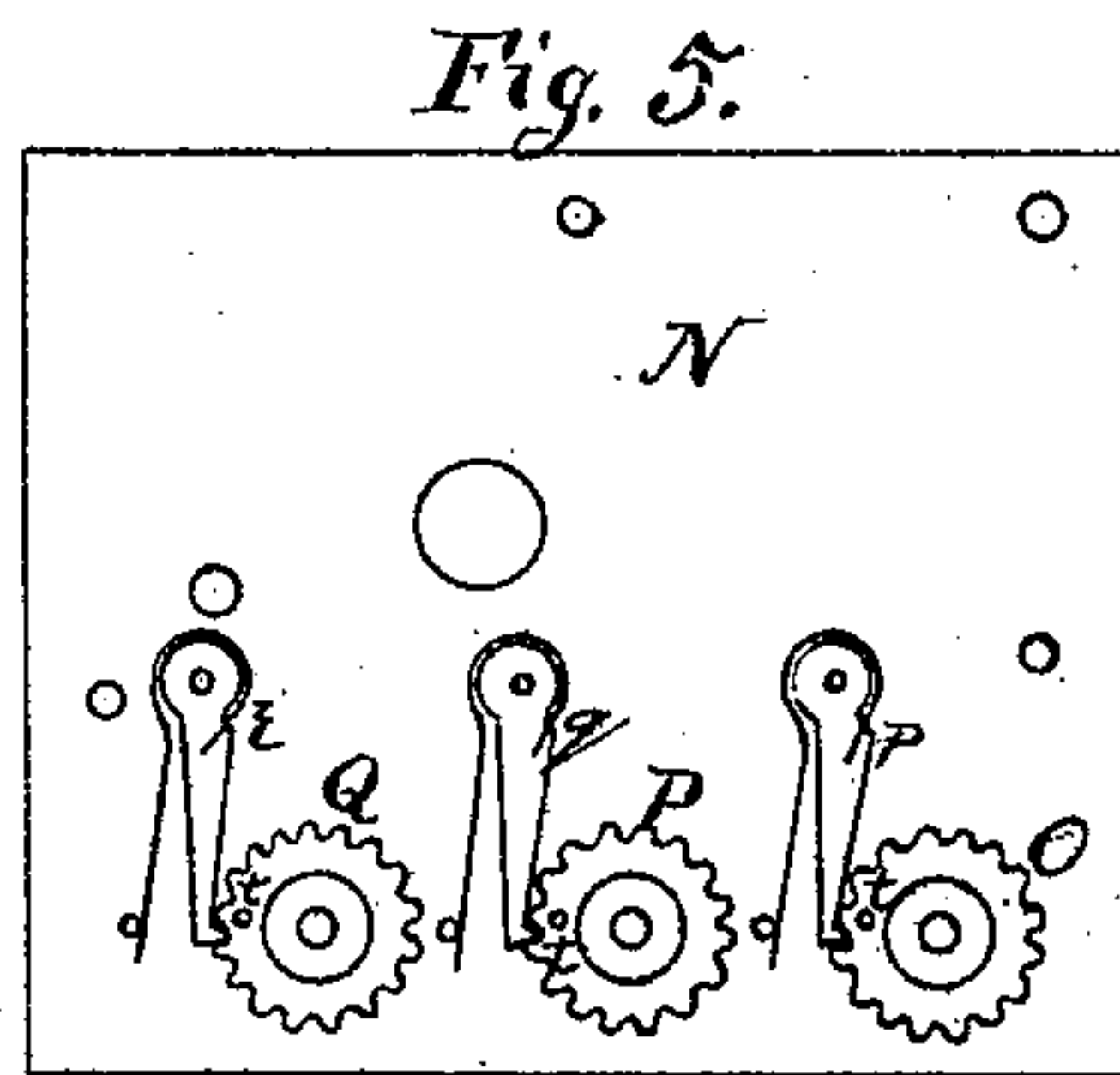
