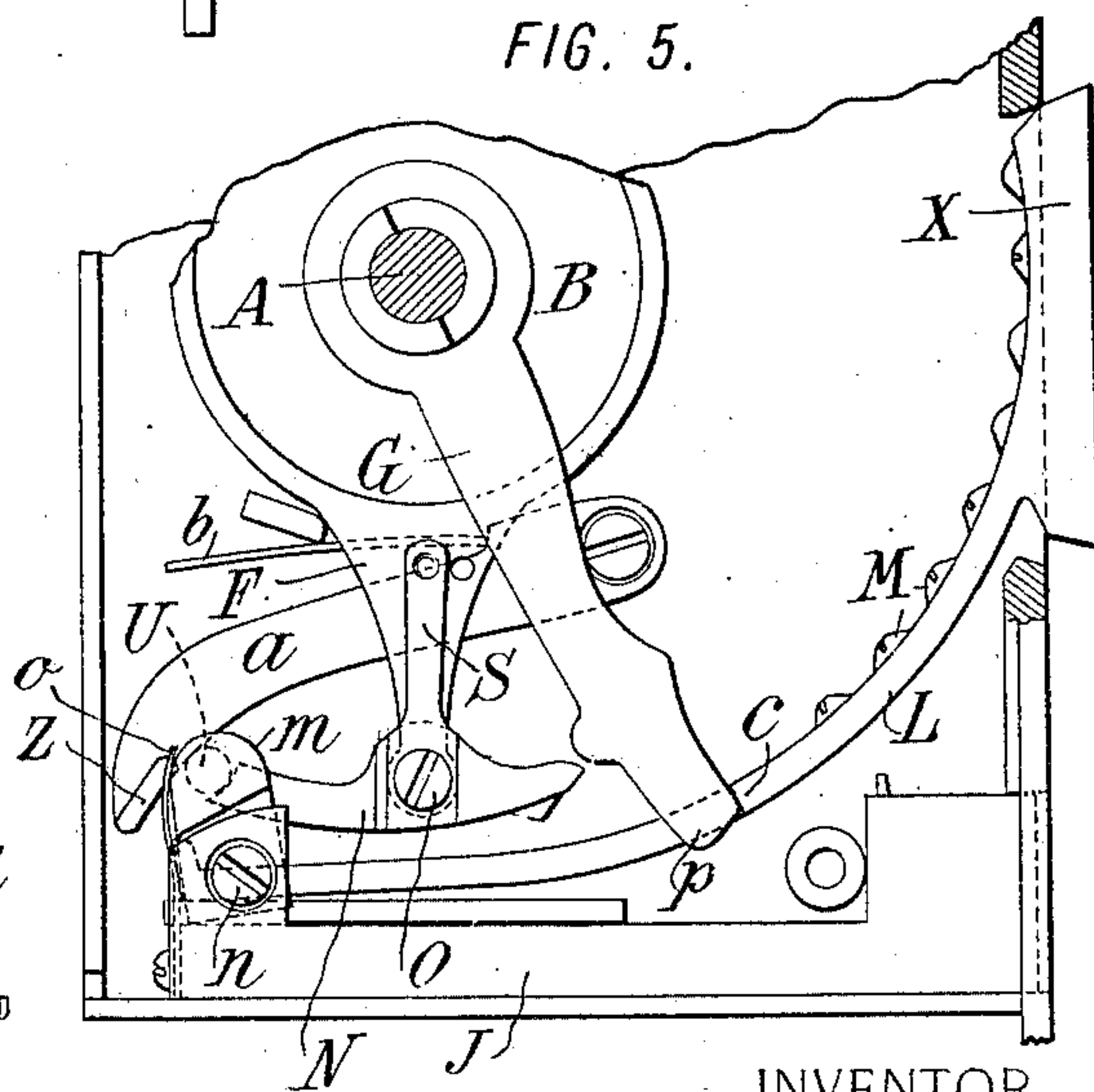
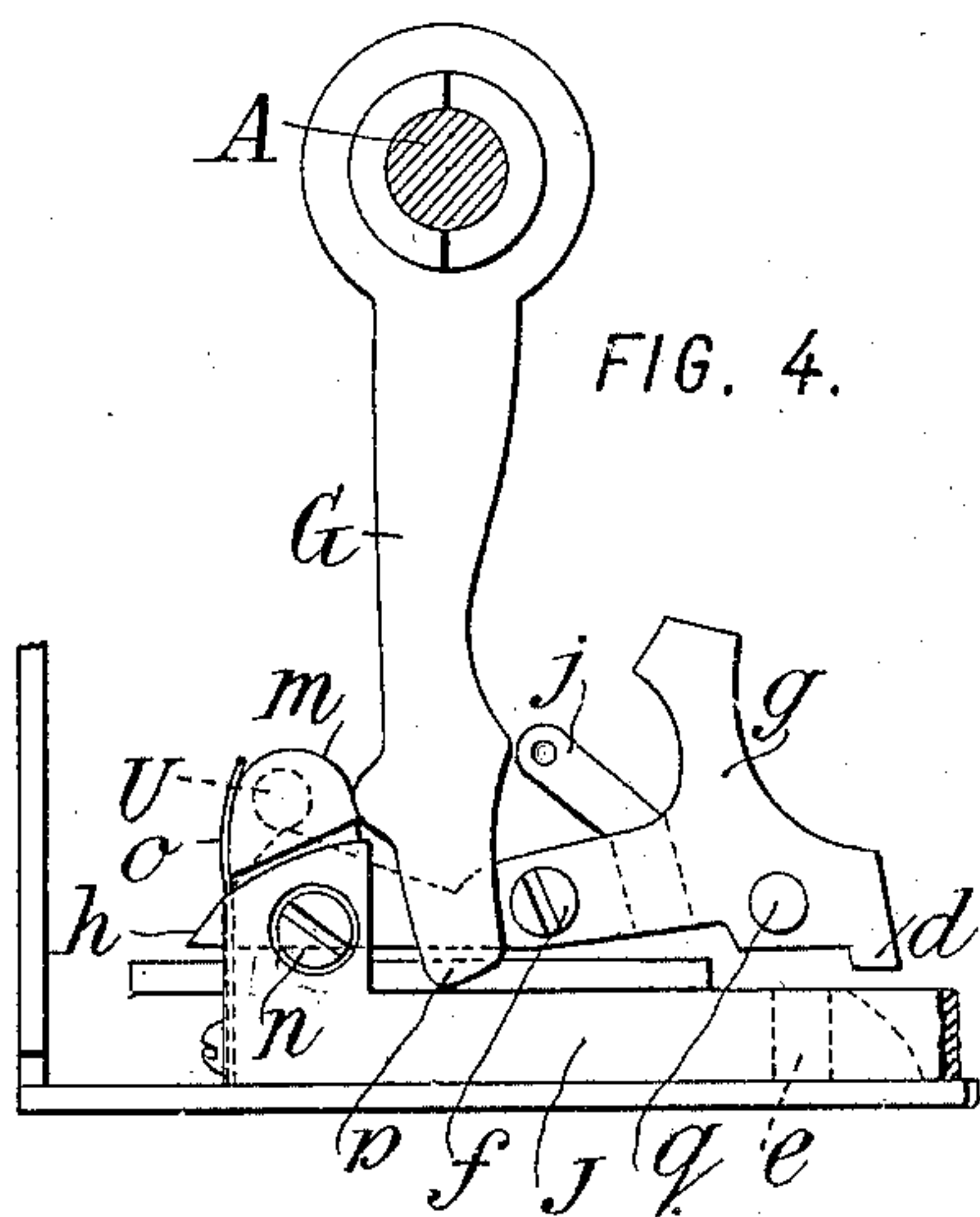
