

(No Model.)

H. J. FRIZELLE.
LOCK.

No. 547,007.

Patented Oct. 1, 1895.

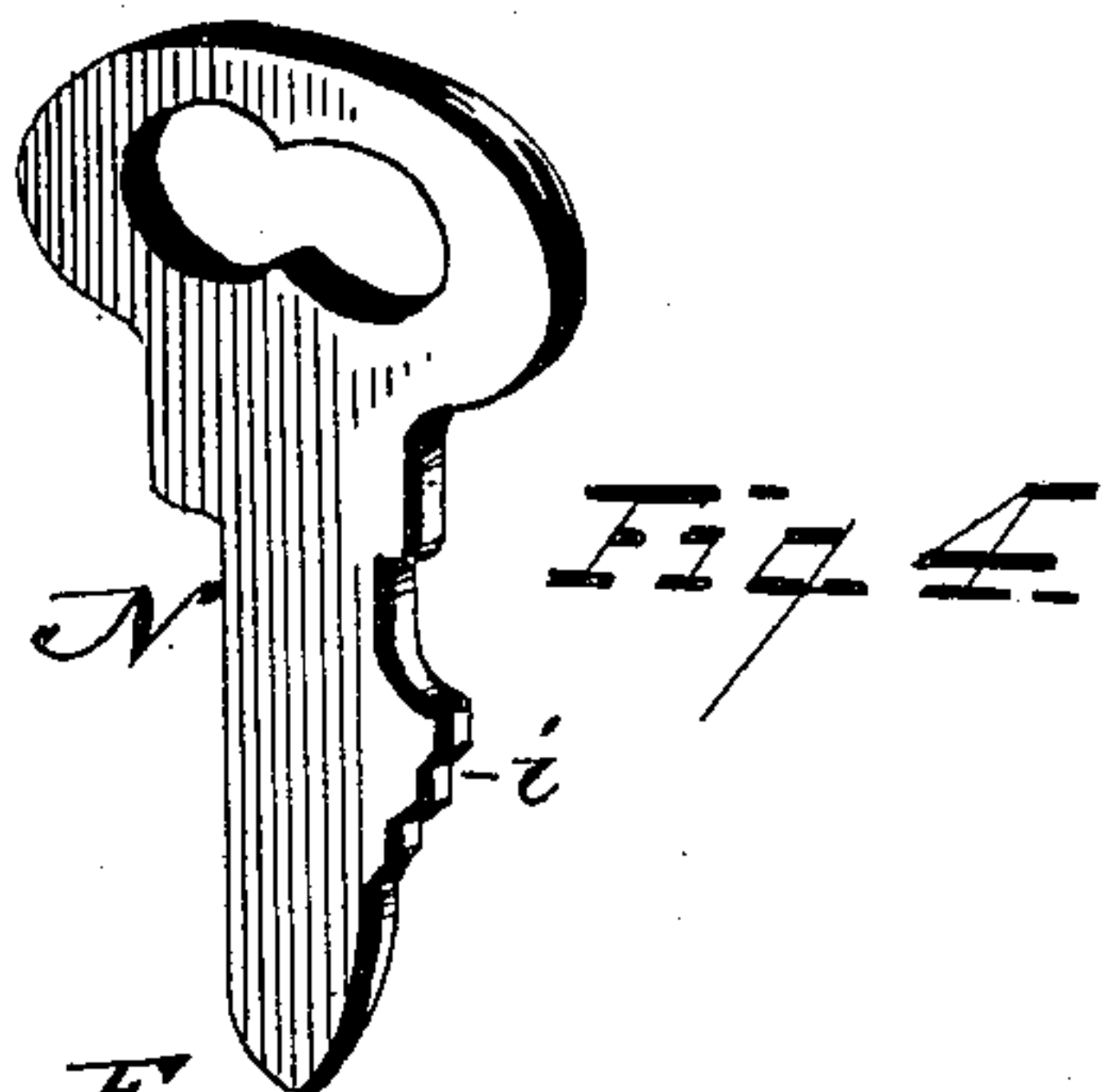
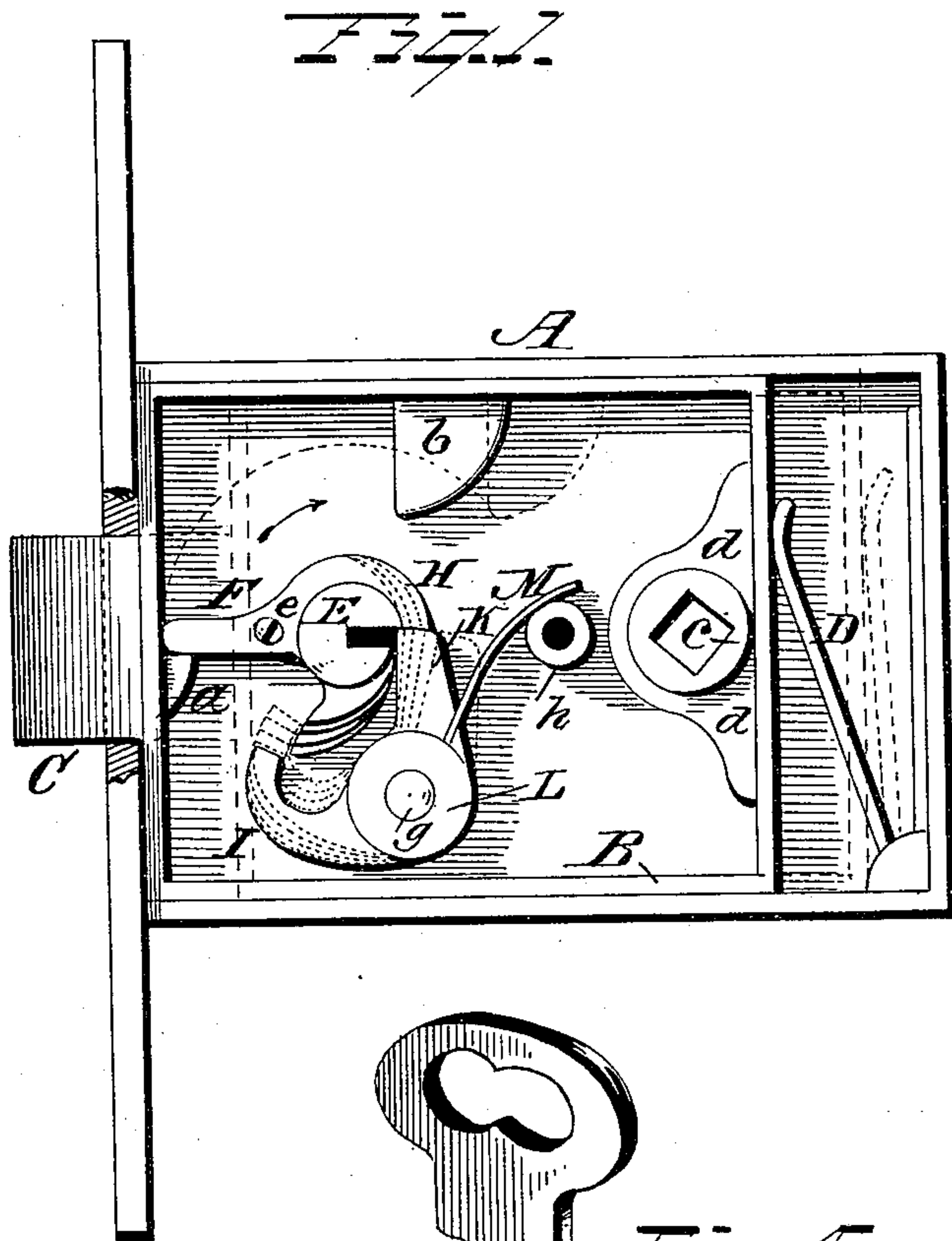


