

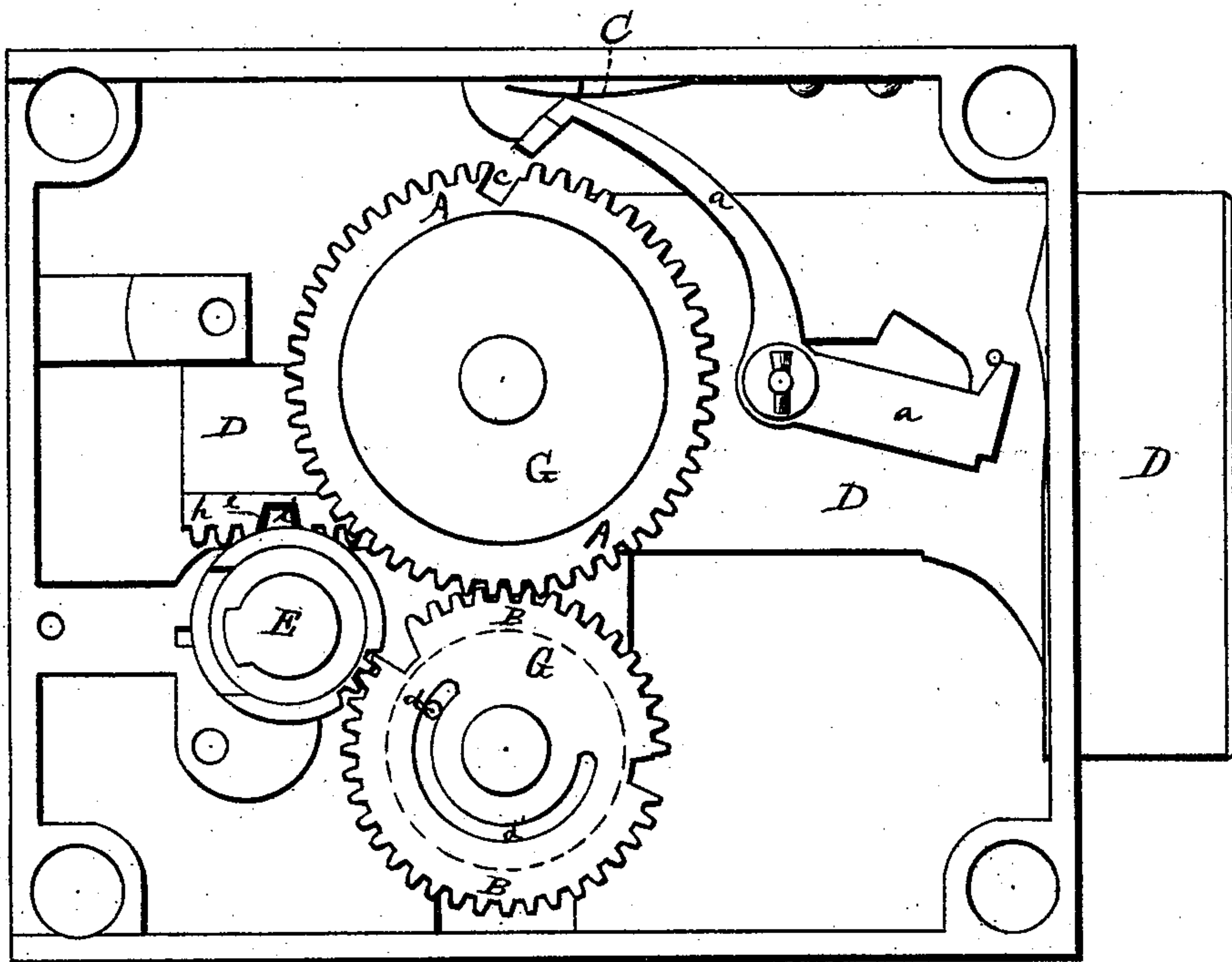
*O.E. Pillard,*

*Permutation Lock.*

*No. 90682.*

*Patented June 1. 1869*

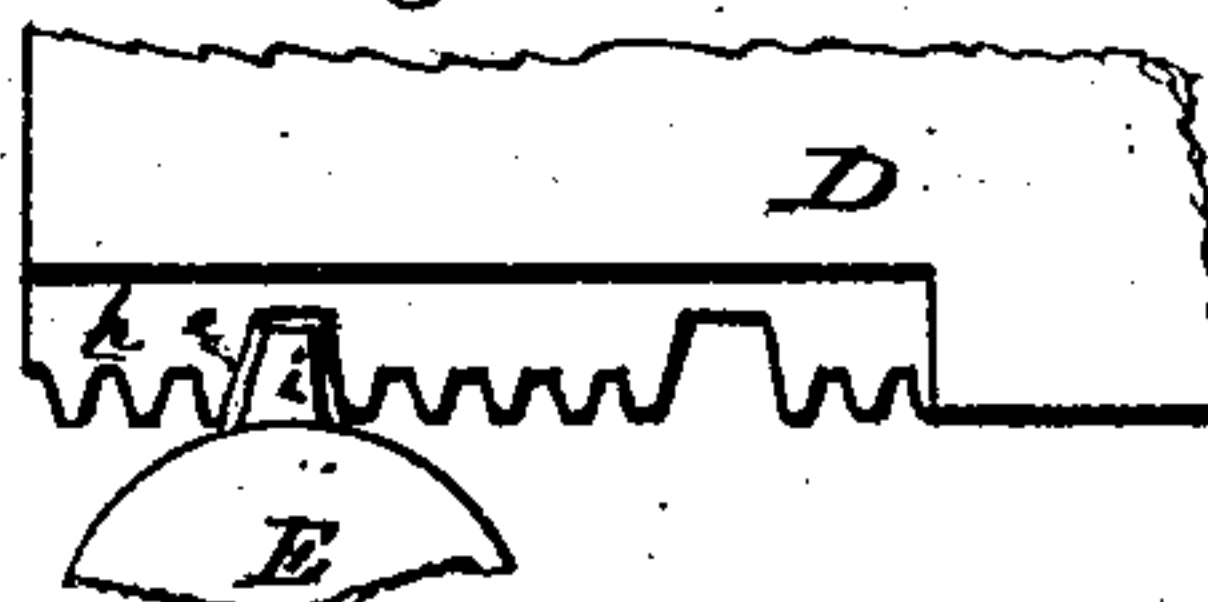
*Fig. 1.*



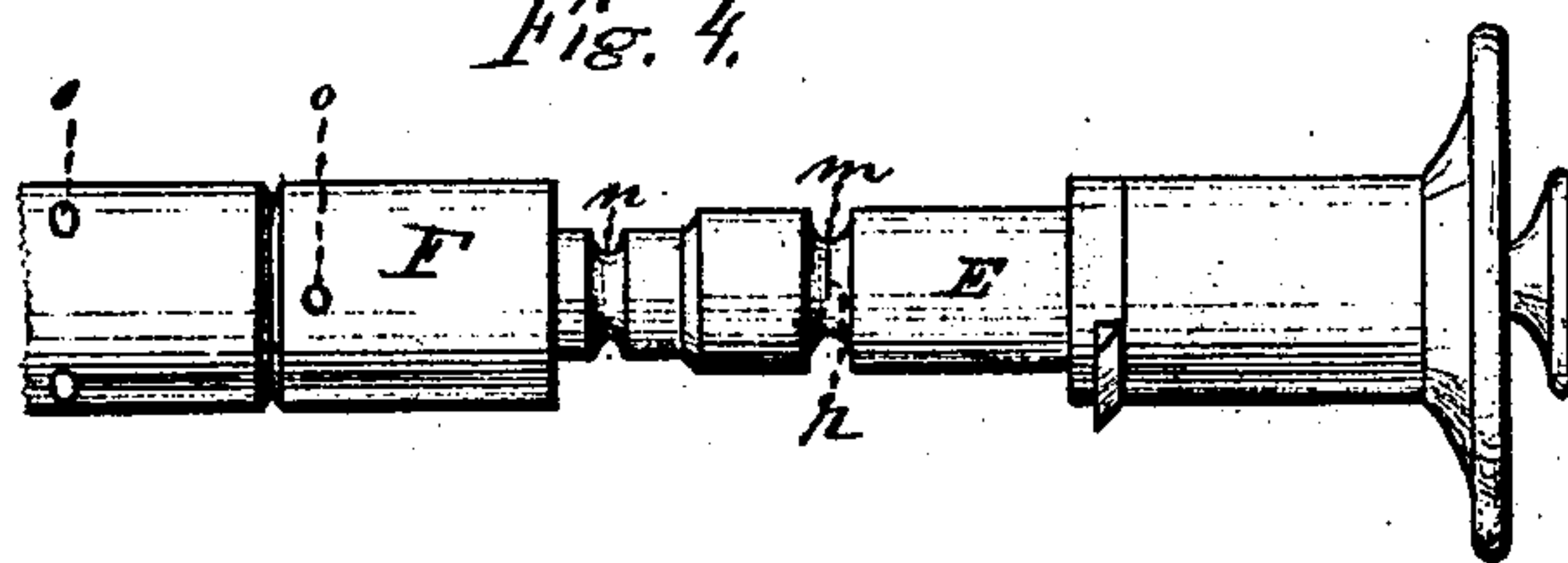
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



*Witnesses*  
*C.E. Mitchell*  
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*Oliver E. Pillard.*



# United States Patent Office.

OLIVER E. PILLARD, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR  
TO FREDERICK H. NORTH, OF SAME PLACE.

*Letters Patent No. 90,682, dated June 1, 1869.*

## IMPROVEMENT IN COMBINATION-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, OLIVER E. PILLARD, of New Britain, in the county of Hartford, and State of Connecticut, have invented new and useful Improvements in Locks; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front elevation of my invention, with the front plates removed, to show the interior.

Figure 2 is an edge view of the rack and a portion of the bolt.

