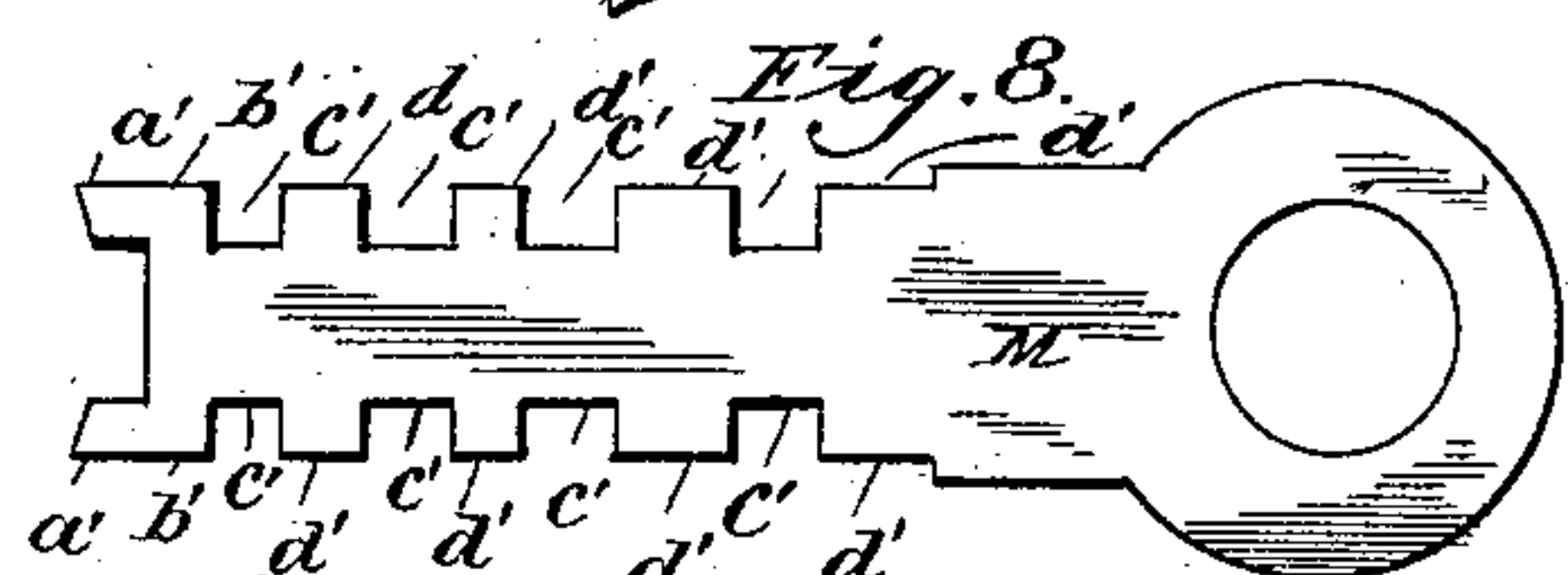
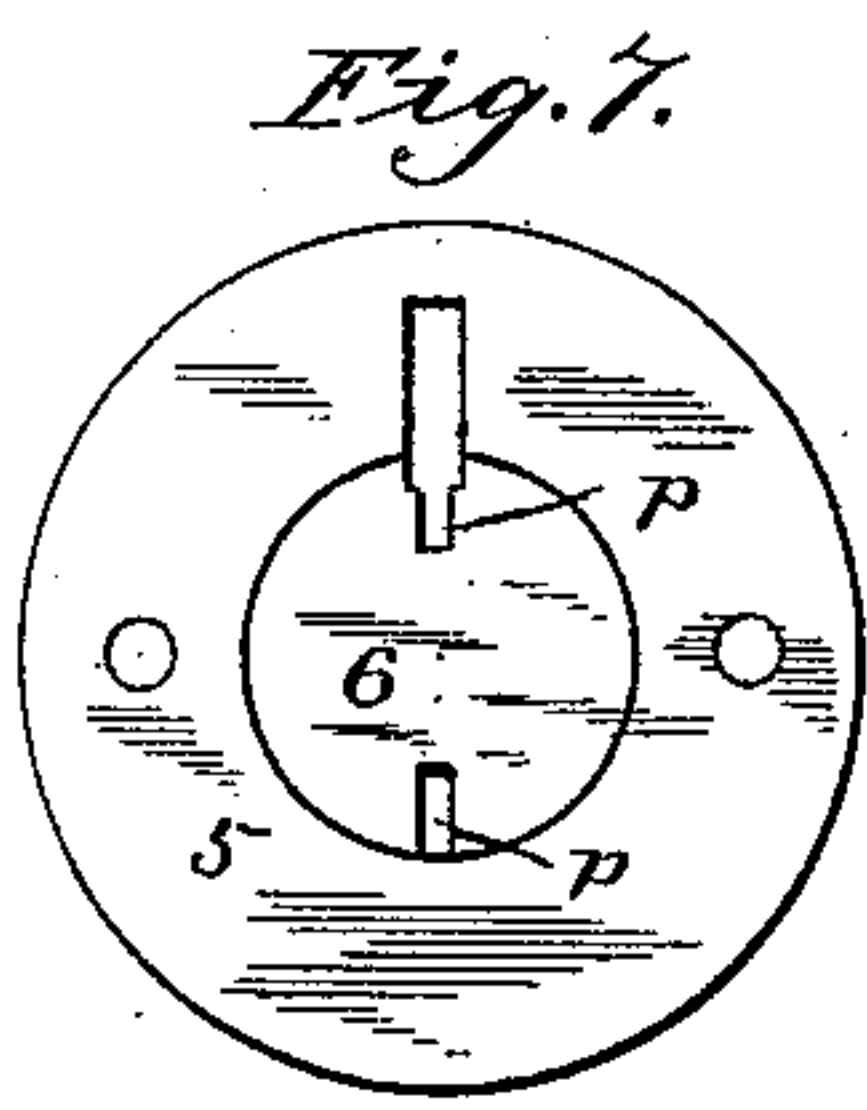
