

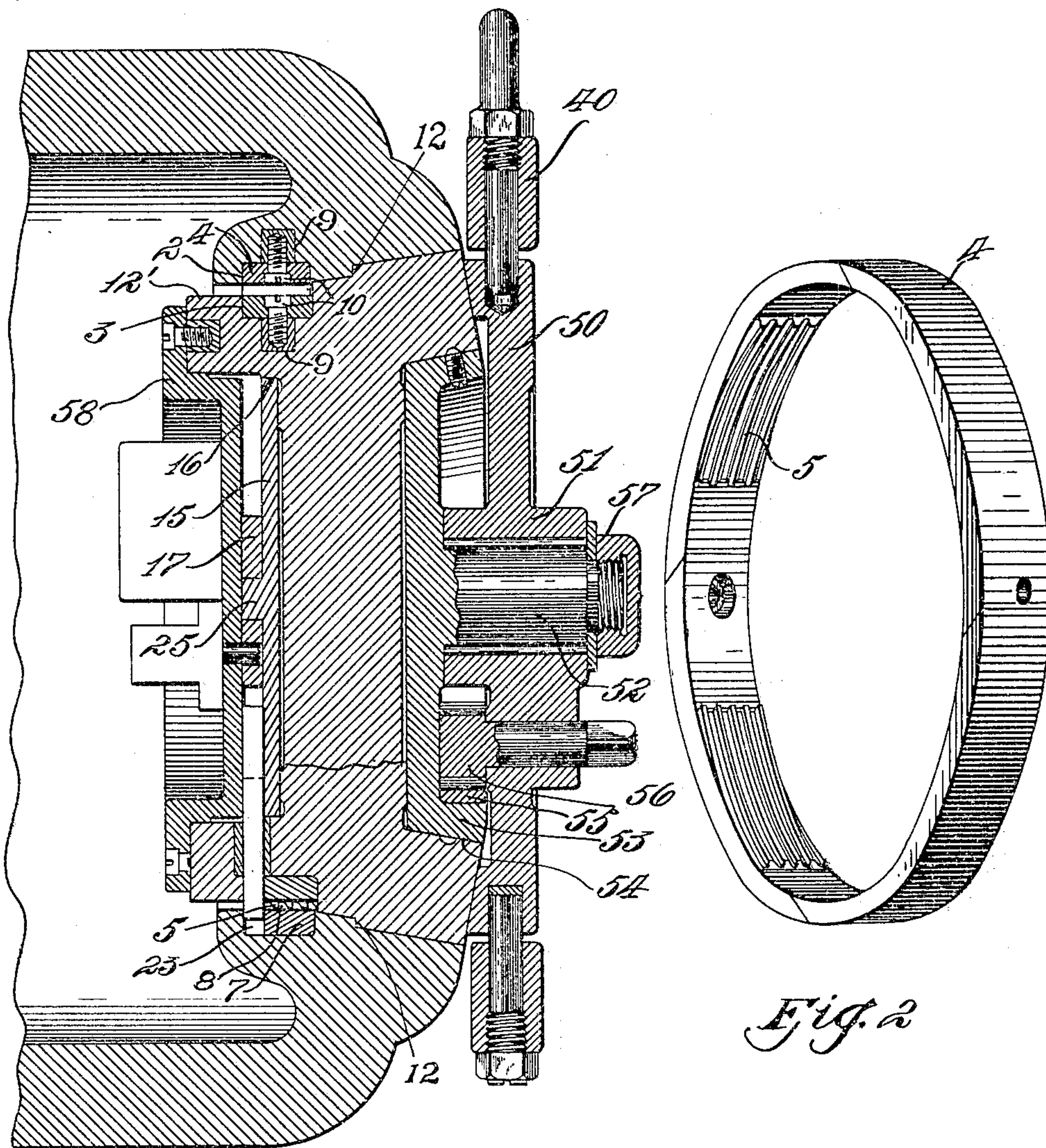
No. 793,132.

PATENTED JUNE 27, 1905.

