

No. 894,252.

PATENTED JULY 28, 1908.

J. BAUM.  
PERMUTATION LOCK.  
APPLICATION FILED SEPT. 3, 1907.

3 SHEETS—SHEET 1.

Fig. 1.

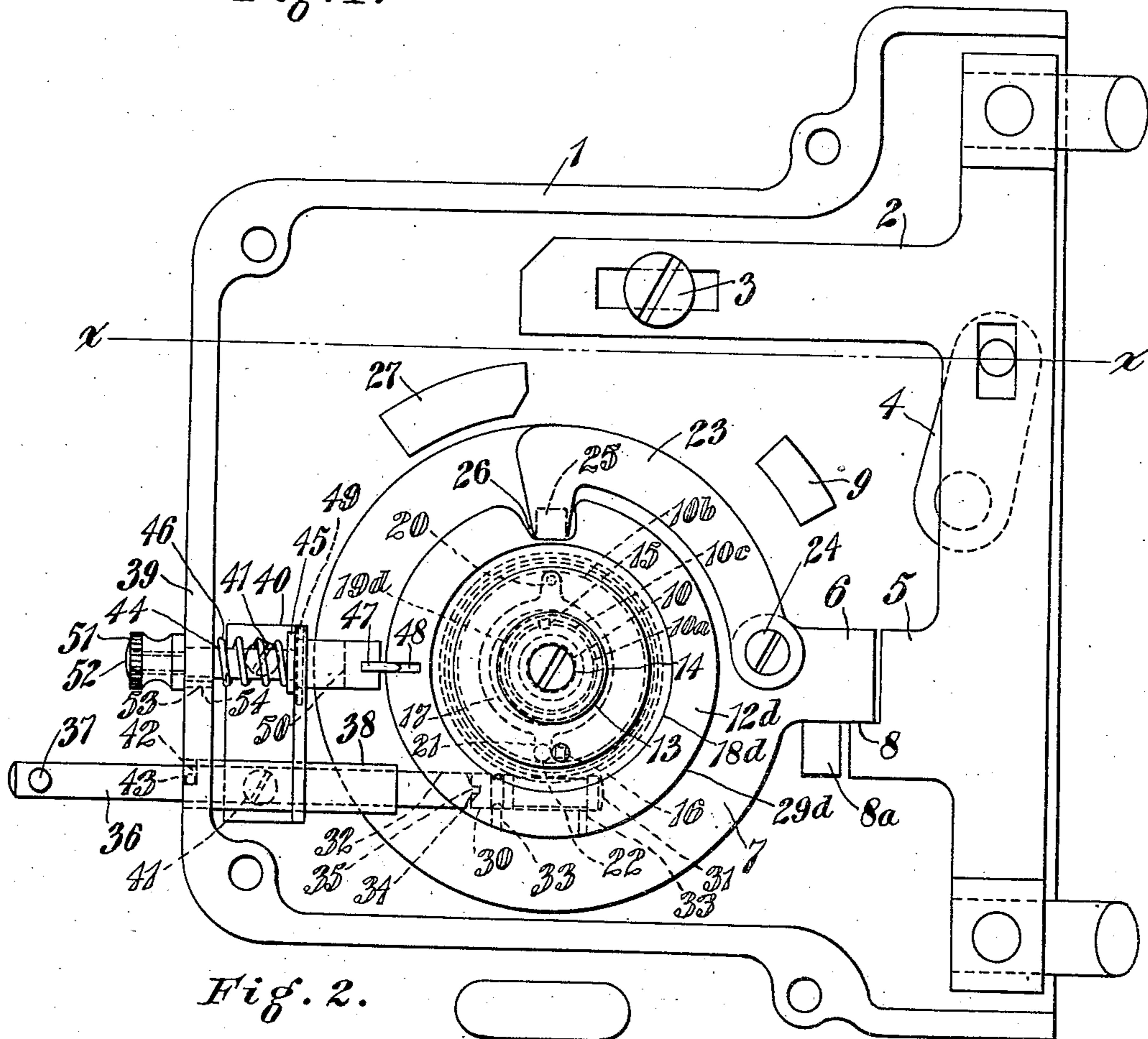
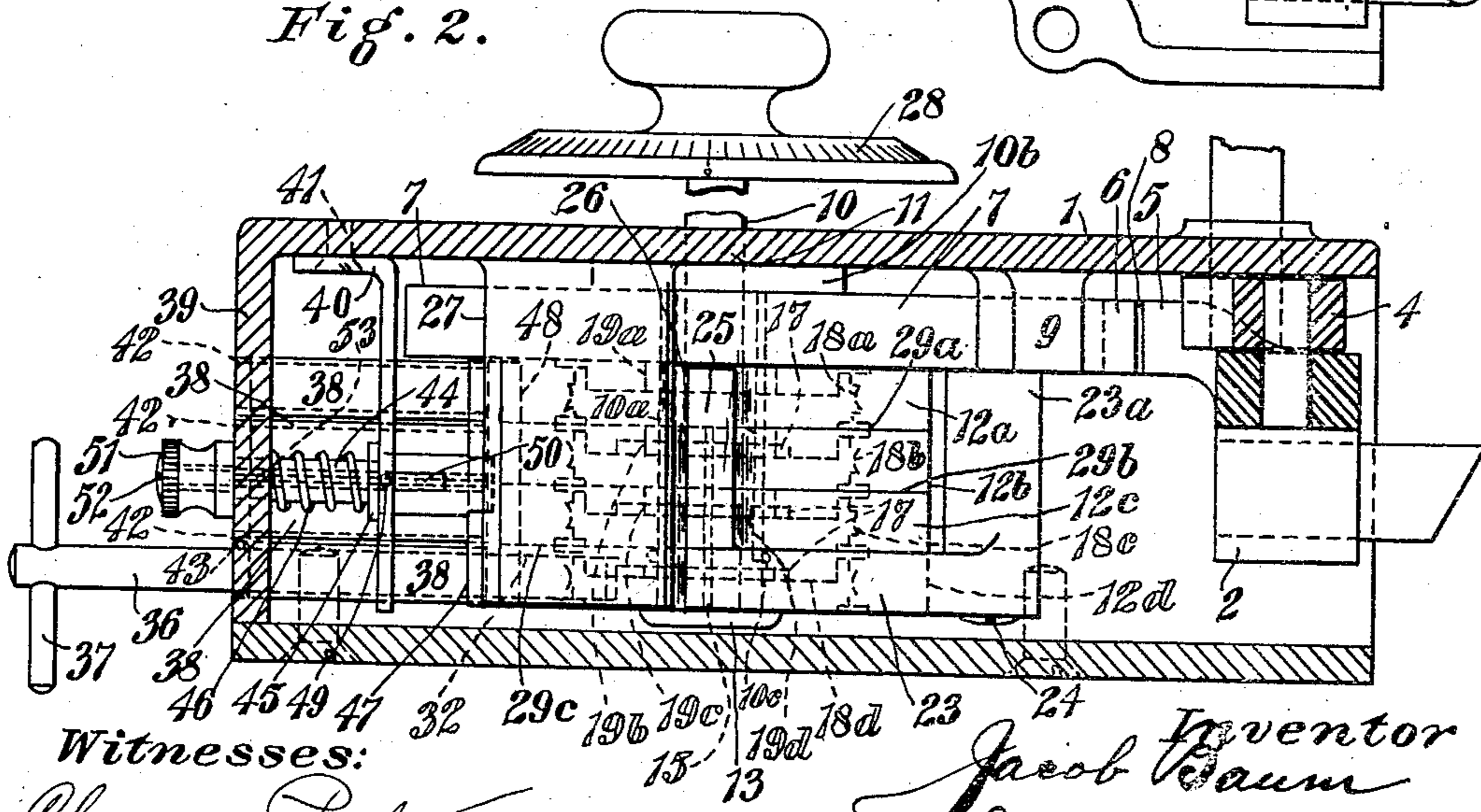


