Jan. 31, 1956 J. P. PACA ET AL 2,732,815

VAULT DOOR

Filed Sept. 30, 1950 5 Sheets-Sheet 1

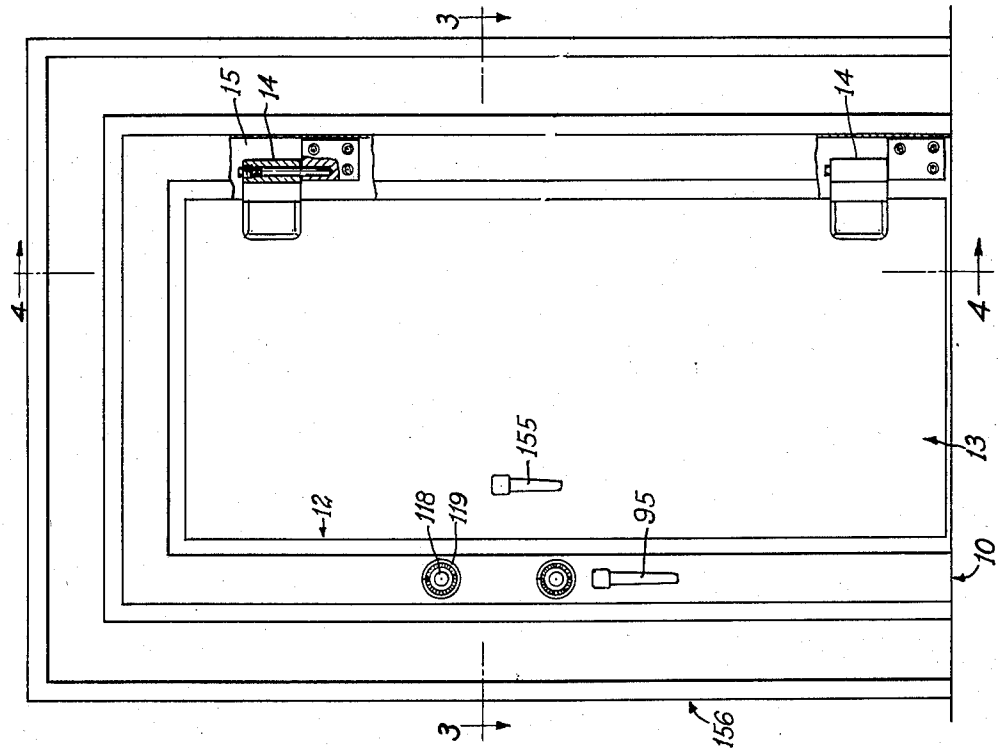


Fig. 1

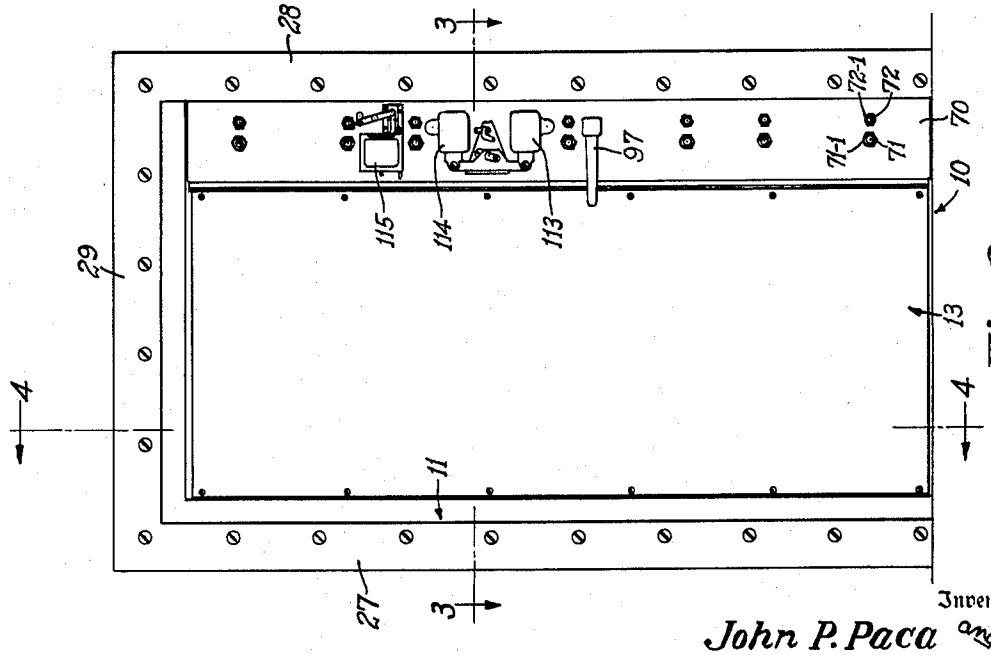


Fig. 2

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VAULT DOOR

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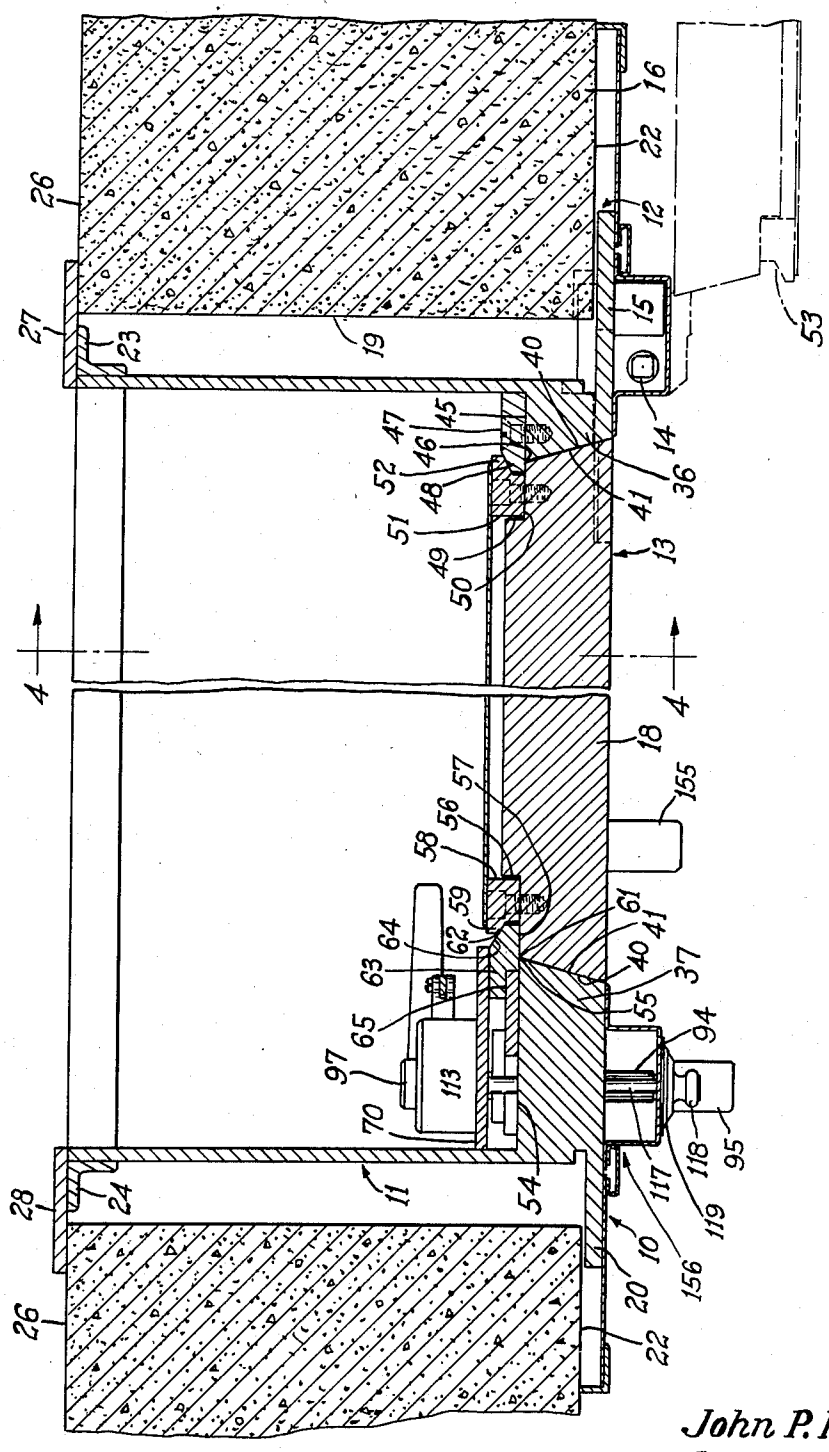


