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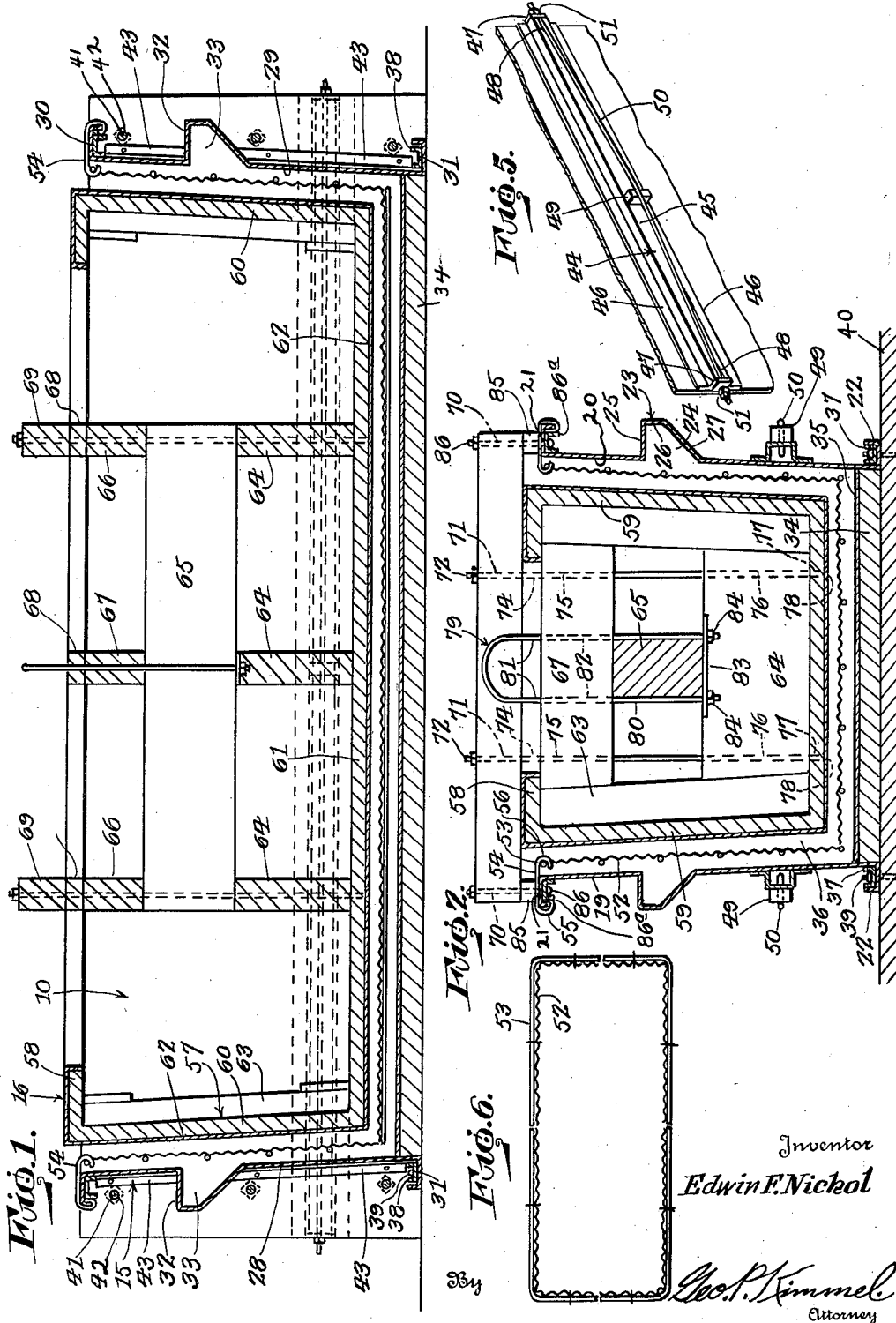
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2,068,302

MOLDING APPARATUS

Filed Sept. 16, 1935

3 Sheets-Sheet 1



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Fig. 7.

