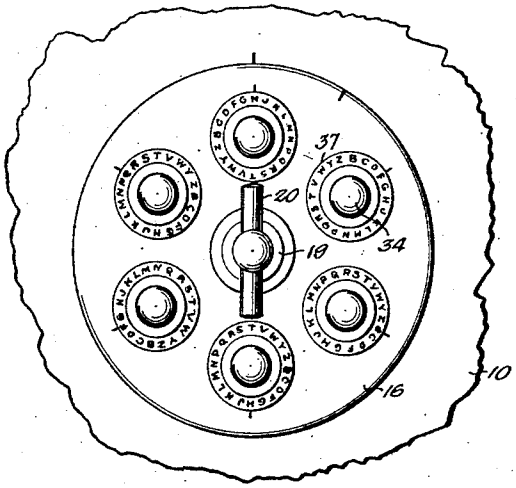
Dec. 22, 1925. 1,566,829

F. CLARK

COMBINATION LOCK

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Fig. 1.



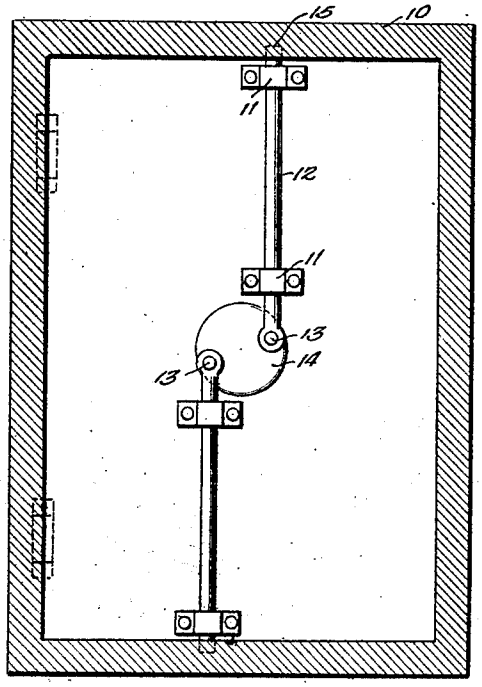


Fig. 6.

WITNESSES

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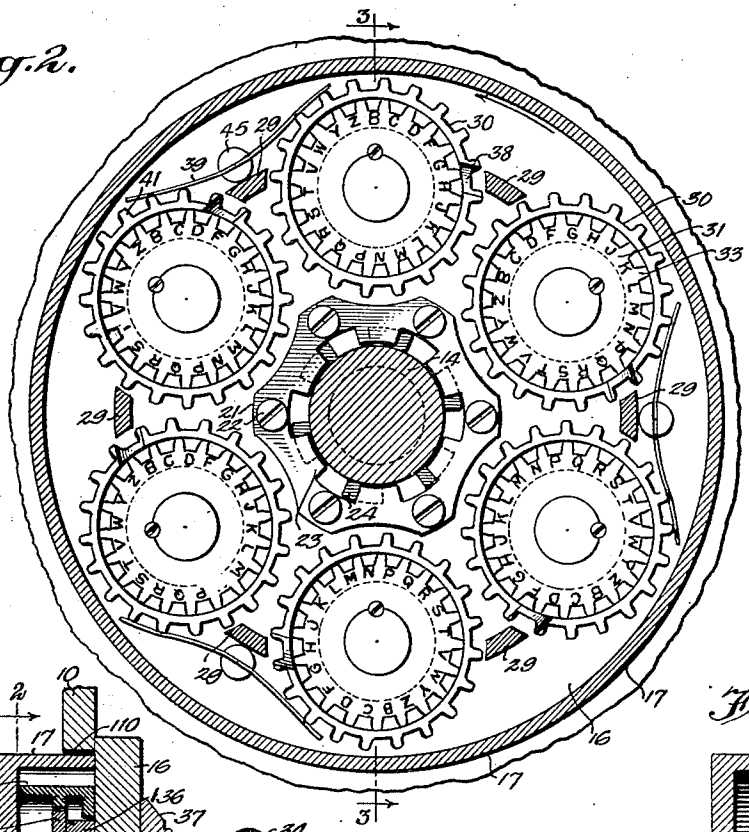
Dec. 22, 1925. 1,566,829

F. CLARK

COMBINATION LOCK

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Fig. 2.



