

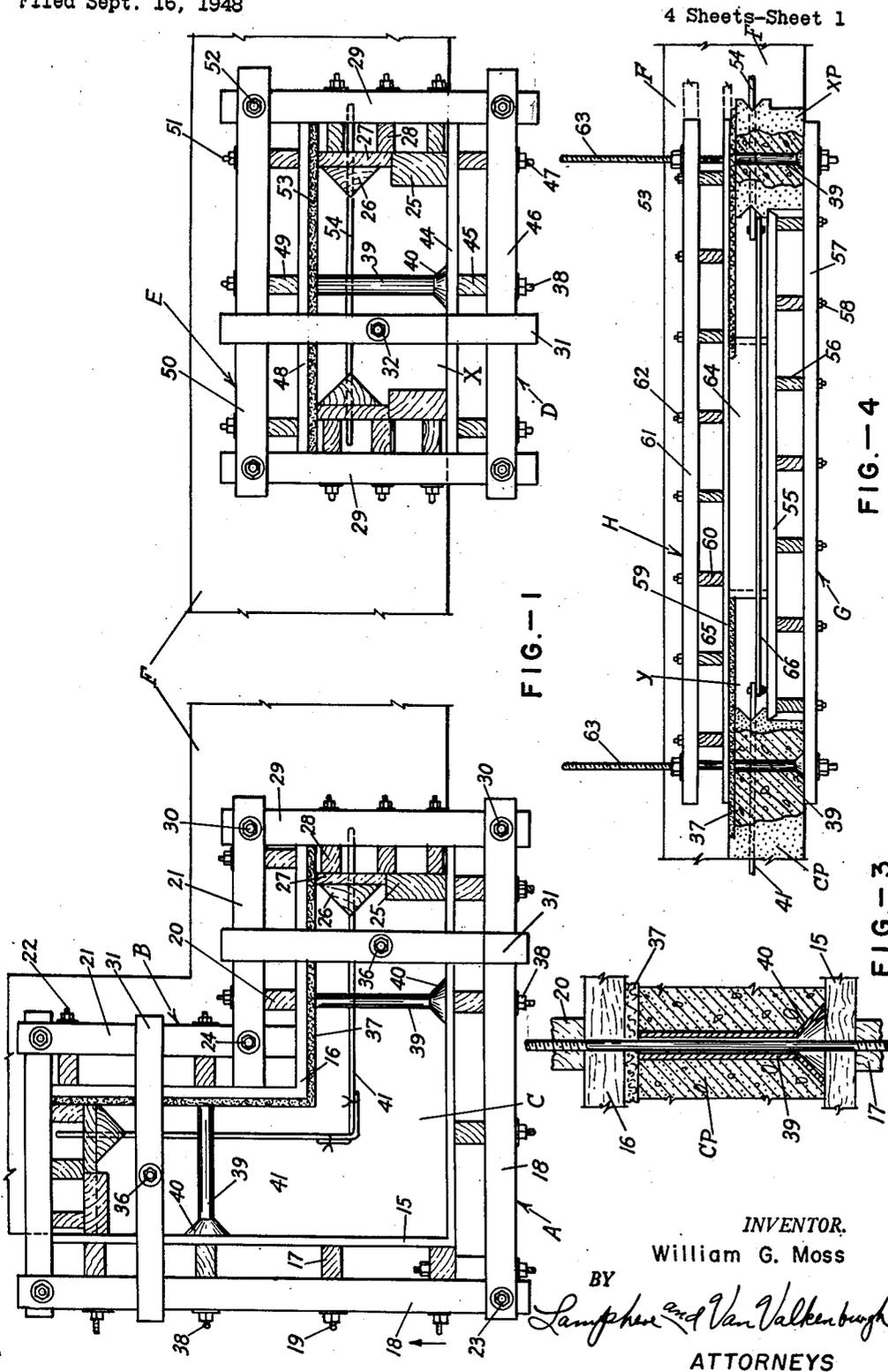
April 7, 1953

W. G. MOSS

2,633,621

BUILDING CONSTRUCTION

Filed Sept. 16, 1948



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4 Sheets-Sheet 2

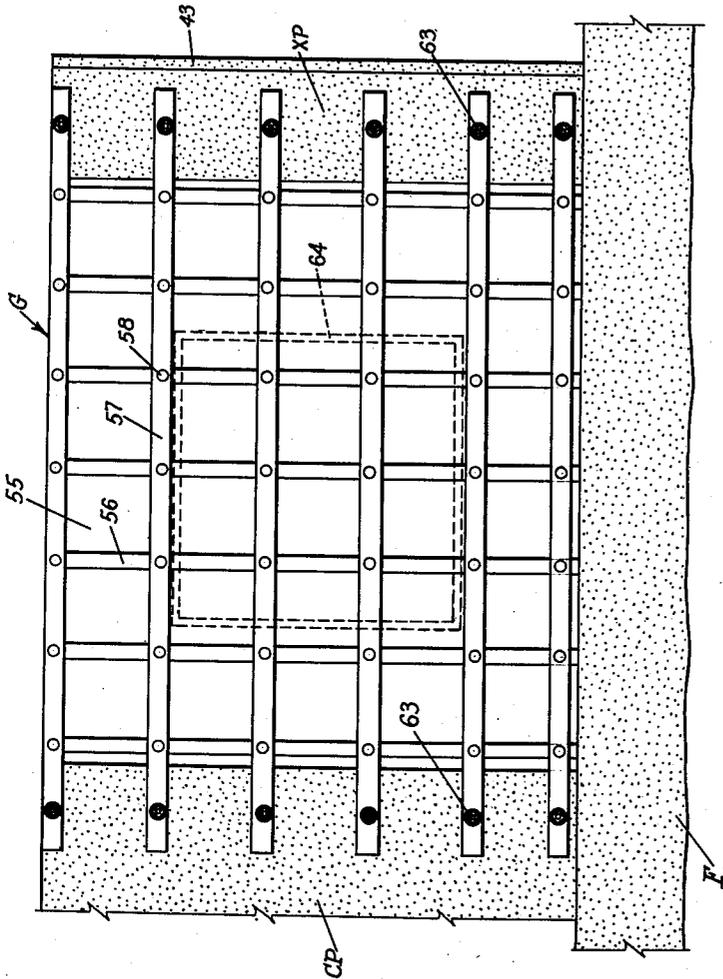


FIG. - 5

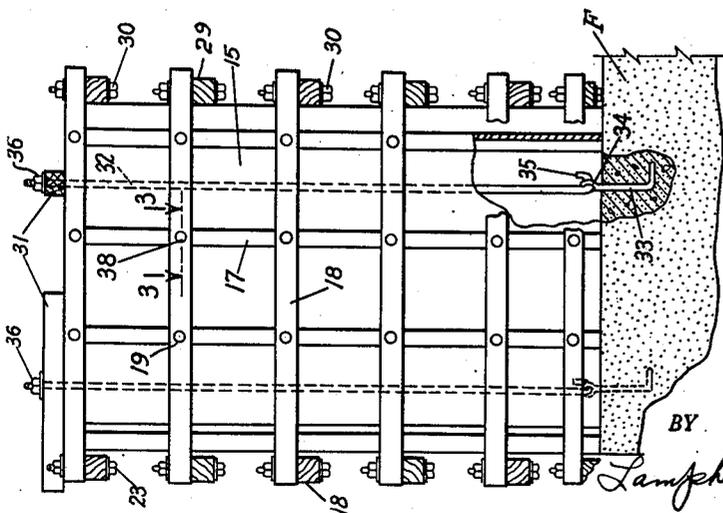


FIG. - 2

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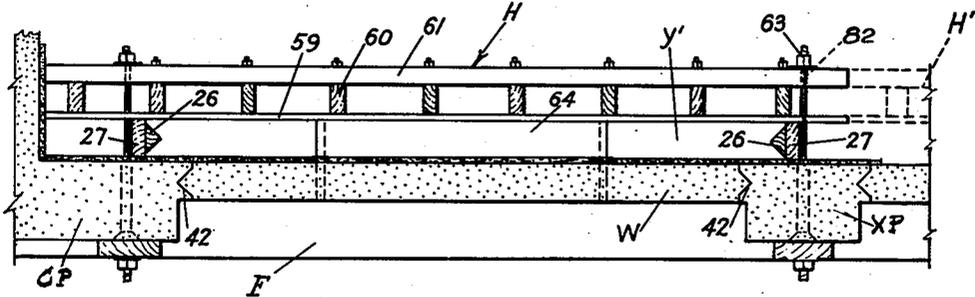


