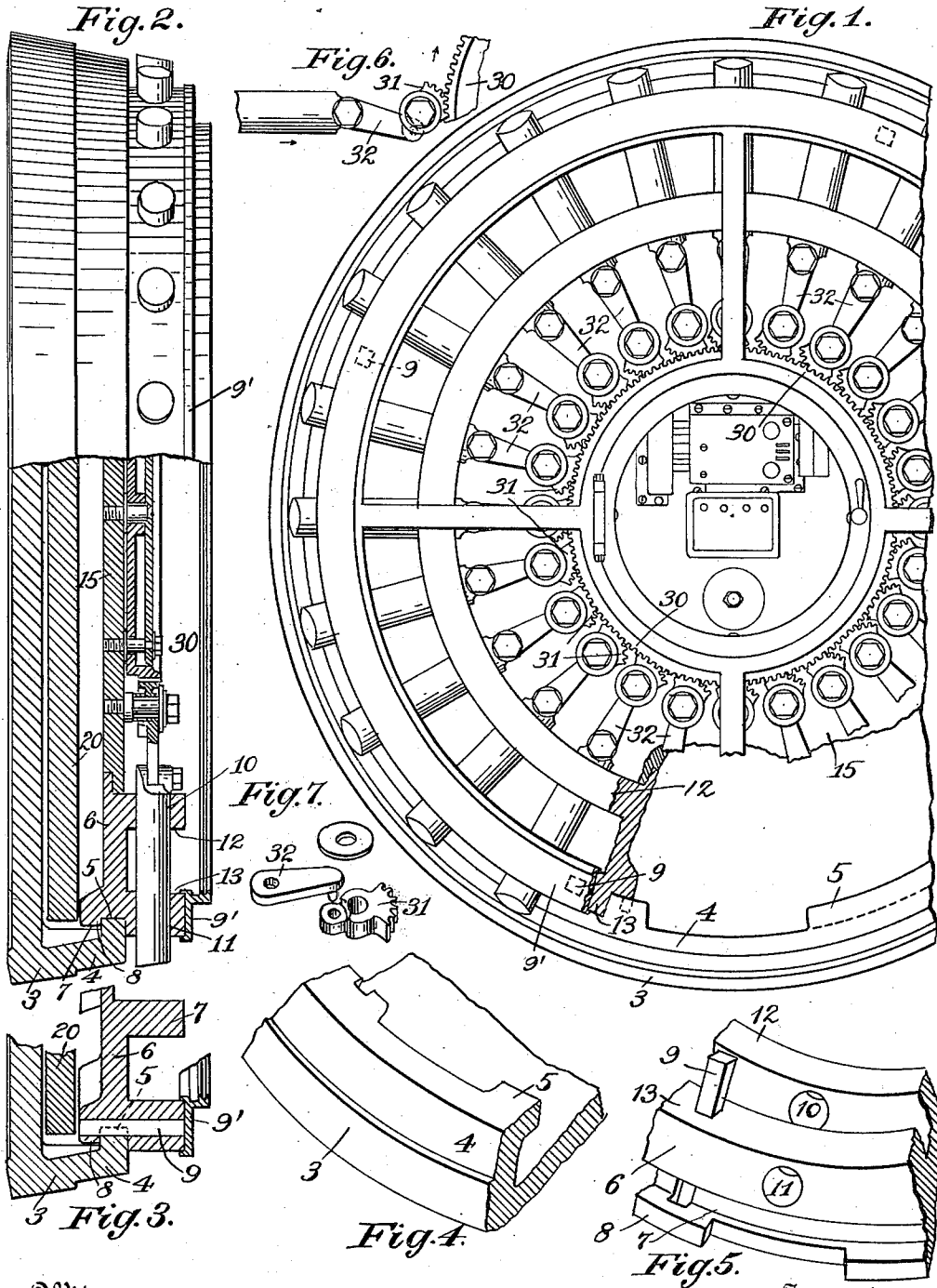


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SAFE OR VAULT DOOR.
APPLICATION FILED DEC. 2, 1909.

997,778.

Patented July 11, 1911.



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SAFE OR VAULT DOOR.

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To all whom it may concern:

Be it known that I, SAMUEL W. FISH, a citizen of the United States, residing at Plainfield, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Safe or Vault Doors, of which the following is a specification.

