

June 12, 1945.

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2,377,944

METHOD OF CONCRETE FLOOR CONSTRUCTION

Filed April 26, 1944

2 Sheets-Sheet 1

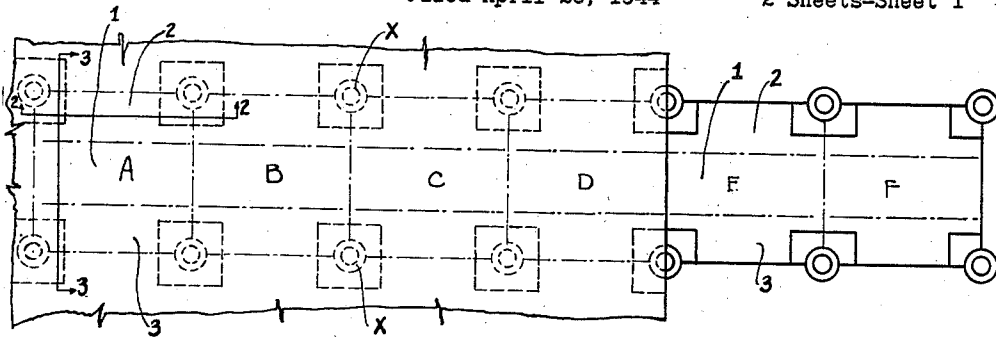


FIG. 1

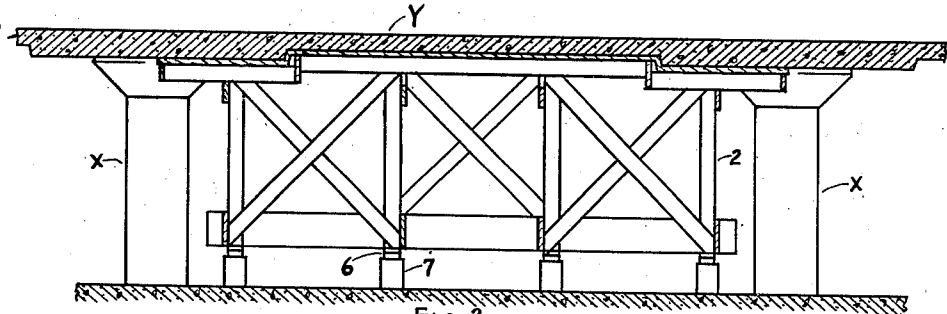


FIG. 2

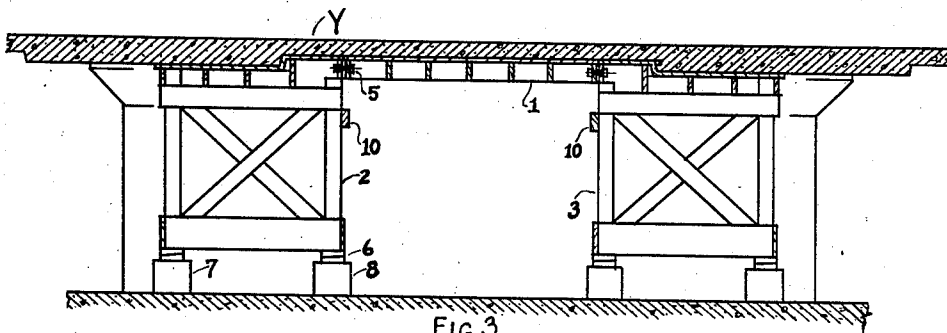


FIG. 3

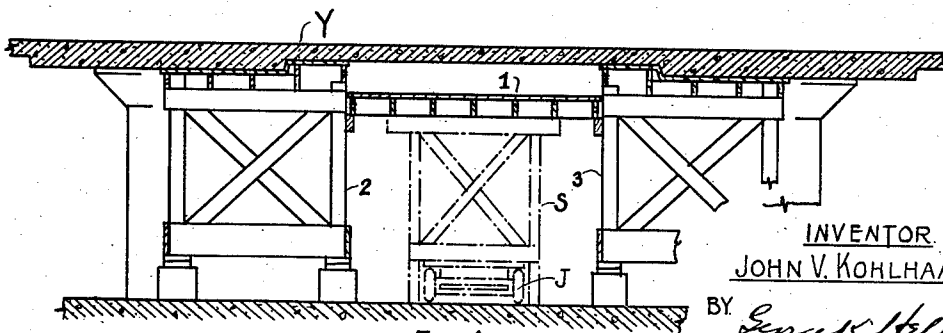