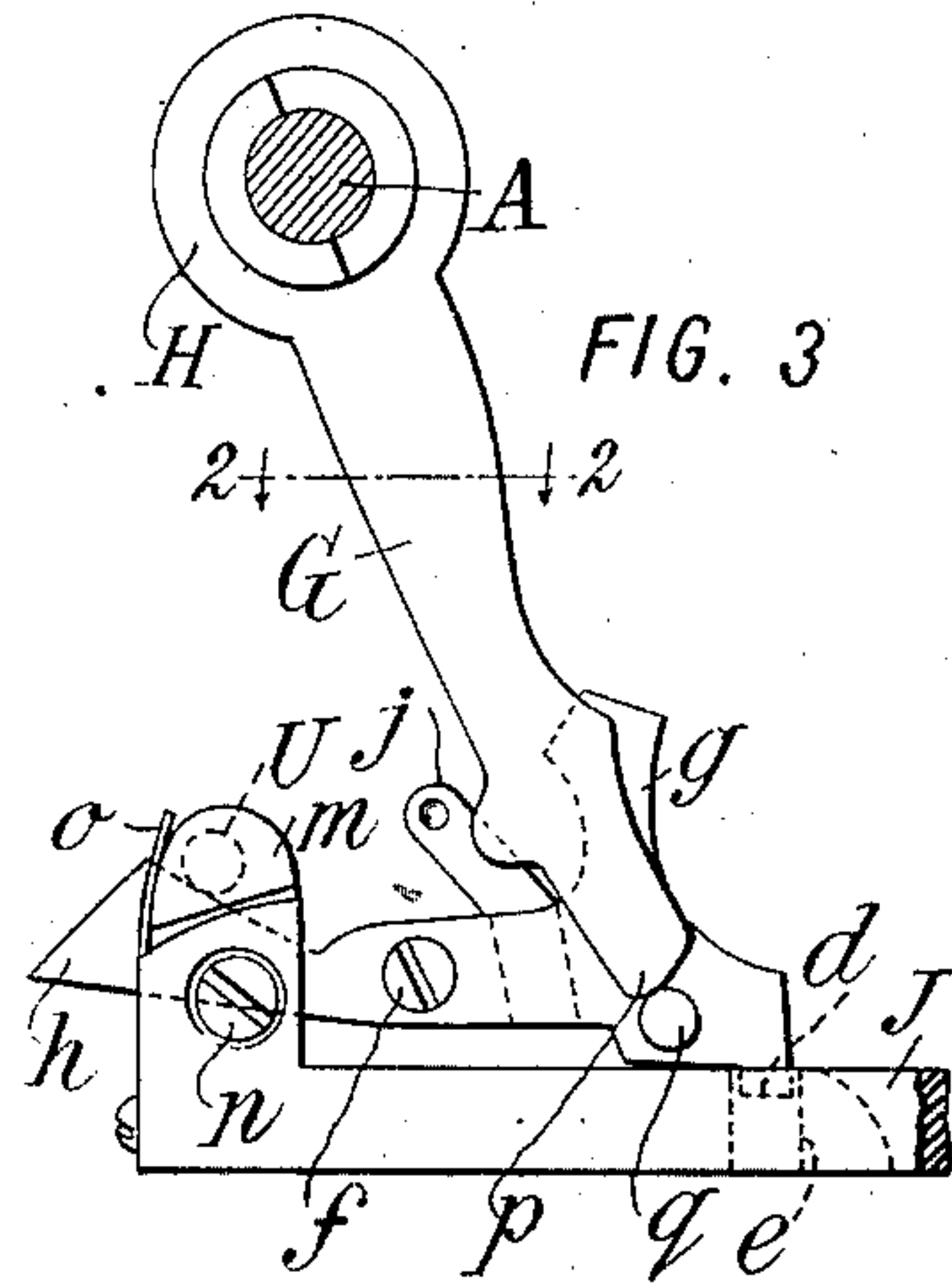