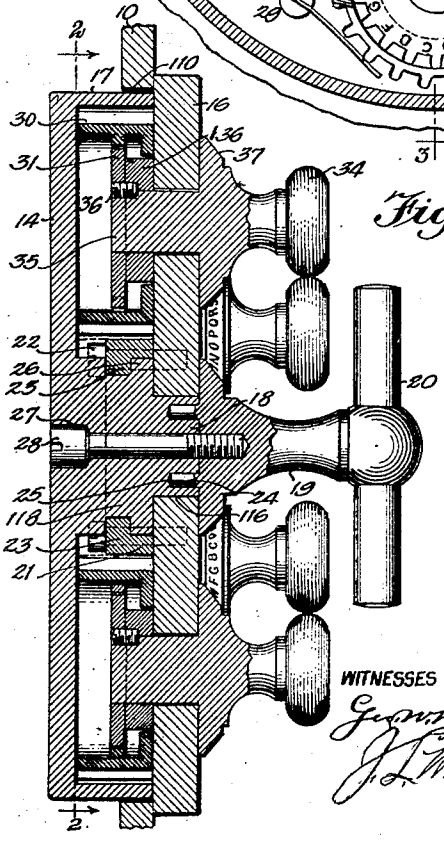


Fig. 3.

Fig. 4.

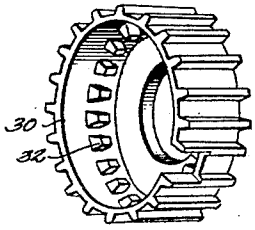
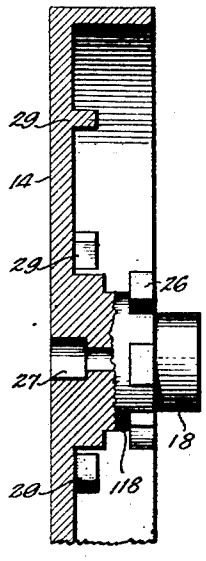


Fig. 5.



WITNESSES

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Patented Dec. 22, 1925. 1,566,829

UNITED STATES PATENT OFFICE.

FRANCISCO CLARK, OF DURANGO, MEXICO.

COMBINATION LOCK.

Application filed February 12, 1924. Serial No. 692,398.

To all whom it may concern:

Be it known that I, FRANCISCO CLARK, a citizen of Mexico, and a resident of Durango, Mexico, have invented a new and Improved Combination Lock, of which the following is a description.

My invention relates to a combination lock for safes and other structures, in which a plurality of tumblers is required to be arranged in a given order to permit the lock to be operated.

The general object of my invention is to provide a combination lock improved in various particulars especially with respect to the form of the individual tumblers and the tumbler assemblage having in view the effective guarding of the lock against tamperers.

A specific object of the invention is to provide a tumbler assemblage making for compactness and simplicity.

The means whereby the above and other objects as will appear are attained will be readily understood from the specific description following.

Reference is to be had to the accompanying drawings forming a part of this specification, it being understood that the drawings are merely illustrative of one example of the invention.

Figure 1 is a front elevation of a combination lock embodying my invention;

Figure 2 is a section on the line 2—2 of Figure 3;

Figure 3 is a transverse vertical section as indicated by the line 3—3, Figure 2;

Figure 4 is a perspective view of the tumbler ring or shell;

Figure 5 is a fragmentary view in vertical section of the turnable lock-operating disk;

Figure 6 is an elevation of the bolt assemblage with the safe structure in section.

In the illustrated example the numeral 10 indicates a safe or like structure having an opening 110 in which my improved lock is fitted. The lock bolts 12 are movable in opposite directions for locking and unlocking and have guided movement in suitable keepers 11. The bolts 12 are pivoted at their adjacent ends as at 13 to a bolt-operating disk 14 which serves to reciprocate the bolts into recesses 15 in the structure 10 or to withdraw the bolts from said recesses.

In accordance with my invention the lock has a base plate 16 mounting the operable parts. The disk 14 is spaced from the back of the plate 16 and contacts with the back of the latter, said turnable disk 14 and its flange 17 with the base plate 16 forming a housing for the tumblers as will appear. A hub or boss 18 formed on the disk 14 extends forwardly through a central opening or bore 116 in the base plate 16. At the inner periphery of the element 21 spaced tooth-like projections 23 are formed. A handle 20 is provided for turning the bolt operating disk or member 14 and on the inner face of the shank 19 of said handle are pins 24 received in blind pin holes 25 formed in the front face of the boss 18.

