March 12, 1935. F. J. BREMER 1,994,094

LOCK STRUCTURE

Filed Feb. 12, 1934 2 Sheets-Sheet 1

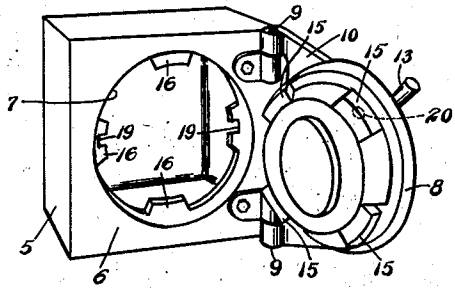


Fig. 1.

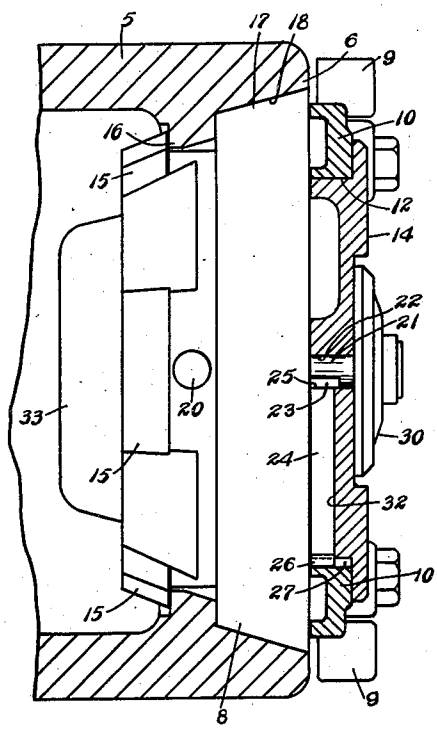
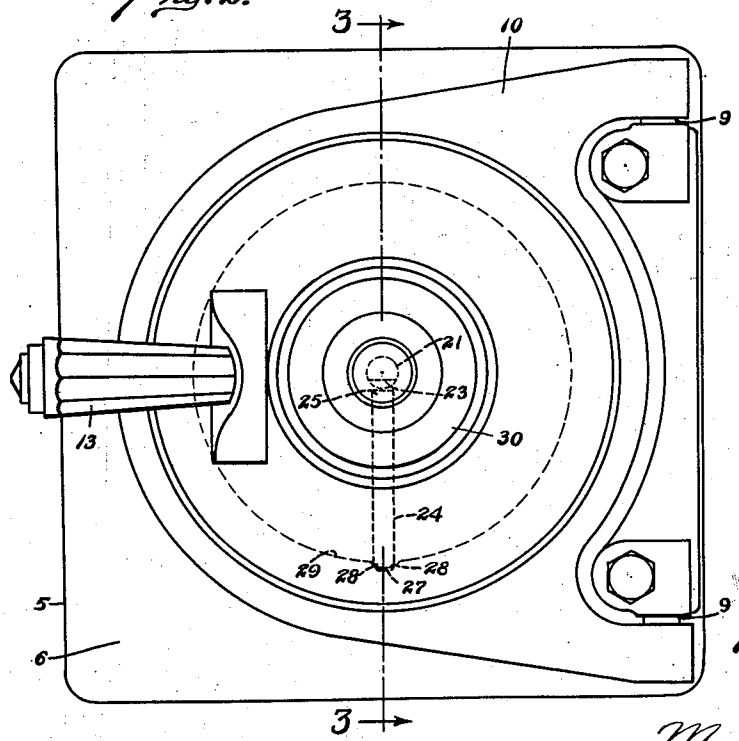


Fig. 3.

Fig. 2.



