Nov. 1, 1932. W. F. DIESEL 1,885,238

LOCKING MECHANISM

Filed Oct. 31, 1930

Fig. 1

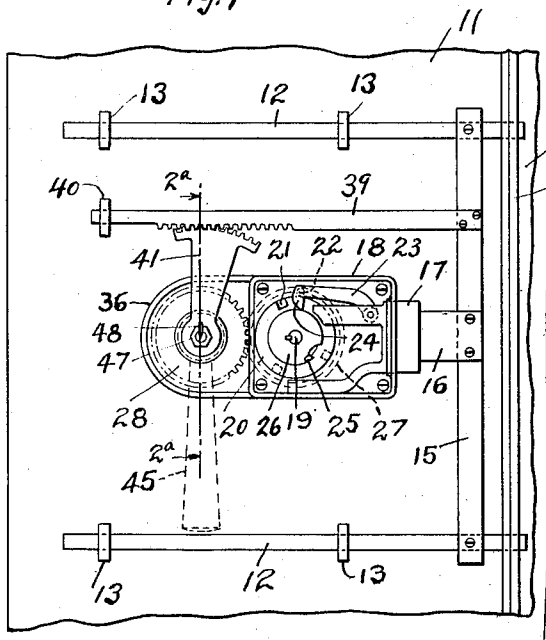


Fig. 2

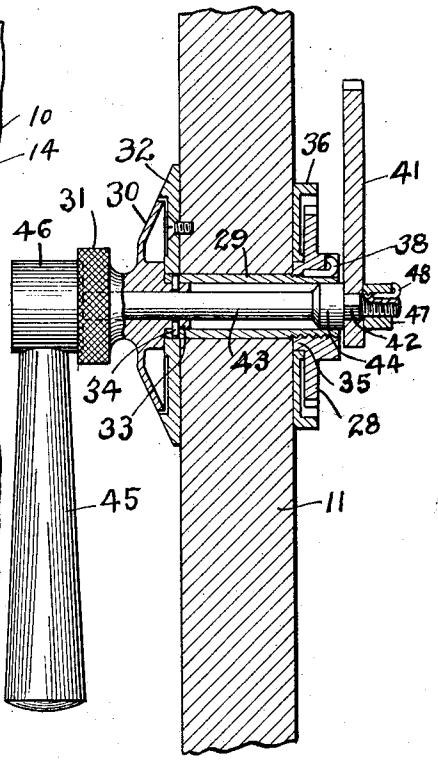


Fig. 3

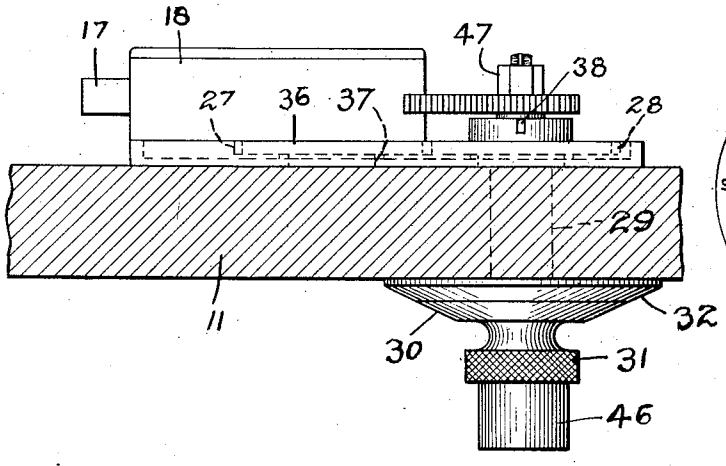
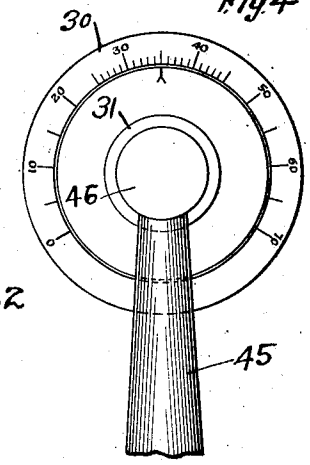


Fig. 4



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UNITED STATES PATENT OFFICE

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LOCKING MECHANISM

Application filed October 31, 1930. Serial No. 492,477.

The present invention relates to a locking mechanism for guarding the doors or closures of safes, vaults and the like and has for its object to provide an improved arrangement of operating and control elements for the locking mechanism which affords a compact, simplified and practical arrangement, economical to manufacture and convenient to operate.

A further object of the invention is to provide in safes, vaults and the like having bolt-work for securing the doors or closures thereof and having a combination lock for protecting the bolt-work, an improved arrangement of operating devices combined or associated in such a manner that each is rendered operable through a common opening formed in the door or closure, one to control the combination lock and the other the bolt-work.