FIG. 4

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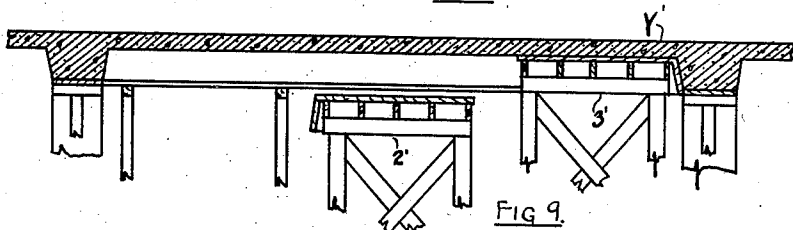
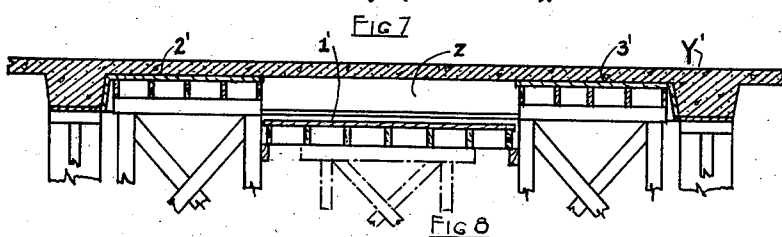
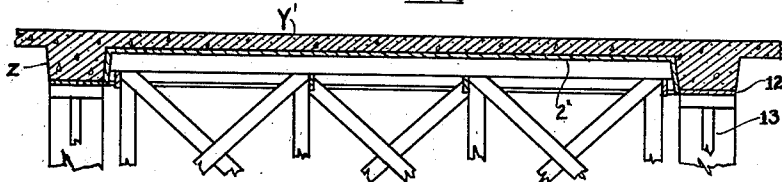
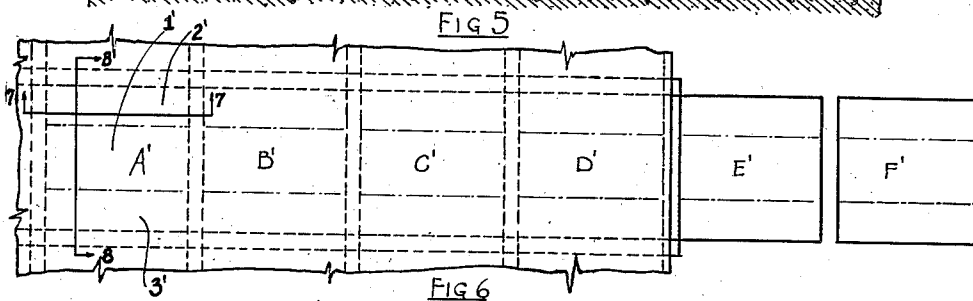
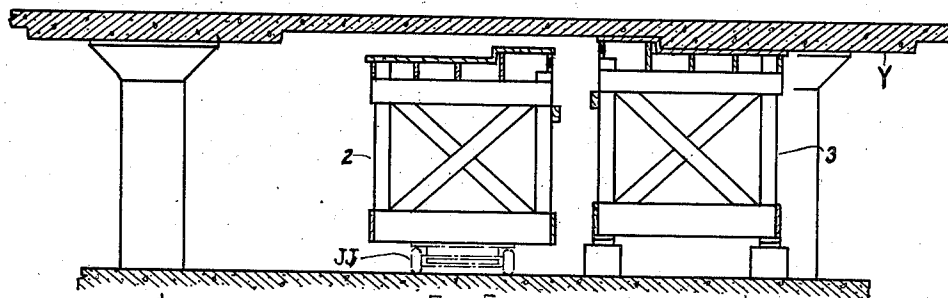
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METHOD OF CONCRETE FLOOR CONSTRUCTION