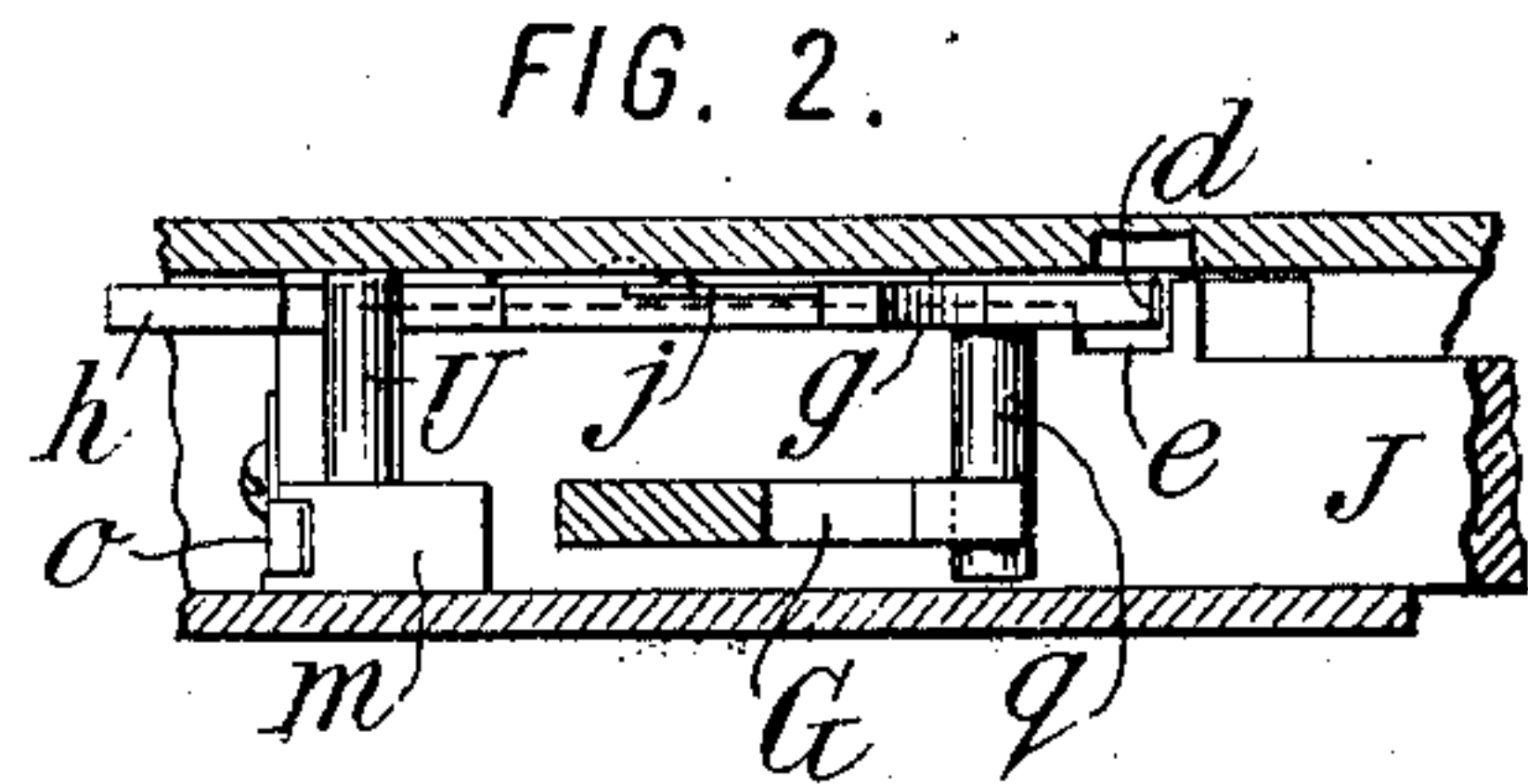
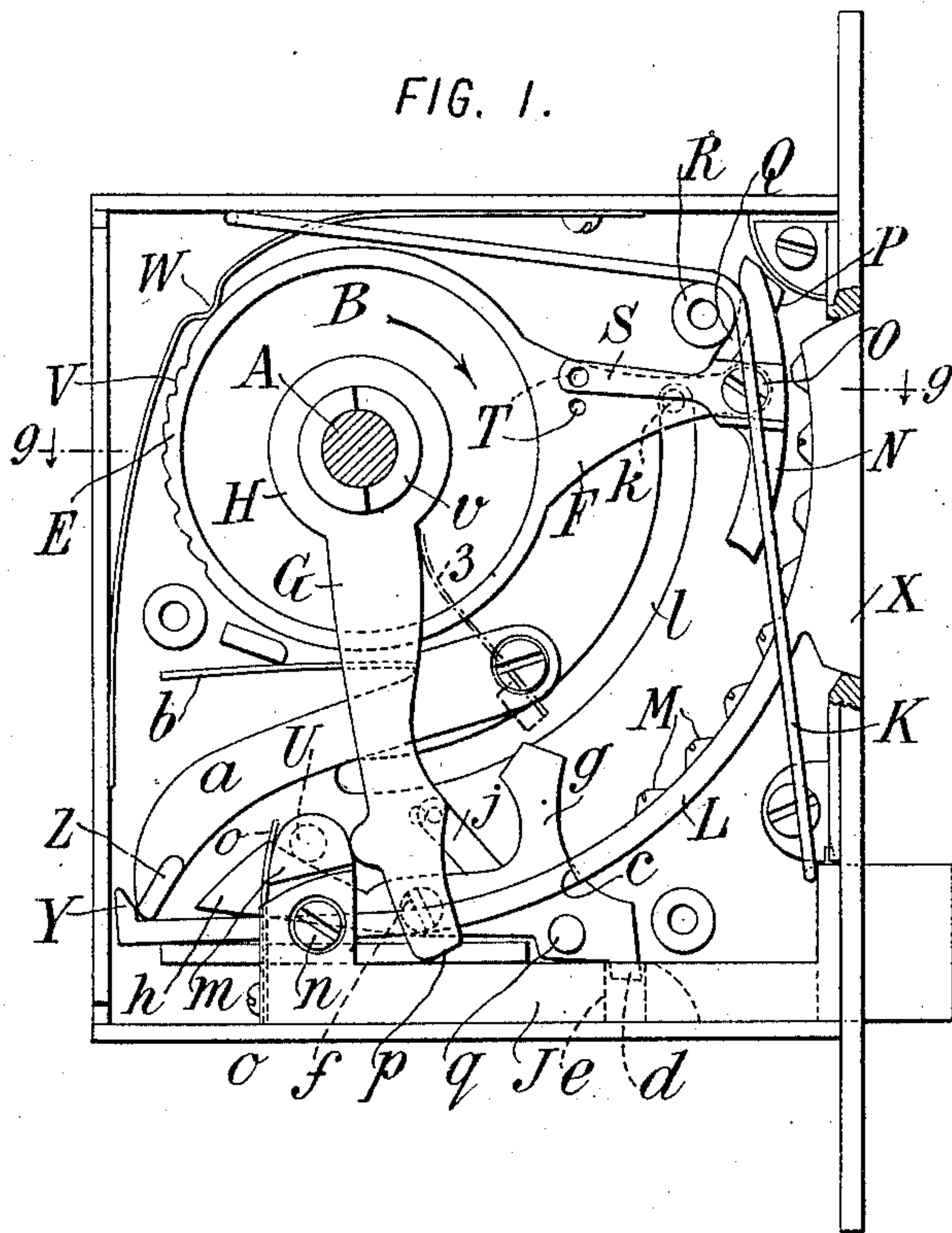


