A modular security vault structure having a plurality of prefabricated concrete panels forming the vault side, ceiling and floor walls. Some of the panels have integral corners. The panels are formed with tongues and grooves for tongue and groove joint connection between adjacent panels. Spaced rows or layers of reinforcing bar grids are embedded within the panels. The ends of the bar grids extend into the tongues and into the panels on either side of the grooves so as to overlap at each tongue and groove joint. Plates cover the joint lines between panels on the inner vault surfaces. The plates are bolted to sockets embedded within the panels and connected with the bar grids. Vertical panel joints in the vault side walls are offset from horizontal joints in the vault ceiling and floor walls. A usual vault door may be hung in a wall of the modular vault structure. Lighting, alarm and ventilating requirement conduits, offset at least once, may be embedded in the prefabricated panels so that any vault structure can be erected completely and quickly at the bank site.

5 Claims, 16 Drawing Figures
MODULAR CONCRETE VAULT STRUCTURE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to security vault structures and in particular to a modular prefabricated reinforced concrete vault construction. More particularly, the invention relates to a modular concrete vault structure formed of reinforced concrete panels with tongue and groove joints between panels, which may be erected quickly at the site, for example, of a branch bank at a suburban shopping center without time-consuming and costly concrete form erection and concrete setting time delays at the bank site, and which modular vault structure satisfies the security requirements of regulating bodies in the banking field.

2. Description of the Prior Art

Various fireproof buildings, burial vaults, safes, and vaults heretofore have been erected from precast or preformed panels. Some panels have been reinforced concrete and some have had tongue and groove joints. Other walls or panels have been formed of gypsum, stone or sheet metal shells filled with such materials as lime, plaster-of-paris coal-ashes, earthy matter, alum, heat insulation material, cork board, or the like. Some walls have had panels of laminated layers of iron and steel, or of case hardened armor-plate. Some walls have been formed of precast blocks or tile held together with tie-rods. Joints between panels have been covered with angle iron or metal strips. Adjacent panels have been connected with tie-rods.

None of the myriad of such known prior structures satisfy current security requirements of regulatory bodies concerning bank vaults to protect against burglary and unauthorized access. Heretofore, bank vaults having walls, for example, 12 to 36 inches in thickness of reinforced concrete, have been cast at the bank site with attendant complications of erection of forms, pouring concrete, permitting the concrete to set, stripping forms, etc., in order to satisfy security requirements of regulatory bodies. Bank vault walls in the past have been acceptable by regulatory bodies as being the equivalent for protective purposes of up to 12 inches thick reinforced concrete walls when formed of steel lining plates faced with fire-resistant material. In the past, this has permitted prefabricated panels of steel lining plates faced with fire-resistant material to be used in erecting vaults for small branch banking facilities at suburban locations such as at shopping centers.

However, recently regulatory bodies have withdrawn approval of steel lining and fire-resistant material wall structures for bank vaults as a substitute for reinforced concrete wall structures in certain wall thicknesses. This has required vault structures for branch bank buildings to be erected at the bank site in accordance with prior building construction procedures for building reinforced concrete walls. Thus, the erection of forms, the casting of concrete, the stripping of forms, etc., has had to be carried out at the bank site. This, in turn, has resulted in a long construction time factor for building branch bank facilities complete with vault, etc.

There is a great demand for branch bank structures which may be erected quickly at shopping centers, including the complete building, a bank vault, all necessary banking equipment, and all interior furnishings, and which may be completed and ready for use within, say, ninety days of placing the order for such a branch bank facility.

The combined security and time factor requirements for such a branch bank vault structure cannot be satisfied by known prior structures or modes of erection, and thus, an unsatisfied need exists in the banking field for a modular reinforced concrete vault structure which can meet the stated demand for branch bank facilities.

SUMMARY OF THE INVENTION

Objectives of the invention include providing a modular concrete vault structure which may be erected quickly using prefabricated reinforced concrete panels having tongue and groove joints between adjacent panels which form all of the side, ceiling and floor walls of the vault; providing a modular concrete vault structure in which the reinforcing bar grids in wall panels overlap in the tongue and groove joints between adjacent panels; providing a modular concrete vault structure having metal plates covering joint lines between adjacent panels on the inner vault surfaces directly connected to and integrated with the reinforcing bar grids in the panels so as to inhibit attack of or attempts at unauthorized access to the vault structure in the region of the joints between adjacent panels, and so as to resist ramming forces applied in an attempt to knock down a portion of the modular wall structure; providing a modular concrete vault structure having reinforced concrete walls satisfying the security requirements of regulatory bodies in the banking field without pouring the concrete walls at the bank site; and providing a modular reinforced concrete vault wall structure which eliminates difficulties heretofore existing in the construction of bank vaults, achieves the stated objectives simply and effectively, and solves problems and satisfies needs existing in the art.

