

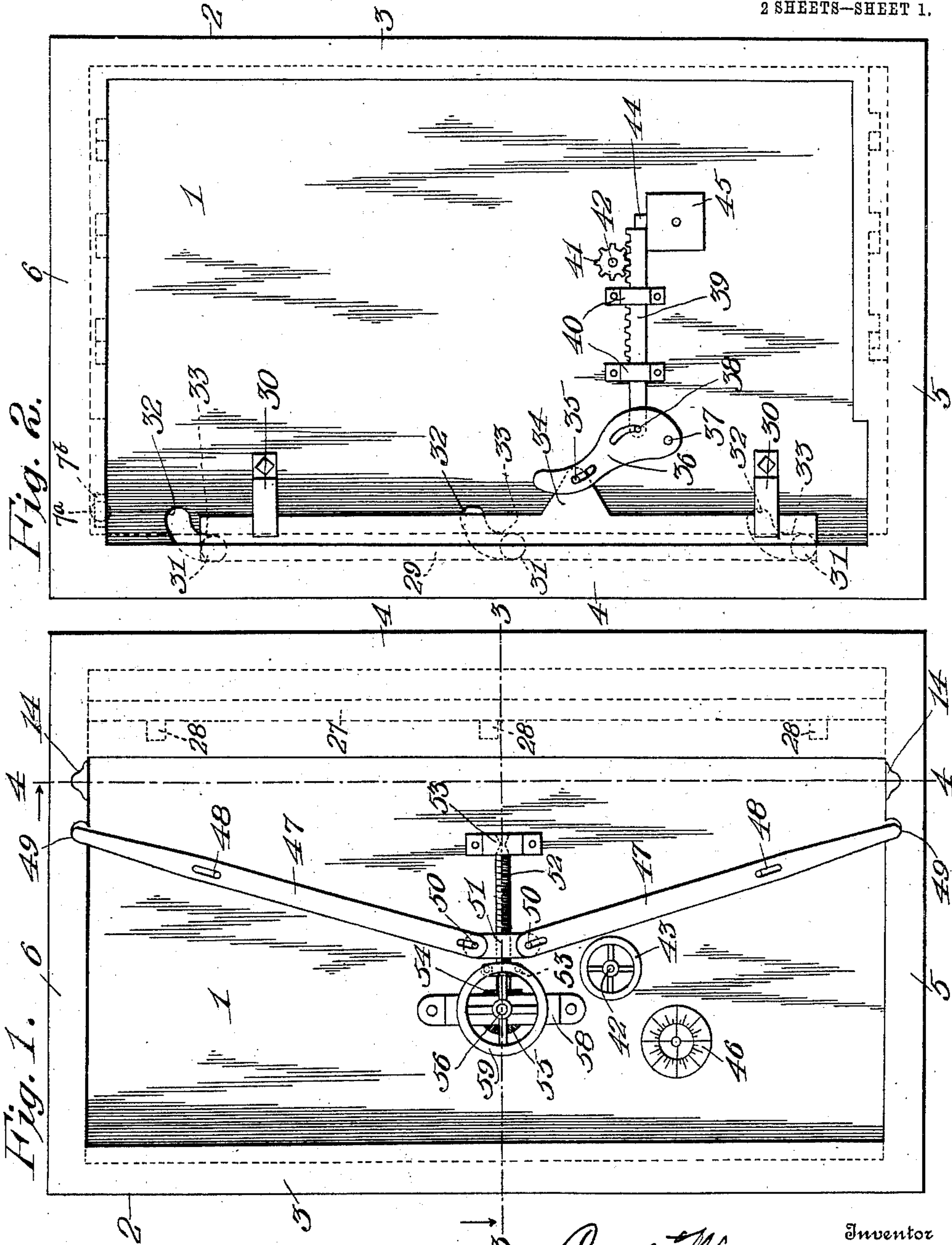
C. WEISS.  
VAULT DOOR.

APPLICATION FILED SEPT. 15, 1908.

915,397.

Patented Mar. 16, 1909.

