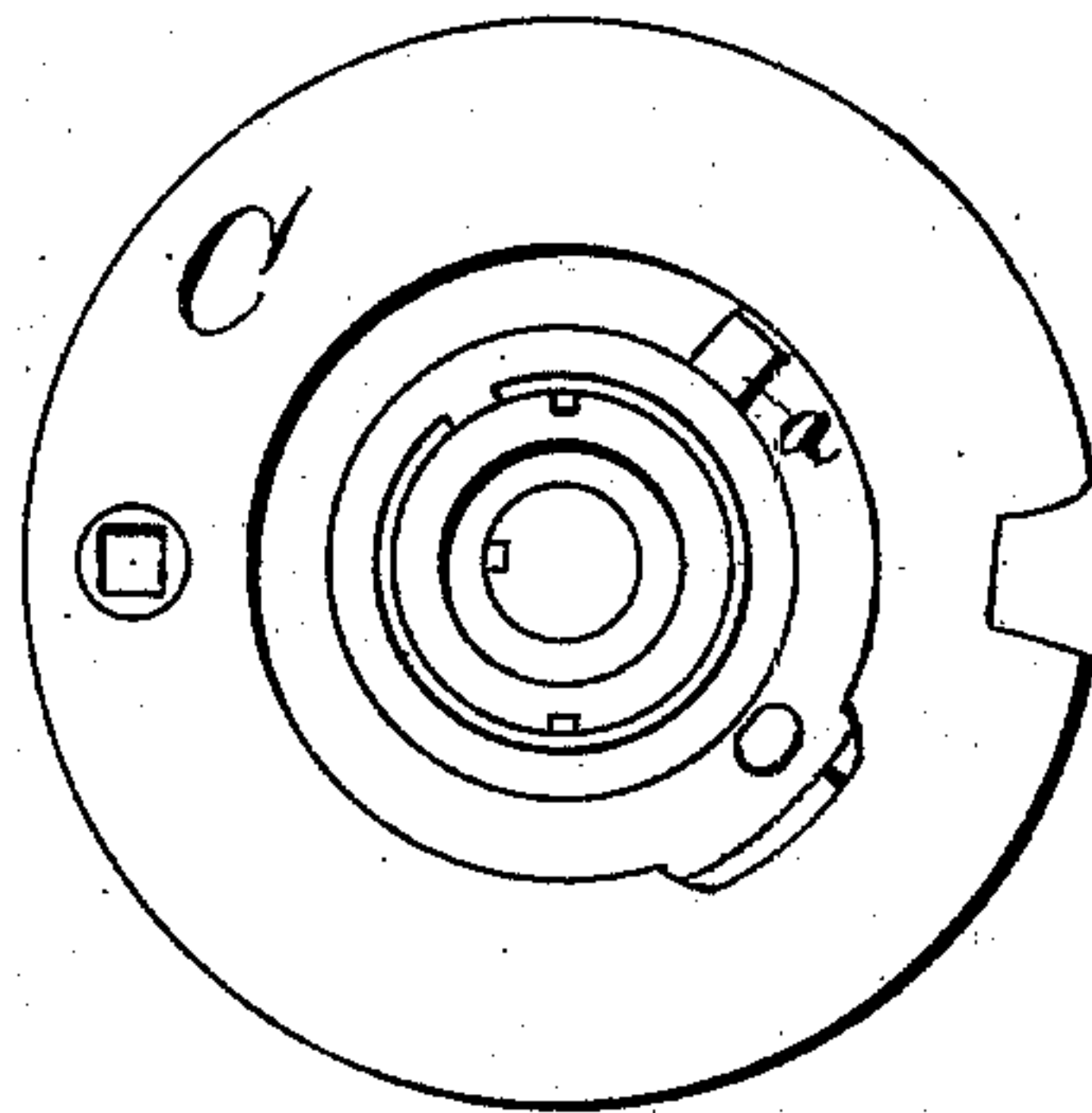


Fig. 2.

