

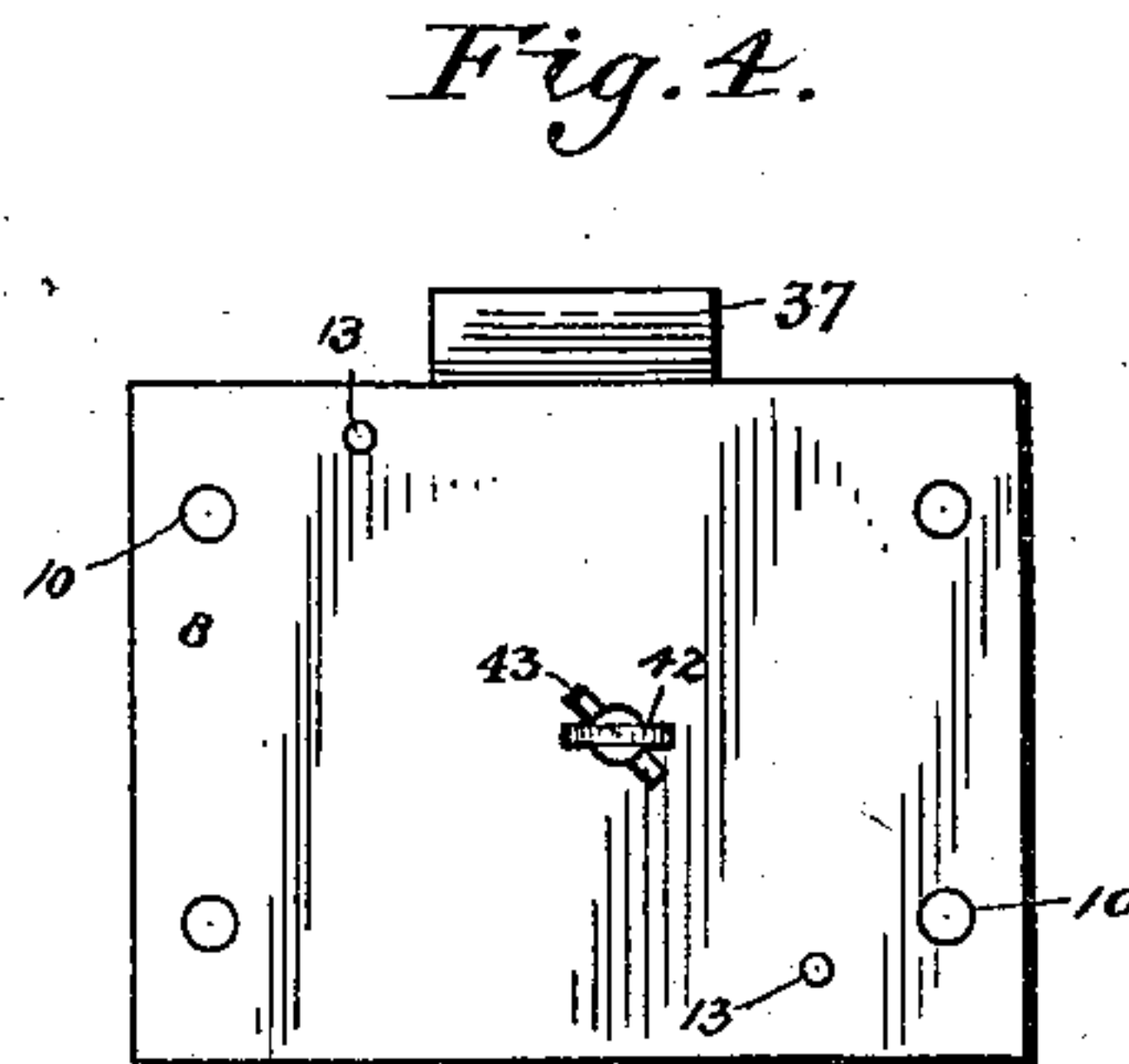
