No. 793,044. PATENTED JUNE 27, 1905.

W. BRINTON & W. GASTON.

SAFE OR VAULT.

APPLICATION FILED SEPT. 30, 1903.

2 SHEETS—SHEET 1.

Fig. 1.

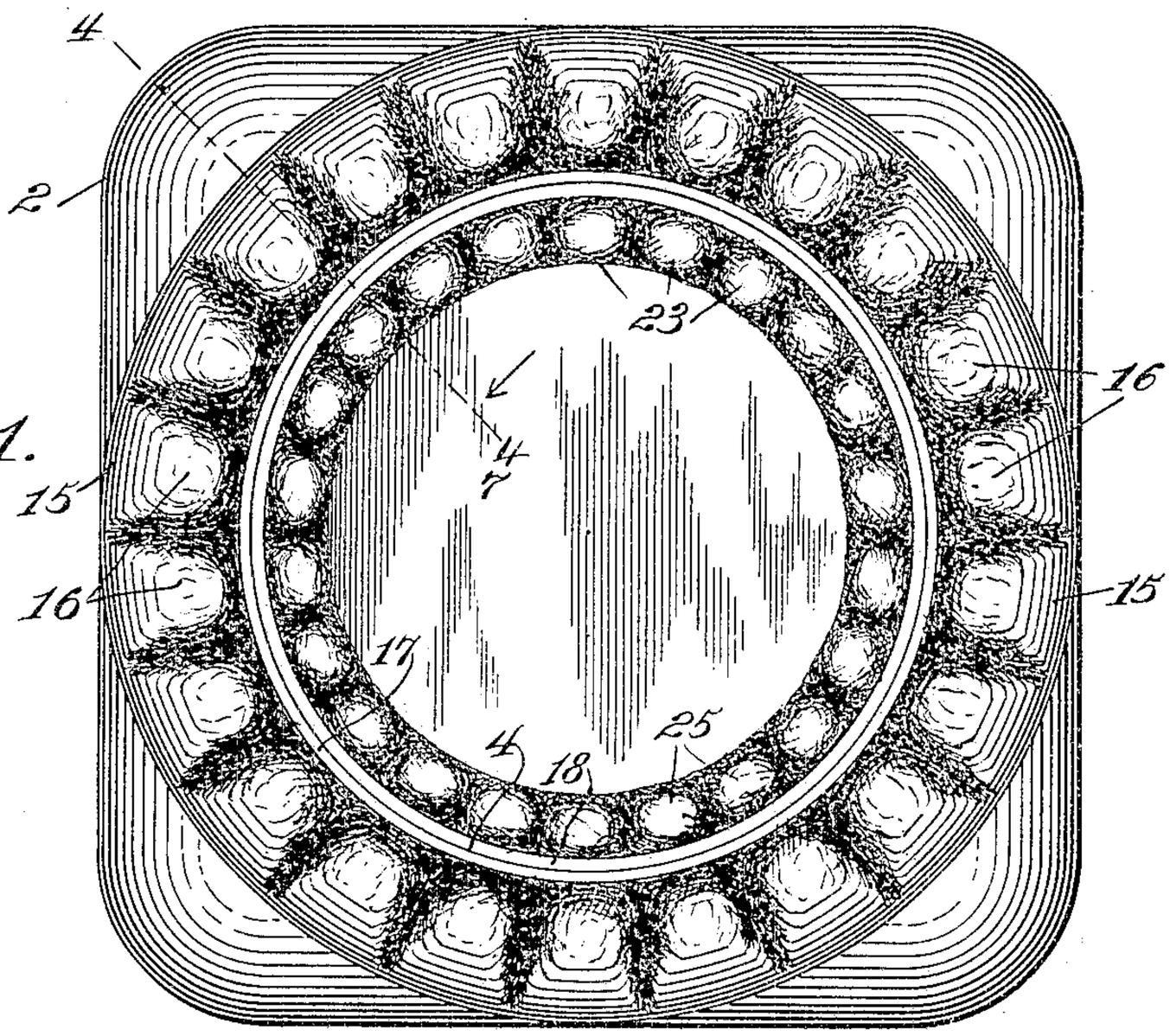
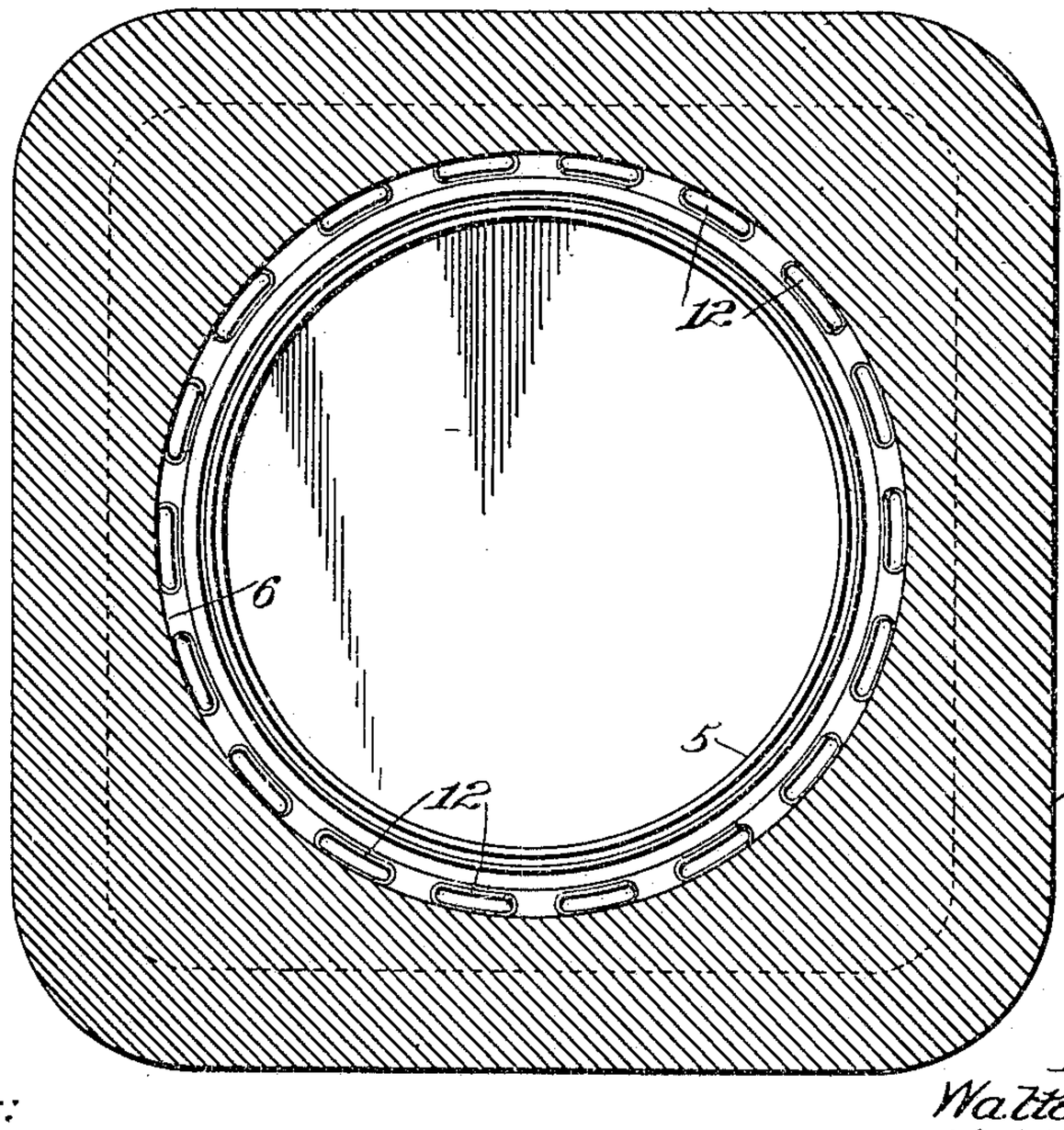