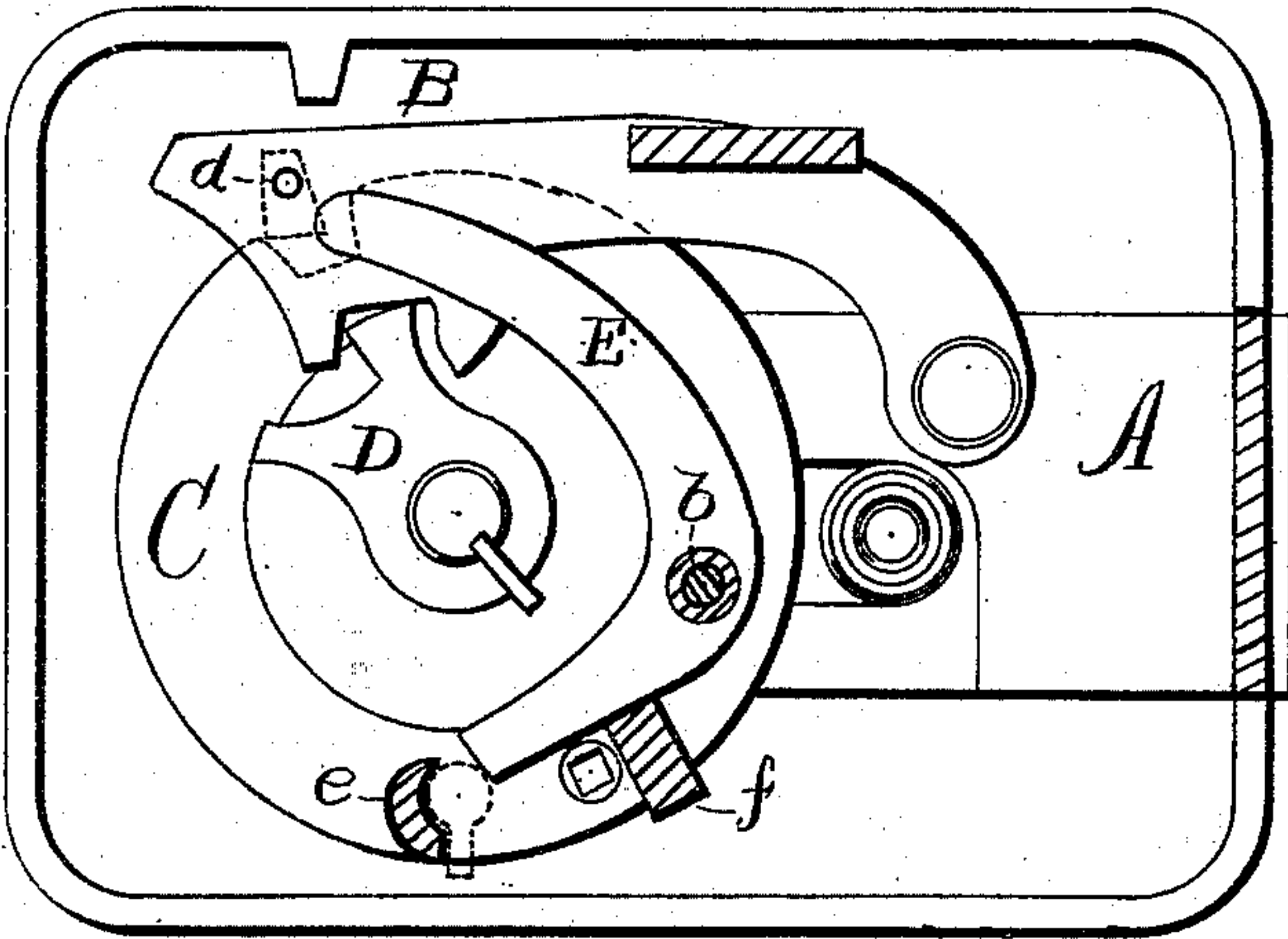


Fig. 5.