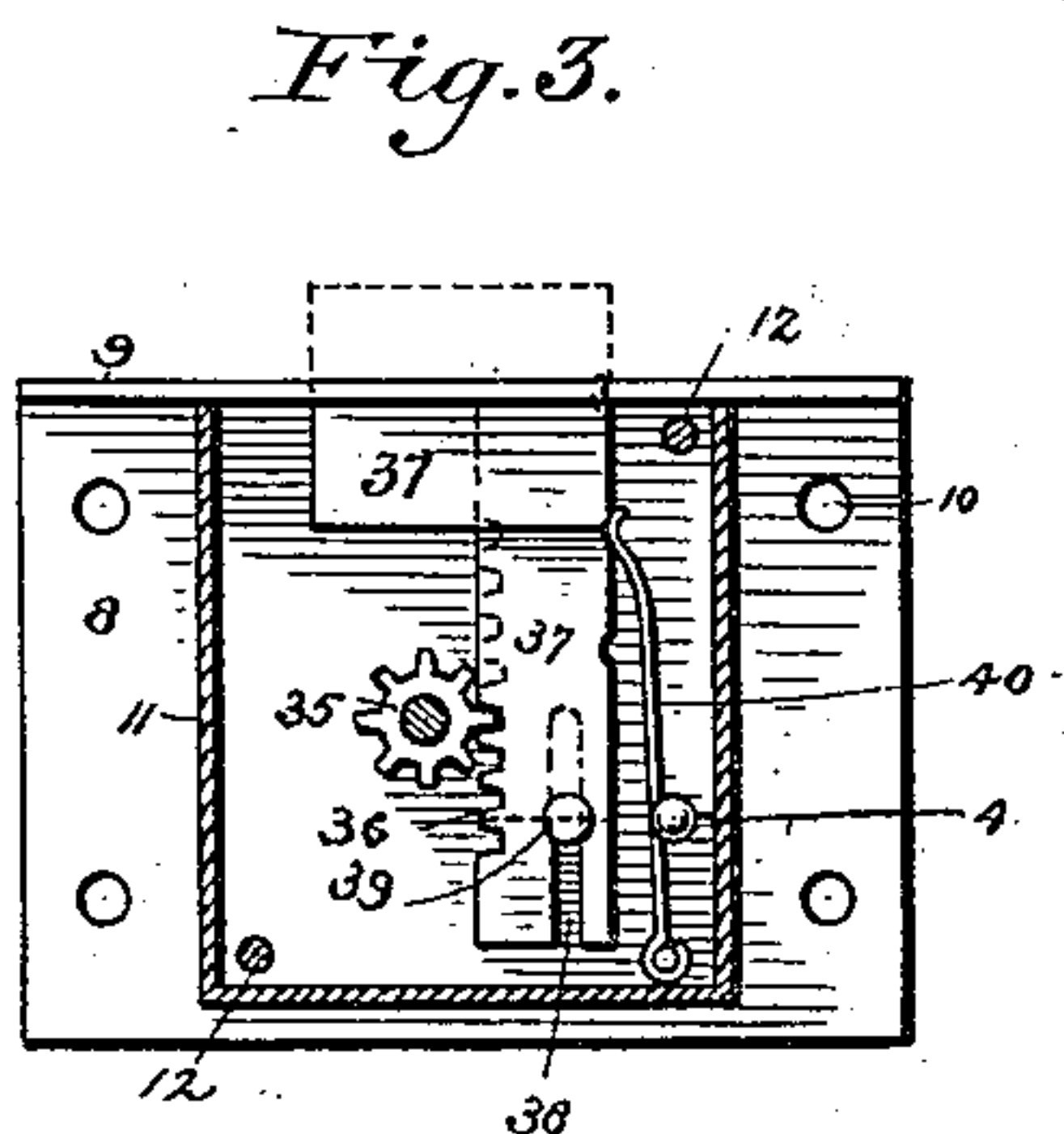
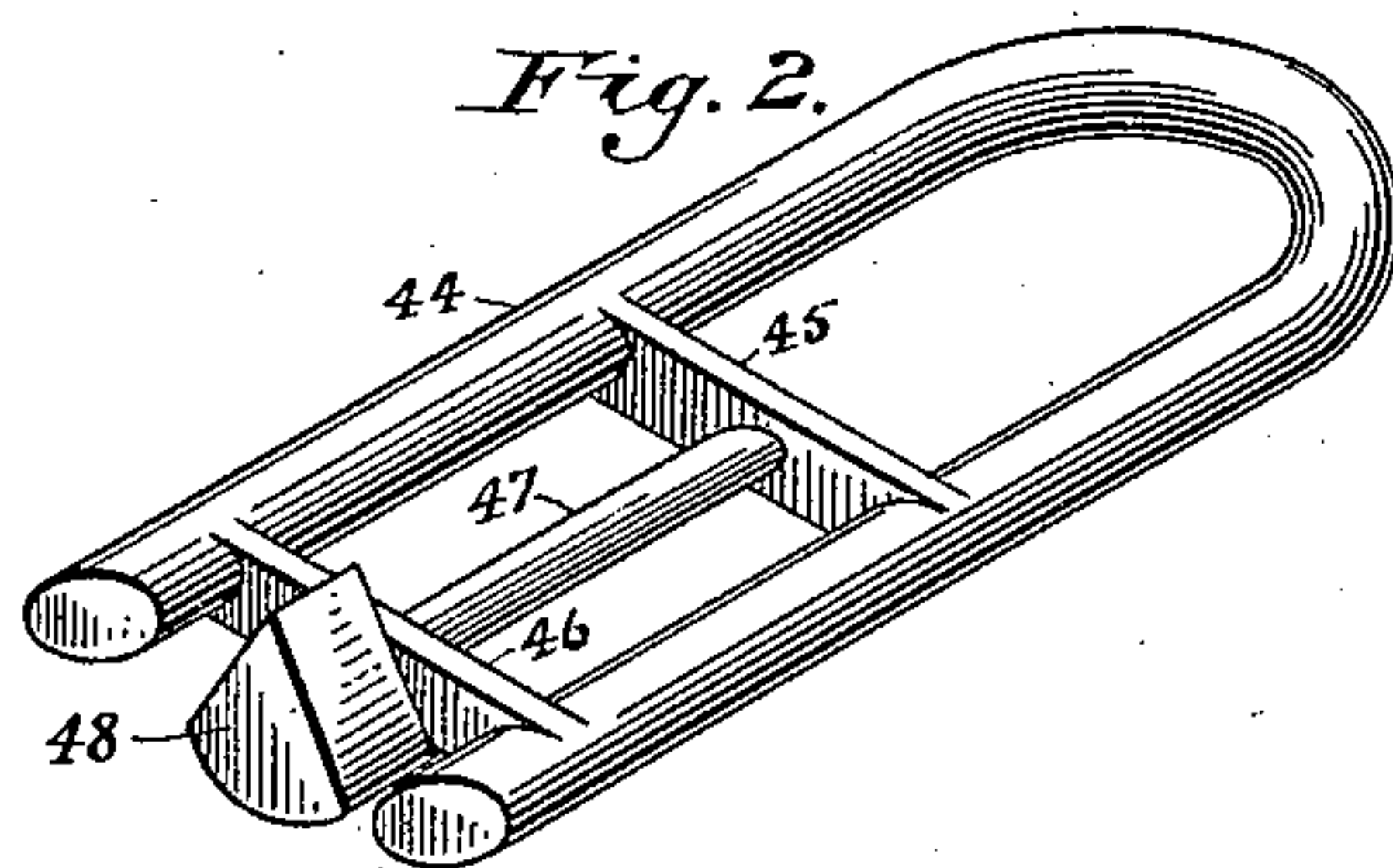
