

March 14, 1933.

J. S. FREDERICK

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CONCRETE FORM

Filed July 31, 1930

6 Sheets-Sheet 1

Fig. 1.

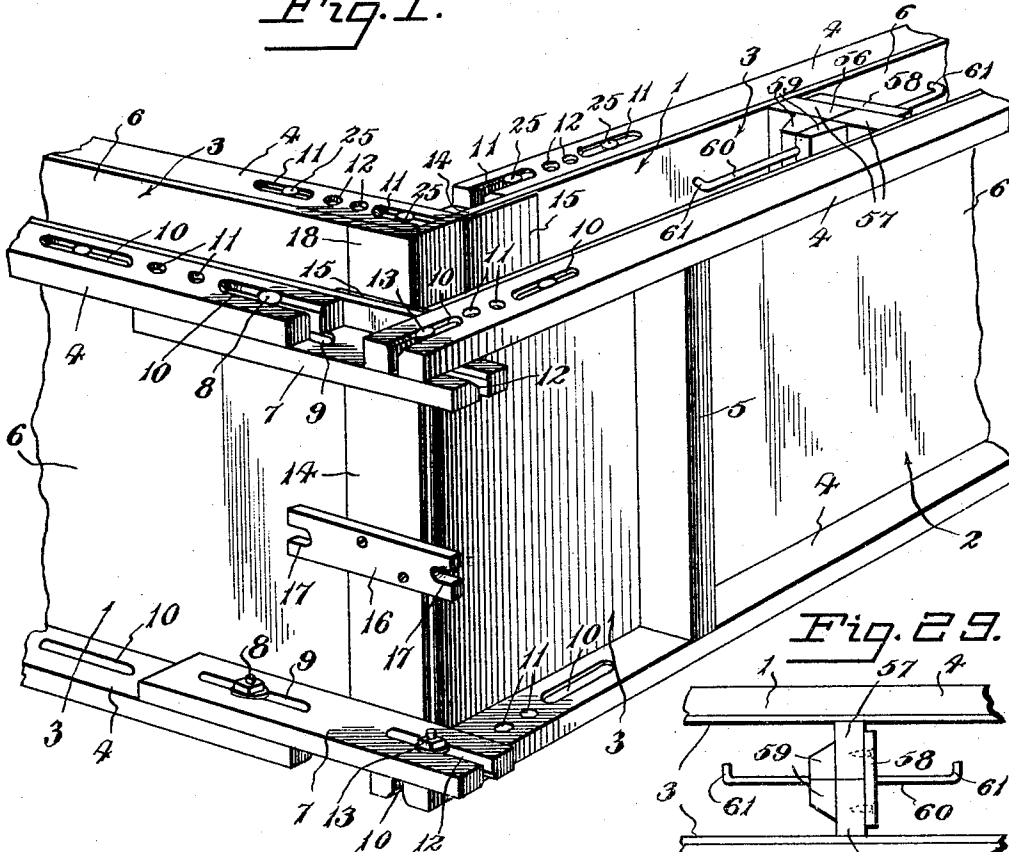


Fig. 29.

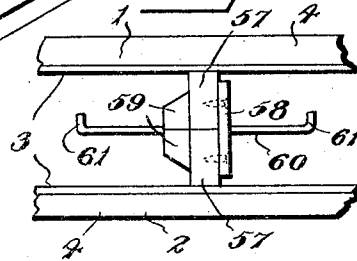


Fig. 2.

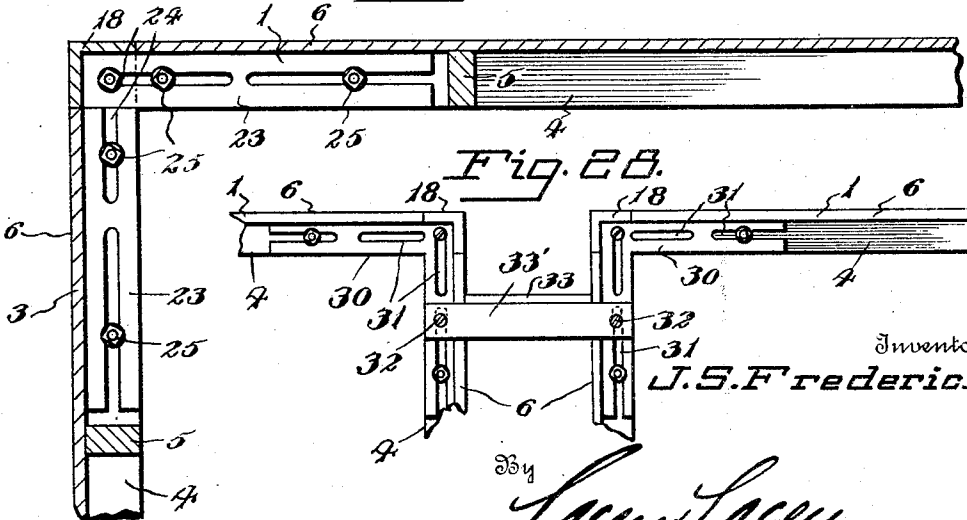


Fig. 28.

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March 14, 1933.

J. S. FREDERICK

1,901,392

CONCRETE FORM

Filed July 31, 1930

6 Sheets-Sheet 2

Fig. 3.

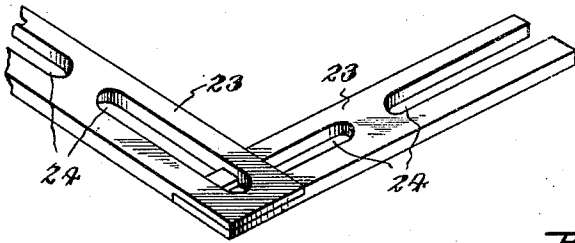


Fig. 4.

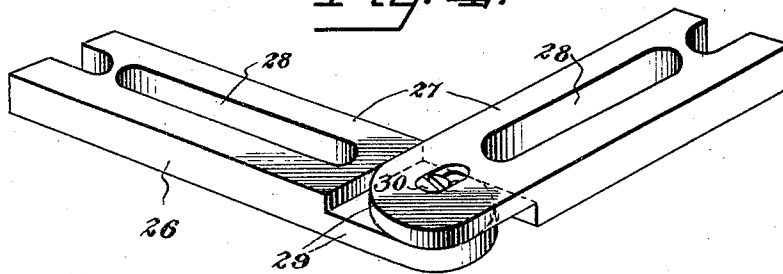


Fig. 5.

