Dec. 17, 1957 H. A. BEAUREGARD 2,816,432

COMBINATION LOCK FOR WALL SAFES AND THE LIKE

Filed Oct. 10, 1955

Fig. 1.

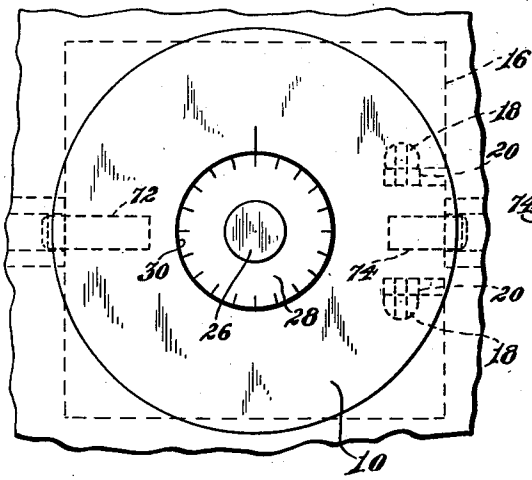


Fig. 2.

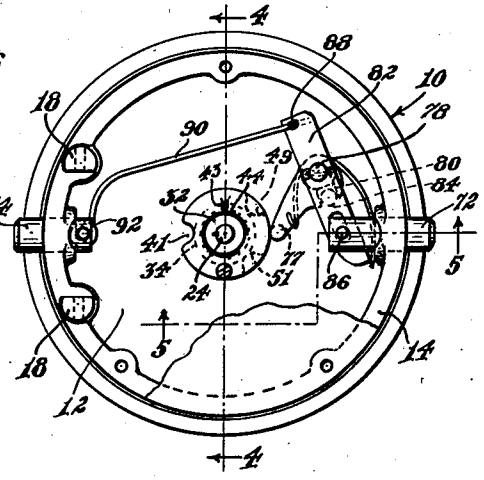


Fig. 4.

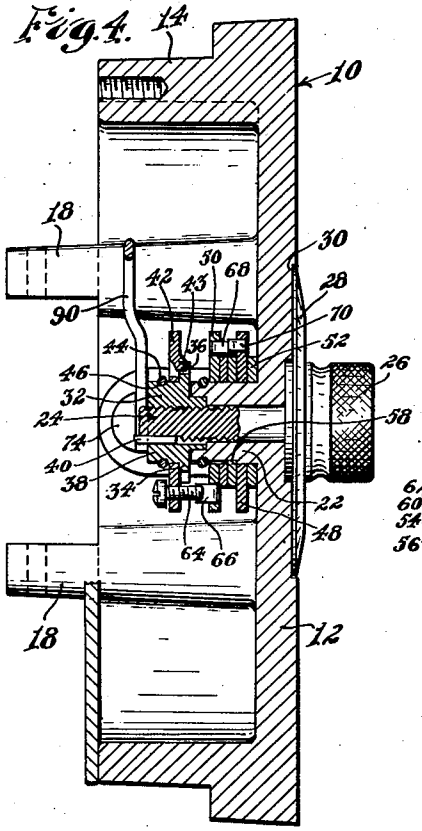
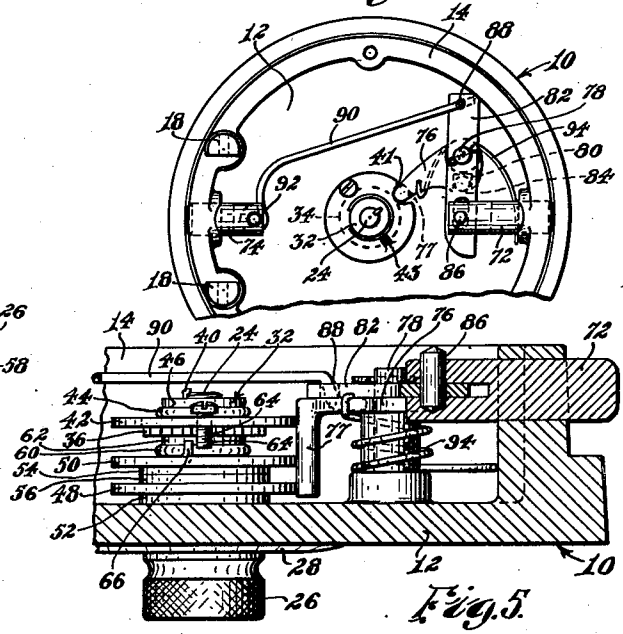


Fig. 5.



