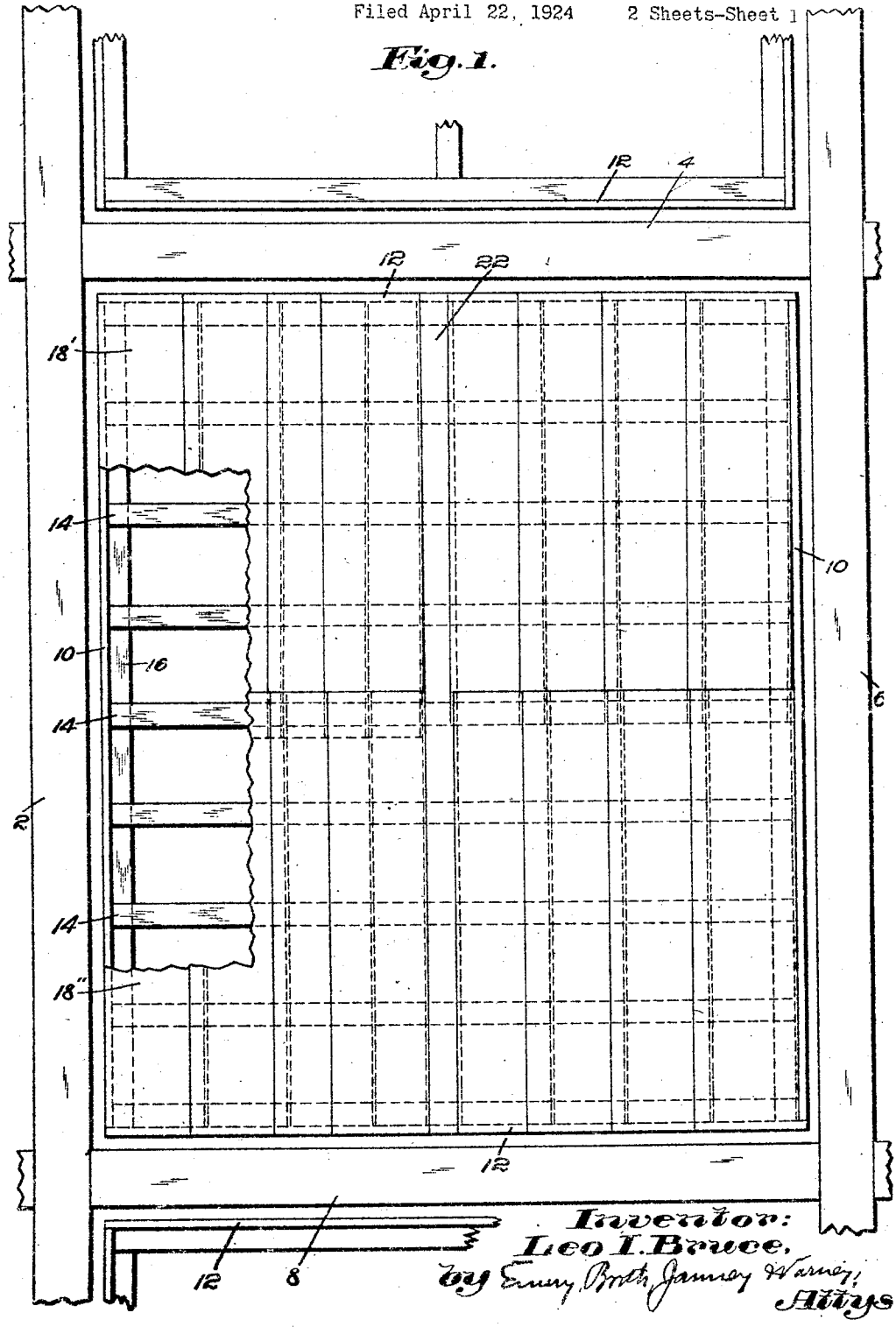
July 13, 1926. 1,592,074

L. I. BRUCE

FORM FOR CONCRETE WORK

Filed April 22, 1924 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

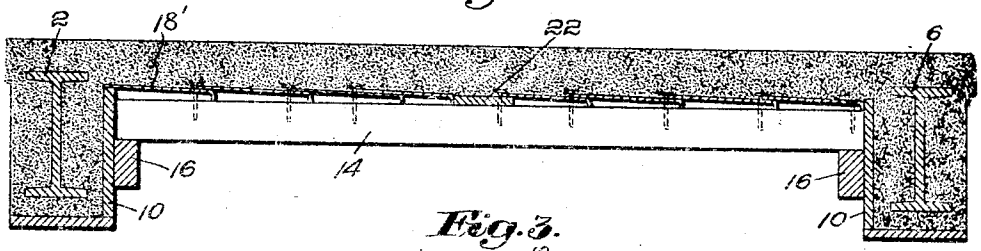


Fig. 3.