Fig. 3

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VAULT DOOR

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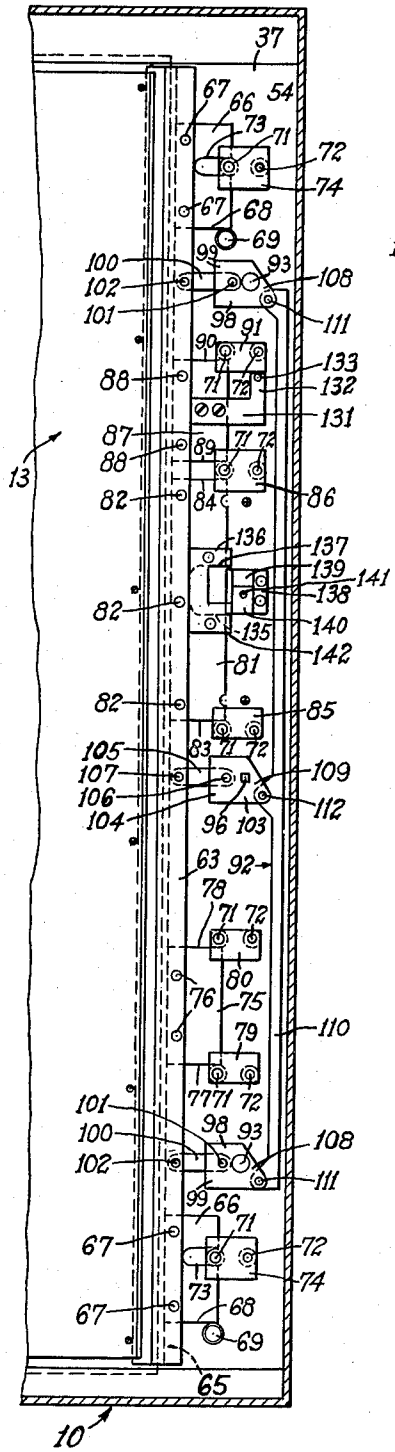