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

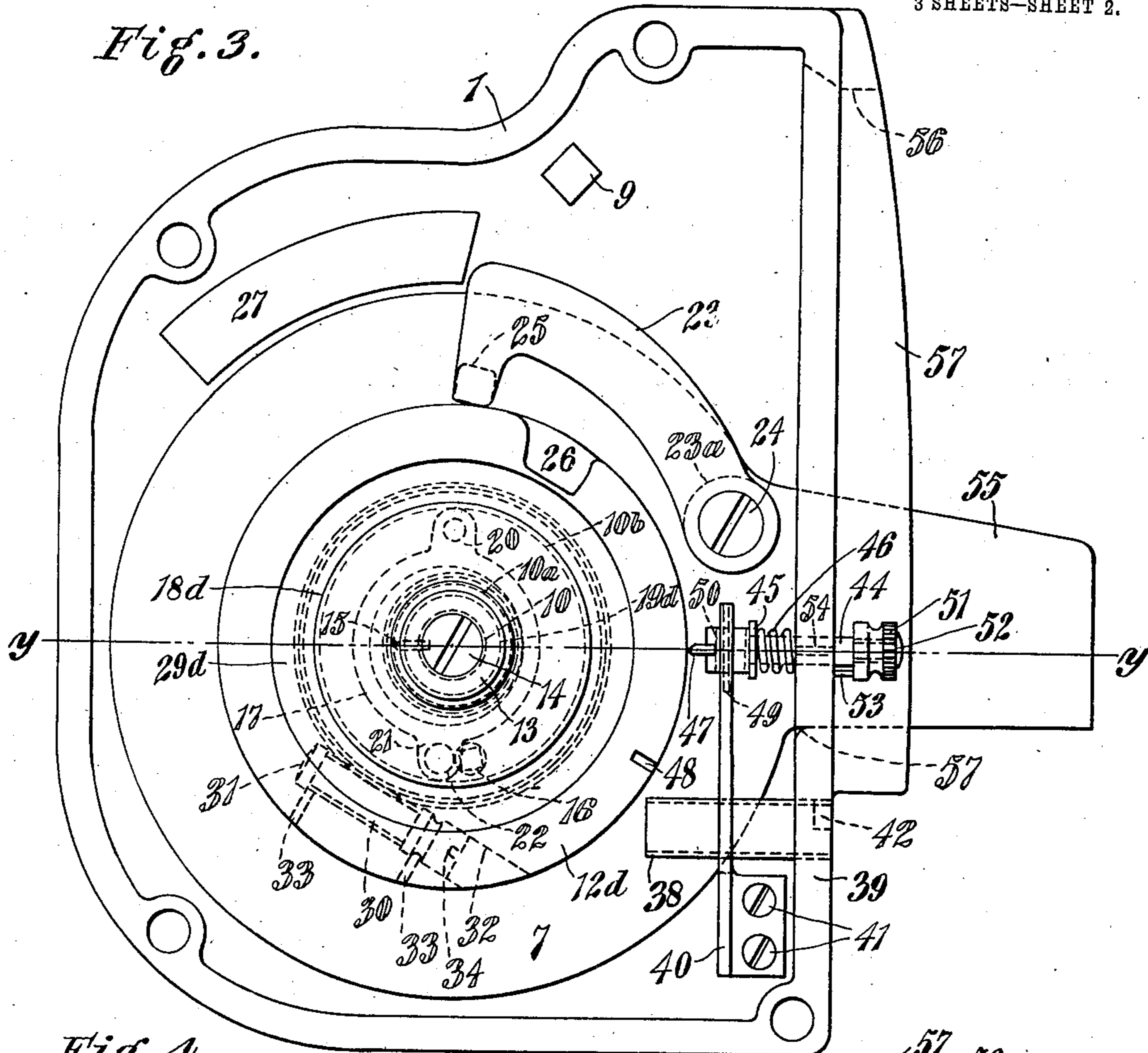


Fig. 4.