Fig. 2



Witnesses:
Galderon G. Fuss.
C. A. Jarvis.

Inventors:
Walter Brinton.
Walter Gaston.
By their Attorney,
F. A. Richards.

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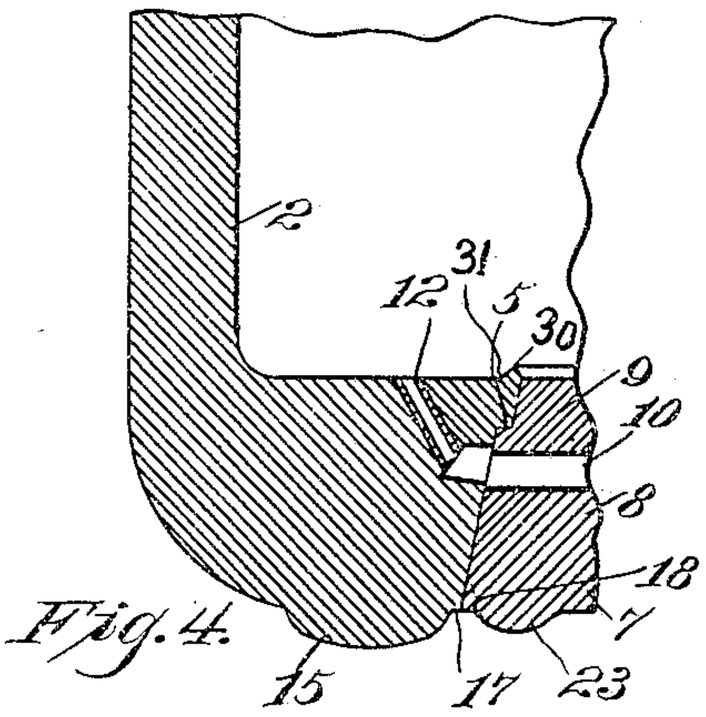

Fig. 4.

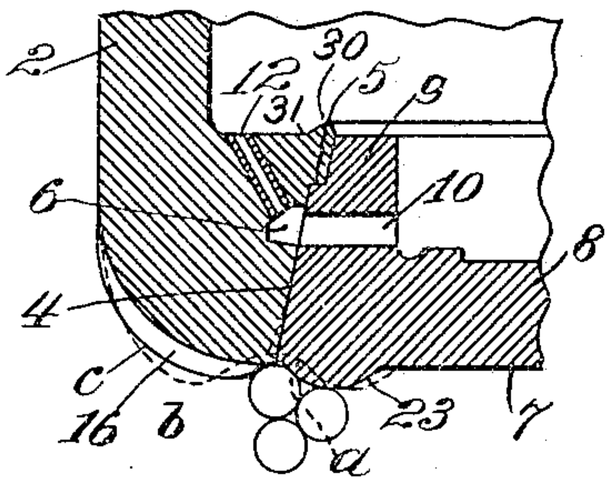

Fig. 5.

