June 2, 1953 M. MARGO 2,640,344

COMBINATION DOOR LOCK

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Fig. 1.

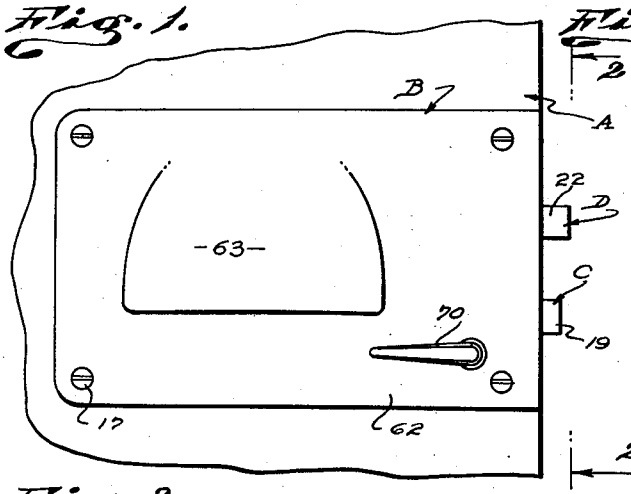


Fig. 2.

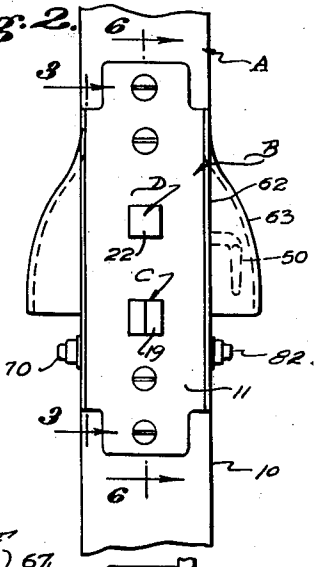


Fig. 3.

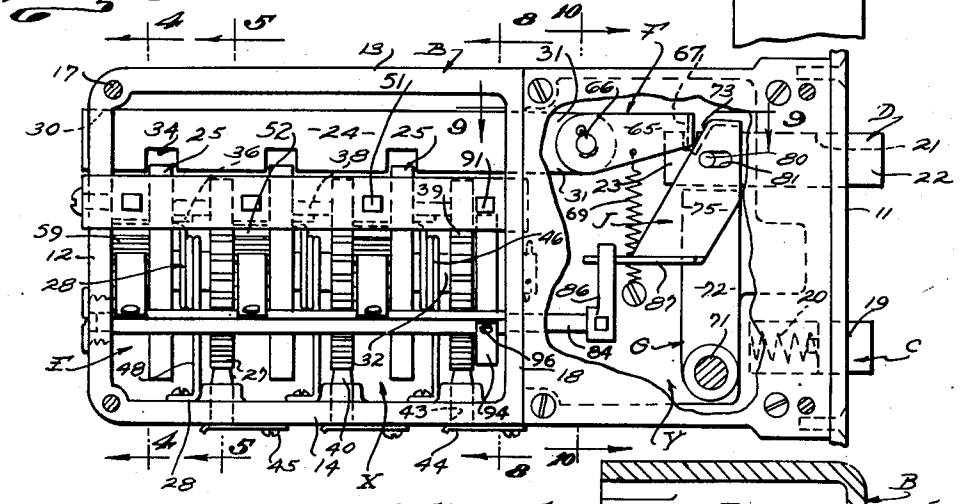


Fig. 4.

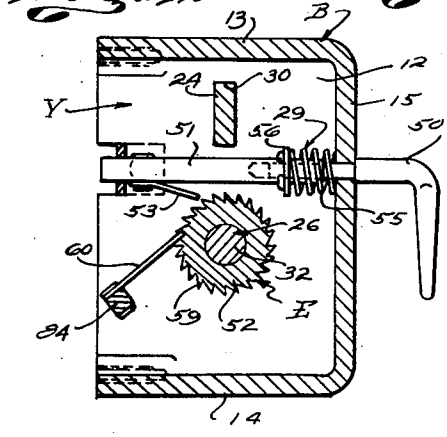
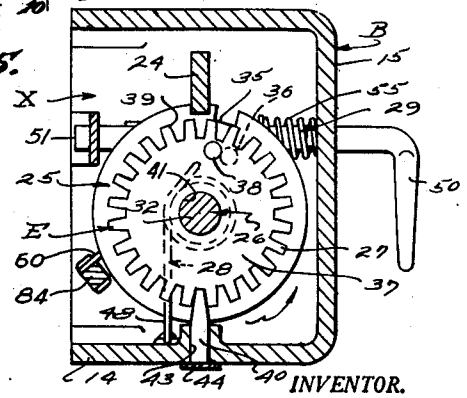


Fig. 5.



