Nov. 2, 1926. 1,605,443

A. KENNEDY

VAULT

Filed Nov. 8, 1923

FIG. I.

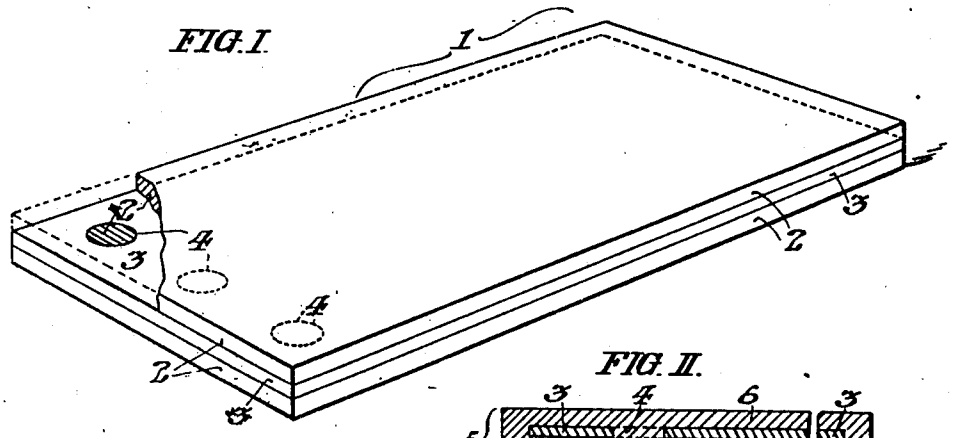


FIG. II.

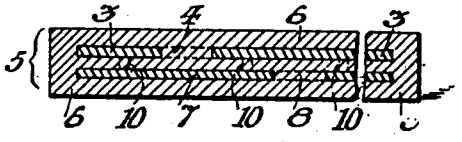


FIG. III.

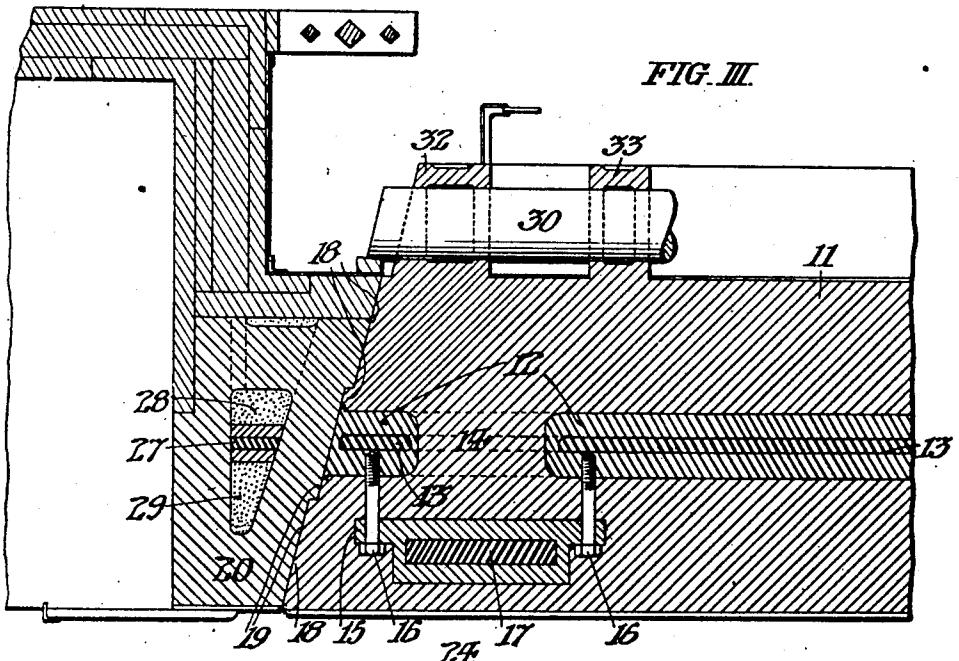
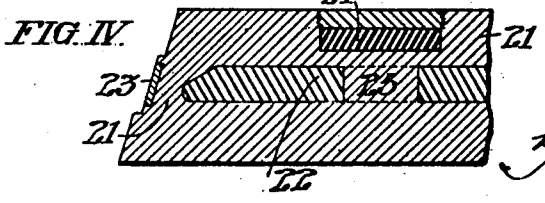


FIG. IV.