These objectives and advantages are obtained by the modular concrete vault structure, the general nature of which may be stated as including, vault compartment-forming, side, ceiling and floor walls formed of a series of prefabricated or precast reinforced concrete panels; tongue and groove formations on the panels providing tongue and groove joints between all vault wall forming panels; spaced rows of reinforcing bar grids embedded within each panel and having bar grid ends extending into each panel tongue and on either side of each panel groove so that the bar grid ends overlap at each tongue and groove joint; plate means within the vault compartment covering the joint lines at the inner wall surfaces between adjacent panels; means connecting the plate means directly to the bar grids, said connecting means preferably including threaded sockets embedded in the panel-forming concrete and joined within the panels to the bar grids embedded within the panels, and screws engaging the plate means and the threaded sockets; the panel joints in the vault side walls being offset from the joints in the vault ceiling and floor walls; alarm, lighting and ventilating means conduits embedded in certain of said panels; and each conduit having at least one offset formed therein.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention — illustrative of the best modes in which applicants have contemplated applying the principles — are set forth in the following description and shown in the drawings and
The end, back and front wall panels 5, 6, 7 and 8 each are formed with grooves 4 having outer groove surfaces along their top and bottom edges intermediate the inner and outer faces or surfaces of the panels. The vertical edges 16 of end wall panels 5 and 6 also are formed with grooves 4. The vertical edges 17 of back wall panel 7 are formed with tongues 3 having outer tongue surfaces to seat in the end wall grooves 4 (FIG. 1). The left hand vertical edge of front wall panel 8 (FIG. 2) is formed with a tongue 3 and the righthand vertical edge 18 of front panel 8 is formed with a groove 4. Thus, there are tongue and groove joints 3-4 at each of the vertical joints between end wall panels 5 and 6 and back and front wall panels 7 and 8; and the vertical panel edges 16 and 18 which form the vertical sides of the vault door opening 15 have groove formations 4 therein (FIG. 1).

The left hand and righthand outer edges (FIG. 2), respectively, of end floor panels 12 and 14 are flat, but the inner edges 19 and 20 of panels 12 and 14 are formed with tongues 3. Matching grooves 4 are formed in the side edges of the intermediate floor panel 13 which abut the panel edges 19 and 20 to form tongue and groove joints 3-4 between the assembled floor panels 12, 13 and 14 (FIG. 2).

Similarly, the end ceiling panels 9 and 11 have tongues 3 formed along their edges 21 and 22, respectively, and the intermediate ceiling panel 10 has matching grooves 4 formed in its edges which abut the panel edges 21 and 22 to form tongue and groove joints 3-4 between the assembled ceiling panels 9, 10 and 11.

The ceiling and floor panels 9, 10, 11, 12, 13 and 14 each are formed with tongues 3, the ceiling panels on their undersurfaces, and the floor panels on their top surfaces, surrounding and spaced from the assembled panel outer edges, excepting at the upper and lower sides of the vault door opening 15. These tongues 3 on the ceiling and floor panels seat in matching grooves 4 at the top and bottom edges of the end, back and front wall panels 5, 6, 7 and 8 to form tongue and groove joints 3-4, respectively, between the vertical wall and horizontal floor and ceiling panels forming the vault wall structure 1.

The vault structure panels assembled as illustrated in FIGS. 1, 2 and 9 have horizontally extending tongue and groove joints between the ceiling panels 9, 10 and 11 and between the floor panels 12, 13 and 14 which are offset laterally from the vertically extending tongue and groove joints between the vertical wall panels 5, 6, 7 and 8. This is important from the standpoint of increased resistance to attack by an intruder seeking unauthorized entry to the structure using forces such as ramming forces.

The edge of the vault door opening 15 at the top thereof is formed by a downturned concrete flange formation 23 at the front end of ceiling panel 10. The lower outer corner of flange 23 may be trimmed with an angle member 24 embedded in the concrete to protect the concrete from chipping. Similarly, the outer corners of the vertical edges 16 and 18 of panels 6 and 8 may have a trim angle member 25 embedded in the panel concrete (FIG. 1).