INVENTOR.
Murray Margo
BY
Attorney

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Fig. 6.

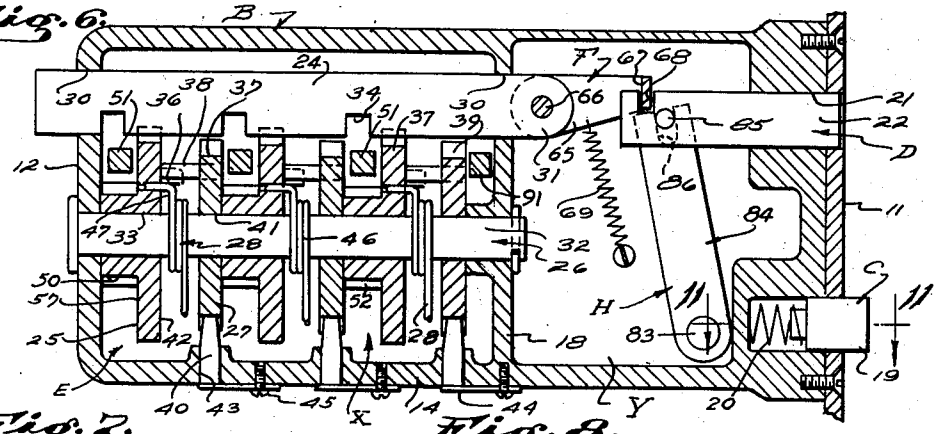


Fig. 7.

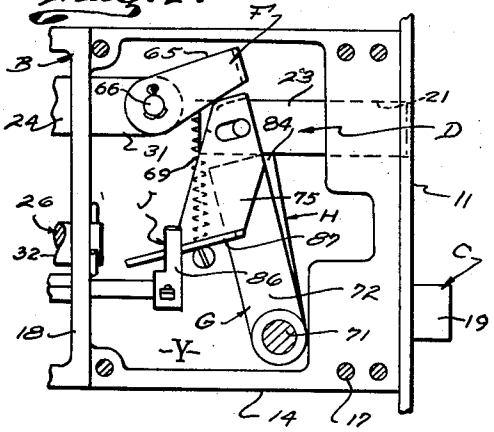


Fig. 8.

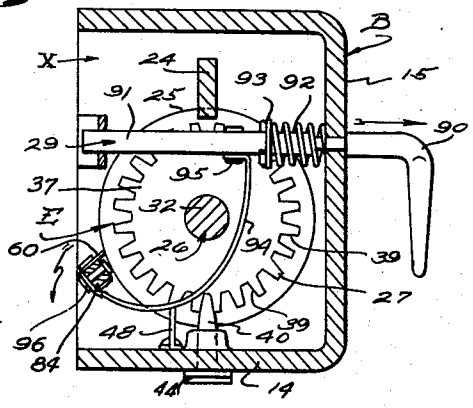


Fig. 9.

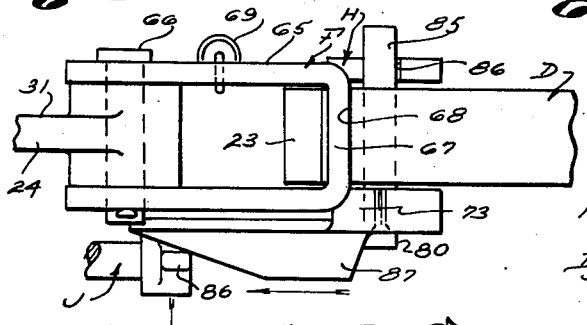


Fig. 10.

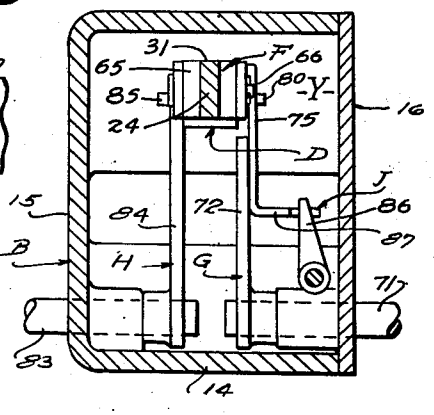
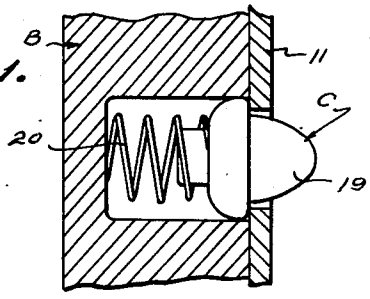


Fig. 11.