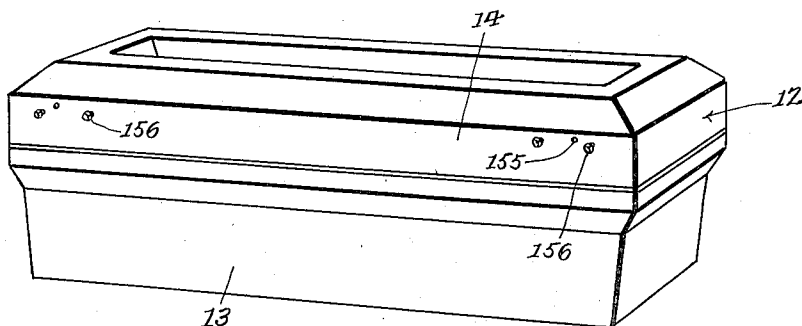


Fig. 8.

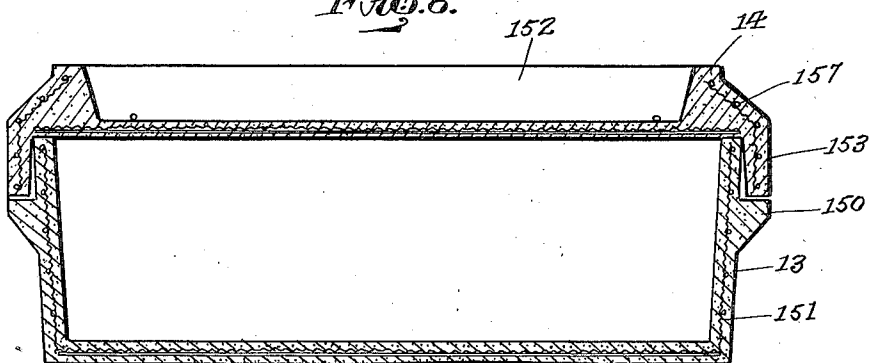
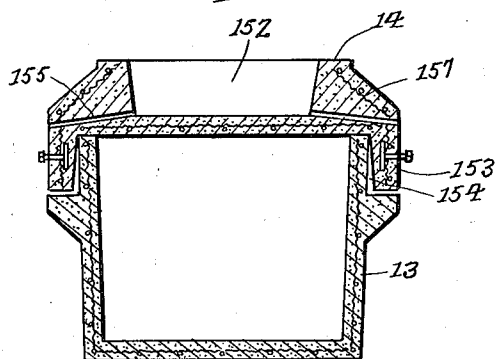


Fig. 9.



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UNITED STATES PATENT OFFICE

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MOLDING APPARATUS

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4 Claims. (Cl. 25—130)

This invention relates to a molding apparatus.

The object of the invention is to provide, in a manner as hereinafter set forth an apparatus of the class referred to for producing a metallic reinforced concrete structure.

A further object of the invention is to provide, in a manner as hereinafter set forth an apparatus of the class referred to for producing the body and lid sections of a burial vault of metallic reinforced concrete.

A further object of the invention is to provide, in a manner as hereinafter set forth an apparatus of the class referred to for producing a metallic reinforced concrete structure with the reinforcement in the form of a reticulated basket carrying angle-shaped bars and with the points of emergence of the stretches or legs of the bars disposed at the corners of the basket.

A further object of the invention is to provide, in a manner as hereinafter set forth, an apparatus for the purpose referred to including a pair of elements for forming a pair of molding chambers, and each of said elements being provided with means to prevent the leakage of the material being molded during the molding operation.

Further objects of the invention are to provide, in a manner as hereinafter set forth, an apparatus for the purpose referred to which is strong, durable, readily assembled, thoroughly efficient in its use and having the elements thereof conveniently handled when occasion requires.