To these and other ends the invention resides in certain improvements and combinations of parts, all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawing:

Fig. 1 is a view in elevation looking at the rear side of the door and showing the general arrangement of one embodiment of the invention;

Fig. 2 is a sectional elevation drawn to an enlarged scale and taken on line 2*a*—2*a* of Fig. 1;

Fig. 3 is a sectional plan through the safe door showing the relationship of the combination lock and control parts on the opposite sides of the door, and

Fig. 4 is a front elevation of the dial and operating handle for controlling the combination lock and bolt-work.

Similar reference numerals throughout the several views indicate the same parts.

The present invention embodies means for effecting control through a single opening in the safe door, of the bolt-work at the inner side thereof and a combination lock for protecting the same, also located upon the inner face of the door. One advantage of this arrangement is that it eliminates the more or less expensive operation of drilling one of the openings through the relatively thick wall of the door heretofore required for the reception of the operating spindle for the bolt-work.

A further advantage in eliminating one of the openings is that it reduces the number of points of attack by those attempting to gain access to the bolt-work for the purpose of releasing the same with the idea of robbing the safe.

A further advantage lies in the fact that with the present arrangement if the combination dial spindle is driven in the external operating means for the bolt-work is destroyed, whereas with the arrangement now in use this spindle remains intact and permits the bolt-work to be readily shifted to release position after the combination lock has been rendered ineffective as a means for protecting the bolt-work.

A still further advantage in combining the control devices lies in the fact that the dial spindle is used as a mounting for the operating handle and spindle for shifting the bolt-work, whereby a reduction in the number of parts is effected and likewise the cost of manufacture.

Referring to the drawing 10 represents a portion of the wall of a safe, vault, or other container, and 11 the door or closure therefor. The door may be provided with any suitable type of bolt-work such for example as that illustrated in Fig. 1, which comprises a plurality of bolts 12 supported by guides 13 on the door and arranged to take into openings formed in the door jamb or plate member 14 secured thereto in any suitable manner. The bolts are connected by a carrying bar 15 having a locking dog 16 thereon guarded or protected against release by suitable means such as, the combination lock bolt 17 shown projecting from the lock casing 18 in the path of the dog 16. The casing carries a tumbler spindle 19 on which any suitable number of tumblers 20 are mounted and provided with the usual notches 21, which when brought into registry by the successful operation of the combination permit the laterally projecting pin 22 on the pivoted arm or gate 23 to drop

therein. In this position of the parts the lug 24 on the gate engages an abutment 25 on the bolt operating disk 26 secured on the tumbler spindle, whereby upon rotation of the spindle in an anti-clockwise direction as viewed in Fig. 1, the bolt 17 will be withdrawn to release the bolt-work.

Operation of the tumbler spindle is effected through a gear 27 thereon, the teeth of which are in mesh with those of a similar gear 28 on the spindle 29 extending through an opening in the safe door and provided with a dial 30 having an operating knob 31, the dial being associated with the usual dial plate 32 as shown in Fig. 2. The dial spindle is of tubular construction and has extended within its outer end a projection 33 on the dial which is suitably secured to the spindle, as by means of the pins 34, Fig. 2. The inner end of the spindle is preferably threaded to receive the gear 28, the latter having a hub 35 journaled in a supporting plate 36 on the rear face of the door. The gear 27 is preferably provided with a hub 37 also journaled in the plate 36, the latter forming a support for the casing 18 as shown in Fig. 3. The gear 28 is prevented from working loose on the spindle by means of a key 38 applied as shown in Fig. 2.

The operating means for shifting the bolt work to and from locking position comprises a rack bar 39 connected with the bolt carrying member 15 and guided by a lug 40 on the door, the teeth of the rack bar meshing with those of a segment 41, the lower end of which is rigidly secured on the squared portion 42 of an operating spindle 43 extending through the dial spindle as shown in Fig. 2. The spindle 43 at its outer end is journaled in the dial or dial knob and is provided at its inner end with an enlarged bearing portion 44 journaled in the dial spindle. The operating handle 45 for the spindle 43 is provided at its inner end with an annular portion 46 seated in a recess formed in the dial knob 31, the spindle 43 having sufficient play to permit of free and easy rotation of the dial spindle when operating the combination. The gear segment 41 is clamped upon the spindle 43 by means of the nut 47 threaded on the reduced end portion of the spindle and secured against turning by a key 48.

