No. 827,351. PATENTED JULY 31, 1906.

S. A. ELY.

SAFE.

APPLICATION FILED APR. 3, 1905.

4 SHEETS—SHEET 1.

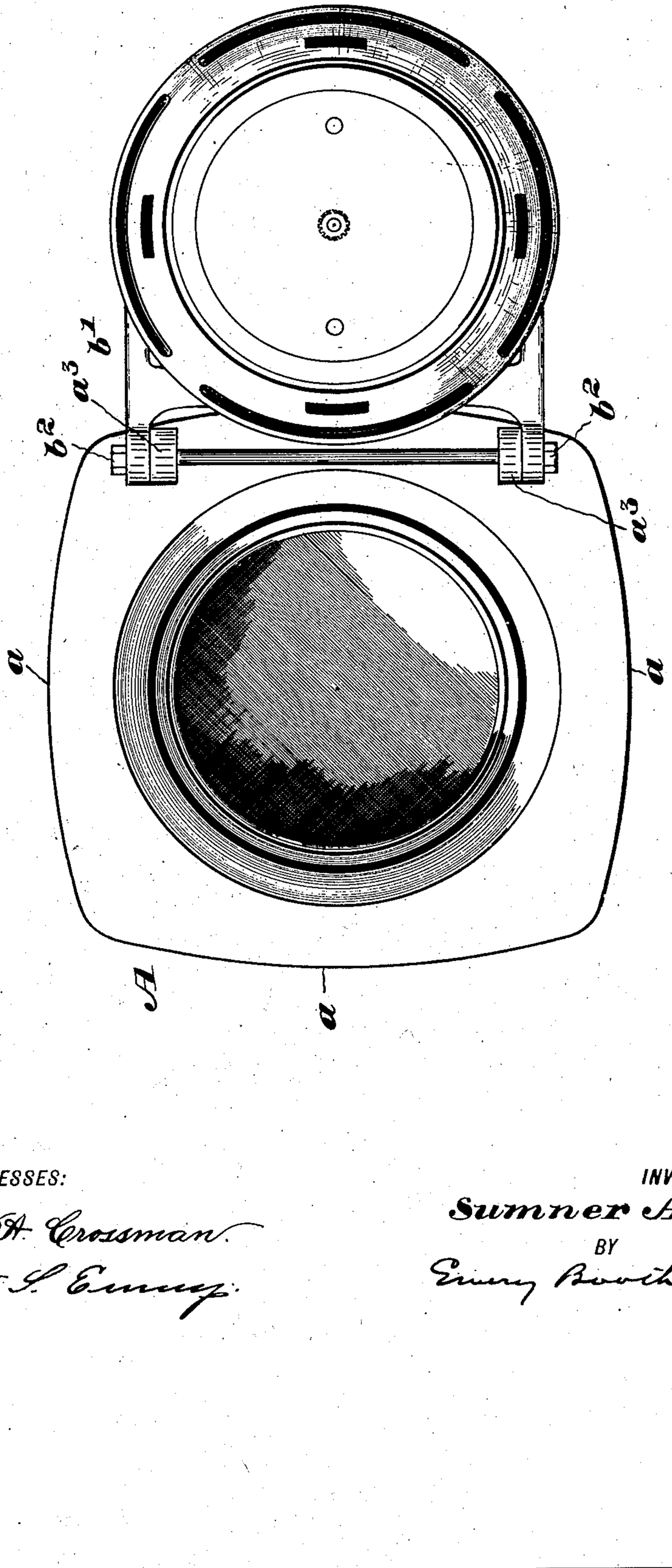

Fig. 1.

