

No. 860,201.

PATENTED JULY 16, 1907.

O. M. FARRAND.
COMBINATION OR KEYLESS LOCK.
APPLICATION FILED NOV. 1, 1906.

FIG. 1.

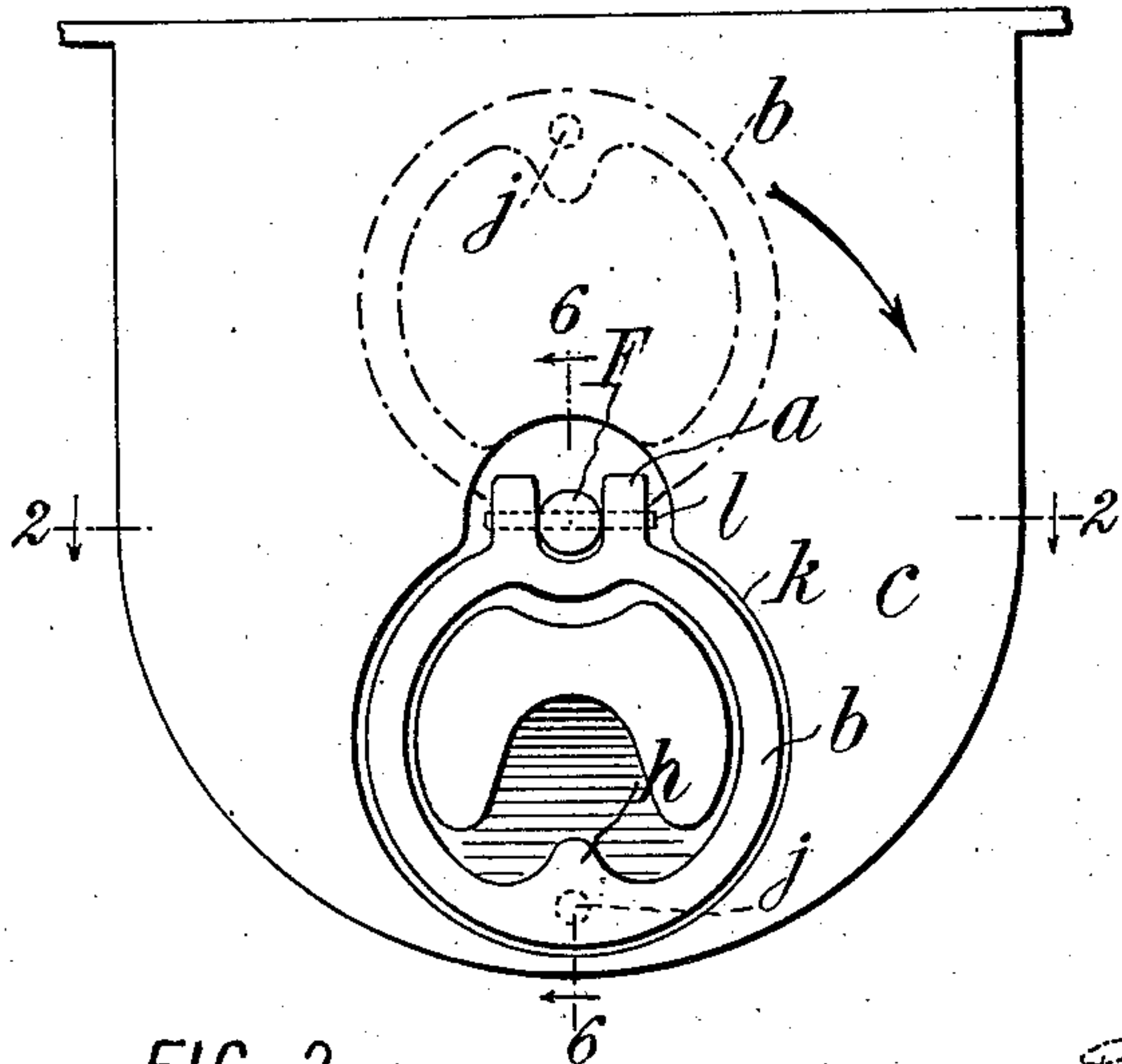


FIG. 5.