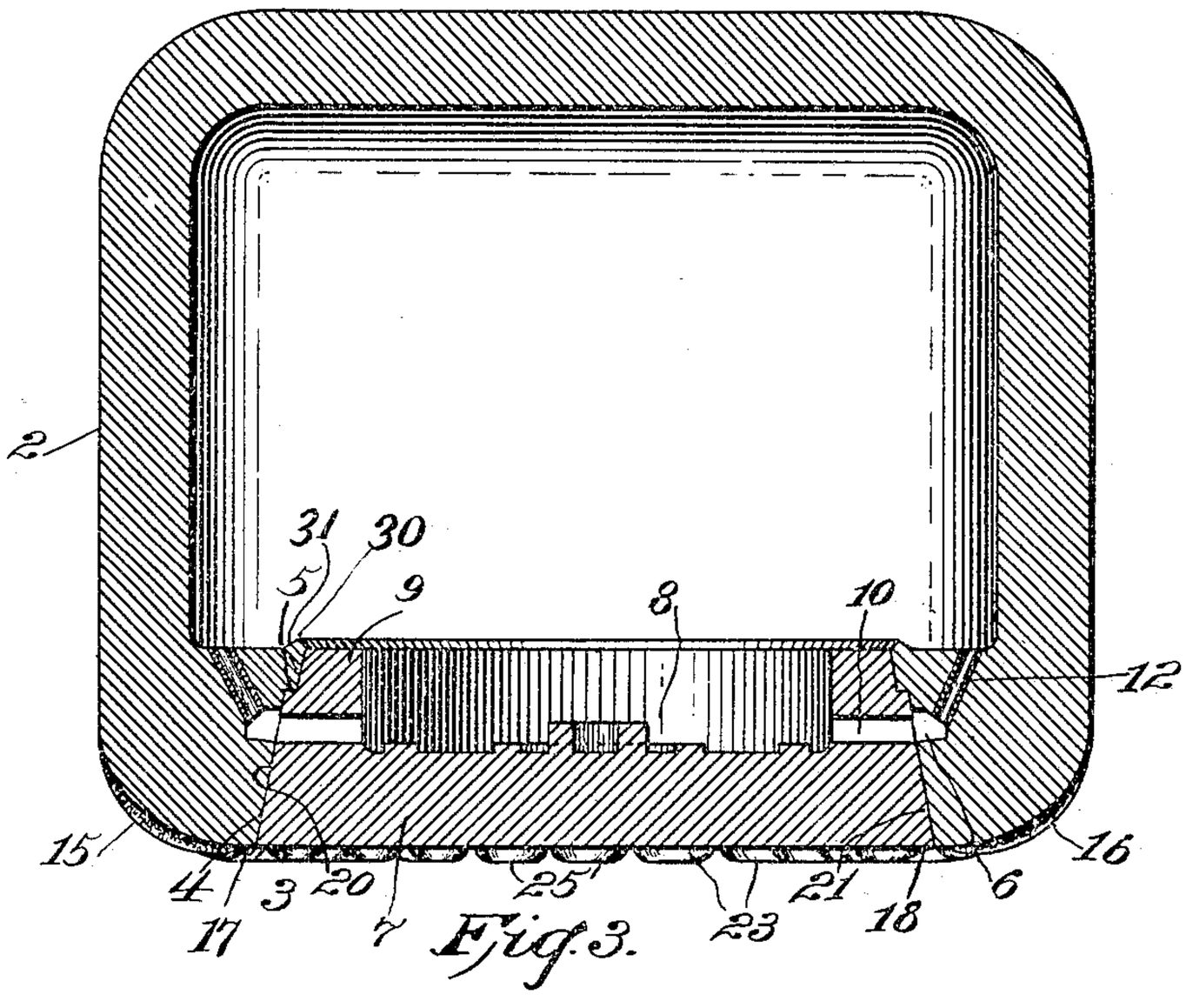

Fig. 3.

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

Inventors:
Walter Brinton.
Walter Gaston.
By their Attorney,
F. A. Richards.

PHOTO LITHOGRAPHED BY SACKETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 793,044. Patented June 27, 1905.

UNITED STATES PATENT OFFICE.

WALTER BRINTON, OF HIGHBRIDGE, AND WALTER GASTON, OF PLAINFIELD, NEW JERSEY, ASSIGNORS TO TAYLOR IRON AND STEEL COMPANY, A CORPORATION OF NEW JERSEY.

SAFE OR VAULT.

SPECIFICATION forming part of Letters Patent No. 793,044, dated June 27, 1905.

Application filed September 30, 1903. Serial No. 175,161.

To all whom it may concern:

Be it known that we, WALTER BRINTON, residing at Highbridge, in the county of Hunterdon, and WALTER GASTON, residing at Plainfield, in the county of Union, State of New Jersey, citizens of the United States, have invented certain new and useful Improvements in Safes or Vaults, of which the following is a specification.

This invention relates to safes or vaults, and particularly to that class thereof known as "burglar-proof" safes, the object of the invention being to provide an improved structure with its door and body so formed around the joint at such door that it has superior resisting qualities and is especially adapted to resist attacks not only by nitroglycerin and other high explosives, but also by mechanical means.

A further object of the invention is the provision of a safe or vault body having an improved form of bead around its doorway.

A further object of the invention is the provision of an improved door.

A further object of the invention is the provision of a safe body and door each having a corrugated bead coöperating to insure superior resisting qualities to attacks.

A further object of the invention is the provision of a safe or vault body so constructed that such body may be cast around its jamb with a larger amount of metal without materially interfering with the substantial uniformity of such casting.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of this improved safe body and door. Fig. 2 is a vertical cross-sectional view thereof looking from the rear of the safe. Fig. 3 is a horizontal cross-sectional view of Fig. 1. Fig. 4 is a sectional view taken in line 4 4, Fig. 4, of a part of one corner of the safe-body and its door, illustrating on a larger scale the formation of the beads; and Fig. 5 is a view illustrating what it is apprehended is the action of such beads under the effect of a high-explosive charge.

