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PATENTED MAR. 27, 1906.

J. H. WILLIAMS.

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APPLICATION FILED JUNE 18, 1904.

2 SHEETS—SHEET 1.

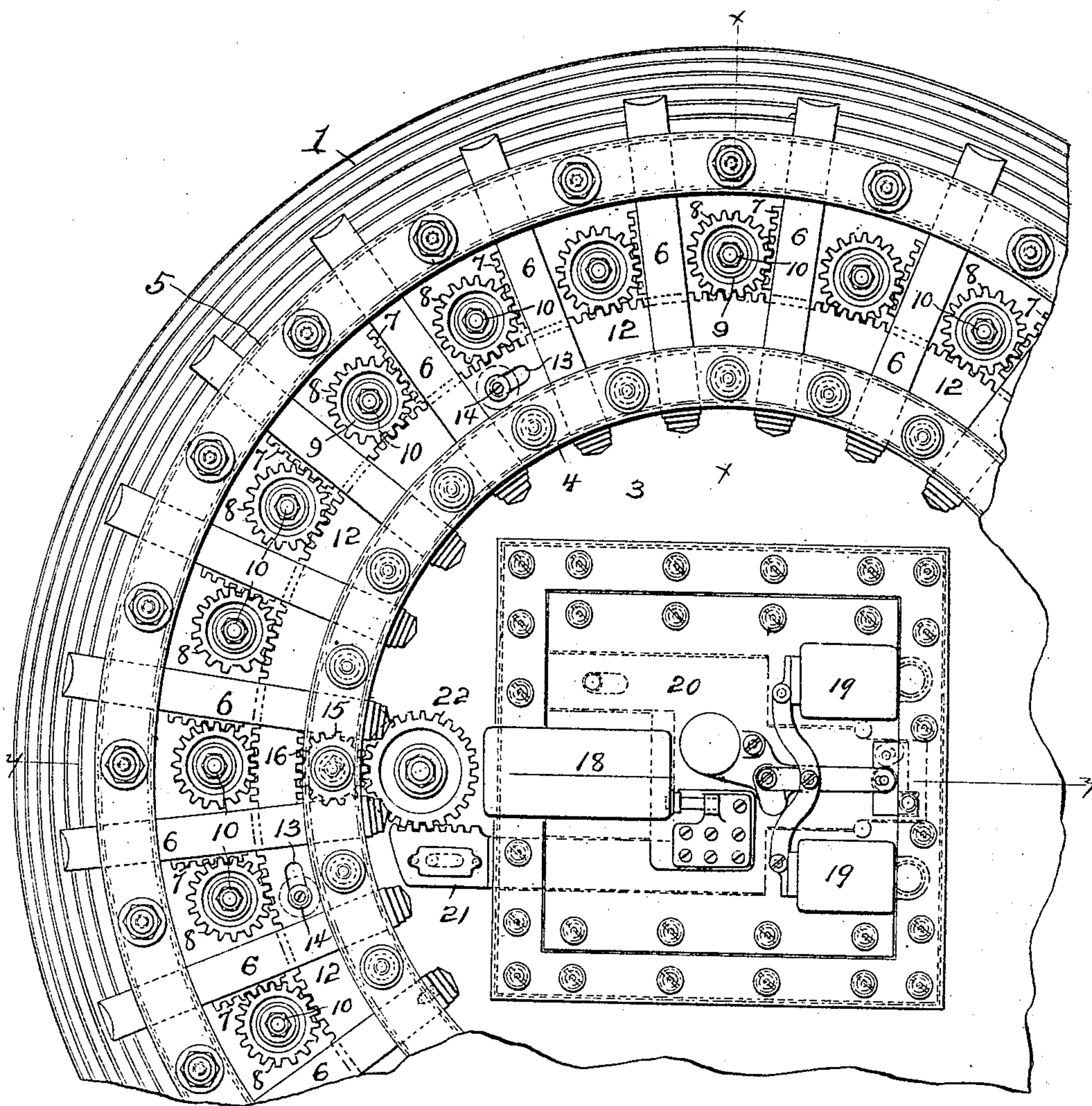


FIG. 1.