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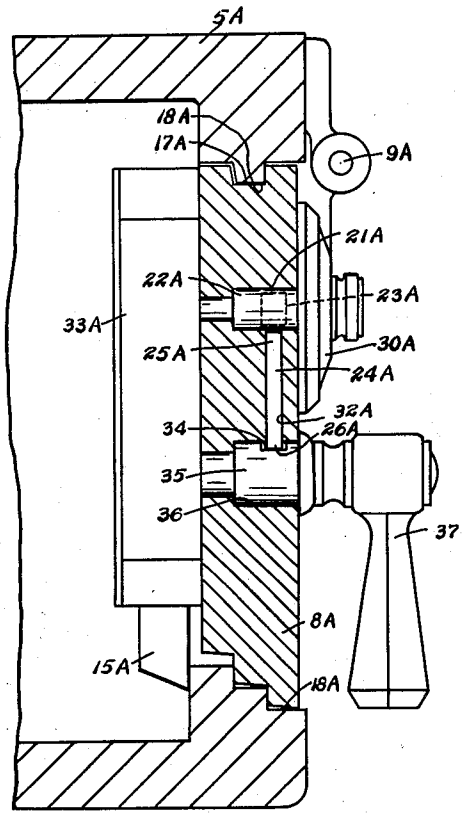


Fig. 4.

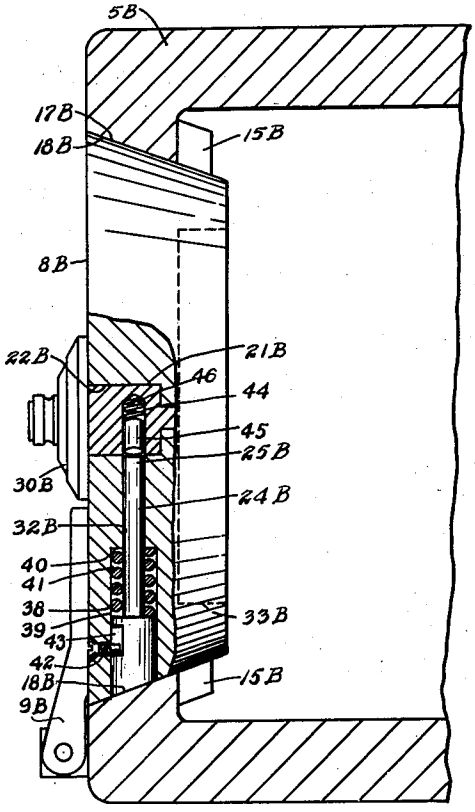


Fig. 5.

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LOCK STRUCTURE

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Application February 12, 1934, Serial No. 710,881

14 Claims. (Cl. 109—3)

This invention relates to a lock structure for theft proof chests or safes.

An object of the invention is to preclude the possibility of locking the safe or chest in an incorrectly or partly bolted condition.

More specifically, an object is to preclude throwing of the lock bolt to the locked position until the door of the chest or safe has been closed and conditioned to register all the cooperative holding lugs of the door and safe body.

Another object is to provide very simple, effective, and inexpensive means for accomplishing the above objects.

These and other objects are attained by the means described herein and disclosed in the accompanying drawings, in which:

Fig. 1 is a perspective view illustrating a rotating door type of safe or chest embodying the invention.

Fig. 2 is a front view of the Fig. 1 chest or safe, with the door thereof disposed in the closed and locked position.

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 2, showing part of the door in elevation.

Fig. 4 is a cross-sectional view of a modification.

Fig. 5 is a cross-sectional view of a second modification.

As is clearly illustrated in Figs. 1, 2 and 3 of the drawings, the rotating door type chest or safe may comprise any suitable type of body 5 having a wall 6 provided with a circular opening 7. The opening is closed or sealed by a rotatable door 8 which may be hingedly supported by the body as at 9, or otherwise supported for movement relative to the body. One method of supporting the door is illustrated in the drawings, wherein 10 indicates a door supporting member hingedly mounted upon the chest at 9, and having provided therein an opening 12 in which the door is supported for rotatory movement. The door may be rotated within the opening 12 by the use of any suitable means, such as a handle 13 secured thereto for moving the door lugs or abutments 15 to a position behind the cooperative lugs or abutments 16 on the chest wall 6, when the door is closed. The circular rim 17 of the door then cooperates with the circular jamb 18 on the safe or chest wall, for effecting a seal.

