No. 775,356. PATENTED NOV. 22, 1904.

S. L. SMITH.

SAFE OR VAULT.

APPLICATION FILED JUNE 4, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

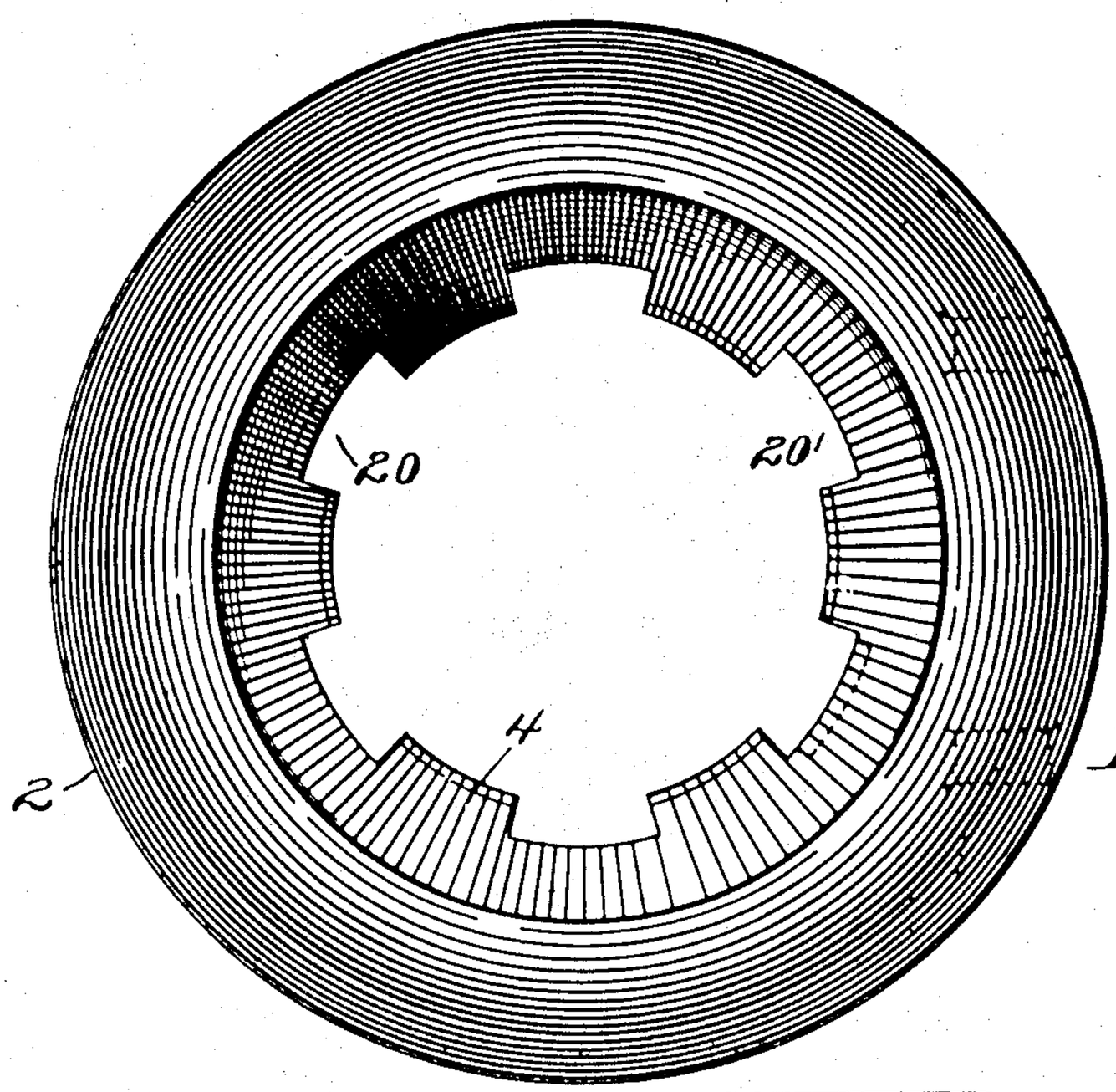

Fig. 2.