WITNESSES

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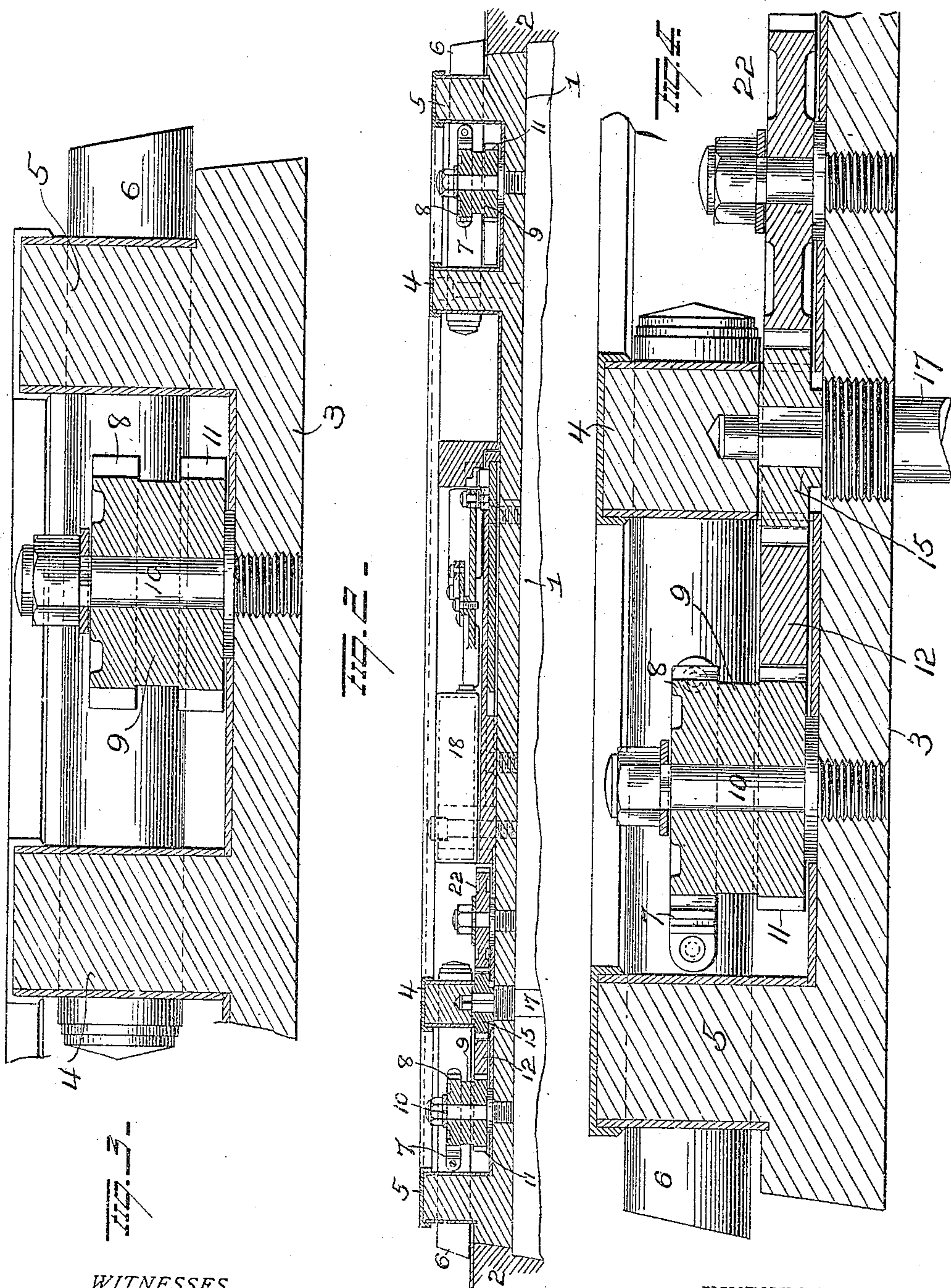
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# UNITED STATES PATENT OFFICE.

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## BOLT CONSTRUCTION FOR SAFE OR VAULT DOORS.

No. 816,519.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed June 18, 1904. Serial No. 213,158.

*To all whom it may concern:*

Be it known that I, JAMES HENRY WILLIAMS, a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Bolt Construction for Safe or Vault Doors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in vaults and safes, and more particularly to the door-bolt construction and operation thereof, the object of the invention being to provide a circular door with radially-mounted bolts and provide improved mechanism for simultaneously operating all of said bolts; and the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a fragmentary face view of the inside of the door, illustrating my improvements. Fig. 2 is a view in cross-section thereof, showing the door in locked position in the vault or safe opening; and Figs. 3 and 4 are views in section on the lines *x x* and *y y*, respectively, of Fig. 1.

