J. BLASZCZYK.

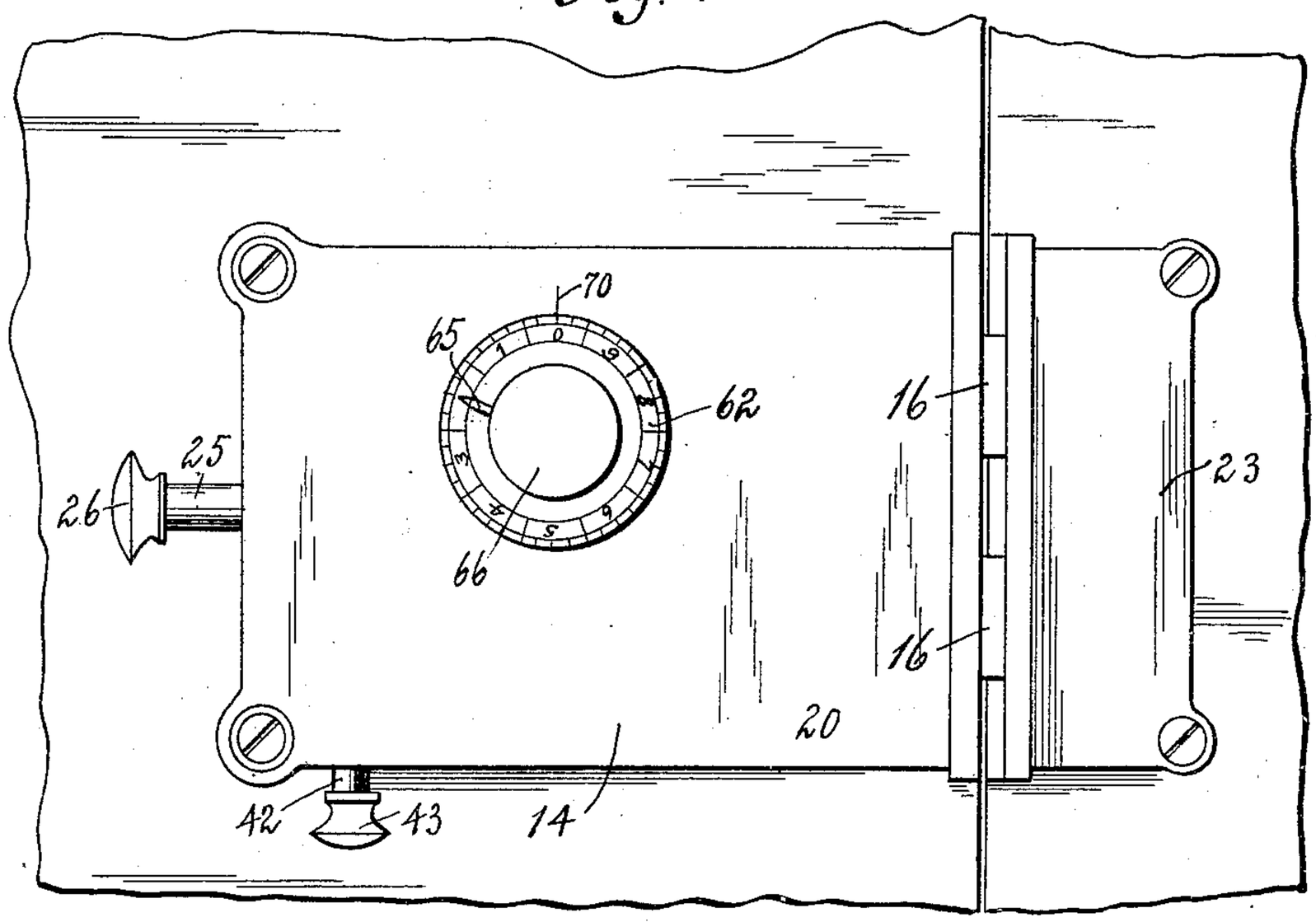
LOCK.

APPLICATION FILED MAR. 19, 1909.

931,256. Patented Aug. 17, 1909.