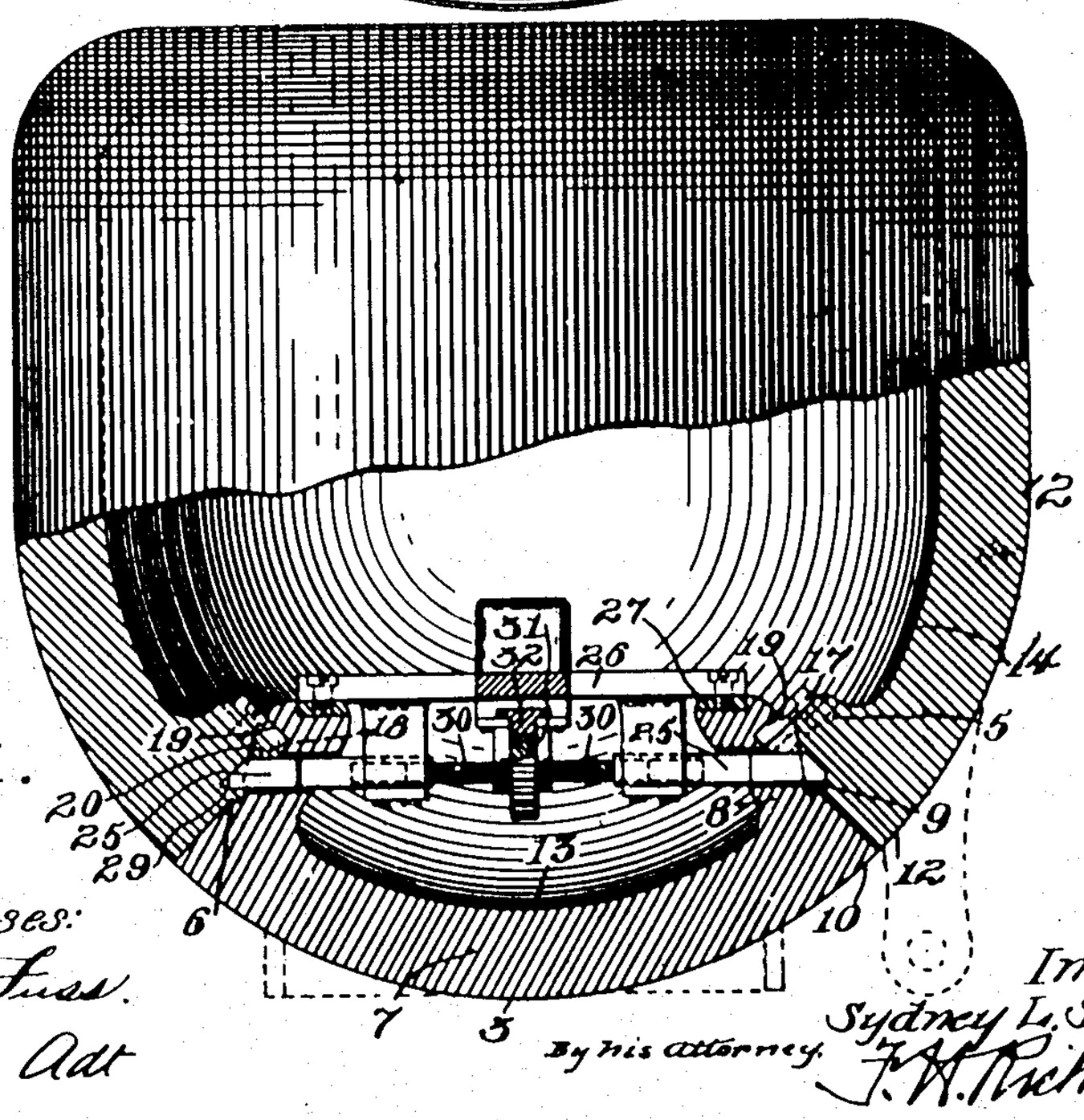

Fig. 1.

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NO MODEL. 2 SHEETS—SHEET 2.

