

June 26, 1934.

N. GARRETT

1,963,983

METHOD OF BUILDING FLOOR AND ROOF STRUCTURES

Filed Oct. 5, 1931

6 Sheets-Sheet 1

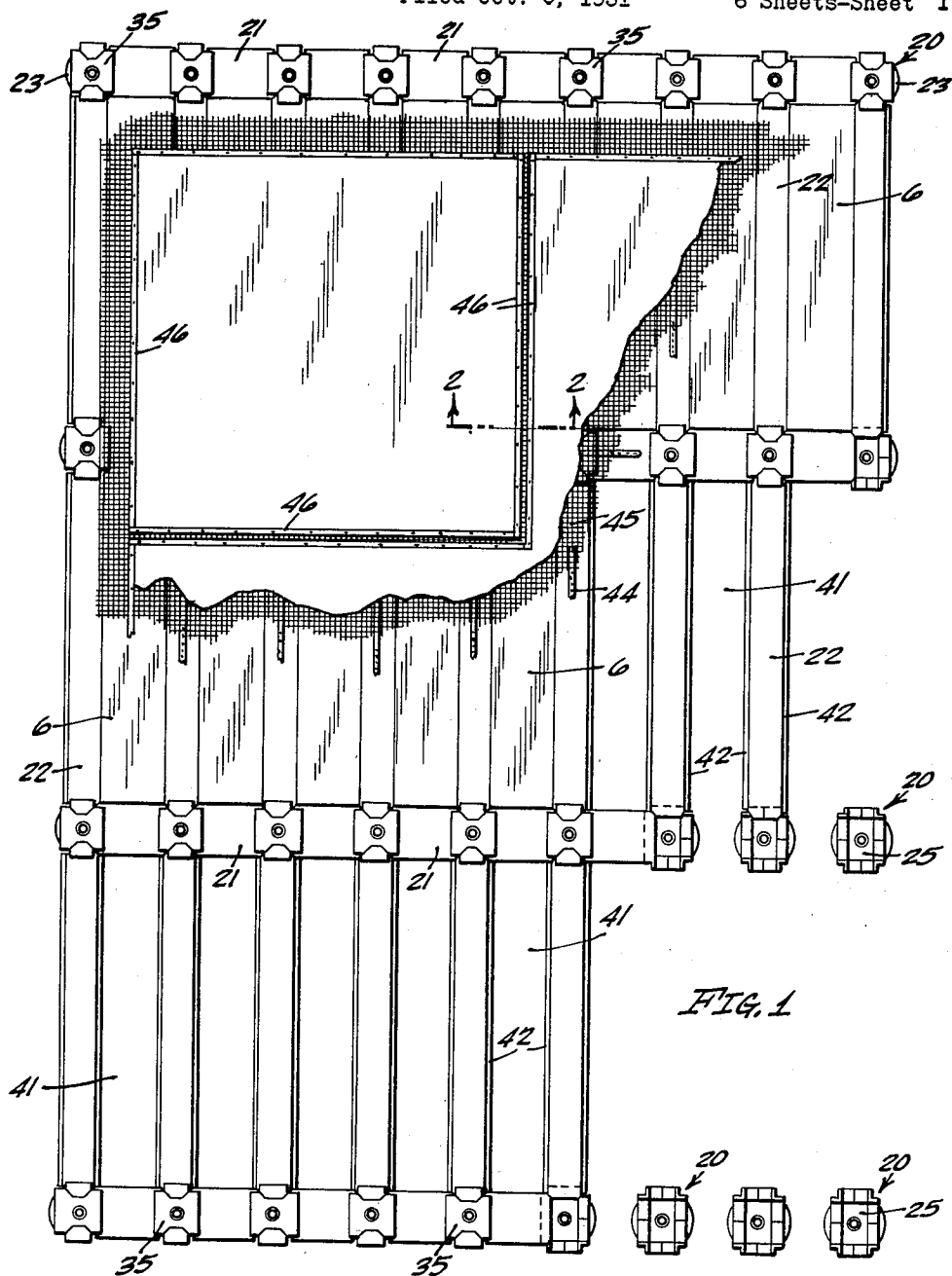


FIG. 1

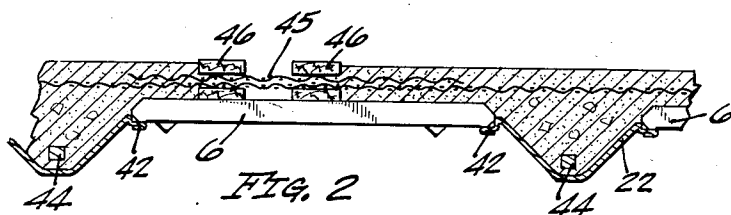


FIG. 2

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June 26, 1934.