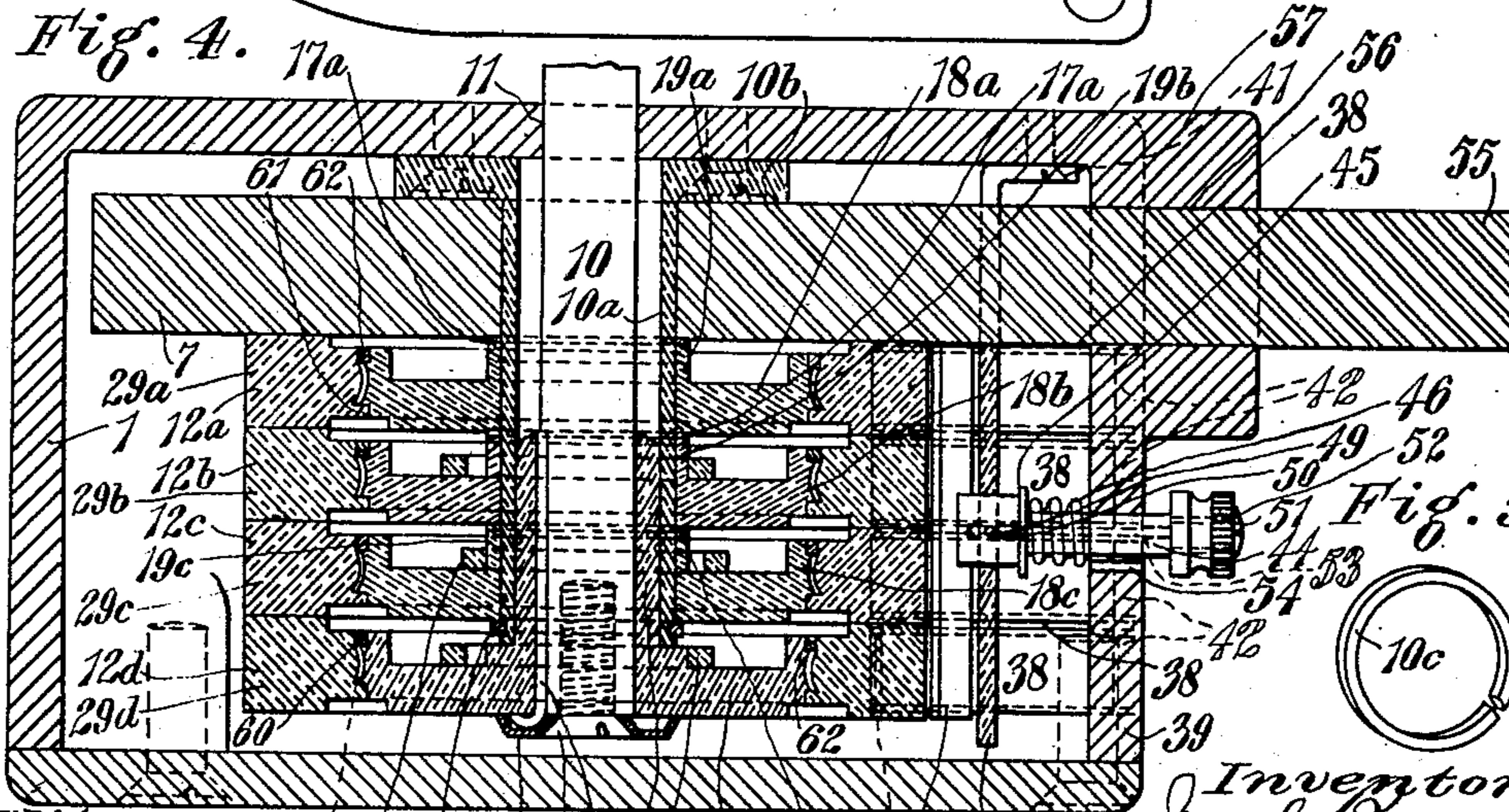
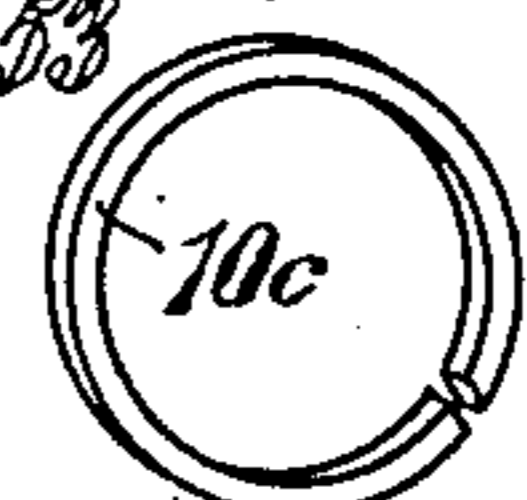


Fig. 5.