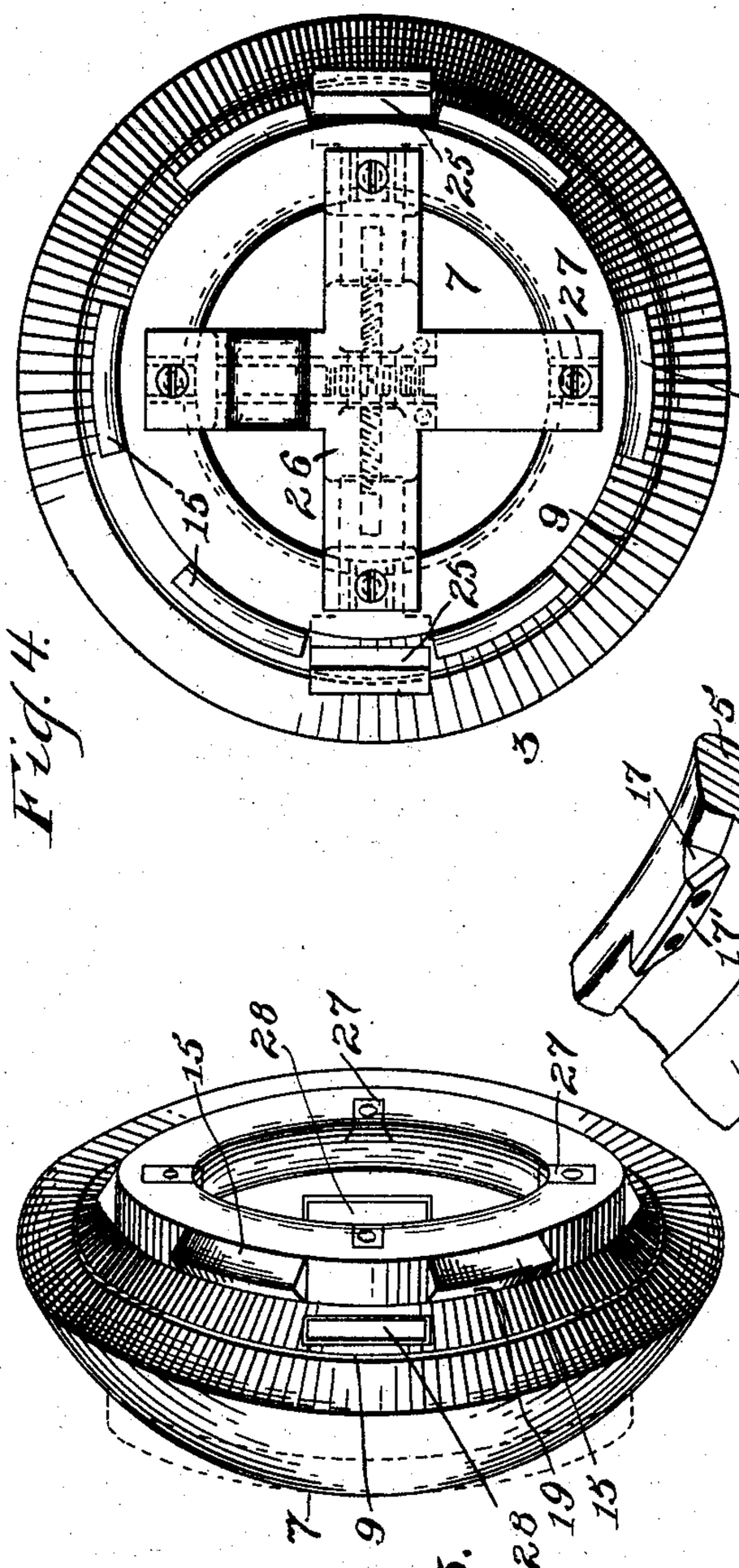

Fig. 4.