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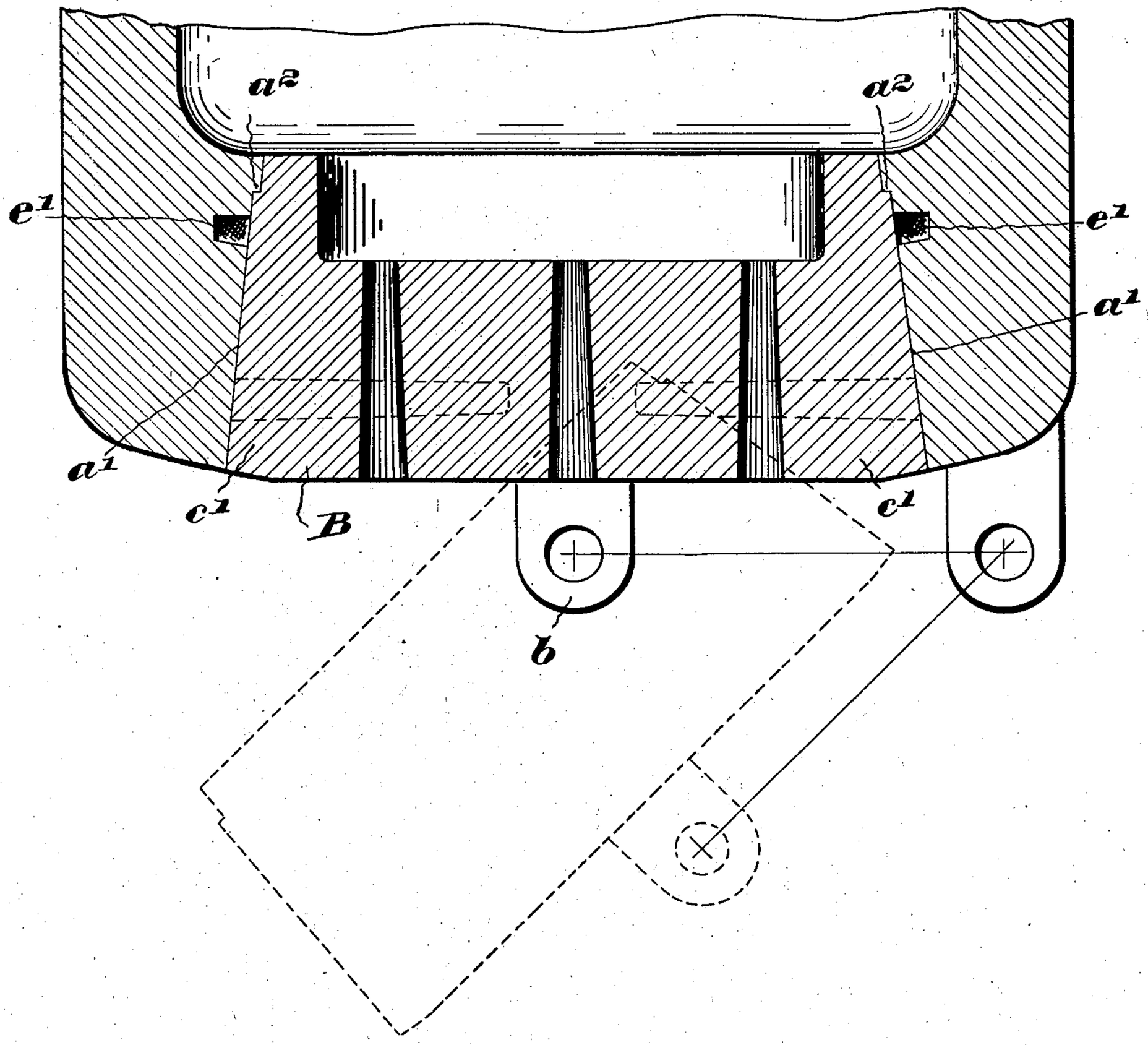
4 SHEETS—SHEET 2.

