

W. H. HOLLAR, W. REES & H. F. BALOU.
VAULT.

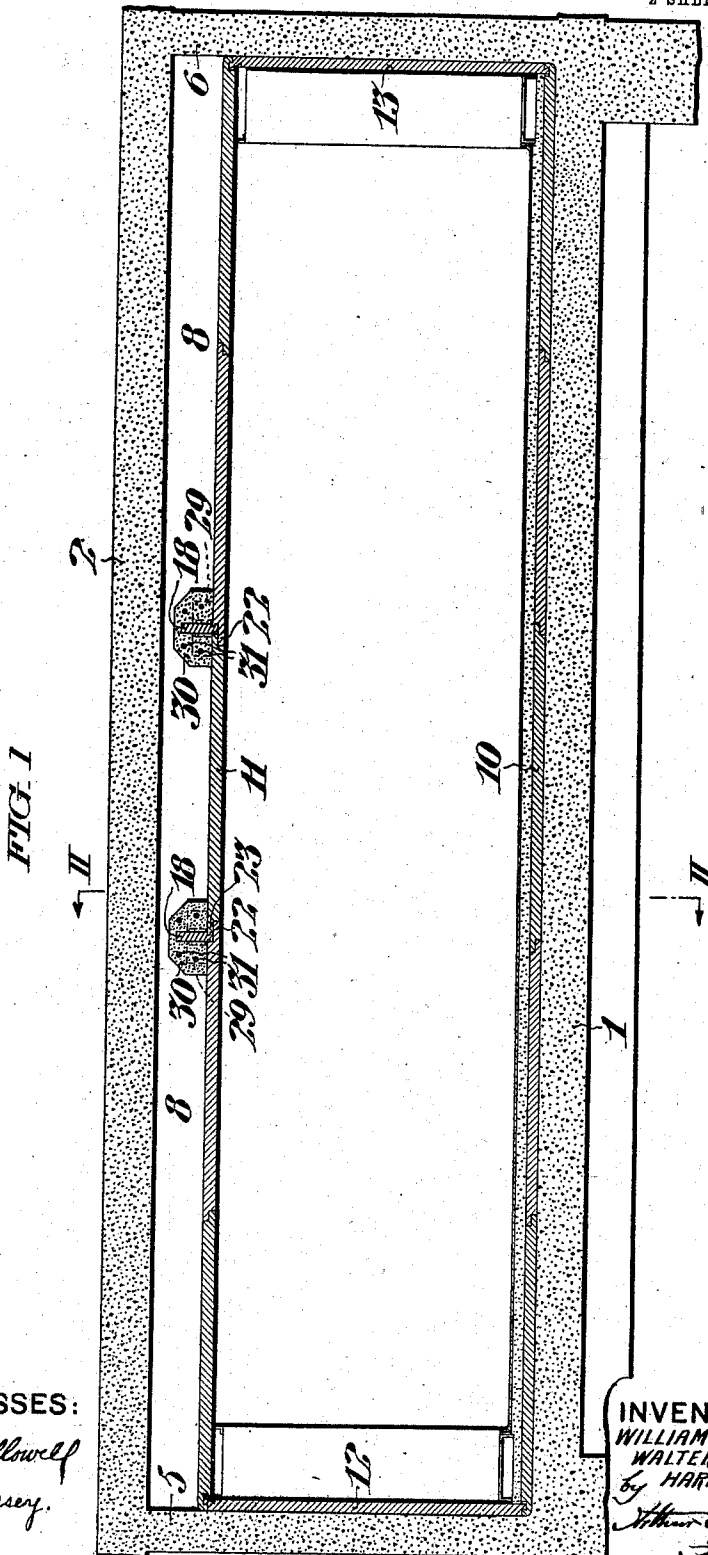
VAULT.

APPLICATION FILED MAR. 3, 1909.

Patented Nov. 29, 1910.

2 SHEETS—SHEET 1.

977,307.



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2 SHEETS—SHEET 2.

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FIG. II.

