

F. HANDSCHUH:
UNLOCKING MECHANISM FOR SAFES AND VAULTS.
APPLICATION FILED FEB. 13, 1912.

1,054,112.

Patented Feb. 25, 1913.

2 SHEETS—SHEET 1.

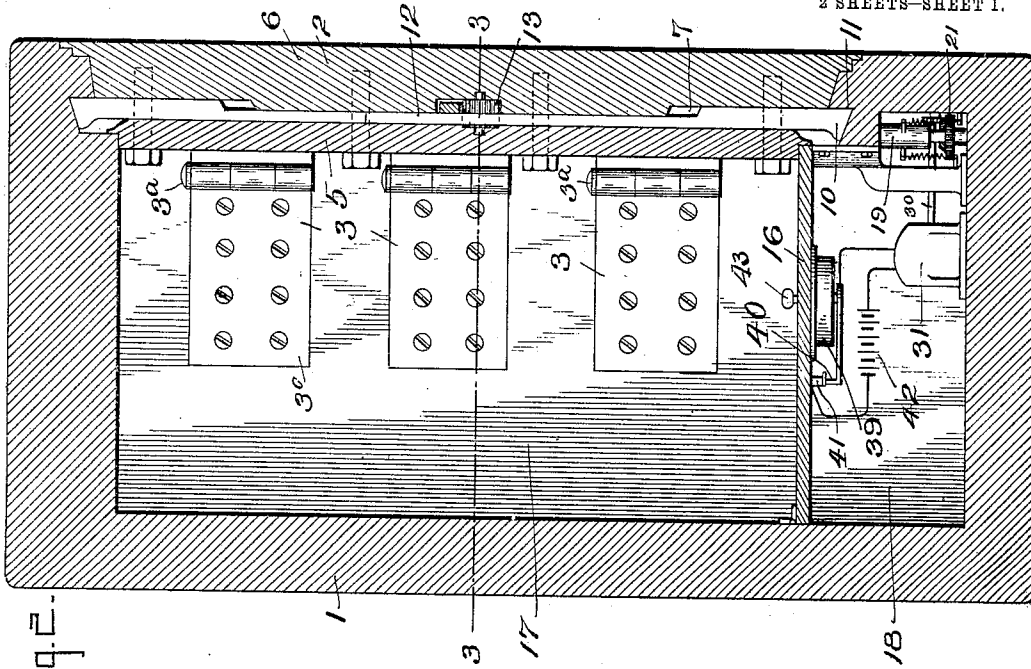


Fig. 2.