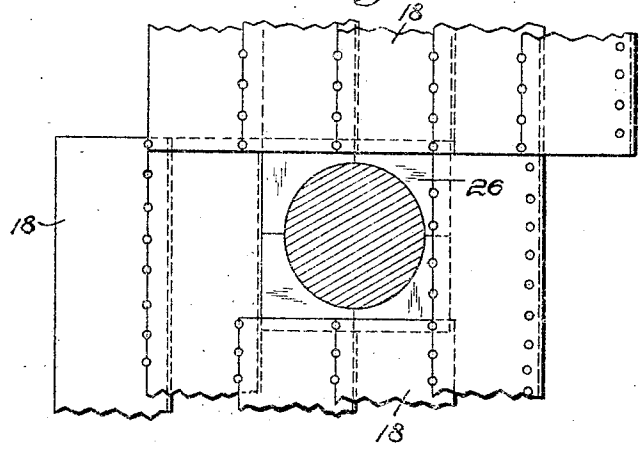


Fig. 4.

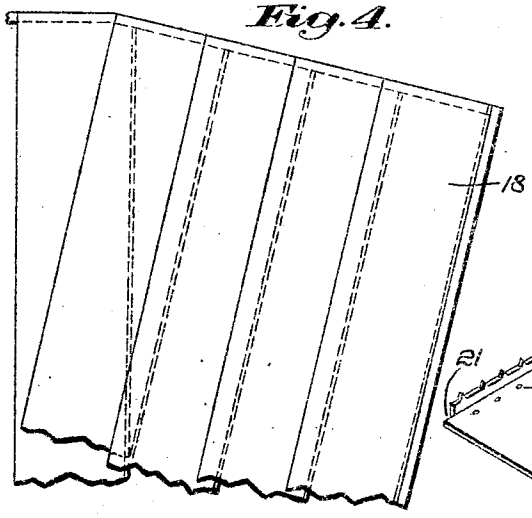
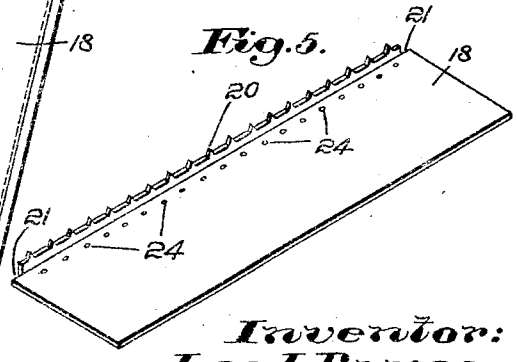


Fig. 5.



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UNITED STATES PATENT OFFICE.

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FORM FOR CONCRETE WORK.

Application filed April 22, 1924. Serial No. 708,185.

This invention relates to forms for concrete work.

Heretofore in the construction of forms for concrete work these were made of wood, the contact surface for the concrete being made up of planks nailed or otherwise secured together in sufficient number to form a contact surface of the exact size and shape of the concrete slab or panel to be formed. These wooden forms are usually made up in sections of exact size and then placed in position as a whole.

The present invention has for its object among other things to provide a contact surface which can be used over and over and be readily and quickly applied where it is to be used without preliminary cutting or fitting, or handling and rehandling a large number of varying sizes, and which is of such a nature that it can be fitted to spaces of any size or shape, as distinguished from the known wooden contact surfaces which were built in advance each to fit the special space where it was to be used. Other objects of the invention will appear from the following description.

The invention and its aims and objects will be readily understood from the following description taken in connection with the accompanying drawings of one embodiment of the invention herein shown and described for illustrative purposes, the scope of the invention being more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a plan view of a form and more particularly of a contact surface embodying my invention;

Fig. 2 is a cross-section of the construction shown in Fig. 1;

Fig. 3 is a top plan view of a detail of the construction shown in Fig. 2;

Fig. 4 is a top plan view of a detail of the contact surface shown in Fig. 2, illustrating its adaptability to spaces of irregular shape; and

Fig. 5 is a detail of one illustrative form of member or unit which may be used in accordance with my invention.

In the illustrative embodiment of the invention the latter is shown in its application to a steel frame building, the I-beams bordering a slab space being indicated in Fig. 1 by the reference numerals 2, 4, 6 and 8. In the case of a wholly concrete structure the I-beams would be replaced by concrete beams.

As the various slab spaces in a building would all be substantially the same, except possibly as to size and shape, it will be sufficient for the understanding of the invention to describe the latter in its application to a slab space of regular shape or contour and to one of irregular shape and contour.