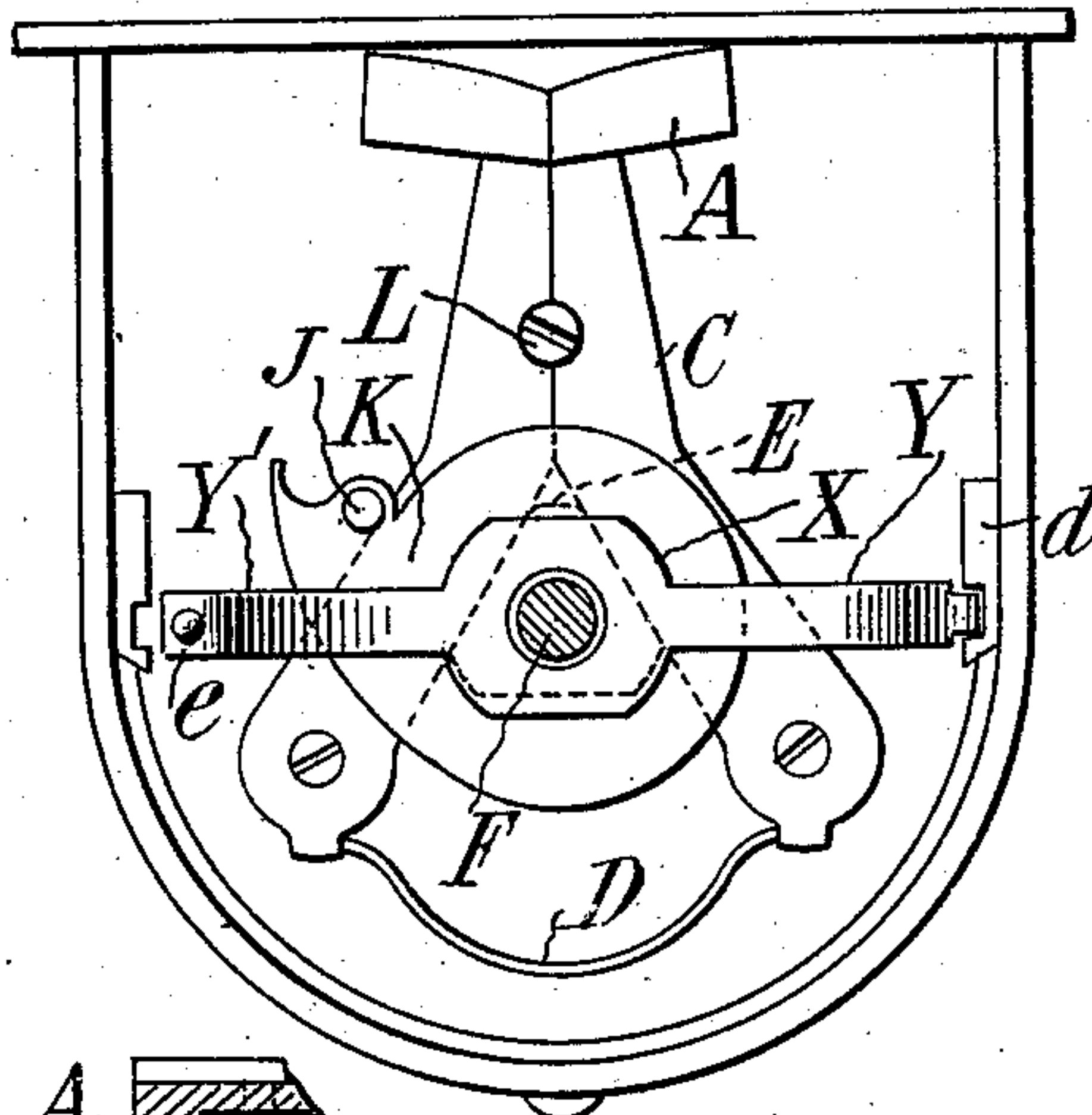


FIG. 2.