H. D. HIBBARD.  
SAFE OR VAULT.

APPLICATION FILED AUG. 19, 1903.

2 SHEETS—SHEET 1.



*Fig. 1*

*Fig. 2*

Witnesses:  
*C. C. Fuss.*  
*C. A. Jarvis*

Inventor:  
*H. D. Hibbard.*  
By his Attorney,  
*F. A. Richards.*



No. 793,132.

PATENTED JUNE 27, 1905.

H. D. HIBBARD.  
SAFE OR VAULT.

APPLICATION FILED AUG. 19, 1903.

2 SHEETS—SHEET 2.

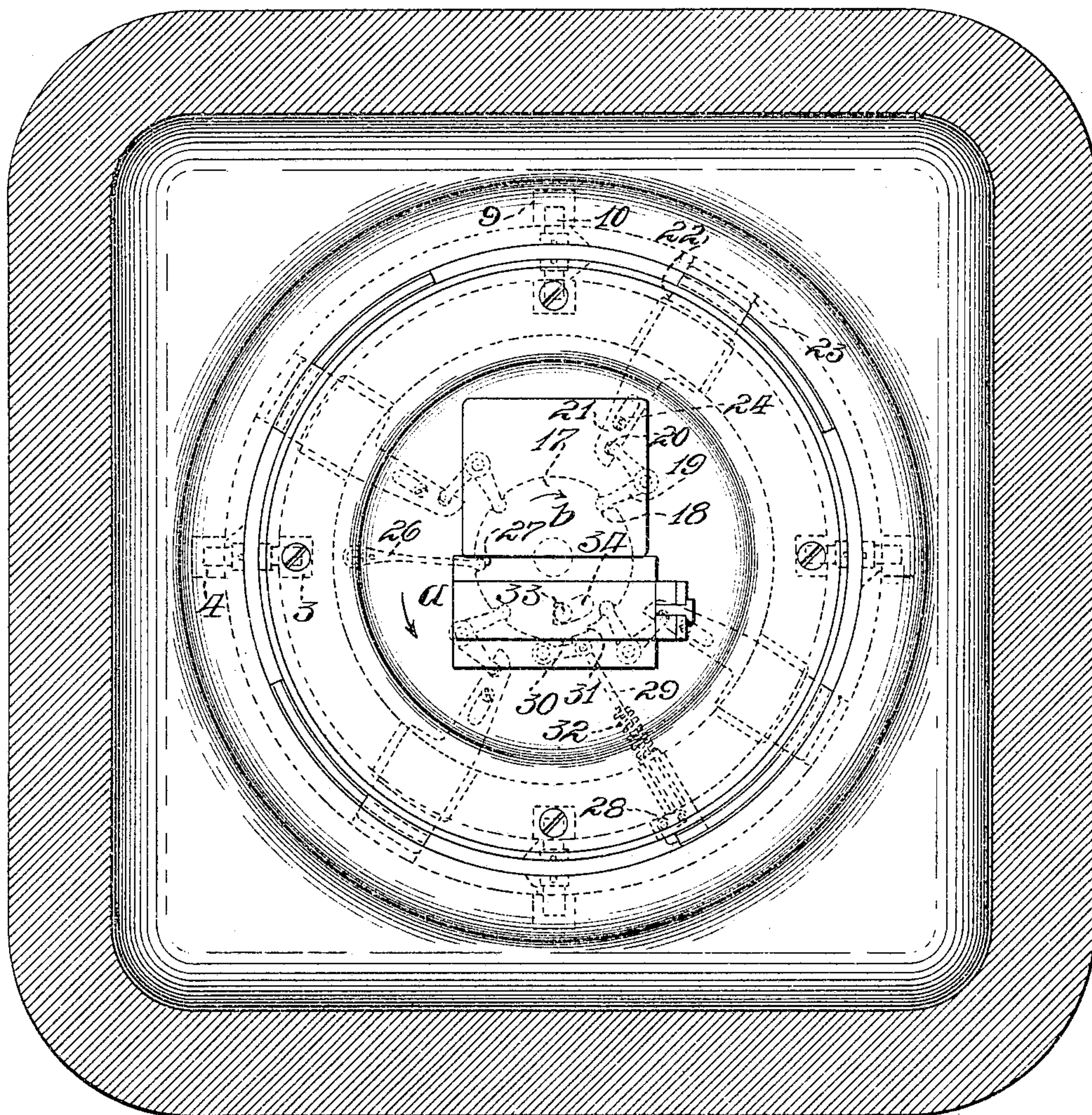


Fig. 3.

