Sept. 18, 1928. 1,684,908

F. O. BRUNELLE

LOCK

Filed Nov. 13, 1926

Fig. 1.

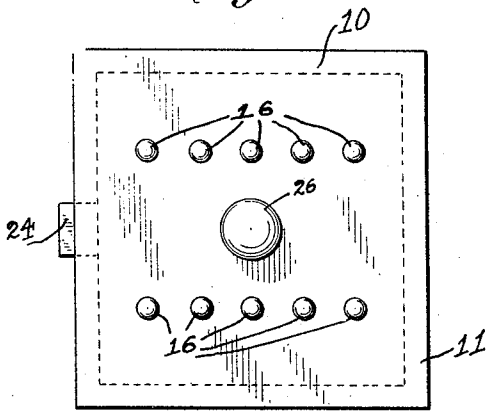


Fig. 2.

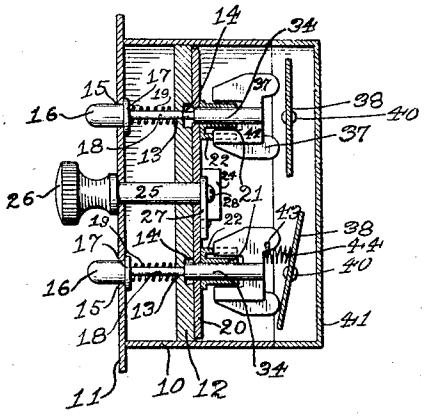


Fig. 3.

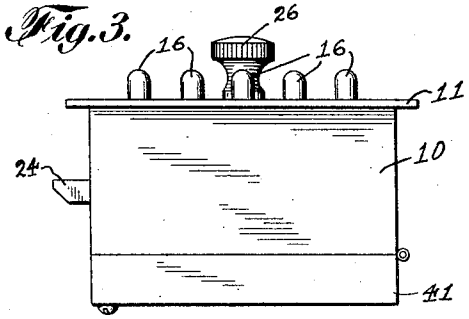


Fig. 5.

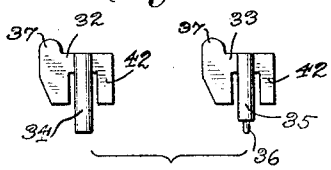
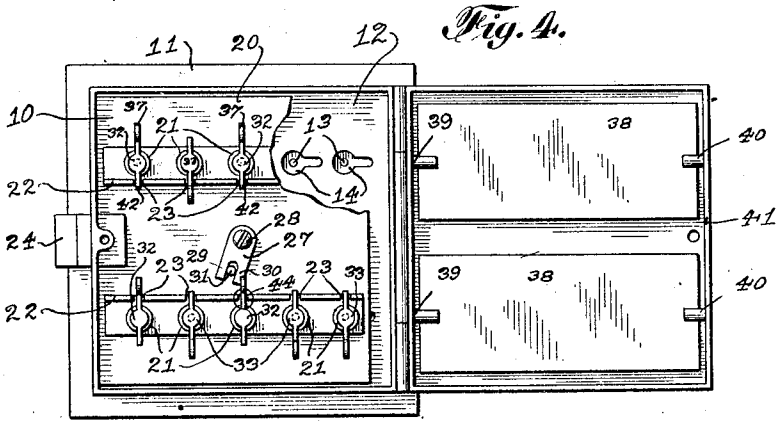


Fig. 4.



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UNITED STATES PATENT OFFICE.

FRANK O. BRUNELLE, OF MERIDEN, CONNECTICUT.

LOCK.

Application filed November 13, 1926. Serial No. 148,207.

This invention relates to locks, and more particularly to combination locks especially adapted for use on doors, safes, automobile ignition systems, etc.

One object of this invention is to provide a combination lock which cannot be operated unless the combination is known, and which will be automatically re-locked when the unlocking tumblers are released.

A further object is to provide a lock of the above nature in which the combination may be readily changed whenever desired.

A further object is to provide a lock of this nature, which will be relatively simple in construction, easy to manipulate, compact, ornamental in appearance, and very efficient and durable in use.

With these and other objects in view there has been illustrated on the accompanying drawings one form in which the invention may be conveniently embodied in practice.

Fig. 1 represents a front elevation of such a lock.

Fig. 2 is a side sectional view of the same.

Fig. 3 is an end view of the lock.

Fig. 4 is a front view of the lock with certain parts broken away and showing its appearance when the cover of the casing is open.

Fig. 5 is a side view of two of the tumbler elements employed in the lock mechanism.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, the numeral 10 indicates a casing, preferably rectangular in general outline and having a flanged top plate 11.

The interior of the casing is divided into two compartments by a partition 12 having a plurality of circular apertures 13 on the side toward the flanged top plate 11. The rear face of the partition is provided with a plurality of keyhole shaped recesses 14, the circular parts of which are in alinement and concentric with the circular apertures 13, said recesses being preferably arranged in two parallel rows at the top and bottom of the partition.