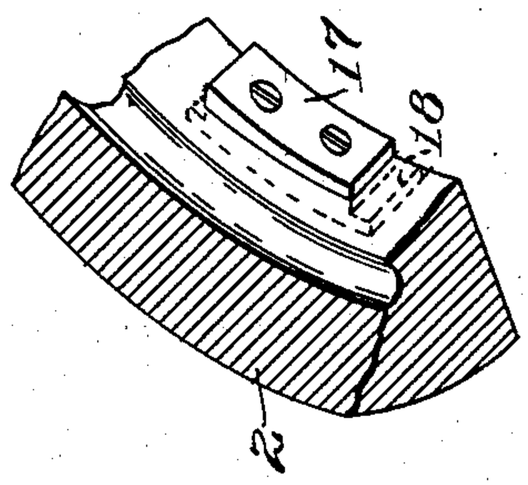

Fig. 6.

Fig. 7.

Fig. 3.

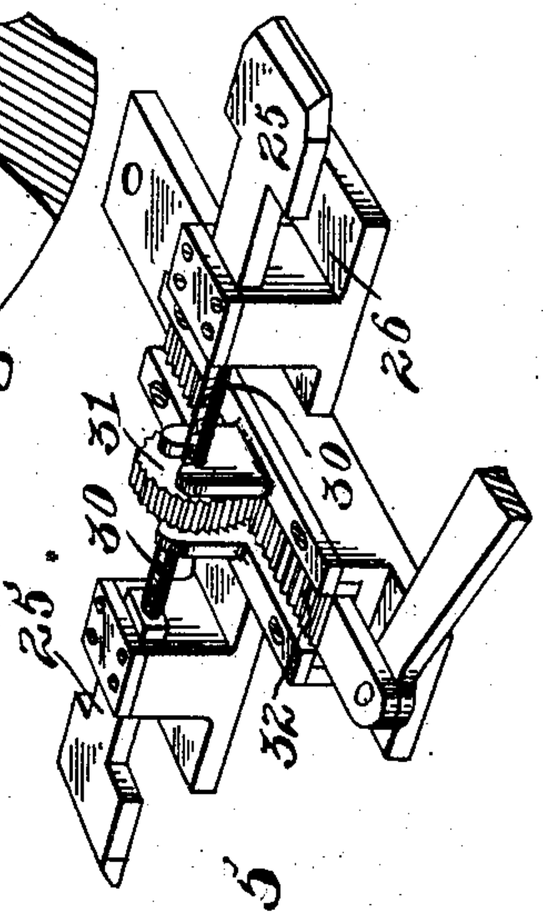

Fig. 5.

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No. 775,356. Patented November 22, 1904.

UNITED STATES PATENT OFFICE.

SYDNEY L. SMITH, OF BAYONNE, NEW JERSEY.

SAFE OR VAULT.

SPECIFICATION forming part of Letters Patent No. 775,356, dated November 22, 1904.

Application filed June 4, 1904. Serial No. 211,083. (No model.)

To all whom it may concern:

Be it known that I, SYDNEY L. SMITH, a citizen of the United States, residing in Bayonne, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Safes or Vaults, of which the following is a specification.

This invention relates to burglar-proof safes or vaults, the object being to provide an improved structure of this class in which the door is so formed and secured that it will most effectively resist attempts to open the joint thereof or to force the door from its seat.

In the drawings accompanying and forming a part of this specification, Figure 1 is a part horizontal sectional view of this improved safe or vault with its door in position. Fig. 2 is a front view of the safe or vault with the door removed. Fig. 3 is a perspective view of the door. Fig. 4 is a rear view of such door. Fig. 5 is a perspective view of the bolting mechanism for preventing the rotation of the door. Fig. 6 is a detail view of one of the body-locking lugs, and Fig. 7 is a detail view of another construction of the door-locking lugs.

Similar characters of reference designate corresponding parts in the several figures of the drawings.