Witnesses:

Calderon & Tuss.

C. A. Jarvis.

Inventor:

H. D. Hibbard.

By his Attorney,

F. W. Richards.



## UNITED STATES PATENT OFFICE.

HENRY D. HIBBARD, OF PLAINFIELD, NEW JERSEY, ASSIGNOR TO  
MANGANESE STEEL SAFE COMPANY, OF NEW YORK, N. Y., A  
CORPORATION OF NEW JERSEY.

## SAFE OR VAULT.

SPECIFICATION forming part of Letters Patent No. 793,132, dated June 27, 1905.

Application filed August 19, 1903. Serial No. 169,961.

*To all whom it may concern:*

Be it known that I, HENRY DEMING HIBBARD, a citizen of the United States, residing in Plainfield, in the county of Union and State  
5 of New Jersey, have invented certain new and useful Improvements in Burglar-Proof Safes or Vaults, of which the following is a specification.

This invention relates to burglar-proof safes  
10 or vaults, and more particularly to that class thereof known as "rotary" or "screw-door" safes or vaults, the object of the invention being to provide an unmachineable or non-workable metal body and rotary door, each of an  
15 integral structure, with locking means effective to lock the door on the rotation thereof formed of machineable metal so located that the strains thereon are transmitted directly and carried by the solid metal of the door and  
20 body, respectively, instead of having such strains received by bolts or other fastening means.

A further object of the invention is to provide a manganese-steel integral safe or vault  
25 body and a similarly-formed rotary door, with locking threads or lugs formed of machineable metal secured to the body and door in such manner that the use of fastening bolts or devices for holding such parts to the body and  
30 door are entirely dispensed with.

In the drawings accompanying and forming part of this specification, Figure 1 is a cross-sectional view of a part of this improved safe with the door shown as closed, the section  
35 through the door being taken on two different points, as indicated by the broken line. Fig. 2 is a perspective view of one part of the rotary locking means; and Fig. 3 is an interior view of the safe, showing one form of  
40 means for preventing rotative movement of the door.

In manufacturing screw-door safes constructed of unmachineable or non-workable metal—such, for instance, as manganese steel,  
45 which, as is well known, cannot be worked in any practicable manner except by grinding—it is desirable in order to provide a practical structure of this kind to form the locking

threads or lugs of machineable metal. While lugs or threads can in some instances be  
50 formed integral with the door and body, such a structure is not as desirable, not only because of the cost of manufacture, owing to the length of time necessary to grind the threads, but for other reasons not necessary to enlarge  
55 upon in this specification. Several attempts have been made to form the locking-threads separate and independent of the door—as, for instance, by forming the mutilated threads upon a machineable ring and securing such ring  
60 to the door by bolts projecting into soft-metal inserts located in the door, also by attempting to cast the metal forming the body of the door around such ring, and also by securing  
65 such ring to the door by wedge-shaped locking members maintained in position by dove-tail recesses in a disk formed on the inner side of the door, all of which are necessarily  
70 weak in construction and ineffective to withstand the tremendous force of nitroglycerin, and actual demonstrations have proven that  
75 it is not possible in any practicable manner to secure a ring to the door by means of bolts embedded in soft-metal inserts, since, as was shown by these demonstrations, nitroglycerin  
80 will either break off the bolts which secure the ring to the door or pull the door away from such bolts by stripping the threads embedded in the soft-metal inserts. These demonstrations clearly showed that a burglar-proof safe  
85 cannot be made by using bolts or other fastening devices to secure the locking screw-ring to the door, since such bolts cannot withstand the strain caused by the force of high explosives. To those who are familiar with  
90 the peculiar characteristics of metal, particularly manganese steel, it is also a well-known fact that it is not practicable to cast such metal around a part of workable metal, since one  
95 recedes or shrinks from the other, so that the two parts will be connected at best but loosely, and consequently there would be considerable play and backlash in the door, so that nitroglycerin could be readily inserted into the jamb  
closed owing to such play. Consequently the