Fig. 2

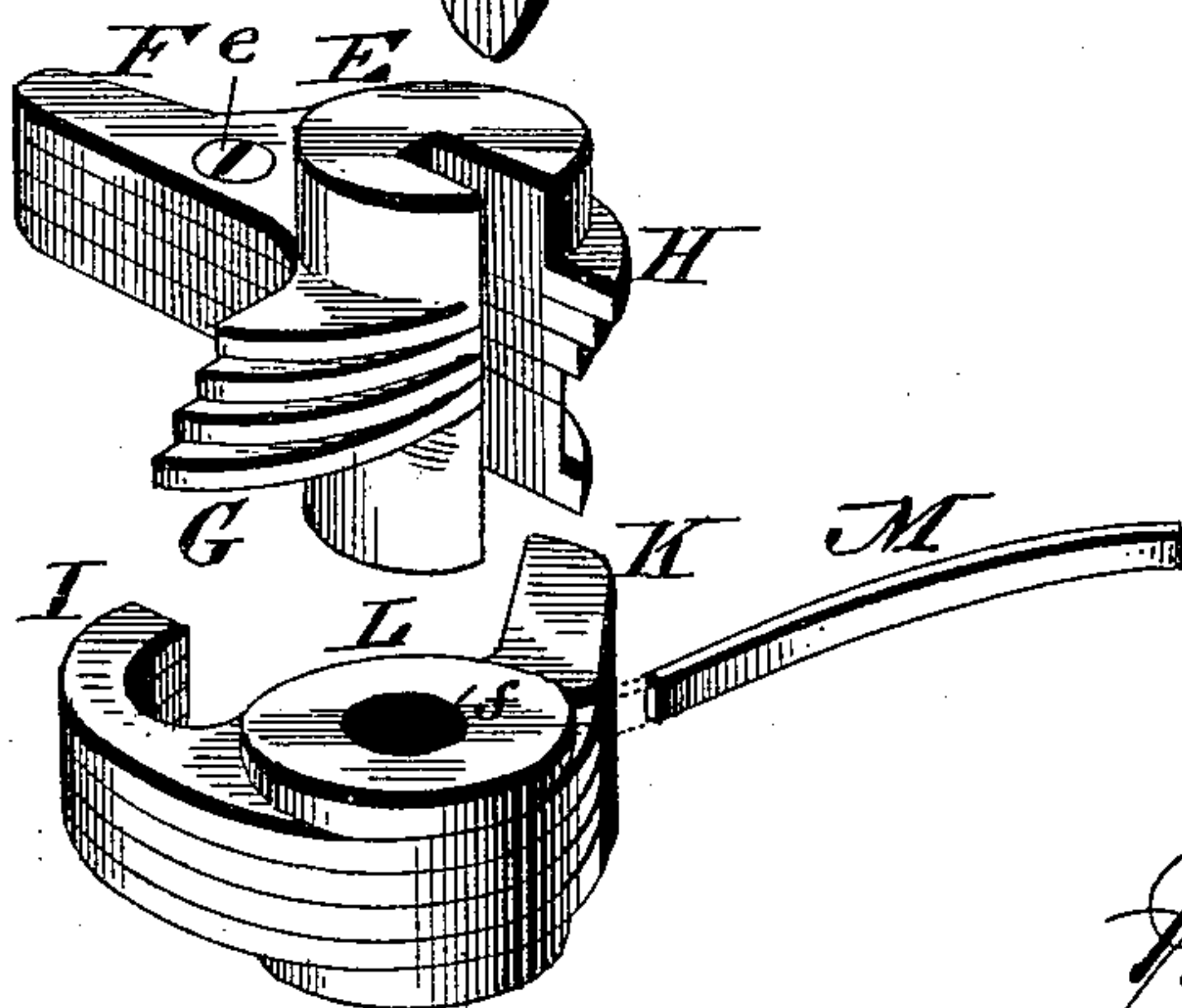


Fig. 3

Witnesses
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UNITED STATES PATENT OFFICE.

HORACE J. FRIZELLE, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF ONE-HALF TO ROBERT A. MACGREGOR, OF SAME PLACE.

LOCK.