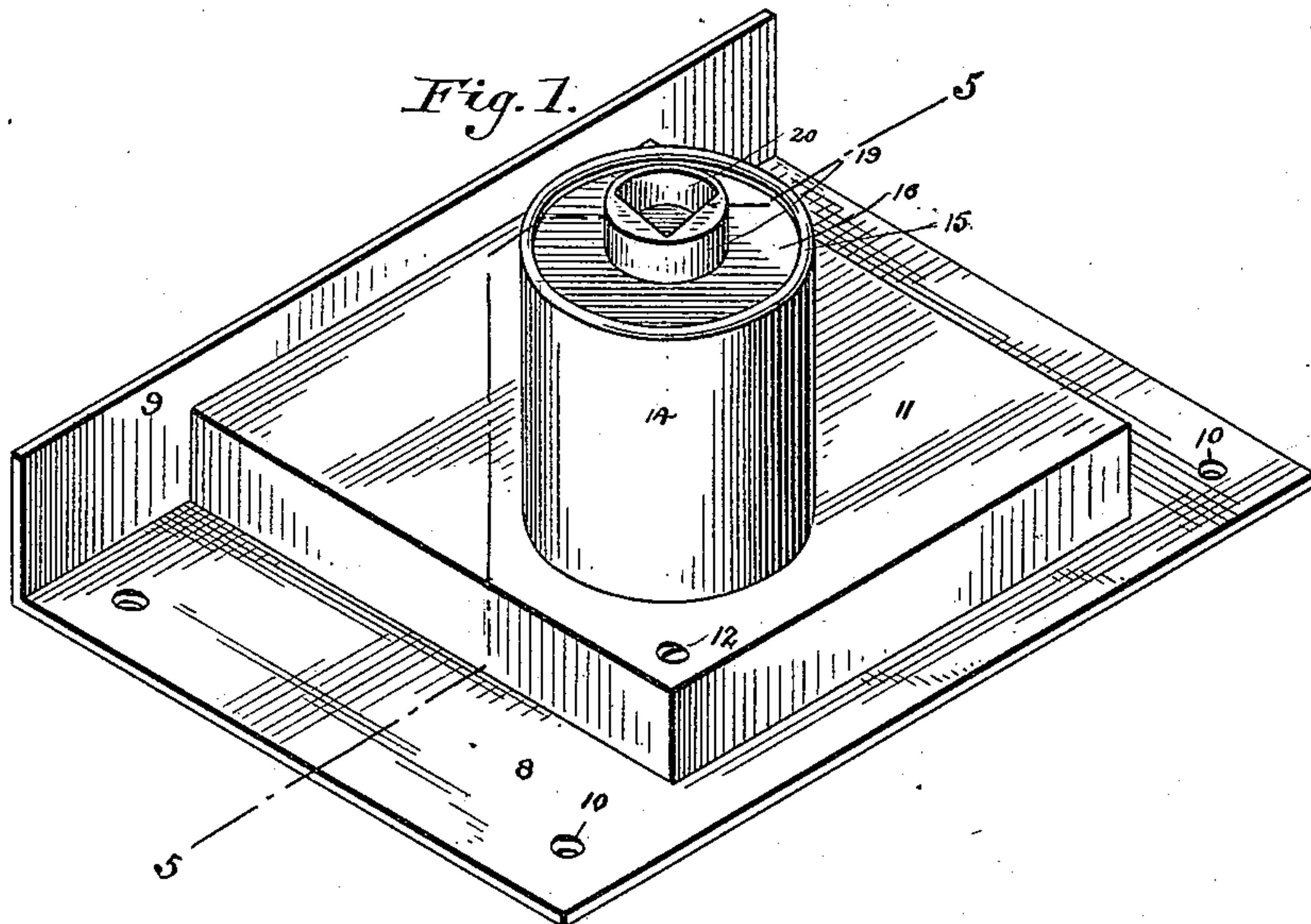
(No Model.)