O. M. FARRAND.
KEYLESS LOCK.
APPLICATION FILED NOV. 6, 1908.

965,172.

Patented July 26, 1910.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

FIG. 6.

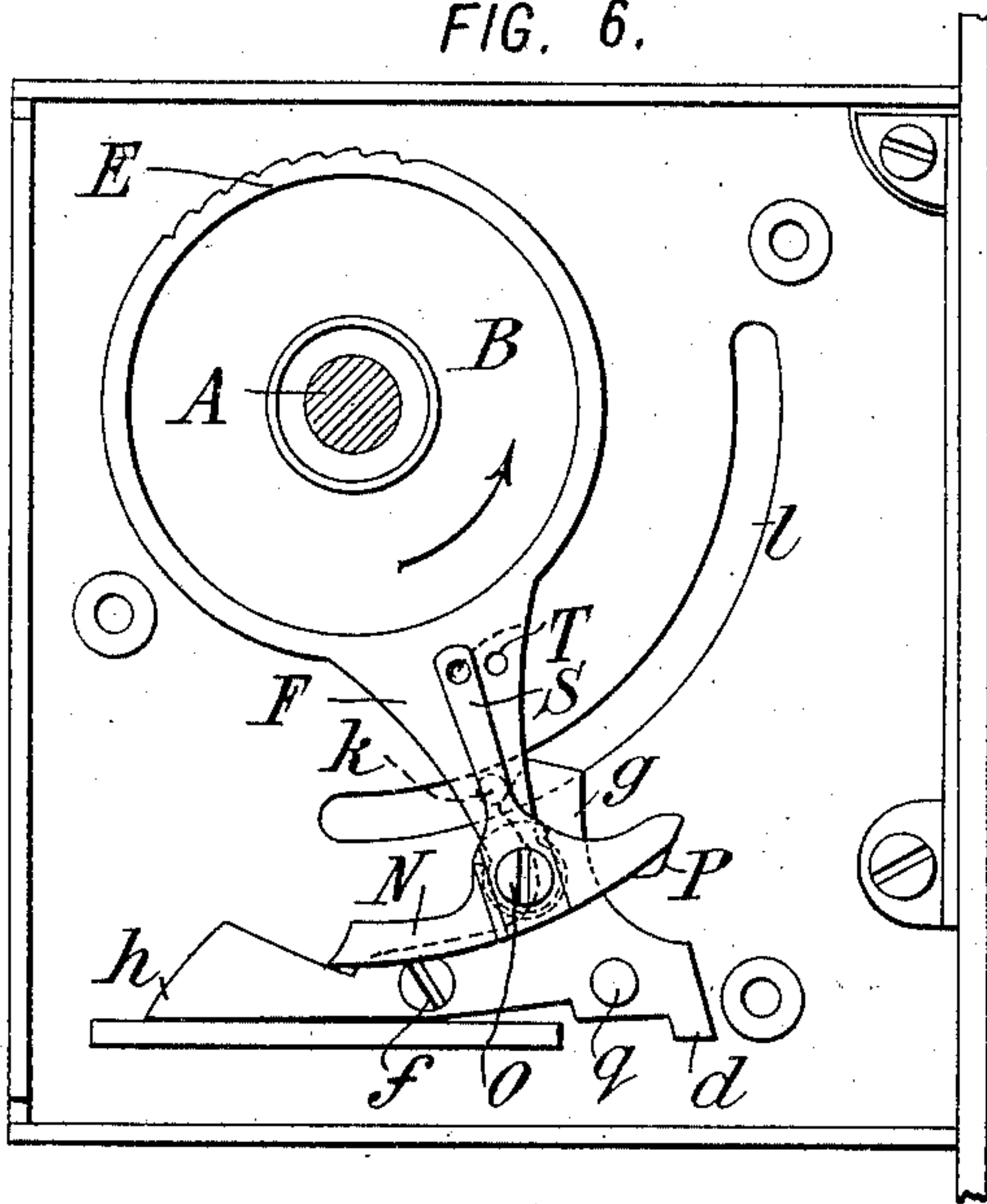


FIG. 7.

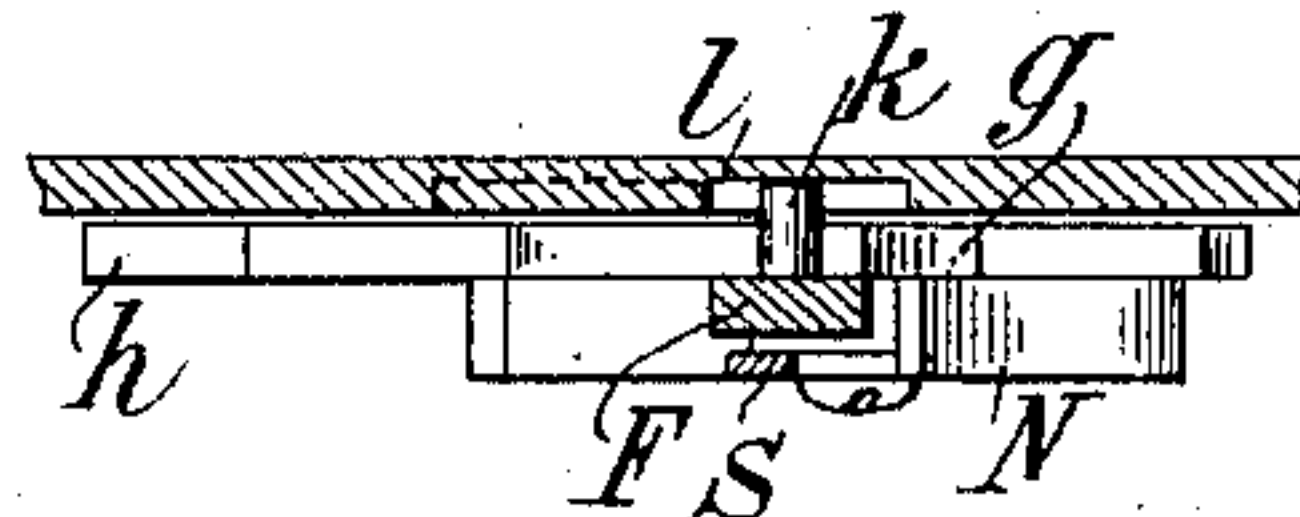


FIG. 8.

