

W. F. Kistler,

Permutation Lock.

No. 94613.

Patented Sep. 7. 1869.

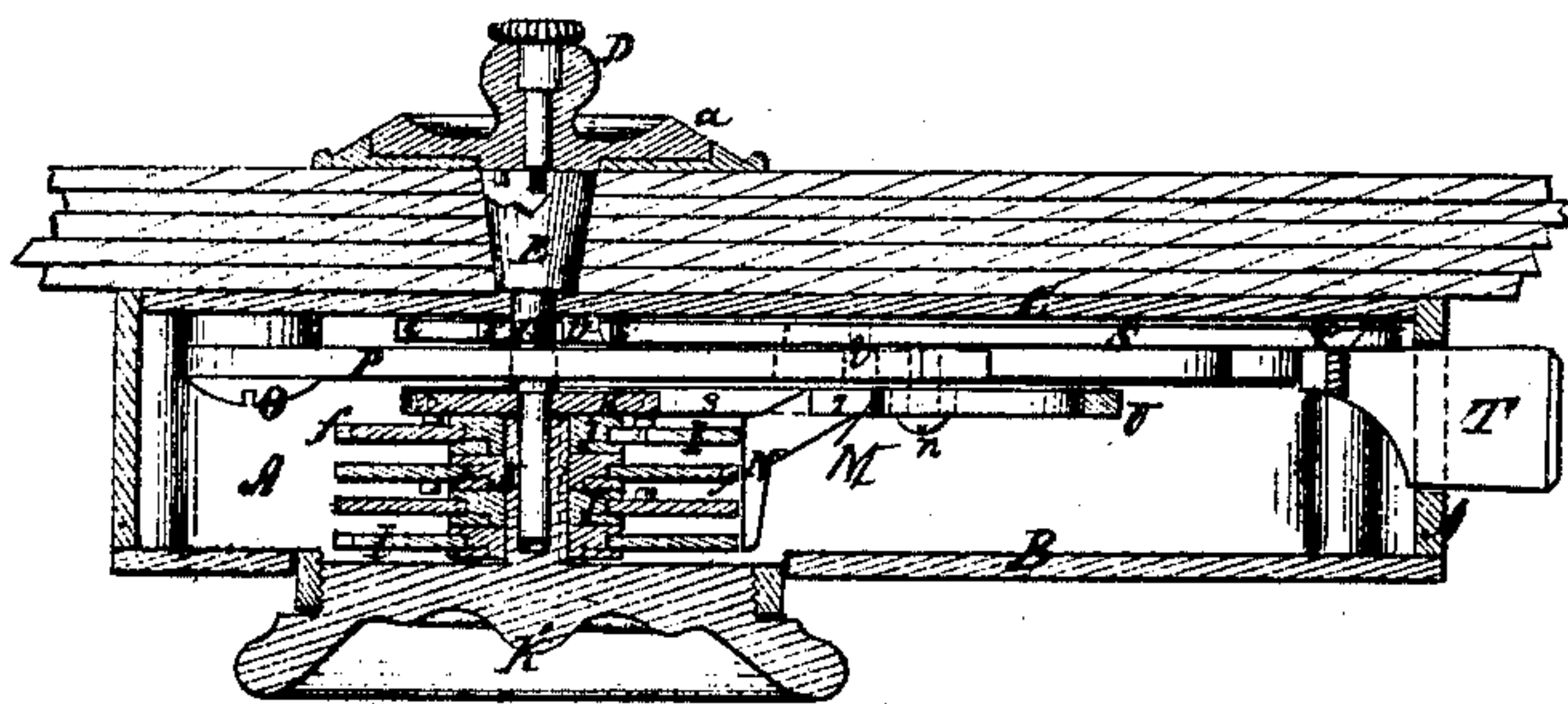


Fig. 2.