Fig. 5

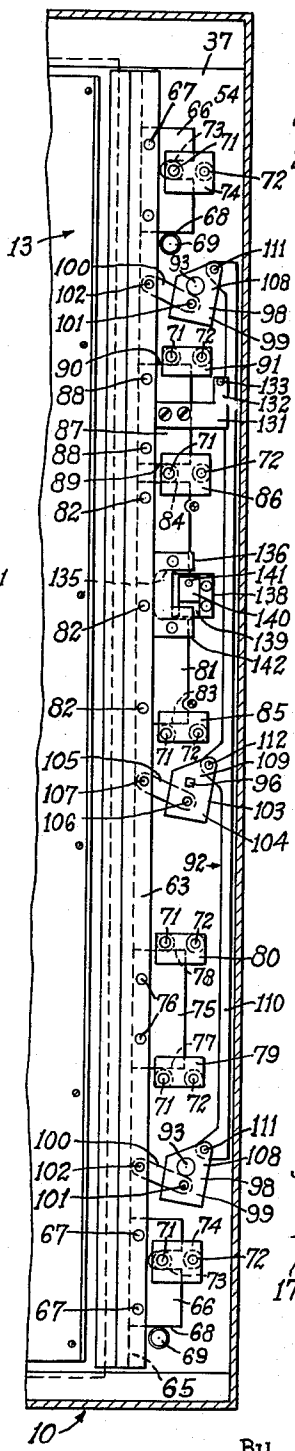


Fig. 6

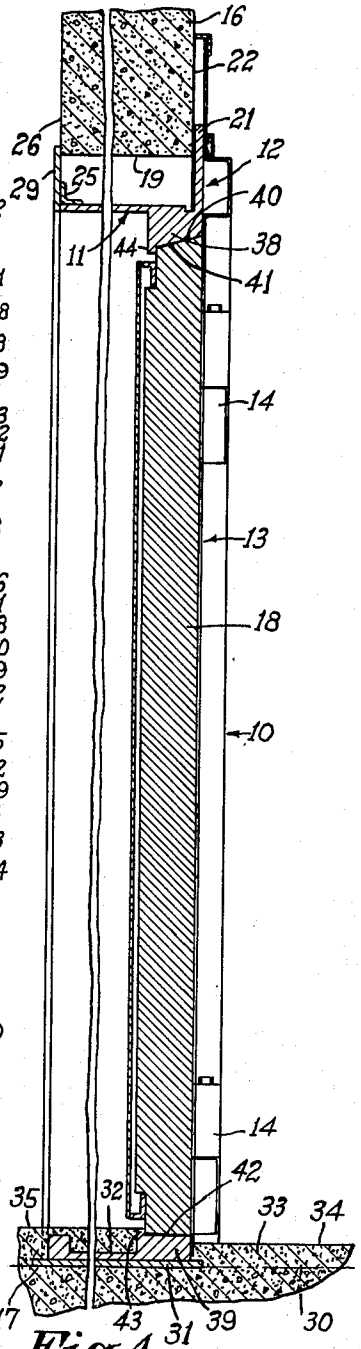


Fig. 4

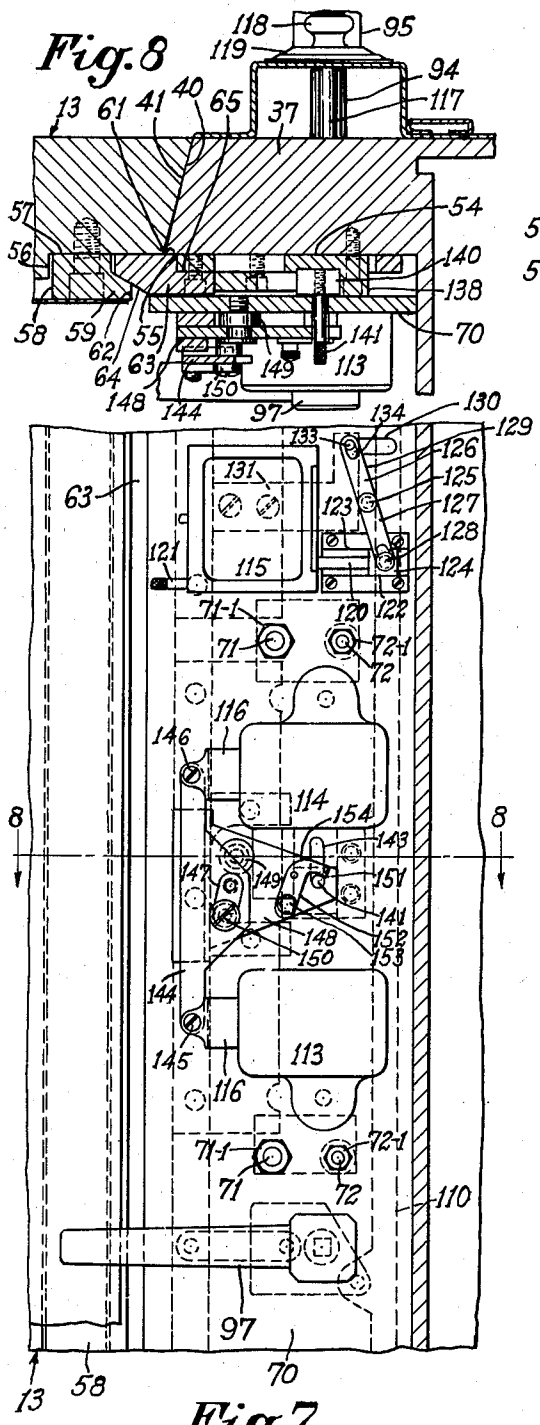
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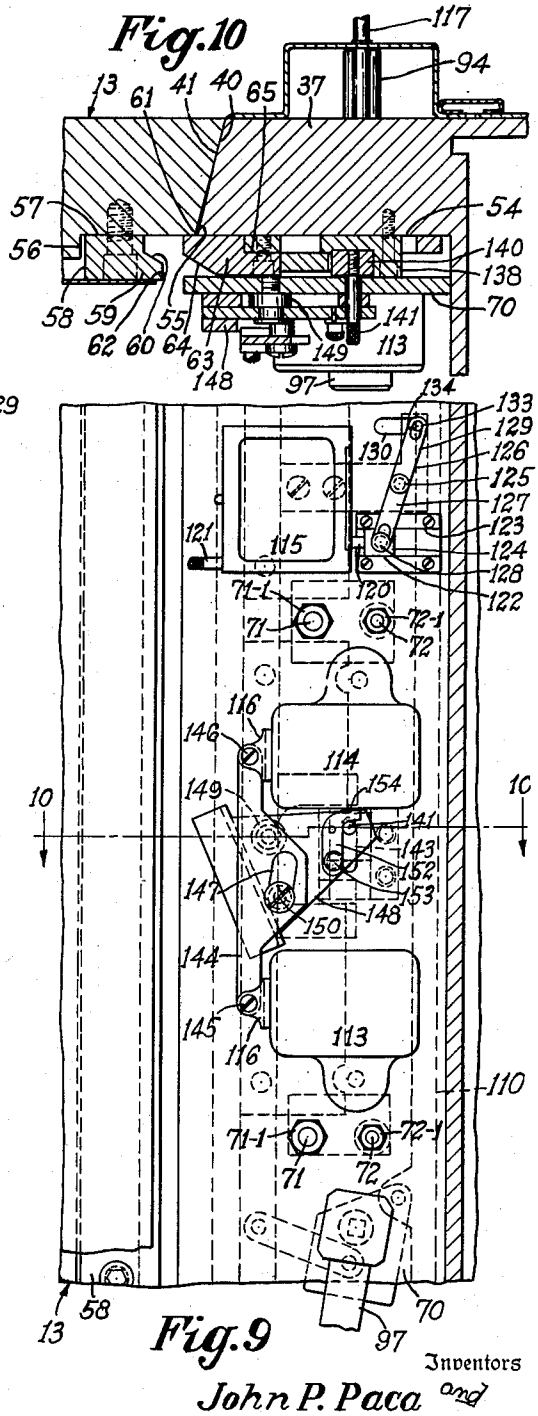
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VAULT DOOR

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VAULT DOOR

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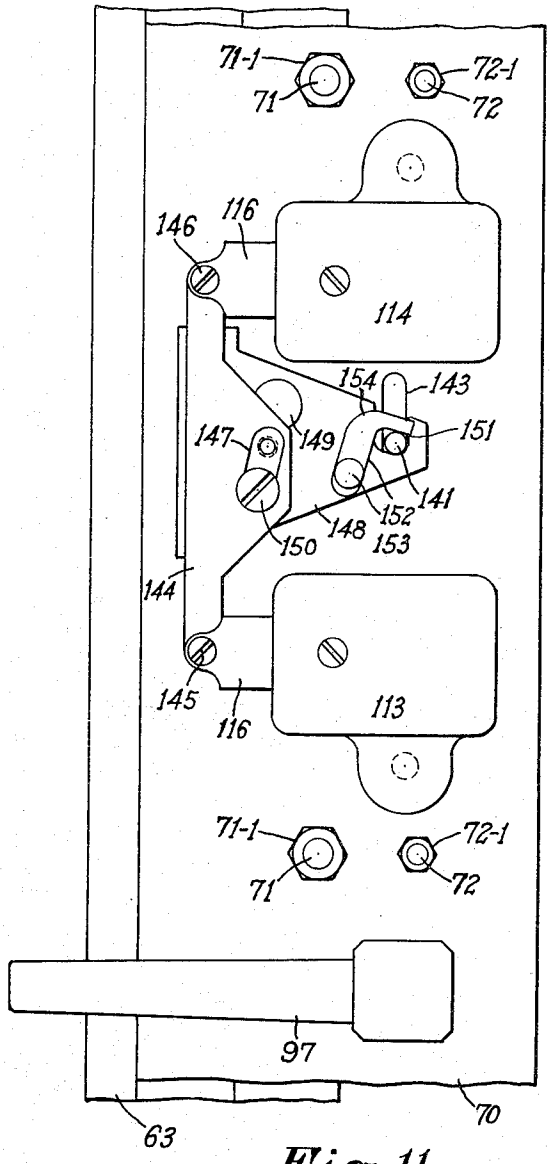


Fig. 11

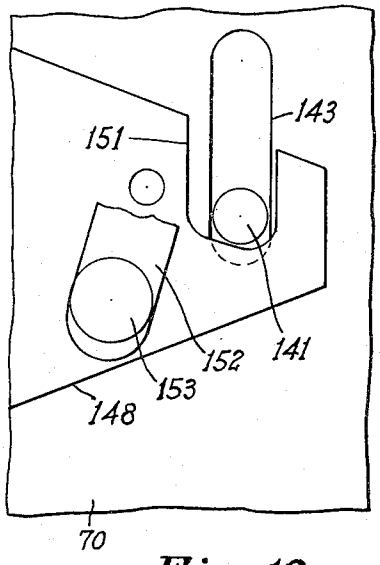


Fig. 12

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2,732,815

VAULT DOOR

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Application September 30, 1950, Serial No. 187,756
11 Claims. (Cl. 109—59)

The invention or discovery relates to vault doors used as parts of vault structures in banks, government offices, and other places of business where it is desired to store and safeguard valuables such as money, documents, and other articles.

In such a vault construction, access is had to the interior of the vault through a vestibule at the outer end of which is located a door frame. The door for the vault is hinge mounted at one side on a jamb of the door frame. Such a usual vault door may be circular, but the present invention or discovery relates to rectangular vault doors and the rectangular door frames therefor.

The usual rectangular vault door prior to the present improvements has bolt work operatively mounted on its inside rectangular face, and one or more bolt locking units are mounted on the inside rectangular face of the door and adapted to be operated to selectively maintain the bolts of the bolt work in extended engaging position with stops on jam members of the door frame when the door is closed, and it is desired to prevent its being opened by an unauthorized person or persons.

The locking units are usually one or more combination locks each having a dial on the outside rectangular face of the door, and each having a combination setting spindle which extends through the door from the lock on the inside rectangular face and terminates on the outside of the door in a knob having a pointer which is utilized in connection with the dial for setting the combination in a well known manner.

The locking units may also include a time lock, and when the locking units are unlocked, the bolts of the bolt work may be extended and withdrawn by an operating handle extending from the outside rectangular face of the door.

In the manufacture of such a usual rectangular vault door having bolt work and bolt locking units mounted on the door itself, considerable difficulties are encountered because such bolt work includes a plurality of bolts and common operating mechanism, all of which must be properly located and fitted on the door, and associated with the bolt locking units.

Moreover, in the installation of such a usual vault door having bolt work and bolt locking units mounted directly thereon, considerable difficulties are encountered in effecting the proper adjustments of the working parts.

The relatively large number of parts in usual bolt work and bolt locking units mounted directly on a vault door and the difficulties encountered in the manufacture and installation of the same necessitate a relatively high cost to the purchaser of the vault door.

The objects of the present invention or discovery include the provision of an improved and simplified vault door construction including a vault door, a door frame hinge mounting the door, and associated bolt mechanism and bolt locking units, the improved vault door construction having parts which are substantially reduced in number as compared with usual vault door construction including usual bolt work, and the parts having a construction and arrangement which eliminate many of the manufacturing and installation difficulties encountered in connection with usual rectangular vault doors having usual

bolt work and bolt locking units directly mounted thereon.