3 SHEETS—SHEET 1.

Fig. 1



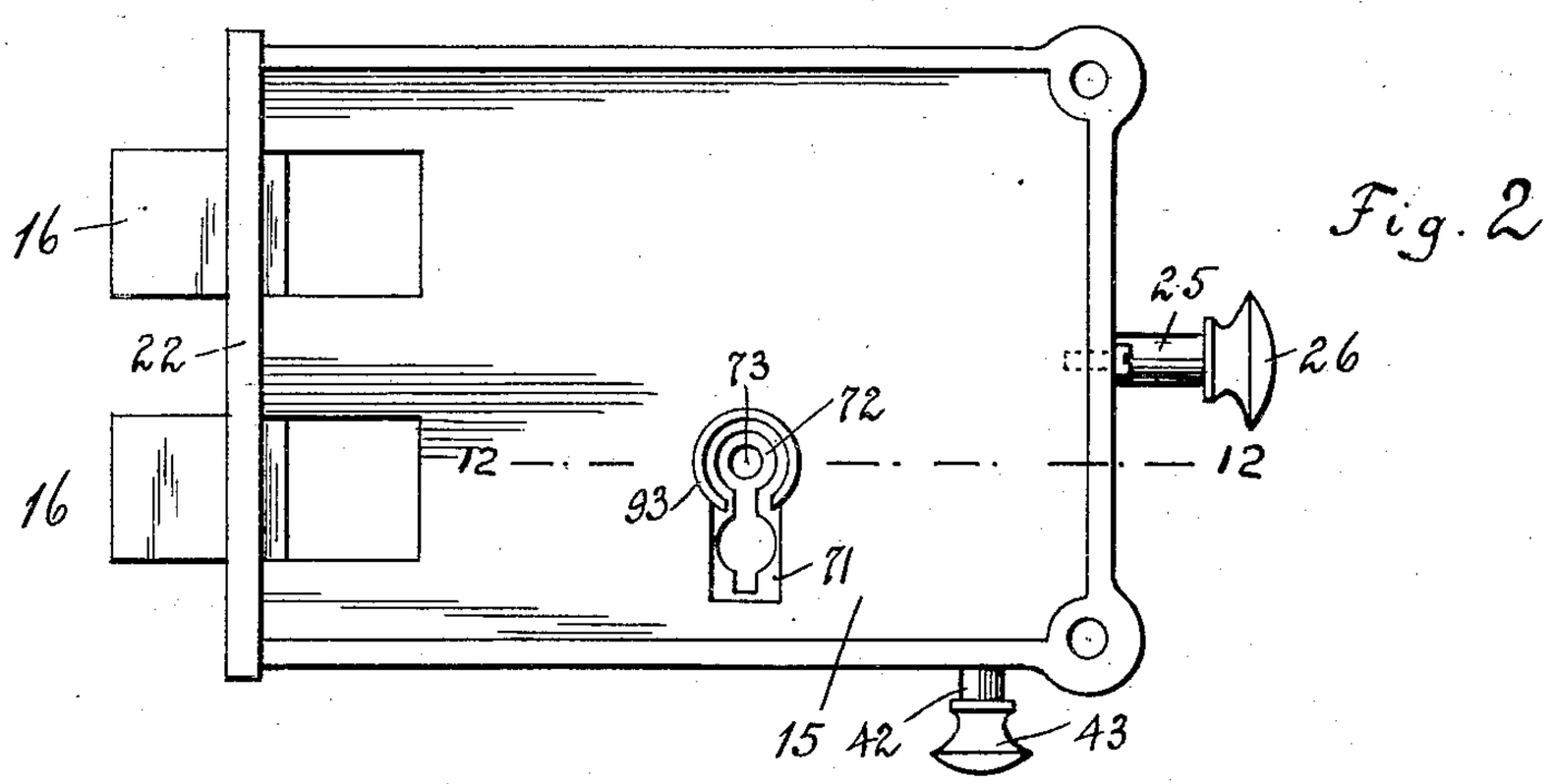


Fig. 2

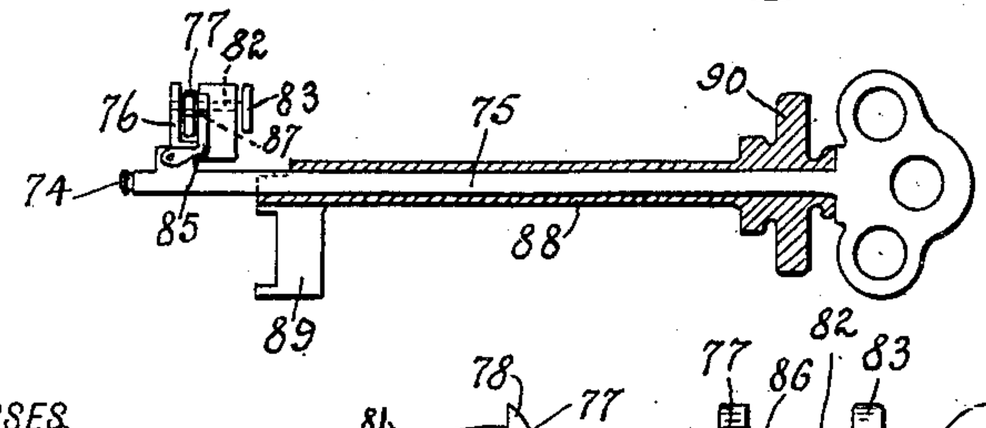


Fig. 3

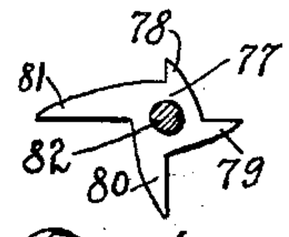


Fig. 4

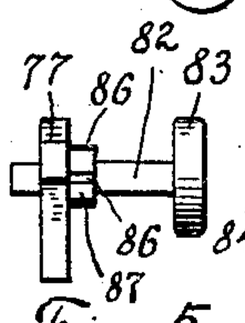


Fig. 5

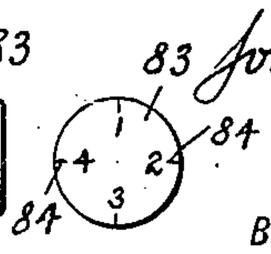


Fig. 6

WITNESSES

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3 SHEETS—SHEET 2.