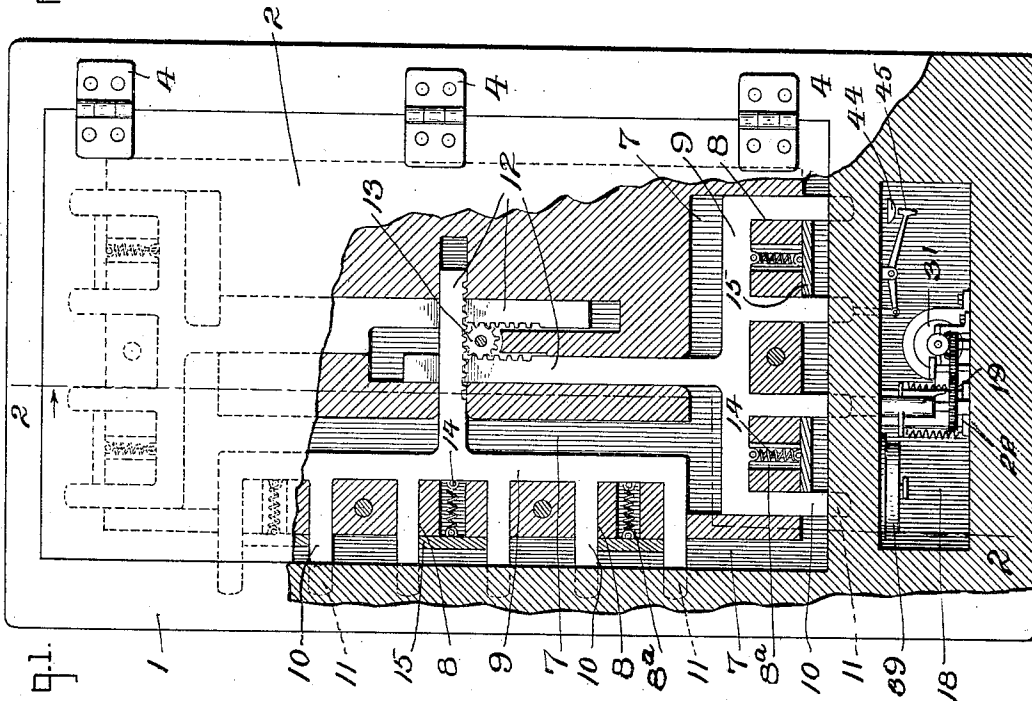


Fig. 1.

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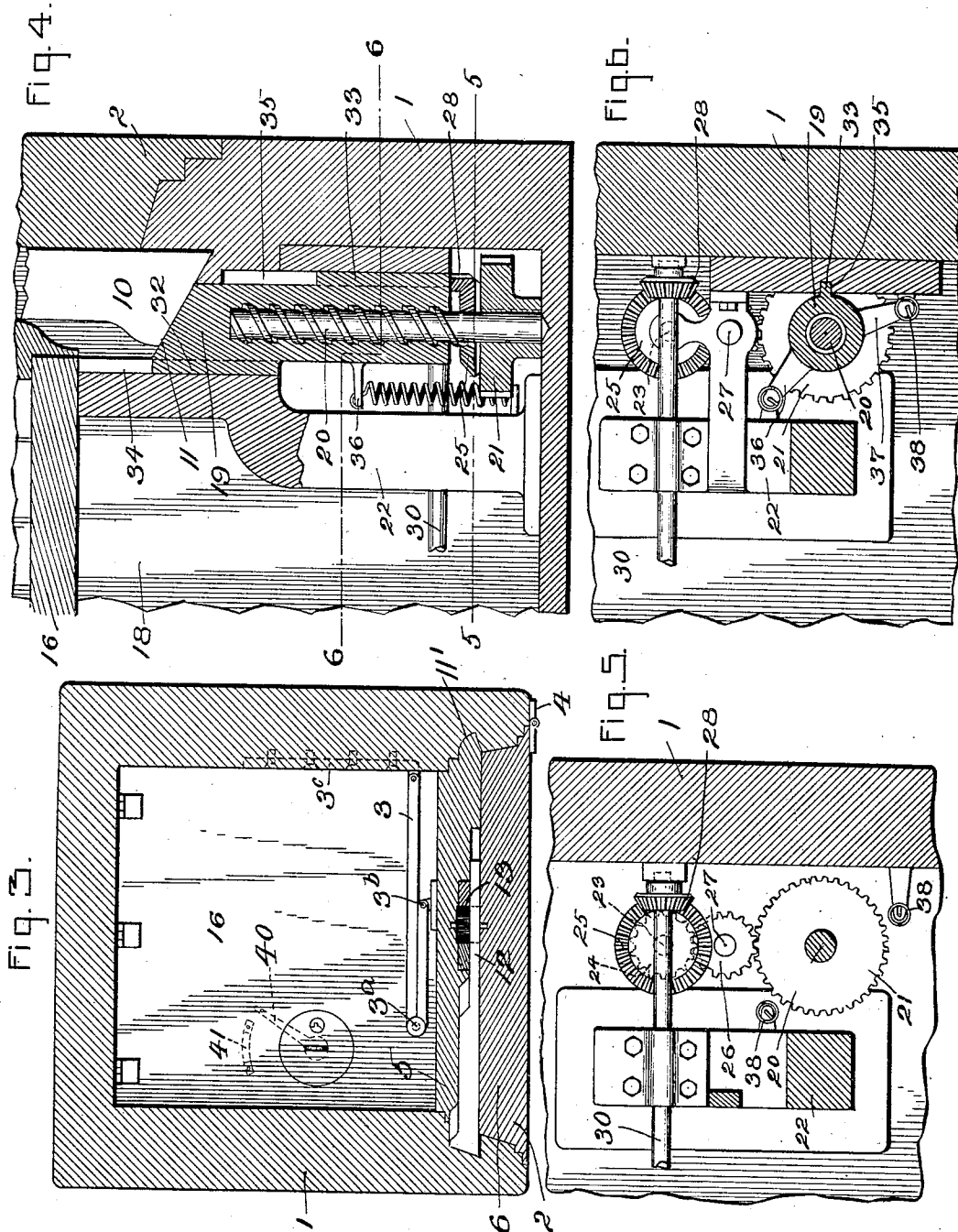
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ATTORNEYS

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UNITED STATES PATENT OFFICE.