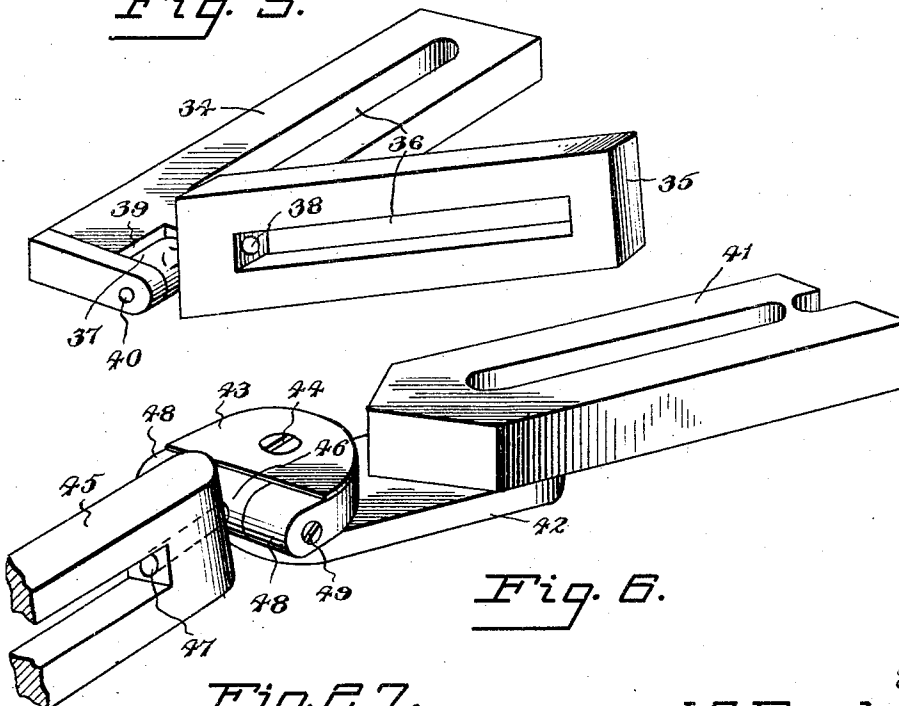


Fig. 6.

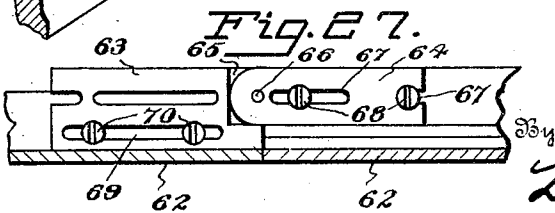
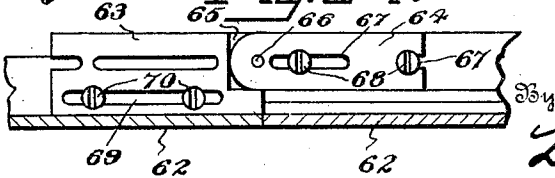


Fig. 7.



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J. S. FREDERICK

1,901,392

CONCRETE FORM

Filed July 31, 1930

6 Sheets-Sheet 3

Fig. 7.

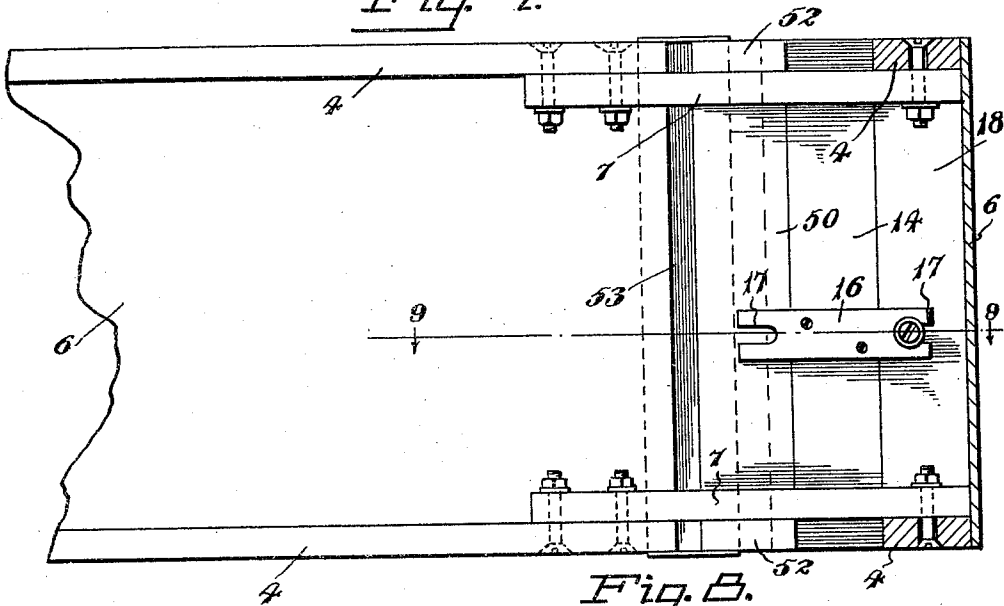


Fig. 8.

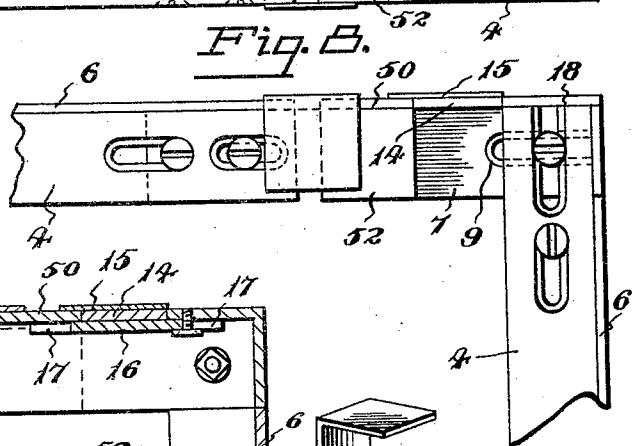


Fig. 9.

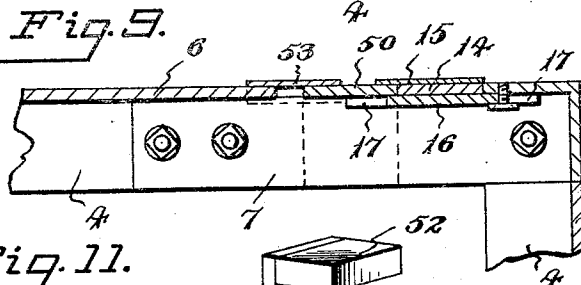


Fig. 11.