Figure 3 is a side view of the same.

Figure 4 is an elevation of a part of the shaft.

Similar letters of reference indicate like parts.

The invention is designed as an improvement on the lock patented by Henry Isham, July 1, 1856, and July, 7, 1857, and also by myself, June 30, 1868.

The invention consists in the peculiar arrangement of the latch and tumblers, so that the slot in the tumblers shall never be made to come in contact with or pass the small tumbler.

It also consists in securing the sleeve on the shaft by two pins instead of one, both fitting into suitable grooves in the shaft, which is so arranged, that if the shaft should be broken off at or near the outer groove, the second pin shall hold the sleeve in place.

A designates the set of large tumblers, and B, the small ones.

The centre of the tumblers A is intended to be on a line directly above the centre of the tumblers B, while the latch *a* is placed so that when it engages with the tumblers A, the slot *c*, into which the catch-end of the latch *a* is thrown, will be on a line with the centres of the tumblers A and B.

The small tumblers B are arranged, by the stop-pin *d*, to rotate a given distance only.

The tumblers A should contain a little more than twice as many teeth as the number of teeth in tumblers B that are allowed to pass a given point. Thus the farthest that the tumbler A can be moved at any one time will be a little less than one-half of a revolution.

If the teeth of the tumblers engage when the tumbler B is stopped by the stop-pin *d*, and the slot *c* is on a line with the centres of the tumblers A and B, by turning the shaft E the slot *c* will be brought near the tumbler B; but as it cannot be turned quite half-way around, it will stop a little short of the centre line, between the two tumblers.