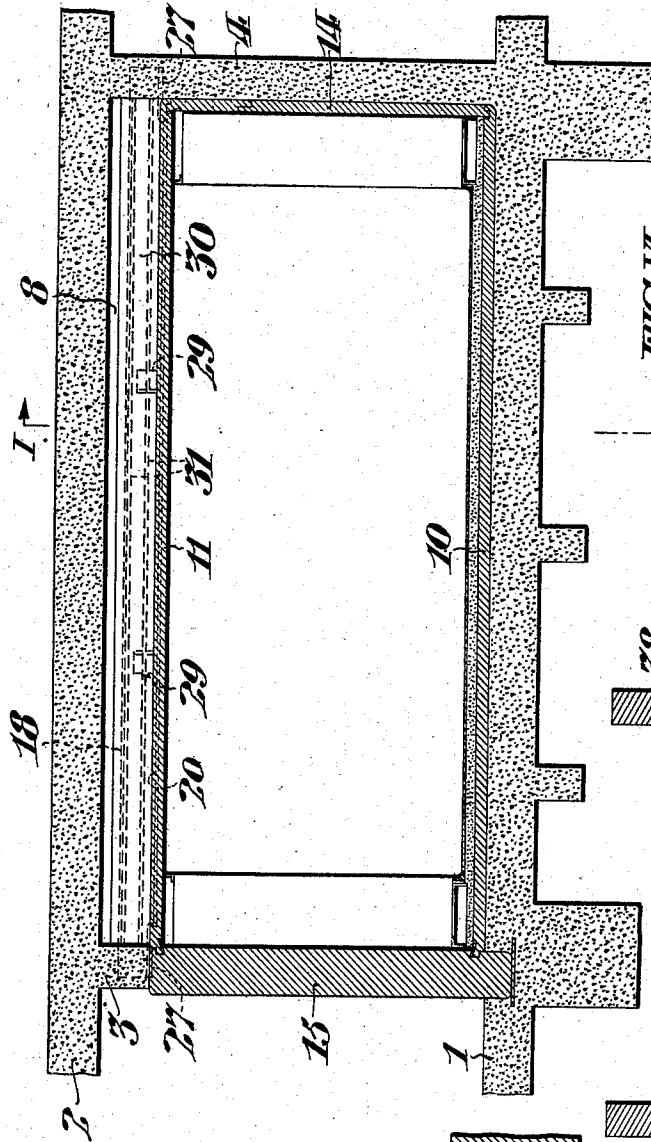


FIG. VI.



FIG. V.

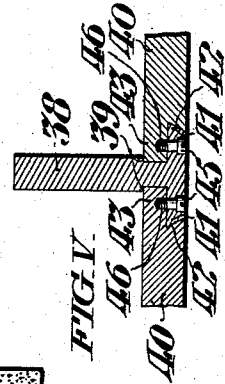


FIG. IV.

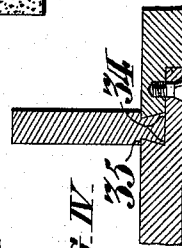
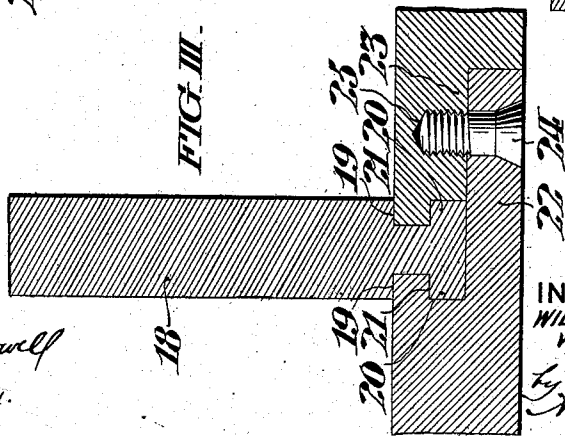


FIG. III.



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UNITED STATES PATENT OFFICE.

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VAULT.