Each of the vault wall panels, when being precast, is provided with reinforcing means of some type typically required and approved for reinforced concrete vault wall construction. One of the approved reinforcing means comprises % inch deformed steel bars located

DESCRIPTION OF THE PREFERRED EMBODIMENTS

First Embodiment

An example of the improved modular reinforced concrete vault structure is shown generally at 1 in assembled condition in FIGS. 1, 2 and 9.

The modular structure 1 includes a series of prefabricated reinforced concrete panels or sections, one of which is generally indicated at 2. Each panel 2 has suitable formations of tongues or grooves, or both, indicated generally at 3 and 4, so that the erected structure 1 has tongue and groove joints between adjacent panels 2. The number, type and shape of each panel 2 that is used will vary depending upon the particular size of the vault to be built.

Vault 1 as shown has two U-shaped end wall panels 5 and 6, a back wall panel 7, a front wall panel 8, ceiling panels 9, 10 and 11, and floor panels 12, 13 and 14. A vault door opening 15 is formed between ceiling and floor panels 10 and 13, and front wall panel 8 and one leg of right end wall panel 6. Any usual vault door may be hung to close vault door opening 15.

are particularly and distinctly pointed out and set forth in the appended claims.

FIG. 1 is a top plan view, with portions broken away, of the improved modular concrete vault structure;

FIG. 2 is a front elevation, with portions broken away, and in section, of the improved modular concrete vault structure;

FIG. 3 is an enlarged fragmentary sectional view of ceiling and end wall joints, taken on line 3-3, FIG. 1;

FIG. 4 is an enlarged fragmentary sectional view of a floor and side wall joint, taken on line 4-4, FIG. 2;

FIG. 5 is a fragmentary sectional view through a ceiling joint, looking in the direction of the arrows 5-5, FIG. 3;

FIG. 6 is a further enlarged fragmentary sectional view of a joint between an end wall and a ceiling panel, taken on line 6-6, FIG. 1;

FIG. 7 is a similar enlarged fragmentary sectional view of a joint between side wall panels, taken on line 7-7, FIG. 3;

FIG. 8 is a further enlarged fragmentary sectional view of the plate connection with a bar grid, taken on line 8-8, FIG. 7;

FIG. 9 is a sectional view taken through the doorway for the vault of FIGS. 1 and 2, looking in the direction of the arrows 9-9, FIG. 2;

FIG. 10 is an enlarged fragmentary section of the righthand portion of the frame for the vault door opening of FIG. 2;

FIG. 11 is an enlarged fragmentary viewing looking in the direction of the arrows 11-11, FIG. 1;

FIG. 12 is a fragmentary sectional view taken on the line 12-12, FIG. 10;

FIG. 13 is a top plan view, with portions broken away, of a modular concrete vault structure smaller than shown in FIG. 1;

FIG. 14 is a side elevation with parts broken away and in section, of the vault structure shown in FIG. 13;

FIG. 15 is a front view of the vault structure of FIGS. 13 and 14, looking toward the vault door opening; and

FIG. 16 is an enlarged fragmentary viewing looking in the direction of the arrows 16-16, FIG. 13.

Similar numerals refer to similar parts throughout the drawings.
on four inch centers in horizontal and vertical rows (with respect to a vertical wall) forming a grid, herein called a bar grid and indicated at 26. The bars are tied together in proper spaced grid arrangement in a manner usual in the use of concrete reinforcing bars as by using tie wires, not shown. The grids 26 must be located not less than 6 inches apart and are staggered in each direction. The number of grids required depends upon the thickness of the wall, floor or ceiling. As shown, two grids 26 are located in each panel which is the number required for a 12 inch thick reinforced concrete vault wall. If the wall is horizontal and not vertical, the bar grids 26 also are arranged horizontally; and their grid pattern has the spaced bars arranged perpendicularly in rows.

The bar grids 26, as shown in FIGS. 3 to 7, each have a first series of spaced parallel bars and a connected second series of spaced parallel bars oriented at 90° with respect to the first series. The staggered arrangement indicated is achieved by arranging the spaced bars in the first series of one bar grid row (such as the upper row in FIG. 7) parallel with and staggered with respect to the spaced bars in the first series of the second or lower bar grid row shown in FIG. 7; and by arranging the spaced bars in the second series of the one row parallel with and staggered with respect to the spaced bars in the second series of the second row, as shown for example in FIG. 6.