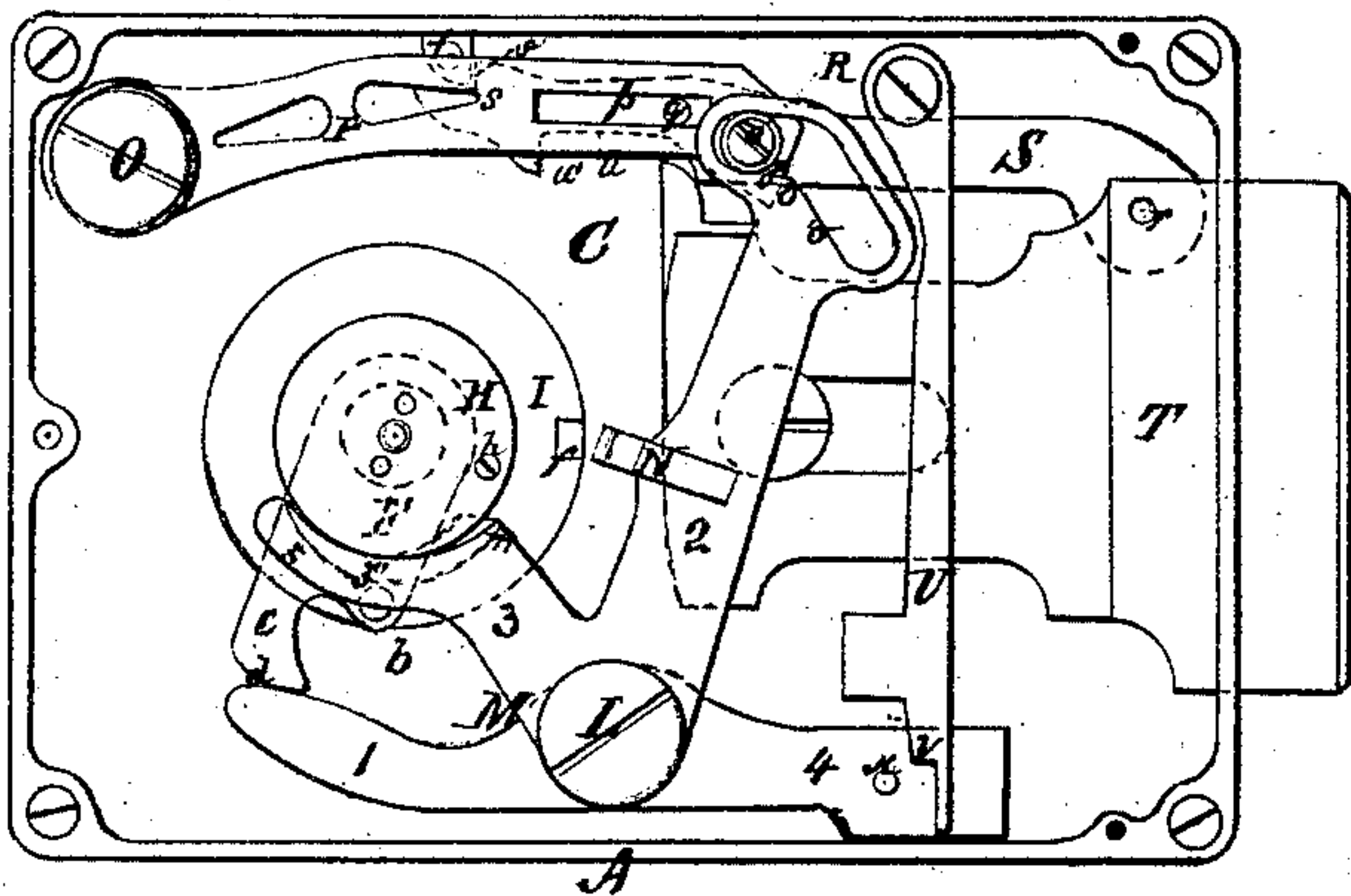


Fig. 4.