In order to permit the lock to be operated, the flanged top plate 11 is provided with two rows of apertures 15 corresponding to and in alinement with the apertures 13 in the partition, and being adapted to receive a plurality of operating keys or push buttons 16 extending outwardly through said flanged top plate 11. The rear of the buttons 16 are provided with flanges 17 underlying the plate 11, said buttons having a plurality of reduced pins 18 extending rearwardly through the circular apertures 13. The pins 18 are surrounded by spiral springs 19 which serve to normally press the buttons 16 outwardly at all times.

A sliding locking plate 20 is mounted in the casing in contact with the rear face of the partition 12, and said plate 20 is provided with two rows of rearwardly extending sleeves 21. The sleeves 21 correspond to and are adapted to aline with the circular holes 13 in the partition 12 when the sliding plate 20 is in locked position. The sliding plate 20 is provided at one end with a locking bolt 24 of usual standard construction and adapted to engage a keeper as on a door.

Between the two rows of sleeves 21, provision is made of a pair of parallel spaced ribs 22, said ribs having slots 23 for a purpose to be hereinafter described.

In order to slide the locking plate back and forth across the partition 12, provision is made of an operating spindle 25 having one end extending forwardly through the top plate 11 and terminating into a knurled hand knob 26. The other end of the spindle 25 is journaled in the partition 12 and extends rearwardly for a short distance through the sliding plate 20.

In order to cause the plate 20 to slide back and forth when the knob 26 is rotated, the projecting end of the spindle 25 has a forked member 27 rigidly secured thereon, as by means of a screw 28, and said forked member is provided with a pair of parallel arms 29 and 30 slidably fitted about a pin 31 rigidly secured on the sliding plate 20.

Slidably mounted within the sleeves 21 are a plurality of active tumbler members 32 and idle tumblers 33, the former being of somewhat different construction from the latter. As clearly shown in Fig. 5, the active tumblers 32 have cylindrical rods 34 adapted to fit within the sleeves 21 and being of uniform diameter throughout their lengths. The idle tumblers 33, on the other hand, are similarly provided with cylindrical rods 35 fitting within the sleeves 21, but the rods 35 are shorter in length than the rods 34 of the tumblers 32, said short rods 35 terminating in short reduced sections or pins 36, as clearly shown in Fig. 5.

By means of this construction, it will be seen that the active tumblers 32 will serve to lock the sliding plate 20 together with its locking bolt 24 against withdrawal whenever

the tumblers 32 are positioned within the circular recesses 14 or at the left, as viewed in Fig. 2.

It will also be noticed that the idle tumblers 33 by reason of their reduced ends or pins 36 can at no time serve any locking function, as the pins 36 are capable of sliding out of the circular portions and into the narrow side slots of the key-hole rescesses 14 at all times.

Both sets of tumblers 32 and 33 are provided on one side of the central rods 34 and 35 with downwardly and upwardly extending webs 37, said webs 37 being curved at their upper edges to engage with a pair of wing plates 38 pivoted at 39 and 40 respectively within a cover 41 hinged to the casing 10 at the rear of the lock.

The tumblers 32 and 33 are also provided with downwardly extending webs 42 at the side of the rods 34 and 35 opposite from the webs 37, said webs 42 being adapted to fit within the slots 23 of the ribs 22 previously mentioned, for the purpose of maintaining the tumbler members in proper position parallel to each other. All of the active tumblers 32 are arranged with their webs 37 above the the webs 42, while the idle tumblers 33 are arranged with the webs 37 below the webs 42. The web 37 of one of the tumblers 32, as clearly shown in Fig. 2, is provided with an aperture 43 for connection to one end of a spiral spring 44, the other end of said spring being adapted to continuously press against the upper part of the lower wing plate 38.

In operation, when it is desired to unlock the door or other device upon which the lock has been installed, the person knowing the combination will push in the particular buttons 16 corresponding to the active tumblers 32, and those buttons only. This operation will move the active tumblers 32 out of locking engagement with the key-hole recesses of the partition 12, and while holding the particular button 16 corresponding to the spring-pressed tumbler 32 against the tension of the spring 44, it will be easy for the operator to withdraw the bolt by turning the knob 26.

In case the operator by mistake should press one of the buttons 16 of the upper row corresponding to an idle tumbler 33, the web 37 of said idle tumbler 33 will engage the lower half of the wing member 38, and cause it to swing about its pivots 39 and 40. The upper half of said wing member will then engage the webs 37 of all the active tumblers 32 of said upper row which are in unlocked position and push said tumblers back into locked position.

It will be understood that during the unlocking operation, it will be necessary to hold the button 16 corresponding to the spring-pressed tumbler 32 inwardly, as otherwise the spring 44 would push said tumbler back into its locking recess and prevent withdrawal of the bolt 24 when the hand knob 26 is operated.