Inventor
Horace A. Beauregard
By John H. McKenna
Attorney

United States Patent Office

2,816,432

Patented Dec. 17, 1957

2,816,432

COMBINATION LOCK FOR WALL SAFES AND THE LIKE

Horace A. Beauregard, Dorchester, Mass.

Application October 10, 1955, Serial No. 539,639

4 Claims. (Cl. 70—156)

This invention relates to improvements in wall safes and the like. More particularly, the invention provides improved combination locking mechanism, for wall safes and the like, which is highly effective and efficient in operation yet substantially simplified as compared with any of the prior comparable safe-locking mechanisms of which I am aware.

It is an object of my invention to provide a combination lock for wall safes and the like wherein relatively inexpensive parts may be relatively quickly and easily assembled as compared with the prior comparable safe-locking mechanisms.

Another object of the invention is to provide a simple yet effective linkage connection between one bolt and the actuating mechanism for another diametrically opposite bolt, whereby the two bolts operate in unison between their retracted and projected positions.

A further object of the invention is to provide an improved arrangement of tumbler disks on an operating shaft with the disk which is nearest the end of the shaft adjustably fixed on the shaft to facilitate changing of the lock combination whenever desired.

It is, moreover, my purpose and object generally to improve combination safe locks and especially to simplify the construction and assembling of combination locks for wall safes and the like.

In the accompanying drawing:

Fig. 1 is a front elevational view of a wall safe whose door embodies features of my invention;

Fig. 2 is a rear elevational view of the door of Fig. 1, with the bolts projected;

Fig. 3 is a view generally similar to Fig. 2 but showing the bolts in their retracted positions;

Fig. 4 is a cross-sectional view on line 4—4 of Fig. 2, on a larger scale; and

Fig. 5 is a fragmentary cross-sectional view on line 5—5 of Fig. 2, on the scale of Fig. 4.

Referring to the drawing, the wall safe door 10 ordinarily will be of relatively heavy metal stock in the form of an annularly flanged circular disk 12 whose flange is indicated at 14. Door 10 may be hinged to the body 16 of the safe in any suitable manner, such as by means of ears 18 on the door 10 coacting with ears 20 on the safe body, with a hinge pin extending through the ears of each pair of associated ears 18, 20 or through both pairs of ears 18, 20, the hinge means being located and adapted to be entirely concealed when the door 10 is closed.

As best seen in Fig. 4, the flanged side of disk 12 has an integral projecting boss 22 centrally thereof, and a threaded shaft 24 extends loosely and rotatably through the disk 12 and boss 22. The outer end of shaft 24 has a knob 26 and graduated disk 28 rigid thereon, the disk 28 preferably being rotatably seated in the counter-sink 30 in the front face of door 10. The inner end of shaft 24 projects beyond boss 22 and has fixed thereon a member indicated generally at 32 comprising a disk part 34 having a series of notches 36 spaced apart around its edge margin and

a hub part 38 which is screwed on shaft 24 and then secured against rotation on the shaft by key means 40. Member 32 has a bearing on the end portion of boss 22.

One tumbler disk 42 is mounted on hub part 38 of member 32 in engagement with disk part 34 thereof, and tumbler disk 42 is removably maintained on the hub part 38 by the resilient retainer ring 44 which removably engages in an annular groove 46 in hub part 38. Tumbler disk 42 has an edge notch 41 therein and has a depressed tongue 43 located and adapted to be engaged in any selected one of the notches 36 of disk part 34 for locking tumbler disk 42 against rotation relative to member 32 and shaft 24. By removing retainer ring 44, the tumbler disk 42 may be adjusted selectively on member 32 to locate its edge notch 41 selectively around shaft 24 with tongue 43 engaging in a selected notch 36 of disk part 34. This provides a simple yet effective means for changing the lock combination when desired.

Two other tumbler disks 48, 50 are rotatably mounted on boss 22 between member 32 and the disk body of door 10, the tumbler disk 48 being spaced from the disk body of door 10 by the washer 52 which is loose on boss 22, and tumbler disk 50 being spaced from tumbler disk 48 by the two washers 54, 56 one of which is loose on boss 22 and the other keyed to the boss, as at 58, so that tumbler disk 50 may be rotated without carrying tumbler disk 48 around with it by frictional drag. Disks 48, 50 and washers 52, 54 and 56 may be held on the boss 22 by a resilient retainer ring 60 removably engaging in annular groove 62 adjacent to the end of boss 22. Tumbler disk 48 has a notch 49 in its edge margin, and tumbler disk 50 has a notch 51 in its edge margin.