The present improvement relates to safe or vault doors, and more particularly to the bolting mechanism thereof, the object of the invention being to provide improved means for connecting the bolting mechanism to the door, reference being hereby made to my contemporaneously pending applications Serial No. 561,183, filed May 13, 1910, and Serial No. 578,993, filed August 26, 1910, which illustrate different forms of my improved bolt supporting means as applied to solid doors.

In the drawings accompanying and forming part of this specification, Figure 1 is a rear view of a part of a vault door having part of the bolting mechanism broken away; Fig. 2 is partly a side and partly a sectional view of this improved door and its bolting mechanism; Fig. 3 is a detail sectional view of one portion of the door; Fig. 4 is an enlarged detail perspective view of a portion of the outer member of the door; Fig. 5 is an enlarged detail perspective view of a portion of the inner or bolt supporting member of the door; Fig. 6 is a detail view illustrating a portion of one of the bolts and a portion of the means for protracting and retracting the same; and Fig. 7 is a detail view of the means for operating the bolts.

Similar characters of reference indicate corresponding parts throughout the figures of the drawings.

It is desirable in practice, especially in large vault doors, which usually weigh many tons, to so support the bolting mechanism that the supporting means therefor may be separate and independent of the door proper but so connected therewith that to all intents and purposes the door and its bolting mechanism are a unitary structure, and this is especially desirable where the door is made of unmachineable metal, since in such cases, when the door is itself provided with bolt openings, the casting must not only be unusually heavy and massive, but the heat treatment thereof is difficult.

In the present improvement, in order to

do away with these disadvantages, the door is made up of a pair of members, an outer or body member and an inner or bolt supporting member, the latter of which may be made of some suitable steel less difficult to machine, whereby the outer member may be readily made of unmachineable metal and heat treated while the inner member, as stated, may be made of a different steel and of a steel which can be readily machined.

The door 2 in the form shown comprises the outer member 3 having preferably a rearwardly extending flange 4 provided around the same with suitable lugs 5. The inner or bolt carrying member 6 may comprise an annular ring 7 having lugs 8 adapted to coöperate with the lugs 5 of the outer member 3 and so be interlocked therewith, suitable keys 9 being provided for preventing the separation of the two members of the door when once they are interlocked, the detachment of these keys being prevented by an annular ring or plate 9' secured to the inner member of the door. The annular member 7 is provided with suitable bolt openings 10 and 11 carried by projections 12 and 13 for the reception of the bolts. Secured to this annular member 7 for supporting the bolt operating means and the time lock and other mechanism usually used in vault doors, is a disk 15. By reason of this construction it will be observed that the bolt supporting member 7 may be made of a different metal from that of which the main portion of the door is made, and of a metal, as hereinbefore stated, which can be readily machined, the two members being interlocked by a rotary motion of one relatively to the other through the medium of the lugs, and when so interlocked keyed or otherwise held together. In practice the vault doors may be provided with a protecting plate 20 between the body door and the inner bolt supporting member 7.

For operating the bolts suitable gearing is provided, this being automatically operated or otherwise, as found most desirable in practice. This gearing in the present instance comprises a ring gear 30 meshing with a series of segmental gears or segments 31, one connected with each bolt, and for this purpose each segment 31 is pivotally connected by an arm or crank 32 with its bolt, whereby, on rotating the ring gear, the

segments will be operated to either withdraw or protract the bolts, each segment and its connected crank arm thus forming a toggle joint, so that when the bolts are protracted the pivotal connections of the crank arm of each bolt are in alinement, and therefore in a dead-center position, so that it is impossible to force in or retract the bolts except by rotating the operating gear 30 in the manner shown in Fig. 6.

By reason of the present improvement I am able not only to provide an improved operating means for the bolts, but also an improved means for supporting and securing the bolts to the door, thus obviating the necessity of having the bolt supporting portion of the door and the door proper made as a single massive casting, and also obviating the necessity of making the entire structure of one metal.

I claim as my invention:

1. In a door of the class described, the combination of an outer or door member and an inner or bolt-supporting member having interlocking means rigidly secured together by the rotary movement of one relatively to the other, and door holding bolts carried by said bolt-supporting member.

