

(Model.)

W. E. MALLEY.
PERMUTATION LOCK.

No. 330,137.

Patented Nov. 10, 1885.

Fig. 1

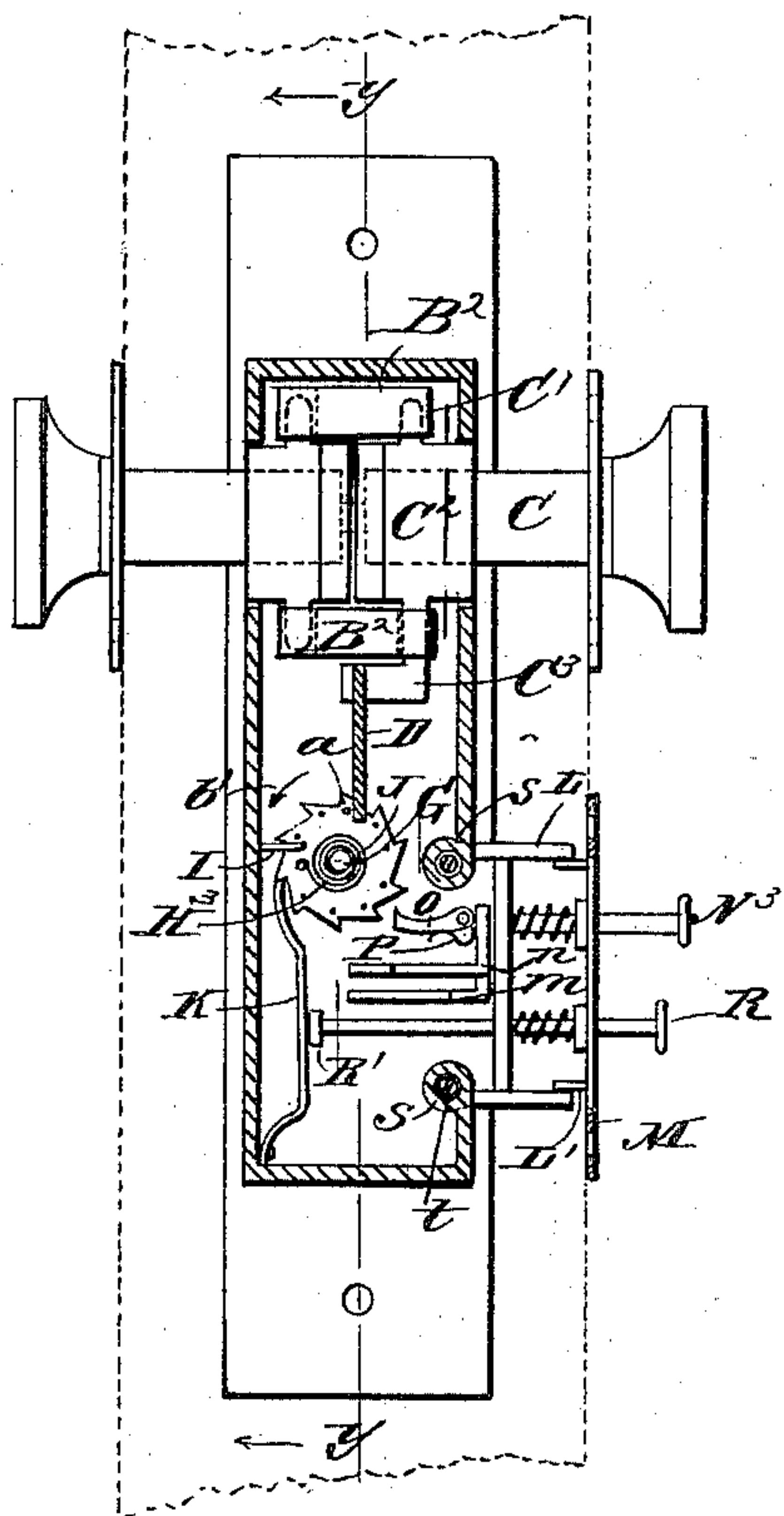


Fig. 2

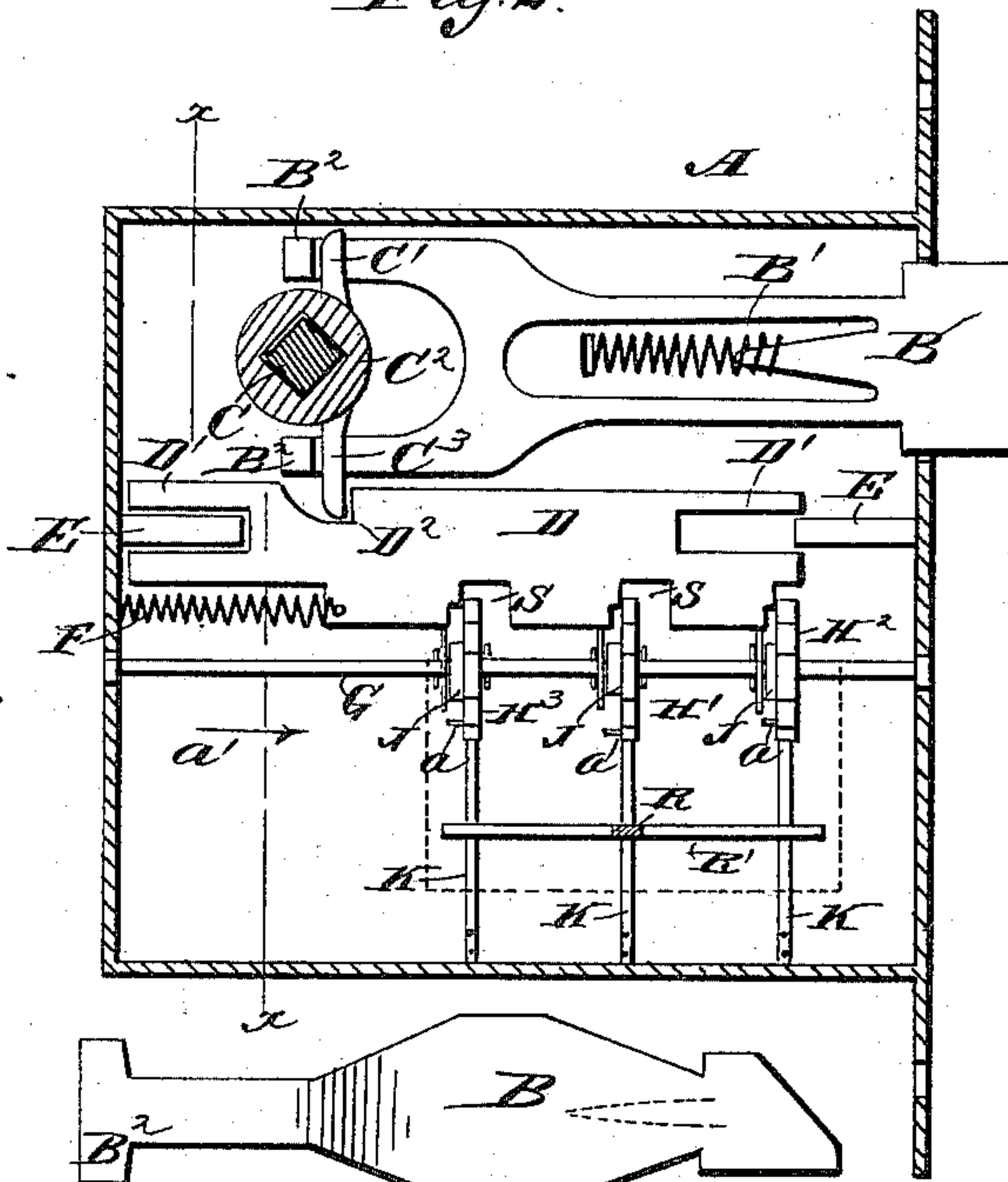


Fig. 3