2 Sheets—Sheet 1.

W. W. FENNER.
MAGNETIC LOCK.

No. 428,247.

Patented May 20, 1890.



Witnesses

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Inventor

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(No Model.)

2 Sheets—Sheet 2.

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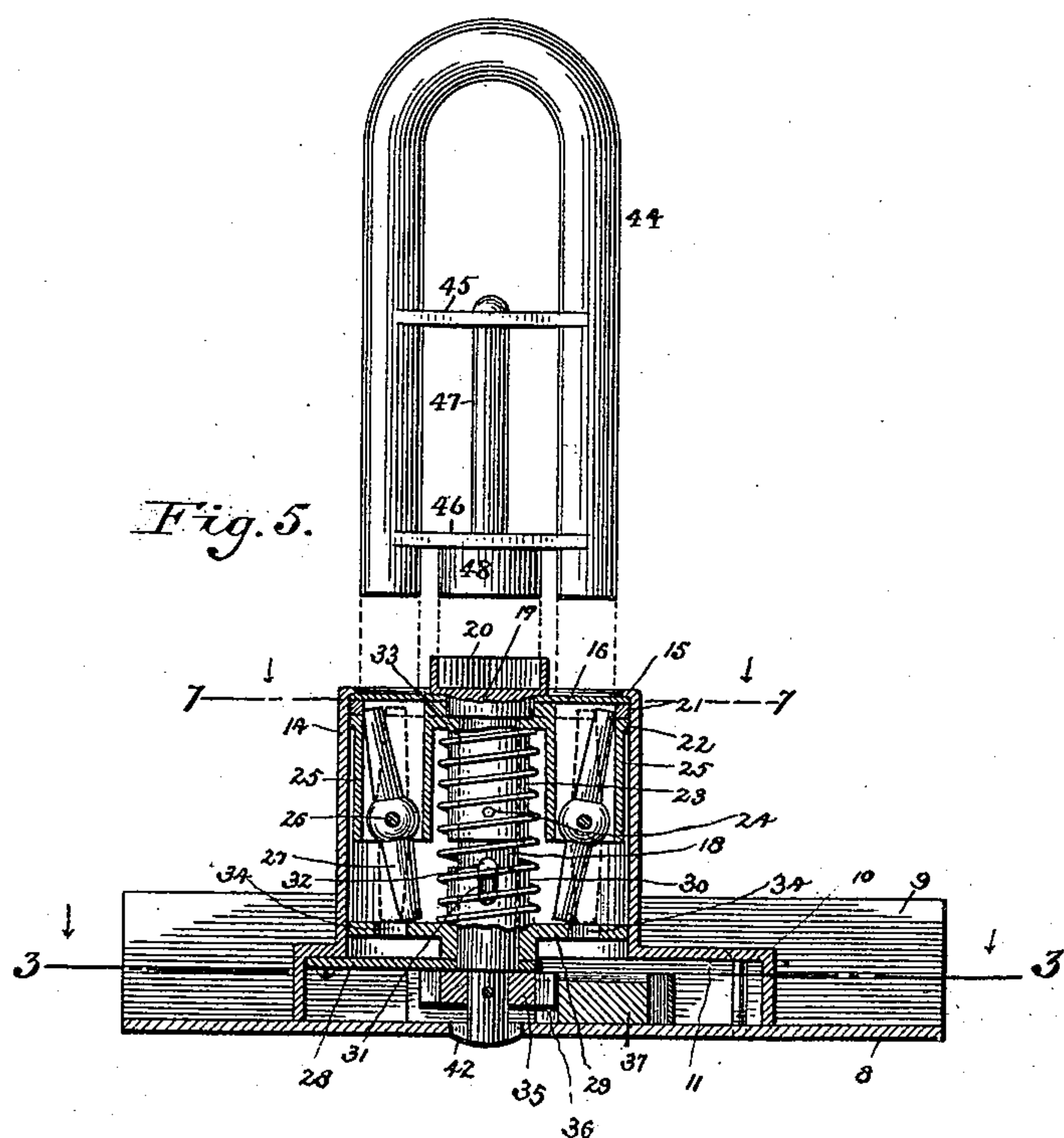


Fig. 6.