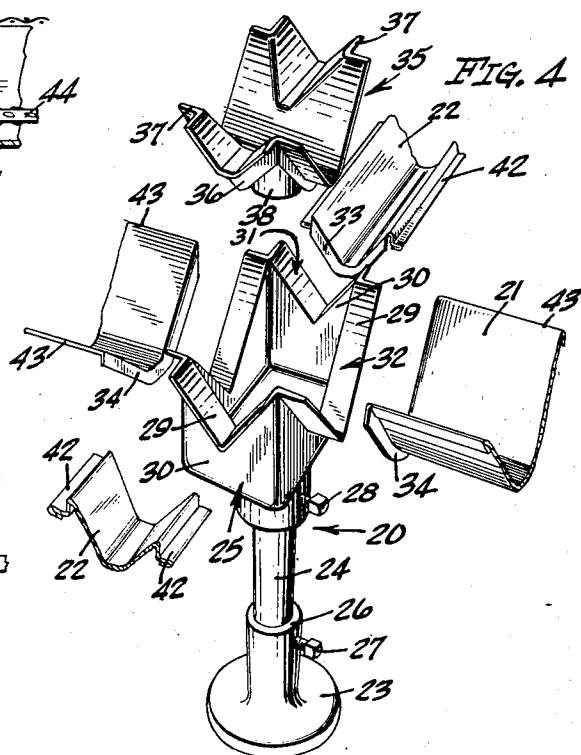
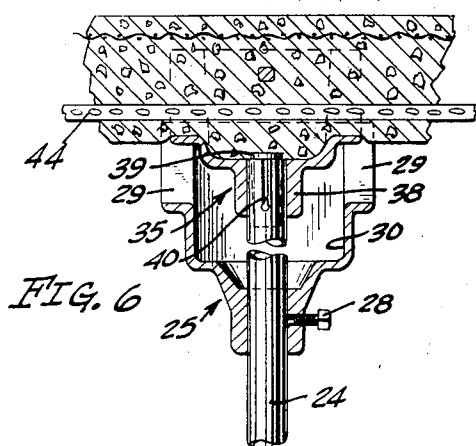
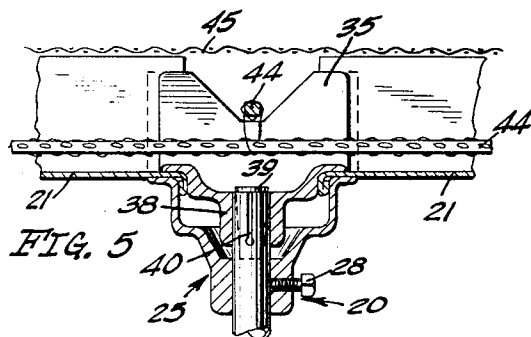
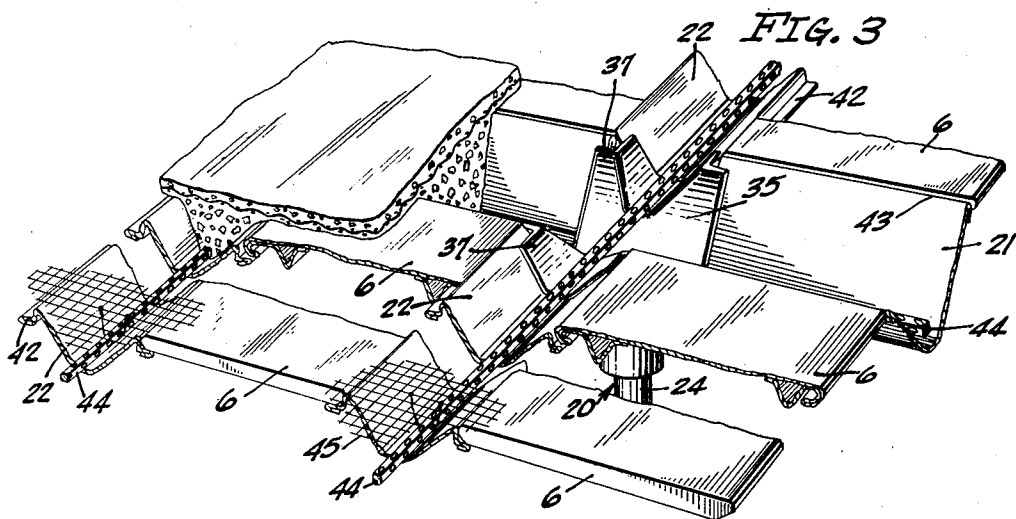
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6 Sheets-Sheet 2



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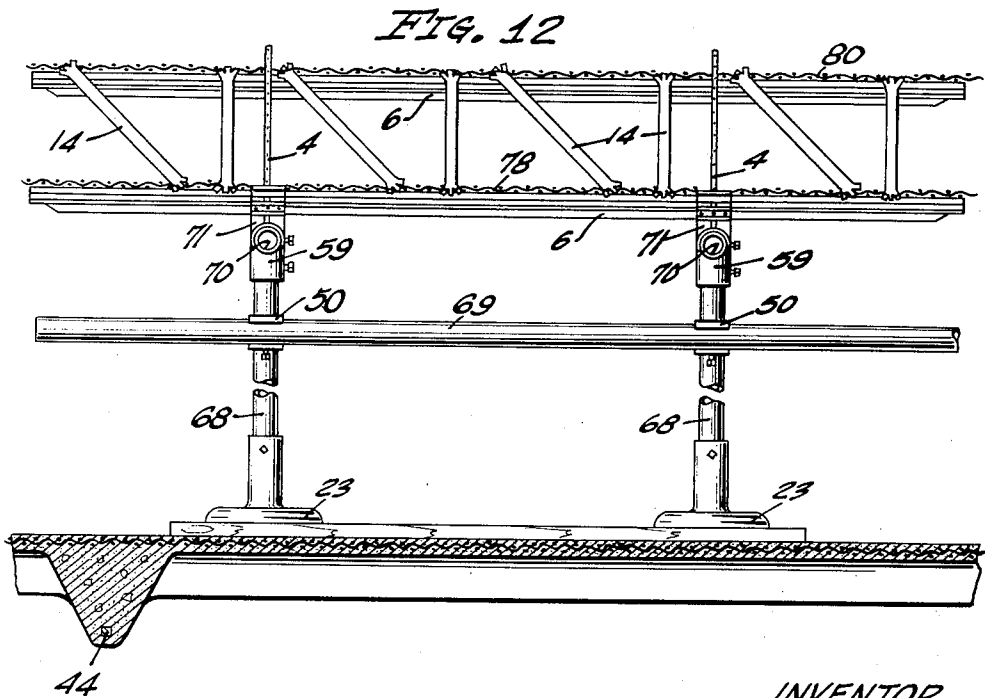
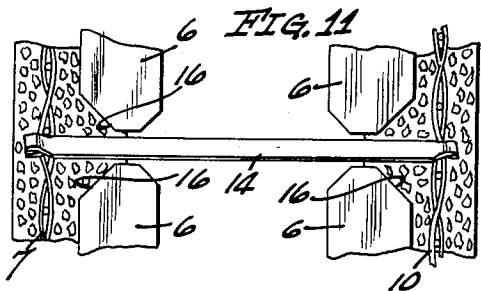
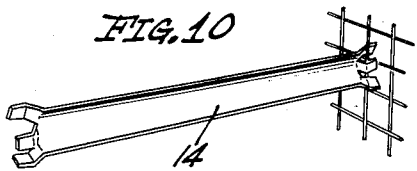
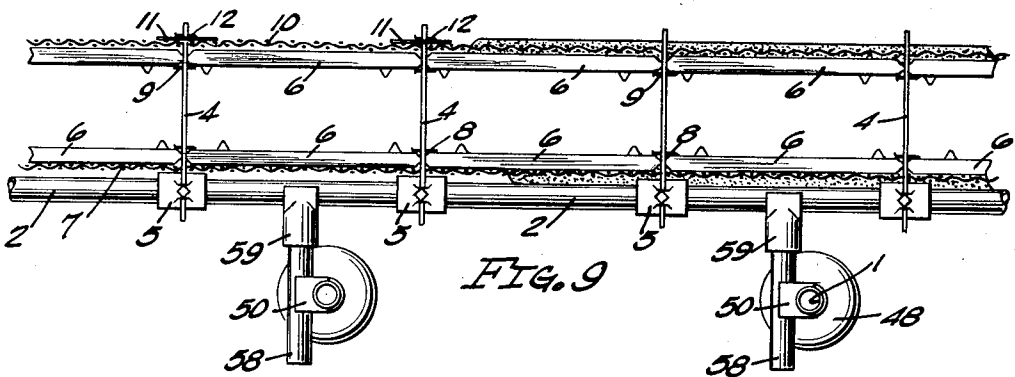
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METHOD OF BUILDING FLOOR AND ROOF STRUCTURES