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

The present improvement comprises in a general way a safe-body 2, having a doorway 3, provided with an elongated jamb 4, having a step or offset 5 and a bolt-receiving groove 6, which may, however, be in the form of independent pockets or recesses, if desired, and a door 7, comprising a body 8 and a rearwardly-extending flange 9, having openings 10 for the passage of the bolts. This door and body is in practice formed of unmachineable metal—such, for instance, as manganese steel—each of an integral structure.

Owing to the introduction of nitroglycerin as an aid in safe-breaking by burglars, it is essential that the highest quality of metal should be utilized in the manufacture of safes or vaults to secure valuables from attacks by the modern burglar; but in addition to this it is also necessary that large bearing-surfaces be provided at the joint around the door to distribute the effect of the charges of high explosives fired against the safe, while the provision of steps or offsets so located that they are easily accessible must be avoided. In addition to this it is also desirable that the joint around the door be protected against attacks by the use of sledges or other mechanical means. To give the safe as a structure a superior resisting quality, manganese steel is, as hereinbefore stated, used from which to cast the body and the door each in one piece. The body and door are subsequent to casting heat-treated in order to toughen the same and give such structure still higher resisting qualities, and for this purpose each part is after being cast subjected to heat in a suitable manner—as, for instance, by placing the same in a furnace and gradually increasing the heat up to a predetermined temperature, preferably from a certain point—after which the castings are removed and cooled—as, for instance, by immersing the same in brine water. To properly heat-treat these castings, it is necessary that they be substantially uniform throughout or when this is not desirable that any lack of uniformity be equalized by the

mode in which the casting is formed, so that uniformity in the treatment of the casting may still be obtained. In the present instance, since the body is cast with a larger amount of metal around the doorway than at other parts of the body, these advantages are obtained by locating in the casting a series of openings or ducts in which are shown located pipes 12, which are placed in the mold prior to casting, and which pipes connect the interior of the safe with the bolt-groove 6. By this means an equal distribution of the heat is obtained at this part of the casing, notwithstanding it is much larger in bulk than the other portions of the body, and also the cooling material is more effective, both the heating and cooling being by the provision of this means substantially uniform. The provision of these passages also insure the more equal and uniform cooling of the mass of metal during the setting of the casting, thus avoiding strains at such part of the body, as well as the proper equalization and circulation of the heat during the heat treatment and also the proper chilling effect and circulation of the water. The same advantage is obtained in the door by means of the bolt-openings. Furthermore, these passages or ducts (shown in the present instance located entirely around the body and establishing communication between the jamb and the interior of the safe and located relatively close to one another) also constitute a means of carrying off any fluid explosive should the same penetrate the joint around the door, since it would flow backward, owing to the tapered formation of the door and jamb, until it reached the bolt-groove, into which it would pass, and thence around to the bottom thereof and out through the adjacent passages 12 into the interior of the safe, where it would be impracticable to explode it except by concussion, and even then the entire contents of the safe would probably be wrecked, so that a successful burglarious opening of the safe would not be possible. It being well known that a burglar is unwilling to take mutilated money, his attacks upon a safe are therefore always made with a view of avoiding the necessity of ruining the contents. In some forms of safes or vaults the flange 30 could be made so as to have great depth, if desired, the recess 31, formed between it and the side wall of the safe with which the passages 12 communicate, likewise having great depth.