Further objects of the present invention or discovery include the provision of such an improved vault door construction, and in which the construction and arrangement of parts give the door and frame a clean and smooth appearance both when viewed from the outside or from the inside of the vault.

The foregoing and other objects are attained by the vault door construction, parts, combinations, and subcombinations, which comprise the present invention or discovery, the nature of which is set forth in the following general statement, and preferred embodiments of which, together with their mode of use, are set forth by way of example in the following description, and which are particularly and distinctly pointed out and set forth in the appended claims forming part hereof.

The nature of the improved vault door construction of the present invention or discovery may be stated in general terms as including a vault door, a door frame hinge mounting the door, and associated bolt mechanism and bolt locking units for bolting the door in the door frame when the door is closed, the door and door frame preferably being rectangular and the door frame including a lock side member, and all moving parts of the bolt mechanism and all of the bolt locking units being mounted on the door frame lock side member.

From a different and broader standpoint, the improved vault door construction may be stated as including, in a construction constituted in part by members forming a door frame engirdling an opening, a door, hinge means mounting the door on the frame, the door fitting in the door opening when the door is closed, and the door frame including a longitudinally extending member and the door including a longitudinally extending member aligning with the door frame longitudinally extending member when the door is closed, the improved combination in which one of the longitudinally extending members has formed therein a laterally opening longitudinally extending groove, a longitudinally extending bolt bar, means mounting the bolt bar for lateral movement on the other longitudinally extending member, means for moving the bolt bar alternately laterally towards the grooved longitudinally extending member to an extended position and away from the grooved longitudinally extending member to a retracted position, the bolt bar fitting in the groove when the door is closed and the bolt bar is in the extended position, and the bolt bar being withdrawn from the groove when the bolt bar is in the retracted position, a longitudinally extending lock and linkage mounting plate extending at one side of the bolt bar and the bolt bar mounting member whereby the bolt bar is located between the lock and linkage mounting plate and the bolt bar mounting member, at least two stop members extending from the bolt bar and a first stop member including a first pin extending towards the lock and linkage mounting plate and a second stop member extending laterally from the bolt bar away from the grooved longitudinally extending member and there being a lock block clearance space at one side of the second stop member, a lock block mounted for movement on the bolt bar mounting longitudinally extending member between a position aligned with the second bolt bar stop member and preventing movement of the bolt bar and a position aligned with the clearance space and permitting movement of the bolt bar, a second pin extending from the lock block towards the lock and linkage mounting plate, a first lock on the lock and linkage mounting plate, the first lock including a releasable and lockable reciprocating plunger and first linkage means operatively associating the plunger with the first pin for selectively permitting and preventing movement of the first pin, and second lock means on the lock and linkage mounting plate, and second linkage

means operatively and releasably interposed between the second lock means and the second pin, the second linkage means including a link member movable for moving the second pin, and the second lock means including at least one reciprocating bolt movable to actuate the movable link member.

By way of example, embodiments of the improved vault door construction and parts thereof, of the present invention or discovery are illustrated in the accompanying drawings forming part hereof, in which

Figure 1 is a front elevational view of the improved vault door construction, with portions broken away and shown in section, and showing the vault door hinge mounted in the frame, and looking at the outside or front faces of the door and frame;

Fig. 2 is a rear elevational view thereof looking at the inside or rear faces of the door and frame, and showing certain associated parts mounted on the inside of the frame;

Fig. 3 is an enlarged fragmentary transverse sectional view thereof, as on lines 3—3, Figs. 1 and 2, the bolt bar being shown in its extended door bolting position;

Fig. 4 is a fragmentary vertical sectional view thereof on a scale enlarged with respect to Figs. 1 and 2 and reduced with respect to Fig. 3, as on lines 4—4, Figs. 1, 2, and 3;

Fig. 5 is an enlarged fragmentary rear elevational view looking in the same direction as Fig. 2, and with parts shown in section and other parts removed, and showing the bolt bar of the bolt mechanism in its extended and door bolting position, and showing the relative location and arrangement of other parts of the bolt mechanism when the bolt bar is in its extended position;

Fig. 6 is a view similar to Fig. 5 showing the bolt bar in its withdrawn position disengaged from the door, and showing other parts of the bolt mechanism in their relative locations and arrangements when the bolt bar is withdrawn;

Fig. 7 is an enlarged fragmentary rear elevational view, looking in the same direction as Fig. 2 and illustrating details of the bolt locking units of the improved vault door construction and associated parts when the bolt bar is extended and locked.

Fig. 8 is a transverse sectional view thereof as on line 8—8, Fig. 7;

Fig. 9 is a view similar to Fig. 7 showing the locking units and associated parts when the bolt bar is unlocked and withdrawn;

Fig. 10 is a transverse sectional view thereof as on lines 10—10, Fig. 9;

Fig. 11 is an enlarged view of a portion of Fig. 7; and

Fig. 12 is a further enlarged view of a portion of Fig. 11.

Similar numerals refer to similar parts throughout the several views of the drawings.

The improved vault door construction is indicated generally by 10, and includes walls forming a rectangular vestibule indicated generally by 11 and having at its front end, members forming a rectangular door frame indicated generally by 12. A vault door indicated generally by 13 is mounted at one side by hinges 14 on one of the side members 15 of the door frame.

The door frame 12 engirdles a rectangular opening, and the door 13 fits in the opening when closed, as shown in full lines in the several views of the drawings. The open position of the door is shown in dot-dash lines in Fig. 3.

The improved vault door construction 10 is adapted for being incorporated in a vault which may be of any usual vault construction, and has a front wall 16 indicated conventionally in Figs. 3 and 4, and a floor 17 indicated conventionally in Fig. 4.

In the drawings, the vestibule 11 including the door frame 12 is shown, for purposes of convenience, as if made of a one-piece casting. It is noted, however, that the vestibule 11 and the door frame 12 may be made, and usually are made of composite plate and bar construction, in which the members are welded, bolted, screwed, or otherwise connected with each other. In the present improved vault door construction 10, the improvements are constituted in part by the external conformations of the vestibule 11, the door frame 12, and the door 13, and the manner in which these parts are built is a matter of design.

The door 13 includes a main rectangular body 18, which in the drawings, for purposes of convenience, is similarly shown as if made in one piece, since the detail construction of the rectangular body 18, excepting for its external conformation, is not a part of the present improvements. In practice it is usual that the main door body 18 be of composite construction, which varies according to the engineering specifications for the door.

The front vault wall 16 has formed therein a rectangular opening indicated by 19, and the vestibule 11 when installed is located in the vault wall opening 19 as shown in Figs. 3 and 4. The door frame 12 at the front end of the vestibule 11 includes the laterally extending flange member 15 at one side, a similar laterally extending flange member 20 at the other side, and a laterally extending flange member 21 at the top. The vault wall 16 has a vertical flat front face 22, and the door frame flange members 15, 20, and 21 extend across the borders of the vault wall flat face 22 at the front end of the opening 19, as shown in Figs. 3 and 4.

At the rear end the vestibule includes laterally extending side flanges 23 and 24 and a top flange 25, which are located within the vault wall opening 19 and have rear faces in the same plane as the rear flat face 26 of the vault wall 16. A side flange bar 27 is in abutment with the vestibule side flange member 23 and extends across the rear face 26 of the vault wall 16; a similar side flange bar 28 is secured in abutment with the vestibule side flange member 24 and extends across the vault wall rear face 26; and a similar top flange bar 29 is secured in abutment with the vestibule top flange member 25 and extends across the rear face 26 of the vault wall 16.

As shown in Fig. 4, before the vault door construction 10 is installed, the floor 17 has a semi-finished top face indicated by the dot-dash line 30 which is the bottom face of the wall opening 19. In the installation of the vault door construction 10, a foundation plate 31 is positioned upon the floor semi-finished top face 30 at the bottom of the wall opening 19, and the vestibule 11 is positioned in the wall opening 19. The vestibule 11 includes bottom members indicated generally by 32 which have flat bottom faces seating upon the flat top face of the foundation plate 31. The finish portion 33 of the floor 17 is then applied upon the semi-finished face 30, and the finish floor portion 33 has a floor line 34 in the banking room, and a floor line 35 inside the vault at a slightly higher elevation than the floor line 34.