2 SHEETS—SHEET 1.



Witnesses

Chas. L. Gruebauer

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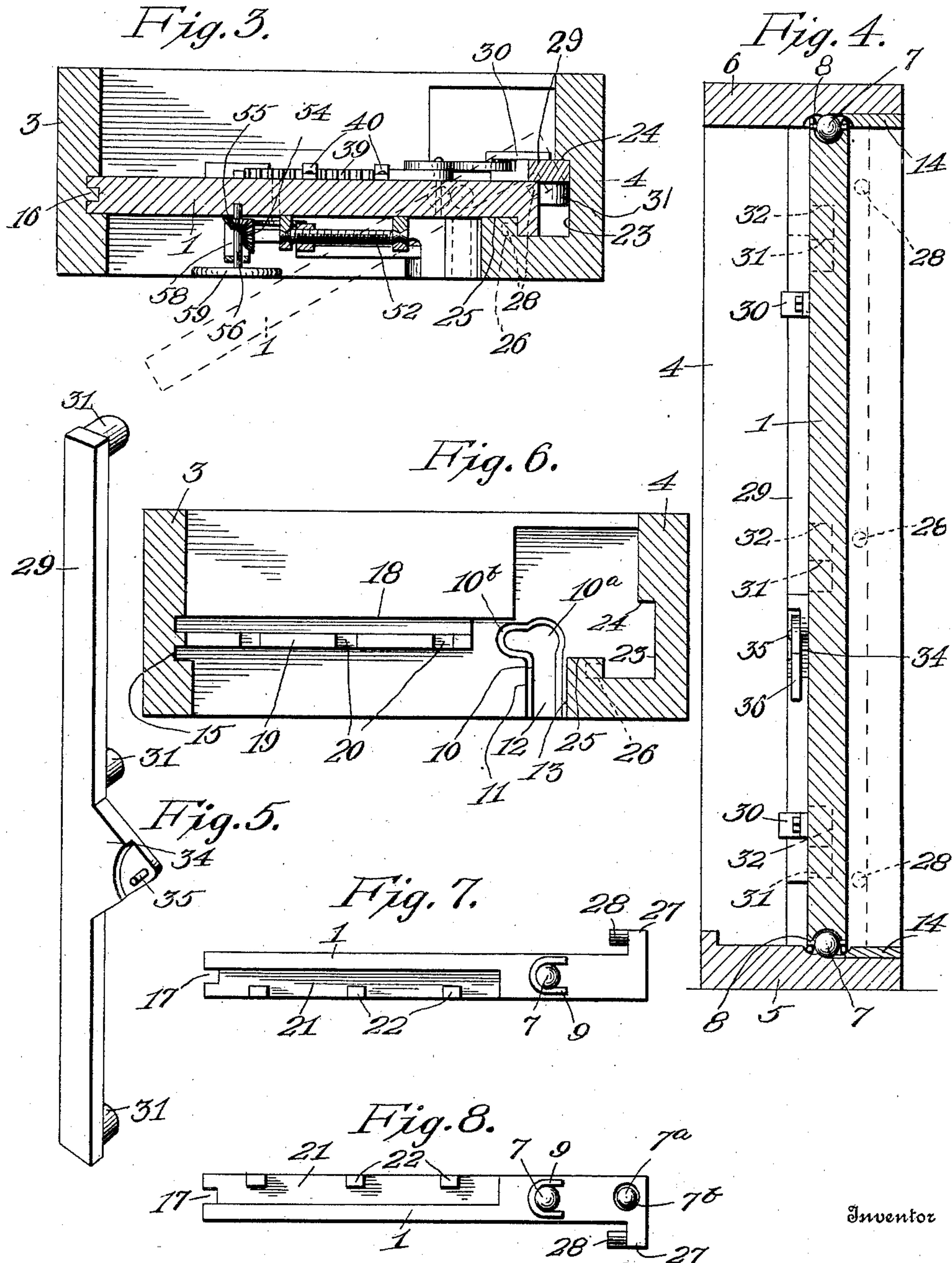
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# UNITED STATES PATENT OFFICE.

CARL WEISS, OF WASHINGTON, DISTRICT OF COLUMBIA.

## VAULT-DOOR.

No. 915,397.

Specification of Letters Patent.

Patented March 16, 1909.

Application filed September 15, 1908. Serial No. 453,172.