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6 Sheets-Sheet 4



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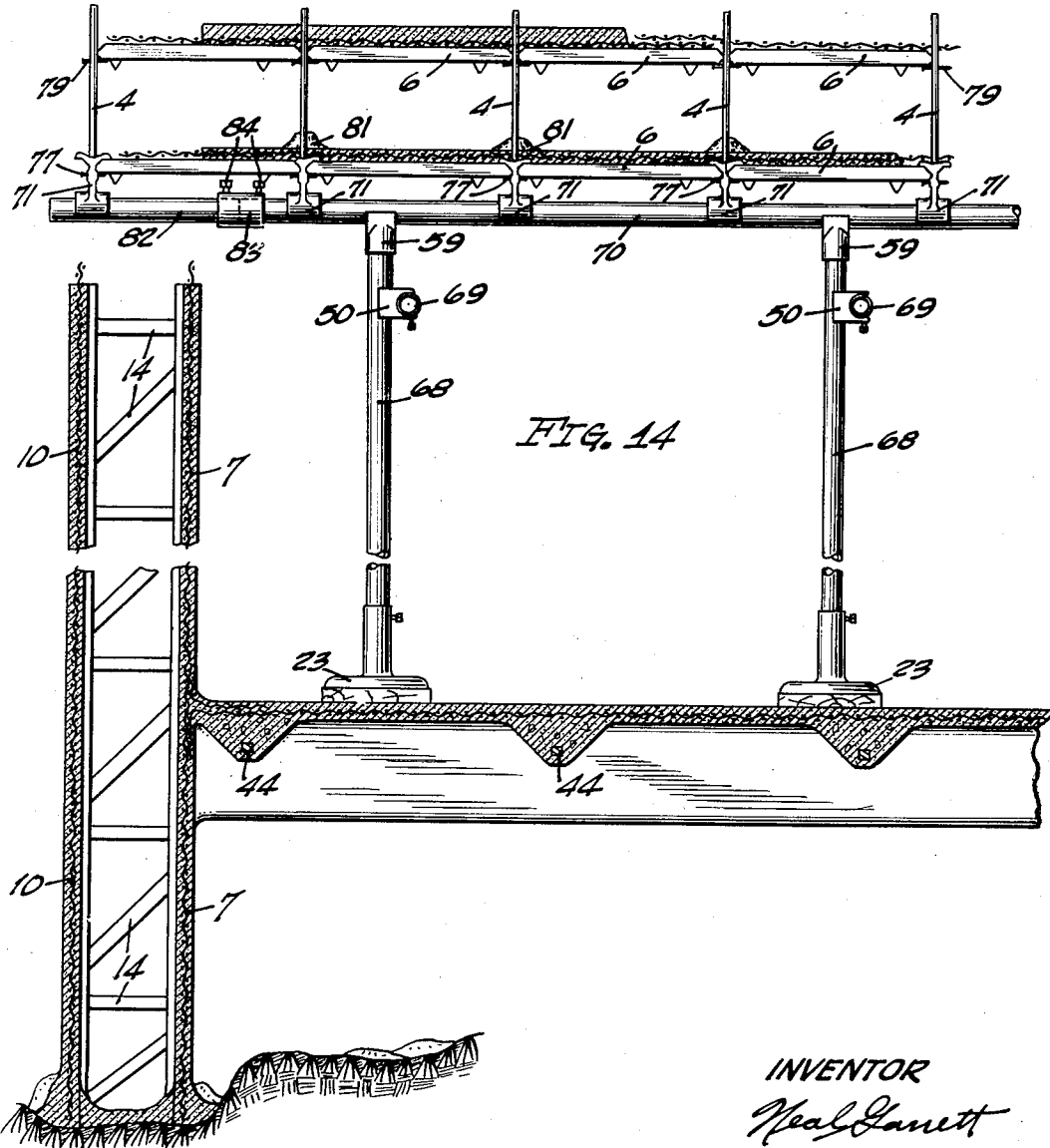
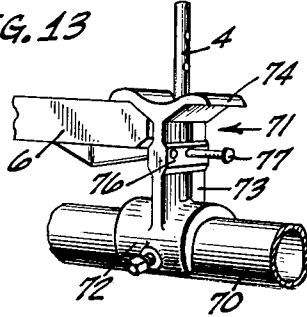
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METHOD OF BUILDING FLOOR AND ROOF STRUCTURES

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FIG. 13



June 26, 1934.