The door frame 12 includes a side jamb member 36 at the hinge side of the frame, a side jamb member 37 at the lock side of the frame, a top jamb member 38, and a bottom jamb member 39. Each of the jamb members 36, 37, and 38 has a bevelled jamb face 40 which slopes from front to rear so that the opening in the door frame is smaller at the rear than at the front. The bevelled jamb faces 40 of the door frame 12 mate with similar bevelled jamb faces 41 on the sides and top of the door 13 when the door is closed. The upper face 42 of the bottom jamb member 39 is horizontal as shown, and the bottom jamb member 39 has a stop flange 43 projecting upwardly above the face 42. Similarly, the top jamb member 38 has a stop flange 44 projecting downwardly from the face 40.

The hinge side jamb member 36 has a rear face 45 meeting its bevelled jamb face 40 at a rear upright corner 46. A tongue bar 47 preferably extending the entire length of the hinge side jamb member 36 is secured to the jamb member 36 in abutment with its rear face 45. The tongue bar 47 includes an outer bevelled tongue

portion 48 extending laterally beyond the jamb face 40 and over the corner 46.

The main door body 18 as shown has a longitudinally extending rabbet 49 formed in its hinge side rear corner, and the rabbet 49 has a flat bottom face 50 which lies in a common plane with the rear face 45 of the jamb member 36 when the door 13 is closed, as shown in Fig. 3. A groove forming bar 51, preferably extending the entire length of the door, is secured in the rabbet 49 and in abutment with the rabbet bottom face 50. The groove forming bar 51 includes a longitudinally extending bevelled flange portion 52 transversely spaced from and extending laterally over the outer border portion of the rabbet bottom face 50 and forming therewith a transversely bevelled groove 53 in which the tongue portion 48 of the tongue bar 47 fits when the door is closed.

The lock side jamb member 37 has a rear face 54 meeting its bevelled jamb face 40 at a rear upright corner 55. The main door body 18 has a longitudinally extending rabbet 56 formed in its lock side rear corner, and the rabbet 56 has a flat bottom face 57 which lies in a common plane with the rear face 54 of the jamb member 37 when the door 13 is closed, as shown in Fig. 3. A groove forming flange bar 58, preferably extending the entire length of the door is secured in the rabbet 56 and in abutment with the rabbet bottom face 57. The groove forming bar 58 includes a longitudinally extending bevelled flange portion 59 transversely spaced from and extending laterally over the outer border portion of the rabbet bottom face 57 and forming therewith a transversely bevelled groove 60. The rabbet bottom face 57 of the door 13 meets with the bevelled face 41 at a corner 61 which is aligned with the corner 55 of the jamb member 37, when the door is closed. The flange portion 59 of the groove forming bar 58 has a longitudinally extending side face 62 which is offset as shown from the corner 61 in the direction of the hinge side of the door 13.

The construction and combination of the door body 18 and the groove forming bars 51 and 58 may be broadly defined as constituting a door having in each of its side faces, and preferably at each of its rear corners a laterally opening transversely bevelled longitudinally extending groove. The construction and combination of the hinge side jamb member 36 and the tongue bar 47 may be broadly defined as constituting a jamb member having a bevelled jamb face and a tongue extending beyond the bevelled jamb face and fitting in the hinge side longitudinally extending groove of the door when the door is closed.

On the rear face 54 of the lock side jamb member 37 there is located a tongue bolt bar 63, which preferably extends the entire length of the lock side jamb member 37 and is operatively mounted for lateral movement crosswise of the corner 55 and the rabbet face 57 of the door body 18 when the door is closed. The tongue bolt bar 63 includes an outer bevelled tongue portion 64 which as shown at all times extends laterally beyond the jamb face 40 and the corner 55. When the door is closed and the bolt bar is laterally extended for bolting the door, the tongue portion 64 of the bolt bar 63 extends into the groove 60 as shown in Figs. 3 and 8. When the bolt bar 63 is retracted as shown in Fig. 10, the tongue portion 64 is withdrawn laterally out of the groove 60 and clears the side face 62 of the tongue portion 59 of the groove forming bar 58, thereby permitting opening of the door.

The operative mounting of the bolt bar 63 for lateral movement on the lock side jamb member 37 may be effected by a number of different means. Preferred means for operatively mounting the bolt bar 63 on the lock side jamb member 37 for lateral movement with respect to the jamb member are illustrated and described in detail hereinafter. When the bolt bar is extended in the position bolting the door as shown in Figs. 3 and 8, it is necessary that one or more lock units be associated with the bolt bar and its mounting means or mechanism for locking or stopping the bolt bar in its extended door bolting position. Preferred multiple lock units, associated with the bolt bar and its mounting means, are illustrated and described hereinafter.

The bolt bar 63 has a longitudinally extending rabbet 65 formed in its inside corner adjacent the rear face 54 of the lock side jamb member 37 as best shown in Figs. 3, 8, and 10. Upper and lower rectangular hanger and guide plates 66 each has a side portion located in the rabbet 65 and secured to the bolt bar 63 by rivets 67 as shown in Figs. 5 and 6. One plate 66 is adjacent the upper end of the bolt bar and the other plate 66 is adjacent the lower end of the bolt bar. Each hanger and guide plate 66 extends laterally from the bolt bar 63 away from the door 13, and each plate 66 has a lower horizontal face 68 which is seated and supported upon one of the upper and lower rollers 69, each of which is mounted on the rear face 54 of the lock side jamb member 37. The axes of the rollers 69 are parallel with each other and perpendicular to the rear vertical face 54 of the lock side jamb member 37.

The parts of the bolt mechanism including the bolt bar 63 which are operatively mounted on the rear vertical face 54 of the lock side jamb member 37 are provided with a longitudinally extending cover and lock unit mounting plate 70 which is spaced from and removably secured to the rear face 54 of the lock side jam member 37, as shown by two rows of vertically spaced studs 71 and 72 having threaded outer ends of reduced diameters on which are secured respectively nuts 71–1 and 72–1.

In Figs. 5 and 6, the cover plate 70 is removed showing the parts of the bolt mechanism mounted on the rear vertical face 54 of the lock side jamb member 37. For maintaining the bolt bar 63 against displacement away from the rear face 54 of the lock side jamb member 37 when the cover and lock unit mounting plate 70 is removed, each stud 71 is horizontally aligned with one of the studs 72. The lower hanger and guide plate 66 has formed therein a notch 73 which is horizontally aligned with the lower set of studs 71 and 72, and a lower retainer plate 74 is located and secured on the reduced threaded shanks of the lower set of studs 71 and 72, the lower retainer plate 74 being on the outside of the lower hanger and guide plate 66. Similar retaining means are provided for the upper hanger and guide plate 66, and include the upper set of studs 71 and 72 and an upper retainer plate 74.

Spaced above the lower hanger and guide plate 66, there is located a first intermediate guide plate 75 having a side portion located in the rabbet 65 and secured to the bolt bar 63 by rivets 76. The guide plate 75 extends laterally from the bolt bar 63 away from the door 13. One of the side by side sets of studs 71 and 72 is located below the lower horizontal face 77 of the guide plate 75, and another set of studs 71 and 72 is located above the upper horizontal face 78 of the guide plate 75. On the lower set of studs 71 and 72 adjacent the guide plate 75, a lower retainer plate 79 is secured and extends over the lower border of the guide plate 75. On the upper set of studs 71 and 72 adjacent the guide plate 75, an upper retainer plate 80 is secured and extends over the upper border of the guide plate 75.

Spaced above the first intermediate guide plate 75, there is located a second intermediate guide plate 81 having a side portion located in the rabbet 65 and secured to the bolt bar 63 by rivets 82. The guide plate 81 extends laterally from the bolt bar 63 away from the door 13. One of the side by side sets of studs 71 and 72 is located below the lower horizontal face 83 of the guide plate 81, and another set of studs 71 and 72 is located above the upper horizontal face 84 of the guide plate 81. On the lower set of studs 71 and 72 adjacent the guide plate 81, a lower retainer plate 85 is secured and extends over the lower border of the guide plate 81. On the upper set of

studs 71 and 72 adjacent the guide plate 81, an upper retainer plate 86 is secured and extends over the upper border of the guide plate 81.