It will be noted, by reference to Fig. 1 that certain of the stationary lugs 16 are provided with transverse slots or keepers 19 for reception of one or more sliding bolts 20 carried by the rotatable door. It should readily be evident that these bolts, when engaging the slots 19 will preclude the rotation of the door from the locked position.

The present invention is concerned with precluding actuation of one or more locking bolts 20 until and unless the safe door is rotated to engage the various lugs 15 thereof with the corresponding lugs 16 of the safe body. To this end, lock spindle or dial shaft 21, which is mounted in a bearing 22 of the bearing plate member 14, has formed therein a cut-out or notch 23, which may be in the nature of a flat, adapted to receive a sliding latch bar 24 for the spindle. The spindle latch bar 24 may be in the form of a longitudinal angular or round rod or the like, having a substantially flat upper end 25 and a lower end provided with one or two inclines 26. The lower end of the latch bar 24 is adapted normally to cooperate with a latch bar actuating means which may be in the form of a seat or depression 27 formed in the material of the hinge member 10. The seat or depression preferably includes one or more inclined faces 28 adapted to cooperate with the tapered lower end of latch bar 24, as indicated in Fig. 2, so that rotational movement of the door relative to the notch 27, will carry the latch bar 24 from the notch and cause the lower end of the latch bar to ride upon the circular track portion 29 of the member. By thus effecting an elevating movement of the latch bar 24, the upper end of said bar is disposed within the cut-out or notch 23 of the dial shaft or lock spindle, whereby to preclude the possibility of rotating the lock dial 30 until the door is finally rotated to the locked position of Fig. 2, in which position the latch bar 24 is lowered and removed from association with the notch of spindle 21.

From the foregoing it will be understood that with the elements in the positions indicated in Figs. 2 and 3, the dial 30 and its shaft 21 may be rotated in any direction for the purpose of conditioning the tumblers of the door lock; however, as soon as the door is unlocked, and the handle 13 moved to disengage the lugs 15 and 16, the latch bar 24 will be elevated to engage the notch 23 of the spindle and thereby preclude further rotational movement of the dial relative to the door. Upon closing the safe, the locking mechanism may not be actuated by means of dial 30, until the door is rotated to the completely closed and latched position, in which position the latch bar 24 will fall into the seat or depression 27 so as to clear the notch 23 of the spindle, thereby permitting free and unrestricted rotation of the locking means 21—30.

A way or channel 32 formed in the part 14 sup-

ports the latch bar 24. Part 14 is secured to and movable with the door 8. The character 33 indicates a conventional lock in its cover plate.

In the modified construction illustrated in Fig. 4, parts corresponding to the various parts included in the Figs. 1, 2 and 3 structures, bear similar numerals with the letter "A" added to said numerals. The device of Fig. 4 is a chest or safe having a square or rectangular door 8A fitting the square or rectangular opening 18A. In this Fig. 4 modification, the lock controlling spindle 21A is provided with the flat or recess 23A which is adapted to receive the spindle latch member or bar 24A, this bar being slidable in a channel or way 32A formed in the body of the door. The lower end 26A of the spindle latch member is adapted normally to seat within a depression or flat 34 formed in the rotatable bolt throwing spindle 35, which spindle is rotatably mounted in a bearing 36 formed in the body of the door. The bolt throwing spindle may be provided with any suitable type of handle 37 which is accessible from the exterior of the safe or chest. When the bolt 15A and the associated actuating parts 35—37 are in the position shown, for maintaining the door in the locked condition, the lower end 26A of the latch bar 24A is resting within the flat or recess 34 of spindle 35. The upper end 25A of the latch bar then is lowered or retracted relative to the lock controlling spindle 21A, so that said spindle may be freely rotated for actuating the lock mechanism 33A by means of the dial or handle member 30A. As is well known amongst persons skilled in the art to which this invention relates, the member 30A is adapted to be rotated forwardly and back various degrees of rotation, for the purpose of throwing lock tumblers, until the lock tumblers finally are positioned so that the handle 37 may be moved for retracting the bolt 15A. The spindles 35 and 21A are so co-ordinated that the flat or recess 23A of spindle 21A will be in position to receive the end 25A of the spindle latch bar 24A when the element 35—37 is rotated so as to elevate the member 24A due to the cam action between the parts 34 and 26A. When so elevated, the terminal end 25A of member 24A will enter or abut the flat 23A of the lock controlling spindle, so as to preclude rotation of the lock controlling spindle 21A whenever the bolt-throwing spindle 35 is rotated to maintain the spindle latch member 24A in the elevated or latching position. Thus, it will be readily evident that rotational movement of spindle 21A is precluded whenever the spindle 35 is rotated to the bolt retracting position.