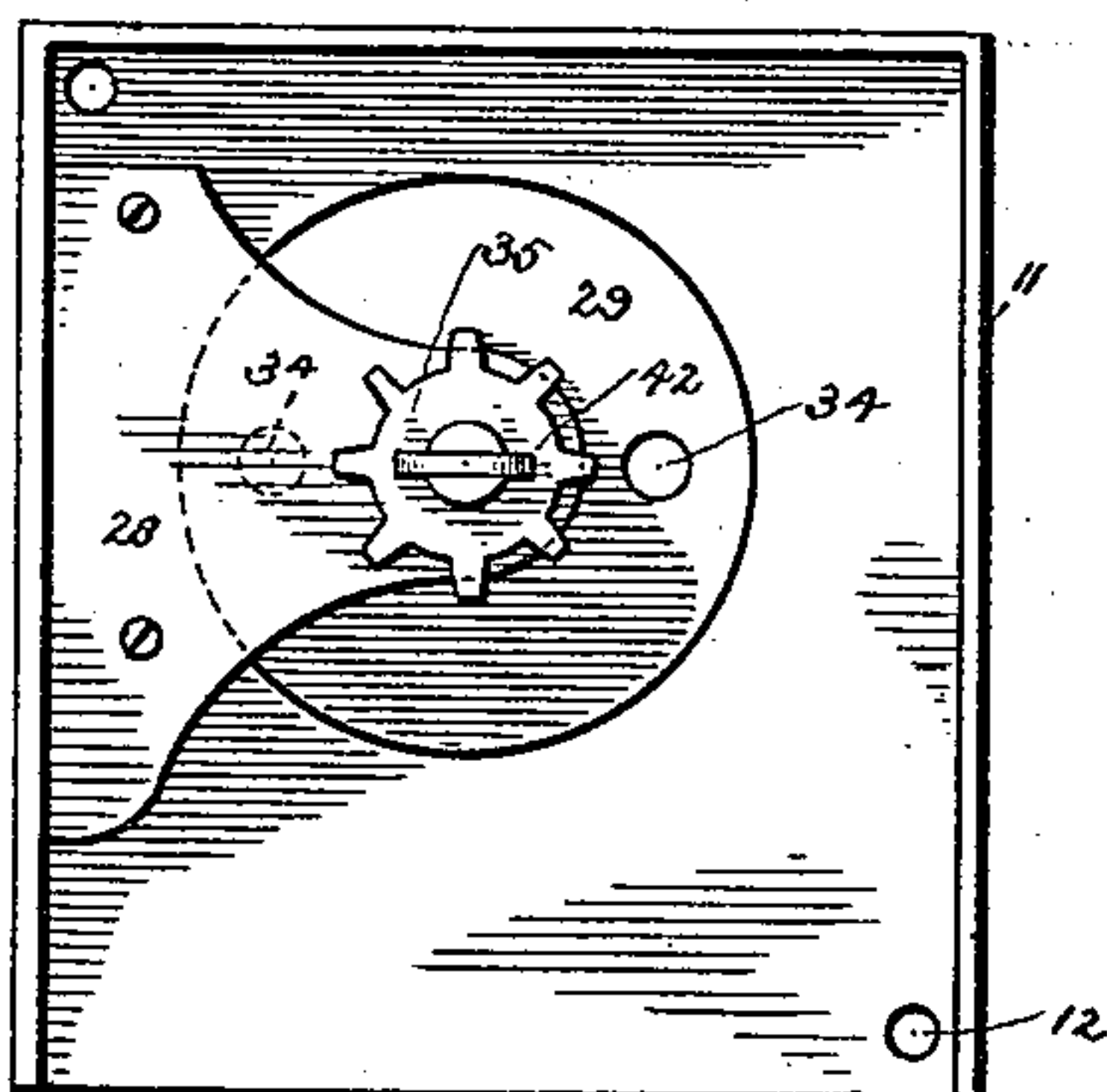
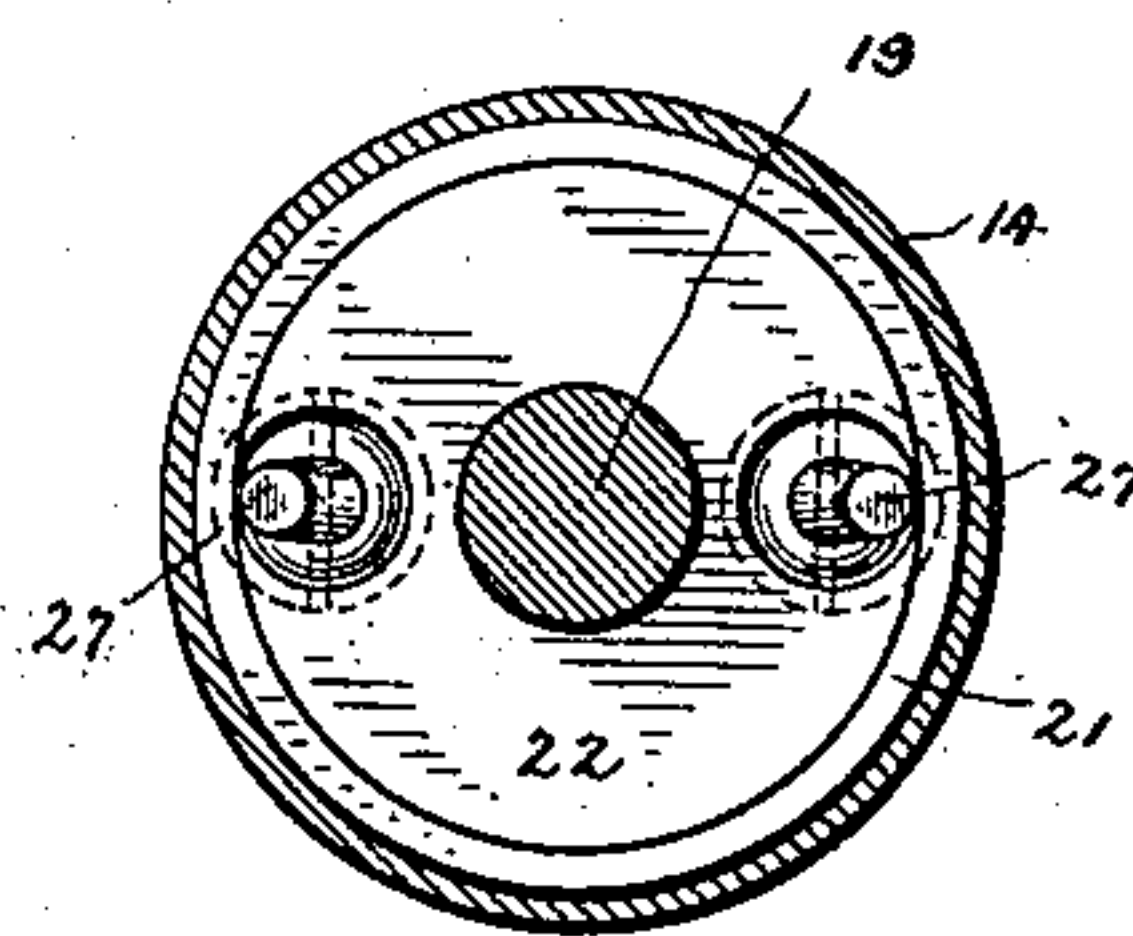