A further object of the invention is to provide, in a manner as hereinafter set forth a molding apparatus including a pair of knock down elements for forming a pair of molding chambers, a pair of cores for suspension in said chambers and each of the cores being in the form of a unitary body for bodily positioning in and removal from one of said chambers. One of said elements and one of the cores associated to produce a metallic reinforced concrete body section of a burial vault and the other element and core associated to produce a metallic reinforced concrete lid section for the body section of the vault.

With the foregoing and other objects which may hereinafter appear the invention consists of the novel construction, combination, and arrangement of parts as will be more specifically described, and are as illustrated in the accompanying drawings wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings:

Figure 1 is a longitudinal sectional view of that structure of the apparatus for molding the body section of the burial vault,

Figure 2 is a cross sectional view of the structure shown in Figure 1,

Figure 3 is a longitudinal sectional view of that structure of the apparatus for molding the lid section for the body section of the burial vault,

Figure 4 is a cross sectional view of the structure shown in Figure 3,

Figure 5 is a perspective view of the form of reinforcement employed for each of the outer wall members of the structure shown in Figure 1,

Figure 6 is a top plan view of the metallic reinforcing unit for the body and lid sections of the burial vault,

Figure 7 is a perspective view, Figure 8 is a longitudinal sectional view and Figure 9 is a cross sectional view of the burial vault produced by the apparatus.

The apparatus includes a pair of molding structures 10, 11 for producing a burial vault 12 (Figures 7, 8 and 9) formed of an open top peripherally ribbed body section 13 and an open top flanged closure or lid section 14 for the section 12. Each of the said sections consists of a molded metallic reinforced concrete body.

The structure 10 includes a molding chamber-forming element 15 and a core 16 associated with the latter. The structure 11 includes a molding chamber-forming element 17 and a core 18 associated with the latter. When structure 10 is employed for molding vault section 13 there is associated therewith any suitable means, not shown, for vibrating it to provide for the settling and proper distribution of the concrete throughout the molding chamber provided by element 15. When structure 11 is employed for molding vault section 14 there is associated therewith any suitable means, not shown, for vibrating it to provide for the settling and proper distribution of the concrete throughout the molding chamber provided by element 17.

With reference to structure 10, the element 15 thereof includes a pair of oppositely disposed outwardly inclined side wall forming members 19, 20 of like construction. Each of said members consists of a rectangular sheet of metallic material of the desired gauge, width and length. The top of each of said members is formed with an outwardly bent downwardly flanged part 21 to provide a combined support and coupler of the same length as that of the member. The

bottom of each of said members is formed with an outwardly bent upwardly flanged part 22 to provide an abutment. Each of said members between its top and bottom is lengthwise outset to form a laterally disposed hollow extension 23 to provide a groove 24 forming a continuation of the molding chamber to be referred to. The groove 24 is closed at each end. The ends of the groove 24 are spaced inwardly adjacent the ends of the member in which it is formed. The extension is formed with a flat top part 25, a vertical outer side part 26 and a bottom part 27 which depends at an inward inclination from the bottom of part 26.

The element 15 includes a pair of oppositely disposed outwardly inclined end wall forming members 28, 29 of like construction. Each of the end members consists of a rectangular sheet of metallic material of the desired gauge, width and height. The top of each of the end members is formed with an outwardly bent downwardly flanged part 30 to provide a combined support and coupler corresponding in length to the width of that of the member. The bottom of each of the end members is formed with an outwardly bent upwardly flanged part 31 to provide an abutment. Each end member between its top and bottom is outset transversely to form a laterally disposed hollow extension 32 to provide a groove 33 forming a continuation of the molding chamber to be referred to. The extensions 32 are of the same contour as that of the extensions 23. Each extension 32 terminates at the side edge of the end member of which it forms a part. The groove 33 is open at each end. The position of the extensions on the end members corresponds to the position of the extensions on the side members.