object of this invention is the provision of a screw-door safe in which, as hereinbefore stated, the body and door can be made of un-machineable or non-workable metal, while the locking threads or lugs may be made separate from such body and door and of machineable metal, but so maintained in position that any strain which comes upon the same will be transmitted to and carried by the body and door, so that the threads or locking-lugs, while formed of unmachineable metal, are so located in position that to all intents and purposes they are integral with the body and door of the safe and do not need any independent or separate means for maintaining such parts in position in so far as resistance to strain is concerned. To accomplish this object in one way, (another way being shown in copending application, Serial No. 169,963, filed August 19, 1903, of myself and W. M. Stone,) the door and body of the safe or vault, preferably cast of manganese steel and somewhat similar to those shown and described in my prior patents—for instance, Patents Nos. 662,428 and 662,429, dated November 27, 1900, and No. 679,382, dated July 30, 1901—are in the present instance provided, the door in its periphery and the body in its circular jamb with annular recesses 2 and 3, registering with each other when the door is closed. In the annular recess 2 of the body is located a ring 4, of machineable metal, (shown formed of sections, shown herein as four,) to facilitate the locking means, which may be in the form of continuous threads, or in the form of interrupted threads, or in the form of lugs, or any other suitable form adapted for the purpose. In the present instance the ring is shown provided with interrupted female threads 5. Located in the recess 3 of the door is a similar ring 7, carrying upon its periphery the co-operating locking male threads 8. By locating each ring in a recess, with its side faces in firm engagement with the side walls of its recess, it will be seen that the strain upon the ring, and especially upon that one which is carried by the door, will be received and carried by the solid metal of the body and door, respectively, since it will be obvious that the strain in any attempt to pull the door from its seat by high explosives or otherwise is necessarily depthwise of the door. By this mode of securing the rings in position it is not possible to separate the ring from the door or from the body, the side walls of the recesses preventing this.

Instead of forming the threads or lugs or locking means upon continuous rings they could be formed on sections separated one from another and located in pockets or independent recesses of the door and body. In other words, the recesses in the door and body need not necessarily be continuous ones. To prevent the turning or slipping of the rings around the door or in the door-jamb, suitable

means may be provided. In the present instance each recess is provided at its under side with several sockets or openings 9, into which soft metal is located for the reception of the ends of suitable bolts 10, projecting through the rings. By means of these bolts the rings are prevented from slipping lengthwise in their recesses. In the form shown the ring-carrying recesses are located in the rear of the offset or step 12. These recesses are formed during the casting of the body and door, respectively.

For preventing the door from being rotated after it is screwed home suitable locking means are provided, comprising in the present instance a set of bolts and means for automatically throwing and retracting the same. For this purpose I locate on the interior of the door-flange 12' a supporting-plate 15, which may be maintained in position in any suitable manner, as by means of bolts embedded in soft-metal inserts; but in the form shown it is frictionally secured in position, it being in the form of a disk and wedged in a circular recess 16, adjacent to the body proper of the door. Secured to the flange of the door by bolts extending into soft-metal inserts or in any other suitable manner is a back plate 50. Carried by this back plate, which in the present instance is shown as somewhat chambered, is the automatic or time lock for controlling the locking-bolts, and thereby the opening of the safe. Between these two back plates is located a disk 17, such disk being carried upon a stud 25 of one of the back plates, shown as the plate 15. This disk has recesses 18 in its periphery, illustrated as four in number, into each of which fits one end of a bell-crank lever 19, pivoted to one of the back plates, the opposite end of which fits into a similar recess 20 in the shank of a locking-bolt 21, which works in an opening 22, formed in or at one side of the male screw-ring to permit the outer end thereof to extend into a recess 23, formed in or at one side of the female ring, the throw of each bolt being regulated by a pin-and-slot connection 24, the slot being formed in the present instance in the shank of the bolt, and the pin being carried by one of the back plates. At this point particular attention is called to the fact that these bolts work in openings formed in the solid metal of the door and project into recesses likewise formed in the solid metal of the body. Suitable metal inserts may, however, be used to insure a proper fit, so that these bolts add considerably to the holding power of the locking-threads, which would not be the case if the bolts were carried by a screw-ring bolted to the door, since when the door is pulled away from its ring the bolts being, as stated, located in the ring add nothing to the security of the structure. The bolts could be made tapered, and thus act to wedge the door into the jamb. For throwing the bolts into their



