

A. W. SIBLEY.
INTERCHANGEABLE KEY LOCK.
APPLICATION FILED JAN. 25, 1908.

Patented June 7, 1910.

3 SHEETS—SHEET 1.

960,421.

FIG: 1

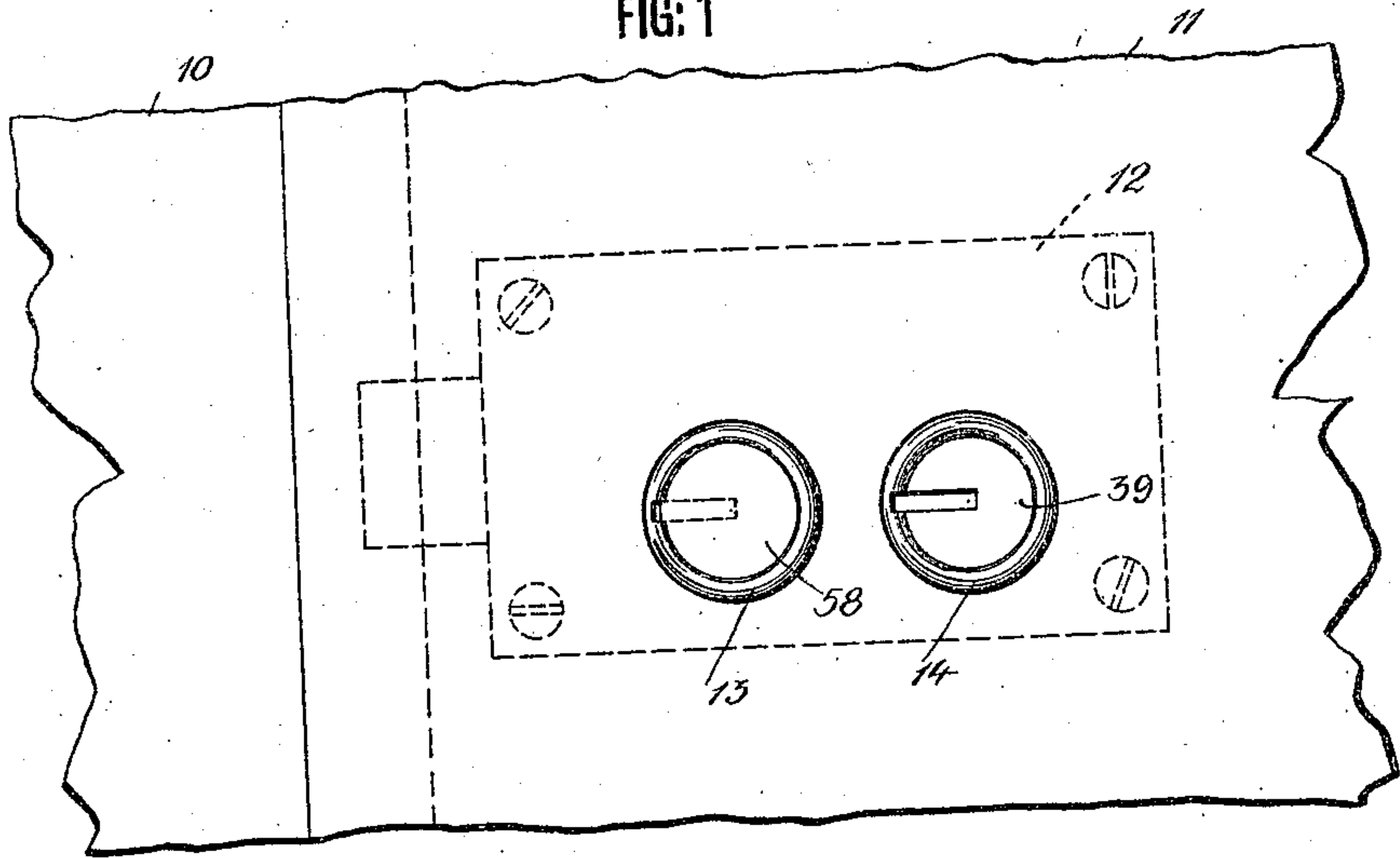


FIG: 2

5 ← 6

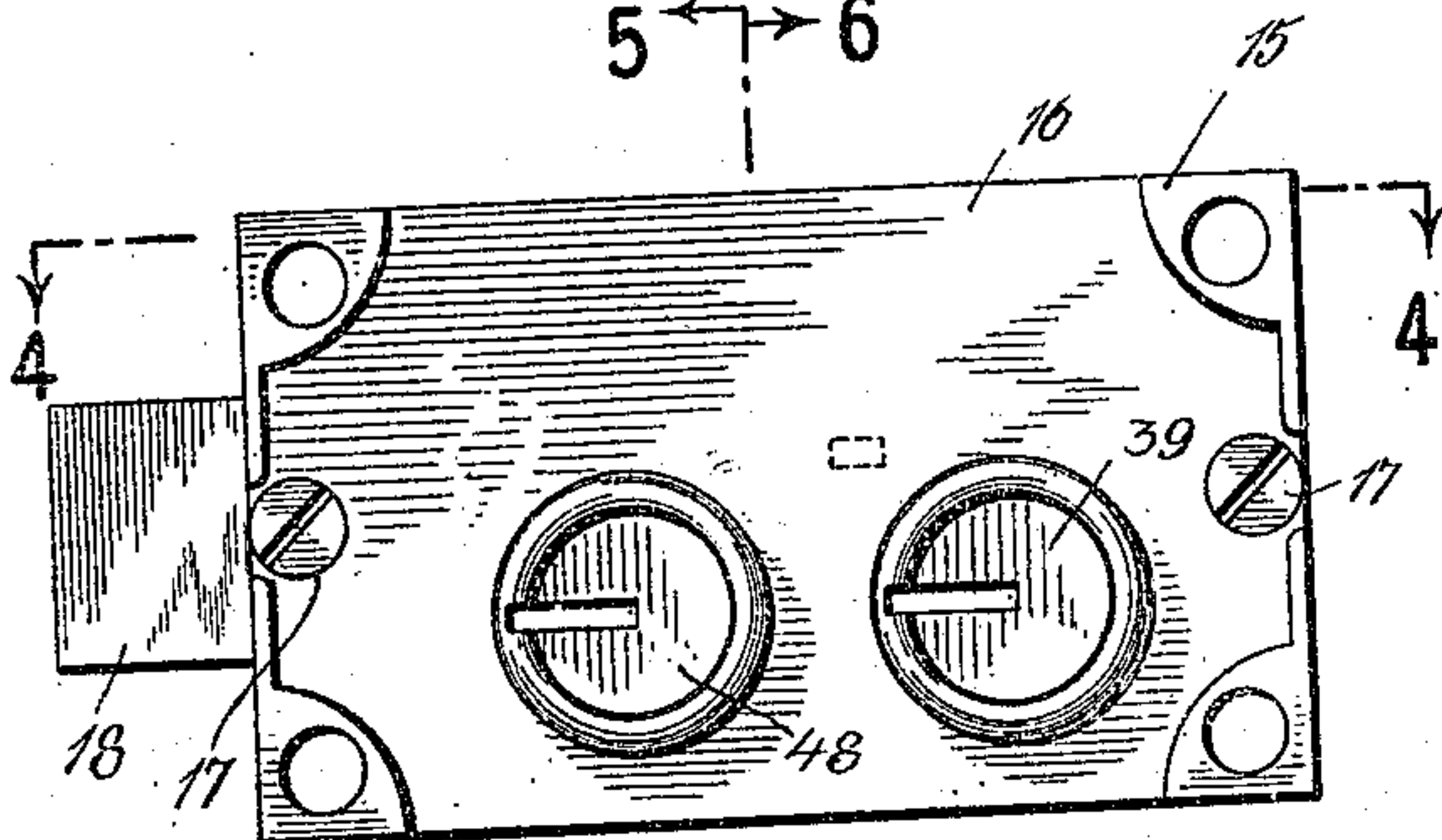
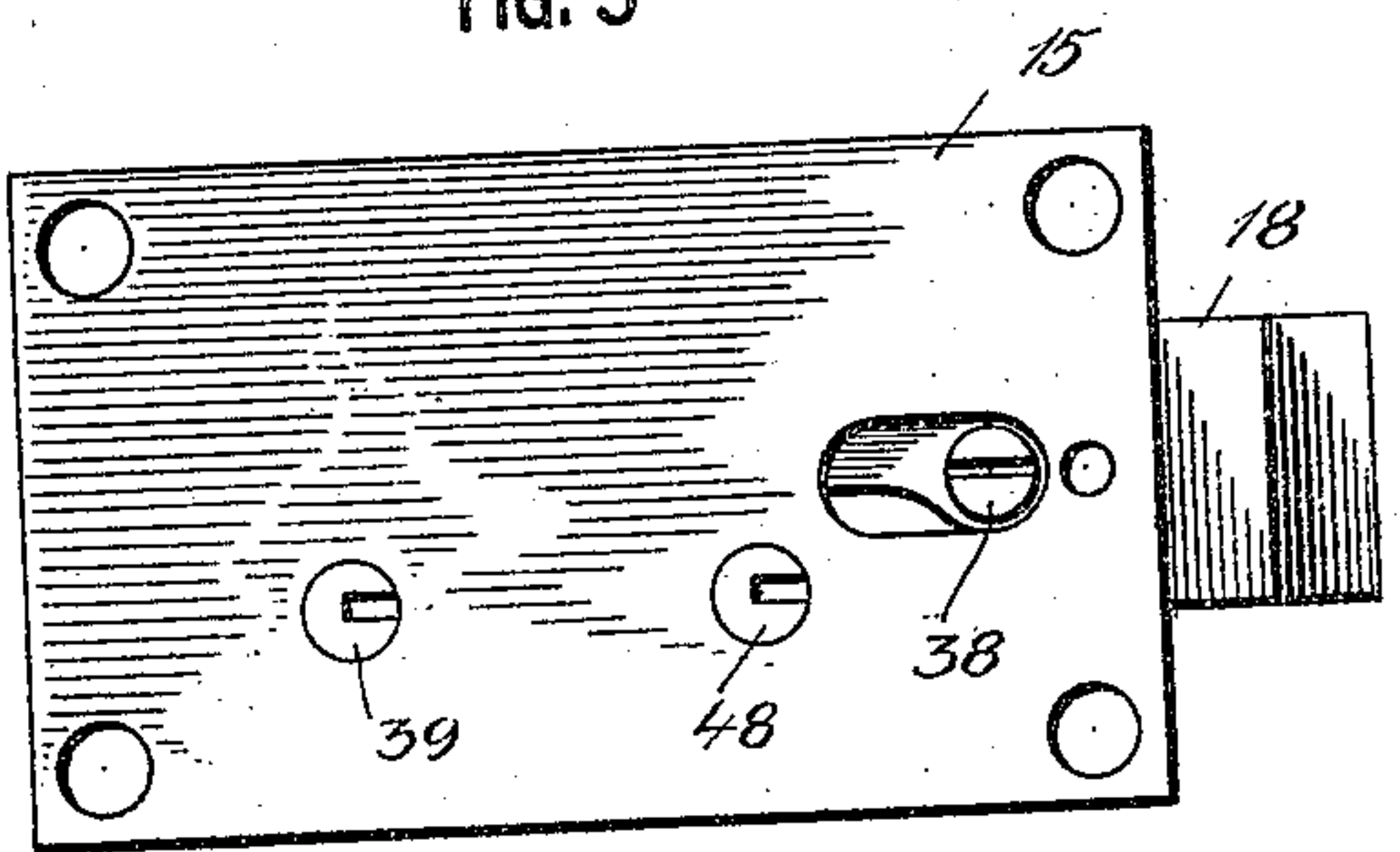