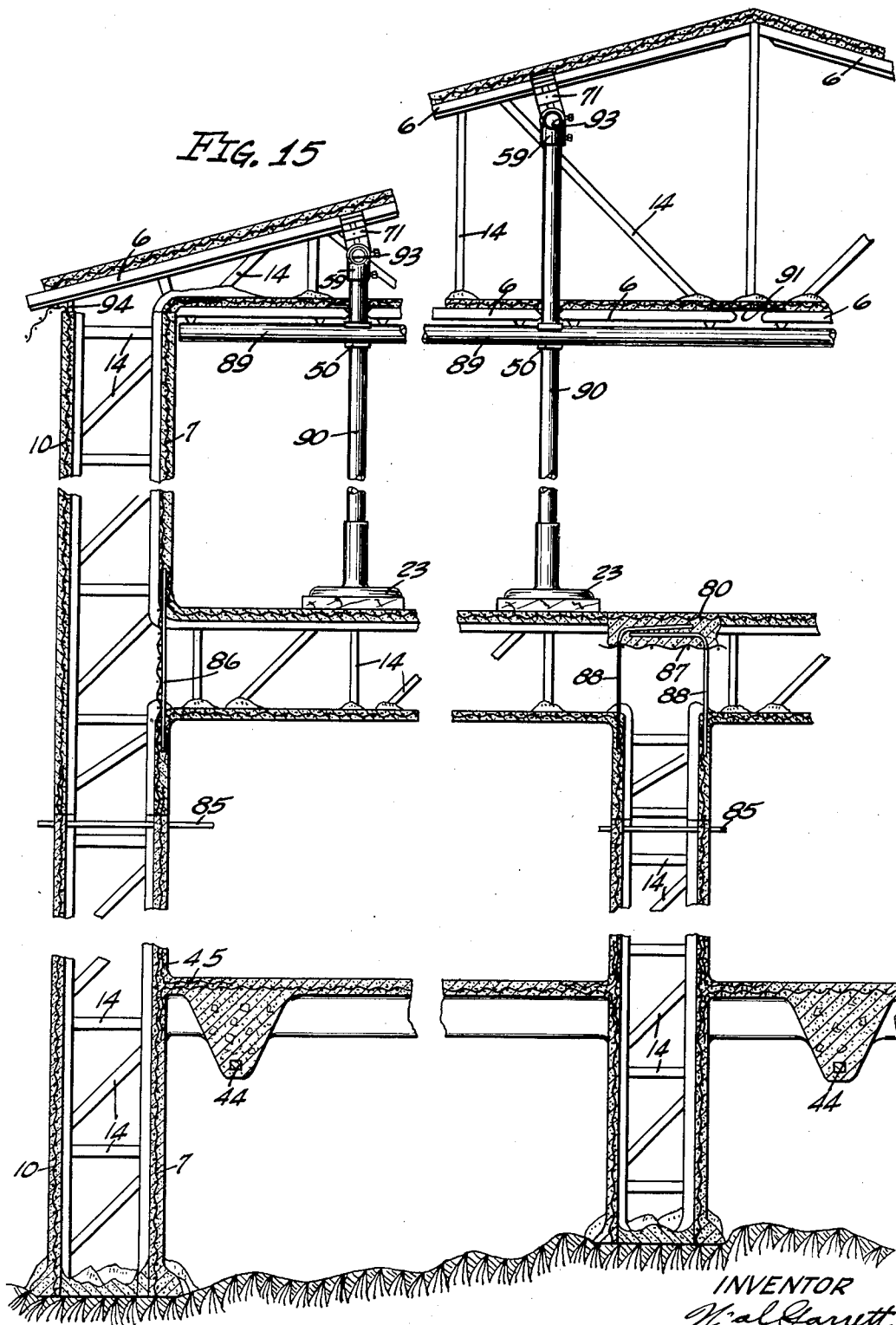
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METHOD OF BUILDING FLOOR AND ROOF STRUCTURES

Filed Oct. 5, 1931

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UNITED STATES PATENT OFFICE

1,963,983

METHOD OF BUILDING FLOOR AND ROOF
STRUCTURES

Neal Garrett, Glendale, Calif.

Application October 5, 1931, Serial No. 566,960

5 Claims. (Cl. 25—155)

This invention relates to methods of making reinforced cementitious structures and more especially to methods of building those structures characterized by horizontal or inclined cementitious slabs.

The subject matter of this invention has particular reference to the types of inventions described and claimed in my co-pending applications Serial Nos. 155,699, filed December 18, 1926; 257,357, filed February 27, 1928; 561,392, 561,393, 561,394 and 561,395, filed September 5, 1931; and 566,958, 566,959, 566,961 and 566,963, filed October 5, 1931.

An object of this invention is to provide methods of forming reinforced cementitious floor and roof structures wherein just a small portion of the apparatus is left in place to support the cementitious material while hardening and a large portion of the apparatus is removed soon after the placing of the cementitious material and is set up again for re-use.

Another object of this invention is to provide a method of building a floor by progressively building the floor over the form work as placed so as to eliminate the necessity of form work for supporting anything except the floor so that a very light form work may be used.

A further object of this invention is to provide methods of forming floor and roof structures wherein the apparatus and materials are easily set together with a minimum of tedious operations, such as tying or nailing elements together.

A still further object of this invention is to provide a method of utilizing a plurality of rigid units of fixed size in a manner so that structures of any shape and dimension may be formed without the use of complicated forms and especially to provide a method of utilizing the units for the construction of floors so that the necessity of horizontal adjustments of the floor form work is eliminated.

A still further object of this invention is to provide a method of constructing floors that is easily used on irregular ground.

A still further object of this invention is to provide a method of constructing floors and roofs that utilizes methods of forming cementitious slabs which have many of the advantages of plastering methods.

A still further object of this invention is to provide a method of building floor and roof structures characterized by spaced, relatively thin cementitious slabs in which the steps of previously erecting beams, joists, and expensive types of previously formed trusses are eliminated and in place

thereof light slab connecting members are placed progressively as the slabs are formed and arranged to integrally join and brace the slabs together.

It is an important object of this invention to provide a method whereby permanent floor and roof structures can be formed of relatively thin, spaced layers of fire-proof materials thoroughly reinforced and webbed together to form structures which are very light and yet substantial and which possess sufficient elasticity and yieldability to successfully resist earthquake shocks.

Further objects of my invention are made apparent by the following detailed description.