FIG. - 6

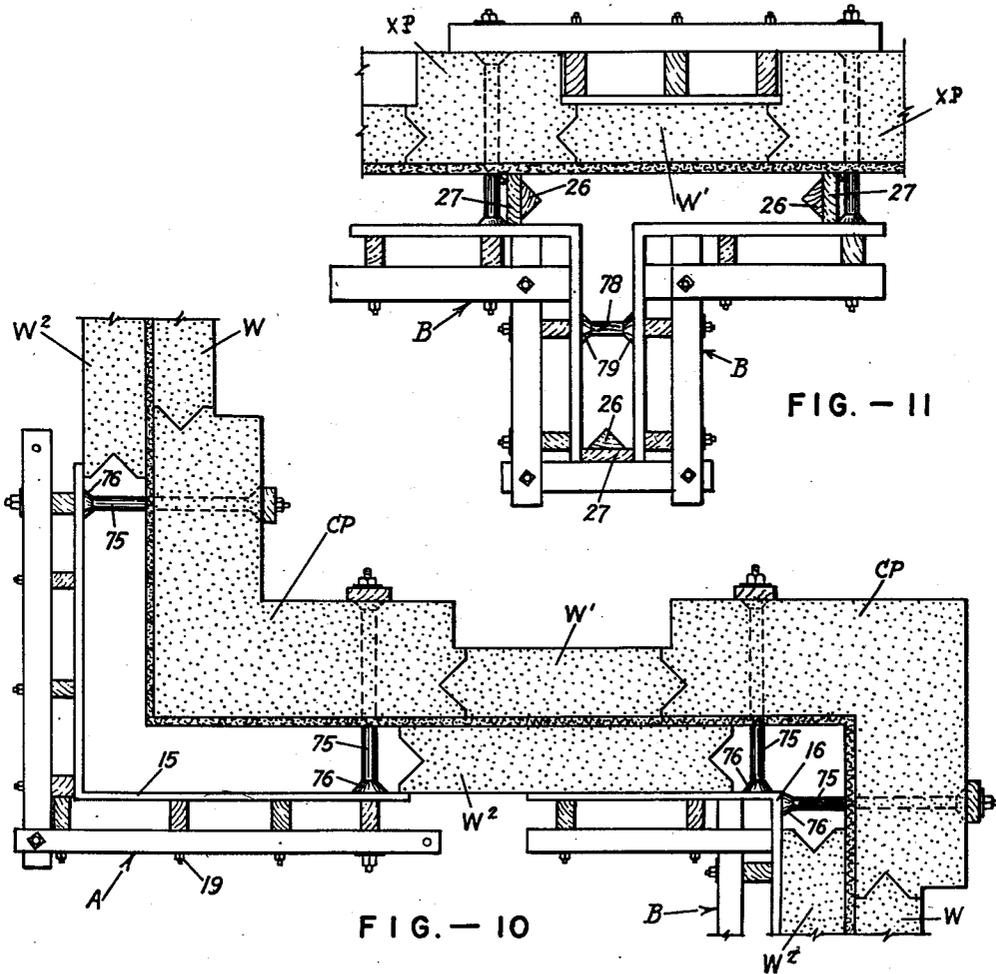


FIG. - 11

FIG. - 10

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4 Sheets-Sheet 4

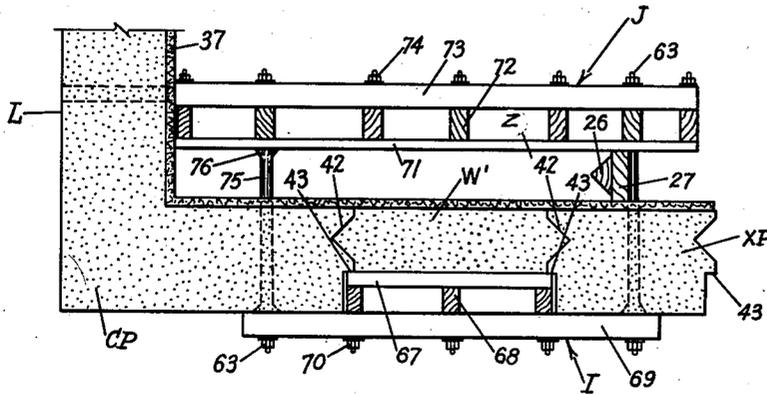


FIG. - 7

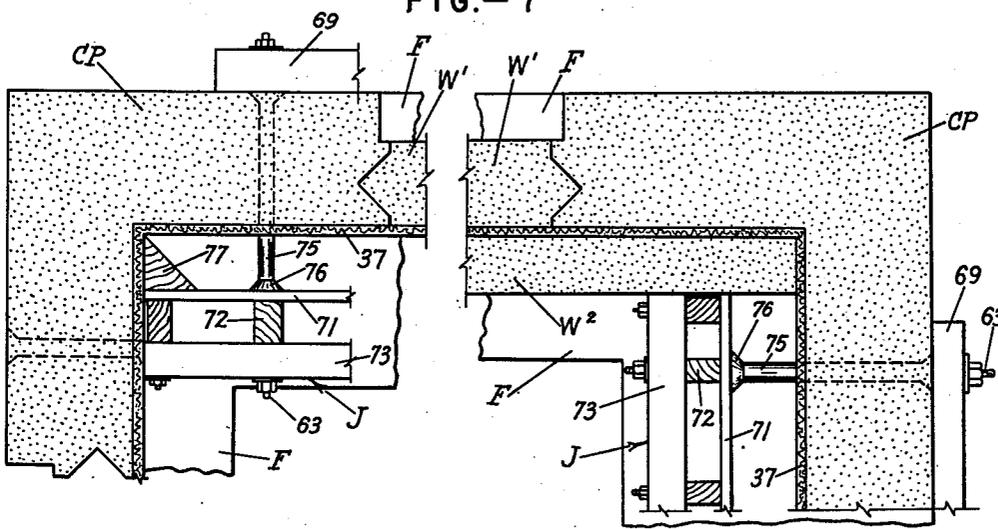


FIG. - 9

FIG. - 8

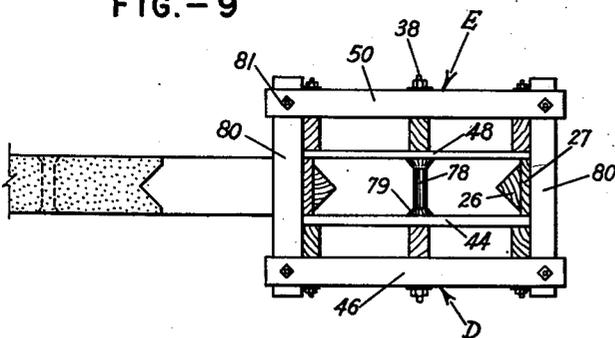


FIG. - 12

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BUILDING CONSTRUCTION

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5 Claims. (Cl. 25—131)

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This invention relates to the construction of walls and more particularly to an improved means and method of constructing walls from concrete or other plastic materials which walls are or may be parts of buildings.

One of the objects of my invention is to provide an improved method of constructing building walls of concrete or like material which will require only a few specially designed forms.

Another object is to produce improved plastic material building forms which will permit the construction of all walls of a building by constructing sections thereof at different times and with a minimum form cost.

Still another object is to provide improved means for constructing the walls of a building from poured plastic material which will have embodied in the interior of the walls insulation material.

Yet another object is to provide improved means for so constructing concrete building walls in sections that each section will not require any great volume of concrete to be poured at any one time and thereby permit a building to be constructed, if desired, at odd times.

A further object is to so provide forms for making walls of plastic material that it will be possible to construct the walls in sections with a minimum number of forms and without any necessity of side bracing.

A still further object is to provide improved means and method for the construction of concrete building walls in sections which will permit certain spaced sections to be poured first and connecting sections to be poured later by the use of forms attachable to the previously built sections.

Yet a further object is to provide a means and method of so constructing a concrete wall in sections that the sections will be locked together or interengaged and smooth interior and exterior wall surfaces provided.

A further object is to provide an improved means and method of constructing a poured concrete wall in which there are inner and outer wall portions poured separately and in which said portions are each poured in separate sections, with all sections joined together in locked or interengaged relation and with no joints on the outer wall portion opposite any joints on the inner wall portion.