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2 Sheets-Sheet 2



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2,377,944

METHOD OF CONCRETE FLOOR
CONSTRUCTION

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Application April 26, 1944, Serial No. 532,725

4 Claims. (Cl. 25—155)

This invention relates to the construction of concrete floors and the like and is designed to expedite their erection and reduce the cost thereof; to these ends it contemplates use of forms of special type and their manipulation in accordance with certain principles by which it is possible to erect consecutive adjoining areas of the floor with a minimum of time and labor.

It is therefore a principal object of the invention to provide a novel method of constructing concrete floors and the like which may be advantageously utilized in place of the methods commonly employed.

Other objects, advantages and novel steps and operations realized by or incident to the use of the invention are hereinafter more particularly pointed out or will be apparent to those skilled in the art from the following description and accompanying drawings which together are illustrative of but not restrictive to the employment of the invention in the construction of flat slab and marginal beam flat slab floors.

In accordance with the invention, a longitudinally extending section of the floor between lateral supporting elements such as columns or beams and of any desired length is progressively constructed unit by unit by the use of a series of sectional forms each adapted to support the concrete for one unit, and in its preferred practice a plurality of these forms are first erected in alignment side by side. Concrete is then poured into the first form of the series and then progressively into the others, and after it is sufficiently hardened in the one first poured the sections of that form are disassembled and consecutively passed in a predetermined way beneath the other forms in which the later poured concrete is still setting and at a point just beyond the last erected form are reassembled for reception of more concrete to form additional units of the floor in prolongation of the previously poured ones, as will now be explained in greater detail.

I shall first refer more particularly to Figs. 1-5 inclusive which more or less diagrammatically illustrate the application of the method in the construction of a flat slab floor, in which

Fig. 1 is a fragmentary top plan view of a portion of the completed floor and adjacent but as yet unfloored unit areas in prolongation thereof;

Fig. 2 is a vertical section on a larger scale on line 2-2 in Fig. 1;

Fig. 3 is a similar section on line 3-3 in Fig. 1;

Fig. 4 is a section corresponding to Fig. 3 but showing the central section of the form lowered from pouring position preparatory to being moved

out of alignment with its wing sections, and Fig. 5 similarly shows one of the wing sections en route to the position in which it is next to be employed.

Figs. 6-9 inclusive illustrate in a generally similar manner the employment of the invention in the erection of a marginal beam flat slab floor, Fig. 6 thus generally corresponding to Fig. 1 and Figs. 7, 8 and 9 respectively to Figs. 2, 4 and 5 but with their lower parts broken away for convenience of illustration.

Corresponding parts in the various figures are designated in general by the same reference characters but in the case of Figs. 6-9 inclusive with the addition of a prime (').

I shall first refer to the use of the invention in the construction of a flat slab floor (Figs. 1-5 inclusive) and will assume two parallel rows of columns X in equally longitudinally spaced relation have been erected in any suitable way upon which the floor Y is designed to rest, thus defining a plurality of longitudinally continuous generally rectangular areas designated as A, B, C, D, E and F.

In accordance with the invention I first prepare a plurality of forms of the general construction best shown in Figs. 2 and 3, these being made of wood or other suitable material properly braced in conformity with usual or any convenient practice and each adapted to receive concrete to form a unit of the floor the corners of which are defined by the columns X. Each form comprises a central section 1 and side or wing sections 2, 3 which when assembled on opposite sides of the central section afford with it an upper surface for the reception of the concrete, which surface in this type of construction is normally a little higher in its central part than proximate its edges.