In the drawings

Fig. 1 is a plan view showing successive steps in the erection of a floor;

Fig. 2 is a fragmentary vertical sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary perspective view of a portion of the form panels and intervening beam and joist forms for pouring a floor, a fragment of the completed floor being shown;

Fig. 4 is a fragmentary perspective view showing the floor form support, the cover member and the ends of beam and joist forms in their relative positions but removed from the support;

Fig. 5 is a fragmentary vertical median sectional view through a beam form and floor form supporting bracket showing the forms assembled;

Fig. 6 is a view similar to Fig. 5 showing the floor form supporting bracket lowered and the forms removed;

Fig. 7 is a fragmentary vertical sectional view through a structure built according to my invention showing method of building walls and of joining floors and walls;

Fig. 8 is a fragmentary perspective view showing the pipe scaffolding and its use in alining and supporting the form panels;

Fig. 9 is a plan view of assembled apparatus for building a wall and a portion of wall formed thereon;

Fig. 10 is a perspective view of a slab connecting member;

Fig. 11 is an enlarged fragmentary plan view of the apparatus and wall formed thereon at a gap in the form panels;

Fig. 12 is a sectional view showing apparatus for constructing a double floor;

Fig. 13 is a perspective view of a support for floor and panels;

Fig. 14 is a fragmentary elevational view of apparatus for constructing a double floor showing a portion of floor formed therewith;

Fig. 15 is a fragmentary vertical section through a structure formed by my method and shows a method of constructing a roof.

Apparatus and procedure for building one type of floor is illustrated in Figures 1 to 6, inclusive. A plurality of supports 20 are set up at the proper positions and adjusted to the desired levels to serve as end bearings for the beam forms 21 and the smaller beam forms or joist forms 22. The apparatus for constructing the floor is comprised of many simple parts and the description of the construction and use of each part applies to all like parts wherever they are used throughout the construction of the floor.

Support 20 includes a flanged base 23, a post 24, and a bracket 25. The post 24 is held vertically in boss 26 of base 23 and is fixed at a predetermined level by set screw 27. Bracket 25 is vertically adjusted on post 24 and fixed at a predetermined height by set screw 28. Bracket 25 has flanges 29 extending outwardly from its side walls 30, said flanges forming V-shaped notches 31 and 32 to receive the joist forms and beam forms respectively.

The ends of the joist and beam forms are provided with flanges 33 and 34 respectively. The joist and beam forms are placed with the back faces of their flanged ends tightly against the inside faces of the walls of a bracket and define a space into which cover 35 tightly fits. Cover 35 is best shown in Fig. 4, and the manner by which it locks the ends of the beam or joist forms is best illustrated in Fig. 5. The shoulders 36 of the cover coact with the walls 30 of the bracket, and the flanges 37 of the cover coact with flanges 29 of the bracket to hold the ends of the joist and beam forms from being displaced. Centrally and at the bottom of the cover 35 is an integral boss 38 having a hole therethrough. When the cover 35 is placed within the bracket, the hole in the boss 38 receives the upper end of the post 24. The post 24 holds the cover in position to secure even a single joist and/or beam form against horizontal displacement so that it is not necessary to have all four form ends in the bracket. As illustrated in Fig. 5, taper plug 39 is inserted into the upper end of tubular post 24 which is provided with slits 40, only one of which is shown, and the taper plug is driven into the post to wedge the sides of the post firmly against the walls of boss 38 thus securing the cover member to the post.

A plurality of supports 20 may be set up progressively and accurately because the joist and beam forms locked in each preceding bracket definitely locate the following bracket. The joist and beam forms are held substantially throughout their entire depth in the supports 20 to provide a continuous beam action across the supports 20 so as to eliminate the necessity of additional braces to hold the posts 24 upright. The joist and beam forms are of a size to form the sides of rectangular enclosures 41, Fig. 1, which enclosures are each adapted to receive a single panel. Panels 6 are placed face up within the enclosures 41 and are supported by ledges 42 formed integrally with the joist forms 22 as illustrated in Fig. 3. When placed within the enclosures 41, the ends of the form panels 6 abut the upper edges 43 of the beam forms 21, thus aligning the panels longitudinally.

Steel reinforcing bars 44 are laid in the bottoms of the joist and beam forms, and reinforcing 45 which is preferably a form of foraminous sheet material such as wire mesh or expanded metal is spread over the panels and joist forms and beam

forms. The bars 44 are held a short distance from the bottoms of the joist and beam forms by suspending them with wires from reinforcing 45. The weight of the suspended bars 44 tends to hold the reinforcing 45 against the faces of the panels.

It is not necessary to set the apparatus to fit horizontal dimensions and it may extend into or beyond the areas to be occupied by the walls. The elimination of the necessity of accurately positioning the horizontal extremities of the floor forms at predetermined positions makes possible a very easy and rapid erection of the apparatus.

In my method the areas to be occupied by the walls can be far more easily and quickly located and defined on the level platform provided by the apparatus set up as described than can be done in methods where the wall areas must be accurately determined on the ground prior to the erection of the floor forms. The cementitious material of the floors is not to be placed within the areas to be occupied by the walls and partitions. These walls areas are preferably defined by superimposed pairs of bounding strips 46, which rest on the panel faces and are separated by the reinforcing. The reinforcing is provided double at this point so that it may subsequently be bent up and down to provide adequate bond with the walls.

Cementitious material is poured over the floor forms to form a floor of the desired thickness. The floor slab is formed up to the strips 46 to provide its margins substantially in the vertical planes of the proposed wall faces. In the case of exterior walls, only a single pair of strips 46 is required.

A floor of any desired size may be formed upon a form structure made up of units of fixed size, since the exterior walls may be located where desired without regard to the area or shape of the floor forms.

After the cementitious material has hardened sufficiently to bear its own weight, set screws 28 of brackets 25 are loosened, the brackets lowered, and the panels, joist forms, and beam forms are removed. Until permanent support for the floor is provided, covers 35 locked to posts 24 remain under the floor to support it at the junctures of the floor joists and beams as shown in Figures 6 and 7.