In the operation of the mechanism, assuming that it is desired to unlock the safe, the operator will rotate the dial thereby rotating the gears 28 and 27 which effect rotation of the tumbler shaft to bring the notches of the tumblers into alinement. The projection 22 on the gate 23 will then be in registry with the notches, thus permitting the gate to drop and the lug 24 thereon to assume a position in engagement with the abutment 25 on the operating disk 26 which is secured to the tumbler shaft. Continued rotation of the dial spindle will therefore serve to retract the bolt 17 and effect release of the bolt-work. After this operation has been completed it is only necessary to grip the handle 45 and swing it to the right of the dotted line position shown in Fig. 1 in order to rock the segment 41 for the purpose of operating the rack bar to withdraw the bolt work. On the other hand, if it is desired to lock the door the handle 45 is turned to advance the bolt-work to locking position, after which the dial knob is turned to destroy the combination, during which operation the bolt 17 has advanced to locking position with respect to the dog 16 on the bolt carrying bar 15.

While I have provided gearing between the dial spindle and the tubular shaft for operating the latter it will be understood that other suitable means may be provided for this purpose if desired. Furthermore although I have shown a rack and segment for shifting the bolt-work to and from locking position it will be understood that any other suitable means may be provided for this purpose if desired.

I claim:

1. In combination, a container having a closure, locking elements for the closure connected by a carrier bar, a bolt for protecting the locking elements arranged when in locking position to engage and hold the carrier bar in check, a combination lock including a rotary operating member and notched tumblers for guarding the bolt, an operating part for the bolt pivoted thereon and arranged to take into the notches of the tumblers upon successful operation of the combination and to be actuated by the tumblers upon rotation of the operating member whereby to shift the bolt, a spindle journaled in said operating member and having an operating part on its outer end, an arm fixed on the inner end of the spindle, and a part for releasing the carrier bar extending therefrom into engagement with and arranged to be operated by said arm.

2. Locking means for attachment to a closure having an opening therethrough, comprising securing means arranged for connection with the closure, a bolt arranged to extend within the path of the securing means to hold the latter in securing position, an operating element pivotally engaging the bolt and arranged to shift the latter, a combination lock for attachment to the closure including tumblers having notches therein for receiving the operating element upon successful operation of the combination, means for operating the combination lock including a tubular member arranged for rotation within the opening of the closure, a spindle arranged to extend through said tubular member and having an operating part at one end, an actuating member on the opposite end of the

spindle, and a part fixed on the securing means in engagement with and arranged to be moved by the actuating member to move the securing means to release position after the bolt has been shifted by the combination lock.

3. In combination, a container having a closure, locking bolts for the closure connected by a carrier bar, an actuating element for the bar extending therefrom, a bolt for engaging and holding the carrier bar in check, an operating element for the bolt movable thereon, a combination lock on the closure including tumblers having notches therein arranged to receive said operating element when the combination is successfully operated whereby to permit operation of the bolt by said element, a tubular operating member for the combination lock rotatably mounted in the wall of the closure, a spindle journaled in said tubular member, and a member fixed on the inner end of the spindle and operatively engaging said actuating element to effect movement of the carrier bar and locking bolts to release position.

4. A locking mechanism for attachment to a closure having an opening therethrough, comprising slidably mounted securing bolts connected by a carrier bar, an actuating element for the carrier bar, a locking bolt arranged to engage the carrier bar to hold the latter against release, a combination lock arranged for attachment to the closure including a spindle having an operating disk thereon and notched tumblers upon the spindle, an operating element for the locking bolt engaging the latter and having a part arranged to take into the notches of the tumblers upon successful operation of the combination, said operating element upon movement of said part within the notches of the tumblers being conditioned for movement by the operating disk on the spindle, a tubular member arranged for rotation within the opening of the closure, means for operating the combination lock arranged to be actuated by said tubular member, a part rotatable within said tubular member, and a member on said part operatively engaging said actuating element to effect movement of the carrier bar whereby to release the securing bolts.

5. In locking mechanism, a closure having an opening therethrough, locking elements slidably mounted on the inner side of the closure and having a carrier bar therebetween, an actuating member for said elements connected with and extending from the carrier bar, a combination lock on the inner face of the closure including a spindle provided with tumblers and an operating disk, a slidably mounted locking bolt having its free end abutting said carrier bar to hold the locking elements against release, an arm pivotally engaging the locking bolt and arranged to be moved by the operating disk after successful operation of the combination, a drive gear for the spindle secured thereon between the combination lock and the closure, a second gear operatively connected with the drive gear, a hollow spindle extending through the wall of the closure upon the inner end of which the second gear is mounted, a dial on the outer end of the spindle for operating the same to effect operation of the combination lock, a second spindle journaled in the dial spindle and operable from the exterior of the closure, and an arm on the inner end of the second spindle operatively connected with the actuating member of the carrier bar to effect release of the locking elements after successful operation of the combination lock.

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