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM W. FENNER, OF KANSAS CITY, MISSOURI, ASSIGNOR OF ONE-THIRD
TO EMMA RHODES, OF SAME PLACE.

MAGNETIC LOCK.

SPECIFICATION forming part of Letters Patent No. 428,247, dated May 20, 1890.

Application filed January 31, 1890. Serial No. 338,746. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. FENNER, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Magnetically-Operated Locks and Keys Therefor; 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.

My invention relates to certain new and useful improvements in magnetically-operated locks and keys therefor; and it has for its object to provide a lock of such character as to be capable of being operated in either direction by a magnetic key only, thereby furnishing a safeguard against attempts to pick the lock or reproduce the key on the part of persons unacquainted with the magnetic character of the same.

In the accompanying drawings, illustrating one form or embodiment of my invention, Figure 1 represents in perspective an external view of a magnetically-operated lock. Fig. 2 represents in perspective a form of magnetic key therefor. Fig. 3 represents, on a smaller scale, a section taken upon a plane indicated by the line 3 3 of Fig. 5. Fig. 4 represents, also on a smaller scale, an elevation or face view of the base-plate. Fig. 5 represents a side elevation of the key and a section of the lock, taken upon a plane indicated by the line 5 5 of Fig. 1. Fig. 6 represents an interior rear view of the lock-casing and its contents with the base-plate removed, and Fig. 7 represents a section taken on a plane indicated by the line 7 7 of Fig. 5.

Similar numerals of reference indicate similar parts throughout the several views.

