Oct. 16, 1923. 1,470,673

N. F. AMBURSEN

MOLD FORM

Filed Aug. 30, 1919 3 Sheets-Sheet 1

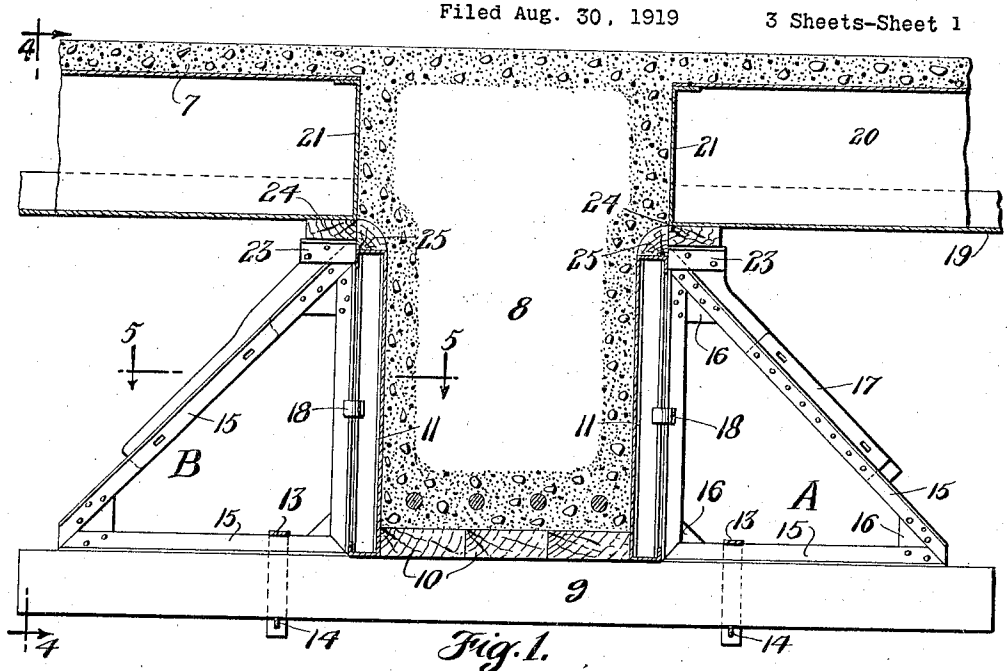


Fig. 1.

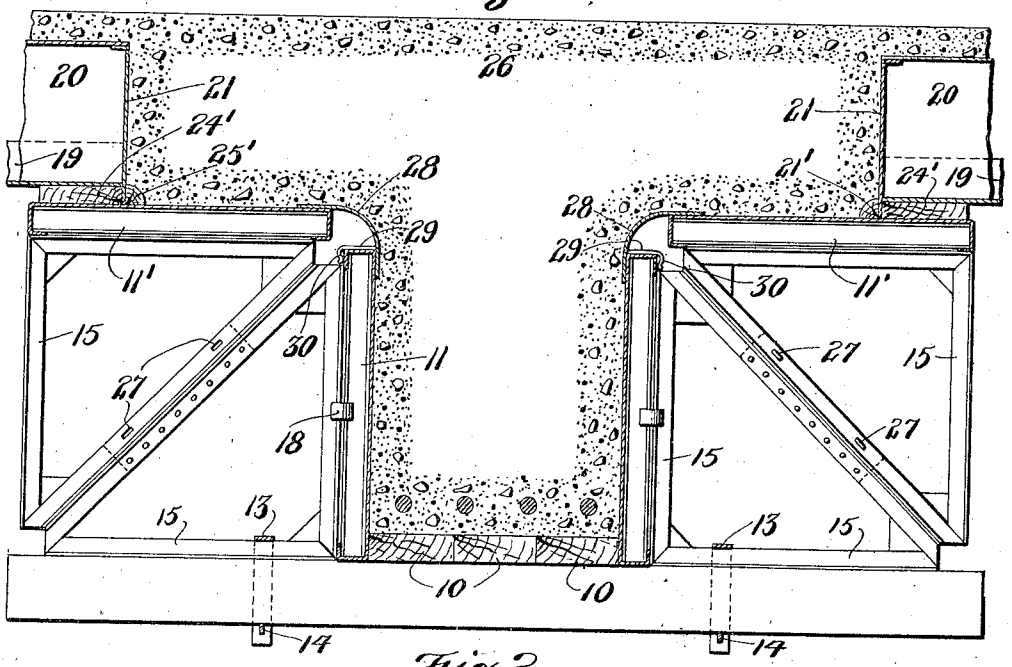


Fig. 2.