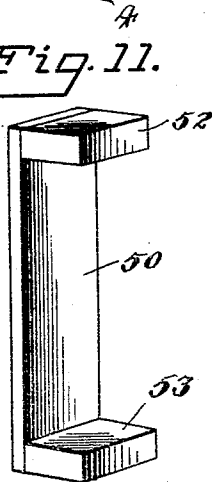


Fig. 12.

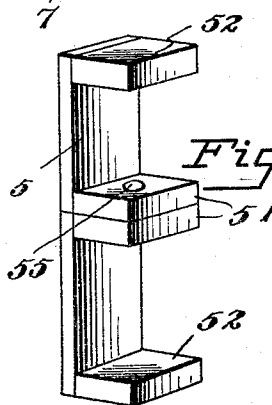
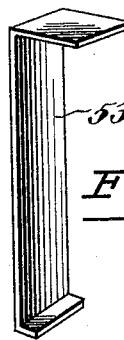


Fig. 10.



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J. S. FREDERICK

1,901,392

CONCRETE FORM

Filed July 31, 1930

6 Sheets-Sheet 4

Fig. 13.

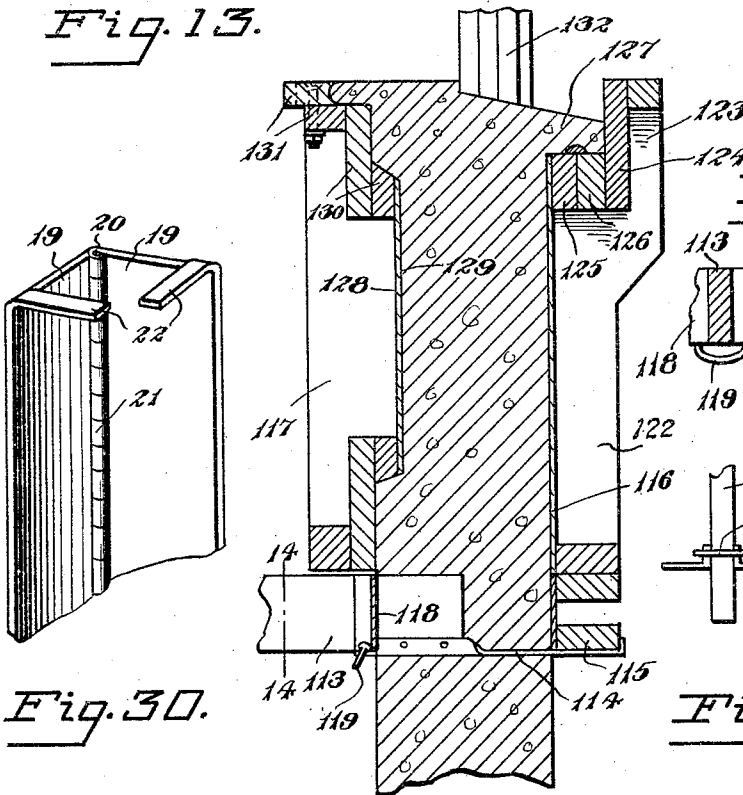


Fig. 14.

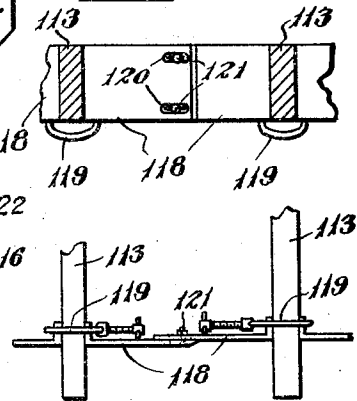


Fig. 30.

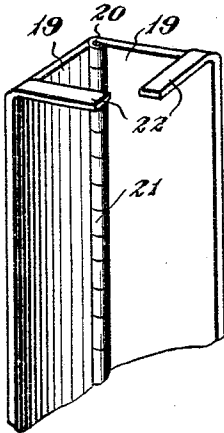


Fig. 15.

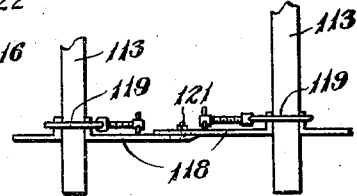


Fig. 16.

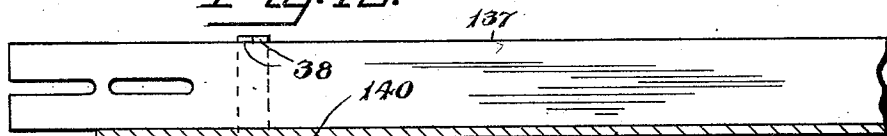
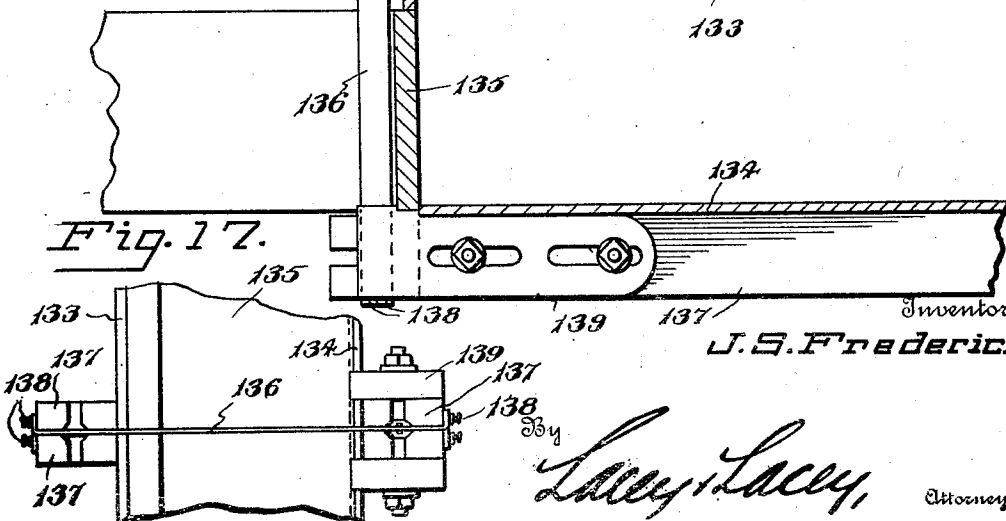


Fig. 17.



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March 14, 1933.