In the Fig. 5 modification, the parts corresponding to similar parts shown in Figs. 1, 2 and 3 are indicated by the same numerals, followed by the letter "B". The Fig. 5 structure illustrates the type of safe or chest wherein the door 8B is not rotatable, but may be swung on a hinge 9B which is fixedly secured by welding or otherwise, relative to the body of the door 8B. In this modification, the spindle latch member or bar 24B is spring urged against the door jamb 18B preferably by means of a spiral compression spring 38 which has one end abutting a shoulder 39 on the member 24B, the other end of the spring being adapted to abut a shoulder 40 of an enlarged bore 41 which receives the spindle latch bar. The bore 41 preferably is concentric with the bore 32B. Outward movement of the spindle latch bar is limited in any suitable manner, such as by means of a stud or the like 42 carried by the door and extended into a slot or way 43 provided in the material of the spindle latch bar.

The lock controlling spindle 21B has formed therein a transverse bore 44 in which is reciprocably mounted a short plunger or locking piece 45 which is always urged outwardly of the spindle by any suitable means such as a coil spring 46. As will be understood the plunger or extendible member 45 normally is confined within the limits of the spindle 21B, by the wall of spindle bore 22B, and by the inner end 25B of the spindle latch bar. As is evident from the disclosure of Fig. 5, an outward swinging of the door 8B after retraction of the bolts 15B will result in a downward or outward movement of member 24B, due to the action of spring 38, under which circumstances the member 45 will be projected downwardly, by spring 46, into the bore 32B whereby to lock or latch the spindle 21B against rotational movement relative to the door. It is to be understood that the member 45 will assume a position in alignment with the spindle latch bar 25B and its bore 32B, only after the lock controlling spindle 21B has been manipulated to unlock the lock 33B and retract the bolts 15B. Thus, when the member 45 is in engagement with the bore 32B, the bolts will be retracted so that the door may be swung open about its hinge means 9B. When the latch bar 24B is abutted by the door jamb 18B as shown, there can be no latching of the lock controlling spindle 21B, for in this position of the latch bar 24B no part of the bore 32B is open for reception of the spring urged stud or plunger 45. It will thus be clearly understood that whenever the door of the Fig. 5 structure is open, the plunger 45 will be partly extended into the bore 32B so that the lock controlling spindle 21B and its handle means 30B will be latched against rotational movement by the operator. As is evident, the way or slot 43 will permit only a partial entry of member 45 into the bore 32B. The door 8B may be either circular or angular, for the shape of the door does not affect the operation of the mechanism contained in the door. The same is true of the Fig. 4 modification. The mechanism for advancing and retracting the bolt is of the well known type wherein manipulation of the lock controlling spindle to throw the lock tumblers is followed by a final movement of the spindle that results in retracting the door bolt.

It is to be understood that various modifications and changes in the structural details of the device may be made, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. A safe or chest comprising in combination a body having a door opening, a door for closing the opening, a set of lugs on the door, and a set of cooperative lugs on the body for engagement with the door lugs to preclude moving the door from the closed position, means for moving one set of lugs relative to the other set for disengaging the lugs, a lock mechanism under the control of which the movable set of lugs may be shifted relative to the other set, and means operative upon movement of the set of movable lugs to hold the lock securely in an unlocked condition.

2. A safe or chest comprising in combination a body having a door opening, a door for closing the opening, a set of lugs on the door, and a set of cooperative lugs on the body for engagement with the door lugs to preclude moving the door from the closed position, means for moving one set of lugs relative to the other set for disengaging the

lugs, a lock mechanism under the control of which the movable set of lugs may be shifted relative to the other set, and means operative upon movement of the set of movable lugs to the disengaging position, to hold the lock securely in an unlocked condition.