WITNESS:

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INVENTOR

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Filed Aug. 30, 1919 3 Sheets-Sheet 2

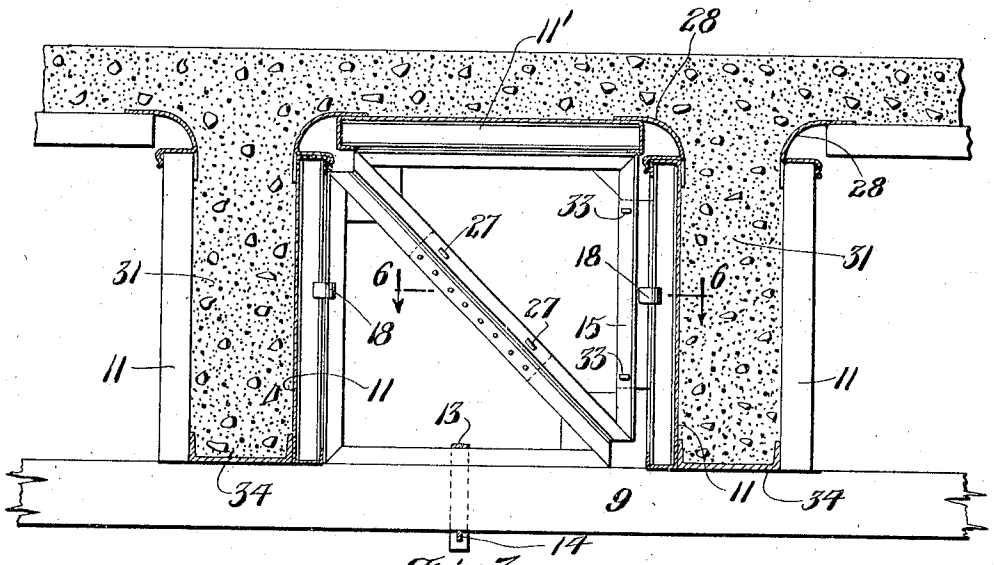


Fig. 3.