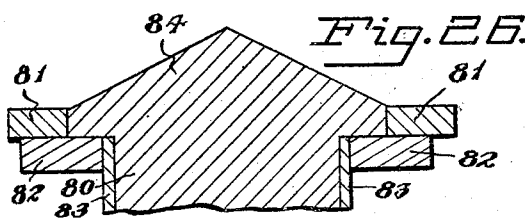
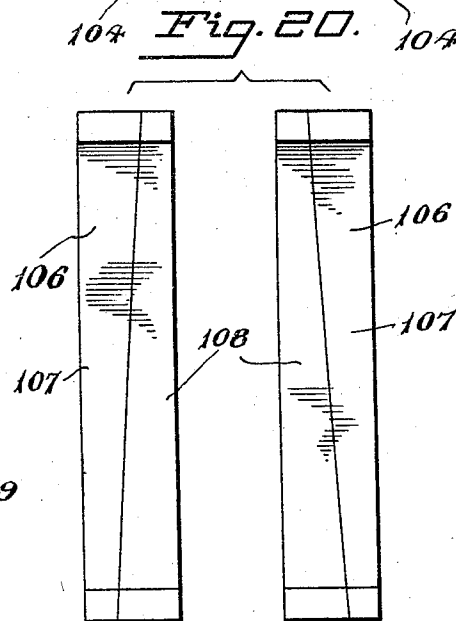
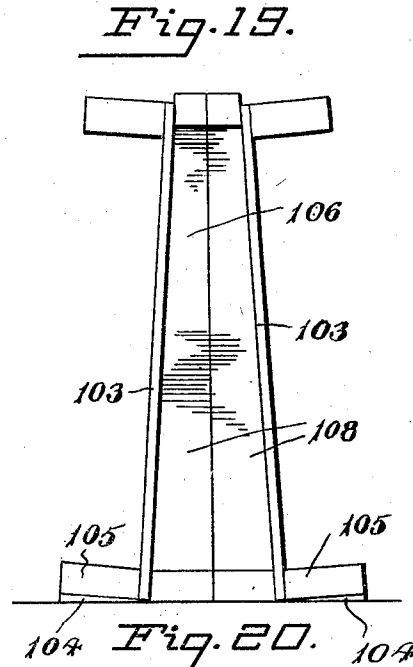
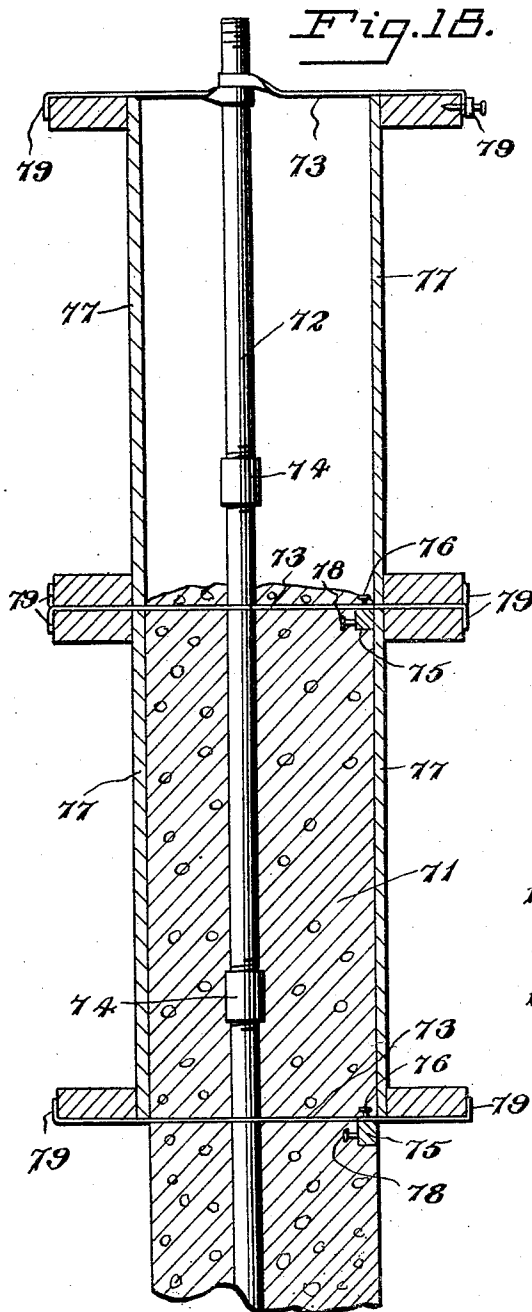
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6 Sheets-Sheet 5



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1,901,392

CONCRETE FORM

Filed July 31, 1930

6 Sheets-Sheet 6

Fig. 21.

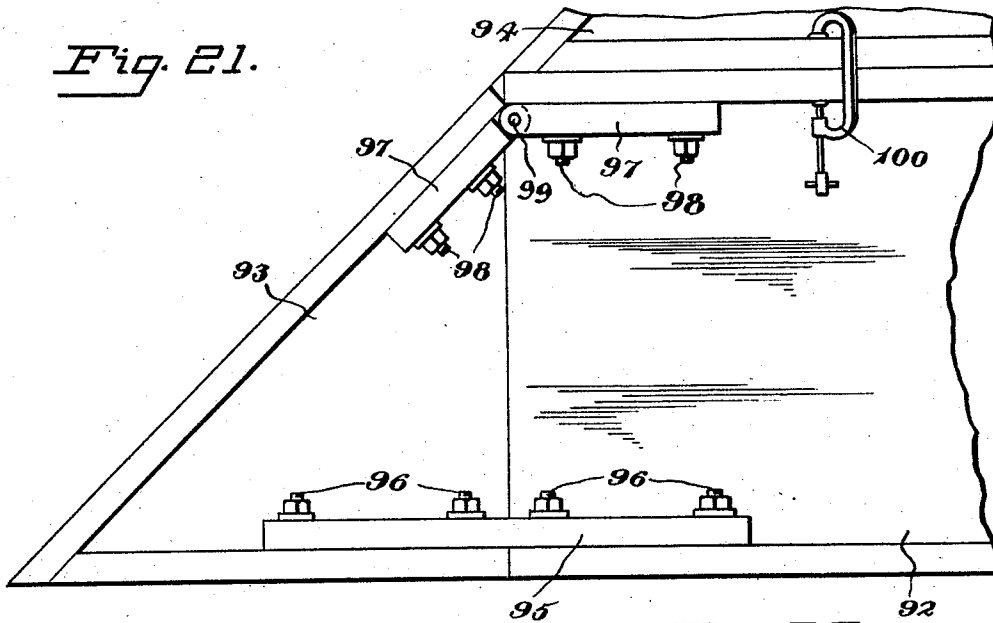


Fig. 22.