3. A safe or chest comprising in combination a body having a door opening, a door for closing the opening, a set of lugs on the door, and a set of cooperative lugs on the body for engagement with the door lugs to preclude moving the door from the closed position, means for moving one set of lugs relative to the other set for disengaging the lugs, a lock mechanism under the control of which the movable set of lugs may be shifted relative to the other set, and means operative upon movement of the set of movable lugs to the disengaging position, to hold the lock securely in an unlocked position, and a door supporting means for guiding the door in its movement toward and from the closing position.

4. A safe or chest comprising in combination a body having a door opening, a door for closing the opening, means supporting the door for rotational movement relative to the door opening, cooperative engaging means on the door and the chest body for securing the door in the opening when the door is rotated a predetermined amount, a bolt on the rotatable door and a keeper carried by the body for receiving the bolt to preclude rotation of the door when the bolt is advanced, a lock and a lock spindle on the door, the spindle being rotatable relative to the door for operating the lock, a spindle latch member associated with the door, means cooperating upon rotational movement of the door, to move the spindle latch member into latching engagement with the spindle when the spindle is disposed in the bolt-releasing position, and means associated with the spindle for retracting the bolt from engagement with the keeper.

5. A safe or chest comprising in combination a body having a door opening, a door for closing the opening, means supporting the door for rotational movement relative to the door opening, cooperative engaging means on the door and the chest body for securing the door in the opening when the door is rotated a predetermined amount, a bolt on the rotatable door and a keeper carried by the body for receiving the bolt to preclude rotation of the door when the bolt is advanced, a lock and a lock spindle on the door, the spindle being rotatable relative to the door for operating the lock, a spindle latch member associated with the door, means cooperating upon rotational movement of the door, to move the spindle latch member into latching engagement with the spindle when the spindle is disposed in the bolt-releasing position, and means for retracting the bolt from engagement with the keeper.

6. A safe or chest comprising in combination a body having a door opening, a door for closing the opening, means supporting the door for rotational movement and for guiding the door toward and from the opening, cooperative engaging means on the door and the chest body for securing the door in the opening when the door is rotated a predetermined amount, a bolt on the rotatable door and a keeper carried by the body for receiving the bolt to preclude rotation of the door when the bolt is advanced, a lock and a lock spindle on the door, said spindle being normally rotatable relative to the door for operating the lock, a spindle latch member, means responsive to rotational movement of the door for advancing the spindle latch member toward the spindle, and means movable with the spindle providing a latch receiver for latching the spindle and restraining it against rotation relative to the door.

7. A safe or chest comprising in combination a body having a door opening, a door for closing the opening, means supporting the door for rotational movement and for guiding the door toward and from the opening, cooperative engaging means on the door and the chest body for securing the door in the opening when the door is rotated a predetermined amount, a bolt on the rotatable door and a keeper carried by the body for receiving the bolt to preclude rotation of the door when the bolt is advanced, a lock and a lock spindle on the door, said spindle being normally rotatable relative to the door, for operating the lock, a spindle latch member mounted for longitudinal reciprocating movement relative to the door and toward and from the spindle, said latch member having opposite ends, a flat on the spindle adjacent to one end of the latch member and into which flat said member may move, an incline fixed relative to the door supporting means, for contacting the other end of the latch member for moving the latch member to a position against the flat upon rotational movement of the door relative to the door supporting means, and means for maintaining the latch member in said last mentioned position until the door is rotated back to the closed and secured position.

8. A safe or chest comprising in combination a body having a door opening, a door for closing the opening, means for supporting the door for rotational movement and for guiding the door toward and from the opening, cooperative engaging means on the door and the chest body for securing the door in the opening when the door is rotated a predetermined amount, a bolt on the rotatable door and a keeper carried by the body for receiving the bolt to preclude rotation of the door when the bolt is advanced, a lock and a lock spindle on the door, said spindle being normally rotatable relative to the door for operating the lock, a bolt advancing and retracting means associated with the spindle, a spindle latch member, means responsive to rotational movement of the door for advancing the spindle latch member toward the spindle, means movable with the spindle providing a latch receiver for the latch member, to hold the spindle stationary relative to the door, and means for maintaining the latch member in engagement with the said latch receiver of the spindle until the door is rotated back to the closed and secured position.