FIG: 3



5 ← 6

FIG: 4

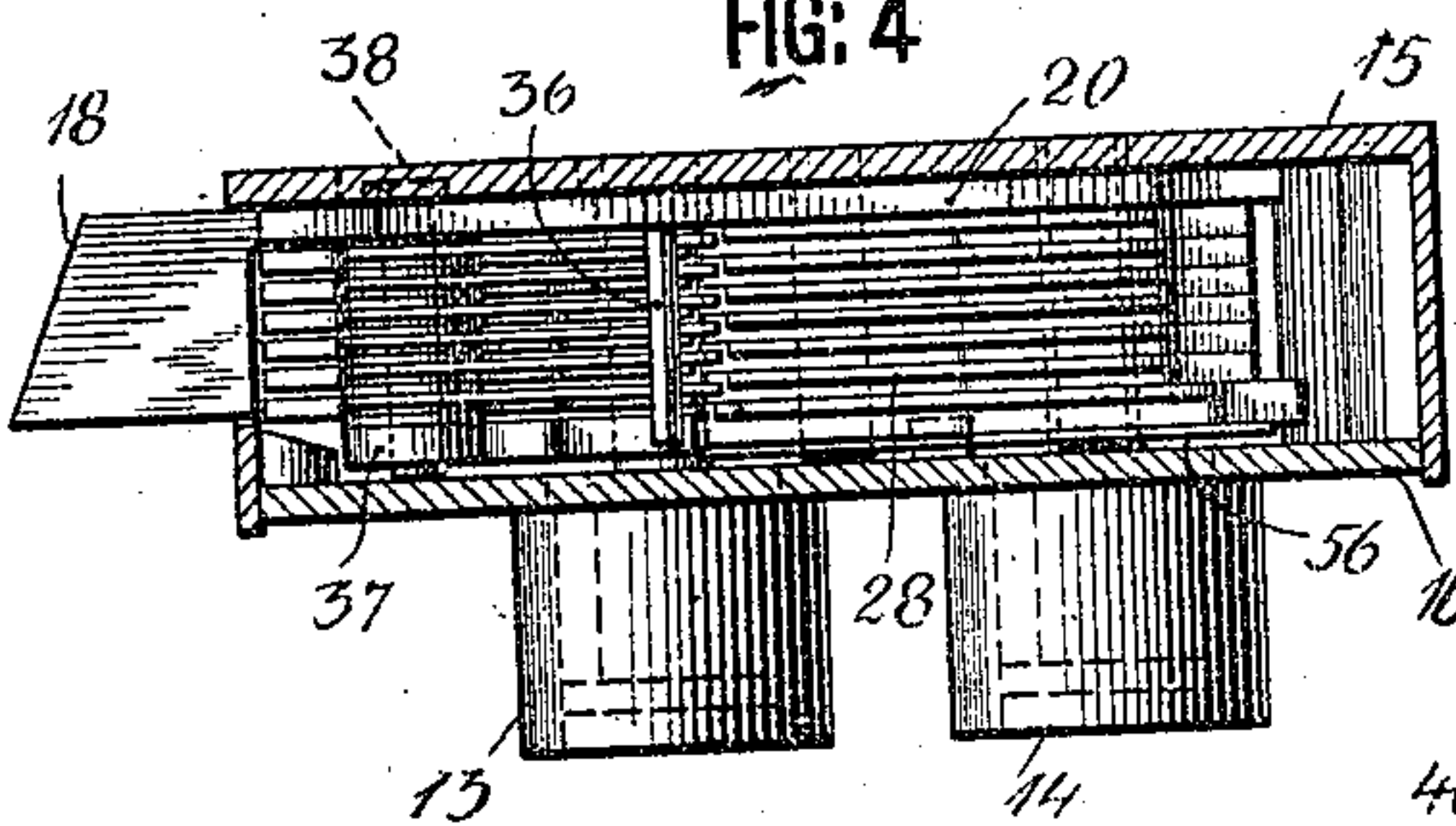


FIG: 5

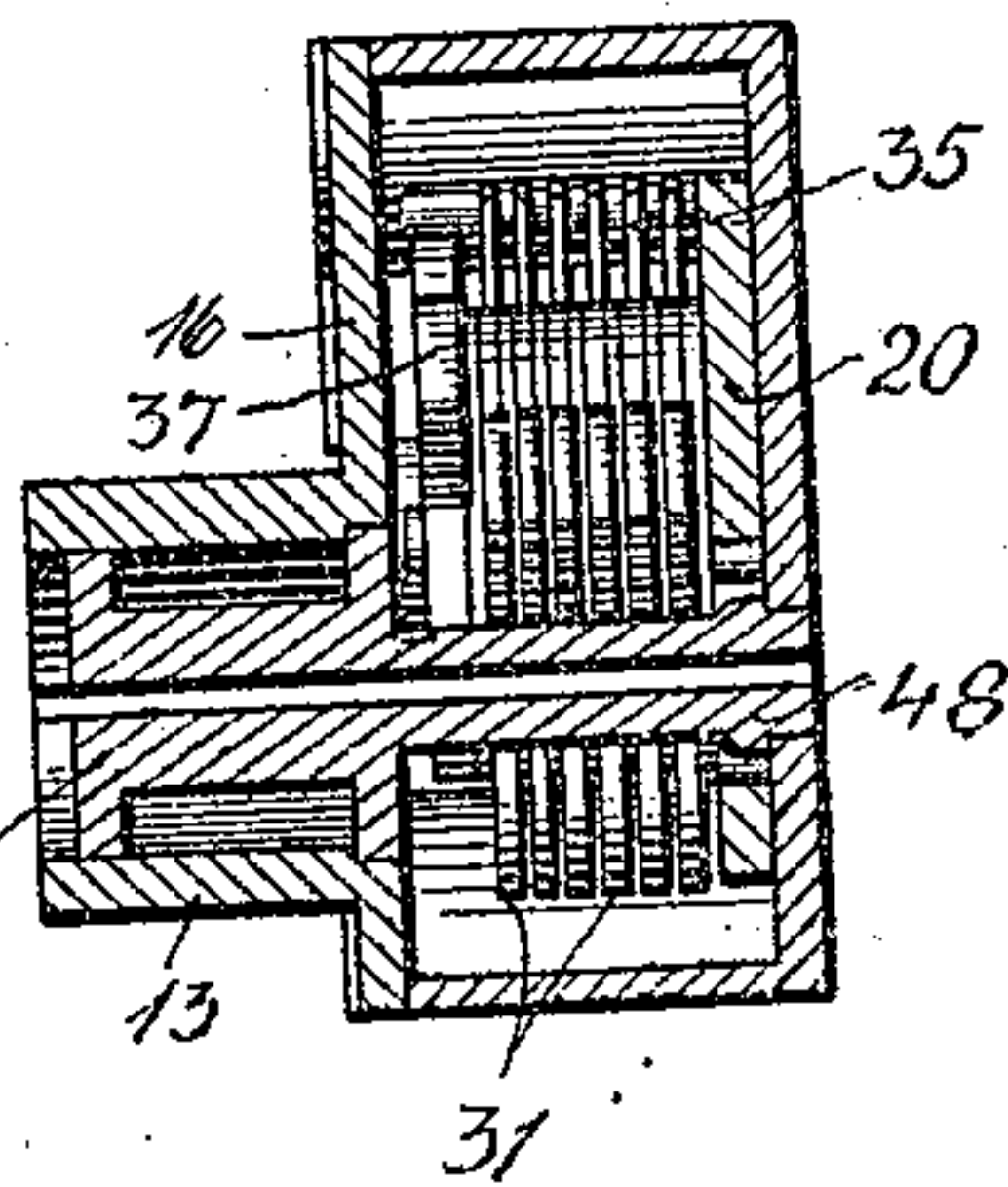
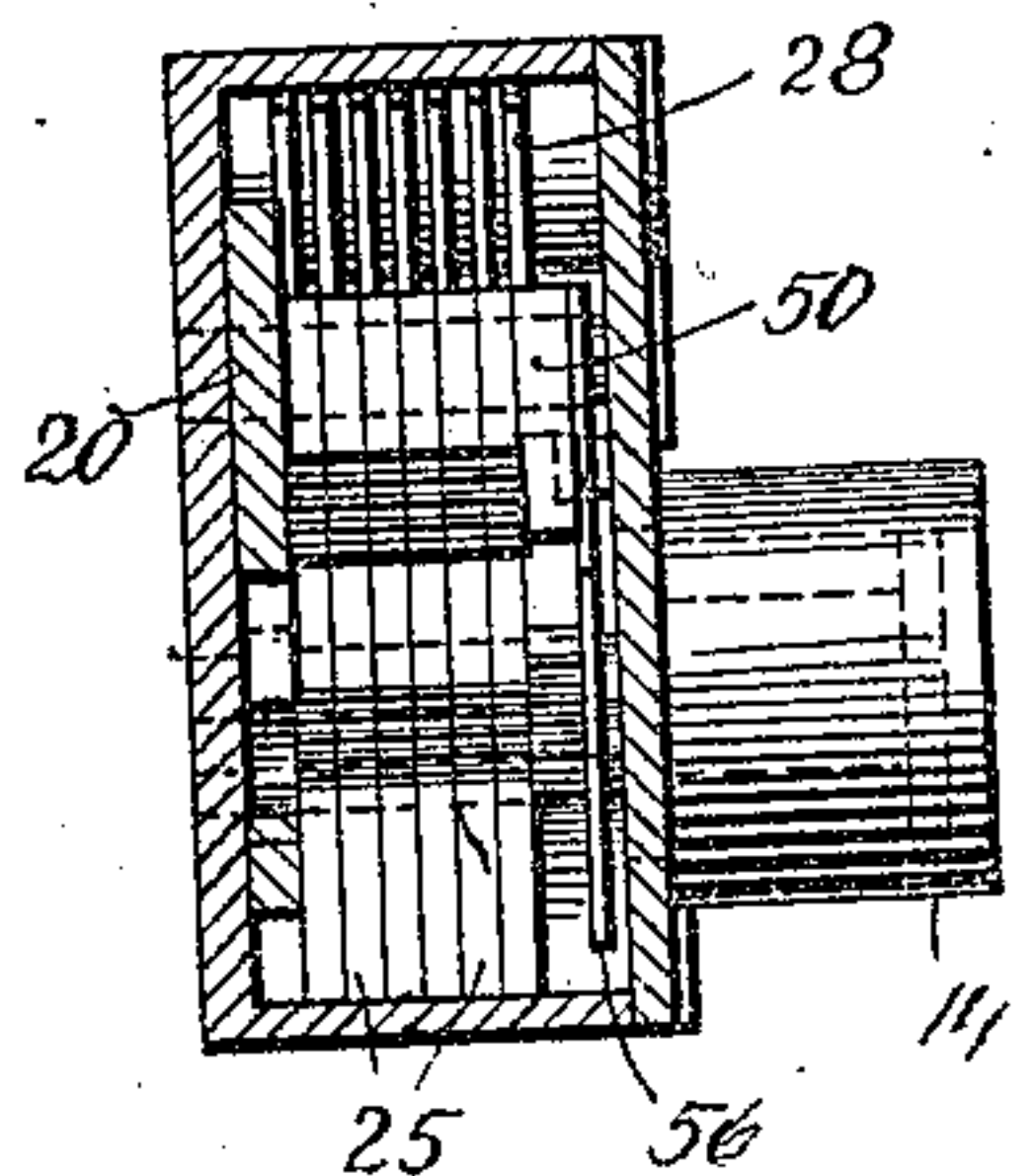