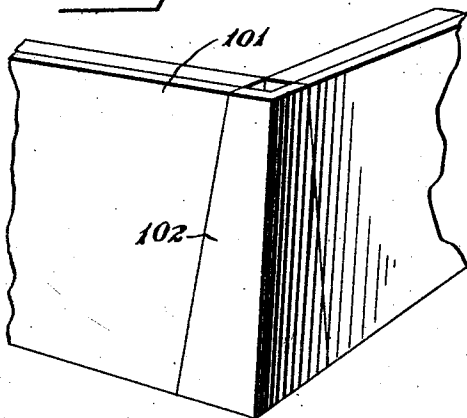


Fig. 23.

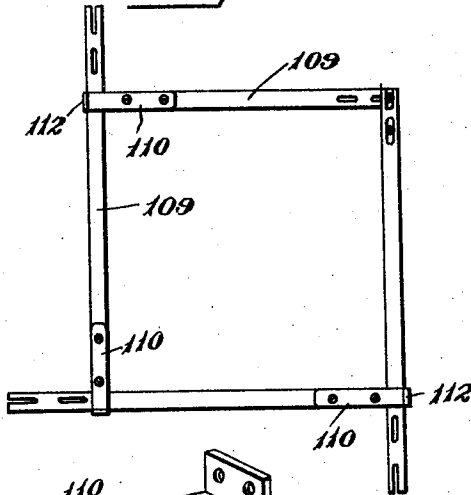


Fig. 25.

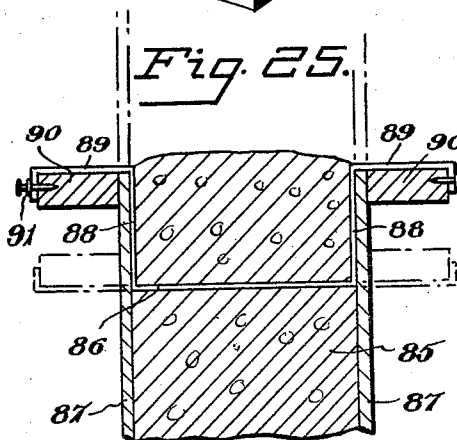
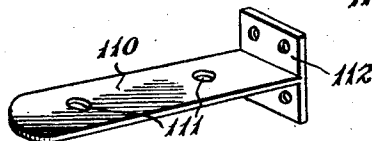


Fig. 24.



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UNITED STATES PATENT OFFICE

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CONCRETE FORM

Application filed July 31, 1930. Serial No. 472,005.

This invention relates to concrete forms and more particularly to molds or forms by use of which buildings of the poured concrete type may be erected.

One object of the invention is to provide a form or mold of the knock-down type which may be very easily erected and through the use of which various parts of a building may be molded and the mold taken apart after the concrete has set and again set up for use.

Another object of the invention is to so form the elements constituting the improved form or mold that they may be used for straight wall sections or for forming corner portions of a building and further to so construct the sections that a corner portion of any angle desired may be molded and also have a portion of a wall being molded extend either perpendicularly or at an incline.

Another object of the invention is to permit a wall to be formed of an even thickness throughout its height or have a portion reduced in thickness towards its top.

Another object of the invention is to so form sections or elements of the mold that they may be used to form either an inside or outside wall of a mold, thereby causing the sections to be interchangeable and facilitating the ease with which a mold may be erected.

Another object of the invention is to provide improved joints for use at corners of a building and to so form these joints that the mold forming sections may be disposed in desired angular relation to each other.

Another object of the invention is to provide the mold with fillers adapted to be set in place in order to form a mold of a desired length in case sections of a regulation length are too long or too short.

Another object of the invention is to not only allow walls to be molded but also partitions of a building and in addition permit doors and windows and inside trim to be provided for.

Another object of the invention is to allow a wall to be firmly braced and in addition

allow nailing strips to be set in place during molding of a wall.

Another object of the invention is to not only allow the forms to be used for molding walls of a building but also permit them to be used for molding chimneys, fire walls and other portions of a building such as posts, columns, floors, roofs or casings for structural beams.

The invention is illustrated in the accompanying drawings, wherein

Figure 1 is a perspective view of a portion of a mold formed in accordance with this invention,

Fig. 2 is a horizontal sectional view through an inner wall of a mold formed in accordance with this invention,

Fig. 3 is a perspective view of a bracket for connecting sections at a corner of the mold,

Fig. 4 is a perspective view of a modified form of corner bracket allowing angular adjustments,

Fig. 5 is a perspective view of another modified form of corner bracket,

Fig. 6 is a perspective view of a corner bracket so constructed that portions thereof may have universal movement relative to each other,

Fig. 7 is a view partially in elevation and partially in section of a modified form of mold wall erected in accordance with this invention,

Fig. 8 is a top plan view of the mold wall shown in Fig. 7,

Fig. 9 is a horizontal sectional view taken on the line 9—9 of Fig. 7,

Fig. 10 is a perspective view of a filler used when erecting the mold shown in Fig. 7,

Fig. 11 is a perspective view of another filler constituting part of the mold shown in Fig. 7,

Fig. 12 is a perspective view of a filler which is somewhat similar to that disclosed in Fig. 11 but of a modified construction,

Fig. 13 is a sectional view showing the manner of erecting a mold to form a window opening and adjoining portions of a wall,

Fig. 14 is a view taken on the line 14—14 of Fig. 13 and showing the manner in which

joists are secured in proper spaced relation during forming of a wall,

Fig. 15 is a bottom plan view of Fig. 14,

Fig. 16 is a sectional view showing the manner of forming a door opening in a wall,

Fig. 17 is a view in end elevation looking from the left in Fig. 16,

Fig. 18 is a sectional view taken vertically through a wall during construction of the same,

Fig. 19 is a view in end elevation showing the manner of forming a wall mold which tapers upwardly,

Fig. 20 is a view showing in end elevation spacers to be disposed between walls of the mold,

Fig. 21 is a side elevation showing the manner in which mold sections are to be erected in order to form a wall having a sloping end,

Fig. 22 is a perspective view of a wall formed in accordance with this invention and having a tapered or sloping corner portion,

Fig. 23 is a top plan view showing the manner in which mold sections are erected to form a chimney.