The element 15 includes a rectangular bottom member 34 having a metallic liner 35 throughout its upper face and flush with the edges thereof. The member 34 has its edges outwardly inclined throughout from its lower face. The side wall forming members have their lower portions about the side edges of the bottom member 34. The side wall forming members are of greater length than that of and extend laterally from the ends of the side edges of member 34. The end wall forming members correspond in width to the length of the end edges of member 34 and have their lower portions about the said end edges and are flush with the side edges of member 34. The side edges of the end wall forming members about the inner faces of the side wall forming members when the said several wall forming members are coupled together to provide a molding chamber 36. The lined member 34 provides the bottom of chamber 35. When the said several wall forming members are coupled together the grooves 33 open into the grooves 24 and the ends of the extensions 32 about the ends of the extensions 23 whereby the grooves 24, 33 form an endless continuation of the chamber 35.

The element 15 includes channel irons 37, 38 mounted in the parts 22, 31 respectively, and extending through said parts and irons are holdfast means 39 for detachably securing the side and end wall forming members to a support 40 upon which is mounted the bottom forming member 35. The holdfast means 39 also maintains the several wall forming members in abutting relation with respect to the edges of member 35. The parts 22, 31 seat on the support 40.

The side wall forming members inwardly ad-

jacent their ends are provided with superposed openings 41 for the passage of tie-elements 42 for detachably coupling said members together and for maintaining the side members in abutting relation with respect to the side edges of the end members.

To prevent leakage of the molding material at the joints between the side and end wall forming members during the molding operations, the inner faces of the members 19, 20 have anchored thereto angle irons 43 which overlap the outer faces of the members 28, 29 at the sides of the latter.

To prevent the bulging of the side wall forming members 19, 20 below the extensions 23 during the molding operation, there is secured lengthwise of the outer face of each of said members a reinforcing element 44 (best shown in Figure 3) consisting of an inwardly opening channel iron 45 provided with side flanges 46 and apertured end closures 47. The ends of the body of iron 45 are cutout as at 48. Integral with the outer side of iron 45 centrally thereof is a laterally disposed lug 49. Extending through the cutouts 48 and closures 47 and mounted against lug 49 is a truss brace 50 in the form of a rod having threaded terminal portions with which engage securing nuts 51 adapted to abut the outer faces of the closure 47. The flanges 46 are anchored to the outer face of a side wall forming member.

The metallic reinforcing unit for and which is to be embedded in the concrete providing the body section 13 of the vault 12 consists of a rectangular metallic basket 52 formed of reticulated material and superposed angle-shaped bars 53 arranged in spaced relation and connected to the outer face of the basket. The points of jointure between the legs or stretches of a bar oppose a corner of the basket. The manner in which the bars are disposed relative to the basket is shown in Figure 6. The structure 10 includes removable means for suspending the concrete reinforcing element within the molding chamber 36 adjacent the bottom and side and end walls of the latter. The said means consists of spaced removable hooks 54 mounted on the parts 21 of the members 19, 20 and on the parts 30 of the members 28, 30. Each hook has depending curved end portions 55, 56 formed to detachably overlap respectively the flange of a part 21 or 30 and a bar 53. The hooks 54 are of a length to extend inwardly beyond the side and end walls of chamber 36 when suspending the basket 52.

The core 16 of structure 10 is hollow and includes a rectangular open top body part 57 formed at its top with an inwardly extending flat rectangular endless flange 58. The body part 57 includes a pair of oppositely outwardly inclined sides 59, a pair of oppositely outwardly inclined ends 60 and a flat rectangular bottom 61. Secured to said body part 57 throughout the outer faces of its sides 59 and ends 60, the upper face and inner edge of the flange 58 and the lower face of bottom 61 is a metallic facing 62. Within the body part 57 and arranged at its sides and ends are brace bars 63. Mounted upon the bottom 61 are three spaced parallel upstanding supports 64. Arranged on the upper end of the supports 64 is a longitudinally extending coupler bar 65 disposed on the lengthwise median of body part 57. Positioned on the ends of the bar 65 are upstanding supports 66 and on the center of bar 65 an upstanding