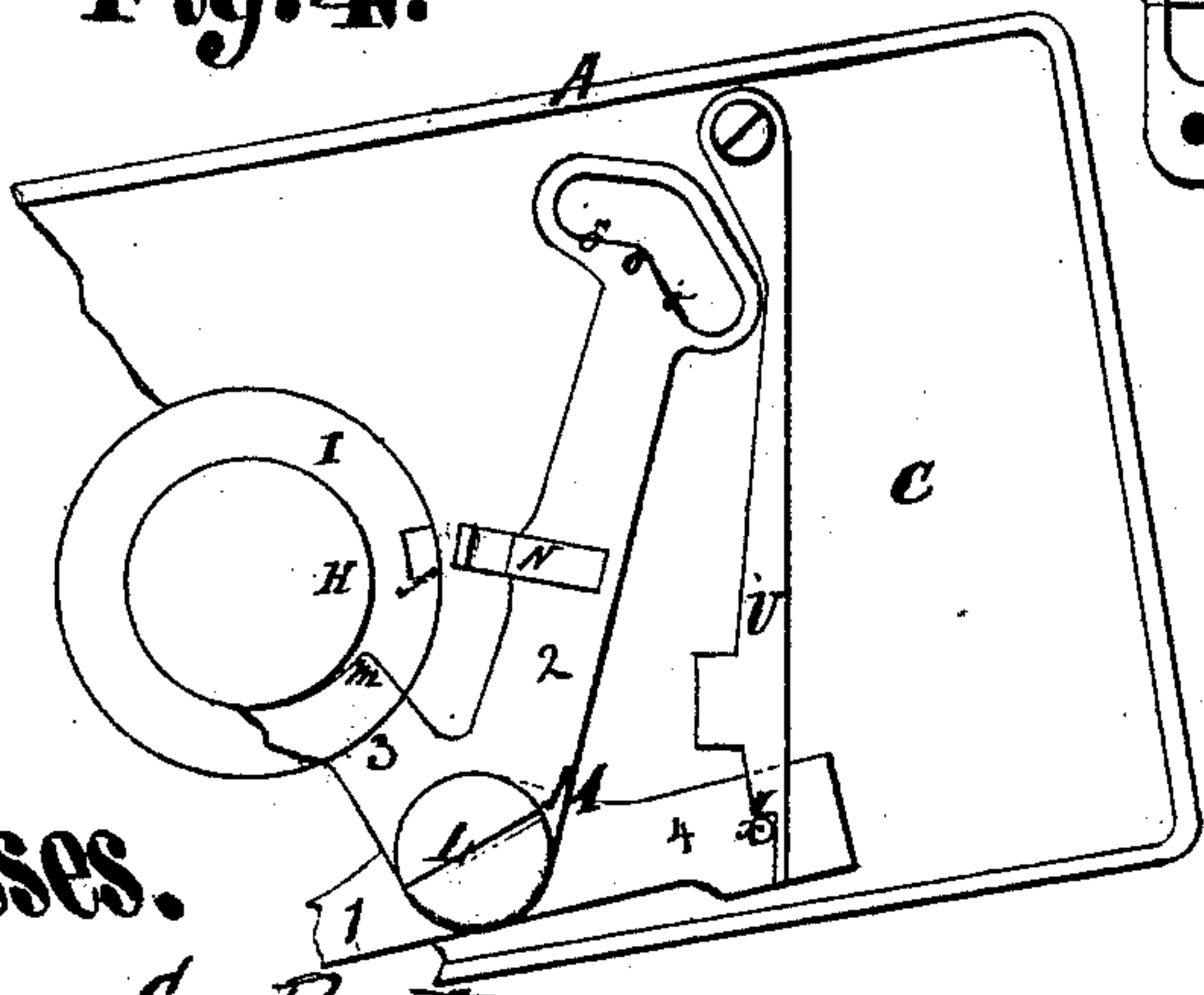


Fig. 5.

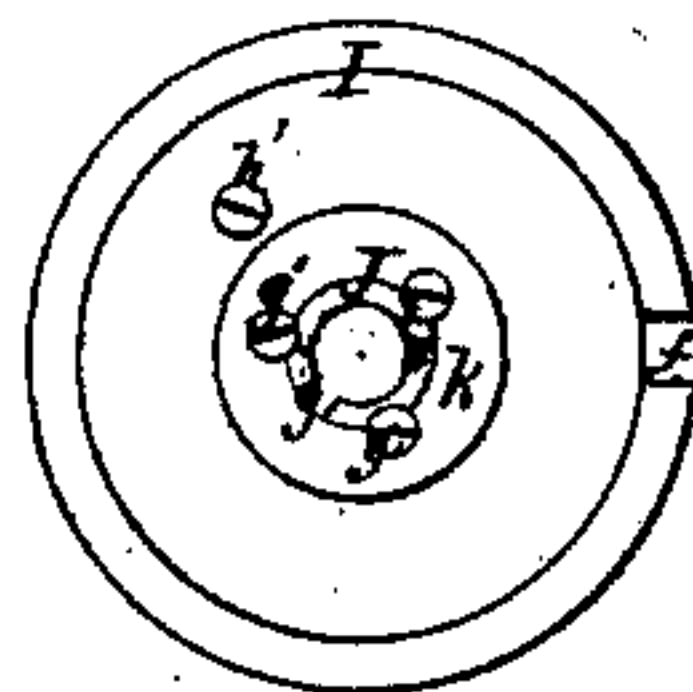


Fig. 6.