FIG: 6



Witnesses:
Max P. A. Doring
A. Newcomb

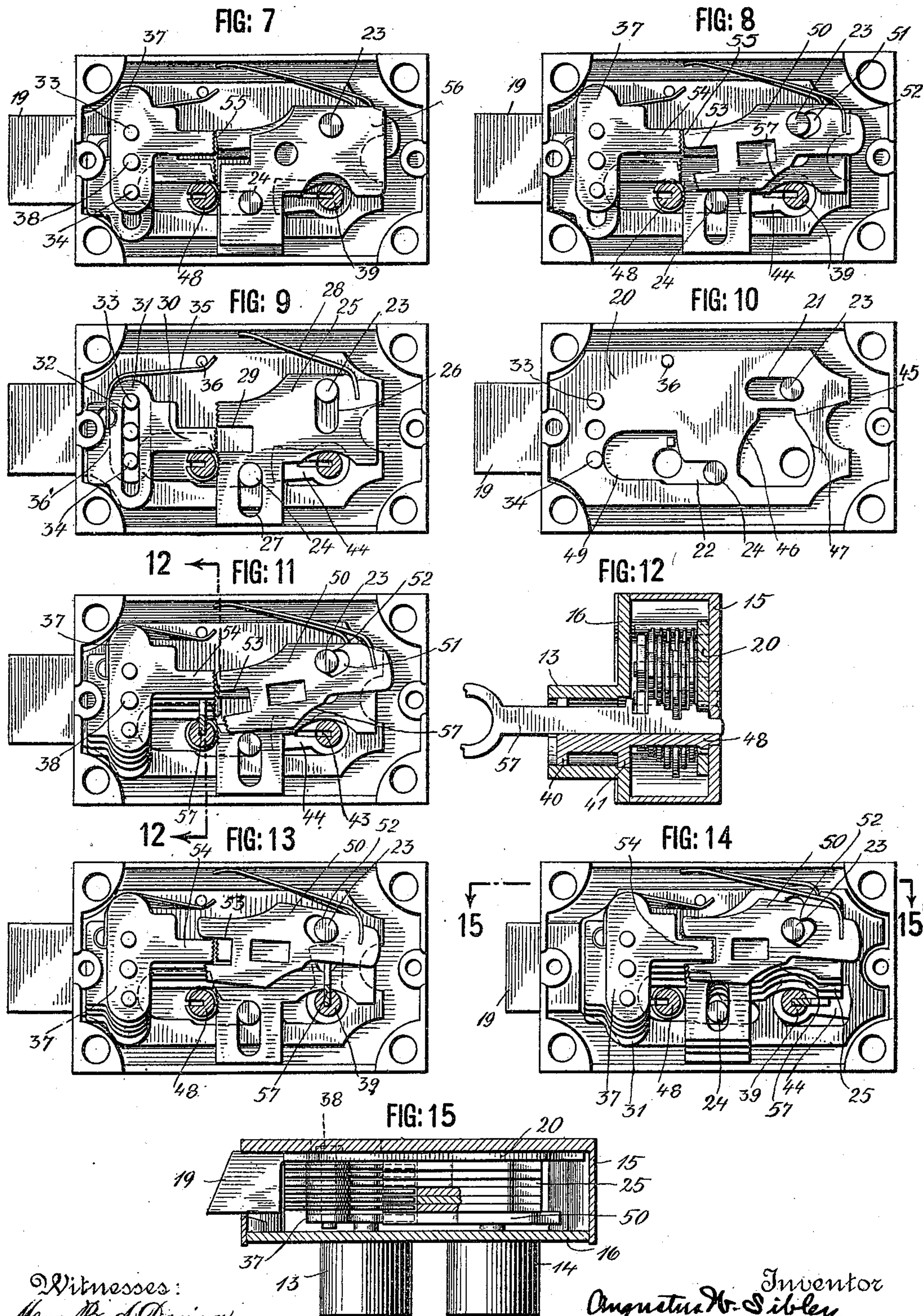
Inventor
Augustus W. Sibley.
By Attorneys
Grindle and Williamson.

A. W. SIBLEY.
INTERCHANGEABLE KEY LOCK.
APPLICATION FILED JAN. 25, 1908.

960,421.

Patented June 7, 1910.

3 SHEETS—SHEET 2.



Witnesses:
Max B. A. Doring.
A. Newcomb

Inventor
Augustus W. Sibley,
By his attorneys
Prindle and Williamson.

A. W. SIBLEY.
INTERCHANGEABLE KEY LOCK.
APPLICATION FILED JAN. 25, 1908.

960,421.

Patented June 7, 1910.

