

A. F. McDONALD.
 MEANS FOR LOCKING DOORS.
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1,179,731.

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Fig. 1.

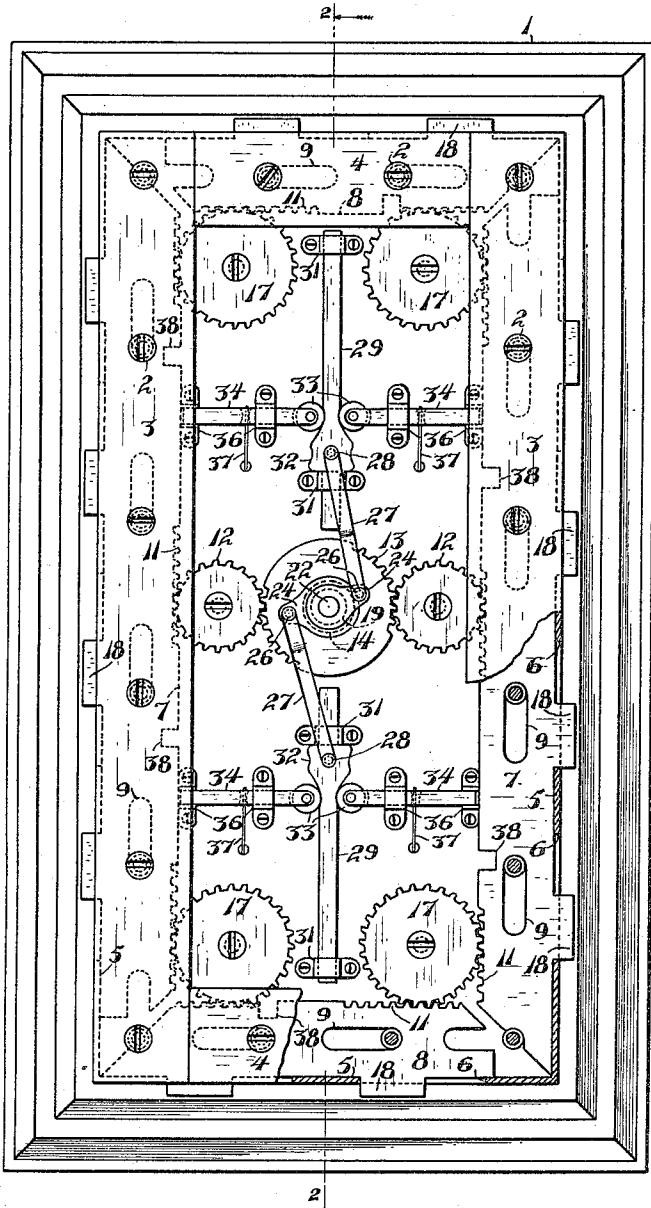
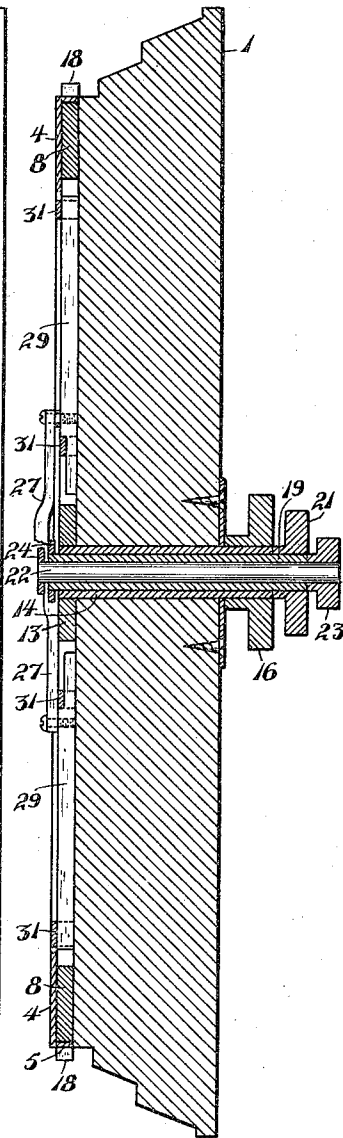


Fig. 2.



Inventor,
 Addie F. McDonald
 By F. M. Wright,
 Attorney

UNITED STATES PATENT OFFICE.

ADDIE F. McDONALD, OF OAKLAND, CALIFORNIA.

MEANS FOR LOCKING DOORS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ADDIE F. McDONALD, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented new and useful Improvements in Means for Locking Doors, of which the following is a specification.

The present invention has for one object to provide a door suitable for safes, vaults, prisons, and the like, which can be locked on all four sides by the continuous movement of a single element.

A further object is to provide additional locking or safety devices for such a door.

In the accompanying drawing, Figure 1 is a broken front view of a door constructed in accordance with my invention; Fig. 2 is a longitudinal sectional view on the line 2—2 of Fig. 1.