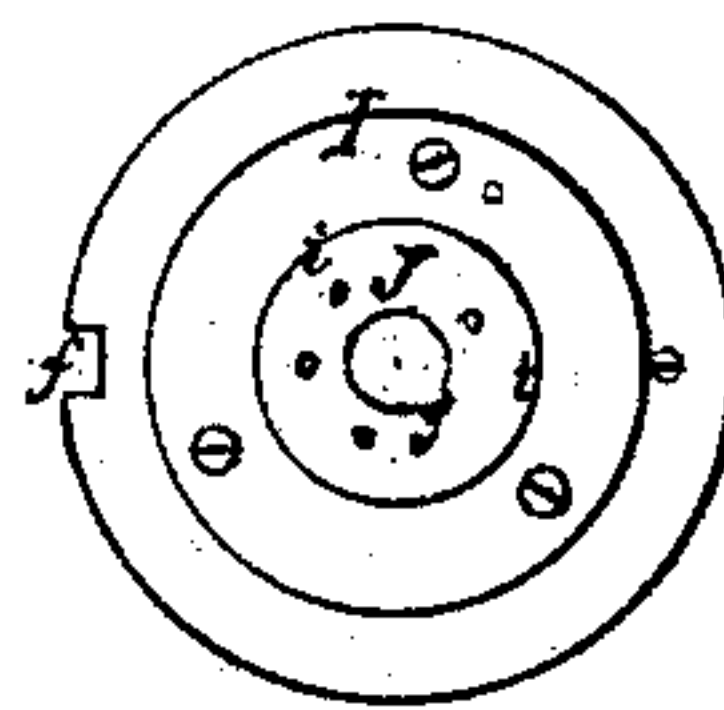
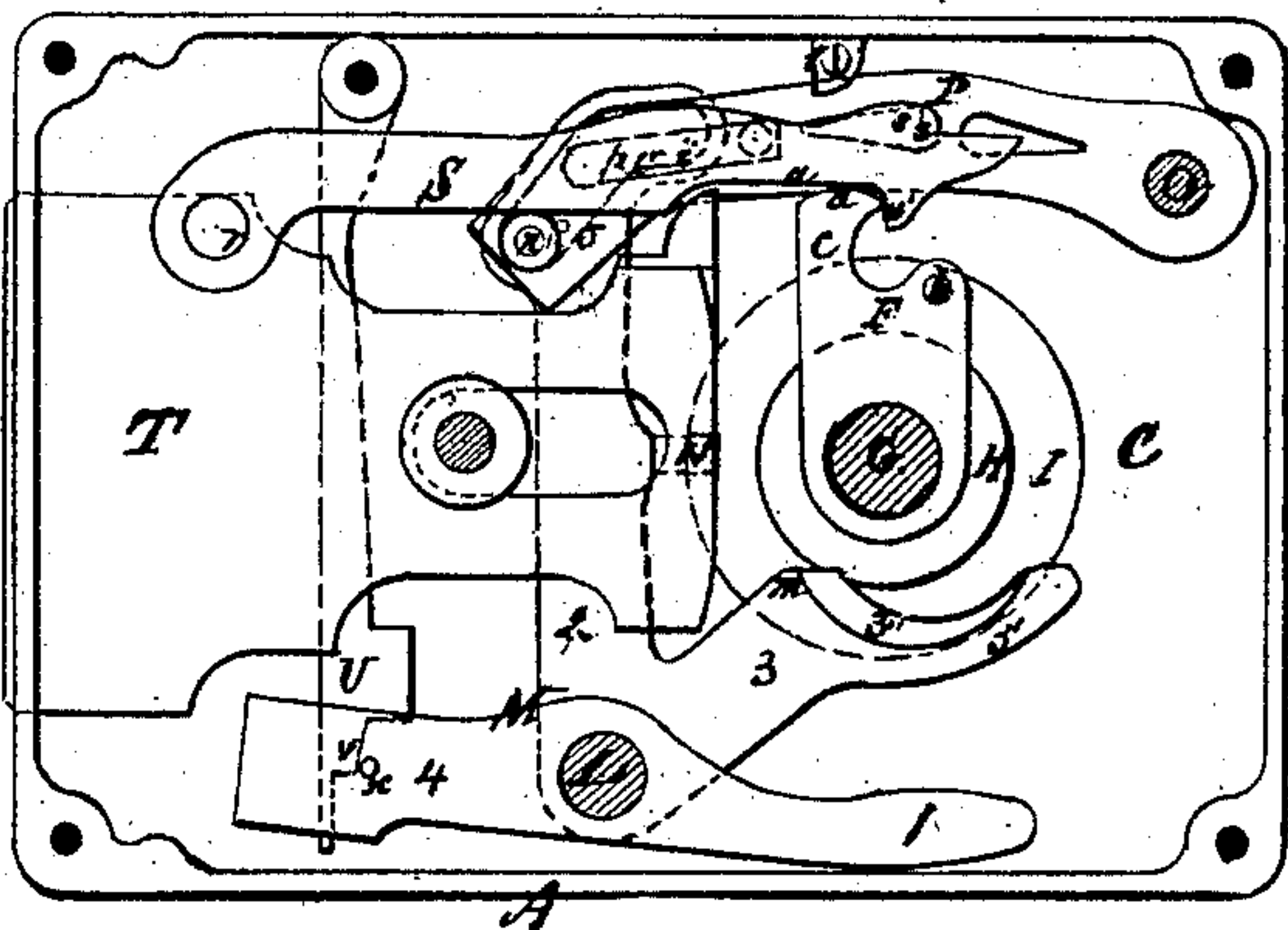