Fig. 7

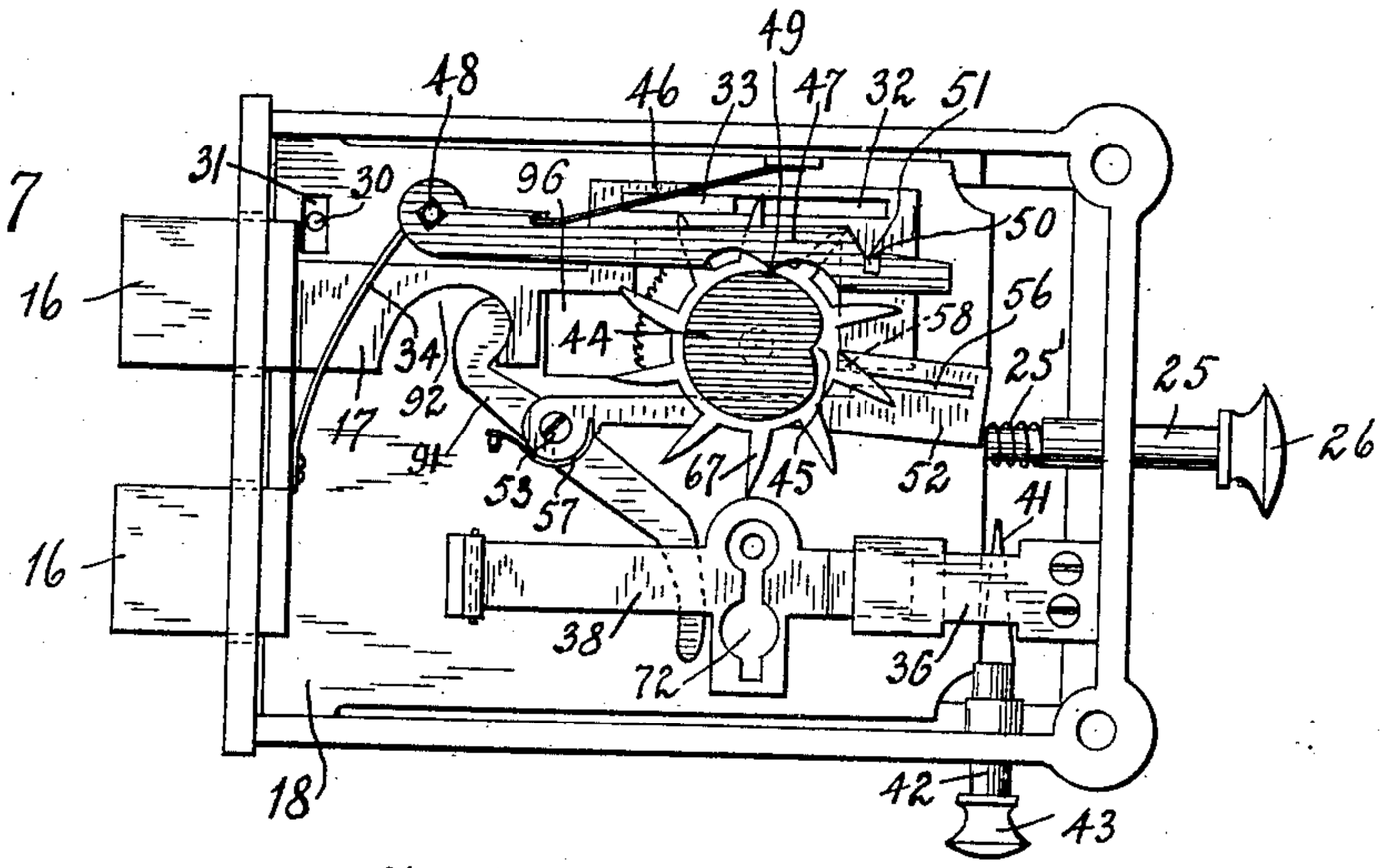


Fig. 8

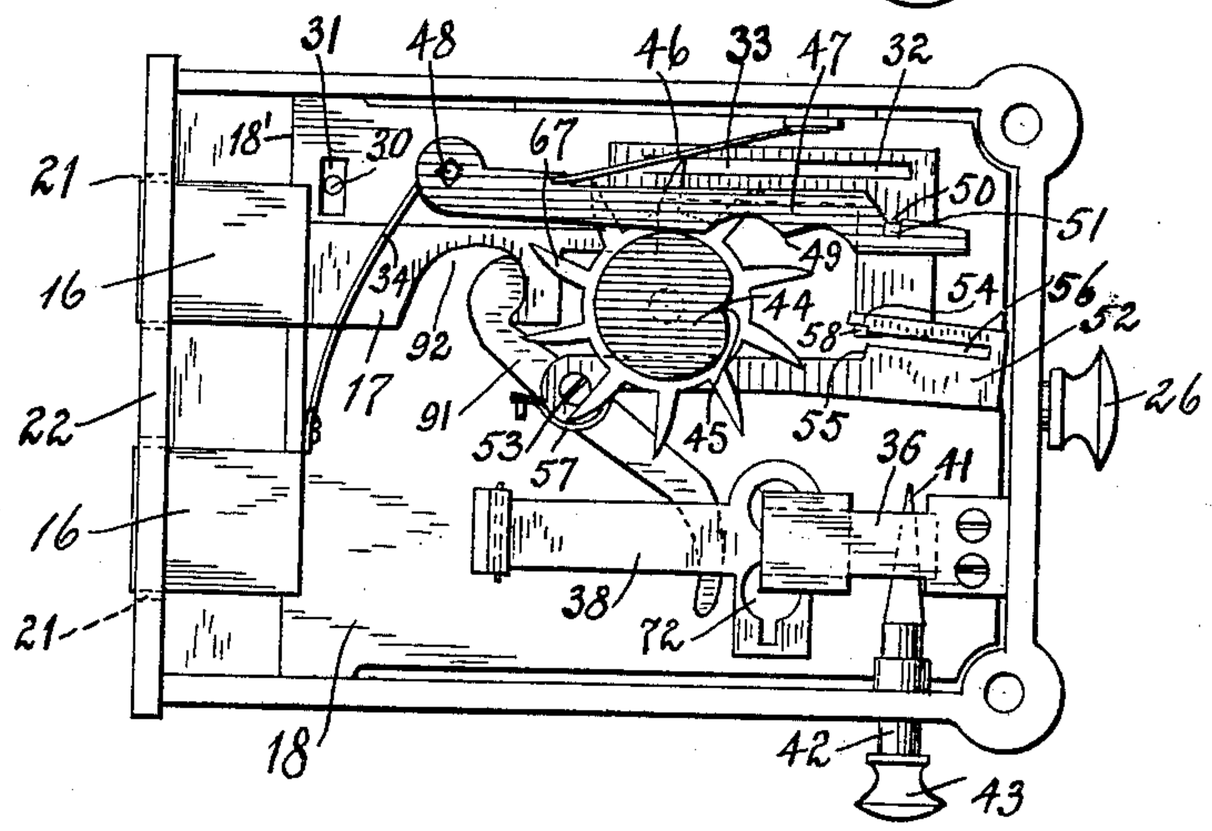
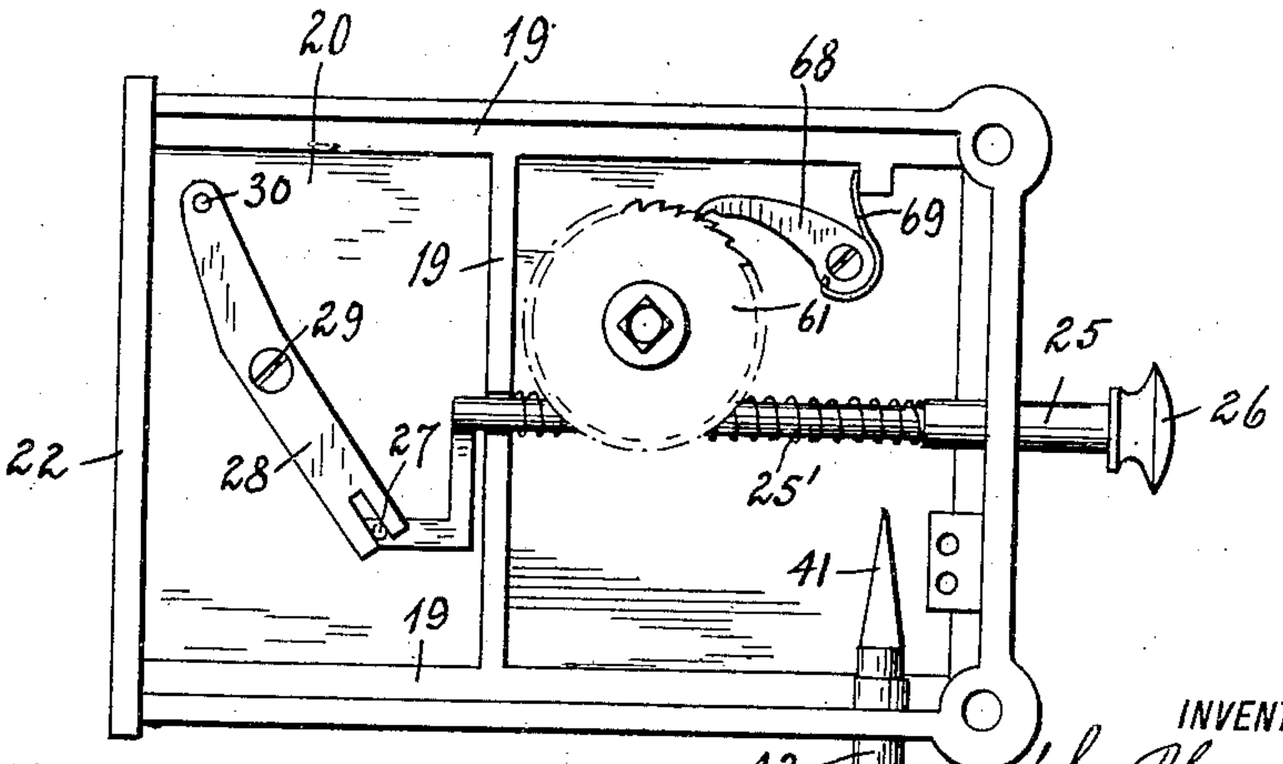