Fig. 2



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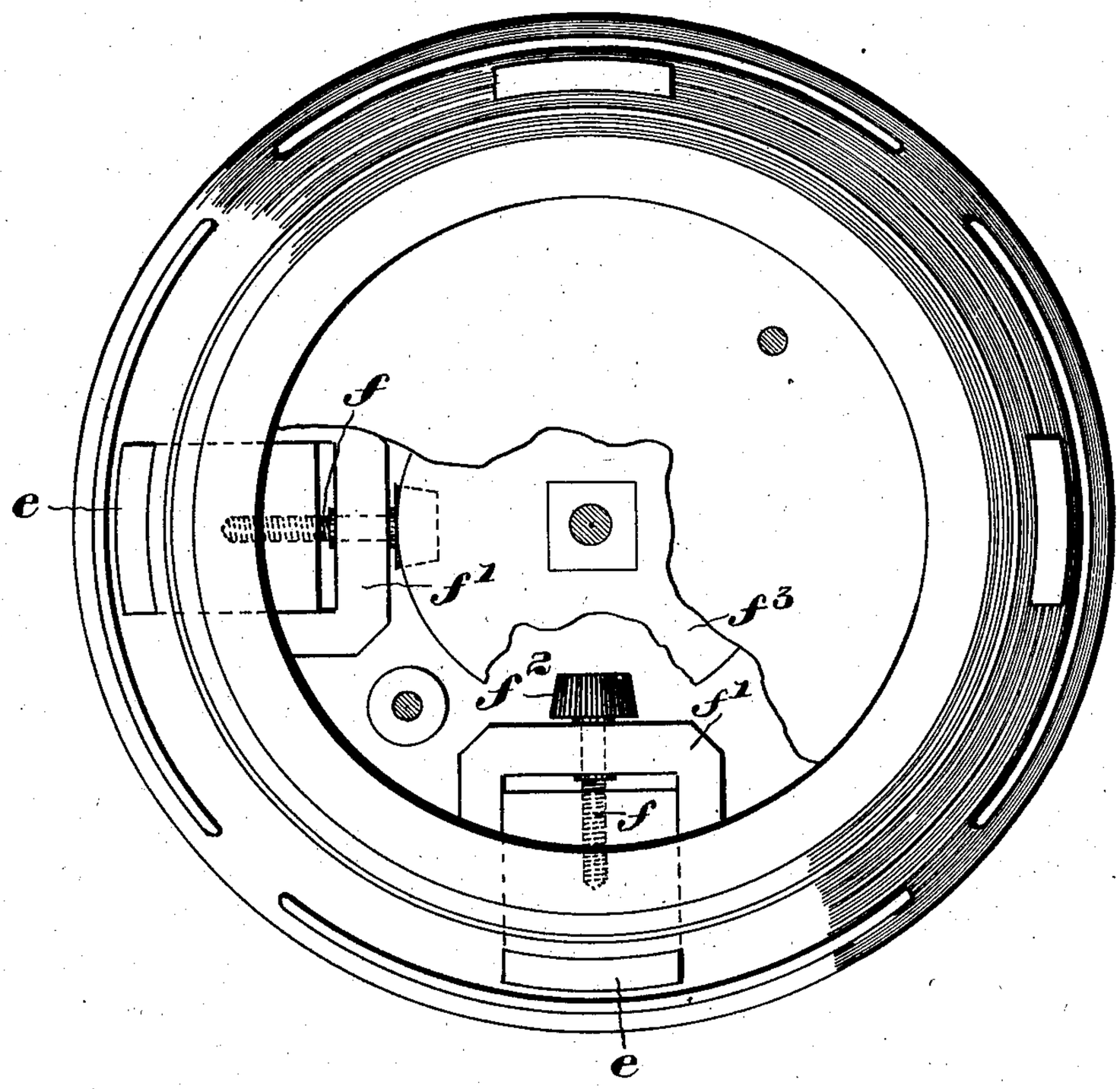
4 SHEETS—SHEET 3.

Fig. 3



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4 SHEETS—SHEET 4.