Fig. 24 is a perspective view of a cleat used when mold sections are erected as shown in Fig. 23,

Fig. 25 is a vertical sectional view taken transversely through a portion of a wall formed in accordance with this invention,

Fig. 26 is a sectional view showing the manner in which the upper portion of a fire wall or other walls may be formed in accordance with this invention,

Fig. 27 is a fragmentary sectional view illustrating a joint for connecting sections of the mold,

Fig. 28 is a top plan view showing mold sections connected to form a partition for a building, or pilaster,

Fig. 29 is a top plan view of a mold constructed in accordance with Fig. 1, and

Fig. 30 is a perspective view of a corner filler having hingedly connected leaves.

This mold is of the knock-down type and is employed in order to erect buildings of the poured concrete type wherein molds are erected and filled with concrete, lower molds being removed after the concrete has set and placed upon upper molds which are filled with concrete in the process of setting. The inner wall of the mold is indicated in general by the numeral 1 and the outer wall by the numeral 2 and each wall consists of sections 3 which may be of any length desired and also of any height. Bars 4 extend longitudinally of each section and are connected by a suitable number of cross bars 5, thereby forming a frame to which a facing 6 is secured and this facing may be formed of boards, or veneering or a suitable composi-

tion. The sections 3 are all of the same construction and may be used to form either an inner or an outer wall and when in use may have either bar 4 uppermost. Cleats or connecting bars 7 are secured to the bars 4 of one section by bolts 8 which are passed through slots 9 formed in the cleats and may be passed through slots 10 or openings 11 formed through the bars 4. The outer ends of these cleats overlap the bars 4 of a companion or meeting section and are formed with slots 12 through which are passed bolts 13 and these bolts are engaged through slots or openings of the bars 4 of the companion mold section in order to secure the two sections together. Therefore, the two sections may form corner portions of an outer wall of a mold. A filler 14 carrying a facing sheet of metal 15 is set in place, as shown in Figure 1, in order to complete the corner and it should be noted that the facing sheet projects at one or both sides of the filler in order to form a smooth joint. A cross bar 16 extends transversely of the filler 14 with its ends projecting from opposite sides thereof and this cross bar has its ends formed with notches 17 through which bolts or other fasteners may be passed in order to firmly hold the filler in engagement with the main wall section. When the wall sections are used to form portions of a mold intermediate the corners of a wall of a building, the wall sections are disposed in end to end relation to each other in which case the bars 4 extend in longitudinal alignment with the cleats 7 overlapping their adjacent ends where they are firmly secured by tightening the bolts 13. The filler 14 will be set in place with its facing 15 overlapping ends of the facings 6 of the mold sections to form a good joint between the wall sections.

The inner wall 1 of the mold is formed of sections having the same construction as those from which the outer wall is formed and a filler 14 may be set in place if found necessary. The projecting side portions of the filler facing sheet 15 permits the sections to be spaced from each other a sufficient distance to allow for expansion and contraction and further permits an inner wall to be shortened for easy removal. At the intersection of the wall-forming sections, there is disposed a corner piece 18 having leaves extending transversely of each other either at right angles or any other angle desired according to the angular relation which one wall of a building is to have to another wall thereof. If so desired, this corner piece may be formed, as shown in Figure 30, of leaves 19 of metal having hinge ears through which is passed a pin 20 in order to form a hinge joint 21. By this arrangement the leaves of the corner piece may be disposed in any desired angular relation to each other. Tongues 22 extend from ends of the leaves to engage over

bars of the wall sections and support the corner piece.

At a corner of a building the sections of the inner wall of the mold are connected by brackets secured to the bars 4 of the mold sections. These brackets may consist of leaves 23 formed of wood or metal and having longitudinally extending slots 24 to receive bolts 25 passed through the openings or slots in the bars 4, and adjacent ends of the leaves are overlapped and firmly secured by bolts. In Figure 4, there has been shown a modified form of bracket 26 consisting of leaves 27 having slots 28 formed therein and having reduced ends 29 which are rounded so that when they are connected by a bolt or screw 30 the leaves may be swung about the fastener as a pivot and thereby permit the leaves or arms of the bracket to extend at an angle to each other or in alinement. By this arrangement the mold sections may be disposed at any angle desired. In some instances, it is desired to have the leaves of the bracket disposed out of a common plane in order to obtain a good fit in which case the bolt 30 may be removed and the leaf at the right in Figure 4 inverted or set in place beneath the reduced end of the companion leaf. It will thus be seen that the relation of the leaves to each other may be considerably varied.

Instead of forming the brackets of leaves which are pivotally connected, the brackets may be of a rigid formation, such as shown in Figure 28, where the brackets, indicated by the numeral 30, have been employed to connect mold sections at the intersection of a main wall of a building with one end of a partition wall. These brackets have their leaves formed with longitudinally extending slots 31 to receive securing bolts and also receive bolts 32 by means of which cross bars 33 of a partition 33 may be secured to the brackets in order that a portion of a dividing wall of a building may be formed.

The bracket shown in Figure 5 consists of leaves or arms 34 and 35 each of which is formed with a longitudinally extending fastener-receiving slot 36. A bearing 37 is pivotally connected with one end of the arm 35 by a stem or swivel 38, and the bearing 37 fits into a recess 39 formed in the leaf 34 where it is mounted upon a pivot pin 40. By this arrangement the leaf 34 may be secured to one wall section and the leaf 35 disposed in the same plane as the leaf 34 at right angles thereto to take the place of the brackets shown in Figures 3, 4 and 28, or this leaf may be swung upwardly about the pin 40 and if necessary turned about the stem 38 in order to dispose the leaf in desired angular relation to the leaf 34. It will thus be seen that a mold section to which the leaf 35 is attached may be disposed at an incline instead of perpendicularly. Disposition of a

mold section at a desired incline or angle may also be accomplished by use of such a bracket as is shown in Figure 6. In this form the leaf 41 carries an ear 42 which projects from one end and to this ear is pivotally attached a bearing 43 by a screw or bolt 44. The leaf 45 is connected with the bearing 43 by a sleeve 46 having a stem 47 rotatably engaged through one end of the leaf and since the sleeve 46 is secured between ears 48 of the bearing by a pivot pin 49, it may have turning movement between these ears. By having the bracket constructed as shown in this figure, the leaf 45 may be swung horizontally relative to the leaf 41 and also vertically about the pin 49 as well as being turned about the stem 47. Therefore, accurate adjustments may be made and a mold section disposed in alinement with or transversely of another mold section and also disposed either perpendicularly or at an incline.