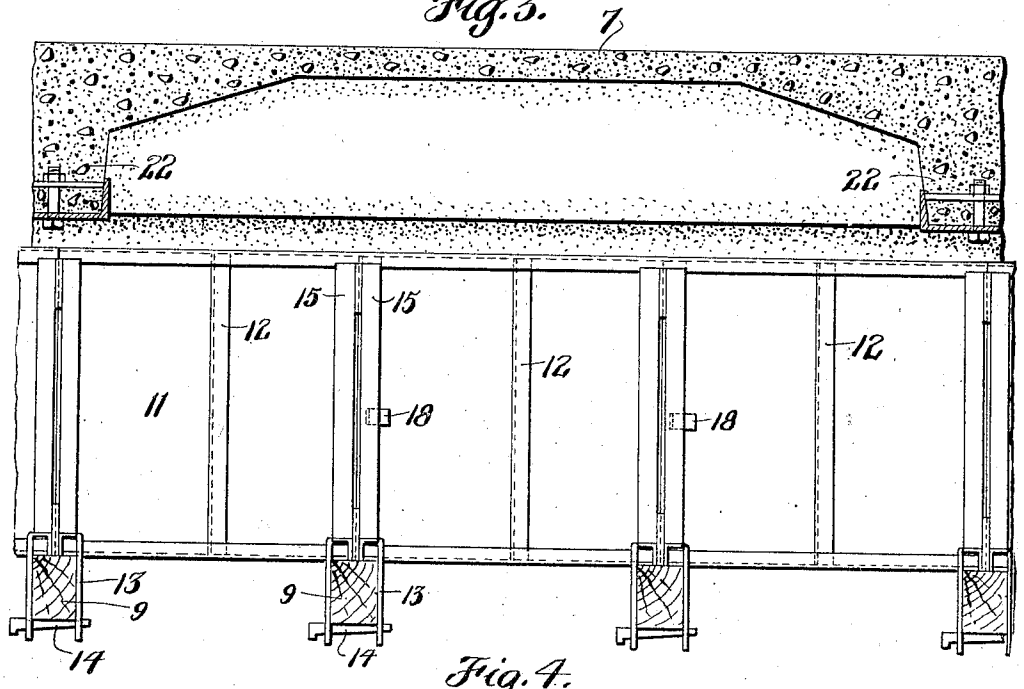


Fig. 4.

WITNESS:

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MOLD FORM

Filed Aug. 30, 1919 3 Sheets-Sheet 3

Fig. 5.

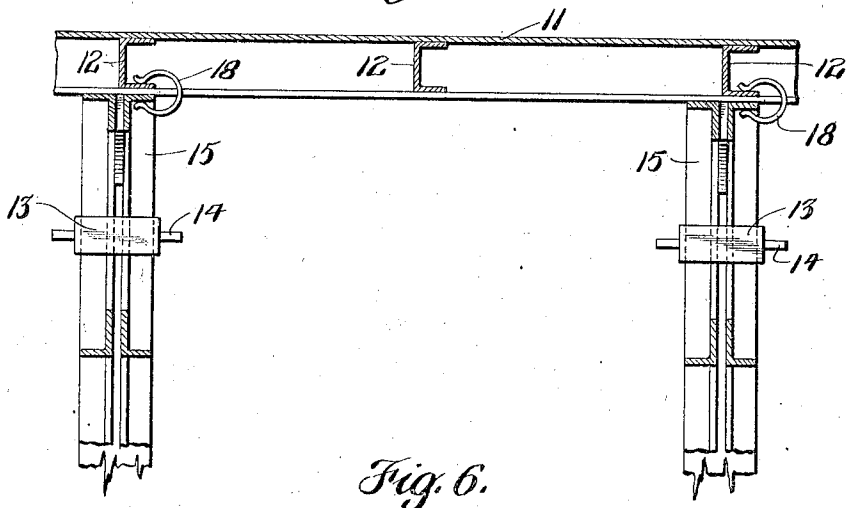


Fig. 6.

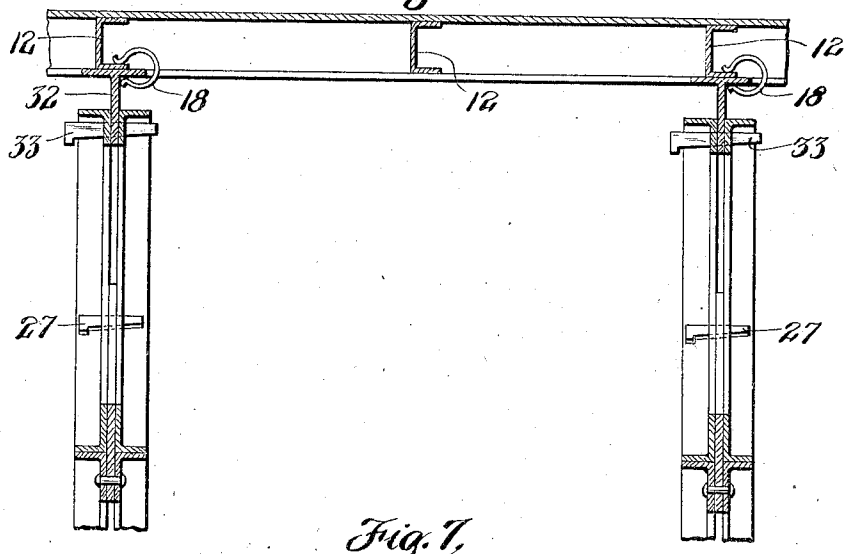
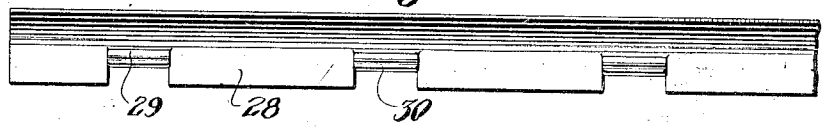