A further object is to provide improved means and method of constructing a concrete building wall wherein corner posts and intermediate pillars are first constructed and then connecting wall sections are constructed later.

Other objects of my invention will become ap-

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parent from the following description taken in connection with the accompanying drawing in which:

5 Figure 1 is a top-view of corner and pillar forms used in constructing a wall in accordance with the invention, said forms being mounted on a foundation and ready for receiving plastic material from which the wall is to be made;

10 Figure 2 is a side view of the corner forms shown in Figure 1, said view being taken in the direction of the arrow shown in Figure 1;

15 Figure 3 is a sectional view taken on the line 3—3 of Figure 2 showing the sleeve and bolt arrangement for holding form sections together, said sectional view showing the plastic material poured;

20 Figure 4 is a top view showing the forms used for constructing a section of the outer wall portion joining the corner and pillar together, said forms also being usable for constructing a wall section to join any two pillars together;

25 Figure 5 is a side view of the forms in Figure 4, said view being from the outer side thereof;

30 Figure 6 is a top view showing how a portion of the forms shown in Figure 4 are employed to construct a section of the inner wall portion of the building wall;

35 Figure 7 is a top view of forms employed to construct sections of the inner wall portion of a building, said forms being shown as used adjacent a corner of the building wall;

40 Figure 8 is a top view showing the same forms of Figure 7 used to construct the section of the inner wall portion which joins at the corner the section constructed by the use of the forms as shown in Figure 7;

45 Figure 9 is a top view showing how a 45 degree joint for the corner of the inner wall portion can be constructed by the use of the forms shown in Figure 7;

50 Figure 10 is a top view showing use of corner forms in constructing the inside portion of a wall at an inside corner;

55 Figure 11 is a top view showing the manner in which corner form sections can be used to construct the portion of a partition wall where it joins the outer wall of a building; and

Figure 12 is a top view showing how the pillar forms employed in constructing the wall pillars of Figure 1 can also be used to construct a partition pillar.

