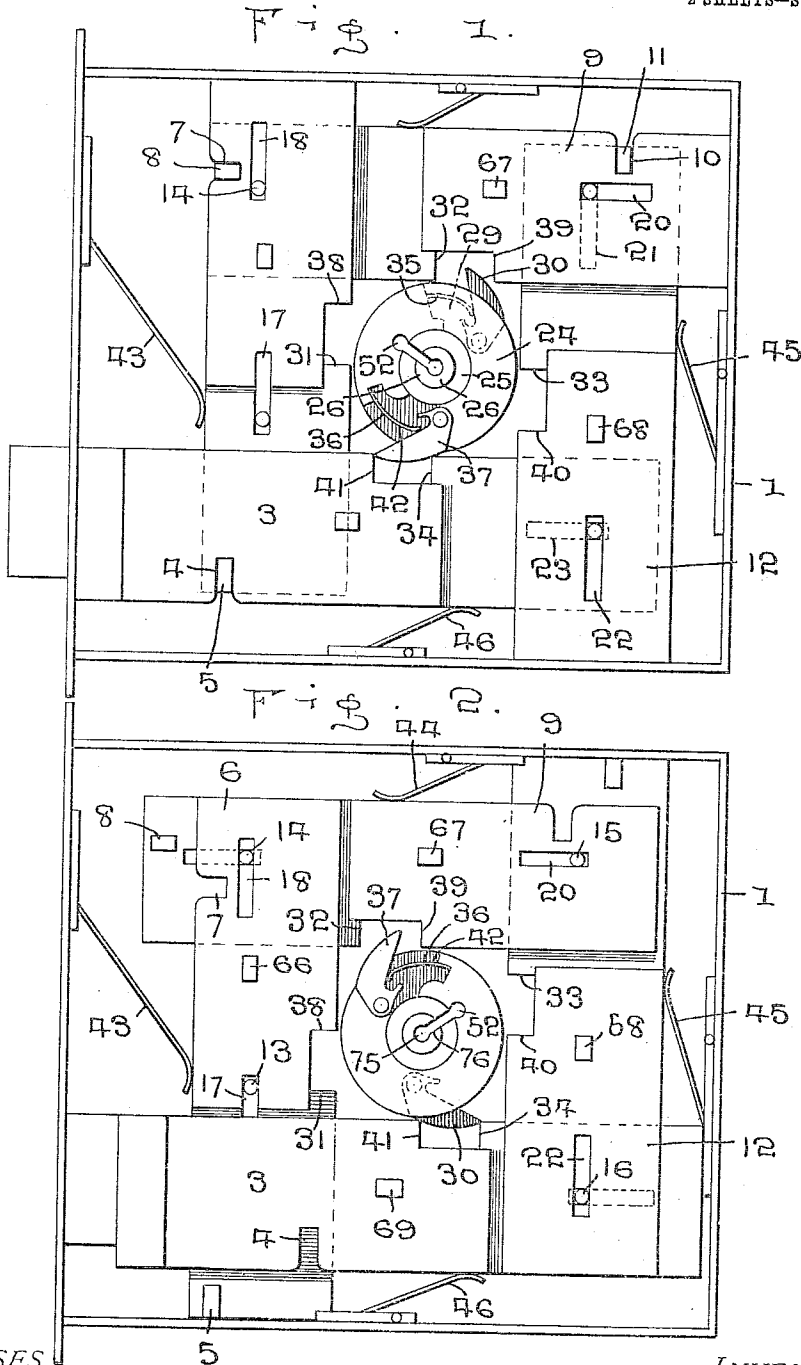


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953,628.

Patented Mar. 29, 1910.

2 SHEETS—SHEET 1.



WITNESSES.