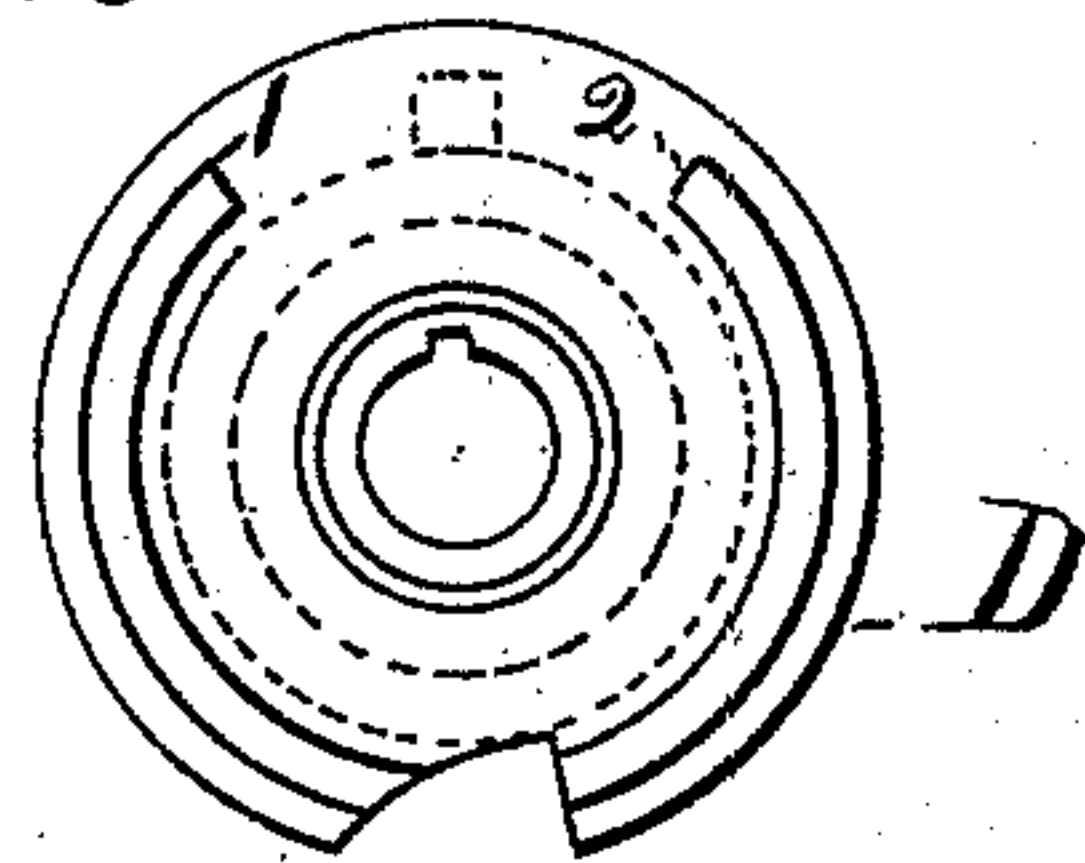


Fig. 3.