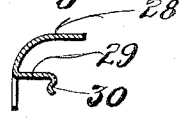
Fig. 7.



WITNESS:

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Fig. 8.



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Patented Oct. 16, 1923. 1,470,673

UNITED STATES PATENT OFFICE.

NILS FREDERICK AMBURSEN, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO UNIFORM COMPANY, A CORPORATION OF MASSACHUSETTS.

MOLD FORM.

Application filed August 30, 1919. Serial No. 320,778.

To all whom it may concern:

Be it known that I, NILS F. AMBURSEN, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Mold Forms, of which the following is a specification.

This invention relates to mold forms for constructing concrete beams, girders, T beams and the like in floors, ceilings and walls, and it has for its primary object the provision of an improved form which can be used interchangeably for constructing such members.

Another object of my invention is the provision of improved form apparatus having the characteristics described which may be readily assembled and taken apart and which when assembled has the requisite rigidity.

My invention also contemplates the provision of improved form apparatus of this character which will accommodate itself to a relatively wide variation in the dimensions of the members to be constructed.

Finally my invention has to do with the provision of simple form apparatus which may be utilized in conjunction with inventions previously patented to me such for example as Letters Patent #1,292,986 of February 4, 1919, and #1,216,644 of February 20, 1917.

The foregoing, together with such other objects as may hereinafter appear, or are incident to my invention I obtain by means of a construction, the preferred embodiments of which I have illustrated in the accompanying drawings, wherein—

Figure 1 is a cross section illustrating the application of my invention to the construction of a beam or girder; Figure 2 is a similar section, illustrating the application of my improvements to the construction of a T beam; Figure 3 is a similar section illustrating the application of the form apparatus to the construction of a plurality of joists or the like; Figure 4 is a section taken on the line 4—4 of Figure 1; Figure 5 is a section taken on the line 5—5 of Figure 1, drawn on an enlarged scale; Figure 6 is a section taken on the line 6—6 of Figure 3, drawn on an enlarged scale; Figure 7 is an inside side elevation of a filler member suitable for use in connection with the form apparatus; and Figure 8 is a cross section taken through the filler shown in Figure 7.

Referring now to Figure 1, it will be seen that I have shown in cross section a portion of a ceiling or floor 7, provided with a large beam or girder 8, in connection with the form apparatus for constructing the same. The forms are supported on struts, of which the member 9 may be considered as the head, or upon stringers, preferably erected on two-foot centers. The bottom of the beams is laid on the heads or shoring to the required depth and width, such bottom being preferably composed of one or more boards 10, as shown in the figure. Panels 11, such as shown and described in the aforesaid Letters Patent #1,292,986 are placed on edge on the heads or shoring and constitute the sides of the beam form. These panels may be of any desired length and constructed in any suitable manner, but I prefer to construct them of a plate flanged at the edges and provided with intermediate reinforcing channels 12.

The panels 11 are supported and braced by means of brackets, indicated as a whole at A and B, such brackets being detachably secured to the heads or shoring 9, by suitable means, such for example as the straps or yoke-like members 13 and the keys 14. The brackets are in the form of an isosceles triangle and the sides and base thereof are composed of pairs of angles 15 with gusset plates 16 interposed therebetween at the corners, the pairs of angles being riveted together through the gusset plates. This forms a very rigid brace and it will be noted that there will be a space between the pairs of angles equal to the thickness of the gusset plates. In the brackets A, a plate 17 is introduced into the space between the angles forming the base of the bracket and is secured thereto in any preferred manner, as by riveting. The purpose of this arrangement will appear hereinafter. In other respects brackets A and B are alike.