The teeth can then be disengaged, and tumbler B, having been turned as far as could be in one direction, must necessarily be turned in the opposite direction,

and after being so rotated, more or less, it again engages with the tumbler A, and carries slot *c* back toward the point from which it started; but as tumbler B rotates a little from its stopping-point before engaging the tumbler A, the tumbler B will be stopped by the pin *d* before the slot *c* has moved as far as it did in the previous operation, thus leaving the slot *c* at a different point. Although the combination can be changed so as to carry the slot *c* in either direction, so as to bring it near the tumbler B, it never can be made to pass the centre line between the two tumblers.

In the former patents, the catch-end of the latch *a* was placed on one side of the tumblers A, consequently the slot *c* passed the tumbler B. An expert in lock-picking would learn to locate the position of the tumbler A, by observing the play in the teeth of the tumblers, which would necessarily be greater when the slot *c* came in contact with the tumbler B.

By the improvement, the play in the teeth is always uniform, thereby making in effect one continuous wheel, the same as if the slot *c* was not in the tumbler, so that it is impossible to locate the slot *c* by the means described.

In my original patent, of 1868, the latch *a* has been a gravity-latch, with one end weighted, which necessitated the construction of both right and left-hand locks.

To make the lock reversible, I construct the latch *a*, nearly balanced on its pivot, and provide a spring, C, which will throw the latch into its place when the lock is placed either side up. Therefore, by placing it one side upward, I produce a right-hand lock, while, by simply inverting it, I produce a left-hand lock.

In the original, the slot *e*, in the rack *h*, (which is secured to the bolt D,) was cut at right angles with the rack. By sliding the wing-follower *i* through the slot *e*, and at the same time turning the shaft a little each time, the sharp corners on the rack *h*, each side of the slot, could be made to entirely cut away the wing-follower *i*, after which the lock could be more readily picked.

To prevent the cutting away of the wing-follower *i*, after the rack *h* is cut in the usual manner, I round the edges on the sides of the slot *e*, as shown in figs. 2 and 3, which entirely overcomes the former defect.

In the original, the sleeve F (fig. 4) was secured to the shaft E by one pin only, which was fitted in a proper groove.

By pressure, or blows on the projecting end of the shaft E, it would break off at the groove, when the sleeve could be slipped back, as shown in fig. 4, and the lock thus could be more readily picked.

In the drawing, the sleeve F is slipped out of place on the shaft, to better show the shaft.



The first groove, *m*, is made deep, and a nick or sawkerf, *r*, is made in it, to make the shaft the weakest at that point, and in the attempt to break the same, insure its breaking off at the same point.

The groove *n* is a little further back on the shaft.

In the sleeve *F* are placed pins *o o*, which pins fit into the grooves *m* and *n*, and secure the sleeve *F* in place, but allow the same to be turned on the shaft *E*. The sleeve *F* is also partly cut into a little beyond the groove *m*.

In an attempt to pick the lock, by breaking the shaft, it breaks at groove *m*, while the pin *o*, in groove *n*, will hold the sleeve *F* in place, and the lock remains secure.

In the original, between each tumbler was a plate, extending between both the tumblers *A* and *B*. The expense of making the same was large, while the teeth on the tumblers often bore against the plate, so as to cause them to turn hard.

I place between each tumbler a washer, *G*; those of

which that are placed between the tumblers *A* are allowed to turn freely. Their edges not projecting as far as the teeth, the tumblers are found to revolve very free and easy, while the expense of making them is much less than that of making the plates.

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

1. The arrangement of the slot *c* in the tumbler *A*, in combination with the tumbler *B*, pin *d*, slot *d'*, and latch *a*, so that when the latch *a* falls into the slot *c*, and allows the bolt *D* to withdraw, the slot *c* shall be on a line with the centres of the tumblers *A* and *B*, substantially as and for the purposes described.

2. The combination of the sleeve *F*, shaft *E*, pins *o o*, and grooves *m* and *n*, substantially as described, and for the purposes set forth.

OLIVER E. PILLARD.

Witnesses:

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