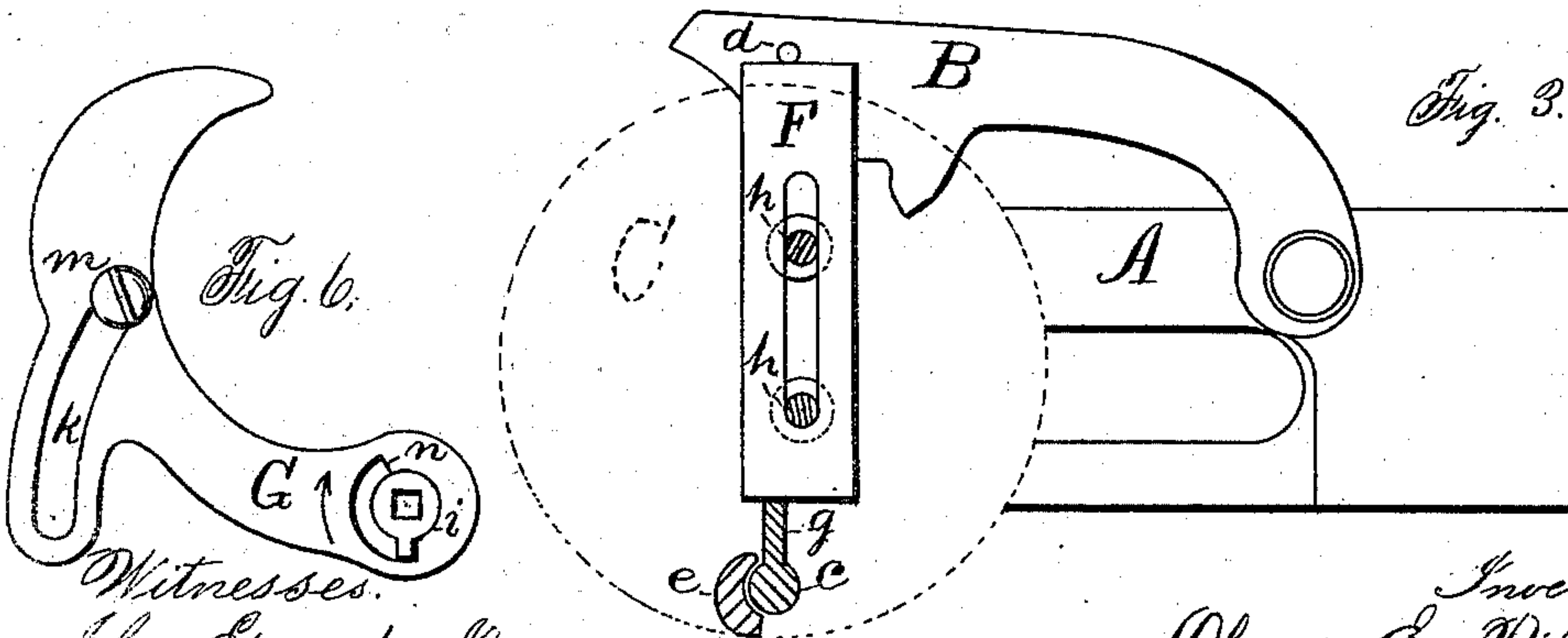
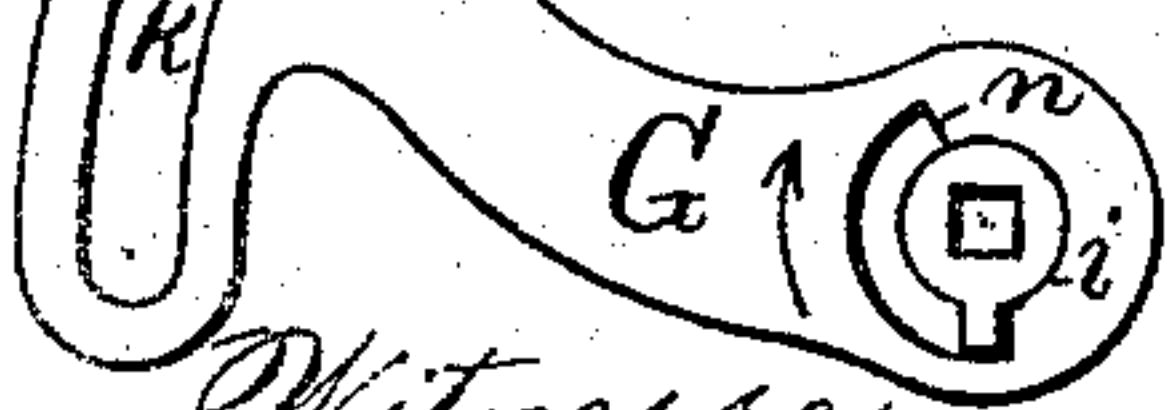


Fig. 6.



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PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 270,114, dated January 2, 1883.

Application filed November 16, 1881. (Model.)

To all whom it may concern:

Be it known that I, OLIVER E. PILLARD, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Combination-Locks, of which the following is a specification.

My invention relates to improvements in combination-locks in which the ordinary index-mark for unlocking is also used to set the tumblers by when the combination is changed, the latch being held up out of the slots in the tumblers by means of special mechanism hereinafter described.