Fig. 4

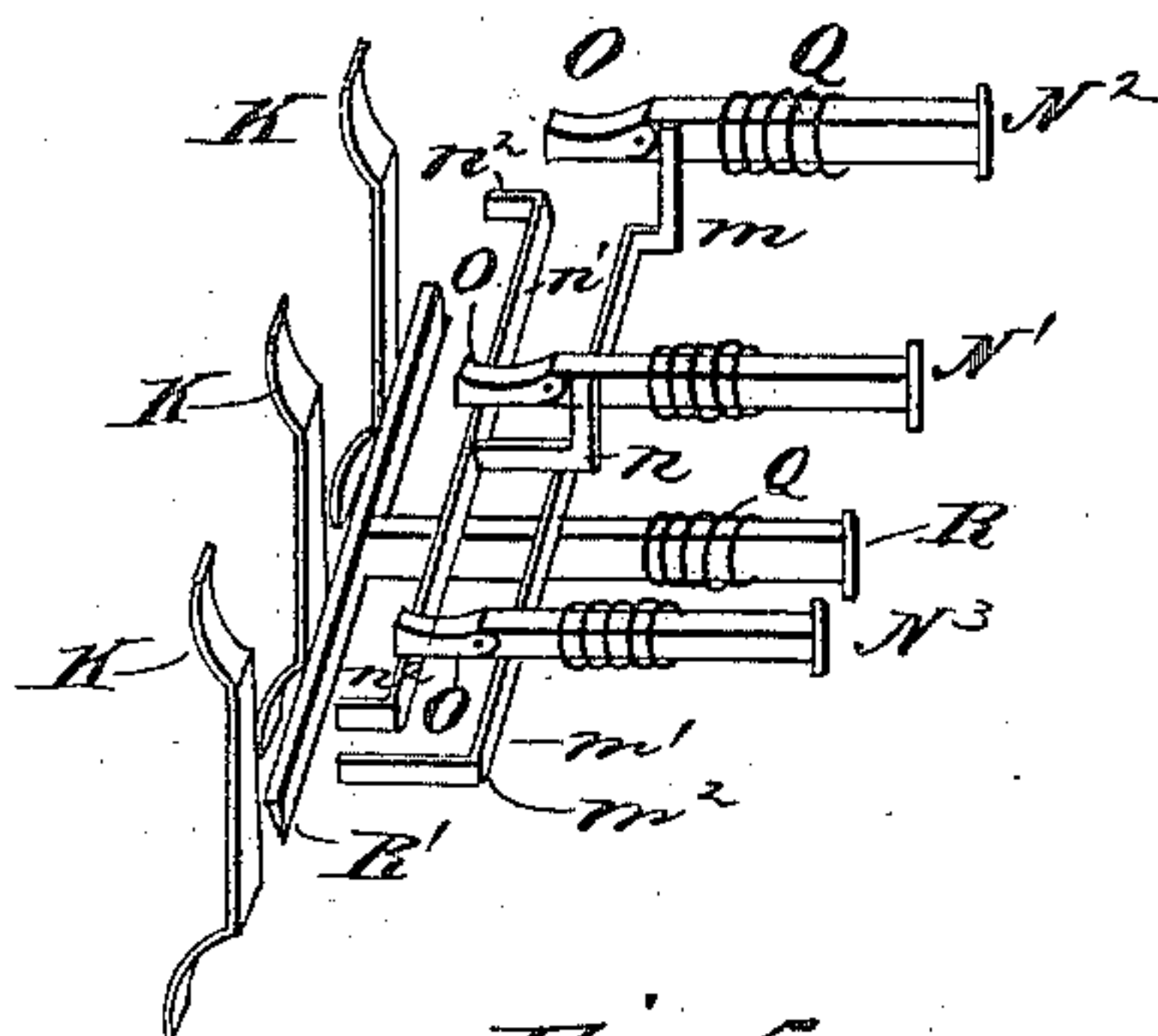
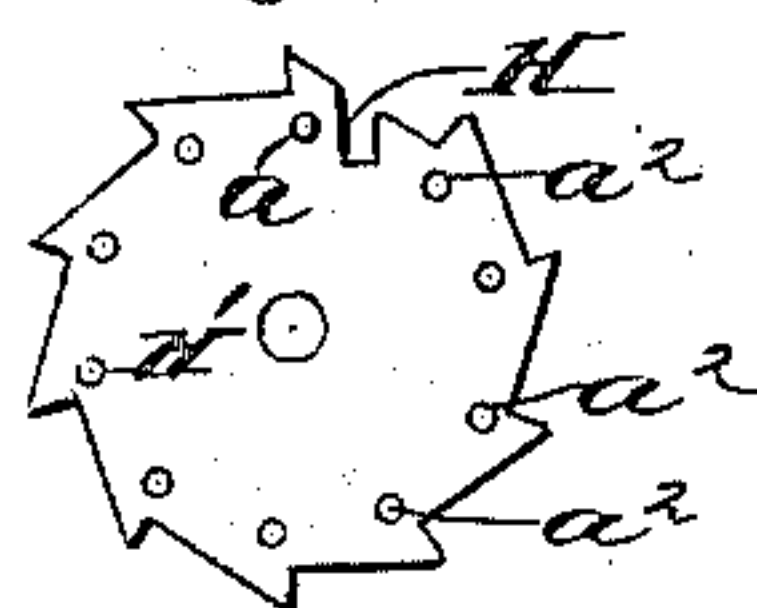