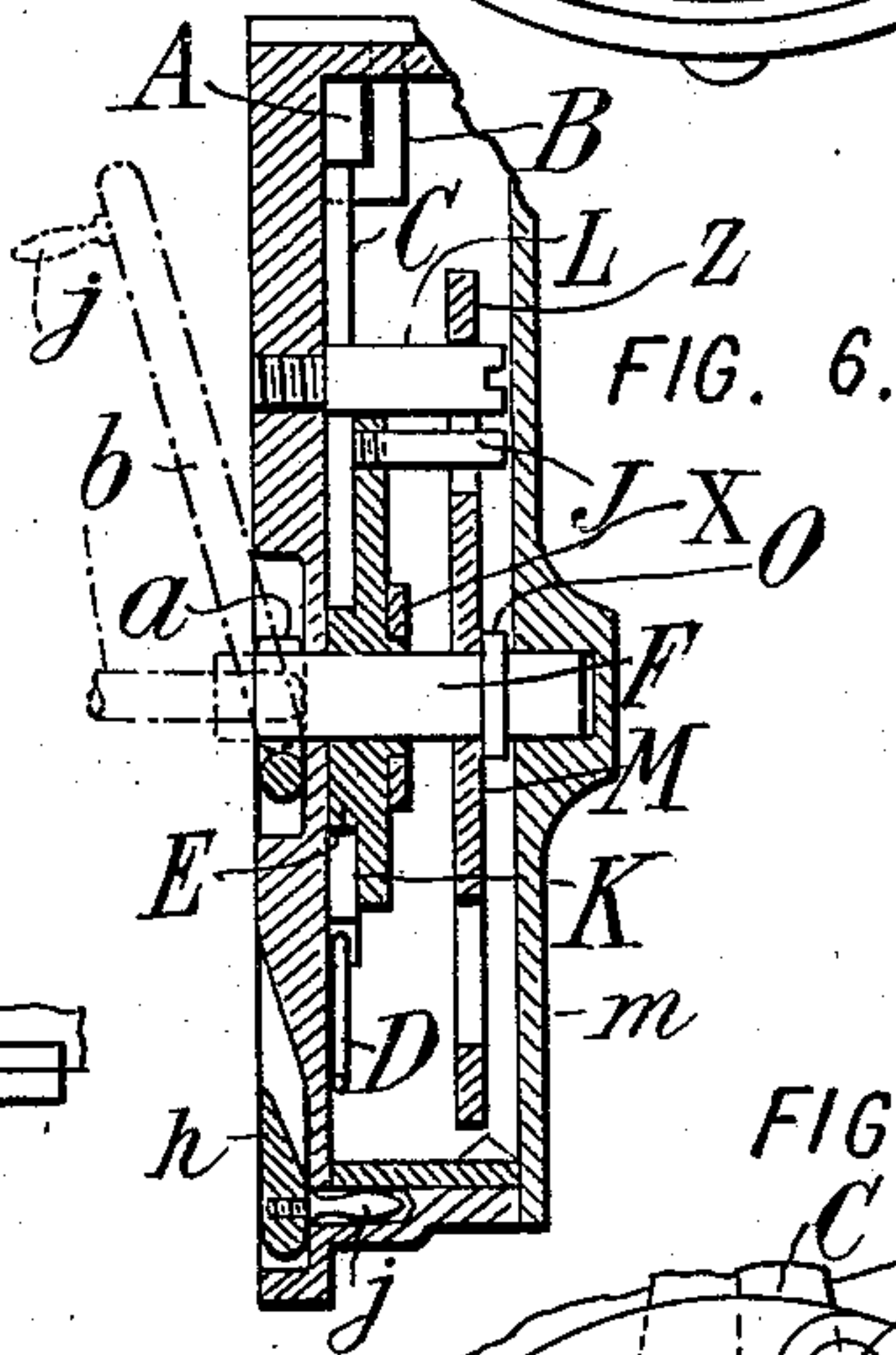
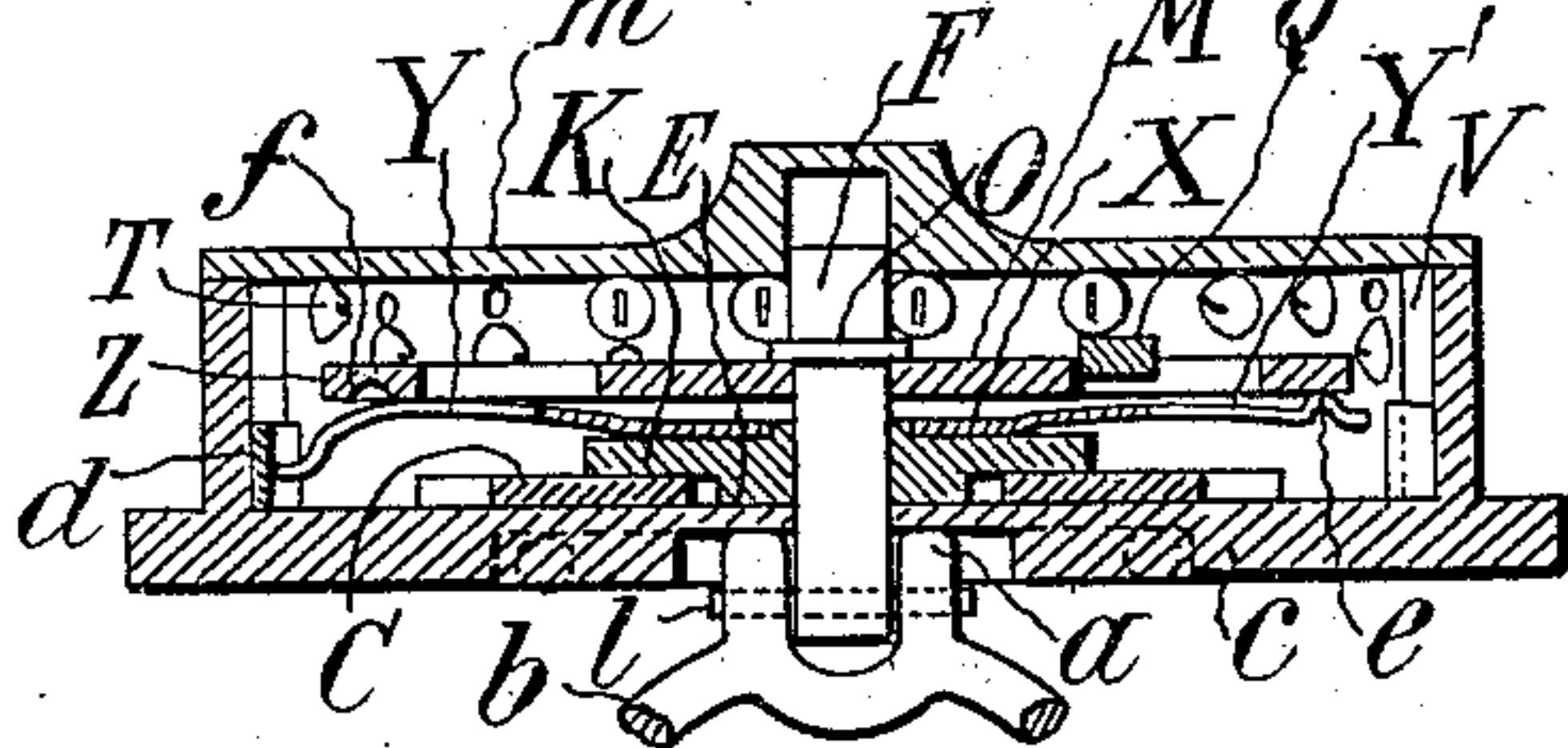