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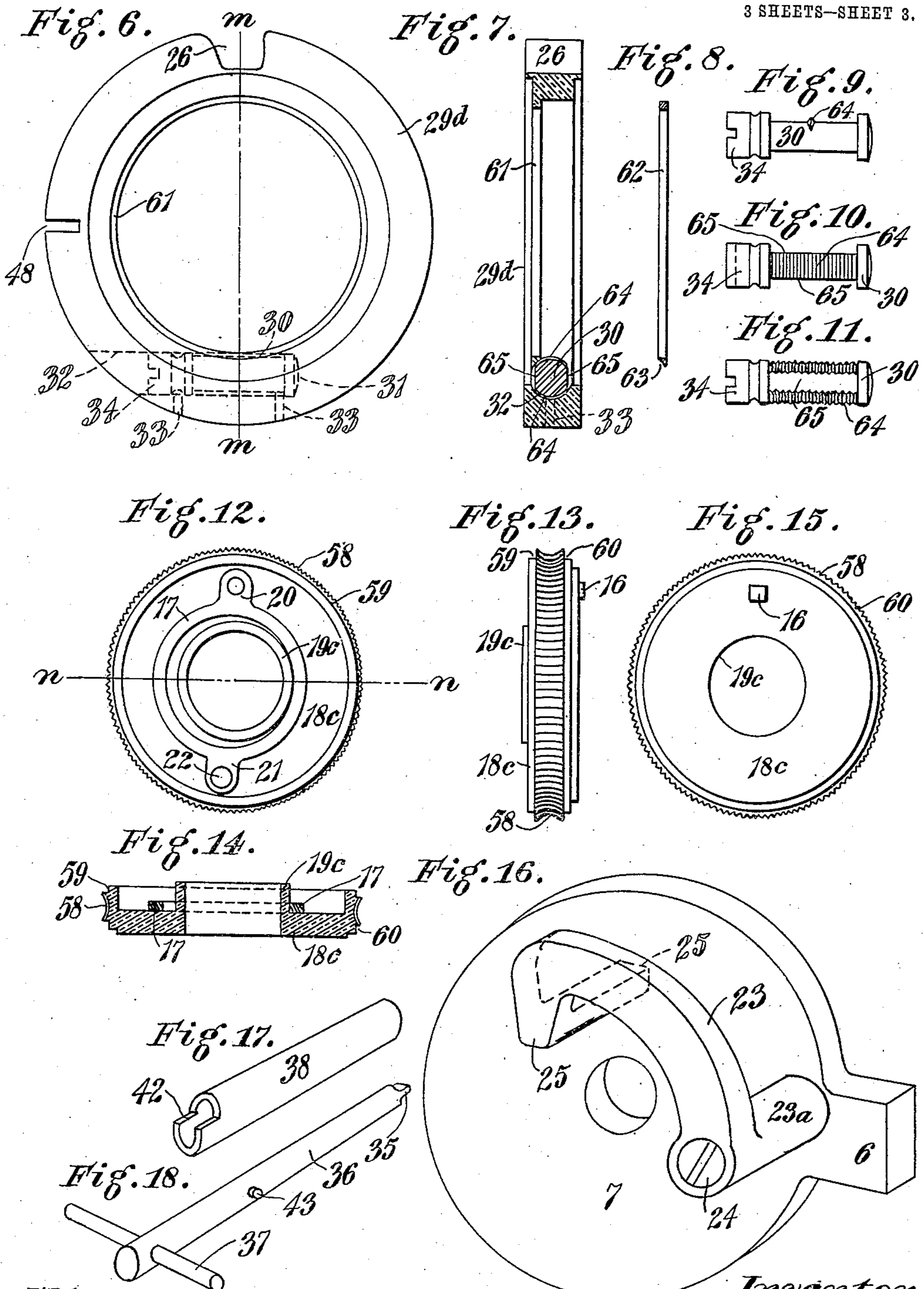
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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

JACOB BAUM, OF CINCINNATI, OHIO.

## PERMUTATION-LOCK.

No. 894,252.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed September 3, 1907. Serial No. 391,002.

*To all whom it may concern:*

Be it known that I, JACOB BAUM, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Permutation-Locks, of which the following is a specification.

My invention relates to locks having revolving tumbler wheels, the object being to provide a simple, compact and reliable construction, convenient to adjust and operate.

My invention consists in the mechanism herein set forth and claimed.

In the drawings: Figure 1 is a rear elevation of a lock embodying my invention, the lock case being represented as having the cover removed, to better disclose the interior construction of the lock. Fig. 2 is a horizontal section on the line  $x-x$  of Fig. 1. Fig. 3 is a rear elevation, the lock case being represented as having the cover removed, showing a modified application of my invention, and also illustrating the parts in different positions than those illustrated in Fig. 1. Fig. 4 is a horizontal section on the line  $y-y$  of Fig. 3. Fig. 5 is a perspective detail of the tumbler holding ring. Fig. 6 is a front elevation of the rim of one of the tumbler wheels with the binding pin in place therein. Fig. 7 is a vertical section on the line  $m-m$  of Fig. 6. Fig. 8 is a vertical section on a line corresponding to  $m-m$  of Fig. 6 through the ring which is adapted to hold the inner disk in place in the rim. Fig. 9 is a detail of a binding pin provided with only one engaging lug. Fig. 10 is a detail plan view of a binding pin provided with a series of lugs, and Fig. 11 is a side elevation of same. Fig. 12 is a front elevation of the inner disk of one of the driven tumbler wheels. Fig. 13 is a side elevation of same. Fig. 14 is a horizontal section on the line  $n-n$  of Fig. 12. Fig. 15 is a rear elevation of same. Fig. 16 is a detail perspective view of the bolt and the dog mounted thereon. Fig. 17 is a detail perspective view of one of the key guides. Fig. 18 is a detail perspective view of the key.