locking position a suitable spring 26 is provided, one end of which fits into a notch or recess 27 in the disk 17, the other end being secured to one of the back plates. For main-  
 5 taining the disk, and thereby the bolts, in their normal or unlocking position suitable means are provided, comprising in the present instance a pivoted dog 28, carried by the male screw-ring and connected with a spring-  
 15 actuated plunger 29, carrying a catch 30 at its inner end engaging a notch 31 in the disk 17.

When the door is screwed home and as it is finally brought to its seat, with its male thread in engagement with the female thread, the  
 25 dog 28 will come into contact with one end of one of the sets of threads when the locking means is formed as an interrupted thread or with a projection if otherwise formed, thereby throwing the dog and actuating the plunger  
 30 against its spiral spring 32 and withdrawing the catch 30 from the notch 31 in the disk, whereupon the spring 26 rotates the disk in the direction of the arrow *a* by throwing the bolts outwardly and automatically locking the door  
 25 against rotation.

The unlocking of the door is done automatically by means of a time-lock and a motor-spring usually provided for this purpose, (not shown herein,) whereby when the time-lock  
 30 runs down it trips a catch holding such spring, so that the spring on being released moves the pin 33 in the direction of the arrow *b*, which projecting into the slot 34 of the disk is in engagement with the end wall thereof  
 35 and rotates the disk, causing it to withdraw the bolts, such disk being held in such position by the catch 30.

The door is supported for rotation by a suitable hinge 40, preferably in the form of a crane-hinge, the ends of which are pivoted to  
 40 a disk or plate 50, having a hub 51, carried upon a stud 52, formed, preferably, as a part of a flanged disk 53, shown fixed into a chamber or recess 54, formed at the outer side of the door. This flange carries a rack 55 or  
 45 has formed thereon a rack for engagement with a pinion 56, carried by the plate or disk 50, the outer end of which is squared for the reception of a crank by means of which the  
 50 door is rotated. The door and plate are held in proper relation by means of a nut and washer 57, located on the threaded end of a stud 52.

Of course it is to be understood that the body of the structure, especially when in the  
 55 form of a vault, could be made up of several members, as in some of my patented vaults, since in such cases the front is made as an integral structure, so that the members 4 would still be located between integral walls, without departing from the spirit or scope of my  
 60 invention.

Having thus described my invention, I claim—

1. A safe or vault comprising an integral  
 65 body and an integral door formed of unma-

chineable metal and having complementary locking parts formed of machineable metal, said parts being rigidly secured to the door and body subsequently to the casting thereof and so located between opposing integrally-connect-  
 70 ed surfaces that the strain thereon is carried directly by the door and body.

2. A safe or vault comprising an integral body and an integral door formed of unma-  
 75 chineable metal, and means having complementary locking-segments formed of machineable metal located in opposing recesses formed in the edge of such door and the jamb of the body and rigidly secured to such door and body.

3. A safe or vault comprising a body formed  
 80 of unmachineable or non-workable metal, and an integral or one-piece rotary door likewise formed of unmachineable or non-workable metal, said door and body having comple-  
 85 mentary locking means formed of machineable metal, the locking means of the door being fixedly secured to such door against movement independently thereof with a wall integral  
 90 with the metal of the door located at the rear or inner side of such means so that strains on such member are received directly by the  
 95 metal-forming part of the integral door, and the necessity of otherwise fastening such locking means against depthwise separation from the door rendered unnecessary.