FIG. 3.

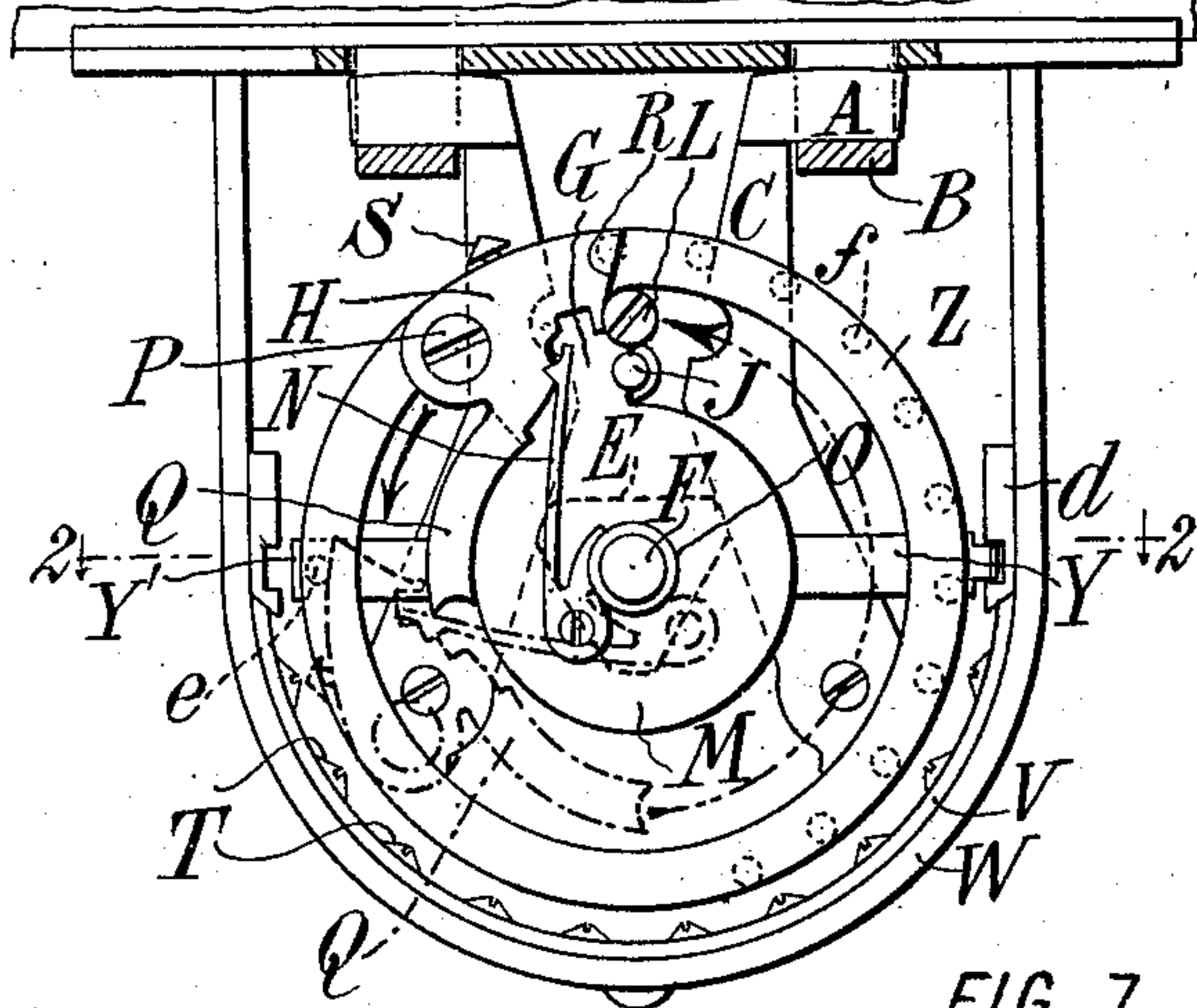


FIG. 4.