The panels 11 are detachably supported from the bracket by such means as the clips 18 which are sprung over one of the angles forming the bracket and one of the reinforcing channels 12 (see Figures 1 and 5).

The bottom of the ceiling, or more properly speaking the ceiling mold con-

sists of a plurality of channels 19 and a plurality of pans 20, such for example as shown in my Letters Patent #1,216,644, the ends of the pans being closed by headers 21. The channels 19 form the transverse joists 22 (see Figure 4) and the pans 20 serve to form the intermediate portions and reduce the thickness of the floor to the desired amount, thus cutting out excess weight. The channels 19 are supported from the brackets by such means, for example, as the supporting members 23 which may be detachably secured to the brackets as by wedges. If necessary, longitudinal strips of wood 24 may be inserted intermediate the channels 19 and the supporting members 23 so as to locate the channels and pans at the proper elevation. The corners formed between the panels 11 and the pans and channels 19 are closed by filler pieces 25 supported on the tops of the panels and by the members 23.

It will be seen from the foregoing that the apparatus, when used for the construction of a beam may be readily assembled and taken down, is very simple in construction and accommodates itself, within practical limits, to considerable variations in the depth and thickness of the beam.

In utilizing the apparatus for the construction of a T beam for a ceiling, floor or wall such as indicated in cross section at 26 in Figure 2, I take pairs of brackets A and B and assemble them in the position shown in such figure by inserting the plates 17 into the space between angles and keying the two brackets together, as by keys 27 (see Figure 6). The pairs of brackets thus form substantially square frames, which are adapted to support the load of mold sections on any and all sides. As before, the straps 13 and keys 14 are utilized to detachably secure the frames in proper position; the bottom boards 10 of the requisite width and depth are laid to form the bottom of the T beam mold; and the side panels 11 are supported from the frames by the clips 18. The bottom wall of the head of the T beam form is made up of panels 11′, preferably of the same construction as the panels 11, and supported on the top of the frames.

If desired these panels may be secured by clips 18 but this is ordinarily unnecessary for the reason that the pans 20 and channels 19 are supported on top of the panels, their weight serving to maintain the panels in position. The headers 21 form the sides of the head of the T beam and the channels 19 and pans 20 are supported at any desired elevation by means of the longitudinal boards 24′, the corners being filled by filler members 25′.

The corners formed by the panels 11 and 11′ in this instance are preferably filled in by means of metallic filler members 28 composed of sheet metal bent into the form shown, such filler members, at a plurality of points, having laterally extending lugs 29 struck up, the end portions 30 thereof being turned down to form spring clips adapted to be sprung over the tops of the panels 11, so as to position the fillers. The supports 23 are removed for this application.

In releasing the forms, the keys 27 are loosened which permits the quadrangular supports to collapse by sliding of the upper bracket on the lower, and causes the superjacent parts and mold sections 11′, 24′, 20, etc., of the form to drop accordingly, without impairment of the support afforded the girder side section 11. This section 11 and the other remaining parts can be removed by releasing the straps 13.

Referring now to Figure 3, I have therein illustrated how the brackets and frames, previously described, may be utilized to form a ceiling or floor, for example, of the joist type. For this purpose the brackets are assembled in the form of frames such as shown in Figure 2, the frames being secured to the shoring as before by the straps 13. The sides of the joists 31 are formed by the panels 11, the panels on one side of the frame being secured by clips 18, in the manner described, while the panels on the other side of the frames are secured by clips 18 to intermediate Ts 32 which are adapted to project into the spaces between the angles 15 and to be detachably secured to the angles by means of keys 33, such keys serving to securely position the Ts. Panels 11′ are utilized to form the bottom of the ceiling and the corners are completed by the filler pieces 28.

In releasing this form for example, the clips 18 which serve to secure the panels 11 to the Ts 32 are removed and the keys 33 are loosened which permits the Ts to be collapsed inwardly, after which the respective panels 11 may be removed and the frame collapsed, as before, by loosening the keys 27.