Thos. W. Riley
M. H. Newcomb

INVENTORS
A. Leszczyński
S. Leszczyński

BY

W. J. Fitzgerald & Co.
Attorneys

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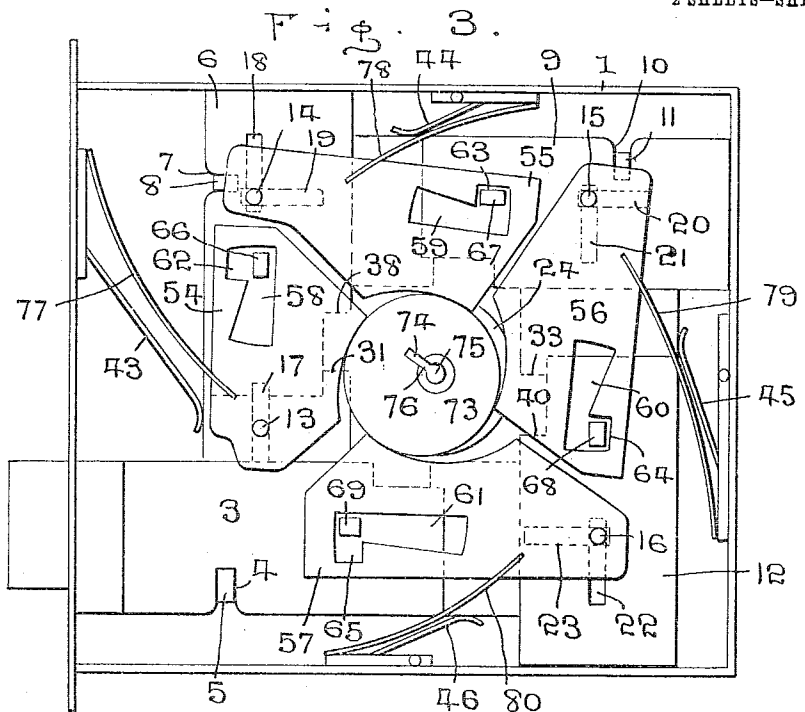


Fig. 5.

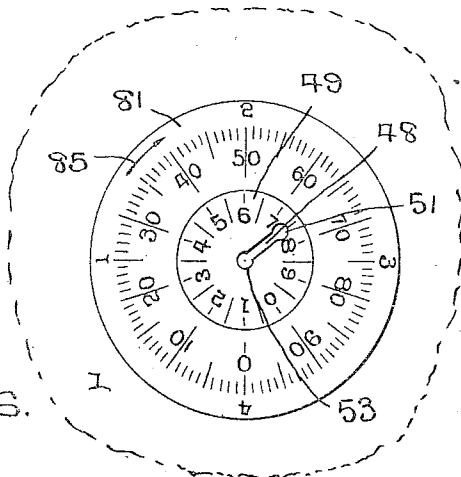
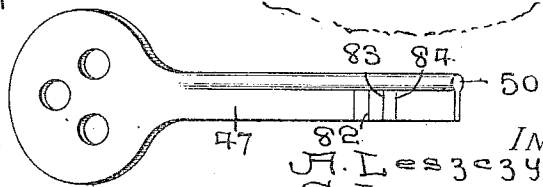
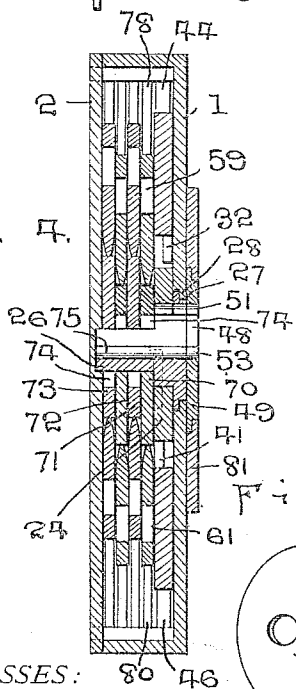


Fig. 4.



WITNESSES:
Thos. W. Riley
M. A. Newcomb.

INVENTORS
A. Leszczynsky
S. Leszczynsky

BY
W. J. FitzGerald
Attorneys

UNITED STATES PATENT OFFICE.

ANTHONY LESZCZYNSKY AND STANY LESZCZYNSKY, OF SHENANDOAH,
PENNSYLVANIA.

COMBINATION-LOCK.

953,628.

Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed August 3, 1909. Serial No. 510,998.

To all whom it may concern:

Be it known that we, ANTHONY LESZCZYNSKY and STANY LESZCZYNSKY, subjects of Nicholas II, Emperor of Russia, residing at Shenandoah, in the county of Schuylkill and State of Pennsylvania, have invented certain new and useful Improvements in Combination-Locks; and we 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.