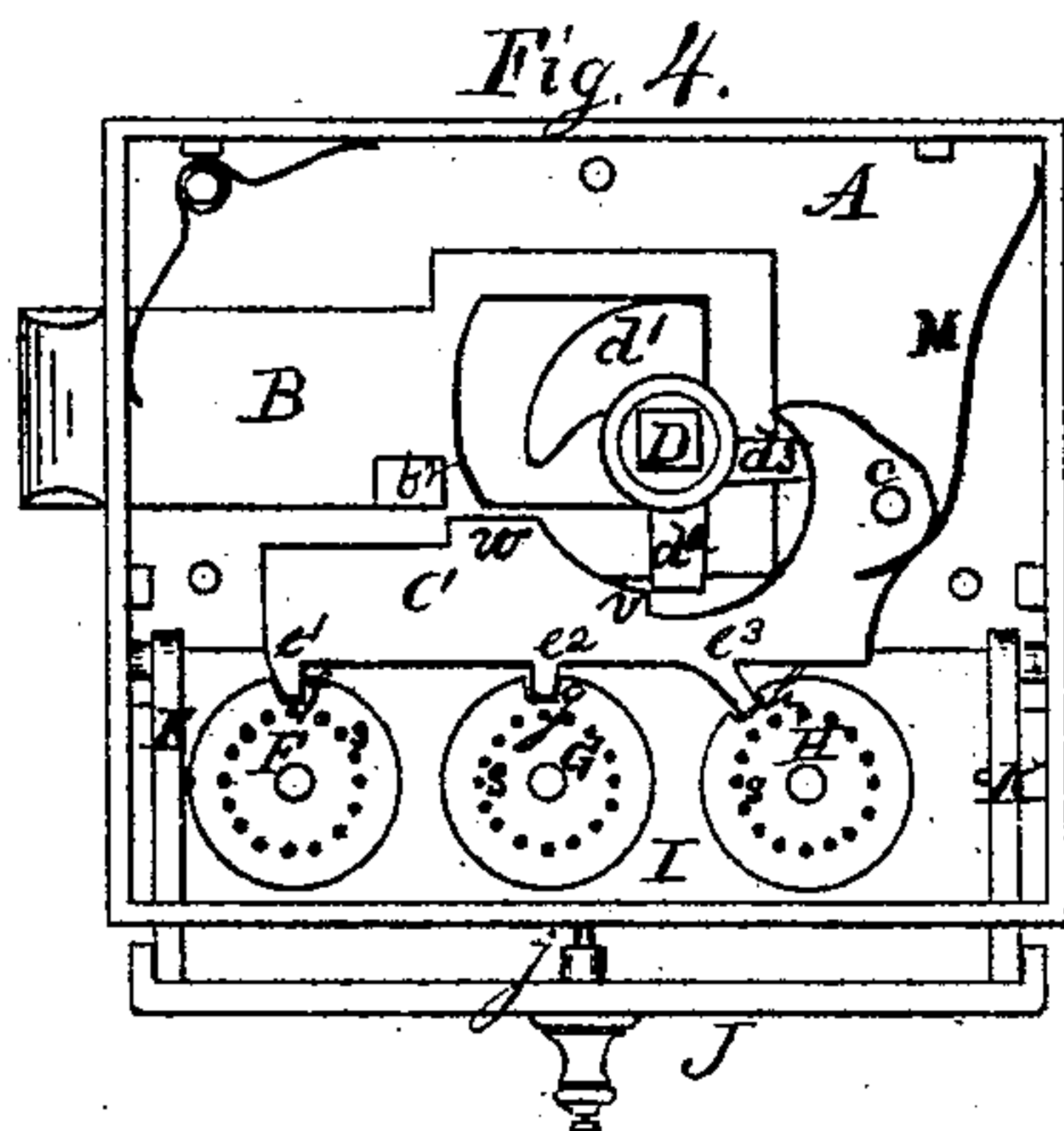
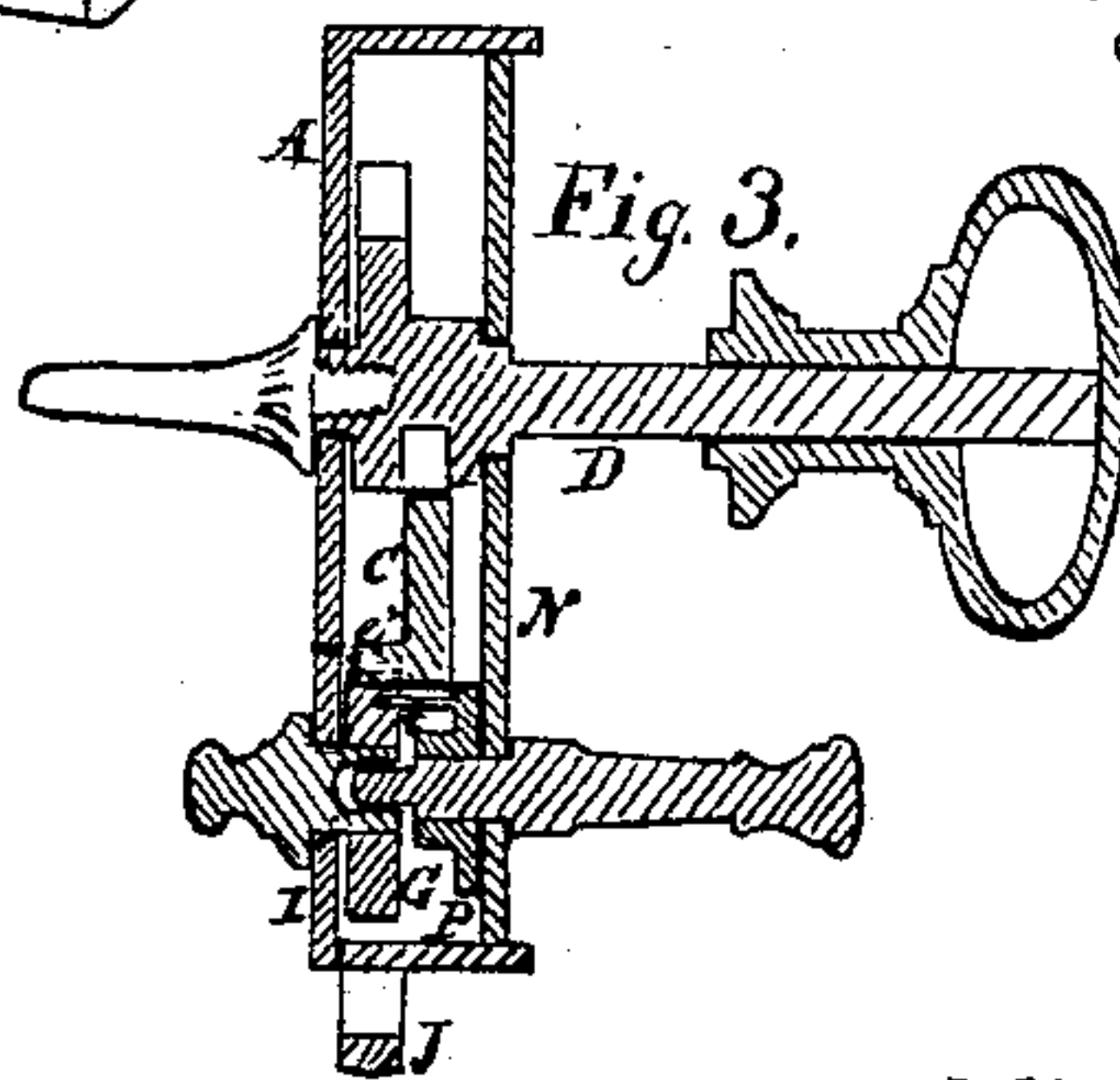