Fig. 9.



WITNESSES

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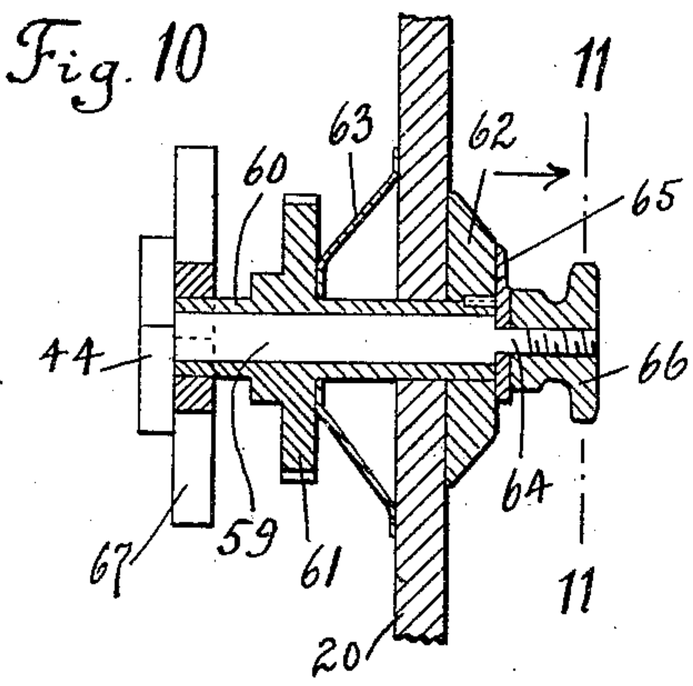
3 SHEETS—SHEET 3.