One of the forms is then assembled in one of the areas defined by four contiguous columns, for example, area A, with the wing sections at the opposite sides of the said area and the center section 1 disposed between them at the proper level in which position it is removably secured in any appropriate manner as by bolts 5 connecting it with the wing sections. To facilitate bringing the form to the proper height with relation to the rest of the building the wing sections are preferably rested on wedges 6 in turn supported on blocks or skids 7, 8 so that by manipulating the wedges the wing sections may be vertically adjusted to the desired position after which center section 1 can be readily inserted between them and secured in place by bolts 5. For convenience of description the forms erected in the various

areas will be designated respectively as Aa, Bb, etc.

To enhance rapidity of the construction work a second form Bb may next be similarly erected in the longitudinally contiguous area B and, in some instances, still other forms Cc, Dd in the next progressively contiguous areas C and D before any of the forms are poured, but under most conditions I deem it preferable to pour concrete into forms Aa and Bb after they are in place, or even only into form A, and allow it to set while the contiguous form or forms are being placed in position. For present purposes therefore we will assume that a pair of forms Aa and Bb are first erected and then poured and that while the concrete therein is setting similar forms Cc and Dd are erected in the contiguous areas C and D and then poured; as normally from three to seven days are required for the first poured concrete to harden sufficiently to permit removal of its supporting forms, this period gives ample time for the erection and pouring of the second set of forms.

When the first poured concrete has reached the required degree of hardness, center section 1 of form Aa is disconnected from its wing sections and lowered from the superjacent floor for a limited distance sufficient, however, to permit it to clear the corresponding center sections of adjacent erected forms when it is moved longitudinally of the floor; for supporting it in this lowered position the wing sections may be provided with rails or abutments 10 upon which the center section can rest as shown in Fig. 4. A hydraulic wheeled jack or dolly J carrying a scaffolding S for supporting the center section is next run underneath it and the jack operated to slightly lift it from the rails 10 so that the entire section is supported on the scaffolding. The dolly is then moved longitudinally so as to withdraw the center section from between the wing sections and carry it outside area A during which movement the center section because of its lowered position readily clears corresponding sections of the other forms overlying its path. This movement of the center section may be in either direction but usually is made toward the far end of the space which is being floored and thus to the right in Fig. 1 and, if so, is continued until the section passes beyond first unpoured area, in this case area E, where it is temporarily allowed to remain on the dolly. If the movement is made in the opposite direction, however, it is arrested after the section clears area A.

Another dolly JJ is then brought up and moved in under one of the wing sections, for example section 2, and wedges 6 are knocked out so as to lower the section on the dolly and separate it from the superjacent concrete; the dolly is then manipulated to move the section laterally inward to approximately the path traversed previously by the center section along which it is then moved longitudinally beneath the erected forms in the direction of the first unpoured area, to wit area E, until it is aligned therewith, the top of the section of course clearing the bottoms of the center sections of the other erected forms during this movement. After attainment of proper longitudinal position the section is moved laterally outward in area E to a position therein corresponding to that which it originally occupied in area A and supported on skids and wedges therein as previously described preparatory to removal of the dolly. The other wing section 3 is then lowered on the dolly and likewise moved inwardly, longi-

tudinally beneath the erected forms and finally outwardly opposite section 2 in area E and secured in place, after which the center section 1 which has previously remained on its dolly J in out-of-the-way position is moved between the wing sections, lifted by the dolly jack to proper alignment therewith and bolted or otherwise secured thereto, thus completing the removal of form Aa originally in area A and its erection in area E ready for the pouring of the concrete to form the corresponding unit of the floor.

The form Bb beneath the poured concrete in area B is then disassembled and in like manner moved beneath the forms in areas C, D and E and re-erected in area F contiguous to area E and concrete is poured in both re-erected forms either successively or at the same time so as to complete the E and F units of the floor. Meanwhile the concrete previously poured in units C and D has become gradually hardening and as soon as it has become self-sustaining these two forms are consecutively disassembled and respectively moved into and re-assembled in the areas beyond F in exactly the same way as the forms from areas A and B were moved to and erected in areas E and F.