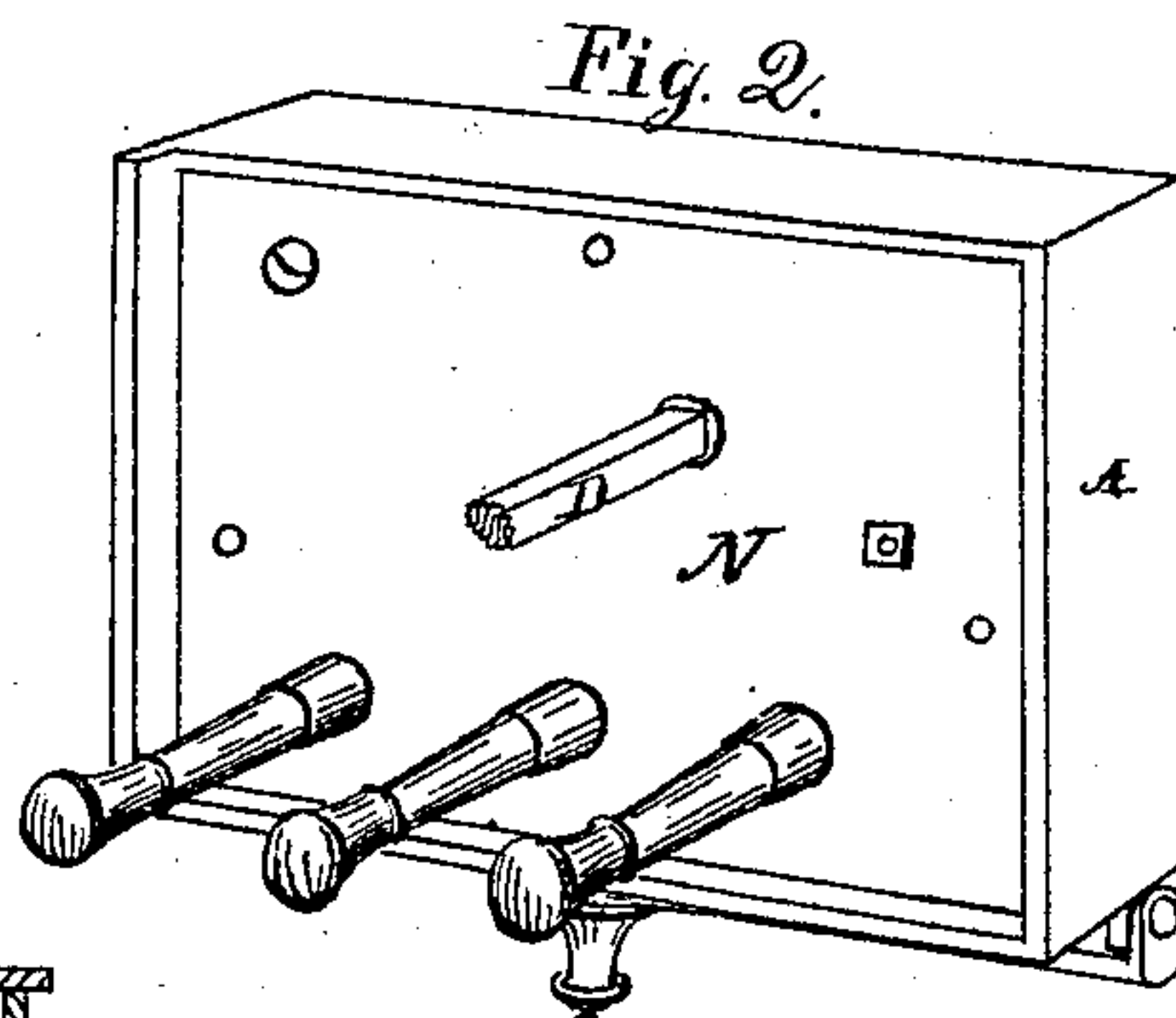