This safe or vault comprises in the preferred form thereof herein shown and described a body 2 and a circular door 3, each of an integral structure and formed of unmachineable metal—such, for instance, as manganese steel. The body has a circular tapered jamb or doorway 4, such jamb being of relatively great depth and partly formed by an inwardly-extending integral flange 5, such jamb being preferably square with the contiguous outer surface of the body, an annular step 6 being located in the jamb for engagement with a corresponding step on the door. The door 3 of dome-shaped formation is shown comprising a body 7 and an inwardly-extending integral flange 8, the tapered joint-surface of which carries an annular step 9 coöperating with the step 6 on the jamb. When the door and body are assembled, the outer surface 10 of the door forms a continuation of the outer surface 12 of the body, which surfaces in the present instance form a part of a complete circle, so that the door fits into the jamb in such manner that there is no space or opening at the joint around the door. The inner surface or wall 13 of the door conforms in the structure shown throughout the major part thereof to the inner surface or wall 14 of the body forming part of the front. This, together with the door-flange, tends to preserve substantial uniformity of the door-casting, which insures not only a better and stronger casting, but in those forms of safes in which the castings are heat-treated will permit the proper heat treatment of such castings. The rotary door is held in its seat by a plurality of coöperating locking-lugs, the lugs 15 of the door being integral therewith.

Heretofore when the structure has been made of unmachineable metal it has not been found practicable to form the locking-threads or tapered lugs integral with the door, since when threads or tapered lugs were used it was not only very difficult as well as a tedious and expensive operation to grind the threads on the door and body to a proper matching fit, but it was not possible to properly grind the door to its seat, which is essential in order to secure a metal-to-metal fit of the door and jamb, since if the threads or tapered lugs are integral with the body and door they will permit the door to be turned just so far and no farther. At the same time the threads or lugs are also being further ground, which is undesirable, as this will permit play or backlash of the door, resulting in a space or opening at the joint into which nitroglycerin could run. To overcome these difficulties, it has been the usual practice to form these locking threads or lugs on a ring of machineable metal and secure it to the door by bolts embedded in soft-metal inserts or to attach it in some other undesirable way, with the result that with the use of a small amount of nitroglycerin after a short ramming of the door to start or loosen the bolts or fastening means the bolts have either been stripped or entirely broken off and the door forced out. This has been done with less than two ounces of nitroglycerin used in several small charges and within an

hour, all of which would be a burglarious operation. The present improvement, however, not only enables me to make the tapered lugs integral with the door, so that unless the metal of the door is smashed it cannot be forced out, but enables me to materially reduce the time and expense of grinding the locking parts, since the body-lugs can be formed separate from the body, as there is no strain thereon, and therefore of machineable metal, while also permitting the door to be properly seated by grinding it to its seat.

The integral lugs 15, carried by the door, are located in proximity to the inner end of the door-flange in position to overlap the body-flange 5. For the purpose of wedging the door home tightly to its seat the body-flange has bolted thereto a number of tapered face-plates 17, herein referred to as lugs, to permit which soft-metal inserts 18 may be cast into the flange during the casting of the body to receive such bolts, as the only strain upon these parts is a crushing one, which would not separate them from the body. The inner faces 19 of the door-lugs will be ground to correspond with the tapered faces of the body-lugs. By forming the body-lugs 17 separate from the body not only can they be more readily machined, but the door may be properly ground to its seat, since this may be done before such lugs are placed in position, so that there is nothing to interfere with the rotation of the door any desired distance. After the door is properly ground to its seat the lugs 17 may then be bolted to the body or flange, as the case may be, whereupon when the door is inserted and properly rotated such door will be drawn to its seat with a metal-to-metal tight fit at the joint. Heretofore the locking devices carried by the body, whether formed as threads or lugs, have projected into the doorway being carried on the jamb-face, in consequence of which the diameter of the door through its locking lugs or threads merely accord with the diameter of the doorway back of the body lugs or threads. In the present instance, however, it will be seen that as the body-lugs are carried on the innermost faces of the body-flange—in other words, at one side of the jamb, this being a desirable feature, since the entire front of the safe would have to be pulled out in order to permit the body-lugs to give way—the diameter of the door through its lugs in order to overlap such body-lugs is greater than the diameter of the doorway at the inner part thereof, so that the door-lugs overlap the body-flange where the safe is provided with such flange, or the body itself at the inner end of the jamb, should such flange be omitted, and to enable such door-locking lugs to be formed as an integral part of the door the jamb is provided with recesses or passages 20, corresponding with the number of lugs formed on the door. These recesses open into the jamb, preferably back of the annular step and into the interior of the safe. These recesses permit the door-locking lugs to pass into position in rear of the body-lugs on the rotation of the door after it is properly seated.