In constructing a wall by employing my invention, certain spaced apart sections will first be constructed. Said sections will have such shape that interconnecting sections can be readily constructed so that a smooth and uniform wall will result and each section will be interlocked with

each adjoining section, and further, all the sections can be tied together by suitable reinforcing material such as rods. To construct the walls by my improved forms and methods, the forms employed in casting the various sections of a wall will be few in number and they will have such construction that they can be efficiently and easily used in producing the independently constructed spaced apart sections or the interconnecting sections between said spaced apart sections.

The accompanying drawings are illustrative only of particular forms embodying my invention and also employable to carry out my improved method. The drawings show the construction of walls and partitions of a building by use of concrete. It is to be understood, however, that the walls need not be walls of a building and that other plastic material besides concrete can be used. Referring in detail, first to Figures 1 to 3, a suitable foundation F will be constructed in a usual manner from plastic material such as concrete. This foundation F can be a footing or it can be the walls of a basement and will be in the general configuration to conform to the shape of the building which is to be constructed.

In Figure 1 there is shown the assembly of forms or moulds necessary to construct a corner post and a spaced pillar or pilaster which will be duplicated in constructing the building. The forms are shown as made of wood, but it is to be understood that other material, such as steel or other metal, can be employed if desired. In the corner form assembly, shown at the left hand side of Figure 1, there is a right angular outer form A and a right angular inner form B. The form A has a wall 15 and the form B has a wall 16 constructed of boards. On the outside of the wall 15 of form A are spaced apart, vertically arranged reinforcing studding 17, backed by horizontally arranged reinforcing members 18, all of which may be secured together by bolts 19. In a similar manner the inner wall 16 of form B has vertically arranged, spaced apart studding 20, and horizontally arranged reinforcing members 21, all of which is secured together by bolts 22, as shown. At the corner of the outer form A the reinforcing members 18 can be arranged to overlap and thus permit their connection by means of bolts 23. Also, at the corner of form B the horizontal reinforcing members can be arranged to overlap and be joined together by bolts 24. With the bolting together of the members forming the various parts of the two forms of the corner form assembly, it will thus be possible to readily dismantle the forms by removing the bolts.

The thickness of the corner post, which is to be constructed by the corner post form assembly, can vary as desired and this will be accomplished by the spacing of the two forms A and B. In the particular corner post to be constructed, as shown in Figure 1, the thickness of the wall forming the post will be less than the width of the foundation, thus permitting an additional inner wall portion to be constructed on top of the foundation F to complete the wall. The two forms A and B are provided with end forms of like construction. Each end form comprises a vertically arranged member 25 of rectangular cross section and a second member 26 of triangular cross section, this latter member being mounted on a backing member 27. The backing member 27 and the rectangular member 25 have reinforcing vertical studding 28 and horizontally arranged reinforcing members 29. The horizontal reinforcing mem-

bers 29 are arranged to extend in overlapping relationship with the horizontal members 18 and 21 of forms A and B so as to be tied thereto by means of bolts 30. By this tying together of horizontal reinforcing members, the whole assembly will be tied together as a unit so that it will hold concrete when it is poured into the space C provided by the form.

In order that the form assembly for the corner post will be tied to the foundation during the pouring of the concrete and thus not be shifted on the foundation or pushed upwardly by the action of the concrete in its plastic state, hold down cross bars 31 are provided which extend across the top of the forms A and B. These tie down bars receive the threaded ends of vertical rods 32 which are arranged to be connected at their lower ends to the foundation. To accomplish this, the foundation during its construction has embedded therein rods 33 which have eyes 34 above the top of the foundation so that when the corner forms are mounted on the foundation, hooked ends 35 on the lower ends of the vertical rods can be inserted in the eyes to thus provide the tie between the foundation and the tie down bars. Thus, by tightening down the nuts 36 at the threaded upper ends of the vertical bars, the corner forms can be held from movement on the foundation.

Since the building to be constructed is to be made from concrete or other settable plastic material, it is desirable to have some insulation means in the walls to prevent loss of heat from the interior of the building to the exterior of the building through the wall, and also desirable that some barrier be provided in the wall to prevent the transfer of any moisture and act as a stop for frost. In the particular building being shown as an example, the inner and outer portions of the walls will be constructed separately and with such a construction the insulation and barrier can be placed between the inner and outer portions of the wall. To accomplish this the insulation and barrier, which can be in the form of a single sheet of suitable material, can be placed on the inner surface of the outer wall portion at the time that the outer wall portion is being poured, which outer wall will include the corner post to be constructed by the use of the form assembly just described. As shown in Figure 1, the insulation material indicated at 37 is placed on the inside surface of the wall 16 of the right angle form B. When the concrete is poured, the insulation will then be secured in place.

The two forms A and B for casting the corner posts are shown as additionally tied together by cross bolts 38, thereby preventing any spreading of the forms inwardly of their ends. Where the bolts pass through the space C between the forms in which the concrete is to be poured, they are arranged to be surrounded by sleeves 39. At the outer end of the sleeve there is provided a cone shaped washer 40, the purpose of which is to provide an easily filled opening at the end of the sleeve after the concrete has been poured and the washer is removed. The sleeve 39 will be left embedded in the concrete after the forms are removed. Thus, by this arrangement, forms A and B will not only be held from spreading, but holes through the poured corner post will be available for receiving bolts to hold other forms to be used later, as will become apparent. The bolts 38 will be positioned so as to be a predetermined distance from the end walls of the forms.