3 SHEETS—SHEET 3.

FIG: 16

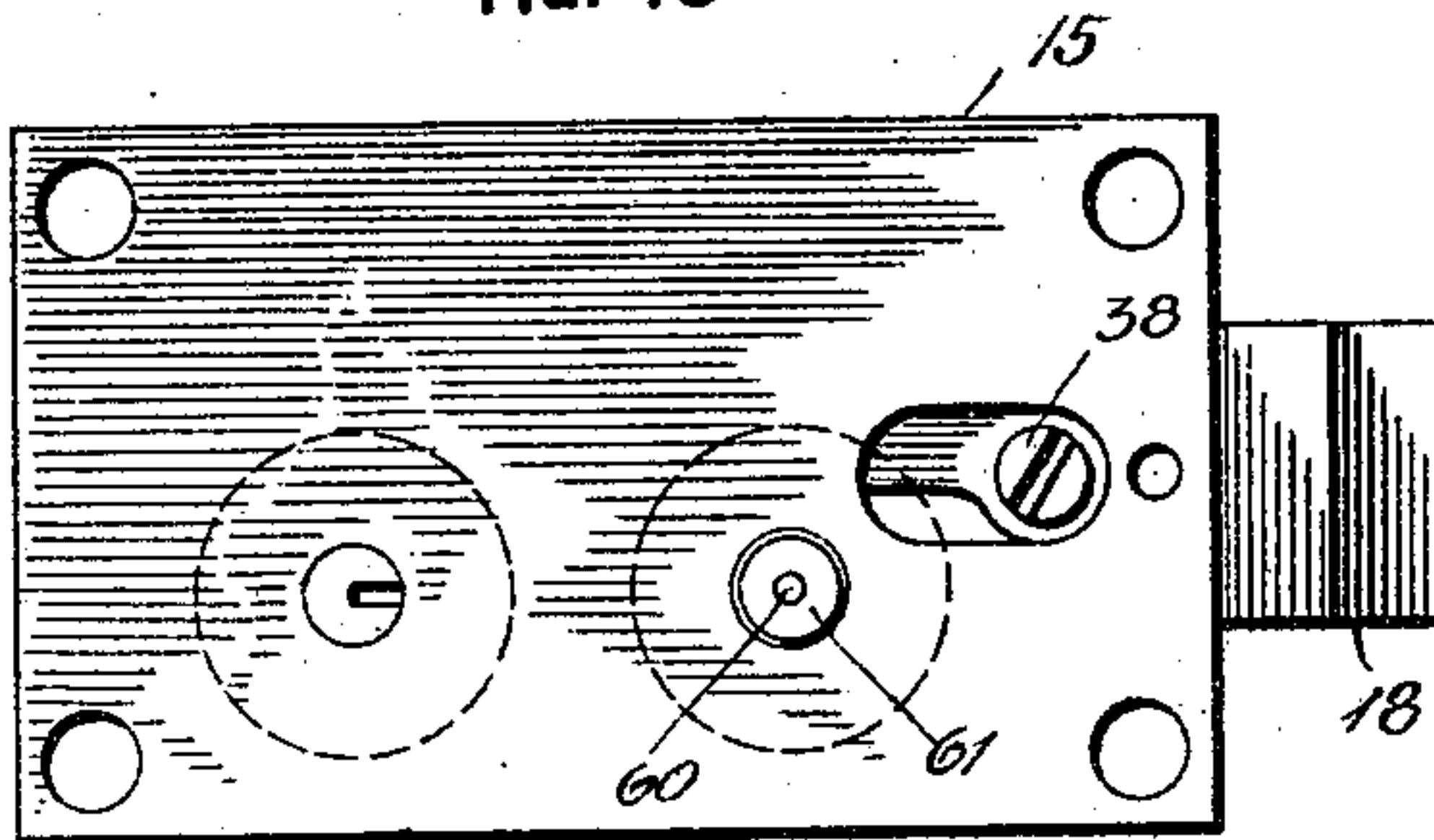


FIG: 17

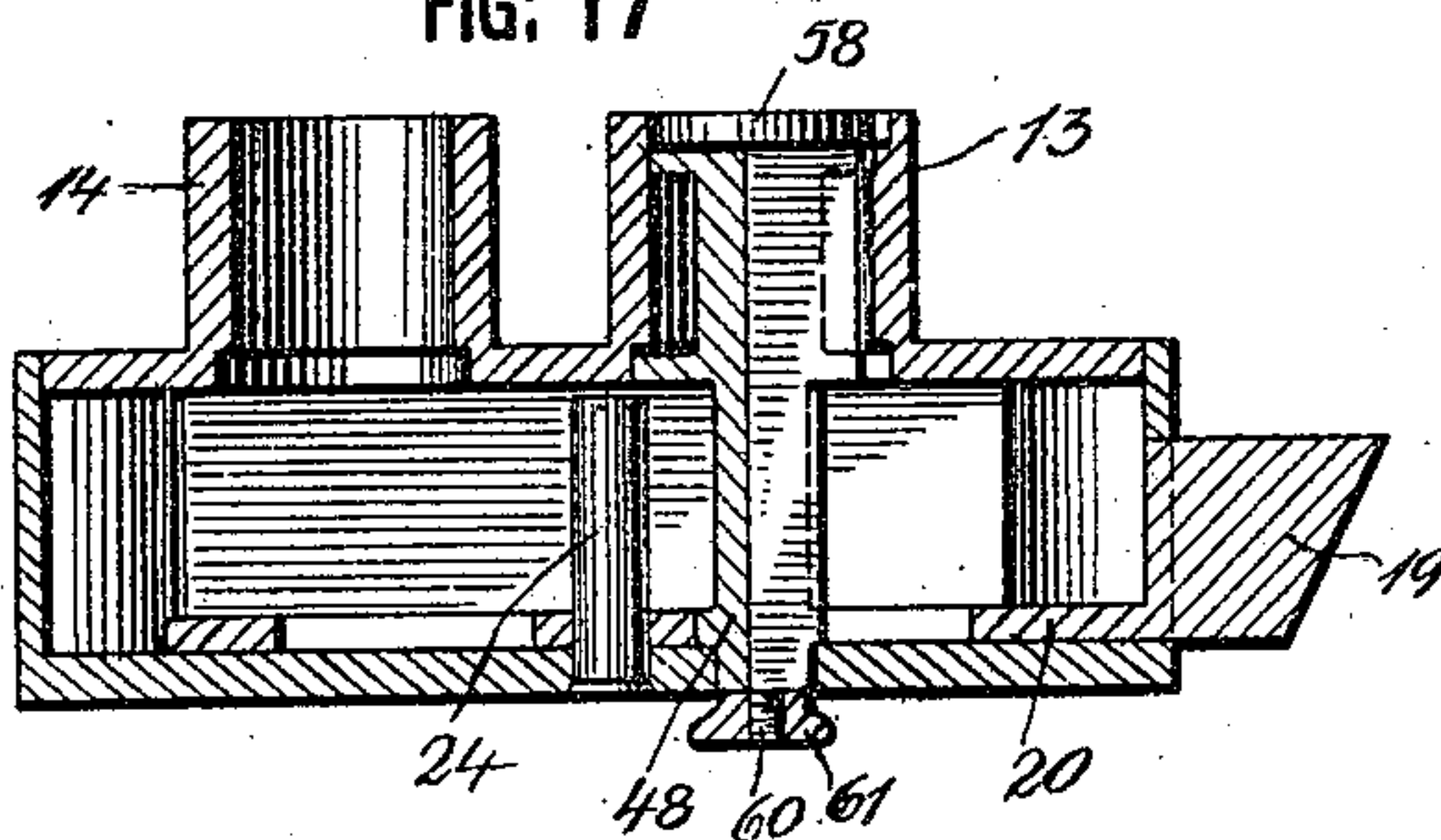


FIG: 18

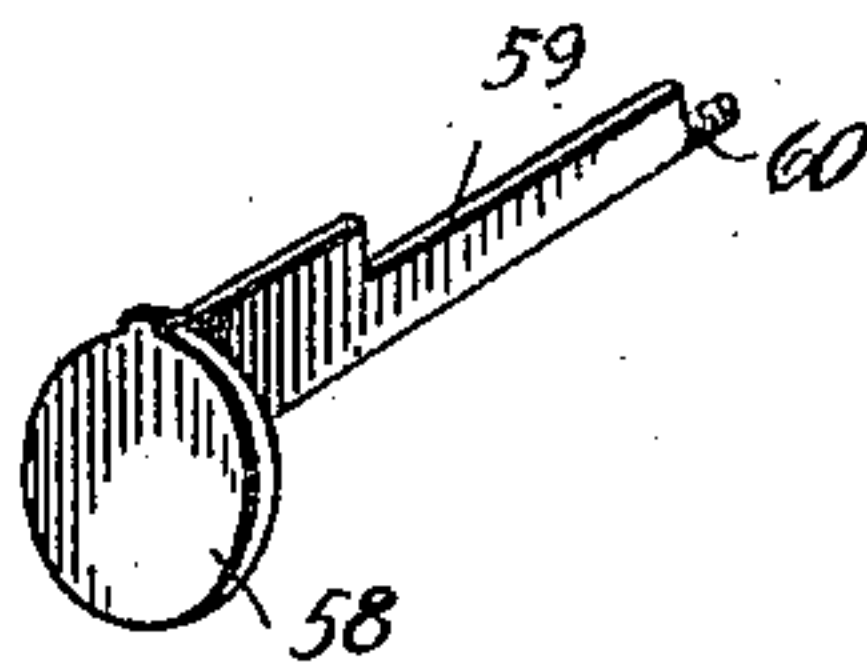
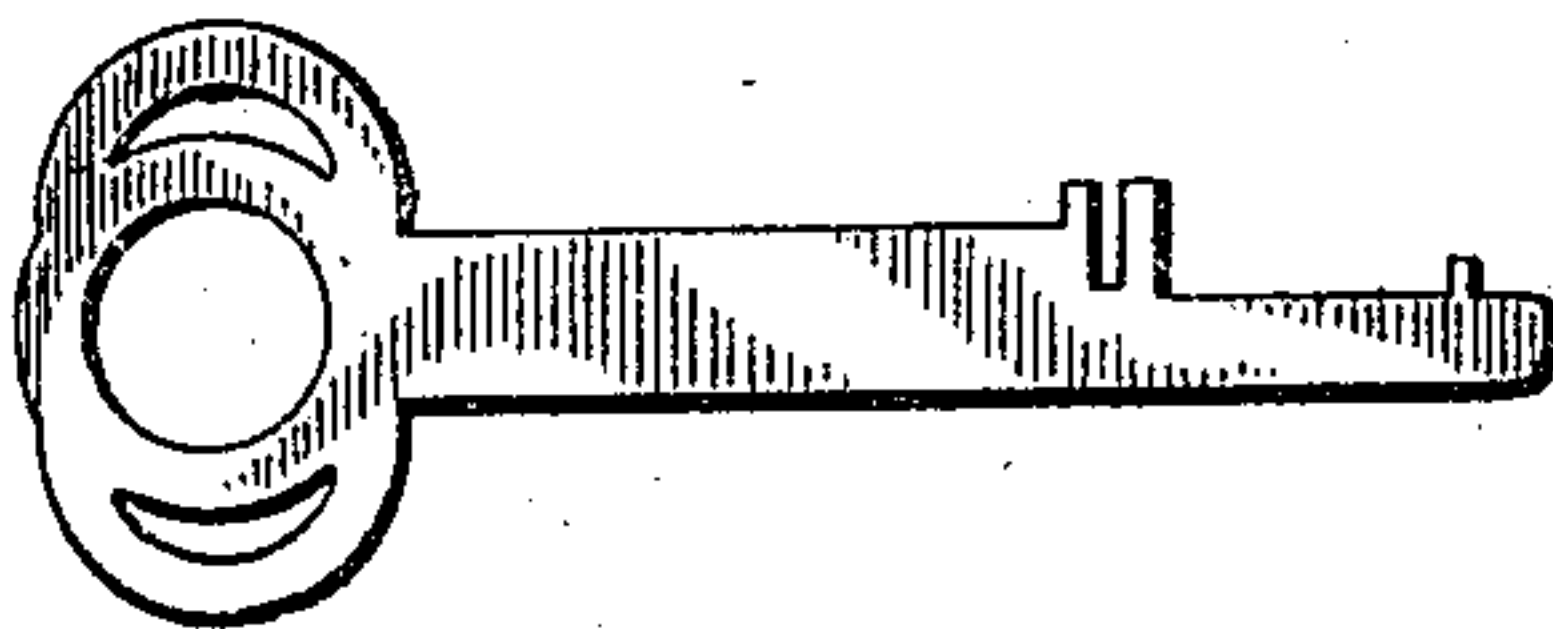


FIG: 19



Witnesses:
Hear B. A. Doring
A. Newcomb

Inventor
Augustus W. Sibley,
By his Attorneys
Grindle and Williamson.

UNITED STATES PATENT OFFICE.

AUGUSTUS W. SIBLEY, OF HAMILTON, OHIO, ASSIGNOR TO HERRING-HALL-MARVIN
SAFE COMPANY, OF HAMILTON, OHIO.

INTERCHANGEABLE-KEY LOCK.

960,421.

Specification of Letters Patent.

Patented June 7, 1910.

Application filed January 25, 1908. Serial No. 412,631.

To all whom it may concern:

Be it known that I, AUGUSTUS W. SIBLEY, of Hamilton, in the county of Butler and in the State of Ohio, have invented a certain new and useful Improvement in Interchangeable-Key Locks, and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of a portion of a safe deposit door having my lock applied thereto; Fig. 2 is a front elevation of the lock removed from the door; Fig. 3 is a rear elevation of the lock of Fig. 2; Figs. 4, 5 and 6 are sectional views taken respectively on the lines 4—4, 5—5 and 6—6 of Fig. 2; Fig. 7 is a front elevation of the lock with the cover plate removed; Fig. 8 is a view similar to Fig. 7 with the guard plate for the master tumbler removed; Fig. 9 is a view similar to Fig. 7 with the master tumbler and its stump plate removed; Fig. 10 is a front elevation of the lock, showing only the casing and the bolt; Fig. 11 is a view similar to Fig. 8, a key being shown in position for setting the stump plates; Fig. 12 is a section on the line 12—12 of Fig. 11; Fig. 13 is a view similar to Fig. 8, showing the master key operating the master tumbler; Fig. 14 is a view similar to Fig. 13, showing the bolt retracted by the depositor's key; Fig. 15 is a section on the line 15—15 of Fig. 14; Fig. 16 is a rear elevation of the lock, showing a cylinder guard in place; Fig. 17 is a horizontal sectional view of Fig. 16, showing the cylinder guard in place, the tumblers being omitted; Fig. 18 is a perspective view of the cylinder guard; and Fig. 19 is a plan view of the master key, the depositor's key being shown in plan in Fig. 12.