Before building the walls, any supports which may be in the way of the erection of the walls are removed. After permanent support is provided for the floor by the walls, or otherwise, all of the supports 20 are removed. Supports 20 are removed by the loosening of set screws 27, and the lowering of posts 24 holding covers 35.

The apparatus and general procedure for constructing walls is illustrated in Figures 7, 8 and 9.

My wall alining system is comprised of vertical pipes 1 supported by bases 48, short horizontal pipes 58, clamps 50 supporting pipes 58 on pipes 1, pipes 2 extending along one side of the predetermined wall position, clamps 59 supporting pipes 2 on pipes 58, rods 4 extending transversely of the area to be occupied by the wall, and clamps 5 holding rods 4 on pipes 2.

Bounding strips 46 are removed and reinforcing 45 is bent downwardly and upwardly. Reinforcing 7 is placed over and supported by rods 4. Backing is provided behind reinforcing 7 by placing panels 6 between vertical rows of rods 4 and pressing them against the reinforcing 7, thereby forcing the same tightly against clamps 5. Pins 8 are placed through holes in rods 4 and hold the panels against the reinforcing 7.

Pins 9 are placed in holes of rods 4 to engage the backs of a second row of panels to space and align the same with respect to the first erected row of panels. Reinforcing 10 is supported on the ends of the rods 4 and held flat against the form faces by inclined strips 11. Each strip 11 is provided with a hole to receive a rod 4 and is held in place by a pin 12 passing through a hole in a rod 4.

The apparatus is erected easily regardless of the roughness of the ground. Each individual panel is slidably held at its vertical edges so as to be vertically independent of the rest of the apparatus and adapted to rest directly on the ground.

A slab connecting member, hereinafter referred to as tie 14, is formed from sheet metal strips into a shape providing a curved cross section to provide rigidity.

Before the cementitious material is applied, ties 14 are inserted through openings of the reinforcing into the position between the form panels illustrated in Fig. 11. Each tie is supported at its ends by engagement with reinforcing 7 and 10. Ties 14 are placed both horizontally and inclined, as illustrated in Figures 7, 14 and 15, to provide a web-like structure to coat with wall slabs in providing a wall adapted to act as a series of vertical trusses.

Reinforcing 7 and 10 is preferably foraminous sheet material, such as wire mesh or expanded metal of a type adapted to reinforce layers of plastered material.

After the slab connecting members and layers of wire mesh are in place, cementitious material is plastered over the form faces to embed the reinforcing 7 and 10. The cementitious material is forced into the recesses formed by the beveled faces 16 of adjoining panels so as to securely embed the ends of the ties.

Referring particularly to Fig. 7, in the formation of interior walls or partitions bounding strips 46 are removed, the exposed portions of reinforcing materials are cut and bent up and down to become incorporated in the wall slabs. Two sheets of reinforcing 67 are placed within the space to be occupied by the partition and the panels are then placed between the sheets of reinforcing and supported on framework for the formation of a wall in substantially the same manner as that described for the formation of an exterior wall. Interior walls are preferably carried down to the ground to act as floor supports.

As soon as the cementitious material has hardened pins 12 and strips 11 are removed, rods 4 are released in clamps 5 and rotated to drop pins 8 and 9, and the forms are removed. Cementitious material is poured between the slabs to close the space between the slabs at the ground, or to form a solid wall if desired.

Reference is directed to Figures 12 to 15, inclusive, for illustration of my method of building a double floor. The floor form supporting structure includes a plurality of vertical pipes 68 supported in bases 23 so as to be vertically adjustable and aligned in rows by pipes 69, which are supported on vertical pipes 68 by clamps 50. Horizontal pipes 70 are supported on the upper ends of vertical pipes 68 by clamps 59. Floor supports 71 are clamped upon pipes 70 at intervals to support the lower row of panels.

Floor support 71 is illustrated in Fig. 13 and comprises a clamp portion 72, an upright web 73, and a floor bearing portion 74. The under

side of the floor bearing portion 74 is provided with an angled surface adapted to receive the angled edges of the form panels. The clamp is provided with a vertical hole to receive a rod 4. The web is thickened at 76 and provided with a hole to receive a pin 77. Floor supports 71 are spaced along pipes 70 so that the panels are supported on pins 77 as shown and sufficient space is provided between consecutive supports 71 so that the thickened portions of the web do not obstruct the dropping of the form panels.

Over the horizontal form surface presented by the lower row of form panels, a layer of reinforcing 78 is laid. A second layer of horizontal panels spaced above the first layer is provided by supporting the panels upon pins 79 horizontally inserted in the vertical rods 4. This provides an upper floor forming surface, over which reinforcing 80 is laid. Reinforcing 78 and 80 is preferably a form of foraminous sheet material such as wire mesh or expanded metal.

Though the sequence of operations in building this floor may be varied, I shall now describe a sequence in which I place the panels progressively and advance the cementitious material over them as erected instead of plastering over several panels previously erected in place. This may be done by a workman supported independently of the form panels so that light panels may be used without being subjected to those ordinary stresses and abuses received by form panels heretofore used as a platform for the bearing of floor materials and workmen applying the same. To begin a floor construction I preferably place one panel in the lower row as at the extreme left of Fig. 14. The vertical walls are stopped a short distance below the level of the second floor so that this first panel may be placed partially over the top of the wall as shown.

For convenience in handling, the reinforcing is preferably used in sheets slightly longer than the panels and having a width of approximately a man's reach. Such reinforcing is placed over the form panel and cementitious material is applied to form a slab beginning at a point in vertical alinement with the interior slab of the wall and extending toward the forward edge of the panel. The forward edge of a panel is herein considered to be the edge adjacent to which another form panel is to be placed.

Next, pins 79 are inserted in rods 4 and upon them is laid the initial panel of the upper row, above and parallel to the corresponding panel in the lower row. Reinforcing and cementitious material are applied to this panel in the same manner.

The second panel of the lower row is supported on supports 71 with its edge adjoining the edge of the first panel to form what may be termed a transverse row. When this panel is in place, reinforcing is laid over it and the cementitious material is advanced from the preceding panel to the forward edge of the last laid panel. This cementitious material is normally advanced to the forward edge of each panel, but the exact point is governed by the width of the sheets of reinforcing, for the edge of each sheet must be left exposed to provide a lap for the next succeeding sheet.