In the accompanying drawings, Figure 1 is a vertical section of my lock, the plane of section being just inside of the inner surface of the cap-plate, thereby leaving the main portions of the lock shown in elevation. Fig. 2 is a like view with the parts thrown into a different position. Fig. 3 shows an elevation of the bolt, the latch, and a slide for holding up the latch instead of the lever. Fig. 4 is an elevation of the tumblers and loose talon with the cam removed. Fig. 5 is a view of the inside of the cam, and Fig. 6 shows a modified form of lever for lifting the latch.

All of the parts of my lock except the mechanism for holding up the latch are old when separately considered, although I have combined them differently from any prior device.

A designates the bolt; B, the latch pivoted thereto; C, the wrench-changing tumblers, and D the cam for throwing the bolt. The latch B has a transverse arm for falling into the slots in the tumblers, whereby said tumblers move with the bolt A.

Between the cam D and the tumblers C is an ordinary loose talon, *a*, Fig. 4, which is allowed only a limited movement, whereby I am enabled to employ a full graduated dial. This loose talon is also indicated in its proper position by broken lines upon the inside of the cam D in Fig. 5, and the shoulders 1 2 on the inside of said cam constitute the means for limiting the movement of said talon. Sometimes the combination is so set as to require one and a fraction reverse revolution of the cam after setting the tumblers in order to bring the cam into position for the latch to fall, and then to throw the bolt for unlocking. The play of the loose talon is sufficient to allow one full reverse revolution of the dial, and in addition thereto a further movement suffi-

cient to throw the bolt without disturbing the last tumbler, so as to get its slot out from under the latch.

I believe that this is the first wrench-changing combination-lock having the loose talon in which the tumblers move back with the bolt. Ordinary wrench-changing combination-locks have two index-marks upon the dial-ring—one for use in changing the combination and the other for use in unlocking. The former is set off a little to one side, so as to bring the slots in the tumblers to one side while setting the combination, and thereby cause the edge of the tumblers to hold up the latch out of contact with the cam. These two index-marks are objectionable, because those who use the unlocking-index day after day are very liable to forget when they are changing the combination and set part or all of the tumblers by the unlocking index-mark, thereby causing much trouble. I overcome this objection by doing away with the second index-mark, and set the combination by the same index-mark that is used for unlocking, and consequently make up the new combination when the slots in the tumblers are all directly under the arm of the latch B, as shown in Fig. 1.

In order to set up the combination with the slots of the tumblers under the arm of the latch, it is necessary that the latch be held up out of engagement with the cam D. This I accomplish by means of a curved lever, E, pivoted by pin or screw *b* to the inside of the cap-plate, (only those portions of the cap-plate are shown which project into the case beyond the plane of section,) which lever is acted upon by the wrench or key *c* to throw its upper end upward against the pin *d* on the latch and to hold the latch up, as shown in Fig. 1. The key or wrench hole in the cap is located directly below the axis of the tumblers, and has by the side of it an inward projection or stop, *e*, to limit the motion of the wrench and cause it to be turned only in the proper direction. When the wrench is withdrawn from the lock the lever falls of its own weight until stopped by the stop *f*. The tumblers are in the form of a wheel within a wheel, fastened together so as to move as one, except in changing the combination, when they are loosened by means of the wrench or key being entered into the wrench-hole in all of the tumblers, and then turned as in ordinary wrench-changing locks.

The term "wrench-changing tumbler-lock"

as herein used means a permutation-lock whose tumblers consist of an inner hub and an outer rim made adjustable on said hub, and loosened and tightened thereon by means of a wrench or key inserted through holes in said tumblers.

In my lock, when the holes in the tumblers are in line with the wrench-hole in the cap-plate and the wrench *c* is inserted therein, the slots in the tumblers are all under the arm of the latch, said arm being indicated by the broken lines in Figs. 1 and 2, which surround the pin *d*.