The upper retainer plate 86 extends downwardly and upwardly from its mounting studs 71 and 72. A third intermediate guide plate 87 has a side portion located in the rabbet 65 and is secured to the bolt bar 63 by rivets 88. The guide plate 87 extends laterally from the bolt bar 63 away from the door 13, and has a lower horizontal face 89 which is located above the set of studs mounting the retainer plate 86, and the upper portion of the retainer plate 86 extends over the lower border of the guide plate 87. The guide plate 87 has an upper horizontal face 90, and another set of studs 71 and 72 is located above the upper face 90 of the guide plate 87. On the upper set of studs 71 and 72 adjacent the guide plate 87, an upper retainer plate 91 is secured and extends over the upper border of the guide plate 87.

The upper and lower hanger and guide plates 66 supported on the upper and lower rollers 69, the retainer plates 74 for the hanger and guide plates 66, the guide plate 75 and its retainer plates 79 and 80, the guide plate 81 and its retainer plates 85 and 86, and the guide plate 87 and its retainer plates 86 and 91 collectively constitute means mounting the bolt bar 63 for horizontal reciprocation on the rear face 54 of the lock side jamb member 37.

Linkage means indicated generally by 92 is provided for effecting the horizontal reciprocation of the bolt bar 63, and the likage means 92 includes an upper pivot pin 93 and a similar lower pivot pin 93 extending rearwardly from the rear face 54 of the lock side jamb member 37. The upper pivot pin 93 is located between the upper hanger and guide plate 66 and the third intermediate guide plate 87, and above the retainer plate 91. The lower pivot pin 93 is located between the lower hanger and guide plate 66 and the first intermediate guide plate, and above the retainer plate 74, the pivot pins 93 being vertically aligned with each other and having their axes perpendicular to the rear face 54 of the lock side jamb member 37.

An operating shaft 94 is journalled in bearing means located in the lock side jamb member 37, and the shaft 94 has an operating handle 95 secured on its extremity on the outside of the lock side jamb member 37. On the inside of the lock side jamb member 37 and beneath the cover plate 70, the shaft 94 is formed with a square section 96. The shaft 94 extends through an opening in the cover plate 70, and on the inside of the cover plate 70 there is secured an operating handle 97.

On each of the pivot pins 93 beneath the cover plate 70 there is pivoted a two-arm lever plate 98 extending laterally from opposite sides of the pivot pins 93. Each lever plate 98 includes an arm 99 extending from its pivot pin 93 towards the bolt bar 63, and a link 100 extends between each lever plate 98 and the bolt bar 63, and one end of each link 100 has a pivot connection 101 with its associated lever plate arm 99 and another link connection 102 with the bolt bar 63. A lever plate 103 has a square aperture formed therein which fits on the square section 96 of the shaft 94, and the lever plate 103 has an arm 104 extending from the square section 96 of the shaft 94 towards the bolt bar 63. A link 105 extends between the bolt bar 63 and the lever plate 103, and the link 105 has a pivotal connection 106 with the arm 104, and has a pivotal connection 107 with the bolt bar 63.

Each lever plate 98 has an arm 108 extending from its pivot pin 93 away from the bolt bar 63. The lever plate 103 likewise has an arm 109 extending away from the bolt bar 63. A connecting link bar 110 extends longitudinally of the jamb member 37 beneath the arms 108 and 109 of the lever plates 98 and 103. A pivot pin connection 111 is provided between the connecting link bar 110 and each arm 108 of the lever plates 98, and a pivot connection 112 is provided between the arm 109 of the lever plate 103 and the connecting link bar 110.

In Fig. 5 the bolt bar 63 and the parts of the linkage means 92 are shown in their relative positions when the bolt bar is extended to its door bolting position. When either of the operating handles 95 or 97 are turned counterclockwise as viewed in Fig. 6, the bolt bar 63 is reciprocated out of the groove 60 as shown in Fig. 10, permitting opening of the door 13.

Means controlled by a plurality of lock units are provided in the vault door construction 10 for locking the bolt bar 63 in its extended door bolting position. In the vault door construction 10, the lock units are mounted on the rear face of the cover plate 70 and have operative connections with parts associated with the bolt bar 63, so that the bolt bar 63 cannot be withdrawn from its extended door bolting position when any of the lock units are set in the locking arrangement of its parts.

As shown, the lock units include a lower combination lock 113, an upper combination lock 114, and a time lock 115 above the upper combination lock 114. The combination locks 113 and 114 are of usual construction, and each includes a bolt 116 which is extended to the positions shown in Fig. 7 when the door 13 is bolted and the combination locks 113 and 114 are lock set. These bolts 116 are withdrawn to the positions shown in Fig. 9 when the combination locks 113 and 114 have been manipulated so as to permit the withdrawal of the bolts 116. The manipulation of each combination lock is effected by means of a spindle 117 which extends through the cover plate 70 and the jamb member 37, and has on its outer end a knob 118 cooperating with a dial plate 119.

The time lock 115 is of usual construction, and includes a plunger 120 which is extended as shown in Fig. 7 when in the locking position and which is withdrawn as shown in Fig. 9 when in the unlocking position. A release arm 121 is operative from inside the vault for withdrawing the time lock plunger 120. On the rear face of the cover plate 70 there is mounted a horizontal slide bearing 122 formed with a horizontal channel 123. A slide block 124 reciprocably fits in the channel 123 and is connected with the outer extremity of the time lock plunger 120. A pivot stud 125 is located above the slide bearing 122 and extends rearwardly from the rear face of the cover plate 70. A lever 126 is pivoted on the pivot stud 125 and includes a lower arm 127 having a slot and pin connection 128 with the slide block 124.

The lever 126 includes an upper arm 129, and the cover plate 70 has a horizontal slot 130 formed therein beneath the outer extremity of the lever arm 129. Beneath the cover plate 70 there is mounted on the guide plate 87 an L-shaped extension bar 131 having an outer base leg 132 on which is mounted a pin 133 which extends through the cover plate slot 130. At the extremity of the upper arm 129 of the lever 126 there is formed a slot 134, and the outer end of the pin 133 extends into the slot 134.

Thus, when the time lock 115 is in the locked arrangement of its parts as shown in Fig. 7, its plunger 120 is extended and maintains the slide block 124 in a position to the right of the pivot stud 125, whereby through the connections of the lever 126 with the slide block 124 and the extension bar 131, the bolt bar 63 is maintained in its door bolting position independently of the locking action of the combination locks 113 and 114.

Referring to Figs. 5 and 6, the guide plate 81 has formed therein a central notch 135, and on the rear face of the guide plate 81 there is secured a check or stop plate 136 having formed therein a notch 137, the notches 135 and 137 opening away from the bolt bar 63. Between the guide plate 81 and the link bar 110 there is mounted on the rear face 54 of the jamb member 37 a guide block 138 horizontally opposite the notches 137 and 135. The guide block 138 has formed therein a rearwardly opening vertically extending guide channel 139. A lock

block 140 fits and vertically reciprocates in the channel 139, and a pin 141 extends rearwardly from the lock block 140. When the lock block 140 is in its lower position as best shown in Fig. 5, it is in locking abutment with the lower portion 142 of the check or stop plate 136 preventing withdrawal of the bolt bar 63 from its door bolting position. When the lock block 140 is elevated to the position best shown in Fig. 6, it is aligned with the notches 137 and 135 and permits the withdrawal of the bolt bar 63 to the position best shown in Fig. 6 in which the bolt bar 63 is disengaged from the groove 60, permitting opening of the door.

Through a link and lever connection between the bolts 116 of the combination locks 113 and 114 and the pin 141, the lock block 140 is maintained in its lower door bolting position as best shown in Fig. 7 when the combination locks 113 and 114 are set in the locking arrangement of their parts with the bolts 116 extended.