The reinforcing bar grids 26 are modified, in accordance with the invention, so that ends of a row of bars extending in one direction, and preferably at least one bar tied to said ends in a row extending in the other grid pattern direction, are bent and offset to be located in the tongues 3 as indicated at 27 for example in FIGS. 3, 4, 6 and 7 where the bent ends extending into the tongue formation are spaced from the tongue outer surfaces. Similarly the ends of bars in one row and usually a cross grid bar in that row are located in the panel portions at either side of the grooves 4, as indicated at 28 with the bar ends extending on either side of each groove spaced from the groove outer surfaces. This is well shown typically in FIGS. 6 and 7 which illustrate horizontal and vertical tongue and groove joints.

The vertical tongue and groove joint illustrated in FIG. 7 between back wall panel 6 and an end of U-shaped end wall panel 6 has a joint line the exterior of which is indicated at 29 between the vertical edges 16 and 17 of panels 6 and 7. The interior joint line 29 is covered as described below.

Bar grids 26 are located in the concrete adjacent the outer surfaces of each of panels 6 and 7, and there also are bar grids 26 located adjacent the inner surfaces of each of panels 6 and 7. The ends 27 of some bars in one row of bars of inner bar grid 26 in panel 7 extend into tongue 3 of panel 7 overlapping the tongue and groove joint 29, as shown in FIG. 7. One crossbar 27a is tied to said ends 27 of inner grid 26, and crossbar 27a is located within tongue 3 of panel 7.

The ends 28 of both bar grids 26 in panel 6 (FIG. 7) extend into wall portions of panel 6 at either side of the groove 4. A crossbar 28a of the inner bar grid 26 in panel 6 is tied to the ends 28 of said inner bar grid 26 and is located within that portion of panel 6 which extends along side groove 4, as shown.

The arrangement of tongue and groove bar grid ends and crossbars 27, 27a, 28, and 28a, is similar in the horizontal joint 29a between top panel 9 and end panel 5, shown in FIG. 6. The arrangement of bar grid ends, etc., in the tongue and groove joint illustrated in FIG. 4, also is similar.

In all of the joints, the bar grid ends 27 extending into the tongues 3 overlap the joint lines and overlap the wall portions of the adjacent panel located at either side of the groove 4 formed in such adjacent panel. Likewise, in all of the joints, the bar grid ends 28 located at either side of a groove 4 overlap the tongue 3 of the adjacent panel, and also overlap the bar grid ends 27 which extend into such tongue. This overlapping structural arrangement is illustrated diagrammatically by the dotted line x—x in each of FIGS. 6 and 7, which line passes through the surface of the ends 28 of bar grids 26 in the grooved panel 6, but which line cuts across the ends 27 of one of the bar grids 26 in the tongued panel 7.

This overlapping arrangement of the ends of the bar grids 26 at each of the tongue and groove joints is an important aspect of the concept of the invention. First of all, it aids in structural strength or resistance of the joints to ramming forces or blows that may be applied by an intruder attempting penetration of the vault wall at one of the tongue and groove joints. Next, the overlapping of the ends of the bar grids at each tongue and groove joint presents the usual bar grid deterrent to penetration of the wall by drilling, hole sawing or the like, in the region of the joints, equivalent to the deterrent presented by bar grids in the body of any reinforced concrete wall in prior vault wall construction that has been cast at the site in the usual manner without joints.

In other words, the new joint structure with overlapping bar grid bar ends presents in effect, though built from precast reinforced concrete panel members which may be assembled quickly at the vault site, the same resistance to intrusion attack that is presented by the approved cast-at-the-site bar grid reinforced concrete wall structure.

In addition to the overlapping arrangement, other means are provided in accordance with the invention to tie the panels and panel reinforcement together at each tongue and groove joint between adjacent panels. Plate members 30 engage the inner panel surfaces and completely cover all joint lines between panels on the inner vault surface such as joint line 29 (FIG. 7). A series of threaded metal sockets 31 is welded by suitable bars 32 to one of the bars of a bar grid 26, which is located adjacent but spaced from the inner surface of the panel, as shown in FIG. 8, the weld areas being located at 33 and 34. The threaded sockets 31 are located with their outer ends flush with the inner panel surface, and sockets 31 are located at spaced intervals in rows adjacent the edges of panels at the tongue and groove joints 29 between adjacent panels (FIG. 7). Plates 30 are secured to the sockets by screws 35.

Angle members 36 similarly completely cover corner joints between end, back and front wall panels 5, 6, 7 and 8, and either the ceiling panels 9, 10 and 11 (FIG. 6), or the floor panels 12, 13 and 14, as shown in FIGS. 4 and 6. Screws 36 secure the angle members 36 to threaded sockets 31 embedded in the concrete wall and welded to one of the bars of an adjacent bar grid 26 (FIG. 6).

