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PERMUTATION LOCK

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2 Sheets-Sheet 1

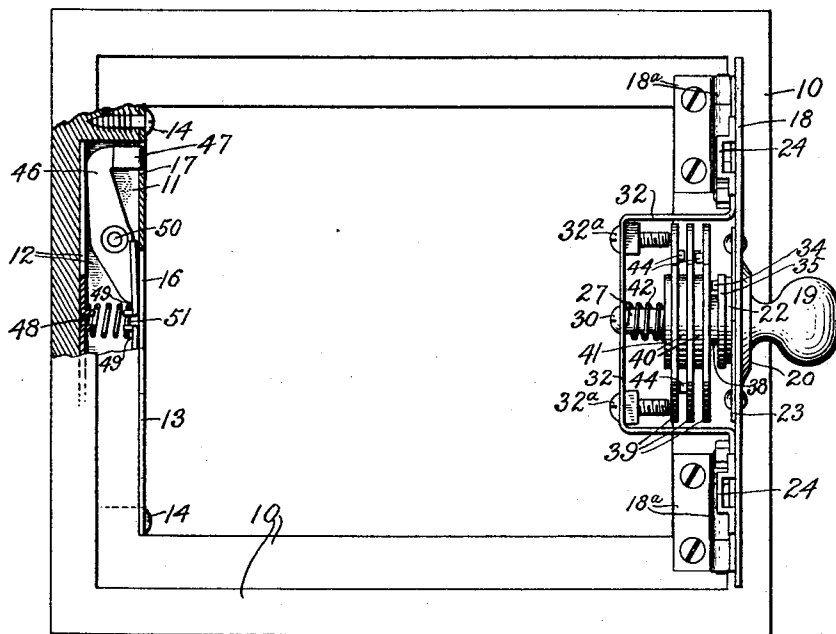


Fig. 1.

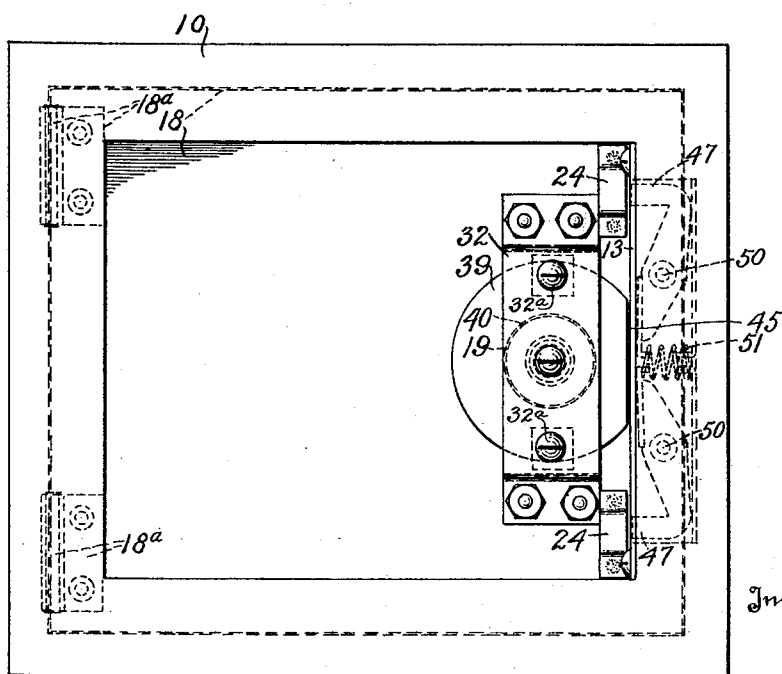


Fig. 2.