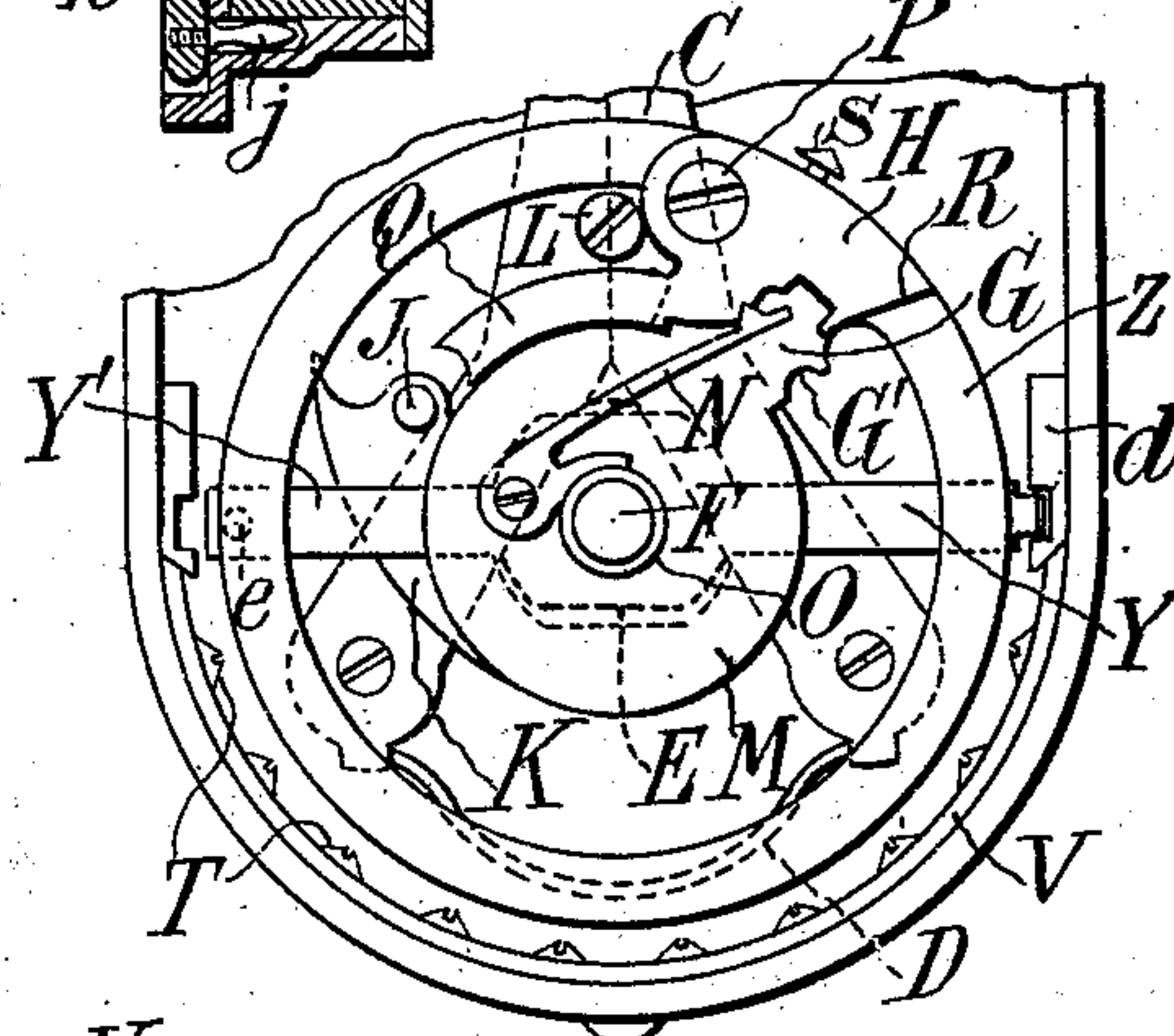
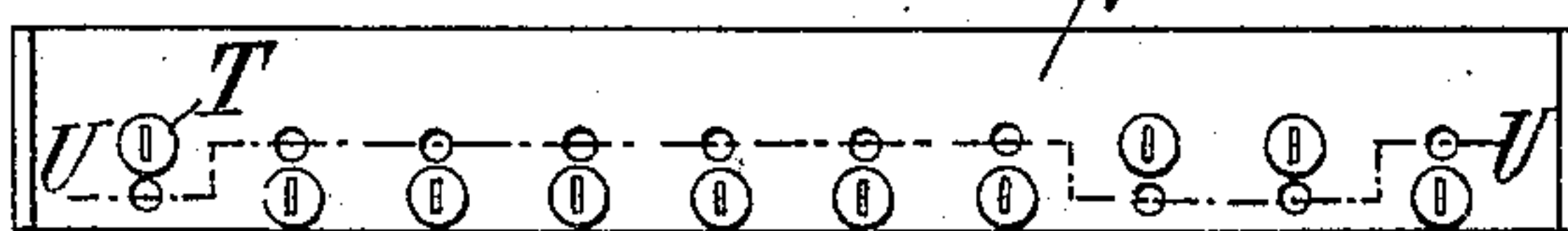