As illustrated in Figs. 1 and 2 of the drawings, the various parts constituting my invention are mounted in a lock case 1, similar to those ordinarily used on fire-proof safes, in which is mounted the double bolt 2 adapted to slide horizontally therein and be guided by a pin 3, the sliding of this bolt being effected by means of the crank 4. The bolt 2

is provided with a projection 5, which is adapted to engage with the radial lug 6 on the revolving bolt 7, to prevent the bolt 2 from sliding backward and thus unlocking the safe or other receptacle upon which the lock is used. This projection 5 is provided with a shoulder 8 and, also, a stop 8<sup>a</sup> is provided on the interior of the lock case adapted to limit the downward movement of the lug 6 on the bolt 7, while the upward movement of the lug 6 is limited by a stop 9 also rigidly mounted on the interior of the lock case 1.

The tumbler spindle 10 is journaled horizontally at 11 in the front of the lock case 1, and the bolt 7 is rotatably mounted upon the tube 10<sup>a</sup> secured to the interior of the lock case by means of its hub 10<sup>b</sup> and concentric with and surrounding the tumbler spindle 10. To the rear of the bolt 7, a series of tumbler wheels 12<sup>a</sup>, 12<sup>b</sup> and 12<sup>c</sup> are loosely mounted upon this tube 10<sup>a</sup> and held against endwise displacement therefrom by a ring 10<sup>c</sup> sprung into an annular groove near the rear end of the tube 10<sup>a</sup>. The tumbler wheel 12<sup>d</sup> is secured in place on the tumbler spindle to the rear of the tube 10<sup>a</sup> by a washer 13, held in place by a screw 14 in the end of the tumbler spindle, which washer 13 also secures against removal a key 15, which causes the tumbler wheel 12<sup>d</sup> to rotate with the tumbler spindle 10 and thus constitute the driving tumbler wheel, while the other three tumbler wheels 12<sup>a</sup>, 12<sup>b</sup> and 12<sup>c</sup> are allowed to rotate on the tube 10<sup>a</sup> and constitute the driven tumbler wheels. However, the rotation of these three tumbler wheels 12<sup>a</sup>, 12<sup>b</sup> and 12<sup>c</sup> is controlled by the driving tumbler wheel 12<sup>d</sup> by means of a series of stationary lugs 16 and movable lugs 22, the stationary lugs 16 being mounted on the rear sides of the inner disks 18<sup>a</sup>, 18<sup>b</sup> and 18<sup>c</sup> of the tumbler wheels 12<sup>a</sup>, 12<sup>b</sup> and 12<sup>c</sup>, respectively, while rings 17 surround the hubs 19<sup>b</sup>, 19<sup>c</sup> and 19<sup>d</sup> of the inner disks 18<sup>b</sup>, 18<sup>c</sup> and 18<sup>d</sup>, respectively, said rings being provided with extensions 20, by means of which they are pivoted to the inner disks, and with extensions 21, on which are mounted the movable lugs 22 adapted to engage with the stationary lugs 16. The disk 18<sup>d</sup>, being outside, is not provided with any stationary lug 16, and the disk 18<sup>a</sup>, being adjacent to the bolt 7, is not provided with any movable lug 17. As will be noted, the hub 19<sup>d</sup> of the disk 18<sup>d</sup>, of the tumbler wheel 12<sup>d</sup> is elongated to give it a sufficient bearing for

the key 15. Preferably, washers 17<sup>a</sup> are interposed between the driven tumbler wheels to decrease the friction between them.

The only means of engagement between the tumbler wheels and the revolving bolt 7 is the dog 23, pivoted to the bolt 7 by means of the screw 24 taking through the elongated hub 23<sup>a</sup> of the dog 23. The dog 23 is provided with an arm 25 adapted to engage with the peripheries of all the tumbler wheels, and to engage within slots 26 therein, this engagement being effected by the dropping of the dog 23, of its own weight. It will, of course, be necessary to bring all of the slots 26 of the tumbler wheels in alinement before the arm 25 of the dog 23 can engage within them. This position is illustrated in Figs. 1 and 2 of the drawings. When the arm 25 has thus engaged within the slots 26, the dog 23 will occupy a position low enough to escape engagement with the main stop 27, which is rigidly mounted on the inner side of the lock case 1 adjacent the periphery of the bolt 7, thus permitting the bolt 7 to be revolved. At the same time, the engagement of the arm 25 in the slot 26 of the driving tumbler wheel 12<sup>d</sup> will cause the bolt to revolve with it, while the arm 25, also being engaged within the slots 26 of the other tumbler wheels 12<sup>a</sup>, 12<sup>b</sup> and 12<sup>c</sup>, will cause them to rotate with the tumbler wheel 12<sup>d</sup> and the bolt 7. When the bolt 7 is thus revolved, its lug 6 escapes the projection 5 of the bolt 2, so that the bolt 2 may be thrown backward for unlocking. The bringing of the slots 26 and the tumbler wheels into alinement is effected through the agency of the series of stationary and movable lugs 16 and 22, respectively, which engage progressively upon the rotation of the tumbler spindle 10 and the tumbler wheel 12<sup>d</sup> rigidly mounted thereon. This engagement of the stationary and movable lugs may occur upon rotation of the spindle in either direction. Thus, when one of the stationary lugs 16 comes in contact with one of the movable lugs 22 mounted on the extension 21 of one of the rings 17, the ring 17 is shifted around until its interior surface strikes against the hub, such as 19<sup>c</sup> of the disk 18<sup>c</sup>, when the disk and the tumbler wheel of which it forms a part, will begin to revolve. When the stationary lug 16 first strikes the movable lug 22, the impact can be felt by the hand turning the tumbler spindle 10 by means of the knob. This impact gives a false indication and leads a person to believe that the tumbler wheel has been rotated, when in reality, thus far only the ring 17 has been moved, making it necessary, in order to operate the lock to throw the bolt, to manipulate the tumbler spindle 10 according to a certain formula under the guidance of the dial 28 similar to the manner of operation of permutation locks in general, this formula constituting the combination of the lock.