Preferably steel plates 37 line the inner faces or surfaces of the vault wall panels at the ceiling, side walls and floor between joint cover plates 30 and corner joint
angle cover members 36, so as to present a uniform surface and appearance within the vault chamber. These plates 37 may be integrated with the panels as the panels the precast by headed anchor lugs 38 extending from the liner plates 37 into the concrete as shown in FIG. 7. The pattern of such anchor lugs is indicated diagrammatically by the circles 38a in FIG. 9.

The construction involving joint line cover plates 30 and angles 36, joined by screws 35, sockets 31 and connections 32 with bar grids 26 form another important aspect of the invention. By these means, the bar grids 26 adjacent the inner face of each panel member, whether for ceiling, sidewall or floor, are integrally connected across the joints at each joint so as to provide in effect an integral grid structure equivalent, from the standpoint of separation at the joints, to the grid structures formed in usual approved cast-in-place reinforced concrete vault wall structures.

By these means, that is, by the overlapping bar grid bar ends at each tongue and groove joint, and by the integrated inner grid structure throughout all six vault walls, the improved modular vault wall structure provides the same reinforced concrete wall security, in a structure that can be assembled quickly from precast panels at the vault site, that heretofore has been provided only by a reinforced concrete vault structure cast in place at the site. Accordingly, the new modular structure provides the security called for by regulatory bodies, without involving delays in construction heretofore characterizing the erection of reinforced concrete vaults cast at the site.

Bank vaults ordinarily are internally lighted, are protected by alarm systems, and are provided with means for ventilating. Conduits and openings may be provided in one or more of the precast panels to accommodate these requirements, such as illustrated particularly in FIGS. 10, 11 and 12. An opening 39 having a larger inner portion 40 may be formed in a leg of end wall panel 6 for the installation of vault ventilating equipment.

Electrical outlets 41 for switches and other electrical components may be formed in a panel communicating with the inner or outer surfaces of one of the panels, such as the leg of end wall panel 6, as shown. Other junction boxes, etc. 42, connected with various conduits indicated diagrammatically by the piping pattern 43 in FIG. 11, also may be formed in one of the panels as the panels are precast.

Some of the conduits 43 may extend out of the panel 6 at 44 (FIG. 11) for connection with a vault door, not shown; or may be connected through conduit 45 (FIG. 9) with a junction box 46 serving one of the ceiling panels.

The lighting and alarm requirement conduits 43, in extending along or through a panel wall are offset at least once, so as to deter use of any conduit as a means of attacking the vault.

Each of the panels 5, 6, 7, 8, 9, 10, 11, 12, 13 and 14, in accordance with design requirements, vault size, required wall thickness, conduit requirements, tongue and groove location, etc., is precast at a convenient location and is ready for assembly at the vault site whenever a vault is to be erected. During erection, floor panels 12, 13 and 14 are assembled, as shown, on leveling plates 47 and leveling screw means 48 supported on footers 49 of required size and arrangement. The footers 49 may be provided at the time the foundation is formed for the building in which the vault 1 is to be located.

Wall panels 5, 6, 7 and 8 then are assembled on the floor panels 12, 13 and 14, and ceiling panels 9, 10 and 11 then are assembled on top of the wall structure. A vault door may be hung in the opening 15 in a usual manner, and floor panel 13 may have a special step or threshold formation indicated at 50 for the vault door.

The joints between panels, assembled in the manner indicated, then are covered by joint plates 30 or angles 36, secured by screws 35 to sockets 31. The liner plates 37, if used, are present as a part of the panels as precast and delivered to the vault site.

The various alarm, lighting and ventilating equipment is installed in the conduits and openings provided for such purposes. After desired surface finishing of exposed walls, both exterior and interior of the vault, the vault is ready for use.

Second Embodiment

A modified form of construction of a modular vault formed of precast reinforced concrete panels is shown in FIGS. 13, 14, 15 and 16 wherein a smaller vault 51 than vault 1 is illustrated. The vault 51 may be formed of a single ceiling panel 52, a single floor panel 53, supported on leveling screw means 54 on footers 55, U-shaped side wall panels 56 and 57 and a back wall panel 58.

The various panels 52, 53, 56, 57 and 58 are assembled together generally in the same manner for vault 51, as described for vault 1, with tongue and groove joints at all joints between adjacent panels. The bar grids 59 in each panel are arranged in the same manner in the vault 51 as described in connection with vault 1.