In Figure 3 I have shown the bottom of the joists as being formed by channels 34 supported from the shoring 9. These channels may be used either side up so as to alter the depth of the joists, or they may have substituted therefor or used in conjunction therewith the arrangement shown in Figures 1 and 2. It will be seen that in this construction as in those heretofore described the parts are readily assembled and taken apart.

It is to be observed that the construction of the brackets is such that when secured to the shoring they will adequately support the panels 11 as against side thrust from the concrete without the necessity of tying the panels together with tie wires or the like passing through the concrete which has been

the customary method of securing the mold sections. The use of bottom supports nailed to the shoring is also obviated.

The advantages incident to my improvement will be readily understood by those skilled in the art and it is to be understood that my invention is not limited to the precise construction and combinations shown and described, and it will be seen that it may be applied in some instances to the construction of sewers and tunnels. The terms "wall" and "girder" therefore, are employed in a broad sense in the claims.

I claim:

1. In mold form apparatus, a plurality of substantially complementary supporting members capable of independent use to support load in one plane and provided with means whereby they may be coupled for conjoint use to support load in another plane.

2. A mold form apparatus of the character described comprising mold sections and a plurality of substantially complemental mold supporting members capable of independent use to support a mold section in one plane and provided with means whereby they may be coupled for conjoint use to support a mold section in another plane.

3 A mold form apparatus of the character described comprising a mold supporting member of triangular form adapted when used independently to be supported from one leg and to support a mold section from the other leg, and when a pair are assembled with the bases in juxtaposition to constitute a rectangular mold supporting member.

4. A mold form apparatus of the character described comprising a pair of triangular mold supporting members, one of which has its base provided with a projecting portion adapted to lap the base of the other member, and means for releasably securing the members together.

5. A mold form apparatus of the character described comprising a pair of triangular mold supporting members, one of which has its base provided with a projecting portion adapted to lap the base of the other member, and means for keying the projecting portion to the base of said other member.

6. A collapsible mold supporting member comprising triangular units, and means for securing said units together whereby when the said means is loosened one unit may shift diagonally relative to the other to collapse the frame.

7. A mold form apparatus of the character described comprising in combination a pair of triangular frame members the legs and bases of which are composed of pairs of angles spaced apart, means for securing the pairs of angles together, and a tongue on the base of one member adapted to be inserted in the space between the angles forming the base of the other member.

8. A mold form apparatus of the character described comprising in combination a pair of triangular frame members the legs and bases of which are composed of pairs of angles spaced apart, means for securing the pairs of angles together, and a tongue on the base of one member adapted to be inserted in the space between the angles forming the base of the other member, together with key means passing through the said last mentioned angles and the said tongue.

9. A mold apparatus of the character described comprising a pair of complemental mold supporting members, each being in the form of a right-angled isosceles triangle, said members being capable of independent use, and means for supporting the said members in complemental relation to constitute a rectangular frame.

10. Wall form apparatus comprising, in combination, main supporting means, mold sections, and a mold section support on said main support supporting said mold sections on more than one side thereof, and collapsible to permit removal of one of them without impairment of the support afforded the other.

11. Girder-like form apparatus comprising, in combination, main supporting means, a girder bottom mold section thereon, wall and girder side mold sections, and a mold section support on said main supporting means supporting said wall and girder side mold sections collapsible to permit removal of one of them without impairment of the support afforded the other.

12. A corner filler for concrete work comprising a bent sheet metal plate with clips for engaging an adjacent edge of the mold structure extending laterally from a face thereof.

13. A girder-like wall form comprising in combination a main supporting means, a bottom girder mold section, opposed vertically disposed side girder mold sections horizontally disposed mold sections extending away from the girder mold sections, and opposed vertically and laterally collapsible supporting members for said vertical and horizontal mold sections.

14. In mold form apparatus, a plurality of complementary substantially counterpart supporting members capable of independent use to support load in one plane and provided with means whereby they may be coupled for conjoint use to support load in another plane.

In testimony whereof I have hereunto signed my name.

NILS FREDERICK AMBURSEN.