The two slabs are joined by ties 14 placed both vertically and inclined as shown in Figures 12 and 15. Ties 14 are stood up in the soft cementitious material with their upper ends against the forward edge of the upper panel. Cementi-

tious abutments 81 are formed to embed the lower ends of ties 14.

A second upper panel is placed in position, covered with reinforcing, and the cementitious material advanced to the forward edge. A projection is formed on the under face of the upper slab at the adjoining edges of adjacent panels in which is embedded the upper ends of ties 14.

The above recited steps are continued to carry the transverse row of panels and the floor formed thereon across the structure. Gaps are left in the floor slabs at those areas which are in vertical alinement with the walls and partitions. These gaps are defined and formed just as were the gaps in the first floor which were to be occupied by the walls. Portions of the apparatus which extend through areas to be occupied by walls and partitions are supported by short pipe extensions 32 which are coupled to pipes 70 by cylindrical clamps 83 and fixed in place by set screws 84. Fig. 14 shows the lower floor slab advanced to a point near the forward edge of the last laid panel and with the corresponding upper panel in place with the wire over it ready for the cementitious material to be advanced from the previously laid upper panel. The cementitious material is shown as stopped near the center of an upper panel to allow for the lap of the reinforcing 80.

When the plaster has suitably hardened, a similar pipe framework is set up for another transverse row of form panels adjacent to the first row. The floor supports of the second transverse row are horizontally alined with those of the first transverse row so that, by removing the pins 77 and 79 the panels may be shifted endwise successively into new positions in the second row. It is preferable to remove the pins 77 first so as to provide the rods 4 free to turn in supports 71 so that the rods may turn to facilitate the removal of the pins 79 which are usually pulled out in a direction longitudinal with respect to the panels. If desired, the rods may be rotated prior to the removal of the upper panels and pins 79, thus releasing the upper panels; the upper panels withdrawn; and then the pins may be easily removed. The panels are shifted endwise to new positions in the succeeding transverse row.

When the form panels are removed, the upper slab is supported from the under slab by ties 14 and the lower slab bears on floor supports 71 which carry the floor until permanent support is provided.

Floor slabs are erected on the forms in the second row to form a strip of floor adjacent and connected to the previously formed floor. The sheets of reinforcing are longer than the panels and lap at the ends of the panels to securely tie successive strips of flooring. Ties 14, placed against panels of the second transverse row, are in alinement with similar members of the already erected floor and thus form a continuation of the truss bracing between floor slabs. Successive strips of flooring are formed in the above described manner upon successive settings of panels so that the floor is extended progressively across the structure.

The completion of the second floor involves the erection of the exterior walls and the finishing of the first floor partitions.

Short extensions 82 and any supports 71 thereon are removed by loosening set screws 84. The reinforcing is cut down the center of the gaps left for the first floor partitions. The reinforcing projecting from the upper and lower slabs is

bent up and down respectively. A pipe framework is erected just as before for the walls. In this case the panels may be conveniently supported on cross rods 85 laid on top of the walls or inserted through the walls near the top, as shown in Fig. 15. The panels are alined so that they will be directly above the positions occupied by the panels during the first stages of the wall erection. This positioning alines the slab connecting members throughout the entire vertical extent of the wall and makes the projections embedding the slab connecting members coextensive in height with the wall slabs.

The exterior slab is carried up to a point approximately at the level of the eaves, using additional panels placed on top of the first ones if necessary. The method of forming this slab is the same as already set forth. In the same manner the interior slab is carried upward to the ceiling level; it being understood that were a third story to be built, both slabs would be stopped somewhat below this point as on the first floor. The second floor is connected to the wall by embedding the bent up and down portions of the reinforcing in the interior wall slab. To aid in carrying stress between the portions of the interior slabs above and below the second floor, vertical reinforcing rods 86, only one of which is shown in Fig. 15, are placed against the reinforcing at suitable spaced horizontal intervals. When a partition is to be carried above the first floor, the method of carrying it up is the same as for erecting an exterior wall, except that the joinder of the second floor to a partition is for each slab of the partition the same as the joinder of an inner slab of an exterior wall to the second floor.

When a partition stops at the ceiling, the construction thereof is done exactly as though it were to be carried on above the second story except that the wall forming materials are only placed below the second floor. The panels are withdrawn and a form 87 is positioned as shown in Fig. 15. The reinforcing rods 88 are bent as shown. The upper layer of reinforcing 80 is bent back and wired to form 87. The gap in the upper floor is then filled with cementitious material.

After permanent support for the double floor has been provided by the completion of the walls or otherwise, pipes 68 are lowered in bases 23, and supports 71 and the rest of the floor form supporting apparatus removed.

After the panels are removed from the walls, the cross rods 85 are pulled out of the sides of the wall.

Another one of my methods of building a double floor is by using a set-up of apparatus similar to that described for the construction of my double wall except that it is erected in the horizontal position. The essential difference between this last mentioned method of building a floor, which is the method of building my double wall in the horizontal position, and the method of building the double floor described with reference to Figures 12 to 15 is that the lower row of form panels are faced down and the lower slab is plastered from the under side. In such a method the clamps 5 perform a function similar to that of the supports 71.

A roof structure is formed according to my invention by forming a structure which, like my double floors, is essentially a series of connected trusses, and in this case a lower horizontal slab is formed to provide the ceiling and an upper

inclined slab is formed to provide the roof slab is illustrated in Fig. 15.

From the foregoing description of the method of building my wall in a horizontal position and the method of building a double floor as illustrated with reference to Figures 12 to 15, two methods of constructing my roof should be evident because it is only necessary to build the upper slab in an inclined position to produce my roof structure. To emphasize the manner in which the use of my apparatus may be varied, I shall now describe a method of building my roof structure which differs from the described methods of building my floors.