9. A safe or chest comprising in combination a body having a door opening, a door for closing the opening, means for supporting the door for rotational movement and for guiding the door toward and from the opening, cooperative engaging means on the door and the chest body for securing the door in the opening when the door is rotated a predetermined amount, a bolt on the rotatable door and a keeper carried by the body for receiving the bolt to preclude rotation of the door when the bolt is advanced, a lock and a lock spindle on the door, said spindle being normally rotatable relative to the door for operating the lock, a bolt advancing and retracting means associated with the spindle, a spindle latch member mounted for longitudinal movement relative to the door and toward and from the spindle, said latch member having opposite ends, a flat on the spindle adjacent to one end of the latch member and into which flat said member may move, an in-

cline fixed relative to the door supporting means, for contacting the other end of the latch member for moving the latch member to a position against the flat upon rotational movement of the door relative to the door supporting means, and means for maintaining the latch member in said last mentioned position until the door is rotated back to the closed and secured position.

10. A door structure for safes and chests, comprising in combination a door and a member upon which the door is supported for rotational movement, a lock and an associated normally rotatable spindle carried by the door, a bolt under the control of the lock and spindle, and means operating, when the door is rotated relative to its support member, to latch the spindle and preclude rotation of the spindle relative to the door.

11. A door structure for safes and chests, comprising in combination a door and a member upon which the door is supported for rotational movement from an initial locked position to an unlocked position, a lock and an associated normally rotatable spindle mounted upon the door, a bolt under the control of the lock and spindle, and latch means operating upon rotational movement of the door from the initial locked position to latch the spindle and preclude rotation thereof relative to the door.

12. A door structure for safes and chests, comprising in combination a door and a member upon which the door is supported for rotational movement from an initial locked position to an unlocked position, a locked and an associated normally rotatable spindle mounted upon the door, a bolt under the control of the lock and spindle, latch means operating upon rotational movement of the door from the initial locked position to latch the spindle and preclude rotation thereof relative to the door, and means for maintaining the latch means in the spindle latching condition in all positions of the door except the initial position.

13. A door structure for safes and chests, comprising in combination a door and a member upon which the door is supported for rotational movement from an initial locked position to an unlocked position, a lock and an associated normally rotatable spindle mounted upon the door, a bolt under the control of the lock and spindle, latch means operating upon rotational movement of the door from the initial locked position to latch the spindle and preclude rotation thereof relative to the door, and means for maintaining the latch means in the spindle latching condition in all positions of the door except the initial position, said maintaining means being in the form of a track carried by the door supporting member.

14. A door structure for safes and chests, comprising in combination a door and a member upon which the door is supported for rotational movement from an initial locked position to an unlocked position, a lock and an associated normally rotatable spindle carried by the door, said spindle having a latch bar receiver formed thereon, a latch bar mounted for movement with the door and for longitudinal reciprocation relative to the door toward and from the spindle, said latch bar having opposite ends one of which is receivable in the latch bar receiver of the spindle, a curved track on the door supporting member and located adjacent to the opposite end of the latch bar, and upon which said opposite end of the latch bar may ride when the door is rotated, and cooperative means associated with the track and with said opposite end of the latch bar, for moving the other end of the latch bar into the receiver of the spindle whenever the door is rotated from the initial position, to latch the spindle and preclude rotation thereof relative to the door.

FREDRICK J. BREMER.

CERTIFICATE OF CORRECTION.

Patent No. 1,994,094. March 12, 1935.

FREDRICK J. BREMER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 19, claim 3, for "position" read condition; and page 4, first column, line 33, claim 12, for "locked" second occurrence read lock; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of May, A. D. 1935.

Leslie Frazer

(Seal) Acting Commissioner of Patents.