Fig. 10



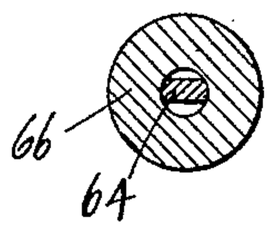
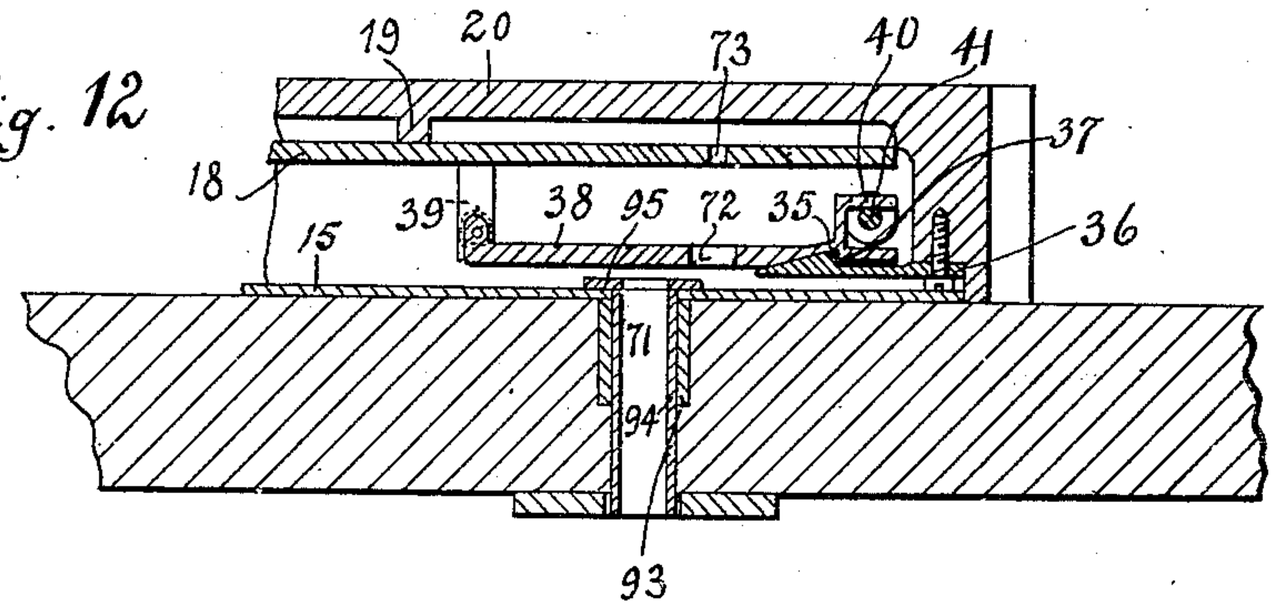


Fig. 11

Fig. 12



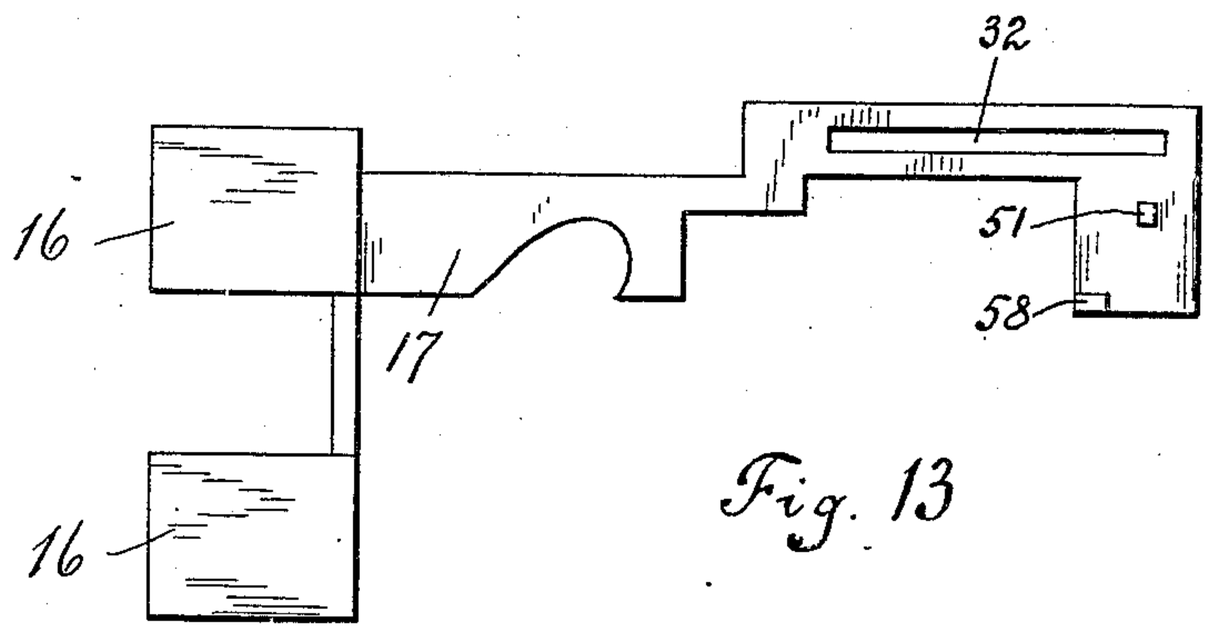


Fig. 13

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JOHN BLASZCZYK, OF NEW YORK, N. Y.

LOCK.

No. 931,256. Specification of Letters Patent. Patented Aug. 17, 1909.

Application filed March 19, 1909. Serial No. 484,353.

To all whom it may concern:

Be it known that I, JOHN BLASZCZYK, a subject of the Czar of Russia, and resident of the city of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Locks, of which the following is a specification.

The present invention relates to locks, and more particularly to permutation locks.

One of the objects of the invention is to provide an improved device of the character specified, whereby it becomes practically impossible to unlock the same unless the person knows the combination.

Another object of the invention is to provide a permutation lock, the combination of which may be readily changed by setting the tumblers thereof, which control the locking bolt.

A further object of the invention is to provide a lock, the tumblers of which are operated by means of an adjustable key, while the locking bolt is retracted by another key operatively connected with said first key.

A still further object of the invention is to provide a permutation lock, the locking bolt of which may be retracted and projected from the inside without changing the positions of the tumblers, that is without interfering with the combination of the lock.

A still further object of the invention is to provide a key, consisting of a tumbler operating part and of a locking bolt retracting part, and to combine said two parts in such a manner that the same will not interfere with each other in their operation.

Other objects and advantages of the device will be apparent from a reading of the specification and an examination of the drawings, forming part of the present application for Letters Patent.