It may also be desired to provide reinforcing

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for the concrete forming the walls, and this reinforcing material can be easily associated with the forms so it will become embedded in the concrete when it is poured. Reinforcing rods 41 are shown as an example, but the reinforcing material can be steel bands, woven wire etc. The amount of reinforcing can be as desired. Also, electrical wire conduit, water pipes, etc. can be associated with the forms so as to become embedded in the concrete. The rods 41 extend through the space C which is going to receive the concrete, with said rods projecting through holes in the end walls and extending beyond the end walls so as to provide a ready connection with other steel reinforcing rods which will be embedded in other sections of the wall as these sections are poured.

When the forms for a corner post are set up, as shown in Figure 1, then the concrete can be poured into the space C between the various walls of the form assembly. After the concrete has set and the forms are removed, the corner post will then appear as shown in Figure 7, such post being indicated by the letters CP. It will be noted that the post will have the insulation material 37 on the inner surface thereof and that the ends of the post will be provided with a vertical V-shaped groove 42 which is formed by the end wall member 26 of triangular cross section. The end of each corner post will also have an offset portion forming a vertical abutment surface 43, such being formed by the relationship of the members 25 and 26 when the end walls of the form assembly for the corner posts were set up.

In order to construct a pillar or pilaster section of the wall to be formed, the form assembly at the right hand side of Figure 1 will be used, and these forms will be mounted on the top of the foundation F in the same manner as the forms used to make the corner posts. As shown, the form assembly comprises inner and outer forms D and E. Form D has a wall 44 with which is associated vertical studding 45 and horizontal reinforcing members 46, all of which are secured together by bolts 47. The form E has a wall 48, vertically arranged studding 49 and reinforcing horizontal members 50, all of which are secured together by bolts 51. The end walls of the form assembly will be the same as the end walls which are used on the corner form assembly for producing the corner posts. The same end walls can thus be used if desired. The members of these end walls are indicated by the same reference numerals as the one described in connection with the corner forms. The horizontal reinforcing members 29 of the end walls will overlap the horizontal reinforcing members 46 and 50 and they will be connected together by bolts 52. Insulation material 53 will be positioned adjacent the wall 48 of form E. Reinforcing rods 54 will be arranged to extend through the forms. The forms will be tied down to the foundation by the hold down bar 31 and the rods 32, which will have their lower ends hooked into rods embedded in the concrete, all as shown in Figure 2 with respect to tying down the corner form assembly. The two forms D and E for the pillar or pilaster will be tied together at their center by bolts 38 extending through sleeves 39 with which is associated the cone washer 40 at the outer end, all as previously described in connection with the corner post forms.

With the pillar forms set up as shown in Figure 1, the concrete will be poured in the space X and

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after it is set and the forms are removed, the pillar or pilaster constructed will then be as shown in Figure 7 at XP. It will be noted that the end sides of this pillar will have the vertically extending V-shaped grooves 42 and the abutment surfaces 43 in the same manner that the corner posts are provided with such grooves and abutments since the same end walls were used in the forms for pouring the pillar XP. The pillar XP will have embedded in it the sleeves 39, thus providing a series of holes in vertical alignment in the pillar. These holes will be the same distance from the ends of the pillar as the holes which were established in the corner posts by having sleeves 39 embedded therein.

After a corner post and a pillar have been constructed, the other corner posts and various other required pillars can be constructed on top of the foundation. Of course, the corner posts and pillars can be constructed in any sequence found convenient. The spacing of the pillars from each other, or from a corner post, can be at various distances. If the portion of the wall is not to have any opening therein, such as a window opening or door opening, the pillars can be placed quite close together, or a pillar quite close to a corner post. However, if there is to be a window or door opening, the pillar or another corner post to permit this opening to be positioned therebetween in the connecting part of the wall between a pillar or a pillar and a corner post. In preferred construction, the distance from corner post to pillar, or from pillar to pillar, should be the same in order that only one form assembly will be necessary to construct the connecting parts of the wall. The distance should be determined and forms built accordingly. As pillars and corner posts will be exposed, they will appear as a decorative asset, and should be uniform as to spacing, whether containing openings for windows or doors, or not. The connecting parts of the walls should be of a width sufficient to produce a standard sized house or building or room, when used in correct multiples with the distance established between pillars and corner posts. Five feet to ten feet can be a practical spacing of the corner posts and pillars.

It will be particularly noted that the forms necessary to construct all of the corner posts and pillars will be few in number. All these forms are shown in Figure 1. It is to be further noted in connection with these forms that the end walls are identical and, therefore, there will be a saving in necessary forms as only one set of end walls will be needed for both form assemblies.

In Figures 4 and 5 there is illustrated a form assembly for constructing a wall portion for connecting a corner post and a pillar, in which said wall portion there is desired to have an opening such as a window. The same form assembly should, for uniformity, be used between two pillars where no opening is desired. As best shown in Figure 4, the form assembly will comprise outer and inner forms G and H. Form G has a wall 55 backed by vertically arranged studding 56 and horizontally arranged reinforcing members 57, all of which will be tied together by bolts 58. The wall 55 will be of a length to extend between the corner post CP and the pillar XP, already constructed, and to have its ends abutting the vertical abutment surfaces 43 on said post and pillar. When the wall is positioned against the abutment surfaces, the horizontal reinforcing members 57 will be arranged to extend alongside the outer surfaces

of the end post and pillar. The inner form H of the form assembly also has a wall 59, vertically arranged studding 60 and horizontal reinforcing members 61, with all of the members tied together by bolts 62. The wall 59 will be of such length as to overlap on the inner surface of the corner post and the inner surface of the pillar. With the inner and outer forms arranged with the corner post and pillar, as shown, it will be possible to employ bolts 63 to hold the forms to the corner post and the pillar. This is accomplished by having the bolts extending through the holes formed by the sleeves 39 which were embedded in the corner post and pillar when these wall portions were poured.