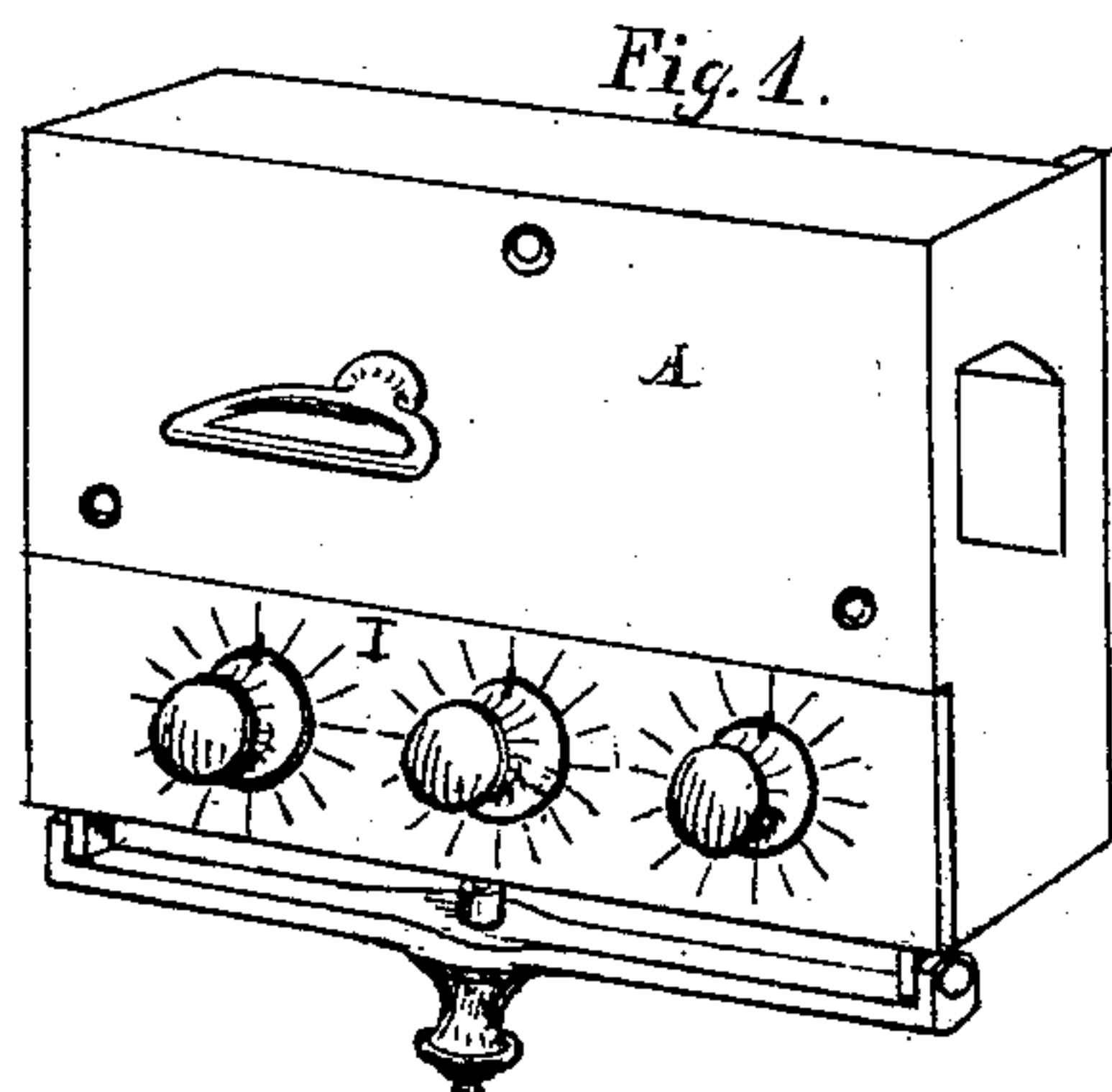