4. A safe or vault comprising a body and a door each formed of non-workable or unma-  
 100 chineable metal, and complementary locking means formed of machineable metal for maintaining the door in the body and located wholly between the outer and inner surfaces  
 105 of the door and body with surfaces integral, one with the other of the unmachineable metal at each side thereof and secured against movement.

5. A safe or vault comprising a body and a rotary door having complementary locking  
 110 means, said door being formed as an integral structure of non-workable or unmachineable metal with its locking means fixedly secured thereto against movement and formed of ma-  
 115 chineable metal, and located in a recess formed in the periphery thereof, the wall of such recess at the inner side of such locking means being integral with the door, so that the  
 120 strains on such locking means are received directly by the integral door.

6. A safe or vault comprising an integral body and an integral door of unmachineable  
 125 or unworkable metal, each having an annular recess, and a ring of workable metal located in each of said recesses and fixed against movement, and carrying means coöperating with the means of its companion ring for maintaining the door closed.

7. A safe or vault comprising an integral body and an integral door of unmachineable  
 130 or unworkable metal, each having an annular recess, and a ring of workable metal located in each of said recesses and fixed against



movement and carrying interrupted threads cooperating with the means of its companion ring for maintaining the door closed.

8. A safe or vault comprising an integral or one-piece body, formed of non-workable or unmachineable metal, a stationary ring formed of machineable metal fixed to said body against movement and having interrupted locking-sections, and an integral or one-piece rotary door likewise formed of unmachineable or non-workable metal having an annular recess in its periphery, a sectional stationary ring located therein and formed of machineable metal and having complementary interrupted locking-sections, the wall of said recess at the inner side of said ring being integral with the door, so that the strain on such ring is received directly by the integral metal forming the door.

9. A safe or vault comprising an integral body and an integral door each formed of unmachineable metal and provided with an annular recess and a sectional machineable ring located in said recess and fixed against movement and carrying threads cooperating with similar threads of its companion ring for maintaining the door closed.

10. A safe or vault body provided with an annular recess in its jamb and a fixed, and non-movable ring located in said jamb between two surfaces of such body integral one with the other and carrying locking-threads.

11. A heat-treated unmachineable-metal safe or vault body having a doorway provided with a recess in its jamb having its two side walls integral, one with the other, and a fixed machineable member located in said recess and carrying locking means.

12. A safe or vault comprising a body and a rotary door, said body and door having complementary locking means, the locking means of the door comprising machineable metal means fixedly secured to and carried by the door in front of an integral unmachineable-metal wall thereof, so that it is held in position against depthwise separation therefrom by the metal of the door itself, and not by the use of independent fastening means separate from the door metal, and which metal is in position to receive directly any strain upon such locking means, due to explosive force or otherwise.

13. A manganese-steel safe or vault body having a doorway provided with a recess in its jamb having its two side walls integral one with the other, and a machineable member located in said recess and carrying locking means, and means for securing said member against movement and comprising a fastening device embedded in a soft-metal insert located at the inner side of said member.

14. A safe or vault body formed of unmachineable or non-workable metal having a doorway provided with a recess in its jamb having its two side walls integral one with the

other, a machineable member located in said recess with its side faces engaged by the integral walls of said body and having locking-threads, and means projecting through said member for preventing movement of said member.

15. A safe or vault door formed of unmachineable or non-workable metal having a recess in its edge with its two side walls integral one with the other, and a machineable member located therein against movement and provided with locking means.

16. An integral safe or vault door formed of unmachineable or non-workable metal having a recess in its edge and a machineable member located therein and provided with segmental locking means, and means for preventing movement of such member.

17. An integral safe or vault door formed of unmachineable or non-workable metal having a recess in its edge and a machineable member located therein and provided with locking means and means for preventing movement of such member and comprising bolts embedded in soft-metal inserts at the inner side of said member.