Fig. 7.



Fig. 3.



Witnesses.

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W. F. KISTLER, OF CINCINNATI, OHIO, ASSIGNOR TO HIMSELF AND
JOSEPH L. HALL, OF SAME PLACE.

Letters Patent No. 94,613, dated September 7, 1869.

IMPROVEMENT IN PERMUTATION-LOCKS.

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

To whom it may concern:

Be it known that I, W. F. KISTLER, of Cincinnati, in the county of Hamilton, and State of Ohio, have invented a new and useful Improvement in Combination No-Key-Hole Locks, of which the following is a full and clear description, reference being had to the accompanying drawings, making part of this specification.

My improvement in locks is applicable to that class of locks termed combination or permutation-locks, to all wherein the rotating tumblers are employed; and consists in peculiarly-constructed washers for lessening the friction between the "tumblers;" also to an "anchor," pivoted to the casing of the lock in such a manner that the parts thereof furthest removed from the "tumblers" shall, by their excessive gravity, prevent the "dog," secured to the anchor, from being in contact with the faces of the tumblers, in order to prevent "feeling" for the slots in the tumblers; and also, to a pendulous check-bar, having a projecting lug near its lower or free end, so constructed, with reference to a corresponding projection from one of the arms of the anchor furthest removed from the tumblers, that in case the safe, or other receptacle of valuables to which the lock is secured, is tilted, the lug at the end of the pendent check-bar will vibrate over, and be in contact with the projection from the anchor, to prevent the contact of the "dog" with the faces of the tumblers.

Figure 1 represents a horizontal sectional plan of my improved lock, taken through the centres of the tumblers and the knob.

Figure 2 is an elevation of the interior of the lock, exhibiting the position of the operating parts thereof, immediately previous to the entrance of the "dog" into the slots in the tumblers before the bolt can be withdrawn.

Figure 3 is an elevation of the interior operating parts of the lock, as seen when the exterior plate is removed. The bolt is withdrawn.

Figure 4 represents part of the interior of the lock, showing the action of the "pendulous check-bar" upon the "anchor," in order to prevent contact of the tumblers and the "dog," in case the safe, or other receptacle of valuables to which the lock is secured, is tilted.

Figures 5 and 6 are respectively the obverse and reverse sides of the tumblers.

Figure 7 is a diametrical cross-section of one of the tumblers.

A is the casing of the lock, of which the rear and front plates, respectively, B and C, may be removed.

The knob D, located upon the outside of the door of the safe, and attached to the dial-plate *a*, is secured to the arbor E in the usual manner.