The invention consists in the construction, arrangement and combination of the several parts of which it is composed, as will be hereinafter more fully described and claimed.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of a portion of a door having the invention applied thereto, the locking bolts being in their outer positions, and Fig. 2 is a rear elevation of the lock, the cover plate being attached thereto. Fig. 3 is an elevation of the combined key, and Figs. 4, 5 and 6 are details of construction, on an enlarged scale, of said key. Fig. 7 is an elevation of the lock with the bolts projected and the cover plate removed, to show the interior parts, Fig. 8 is a similar view with the bolts retracted, and Fig. 9 is a similar view, the locking bolts and their operating means being removed. Fig. 10 is a sectional view of the tumbler setting means, and Fig. 11 a section taken on line 11, 11 of Fig. 10. Fig. 12 is a section taken on line 12, 12 of Fig. 2, on an enlarged scale, and Fig. 13 is an elevation, on an enlarged scale, of the locking bolts.

In the drawings, the numeral 14 indicates the lock case, which may be of any suitable shape, and 15 denotes the cover plate thereof, by the removal of which access may be had to the interior mechanism of the lock. The lock may be attached to the inner side of the door, as shown in the drawings, or may be placed into a mortise formed in the door.

A plurality of locking bolts 16, 16, in the case illustrated in the Drawing 2, are secured together and attached to a plate 17, which is slidably arranged, in a manner hereinafter to be described, upon a base plate 18, reciprocatably mounted upon guides 19, 19, whereby the said base plate and the parts attached thereto may operate in planes parallel to the plane of the cap 20 of the lock. The locking bolts project through apertures 21, 21, formed in the face plate 22 of the lock casing, and engage the keeper 23, attached to the jamb. The base plate 18 may be reciprocated by means of a spring pressed operating bar 25, having a knob 26 on the free end thereof, while its inner end is provided with a pin 27, engaging one end of a lever 28, fulcrumed at 29 to the lock casing and carrying on its other end a pin 30, engaging the slot 31 in the base plate 18. In the locking bolt plate 17 is provided a slot 32, which is engaged by a projection 33, formed on the base plate 18, whereby the reciprocating movement of the locking bolts 16, relative to the base plate 18, is determined and guided. Obviously the apertures 21, in the face plate 22 of the lock, aid the projection 33 in guiding the movement of the locking bolts. A spring 34, attached in any suitable manner to the base plate and the locking bolts, serves to project the latter from their retracted position when released, and to keep the same in such position.

The base plate is kept in its outer position,

that is in a position whereby its front edge 18′ contacts with the face plate 22 of the lock, by means of the spring 25′, bearing against the guide 19 and the enlarged portion of the bar 25. The said base plate may be kept in its inner position, (shown in Fig. 8 of the drawings) by means of a nose 35 of the keeper plate 36, attached to the lock casing, which nose is adapted to engage the nose 37 of the swinging member 38 which is attached to the base plate 18 in such a manner, that the same may swing in a plane at right angles to the plane of the cap plate 20 of the lock, and being kept in constant contact with the keeper 36 by means of a spring 39. An extension 40 is formed upon the member 38 and engages operatively the conical portion 41 of an operating rod 42, which is provided with a knob 43 and is slidably arranged in the lock casing. In actuating the bar 25, the nose 35 of the keeper 36 is brought into engagement with the nose 37 of the swinging member 38, whereby the base plate 18 is kept in its inner position. Pushing the rod 42 toward the member 38, the latter will be disengaged from the keeper 36, whereby the spring 25′ will force the plate into its outer position.

The locking bolts are controlled by two tumblers. One of the same is indicated at 44, and comprises a disk, provided with a notch 45. With this disk is held in constant engagement, by means of a spring 46, a dog 47, pivoted at 48 to the base plate 18, and carrying a nose 49, adapted to coöperate with the notch 45. The dog is furthermore provided with a recess 50, normally engaging a projection 51 of the plate 17 of the locking bolts. The other of said tumblers is indicated at 52 and comprises a flat member, pivoted at 53 to the base plate 18, and being provided with projections 54 and 55, and a slot 56 between said two projections. A spring 57 keeps the projection 54 normally in engagement with projection 58, formed upon the locking bolt plate 17. This projection 58 allows of a relative movement of the locking bolts and the tumbler 52, when the said projection 58 engages the slot 56 of the tumbler.

The tumbler 44 is attached to a spindle 59, rotatably mounted in the sleeve 60 of the ratchet 61, which sleeve is, in turn, rotatably mounted in the cap plate 20 of the casing, and is keyed or otherwise secured to a dial 62, arranged on the outer side of the face plate 20, and kept in engagement with said face plate by means of a plate spring 63, or its equivalent. The outer end of the spindle 59 is squared, as shown at 64, and engages a pointer 65, kept upon said squared end by means of a knob 66, engaging the screw-threads of the squared end of the spindle 59. The end of the sleeve 60, against which the tumbler 44 rests, is also squared and carries thereon a cam wheel 67, for a purpose hereinafter to be described. The ratchet 61 is engaged by a pawl 68, mounted upon the cap plate of the lock casing, and kept in engagement with the ratchet by means of a spring 69.

The dial plate 62 of the device may be graduated in any desired manner. In the case illustrated in the drawings, the plate is marked with ten equal divisions, each of which is subdivided into four parts so that altogether there are forty divisions on the plate, each of which may be brought, of course, to register with the mark 70 upon the outer side of the cap plate of the casing. The number of the teeth of the ratchet 61 corresponds to the number of the divisions of the dial and is, therefore, in the present case, forty; in other words, to each division of the dial corresponds one tooth of the ratchet. There being a fixed relation between the pointer 65 and the tumbler 44, it is obvious that the position of the tumbler can be ascertained from the dial. It will be observed that, when the knob 66 is loosened to some extent, the tumbler 44 may be rotated by means of the pointer 65 without imparting motion to the parts mounted upon the sleeve 60, but when the knob 66 is screwed tight, all the parts upon the spindle 59 and upon the sleeve 60, that is the tumbler 44, cam wheel 67, ratchet 61, dial 62 and pointer 65, will move together.