INVENTOR.
Murray Margo
BY
Attorney

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COMBINATION DOOR LOCK

Murray Margo, Hawthorne, Calif.

Application November 25, 1950, Serial No. 197,597

20 Claims. (Cl. 70—153)

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This invention relates to a combination door lock, that is to a lock for a door which lock involves a combination mechanism releasable only by a predetermined operation of tumblers which normally lock the mechanism.

It is a general object of the present invention to provide a lock of the general character referred to suitable for application to or use in connection with doors such as are employed in dwellings, or the like.

A general object of the present invention is to provide a lock of the general character referred to which involves two operating means, one at each side of the mechanism to occur at each side of the door to which the mechanism is applied, one of which operating means is always available to release the lock whenever operated, while the other is operable to release the lock only when the lock has been actuated to release the several tumblers embodied therein.

Another object of the present invention is to provide a mechanism of the general character referred to which is simple and compact, making it such that it can be incorporated in an ordinary door in much the same manner that the usual door lock is applied to a door. The structure that I have provided is compact and can be incorporated in a case that is easily applied to a typical door.

Another object of the present invention is to provide a mechanism of the general character referred to embodying a simple, easily operated means for adjusting or setting the control tumblers of a lock mechanism enabling the combination of the lock to be changed at will.

It is a further object of the present invention to provide a mechanism of the general character referred to which is sturdy and dependable, the mechanism being free of delicate or intricate parts subject to failure or improper operation.

The various objects and features of my invention will be fully understood from the following detailed description of a typical, preferred form and application of the invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a side view of a portion of a door showing the lock of the present invention applied thereto and showing the bolt and detent of the lock both projecting from the case. Fig. 2 is an end view of the structure shown in Fig. 1, being a view taken as indicated by line 2—2 on Fig. 1. Fig. 3 is a side view of the lock shown detached from the door and with parts broken away to illustrate the mechanism located within the case.

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Fig. 4 is a transverse sectional view taken as indicated by line 4—4 on Fig. 3. Fig. 5 is a transverse sectional view taken as indicated by line 5—5 on Fig. 3. Fig. 6 is a longitudinal sectional view of the lock, being a view taken substantially as indicated by line 6—6 on Fig. 2. Fig. 7 is a view of a portion of the mechanism illustrated in Fig. 3, showing the parts in a different operative position. Fig. 8 is a transverse sectional view taken substantially as indicated by line 8—8 on Fig. 3. Fig. 9 is an enlarged plan view taken as indicated by line 9—9 on Fig. 3. Fig. 10 is a transverse sectional view taken as indicated by line 10—10 on Fig 3, and Fig. 11 is an enlarged plan section taken as indicated by line 11—11 on Fig. 6.

The lock that I have provided is particularly useful as applied to a door A or the like and it involves, generally, a case B, a releasable detent C, a lock bolt D, a lock mechanism E, a releasable coupling F between the mechanism E and the bolt D, two main operating means, and a means G accessible at one side of the lock and serving to release the coupling F and operate the bolt D, and the other a means H accessible at the other side of the case and serving to operate the bolt D when the mechanism E is released, and a releasing mechanism J releasing the lock mechanism so that it restores itself to its normal unactuated or locked position.

The case B is a box-like structure applicable to the door A so that it is rigidly fixed thereto and it is preferably applied or fixed to the door either by being mortised therein or fastened thereto so that it cannot be removed or tampered with in any way from what I will term the outer side 10 of the door. The particular case illustrated has a face or front 11, a back 12, a top 13, a bottom 14 and sides 15 and 16. The side 15 is shown as a permanent or integral part of the case and the case is mounted in the door A so that the side 15 occurs at the side 10 of the door. The side 16 of the case is shown as a removable or detachable part, screw fasteners 17 being to connect the side 16 to the other parts of the case. In the preferred form of the invention the case has a partition 18 dividing it into compartments X and Y, the compartment X serving to house the mechanism E while other portions of the lock are carried in the compartment Y.

The detent C is provided as a means for releasably holding the door in a closed position upon its being moved thereto and it involves a lug 19 slidably carried by the face or front 11 of the case and normally urged outwardly by a spring

20. The lug has a suitably shaped rounded projecting outer end portion adapted to cooperate with a suitable striker plate or keeper so that the structure just described serves as a spring detent or releasable retaining means that holds the door in a closed position but releases when sufficient force is applied to the door, tending to open it. The bolt D of the lock is an elongate part of substantial size slidably carried in a guideway 21 provided in the face 11 of the case B. The bolt has an outer or forward end portion 22 adapted to be moved between a retracted position such as is shown in Fig. 6 and an extended position such as is shown in Figs. 1 and 3. The inner end portion 23 of the bolt is located in chamber Y of the case where it is engaged by the means F, the means G and the means H.