In some cases a wall to be erected is of such length that when a mold is set up it is found that an end of a mold section terminates close to a companion mold section but not near enough to permit a proper joint to be formed between the sections. It is then necessary to apply fillers, such as shown in Figures 11 and 12 and indicated by the numerals 50 and 51. These fillers are set in place as shown in Figures 7 and 8 with their arms 52 overlapping the cleats 7. The filler 50 fits against the filler 14 and is overlapped by the facing 15 and in the preferred arrangement there is a small space between the filler 50 and the adjacent end of the mold section which is closed by a filler 53 formed of sheet metal. By this arrangement the bolts which secure the cleats in place may be released after the concrete with which the mold is filled has set and sufficient movement will be permitted to allow the inner wall of the mold to be taken apart. The filler 51 shown in Figure 12 is similar to that shown in Figure 11, except that it consists of upper and lower sections having contacting arms 54 through which pass a securing bolt 55. By this arrangement the sections of the filler may be taken apart and used for other purposes.

In some cases the building to be erected is of such size that the builder does not have sufficient mold forming sections to extend the full length of a wall. In such cases corner sections are formed and between inner and outer walls of the mold are erected spacing partitions 56. Each of these partitions consists of sections 57 disposed vertically and secured in edge to edge engagement with each other by a suitable number of cross bars or cleats 58 which are releasably secured by screws, as shown in Figure 29. Strips 59 extend longitudinally of the sections 57 at the opposite sides thereof from the cleats 58 in order to form a recess in a cement partition or end wall section formed in the mold and a suit-

able number of rods 60 having bent ends 61 are disposed through the partition longitudinally of the mold in vertically spaced relation to each other. After the corner portion 5 of the wall has set, the mold is taken apart and the sections then disposed along the proper lines to complete the wall between its corner portions. If the mold be long enough to connect the corner portions of the wall, the spacing partitions may be omitted but if the 10 mold is of less length the partitions will be again used. Since the corner portions of the wall will each have a recess in each end and anchor rods projecting from it, the connecting wall section will have portions extending 15 into these recesses and the extended ends of the anchor rods will be embedded in the connecting wall section. Therefore, the connecting wall section will be firmly anchored 20 to the corner sections of the wall.

In Figure 27, there are shown wall sections 62 connected by a bracket connecting of leaves 63 and 64. The leaf 64 engages in a recess 65 of the leaf 63 where it is pivotally mounted 25 by means of a bolt or other suitable fastener 66 and slots 67 are formed in the leaf 64 to receive securing screws 68. The leaf 63 is of greater width than the leaf 64 and in its side portion which projects beyond the 30 leaf 64 is formed with a slot 69 to receive securing screws 70. By this arrangement the mold sections may be disposed in the relation of each other shown in Figure 27 if found necessary.

35 In Fig. 18, there has been shown a wall 71 of concrete having a suitable number of vertically extending reinforcements 72 and transversely extending reinforcements 73 40 consisting of metal strips which may be wrapped about the vertical reinforcements if so desired. Each reinforcement consists of a number of pipe sections connected by couplings 74 but it is to be understood that separate pipes or bars may be used. The metal 45 strips serve to firmly hold the inner and outer forms in proper spaced relation to each other, thereby causing the wall to be properly moulded and a perpendicular wall formed. Gauge strips may be set in place between the 50 forms before securing the strips 73 to the forms in order to insure proper spacing of the forms. The metal strips 73 in addition to serving as transverse reinforcements and braces for the inner and outer forms also constitute supports to which nailing strips 75 55 of wood, to which inside trim of a house is to be secured, may be fastened by small nails 76. These strips 75 are secured to the strips 73 by the nails and set in place after the mold sections 77 are erected and the strips preferably 60 carry small nails 78 which will be embedded in the wall and prevent the strips from working loose after the wall has been completed. The bracing strips 73 are initially of such 65 length that they may project beyond the

mold sections and have their end portions split to form tongues 79 which are bent to engage outer side faces of the longitudinally extending bars of the mold sections. By this arrangement the mold sections may be held 70 in proper engagement with each other as successive tiers of mold sections are set in place. The projecting ends of the reinforcing strips will be cut off when the wall is finished.

If a fire wall 80 is to be formed, bars 81 are 75 secured upon the upper bars 82 of the mold sections 83 which project above the roof line the desired distance, and it should be noted that the bars 81 are disposed in offset relation to the bars 82, thereby forming the fire 80 wall with a head or coping 84 which projects at opposite sides of the fire wall.

In Figure 25, there has been shown a wall 85. The vertical reinforcements 72 are omitted but metal strips 86 extend transversely in the mold between its walls 87. In 85 this embodiment of the invention, the strips 86 extend across the mold in spaced relation to upper edges of the mold walls and are then bent upwardly, as shown at 88, and outwardly, as shown at 89, with their ends secured against side bars 90 of the mold by 90 easily removable nails 91. After the concrete has set, the mold is taken apart and the projecting ends of the strip 86 then bent to extend outwardly from the wall, as indicated by dotted lines. The sections of the mold are then set up with their lower side bars 95 resting upon the projecting ends of the strips which may be tacked to the side bars of the mold sections. By this arrangement a portion of the wall previously formed will extend upwardly into the mold, thereby insuring 100 proper positioning of the mold sections.

In Figure 21, there has been shown mold 105 sections 92, 93 and 94 which are assembled to form a wall which may have one or both ends disposed at an incline. In this formation the mold section 93 is connected with one end of the mold section 92 by a bar 95 secured 110 against the lower side bars of the mold sections by bolts 96, the upper end of the mold section 93 being secured by a bracket having leaves 97 secured to the mold sections by bolts 98 and having their adjacent ends 115 pivotally connected, as shown at 99. The upper section 94 may be secured to the section 92 by a suitable number of clamps 100. Sections, such as shown in this figure, are employed in order to form the upper portion 120 of a wall of a house having a sloping roof.

The wall 101 shown in Figure 22 is reduced in thickness toward its top and formed with a tapered or sloping corner post 102. When 125 forming this type of wall which may be a portion of a building or a retainer wall or garden wall, the mold sections are set up, as shown in Figure 19. Referring to this figure, it will be seen that the mold sections 103 have wedges 104 disposed beneath their lower 130

bars 105. Between the mold sections are disposed spacers 106 which are similar in construction to the spacer shown in Figure 11, except that they are split longitudinally to form sections 107 and 108. In case the wall is to be of an even thickness throughout its height, the spacers will each consist of a section 107 and 108 but if the wall is to taper upwardly each spacer will consist of the sections 107 or the sections 108 and these sections will be placed side by side, as shown in Figure 19, with their perpendicular side edges contacting and their inclined side edges disposed outwardly. When so disposed, the outer side edges of the spacers will converge upwardly.