The doorway is of circular formation for the reception of the circular door, whereby a grinding fit of the door relative to its jamb is obtained and the formation of angles around the doorway avoided, thus obtaining a fluid-tight joint. To preserve this joint against attacks by high explosives, it has heretofore been found desirable to provide a bead on the body around such joint, forming what might be termed a "yielding mass" of metal. It is well known that all metals have what is technically known as "flowage," and in the structure shown in the patent granted to H. D. Hibbard, No. 662,429, dated November 27, 1900, this flowage was provided for by the provision of this bead located around the doorway. In the present instance an integral bead 15, somewhat larger than heretofore, is provided, but made up of a series of separate parts or beads 16, so that although the flowage or yielding of the metal might ordinarily be resisted by the increased mass of such metal forming the bead the effect of the explosive charge, owing to the separate part or bead formation, is local. Consequently the action of the explosive charge, it is apprehended, will be effective upon one or more of the parts or beads to the exclusion of the rest, so that the result notwithstanding the increased mass of metal forming the bead is still the same—namely, a yielding of that part of the metal adjacent to the point where the explosive charge is fired—so that (see Fig. 5) when the metal of the door is forced inward, as at *a*, by the force of the explosive charge and also pushed laterally at its edge, as at *b*, the metal in the bead or beads adjacent to such charge will move laterally, as at *c*, to preserve a metal-to-metal-tight joint at this point. In the form shown this bead 15 comprises a circular projection, flange, or swell extending forwardly of the body proper around the doorway and, as stated, is formed of a continuous series of projections, parts, or beads 16, forming what may be termed in practice a "corrugated" bead. In other words, it consists of a swell or bead formed or made up of a number of lesser swells or beads, all terminating in a circular surface or annular depressed portion 17, adjacent to the doorway and within the outer surfaces of the beads 16, and which surface permits the proper grinding of the metal around the doorway to match with a similar surface 18 on the door, and which two surfaces 17 and 18 are substantially flush with each other, with their side faces 20 and 21 forming, respectively, a part of the jamb and periphery of the door and at an angle to such surfaces 17 and 18, preferably but not necessarily square therewith, such faces 20 and 21 being in metal-to-metal contact from their point of engagement around the door inwardly. The door is likewise provided with a bead 23 of similar formation to that furnished the body and likewise made up of similar parts or beads 25, forming a corrugated bead with the surface or annular depressed portion 18 around the same, but within the outer surfaces of the beads. These beads in addition to forming an explosion-resisting medium, or, more properly speaking, an effective means to preserve a metal-to-metal-tight joint around the door, also provide a means of preventing the door from being attacked at or adjacent to its edge by sledging, since as they project be-

yond the surfaces 17 and 18, which are located relatively remote to the outer surfaces 25 of such beads, and consequently lie within the protecting-walls thereof, it is not practicable to strike such surfaces continuously by sledges with sufficient force to peen the metal—that is, force it away from the edge to form an opening at the joint. In other words, it will be obvious that as the beads located around the joint, project beyond such joint an appreciable distance the joint is within what might be crudely termed a "hollow," so that it is not practicable to strike the metal at the edge of the door by means of blunt sledges, owing to the interference of the beads. Consequently the peening of the metal by a series of successive sledging-blows is not practicable. From the foregoing it will be seen that this bead in its present form not only provides a means of protecting the joint against the effect of explosive charges, and so maintains a tight-joint around the door, but it also protects it against the use of sledges, so that the opportunity of opening the joint at the door at any particular joint in any practicable manner by mechanical or explosive force is prevented. Moreover, by the formation of the bead in the manner shown and described a larger mass of metal may be obtained around the door without interfering with the yielding qualities thereof, and by the provision of the ducts or channels around the doorway this larger mass of metal enables the provision of a longer jamb without interfering with the substantial uniformity of the treatment of the casting, and this larger joint-surface affords a larger surface over which the shocks of an explosive charge are transmitted, so that the effect thereof at any one point is materially lessened.

In conclusion it may be said that while the use of the particular metal described, together with the beads, will afford superior results in the manufacture of burglar-proof safes and vaults, in that it provides a safe in which not only is the joint at the door, usually the most vulnerable point, protected against explosive and mechanical attacks, but it presents a structure not capable of being drilled or cut, it is nevertheless to be understood that the use of these beads, or either of them, with other metals or with manganese steel unheat-treated is within the province of certain of the claims. Manganese steel, especially manganese steel heat-treated, is deemed preferable, since the tendency of this metal is to yield under the effect of explosive charges rather than crack.

From the foregoing it will be seen that the exposed annular surface 17 is located at the outer terminus of the jamb-surface of the body and at an angle thereto and may be substantially square with such jamb-surface, if desired, and substantially at the base of a projecting portion which extends or projects beyond such surface, so that such surface 17 is in the nature of a depressed surface, being located within the outer boundary of such projecting portion of the front which in the present instance is in the form of a bead. The door has its contiguous outer surface substantially flush with this surface 17, and this would be the case whether the door be provided with a bead or not—that is, whether it is of substantially the form shown and described in the said patent to Hibbard, hereinbefore referred to. In either event it will be seen that the outer surface of the door contiguous to its periphery and the annular surface of the body substantially flush therewith are depressed surfaces, so far as that part of the front which projects beyond such surfaces is concerned, both being located within the outermost boundary of such projecting portion, which in the present instance is shown as a bead. This feature, we believe, is new with us and is an important one, since whether the projecting portion be in the form of a bead or the entire front of the safe itself, as in the contemporaneously-pending application of Walter Brinton, Serial No. 212,924, filed June 17, 1904, the joint around the door is within such projecting portion and terminates at each side thereof in a surface matching its companion surface, whereby such surfaces may be ground to a matching fit, so that there is no opening at the joint and so that such joint is within the protecting boundary of the projecting front. This same feature may be obtained in various ways, as shown, for instance, in a contemporaneously-pending application, Serial No. 194,655, filed February 23, 1904, now Patent No. 771,704, dated October 4, 1904, and in said contemporaneously-pending application above referred to, where this subject-matter is claimed broadly.