Our invention relates to new and useful improvements in combination locks and more particularly to that class operated by means of a key and our object is to provide a lock of this class which will require four different operations to properly set the combination.

A further object is to so arrange the parts that it will be necessary to reverse the key in order to release the locking bolt after the parts of the combination have been set, and a further object is to so arrange the locking parts as to require four separate operations or movements of parts in locking or unlocking the bolt.

Other objects and advantages will be hereinafter referred to and more particularly pointed out in the claims.

In the accompanying drawings forming part of this application, Figure 1 is an elevation of the lock showing parts thereof removed and the bolt in its locked position. Fig. 2 is a similar view with the bolt in its unlocked position. Fig. 3 is a similar view with all the parts of the lock assembled. Fig. 4 is a sectional view through the lock with the parts assembled. Fig. 5 is a detail elevation of the face plate of the lock showing the combination graduations thereon, and, Fig. 6 is a perspective view of the key employed for operating the lock.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 1 indicates the casing of the lock, which is constructed in the usual or any preferred manner and 2 indicates the cover therefor, which cover is removably secured over the casing. Positioned within the casing 1 is a locking bolt 3, one end of which is adapted

to protrude through one end wall of the casing and engage any suitable form of keeper. That portion of the bolt within the housing is provided on one of its edges with a notch 4, with which engages a lug 5, carried by a plunger 6, said plunger extending at right angles to the trend of the bolt 3, whereby when the plunger is moved in one direction, the lug will be seated in the notch and removed therefrom when moved in the opposite direction. The plunger 6 is likewise provided with a notch 7, with which engages a lug 8 carried by a plunger 9, said last mentioned plunger extending at right angles to the plunger 6 and at a point adjacent the upper edge of the casing and the plunger 9 is provided with a notch 10 with which engages a lug 11 carried by a plunger 12, said plunger extending at right angles to the bolt 3 and plunger 9. The plungers 6, 9 and 12 are held in their proper position by means of pins 13, 14, 15 and 16, the pin 13 extending through a slot 17 in the plunger 6, the pin 14 through slots 18 and 19 in the plungers 6 and 9, respectively, the pin 15 extending through slots 20 and 21 in the plungers 9 and 12, respectively, while the pin 16 extends through a slot 22 in the plunger 12 and also through a slot 23 in the bolt 3 and as said pins are fixed to the casing 1, the plungers and bolt will be held in proper alinement, but in view of the slots through which the pins extend, may freely move longitudinally.

When the bolt is in its locked position, the various lugs are seated in their respective notches and in order to unlock the bolt, a disk 24 is placed on the interior of the housing, said disk being rotatably mounted around a head 25 having a recess 27 on its under face adapted to cooperate with a ledge 28 on the inner face of the casing 1, thus bringing the bearing portion of the head flush with the inner face of the casing and as said head is stepped to receive the disk 24, said disk will extend over a portion of the head and retain the same in its seated position, when all the parts of the lock are properly assembled. The disk 24 is seated between the various plungers and the locking bolt and has on its under face a recess 29, in which is seated a dog 30,

said dog being pivotally secured in the recess and has its end normally extended beyond the periphery of the disk, whereby when said disk is rotated in one direction, the dog will engage the shoulders 31, 32 and 33 on the plungers 6, 9 and 12, respectively and with a similar shoulder 34 on the locking bolt 3, the dog being normally held in its extended position by means of a spring 35, one end of which is secured to the disk and the opposite end extended into engagement with the dog.