Fig. 4

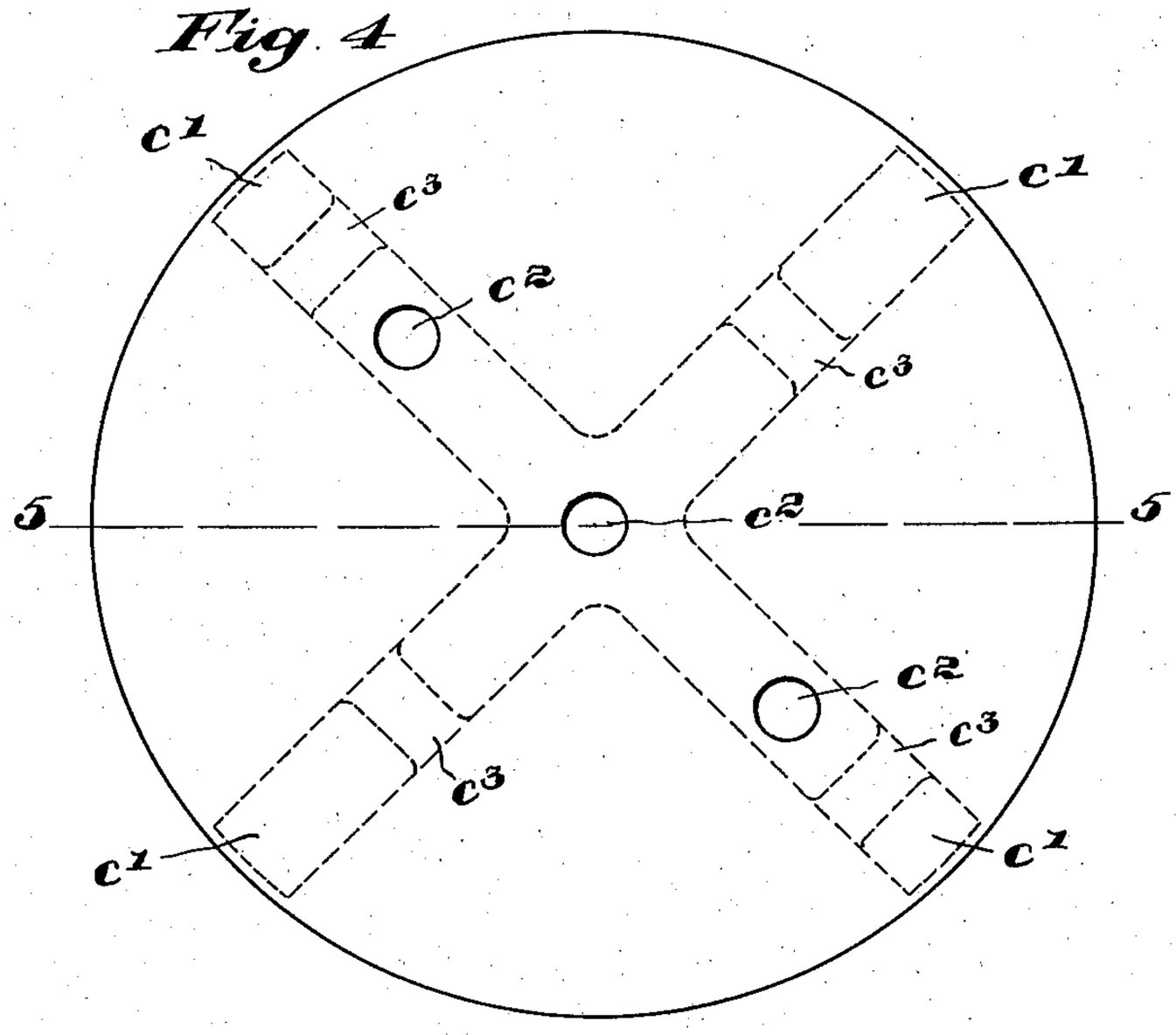


Fig. 5

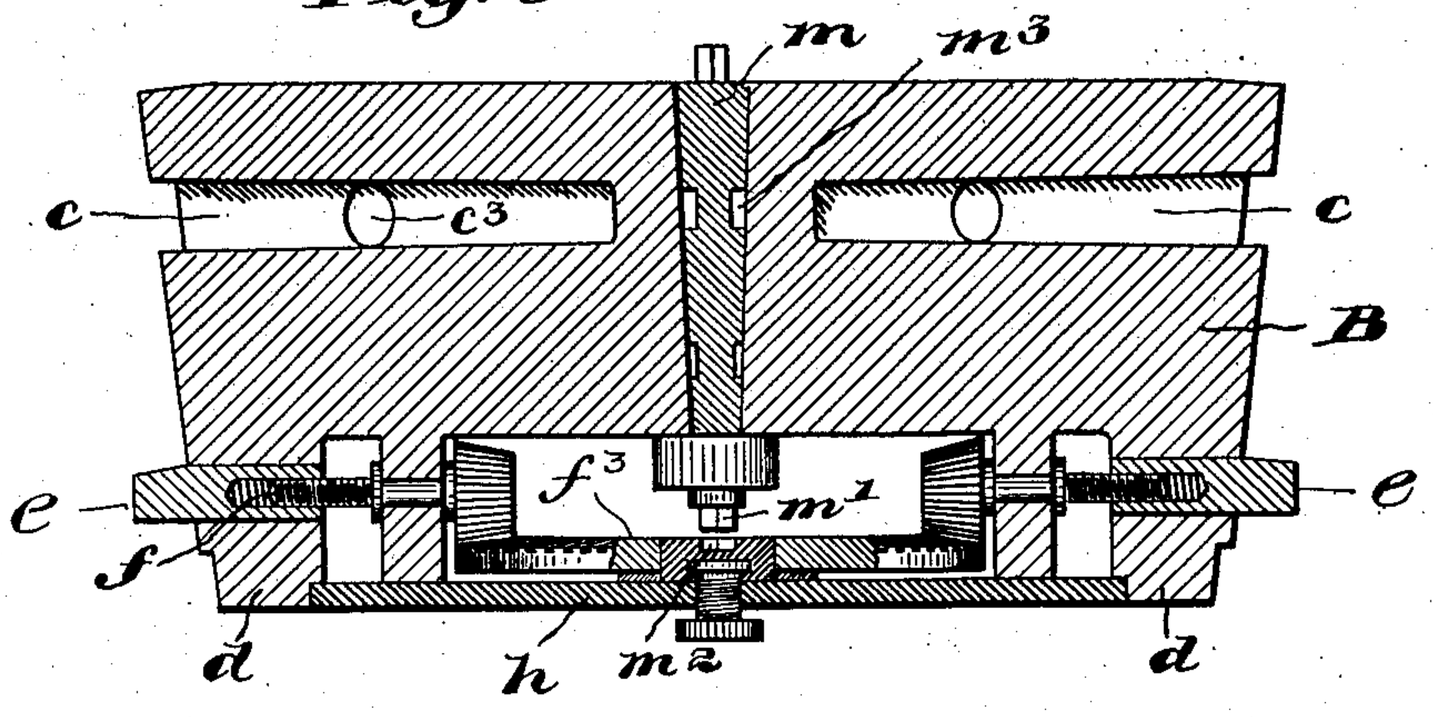
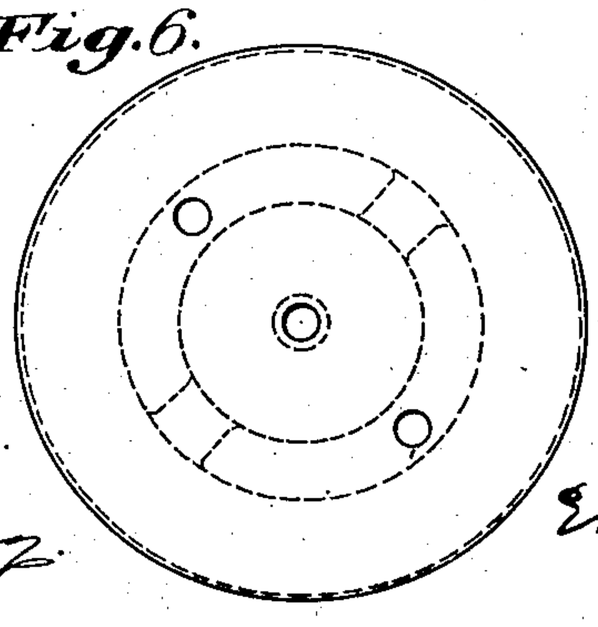


Fig. 6.



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No. 827,351. Specification of Letters Patent. Patented July 31, 1906.

Application filed April 3, 1905. Serial No. 253,406.

To all whom it may concern:

Be it known that I, SUMNER A. ELY, a citizen of the United States, and a resident of Yonkers, county of Westchester, and State of New York, have invented an Improvement in Safes, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates more particularly to the construction of doors for safes, vaults, and the like.

The object of the invention is to prevent burglarious entrance to safes, vaults, and the like through the doors by the use of explosives.

As I will hereinafter more particularly point out and finally claim, the object of the invention is attained by providing a safe-door with chambers so disposed that the use of explosives will only result in detaching the outer portion of the door and tend to more firmly secure the remainder in position to close the safe.

The feature of my invention above referred to, although not defined in connection with other features, will be better understood from a detailed description of the best embodiment of the same at present known to me and illustrated in the accompanying drawings.