To the continuation of the arbor within the lock is secured the arm F, having the projecting pin *b* extending inward, and located at one corner of the free end of said crank-arm F.

The opposite free end *c* of the arm F extends further from the spindle G, the cylindrical continuation of the arbor E, than does the corner bearing the pin *b*, the end face *d* of which is convex.

Further in upon, and secured to the spindle G, is the "driving-disk" H, provided with pin *h*, which engages a similar pin, *h'*, projecting from the first of the series of tumblers I, which are disk-rings, having the slot *f* in each, for the reception of the "dog" when the bolt is to be thrown.

Each of these tumblers I is mounted loosely on the hub *e* of an annular disk or washer, J, the projecting flange *i* of which extends far enough from the hub to separate the tumblers, and serve as a washer between them.

After the tumbler has been mounted on the hub of the disk J, a flange or ring, *k*, is attached, by screws *g*, as clearly shown in figs. 6 and 7, for the purpose of holding the tumbler in place.

These annular disks or washers J, with the tumblers I mounted thereon, are then slid upon a hollow spindle, K, which is attached to a removable head or rose, K'.

This hollow spindle K extends from the head K' to the driving-disk H, and is of the requisite length to receive all the disks or washers J, with the tumblers on them. It is provided with a rib, *l*, that fits into a slot, *g*, on the inner face of the washers, for the purpose of preventing the latter from turning, all as clearly shown in fig. 1.

It is obvious that all of the washers, except the one next to the head K', may have the tumblers I mounted on them, and then be slid upon the hollow spindle K without the use of the flange-ring *k*, and that in the exceptional instance a flange or other equivalent device may be left on the inner face of the head K', and that in this arrangement the tumblers will be as free from friction as in the other.

The spindle G extends beyond the driving-disk into the cylindrical cavity in the spindle K.

Near the bottom of the lock, and nearly midway between the opposite ends thereof, is the pivoting-bolt L to the anchor M.

The anchor has the four arms, 1, 2, 3, and 4, respectively.

A line passed through the centre of the pivot L would pass through the entire lengths of the arms 1 and 4. The arm 1 curves up toward the arm F, which is immediately over it. The upper face of arm 1 is slightly convex.

The arm 3 of the anchor M is elbowed at *m*, where it comes in contact with the driving-disk H. Its prolongation 3', beyond and beneath the driving-disk H, has its upper face convex, to fit about the said disk H.

A curved lug, 3'', projects toward the crank-arm F, and is acted upon by the pin *b*, which projects from one corner of the arm F.

A "dog," N, is secured to the arm 2 of the anchor, in such a position that it readily enters the slots in the tumblers I when it is desirable to withdraw the bolt; otherwise the dog cannot touch the faces of the tumblers, being withheld therefrom by the greater gravity of the arms 2 and 4, which are on one side of the pivot point of the anchor, to the arms 1 and 3 upon the opposite side.

The free end of arm 2 of the anchor is slotted, as exhibited in fig. 2. When the bolt is still out, and the "dog" removed from the tumblers, that part of the slot toward the pivot O of the limiting-arm P is about horizontal, and is much shorter than its opposite and sloping-downward portion.

Projecting from the free end of the arm P is the stud n, which carries a roller, R, located within the slot in the free end of arm 2 of the anchor.

The interior surface of the slot, against which the roller bears when motion is given to the anchor, is elbowed at o, and the incline-surface o' from the angular point O is of greater length than the horizontal surface o'' of the interior of the said slot, in the position of the parts of the lock exhibited in fig. 2.

A slot, p, in the arm P, extends from near the stud n toward the pivot of said arm.

A pin, q, occupies the slot p. It is secured to the operating-lever S, which is attached to the bolt T of the lock by the draught-pin r.

In the free end of the lever S, upon the upper surface thereof, is located the square-cornered recess s. The vertical wall s' is, when the lock is out, as exhibited in fig. 2, in close contact with the corresponding wall of the check-block t, secured to the plate C of the lock-case.

Further from the free end of the lever S than is the recess s, and upon the under surface of said lever, is the recess u. The end wall u' of this recess is impinged upon by the tip of the end c of the crank-arm F when the bolt is being withdrawn, as exhibited in fig. 3.

A pendent check-bar, U, is so pivoted or otherwise secured to the casing of the lock, near the top thereof, that its free end, near the bottom of the lock, may freely vibrate when the safe is tilted.