When it is desired to again lock the mechanism, it will only be necessary for the operator to turn the knob 26 in the opposite direction which will cause the bolt to slide into locked position. This operation will bring the rods 34 of the active tumblers 32 into alinement with the circular sections of the key-hole recesses 14, at which time the spring 44 will force its associated tumbler 32 into locked position, thereby securing the bolt against withdrawal.

In order to more completely safeguard the combination lock, the operator should then push in one button of each of the upper and lower sets corresponding to the idle tumblers 33. The webs 37 will then move the wing plates 38 about their pivots and force the rods 34 of all of the active tumblers 32 into their locking recesses.

It will be understood that the combination of this lock may be readily changed whenever desired merely by rearranging the positions of the active and idle tumblers in the locking plate.

It will also be understood that the spring 44 is used merely to provide an additional safeguard and may be omitted if desired.

While there has been disclosed in this specification one form in which the invention may be embodied, it is to be understood that this form is shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosure but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claims.

Having thus fully described the invention, what is claimed as new, and for which it is desired to secure Letters Patent, is:

1. In a combination lock, a casing, a locking plate slidable in said casing, said plate having a locking bolt for engaging a keeper, said plate carrying a spring-pressed slidable tumbler, said tumbler being normally in locking engagement with said casing, a slidable button on said casing for engaging said tumbler and forcing it out of locking engagement with said casing, and means for sliding said plate thereafter to withdraw said bolt from its keeper while holding the said tumbler in unlocked position.

2. In a combination lock, a casing, a locking plate slidable in said casing, said plate having a locking bolt for engaging a keeper, said plate carrying an active slidable tumbler which is normally in locking engagement with said casing, said plate also carrying an idle slidable tumbler which is always free from engagement with said casing, means for disengaging said active tumbler from said cas-

ing to permit said plate to be moved to unlocked position, and means adapted to be engaged by said idle tumbler for forcing said active tumbler back into locked position, said tumblers being movable with said plate when in unlocked position.

3. In a combination lock, a casing, a locking plate slidable in said casing, said plate having a locking bolt for engaging a keeper, said plate carrying an active slidable tumbler which is normally in locking engagement with a partition on said casing, said plate also carrying an idle slidable tumbler which is always free from engagement with said casing, means for disengaging said active tumbler from said casing to permit said plate to be moved to unlocked position, and means adapted to be engaged by said idle tumbler for forcing said active tumbler back into locked position, said tumblers being movable with said plate when in unlocked position.

4. In a combination lock, a casing, a locking plate slidable in said casing, said plate having a locking bolt for engaging a keeper, said plate carrying an active slidable tumbler which is normally in locking engagement with a partition on said casing, said plate also carrying an idle slidable tumbler which is always free from engagement with said casing, means for disengaging said active tumbler from said casing to permit said plate to be moved to unlocked position, and means adapted to be engaged by said idle tumbler for forcing said active tumbler back into locked position, said partition having a key-hole recess in alinement with said idle tumbler for engaging said active tumbler when in locked position, said idle tumbler having a reduced end which is adapted to slide into the side slot of said key-hole recess when the locking plate is moved.

5. In a combination lock, a casing, a locking plate slidable in said casing, said plate having a locking bolt for engaging a keeper, said plate carrying a plurality of active sliding tumblers normally in locking engagement with said casing, said plate also carrying a plurality of idle sliding tumblers always out of engagement with said casing, means for disengaging said active tumblers from said casing, and means operated by the actuation of one of said idle tumblers for re-engaging all of said active tumblers with said casing, said tumblers being movable with said plate when in unlocked position.

6. In a combination lock, a casing, a locking plate slidable in said casing, said plate having a locking bolt for engaging a keeper, said plate carrying a plurality of active sliding tumblers normally in locking engagement with said casing, said plate also carrying a plurality of idle sliding tumblers always out of engagement with said casing, means for disengaging said active tumblers from said casing, and a wing plate operated by the actuation of one of said idle tumblers for re-engaging all of said active tumblers with said casing.

7. In a combination lock, a casing, a locking plate slidable in said casing, said plate having a locking bolt for engaging a keeper, said plate carrying a plurality of active sliding tumblers normally in locking engagement with said casing, said plate also carrying a plurality of idle sliding tumblers, and spring-pressed means for automatically returning all of said active tumblers into engagement with said casing when said active tumblers are released, said tumblers being movable with said plate when in unlocked position.

8. In a combination lock, a casing, a locking plate slidable in said casing, said plate having a locking bolt for engaging a keeper, said plate carrying a plurality of active sliding tumblers normally in locking engagement with said casing, said plate also carrying a plurality of idle sliding tumblers which are free from engagement with said casing at all times, and means for causing said active tumblers to be moved to locked position when any one of said idle tumblers is operated, said tumblers being movable with said plate when in unlocked position.

In testimony whereof, I have affixed my signature to this specification.

FRANK O. BRUNELLE.