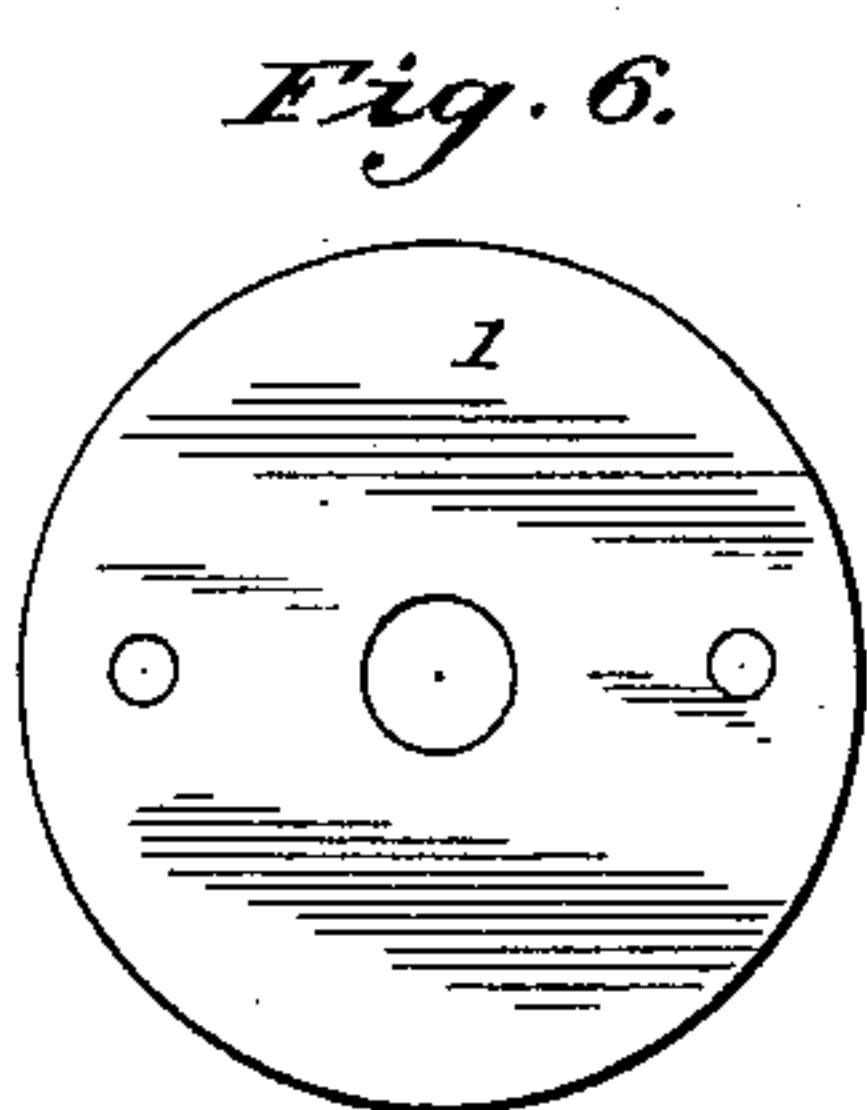