An abutment member or lug 64 projects from tumbler disk 42 toward tumbler disk 50, outward of the periphery of disk part 34 of member 32, and an abutment member or lug 66 projects from tumbler disk 50 toward tumbler disk 42 in the rotational path of lug 64 of the latter said disk, and another abutment or lug 68 projects from disk 50 toward tumbler disk 48 outward of the peripheries of washers 54, 56. Tumbler disk 48 has an abutment or lug 70 projecting toward tumbler disk 50 in the rotational path of lug 68 of the latter said disk. Hence, a rotation of knob 26 in one direction rotates shaft 24 and tumbler disk 42, and tumbler disk 42 picks up and rotates tumbler disk 50 as soon as lug 64 of disk 42 engages lug 66 of disk 50. Continued rotation of knob 26 in the same direction ultimately results in tumbler disk 50 picking up and rotating tumbler disk 48 as soon as lug 68 of disk 50 engages lug 70 of disk 48. Reversal of the direction of turning of knob 26 results in initial rotation of only tumbler disk 42 until lug 64 of disk 42 engages lug 66 of disk 50, after which the latter disk may be carried around and stopped when its edge notch 51 is in registration with the edge notch 49 of tumbler disk 48. Reversing again the direction of turning of knob 26, the edge notch 41 of tumbler disk 42 may be brought to and stopped in registration with the edge notches of the other two tumbler disks.

Registration of the edge notches 41, 49 and 51 of all of the tumbler disks at a predetermined angular location around the axis of shaft 24 conditions the locking means for simultaneous retraction of the oppositely disposed locking bolts 72, 74.

The bolt-actuating mechanism is mounted at the back of door 10 within the confines of the flange 14 and entirely to one side of the tumbler disks, excepting a link element which extends to the bolt at the other side. The mechanism comprises a pawl member 76 pivotally mounted on a pivot pin 78 which may be rigid on door 10. Member 76 has a portion which is relatively deeply notched at 80. A lever 82 is pivoted on the outer end of pivot pin 78 in overlying relation to the notched por-

tion of pawl member 76, the lever having a projection 84 thereon which slidably engages in notch 80 of pawl member 76. One end portion of lever 82 has pin-in-slot connection at 86 to the inner end of locking bolt 72, and the other end of the lever is arranged and adapted to engage the door flange 14 which limits inward or retracting motion of bolt 72. This said other end of the lever 82 has pivotally connected to it at 88 one end of the previously mentioned link element, indicated at 90, whose opposite end is pivotally connected at 92 to the inner end of locking bolt 74. The outer end of pawl member 76 has a depending pin part 77 thereon which is adapted to ride on the peripheral edges of all three tumbler disks 42, 48 and 50 excepting when the three disk notches 41, 49 and 51 are in registration at the location of pin part 77, at which time the pin part enters within all of the notches under the urge of spring 94 which constantly biases pawl member 76 clockwise about its pivot 78 as viewed in Figs. 2 and 3. Fig. 2 shows the pawl member pin part 77 riding on the peripheries of tumbler disks 42, 48 and 50, with the locking bolts 72, 74 projected, and Fig. 3 shows the pawl member pin part 77 engaged in the disk notches 41, 49 and 51 and swung clockwise to retract the locking bolts 72, 74. Spring 94 itself may be strong enough to swing pawl member from its Fig. 2 position to its Fig. 3 position, with needed simultaneous counterclockwise rotation of the tumbler disks. Ordinarily, however, the spring will be aided by the fingers of a person turning knob 26 in the proper direction.

It is a feature of the invention that the tumbler disk 42 which is fixed to operating shaft 24 is at the end of the shaft where it is conveniently accessible for changing the lock combination by removing retaining ring 44 and rotating disk 42 to locate its tongue 43 in a different one of the notches 36 in disk part 34 of member 32. Also, it is an important manufacturing advantage that the lock mechanism may be quickly assembled with a minimum of labor costs. In this latter connection, the tumbler disks 48, 50 and the spacing washers 52, 54 and 56 may be loosely arranged on central boss 22 with the washer 56 keyed at 58 to the boss, following which the ring retainer 60 may be snapped into place. Tumbler disk 42 will be pre-assembled with member 32 and secured on the latter by retainer ring 44, with the tongue 43 in a selected notch 36 of disk part 34. Threaded shaft 24 is inserted through boss 22, and member 32 with tumbler disk 42 fixed thereon is screwed on the end of shaft 24 and keyed thereto.

The bolt operating mechanism may be easily and quickly assembled by first arranging spring 94 on the hub of pawl member 76 and then placing the pawl member 76 on pivot pin 78 with the spring tensioned and biasing pin part 77 against the peripheries of the tumbler disks, as best seen in Fig. 5. Bolts 72, 74 next may be inserted, after which the lever 82 may be arranged on pivot pin 78 with its lug 84 engaging in notch 80 of pawl member 76. The actuating rod 90 may be loosely connected at 88 to the outer end of lever 82 followed by connection of the other end of rod 90 to bolt 72. Finally, the inner slotted end of lever 82 may be connected to bolt 72.