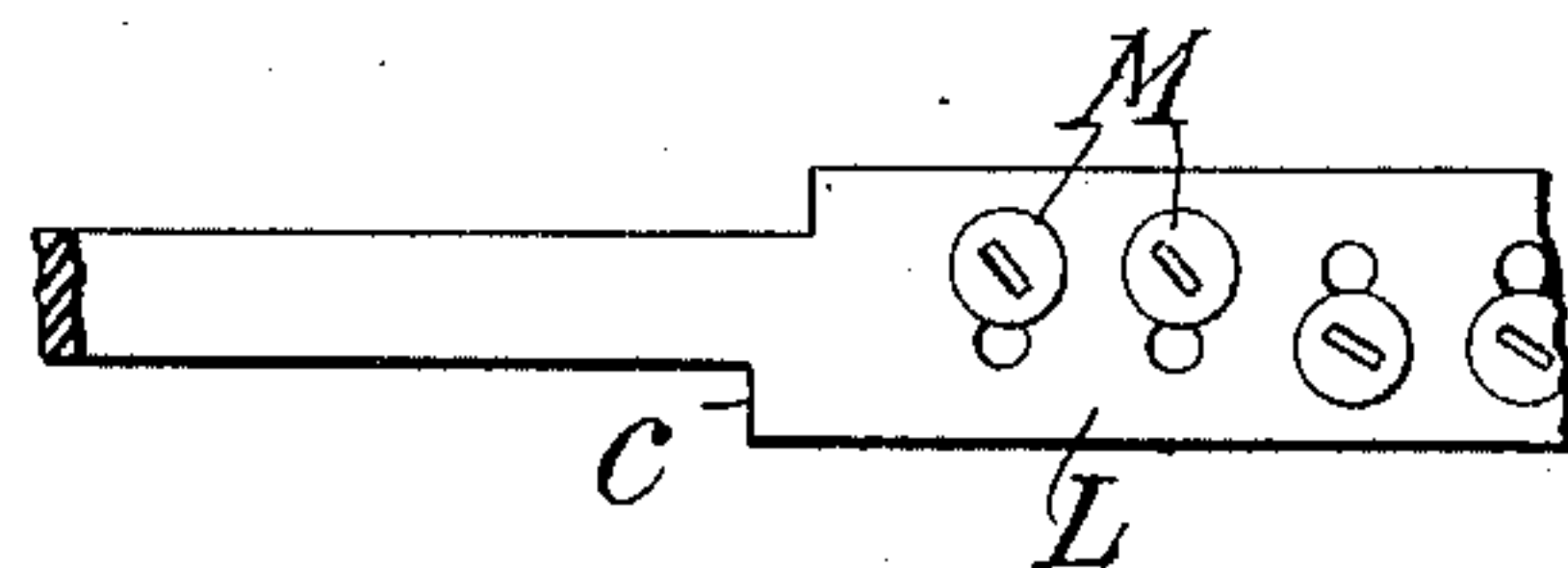


FIG. 9.

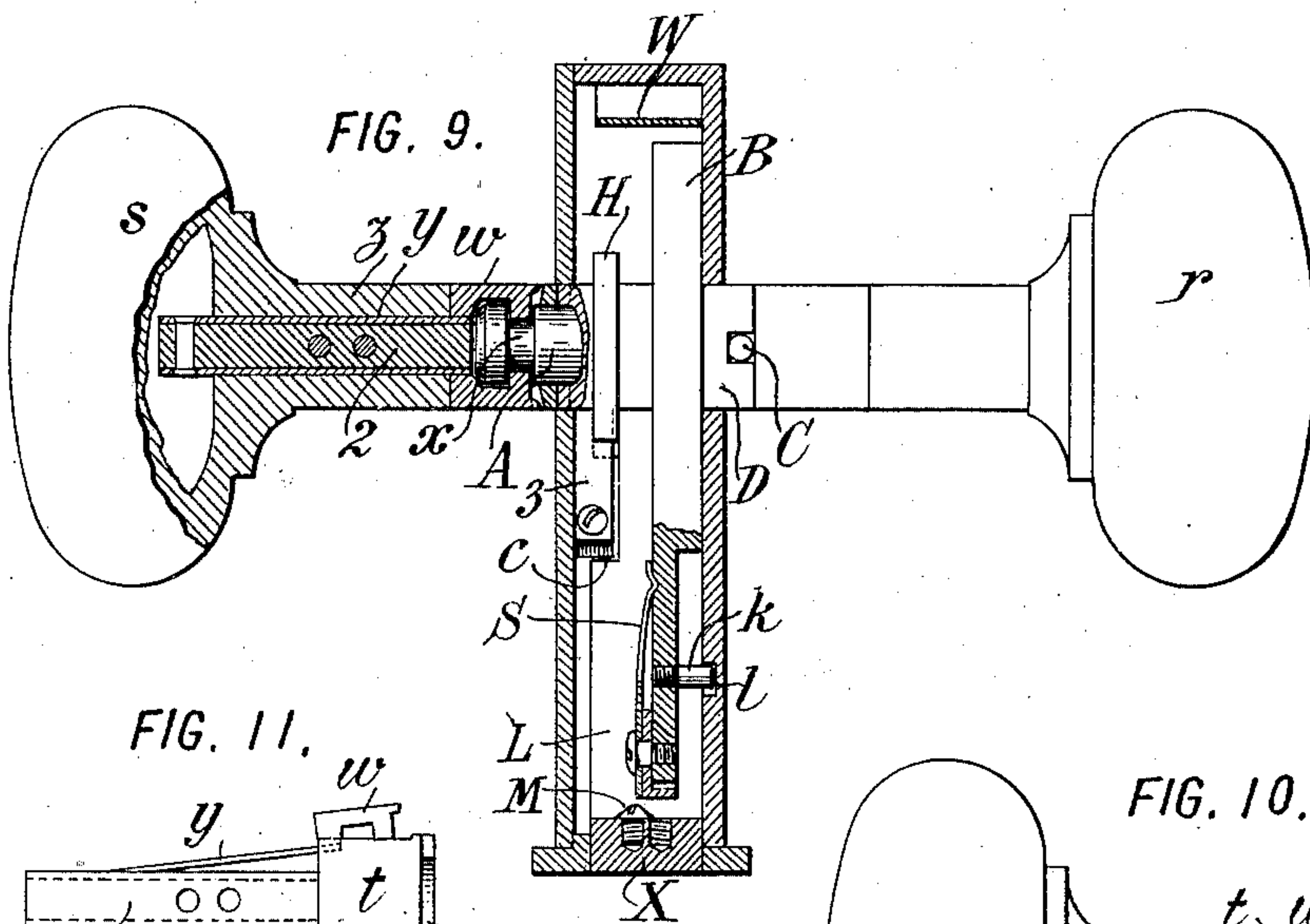


FIG. 11.