FIG. 7.



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COMBINATION OR KEYLESS LOCK.

No. 860,201.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed November 1, 1906. Serial No. 341,525.

To all whom it may concern:

Be it known that I, OLIVER M. FARRAND, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have
5 invented certain new and useful Improvements in Combination or Keyless Locks, of which the following is a specification.

This invention aims to provide certain improvements in combination locks adapted for use in a great
10 variety of situations, but especially designed for use in trunks or in similar situations. The lock is operated by the sense of touch, so that it may be operated without the necessity of inspecting numbers upon the lock. For example it may be operated perfectly
15 well by a blind or deaf person. It has of course the further advantage of avoiding the necessity for a key, and in the special form shown a compact knob or handle is provided which is adapted to lie flush with the face of the lock so as to avoid injury such as might
20 occur in the transportation of the trunk.

The construction is extremely simple, and the lock is perfectly reliable in operation.

Other advantages are referred to in detail hereinafter.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 is a face elevation; Fig. 2 is a cross-section substantially on the line 2—2 of Fig. 1; Fig. 3 is a rear elevation with the inside cover plate removed; Fig. 4 is a similar view with the parts in a different position;
30 Fig. 5 is a similar view with the operating arm removed; Fig. 6 is a section on the line 6—6 of Fig. 1; Fig. 7 is a development of the face of the plate which determines the combination.

The bolts A are thrown into slots in the projections
35 B attached to the lid of the trunk to lock the trunk, as shown in Fig. 3, or are withdrawn to the positions shown in Figs. 4 and 5 to unlock it. These bolts are carried at the ends of arms C which are normally pressed toward each other by a spring D. The separation of the arms to throw the bolts is effected by
40 means of a triangular cam E turned by the operating shaft F through the medium of combination mechanism which is rendered inoperative unless the shaft is moved in accordance with the combination. This
45 arrangement of bolts and operating device is well known, and the invention may be applied to this or to any other suitable bolt or bolts and operating device.

The movement of the shaft is communicated to the
50 cam E through the intermediation of an arm G fixed thereon and carrying at its end a movable member H adapted when the arm is carried around according to the combination, to engage an upwardly projecting pin J on the plate K which carries upon its under face
55 the cam E and to thereby turn said plate and cam. This operation is effected by a movement of the arm

in the direction of the arrow in Fig. 3. A movement of the arm in the opposite direction brings the notch G' (Fig. 4) of the arm itself into engagement with the pin J and returns it to its starting point, as shown in Fig. 3, 60 turning the cam to throw the bolts to the locking position. A stop comprising a fixed pin L serves to limit the movement of the arm in the unlocking position in the manner shown in Fig. 4. In this unlocking action the pin J is thrown partly over, bringing the cam 65 E approximately to the position of Figs. 4 and 5, after which the spring pressing together the two bolt arms C completes the movement automatically. The fixed stop L serves also to limit the backward movement of the arm as shown in Fig. 3. 70

A plate M forms the hub portion of the operating arm G, and carries a light spring N having an arm pressed against the peripheral edge of the collar O upon the shaft, and another arm pressing outward and having a pointed tooth entering either one of two notches in the 75 member H. The member H is pivoted at P and when thrown to the operative or to the inoperative position, is held impositively by the spring N. A long finger Q upon the movable member H is moved inward or outward as this member is moved about its pivot. The 80 length of the finger makes a very slight angular motion sufficient to shift the end of the finger Q a substantial distance. When the finger Q is in the inner position shown in full lines in Fig. 3, it is operative to engage the pin J and draw the bolts. When the finger 85 is in the outward position as shown in dotted lines in this figure, then it will strike not the pin J but the fixed pin L, and there will be no operation. After the arm has been turned entirely around to the unlocking position (supposing the member H to have been 90 shifted to the inoperative position) and is returned to the starting position (Fig. 3), an inclined edge R of the movable member H strikes the fixed pin L and rides up on said pin, causing the finger N to swing inward to its operative position. The finger Q is of greater thick- 95 ness than the outer portion of the member H and extends backward into the plane of the hub M (see Fig. 2), so that the latter limits the inward movement of the finger.