FRANK HANDSCHUH, OF BUFFALO, NEW YORK.

UNLOCKING MECHANISM FOR SAFES AND VAULTS.

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Specification of Letters Patent.

Patented Feb. 25, 1913.

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To all whom it may concern:

Be it known that I, FRANK HANDSCHUH, a subject of the Emperor of Austria-Hungary, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Unlocking Mechanism for Safes and Vaults, of which the following is a specification.

This invention relates to the unlocking mechanism of safes and vaults and especially time unlocking mechanism.

The objects of my invention are to improve the unlocking mechanism and to so construct the same that the safe-door is automatically opened after being unlocked.

In the accompanying drawings consisting of 2 sheets: Figure 1 is a front elevation of the improved safe, partly broken away, to show the locking bolts and other internal mechanism. Fig. 2 is a transverse vertical section on line 2—2, Fig. 1. Fig. 3 is a horizontal section on line 3—3, Fig. 2. Fig. 4 is an enlarged sectional elevation, showing the door-unlocking mechanism. Figs. 5 and 6 are horizontal sections on lines 5—5 and 6—6, Fig. 4.

Similar characters of reference indicate corresponding parts throughout the several views.

1 represents the body of the safe upon which is pivotally mounted the door 2, the latter is preferably provided with internal and external hinges 3 and 4, respectively, the internal hinges 3 being designed to carry the weight of the door, while the external hinges are arranged at one edge of the door and serve merely to confine it to a definite swinging movement like any ordinary hinged door. Each of the internal hinges preferably consists of a pair of horizontal links or leaves pivoted to each other at their meeting ends by a pin 3^a, while their opposite ends are respectively pivoted to lugs or brackets 3^b, 3^c secured to the inner side of the safe door and that side wall of the safe body to which the external hinges 4 are attached. These internal hinge-members form the chief supports of the door in all positions of the latter and folding or unfolding in an obvious manner as the door is closed or opened. As these supporting hinges are wholly within the safe, they cannot be pried or broken off like ordinary external hinges.

The door preferably consists of inner and outer plates 5, 6, firmly bolted together and

having arranged therebetween slots or recesses 7 and bolt-guides 8 communicating therewith. Arranged within these slots are bars 9 carrying therewith outwardly locking bolts 10 which are adapted to enter the apertures 11 arranged in the bottom, side and top walls of the door-opening, the front ends of these bolts being preferably beveled in the customary manner. The rear edge of the door is provided with a flange 11¹ which enters a groove in the adjacent wall of the safe when the door is closed, thereby eliminating the necessity of providing locking bolts at said rear edge. Extending inwardly from each of the bolt bars 9 is a rack bar 12, all of said rack bars meshing with a pinion 13, which imparts equal and simultaneous movement to the several rack-bars and bolts. Located in several recesses 8^a of the door are springs 14 which are connected at their inner ends to the bolt bars 9 while their outer ends are connected to abutment plates 15 which bridge the outer ends of said recesses. These springs tend to hold the locking bolts in their locked position.

The safe is divided by a floor or partition 16 into upper and lower chambers or compartments 17, 18, the upper chamber being adapted to receive the contents of the safe while the lower chamber is adapted to receive the unlocking mechanism. This floor is preferably hinged to the rear wall of the safe to swing upwardly, as shown, but it may be otherwise held in place, if desired. The door 2 is applied only to the upper or main compartment 17. The lower or auxiliary compartment 18 is permanently closed on all sides, so that access can be had thereto only through its top upon raising or removing the floor 16.