Referring to the drawings, 8 indicates the base-plate of a lock of simple construction adapted for use in connection with my invention, and illustrating in one form its practical application. The base-plate may conveniently be provided with the usual guard-flange 9 and with corner perforations 10, as shown, for attachment to a door, drawer, or other part to be locked. The casing 11, secured to the base-plate by screws, as 12, entering the

perforations 13 or otherwise, carries the tumbler casing or cylinder 14 of length appropriate to the thickness of the door or drawer panel through which it passes.

The tumbler-casing 14 is open at its outer end, and is provided thereat with an interior annular rim or flange 15, against which fits the closing-plate 16, said plate being centrally perforated for the passage of the neck 17 of the pinion-shaft 18. The extreme outer end 19 of said shaft is larger than the aperture of the plate 16, and is provided with a recess 20 for the reception of a corresponding portion of the operating-key.

Proximate to the closing-plate 16, which encircles the neck 17 loosely, is a metallic washer 21, and next to said washer is the tumbler-plate 22, bearing the sleeve 23, which encircles the pinion-shaft 18, and is secured thereto by the pin 24. The tumbler-plate also bears the short open-ended cylinders 25, within which are pivoted, at 26, the tumblers 27. The said tumblers are pivoted in such manner that the upper portions thereof will overbalance the lower portions, so as to cause the tumblers to assume normally positions out of alignment with the apertures.

The pinion-shaft 18 passes loosely through an aperture in a bearing-plate 28, attached to the interior of the casing 11. Against said bearing-plate rests the plate 29, having a sleeve 30 encompassing the pinion-shaft, said sleeve being provided with a recess 31 in line with a locking-pin 32 upon the shaft. The sleeves 23 and 30 are surrounded by a spiral spring 33, whose tendency to expand forces them apart and therefore holds the closing-plate normally against the annular rim or flange 15. The plate 29 is provided with apertures 34, which register with the tumblers 27 when the latter are brought into the position shown in dotted lines in Fig. 5. At other times the plate 29 opposes a barrier to the inward movement of the tumblers. Beyond the bearing-plate the shaft 18 is preferably somewhat reduced in diameter and carries the fixed pinion 35, intermeshing with the corresponding broader ratchet-teeth 36 of the lock-bolt 37, said lock-bolt being provided with the usual guide-recess 38, guide-pin 39, and spring 40, bearing against the notched

side of the lock-bolt and having the back-stop or tension-stop 41.

At the inner end of the pinion-shaft 18 is located the cross-pin 42, and the back plate 8 is provided with an aperture corresponding to the shaft end and cross-pin. On reference to Fig. 5 it will be noted that the cross-pin occupies said apertures when the parts are in the position shown in said figure, thereby preventing the shaft 18 and its pinion 35 from being revolved so as to operate the lock-bolt 37.

It is the purpose of my invention to prevent the lock-bolt from being either projected, so as to lock the door or drawer, or retracted, so as to unlock it, except by means of the magnetic key forming a part of my invention. I have therefore provided the base-plate 8 with two separate locking-apertures for the cross-pin 42. This construction will be more fully apparent on reference to Fig. 4, wherein the lock-bolt 37 is shown as projected from its casing into the full locking position. The cross-pin 42 in this adjustment occupies one of the apertures just referred to. When the lock-bolt 37 is retracted, as indicated in full lines in Fig. 3, the cross-pin 42 will occupy the aperture 43 of Fig. 4, so that whether the lock-bolt is in the fully-projected or fully-retracted position it will be impossible to revolve the shaft 18 and its pinion 35 so as to move the lock-bolt, except by first releasing the cross-pin 42 from one or the other of these apertures, as the case may be. It is equally evident that the cross-pin 42 cannot be released from its aperture except by moving longitudinally the shaft 18, upon which it is mounted. Should this be attempted, however, the tumblers 27 (which are normally out of alignment with the apertures) would immediately come in contact with the barrier-plate 34, thereby preventing the inward movement of the shaft 18. With the construction shown, therefore, it becomes necessary before the shaft 18 can be moved inward to first bring the tumblers 27 in alignment with the openings 34, so as to enable them to pass through said openings during the inward movement. To this end I construct said tumblers of material adapted to be attracted by magnetism, and preferably of soft iron—a material which will retain practically no residual magnetism after the controlling-magnet is removed—and I make the key itself the controlling-magnet for aligning the tumblers.

In Figs. 2 and 5 I have shown a suitable form of key for the purpose described. It consists of a horseshoe-magnet 44, having the brass cross-pieces 45 46, within which is soldered the shank 47 of the head 48, of shape or configuration adapted to fit the recess 20 of the shaft 18.