It is obvious that, in order to retract the locking bolts from their projected position, the dog 47 and the tumbler 52 must simultaneously be disengaged from the projection 51 and projection 58 of the locking bolt plate.

The key-hole of the lock is indicated at 71 and registers with a key-hole 72, formed in the swinging member 38. A hole 73, registering with said key-holes, is provided in the base plate and is engaged by the pin 74 of the key, when the latter is inserted into the lock. The key for operating the lock, forming the subject matter of the present invention, consists of a stem 75, having a bit 76, upon which is mounted a cam wheel 77, arranged at right angles to the plane of the bit. This cam wheel comprises four cams 78, 79, 80 and 81 of increasing length, and corresponding to the four subdivisions of the ten divisions of the dial. This cam wheel is fixedly attached to a spindle 82, mounted in said key bit, and being provided with a knob 83, provided with marks 84, 84, corresponding to the four cams of the cam wheel. A spring 85 is attached to the bit and is adapted to engage one of the recesses 86, 86 of a disk 87, fixedly secured to the spindle 82 of the cam wheel, and keeps said cam wheel in the desired position. Obviously the number of the recesses 86 corresponds to the number of the cams upon the cam wheel. The stem 75 of the key carries thereon a sleeve 88,

provided with a bit 89 upon one of its ends and with a knob 90 upon the other of said ends for operating said bit 89. The main bit 76 of the key and the cam wheel 77 serve to operate the tumblers 44 and 52, while the bit 89 of the sleeve 88 serves to operate a lever 91, engaging the recess 92 in the locking bolt plate 17, for actuating the same.

The key-hole 71 in the cover plate 15 of the lock is encircled by a split cylindrical projection 93, in which is slidably mounted a split tubular member 94, the inner end of which rests against a spring 95, carried by the cover plate of the lock and adapted to be pushed by means of the tubular member 94 toward the swinging member 38, whereby the latter may be disengaged with the keeper 36 from the outer side of the door, when desired.

The operation of the device now described is as follows: Let us suppose that the locking bolts 16 are in their projected position, and the other parts in the positions indicated in Fig. 7 of the drawings. A person being inside of a room will retract the locking bolts by pushing the knob 26 toward the lock casing, whereby the base plate will be brought into its inner position, as hereinbefore mentioned. There being a positive connection between the base plate 18 and the locking bolts through the recess 50 of the dog 47 and the projection 51 of the plate 17, and furthermore through the projection 58 of the plate 17 and projection 54 of the tumbler 52, the locking bolts will be retracted and brought into the position shown in Fig. 8 of the drawings. Obviously all the parts, mounted upon said base plate and locking bolt, will participate in the movement of the same, the aperture 96 in the base plate permitting such movement. The nose of the keeper 36 will be brought thus into engagement with the nose of the swinging member 38, and both the base plate and the locking bolts will thus be kept in their retracted positions. To release the locking bolt, it is necessary to push the knob 43 upward, whereby the conical portion 41 of the rod 42 will operate in the hereinbefore described manner. From the outer side of the door, of course, the locking bolts will be brought into their projected position by means of the sleeve 94, above mentioned. It will be observed that the retracting and the projecting in this manner of the locking bolts and base plate do not affect in any way whatever the combination of the lock, since the tumbler 44 remains stationary and the tumbler 52 is kept in its position relative to the base plate 18 with which it moves.

In order to set a certain combination, the knob 66 is screwed tight, whereby, owing to the friction existing between the several parts, arranged upon the spindle 59 and the sleeve 60, the said parts will turn together. The knob is turned until the zero mark upon the dial plate 62 registers with the mark 70 on the outer side of the cap plate 20 of the casing. The object of this first operation is to bring the cam wheel 67 into such a position whereby it may be readily engaged by the main bit 76 of the key. The second step consists of freeing, by unscrewing the knob 66 to a certain extent, the several parts upon the sleeve 60 from the parts upon the spindle 59, whereby the pointer 65 may be brought to indicate any desired number upon the dial, whereafter the knob 66 is again screwed tight, so as to connect securely the parts upon the spindle and sleeve, mentioned. The parts upon the spindle and sleeve are assembled in such a manner that when both the zero mark of the dial and the pointer coincide with the mark 70 upon the cap plate, the projection 49 of the dog 47 engages the notch 45 of the tumbler 44, whereby the projection 51 is disengaged from the recess 50, which would allow the locking bolts to be retracted were it not for the cooperating projections 58 and 54 on the plate 17 and tumbler 52, respectively. When by means of the second operation, mentioned, the pointer is turned to indicate a certain numeral upon the dial, the projection 49 is disengaged from the notch 45 in the tumbler 44, and the projection 51 engaged with the recess 50. It will be observed thus, that the higher the number which the pointer indicates upon the dial, the greater is the angle through which the tumbler 44 must be moved backward, in order to bring the projection of the dog 47 into engagement with the notch 45 of the tumbler 44, in which position the projection 51 of the locking bolt plate 17 will be released.

By inserting the key into the lock and operating by means of its main bit the cam wheel 67, which comprises in this particular case ten cams, it will be observed that each turn of the key turns the cam wheel and thus the tumbler 44 one-tenth of a revolution, that is through an angular distance of 36°, whereafter another of the cams of the cam wheel comes into a position to be operated upon by the bit so as to move the tumbler again through an angular distance of 36°. Since, on the other hand, the ratchet wheel is formed with forty teeth, it will be observed that the cam wheel and thus the tumbler 44 may be turned one-fortieth of a whole revolution, that is 9°, when necessary.