If preferred, the body-lugs 17 could be formed integral with the body, suitable face-plates 17′ (see Fig. 7) being bolted to the lugs of the door, for which purpose soft-metal inserts could be located in the lugs of the door, since owing to the organization there is no strain other than a crushing one on these members 17′, and consequently they could not be separated from the door by any force tending to pull the door outward. In this case also the door may be readily ground to its seat and then the face-plates 17′ applied. This permits the safe to be more easily constructed, since the plates 17′ can be more readily applied to the door than to the inside of the safe-body. To all intents and purposes, owing to the location of the face-plates, they are, so far as separating them from the door is concerned, under an explosive or other force, the same as integral therewith. If preferred, both the lugs proper of the door and body could be provided with the separable face-plates.

From the foregoing it will be seen that whichever construction is used the integral lugs of the door are relatively remote to the opposing integral surfaces or lugs on the body—that is to say, the opposing locking-surfaces on the door and body are spaced apart and would be ineffective to prevent depthwise movement of the door unless the separable but rigidly or fixedly secured plates were inserted to fill these spaces.

The door will in practice be suitably supported to permit its rotation—as, for instance, by means of a crane-hinge pivotally supported to the hinge-lugs of the body (see dotted lines) and pivotally carrying a ring in which the ring (see dotted lines) of the door, formed integral or secured by bolts and soft-metal inserts; will fit and revolve—a suitable rack and pinion being used to rotate the door. This mechanism, however, it is not deemed necessary to show, since it does not form a part of my invention.

For preventing rotary movement of the door some suitable means may be used, shown in the present instance as bolting mechanism, comprising a pair of bolts 25, although a greater or less number could be used, if desired. These bolts are supported by a bar-formed back plate 26, shown in the present instance comprising a pair of cross-bars forming a cross-shaped member, secured to the flange of the door by suitable bolts projecting into soft-metal inserts 27. If preferred, the ends of these cross-bars could project into recesses formed in the flange. In any event they will serve to give stability to the annular flange should there be any elastic tendency thereof.

The door-locking bolts pass through bolt-

passages 28 formed in the flange and project into recesses or bolt-openings 29, formed in the jamb of the body, preferably in the rear of the annular steps. The bolts are shown with tapered edges, so that when shot into the jamb they will completely fill their bolt-openings, and thus prevent any lost motion, so that the door could not be rotated backward to open the joint. For throwing and retracting the bolts some suitable means may be used. In the present instance the bolts are provided with right and left hand threaded shanks 30, carrying at their inner ends a pinion or gear 31, in mesh with a rack 32, to which rack a suitable automatic or time lock may be connected, which, however, it is not deemed necessary to show. When the time-lock runs down, the rack is shifted and the bolts withdrawn, whereupon the door may be rotated to open it.

When the door is closed and rotated into its locked position, a suitable device may operate the automatic lock in the usual manner as the door reaches its final position, thereby to throw the bolts and lock the door against rotation.

By providing a dome-shaped door the strain under the action of a ram is more equally distributed and is transmitted to the body in a radial direction and taken up by such body, the arched form of the door preventing it being used as a wedge to open the joint, since it acts, it is believed, to resist the blows of a ram to a greater extent than a door the body of which is flat, or substantially so. This form of door need not necessarily be a rotary door.

Whatever be the form of the meeting surfaces, whether tapered or plane surfaces or otherwise formed, it will be seen that the body-surfaces are located in the rear of and away from the jamb—that is, diverge from such jamb so as to be outside thereof instead of inside of such jamb in the form of radial lugs as heretofore, the complementary surfaces on the door overlapping such body lugs or surfaces, one of the novel features of the present invention being locking surfaces or lugs preferably integral with the door which overlap, not lugs projecting into the jamb, but the wall of the body or a flange thereof, which wall extends inwardly away from the jamb, lying entirely outside thereof.

