United States Patent

[11] 3,595,516

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[45] Patented **July 27, 1971**

[54] **FORM FOR CASTING CONCRETE STRUCTURAL UNITS**
4 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** ..... **249/155,** 25/121, 249/50, 18/34 R
[51] **Int. Cl.** **B28b 7/02**
[50] **Field of Search** ..... 249/155, 158, 160, 161, 162, 50; 25/121, 118 Q, 118 T; 18/34 R, 42 R, 5 R; 52/425, 743, 744

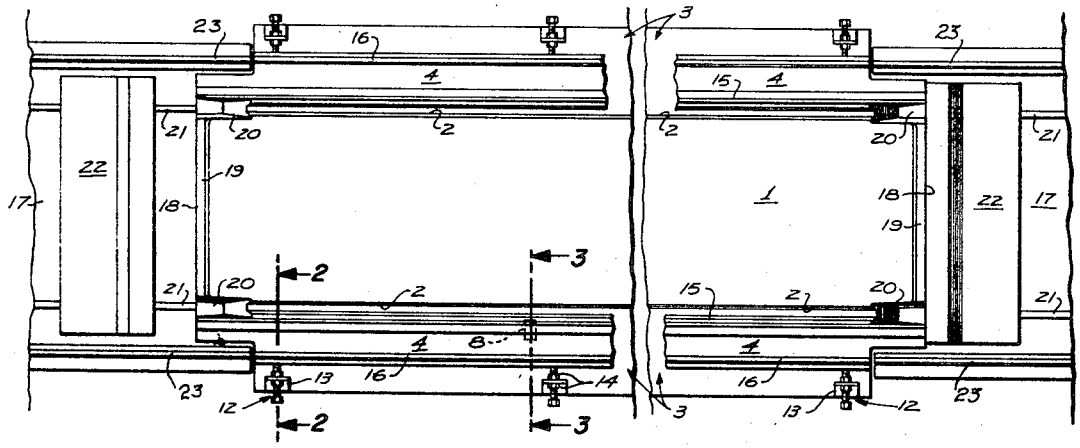
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ABSTRACT: A form for casting structural units of the type involving at least a concrete slab and side beams and may include end beams and corner legs, the form including beam casting forms slidable a limited distance on an underlying surface between a casting position and a clearance position, each beam casting form being itself a concrete structure secured to the underlying structure by steel straps the extremities of which are anchored in the beam casting form and the underlying structure, whereas the central portions are encased in an elastomer to permit limited movement of the beam casting form.