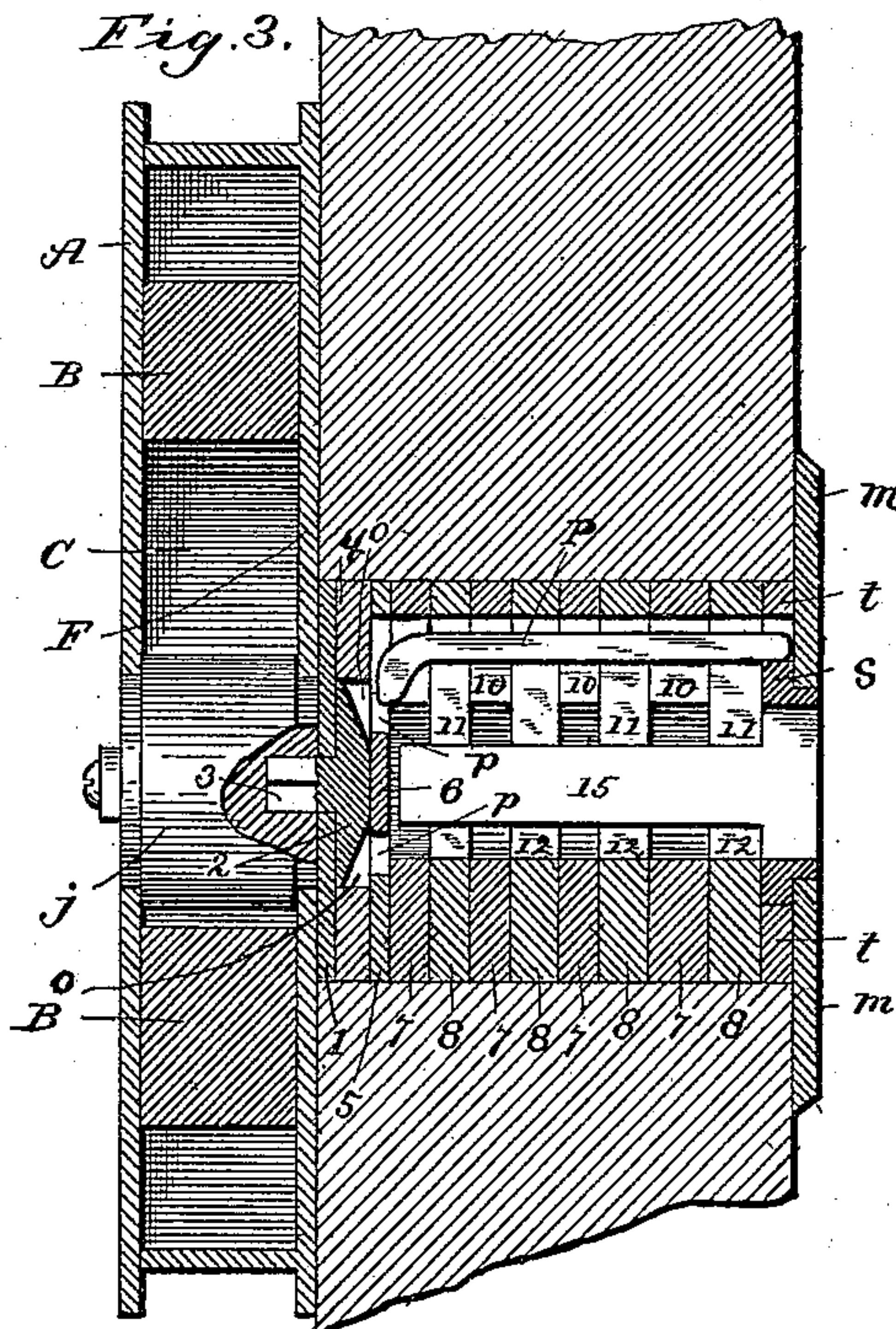
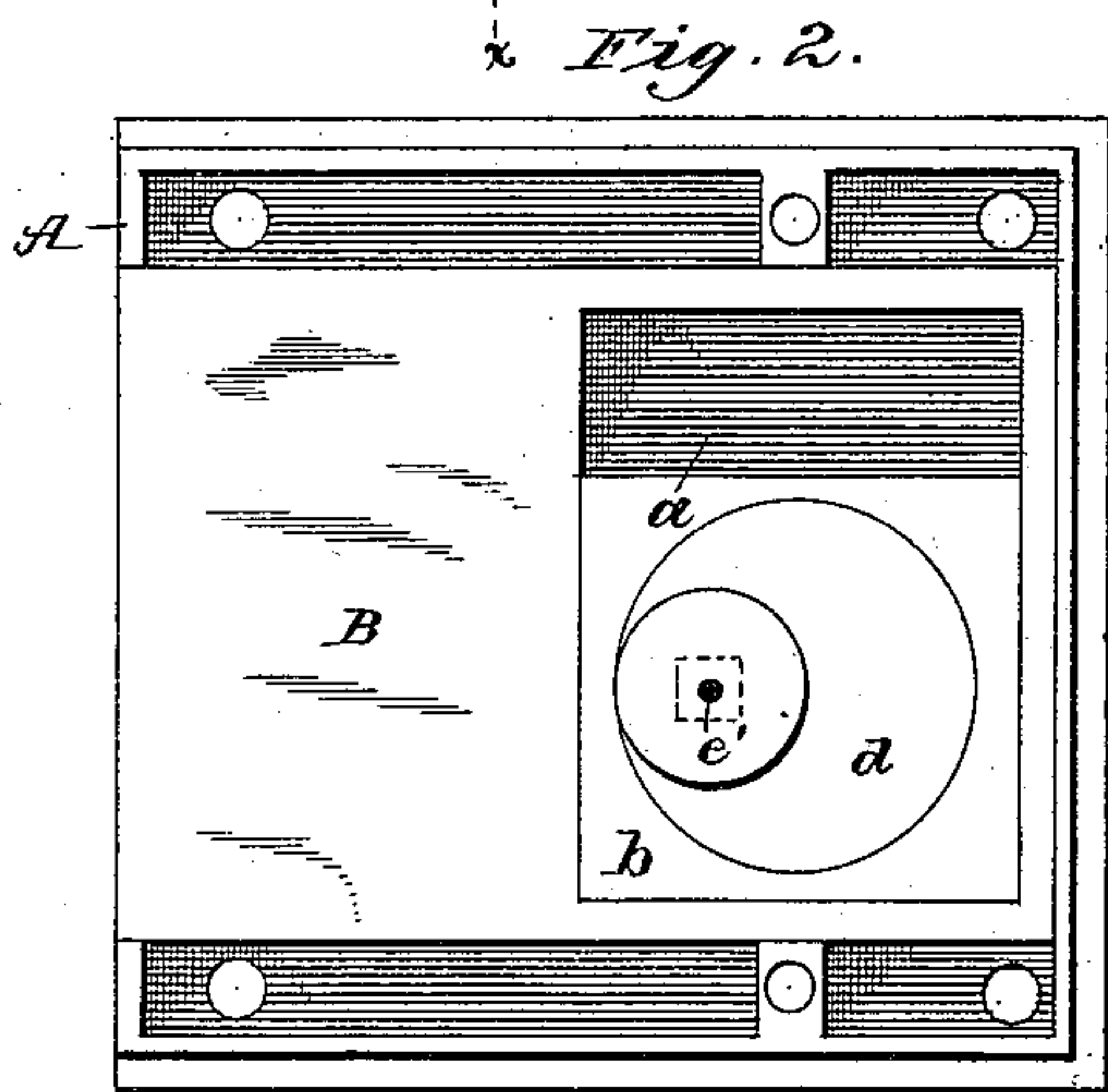