In the drawings referred to, Figure 1 in front elevation shows a safe illustrating my invention. Fig. 2 is an enlarged horizontal section through the front part of the safe-body and its door, the door being shown closed in full lines and partially open in dotted lines. Fig. 3 is an inner face view of the door with a portion broken away to expose part of the locking mechanism. Fig. 4 is a front face view of the door by itself. Fig. 5 is a cross-section thereof on the dotted line 5 5. Fig. 6 is a front face view of a modified form of door.

In the particular embodiment of my invention, selected for illustration herein and illustrated in Figs. 1 to 5, inclusive, of the drawings, the safe-body A is of the cast or chilled iron or steel type, it being of any desired shape and material so far as the door and locking mechanism are concerned. I prefer, however, that the safe-body shall have a general rectangular shape as distinguished from a circular shape; but at the same time I prefer to crown the several faces of the body, including the back, giving to the same the general crown shape illustrated at *a* in Fig. 1. By this construction I gain the strength and support arising from the more or less pronounced but rounded corners of the body, while retaining what is equally desirable—the great strength due to an arched side wall. This crown-face rectangular body enables me to obtain the greatest strength and resistance with a relative minimum amount of metal.

Referring particularly to Fig. 2, the body A is provided at its front with a door-opening presenting a circular outline and a door-jamb a' of more or less conical formation, preferably stepped one or more times, as at a^2. Mounted in this opening is the door B, the same, as shown, having cast upon it suitable hinge-lugs *b*, Fig. 2, to which is connected the hinged frame or yoke b', Fig. 1, that is in turn hinged at b^2 in usual manner to the body-lugs a^3. Any other hinge construction may be employed without departing from the spirit of my invention.

Referring now particularly to Figs. 4 and 5, the door B, while there shown as a single casting or member, is provided, nevertheless, and preferably nearer to its outer face than to its inner face with one or more recesses or chambers *c c*, entering from the circular periphery of the door and nearly severing the outer and inner portions of the door lying at opposite sides thereof. As here shown there are four of these recesses or chambers converging toward the axis of the door and separated from each other by the relatively narrow ribs c'. (Shown in dotted lines, Fig. 4, and in full lines, Fig. 2.) These chambers or recesses, while preferably partially or wholly open adjacent to the circumference of said door, (see Fig. 5,) should, if closed, at least be by a wall of such nature that any explosive introduced between the door and the safe-body will act naturally or first in the chambers or recesses and against the side walls thereof rather than between the safe-body and the periphery of the door. The idea of these chambers or recesses, whether arranged radially, as in Fig. 4, or concentrically, as in Fig. 6, or otherwise, is this: When an explosive is introduced between the door and the safe-body, it will flow or fall into these recesses or chambers, or when exploded will tend naturally to act in them and will merely blow off or rupture the outer and thinner face portion of the door and will thereby expend its force without injuring the heavier inner portion and

the locking mechanism mounted thereon. In fact, the action of an explosive in any one or all of these chambers or recesses will tend more firmly to seat the more substantial inner portion of the door the better to resist further operations, as well as for the better protection of the locking mechanism. The walls or ribs separating adjoining chambers or recesses may, if desired, be perforated, as at c^3, to place said chambers in communication with each other and by enlarging the chamber in which the explosive may act correspondingly reduce its effectiveness. These recesses or chambers between the door portions also serve as heat-resisting or insulating means to protect the contents of the safe. When the door is made as a casting, suitable openings c^2, Fig. 4, in any number are provided to receive those parts of the locking mechanism which must be accessible from the exterior of the door. Preferably these openings are made conical in shape from front to rear, as best indicated in Fig. 5, to permit accuracy of fit of the parts introduced therethrough and at the same time to render it more difficult for any instrument or explosive to be introduced thereat. While I have found in practice that it is ordinarily sufficient for the purposes of the invention to provide a door having an outer and relatively thin portion separated by one or more recesses or chambers from a relatively heavier inner portion, nevertheless my invention obviously includes the use of any desired number of door portions separated in any desired manner and graded as may be deemed best to resist operations likely to be conducted against it.