1 represents the circular door, and 2 the vestibule, of the safe or vault.

Secured to the inner face of the door 1 and forming a part thereof is a plate 3, having parallel circular enlargements or rings 4 and 5 made with aligned openings forming bearings and guides for an annular series of radially-mounted bolts 6, having free longitudinal movement in the bearings and adapted to be projected over the jamb of the vestibule to lock the door, as will be more fully hereinafter described. Each bolt 6 is provided on one side near the center of its length with a rack 7, each of which is engaged by the upper set of teeth 8 on double gears 9, mounted to turn on bolts 10, secured to plate 3, and the lower set of teeth 11 of all of said double gears are engaged by a circular rack 12, mounted to turn around the inner fixed ring or enlargement 4, and is provided at regular intervals with short slots 13, in which studs 14 are located to limit the movement of said rack.

The rack 12 is turned by a small pinion 15, mounted in a recess in the inner ring or enlargement 4 between two of the bolts 6 and meshing with a short series of rack-teeth 16 on the inner edge of rack 12, and said pinion 15 is secured on a journal 17, passing through the door. The turning of the pinion 15, and consequent operation of the bolts, is controlled by any desired form of locking mechanism, and I have shown as controlling mechanism a time-lock 18 and combination-locks 19, controlling the operation of a plate 20, having a bolt or arm 21 thereon provided with a rack on one edge meshing with a gear 22, which latter meshes with pinion 15 and prevents turning of the latter and the operation of the bolts 6 until desired.

By constructing my improvements as above explained the gears for directly driving the locking-bolts are located between the bearings of said bolts and there is no unnecessary friction of parts, and by so locating the driving-gears I am enabled to employ much larger gears than would be the case were the gears at the inner ends of the bolts, and but a slight movement of the rack is required to operate the bolts.

My improvements are of extremely simple construction, strong and durable in use, and mechanically perfect in operation.

A great many slight changes might be made in the general form and arrangement of parts without departing from my invention, and hence I would have it understood that I do not restrict myself to the precise details set forth, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a door provided with an outer series of bolt-guides arranged in circular formation, and an inner series of bolt-guides parallel with the outer series, of a series of bolts each carried by an inner and outer guide, independent means engaging each bolt for moving same longitudinally, the said means being located intermediate the outer and inner guides, and devices for actuating all of said bolt-engaging means simultaneously.

2. The combination with a door having



two parallel series of bolt-guides, of a series of bolts having bearings in said guides, a rack on an intermediate portion of each bolt, pinions located intermediate of the guides meshing with the racks on the bolts, and means for operating said pinions simultaneously.

3. The combination with a circular door having two parallel series of bolt-guides, of a series of radially-disposed bolts mounted in said guides, a rack on each bolt between its guides, pinions intermediate of the bolt-guides and meshing with the racks on the bolts, a circular rack meshing with said pinions and means for actuating said circular rack.

4. The combination with a door provided with two parallel series of bolt-guides, of a series of bolts having bearings in said guides, each bolt provided with a rack between said guides, gears located between the bolt-guides and engaging the racks on the bolts, a rack also located between said guides and meshing with said pinions, said rack having a series of teeth on its inner edge, a pinion meshing with said series of teeth, and means for rotating said last-mentioned pinion.

5. The combination with a circular door having parallel circular enlargements or rings on its inner face, of a series of radially-

disposed bolts having bearings in aligned openings in the enlargements or rings, racks on said bolts between the rings, gears between the rings engaging the racks on the bolts, a circular rack engaging all of said gears, a pinion adapted to drive the rack, a journal on which said pinion is secured, projecting through the door, and locking mechanism controlling the operation of the pinion.

6. The combination with a circular door, having parallel rings or enlargements on its inner face, of a series of radially-disposed bolts extending all around the door and having aligned bearings in said rings or enlargements, racks secured to the bolts, gears between the rings or enlargements engaging the racks on the bolts, a circular rack around the inner ring or enlargement engaging all of said gears, a pinion engaging said rack, a journal extending through the door and adapted to operate said pinion, and locking mechanism controlling the operation of the pinion.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JAMES HENRY WILLIAMS.

Witnesses:

RUTHERFORD S. FOWLES,  
WILLIAM C. WEISBROD.