The changing of the combination of the lock is the purpose of the construction of the tumbler wheels with the inner disks 18<sup>a</sup>, 18<sup>b</sup>, 18<sup>c</sup> and 18<sup>d</sup>, which, allowing them to rotate in the rims 29<sup>a</sup>, 29<sup>b</sup>, 29<sup>c</sup> and 29<sup>d</sup>, respectively, permit the changing of the positions of these inner disks relative to the positions of the slots and to that of the bolt 7 and the dog 23. For holding the rims to rotate with the inner disks or to release the inner disks and allow them to rotate independently of the rims, as may be desired in changing the combination of the lock, binding pins 30 are mounted in the rims with their axes on the chords of the circumferences of said rims, and consequently tangential to the arc of rotation of the tumbler wheels.

The binding pin 30 bears against the concave inner end 31 of the socket 32, in which it is mounted, and is held against endwise displacement therefrom by pins 33 inserted from the periphery of the rim of the tumbler wheel. The other end of the binding pin 30 has the slot 34 adapted to receive the bit 35 of the key 36, which key is provided with a suitable handle 37 for turning the same. This key 36 is inserted into the socket 32 through a key guide 38, one of which is provided for each tumbler, supported at one end in the wall 39 of the lock case 1 and further supported by a bracket 40, mounted on the inside of the lock case by means of screws 41. These key guides are recessed at their ends within the wall of the lock case, as at 42, the recess extending about half way around the wall of the key guide. The key 36 is provided with a lug 43 adapted to come within the recess 42 when the bit 35 of the key has entered the slot 34 of the binding pin. The purpose of the recess 42 and the lug 43 is to guide the key so that its bit 35 will be in position to enter the slot 34 of the binding pin, and so that the key will not be turned too far in operation. Also mounted in the wall 39 and in the bracket 40 above the series of key guides 38, is the plunger 44, provided with a washer 45, between which and the wall 39, is secured a spiral spring 46, tending to force the plunger toward the tumbler wheels. On its inner end the plunger is provided with a bit 47, and the tumbler wheels are provided with radial slots 48, into which this bit 47 may be inserted by the pressure of the spiral spring 46 when all of the slots 48 are brought into alinement. The plunger 44 is held from rotating by means of a pin 49 mounted in the bracket 40 and taking through a slot 50 in the plunger, thus maintaining the bit 47 in a horizontal position ready to enter the slots 48. Outside the wall 39, the plunger is provided with a rotatable head 51, held thereupon by means of a screw 52 and provided with a pin 53, which is adapted to normally restrain the head 51 and the plunger 44, which is attached there-

to, outward against the pressure of the spiral spring 46. The plunger 44 may be allowed to slide inward by rotating the head 51 until the pin 53 comes in alinement with a hole 54 in the part of the wall 39 of the lock case, adjacent to the plunger 44, and which forms a support therefor.

The relative positions of the slots 26, slots 48 and binding pins 30, are exactly alike in all the rims of the tumbler wheels, and are such that the binding pins 30 will come in alinement with the key guides 38, the slots 48 will come in alinement with the bit 47 and the slots 26 will come in alinement with the arm 25 of the dog 23, all at the same time, as shown in Figs. 1 and 2. Thus, when it is desired to change the combination of the lock, it is only necessary to bring the tumblers into unlocking positions, release the plunger 44 and allow the bit 47 to enter the slots 48, insert the key 36 through each of the key guides 38 into each of the binding pins 30, successively, and rotate them the distance allowed under the control of the recess 42 and the lug 43, which will release the inner disks and allow them to rotate independently of the rims. The old combination may then be destroyed and the new combination may be made by manipulating the tumbler spindle according to the new formula desired, guided by the dial 28 as usual. After this has been done, it is only necessary to again insert the key 36 through each key guide into each binding pin, successively, turn them backward and clamp the inner disks into rotative engagement with the rims again. Then the plunger 44 is pulled outward, removing the bit 47 from the slots 48 and allowing the lock to be used with the new combination.

As illustrated in Figs. 3 and 4, it will be noted that my improved revolving bolt may be used directly, where the lug 55 extends outside the lock case 1 through a slot 56 in the projection 57 which is adapted to conform to the contour of the safe door. The other features of this construction are similar to those illustrated in Figs. 1 and 2, except that the changing device is mounted adjacent the lug 55 of the bolt, to adapt it for use on a safe door comprising plates on both sides of the lock case, or any closed construction that does not admit of access to the lock case except on the edge adjacent to the bolt. Also the shapes of some of the parts are slightly modified to adapt them to the construction illustrated. To better facilitate identification of the parts, the same reference numerals are used for the similar parts throughout the drawings. The various parts are here illustrated in locked position, where it will be noted that the bolt 7 will be prevented from rotating by the engagement of the dog 23 with the stop 27.

The peripheries of the inner disks being

notched, as at 58, it is desirable to provide a smoother bearing between the inner disks and the rims, which is accomplished by turning down the peripheries of the inner disks, as at 59 and 60, and providing the inner surfaces of the rim with corresponding annular extensions 61 and 62, so proportioned as to allow the notched peripheries of the inner disks to clear the inner surfaces of the rims and cause the turned down portions of the inner disks and the annular inward extensions of the rims to form journal bearings. In order to permit of the insertion or removal of the inner disks, one of the annular extensions 62 in each rim is provided in the form of a removable ring, as shown in section in Fig. 8. This removable ring is preferably slightly recessed at 63 to allow clearance of the binding pin 30. The notched peripheries of the inner disks are preferably made concave to accommodate them to the binding pins 30, which are provided with one or more lugs 64, corresponding to the notches in the peripheries of the inner disks. Where a single lug is used, as illustrated in Fig. 9, the body of the pin may be a plain cylinder, but when a plurality of lugs are used, as illustrated in Figs. 10 and 11, the pin takes the form of a cylinder provided with the annular lugs and flattened on opposite sides so as to remove portions of these lugs, as at 65. Thus, when the pin is rotated about one-fourth of a revolution, it may engage or disengage to bind or release the inner disk as desired. It will be noted that the single lug will accomplish this purpose practically as well as the plurality of lugs, although the plurality of lugs obviates the necessity of considerable accuracy in adjustment. In order that the binding pin may be maintained in binding position, the parts are so adjusted that the binding pin will fit snugly against the periphery of the inner disk, thus insuring enough friction to accomplish this purpose.