We claim as our invention—

1. A cast, unmachineable metal, integral safe or vault body having an annular series of protuberances located around its doorway at the front of the door-body.

2. A safe or vault body having around its doorway a forwardly-extending bead, projection, flange or swell formed of a number of contiguous lesser beads, projections, flanges or swells.

3. An integral safe or vault body cast of manganese steel, heat-treated subsequent to such casting by heating it up to a predetermined temperature and then cooling it and provided with a flange, bead, swell, or projection around its doorway formed of a number of lesser beads, flanges, swells or projections.

4. An integral, unmachineable metal, safe or vault body having a bead projecting beyond its circular jamb-surface, the inner wall of such bead terminating at its base in a smooth annular surface located at the outer terminus of and at an angle to the jamb-surface, and

formed to be substantially flush with the contiguous outer surface of the door when such door is closed.

5. A safe or vault body having a bead located around its doorway terminating at the inner side thereof in a surface located within the outer boundary of such bead, such surface being located at an angle to the jamb-surface and exposed when the door is closed.

6. A safe or vault body having a bead located around its doorway terminating at the inner side thereof in a surface located within the outer boundary of such bead, such surface being substantially square with the jamb-surface and exposed when the door is closed.

7. A safe or vault body having a series of protuberances around its doorway terminating in a ground surface within the outer boundary of such bead.

8. An integral, unmachineable metal safe or vault body having a forwardly-projecting corrugated bead terminating at the inner side thereof in a relatively flat annular surface located within the outermost boundary of such corrugated bead.

9. A cast, unmachineable metal, integral safe or vault body having corrugations at the front thereof formed during the casting of such body.

10. A safe or vault door having adjacent to its edge a forwardly-extending bead, projection, flange or swell formed of a number of contiguous lesser projections, beads, flanges, or swells.

11. An integral, cast, unmachineable metal, safe or vault door having a series of integral protuberances at its outer side formed during the casting of such door.

12. An integral safe or vault door cast of steel and heat-treated subsequent to such casting by heating it up to a predetermined temperature and then cooling it, and provided with a flange, bead, swell, or projection around the same adjacent its edge formed of a number of lesser beads, flanges, swells or projections.

13. A safe or vault door having a bead located around the same terminating at its outer side in an annular surface located within the outer boundary of such bead, such surface being substantially square with the edge of the door.

14. A safe or vault door having a corrugated bead terminating in a ground surface within the outer boundary of such bead.

15. An integral safe or vault door having a forwardly-projecting bead terminating at its outer side at its base in an annular surface located within the outermost boundary of such portion, and at an angle to the periphery of the door.

16. An integral circular safe or vault door comprising a body and an interiorly-located annular flange, said door having an offset or step at its periphery, and provided with a forwardly-extending annular bead located around and adjacent to the edge thereof.

17. An integral, unmachineable metal, circular safe or vault door having a forwardly-extending annular bead adjacent to its edge, and a rearwardly-extending annular flange.

18. A safe or vault body having a circular doorway provided around the same with an integral bead, and a door adapted to fit said doorway and also having an integral bead.

19. A safe or vault body having a circular doorway provided around the same with an integral bead, and a door adapted to fit said doorway and also having an integral bead, said beads having between them a pair of matched surfaces.

20. A safe or vault body having a jamb and a surface around and at the outer terminus of such jamb with a bead extending beyond such surface and protecting it, and a door fitting into said jamb and having at the outer terminus of its periphery a surface matching and substantially flush with the said surface of the body.

21. An integral unmachineable metal safe or vault body having a circular doorway with an integral bead projecting beyond the outer terminus of its jamb, and having interiorly of and at the base of such bead an annular ground surface located at an angle to and at the outer terminus of the jamb-surface, and an integral circular unmachineable metal door fitting into said jamb and having an annular ground surface contiguous to its edge matching and substantially flush with such annular surface of the body.