A shoulder, v, near the free end of the said check-bar, extends over the pin x, projecting from the arm 4 of the anchor, as shown in fig. 4, where the lock is not horizontal.

To manipulate the lock for the purpose of unlocking the safe or other receptacles of valuables, the slots f in the tumblers I are, by means of the known combinations, brought into line opposite the dog N of the anchor M, when, by a quick motion of the knob D, the free end c of the crank-arm F impinges upon the arm 1 of the anchor M, as exhibited in fig. 2, pressing it to the bottom casing of the lock, as shown in fig. 3, causing the dog N to enter the slots in the series of tumblers I at the same time the slotted free end of the arm 2 of the anchor is caused to move quickly in a direction opposite to the bolt T. The roller R rolls over the inner horizontal, angular, and incline-surfaces of the slot of arm 2.

This operation causes the limiting-arm P to drop down at its free end, and since the pin q of the operating-lever S extends within the slot p of the limiting-arm P, the operating-lever S also falls, or is carried down, liberating the recess s of the said operating-lever from the check-block t.

Still rotating the knob D, the "tip" of the free end c of the crank-arm F engages the end wall u' of the recess u in the bottom face of the free end of the lever S. The bolt T is then drawn within the lock, as clearly shown in fig. 3, and the door of the safe or other receptacle opened.

When it is desired to lock the door, it is first closed, and the knob then turned in a direction opposite to

that in which it was moved for withdrawing the bolt. As it is thus turned, the point c of the arm F impinges against the rear end of the bolt, and drives it forward, and immediately the pin b, on the arm F, engages with the rib 3'' of arm 3 of the anchor M, and raises its arms 3 and 1 sufficiently to cause the weight of its other arms, 2 and 4, to turn it upon its pivot L, and thus, at the same time, withdraw the dog N from the tumblers, and cause the free end of the limiting-arm P to carry up the free end of the operating-lever S, so as to bring the vertical wall of its recess s immediately opposite the block t, and thus hold the bolt in place.

The combination or arrangement of the tumblers may now be broken up, when it will be impossible to operate the lock without the combination being known to the operator.

It cannot be picked, for the reason that as the dog N is held away from the tumblers, there can be no "feeling" for the slots, and consequently, no measurements taken by a "micrometer," for the purpose of setting the tumblers on the line of their slots.

When a quick motion is given to the anchor M by a sudden turning of the knob, the dog N will strike against the face of some of the tumblers, and cause the anchor to rebound to its original position; and when the knob is turned slowly the pin b, in engaging with the rib 3'' on arm 3 of the anchor, will cause the latter to tilt, and withdraw the dog N from contact with the tumblers.

The pendent-arm U is called into use when the safe is tilted in such a manner that the "dog" N will be in contact with the faces of the tumblers, on account of the centre of gravity of the anchor being transposed to the opposite side of the pivoting-bolt L or nearer the tumblers.

A shoulder, v, near the free end of said pendulous arm, extends over the pin x, which projects from the arm 4 of the anchor, near the end thereof, preventing the contact with the tumblers of the dog N.

From the foregoing description and operation of my improved lock, it appears that to those locks wherein the revolving tumblers are employed, the anchor and pendulous-arm U may be used in connection therewith, to prevent beyond doubt the picking of the lock; therefore constitute indispensable elements of locks.

The advantage of the herein-described washers is in the lessening the friction between themselves and the tumblers caused to revolve within and about them in the manipulation of the lock.

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

1. Mounting the tumblers I on the stationary annular disks or washers J, constructed substantially as herein described, and then arranging them on the spindle K, as and for the purpose set forth.

2. The anchor M, consisting of the arms 1, 2, 3, and 4, constructed and arranged to operate substantially as herein described, and for the purposes set forth.

3. The arm F, with its point c and its pin b, in combination with the anchor M, consisting of arms 1, 2, 3, and 4, when constructed and arranged to operate substantially as herein described, and for the purposes set forth.

4. The pendent check-bar U, in combination with the anchor M, when constructed and arranged to operate substantially as and for the purpose set forth.

5. The arm F, anchor M, tumblers I, arm P, lever S, block t, and lock-bolt T, when constructed and arranged to operate substantially as and for the purpose specified.

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Witnesses:

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