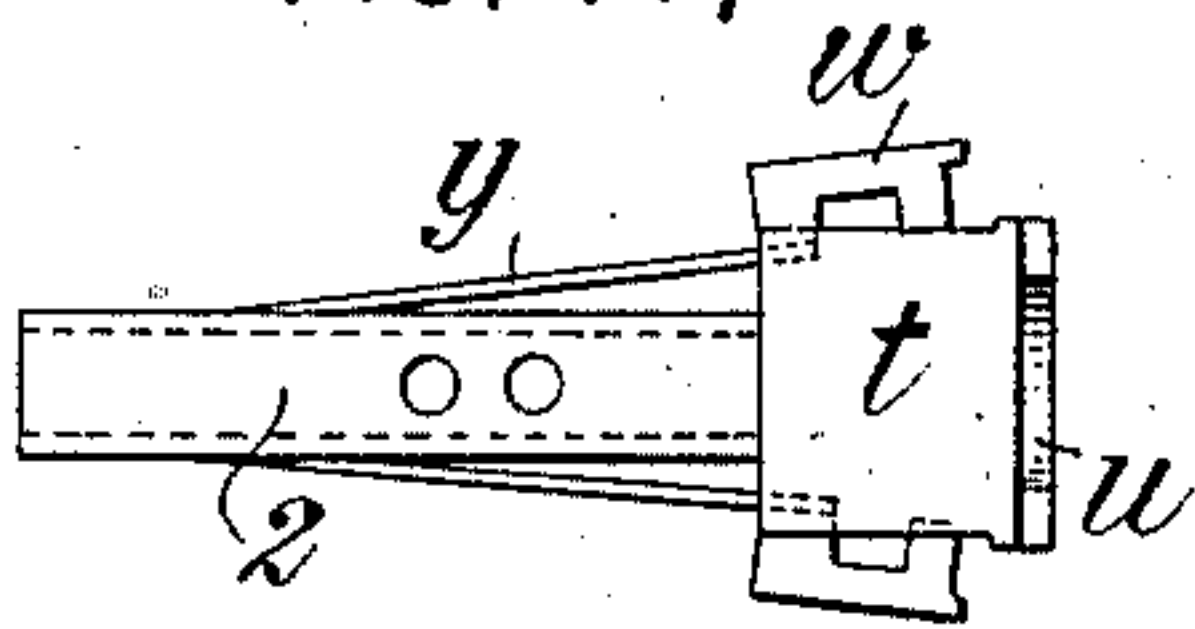
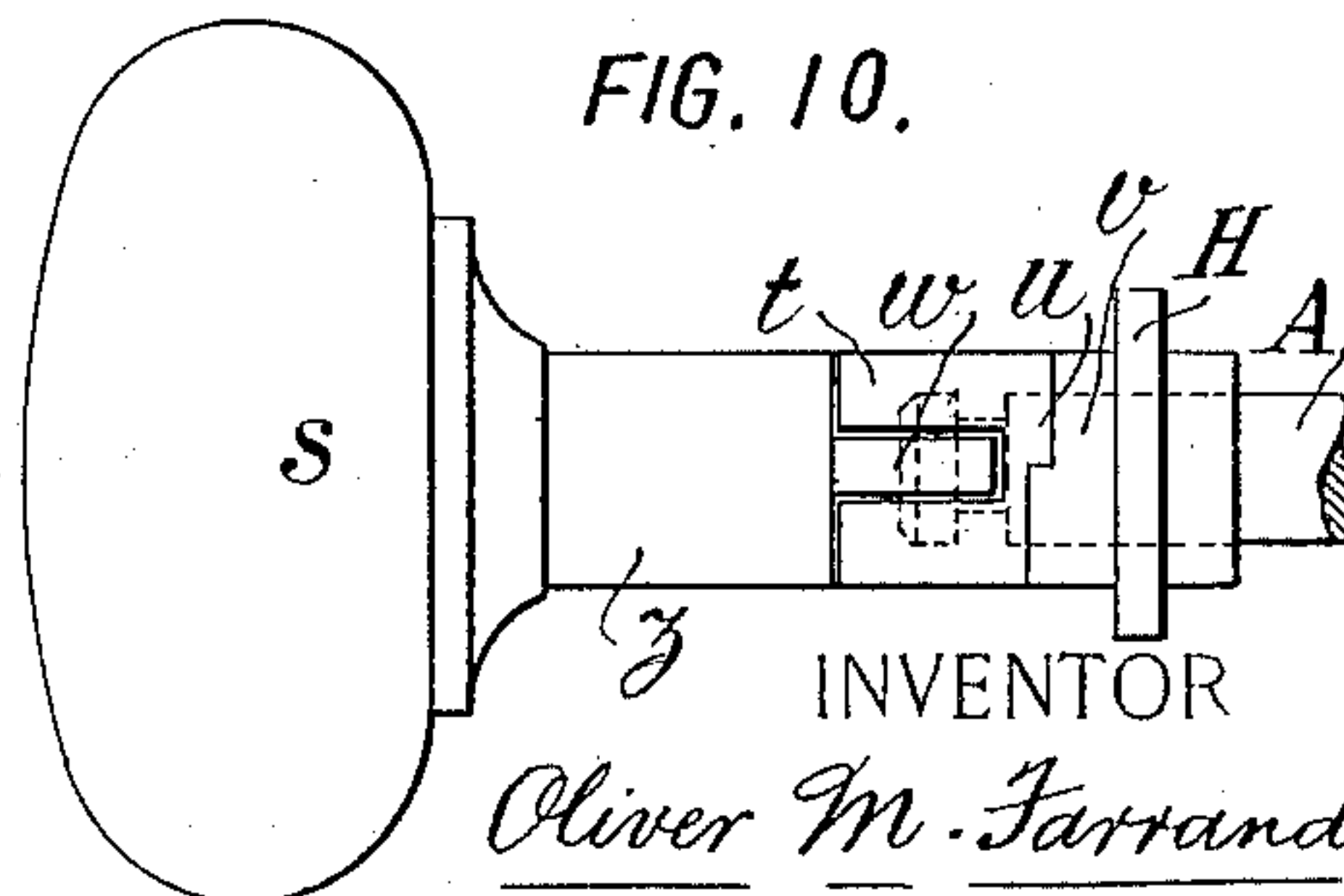


FIG. 10.