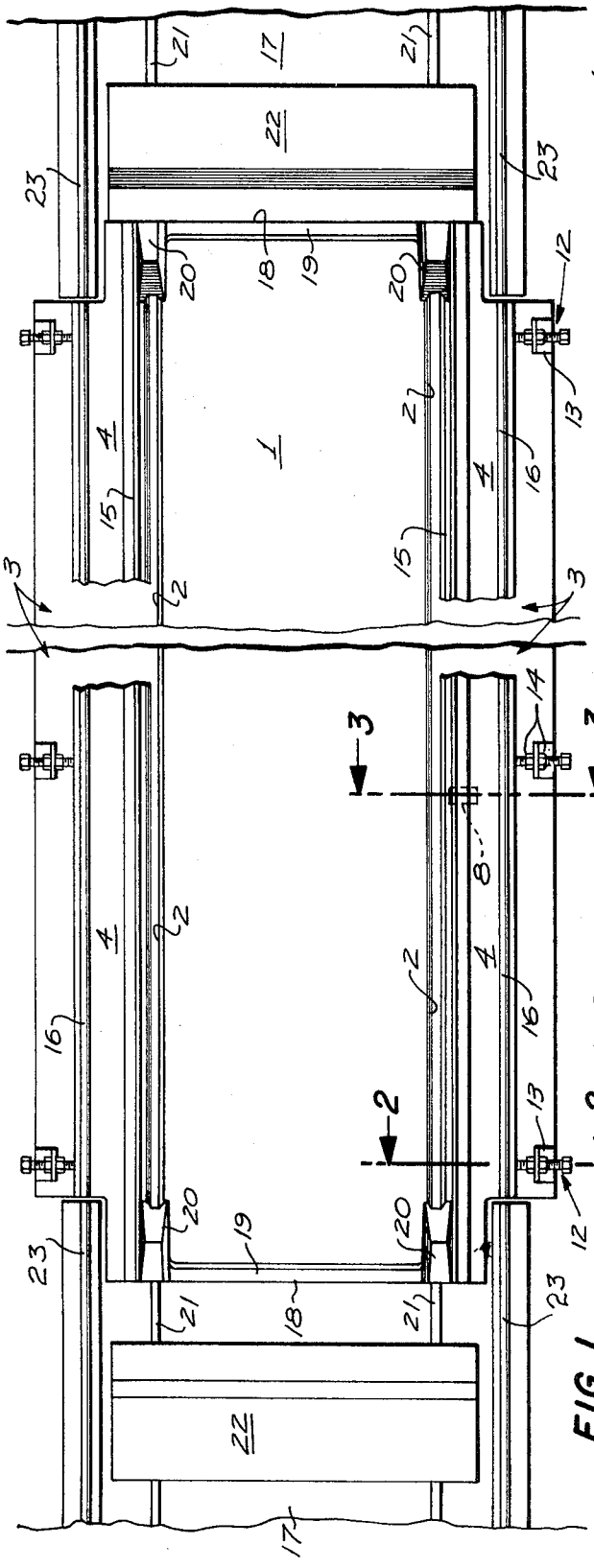


FIG. 1

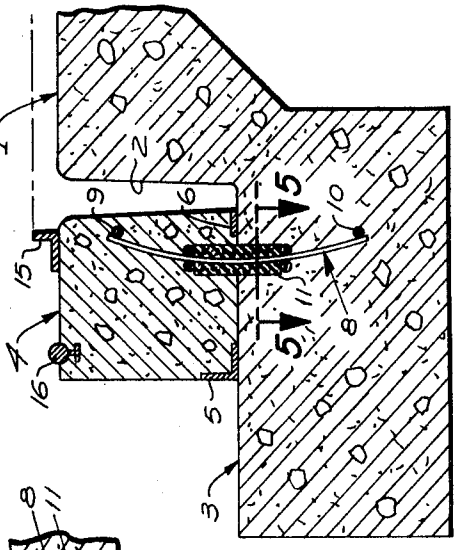


FIG. 3

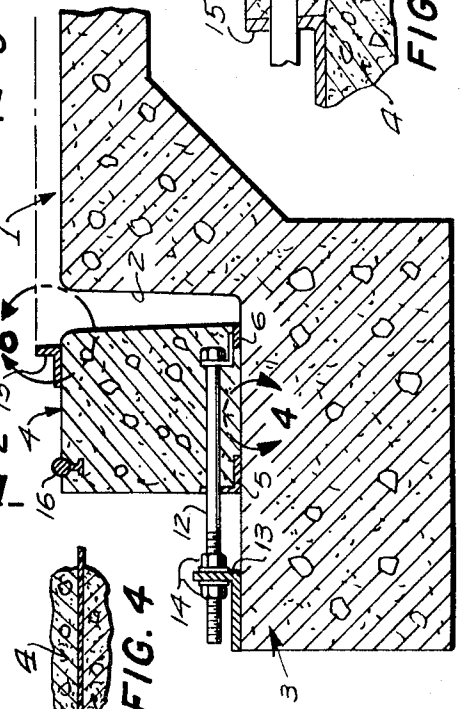


FIG. 2

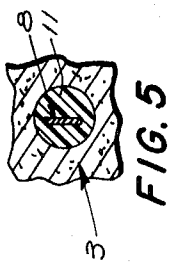


FIG. 5

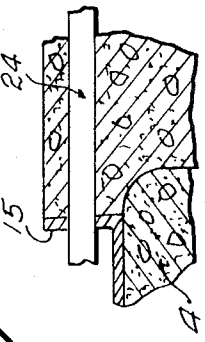


FIG. 6

FIG. 4

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FORM FOR CASTING CONCRETE STRUCTURAL UNITS

BACKGROUND OF THE INVENTION

The present invention pertains to forms for repeated casting of concrete structural units; for example, concrete slabs having side beams and possibly end beams as well as corner legs. Such structural units being disclosed in my copending application, Ser. No. 837,986, filed June 2, 1969, entitled Precast Concrete Building Construction. Such structural units preferably utilize expansive concrete which on setting and curing undergoes expansion. The expansion may be sufficient to place internal reinforcing under tension to hold the concrete under compression, or may be merely enough to compensate for shrinkage. Expansive concrete suitable for the purposes of this invention are disclosed in U.S. Pat. No. 3,215,701 and No. 3,303,037.