On the periphery of the boss 18 at an enlarged zone 118 thereof, an annular series of tooth-like projections 26 are provided which are adapted to pass through the spaces between projections 23 and to be entered beneath said projections 23 by a slight turning movement of disk 14 and its hub 18, whereby to hold the disk 14 in interlocked engagement with the disk 16 to prevent displacement of said disk 14. A screw 28 passes centrally through the disk 14 and its boss 18 and into the shank 19 of central handle 20, the screw being accommodated in a counter-sunk hole made axially through the disk 14 and its said hub.

On the inner face of the disk 14 at regular intervals are projections or wards 29 to coact with the tumbler assemblage as follows: An annular series of tumblers 30 is provided on the base 16 each on a separate axis, the said tumblers being disposed on the base 16 laterally outward of the boss 18 and handle 20. The tumblers 30 are cylindrical and composed of an outer shell and an inner disk 31. The shell of the tumbler 30 has internally an annular series of teeth 32 and the disk 31 has a corresponding series of teeth 33 fitting the interdental spaces between the teeth 32. The disks 31 bear an annular series of consonants only, all vowels being omitted. A turning knob 34 is provided for each tumbler 30, the shank 35 thereof extending through the base plate 16 and suitably fastened to disk 31 as by set screw 36 entering partially into the shank 35 and partially into said disk 31. The numeral 136 indicates a washer or spacing ring between base plate 16 and each disk 31. The shank of each turning knob 34 or equivalent handle on the tumblers 30 has a dial 37 at the front of the base plate 16,

said dials bearing consonant letters corresponding with and in the same relation as the letters on the disk 31. In the flange of the outer shell of each tumbler 30 is formed a transverse cut-out or opening 38 which permits the entrance of the adjacent projection 29 whenever said cut-out is presented to said projection as shown in Figure 2. Hence, the disk 14 may be turned by the handle 20 to a limited extent so that the turning of said disk will project the bolts 12 into the recesses 15 or withdraw said bolts from the recesses.

The disk 31 of each tumbler 30 may be removed, given a partial turn, and then replaced to bring any one of the consonant letters on said disk adjacent the cut-out 38 of the tumbler to thereby change the combination as may be desired. Dial 37 determines when the particular letter on said disk adjacent the cut-out 38 is in line with the adjacent projection 29 on disk 14. It will be readily understood that until all the tumblers 30 present their cut-outs 38 to the wards or projections 29 the disk 14 cannot be turned since the engagement of any particular ward 29 with the periphery of a tumbler will prevent the turning of a disk 14 to operate the bolts 12.

To prevent undue movement of the tumblers in response to the turning of knobs 34 I provide friction springs 39 held to studs 45 on plate 16 and bearing by their ends against the respective tumblers at the periphery. For effective engagement of the springs 39 the tumblers 30 are formed with an annular series of peripheral teeth 41.

In practice any code word may be adopted having consonants equalling the number of tumblers. It will be readily understood that the number of tumblers may be varied there being six employed in the illustrated example. On the base 16 adjacent to each tumbler is a mark into line with which the letter for which that particular tumbler is set may be brought and the base 16 and the structure 10 have correlated marks to be brought into alinement to indicate the unlocked position of the bolts 12. "Manipulated" is an example of a word that may be employed for an assemblage involving six tumblers, said word having the six separate consonants m—n—p—l—t—d. The respective tumblers 30 will be set by a proper disposition of the disk 31 thereof to bring one of the consonants in "manipulated" adjacent to the cut-out 38. When the respective selected letters and the cut-outs 38 are presented to the projections 29 by the turning of the knobs 34 as determined by the dials 37, the bolt operating disk or member 14 may be given a limited turning movement by the handle 20, by reason of the projections 29 being permitted to enter and pass into the respective cut-outs 38. In all other positions of the tumblers 30 the flange of the outer shell is uninterrupted and offers a barrier to the projections 29 and therefore opposes turning movement of the bolt-operating member 14.

I would state in conclusion that while the illustrated example constitutes a practical embodiment of my invention, I do not limit myself strictly to the exact details herein illustrated, since, manifestly, the same can be considerably varied without departure from the spirit of the invention as defined in the appended claim.

Having thus described my invention, I claim:

A combination lock including a base plate having an approximately central opening, a turnable bolt operating member disposed at the back of the plate and having a hub extending through said opening, a handle attached to said hub at the front of the base plate, a ring-like element on the base plate at the back and having an annular series of spaced tooth-like projections, members on said hub adapted to pass through the spaces between said projections and adapted to move to the back of the said projections by a turning of the bolt-operating member, a series of tumblers, and means on the tumblers to oppose or to permit the turning of said bolt-operating member.

FRANCISCO CLARK.