977,307.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, WILLIAM H. HOLLAR, WALTER REES, and HARRY F. BALOU, of Philadelphia, in the State of Pennsylvania, have
5 invented a certain new and useful Improvement in Vaults, whereof the following is a specification, reference being had to the accompanying drawings.

Our invention relates to vaults having sectional walls formed of separable metal plates assembled in alinement and detachably connected, and is particularly applicable to such ceiling walls. Hitherto, it has
10 been the practice to support such walls by metal beams having bolts or other separate attaching means connecting them with the walls, and to connect the wall plates at their joints by bolts or other separate attaching means distinct from the means employed for
15 attaching said beams.

It is the object of our invention to lessen the number of holes or sockets for attaching means which must be formed in the plates, by utilizing the same bolts to connect the
20 wall plates with each other and with the beams, and in such manner that such attaching means are inaccessible from the exterior of the vault, and the outer faces of the wall plates are imperforate.

As hereinafter described, our invention comprises such a construction and arrangement that the supporting beams are engaged with the plates by projections on the beams
25 extending in recesses in the adjacent edges of the plates and the latter are connected in the desired relation with the beams by bolts which are inaccessible from the exterior of the vault. Such construction is particularly advantageous in its adaptation
30 to vault walls made of armor plate, which are weakened by the ordinary methods of connection of the plates with their supports, because of the necessary softening of the exterior of the plates incident to the formation of the holes or sockets for the ordinary
35 attaching means, it being observed that the improved construction does not require any holes or sockets in the outer faces of said plates which may therefore remain of their
40 original hardness.

Our invention comprises the various novel features of construction and arrangement hereinafter more definitely specified.

In the drawings; Figure I, is a longitudinal sectional view of a vault conveniently
55 embodying our improvement, section being taken on the line I, I in Fig. II. Fig. II, is a vertical transverse sectional view of said vault, taken on the line II, II in Fig. I. Fig. III, is a fragmentary sectional view
60 showing the form of the invention indicated in Fig. I, but on a larger scale. Figs. IV, V, and VI, show modified forms of the invention.

In said figures; 1 and 2, are respectively the
65 first and second floors of a building connected by vertical walls 3, 4, 5, and 6, conveniently made of reinforced concrete, and forming a chamber 8, containing the vault formed of metallic plates assembled in the floor 10,
70 ceiling 11, side walls 12 and 13, back wall 14, and front wall 15, the latter being conveniently formed of armor plate substantially in alinement with said building wall 3.

As shown in Figs. I and II, the ceiling
75 wall 11, is supported by transversely extending beams including vertical webs 18, having their respectively opposite ends supported in said building walls 3 and 4, and having shoulders 19, overlapping the con-
80 tiguous edges of the adjacent plates of which said ceiling 11, is formed. Said beams and plates are interengaged by projecting ledges 20, upon respectively opposite sides of said beams extending in corresponding undercut
85 recesses 21, in the edges of said plates.

As shown in Fig. III, the margins 22
and 23, of said plates are overlapped, and said plates are fastened together by the
90 screw bolts 24, having their heads countersunk in the plate margins 22, and their opposite ends in threaded engagement with sockets 25, in said plate margins 23, and
95 said fastening means also serve to rigidly connect said beams 18, with said plates without the employment of any additional fastening means, said beams being thus held
100 with their projecting ledges 20, in engagement with the recesses 21, and with their webs extending from said plates exterior to the vault inclosure.

Referring to Fig. II, it may be observed that said projections 20, terminate short of the ends of the beams 18, and the latter rest
105 upon plates 27, in the respective supporting walls. Said beams are also conveniently

provided with brackets 29, rigidly connected therewith, and resting upon the tops of the plates 11, so as to brace said beams 18, in normal relation to said plates. We also
 5 find it convenient to embed said beams in masses of concrete 30, reinforced by rods 31, in connection with the opposite walls of the building.

The form of our invention shown in Fig. IV, differs from that shown in Fig. III, only in that the oppositely projecting ledges 34, converge toward the shoulders 35, on the beam. It may be observed that tight joints may be made between the plates and beams
 15 in this form of our invention without the accurate fitting required for the form shown in Fig. III.