Fig. 5



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PERMUTATION-LOCK.

SPECIFICATION forming part of Letters Patent No. 330,137, dated November 10, 1885.

Application filed May 25, 1885. Serial No. 166,589. (Model.)

To all whom it may concern:

Be it known that I, WALTER E. MALLEY, of New Haven, in the county of New Haven and State of Connecticut, have invented a new and Improved Combination and Permutation Lock, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved combination and permutation lock which is simple in construction, safe and reliable, and not apt to get out of order.

The invention consists in the combination, with a casing, a sliding bolt, and a sliding tumbler, of ratchet-wheels adapted to engage with the tumbler, and of push-pins or other devices for turning the ratchet-wheels to permit the tumbler to slide, the said ratchet-wheels being held in place by suitable pawl-springs, which can be disengaged from the wheels by means of a separate push-pin or other device. The ratchet-wheels are mounted loosely on a shaft and are turned by springs wound on the shaft, and secured to the same and to the ratchet-wheels. Each ratchet-wheel is provided with a laterally-projecting pin adapted to engage with a pin or projection on the casing.

The invention also consists in parts and details and combinations of the same, as will be fully described and set forth hereinafter.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a cross-sectional elevation of my improved lock on the line *xx*, Fig. 2. Fig. 2 is a longitudinal sectional view on the line *yy*, Fig. 1. Fig. 3 is a plan view of the bolt. Fig. 4 is a perspective view showing the arrangement of the push-pins. Fig. 5 is a face view of one of the ratchet-wheels.

In the casing *A* a sliding bolt, *B*, is held, the beveled end of this bolt being projected from the end of the casing by a spring, *B'*, in the usual manner, and the said bolt being provided at its forked inner end with teeth or projections *B²*, on which the arms *C'* *C³* of a nut, *C²*, on the knob-shaft *C* are adapted to act for the purpose of withdrawing the bolt. A sliding tumbler, *D*, is provided at the ends with notches or recesses *D'*, which engage the

tongues or cross-pieces *E*, secured to or cast upon the casing, and adapted to guide the said tumbler. The tumbler is also provided in its upper edge with a notch or recess, *D²*, into which the end of the downwardly-projecting arm *C³* of the nut *C²* passes. The tumbler is drawn in the inverse direction of the arrow *a'* by a spiral spring, *F*, secured to the tumbler, and to the inner end piece of the casing *A*. Parallel with and below the sliding tumbler *D* a shaft, *G*, is held in the casing, and on the same three ratchet-wheels, *H'*, *H²*, and *H³*, are loosely mounted, each ratchet-wheel being provided with a notch, *H*. At each tooth a pin-aperture, *a²*, is formed in one side of each wheel, and in one of them a pin, *a*, is held, the said pins being adapted to strike corresponding pins, *I*, projecting from the inner surface of the casing. Adjacent to each ratchet-wheel a flat spiral spring, *J*, is coiled around the shaft, and has one end secured to the said shaft and the other end to the side of the ratchet-wheel, the said springs swinging the wheels in the direction of the arrow *b'*, Fig. 1. Against the toothed edge of each ratchet-wheel a locking-spring, *K*, rests, which is secured to the casing at or near the bottom. From the side of the casing a rectangular or other neck, *L*, projects, which is provided with an extension-piece, *L'*, fitting in the said neck, the said extension-piece being provided with an escutcheon-plate, *M*, to fit on the outer surface of the door, in which the lock is mortised. This extension-piece has to be provided, as the thicknesses of doors vary. In some cases the escutcheon-plate *M* is on the outer edge of the neck *L*, and in some cases it is a greater or less distance from the same.