Diametrically opposite the recess 29 and in the opposite face of the disk 24 is a recess 36, in which is pivotally mounted a dog 37 similar to the dog 30, which dog is adapted to be employed for returning the locking bolt and the various plungers to their respective locked positions, said plungers having shoulders 38, 39 and 40, respectively, with which the dog 37 is adapted to engage, while the locking bolt 3 is provided with a shoulder 41, said dogs being so arranged that when the disk is rotated in one direction, one of the dogs will engage its respective shoulders, while the opposite dog will spring inwardly and pass its respective shoulders, the dog 37 being normally held in its extended position by means of a spring 42. In unlocking the bolt, the dog 30 is first engaged with the shoulder 33 and the disk rotated until the lug 11 is moved out of engagement with the notch 10, a continued rotation of the disk successively engaging the dog with the shoulders 32 and 31 and disengaging the lugs 8 and 5 from the notches 7 and 4, respectively, thereby releasing the locking bolt so that when the dog 30 is moved into engagement with the shoulder 34, the locking bolt will be moved into the lock and released from its keeper, the plungers 6, 9 and 12 and the locking bolt 3 being held against casual longitudinal movement by means of springs 43, 44, 45 and 46, respectively, which springs direct pressure against the edges of the plungers and locking the bolt.

The disk 24 is operated through the medium of a key 47, which key is introduced through a slot 48 in a key plate 49, said slot extending from the axial center of the key plate toward one edge thereof, one edge of the key having a circular rib 50 thereon, which is adapted to enter a circular seat 51 at the outer end of the slot 48 and engage a similarly constructed seat 52 in the inner edge of the disk 24, the opposite end of the slot 48 being provided with a seat 53 for the reception of the rib 50. The various plungers and the locking bolt are further held in their locked positions by a series of latches 54, 55, 56 and 57, there being preferably four latches in each series, said latches having registering slots 58, 59, 60 and 61, respectively therein, the outer ends of said

slots having lateral extensions 62, 63, 64, and 65, respectively, said slots and extensions being adapted to receive standards 66, 67, 68 and 69, respectively, on the plungers 6, 9 and 12 and the locking bolt 3.

When the bolt 3 is in its locked position, the various standards are engaged with the respective lateral extensions of the slots in the latches and in order to permit the plungers and bolt to be moved longitudinally, a plurality of tumblers 70, 71, 72 and 73, are employed, which tumblers are equal in number to the number of latches in each series and are rotatably mounted around the key shaft 26, said tumblers being preferably arranged eccentric to the axis of the key shaft and each tumbler is provided with a way 74 for the reception of the blade portion of the key 47, the key shaft 26 having a bore 75 therethrough to receive the rib 50 of the key and an intersecting way 76 adapted to cooperate with the ways 74 in the tumblers. The series of latches are pivotally mounted, respectively, on the pins 13, 14, 15 and 16, and the inner edges thereof are forced into engagement with the tumblers by means of springs 77, 78, 79 and 80, respectively, there being a spring for each of the latches, the inner ends of which are engaged with the latches while the outer ends thereof press against the walls of the casing, and hold the inner edges of the latches firmly seated against their respective tumblers.

When the tumblers are concentric or in registration with each other, the ways 74 are out of registration and in order to operate the lock to release the bolt from its keeper, the key 47 is introduced into the slot 48 with the rib 50 in registration with the slot 53 and the key then turned until all of the ways in the four tumblers are brought into registration with each other and the blade of the key entered therein, this operation extending the key entirely through all of the tumblers. One set of the combination numbers and graduations are placed upon a dial 81, which surrounds the key plate 49, while the cooperating numbers and graduations on the key plate 49 and for illustration, the numbers 10—30—60—80 on the dial and 2—6—7—5 on the key plate are used to set the tumblers to release the plunger 12.

In operation, the key plate is rotated until the numeral 2 is brought into registration with the numeral 10, when the key is moved outwardly until the registering mark 82 on the blade of the key comes in registration with the outer face of the key plate 49, when the key is again rotated until the numeral 6 thereon is registered with the numeral 30 on the dial, when the key is again moved outwardly until the mark 83 registers with the outer face of the key plate and the parts rotated until the numeral 7 regis-