SPECIFICATION forming part of Letters Patent No. 547,007, dated October 1, 1895.

Application filed July 15, 1895. Serial No. 555,969. (No model.)

To all whom it may concern:

Be it known that I, HORACE J. FRIZELLE, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Locks; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon.

The present invention has relation to the mechanism employed for operating the bolt of all classes of locks for whatever purpose used, and is especially valuable in that class which embodies the two features of a combined latch and lock wherein a single bolt is employed and a key is adapted to be used as well as the door-knob itself.

The object of the invention is to improve the construction of the bolt-operating mechanism, whereby a more perfect action of the tumblers is obtained, the lock in its general construction materially enhanced in value and possessing the necessary strength and durability requisite in locks of this character.

The above objects are attained by a lock constructed substantially as shown in the drawings, and hereinafter described and claimed.

Figure 1 of the drawings represents a side elevation of a lock constructed in accordance with my invention, the side or face plate being removed to show the interior construction of the lock, the bolt and operating parts being shown in a locked position in full lines and an unlocked position in dotted lines; Fig. 2, a perspective view, in detail and on an enlarged scale, of the keyhole-hub and its connections; Fig. 3, a similar view of the tumblers, showing one of the springs that is connected thereto to automatically act upon the tumblers to force them back into position shown in full lines of Fig. 1; Fig. 4, a perspective view, on an enlarged scale, of one of many forms of keys that may be used in connection with the lock.

In the accompanying drawings, A represents the lock-casing, which may be of any suitable construction to adapt it to the class of lock to which my invention may be applied. Within

the casing A is fitted a slidable frame B, having upon its front end a bolt C, said frame having a stop *a* and a fulcrum-bearing *b*, which extends down from the upper side of the frame. At the rear end of the casing A is suitably attached one end of a suitable spring D, the upper or free end thereof bearing against the end of the frame B to force the frame forward when the bolt is released. The knob-spindle of the lock extends through the usual sleeve *c*, which sleeve extends through the side plates of the casing A, and has the ordinary wings *d* to act upon the rear end of the slidable frame B when the knob-spindle and sleeve *c* are turned in either direction.

The above-described means for operating the bolt through the medium of the knob-spindle may be variously modified or changed, as circumstances would require, and in a lock where no knob-spindle is used such means may be entirely dispensed with.

The keyhole-hub E extends through the side plates of the lock-casing A, and is provided with a lever-arm F and a plurality of stationary steps G and stationary steps H, which are disposed opposite each other, as shown in Fig. 2 of the drawings.

The steps G and H extend out from the keyhole-hub E, as shown, and may be formed by connecting together a series of flat metal plates or constructed from a single piece of metal, as found most preferable. The steps G and H have curved edges and successively increase in length, as shown in Fig. 2 of the drawings. I have shown these steps and also the keyhole-hub and lever-arm as being formed of a number of metal sections, which are afterward connected together by a screw *e* or by any other well-known and suitable fastening, this being considered the most practical way, although the parts may be formed from a single piece of metal, as previously stated. The double series of tumblers I K are in number to correspond with the number of the steps G and steps H, respectively, each pair of tumblers being stamped or otherwise formed from a single piece of sheet metal with a central disk L. The disks L have a hole *f*, and when together, as shown in Fig. 3, they are connected by means of a pivot-

pin *g*, which pin extends through the side plates of the lock-casing A and is made fast thereto.

The above means of connecting the tumblers together and within the lock-casing enables each pair of tumblers to move and act independently of each other through the medium of the key hereinafter described.

The tumblers I are curved or hook-shaped to better act in connection with the curved steps G, while the tumblers K are straight with a bevel end, as shown in Fig. 3 of the drawings.

The tumblers K have springs M connected to them, the free ends of the springs bearing against the stud *h*, which stud projects from the inner side of one of the plates or sides of the lock-casing A and is provided with a screw-hole by which the removable plate to the lock-casing may be secured in place by means of a screw passing through the plate and engaging with the screw-threaded hole in the stud.