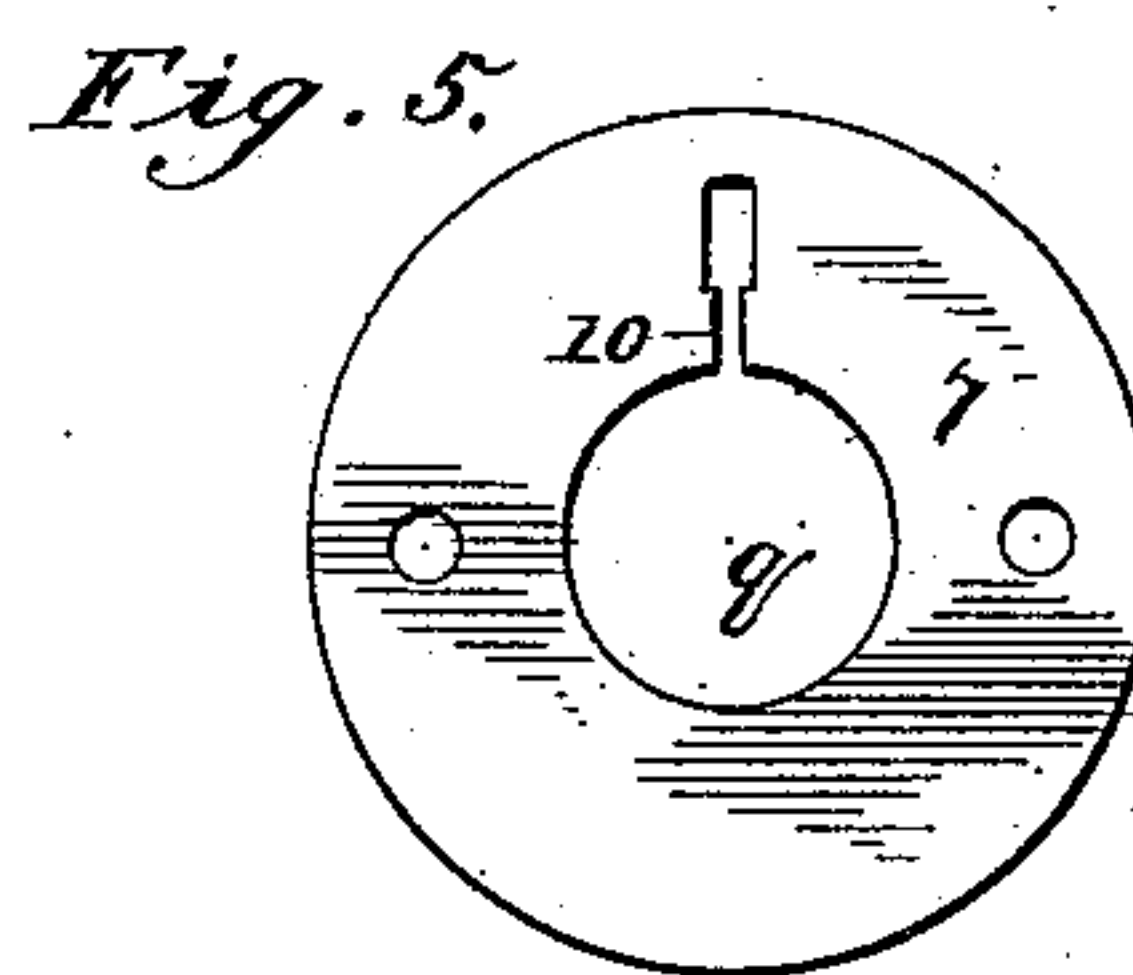