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Patented Nov. 2, 1926. 1,605,443

UNITED STATES PATENT OFFICE.

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VAULT.

Application filed November 8, 1923. Serial No. 673,482.

It is an object of my invention to provide a construction and arrangement of the walls for a safe or vault inclosure such as to be highly resistant to felonious attack by means designed to effect burning, fusion or other disintegration thereof by heat. Such means of attack include oxy-acetylene flames and electric arcs.

My invention relates to the inclusion in a vault wall or door of a plate of metal having such a high melting point that it is impossible to successfully feloniously penetrate it by such heating means as aforesaid. As hereinafter described, an essential feature of my invention is the inclusion of such refractory metallic elements in plates or slabs of cast metal, preferably steel, and conveniently by forming the refractory plate with openings therethrough in spaced relation to each other and causing the cast metal to flow through said openings and upon opposite sides of such foraminous plates.

Moreover, as hereinafter described, I prefer to further obstruct the line of attack at the region of such openings in the refractory metal by auxiliary protecting means which may include another such refractory metal plate with openings therethrough in staggered relation to the openings in the first plate aforesaid, or may consist of auxiliary plates in substantial registry with the individual openings through said first plate. In either case, the refractory plates and the means for obstructing the openings therethrough may be rigidly connected, by bolts, or otherwise, before the molten cast metal is applied thereto.

Such construction is advantageous in that the cast metal is permanently connected with the refractory metal even if the latter has such a high fusion point that the cast metal does not unite therewith at the contiguous surfaces of the two metals. Such construction has the further advantage that the completed slab, thus composed of a foraminous refractory plate thus imbedded in cast metal, appears to be formed entirely of the latter; there being no indication upon the exterior of such a slab that it is of such composite character.

My invention includes the various novel features of construction and arrangement hereinafter more definitely specified.

In said drawings: Fig. I is a perspective view of a rectangular slab designed to form part of a vault inclosure wall and including a single foraminous refractory plate imbedded in cast metal.

Fig. II is a fragmentary sectional view of a plate similar to Fig. I, except that it includes a plurality of refractory plates with their openings in staggered relation.

Fig. III is a fragmentary horizontal sectional view of a vault door and adjacent wall members embodying my improvement.

Fig. IV is a fragmentary radial sectional view of a circular door slab embodying a modified form of my invention.

Referring to Fig. I; the vault wall member 1 comprises a slab of cast steel 2 having imbedded therein a plate of more refractory metal 3; said plate 3 being rendered foraminous by a plurality of openings 4 therethrough and the cast metal extending through said openings in unitary relation with the cast metal upon opposite sides of said plate.

Referring to Fig. II; the vault wall member 5 comprises a slab of cast steel 6, having imbedded therein a plate of more refractory metal 3; said plate 3 being rendered foraminous by a plurality of openings 4 therethrough and the cast metal extending through said openings in unitary relation with the cast metal upon opposite sides of said plate. However, said slab 5 includes another plate, of refractory metal 7, imbedded therein, covering and obstructing access to said openings 4 in said first plate 3; said second plate being rendered foraminous by a plurality of openings 8 and the cast metal extending through said openings in unitary relation with the cast metal upon opposite sides thereof. I find it convenient to rigidly connect said imbedded plates 3 and 7 before imbedding them in the cast metal, and preferably independently of said cast metal. Such connecting means may conveniently include screw bolts 10 in threaded engagement with said plates.

It may be observed that whereas, in Fig. I, the imbedded plate 3 extends to edges of the slab in which it is imbedded; on the contrary, in Fig. II, the imbedded plates 3 and 7 do not extend to the edges of the slab. Said form shown in Fig. I is advantageous in that the slab is protected from penetration at its edges by the imbedded refractory plate; but the latter is visible at the edges of the slab. On the other hand, the form shown

in Fig. II is advantageous in that the imbedded refractory plate is covered and concealed at its edges; but the edges of said slab shown in Fig. II are consequently more susceptible to attack, although said refractory plates 3 and 7 may also be drill proof. However, both forms are advantageous in that there is no indication upon either of the opposite plane faces of the slabs that there is any protective element included therein.