When the combination locks 113 and 114 are manipulated to the unlocked arrangement of their parts, and the bolts 116 are withdrawn as best shown in Fig. 9, the lock block 140 is elevated to its position shown in Fig. 6, and the bolt bar 63 may be withdrawn out of bolting engagement with the groove 60.

Between the combination locks 113 and 114 the cover plate 70 has formed therein a vertically extending slot 143, and the pin 141 extends from the lock block 140 through the slot 143 and rearwardly of its rear face.

The link and lever means connecting the bolts 116 of the combination locks 113 and 114 includes a lock link 144 which has a pivotal connection 145 of its lower end with the outer end of the bolt 116 of the lower combination lock 113. The upper end of the lock link 144 has a pivotal connection 146 with the outer end of the bolt 116 of the upper combination lock 114. The lock link 144 has formed therein a slot 147 which is inclined from its lower end away from the vertical, the pivotal connections 145 and 146 being vertically aligned with each other when the bolts 116 are extended as shown in Fig. 7. Beneath the lock link 144 is located a lock lever 148 which is pivotally mounted on the rear face of the cover plate 70 by a pivot screw 149 which is located above the slott 147. A screw pin 150 extends through the slot 147 and is screwed in the lock lever 148, the slot 147 and pin constituting a slot and pin or loose connection between the lock link 144 and lock lever 148.

The lock lever 148 has formed therein an upwardly opening notch 151 shown in full lines in Fig. 7, and the outer extremity of the pin 141 is seated in the bottom of the notch 151. A latch hook 152 has a lower end having a pivotal connection 153 with the lock lever 148 adjacent its lower face. The latch hook has an upper hook end 154, and the latch hook is spring pressed so that its hook end 154 is ordinarily hooked over the outer extremity of the pin 141.

When the door is bolted as shown in Figs. 3, 5, and 7, and the combination locks are set with their parts in the locking positions, and it is desired to unlock and unbolt the door, it is first necessary that the time lock 115 shall have been operated to release its plunger and permit movement of the slide block 124. It is then necessary that the knobs 118 of the combination locks 113 and 114 be manipulated to set the tumblers of the combination locks in positions permitting withdrawal of the bolts 116. The bolts 116 are then withdrawn by the usual operation of the knobs 118 from the positions shown in Fig. 7 to the positions shown in Fig. 9, thereby through the link and lever connecting means between the bolts 116 and the pin 141 elevating the lock block 140 to the position shown in Fig. 6 is which it is aligned with the notches 135 and 137 of the guide plate 81 and the check or stop plate 136. The outer handle 95 may then be rotated to turn the shaft 94 counterclockwise as viewed in Fig. 6, whereby the turning of the lever plate 103 with the shaft 94, and through the link connection of the lever plate 103 with the bolt bar 63 and through the connection of the lever plate 103 by the link bar 110 with the lever plates 98 and their link connections with the bolt bar 63, will effect withdrawal of the bolt bar 63 to the door releasing position shown in Figs. 6, 9, and 10.

If by accident a person is locked in the vault, when the door 13 is bolted and the lock units are set in the locking positions of their parts, the person so locked in the vault may unlock the lock units 113 and 114 enabling the bolt bar 63 to be withdrawn by turning the inside handle 97.

For this purpose the person in the vault manipulates the time lock release arm 121, permitting movement of the plunger 120 and connected parts from their locking position shown in Fig. 7 to the unlocked position shown in Fig. 9.

The latch hook 152 is then swung so that its hook end 154 is disengaged from above the outer extremity of the pin 141, and the pin 141 is then manually lifted so as to move the lock block 140 to the unlocked position shown in Fig. 6, where it is held while the handle 97 is being turned to withdraw the bolt bar 63 from engagement with the door 13, and permitting opening of the door.

The door 13 is provided on its outside with a handle 155 for pulling the door open or pushing it closed from the outside. From the inside the door is pushed for opening it.

As shown, and preferably, architrave and pilaster trim members indicated generally by 156 are mounted on the outside of the side and top members of the door frame 12.

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 words are used for descriptive purposes and not for the purpose of limitation and are intended to be broadly construed.

Moreover, the invention or discovery is not limited to the exact structure shown herein, because the sizes of the various parts may be varied to provide other structural embodiments without departing from the scope of the present invention or discovery.

Having now described the features of the invention or discovery, the construction, manufacture, operation, and use of a preferred form of the improved vault door construction, and the advantages and results obtained by the use of the same; the new and useful inventions, discoveries, constructions, devices, combinations, and sub-combinations, and reasonable equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

We claim:

1. In vault door construction including members forming a door frame engirdling an opening, a door, hinge means mounting the door on the frame, the door fitting in the door opening when the door is closed, the door frame including a longitudinally extending member and the door including a longitudinally extending member aligning with the door frame longitudinally extending member when the door is closed, the combination including portions of one of the longitudinally extending members forming a laterally opening longitudinally extending groove, a longitudinally extending bolt bar, bolt bar mounting and positioning means operatively mounting the bolt bar on the other longitudinally extending member, the bolt bar being alternately laterally movable towards the grooved member to an extended position and away from the grooved member to a retracted position, the bolt bar fitting in the groove when the door is closed and the bolt bar is in the extended position, and the bolt bar being withdrawn from the groove when the bolt bar is in the retracted position, two stop members on the bolt bar, block means for each stop member, each block means being movable between two positions, one of said block means including a reciprocating member and the other of said block means including a swinging

member, lock means for each block means, each lock means including a movable member, one of the lock means movable members having a connection with its associated lock means, and each lock means movable member being selectively movable to alternately position its associated block means in one position relative to its associated stop member and stopping the bolt bar in its extended position and in another position relative to its associated stop member and permitting retraction of the bolt bar from the groove.

2. In vault door construction as set forth in claim 1, and in which the lock means for the block means including the swinging member is a time lock.

3. In vault door construction including members forming a door frame engirdling an opening, a door, hinge means mounting the door on the frame, the door fitting in the door opening when the door is closed, the door frame including a longitudinally extending member and the door including a longitudinally extending member aligning with the door frame longitudinally extending member when the door is closed, the combination including portions of one of the longitudinally extending members forming a laterally opening longitudinally extending groove, a longitudinally extending bolt bar, bolt bar mounting and positioning means operatively mounting the bolt bar on the other longitudinally extending member, the bolt bar being laterally movable towards the grooved member to an extended position and away from the grooved member to a retracted position, the bolt bar fitting in the groove when the door is closed and the bolt bar is in the extended position, and the bolt bar being withdrawn from the groove when the bolt bar is in the retracted position, first lock means, first bolt bar block means movable between two positions, the first lock means including movable members selectively preventing movement of the first bolt bar block means from one of said positions, the first bolt bar block means including a swinging member, the swinging member having a first connection with the bolt bar and being associated with a movable member of the first lock means, the first lock means being a time lock, second bolt bar block means movable between two positions, second lock means including movable members separate from the second bolt bar block means, one of the second lock means movable members having a connection with the second movable bolt bar block means and the second lock means movable members being selectively movable to alternately position the second bolt bar block means in one position blocking the bolt bar in its extended position and in another position permitting retraction of the bolt bar from the groove, the second lock means including a combination lock.

4. Bolt and lock construction for a vault door and the like, including a longitudinally extending bolt bar mounting member having angled longitudinally extending faces making junction with each other at a longitudinally extending corner, a bolt bar, means mounting the bolt bar for lateral movement on the mounting member cross-wise of one of its angled faces and the corner, the other angled face of the mounting member constituting a side face and being adapted for separable alignment with a side face of another longitudinally extending member, means for moving the bolt bar alternately laterally in opposite directions cross-wise of the side face and the corner between two positions, one position being an extended position relative to the side face and the corner and the other position being a retracted position relative to the side face and the corner, a longitudinally extending lock mounting plate spaced from the bolt bar and the one angled face of the mounting member whereby the bolt bar is located between the lock mounting plate and the bolt bar mounting member, a first stop member on the bolt bar, first block means movable to and from a position preventing movement of the first stop member and the bolt bar, and lock means on the mounting plate, the lock means including a first lock member movable to and from a position preventing movement of the first block means, whereby movement of the bolt bar may be selectively prevented and permitted by movement of the first movable lock member.