End portions of the bar grids 59 are located in each tongue and groove joint in overlapping arrangement in the same manner as described in connection with vault 1. The bar grids 59 are tied together at the tongue and groove joints between back panel 58 and side panels 56 and 57 through plates 60, which are screwed at 61 (FIG. 15) to threaded sockets embedded in the panels and connected to the bar grids 59 of adjacent panels. Similarly angle members 62 are tied to the panels at the corner joints (FIG. 15).

Openings and conduit means for lighting, alarm and vault ventilating systems may be incorporated in one of the panels of the vault 51, as illustrated in FIG. 16, in the same manner as described in connection with FIG. 11.

IN GENERAL

Accordingly, the improved modular reinforced concrete vault structure enables a vault to be erected in a minimum period of time at the vault site from precast or prefabricated panels having strength and approved security characteristics and intrusion resistance comparable to requirements heretofore acceptable by regulatory bodies only in cast-at-site reinforced concrete vault structures; enables the component modular precast panels to be integrated quickly with tongue and groove joints wherein the accepted bar grid reinforcement overlaps at the joints and the grids in adjacent panels are physically connected adjacent the inner vault wall surfaces; provides a structure which is efficient, effective, and secure in use after assembly; and provides a modular structure which achieves the enumerated objectives, eliminates problems that have been
present in the art, satisfies an existing want, and attains the new results indicated.

In the foregoing description, certain terms have been used for brevity, clearness and understanding but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such terms are used for descriptive purposes and are intended to be broadly construed.

Moreover, the description and illustration of the invention is by way of example, and the scope of the invention is not limited to the exact details of the construction shown or described.

Having now described the features, discoveries and principles of the invention, the manner in which the improved modular concrete vault structure is constructed and assembled, the characteristics of the new construction, and the advantageous, new and useful results obtained; the new and useful structures, devices, elements, arrangements, parts, and combinations are set forth in the appended claims.

We claim:

1. Modular concrete vault construction including a series of precast reinforced concrete vault compartment-forming side, ceiling and floor wall panels each having an inner surface; tongue and groove formations each having outer surfaces selectively located on the panels interengaged to provide tongue and groove joints between all adjacent vault wall forming panels; at least two spaced rows of metal reinforcing bar grids embedded within each panel; one of said rows of bar grids in each panel being located adjacent but spaced from the panel inner surface; each reinforcing bar grid having a first series of spaced parallel bars and a connected second series of spaced parallel bars oriented at 90° with respect to the first series; the spaced rows of bar grids being arranged with the spaced bars in the first series of one row parallel with and staggered with respect to the spaced bars in the first series of the second row, and with the spaced bars in the second series of the one row parallel with and staggered with respect to the spaced bars in the second series of the second row; one of the bar grids having bent offset ends extending into the tongue formation and spaced from the tongue outer surfaces of each panel tongue; the bar ends of the spaced rows of bar grids extending on either side of each groove formation in each panel at the sides of said spaced from the groove outer surfaces of each panel groove; the bar grid ends in the panel tongue of one panel overlapping the bar grid ends in the interengaged groove formation of an adjacent panel; metal plate means engaging the panel inner surface and completely covering the joint line between adjacent panels at each joint between adjacent panels; metal connector means mounted adjacent each joint line on the one bar grid located adjacent the panel inner surface of each of the adjacent panels at each joint; and means connecting the metal plate means and said metal connector means to integrate all the metal bar grid rows adjacent the inner vault wall surfaces into one metal reinforcing bar grid structure.

2. The construction defined in claim 1 in which liner plates are connected to the panels on all inner panel surfaces extending between the metal plate means covering the joint lines so as to present a uniform surface and appearance within the vault compartment.

3. The construction defined in claim 1 in which the plate means covering the joint lines between adjacent side, ceiling and floor wall panels are flat plates, and in which the plate means covering corner joint lines between panels are angle members.

4. The construction defined in claim 1 in which the metal connector means includes threaded sockets embedded in the panel-forming concrete accessible at the panel inner surface, means joining the sockets within the panels to the bar grids, and screw means engaging the joint covering metal plate means and threaded sockets.

5. The construction defined in claim 1 in which there are vertical panel joints between vault side wall panels and horizontal panel joints between vault ceiling and floor wall panels; and in which the panel joints and the vault side walls are offset from the joints in the ceiling and floor walls.

* * * * *