The lock mechanism E is a tumbler type combination lock mechanism and in its preferred form it includes, generally, a lock bar 24 mounted to reciprocate in the case, a plurality of tumblers 25, mounting means 26 for the tumblers, adjustable stop means 27 for the tumblers, means 28 normally yieldingly acting on the tumblers to operate them in one direction and operating means 29 for the tumblers.

The various parts of the lock mechanism E are preferably housed or confined within the chamber X of the case except that certain of the parts project from the case for cooperation with other parts of the lock, as will be hereinafter described.

The lock bar is an elongate member slidably supported by the case and in the preferred form of the invention it is slidably supported in guide openings 30 in the back 12 and partition 18 of the case so that it is in substantial alignment with the bolt D and is mounted to operate parallel with the bolt. The end 31 of the bar projects into the chamber Y of the case and is opposite the inner end portion 23 of the bolt.

The mounting means 26 for the tumblers 25 is preferably a shaft 32 mounted in the case B to extend through the compartment X parallel with the lock bar 24. In the preferred arrangement the shaft 32 extends between and is carried by the back 12 and partition 18 and is spaced below the lower edge portion of the lock bar 24 as shown throughout the drawings. In carrying out my invention I may employ any desired number of tumblers 25 and when several tumblers are employed, as illustrated in the drawings, they are carried by the shaft 32 so that they are spaced along the shaft, as illustrated in Figs. 3 and 6 of the drawings. Since it is preferred that the tumblers be identical or alike in form, construction and operation, I will describe but one tumbler, it being understood that the description is applicable to all of the tumblers. It is to be understood, however, that in practice the tumblers are set differently through the means 27 hereinafter described.

Each tumbler 25 is preferably a rotatable element cooperating with the lock bar 24. The tumbler is rotatably supported by shaft 32 to rotate in a plane normal to the longitudinal axis of the lock bar and the tumbler is preferably a disc-like part having a central opening or bore 33 rotatably passing the shaft 26. The disc-like tumbler is of such diameter as to overlap or intersect the lower edge portion of the lock bar 24. The lock bar has a notch or recess 34 in its lower edge portion accommodating the peripheral portion of the tumbler. With the periphery of the tumbler engaged in the notch of the lock bar the bar is locked against longitudinal movement. A recess or notch 35 is provided in the periphery of the tumbler and the tumbler is such that it can be rotated to a position where the notch 35 registers with the lock bar, in which case the bar is free to move longitudinally.

There is an adjustable stop means 27 for each tumbler which means includes, generally, a stop lug 36 projecting axially from one side of the tumbler, a block 37 rotatably supported on shaft 36 at said side of the tumbler, a stop lug 38 projecting from the block to cooperate with the stop lug 36, and means for setting the block 37 in various rotative positions, which means includes, generally, notches or recesses 39 in the periphery of the block 37 and a stop pin 40 carried by the case to engage one of the recesses, the pin being mounted so that it can be disengaged to allow a block to be set in various positions. The block 37 is preferably a disc-shaped part having a central opening or bore 41 passing the shaft 32. The stop 38 projects from the block 37 toward the tumbler 25 and engages the side wall 42 of the tumbler so that it serves to space the block 37 from the tumbler.

The means provided for setting the block in various rotative positions serves to fix the block against rotation and thereby sets or fixes the stop lug 38 in a fixed position so that it stops the tumbler in a predetermined rotative position. It will be apparent that by locating the stop lugs on the tumbler and block so that they engage, as shown in the drawings, the rotative position of the block 37 will determine the position in which the tumbler is stopped. In the preferred form of the invention the recesses 39 provided in the periphery of the block are in a continuous series around the periphery of the block so that the block has a notched or toothed periphery similar to a gear. The set pin 40 is slidably carried in a guide opening 43 in the bottom 14 of the case and a releasable retainer 44 applied to the bottom of the case normally holds the pin in position where its inner end extends into the case to enter one of the recesses 39 in the block 37. In the case illustrated the retainer 44 is held by a screw 45 as clearly illustrated in Fig. 6 of the drawings. The means 28 acting to normally yieldingly turn the tumbler 25 engages the tumbler so that the tumbler is normally turned to a position where the stop lug 36 on the tumbler engages or stops against the stop lug 38 on the block 37. In the preferred form of the invention the means 28 involves a helical spring having a coil portion 46 surrounding the shaft 32 between the tumbler and the block and having one projecting leg 47 fixed to the tumbler and another projecting leg 48 fixed to the case.