It being noted that in both of the forms of our invention shown in Figs. III and IV, the adjacent edges of the adjoining plates must be differently shaped; it is to be understood that it is within the scope of our invention to connect the supporting beams with plates having recessed edges which are
 20 precisely alike. For instance, as shown in Figs. V and VI.

In the form of our invention shown in Fig. V, the beam comprising the vertical web 38, having shoulders 39, overlapping the adjoining plates 40, has projecting ledges 41, engaging similar undercut recesses 42, in said plates, and also overlapping the margins 43, thereof, so as to be conveniently connected therewith by the
 30 screw bolts 45, which extend through said ledges 41, in screw threaded engagement with sockets 46, in said plates.

In the form of our invention shown in Fig. VI, the beam comprising the web 48, has opposite projections 50, engaging corresponding recesses 51, in the edges of the adjoining plates 52, and said beam and plates are retained in engaged relation by the plate 53, which overlaps the margins
 45 54, of said plates 52, and is connected therewith by the screw bolts 55, which extend through said plate 53, in screw threaded engagement with the sockets 56, in said plates 52.

It may be observed that it is characteristic of all of the forms of our invention above described, that the beams are engaged with the plates by projections extending within recesses in the edges of the adjoining plates,
 55 and without the employment of any connecting means accessible from the exterior of the vault, so that the outer faces of the wall plates may retain the maximum degree of hardness and consequent resistance to attack, which is not the case in structures requiring perforations or sockets in the outer
 60 faces of the plates for the engagement of the attaching or supporting means.

We do not desire to limit ourselves to the

precise details of construction herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of our invention as defined in the appended claims.

We claim:—

1. In a vault, the combination with alined wall plates having overlapping margins and opposed undercut recesses in their adjacent edges; of a beam arranged to support said plates, having projections engaged in said
 75 recesses, and having a web extending exterior to said plates; means supporting said beam and, means distinct from said plates and beam, detachably connecting said plates at their margins; said connecting means being inaccessible from the exterior of the vault.

2. In a vault, the combination with a ceiling wall comprising alined metal plates with adjacent edges, having recesses in said edges; of a beam supporting said plates, having
 85 projections extending in said recesses in the plates, and a web extending from said plates exterior to the vault; and, means supporting said beam at its ends, comprising walls independent of said vault.

3. In a vault, the combination with a wall comprising metal plates with adjacent edges, having recesses in said edges; of a wall supporting said plates, having
 95 projections extending in said recesses in the plates and a web extending from said plates; and, means supporting said beam at its ends, comprising walls independent of said vault.

4. In a vault, the combination with a metal wall; of a metal beam having projections extending within said wall, and a web extending from said wall, beyond the edges thereof; and means supporting said beam
 100 independently of said vault.

5. In a vault, the combination with a metal wall; of a metal beam having projections extending within said wall, and a web extending from said wall; and, means supporting said beam independently of said
 105 projections.

6. In a vault, the combination with alined wall plates having overlapped margins and opposed undercut recesses in their adjacent edges; of a beam arranged to support said
 115 plates, having projections engaged in said recesses and having a web extending exterior to said vault; and, means supporting said beam independently of said plates.

7. In a vault, the combination with wall plates having their edges in contact with each other and having undercut recesses in said contacting edges; of a beam arranged to support said plates, having projections engaged in said recesses, and having a web
 120 extending exterior to said vault; and, means supporting said beam independently of said plates.

8. In a vault, the combination with wall
plates having their edges in contact with
each other and having recesses in said con-
tacting edges; of a beam arranged to sup-
5 port said plates, having projections engaged
in said recesses, and having a web extending
exterior to said vault; and, means support-
ing said beam independently of said plates.
In testimony whereof, we have hereunto

signed our names at Philadelphia, Pennsyl- 10
vania, this eleventh day of Feb. 1909.

WILLIAM H. HOLLAR.
WALTER REES.
HARRY F. BALOU.

Witnesses:

B. E. Wood,
AL. DOHERTY.