*To all whom it may concern:*

Be it known that I, CARL WEISS, a subject of the Emperor of Germany, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Vault-Doors, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in burglar proof doors for bank vaults, safes and the like.

The object of the invention is to provide a simple and practical door of this character which will be effectively secured and locked around all of its edges so that it will be impossible for it to be blown open or otherwise opened by unauthorized persons.

With the above and other objects in view, the invention consists of the novel features of construction and the combination and arrangement of parts hereinafter fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the improved door and its frame; Fig. 2 is an elevation of the rear or inner side of the same; Fig. 3 is a horizontal section taken on the line 3—3 in Fig. 1; Fig. 4 is a vertical section on the line 4—4 in Fig. 1; Fig. 5 is a detail perspective of the movable side bolt; Fig. 6 is a horizontal section through the door frame looking downwardly; Fig. 7 is a view of the bottom edge of the door; and Fig. 8 is a plan view of the top edge of the door.

In the drawings 1 denotes the door which is of substantially rectangular shape and mounted for both sliding and swinging movement in a frame 2 consisting of two sides or jambs 3, 4, a bottom or sill 5 and a top or cap 6. The door is provided in its top and bottom edges and at a suitable distance from its inner side edge with pivots 7 in the form of balls or spheres journaled upon transverse pivot pins 8 arranged in substantially U-shaped socket bearings 9 which are formed upon and project from said top and bottom edges of the door, as more clearly shown in Figs. 7 and 8. The pivots 7 are adapted to engage elongated bearing recesses or channels 10 formed in the top and bottom of the door frame and their U-shaped bearing projections 9 are adapted to engage grooves 11 which surround the recesses 10, as shown in Fig. 6. This construction will permit the door to be shifted or slid transversely in the frame and also swung outwardly or in a for-

ward direction, as indicated in dotted lines in Fig. 3. In order to permit the pivot balls 7 to be initially placed in their recesses 10, the latter and also the grooves 11 are made L-shaped so as to have extensions 12, 13 which open upon the front edges of the top and bottom of the door frame. After the door has been placed in position in the frame said extensions are adapted to be closed by suitably shaped plates 14, as shown more clearly in Figs. 1 and 4. The recesses 10 extend transversely of the door frame and when the pivot balls 7 are in their ends 10<sup>a</sup> the door will be permitted to swing upon said balls as pivots and when swung inwardly it can be slid or shifted transversely of the frame, whereupon said pivot balls will move from the ends 10<sup>a</sup> to the ends 10<sup>b</sup> of said recesses 10, as herein-after more fully explained.

The side or jamb 3 of the door frame is formed with a vertical channel 15 into which the free or outer edge of the door is adapted to be projected by reason of its sliding movement. Said channel 15 is of just sufficient width to receive said edge of the door and in its bottom is preferably formed a rib 16 adapted to enter a longitudinal groove 17 in the edge of the door when the door is projected into the channel 15.

The top and bottom of the door frame are recessed toward their front or outer portions to provide stop shoulders 18 adapted to be engaged by the inner face of the door when the latter is swung into the frame, and also to provide ribs 19 which are spaced by transverse slots 20. The top and bottom edges of the door are also recessed, as shown at 21 in Fig. 7 so as to receive the ribs 19 and in said recesses 21 are formed projections 22 which are adapted to pass through the slots 20 when the door is swung closed. Said projections 22 are adapted to be shifted in rear of the ribs 19 when the door is slid to its locked position after being closed and thereby serve as a locking means for the top and bottom of the door. In order to prevent the outer edge of the door from sagging when it is swung open, a bearing ball 7<sup>a</sup> is arranged in a socket 7<sup>b</sup> formed in the upper edge of the door close to its inner side edge.