Considering now the positions of the parts, shown in Figs. 1 and 7, it will be seen that the pointer indicates the numeral 2¼ upon the dial, which shows that the angular distance between the projection 49 of the dog 47 and notch 45 of the tumbler 44 amounts to 81°, which corresponds to two whole turns of the key and one-quarter of a turn. In order to adjust the key for the proper working in

this particular case, the shortest of the cams, that is cam 78, is set by means of the knob 83 so as to be the working cam in this case. This position can be easily ascertained by the four numerals upon the knob 83. The key is now inserted into the key-hole in such a manner that the sleeve 88 and therewith the bit 89 is kept on its outer position, that is in a position, whereby the inner end of the sleeve contacts with the bow of the key. Turning now the key two times and thereafter through one-quarter of its operating stroke, the notch 45 of the tumbler and the projection of the dog 47 will be brought into engagement, releasing thereby the projection 51 upon the locking bolt plate 17. At the same time the cam 78 upon the key bit 76 will operate the tumbler 52 in the following manner: During the first quarter of the operating stroke of each revolution of the key, that is through an angular advance of 9° of the tumbler 44, the tumbler 52 is raised so that the slot 56 is brought into alinement with the projection 58 on the locking bolt plate, while during the remainder of the turn, the projection 54 engages again the projection 58. Obviously thus after two whole turns of the key the projections 54 and 58 engage each other, and then during the time the tumbler 44 is moved through an angular distance of 9°, the tumbler 52 is lifted, so that when the projection 49 engages the notch 45 of the tumbler 44, whereby the projection 51 is disengaged from the recess 50 of the dog 47, simultaneously the projections 54 and 58 are disengaged from each other, whereby the locking bolt is released. Inserting now the sleeve 88 of the key into the lock, the bit 89 thereof will engage the lever 91, the free end of which will be forced by turning the said sleeve toward the face plate 22 of the casing, whereby the other end, engaging the recess 92 in the lock bolt plate, will retract the locking bolts. Obviously the base plate 18 remains stationary during this operation, whereby the spring 34 will project the said bolts as soon as the key is disengaged from the lever 91.

From the foregoing description, it is obvious that the combination of the lock may be changed whenever required, and that the key must be turned one to ten times according to the position of the pointer upon the dial, and one-quarter to three-quarters of its operating stroke as the pointer indicates upon the dial besides the divisions one to three subdivisions. The cam 78 upon the cam wheel 77 is made to operate when the pointer indicates a given numeral plus one subdivision, the cam 79 when the pointer indicates a given number plus two subdivisions, and so on.

As hereinbefore described, the cam 78 lifts the tumbler 52 into its proper position during the first quarter of the operating stroke of a turn of the key, while during the remainder of the turn, projections 54 and 58 of the tumbler and plate 17, respectively, are in engagement with each other. Should, therefore, the tumbler 44 require for instance, a certain number of whole turns of the key plus two quarters of the operating stroke of a turn of the key and the cam 78 be used, it will be seen that while at the end such certain number of turns and two-quarters of the operating stroke of the key, the projection 49 of the dog engages the notch 45 of the tumbler 44, the projection 58 will not be in line with the slot 56, preventing thereby the operation of the locking bolt. Cam 79 of the cam wheel 77 operates in the following manner: During the first quarter of the operating stroke of a turn of the key the tumbler 52 is lifted higher than necessary, and at the end of the second quarter of the operating stroke of a turn the slot 56 is brought in the line with the projection 58. A cam 80 lifts the tumblers still higher, whereby the projection 55 of the tumbler 52 engages the projection 58 of the plate 17, and only during the third quarter of the operating stroke of a turn will the projection 58 be in line with the slot of the tumbler 52. In a similar manner works cam 81, the only difference being that only at the end of the operating stroke of a turn of the key are the parts mentioned in the proper positions. It will thus be seen that the lock, hereinbefore described, is provided with two independent tumblers, a coöperation between which is caused by means of the cams arranged upon the bit of the key.

Many minor changes may be made obviously in the arrangement and construction of the several parts of the invention without departing from the spirit and scope of the same.

What I claim is:

1. In a lock, the combination with a locking bolt, of a permutation mechanism controlling the same, and a key operated tumbler engaging said locking bolt independent of said permutation mechanism and adapted to coöperate therewith and to be disengaged from said locking bolt simultaneously with said permutation mechanism.

2. In a lock, the combination with a locking bolt, of two independent tumblers controlling the same, and a permutation mechanism controlling one of said tumblers, the other being operated by a key in such a manner that the same is disengaged simultaneously with the first tumbler from the locking bolt.

3. In a lock, the combination with a locking bolt, of a permutation mechanism controlling the same, a tumbler engaging said locking bolt independent of said permutation mechanism and adapted to coöperate therewith, and to be disengaged from said

locking bolt simultaneously with said permutation mechanism and means for operating said locking bolt.

4. In a lock, the combination with a lock casing, of a base plate slidably arranged therein, a locking bolt mounted upon said base plate, two independent tumblers controlling said locking bolt, a permutation mechanism controlling one of said tumblers, and means for shifting said base plate and the locking bolt mounted thereon without disturbing the combination of the lock.

5. In a lock, the combination with a lock casing, of a base plate slidably arranged therein, a locking bolt mounted upon said base plate, two independent tumblers controlling said locking bolt, a permutation mechanism controlling one of said tumblers, means for shifting said base plate and the locking bolt mounted thereon without disturbing the combination of the lock, and means for operating said locking bolt.

6. In a lock, the combination with a lock casing, of a base plate slidably arranged therein, a locking bolt mounted upon said base plate, a tumbler controlling said locking bolt, a permutation mechanism controlling said tumbler, and means for shifting said base plate and the locking bolt mounted thereon without disturbing the combination of the lock.

Signed at New York, in the county of New York and State of New York, this 2d day of March, A. D. 1909.

JOHN BLASZCZYK.

Witnesses:

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