I claim as my invention—

1. A safe or vault comprising a body having a circular jamb and a circular dome-shaped door fitting into said jamb with its outer curved surface meeting and substantially flush with the contiguous outer surface of the body around said jamb, said body and door having rearwardly-extending circular flanges prolonging the depth of the jamb.

2. A safe or vault comprising a body having a circular doorway, and a dome-shaped door fitting therein, the curved outer surface of the door meeting and substantially flush with the contiguous outer surface of the body, said door having radially-projecting locking-surfaces overlapping inner surfaces on the body diverging inwardly from the jamb, one set of such surfaces being removable and the other integral.

3. A safe or vault comprising a body and a dome-shaped door, the outer surface of which forms a continuation of the outer surface of the body without the formation of an opening or space at the joint thereof, said body and door having rearwardly-extending integral flanges carrying locking means.

4. A safe or vault comprising a body, a rotary dome-shaped door the outer surface of which forms a continuation of the outer surface of the body without the formation of an opening or space at the joint thereof, said body and door having rearwardly-extending integral flanges carrying locking means comprising radially-projecting locking-lugs, the door-lugs integral therewith and overlapping the locking-surfaces carried by the body-flange at that part thereof which diverges inwardly from the jamb.

5. A safe, or vault comprising a body, a rotary dome-shaped door, the outer surface of which forms a continuation of the outer surface of the body without the formation of an opening or space at the joint thereof, said body and door having rearwardly-extending flanges carrying locking means comprising radially-projecting lugs integral with the door-flange and separable lugs carried by the body-flange, and means for preventing rotation of the door.

6. A safe or vault comprising a body having greater thickness around the jamb thereof than at other parts of such body and having locking-surfaces diverging from the jamb at the inner end thereof, and a rotary dome-shaped door provided with integral locking-surfaces coöperating with the locking-surfaces of the body.

7. A safe or vault comprising a body having a circular jamb and rotary door-locking tapered surfaces located at the inner end thereof outside of such jamb and tapered in the direction of rotary movement of the door, and an integral rotary door having a rearwardly-extending flange provided with integral tapered locking-surfaces overlapping the locking-surfaces on the body for holding such door against withdrawal.

8. A safe or vault comprising a body having a rearwardly-extending flange located around its jamb and provided on its inner face outside of such jamb with tapered locking-surfaces tapered in the direction of rotary movement of the door, and a rotary door having integral tapered locking-surfaces overlapping the locking-surfaces of said body.

9. A safe or vault comprising a body and a rotary door having located transversely to the plane of the jamb opposing surfaces integral with the door and body respectively and

spaced apart, and rigidly secured, separable means filling such spaces.

10. A safe or vault comprising a body and a rotary door having located transversely to the plane of the jamb opposing surfaces integral with the door and body respectively and spaced apart, and tapered means filling such spaces.

11. A safe or vault comprising a body and a rotary door having located transversely to the plane of the jamb opposing locking-surfaces integral with the door and body respectively and spaced apart, and one having fixedly secured and separable means filling such spaces.

12. A safe or vault comprising a body and a rotary door having located transversely to the plane of the jamb opposing locking-surfaces integral with the door and body respectively and spaced apart and one having rigidly secured but separable tapered members filling such spaces.

13. A safe or vault comprising a body and a rotary door, said body having removable locking-surfaces located at the inner end and outside of its jamb, said door having a plurality of coöperating integral locking-surfaces.

14. A safe or vault comprising a body and a rotary door, said body having removable, tapered locking-surfaces located at the inner end and outside of its jamb, said door having a plurality of coöperating integral locking-surfaces.

15. A safe or vault comprising a body having a rearwardly-extending integral flange and a rotary door, said flange and door having opposing integral overlapping surfaces located at an angle to the jamb and spaced apart with separable but rigidly-secured members filling the spaces between such opposing integral surfaces.

16. A safe or vault comprising a body and a rotary door having a rearwardly-extending flange, said body and door flange having opposing integral overlapping surfaces located at an angle to the jamb and spaced apart and one carrying separable but rigidly-secured members filling the spaces between such opposing integral surfaces.

