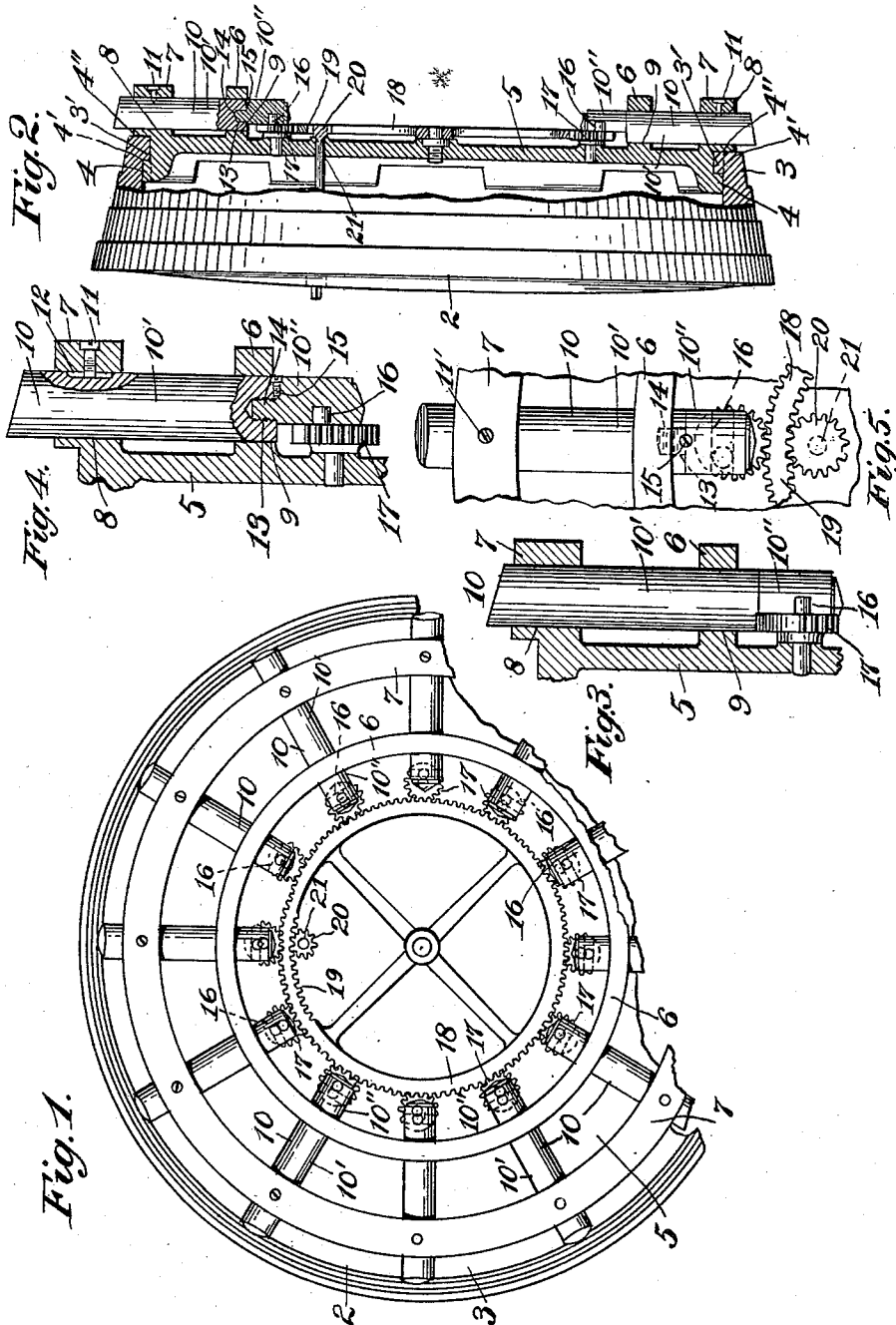


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SAFE OR VAULT DOOR.
APPLICATION FILED MAY 27, 1910.