Referring now more particularly to Figs. 3 and 5, the door is provided at its inner face with a circumferential flange d, through which are extended and in which slide the locking-bolts e, here shown as four in number. These bolts may be of rectangular or other cross-sectional shape and enter usual pockets e', Fig. 2, in the safe-body and preferably near the inner wall thereof. The several bolts e are drilled and tapped to receive the threaded ends of the operating screws or actuators f, said screws at their inner ends being passed loosely through the retaining-walls f', cast integrally with the door, and are provided beyond said walls f' with pinions f^2, that are engaged by a common master or center wheel f^3 for actuating them simultaneously and similarly. The bolt-actuating screws f are shouldered or collared at the opposite sides of their respective walls f', so that rotation of said screws will cause the bolts to be screwed outward and inward thereon for the purpose of locking and unlocking the door. In small sizes these supporting-walls f' will be yoke-shaped, as indicated in Fig. 3, for convenience in manufacture; but in the larger sizes said walls may more conveniently be formed as so many parts of a single circular lip or flange concentric with the outer flange d. The common operating or master wheel f^3 is here shown as centrally mounted upon an inner cap or plate h, Fig. 5, suitably secured to the inner door-face and preferably countersunk in and so as to be flush with the inner face of the outer flange d.

In Fig. 5 the central aperture through the door is shown as receiving the conical spindle m, which at its inner end forms a part of any usual or desired locking mechanism for operating the bolts and at its outer end is squared or otherwise fitted, as indicated, to receive the operating mechanism of some form of lock or other apparatus arranged on or in connection with the inner portion of the door. The inner end of said spindle m is shown as squared at m', so as to enter at the proper time the correspondingly-shaped recess m^2 in the hub of the operating-wheel f^3 for operating the latter from the outside of the safe-door. Said spindle is also shown as circumferentially grooved at one or more points, as indicated at m^3, to improve the bearing of the spindle and to render it more difficult for explosives to pass the same.

In the described embodiments of my invention it will be noted that the explosion chamber or chambers are open at the periphery of the door and extend inwardly toward the center, and in every instance the spindle-receiving opening is surrounded by a wall, so as to reduce the liability of the gases entering the safe through the spindle-opening.

As already sufficiently indicated, the door is so constructed that its outer portion yields most readily to the force of an explosion, and since the convergence of the door-jamb is toward the interior of the safe there is no resistance to the blowing out of its outer portion, while the shorter diameter of the inner portion of the jamb coöperates with the corresponding configuration of the inner portion of the door to insure even a greater security of that portion of the door when, upon explosion, the outer portion has been blown away or ruptured.

My invention is not limited to the embodiments thereof here illustrated and described, for obviously they may be varied in many particulars within the spirit and scope of the invention disclosed.

What I claim is—

1. A safe, provided with a door-jamb, and a door arranged to be moved into and out of said jamb and having an explosion chamber or chambers extending inwardly from and open at its periphery, the substance of the door on opposite sides of the chamber or chambers being rigidly united and the outer portion adapted to be severed from the inner portion by the force of an explosion within the chamber or chambers, without removing

the inner portion, the door-jambs serving as the covering medium for the peripheral opening of the chamber or chambers.

2. A safe, provided with a single integral door, having one or more explosion-chambers extending inwardly from and open at its periphery, and rib-like walls connecting the material of the door on opposite sides of the chambers.

3. A safe, provided with a single integral door, having a number of explosion-chambers extending inwardly from and open at its periphery, and rib-like walls connecting the material of the door on opposite sides of the chambers and interposed between the chambers, said rib-like walls having transverse perforations for establishing intercommunication of the chambers.

4. A safe-door, made as a single casting, having one or more explosion-chambers extending inwardly from and opening at the periphery of the door, the door having a spindle-socket extending from front to back through it, and the solid material of the door surrounding the spindle-socket and separating the socket from the chamber.

5. A safe-door, made as a single casting, having a number of radially-arranged explosion-chambers opening at its periphery and rib-like walls separating said chambers.

6. A safe-door, made as an integer and provided with a recess extending inwardly from its periphery and open at the periphery and constituting an explosion-chamber, the substance of the door on opposite sides of the chamber being rigidly united and the outer portion thinner than the inner portion and adapted to be ruptured or blown out under the force of an explosion within the explosion-chamber.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SUMNER A. ELY.

Witnesses:
FREDERICK L. EMERY,
HOWARD W. SMITH.