17. A safe or vault comprising a body having a rearwardly-extending integral flange and a rotary door having a rearwardly-extending integral flange, said flanges having opposing integral overlapping surfaces located at an angle to the jamb and spaced apart and one carrying separable, but rigidly-secured, plates filling the spaces between such opposing integral surfaces.

18. A safe or vault comprising a body having a rearwardly-extending integral flange and a rotary door having a rearwardly-extending integral flange, said flanges having opposing integral overlapping surfaces located at an angle to the jamb and spaced apart and one carrying separable, but rigidly-secured, tapered members filling the spaces between such opposing integral surfaces.

19. A safe or vault comprising a body and a rotary door, each having a rearwardly-extending flange, tapered means carried on the innermost face of the body-flange outside of the jamb, and means integral with the flange of the door and coöperating with such tapered means for locking the door to its seat.

20. A safe or vault comprising a body and a rotary door, said body and door having rearwardly-extending circular flanges, the flange of the door having integral locking surfaces or lugs coöperating with removable tapered surfaces or lugs carried by the innermost face of the body-flange outside of the jamb thereof, and means for locking the door against rotation.

21. A safe or vault comprising a body and a rotary door having integral locking surfaces or lugs coöperating with locking surfaces or lugs carried by and removable from the body.

22. A safe or vault having a circular jamb provided with cut-away portions opening thereinto and at the rear of such jamb, a rotary door having radially-projecting locking-surfaces adapted to pass through such cut-away portions to the rear of the jamb and into position to engage tapered surfaces at the sides of such cut-away portions at the rear of such jamb and tapering in the direction of the rotary movement of the door, to wedge and lock the door against withdrawal, and means for preventing the rotation of the door.

23. A safe or vault comprising a body having a rearwardly-extending flange having recesses opening into the jamb and at the rear thereof, such flange having at the sides of such recesses at the rear of such flange tapered locking surfaces or lugs, a rotary door having integral locking-surfaces adapted to pass through such recesses to the rear of the body-flange and into position on the rotation of the door to coöperate with the locking-surfaces of such flange, and means for preventing the rotation of the door.

24. A safe or vault body having a rearwardly-extending circular flange having a plurality of diverging recesses located therein and opening into the jamb and at the rear thereof, and forming locking surfaces or lugs at the sides of such recesses, in the rear and outside of such jamb.

25. A safe or vault comprising an unmachineable-metal body and an unmachineable-metal rotary door having opposing integral surfaces comprising an annular step on the door coöperating with an annular step on the jamb, and sets of opposing integral locking-surfaces in the rear of said steps, those of the door adapted to overlap those of the body in the rear of and diverging from the jamb, with spaces therebetween, and machineable-metal means for filling such spaces.

26. A safe or vault door comprising a body

and a flange, and a pair of crossing bars secured to such flange.

27. A safe or vault door comprising a body having an inwardly-extending flange, and a bar-formed back plate secured thereto.

28. A safe or vault body comprising a body and a rotary door, one having integral locking-surfaces, and the other rigid, but removable locking-surfaces, one set of such surfaces overlapping the other at the inner end of the jamb and back therefrom.

29. A safe or vault comprising a body and a rotary door, said body and door each having a rearwardly-extending circular flange, one of said flanges having integral locking-surfaces and the other rigid but separable locking-surfaces, and one set of locking-surfaces overlapping the other at the inner end of the jamb and at one side thereof.

30. A safe or vault comprising an unmachineable-metal body and an unmachineable-metal rotary door having opposing integral surfaces located at an angle to the jamb and spaced apart, and machineable-metal means located to fill up such spaces.

31. A safe or vault comprising an unmachineable-metal body and an unmachineable-metal rotary door having rearwardly-extending flanges furnished with opposing integral surfaces located at an angle to the jamb and spaced apart, and machineable-metal means located to fill up such spaces.

32. A safe or vault comprising an integral unmachineable-metal body and an integral unmachineable-metal rotary door having sets of opposing integral surfaces located transversely to the jamb and spaced apart to permit the guiding of the door to its seat and a set of machineable-metal members secured to one set of such integral surfaces to fill up such spaces.

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