997,780.

Patented July 11, 1911.



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SAFE OR VAULT DOOR.

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Specification of Letters Patent.

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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.

This invention relates to safe or vault doors, more particularly however to vault doors, the object of the invention being to provide an improved door having improved means for supporting the bolting mechanism, and which bolt supporting means comprises a back plate interlocked with the door in such manner that the improper separation of one from the other is prevented and which back plate in the present construction is united with the door by rotating one of the members relatively to the other, and is in part an improvement upon my contemporaneously pending application Serial No. 558,611, filed April 30, 1910.

A further object of the invention is the provision of an improved means for connecting the bolting mechanism to the door.

In the drawings accompanying and forming part of this specification, Figure 1 is a rear view of a vault door provided with this improved bolting mechanism, a portion of such door being broken away; Fig. 2 is a side elevation, partly in section, of the door and its bolting mechanism; Fig. 3 is a detail view of one of the bolts and its operating pinion, the bolt being shown retracted; Fig. 4 is a substantially similar view, with portions of the bolt shown, however, in section, the bolt being shown protracted; and Fig. 5 is a detail view of one of the bolts, a portion of the door and a portion of the operating means for the bolt.

Similar characters of reference indicate corresponding parts in the different figures of the drawings.

The door 2, which may be of any suitable construction, in the present instance is shown provided with a rearwardly extending flange 3 having interiorly located lugs 3' by means of which there is secured by cooperating holding lugs 4 a bolt-carrying frame or back plate 5, which back plate may be of a different metal from that of which the

body of the door is constructed. For instance, the body of the door may be made up of unmachineable metal, as for instance manganese steel, while the back plate, parts of which require considerable machining to permit the proper fitting of the bolts and the securing of the bolt operating means thereto, may be made of what is ordinarily understood as a machineable metal or steel, since there is no opportunity afforded to a burglar to get at this part of the door. This frame or back plate 5 is provided on its rear side with a bolt-carrying frame in the form of a pair of parallelly located flanges 6 and 7, which are of annular form when the door is a round door, these flanges having a series of alined bolt openings 8 and 9 around the same for the reception of the sliding bolts 10. The outer ring 7 is constructed to overlap the rear surface or end of the flange, so that when this bolt holding plate and door are interlocked by the lugs it will be observed that the lugs of the door flange are located between opposing surfaces 4' and 4'' of the back plate, this back plate and door, by reason of the holding lugs, being secured together by a rotary movement of one relatively to the other and held against separation by some suitable means, as for instance a key, not deemed necessary to be shown herein, so that the door and its back plate will form a unitary structure for swinging movement together and for rotary movement where it is desired to make the door of this form. Some suitable supporting hinge will of course be provided to support the door either for swinging movement or for rotary movement, according to the construction of safe or vault with which the door is used, but as this constitutes no part of my present invention it is not deemed necessary to show a hinge herein. Each of the bolts 10 has a limited movement, which may be determined by a set screw 11 projecting through the outer bolt flange into a recess or groove 12 in the bolt. This device, however, is more particularly for the purpose of preventing any tendency of the bolt to rotate during its sliding movement.

In the present improvement each of the bolts is made up of a pair of members 10' and 10'', which enables the bolt proper to

be made of one metal while the inner end or extension portion 10'' thereof may be made of a different kind of metal, thus reducing the cost as well as facilitating the manufacture of the bolt mechanism and also the erection of the bolt work, since the extension member, which may require considerable machine work, may be made of a metal which will readily permit this, while that portion of the bolt which is effective to hold the door in position may be made of a metal particularly adapted for this purpose. In the present improvement these two members 10' and 10'' are united by providing the member 10' of the bolt with an internally threaded opening 13 for the reception of a threaded projection 14 formed on the member 10'', the two parts of the bolt being prevented from turning one relatively to the other by means of a set-screw 15. The extension member 10'' of the bolt is provided with a transverse slot 16, which slot is open at its ends. By forming the slot in this manner it can be more readily and quickly machined.