The operation of the invention will be readily apparent. Assuming the lock-bolt to be fully projected, so as to lock the door or drawer to which it is attached, it may be retracted as

follows: The key-head 48 is inserted in the recess 20, thereby bringing the poles of the magnet 44 in near proximity to the outer ends of the tumblers 27. The said ends of the tumblers will immediately be attracted to the strongest part of the magnetic field thus created, and the tumblers will therefore swing on their pivots 26 and assume the vertical positions shown in dotted lines in Fig. 5, so as to come in alignment with the apertures 34 of the plate 29. The shaft 18 may thereupon be pushed inwardly, so as to release the cross-pin 42 from its locking-aperture, the tumblers 27 during this inward movement passing through the apertures 34. The shaft 18 and its pinion 35 may then be revolved in the direction indicated by the arrow in Fig. 4, so as to retract the lock-bolt 37, as indicated in full lines in Fig. 3. When the lock-bolt is fully retracted, the cross-pin 42 comes in alignment with the aperture 43 of the base-plate 8, whereupon on the removal of the key the spring 33, acting upon the shaft 18 and its accessories, forces said shaft outward to its original position, thereby causing the cross-pin 42 to enter the aperture 43, thereby again locking the shaft and its pinion against rotation. In order now to project the lock-bolt 37 into the locking position, it will again be necessary to employ the magnetic key, and in a manner similar to that just described.

It will be evident that without the aid of the magnet for aligning the tumblers it will be impossible to either project or retract the bolt-lock 37. The mere duplication, therefore, of the shape or configuration of the key will not enable the lock to be operated, and this fact presents a safeguard against the duplication of the key by persons unacquainted with its magnetic properties.

As I have said above, I prefer to make the tumblers 27 of soft iron, which will retain practically no residual magnetism after the removal of the magnetic key. This is of advantage for the reason that should the tumblers be constructed of material capable of retaining any considerable degree of permanent magnetism said tumblers would be attracted to the vertical position by a key of the form described, even though the part 44 were made of unmagnetized iron or steel.

While in the foregoing description and in the drawings I have shown a particular form or embodiment of my invention, I desire it to be distinctly understood that I do not limit myself to the exact construction or arrangement of parts described, but contemplate, as circumstances may require, the employment of such equivalents for the several parts as the nature of my invention and the scope of my claims, hereinafter made, shall justify.

Having thus described my invention, what I claim is—

1. The combination, with a lock provided with a bolt, a shaft and pinion normally locked against rotation for operating the said bolt, a barrier for preventing the unlocking of

said shaft and pinion, and a magnetizable pin or pins connected to the shaft and normally blocked by said barrier, in combination with a magnetic key for placing the barrier and pin in a non-obstructive relationship to each other, substantially as described.

2. A lock of the kind described, provided with a bolt, a shank and pinion normally locked against rotation for operating said bolt, a barrier-plate for preventing the unlocking of said shaft and pinion, said barrier-plate having apertures therein, and magnetizable tumblers connected with said shaft and normally blocked by said barrier-plate, the said pins being in alignment with the barrier-plate apertures when in a magnetic field, substantially as described.

3. A lock of the kind described, provided with a bolt, a longitudinally-movable shaft and pinion for operating the said bolt, said shaft having a cross-pin normally located in a locking-aperture, a barrier-plate for preventing the unlocking of said shaft and pinion, said barrier-plate having apertures therein, and magnetizable tumblers connected with the shaft and normally blocked by said barrier-plates, the said pins being in alignment with the barrier-plate apertures when in a magnetic field, substantially as described.

4. A lock of the kind described, provided with a bolt, a longitudinally-movable shaft and pinion for operating the said bolt, said shaft having a cross-piece normally located in a locking-aperture, a spring for holding said cross-pin within the aperture, a barrier-plate

for preventing the unlocking of said shaft and pinion, said barrier-plate having apertures therein, and magnetizable tumblers connected with the shaft and normally blocked by said barrier-plate, the said pins being in alignment with the barrier-plate apertures when in a magnetic field, substantially as described.

5. A lock of the kind described, consisting of a base-plate, a bolt-casing, a tumbler-casing, a bolt located within the bolt-casing, a longitudinally-movable shaft and pinion for operating the said bolt, said shaft having at its outer end a recess for engagement with a key-head and at its inner end a cross-pin normally located in a locking-aperture of the base-plate, a barrier-plate loosely encircling the shaft, said barrier-plate having apertures therein, a spring for holding said cross-pin within its aperture, and magnetizable tumblers connected with the shaft and normally blocked by said barrier-plate, the said pins being in alignment with the barrier-plate apertures when in a magnetic field, substantially as described.

6. As a new article of manufacture, a horse-shoe-magnet provided with connecting cross-pieces, a key-head, and a shank attached to said cross-pieces, substantially as described.

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

WILLIAM W. FENNER.

Witnesses:

S. FRED. HOWE,
GEO. E. RHODES.