In order to form the opening in the connecting wall portion which is going to be constructed by the forms shown in Figures 4 and 5, a frame structure 64 will be positioned between the wall 55 of form G and the wall 59 of form H. There will also be provided on the inner surface of wall 59, a sheet of insulation material 65 which will then be in the same plane as the insulation material 37 and 53 on the inner surfaces of the pillar and corner post. It will not be necessary to hold this form assembly down to the foundation by any tie down cross bars, as was employed in constructing the corner posts and pillars, since the bolts 63 tying the forms G and H to post and pillar will perform this function. After the form assembly is set up, reinforcing rods 66 will be suitably connected, as shown in Figure 4, to the ends of reinforcing rods 41 and 54 embedded in the corner post and pillar. When concrete is poured into the space Y provided by the forms, the connecting wall W, as shown in Figure 6, will be formed between the corner post and the pillar. This wall will be interlocked at its ends with the corner post and the pillar since concrete will flow into the V-shaped grooves 42. After the forms are removed, the insulation material will remain on the connecting wall section W and it will be continuous with the insulation on the corner post and pillar.

By use of the form assembly shown in Figures 4 and 5 to construct the connecting wall W, the various pillars or pillar and corner posts can be connected by wall structures in the same manner as is done in producing the connecting wall W. If a pillar and corner post, or two pillars, are by necessity closer together than the pillar and corner posts shown in Figures 4 and 5, then of course the forms to construct the interconnecting wall will be shorter than those shown in Figures 4 and 5. In Figure 7 there is illustrated an interconnecting wall section W¹ which is shorter than the connecting wall W, such wall section not being provided with any opening.

In the building illustrated, which is to have walls constructed from outer and inner wall portions, the inner wall portion will be ready to be constructed after the pillars, corner posts and interconnecting wall sections W or W¹ have been fully constructed. In order to pour the inner portion of the wall, which is indicated in the various drawings as wall W², the same form H can be used as was used in pouring the connecting walls W. Figure 6 shows how this form is used to construct the inner wall portion which will be poured on the inside of the connecting wall W. The form H need only be spaced from the interconnecting wall W and the same bolts 63 employed to hold it in position. Instead of using the whole end wall structure which was

employed in the corner post and pillar assembly forms, the members 26 and 27 thereof only will be used as the end walls for the form. These will be held in position by the bolts 63, with such bolts also acting as a backing as shown. With the form assembly then set up as shown in Figure 6, the space Y' is ready to be filled with concrete so as to produce the inner wall portion parallel with the interconnecting outer wall W. If a window opening has been provided in the wall W, then a coinciding window opening will be provided in the inner wall portion which is going to be poured in the space Y'. This is done by provision of a frame 64. When the space Y' is filled with concrete to construct the inner wall portion W², the total thickness of the whole wall will then be established and it will be noted that the insulation sheet will be embedded between the two wall portions. It will also be particularly noted that when the inner wall portion W² is formed by pouring concrete in the space Y' provided by the forms, the ends of this wall will be offset with respect to the ends of the interconnecting wall W. Thus, there will be no coinciding joints in the inner and outer wall portions. By using the end wall form members 26 and 27 as the end walls of form assemblies to construct sections of the inner wall portion, the inner wall portion will have a vertical groove in its ends, and thus as adjacent sections of the inner wall portion are poured by use of forms such as H, they will interlock with the ones already poured.

When the inner wall portion at a corner is to be poured, either the form H shown in Figures 4 and 6 or the forms shown in Figure 7 will be used, depending on what distance is established between a corner post and an adjacent pillar. The Figure 7 forms are the same forms which are employed to pour short connecting walls W¹, as already referred to. Such forms, as illustrated, comprise the outer and inner forms I and J. Outer form I has a wall 67, a studding 68 and horizontal reinforcing members 69, all connected together by bolts 70. The inner form J comprises a wall 71, studding 72 and horizontal reinforcing members 73, all tied together by bolts 74. In constructing the short connecting wall W¹, the form J having the wall 71 is positioned up against the corner post CP and the pillar XP and the wall 67 positioned up against the vertical abutment surfaces 43 formed on said corner post and pillar. To pour the inner portion of the wall, the form J will merely be moved away from the corner post and pillar a distance corresponding to the thickness of the inner wall portion W² which is to be poured. The same bolts 63 will then be employed to hold the spaced form in position and an end wall comprising the members 26 and 27 will be used. These two end wall members will be placed against the bolts 63 as a backing. Bolts 63 at the right end of the form, as shown in Figure 7, will not be provided with any sleeve since no concrete will be poured around these bolts. However, the other bolts 63 which pass through the corner post will be provided with a sleeve 75 and a cone shaped washer 76, as shown, so that bolts 63 can be removed after the concrete is poured. When the space Z, provided by the form shown in Figure 7, is filled and the concrete allowed to set, the forms can be removed. It will be noted that form I is not essential for pouring the inner wall portion W², but is shown in Figure 7 primarily to illustrate that form J is a part of a form assembly in-

cluding form I, usable in constructing short connecting wall portions W^1 between corner posts and adjacent pillars or between pillars. After wall W^1 is constructed, Figure 7 also illustrates how form I can be left in place and form J merely moved back to then pour a section of the inner wall portion W^2 .

It will be particularly noted in connection with the form assembly shown in Figure 7 that the form J comprising the wall 71, studding 72 and reinforcing members 73 has the bolts 63 passing therethrough at different distances from the ends of the form. In other words, the distance from the bolts 63 which pass through the corner post and the adjacent end of the form is greater than the distance from the bolts 63 which pass through the pillar and the adjacent end of the form. The reason for this is that this form is usable in pouring the inner wall portion which is to join the inner wall portion W^2 poured in the spaced Z of Figure 7. When the inner wall portion W^2 is poured in space Z, its one end will be against the leg L of the corner post and thus make the available distance between the corner and the bolt hole in this leg L of the corner post less by the thickness of the walls W^2 already poured. Now, when the form having the wall 71 is used to pour the inner wall portion which is going to join the section of wall W^2 already poured in space Z, such form will be inverted, all as shown in Figure 8, so that its end can abut against the wall W^2 and still use the bolt holes which were formed in the corner post by the use of the sleeves. It will be noted that the form H, shown in Figures 4 and 6, has the same relationship between attaching bolts and the ends of the form as form J has. Thus, if form H is used in pouring inner portions of the wall at a corner, it will be used in the same manner as form J, the only difference between forms H and J being primarily one of length.