SUMMARY OF THE INVENTION

The objects of the invention are summarized as follows:

First, to provide a form for casting concrete structural units which is intended to be used repeatedly and wherein a series of forms may be arranged in tandem and provided with tracks so that appropriate vehicles carrying mixers or premixed concrete, finishing machines and the like may be moved along the tracks to service the forms.

Second, to provide a form particularly suited for, but not limited to, the casting of concrete slabs including marginal beams as well as corner legs and which may utilize expansive concrete.

Third, to provide a form which incorporates unique beam casting members constructed of concrete, to provide rigidity, and capable of limited movement to permit moving the form member clear of the beam cast thereby to permit removal of the structural unit.

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary plan view of the form for casting concrete structural units.

FIG. **2** is an enlarged fragmentary transverse sectional view, taken through **2–2** of FIG. **1**.

FIG. **3** is another fragmentary transverse sectional view thereof, taken through **3–3** of FIG. **1**.

FIG. **4** is an enlarged fragmentary sectional view, taken within Circle **4** of FIG. **2**.

FIG. **5** is an enlarged fragmentary sectional view, taken through **5–5** of FIG. **3**.

FIG. **6** is an enlarged fragmentary sectional view, taken within Circle **6** of FIG. **2**, showing a portion of a concrete member cast by the form and casting rod therein.

The form for casting concrete structural units includes a slab casting form **1**, which is shown as a raised rectangular body of concrete, provided with essentially vertical sidewalls **2**. Supporting pads **3** also formed of concrete extend laterally from the base of each sidewall **2**. Resting on each supporting pad is a side beam casting form **4**. Each casting form **4** is constructed of concrete of relatively massive cross section and extends the length of the slab casting form **1**. The lower corners of the casting form **4** are provided with reinforcing strips **5** and **6** of metal.

Interposed between each form **4** and the pad **3** is an antifriction membrane **7**; for example, a polyethylene sheet may serve this purpose; or certain of the halogen substituted polyethylene compositions may serve this purpose.

At spaced intervals, each casting form **4** and the underlying pad **3** are joined by a tie strap **8**. It has been found that an automobile leaf spring is satisfactory for this purpose. The extremities of the tie straps are bonded directly to the concrete and may be welded to internal reinforcing **9** and **10** embedded in the form **4** and pad **3**, respectively.

The midportion of each tie strap is encased in a body **11** of elastomeric material, such as rubber or synthetic rubber, or the more yieldable plastic materials. In practice, each supporting pad **3** is cast in place with the tie straps **8** and the upper portions of the elastomeric bodies **11** projecting upwardly therefrom. Later, the forms **4** are cast in place utilizing the membranes **7** to prevent adherence to the underlying pad **3**.

Cast in each form **4** near the bottom thereof is a set of horizontally extending adjustment bolts **12**, which project outwardly from the form **4** and through upstanding portions of corresponding anchor brackets **13**. The bolts **12** receive adjustment nuts **14** so that the casting form may be moved to and from the corresponding sidewalls **2** within the limits permitted by the elastomeric bodies **11**.

The upper side of each casting form **4** is provided with an angle bracket **15** which constitutes a form for casting the edge of the slab cast by the form **1**. Partially embedded in the upper side of each casting form **4** is a track **16** which is used to guide various tools or vehicles, such as concrete mixers, containers for the mixed concrete to be poured over the forms, as well as leveling devices or finishing machines for the concrete slab cast on the form **1**.