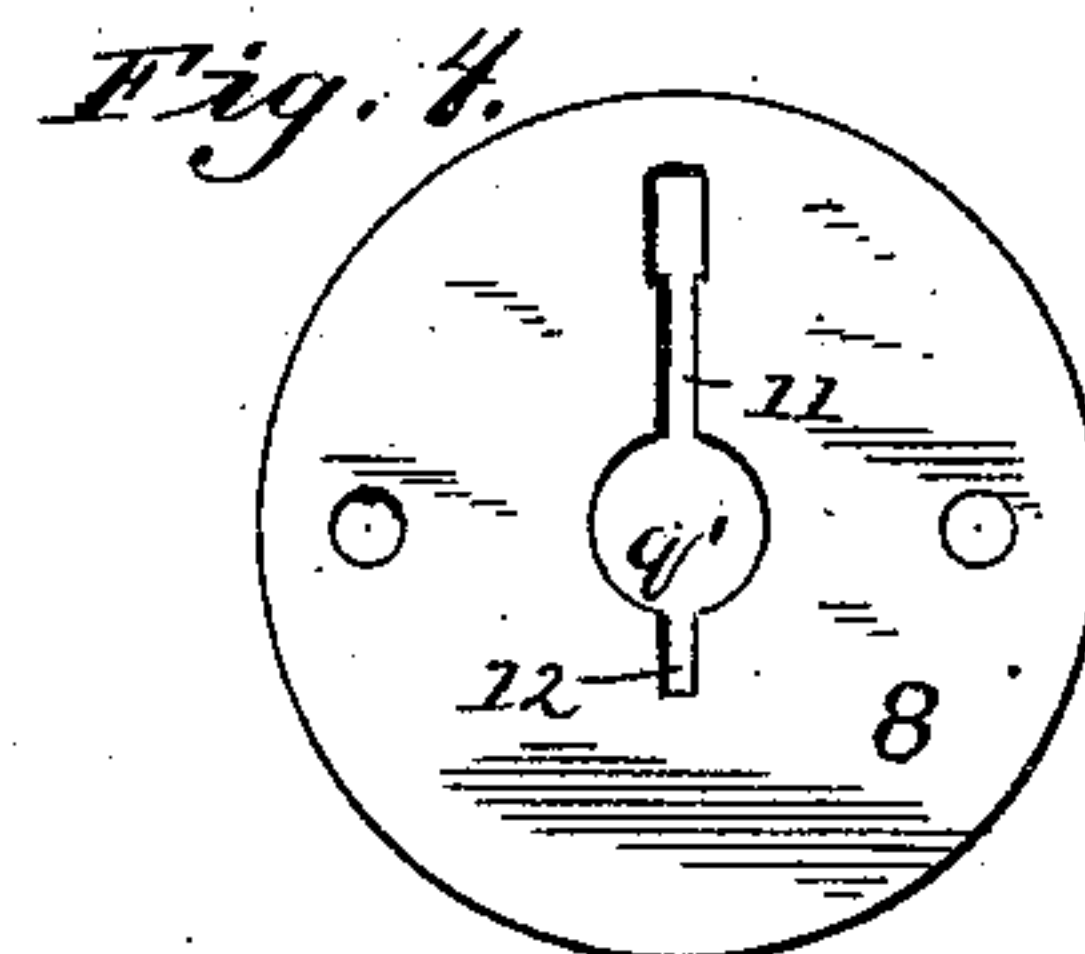
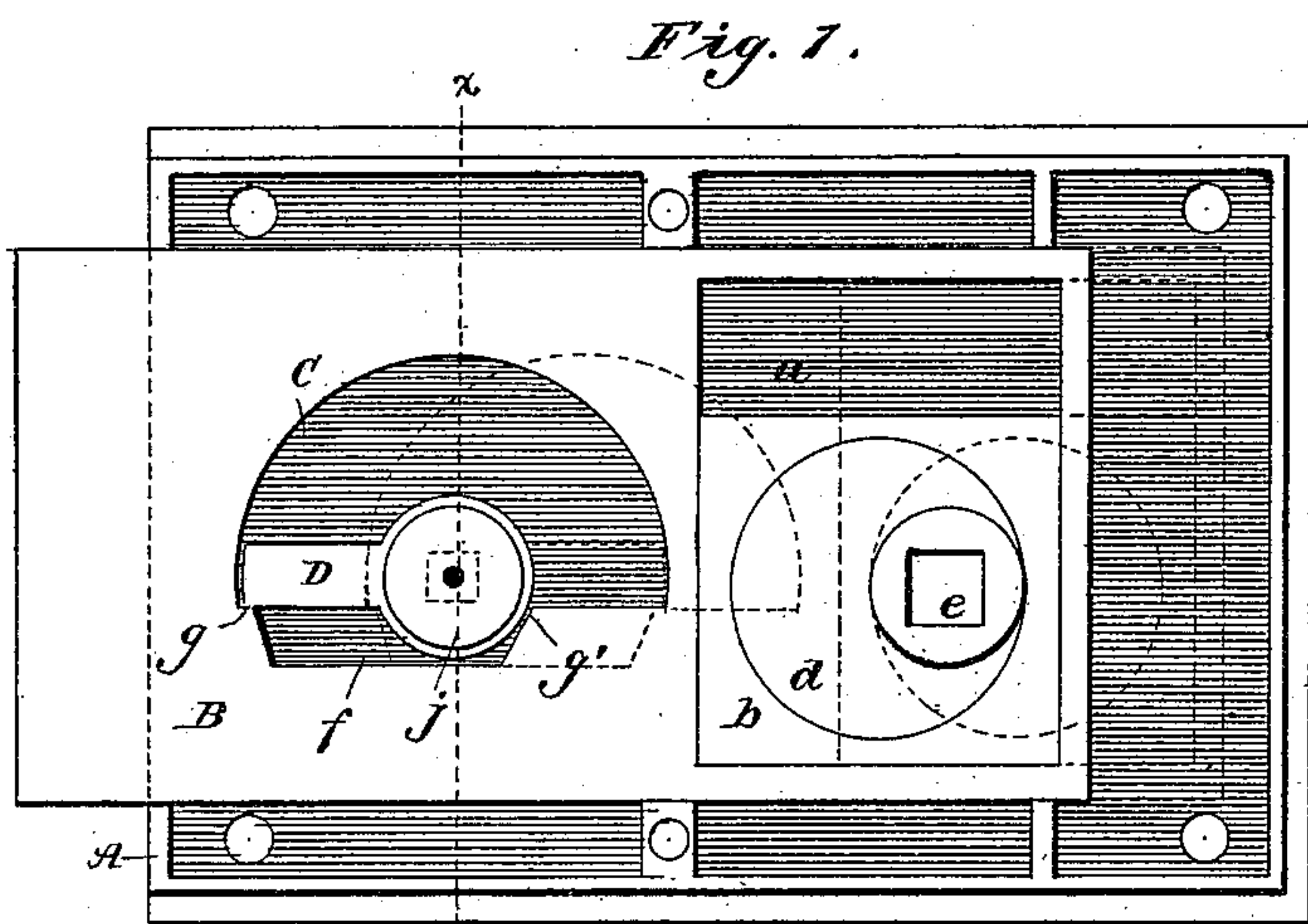