If it should be desired to have the two inner wall portions at a corner join on a 45 degree line instead of an overlapping arrangement, such can be done by the use of a filler member having a cross sectional shape of a right triangle. Such an arrangement is shown in Figure 9 where the filler member 77 is so associated with the form J that when the space Z is filled and the wall W^2 formed, the end of the wall at the corner will have a 45 degree surface. When the joining inner wall portion is then poured by the use of the form arranged as shown in Figure 8, the line of jointure of the two inner wall portions will then be at a 45 degree angle.

In some buildings it may not be desired to construct the building so all corners will be outside corners, as a jog in the wall may be necessary, thereby establishing an inner corner. To make this jog in a wall, the forms already described will be used as shown in Figure 10. The corner forms A and B, shown in Figure 1, will be employed to make the two corner posts CP, one being an outer corner post and the other an inner corner post. The interconnecting wall W^1 between these two corner posts will be constructed in a manner already described by use of forms I and J. After the outer portion of the wall comprising the corner posts and connecting walls is constructed, the inner wall portion W^2 will be constructed in a manner already described in connection with Figure 7. This will leave the inner wall portion uncompleted at the inside of the outer corner post and at the inside of the inner corner post. To provide forms

to connect up the sections of the inner wall portions W^2 , the right angle forms A and B used for pouring the corner posts CP will then be used in a manner as illustrated with said sections held in position by bolts which pass through the sleeve openings in the corner posts. The form section A having the wall 15 will be connected in spaced relation with the inner side of the inner corner post CP and the form B, having the wall 16, will be connected in spaced relation with the inner side of the outer corner post CP. Wherever concrete is to be poured around connecting bolts, sleeves 75 and conical washers 76 will be employed so that bolts can be removed after the concrete is set. When forms A and B are used as shown, additional holes may be necessary in the forms as the holes used in the forms in setting up corner post forms will not be proper for bolts passing through embedded sleeves in the corner posts. However, with a proper design of the forms, it may be possible to use holes employed for bolts 19 as the holes for bolts 63. Thus, no new holes would be necessary to be placed in the forms which, when not used, would have to be plugged.

If a building to be constructed is to have partitions to form rooms, these partitions can also be made by the use of the forms already described. In Figure 11 there is shown the manner of use of the forms to pour a portion of a partition where it is to join a complete outside wall already constructed. Two forms, such as B, used to pour corner posts CP will be employed and they will be attached to an outside wall and to each other in the manner shown. Each end wall of the forms will comprise the triangular cross sectional member 26 and its backing member 27. Wherever a tie bolt passes through a concrete receiving space provided by the form, sleeves 78 and conical washer 79 will be used so as to permit the bolts to be removed from the set concrete and leave a conical hole end to facilitate filling.

Also, in making partitions, it is desirable to first construct pillars, which pillars can then be interconnected by sections constructed by using forms already described. In Figure 12 there is illustrated the use of forms for making a partition pillar. These forms will be the same as those used to make a wall pillar as shown in Figure 1, with the exception that the forms will be mounted closer together because the partition will not need to be as thick as an outer wall pillar. As shown in Figure 12, the pillar forms D and E, having the walls 44 and 48, will be used for the sides of the pillar, and these will be spaced apart by use of sleeves 78 and conical washer 79 through which the bolts 38 will pass. The horizontal reinforcing members 46 and 50, associated with the sides of the forms, will have their ends connected by overlapping horizontal reinforcing members 80 which will overlap with and be connected to the reinforcing members 46 and 50 by bolts 81. The end walls for the form will comprise the members 26 and 27, already described, and they will merely be placed so as to be backed by the connecting reinforcing members 80. It will be apparent that after numerous spaced apart pillars have been constructed, they can be readily connected together by use of forms which have already been described, which forms will be attached to the pillars by use of bolts passing through the sleeves 78 having conical end washers 79.

In building partitions it is to be understood that the forms can be used in other combinations

than those illustrated. If, for example, it should be desired to bring out a partition from an inside corner post, such as the one shown at the left in Figure 10, one of the right angle forms A or B can be combined with a straight form

such as J or H, with the forms being attached to the legs of the corner posts by bolts passing through the holes in said legs. From the foregoing description of my forms and their use, it is seen that the complete walls and partitions of a building can be constructed from poured concrete, with the outer walls having embedded therein between inner and outer wall portions desirable insulation and barrier means to prevent transfer of moisture. The walls will be smooth on the exterior and interior surfaces. The holes through the walls, formed by the sleeves, can be plugged and because of the use of conical washers the ends of these holes can be easily filled and be smooth with the wall. Although the walls of the building will be made of inner and outer portions if constructed in sections, there will be no joints between any sections which will coincide with other joints of other sections. Each section will be interlocked with an adjacent section, regardless of whether the sections form a part of the outer wall portion or the inner wall portion.

It will be particularly noted that only a few forms will be required for constructing all the walls of a building, both exterior walls and partitions, and because of the method employed which will comprise constructing the walls by spaced apart sections and then interconnecting the sections, it will be possible for one or two persons to construct all the walls of a building at odd times. Thus, the method of constructing a building in accordance with my invention will permit individuals, with planned instructions, to build their own house or other building from concrete or other plastic material. After the walls of the building are constructed, the roof can be put on by any usual methods and if bolts or other tie-in connections are required to attach the roof, they can be embedded in the top of the walls during pouring of the concrete.

In describing the construction of a building by the use of my improved forms, reinforcing material for the concrete is shown and this reinforcing means, which is in the form of rods, can extend all around the building, thus tying the whole building together by reinforcing material. If any additional reinforcement is required, it can be placed in the concrete at the time it is poured and at desired points.

I have shown the insulation as being embedded between inner and outer wall portions with the insulation being inside the forms which are used when the outer wall portion comprising corner posts, pillars and interconnecting walls are poured. However, this insulation sheet could be put on the outer wall portions by suitable adhesive after the outer wall portions are poured or, if desired, in place of sheets of material, other insulation in a plastic form could be painted or otherwise applied to the interior surface of the outer wall portions after they have been poured. If it should not be desired to provide for any insulation to be embedded in the concrete walls of the building, then the walls of the building could be constructed without the inner wall portions, that is, the wall constructed by forming corner posts, pillars and interconnecting walls. Such a wall construction would probably be suitable for garages, warehouses and the like, or even for

plain straight walls employed as fences or retaining walls.