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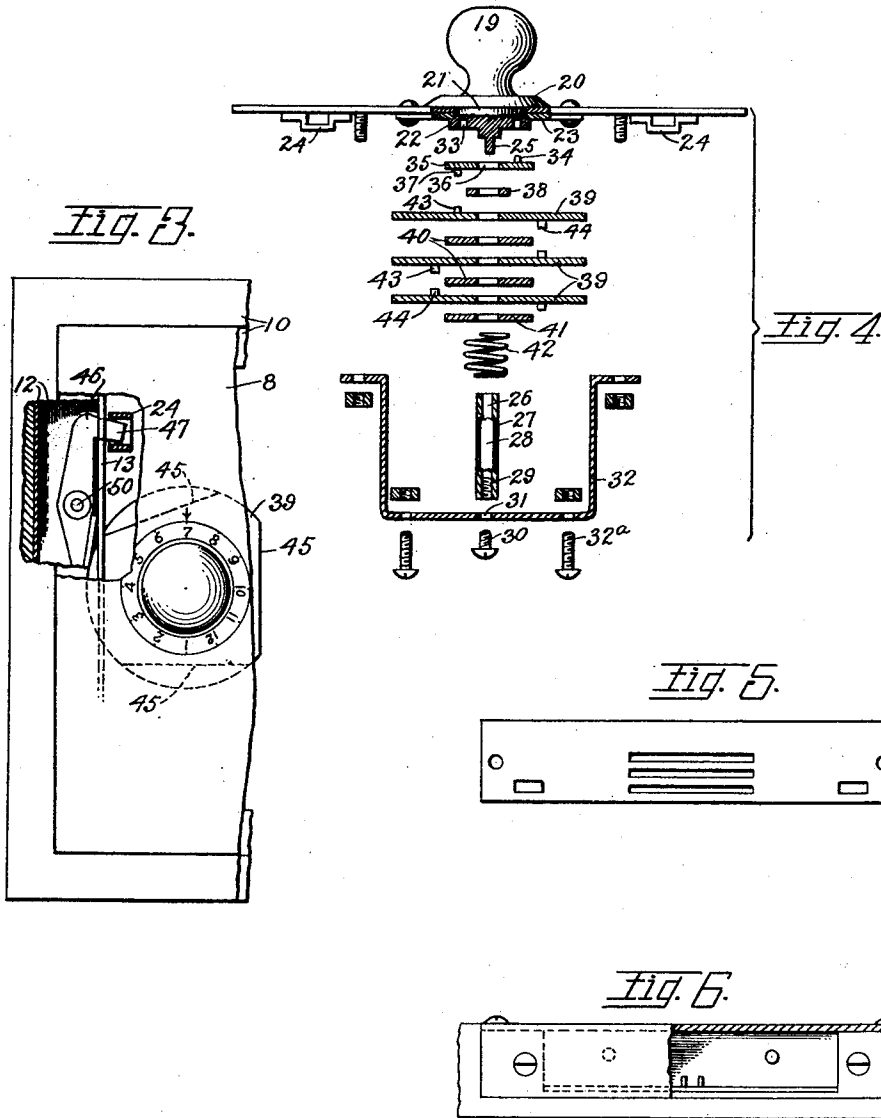
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UNITED STATES PATENT OFFICE

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PERMUTATION LOCK

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This invention relates to permutation locks, and especially to an improved form of permutation lock which is capable of being used on doors, drawers or other closures of various kinds and for various purposes.

One object of this invention is to provide an exceedingly simple and comparatively inexpensive permutation lock which is exceedingly effective in securing the closure against being opened or partly opened or even moved in the opening direction.

Another object is to provide a device of this character having rotary permutation disks, a corresponding keeper to engage with each of said disks, and supplemental detents or locking elements, and corresponding keepers for the latter.

Other objects and important features are pointed out or implied in the following details of description, in connection with the accompanying drawings in which:

Figure 1 is an elevation of a door-frame having a door hinged thereon and in its wide-open position, said door and door-frame having my invention applied thereto.

Figure 2 is an elevation showing the opposite or inner side of the door-frame, the door being closed, but not locked.

Figure 3 is a detail view showing a fragment of the door and door-frame, the permutation disks being in their locking position, that is, engaged with the respective keepers.

Figure 4 is a detail view showing the door having a part of the permutation lock secured thereto, other parts of the permutation lock being detached from the door, arranged in axial alinement and in order in which they are to be assembled, but spaced from one another so as to show the construction of each element clearly, certain of these parts being partly in section.

Figure 5 is a detail view of the keeper or slotted plate which is secured on the door-frame and engages with the permutation plates or disks when the door is locked.

Figure 6 is a view showing a fragment of the door-frame having the keeper secured thereto and also having the pivots of the supplemental locking members shown in a cavity of the door-frame.

Referring to these drawings in detail, in which similar reference characters correspond to similar parts in the several views, the invention will now be described in detail as follows:

The door-frame 10 may be of any appropriate size, shape and material, and the present illustration may be considered as applying to a small safe or safe-deposit box or inner compartment of a safe. The frame is provided with a cavity or keeper-seat 11 in which is seated a keeper-frame or base 12. A slotted keeper plate 13 is secured over the cavity 11, by screws 14 or other appropriate means, and this keeper-plate is provided with three parallel bars or keeper-elements 15 which are separated by slots 16. The plate 13 also has openings or slots 17 which may either be a continuation of one of the slots 16, or be separate therefrom as shown.

The door 18 is hinged to the frame 10 at 18^a, and has secured thereto the parts of the permutation lock which are shown in Figure 4. The permutation lock may be considered as consisting of three units, that is, the closure-carried unit, the frame-carried unit or keeper 13, and the auxiliary or supplemental locking unit which includes the plate or base 12 and the locking elements carried thereby.