R. A. LEE.

Improvement in Permutation-Locks.

No. 132,161.

Patented Oct. 15, 1872.



WITNESS

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# UNITED STATES PATENT OFFICE.

ROLLIN A. LEE, OF CLEVELAND, OHIO.

## IMPROVEMENT IN PERMUTATION LOCKS.

Specification forming part of Letters Patent No. **132,161**, dated October 15, 1872.

*To all whom it may concern:*

Be it known that I, ROLLIN A. LEE, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented an Improved Permutation Lock, of which the following is a specification:

This invention relates to that class of locks in which the bolt is secured by a tumbler engaging with disks which are set in a given position determined by a certain combination of numbers. The invention consists in the combination of the notched disks with a swinging plate and means for securing it in position for changing the combination of numbers. The invention further consists in the combination, with the disks and swinging-plate, of a peculiar tumbler having projections adapted to enter the notches in the disks. Finally, the invention consists in the combination of the disks, swinging plate, and fastening devices, ratchets, pawls, the tumbler, bolt, and arbor, all constructed and operating substantially as hereinafter described.

In the drawing, Figure 1 is a perspective view of a lock embodying my improvements; Fig. 2 is a similar view showing the reverse side of the lock; Fig. 3 is a transverse section of the lock; Fig. 4 is a view of the interior of the lock; and Fig. 5 is a view of the inner face of the covering-plate with its attachments.

Similar letters of reference indicate like parts in the several figures.