support 67. The supports, 66, 67, are arranged in parallel spaced relation and abut the lower faces of the flange 58. Arranged on the supports 66, 67 between the inner edge of flange 58 are three filler strips 68 which align with the upper face of that portion of the facing 62 mounted on flange 58. The core 16 includes a pair of spaced parallel suspension bars 69 therefor which are disposed transversely of and are of greater length than the width of body part 57. The bars 69 are formed with outer vertical openings 70 in close proximity to the ends thereof and inner vertical openings 71 between the openings 70 and the vertical medians of the bars. The bottom 61, outer supports 64, bar 65, supports 66, outer strips 68 and suspension bars 69 are clamped together by spaced parallel tie means 72 extending through the openings 71, openings 74 in the outer filler strips, openings 75 in the supports 66, openings 76 in the outer supports 64, openings 77 in the bottom 61 and countersunk in openings 78 in the facing 62. The central support 64 is suitably anchored to body part 57. The core 16 includes a lifting element 79 therefor which includes an upstanding inverted yoke 80 having its sides extending through openings 81 in the central filler strip, openings 82 in the support 67 and are arranged at the sides of and depend below the bar 65. Positioned against the bottom of bar 65 is a plate 83 formed with openings for the passage of the sides of the yoke. Carried on the lower ends of the sides of the yoke 80 are securing nuts 84. When the core 16 is suspended within the element 15 it is detachably anchored thereto and in this connection it will be stated that the bars 69 are supported at their ends upon apertured spaced blocks 85 mounted on the parts 21 of the members 19, 20 adjacent the hooks 54. The means for detachably anchoring the core to the element 15 consists of spaced holdfast devices 86 extending through the openings 70 in bars 69, through the apertured blocks 85, through the parts 21 of the members 19, 20 and through inverted channel irons 86 arranged below and confined in the said parts 21 inwardly adjacent the depending outer ends 55 of the hooks 54.

The element 17 of structure 11 includes a pair of oppositely disposed side wall forming members 87, 88 and a pair of oppositely disposed end wall forming members 89, 90. Each of said side wall forming members is constructed from a rectangular sheet of metallic material of the desired gauge, width and length. Each of said end wall forming members is constructed from a sheet of metallic material of the desired gauge, width and height. The side members are of like construction and each consists of a vertical top portion 91, an inwardly inclined intermediate portion 92 depending from the portion 91 and a vertically disposed lower portion 93 of materially less height than the portion 91. The upper end of the latter is formed with an outwardly bent downwardly flanged part 94 forming a combined coupler and support. The lower end of portion 93 is provided with an outwardly bent upwardly flanged part 95 providing a combined retainer and abutment. The end members are of like construction and each consists of a vertical top portion 96, an inwardly inclined intermediate portion 97 depending from the portion 96 and a vertically disposed lower portion 98 of materially less height than the portion 96. The upper end of the latter is formed with an

outwardly bent downwardly flanged part 99 providing a combined coupler and support. The lower end of the portion 98 is provided with an outwardly bent upwardly flanged part 100 forming a combined retainer and abutment. The parts 95, 100 are mounted upon a rectangular frame 101 which is seated upon a support 102 for structure 11. The frame 101 has its upper face provided throughout with a metallic facing 103. Mounted on the facing 103 as well as being suitably secured therewith is an inverted hollow frusto tapered rectangular upstanding member 104 having its inner side and upper face formed throughout with a metallic facing 104^a. The latter and frame 103 in connection with a portion of the facing 103 and a portion of the frame 101 provide the bottom of the molding chamber 105. The side and end walls of the latter are formed respectively by the said side and end members. The end members 89, 90 are arranged between, abut the inner faces of and are positioned inwardly adjacent the ends of the side members 87, 88. The portions 91, 92 and 93 of the members 87, 88 abut the end edges respectively of the portions 96, 97 and 98 of the members 89, 90. To prevent leakage of the molding material at the joints between the members 87, 88, 89 and 90 the inner faces of the members 87, 88 have secured thereto angle irons 106 which overlap the outer faces of the members 87, 90 bordering the side edges of the latter. The members 87, 88, 89 and 90 are detachably held in abutting engagement by a pair of upper tie devices 107 and a pair of lower tie devices 108. The upper tie devices are arranged at and extend through the portions 91 of members 87, 88 outwardly adjacent the portions 96 of the members 89, 90. Positioned against the outer faces of the portions 92 of the members 87, 88 are spaced triangular-shaped apertured blocks 109. The lower tie devices 108 extend through the blocks 109 and the portions 92 of the members 87, 88 outwardly adjacent the portions 97 of the members 89, 90.