If the concrete casting form is to be employed for the casting of structural units having legs in the corners thereof, as shown in the aforementioned copending application, a pit **17**, deep enough to cast such legs, is provided at each end of the slab casting form **1**. Each pit includes a wall **18**, the upper portion of which may be recessed approximately the depth of the sidewalls **2** so as to form end beam casting walls **19**. In alignment with the side beams to be cast between the sidewalls **2** and the forms **4** are vertical leg casting channels **20**. The bottom of each pit is provided with suitable guide tracks **21**, on which are mounted end casting forms **22** which abut the wall **18** and close the channels **20** to provide the cavity for casting the legs of the structural unit. Also, the end form **22** cooperates with the end beam casting walls. **19**.

Operation of the structural unit casting form is as follows:

Appropriate reinforcing, not shown, is placed in the cavities of the form and over the slab casting form **1**. Such reinforcing may include tendons placed in the space between the sidewalls **2** and the side beam casting forms **4**. The sidewalls of the various cavities, including the channels **20**, are appropriately tapered to permit the cast structure to be removed from the forms. After the concrete has been poured, and undergone an initial set, the side beam casting forms **4** are moved away from the sidewalls **2**. The amount of such movement depends upon the ultimate expansion of the concrete and a sufficient additional distance to separate the casting form **4** from the beams. Similarly, the end casting forms **22** are moved away from the ends of the slab casting form so as to free the legs cast in the channels **20**. In the course of casting the structural unit, appropriate lifting members have been cast therein, preferably at the corners thereof, so that the structural unit may be lifted from the form.

In practice, a series of the casting forms shown in FIG. **1** are arranged in end-to-end relation with an end pit between each pair of forms, and tracks **23**, alongside each pit, link the tracks **16**, and the tracks **16** align therewith when the casting forms **4** are in the proper position for casting the side beams of the structural unit.

Reference is directed to FIG. **6**. It is essential in the casting of building units such as disclosed in the copending application, Ser. No. 837,986, that passages to receive transverse tendons be cast in the slab portion of the building unit. This is accomplished by use of casting bars **24**, preferably formed of metal of suitable cross section and coated with a suitable parting agent. The ends of each bar are supported in openings provided in the edge casting flanges **15**. It has been found that during the curing period of the concrete, there is a period in which the concrete is self-sustaining yet has not set sufficiently that the casting bars cannot be withdrawn. This condition is improved if some expansive cement is used.

While particular embodiments of this invention have been shown and described, it is not intended to limit the same to the details of the constructions set forth, but instead, the invention

embraces such changes, modifications and equivalents of the various parts and their relationships as come within the purview of the appended claims.

I claim:

1. A form for casting structural units having a slab and side beams, said form comprising:

a. a slab casting form including beam casting sidewalls;

b. supporting pads extending laterally outward from the bottom margins of said sidewalls;

c. a massive beam and slab edge casting member slidable on each pad to and from each beam casting sidewall between a beam casting position and a beam releasing position;

d. a plurality of yieldable tie members, each having an upper end embedded in a casting member and a lower end embedded in the pad below;

e. an elastomeric body encasing the central portion of each tie member and embedded in the confronting portions of each pad and corresponding casting member;

f. and means for moving each casting member to and from the corresponding casting sidewall within the limits permitted by said elastomeric bodies.

2. A form, as defined in claim 1, wherein:

a. a friction reducing plastic membrane is interposed between each casting member and corresponding pad.

3. A form, as defined in claim 1, wherein:

a. a pit is located at each end of said slab casting form and includes a wall having leg casting channels therein aligning with the beam casting space between said beam casting sidewalls and casting members;

b. and an end form movable in each pit between a casting position closing said channels and a releasing position.

4. A form for casting structural units, comprising:

a. a fixed wall casting form;

b. a supporting pad extending laterally from the bottom of said fixed form;

c. a movable wall casting form confronting said fixed form and mounted on said pad; said movable form being movable between a casting position with respect to said fixed form and a releasing position for removal of a wall member cast between said forms;

d. a plurality of tie members having ends embedded in said movable form and said supporting pad;

e. an elastomeric body encasing the central portion of each tie member and embedded in the confronting surfaces of said movable form and said pad;

f. and means for moving said movable member with respect to said pad within the limits permitted by said elastomeric bodies.