The neck *L* can be held in the casing in any suitable manner, but I prefer to form eyes *s* on the edges of the opening, and corresponding eyes on the inner edges of the neck, the eyes of the neck and opening interlocking, and then I pass a screw, *t*, through the said eyes from the end of the lock-casing, thus holding the neck on the casing.

In the plate *M* three pins, *N'* *N²* *N³*, are held to slide at right angles to the longitudinal plane of the lock-casing, and on the inner end of each pin a pawl, *O*, is pivoted, which is held raised by a spring, *P*. The pawls are so

arranged that they can act upon the corresponding ratchet-wheels, H' , H^2 , and H^3 . Spiral springs Q surround the push-pins N' , N^2 , N^3 and push them outward. Below the
 5 above-mentioned push-pins a push-pin, R , is arranged in the plate M , which is also pressed outward by a spring, Q , and has a cross-piece, R' , on its inner end, the said cross-piece extending across to the springs K , as shown in
 10 Fig. 4. To the inner end of the push-pin N' an elbow, n , is secured, and projects downward, and to the elbow a cross-piece, n' , is secured, which is provided at each end with a tooth, n^2 , the said teeth n^2 being adapted
 15 to act on the springs K of the ratchet-wheels H^2 and H^3 . On the push-pin N^2 a downwardly-projecting elbow, m , is secured, and to the same a cross-piece, m' , is fastened, which is provided on its free end with a tooth, m^2 ,
 20 adapted to act on the spring K of the ratchet-wheel H^3 . The cross-pieces or rods n' , m' constitute the permutation devices, and may be left off or may be applied, as desired.

In the bottom of the sliding tumbler D two
 25 notches, S , are formed, which correspond in position to the ratchet-wheels H' and H^3 , the end of the tumbler being adjusted to the third ratchet-wheel, and in that edge of each notch S facing the ratchet-wheel.

30 The operation is as follows: To unlock the lock, the notches H of the three wheels H' , H^2 , H^3 must be in line, so that the tumbler can be passed into the said notches. In order to bring the notches in this position, the wheels
 35 are revolved the distance of one, two, or more teeth by means of the push-pins N' , N^2 , N^3 . By pushing the said pins in their pawls engage with the teeth of the ratchet-wheels and revolve the ratchet-wheels. For example, the
 40 wheel H' is to be revolved the distance of one tooth, the wheel H^2 the distance of two teeth, and the wheel H^3 the distance of three teeth. For this purpose the lock must first be adjusted, which is accomplished by placing the
 45 removable pins a in the apertures of different teeth. The pin a in the disk H' is placed one tooth from the notch, in the disk H^2 it is placed two teeth from the notch, and in the disk H^3 it is placed three teeth from the notch,
 50 the said pins resting on the corresponding pins, I , as the wheels are thrown in the direction of the arrow b' until they rest on the said pins I . If the disks or ratchet-wheels have been so adjusted that the notches are in line, the knob
 55 is turned and the bolt withdrawn, and at the same time the tumbler D is moved in the direction of the arrow a' and through the notches of the ratchet-wheels. When the knob-shaft is released, the spring B' pushes the bolt out-
 60 ward, and the spring F' pulls the sliding tumblers in the inverse direction of the arrow a' . The pin R is pressed inward to throw off the springs K , or one or more of the push-pins N' , N^2 , N^3 are pushed inward one or more times,
 65 so as to shift the ratchet-wheels in such a manner that the notches will not be in line, thus making it impossible to shift the tumbler.

If at any time the bolt is to be withdrawn, the push-pin R is pushed inward so as to dis-
 engage the springs K from the ratchet-wheels, 70 thus permitting the several springs J to swing the three ratchet-wheels in the direction of the arrow b' until they rest on their pins I . The several ratchet wheels are thus thrown
 75 into their normal position, and if they are moved one, two, or three teeth, as set forth above, their notches will be in line, and the tumbler can be moved in the inverse direc-
 80 tion of the arrow a' and the bolt withdrawn. The push-pin R must be pushed in every time before the lock is unlocked, so that the ratchet-wheels will be in their relative positions.