It will be seen that with the construction herein described and illustrated, the necessity for extreme accuracy is largely eliminated, while its simplicity constitutes the further advantage of allowing the parts to be readily assembled or taken apart, thus allowing of increased economy, both in production and maintenance. The compact and simple construction afforded by the use of the revolving bolt, together with the position of the combination changing device adjacent to the lug 55, and therefore most conveniently accessible, make this lock a well adapted one for use on manganese steel and other fire and burglar proof safe doors of heavy, closed construction. For adapting the lock for use under such conditions, it is obvious that the relative position of the changing mechanism to the other parts may be varied, as illustrated in Figs. 3 and 4 of

the drawings, while, as will also be noted, the size and shape of the revolving bolt may be varied to adapt it to different conditions, and being interposed in front of the tumblers as it is, may, when constructed of proper material and in the correct proportions, afford a reinforcement to the outer plate of the safe door to protect the tumblers, and their mechanism against the use of boring tools to open the safe otherwise than by the manipulation of the lock according to the combination.

As will be noted from the above, while I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form and proportion of parts as circumstances may suggest or render expedient without departing from the scope and spirit of my invention.

Having thus fully described my invention, I claim:

1. In a permutation lock, a bolt, a series of rotatably mounted tumbler wheels, operative engaging means between said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims, the inner disks being rotatable in the rims, and binding pins mounted in said rims tangentially of their arc of rotation with convex surfaces presented toward the peripheries of the inner disks and having projections to engage with the peripheries thereof and prevent the turning of the inner disks with respect to the rims, substantially as and for the purposes specified.

2. In a permutation lock, a bolt, a series of rotatably mounted tumbler wheels, operative engaging means between said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims and said disks having notched peripheries adjacent to the inner surfaces of said rims, binding pins mounted in said rims tangentially of their arc of rotation and adapted to engage with the notched peripheries of said inner disks, and means for manipulating said binding pins, substantially as and for the purposes herein set forth.

3. In a permutation lock, the combination with a bolt, of a series of tumbler wheels and a tumbler spindle concentric to which said bolt and said tumbler wheels are rotatably mounted, means for engagement between said tumbler spindle and said tumbler wheels, means for engagement between said tumbler wheels and said bolt, said tumblers comprising inner disks and rims, binding pins mounted in said rims, at right angles to the axis of rotation of said tumbler wheels and said bolt, and constructed to bind or release said inner disks from rotative engagement with said rims, and means for manipulating said binding pins.

4. In a permutation lock, a tumbler

spindle, a tumbler wheel mounted on said tumbler spindle in rotative engagement therewith, additional tumbler wheels mounted concentric to said tumbler spindle, stationary lugs and movable lugs on said tumbler wheels adapted to form rotative engaging means between said tumbler wheels, combination changing mechanisms for said tumbler wheels, and a bolt having operative engaging means with said tumbler wheels and rotatably mounted on said tumbler spindle concentric to said tumbler wheels, and adapted to cover the tumbler wheels, and said rotative engaging means and said combination changing mechanisms, substantially as and for the purposes set forth.

5. In a permutation lock, a bolt, a series of tumbler wheels, means for the operative connection of said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims and said disks having notched peripheries adjacent to the inner surfaces of said rims, and being rotatable therein, binding pins mounted in said rims, a lug on each of said binding pins extending radially therefrom and adapted to engage with the notched peripheries on said inner disks, and means for rotating said binding pins to engage or disengage the lugs with the notches on said inner disks.

6. In a permutation lock, a bolt, a series of tumbler wheels, operative engaging means between said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims, said disks having notched peripheries adjacent to the inner surfaces of said rims, portions of said notched peripheries being turned down, annular extensions on the inner surfaces of said rims adapted to engage with the turned down portions to form journal bearings between said inner disks and said rims, binding pins mounted in said rims adapted to engage with said notched peripheries, and means for manipulating said binding pins.

7. In a permutation lock, a bolt, a series of tumbler wheels, means for operative engagement between said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims, said disks having notched peripheries adjacent to the inner surfaces of said rims, portions of said notched peripheries being turned down and said rims being provided with annular extensions on the inner surfaces thereof adapted to engage within said recesses in said notched peripheries to form journal bearings between said inner disks and said rims, one of said annular extensions being removable from each of said rims, binding pins mounted in said rims and adapted to engage with said notched peripheries, and means for manipulating said binding pins.

8. In a permutation lock, a bolt, a series of rotatably mounted tumbler wheels, means

for the operative connection of said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims, and said disks having notched peripheries adjacent to the inner surfaces of said rims, binding pins rotatably mounted in said rims tangentially of the arc of rotation of said tumbler wheels, means for engagement between said binding pins and the notched peripheries of said inner disks, and means for manipulating said binding pins.