A cotter pin secures lever 82 and pawl member 76 on the pivot pin 78, and drop-in pins may be employed to effect the connections of rod 90 to the bolts 74, 72, as shown at 86 in Fig. 5. When a cover member is arranged over the chamber within which the operating mechanism is arranged, the drop-in pins at the connections 86, 92 are maintained thereby against coming out accidentally.

Various changes may be made in details of the herein disclosed locking mechanism within the scope of the appended claims, and it is intended that the patent shall cover, by suitable expression in the appended claims, whatever features of patentable novelty exist in the invention disclosed.

I claim as my invention:

1. In a safe having a hinged door, locking mechanism for the door comprising an operating shaft extending through the door and having a knob fixed thereon at the outer side of the door, a first tumbler disk adjustably fixed on said shaft at the inner side of the door, a plurality of other tumbler disks between said first disk and said door and individually rotatable about the axis of said shaft, a pawl member pivotally mounted on said door at the inner side thereof, resilient means constantly biasing said pawl member about its pivot into engagement with peripheral portions of all of said tumbler disks, each said disk having a peripheral notch therein, and said pawl member being adapted to be rotated in the direction of its said bias when it engages notched peripheral portions of all of the tumbler disks simultaneously, a pair of generally oppositely disposed locking bolts slidably mounted on said door, said pawl member having leverage arms associated therewith at opposite sides of the pivot of the pawl member and movable in unison with the pawl member, means pivotally connecting one of said leverage arms to one of said locking bolts, and a relatively rigid link element pivotally connected at one end to the other of said leverage arms and pivotally connected at its other end to the other of said locking bolts, whereby a said rotation of said pawl member effects simultaneous retraction of said bolts in directions generally toward each other.

2. A wall safe door comprising a generally circular body having an annular flange projecting from said body at the inner side of the door, a plurality of tumbler disks mounted for relative rotation centrally within said flange, each said disk having a peripheral notch adapted to be brought into registration with the similar notches of the other disks, a pair of diametrically opposite locking bolts extending slidably through said flange, bolt-actuating means arranged within said flange generally between said disks and one of said bolts, said actuating means comprising a pivotally mounted member constantly biased into engagement with peripheral portions of all of said tumbler disks and adapted to be rotated in the direction of its said bias when it engages in said peripheral notches of said disks with all of said notches in registration, there being generally oppositely extending leverage arms associated with said pivotally mounted member at opposite sides of the pivot of the latter said member and movable in unison with said pivotally mounted member, pin means pivotally connecting one of said leverage arms to one of said bolts, an actuating link pivotally connected at one of its ends to the other of said leverage arms and pivotally connected at its other end to the other of said bolts, whereby said bolts become retracted simultaneously in response to a said rotation of said pivotally mounted member.

3. A wall safe door as defined in claim 2, wherein said pivotal connection of one end of said actuating link to said other of said leverage arms comprises an end portion of said link offset in general parallelism with the major portion of the link, said off-set end portion of the link being inserted through a hole in said other of said leverage arms and swung into general parallelism with the plane of said leverage arms, the said pivotal connection of the other end of said link to the other bolt being a drop-in pin and slot connection, there being a cover for said disks and bolt-actuating means, at the inner side of said door, said cover acting to maintain said drop-in pin against accidental displacement.

4. Bolt-retracting mechanism for safe doors and the like, comprising a pawl member pivotally mounted on the safe door at the inner side thereof, resilient means biasing said pawl member in one direction about its pivot, tumbler disks relatively rotatable at the inner side of said door and arranged with their peripheries adjacent to and engaged by said pawl member, each said disk having a peripheral notch therein and said pawl member being adapted to be rotated in the direction of its said bias when it engages the said peripheral notches of all of the disks simultaneously, a pair of diametrically opposite

bolts slidably mounted on said door, a lever movable with said pawl member and having an arm pivotally connected to one of said bolts at one side of the pivot of said pawl member, an actuating link pivotally connected at one of its ends to another arm of said lever and pivotally connected at its other end to the other of said bolts, whereby said bolts become retracted in unison in response to a said rotation of said pawl member.

References Cited in the file of this patent

UNITED STATES PATENTS

279,334	Clark	June 12, 1883
845,057	Cramer	Feb. 26, 1907
997,790	Fish	July 11, 1911
1,911,559	Dyson	May 30, 1933