Referring to the drawing, 1 indicates a door of a safe, vault, prison, or the like. Secured by screws 2 to the inner side of the door near its edges are plates 3 extending longitudinally of the door and plates 4 extending transversely thereof. The main portions of said plates are spaced from the door by bent portions 5 thereof forming feet resting against the inner surface of the door, said feet being spaced from each other to leave recesses or notches 6. Between said plates and the inner surface of the door can slide longitudinal locking bars 7 and transverse locking bars 8, said bars being guided in their sliding movement by the engagement of said screws 2 with longitudinal slots 9 therein. All of the bars slide in the same cyclical direction, and, with this end in view, the ends of the bars are formed at an angle of 45° therewith. All of said bars are formed on their inner edges with series of racks 11, there being three such racks on each longitudinal bar and two on each transverse bar. The central racks on the longitudinal bars mesh with gear wheels 12, which, in turn, mesh with a central gear wheel 13 secured to a shaft 14 which extends through the door to the outside and is provided on the outside of the door with a knob or handle 16. Upon turning this knob or handle 16, it is evident that longitudinal movement in opposite directions, but in the same cyclical direction around the door, is imparted to the two longitudinal bars.

17 indicates idle gear wheels, pivoted on shafts secured in the door, each of which

wheels 17 meshes with a terminal rack on a longitudinal bar and with a rack on a transverse bar. It results from this construction that, when the longitudinal bars are moved longitudinally, so are likewise the transverse bars, and in the same cyclical direction as the longitudinal bars.

From the outer edges of all the bars extend bolts 18, which, when moved longitudinally in one direction, engage keepers, not shown, in the safe, vault, or other chamber which it is desired to close by the door, but which, when moved in the opposite direction, are out of register with said keepers. It is thus evident that by means of the mechanism above-described I can bolt all four sides of the door by the continuous movement of the knob 16.

To additionally insure the safety of the locking means above-described, the shaft 14 is made hollow and the knob 16 is made annular and there extend therethrough, first, a tube 19 to which is secured an annular knob 21, and then, within the tube 19, a shaft 22 to which is secured, outside the door, a knob 23. To the inner ends of the tube 19 and shaft 22 are secured oppositely extending crank arms 24, to the outer ends of which are pivoted, as shown at 26, links 27, which are also pivoted, as shown at 28, to bolts 29, which slide in guideways 31 secured upon the inner surface of the door. Said bolts are formed on opposite sides with enlargements or cams 32, which engage cam rollers 33 upon the inner ends of bolts 34 which slide in guides 36 secured upon the inner surface of the door, and which are retracted by springs 37. All of said bolts 29 and 34 are adapted to enter recesses 38 in the inner edges of the bars. It thus appears that by turning the annular knob 21, when the bars are in their locking position, one of the transverse bars is locked directly by means of a bolt 29 and the two longitudinal bars are locked by the two bolts 34 at the end of the door next said transverse bar. The other transverse bar is also locked, by reason of its engagement with the idle gear wheels 17, which are locked by means of the longitudinal bars. Upon turning the knob 23 the other transverse bar and the longitudinal bars are directly locked, and therefore each bar becomes doubly locked.

I claim:—

1. In combination with a rectangular door, a bar extending along each edge of

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the door, means for guiding each bar in a movement parallel with the adjacent edge of the door, each bar having a series of bolts extending from its outer edge, and a series of racks in its inner edge, idle gear wheels each of which meshes with a rack on a transverse bar and a rack on a longitudinal bar, gear wheels each meshing with a rack on a longitudinal bar, a central gear wheel meshing with said latter gear wheels, and means extending through the door for operating said central gear wheel.

2. In combination with a rectangular door, a bar extending along each edge of the door, means for guiding each bar in a movement parallel with the adjacent edge of the door, said bars having beveled ends in proximity to each other, each bar having a series of bolts extending from its outer edge, and a series of racks in its inner edge, idle gear wheels each of which meshes with a rack on a transverse bar and a rack on a longitudinal bar, gear wheels each meshing with a rack on a longitudinal bar, a central gear wheel meshing with said latter gear wheels, and means extending through the door for operating said central gear wheel.

3. In combination with a rectangular door, a bar extending along each edge of the door, means for guiding each bar in a movement parallel with the adjacent edge of the door, a bolt carried by each bar, means for moving all of said bars in synchronism in the same cyclical direction, each bar having a recess in its inner edge, bolts movable into said recesses, and means for moving said

bolts operable from the other side of the door.

4. In combination with a rectangular door, a bar at each edge of the door, means for guiding each bar in the direction of its length, a bolt carried by each bar, means for moving all of said bars in synchronism, each bar having in its inner edge a series of recesses, bolts movable into said recesses, rotatable shafts extending through said door, crank arms on said shafts, and links connected to said crank arms and to certain of said bolts, said latter bolts being operatively connected with the remaining bolts.

5. In combination with a rectangular door, a bar at each edge of the door, means for guiding each bar in the direction of its length, a bolt carried by each bar, means for moving all of said bars in synchronism, each bar having in its inner edge a series of recesses, bolts movable into said recesses, rotatable shafts extending through said door, crank arms on said shafts, and links connected to said crank arms and to certain of said bolts, said bolts having enlargements or cams, the remaining bolts having rollers adapted to be actuated by said cams to move the bolts longitudinally, and springs for restoring said latter bolts to their normal position.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses:

ADDIE F. McDONALD.

Witnesses:

F. M. WRIGHT,
D. B. RICHARDS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents Washington, D. C."