18. An integral safe or vault door formed of unmachineable or non-workable metal having an annular recess located in its edge, and a fixedly-secured sectional ring located in said recess and carrying locking-faces.

19. An integral safe or vault door formed of unmachineable or non-workable metal having an annular recess located in its edge, and a machineable and sectional ring located in said recess and carrying locking-threads, and means for preventing the movement of said ring relatively to the door.

20. An integral safe or vault comprising a body and a door, each formed of unmachineable metal, and having means for locking the door against rotation and withdrawal and comprising means, secured against movement, carried in the jamb and edge respectively of the body and door and formed of machineable metal for maintaining the door in its closed position and means located to work in juxtaposition to said fixed means and effective to prevent the rotation of the door.

21. An integral safe or vault comprising a body and a door, each formed of unmachineable metal, and having means for locking the door against withdrawal and comprising means fixedly secured in the jamb and edge respectively of the body and door and formed of machineable metal for maintaining the door in its closed position and means located to work in juxtaposition to said fixed means and effective to prevent the rotation of the door and comprising bolts, and means for automatically protracting said bolts when the door is turned home.

22. A safe or vault comprising an integral body and an integral door each formed of unmachineable or non-workable metal, and hav-



ing means for locking the door against rotation and withdrawal and comprising machineable members having locking-faces and seated respectively in the jamb of the body and edge of the door, and cooperating to maintain the door in the jamb, means comprising bolts working in openings and recesses formed respectively in the integral door and body and effective to prevent rotation of the door, and automatically-operative means for operating the bolts.

23. An integral safe or vault door formed of manganese steel and provided with means for preventing the rotation and withdrawal of the door from its jamb and comprising one or more boltways, a bolt fitting in each of said ways, automatically-operative means for operating said bolts, and a machineable member carried by said door in the edge thereof and constituting part of the means for holding the door in its jamb and so located that an integral part of such door is at the inner side of and receives the strain on said member.

24. An integral safe or vault door formed of unmachineable metal and provided with means for preventing the rotation and withdrawal of the door from its jamb and comprising one or more boltways, a bolt fitting in each of said ways, automatically-operative means for operating said bolts and a machineable member carried by said door and so located that an integral part of such door is at the inner side of and receives the strain thereon and constituting a part of the means for holding the door in its jamb, and provided with threads or lugs.

25. A safe or vault comprising a body and a rotary door having means for locking the door against rotation and withdrawal and comprising complementary interrupted locking means said door being formed as an integral structure of non-workable or unmachineable metal with its locking means comprising a sectional, unmachineable-metal member having interrupted locking-faces thereon and secured to the door against movement, and lo-

cated with a wall at the inner side of such ring integral with the door so that any strain on such ring is carried directly by the integral door, and means for preventing rotation of the door.

26. A safe or vault comprising an integral body and an integral door each formed of unmachineable or non-workable metal, means for maintaining the door in its seat against rotation and withdrawal, and comprising a pair of members formed of machineable metal having cooperating locking-faces each fitted into position subsequent to the casting of its respective part, with surfaces integral one with the other of the door and body, respectively, located at each side thereof so that the strains thereof are received by the non-machineable metal, locking means carried by and projecting from the door and into the body for preventing the rotation of the door, and automatically-operative means for operating said means.

27. A safe or vault comprising an integral body and an integral door each formed of unmachineable or non-workable metal, means for maintaining the door in its seat against rotation and withdrawal, and comprising a pair of members formed of machineable metal having cooperating locking-faces each fitted into position subsequent to the casting of its respective part with surfaces integral one with the other of the door and body respectively, located at each side thereof so that the strains thereof are received by the non-machineable metal, locking means carried by and projecting through the side wall of the door and into the wall of the body for preventing the rotation of the door, and automatically-operative means for operating said means, the organization being such that said locking means is also effective to assist in maintaining the door in its seat.

HENRY D. HIBBARD.

Witnesses:

C. A. WEED,  
R. JACKSON.