It will now be apparent that in accordance with the invention the floor between two rows of its supporting columns can be progressively constructed unit by unit with great rapidity and a minimum of effort, since while the concrete is hardening in one or more of the last poured units the forms from previously poured ones are knocked down, passed beneath them and re-erected in areas contiguous to the still hardening concrete preparatory to the pouring of such contiguous sections, the forms being thus consecutively used over and over again until the floor is finished from end to end.

While in the preferred practice of the invention as hitherto explained two or more of the forms are erected and poured, a like number of forms then erected adjacent thereto and poured and the first set of forms then disassembled, consecutively moved under the second set and re-erected beyond them preparatory to again being poured since this procedure is ordinarily faster and more economical than pouring but a single form at a time, it is equally within the scope of the invention to erect and pour one form, then the adjacent form and, after the concrete in the first form has hardened, to disassemble it, pass its sections beneath the second form and re-erect them on the opposite side thereof preparatory to pouring the third unit.

Figs. 6-9 inclusive are designed to illustrate the application of the method in the construction of marginal flat slab floors in the erection of which it can be utilized with the same advantages as in the erection of flat slab floors as hitherto described. Since the support for marginal beam flat slab floors is primarily derived from beams Z surrounding each unit of the floor, integral with it and depending below its under surface, the forms in which a floor of this character is poured must therefore be constructed for the reception of the concrete comprised in these beams as well as for that in the flat slab portion which they bound. Thus the concrete receiving portion of the forms utilized are made to conform to these requirements but are otherwise substantially similar to those hitherto described, so that each essentially comprises a center section 1' and wing sections 2', 3'. To form the lower faces of the beams each section at appropriate points may

have a horizontally outwardly directed marginal portion extending from its downwardly depending flange, if it may be so termed, which forms the inner face of the beam, but under most conditions it is preferable to form the lower face of the beam against a flat board or the like 12 supported on appropriate shores 13 which is independent of the form and is placed about the perimeter of the latter after it is erected. Because of their greater section, the beams normally require support for a much longer hardening period than the thinner flat portion of the floor and consequently when they are independently shored in this manner the forms can be removed as soon as the floor is hard enough and re-erected to form another unit while the shores are left in place under the beams as long as may be necessary.

In constructing a floor of this character the procedure is similar to that already described and therefore, in brief, consists in preferably erecting a pair of forms in adjoining areas A', B' and pouring them; then erecting a second pair in areas C', D' and pouring them; consecutively disassembling the first two forms, passing them under the second pair of forms and re-erecting them in areas E', F' preparatory to pouring and so on until the floor is finished. It will be of course understood that instead of erecting, pouring and then moving two series of forms consecutively, only two forms may be used and respectively consecutively erected, poured and then moved under the adjacent poured form and re-erected as already explained.

It will further be appreciated that while I prefer to construct the forms with but one center and two opposed wing sections, it may sometimes be found desirable to facilitate handling or for other reasons to make the sections or some of them in two or more parts which are then assembled to form a complete section when the form is erected and that the use of divisible forms of such character is fully within contemplation of the invention.

Moreover, while I have herein described with considerable particularity certain ways of performing the invention, I do not thereby desire or intend to restrict or limit myself thereto or to the use of forms of any special configuration or design as changes and modifications will readily occur to those familiar with the art and may be made in its practice without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim and desire to protect by Letters Patent of the United States:

1. The method of progressively constructing a concrete floor or the like which comprises providing a pair of similar forms to receive concrete to form a unit of the floor and each including three independent unitary sections bodily movable independently of one another and comprising two laterally spaced wing sections and a central section located at the upper portions of the wing sections and supported by the same in transverse alignment therewith, placing one of said forms in position and pouring concrete thereinto, placing and pouring a second form adjacent the first form, lowering the central section of the first form sufficiently to clear the central section of the second form after the concrete in the first form has become self-sustaining, then moving said central section of the first form through the space between the wing sections of the sec-

ond form to an advanced position beyond the second form, then consecutively moving the wing sections of the first form laterally inward substantially to the path followed by the central section of the first form, thence longitudinally along said path through the space between the wing sections of the second form to an advanced position beyond the second form, then assembling the sections of the first form in an advanced pouring position beyond the second form, and finally pouring concrete into the reassembled first form to complete a unit of the floor adjacent a previously poured unit.