The side or jamb 4 of the door frame is recessed, as shown at 23, to receive the inner edge of the door and to provide a stop shoulder 24 and a rearwardly or inwardly projecting rib 25 formed in its inner side with recesses or seats 26. Formed upon said inner



edge of the door and projecting forwardly is a rib 27 formed with locking projections or studs 28. When the door swings to its closed position in the frame the rib 27 is adapted to swing into the recess 23 so that the projections 28 are disposed opposite the seats 26 in the rib 25, and when said door is shifted transversely to its locked position said projections 28 are adapted to enter the seats or recesses 26 to lock said inner edge of the door. The inner or pivoted edge of the door is further locked by a shiftable upright bolt 29 arranged for sliding movement upon the inner or rear face of the door and adapted to be projected into and out of the recess 23 and into and out of engagement with the shoulder 24 of the latter. Said bolt 29 is in the form of an upright bar or plate slidably mounted in guide brackets 30 and formed with forwardly projecting studs 31 adapted to work in curved grooves or seats 32 formed in said inner edge of the door. Said bolt 29 is adapted to be retracted by moving said studs upwardly into the seats or recesses 32 so that it will clear the shoulder 24 on the side or jamb 4, and it is adapted to effectively lock the door against movement when its studs 31 are moved out of the seats or recesses 32 and into engagement with the straight portions 33 of the inner edge of the door. In order to actuate the bolt 29 it is provided with an arm 34 carrying a pin 35 which works in a slot in the free end of a lever 36 which latter is pivoted at one end as at 37 upon the inside of the door. Said lever 36 has a slot and pin connection 38 with one end of a rack bar 39 mounted for sliding movement in bearings 40. Said rack bar is in mesh with the pinion 41 fixed upon the inner end by a shaft 42 extending through the door and provided upon its front or outer end with a hand wheel 43. It will be seen that when the latter is rotated the rack bar 39 will be shifted to actuate the bolt 29.

In order to lock the controlling shaft 42, any suitable locking means may be provided. As illustrated, a sliding bolt 44 is arranged in a casing 45 and is adapted to be projected into and out of the path of the rack bar 39. The casing 45 is arranged upon the inside of the door and contains a permutation lock controlled by a dial and operating handle 46 arranged upon the outside of the door, as shown in Fig. 1.

The door 1 is very heavy and in order to permit it to be easily shifted or slid transversely within the frame, the operating device shown in Fig. 1 is preferably provided. This operating mechanism comprises two levers 47 loosely fulcrumed intermediate their ends at 48 upon the door and adapted to have their outer ends engage grooves or recesses 49 formed in the top and bottom of the door frame. The inner ends of the levers

47 have a slot and pin connection 50 with a nut 51 arranged upon a screw 52 which is swiveled in bearings 53 upon the door. At one end of said screw is a beveled pinion 54 which meshes with a similar pinion 55 on a shaft 56 journaled in bearing 58 and provided with a hand wheel 59. It will be seen that by rotating the latter the screw 52 may be turned to move the nut thereon and to thereby shift the levers 47 for the purpose of sliding the door transversely in its frame.

The operation of the invention is as follows: Assuming the door to be in its closed and locked position shown in the drawings, when it is desired to open the door the dial 47 of the lock is first manipulated to unlock the bolt 44 and the handle of said lock is then turned to retract the bolt 44 from the path of the rack bar 39. The handle 43 is then turned to shift the rack bar 39 and cause the lever 36 to retract the bolt 29. The hand wheel 59 is then turned to actuate the door shifting device shown in Fig. 1 and to cause the levers 47 to shift or slide the door transversely within the frame and thereby move the pivot balls 7 of the door from the ends 10<sup>b</sup> to the ends 10<sup>a</sup> of the bearing recesses 10. When this is done the outer edge of the door leaves the channel 15, the locking projections 22 register with the slots or grooves 20 and the projections or studs 28 leave the seats 26 so that the door may be swung outwardly, as indicated in dotted lines in Fig. 3. The door may be closed and effectively locked by reversing the operation just described.

From the foregoing it will be seen that the invention provides an exceedingly effective lock for the door of a bank vault, a safe, and the like; and that it is effectively secured around all of its edges so that it cannot be blown open by an explosive and cannot be otherwise opened by an unauthorized person.

Having thus described the invention what is claimed is:

1. The combination of a door frame, a door pivoted therein to swing to its closed position and adapted to be shifted or slid transversely when in its closed position in said frame to hold it against swinging movement, a bolt for locking the door against shifting or sliding movement and a lock for controlling said bolt.