Carried by the back plate is a series of pinions 17, each having a round stud projecting into the slot of its adjacent bolt. The slots, and therefore the pinions, could be located at any desired point throughout the length of the bolt if preferred, for instance between the bolt carrying rings, although the construction shown is preferable, as it enables the bolt to be more readily made up of a pair of members in the manner hereinbefore set forth.

For rotating the pinions a master gear wheel 18 is provided pivotally secured centrally of the back plate, and which wheel is provided on its interior with a series of teeth 19 for engagement with a pinion 20, which may be carried at the inner end of a spindle 21, or which master wheel, or pinion as the case may be, may be operated in any desired manner, as by means of an automatic controlled by time lock mechanism. It will be understood, of course, that the operation of this gear wheel will be controlled by suitable time and combination lock mechanism whether operated by an automatic or by a spindle, which mechanism, however, it is not deemed necessary to show herein. The master gear wheel in revolving rotates each pinion and, by means of the studs on the pinions engaging with the slots located on the inner ends of the bolts, retracts or protracts the bolts in a manner which will be readily understood.

In practice the travel of the pinion stud will be from a top center position to approximately thirty degrees below the horizontal center, although it will be observed that the total available travel is from the top center to the bottom center of the pin-

ion, or approximately 180 degrees, if it should be desired to protract or retract the bolts to a greater extent than is shown.

I am aware that various forms of bolting mechanism embodying the use of pinions and racks and large gear wheels have been used, but in none of them are the bolts made up or supported in the manner disclosed herein, nor are the pinions provided with studs working in transverse slots open at their ends, nor is the bolt carrying frame secured to the door in the effective manner shown herein, nor are the bolts and their operating mechanism, together with the locking mechanism which may be used for controlling such operating mechanism supported by the back plate shown herein, or one which is secured to the door in the manner set forth, and therefore, by the present improvement I am enabled to not only facilitate the construction of the several parts by reducing the cost of manufacture thereof, but am enabled to more readily erect the bolting mechanism and connect the same to the door in a more efficient manner.

From the foregoing it will be observed that the back plate, which is of substantially the same diameter as the inner side of the door, supports not only the bolts and the intermeshing gears for operating the bolts, but is of such a construction that it can also carry any automatic or time lock mechanism which may be used for controlling the operating means, so that the door proper may be made of unmachineable metal while the back plate may be made of machineable metal, and consequently all of the operating and controlling mechanism for the bolts readily secured and supported by one and the same back plate, which is secured and interlocked with the door by lugs, and therefore in an efficient manner, independent of the use of bolts or similar securing means, so that after the door is properly mounted on its hinge carried by the door body the bolts and operating and controlling mechanism may be readily mounted upon the back plate, which latter can then be readily secured to the vault door by rotating one relatively to the other, thus very much facilitating the erection of the bolt work and its operating means, especially when the vault is of large size and is built into the building.

By the provision of a back plate of the form shown and secured to the door in the manner set forth, it will be seen that even though the back plate is made up of a different metal from that of the door and carries the bolting mechanism, it is impossible to separate the door from its back plate, by reason of the holding lugs, without breaking the lugs either from the door flange or the back plate, which would be impossible

without the complete destruction of the door or the vault, especially by reason of the fact that the interlocking lugs between the back plate and the door are located interiorly of the door flange and therefore any liquid explosive that might be forced into the door joint would be more apt to run into the body of the vault and not find lodgment between the lugs of the body and the back plate. Furthermore, by providing a back plate secured to the door in the manner shown, the door may be provided with a chamber between such back plate and the body of the door interiorly of the flange thereof for the location of such time lock or automatic locking mechanism as may be desired, while still permitting it to be supported on and secured to the back plate. Thus I provide a door which may be made up of separate members of different material, one comprising the body proper and the other the locking-mechanism and bolt supporting back plate, which, however, to all intents and purposes constitutes a unitary structure having the same strength and securing qualities as though made as an integral structure.