ters with the numeral 60, when the key is again moved outwardly until the mark 84 thereon registers with the outer face of the key plate, when said plate is again rotated until the numeral 5 thereon registers with the numeral 80, this operation bringing all of the tumblers into registration with each other and with their cammed portions pressing against the four latches 56, swinging said latches outwardly and bringing the standard 68 into the path of the slots 60, thus permitting the plunger 12 to be moved longitudinally. The width of the key is such that when the rib is in engagement with the seat 53, the key will not engage the disk 24 and in order to rotate said disk and cause the dog to move the plunger 12 longitudinally, the key is removed and again introduced into the slot 48 with the rib entering the seat 51, the key seat being then rotated until the rib on the key enters the seat 52 in the disk, when by rotating the key in the direction indicated by the arrow 85 on the dial 81, the dog 30 will be moved into engagement with the shoulder 33 and the plunger 12 moved longitudinally until the lug 11 is disengaged from the notch 10. The key is then removed from the lock and again introduced thereinto with the rib engaging the seat 53, when the same operation is performed in setting the tumblers as in the first instance, using different combination numerals and so on until the remaining plungers have been released and operated and the bolt moved into the lock, and when it is desired to again move the parts of the lock to their locked position, the key is introduced with the rib portion in engagement with the seat 51 and the key plate and disk rotated in the opposite direction from that indicated by the arrow, which will move the dog 37 into engagement with the shoulder 41 and move the locking bolt to its outward position, and by a continuous rotation said dog 37 will be successively brought into engagement with the shoulders 38, 39, and 40 of the plungers 6, 9 and 12, and said plungers returned to their initial position, thereby securely holding the bolt in its locked position. In this manner it will be seen that it will require four separate and distinct operations to release the locking bolt and if desired each set of numbers required to operate the combination may be given to a different person, thereby requiring four persons to operate the lock, the person having the first set of numerals releasing the plunger 12, the second the plunger 9, the third the plunger 6 and the fourth the bolt 3 and it will be readily seen that the absence of anyone of the persons will prevent the opening of the lock. It will be clearly understood of course, that one person can operate the lock by being familiar with all the combinations required to release each

set of latches or two of the combinations may be given to one person and two to another, or in fact, they may be divided up in any suitable manner. After the disk has been operated to return the locking bolt and various plungers to their locked positions, the key is removed from the lock and again introduced into the slot 48 with the rib 50 engaging the seat 53 and the parts then turned until the key is seated its full distance into the lock, thus scattering the various combinations and it will be readily seen that the springs attached to the latches will cause the latches to swing inwardly and seat the standards in the lateral extensions at the ends of the slots in the latches.

What we claim is:

1. In a lock, the combination with a bolt and a plurality of interlocking plungers, one of said plungers being interlockable with the bolt; of means to normally hold said bolt and plungers against longitudinal movement, means to release said plungers one at a time and additional means to move said plungers and bolt to locking or unlocking position.

2. In a lock, the combination with a bolt, a plurality of interlocking plungers, one of which is adapted to interlock with the bolt, a series of latches for the bolt and each plunger and means cooperating with the latches to normally hold the bolt and plungers against longitudinal movement; of means to operate the series of latches one at a time and successively release the plungers and bolt and additional means to successively engage the plungers and bolt to lock or unlock the same.

3. In a lock, the combination with a bolt and a plurality of plungers cooperating therewith, standards on said bolt and plungers; of a series of latches for the bolt and each of the plungers, said latches having registering slots and lateral extensions at the ends of the slots in which said standards are adapted to be seated, means to move the series of latches outwardly and enter the standards in the slots proper and additional means to move said plungers and bolt longitudinally to lock or unlock the same.

4. In a lock, the combination with a locking bolt, a plurality of plungers cooperating therewith, latches for said bolt and plungers, said latches being adapted to normally hold the bolt and plungers against movement in one direction; of tumblers engaged by said latches, means to set the plungers to operate the latches and release the locking bolt and plungers and means to move said plungers and bolt longitudinally when released by the latches.

5. In a lock, the combination with a bolt, a plurality of plungers cooperating with said bolt, latches to normally hold said plungers and bolt against longitudinal movement, said

latches being arranged in series and a plurality of tumblers cooperating with each series of latches; of a key adapted to operate said tumblers to release the plungers and cooperating graduated members to indicate the position of said tumblers when being operated to release the latches.

In testimony whereof we have signed our

names to this specification in the presence of two subscribing witnesses.

ANTHONY LESZCZYNSKY.
STANY LESZCZYNSKY.

Witnesses:

LUKE M. KAZUNAS,
JOS. RYNDNEWICZ.