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KEYLESS LOCK.

965,172.

Specification of Letters Patent.

Patented July 26, 1910.

Application filed November 6, 1908. Serial No. 461,361.

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 invented certain new and useful Improvements in Keyless Locks, of which the following is a specification.

In my Letters Patent No. 840,054, of January 1, 1907, I have described a keyless or combination lock adapted for use in various situations and adapted to be operated by the sense of touch, the means for counting the numbers constituting the combination being invisible, so that it may be operated by a deaf or a blind person and equally well at night or in the day time. In subsequent Letters Patent and applications I have described various special constructions and modifications of said lock.

The present invention relates to a lock of the same class, and provides several new features, which are referred to in the claims hereinafter.

The accompanying drawings illustrate an embodiment of the invention.

Figure 1 is a face elevation, with the inner face plate of the lock removed. Fig. 2 is a horizontal sectional view illustrating the operation of the dead latch by the inner arm. Fig. 3 is an elevation of the same parts in the position in which the dead latch is thrown into operation. Fig. 4 is a side elevation of the same parts with the dead latch withdrawn and the bolt also withdrawn. Fig. 5 is an elevation similar to Fig. 1 and indicating the manner of withdrawing the combination plate. Fig. 6 is a similar elevation showing the throwing of the dead latch upon the return of the outer or combination arm to the starting position. Fig. 7 is a horizontal section through the parts shown in Fig. 6. Fig. 8 is a development in plan of a portion of the combination plate. Fig. 9 is a horizontal sectional view. Fig. 10 is a side elevation of a part of the spindle. Fig. 11 is a side elevation of a part thereof removed from its connection with the other parts.

Referring to the embodiment of the invention illustrated, the lock may be operated by the outer or combination knob by successive

rotary movements, with axial movements at intervals, the intervals being indicated by the sense of touch upon the knob,—that is, by a series of shocks as a member of the mechanism passes over a series of teeth. If the knob is not shifted axially at proper intervals the locking means are rendered inoperative. The lock shown is especially designed for house doors and the like, and for this purpose is provided with an inside knob which works a dead latch and which may release the door by merely turning it in the proper direction.

The central shaft A is operated by the outer knob. This shaft is fastened to a member B, as by means of a pin C (Fig. 9) engaging notches in a hub D of said member. This member B therefore turns with the outer knob. It may be circular as shown, or of other convenient shape and construction, and it carries a rack E by which the successive numbers of the combination are indicated, and an arm F which for convenient distinction I term the "outer" arm, since it will ordinarily be operated by the outer knob, and which effects the withdrawal of the bolt or fails to effect such withdrawal, according as the combination is properly worked or not. For withdrawing the bolt by means of the inside knob without the necessity of working the combination, an "inner" arm G is arranged rotatively upon the central shaft A, being provided with a hub H which is engaged with the inner knob in a manner hereinafter described. This arm G is held in its backward position preferably by means of a leaf-spring 3 mounted on the inner face plate of the casing (Figs. 1 and 9). The bolt J is pressed forward by a spring K, and has a projection at its inner end by engagement with which on the part of either the inner or the outer arm it may be withdrawn.

The combination "plate", which may be a member of any suitable design and proportions, is indicated at L, and is provided with stops M adapted to be set in any desired arrangement in two rows, as described fully in my aforesaid patent. The arm F carries a member N pivoted at O and provided with a projection P on its rear portion (that is to say, its upper portion in the position of

Fig. 1) adapted when the combination is improperly worked to strike one of the stops M of the combination plate and to throw the forward portion (the lower portion, Fig. 1) of the member N outward from the spindle A, the inner face (toward the spindle) of the same arm of the member N being designed as a cam Q which, when it engages a fixed stop R, throws the forward portion of said member inward to the position in which it can engage and withdraw the bolt. This pivoted member N is provided with a slight spring S having a projection adapted to rest in one of the two depressions T of the arm F so as to hold the pivoted member N with its forward arm in either the operative or the inoperative position, but impositively so as to release it under the action of the stop R or one of the stops M. The withdrawal of the bolt is effected by the forward end of the member N striking a pin U projecting sidewise from a part of the bolt J, as shown in Fig. 5.

The teeth of the rack E are arranged with comparatively long sloping faces V upon their rear sides as compared with the slope of their forward faces. This insures that the yielding projection W shall drop gradually into the spaces between the successive teeth and with as little noise as possible. The operator may turn the knob slowly, and the comparatively abrupt faces of the teeth will indicate the interval clearly, while the comparatively long inclines of the rear faces will let the projection W down so slowly as not to make a noise audible to a person standing near. In the construction shown it is the point of the projection W which rests upon and rides down the long inclines V. The shapes of the teeth and the projection W might be reversed so that the teeth might be provided with points riding over a long incline upon the back of the projection W, with the same advantage.

The combination plate is arranged for easy and quick withdrawal, so that it may be set for a new combination whenever desired. A portion X thereof coincides with the outer or exposed edge plate of the casing of the lock and forms a sort of handle by which the plate may be withdrawn and reinserted. The plate has at its opposite end a projection or hook Y which engages a latch Z carried on an arm α which is pressed downward by means of a leaf-spring β . The pin U which is carried by the bolt projects under the arm α , and when the bolt is withdrawn lifts the arm α and releases the combination plate L. Consequently whenever the combination is properly worked by the outside knob, the combination plate is released. In order that it may be withdrawn it must be given a slight outward movement

from the inside, and this is effected by turning the inner knob and with it the inner arm G to the position of Fig. 5 in which the arm G strikes a shoulder c upon the combination plate and throws the portion X thereof out from the casing so that it may be grasped between the thumb and finger to pull the entire plate out. The outer knob must then be turned back to its starting point so as to remove the outer arm F from the path of the combination plate so as to permit the latter to be withdrawn. When the combination is changed to the desired number the plate is reinserted and the hook Y simply pushed past the spring latch Z.