My improved forms and the method of wall construction have been described in connection with building a particular house, and particularly one which is to be built by one or two individuals at odd times. In some instances it may be desired to construct a number of sections at one time, and in such an event more than the minimum forms would be employed. In constructing the inner portion of the wall, that is, the walls W^1 , it may be desirable to pour the concrete for the entire inner portion of the wall at one time. In such event forms such as H would be employed, with slight modifications. A number of forms H would be set up in end to end relation, with all forms properly spaced from the inside surfaces of corner posts, pillars and connecting wall sections W, already constructed. The forms would be held in spaced relation by bolts 63, sleeves 75 and cone shaped washers 76. The forms H would be made of such length that the abutting adjacent ends thereof would be at the holding bolts 63. Thus, a vertically arranged group of holding bolts 63 would serve to hold two abutting forms. When such a continuous pouring of the inner portion of the wall is employed, the end form members 26 and 27 will not be needed, as is believed to be obvious. In order to illustrate the continuous pouring use of the forms, reference is had to the right end of Figure 6. The form H will be shortened so that its end will be at the bolt 63, as is indicated by dashed line 82. The next form H' , shown in dashed lines, will then abut form H at the end shown by dashed line 82. Members 26 and 27 will be eliminated and on the bolts will be placed the sleeve 75 and cone shaped washer 76 in a manner as illustrated in Figure 10.

In connection with the continuous pouring arrangement for several wall sections, it is to be noted that such can also be employed in simultaneously pouring a number of connecting wall sections W or W^1 between pillars and corner posts. The form H, as modified to permit a plurality of such forms to be used to continuously pour the inner portion of the wall as above described, will be used together with forms G in constructing a number of sections W and W^1 at one time. The forms G will be positioned, as shown and described, between a number of pillars or pillars and corner posts. Forms H, equal in number to forms G, will then be attached to the pillars and posts. The forms H will be shortened so they will be in end to end abutting relation to each other at the vertical line of the bolts 63 at the pillars. This single line of bolts will then hold two abutting ends of forms H to a pillar.

Thus, being aware of various modifications and arrangements of forms and their uses to construct a wall, all without departing from the fundamental principles of my invention, it is to be understood that the scope of the invention is not intended to be limited in any manner except in accordance with the appended claims.

What is claimed is:

1. In a method of building a wall which comprises constructing from settable plastic material and by the use of forms and cross positioned tubular members attached to the forms, spaced apart wall sections having holes extending there-through, then constructing from settable plastic material connecting wall sections between the previously constructed spaced apart sections by the use of forms having their ends secured to the

said spaced apart sections by bolts extending through the established holes thereof, and thereafter constructing a wall of settable plastic material adjacent the outer surface of the connecting wall and in overlapping relation to the wall sections by using the connecting wall as one form and another form attached to the wall sections by bolts extending through said established holes.

2. A method of constructing a wall for a building which comprises constructing from plastic material and by the use of forms spaced apart sections of the wall with said forms prior to their receiving the plastic material being provided with an insulation material in such manner that the spaced sections when formed will have the insulation material adhered to the plastic material on the inside wall surface thereof when the forms are removed, connecting the spaced sections by other wall sections constructed from plastic material and by use of forms with insulation material being so provided in said forms prior to their receiving the plastic material that the connecting wall sections will have the insulation material adhered to the plastic material on the inside wall surface thereof when the forms are removed, and then constructing by the use of forms a wall section of plastic material inwardly of and adjacent to the insulation material which is on the previously constructed spaced wall sections and connecting wall sections.

3. A method of constructing a building which comprises producing a foundation conforming with the shape of the building desired, constructing posts of settable plastic material at the corners of the foundation and with holes through the leg portions thereof by use of form assemblies comprising right angular forms, end forms and cross tubular members, constructing on the foundation of settable plastic material posts having holes therethrough with the posts spaced from each other and the corner posts by the use of form assemblies comprising side forms, end forms and cross tubular members, constructing wall sections in the space between the corner and adjacent intermediate posts and between intermediate posts by the use of forms attachable at their ends to the posts to be connected by means of bolts extending through the holes in said posts, providing insulation material on the inner surfaces of the posts and connecting wall sections, and then constructing a wall portion inwardly of and engaged with the insulation material by forms attached at their ends to the end posts and intermediate posts by bolts passing through the same holes in the posts as employed in attaching the forms to construct the said wall sections.

4. A form assembly for constructing a section of a wall from plastic material comprising vertical side form members, vertical end form means, and means for detachably connecting the end form means to the side form members, said end form means each comprising a vertically extending member of such cross sectional shape

as to establish an irregular surface on each end of the wall section produced by placing plastic material in the form and a second vertically extending member of such cross sectional shape as to establish a vertical shoulder on the said produced wall section spaced inwardly of and parallel with its outer wall surface, said members of the end form means being separable to thus permit the use only of the first named members thereof to construct a narrow wall section with irregular surfaces on the ends thereof.

5. A form assembly for constructing a section of a wall from plastic material comprising vertical side form members, vertical end form means, means for detachably connecting the end form means to the side form members, said end form means each comprising a vertically extending member of such cross sectional shape as to establish an irregular surface on the end of the wall section produced by placing plastic material in the form and a second vertically extending member of such cross sectional shape as to establish a vertical shoulder on the ends of said produced wall section inwardly of its outer surface but parallel therewith, tubular members extending between the side form member in right angular relation thereto and having their ends abutting the side form members to hold them spaced apart, and bolts extending through the tubular member with their ends attached to the side form member to thereby hold the side form members from spreading, said tubular members permitting removal of the bolts and establishment of holes through the wall section enabling other forms to be attached to the completed wall section by bolts, and said vertical shoulders permitting the outer of said other forms to abut thereagainst so that a thinner wall section can be established by placing plastic material between said other forms.

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