The object of my invention has been to produce an interchangeable key lock, that is, one which can be set for any one of a variety of keys, which shall be simple in construction, which will be so accurate that it will only operate when a key of exactly the same shape as that for which it has been set is used, and to provide such a lock with parts requiring the use of a master key; and to such ends my invention consists in the interchangeable key lock hereinafter specified.

While my invention is capable of use for other purposes, I have illustrated its application to a lock for a depositor's box in a safe deposit vault, the lock requiring the use both of a master key, retained by the safe deposit company, and of a key retained by the depositor. The lock is so constructed that it can be set to operate with any one of a very large number of depositors' keys, and when so set will not operate with any other key than the particular one for which it is set.

While I shall describe that embodiment of my invention which I consider best adapted for practical use, it is to be understood that my invention is capable of embodiment in many different forms, and that the form chosen is only used for illustration.

In Fig. 1 is shown a wall 10 of a safe deposit vault and a door 11 closing a compartment therein, the door having one of my locks 12 secured to the inside thereof, there being two bosses 13 and 14 for key cylinders which extend through circular holes in the door.

The lock consists of a box-like casing whose open side is closed by a plate 16 secured in place by screws 17. A bolt 18 extends through one of the walls of the lock casing, the bolt, as illustrated in Fig. 10, consisting of a head 19 and a plate 20, the latter having slots 21 and 22 formed therein, the slots engaging pins 23 and 24 respectively, which are fast in the bolt casing. The bolt is guided by engagement of the slots with the said pins and by engagement of the head with the casing. A series of tumblers is mounted upon some part relatively immovable to the casing, and a series of stump plates is mounted upon the bolt so that before the bolt can be retracted the tumblers must be adjusted relative to the stumps. While the tumblers might be mounted upon other parts, I have found it simple and convenient to mount them upon the pins 23 and 24. Heretofore, so far as I know, tumblers have always been pivoted. My tumblers preferably have a purely right line motion, for reasons which I will later point out. As shown in Fig. 9 each tumbler consists of a plate 25 having slots 26 and 27 which receive and are guided upon the pins 23 and 24 respectively. Each tumbler is normally depressed by a spring 28,

whose shank is pinched or brazed in a slot in the tumbler in the usual way, the free end of the spring bearing against the lock casing. The forward edge of the tumbler (that
 5 opposed to the stumps) is provided with a slot 29 which is adapted to receive the stump. Both the forward edge of the tumbler and the end of the stump are roughened or provided with teeth in order that
 10 the stump may not enter the slot unless the slot is at exactly the same level as the stump. As shown in Fig. 9, each stump 30 is integral with a plate 31, the plate having a slot 32 which receives pins 33 and 34 (or other
 15 form of guiding projections) mounted upon the bolt. Each stump plate is provided with a spring 35 secured thereto in a manner similar to the springs on the tumblers, each spring 35 engaging a pin 36 on the
 20 bolt, so that they tend to depress the stumps. In order that the moving of one stump may not carry with it an adjacent stump by the friction of the one upon the other, the stumps are separated by thin plates 36',
 25 which are shown in dotted lines in Fig. 9, the said plates having holes to receive the pins 33 and 34, so that the plates cannot move relative to the bolt, but shall remain stationary during the adjustment of the
 30 stump plates. The tumblers might, if desired, also be separated by plates similar to the plates 36. In order to hold the stump plates in position after they have been adjusted for a new key, any desired means
 35 may be used. That which I have found convenient consists of a plate 37 (Fig. 7), the plate having holes that are adapted to receive the pins 33 and 34, so that the plate is immovable relative to the bolt, and a
 40 screw 38 (see Figs. 15 and 16) which is mounted in the bolt and threaded into the plate 37. When the screw 38 is unscrewed, the stump plates can be adjusted, and when it is screwed up it clamps the stump plates
 45 against the bolt by drawing the plate 37 toward the bolt. In order to operate the tumblers and to reciprocate the bolt, a key cylinder 39 (see Figs. 1, 2 and 8) is provided, the inner end of the cylinder having
 50 bearing in a circular hole in the back plate of the lock, and the outer end of the cylinder having bearing by means of two disks similar to the disks 40 and 41 formed thereon in a cylindrical boss 14 formed in
 55 the cover plate of the lock. The key cylinder is provided with a slot 43 (Fig. 11) which is adapted to receive both the depositor's and the master key. It is also provided with a lug 44 (Figs. 8, 9, 11, 12 and
 60 14), which, by engagement with a notch 45 in the bolt plate is adapted to throw the bolt. The bolt plate is also cut away at 46 and 47 to permit motion of the lug 44 before and after the bolt has been thrown.
 65 In order to guide a key for setting the

stump plates, a key cylinder 48 (see particularly Fig. 5) is mounted in the lock in a manner similar to the key cylinder 39, with this difference, however, that the cylinder 48 has no lug engaging the bolt plate. 70
 In order to permit the bolt plate to move without striking the cylinder 48, the said plate is provided with a slot 49.

In order to make it necessary that a master key be used before the lock can be operated by the depositor's key, a master tumbler 50 is mounted upon the pin 23 (Figs. 8, 11, 13 and 14). The tumbler is provided with a heart-shaped slot 51 by which it engages the pin 23; that is, the upper wall of 80
 the slot has a teat 52 formed at the middle of its length, thus in effect forming a notch or recess at each side of the teat. The master tumbler rests at its lower edge upon the pin 24, and it is provided with a slot 53, 85
 that is adapted to receive a stump 54, the stump for convenience being formed upon the plate 37. Above the slot 53 is a somewhat rounded nose 55, while the forward edge of the tumbler below the slot is provided with teeth to engage with teeth or 90
 other form of roughening formed on the stump. I preferably interpose a thin plate 56 between the master tumbler and the cover plate of the lock, the plate being mounted 95
 upon the pins 23 and 24.

In the operation of that form of my lock which I have illustrated, the parts in their normal positions are as shown in Fig. 7, namely, with the bolt in its forward or 100
 locked position and with the tumblers in their lowest positions. For the purpose of setting the lock for a particular key, the screw 38 is loosened by means of a screwdriver so that the stumps are free to descend 105
 to their lowest positions under the action of their springs. The particular depositor's key to be used, such for instance as the key 57, Fig. 12, is inserted into the cylinder 48 in a horizontal position. The key is then 110
 turned one-quarter of a turn to the vertical position of Fig. 11, and the various steps of its web engage with the under edges of the stumps, raising them against the stress of their springs, as shown in Figs. 11 and 115
 12. The screw 38 is then tightened to clamp the stumps in adjusted position. The depositor's key is then returned to horizontal position and withdrawn from the cylinder 48. To unlock the lock, the master key, such 120
 as that illustrated in Fig. 19, is inserted in the key cylinder 39 in horizontal position, and is then turned one-quarter of a turn to vertical position, and by its engagement with the beveled lower edge 57 of the master tumbler (Fig. 13) it raises such tumbler from 125
 the position of Fig. 11 to the position of Fig. 13, in which its slot is opposite the corresponding stump. The engagement of the key with the beveled lower edge has a tend- 130