The metallic reinforcing means for the concrete forming the lid section 14 of the burial vault 13 consists of a rectangular metallic frame 110 of reticulated material formed with a flared lower portion 111. Arranged at the point of merge of the upper end of the lower portion 111 with the bottom of the remaining portion of the frame 110 is a partition 112 formed of a reticulated metallic material. The frame 110 is encompassed by metallic reinforcing bars 113 of angle-shape arranged in the same manner relative to the frame 110 as the reinforcing bars are arranged with respect to the basket heretofore referred to, that is the manner in which the bars and basket are arranged relatively to each other as shown in Figure 6. The bars 113 are connected to the frame 110. Positioned against the lower face of and connected to partition 112 are spaced metallic reinforcing bars 114. The frame 110 is suspended in the chamber 105 in spaced relation with respect to the members 87, 88, 89 and 90 by means corresponding in arrangement and structure as the suspension for the basket shown in Figures 1 and 2. The suspension means shown in Figures 3 and 4 are indicated at 115. The parts 95 and 99 are anchored to the frame 101 by the holdfast devices 116 extending through the said parts, through the facing in frame 101 and engaging in the latter.

The core 18 of the structure 11 comprises a

hollow open top rectangular body part 117 formed at its top with an inwardly extending flat endless rectangular flange 118. The body part 117 includes a bottom 119, a pair of outwardly oppositely inclined sides 120 and a pair of outwardly oppositely inclined ends 121. The body part 117 is reinforced at sides and ends by upstanding braces 122 which extend from bottom 119 to flange 118. Extending throughout the outer faces of the sides and ends, the upper face and inner edge and lower faces of the bottom of body portion 117 is a metallic facing 119^a. Disposed transversely of and within body part 117 is a pair of spaced parallel upstanding supports 123 which are disposed between opposite sides of the transverse median of and the ends of body part 117. Positioned at its ends upon the supports 123 is a coupler bar 124 extending lengthwise of body part 117. Disposed transversely of, above and of greater length than the width of body part 117 is a pair of spaced parallel suspension bars 125 having a pair of outer vertical openings 126 adjacent their ends and a pair of inner vertical openings 127 spaced inwardly from the openings 126. The bars 125 are seated on spaced apertured supports 128 mounted on the parts 94 of the members 87, 88 adjacent the means 115 on such parts 94. Extending through the openings 127 in bars 125, openings 129 in bar 124, openings 131 in bottom 119 and countersunk in the facing 119^a are spaced tie devices 132 for clamping together body part 117, supports 123, bar 124 and bars 125 together to form bodily movable unit.

The core 18 includes a shifting element 133 for positioning it within and removing it from the element 17. The element 133 includes an inverted yoke 134 having its sides arranged at the sides and depending below the bottom of bar 124. Mounted on the lower ends of the sides of yoke 134 is an apertured coupling plate 135 secured on yoke 134 by the holding nuts 136.