The wrench *c* is provided with a side wing or bit, *g*, at a point which, when the wrench is fully inserted, is just inside of the cap-plate and opposite the short arm of the lever. This bit *g* projects downward when the wrench is being inserted, after which it is turned a half-revolution into the position in which it is represented in Fig. 1, in doing which the square portion of the wrench releases the inner wheel of each tumbler as in other locks, and the wrench-bit *g* acts upon the curved lever to throw it and the latch up out of the slots in the tumblers and to hold it up until the key is turned back to lock the tumblers. When the latch is thus held up by the curved lever and key the dial and tumblers are turned to set up the combination, using the same index-mark that is used for unlocking, thereby avoiding all confusion and all tendency to make mistakes. When the wrench is withdrawn the curved lever falls out of the way of the latch, as shown in Fig. 2.

In Fig. 3 I have represented a slide, *F*, which may be employed as an equivalent for the curved lever *E*. This slide is bolted or screwed to the inside of the cap-plate by screws *h h*, so as to move vertically. It is lifted by the wrench-bit *g*, and its upper end acts upon the pin *d* of the latch in the manner and for the purpose before described. As shown, however, it is necessary to make the wrench-bit a little longer than when the curved lever is employed, in order to raise the latch to the same height. In both of these devices the mechanism for holding the latch up out of the slots in the tumblers is secured to the inside of the cap-plate, and takes off with said plate. In Fig. 6 I have shown another equivalent mechanism for the same purpose, which is designed to be secured to the case proper back of the tumblers. This consists of a pivoted curved lever or arm, *G*, having its axis in direct line with the wrench-hole in the cap-plate. A loose talon, *i*, having a square wrench-hole in the center of its hub, is placed in the end of arm *G*, concentrically with the axis of said arm. A curved slot, *k*, is made in the arm *G*, through which a screw, *m*, is passed into the lock-case to steady said arm. When the square end of the wrench is passed through the tumblers it enters the square hole in the loose talon *i*. The wrench is turned a half-revolution in the direction indicated by the curved dart, and as soon as the talon engages the shoulder *n* it carries the lever with it and

throws the upper outside edge of its hooked end under the pin *d*, to lift and hold up the latch while the combination is being set up, as before described. After the combination is made up the wrench is turned in the reverse direction to lock the tumblers, and the arm falls into the position represented in Fig. 6, out of the way of the latch.

In case it is desirable to turn the wrench or key in the opposite direction from that indicated in Fig. 6 it is only necessary to place the lever *G* on the case the other side up.

Having shown three different forms of mechanism for lifting and holding up the latch while the combination is being made up, I shall hereinafter refer to the same under the general term of "latch lifting and holding mechanism."

I claim as my invention—

1. A permutation-lock having a latch for engaging the slots in the tumblers, and whose tumblers consist of an inner hub and an outer rim adjustable on said hub, in combination with latch lifting and holding mechanism to hold up the latch while the combination is being made up with the slots in the tumblers under the arm of the latch, substantially as described, and for the purpose specified.
2. The combination of the slotted tumblers, the bolt, the latch pivoted to said bolt so that the tumblers move back with the bolt, and latch lifting and holding mechanism acting upon the latch, substantially as described, and for the purpose specified.
3. The combination of the tumblers, the bolt, the latch having the pin *d*, and latch lifting and holding mechanism operated by the tumbler-wrench to act upon the pin *d*, substantially as described, and for the purpose specified.
4. The combination of the cam *D*, tumblers *C*, bolt *A*, latch *B*, and latch lifting and holding mechanism acting upon the latch to hold it out of engagement with the tumblers and cam, substantially as described, and for the purpose specified.
5. The combination of the cam *D*, loose talon *a*, tumblers *C*, bolt *A*, latch *B*, and latch lifting and holding mechanism acting upon the latch while the combination is being made up with the slots of the tumblers under the arm of the latch, substantially as described, and for the purpose specified.
6. The combination of the slotted tumblers, consisting of an inner hub and outer rim adjustable on said hub, the bolt *A*, the latch pivoted to said bolt, whereby the tumblers are caused to move back with the bolt, the cam *D*, and the loose talon *a*, having a limited independent movement on its axis between the shoulders 1 and 2 of said cam, substantially as described, and for the purpose specified.

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Witnesses:

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