(No Model.)

W. C. SMITH.
LOCK.

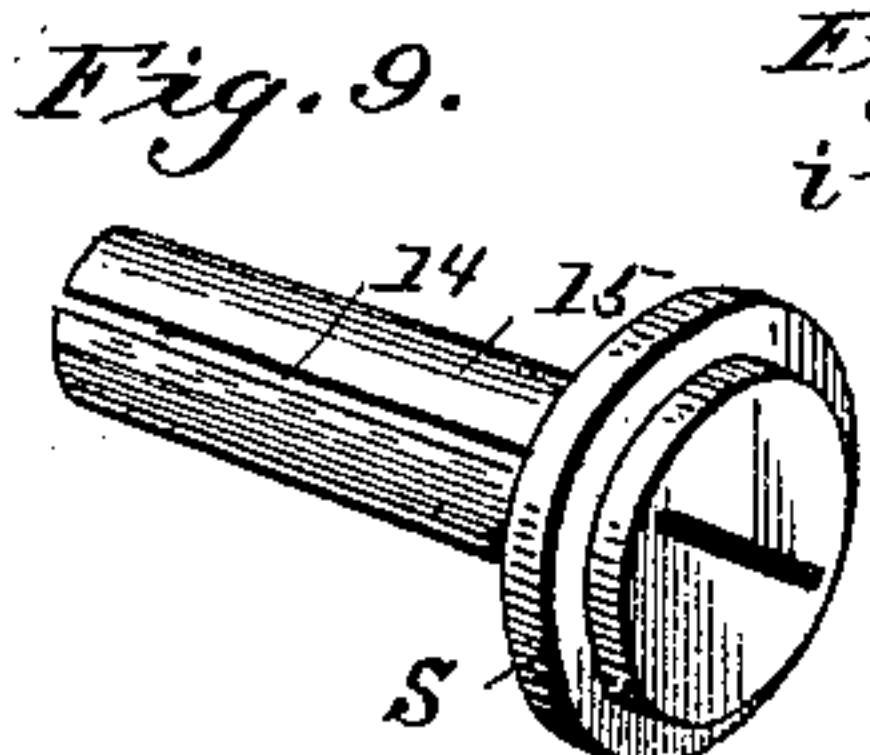
No. 449,830.

Patented Apr. 7, 1891.



WITNESSES:

Edwin L. Bradford
W. Curtis Lammond



INVENTOR
William C. Smith
BY
E. C. Ellis
ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM C. SMITH, OF WARSAW, MISSOURI.

LOCK.

SPECIFICATION forming part of Letters Patent No. 449,830, dated April 7, 1891.

Application filed June 26, 1890. Serial No. 356,807. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. SMITH, a citizen of the United States, residing at Warsaw, in the county of Benton and State of Missouri, have invented certain new and useful Improvements in Door-Locks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in locks intended for use upon all kinds of swinging doors; and it consists, substantially, in such features of arrangement, construction, and combinations of parts, as will hereinafter be more particularly described and claimed.

The object of the invention is to provide a simple form of lock for all kinds of doors which shall be dependent upon its action entirely without the use of springs, thereby obviating a great many disadvantages heretofore attendant upon the kinds of door-locks in which the use of springs is resorted to.

The invention has for its further object to provide a lock which shall be capable of having its operative parts brought into such position or relationship with each other as that the bolt can be operated either by the use of a key or door-knob to be opened and closed as in the manner of the ordinary spring-latch, but without the employment of springs, as before stated.

The invention has for its further object to provide a lock which shall be capable of being so set as to prevent the withdrawal of the locking-bolt by any attempt to do so from without, yet at the same time to be readily released, so as to be withdrawn, by the proper manipulation of the lock from within.