When the bars 125 are mounted on the blocks 128, the core 18 is suspended in the element 17 in spaced relation to the sides, ends and bottom of the chamber 105, and it is also spaced from the frame 110 and partition 112. The core 18, when suspended in element 17 is detachably anchored to the latter and to the support 101. For the purpose four tie devices 137 are employed. A pair is associated with each bar 125. Each device 137 consists of a pair of rods 138, 139. The rod 138 has a loop 140 at its lower end. The rod 139 has a loop 141 at its upper end. The loops 140, 141 are interengaged for loosely connecting the rods 138, 139 together. The upper end of rod 138 is threaded. The lower end of rod 139 is threaded. The rods 138 extend through the openings 126 in bars 125, through the apertured blocks 128, the parts 94 of members 87, 88, and channel irons 142 arranged below and within the parts 94. The rods 139 extend through the support 101. The upper ends of rods 138 carry securing nuts 143. The lower ends of bars 139 carry securing nuts 144 which coact with the nuts 143 for maintaining the tie devices 137 in position to detachably anchor element 17 and core 18 together and to detachably anchor structure 11 to support 102.

The element 17 includes four spaced short rods 145, only two shown, which extend from the side wall forming members 87, 88 to the facing 134^a of the member 104. These rods 145 are suitably secured in position and have their inner ends positioned substantially in relation to the corners

of member 104. The rods 145 incline downwardly from their outer to their inner ends.

The lid section 14 of the vault 12 is to have anchored therein couplers for detachably connecting to said section a lowering means, not shown and for such purpose a pair of spaced parallel coupling elements 146, only one shown, is arranged in each side of the chamber 105. Each element 146 includes a body part 147 formed with a pair of outwardly extending spaced parallel stems 148, only one shown which have threaded outer portions for receiving nuts 149 for detachably connecting with the lowering device. The body part is positioned against the inner face of frame 110 above the tapered lower portion of the latter. The stems 148 extend through the frame 110 across chamber 105 and through members 87, 88.

The body section 13 of the vault 12 has its sides and ends formed with laterally extended ribs 150 between the upper and lower ends thereof. The sides of the section 13 are oppositely outwardly inclined. The ends of the section 13 are oppositely outwardly inclined. The metallic reinforcing means for the section 13 of the vault is designated at 151 and is embedded in the sides, ends and bottom of said section. The ribs 150 on the section 13 are formed by the grooves 24, 33 in the side and end wall forming members of chamber 36.

The lid section 14 of the vault is formed in its top with an enlarged rectangular cavity 152 provided by the member 104. The lid section 14 is formed with a depending rectangular flange 153 which is to oppose section 13, in a manner as shown in Figures 8 and 9 to form a tapered recess or space 154. The flange 153 does not extend to the ribs 150. The flange 153 is formed by the portions 91 of the side members 87, 88 and the portions 96 of the side members 89, 90. The lid section includes drainage openings 155 for cavity 152 which are provided by the bars 145 of element 17. The means for detachably connecting a lower device to lid section are arranged in and project from the sides of the flange 153 and are indicated at 156 Figure 7. The metallic reinforcing means for lid section 14 and designated at 157 is disposed throughout the flange 153 and arranged around the side and ends of and below the bottom of cavity 152.

What I claim is:

1. In a molding apparatus, a pair of end walls, a pair of side walls abutting and extended outwardly from the side edges of the end walls, a bottom coacting with said walls providing a molding chamber, each of said walls at its top being formed with an outwardly directed angle-shaped part having a horizontal leg and a vertical leg depending from said other leg and constituting a combined support and coupler, spaced elements seated on, disposed transversely of, extending inwardly from and inter-engaging with the vertical legs of said parts constituting means for suspending a metallic reinforcing unit within said chamber in spaced relation to the inner faces of said walls and bottom, outwardly directed flanges at the lower ends of said walls, means coacting with said flanges for detachably maintaining said walls upstanding, tie devices extending through and coacting with the extended portions of the side walls for detachably maintaining the inner faces of the side walls against the side edges of the end walls, spaced upstanding supports mounted on the said parts of said side walls, a core for suspension in said

chamber in spaced relation to said unit and provided with suspension bars seated on said spaced supports, and means for detachably clamping said bars, spaced supports and said parts of said side walls together.