5. Bolt and lock construction for a vault door and the like, as set forth in claim 4, and in which the first block means has a slidable association with the first movable lock member.

6. Bolt and lock construction for a vault door and the like, as set forth in claim 4, and which includes a second stop member on the bolt bar, second block means movable to and from a position preventing movement of the second stop member and the bolt bar, the lock means including a plurality of lock mechanisms, a first lock mechanism including the first movable lock member, and a second lock mechanism including a second lock member movable to and from a position preventing movement of the second block means.

7. Bolt and lock construction for a vault door and the like, as set forth in claim 6, and in which the first block means is operatively mounted on the lock mounting plate, and the second block means is operatively mounted on the bolt bar mounting member.

8. In vault door construction including members forming a door frame engirdling an opening, a door, hinge means mounting the door on the frame, the door fitting in the door opening when the door is closed, the door frame including a longitudinally extending member and the door including a longitudinally extending member aligning with the door frame longitudinally extending member when the door is closed, the combination including portions of one of the longitudinally extending members forming a laterally opening longitudinally extending groove, a longitudinally extending bolt bar, bolt bar mounting and positioning means operatively mounting the bolt bar on the other longitudinally extending member, said bolt bar mounting and positioning means including a set of two longitudinally spaced hanger and guide members extending laterally from the bolt bar away from the grooved member, each of said hanger and guide members having an upper and lower laterally extending surface and having a laterally extending notch formed therein intermediate said upper and lower surfaces, a set of studs mounted on the bolt bar mounting member, one of said studs being received through each of the hanger and guide member notches with said hanger and guide members being laterally movable with respect to said studs within the limits of said notches, retainer plates mounted on each of said studs spaced from the bolt bar mounting member retaining the hanger and guide members between said retainer plates and the bolt bar mounting member, longitudinally spaced supporting rollers operably mounted on the bolt bar mounting member, one of said rollers underlying each of the hanger and guide member lower laterally extending surfaces for supporting one of the hanger and guide members thereon, the bolt bar being alternately laterally movable toward the grooved member to an extended position and away from the grooved member to a retracted position, the bolt bar fitting in the groove when the door is closed and the bolt bar is in the extended position, and the bolt bar being withdrawn from the groove when the bolt bar is in the retracted position, two stop members on the bolt bar, block means for each stop member, each block means being movable between two positions, lock means for each block means, each lock means including a movable member, one of the lock means movable members having a connection with its associated block means, and each lock means movable member being selectively movable to alternately position its associated block means in one position relative to its associated stop member and stopping the bolt bar in its extended position and in another position relative to its associated stop member and permitting retraction of the bolt bar from the groove.

9. In vault door construction including members form-

ing a door frame engirdling an opening, a door, hinge means mounting the door on the frame, the door fitting in the door opening when the door is closed, the door frame including a longitudinally extending member and the door including a longitudinally extending member aligning with the door frame longitudinally extending member when the door is closed, the combination including portions of one of the longitudinally extending members forming a laterally opening longitudinally extending groove, a longitudinally extending bolt bar, bolt bar mounting and positioning means operatively mounting the bolt bar on the other longitudinally extending member, the bolt bar being alternately laterally movable toward the grooved member to an extended position and away from the grooved member to a retracted position, the bolt bar fitting in the groove when the door is closed and the bolt bar is in the extended position, and the bolt bar being withdrawn from the groove when the bolt bar is in the retracted position, two stop members on the bolt bar, block means for each stop member, each block means being movable between two positions, lock means for each block means, each lock means including a movable member, one of the lock means movable members having a connection with its associated block means, said connection including a lock link pivotally mounted on the lock means and having an inclined slot formed therein, a lock lever pivotally connected to said lock link through a pin received in said lock link slot, said lock lever having an upwardly opening notch formed therein laterally spaced from the connection of said lock lever to said lock link, a pin received in said lock lever notch and connected to said one lock means associated block means, a latch hook pivotally mounted on said lock lever normally engaged with said pin retaining said pin in said notch, and each lock means movable member being selectively movable to alternately position its associated block means in one position relative to its associated stop member and stopping the bolt bar in its extended position and in another position relative to its associated stop member and permitting retraction of the bolt bar from the groove.

10. In vault door construction including members forming a door frame engirdling an opening, a door, hinge means mounting the door on the frame, the door fitting in the door opening when the door is closed, the door frame including a longitudinally extending member and the door including a longitudinally extending member aligning with the door frame longitudinally extending member when the door is closed, the combination including portions of one of the longitudinally extending members forming a laterally opening longitudinally extending groove, a longitudinally extending bolt bar, bolt bar mounting and positioning means operatively mounting the bolt bar on the other longitudinally extending member, said bolt bar mounting and positioning means including a two-arm lever plate pivotally connected to the bolt bar and pivotally connected to another portion of the bolt bar mounting and positioning means, a shaft journalled in and extending through the bolt bar mounting member connected to the lever plate intermediate the ends of said shaft, the bolt bar mounting member having a rear face and a front face, the bolt bar mounting and positioning means and the bolt bar being located on the rear face of the bolt bar mounting member, the shaft having a handle beyond the front face of the bolt bar mounting member and another handle beyond the rear face of the bolt bar mounting member, the bolt bar being alternately laterally movable toward the grooved member to an extended position and away from the grooved member to a retracted position, the bolt bar fitting in the groove when the door is closed and the bolt bar is in the extended position, and the bolt bar being withdrawn from the groove when the bolt bar is in the retracted position, two stop members on the bolt bar, block means for each stop member, each block means being movable between two positions, lock means for each block means, each lock means including a movable member, one of the lock means movable members having a connection with its associated block means, said connection including a lock link pivotally mounted on the lock means and having an inclined slot formed therein, a lock lever pivotally connected to said lock link through a pin received in said lock link slot, said lock lever having an upwardly opening notch formed therein laterally spaced from the connection of said lock lever to said lock link, a pin received in said lock lever notch and connected to said one lock means associated block means, a latch hook pivotally mounted on said lock lever normally engaged with said pin retaining said pin in said notch, and each lock means movable member being selectively movable to alternately position its associated block means in one position relative to its associated stop member and stopping the bolt bar in its extended position and in another position relative to its associated stop member and permitting retraction of the bolt bar from the groove.

11. In vault door construction including members forming a door frame engirdling an opening, a door, hinge means mounting the door on the frame, the door fitting in the door opening when the door is closed, the door frame including a longitudinally extending member and the door including a longitudinally extending member aligning with the door frame longitudinally extending member when the door is closed, the combination including portions of one of the longitudinally extending members forming a laterally opening longitudinally extending groove, a longitudinally extending bolt bar, bolt bar mounting and positioning means operatively mounting the bolt bar on the other longitudinally extending member, the bolt bar being alternately laterally movable toward the grooved member to an extended position and away from the grooved member to a retracted position, the bolt bar fitting in the groove when the door is closed and the bolt bar is in the extended position, and the bolt bar being withdrawn from the groove when the bolt bar is in the retracted position, two stop members on the bolt bar, one of said stop members extending laterally from the bolt bar away from the grooved member, said one stop member having a notch formed therein opening laterally away from the grooved member, block means for each stop member, each block means being movable between two positions, a vertically extending guide member secured on the bolt bar mounting member laterally spaced from said one stop member, the block means associated with said one stop member constituting a block vertically reciprocally mounted in the guide member and movable to and from a position not aligned with said one stop member notch in blocking alignment with said one stop member and to and from a position aligned with said one stop member notch and receivable in said notch when the bolt bar is moved laterally away from the grooved member, lock means for each block means, each lock means including a movable member, one of the lock means movable members connected with the reciprocally mounted block, and each lock means movable member being selectively movable to alternately position its associated block means in one position relative to its associated stop member and stopping the bolt bar in its extended position and in another position relative to its associated stop member and permitting retraction of the bolt bar from the groove.

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