By adjusting the pins a in holes in different teeth various combinations can be produced. For instance, one wheel can be set to be re-
 85 volved one tooth, another eight, and the other six, and so on. It is evident that a greater number of ratchet-wheels and corresponding push-pins can be used. The ratchet-wheels turn in the notches S of the sliding tumbler. 90

When the permutation device shown in Fig. 4 is used, the operation is somewhat different. In this case the pins must be pushed
 in in the proper order, the pin N' first, the pin N^2 second, and the pin N^3 last, as other- 95 wise the notches will not come in line. The pin N' is pushed in first, and the teeth n^2 on the cross-bar n' push the springs K of the wheels H^2 and H^3 from the said wheels, thus
 100 permitting the springs of the corresponding wheels to turn the wheels in the direction of the arrow b' until their pins a rest on the pins I . Then the pin N^2 is pushed inward, which does not act on the spring K of the wheel H^2 or H' ,
 105 but acts on the spring K of the wheel H^3 , thus again disengaging the spring from the said wheel and permitting the spring J to turn the said wheel (if in a forward position) in the
 110 direction of the arrow b' until the pin a of the said wheel H^3 rests upon the corresponding pin I . Then the pin N^3 is pushed inward, which does not act on any of the springs K . If by mistake the pin N^2 is pushed in first
 115 and the wheel H^2 brought in its proper position, and then the pin N' is pushed in, the teeth n^2 , acting on the springs K , release the same from the wheels H^2 and H^3 , thus per-
 120 mitting the springs J to swing the said wheels in the direction of the arrow b' , whereby the wheel H^2 , which has been previously adjusted in the proper position by pressing in the pin
 125 N^2 twice, is again thrown out of its position, and thus prevents the tumbler from being shifted in the direction of the arrow a' and the bolt from being pulled inward.

As stated, the permutation device is not absolutely necessary, and can be omitted when desired.

Having thus described my invention, what I claim as new, and desire to secure by Letters 130 Patent, is—

1. In a combination-lock, the combination, with a frame or casing, a sliding bolt, and a sliding tumbler, of a series of ratchet-wheels

adapted to engage with the tumbler, a shaft on which said wheels are mounted, springs for turning the several ratchet-wheels, locking-springs for locking the ratchet-wheels in place, push-pins for turning the ratchet-wheels, and a push-pin for disengaging the locking-springs from the ratchet-wheels, substantially as herein shown and described.

2. In a combination-lock, the combination, with a frame or casing, sliding bolt, and sliding tumbler, of a series of ratchet-wheels, a shaft on which said wheels are mounted, an adjustable pin projecting from one side of each ratchet-wheel, a pin or projection on the frame with which the pin on the ratchet-wheel can engage, a spring for turning each separate ratchet-wheel, springs for locking the ratchet-wheels in place, push-pins for turning the ratchet-wheels, and a push-pin for disengaging the locking-springs from the ratchet-wheels, substantially as herein shown and described.

3. In a combination-lock, the combination, with a casing or frame, a sliding bolt, and a sliding tumbler, of ratchet-wheels, a shaft on which said wheels are mounted, the springs K, the push-pin R, having a cross-piece, R',

adapted to act on all the springs K, and of push-pins for turning the ratchet-wheels, substantially as herein shown and described.

4. In a combination-lock, the combination, with a casing, of a neck projecting from the same, an extension-piece held on the neck and provided with a face-plate, M, sliding pins in the face-plate, ratchet-wheels adapted to be acted upon by the pins, and a sliding tumbler adapted to engage with the ratchet-wheels, substantially as herein shown and described.

5. In a combination and permutation lock, the combination, with the casing, a sliding bolt, and sliding tumbler, of ratchet-wheels adapted to engage with the tumbler, a shaft on which said wheels are mounted, springs for turning the ratchet-wheels, springs for locking the ratchet-wheels in place, push-pins for turning the ratchet-wheels, and arms connected with said push-pins and adapted to act on the locking-springs of other ratchet-wheels, substantially as herein shown and described.

WALTER E. MALLEY.

Witnesses:

HENRY D. WHITE,
OLIVER S. WHITE.