2. In a molding apparatus, a pair of end walls, a pair of side walls abutting and extended outwardly from the side edges of the end walls, a bottom coacting with said walls providing a molding chamber, each of said walls at its top being formed with an outwardly directed angle-shaped part having a horizontal leg and a vertical leg depending from said other leg and constituting a combined support and coupler, each of said walls between its top and bottom being formed with an outwardly directed, hollow extension forming a groove providing an outward continuation of said chamber at the sides and ends of said chamber, the grooves in the end walls opening into the grooves of the side walls, spaced elements seated on, disposed transversely of, extending inwardly from and inter-engaging with the vertical legs of said parts constituting means for suspending a metallic reinforcing unit within said chamber in spaced relation to the inner faces of said walls and bottom, outwardly directed flanges at the lower ends of said walls, means coacting with said flanges for detachably maintaining said walls upstanding, tie devices extending through and coacting with the extended portions of the side walls for detachably maintaining the inner faces of the side walls against the side edges of the end walls, spaced upstanding supports mounted on the said parts of said side walls, a core for suspension in said chamber in spaced relation to said unit and provided with suspension bars seated on said spaced supports, and means for detachably clamping said bars, spaced supports and said parts of said side walls together.

3. In a molding apparatus, a pair of end walls, a pair of side walls abutting and extended outwardly from the side edges of the end walls, a bottom coacting with said walls providing a molding chamber, each of said walls at its top being formed with an outwardly directed angle-shaped part having a horizontal leg and a vertical leg depending from said other leg and constituting a combined support and coupler, spaced elements seated on, disposed transversely of, extending inwardly from and inter-engaging with the vertical legs of said parts constituting means for suspending a metallic reinforcing unit within said chamber in spaced relation to the inner faces of said walls and bottom, outwardly directed flanges at the lower ends of said walls, means coacting with said flanges for detachably maintaining said walls upstanding, tie devices ex-

tending through and coacting with the extended portions of the side walls for detachably maintaining the inner faces of the side walls against the side edges of the end walls, spaced upstanding supports mounted on the said parts of said side walls, a core for suspension in said chamber in spaced relation to said unit and provided with suspension bars seated on said spaced supports, means for detachably clamping said bars, spaced supports and said parts of said side walls together, and a reinforcing structure for each side wall to prevent the bulging thereof, said structure being secured to the outer faces of said side walls below the longitudinal medians thereof, disposed lengthwise of such walls and including truss braces.

4. In a molding apparatus, a pair of end walls, a pair of side walls abutting and extended outwardly from the side edges of the end walls, a bottom coacting with said walls providing a molding chamber, each of said walls at its top being formed with an outwardly directed angle-shaped part having a horizontal leg and a vertical leg depending from said other leg and constituting a combined support and coupler, each of said walls between its top and bottom being formed with an outwardly directed, hollow extension forming a groove providing an outward continuation of said chamber at the sides and ends of said chamber, the grooves in the end walls opening into the grooves of the side walls, spaced elements seated on, disposed transversely of, extending inwardly from and inter-engaging with the vertical legs of said parts constituting means for suspending a metallic reinforcing unit within said chamber in spaced relation to the inner faces of said walls and bottom, outwardly directed flanges at the lower ends of said walls, means coacting with said flanges for detachably maintaining said walls upstanding, tie devices extending through and coacting with the extended portions of the side walls for detachably maintaining the inner faces of the side walls against the side edges of the end walls, spaced upstanding supports mounted on the said parts of said side walls, a core for suspension in said chamber in spaced relation to said unit and provided with suspension bars seated on said spaced supports, means for detachably clamping said bars, spaced supports and said parts of said side walls together, and a reinforcing structure for each of said side walls to prevent the bulging of the latter, said structures being arranged below the groove-forming extensions of said side walls, anchored to and disposed lengthwise of the side walls and including truss braces.

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