The operating means 29 for the tumbler is operable to rotate or advance the tumbler about the shaft 26 so the tumbler is turned to move the stop lug 36 away from the stop lug 38 until the tumbler reaches a position where its notch 35 registered with the lock bar 24. The means 29 includes, generally, a manually operable finger piece 50 at the exterior of the case at one side thereof, preferably the outer side 15, a shank 51 carrying the finger piece and slidably supported in the case, a ratchet wheel 52 concentric with the tumbler and joined or fixed thereto, and a ratchet arm or pawl 53 carried by the shank 51 to cooperate with the ratchet wheel. The shank 51 is slidably guided by the case and

is normally held in what I will term an in position by a spring 55 located in the case and acting between the side 15 of the case and a stop shoulder 56 on the shank.

The ratchet wheel 52 projects from the side 57 of the tumbler and is preferably formed integral with the tumbler. The ratchet wheel has peripheral teeth 59 extending around it, as shown in Fig. 4, it being preferred that the teeth of the ratchet wheel be related to the recesses of the block 37 so that they correspond, that is, in practice I prefer to provide recesses uniformly spaced entirely around the block 37, in which case I provide a corresponding number of teeth 59 equally spaced around the ratchet wheel 52. The pawl 53 is carried by the shank 51 to face the teeth of the ratchet wheel, the parts being shaped and proportioned so that each time the shank 51 is moved forward, as by forward movement of the finger piece 50, the ratchet wheel is advanced one tooth, that is, an amount corresponding to one tooth.

A lock pawl 60 is provided to cooperate with the ratchet wheel 52 to hold the ratchet wheel advanced as it is operated through the shank and pawl, as above described. The lock pawl 60 is preferably a spring pawl that allows the ratchet wheel 52 to turn freely away from the stopped position where the stop lugs 36 and 38 cooperate, but positively prevents the return movement under the influence of the means 28.

In a typical embodiment of the invention I will provide several tumblers 25 each with related parts, as just described, and in such case the several finger pieces 50 of the operating means 29 will occur at or project from the outer side of the case. In the preferred form of the invention I provide a cover plate 62 at the said outer side of the structure which cover plate is provided with a hood-like part 63 which shields or overlies the several finger pieces 50 and is open at the bottom, enabling an operator to reach beneath the hood in order to engage the finger pieces. The hood serves to effectively conceal and also protect the several finger pieces and in practice acts to impede operation or attempted operation of the device by an unauthorized person.

The releasable coupling F provided between the lock bar 24 and the bolt D includes, generally, a latch 65 pivotally connected to one of the connected parts by a pivot pin 66. In the case illustrated the latch is carried on the end 31 of the lock bar 24 and it has a dog portion 67 at its outer end cooperating with an upwardly facing notch 68 in the end portion 23 of the bolt. The arrangement is such that gravity normally holds the latch in position so that the dog engages in the notch. However, in practice I provide a spring 69 coupling between the latch and the case to normally yieldingly urge the latch downwardly, as clearly illustrated in Fig. 6 of the drawings.

It will be apparent from an examination of the drawings that when the latch 65 is engaged with the notch 68 in the bolt as shown in Figs. 3 and 6, the lock bar 24 is coupled to the bolt so that these elements move together, or as a unit, whereas when the latch 65 is lifted or in an elevated position, as shown in Fig. 7, the coupling between the bar and the bolt is released or disengaged so these elements move independently of each other.

The operating means G serves to release the coupling means F and to operate the bolt. The means G in the preferred form of the invention includes an operating handle 70 at one side of the case, preferably at the inner side, so that it is

accessible from the inner side of the door A, a shaft 71 rotated by the handle, a lever 72 on the shaft 71 within the compartment Y of the case, a cam 73 fixed on and operated by the lever 72 and a connection between the lever 72 and the bolt D.

The handle 70 located at the inner side of the door A may be of any desired form or design. In the drawings I have shown a lever type handle such that it can be deflected to cause the desired rotation of the shaft 71. The lever 72 is fixed on the shaft 71 so that when the shaft 71 is turned the lever 72 is swung. To accomplish the desired operation the lever 72 swings from the position shown in Fig. 3 to that shown in Fig. 7.

The cam 73 is fixed to the outer end portion of the lever 72 being formed on a plate 75 fixed to the outer end portion of the lever. The cam 73 cooperates with the outer end portion of the latch 65 so that as the lever 72 moves from the position shown in Fig. 3 to that shown in Fig. 7 the cam lifts the latch clearing the dog portion of the latch from the bolt D.