A pipe scaffolding is erected for supporting the roof forms. A lower row of panels is laid directly on horizontal pipes 89, only one of which is shown in Fig. 17. In this variational form of my method of building a roof, the lower row of form panels is to be used to support workmen, and for this reason it is preferable to provide pipes 89 at relatively close intervals and to use planks or other suitable means on the upper face of the panels for protecting the panels. Vertical pipes 90 of the scaffolding extend between the panels of the lower row. The panels in the lower row are spaced at pipes 90 and elsewhere so as to adjust the length of the row to fit between the walls. The gaps between panels are covered with sheet metal plates 91.

Reinforcing is laid over the lower row of panels. The scaffolding is provided with horizontal pipes 93 on which are mounted supports 71. Supports 71 are set with the slab bearing portions inclined to bear the roof slab and are used to support the upper row of panels in a manner similar to the way they are used to support the panels for the lower slab of the double floor. In this particular case I have chosen to lay the panels perpendicular to the roof ridge and in rows parallel to the roof ridge. The roof slab is built progressively in a manner similar to that for building the upper slab of my double floor. The portion of the roof adjacent to the ridge is built first and the forms are used in successive rows until the roof slab is built to the eaves.

As the roof slab is laid, ties 14 are positioned so as to extend between the panels of the upper row and to have their upper ends in position to be embedded in the roof slab and their lower ends resting on the lower row of form panels. Ties are selected which are sufficiently large so as to be capable of withstanding, as web members of the trusses, the maximum stresses that would result from the worst possible loading of the roof structure.

A bounding strip 94 serves as a convenient support for the form panels at the eaves. To remove the forms used for the roof slab, the strip 94 is knocked out, the panels are released from the supports 71, and withdrawn through the space between the roof slab and the outside wall slab. Then this space is filled with cementitious material to join the outside wall slab and the roof slab.

Cementitious material is applied over the lower row of form panels and portions thereof are heaped up to form projections for embedding the lower ends of ties 14. Projecting portions of the wall slab reinforcing are embedded in the ceiling slab to strengthen the jointer between the ceiling and the walls. The usual scuttle hole is left in the ceiling and is used for the exit of the workmen after completing the ceiling slab.

When the cementitious material has set suffi-

ciently to sustain itself, pipes 89 are taken down. When this is done, the ceiling slab is suspended from the roof slab by ties 14 and the roof slab bears on supports 71 which help carry the roof structure until the cementitious material has gained sufficient strength to function with the reinforcing as the cords of the roof trusses. After the roof structure has gained such strength, the pipes, clamps, and supports 71 are removed. The vertical pipes 90 are vertically adjustable in bases 23 to facilitate their removal. Holes and imperfections left after the removal of the apparatus are filled with cementitious material.

My single slab floor, my double floor, and my double wall are each adapted to be used for an inclined or a horizontal slab of a roof structure.

My construction differs from conventional construction in that instead of first erecting permanent structural stress bearing frame members and later covering the frame members with plastered slabs, I form the structure progressively, forming the relatively thin slabs progressively, tying the slabs together as they are formed and causing the slabs and the slab connecting members to form a structure that takes the place of the conventional type of construction.

It is contemplated that features of my invention will be used in the construction of buildings where cementitious slabs are formed on permanent backing.

Although features of my invention relate to the use of method of forming relatively thin cementitious slabs which have advantages of plastering methods, my invention includes features which are to apply to heavy poured concrete work.

The term cementitious material is used to refer to any material in a soft state capable of hardening or to any material which was at one time in a soft state and has hardened.

While preferred forms of this invention have been described, it is to be understood that the drawings and the description thereof are to be considered as illustrative of, rather than limitative upon, the broader claims because it will be apparent to those skilled in the art that changes may be made without departing from the scope of my invention.

I claim:

1. The method of making a roof structure characterized by a horizontal slab and an inclined slab joined at spaced intervals by slab connecting members, that includes erecting a horizontal sheet of slab reinforcing and an inclined sheet of slab reinforcing, arranging individually slab connecting members so that each slab connecting member has its length extending transversely with respect to the sheets of slab reinforcing, applying cementitious material over the sheets of slab reinforcing to form a horizontal slab and an inclined slab, and progressively embedding in the cementitious material portions of the slab connecting members as the slabs are formed.

2. The method of making a roof structure characterized by a horizontal slab and an inclined slab joined at spaced intervals by slab connecting members, that includes erecting a horizontal sheet of slab reinforcing and an inclined sheet of slab reinforcing, arranging individually slab connecting members so that each slab connecting member has its length extending transversely with respect to the sheets of slab reinforcing, applying cementitious material over the sheets of slab reinforcing to form a horizontal slab and an inclined slab, forming cementitious

projections on opposed slab faces, and bonding portions of slab connecting members in the projections.

3. The method of making structures characterized by two relatively inclined slabs joined at spaced intervals by slab connecting members, that includes erecting two relatively inclined sheets of slab reinforcing, arranging individually suitable slab connecting members to provide rows of slab connecting members adapted to act with the slabs as the webbing of a truss acts with the cords of a truss, applying cementitious material over the sheets of slab reinforcing to form spaced slabs and embedding in the cementitious material portions of the slab connecting members as the slabs are formed.

4. A method of making a roof structure characterized by two spaced slabs that includes erecting temporary slab supports in position for supporting engagement with the upper slab of the roof structure and at spaced intervals throughout the area to be covered by the roof structure, erecting two rows of upwardly facing form panels to provide one row thereof in place to form said upper slab and the other row thereof in

place to form the lower slab of the roof structure, forming a slab on each of the rows of panels, progressively joining the slabs with slab connecting members as the slabs are formed, removing the panels to leave the lower slab suspended from the upper slab by means of the slab connecting members and to leave the upper slab supported on said supports, joining the slabs to permanent roof bearing structures and removing said supports after the cementitious material has hardened.

5. A method of building a roof structure that includes erecting a scaffolding, a horizontal row of form panels supported by the scaffolding, and an inclined row of form panels supported upon portions of the scaffolding extending through the lower row of panels; forming a roof slab over the inclined row of panels; forming a ceiling slab over the horizontal row of panels; joining the slabs with slab connecting members arranged to act with the slabs as the webbing of a truss acts with the cords of a truss; and removing the panels and scaffolding.

NEAL GARRETT.

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