The invention has for its further object to provide a lock for all kinds of doors which can only be opened from the outside of the door by the use of a key specially designed for the purpose.

The invention has for its further object to provide a lock for all kinds of doors which while permitting of the withdrawal of its locking-bolt by the use of a specially-designed key from without can yet be so set from within as to be prevented from such withdrawal even by the use of such specially-designed key.

The invention has for its further object to provide tumbler devices or mechanism for operating the oscillating lever which actuates the bolt, and which serves to prevent the unlocking or withdrawal of the bolt by manipulation from without except by the use of a key specially designed for the purpose.

The invention has for its further object to provide a tumbler mechanism which shall serve to admit of the insertion only of the key specially designed therefor, thereby adding greater security against opening the lock by the use of a false key or instrument.

The invention has for its further object to provide a tumbler mechanism which while the bolt remains in its locked position shall be held into interlocking engagement with said bolt to prevent it from being withdrawn by manipulation from without except by the use of the special key.

The invention has for its further object to provide a tumbler mechanism for the lock which shall be capable of such variations, or changes in its arrangement or organization as to render it possible to make up a great number of locks or series of locks having this form of tumbler mechanism, each of which shall require a separate specially formed key.

Finally, the invention has such other objects in view as will more fully hereinafter appear when taken in connection with the accompanying drawings, in which—

Figure 1 represents in side elevation an interior view of my improved lock, the covering-plate being removed, the said figure being intended to represent the locked position of the bolt, as well also the place for the passage of a knob-spindle when it may be desired to employ a knob for the purpose of slipping the bolt. Fig. 2 is a similar view to Fig. 1, except that this figure is intended to represent a modification in the form of a simple latch similar in purpose to the ordinary spring-latch, (but without springs,) and may be operated in a similar manner as the construction in Fig. 1—that is to say, either by a key and knob or only one of them. Fig. 3 is an enlarged transverse sectional view on line $x\ x$, Fig. 1, of the lock-casing, together with its interior mechanism, as well as my improved tumbler mechanism, the said view representing the manner of connection of the

said devices and clearly indicating how they operate together in view of the description hereinafter supplied. Figs. 4, 5, 6, and 7 are plan views in detail of the several forms of rings which go toward making up the tumbler devices or mechanism. Fig. 8 is an enlarged side view of the key specially designed to operate said tumbler devices or mechanism, so as to enable the bolt of the lock to be withdrawn. Fig. 9 is a view in perspective of the hollow split plug designed for receiving and guiding the specially-formed key. Fig. 10 is a perspective view in detail of the crank employed to prevent turning of the bolt either from within or without until released.

In carrying my invention into effect I provide a suitable casing A, in which works a sliding bolt B, said bolt being formed at its inner end or portion with a square recess or opening *a*, in which is located a movable plate *b*, having a central opening in which closely fits an eccentric or cam *d*, formed with a square opening *e*, designed to receive the shank of a door-knob, when desired, so as to permit of the bolt B being worked in and out by simply turning the shank in the ordinary manner of turning the knob of a door to open the same.

In Fig. 2 I have shown on the side of the cam, in dotted lines, a squared shoulder, and centrally thereof is a hole *e'*, which is formed to receive a screw, thus it being seen that the bolt may be turned in this instance by the use of a crank like that shown in Fig. 10, it being only necessary to fit the crank upon the squared shoulder.

The reason for employing the construction shown by Fig. 1 is only to facilitate the ready opening and closing of the door by hand when the bolt is in its unlocked position. In said Fig. 1 I have also shown the bolt as being formed with an arc-shaped opening C, terminating at the base with a cavity *f*, so as to accommodate the movement of the hub of the oscillating locking-lever D for the bolt, and also to form stops *g g'* for said lever or arm, accordingly as the same may be turned in one direction to maintain the bolt locked or in the other direction to permit it to be withdrawn.

The hub *j* of the locking-lever is formed with a squared shoulder (see dotted lines, Fig. 1) similar to that shown on the side of the cam in Fig. 2, dotted lines, and the purpose of this shoulder is also to receive the small crank E, (shown in Fig. 10,) so as to permit of said locking-lever being turned from the inner side of the door in like manner as the cam of Fig. 2 is turned.

By the employment of a small pin *i*, adapted to work loosely in the handle of the crank and also to be slipped into an opening (not shown) in the side of the plate F, which covers the casing, (and which is only seen in Fig. 3,) the crank can be made to hold the lever D in the position shown in Fig. 1, and thus pre-

vent the turning of the bolt from without even by the use of the special key hereinafter referred to more specifically.

To operate the bolt the same is thrown outward by turning the cam *d* a half-revolution to the right or to the left, according to the side of the lock from which the turning is effected, and this will cause the movable plate *b* to describe an up-and-down movement within opening *a* of the bolt, and the bolt will be forced out to the extent of its limit.