The connection provided between the lever 72 and the bolt D is preferably a slack or link connection allowing cooperation of the cam 73 and latch 65 to disengage the latch before the lever 72 acts to move the bolt D. In the preferred form of the invention the connection involves a pin 80 carried by the bolt D to project laterally therefrom and into a suitable arcuate slot 81 in the plate 75 on the lever 72. The slot 81 is long enough so that it allows free movement of the lever 72 and its plate 75 relative to the bolt sufficient to effect disengagement of the latch 65 before the bolt is moved to retract it as shown in Fig. 7.

The operating means H is operable to move the bolt to the retracted position when the several tumblers 25 have been positioned to release the bar 24 so that it is free to move. In the preferred form of the invention the means H includes, generally, a handle 82 at the outer side of the door, a shaft 83 carried by the case and supporting the handle, a lever 84 on the shaft within the chamber Y of the case, and a suitable connection between the lever 84 and the bolt D.

The handle 82 may like the handle 70 be of any suitable form or design. The shaft 83 carrying handle 82 is preferably located in alignment with the shaft 71 carrying handle 72 as shown in Fig. 10 of the drawings. The connection between the lever 84 and the bolt D preferably includes a pin 85 projecting laterally from the bolt to extend into a slot 86 formed in the outer end portion of the lever 84 to extend longitudinally thereof, as shown in Fig. 6 of the drawings.

It will be apparent that the means H provides a simple, mechanical connection between the handle 82 at the outer side of the door and the bolt D whereby the bolt can be moved to the retracted position whenever the lock bar 24 is released so that it is free to move longitudinally.

The releasing mechanism J is provided primarily as a means whereby the lock mechanism may be released so that it restores itself under action of the springs 28. It will be understood that before an operator attempts to work the combination for which the lock mechanism E is set it is desirable to clear the lock mechanism or have it restored to a fully locked position, at which time each of the tumblers is positioned with its stop lug 36 in engagement with stop lug 38 of its related stop means. Furthermore, it is desirable to be able to easily restore the lock mechanism in the event that any one of the

tumblers is overactuated in the course of operation of the combination or, in other words, is operated so that the notch of the tumbler moves beyond a position to register with the lock bar.

The means J includes, generally, a shiftable support for the control pawls **60** which support is preferably in the form of a shaft **84** supported by the case to extend through compartment X of the case parallel with shaft **32** and having an end portion projecting into compartment Y of the case. The several lock pawls **60** are fixed on the shaft **84** to normally project therefrom into position to engage the ratchet members **52**, as clearly shown in Fig. 4 of the drawings. The shaft **84** is rotatably supported by the case and a finger **86** projects from the shaft **84** within the compartment Y. A cam **87** is carried by the lever **72** of the means G. The cam **87** is preferably a part of the plate **75** attached to the lever **72** and it is so formed and related to the finger **86** as to cause deflection of the finger and consequent rotation of the shaft **84**, each time the lever **72** is moved from the position shown in Fig. 3 to that shown in Fig. 7. This rotation of shaft **84** is such as to lift the lock pawls **60** away from the ratchet wheels thus releasing them so that the springs **48** rotate the pawls to the stopped positions.

Through the construction just described it will be apparent that the combination lock mechanism E can be easily and quickly restored or positioned in the fully locked or initial position by simple operation of the handle **70** at the inner side of the door.

To effect restoring of the lock mechanism E from the outer side of the door I provide a restoring handle **90** at the outer side of the case projecting from the case as do the handles or finger pieces **50** of the lock mechanism. The handle **90** is on a shank **91** slidably guided by the case and a spring **92** acts between the outer wall of the case and a stop shoulder **93** on the shank so that the shank is normally in an in or retracted position. A suitable connection is provided between the shank **91** and the shaft **84** so that when the shank **91** is moved to the outer extended position the shaft **84** is rotated to release the lock pawls **60**. The connection illustrated in the drawings is shown in Fig. 8 and involves a flexible strip **94** of spring material such as spring steel having one end anchored to the shaft **91** at **95** and having its other end anchored to the shaft **84** at **96**. The strip **94** forms a tie between the shank **91** and the shaft so that the shaft is pulled around or is rotated when the shank **91** is operated.

From the foregoing description it is believed that the setting and operation of the mechanism will be fully understood. It will be apparent that the pins **40** controlling the rotative position of the several blocks **37** may be set so that the blocks are in any desired rotative position, thus locating the stop lugs **38** wherever desired. By setting the stop lugs **38** in different positions different numbers or operations of the operating means **29** will be required to bring the tumblers into position with their notches aligned with the lock bar. Assuming the lock mechanism E to be in the fully restored position a person knowing the setting of the blocks **37** may release the lock mechanism E by operating the means **29** controlling the tumblers the proper number of times. When the tumblers have been operated so that their notches are aligned with the lock bar **24** the bar is free to move and the bolt D can be withdrawn by simple operation of the handle **82** at the outside of the door. As hereinabove described the door can always be opened freely or easily from the inner side by merely turning or manipulating the handle **70**, which operation releases the coupling means F prior to moving the bolt D.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a plurality of tumblers normally holding the bar and operable to release the bar and individually operable tumbler actuators accessible at one side of the case, a releasable coupling between the bolt and bar, and two manual operating means each cooperatively related to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released.

2. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a notched lock bar, a plurality of notched tumblers normally engaged in the notches of the bar holding the bar and operable to a position where their notches register with the bar to release the bar and individually operable tumbler actuators accessible at one side of the case, a releasable coupling between the bolt and bar, and two manual operating means each coupled to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released.

3. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a plurality of tumblers normally holding the bar and operable to release the bar and individually operable tumbler actuators accessible at one side of the case, a releasable coupling between the bolt and bar including a latch pivotally carried by the bar and normally engaged in a notch in the bolt, and two manual operating means engageable at opposite sides of the case, one operable to release the coupling and coupled with the bolt to operate it and the other coupled with the bolt to operate the bolt when the bar is released.

4. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a plurality of tumblers cooperatively related to the lock bar, and tumbler actuators at the exterior of the case to be individually selectively and manually operated at one side of the door, a releasable coupling between the bolt and bar, and operating means including a handle at one side of the case and cam means operated by the handle to first release the coupling and then operate the bolt.

5. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a plurality of tumblers, and individually operable tumbler actuators accessible at one side of the case, a releasable coupling between the bolt and bar, operating means including a handle at one side of the case and cam means operated by the handle to first release the coupling and then operate the bolt, and operating means including a handle at the other side of the case cooperatively related to the bolt and operating the bolt when the bar is released.

6. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a releasable coupling carried by the bar and engageable with the bolt, a plurality of independently movable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, means normally yieldingly urging the tumblers to a stopped position, and operating means for the tumblers including ratchet mechanisms for moving the tumblers and independently operable handles for operating the ratchet mechanisms, and two manual operating means coupled to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released.

7. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a releasable coupling carried by the bar and engageable with the bolt, a plurality of independently movable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, means normally yieldingly urging the tumblers to a stopped position, and operating means for the tumblers including ratchet mechanisms for moving the tumblers and independently operable handles for operating the ratchet mechanisms, each ratchet mechanism including a lock pawl, two manual operating means cooperatively related to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released, and means operated by one of the operating means acting to release the lock pawls of the ratchet mechanisms.

8. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a releasable coupling carried by the bar and engageable with the bolt, a plurality of independently movable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, means normally yieldingly urging the tumblers to a stopped position, and operating means for the tumblers including ratchet mechanisms for moving the tumblers and independently operable handles for operating the ratchet mechanisms, each ratchet mechanism including a lock pawl, two manual operating means coupled to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released, and means operated by one of the operating means acting to release the lock pawls of the ratchet mechanisms and including an independent operating handle.

9. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a releasable coupling carried by the bar and engageable with the bolt, a plurality of independently movable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, means normally yieldingly urging the tumblers to a stopped position, and operating means for the tumblers including ratchet mechanisms for moving the tumblers and independently operable handles for operating the ratchet mechanisms, each ratchet mechanism including a lock pawl, two manual operating means cooperatively related to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released, and means operated by the first mentioned operating means acting to release the lock pawls of the ratchet mechanisms.

10. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including, a lock bar, a releasable coupling carried by the bar and engageable with the bolt, a plurality of independently movable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, means normally yieldingly urging the tumblers to a stopped position, and operating means for the tumblers including ratchet mechanisms for moving the tumblers and independently operable handles for operating the ratchet mechanisms, each ratchet mechanism including a lock pawl, two manual operating means each coupled to the bolt and engageable at opposite sides of the case, one operable from the inner side of the case to release the coupling and operate the bolt and the other operable from the outer side of the case to operate the bolt when the bar is released, and means operated by one of the operating means acting to release the lock pawls of the ratchet mechanisms and including an independent operating handle at the outer side of the case.

11. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a releasable coupling pivotally secured to one end of the lock bar and adapted to engage the bolt, a plurality of independently rotatable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, each stop means including a rotatable notched block and a releasable lock pin engaging a notch in the block holding the block in a selected rotative position, means normally yieldingly urging each tumbler to a stopped position, and ratchet means for each tumbler operable to rotate the tumbler against the last mentioned means and including an operating handle at the exterior of the case, and two manual operating means each cooperatively related to the bolt and engageable at opposite sides of the case, one operable to release the coupling

and operate the bolt and the other operable to operate the bolt when the bar is released.

12. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a releasable coupling pivotally secured to one end of the lock bar and adapted to engage the bolt, a plurality of independently rotatable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, each stop means including a rotatable notched block, cooperating stop lugs on the tumbler and block, and a releasable lock pin engaging a notch in the block holding the block in a selected rotative position, means normally yieldingly urging each tumbler to a stopped position, and ratchet means for each tumbler operable to rotate the tumbler against the last mentioned means and including an operating handle at the exterior of the case, and two manual operating means each coupled to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released.

13. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a releasable coupling pivotally secured to one end of the lock bar and adapted to engage the bolt, a plurality of independently rotatable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, each stop means including a rotatable notched block and a releasable lock pin engaging a notch in the block holding the block in a selected rotative position, means normally yieldingly urging each tumbler to a stopped position, and ratchet means for each tumbler operable to rotate the tumbler against the last mentioned means and including a lock pawl and an operating handle at the exterior of the case, two manual operating means coupled with the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released, and means operable to release the lock pawls including a handle accessible at the exterior of the case.

14. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar coupled to the bolt by a releasable coupling, a plurality of independently rotatable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, each stop means including a rotatable notched block and a releasable lock pin engaging a notch in the block holding the block in a selected rotative position, means normally yieldingly urging each tumbler to a stopped position, and ratchet means for each tumbler operable to rotate the tumbler against the last mentioned means and including a lock pawl and an operating handle at the exterior of the case, two manual operating means, each coupled to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released, means operable to release the lock pawls including a handle accessible at the exterior of the case, and means operated by the first mentioned operating means acting to release the lock pawls when said first mentioned means is operated.

15. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar coupled to the bolt by a releasable coupling, a plurality of independently rotatable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, each stop means including a rotatable notched block and a releasable lock pin engaging a notch in the block holding the block in a selected rotative position, means normally yieldingly urging each tumbler to a stopped position, and ratchet means for each tumbler operable to rotate the tumbler against the last mentioned means and including a lock pawl and an operating handle at the exterior of the case, two manual operating means cooperatively coupled to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released, and means operable to release the lock pawls including a rotatably mounted shaft carrying the lock pawls and a handle accessible at the exterior of the case operable to rotate the shaft.

16. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar coupled to the bolt by a releasable coupling, a plurality of independently rotatable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, each stop means including a rotatable notched block and a releasable lock pin engaging a notch in the block holding the block in a selected rotative position, means normally yieldingly urging each tumbler to a stopped position, and ratchet means for each tumbler operable to rotate the tumbler against the last mentioned means and including a lock pawl and an operating handle at the exterior of the case, two manual operating means each coupled to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released, means operable to release the lock pawls including a rotatably mounted shaft carrying the lock pawls and a handle accessible at the exterior of the case operable to rotate the shaft, and means operated by the first mentioned operating means rotating the shaft to release the lock pawls when the said first mentioned means is operated.

17. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a releasable coupling pivotally secured to one end of the lock bar and adapted to engage the bolt, a plurality of independently movable tumblers normally holding the bar and operable to release the bar, stop means for each tumbler, means normally yieldingly urging the tumblers to a stopped position, and operating means for the tumblers including ratchet mechanisms for moving the tumblers and independently operable handles for operating the ratchet mechanisms, each ratchet mechanism including a lock pawl, two manual operating means each cooperatively related to

the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released, and cam means operated by one of the operating means acting to release the lock pawls of the ratchet mechanisms.

18. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a plurality of tumblers normally holding the bar and operable to release the bar, and individually operable tumbler actuators accessible at one side of the case, a releasable coupling between the bolt and bar, and two manual operating means coupled to the bolt and engageable at opposite sides of the case, one including cam means operable to release the coupling and means operating the bolt when the coupling is released, and the other operable to operate the bolt when the bar is released.

19. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including, a notched lock bar, a plurality of rotatable notched tumblers normally engaged in the notches of the bar holding the bar and operable to a position where their notches register with the bar to release the bar, a single shaft supporting the tumblers, and individually operable tumbler actuators accessible at one side of the case, a releasable coupling between the bolt and bar, and two manual operating means cooperatively coupled to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released.

20. A lock of the character described including, a case for application to a door and having inner and outer sides, a bolt carried by the case operable to lock the door, a lock mechanism carried by the case including a lock bar, a plurality of tumblers normally holding the bar and operable to release the bar, and individually operable tumbler actuators accessible at one side of the case and each including a tumbler operating ratchet mechanism, a releasable coupling between the bolt and bar, and two manual operating means coupled to the bolt and engageable at opposite sides of the case, one operable to release the coupling and operate the bolt and the other operable to operate the bolt when the bar is released.

MURRAY MARGO.

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