For determining the position of the finger Q, a pro- 100 jection S is provided on the outer edge of the member H, and is moved over certain stops T which are arranged in two parallel lines, and which project sufficiently to strike the projection S and throw the finger Q to its outward inoperative position. To avoid this re- 105 sult the arm is given not only a rotary but also an axial movement at suitable intervals so as to cause the projection S to move in an offset line U U, Fig. 7. The combination in this case would read 1, 6, 2, 1. The stops T may be conveniently mounted upon a curved plate 110 V lying directly against the lower curved edge of the plate W of the lock casing.

The axial movements of the arm are effected by a specially compact mechanism. A spring comprising a central plate X and a pair of arms Y Y', presses in a rearward direction upon a ring Z which is connected with and preferably an integral part of the arm G. When it is desired to shift the arm forward, the shaft F is pulled preferably by the cam action of a pair of arms *a* pivoted upon the outer end of the shaft and constituting parts of the handle *b*. When the handle is pulled perpendicularly up from the plate as indicated in Fig. 6, the shaft is pulled outward. When the handle is allowed to lie approximately flat against the front plate *c* as indicated in the same figure, then the spring presses the arm backward. The shaft may be separate from the arm, the desired movement of the arm being effected through the collar O on the shaft, or the shaft and arm may be integral with each other. The ends of one or both of the spring arms Y Y' project into grooves formed in plates *d* at the sides so as to prevent rotation of the spring.

For counting off the combination the arm Y' is provided with an upwardly projecting boss *e*, and the ring Z is provided on its under face with recesses *f* into which the boss *e* springs, causing a slight shock or jar which can be distinctly felt as the shaft is turned although the numbers of the combination are invisible. The location of the recesses *f* is such that they engage the projection *e* in succession as the projection S passes over or alongside of the successive stops T, and thus count the number of steps which the arm has been moved from the starting position. In the construction illustrated, the starting position for the combination does not occur until the arm has received nearly a quadrant movement, but this may be varied of course. The handle preferably consists of a ring *b* with a thumb-piece *h* at the point opposite the shaft F, and with a handle *j* which serves also as a lock to hold the ring *b* down, an aperture being provided in the front plate *c* into which the handle *j* enters with slight friction. The plate *c* is formed with a depression *k* corresponding to the shape of the handle of the lock, and in which the ring *b*, thumb-piece *h* and cam arms *a* lie when the lock is locked. These parts are thus flush with or below the exposed face of the lock, and are protected from accidental injury. The pull of the spring upon the shaft F tends also to hold the handle *b* flat upon the front plate of the lock.

To operate the lock, it is manipulated as follows:—The thumb-piece *h* is lifted against the slight resistance of the pin *j* in the socket, and is swung over to the dotted line position shown. The pin *j* then projects outward and forms a convenient handle for the handle *b* of the lock. This handle is then rotated in the direction of the arrow Fig. 1, until the projection *e* springs into the first recess *f*. This indicates that the first stop T has been passed. The handle *g* is then swung about its pivot *l* so as to stand out approximately perpendicular to the face of the lock and to shift the shaft F axially. Holding the handle in this perpendicular position, it is turned until the projection *e* has sprung in succession into six of the notches *f*, after which the handle *g* is turned flat against the face of the lock and turned two steps; then perpendicular and turned one step, after which the shaft may be turned with the handle in any position, and the finger Q will strike the pin J and draw

the bolts. In locking, the shaft F is turned in the opposite direction without regard to the position of the handle, until the arm G has thrown the pin J back to the locking position and is brought up against the fixed pin L. The shaft is then in the starting position, and the handle *b* may be thrown down into the recess *k* and pressed slightly to force the pin *j* into its socket so as to hold the handle down.

In assembling the lock, the rear plate *m* is removed and the cam E and plate K, spring X, Y, Y', hub M and connected parts, and shaft F, are introduced and fastened by passing the pin *l* through the handle *b* and the end of the shaft. The plate V is simply pushed into place with its ends under the overhanging edges of the plates *d*. For changing the combination, the plate may be as easily withdrawn and the stops T unscrewed and replaced at desired points, without touching the other parts of the mechanism.

The rear plate *m* is formed at its center with a hollow boss projecting over the inner end of the shaft and protecting it from contact with the contents of the trunk which might interfere with the working of the lock from the outside.

Though I have described with great particularity of detail certain specific embodiments of the invention, yet it is not to be understood therefrom that the invention is restricted to the specific embodiments disclosed.

Various modifications thereof in detail and in the arrangement and combination of the parts, may be made by those skilled in the art without departure from the invention.