In Figure 23, there has been shown an assemblage whereby a short wall, chimney or the like may be molded. In this assemblage the mold sections are of such length that they cannot be disposed with their ends intersecting and form walls of the proper dimensions. It is not desired to cut the sections and, therefore, each is disposed with one end bearing against a side face of a mold section and its other end portion projecting. Cleats 110 are secured against the upper edge faces of the mold sections by screws or other fasteners passed through openings 111 in the cleats and these cleats project from the mold sections and are formed with heads 112 disposed in a vertical plane and adapted to engage the mold sections and retain them at right angles to each other. If so desired, certain of the sections may have their ends intersecting and connected as previously set forth.

When a window opening is to be formed in a wall, the assemblage shown in Figures 13, 14 and 15 is to be used. Referring to this figure, it will be seen that the floor joists 113 have their ends embedded in the wall and rest upon a lower wall section previously moulded. Strips 114 extend transversely through the wall with their inner end portions nailed to the side faces of the joists and their outer ends extending and engaging beneath the lower bars 115 of the outer mold section 116. The inner mold section 117 rests upon the joists and the joists are secured in proper spaced relation to each other by spacing plates 118 which are secured to the joists by clamps 119. The plates overlap between joists and are formed with longitudinally extending slots 120 through which bolts 121 are passed. By this arrangement the plates may be adjusted in relation to each other and the joists secured in desired spaced relation. The mold sections 116 and 117, used when forming window openings, are of a different construction from those used for other portions of a wall. The section 116 carries bars 122 which are disposed vertically and have reduced offset upper end portions 123 and to these upwardly extending portions is se-

cured a board 124 spaced from the upper bar 125 of the mold section by a bar 126. This bar 126 is of a depth similar to the bar 125 and cooperates therewith so that an outer sill 127 for a window opening may be formed and project from the wall of the building the necessary distance. The inner mold section has a portion 128 offset in order to form a recess or depression 129 in a wall beneath a window and strips 130 and 131 are employed in order to form the apron and inner sill of a window. The window frame 132 is set in place after the concrete has sufficiently set.

When forming a door, the mold sections 133 and 134, forming walls of the mold, are set up as shown in Figure 16; and after a door frame 135 has been set in place a metal securing strip 136 is passed through the doorway with its ends extending between longitudinally extending bars 137 of the mold sections where it is secured by bending its ends, as shown at 138. Cleats 139 are secured to the bars 137 of the sections forming the inner wall of the mold and overlap the door frame in order to hold the door frame firmly in place where it will serve as an end wall for the mold during setting of the concrete. A filler strip 140 may be set in place if found necessary. It should be noted that the facing of the inner mold wall 134 may slightly overlap the door frame, thereby causing the door frame to project inwardly a slight extent. By this arrangement plaster may be applied to the inner surface of the wall without projecting beyond the door frame.

A brick building is much more expensive and not as strong or as weather resisting as concrete but if brick is wanted an outer course may be built and an inner form then erected and the intervening spaces filled with concrete. This makes a stronger wall than solid brick. In a cellar construction an inner form can be set up and space between the form and earthen walls of the cellar filled with concrete.

I have, therefore, provided molds through the use of which a poured concrete building may be erected and not only walls formed but also door and window openings. I have further provided a set of molds of such construction that walls may extend in desired angular relation to each other in order to form bay windows and have further provided molds whereby fire walls, chimneys and other portions of a house or building may be formed. I have further provided a set of molds consisting of sections which may be very easily and quickly assembled and taken apart for successive use.

Having thus described the invention, I claim:

1. In a building mold, inner and outer walls each consisting of sections having a frame including longitudinally extending

bars, bars to connect ends of said sections extending between adjacent ends of the sections and overlapping ends of the frame bars, the bars being formed with longitudinally extending slots, and fasteners passed through the slots of the bars to slidably and pivotally connect the bars and releasably secure the sections in set positions.

2. In a building mold a bracket to connect mold forming sections, said bracket having arms pivotally connected to each other for movement in horizontal and vertical planes, the arms of said brackets being formed with longitudinally extending slots whereby the arms may be secured to end portions of mold forming sections.

3. In a building mold, inner and outer walls each consisting of companion sections, each section having a frame including longitudinally extending bars, a facing carried by said frame at one side thereof, means adjustably connecting adjacent ends of companion sections whereby the sections may be set up in determined angular relation to each other with their facings disposed inwardly, and spacers disposed vertically in the mold with their side edges contacting with said walls, each spacer being formed of mating separable side sections having contacting side edges formed with registering grooves forming openings through the spacer, and tie rods disposed in the grooves through the spacers longitudinally of the mold and projecting from the spacer whereby to be embedded in plastic material when the mold is filled.

4. In a building mold, inner and outer walls each consisting of companion sections, means to connect said sections to form walls, and spacers between said walls disposed transversely thereof with their side edges contacting with inner faces of the walls, each spacer being formed of mating transversely separable side sections having contacting side edges recessed whereby tie rods may be disposed through the spacer longitudinally of the mold and embedded in plastic material when the mold is filled.

5. In a building mold, inner and outer walls each consisting of companion sections, means to connect said sections to form walls, and spacers between said walls disposed transversely thereof with their side edges contacting with inner faces of the walls, each spacer being formed of mating transversely separable side sections having contacting side edges recessed whereby tie rods may be disposed through the spacer longitudinally of the mold and embedded in plastic material when the mold is filled, vertically extending strips being provided on the spacer sections in abutting relation and forming a recess in one end of a wall section formed in the mold.

6. In a building mold, a bracket for connecting ends of mold forming sections, said bracket having leaves adapted to be secured

to mold sections longitudinally thereof, one leaf having a recess leading from one side edge, and a bearing pivoted in said recess and having a shank swiveled in the other leaf.

7. In a building mold, a bracket for connecting ends of mold forming sections, said bracket having leaves adapted to be secured to mold sections longitudinally thereof, one leaf having a tongue extending from its inner end, a hinge block pivoted to said tongue for turning in a plane parallel to the tongue, and a sleeve hinged to said block and having a shank swiveled to the inner end of the other leaf axially thereof.

In testimony whereof I affix my signature.

JOHN S. FREDERICK.

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