The key N, as shown in Fig. 4 of the drawings, may have notches or shoulders *i* upon one or both edges and may be in number and form to correspond to the number and form of the tumblers. It may be desirable to have the notches or shoulders upon both edges of the key, so that the key may be inserted in the keyhole-hub without the necessity of observing which edge of the key is uppermost, as the notches or shoulders upon the opposite edges would correspond with each other. The construction of the key, however, is left entirely with the manufacturer and may be variously modified to adapt it to the special form of lock used. The position which the parts assume is indicated in full lines of Fig. 1 of the drawings. The lever-arm F at its end will rest upon the stop *a* and the tumblers K will be in a position to prevent the keyhole-hub E from being turned without the proper key inserted therein. The frame B is now in a locked position and cannot be operated by the knob-spindle, but only by the proper key engaging with the keyhole-hub E, the position of the lever-arm F preventing the frame from being moved. Now, when it is desired to bring the locking mechanism in position, so that the lock may be operated either by the key or the knob-spindle, the key is inserted in the keyhole-hub E and the notches or shoulders *i* thereon will force out the tumblers K from contact with the steps H. The position of the tumblers K will now allow the steps H to pass them and the hub to be turned in the direction of the arrow in Fig. 1 of the drawings. This movement of the hub E will carry the lever-arm F up against the fulcrum-bearing *b*, which will release the frame B and enable said frame to be operated by the usual knob-spindle to unlatch the door or by means of the key.

When the frame B is operated by the knob-spindle, the hub or sleeve *c* being turned in

either direction, one of the wings *d* will press against the frame and force it back to the position, as indicated by dotted lines, and carry with it the bolt C, and when the knob-spindle is released the spring D will force the frame back to the position shown in full lines and the bolt thereon in engagement with the door.

I have described above the operation of the lock through the medium of the knob-spindle; but when it is desired to operate it by the key alone the hub E is turned by means of the key, and through the action of the lever-arm F against the fulcrum-bearing *b* the frame B will be forced back to the position indicated in dotted lines.

From the above description it will be seen that a single bolt is made to serve the purpose of a latch and lock with an operating mechanism, and is both strong and durable and readily applied to any kind of a lock where a sliding bolt is used.

When the key is inserted in the hub, the tumblers K are turned just sufficient to allow of the hub being turned; but should the tumblers be moved beyond that distance necessary to allow of the free action of said hub the tumblers I will hook over the ends of the steps G and prevent the lock from being operated. This prevents the lock from being operated except by a key especially adapted to the tumblers, the hooked tumblers I guarding against the successful use of a key having any arrangement of notches or shoulders.

It is absolutely necessary for the operating of the lock that both sets of tumblers should be in their proper position with relation to the two sets of steps upon the keyhole-hub. Thus a double guard is provided against any tampering with the lock.

I do not desire to be understood as confining my invention to a door-lock, as the double sets of tumblers and steps may be applied to various forms of locks by a simple change of parts in order to adapt them to the class of locks used, and any such change or modification as would come within ordinary mechanical skill may be made without departing from the principle of my invention, the essential features of which are the double sets of tumblers in connection with the double sets of steps, as hereinbefore described.

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

1. A lock consisting of a bolt and means for operating it, said means comprising a keyhole hub having a double set of steps which extend therefrom in opposite directions, and a double set of tumblers arranged in pairs and adapted to lock or release the key hole hub, substantially as and for the purpose set forth.

2. A lock consisting of a bolt and means for operating it, said means comprising a keyhole hub having a double set of steps, and a double set of tumblers, one of the tumblers of

each pair having a curved or hooked end and acting in conjunction with the steps, substantially as and for the purpose described.

3. A lock consisting of a suitable frame
5 having a bolt upon its end and provided with a stop and a fulcrum-bearing, and a key-hole hub having a double set of steps, and a lever-arm to act in connection with the stop and fulcrum-bearing, and a double set of tumblers
10 to act in conjunction with the double set of

steps, substantially as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

HORACE J. FRIZELLE.

Witnesses:

R. A. MACGREGOR,
CLARA B. MARTIN.