I claim as my invention:

1. A safe or vault door, a back plate covering the back of and of substantially the same diameter as the door and overlapped by a portion of said door and interlocked therewith by lugs carried by engaging portions of such door and plate.

2. A safe or vault door comprising a body having a rearwardly extending flange provided with interiorly located lugs, and a back plate extending across from side to side of the door and having lugs adapted to interlock with the lugs of the flange.

3. A safe or vault door comprising a body having a rearwardly extending flange provided with interiorly located lugs, and a back plate having lugs adapted to interlock with the lugs of the flange on the rotation of one of said members, said back plate comprising a bolt carrying frame made up of a pair of parallelly located flanges.

4. A safe or vault door comprising a body having a rearwardly extending flange provided with interiorly located plate holding means, and a back plate having means adapted to engage with the holding means of the flange on the rotation of one of said members, said back plate comprising a bolt carrying frame made up of a pair of spaced apart annular flanges.

5. A safe or vault door having interiorly located lugs, a bolt carrying back plate provided with lugs interlocked with the lugs of the door on the rotation of one of said members and adapted to support the locking mechanism and bolts, said plate having a bolt carrying flange for the reception of

bolts, bolts carried by said flange, and means for protracting and retracting the bolts.

6. A safe or vault door, a bolt-carrying back plate provided with means for interlocking it with similarly formed means carried by the door on the rotation of one of said members and adapted to support the locking mechanism and bolts, said plate having a diameter substantially corresponding with that of the door and provided with a bolt-carrying flange for the reception of bolts, bolts carried by said flange, and means carried by the back plate for protracting and retracting the bolts.

7. A safe or vault door having interiorly located lugs, a bolt carrying back plate provided with lugs interlocked with the lugs of the door and adapted to support the locking mechanism and bolts, said plate having a bolt carrying flange for the reception of bolts, bolts carried by said flange, and means carried by the back plate for protracting and retracting the bolts.

8. A safe or vault door comprising a body having a rearwardly extending flange provided with interiorly projecting lugs, a back plate adapted to support locking and bolt mechanism and provided with lugs interlocked with the lugs of the flange, said back plate having a bolt carrying frame comprising a pair of annular flanges provided with aligned bolt openings, sliding bolts supported by said flanges, and means for reciprocating said bolts.

9. A safe or vault door comprising a body having lugs projecting toward the axis thereof, and a bolt and locking-mechanism carrying back plate of substantially the diameter of the door at its inner side and also provided with lugs adapted to interlock with the lugs of the door.

10. A safe or vault door comprising a body having lugs provided toward the axis thereof, and a bolt and locking-mechanism carrying back plate of substantially the diameter of the door at its inner side and also provided with lugs adapted to interlock with the lugs of the door, said back plate having a bolt carrying flange adapted to overlap the rear sides of the door lugs.

11. A safe or vault door comprising a body having lugs projecting toward the axis thereof, and a bolt and locking-mechanism carrying back plate of substantially the diameter of the door at its inner side and also provided with lugs adapted to interlock with the lugs of the door, said back plate having a bolt carrying flange adapted to overlap the rear sides of the door lugs and also having a parallelly located flange within said first flange.

12. A safe or vault door comprising a body having lugs projecting toward the axis thereof, a bolt and locking-mechanism carry-

ing back plate of substantially the diameter
of the door at its inner side and also pro-
vided with lugs adapted to interlock with
the lugs of the door, said back plate having
5 a bolt carrying flange adapted to overlap
the rear sides of the door lugs and also
having a parallelly located flange within

said first flange, sliding bolts carried by said
flanges and means for actuating said bolts.

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