The door-carried unit consists of a combined knob or handle 19, index-disk 20 and apertured boss or journal member 21, the latter being provided with a retaining flange 22. Retaining plates 23 are engaged with the flange 22 and are secured on the door 18 by rivets or other appropriate means which may also be employed for securing keeper elements 24 in place. The member 19—20—21 has a reduced pivotal portion 25 extending into the hollow axle or journal-

member 27 which is slabbed at 28 and provided with a screw-threaded part 29 for engagement with a screw 30, which latter extends through a central opening 31 of a yoke 32 which is riveted or otherwise secured to the door or closure 18. The member 19—20—21 may have any appropriate number of apertures 33 which are interchangeably engageable with a stud 34 on a disk 35 which has a central circular opening 36 which serves as a bearing to receive the rod 27 so that it can rotate around the rod or axle 27 and carry its actuating lug or stud 37. A spacing-washer 38 is centrally apertured to receive the adjacent end of the axle 27 and to fit against the slabbed side 28, so as to prevent it from rotating. Three permutation disks 39 have circular openings and are mounted for rotation upon the non-rotary axle 27, and two spacing washers 40 are disposed between these disks and have openings with straight marginal parts that fit snugly against the slabbed side 28 to prevent them from rotating. A washer 41 also fits against the slabbed side and against the inner side of the innermost permutation disk, being yieldingly held against the latter by a compression spring 42, the inner end of which is seated against the yoke 32. Each disk 39 has an outwardly extending actuator or stud 43 and an inwardly extending actuator 44, these studs being positioned for abutting against one another and against the stud 37 when the disk 35 is rotated. Each of the disks 39 is approximately circular, but has one straight edge 45 which is provided by eliminating a small segment of the circle. These straight edges 45 are in such relation to the studs 37, 43 and 44, that they are adapted to be moved into the same plane by rotation forward and backward in a manner which is well known to persons who are familiar with this type of permutation lock.

When the straight edges 45 are in the same plane while the door is closed, and are parallel with the outer face of the keeper or plate 13, they are slightly spaced from the plate 13, and the door can be closed and opened without interference of these disks with the keeper-plate. However, if any one of these plates is turned from this position, its arcuate part will extend through the corresponding slot 16, so it engages with the corresponding keeper element 15, and secures the door against being opened. If two of the disks are turned so they extend through the slots 16, the security is doubled, and if three of the disks extend through the slots 16, the security is trebled, and this is true as to strength of the locking engagement as well as to the difficulty of turning the disks out of engagement with the keeper 13 without knowing the combination of the permutation lock.

For making the security of this lock fourfold, the supplemental or auxiliary locking

mechanism is provided in the cavity 11. This mechanism includes two duplicate levers 46 each provided with a keeper-engaging part or lug 47, a central opening or bearing 48 and a spring-seat 49. These levers are pivotally mounted on pivots 50 which project from the base-plate 12 through the bearing sleeves 48, which serve to hold these levers in such position that their parts 47 extend through the respective openings 17. A spring 51 has one end against the spring-seats 49, and bears against the latter for normally holding the parts 47 retracted within the cavity 11. The spring-seats 49 extend across all of the slots 16 and in position to be pressed inward by the arcuate parts of the disks 39. Therefore, when any one of the disks 39 extends through the corresponding slots 16, both levers 46 are actuated thereby, so their parts 47 extend through slots 17 and thus engage with the keeper 13 so as to supplement the locking effect of the disk or disks 39.

In changing the combination, it is only necessary for the disk 35 to be moved inward a slight distance and held while the knob 19 is turned, so the stud 34 will be engaged with another one of the recesses 33. In order that the disk 35 may thus be moved, the screws 32a must be loosened, or the inner disk 39 may be sprung slightly, and when it is released from the means by which it is sprung, it will return to its normal condition or relation, for it is composed of somewhat springy material.

Although I have described this embodiment of my invention specifically, it is not my intention to limit my patent protection to these exact details of construction and arrangement, for the invention is susceptible of numerous changes within the scope of the inventive ideas as implied and claimed.

What I claim as my invention is:

1. In a permutation lock, the combination of a closure-frame, a closure engaged with said closure-frame for closing it, a locking unit mounted on the closure and including a rotary plate having a straight edge and an arcuate edge, a keeper-plate mounted on the closure-frame and having a slot through which said arcuate edge is adapted to extend for locking engagement with the keeper-plate, and a supplemental locking device including a lever which is operable by said arcuate edge, said closure being provided with a keeper-element for engagement with said lever, and means to move said lever for unlocking said supplemental locking device when said arcuate edge is moved out of engagement with said lever.

2. In a locking device, the combination of a closure-frame having a cavity therein, a closure engaged with said closure-frame for closing it, keepers on said closure, two complementary levers pivotally mounted in said cavity and each provided with a part which

is movable into engagement with a corresponding one of said keepers, yielding means to normally hold said levers out of engagement with said keepers, a keeper-plate disposed over said cavity and having a slot substantially between the keeper-engaging parts of said levers, and a plate mounted for rotation on said closure and provided with a part which is adapted to extend through said slot of the keeper-plate and to co-act therewith for locking the closure and for actuating said levers so as to cause their engagement with the keepers on said closure.

In testimony whereof I affix my signature.

MILON H. BORZIN.