A dead latch provided with a pin or projection d entering a recess e in the bolt serves to hold the latter against being pushed back from its outer end. This latch is pivoted at f and is provided with arms g and h for operating it. Said latch carries a light spring j with a projection bearing against or taking into recesses in the outer plate of the casing so as to hold it impositively in its operative or its inoperative position.

The arm g projects into the path of a pin k carried on the outer face of the outer arm F, the outer plate of the casing being provided with a groove l to accommodate the pin k when the outer knob and arm are shifted to their outer positions in operating the combination. In the unlocking movement of the arm F the pin k passes over arm g of the dead latch, the latter being in its lowered operative position. Or, if the latter has been previously withdrawn, then the pin k engages the inclined edge of the arm g and throws the dead latch down to its operative position. The dead latch is withdrawn, however, by means of the pin U (when struck by the member N carried on the arm F) engaging the upper inclined edge of the arm h and pressing the latter down, after which the continued movement of the combination arm F withdraws the bolt. In order to permit this operation the pin U is not a rigid part of the bolt, but is mounted on a yielding part of the same comprising an arm m pivoted at n and pressed forward by a spring o . On the return movement of the combination arm F the bolt at once is thrown by its main spring K, after which the pin k of the combination arm strikes the arm g of the dead latch and throws the latter to operative position to prevent the pushing back of the bolt.

When the lock is to be opened from the inside, the inside arm G strikes the portion m of the bolt and first withdraws the dead latch in the manner previously explained, and then withdraws the bolt. Ordinarily therefore the dead latch will stand with-

drawn. If, however, it is desired to throw the dead latch to operative position from the inside, it is only necessary to turn the inside arm G to the left, whereupon its suitably shaped end *p* will engage a lateral pin *q* carried by the dead latch and will throw the latter down to its operative position (Figs. 2 and 3).

As previously described the outer or combination arm and the inner arm are arranged to turn independently of each other, and the complete spindle of the lock includes a central shaft A which rotates the combination arm and which rotates independently of the inside arm. Various constructions may be adapted for assembling the parts in this way. The central shaft A may be provided with a pin C (Fig. 9) whereby it is connected with the combination arm by simply passing the shaft through the lock, or this central shaft may be part of the member within the casing which carries the combination arm. The arrangement shown is advantageous in that it permits the making of the central shaft in one piece with the outer knob *r*. This prevents the removal of the outer knob by thieves or mischievous people, which frequently happens where the outer knob is detachable by merely removing one or two screws. The inner knob *s* is arranged to engage the inner end of the shaft A to prevent the withdrawal of the latter, and at the same time to rotate relatively to said shaft A and to carry with it in its rotation the hub H of the inner arm. These purposes are advantageously effected by means of an intermediate member having a head *t* which surrounds the end of the shaft A and which is provided with a projecting portion *u* (extending for half the circumference) engaging a corresponding depression *v* of the hub H, and which also carries one or more teeth *w* adapted to enter or to be withdrawn from an annular groove *x* in the shaft A near its inner end. These teeth *w* are carried upon the ends of long springs *y* which are pressed inward when the shank *z* of the knob is forced over the shank 2 of the intermediate member, the shank *z* being fastened on the shank 2 in the usual way by means of screws.

Though I have described with great particularity of detail certain specific embodiments of my 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. In combination, a bolt having a member *m* yieldingly connected thereto, a dead

latch adapted to prevent the withdrawal of said bolt and to be withdrawn by the yielding movement of said member *m*, and a combination arm F adapted when moved according to a determined combination to give to said member *m* its yielding movement to withdraw the dead latch, and to continue such movement and thereby withdraw the bolt.

2. In combination, a bolt, a dead latch for preventing the withdrawal of said bolt and which is provided with an arm *g*, an operating arm F adapted to be moved past said arm *g*, and a pin *k* carried by said operating arm and adapted to engage the arm *g* to operate the dead latch.

3. In combination, a bolt, an arm G, a dead latch for preventing the withdrawal of the bolt and adapted to be actuated by the movements of said arm in opposite directions to throw and to withdraw said dead latch, and combination mechanism for withdrawing the bolt.

4. In combination, a bolt, a dead latch for preventing the withdrawal of the same, an arm G, a pin *q* carried by said dead latch and adapted to be engaged by said arm G for throwing the dead latch, an arm *h* carried by the dead latch, and an intermediate member *m* carried by said bolt and adapted to transmit a movement of the arm G to the arm *h* to withdraw the dead latch.

5. A combination lock including a removable plate provided with means for determining the combination, means for fastening said plate in place, and means actuated on the proper working of the combination for releasing said plate.

6. A combination lock including a removable plate provided with means for determining the combination, means for fastening said plate in place, and means for releasing said plate and projecting a part of it out of the casing to permit its removal.

7. A combination lock including a removable plate provided with means for determining the combination, said plate having a shoulder, and means actuated by a knob of the lock and adapted to engage said shoulder to project a part of said plate out of the casing.

8. In combination, a pair of knobs *r* and *s* adapted to rotate relatively to each other, a central shaft A rotated with the knob *r*, a hub H on said shaft, and means for connecting the knob *s* with said hub to rotate the latter, said connecting means consisting of a member having a shouldered engagement with the hub H, and having a tooth *w*, said shaft A having an annular groove *x* adapted to receive said tooth *w*.

9. In combination, a pair of knobs *r* and *s* adapted to rotate relatively to each other,

a central shaft A rotated with the knob *r*,
a hub H on said shaft, means for connecting
the knob *s* with said hub to rotate the latter,
said connecting means including a hub *t*
5 adapted to have a toothed engagement with
the hub H, a tooth *w*, and a spring *y* nor-
mally holding said tooth out and adapted to
be engaged by the shank of the knob *s* to
press the tooth *w* in, said shaft A having an

annular groove *x* into which said tooth *w* 10
enters when it is pressed in.

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

OLIVER M. FARRAND.

Witnesses:

DOMINGO A. USINA,
THEODORE T. SNELL.