The unlocking mechanism consists of a vertically movable rod or plunger 19 which is located directly beneath or in line with one of the locking bolts 10. Engaging a longitudinally screw threaded bore of this plunger is a rotary screw 20 of comparatively steep pitch journaled at its lower end in a bearing in the floor of the lower safe-compartment 18, as best shown in Fig. 4. On the lower portion of the screw 20 is secured a gear wheel 21. Mounted vertically in a stationary frame or standard 22 is a shaft 23 to which is fixed the gear wheel 24 and the bevel gear 25. The wheel 24 engages an idle gear 26 which is mounted on

the shaft 27 and meshes with the gear wheel 21 while the bevel gear 25 is rotated by a bevel pinion 28 secured to the motor-shaft 30 which in turn is rotated by a motor 31, preferably an electric motor. The unlocking plunger 19 is provided on its periphery with longitudinal tongues or splines 32, 33, which engage vertical grooves 34, 35 in the front side of the frame 22 and the opposing wall 10 of the safe, thus preventing the plunger 19 from rotating when rotary motion is imparted to the screw 20. Projecting laterally from the plunger are arms 36, 37 having attached thereto springs 38 which are secured at their lower ends to the frame 22 and inner wall of the safe. The motor 31 is electrically connected with a clock 39 of any suitable construction. Extending from this clock is a contact finger 40 which engages a contact plate 41 electrically connected through a battery 42 to the motor 31. Projecting above the flooring 16 is the winding knob 43 of the clock. At a predetermined time the contact members 40-41 come together, thereby starting the motor 31 which through the train of gearing hereinbefore described imparts a rotary movement to the screw 20. Inasmuch as the plunger 19 cannot rotate, it is forced upwardly against the cooperating locking bolt 10, forcing the latter and all the other bolts out of the apertures 11 in the safe body and unlocking the door. At the same time the springs 38 are strained. Owing to the beveled faces of the locking bolts 10, the plunger 19 after having pushed said bolts to their unlocked position forces the door open by the continued upward movement of the plunger. To facilitate this action, the upper end of the plunger 19 is preferably beveled to correspond to the slant of the contiguous locking bolt 10. When the contact 40 passes the contact 41, the motor stops and the springs 38 react and retract the plunger to its initial lowered position, rotating the screw in the opposite direction, the motor-armature (not shown) and the train of gearing between it and the screw taking part in this backward rotation of the latter. This improved unlocking mechanism, while comparatively simple in construction, is positive and reliable in operation. By locating this mechanism wholly in a separate compartment below the main compartment of the safe, it is exceedingly difficult for unauthorized employees or other persons to reset the clock or otherwise tamper with the unlocking mechanism without danger of detection, as it is necessary to empty the safe and re-

move the flooring 16 before access can be had to said mechanism.

Mounted in the lower compartment 17 is a bell 44 which is arranged to be struck by a hammer or tappet 45 when the bolts 10 have passed into the apertures 11 and locked the safe-door, thus giving an alarm of that fact.

I claim as my invention:

1. The combination of a safe body, a door applied thereto, a locking bolt carried by the door and provided with a beveled face, a slidable unlocking member arranged to bear endwise against said beveled face, whereby after the bolt has been shifted to its unlocked position by said member, the continued pressure of the member against said beveled face forces the door open, and means for operating said unlocking member.

2. The combination of the safe-body, a door applied thereto and having a locking bolt, a non-rotary reciprocating member co-acting with said bolt to unlock the same, a rotary screw engaging said member for imparting longitudinal movement thereto, and means for rotating said screw.

3. The combination of the safe-body, a door applied thereto and having a locking bolt, a non-rotary reciprocating member co-acting with said bolt to unlock the same, a rotary screw engaging said member for imparting longitudinal movement thereto, means for rotating said screw to advance said member, and means for automatically retracting said member.

4. The combination of the safe-body, a door applied thereto and having a locking bolt, a non-rotary reciprocating member co-acting with said bolt to unlock the same, a rotary screw engaging said member for imparting longitudinal movement thereto, means for rotating said screw, and a return-spring connected with said reciprocating member.

5. The combination of a safe body, its door, a locking bolt carried by the door, and unlocking means comprising a non-rotary plunger acting on said bolt and having a screw threaded bore, a rotary screw engaging said bore, means for rotating said screw in one direction, and a return spring connected with said plunger for withdrawing it to its initial position at the end of its forward movement.

Witness my hand this 1st day of February, 1912.

FRANK HANDSCHUH.

Witnesses:

C. F. GEYER,
E. M. GRAHAM.