ency to force the tumbler forward, and the tumbler rides forward as soon as it has reached the proper level, the rounded nose of the tumbler aiding in this action. The tumbler goes forward to the position of Fig. 13, in which the teat 52 has slipped forward of the highest portion of the pin 23, and therefore tends to hold the tumbler in its forward position. The master key is then returned to horizontal position and removed from the cylinder. The key 57 is then placed in the cylinder in horizontal position and is turned one-half revolution rearward. As the depositor's key turns upward, the steps in its web engage the lower edges of the tumblers and raise them against the stress of their springs until their respective slots are exactly at the level of the corresponding stumps. By this time, the lug 44 on the key cylinder has engaged the slot 45 in the bolt, and the bolt begins to move rearward, this motion being permitted because the stumps exactly register with their corresponding slots. As the bolt moves rearward, the master stump 54 strikes the bottom of the slot in the master tumbler and throws the tumbler from the position of Fig. 13 to the position of Fig. 14, in which the teat 52 is to the rear of the highest portion of the pin 23. In order to throw the bolt forward to lock the door, it is only necessary to turn the depositor's key from the position of Fig. 14 one-half turn. This motion causes the lug 44 to engage the slot 45 in the bolt and throw the bolt forward, and it also causes the stumps to be retracted from their respective slots in the tumblers, when the tumbler springs will throw the tumblers to their lowest positions, in which they are out of line with their respective stumps. The master tumbler being held in its rearward position by engagement of the teat with the pin 23 is released from its stump as the stump passes to the position of Fig. 11, and the master tumbler drops to the position of Fig. 11.

In order to prevent any use of the forward key cylinder except in the presence both of a representative of the safe deposit company and of the customer, the key guard illustrated in Figs. 16 to 18 may be used. Such key guard consists of a disk 58 mounted upon the end of a shank 59, the shank being of proper shape to fill the slot in the cylinder 48. The end of the shank 59 has a thread 60 upon which a thumb nut 61 may be screwed to fasten the key guard in place. As the thumb nut is on the inside of the door it can only be gotten at when the door is unlocked and that requires the use of the master key.

It will be observed that my lock has among others the following advantages: Considering that it is adapted to be set for any one of a large number of keys, and that

it requires the use both of the depositor's key and the master key, the lock is exceedingly simple. As the tumblers have a straight line motion instead of swinging about a center, their stump-receiving slots are always horizontal, and it is evident that with a given degree of accuracy in the key and tumblers, the stumps can be made to fit the slots in the tumblers with greater nicety than would be possible if the tumblers were pivoted; so that the danger that the lock will be operated by a key for which it is not set is lessened. The safety of the lock in this regard is rendered still greater by the use of the stumps, which are always horizontal.

It is obvious that various changes can be made in the above illustrated construction which will be within the scope of my invention, and I desire not to be limited beyond the requirements of the prior art and the terms of my claims.

I claim:

1. In an interchangeable key lock, the combination of a series of adjustable stumps, means for fastening said stumps in adjusted position, a corresponding series of tumblers, and mechanism for permitting the engagement of both said stumps and said tumblers by the same key.
2. In an interchangeable key lock, the combination of a series of stumps, means for directly engaging and operating said stumps by means of the key to which the lock is to be set, and a corresponding series of tumblers.
3. In an interchangeable key lock, the combination of a series of stumps, a series of tumblers, a key cylinder for permitting a key to operate said tumblers, springs adapted to move said stumps in one direction, another key cylinder for permitting a key to move said stumps in the opposite direction, and means for securing said stumps in adjusted position.
4. In an interchangeable key lock, the combination of a series of stumps, springs adapted to move said stumps in one direction, means permitting a key to move them in the opposite direction by direct engagement with the stumps, and means for securing said stumps in adjusted position.
5. In an interchangeable key lock, the combination of a series of adjustable stumps, a corresponding series of tumblers, and two key cylinders, one to permit engagement of said stumps by a key, and the other to permit engagement of said tumblers by the same key.
6. In an interchangeable key lock, the combination of a series of adjustable stumps, a corresponding series of tumblers, two key cylinders, one to permit engagement of said stumps by a key and the other to permit engagement of said tumblers by the same key,

springs for moving said stumps in opposition to said key, and means for securing said stumps in adjusted position.

7. In an interchangeable key lock, the combination of a series of adjustable stumps, a corresponding series of tumblers, two key cylinders, one to permit engagement of said stumps by a key and the other to permit engagement of said tumblers by the same key, springs for moving said stumps in opposition to said key, and means for securing said stumps in adjusted position, said means comprising a screw secured to the part upon which said stumps are mounted and a plate adapted to be forced against said stumps by said screw.

8. In an interchangeable key lock, the combination of a casing, a bolt, a series of stumps mounted to slide upon said bolt in a direction transverse to its movement, means permitting the engagement of said stumps by a key, springs tending to force said stumps against said key, and a screw and plate mounted upon said bolt on opposite sides of said stumps to fasten the stumps to the bolt in adjusted position.

9. In an interchangeable key lock, the combination of a casing, a bolt, a series of adjustable stumps mounted upon the bolt, pins on the casing, a series of tumblers mounted on said pins for operation by a given key, and a tumbler mounted upon one of said pins for operation by a second key.

10. In an interchangeable key lock, the combination of a casing, a bolt, a series of stumps adjustably mounted on the bolt, a corresponding series of tumblers for operation by a given key, a pin on the casing, a master tumbler having a slot to receive said pin, a spring tending to force one wall of said slot against said pin, a teat formed on said wall of said slot, said tumbler having a stump receiving slot, and also having a key

engaging edge so shaped that the key will not only raise the tumbler to position its slot but will also move the tumbler to partially engage its corresponding stump.

11. In an interchangeable key lock, the combination of a casing, a bolt, a series of stumps adjustably mounted on the bolt, a corresponding series of tumblers for use with one key, a tumbler adapted to be engaged by a second key, a pin upon the casing, said tumbler having a wall adapted to bear against said pin and having a teat on said wall, a spring tending to force said wall against said pin, said tumbler having a stump receiving slot and a projecting nose at the side of said slot, said tumbler also having a beveled edge that is adapted to be engaged by its key, whereby said tumbler may be raised by its key to engage the stump in its slot, thereby moving said teat to the forward side of said pin, and whereby said first-mentioned key may then be used to throw the bolt, so that said stump by striking said tumbler shall throw said teat to the rear side of said pin so that upon the forward movement of the bolt said tumbler shall be disengaged from its stump.

12. In an interchangeable key lock, the combination of a casing, a bolt, a series of stumps adjustably mounted on said bolt, a series of tumblers adapted to be operated by a depositor's key, a master tumbler superposed upon said first mentioned series of tumblers, and a plate immovable relative to the tumblers and interposed between the master tumbler and said first-mentioned series of tumblers.

In testimony that I claim the foregoing I have hereunto set my hand.

AUGUSTUS W. SIBLEY.

Witnesses:

H. J. BUCKER,
J. C. SLAYBACK.