2. The method of progressively constructing a concrete floor or the like which comprises providing a pair of similar forms to receive concrete to form a unit of the floor and each including three independent unitary sections bodily movable independently of one another and comprising two laterally spaced wing sections and a central section located at the upper portions of the wing sections and supported by the same in transverse alignment therewith, placing one of said forms in position and pouring concrete thereinto, placing and pouring a second form adjacent the first form, lowering the central section of the first form sufficiently to clear the central section of the second form after the concrete in the first form has become self-sustaining, then moving said central section of the first form through the space between the wing sections of the second form to an advanced position beyond the second form, then consecutively moving the wing sections of the first form laterally inward substantially to the path followed by the central section of the first form, thence longitudinally along said path through the space between the wing sections of the second form and thence laterally outward to positions adjacent said second form and corresponding to positions originally occupied by the wing sections of the first form, next moving the central section of the first form longitudinally into transverse alignment with said wing sections of the first form and raising and securing said central section to a position corresponding to that which it originally occupied with respect to said sections of the first form, and finally pouring the re-erected form to complete a unit of the floor adjacent the second poured unit.

3. The method of progressively constructing a concrete floor or the like which comprises providing a pair of similar forms to receive concrete to form a unit of the floor and each including three independent unitary sections bodily movable independently of one another and comprising two laterally spaced wing sections and a central section located at the upper portions of the wing sections and supported by the same in transverse alignment therewith, placing one of said forms in position and pouring concrete thereinto, placing and pouring a second form adjacent the first form, lowering the central section of the first form sufficiently to clear the central section of the second form after the concrete in the first form has become self-sustaining, then moving said central section of the first form through the space between the wing sections of the second form to an advanced position beyond the second form, then consecutively moving the wing sections of the first form laterally inward substantially to the path followed by the central section of the first form, thence longitudinally along said path through the space between the wing sections of the sec-

ond form and thence laterally outward to positions adjacent said second form and corresponding to positions originally occupied by the wing sections of the first form, next moving the central section of the first form longitudinally into transverse alignment with said wing sections of the first form and raising and securing said central section to a position corresponding to that which it originally occupied with respect to said sections of the first form, finally pouring the re-erected form to complete a unit of the floor adjacent the second poured unit, then lowering the central section of the second form sufficiently to clear the central section of said re-erected form after the concrete in the second form has become self-sustaining, then moving said central section of the second form through the space between the wing sections of the first form to an advanced position beyond the re-erected first form, then consecutively moving the wing sections of the second form laterally inward substantially to the path followed by the central section of the second form, thence longitudinally along said path through the space between the wing sections of the first form to an advanced position beyond the first form, then assembling the sections of the second form in an advanced pouring position beyond the first form, and finally pouring concrete into the reassembled second form to complete a unit of the floor adjacent a previously poured unit.

4. The method of progressively constructing a concrete floor or the like which comprises providing a series of similar forms, each including three independent unitary sections bodily mov-

able independently of one another and comprising two laterally spaced wing sections and a central section located at the upper portions of the wing sections and supported by the same in transverse alignment therewith, placing said forms in position and pouring concrete thereinto, lowering the central section of the first form of the series sufficiently to clear the central sections of the other forms after the concrete in the first form has become self-sustaining, then moving said central section of the first form through the space between the wing sections of said other forms to an advanced position beyond said series of forms, then consecutively moving the wing sections of the first form laterally inward substantially to the path followed by the central section of the first form, thence longitudinally along said path through the space between the wing sections of said other forms to an advanced position beyond the last form of said series, then assembling the sections of the first form in an advanced pouring position adjacent said last section of the series, then pouring concrete into the reassembled first form to complete a unit of the floor adjacent a previously poured unit, then successively moving the sections of each of the said other forms of the series through the space between wing sections of the series to an advanced pouring position, then re-assembling the sections in an advanced pouring position, and then pouring concrete into the re-assembled form to complete a unit of the floor adjacent a previously poured unit.

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