22. A safe or vault body having a circular doorway, and provided with an integral bead projecting beyond the outer terminus of the jamb, and having interiorly of and at the base of such bead an annular surface located substantially square with and at the outer terminus of the jamb-surface, and a door fitting into said jamb and having contiguous to its edge an annular surface matching and substantially flush with such annular surface of the body.

23. An unmachineable metal safe or vault body having a circular doorway and provided with an integral bead projecting beyond the outer terminus of the jamb, and an integral, circular, unmachineable metal door fitting into said jamb and having on its front and contiguous to its edge an annular flat surface located within and at the base of the bead of the body.

24. A safe or vault body having a circular doorway provided around the same with an integral bead, and a door adapted to fit said doorway and also having an integral bead, said beads having between them a relatively flat surface.

25. A safe or vault body having a circular doorway, and a door adapted to fit therein, said body having around its doorway a corrugated bead integral with such body and in position and adapted to yield with the metal of

the door at the edge thereof when such door metal is under high explosive charges moved laterally, thereby to preserve a tight metal-to-metal joint or contact between metals of the door and body at the joint.

26. A safe or vault comprising a body having a circular doorway and provided around such doorway with an integral corrugated bead, and a door also having around and adjacent to its edge a corrugated bead.

27. A safe or vault comprising a body having a circular doorway and provided around such doorway with a corrugated bead integral with a part of such body and a door also having around and adjacent to its edge a corrugated bead, the marginal faces of the door and body being substantially flush, with the joint-surfaces of such door and body in engagement with each other.

28. An integral safe or vault comprising an integral body having a circular doorway with a bead around the same, a door fitting said doorway and also having a bead around and adjacent to its edge, said door and body having a relatively flat surface between said beads at which point the joint of the door terminates.

29. An integral safe or vault comprising an integral body having a circular doorway with a bead around the same a door fitting said doorway and also having a bead around and adjacent to its edge, said door and body having a relatively flat surface between said beads at which point the joint of the door terminates, and one of said beads being formed of a number of lesser beads.

30. A safe or vault body having a jamb provided with bolt-receiving means, and a plurality of passages connecting the interior of said body with said bolt-receiving means.

31. A safe or vault body having its jamb provided with a bolt-receiving groove and a plurality of passages connecting such groove with the interior of such body.

32. A safe or vault body having a circular doorway provided with bolt-receiving means and a series of substantially equidistant passages located in the body entirely around the doorway and connecting the interior thereof with such bolt-receiving means.

33. A safe or vault body having a circular doorway provided with bolt-receiving means and a plurality of pipes located in the body and connecting the interior thereof with such bolt-receiving means.

34. A safe or vault body having a doorway and passages located entirely around such doorway and providing communication between the jamb-surface and the interior of such body.

35. A safe or vault body having a doorway and passages located around such doorway and providing communication between the jamb-surface and the interior of such body, such passages having pipes located therein.

36. An integral cast-steel safe or vault body having a circular doorway and provided entirely around such doorway at intervals with transverse passages having pipes or tubes located therein communicating with the interior of the body.

37. An integral cast-steel safe or vault body having a doorway and provided entirely around such doorway, at intervals, with passages communicating with the interior of such body.

38. An integral, cast, unmachineable metal safe or vault body having a circular doorway and an integral, cast, unmachineable metal circular door fitting such doorway, said door and body having means for preventing successful attacks on the door - joint and comprising passages affording communication between the jamb-surface and the interior of the body and a pair of matching surfaces forming the outer terminus of the joint around the door and beyond which matching surfaces a part of the body-front projects.

39. A safe or vault body having a rearwardly-extending flange forming a recess, said body also having a bolt-groove located in its jamb, and a plurality of passages connecting said bolt-groove with said recess.

40. A safe or vault body having a rearwardly-extending integral flange, said body also having bolt-receiving means, and passages establishing communication between the jamb and the interior of the body.

WALTER BRINTON.
WALTER GASTON.

Witnesses as to Walter Brinton:
JACOB STRUBLE,
A. F. MURRAY.
Witnesses as to Walter Gaston:
SOLON S. HIBBARD,
ERNEST G. JUDKINS.