To describe the manner of operating the unlocking of the bolt from without or on the outer side of the door, as well as the devices for preventing such unlocking by the insertion of any false instrument or key, I will proceed as follows, viz: I employ a number of peculiarly-constructed disks or rings, all of the same diameter, and for the accommodation of which an opening is made in the door for their reception, as shown in Fig. 3. The casing of the lock (containing its inner mechanism) is secured against the inner side of the door in proper position before the opening therein, and upon the outer side of the door a suitable face-plate *m* is secured, the same having a central opening sufficiently large to admit the key M. (Shown in Fig. 8.) In organizing the mechanism I first take a disk or ring 1 (shown in Fig. 6 in detail) and press this disk snugly up into place against the casing of the lock. I then insert a plate 2, having a squared projection 3, which passes through the central opening in plate 2 and enters the hub *j* of the locking-lever D, the said plate 2 being formed with bevel-shaped openings *o o*, so as to facilitate entrance or passage of the key-bit, as hereinafter set forth, this plate 2 being surrounded by a ring 4, as shown in Fig. 3. Next to the ring 4 is inserted such a ring as is shown in detail, Fig. 7, the same being designated by the numeral 5 and having fitting within it a small disk 6, that is notched diametrically, as shown at *p p*, which notches coincide with the openings *o o* of the plate 2, and are also to permit the passage of the bit of the key, as hereinafter set forth. Next following the ring 5 are inserted alternately one after the other first the ring shown at Fig. 5 and designated by the numeral 7 and then the ring shown at Fig. 4 and designated by the numeral 8. As shown in Fig. 3, there are four of each of the rings 7 and 8 employed, alternating with each other, and it will be seen on reference to Figs. 4 and 5 that such rings are formed with central openings *q* and *q'*, respectively, the smaller of which openings is just large enough to admit passage of the split key-guide hereinafter referred to. The purpose of having the openings of these rings of varying diameters is to form alternating flanges and notches to correspond with and fit into the nibs and notches of the key hereinafter described, so that the parts will act to operate in the manner intended. It will be seen, further, that each of the plates 7 and 8 is formed, respectively, with coinciding up-

wardly-extending slots 10 and 11, and that each plate 8 is also formed with a downwardly-extending slot 12. These slots 10 and 11, it will be seen, are narrow for a short distance and then become enlarged at their upper extremities, the purpose of which being to form entrances for the passage of the key, as well as a passage through all the rings of the latch P, which serves to hold the disk 6 in position and prevent it from being turned, so as to maintain the lock from being opened until the insertion of a proper key. This latch P passes through and rests in the enlarged portions of the slots 10 and 11, as seen in Fig. 3, while the straight or narrow portions of these slots, as well as the slots 12 of the rings 7, are made to coincide with the split 14 of the key-guide 15, which passes centrally through all of the rings in the manner shown. Said key-guide is provided with a head or flange *s*, as shown, and is provided with a key-hole for the insertion of the key. Surrounding said head or flange *s* is a ring *t*, which serves to maintain the same in position, as well as to keep the several rings or tumblers in compact form.

It will be seen on examining the key shown in Fig. 8 that the same is first formed at its end with bevel-shaped bits *a' a'*, which correspond to the openings *o o* in plate 2 and the notches *p p* of the disk 6, said bits being for the purpose of entering these openings and notches, and thereby lifting the latch P by the curved inner end thereof, as will be clearly understood from the drawings. (See Fig. 3.) Following after the bits the key is formed with straight portions *b' b'*, which correspond to the ring 7 first inserted. After the portions *b' b'* the key is formed with alternating notches *c' c' c' c'* and nibs *d' d' d' d'*, the said alternating notches and nibs or bits corresponding to the successive alternating arrangement of the rings 7 and 8, hereinbefore explained.

On reference again to Fig. 3 it will be observed that the several rings or tumblers employed by me are of varying thicknesses, and I desire to state at this point that many different combinations may be formed in this way—that is to say, that by varying the thicknesses of these rings differently in each lock or in each set or series of locks the arrangement or organization of each may be so determined as to require different keys for their manipulation, thus rendering it difficult, as

will be manifest, for any one to make a key to fit.

I lay no claim herein to the form of cam movement illustrated by Fig. 2, since the same is specifically claimed in my former application, filed December 24, 1889, and bearing Serial No. 334,899.

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

1. In a lock of the character described, the combination, with the casing, of the sliding bolt B, formed with the arc-shaped opening C, and stops *g g'*, of the oscillating locking-lever moving in said arc-shaped opening, so as to lock the bolt in its outer position, as set forth.

2. In a lock of the character described, the combination, with the locking-lever having its hub formed with the squared offset, of the crank E, adapted to fit said offset and provided with the loose pin designed to enter a suitable opening in the casing of the lock, so as to prevent said lever being turned, substantially as described.

3. In a lock of the character described, the combination, with the lock-casing and its interior mechanism, of the tumbler devices or mechanism consisting of the disk 6 and a number of disks or rings having central openings of varying diameter and being of varying thicknesses, the said rings having a latch passing through the same and provided with a central key-guide adapted to receive a key, substantially as described.

4. In a lock, the combination, in the tumbler devices shown, of the alternating rings 8 and 7, the former having slots 10 and 12 and the latter the slots 10, the said rings being also formed with central openings *q* and *q'*, respectively, the split key-guide passing through said openings, the ring 5, having its notched central disk 6, the plate having a projection entering the hub of the locking-lever, and the latch passing through said rings, substantially as shown, and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM C. SMITH.

Witnesses:

W. CURTIS LAMMOND,
E. EVERETT ELLIS.