Such wall members as shown in Figs. I and II may be so shaped that they may be fitted together in any convenient manner to form an inclosure or an inclosure door. However, in Fig. III, I have shown a form of my invention especially adapted to form a vault door. In said figure; the slab 11 is conveniently formed of cast steel having imbedded therein the plate 12, of more refractory metal, which is not drill proof, but which incloses a drill proof plate 13 which may be a self-hardening alloy. That composite plate 12, 13 has a plurality of openings 14 through which said cast metal 11 extends in unitary relation with the cast metal upon opposite sides of said imbedded plates. Access to such openings 14 may be obstructed by similar composite plates 15, inclosing drill proof elements 17. I prefer to employ screw means 16 to rigidly connect said embedded plates 12 and 15, independently of said cast metal 11, to facilitate the casting operation.

Said door slab 11 may be circular and have a series of conical zones 18 fitting corresponding recesses 19 in the vault wall 20. In that case; I have found it convenient to finish the edge of said door slab by turning operations, leaving the edge of the imbedded refractory metal plate 12 exposed. However, in the form of my invention shown in Fig. IV; the cast metal 21 of the slab covers the edge of the imbedded refractory metal plate 22 and access to the edge of the latter is obstructed by a circular conical band 23 of hardened steel. Moreover. as shown in Fig. IV; a drill resisting member 24 may cover the opening 25 in said refractory plate 22 at the inner side of the latter.

Said wall 20 may have a ring of refractory metal 27 imbedded therein, entirely surrounding the door opening, and between imbedded masses of drill resisting material 28 and 29.

Of course, such a door as above described may be hinged and removably secured in any convenient manner. However, I find it desirable to employ a circular series of radially reciprocatory bolts 30 which are mounted to slide in alined bearings in the concentric rings 32 and 33 which are cast in unitary relation with the door slab 12. I have indicated in said Fig. III the usual vestibule appurtenances of such a vault structure which, however, need not be described as they are not essential elements of my present invention.

Although a vault inclosure may be formed of slabs embodying my invention connected in any convenient manner; I find it desirable to overlap and interlock them at their edges and to cover the joints between them by plates bolted thereto within the vault; in the manner described at length and claimed in my co-pending application Serial No. 673,483 filed November 8, 1923, for Letters Patent of the United States for improvement in vaults.

Therefore, I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention, as defined in the appended claims.

I claim:

1. A vault wall member, comprising a slab of cast steel, having, imbedded therein, a plate of more refractory metal, having a higher melting point than ordinary steel, said plate being foraminous, and the cast metal extending through openings in said refractory metal plate and in unitary relation with the cast metal upon opposite sides of said plate; means including another plate, of refractory metal, imbedded in said slab, covering and obstructing access to an opening in said first plate; and screw means rigidly connecting said imbedded plates, independently of said cast metal.

2. A vault wall member, comprising a slab of cast steel, having, imbedded therein, a plate of more refractory metal, having a higher melting point than ordinary steel, said plate being foraminous, and the cast metal extending through openings in said refractory metal plate and in unitary relation with the cast metal upon opposite sides of said plate; means, including another plate, imbedded in said slab, covering and obstructing access to an opening in said first plate; and means rigidly connecting said imbedded plates, independently of said cast metal.

3. A vault wall member, comprising a slab metal having, imbedded therein, a plate of more refractory metal; having a higher melting point than ordinary steel, said plate being foraminous, and the cast metal extending through openings in said refractory metal plate and in unitary relation with the cast metal upon opposite sides of said plate; means, imbedded in said slab, covering and obstructing access to an opening in said plate; and means rigidly connecting said imbedded members, independently of said cast metal.

4. A vault wall member, comprising a slab of cast metal, having, imbedded therein, a plate of more refractory metal, having a

higher melting point than ordinary steel, said plate being foraminous, and the cast metal extending through openings in said refractory metal plate and in unitary relation with the cast metal upon opposite sides of said plate; means, imbedded in said slab, covering and obstructing access to an opening in said plate; and means rigidly connecting said imbedded members, independently of said cast metal.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this twenty-fifth day of October, 1923.

ANTHONY KENNEDY.