2. The combination of a door frame having elongated pivot bearings, a door, pivots carried by the latter and arranged in said elongated bearings whereby said door may be swung into and out of the frame, also be slid or shifted within the same and co-acting locking members upon the edges of the door and its frame and adapted to engage each other when the door is shifted within the frame to lock said door against swinging movement and means for preventing shifting movement of the door.

3. The combination of a door frame hav-



ing elongated pivot bearings, a door, pivots carried by the latter and arranged in said elongated bearings whereby said door may be swung into and out of the frame and also be slid or shifted within the same, co-acting locking means upon the edges of the door and its frame to prevent the door from being swung open after it is shifted within the frame, and a bolt for preventing shifting movement of the door.

4. The combination of a door frame having elongated pivot bearings, a door, pivots carried by the latter and arranged in said elongated bearings whereby said door may be swung into and out of the frame and also be slid or shifted within the same, co-acting locking means between the edges of the door and its frame for preventing swinging movement of the latter after it has been shifted within the frame, means for preventing the door from being shifted, and a locking device for the last mentioned means.

5. The combination of a door frame having elongated pivot bearings, a door, pivots carried by the latter and arranged in said elongated bearings whereby said door may be swung into and out of the frame and also be slid or shifted within the same, co-acting means between the edges of the door and its frame for preventing the door from swinging after it has been shifted within the frame, means for preventing the door from being shifted and means for shifting the door when the last mentioned means is inoperative.

6. The combination of a door frame, a door, means for mounting said door whereby it may be swung into and out of the frame and also be slid or shifted within the same, door shifting levers carried by the door and adapted to engage the frame, an operating screw, a nut upon the screw for actuating said levers, and means for rotating said screw.

7. The combination of a door frame having elongated pivot bearings, a door, pivots carried by the latter and arranged in said elongated bearings whereby said door may be swung into and out of the frame and also be slid or shifted within the same, co-acting locking means between the edges of the door and its frame for preventing the door from swinging after it has been shifted, a bolt for preventing the door from being shifted, manually operated means for actuating said bolt and a lock for controlling said operating means.

8. The combination of a door frame, a door, means for mounting the door whereby it may be swung into and out of the frame and also be slid or shifted within the same, co-acting locking means between the edges of the door and its frame for preventing swinging movement of the door after it is shifted within the frame, a bolt carried by the door and adapted to engage the frame to

prevent shifting movement of the door, a lever for operating said bolt, a rack and pinion device for operating said lever and a lock for said rack and pinion device.

9. The combination of a door frame formed in the opposing or inner faces of its top and bottom with elongated pivot recesses, a sliding and swinging door formed in its top and bottom edges with bearing recesses, rotary pivot balls journaled in the bearing recesses of the door and adapted to both run and rotate in the pivot recesses in the frame, means for locking the door against swinging movement when it is swung into the frame and shifted laterally and means for preventing shifting movement of the door.

10. The combination of a door frame, a door mounted in said frame for both swinging and sliding movement, means for locking the door against swinging movement when it is slid or shifted within the frame, means for preventing the door from being shifted after it is locked against swinging movement and means for locking the last mentioned means.

11. The combination of a door frame, a door mounted in said frame for both swinging and sliding movement, means for locking the door against swinging movement when it is slid or shifted within the frame, means for preventing the door from being shifted after it is locked against swinging movement, means for locking the last mentioned means, and means whereby the door may be slid or shifted transversely within the frame.

12. The combination of a door frame having opposing seats, a door mounted within the frame for both sliding and swinging movement, a pair of door shifting levers loosely pivoted to the door intermediate their ends and adapted to have one end removably engage said seats in the frame and means for simultaneously operating the other ends of said levers.

13. The combination of a door frame having a seat, a door slidably mounted in the frame, a door shifting lever fulcrumed intermediate its ends upon the door and adapted to have one end engage said seat and a screw for operating the other end of said lever.

14. The combination of a door frame having opposing seats, a door slidably mounted in the frame, a pair of door shifting levers loosely pivoted intermediate their ends to the door and adapted to have one end engage said seats, a nut loosely connected to the other ends of said levers and a screw arranged in said nut and mounted for rotary but non-sliding movement upon the door.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

CARL WEISS.

Witnesses:

J. D. YOAKLEY,  
L. O. LITTLE.