9. In a permutation lock, a rotatably mounted bolt, a series of rotatably mounted tumbler wheels concentric to said bolt, a tumbler spindle concentric to said bolt and said tumbler wheels, means for the operative connection of said tumbler wheels and said bolt, means for the operative connection of said tumbler wheels and said tumbler spindle, said tumbler wheels comprising inner disks and rims, binding pins mounted in said rims tangentially of the arc of rotation of said inner disks and rims and of the arc of rotation of said bolt and tumbler spindle, said binding pins being adapted to form rotative engaging means between said inner disks and said rims, and means for manipulating said binding pins, substantially as and for the purposes herein set forth.

10. In a permutation lock, a bolt, a series of tumbler wheels, means for operative engagement between said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims, said disks having notched peripheries adjacent to the inner surfaces of said rims, binding pins mounted in said rims, adapted to form rotatable engaging means with the notched peripheries of said inner disks and rotatable on axes at an angle to the axis of said tumbler spindle, a key adapted to be inserted to manipulate each of said binding pins, key guides for said key so mounted that said binding pins may be brought into alinement with them by the rotation of said tumbler wheels, and means for the operative connection of said tumbler spindle and said inner disks.

11. In a permutation lock, a bolt, a series of tumbler wheels, means for operative engagement between said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims, said disks having notched peripheries adjacent to the inner surfaces of said rims, binding pins mounted in said rims, adapted to form rotatable engaging means with the notched peripheries of said inner disks, and rotatable on axes at an angle to the axis of said tumbler spindle, a key adapted to be inserted to manipulate each of said binding pins, key guides for said key, having recesses therein, said key being provided with a lug, adapted to limit the turning of said key in manipulating said binding pins, and means for the operative

connection of said tumbler spindle and said inner disks.

12. In a permutation lock, a bolt, a series of tumbler wheels, means for operative engagement between said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims, said disks having notched peripheries adjacent to the inner surfaces of said rims, binding pins mounted in said rims adapted to form rotatable engaging means with the notched peripheries of said inner disks and rotatable on axes at an angle to the axis of said tumbler spindle, a key adapted to be inserted to manipulate each of said binding pins, key guides for said key, so mounted that said binding pins may be brought into alinement with them by the rotation of said tumbler wheels, means for the operative connection of said tumbler spindle and said inner disks, and means for holding said rims stationary when said binding pins have been brought into alinement with said key guides.

13. In a permutation lock, a bolt, a series of tumbler wheels, means for operative engagement between said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims, said disks having notched peripheries adjacent to the inner surfaces of said rims, binding pins mounted in said rims adapted to form rotatable engaging means with the notched peripheries of said inner disks and rotatable on axes at an angle to the axis of said tumbler spindle, a key adapted to be inserted to manipulate each of said binding pins, key guides for said key so mounted that said binding pins may be brought into alinement with them by rotating said tumbler wheels, rotative engaging means between said tumbler spindle and said inner disks, said rims being provided with slots in the peripheries thereof, a spring actuated plunger, a bit mounted on said plunger and adapted to enter said slots to hold said rims stationary, and means for normally restraining said plunger to hold said bit away from the peripheries of said rims.

14. In a permutation lock, a bolt, a series of tumbler wheels, means for operative engagement between said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims, said disks having notched peripheries adjacent to the inner surfaces of said rims, binding pins mounted in said rims, adapted to form rotatable engaging means with the notched peripheries of said inner disks and rotatable on axes at an angle to the axis of said tumbler spindle, a key adapted to be inserted to manipulate each of said binding pins, key guides for said key so mounted that said binding pins may be brought into alinement with them by the rotation of said tumbler wheels, rotative engaging means between said tumbler spindle

and said inner disks, said rims being provided with slots in the peripheries thereof, a bit adapted to engage within said slots to hold said rims stationary when said binding  
5 pins are in alinement with said key guides, a plunger on which said bit is mounted, a bracket in which said plunger is adapted to slide, a spring adapted to force said plunger and said bit toward said rims, and means for  
10 normally holding said bit away from said rims against the pressure of said spring.

15 15. In a permutation lock, a bolt, a series of tumbler wheels, operative engaging means between said tumbler wheels and said bolt, said tumbler wheels being provided with  
changing devices adapted to be manipulated by the insertion of a key at an angle to the axis of said tumbler spindle, said tumbler  
20 wheels being provided with slots in the peripheries thereof, a bit adapted to engage within said slots to hold said tumbler wheels in position for the insertion of said key, a  
plunger on which said bit is mounted, a support in which said plunger is slidably mounted,  
25 a spring adapted to force said plunger and said bit toward said tumbler wheels, a rotatable head on said plunger, a pin in said head adapted to hold said plunger and said  
bit away from said tumbler wheels against  
30 the pressure of said spring, and a recess in said support adapted to receive said pin upon the rotation of said head and allow said bit to engage within said slots in said tumbler  
wheels.

16. In a permutation lock, a bolt, a series  
35 of tumbler wheels, means for operative engagement between said tumbler wheels and said bolt, said tumbler wheels comprising inner disks and rims, said disks having  
notched peripheries adjacent the inner sur-  
40 faces of said rims, binding pins mounted in said rims, a series of lugs on said binding pins adapted to engage with the notched peripheries on said inner disks, said binding pins  
having flattened places, and means for rotat-  
45 ing said binding pins whereby said flattened places may be brought adjacent to said notched peripheries to disengage the peripheries of said inner disks from said binding  
pins. 50

17. In a permutation lock, a bolt, a series  
of tumbler wheels, means for operative en-  
gagement between said tumbler wheels and  
said bolt, said tumbler wheels comprising  
55 inner disks and rims, said disks having notched peripheries adjacent the inner surfaces of said rims, binding pins rotatably mounted in recesses in said rims and bearing  
against the ends of said recesses, pins holding  
said binding pins within said recesses, means  
60 for engagement between said binding pins and the notched peripheries of said inner disks and a key adapted to be inserted into said recesses to rotate said binding pins.

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Witnesses:

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