What I claim is:—

1. A lock including in combination a shaft adapted to rotate and to receive axial movements at suitable intervals in its rotation, a bolt, means between the shaft and the bolt whereby the latter is operated by a rotating movement of said shaft, and a handle adapted to be shifted angularly and to thereby effect the axial movement of the shaft.
2. A lock including in combination a shaft adapted to rotate and to receive axial movements at suitable intervals in its rotation, a bolt, means between the shaft and the bolt whereby the latter is operated by a rotating movement of said shaft, a front plate *c*, a handle *b* pivoted upon the outside of the front plate to the end of said shaft, a cam operated by the swinging of said handle about its pivot to pull the shaft outward, and a spring tending to pull said shaft inward and to hold said handle flat upon the front plate.
3. A lock including in combination a shaft adapted to rotate and to receive axial movements at suitable intervals in its rotation, a spring tending to pull said shaft inward, a front plate *c* through which the shaft passes, a handle comprising a ring *b* pivoted upon the outer end of the shaft and having projections *a* constituting cams adapted to bear upon the plate *c* when the ring *b* is raised from the plate and thus to pull the shaft outward, a thumb-piece *h* within the ring *b*, a handle *j* for the ring *b* adapted to enter with slight resistance a hole in the plate so as to hold the ring *b* impositively against the plate and adapted when the ring *b* is inverted to form a handle therefor, said plate *c* having a groove *k* designed to accommodate the ring *b* and connected parts so that these lie flush with or below the face of the plate.
4. A lock including in combination an operating arm adapted to rotate and to receive axial movements at suitable intervals in its rotation, a ring Z rotating with said arm and provided with recesses *f*, and a projection *e* yieldingly pressed against the face of said ring Z in which said recesses are formed and adapted to spring into said recesses in succession as the ring is turned to produce a slight jar sufficient to indicate the successive steps in the rotation.

5. A lock including in combination a bolt, a shaft adapted to rotate and to receive axial movements at suitable intervals in its rotation, an arm rotated with said shaft, a rotatable device for operating said bolt, a pin J carried thereby, a fixed pin L, and a member carried upon said arm and movable to either an operative position in which it engages the pin J and rotates the same, or an inoperative position in which it engages the pin L and prevents further movement of the arm.
6. A lock including in combination a bolt a shaft adapted to rotate and to receive axial movements at suitable intervals in its rotation, an arm rotated with said shaft, a rotatable device for operating said bolt, a pin J carried thereby, a fixed pin L, and a member carried upon said arm and movable to either an operative position in which it engages the pin J and rotates said device, or an inoperative position in which it engages the pin L and prevents further movement of the arm, said movable member having an edge R adapted to engage the fixed pin L when the arm is brought back to its starting position to insure the return of the movable member to its operative position whenever it shall have been moved away therefrom.
7. A lock including in combination a bolt a shaft adapted to rotate and to receive axial movements at suitable intervals in its rotation, an arm rotated with said shaft, a rotatable device for operating said bolt, a pin J carried thereby, a fixed pin L, and a member carried upon said arm and movable to either an operative position in which it engages the pin J and rotates said device, or an inoperative position in which it engages the pin L and prevents further movement of the arm, said member having a long finger Q for directly engaging the pins J and L, and said finger lying partly in the plane of the arm so as to limit the inward movement of the finger.
8. A lock including in combination a series of stops the position of which determines the combination according to which the lock is opened, such stops being carried upon a curved plate V, the casing of the lock being pro-

vided with a curved plate W and with plates *d* having overhanging edges, and the plate V being adapted to be held in place by said plate W and said overhanging edges so that it may be readily withdrawn for altering the combination.

9. A lock including in combination a bolt, an arm G, a series of stops T arranged in parallel lines, a pivoted member H on said arm, a finger Q forming an extension of said member H, a rotatable device for operating said bolt, a pin J carried thereby, a fixed pin L, a projection S upon said pivoted member adapted when engaged by one of said stops to swing the finger Q outward into the circle of said fixed pin L, so that when the arm is rotated there shall be no operation of the lock, said member H having a rear edge R adapted to strike the fixed pin L to restore the finger Q to its inner position in the circle of the pin J, a shaft F, a handle upon the outer end of said shaft, a cam operated by said handle for pulling said shaft and arm axially outward to avoid the stops T of the inner line, a ring Z carried by said arm, a spring arranged to force said ring and arm axially inward to avoid stops T along the outer line, and a projection *e* carried by said spring, said ring Z having recesses *f* into which said projection *e* springs as the arm is turned with a shock sufficient to indicate the successive steps, said recesses being so located as to successively receive the projection *e* as the projection S successively passes the stops T.

10. A lock including in combination a shaft adapted to rotate and to receive axial movements at suitable intervals in its rotation, a handle on the outer end for operating said shaft, and a plate covering the inner end of the shaft to prevent interference with its operation from the outside.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

OLIVER M. FARRAND.

Witnesses:

DOMINGO A. USINA,
FRED WHITE.