The lock-case A may be made in the form shown, or of any other suitable construction. The bolt B is made with an open frame at its inner end to receive the arm  $d^1$  of the arbor D. This arbor is provided with other arms,  $d^2$ ,  $d^3$ , in a different plane from that of the arm  $d^1$ , which operate in connection with the tumbler C, as will be hereinafter described. The tumbler is pivoted at  $c$ , and has connection with a spring, M, bearing against the lock-case, which insures its prompt action. On the upper surface of the tumbler is a shoulder,  $v$ , which, when the parts are in a certain position, engages with the arm  $d^2$  of the arbor, and another shoulder,  $w$ , for engagement with a lug,  $b^2$ , on the bolt. On the lower side of the tumbler are projections  $e^1$ ,  $e^2$ ,  $e^3$ , adapted to enter notches  $f$ ,  $g$ ,  $h$  in the disks F G H. These disks are keyed to short shafts or arbors, which pass through and have their bearings in a plate, I,

and have knobs on their outer ends, as shown in Figs. 1 and 3. The plate I is attached at each end to a bar, K, pivoted in the lock-case so as to be capable of a swinging motion. These bars K are connected by a horizontal bar, J, provided with a set-screw,  $j$ , which, being turned up against the lock-case, secures the plate I and its attachments in position. The object of attaching the disks to a swinging plate is to facilitate the changing of the combination, as will be presently explained. On the inner face of the plate N, which forms the covering of the lock on the opposite side from the plate I and its attachments, ratchet-wheels O P Q are located, being attached to arbors which extend through and have their bearings in the plate N, and are provided with knobs on their outer ends. The number of teeth on the ratchet-wheels corresponds to the number of holes  $s$  in the face of the disks F G H; and in the face of each ratchet-wheel is fixed a pin,  $t$ , adapted to enter any one of the holes  $s$  in the disks, as shown in Fig. 3. Spring-pawls  $p$ ,  $q$ ,  $r$ , engaging with the teeth of the ratchet-wheels, are pivoted to the inner face of the plate N, as shown in Fig. 5. One of the teeth on each ratchet-wheel—the one next the pin  $t$ —has one of its sides straight, so that the dog or pawl will not slip over it, to form a starting-point from which to count the notches in adjusting the combination.

When the parts are in the position shown in Fig. 4, the bolt may be freely moved back and forth by turning the arbor, and it is simply a latch-bolt. To lock the bolt, the tumbler is thrown up by turning the arbor backward, and the projections on the tumbler being thus lifted from the notches of the disks, the latter may be turned so that the projections will not re-enter the notches, but will rest on the peripheries of the disks, and the tumbler is thereby so elevated and supported that the shoulder  $w$ , by engagement with the lug  $b^2$  on the bolt, will prevent the latter from being thrown back. The bolt cannot be released until the disks are turned to a certain combination of numbers to bring the notches in the disks around to the proper points to receive the projections on the tumbler. For example, the lock is set to the combination 578, the disk F must be turned five points, (or teeth of the ratchet-wheel O,) G turned seven, and H turned eight teeth of



their corresponding ratchet-wheels. The projections  $e^1 e^2 e^3$  now enter the notches  $f g h$ , thus lowering the tumbler and permitting the operation of the bolt. Now, suppose it is desired to change the combination to 795. The plate I is released and thrown outward while the disks are in their present position, which operation disengages the pins  $t$  from the disks and the ratchet-wheels may then be turned without affecting the position of the disks, the first one, O, at the left being turned seven teeth, (counted by the click of the dog or pawl,) the next one nine, and the third five. The plate I is then returned to its place and secured by means of the set-screw  $j$ , the pins  $t$  entering the correspondingly-numbered holes in the disks; then by turning the arbor D slightly backward the tumbler is raised and the disks turned so as to hold up the tumbler and lock the bolt in the manner hereinbefore stated.

There may be various modifications without departing from the nature of my invention. For instance, the bars K K J, attached to the plate I, may be placed inside of the lock-case. The position as well as the number of the

disks may be varied. The tumbler may be of circular form with a number of disks arranged around it, by which the number of combinations which may be used would be greatly increased.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination and arrangement of the disks F G H with the swinging plate I and means for securing the same, for changing the combination of numbers, substantially as shown and described.

2. In combination with the disks F G H and swinging plate I, I claim the tumbler O with projections  $e^1 e^2 e^3$ , substantially as herein described.

3. The combination of the disks F G H, devices I J K, ratchets O P Q, pawls  $p q r$ , tumbler C, bolt B, and arbor D  $d^1 d^2 d^3$ , all constructed and operating substantially as herein set forth.

ROLLIN A. LEE.

Witnesses:

GEO. W. TIBBITTS,  
N. A. GILBERT.