2. In a door of the class described, the combination of an outer or door member and an inner or bolt-supporting member rigidly secured together by means of lugs carried by said members on the rotation of one relatively to the other, and door holding bolts carried by said bolt-supporting member.

3. A safe or vault door comprising an outer member and a bolt-supporting member having interlocking means interlocked by a rotary movement of one relatively to the other, means for securing them against separation, and sliding bolts carried by said bolt-supporting member.

4. A safe or vault door comprising an outer member and a bolt-supporting member having interlocking means interlocked by a rotary movement of one relatively to the other, means for securing them against separation and comprising one or more keys, and sliding bolts carried by said bolt-supporting member.

5. A circular safe or vault door comprising an outer member and an annular bolt-supporting member having interlocking means interlocked by a rotary movement of one relatively to the other, means for securing them against separation and comprising interlocking lugs carried by the members, and door holding bolts carried by said annular member.

6. A circular safe or vault door comprising an outer member and an annular bolt-supporting member interlocked by a rotary movement of one relatively to the other, means for securing them against separation

and comprising interlocking lugs carried by the members, means for preventing the rotation of one member relatively to the other, and sliding bolts carried by said annular member.

7. A circular safe or vault door comprising a pair of members, one an outer member and the other an inner bolt-supporting ring, said members being made of different metals, means for locking the two members together by a rotary movement of one member relatively to the other and comprising lugs, and door holding bolts carried by said ring.

8. In a safe or vault door, an outer member comprising a body and a rearwardly extending annular flange, an inner member interlocked therewith by means carried by said members and having bolt-supporting means, and sliding bolts carried thereby.

9. In a safe or vault door, an outer member and an inner member, one of said members having a flange, said members having means for interlocking them together, and door holding bolts carried by said inner member.

10. In a safe or vault door, an outer member and an inner member, one of said members having a flange, said members having means for interlocking them together by a rotary movement of one relatively to the other, and door holding bolts carried by said inner member.

11. In a safe or vault door, an outer member and an inner bolt-supporting member, the latter comprising a ring, means for interlocking said members together by a rotary movement of one relatively to the other and comprising interlocking lugs, and means for preventing the rotation of one member relatively to the other, and door holding bolts carried by said ring.

12. In a safe or vault door, an outer member and an inner bolt-supporting member, the latter comprising a ring, lugs for interlocking said members together on the rotation of one relatively to the other, a disk carried by said members, bolt-operating means carried by the disk, and sliding bolts carried by the ring.

13. A safe or vault door comprising an outer member having a rearwardly extending flange carrying lugs and an inner member comprising a ring having lugs adapted to interlock with the lugs of the outer member on the rotation of one member relatively to the other and also having supporting means, sliding bolts carried by said supporting means of the inner member, and means carried by said inner member and effective to retract and protract the bolts.

14. A safe or vault door comprising an outer member, an inner bolt supporting member, said members having interlocking lugs interlocked on the rotation of one of said members relatively to the other, sliding

bolts carried by the inner bolt supporting member, bolt operating means carried by said inner member for retracting and protracting the bolts, and means for preventing the rotation of the inner member independently of the outer member.

15. A safe or vault door comprising an outer member, an inner bolt supporting member, said members having interlocking lugs interlocked on the rotation of one of said members relatively to the other, a key or keys for preventing the rotary movement of one member relatively to the other after they are interlocked, means for preventing the detachment of the keys, sliding bolts carried by the inner bolt supporting member, and bolt operating means carried by said inner member for retracting and protracting the bolts.

16. A safe or vault door comprising an outer member and an inner member, each having lugs interlocked for movement as a unitary structure on the rotation of one of said members relatively to the other, said

inner member comprising a ring having bolt supporting means, bolts carried thereby, a member for carrying bolt operating means carried by said inner member, and bolt operating means carried by said member.

17. A safe or vault door comprising an outer member and an inner member interlocked for movement as a unitary structure by lugs carried by said members on the rotation of one relatively to the other, a key or keys for preventing the rotary movement of one member relatively to the other, means for preventing the detachment of the keys, and door holding bolts carried by said inner member.

18. A safe or vault door comprising a main body member and a bolt carrying member connected together by interlocking lugs on the rotation of one member relatively to the other.

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Witnesses:

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