Referring more particularly to Figs. 1 and 2, the beam forms, which may be of any usual and well known plank construction, are shown at 10—10 and 12—12. The joists upon which the planks constituting the contact surface rested heretofore are indicated at 14 in Figs. 1 and 2. These in turn are supported by joists 16 extending at right angles thereto. This joist structure 14—16 is usually used, but any other suitable supporting means for the contact surface may be used without departing from the spirit of my invention, and I do not limit my invention to any particular supporting means for the contact surface. It is usual to have the upper surfaces of the joists 14 at a level a little below the upper ends of the planks 10 of the beam forms, approximately the thickness of the planks forming the contact surface. The beam forms will be supported in any suitable and customary manner.

It is to be understood that while I have herein described a form structure, the particular form of form structure used is not material and the form structure and its supporting means may be of any suitable type, my invention relating more particularly to the contact surface.

In accordance with my invention I use a plurality of separate elements or members 18 to form the contact surface, in place of the wooden planks heretofore used. These elements are preferably not secured or fastened together to form the contact surface, as distinguished from the planks heretofore used which were fastened together to form the contact surface, the whole contact surface being then put in place as a whole in the space intended for it and to which it had been previously fitted.

My invention also comprises spacing means to space the elements or units from their supporting means. My invention also comprises means to prevent displacement of

a unit after it has been placed in position. My invention also contemplates providing means for stiffening the relatively thin material from which the units are made so that they will have sufficient strength to support the wet concrete over the space between the supporting joists or other supporting means.

I may make my separate elements or members 18 of any suitable material and of any suitable shape. In the illustrative embodiment of my invention herein shown and described I preferably make these elements or members of relatively thin sheet metal, say about $\frac{1}{16}''$ in thickness, and of rectangular shape (see Fig. 5). One marginal portion 20 will preferably be bent over at substantial right angles to the main body of the element and this edge provided with teeth or the like. The bent over edge constitutes one convenient form of spacing means and also one convenient form of stiffening means, and the toothed edge 20 constitutes a convenient form of means to prevent displacement of a unit, but it is to be understood that my invention is not to be considered as limited to the particular spacing means, stiffening means or displacement preventing means herein shown, as I may use any suitable spacing means, stiffening means and displacement preventing means without departing from the spirit of my invention.

The mode or manner of using my invention will be apparent from Figs. 1 and 2. As therein illustrated, the individual elements or units 18 are placed in overlapping relation. This may be done in any suitable arrangement according to the shape of the space to which the contact surface is to be applied. In the case of a square space, as illustrated in Figs. 1 and 2, I have found it convenient to put, say the element 18′ in place first, with one of its long edges resting upon the upper edge 20 engaging the joists 14. The upper edge, viewing Fig. 1, will rest upon the upper edge of form plank 10 of the form of the beam 4. For this purpose the down-turned edge 20 is cut away or notched at 21 (Fig. 5). I then place another element, say 18″, also with its longer flat edge resting upon the beam form 10 and its down-turned toothed edge engaging the joists 14, the upper edge of said element 18″, viewing Fig. 1, overlapping the lower edge of the element 18′. I proceed in this manner until the line of elements thus applied reaches the beam form of the beam 8, Fig. 1, the free end of the last element resting upon said form, the down-turned edge 20 being notched, as above stated for this purpose.

I then start a second line of elements, preferably at the top of the space, viewing Fig. 1, applying this line of elements in the same manner as the first line which those of the second line overlap, as indicated in Figs. 1 and 2, I proceed in this manner until the space to be filled in, herein the space between the beams 2, 4, 6 and 8, has been filled in.

Herein each vertical line, viewing Fig. 1, comprises but two elements, but it will be apparent that any number can be used according to the space to be filled in, the overlap of the individual elements varying according to requirements. The toothed edge 20, by its engagement with joists 14, prevents inadvertent displacement of the elements after they have once been placed in position.

Sometimes it is necessary to provide for the location of pipes which are to extend through the concrete, or for the location of shafting hangers, electrical outlets or the like in the concrete. In such case and in order to avoid damage to the elements 18 by perforating the latter or securing any object thereto, I simply insert a plank or board at the desired point. The pipes can then be inserted in the latter or the shafting hangers or other objects can be secured to the plank in the desired location. The elements are then built up to and around the plank in the same manner as already described. In Figs. 1 and 2, for example, I have illustrated a plank 22 inserted for this purpose. From these figures it will be seen that adjacent one side of said plank the down-turned toothed edge of the element or elements abut the edge of the plank, while upon the opposite side the edge of the adjacent element or elements rests upon the plank. I preferably make the depth of the down-turned edge 20 of the elements substantially equal to the thickness of the planks ordinarily used so that the entire contact surface including the plank will be substantially level or in substantially the same plane.

The elements, according to my invention, are capable of great flexibility in their arrangement in the formation of contact surfaces of any shape. In Fig. 3, for example, I have shown that adaptation to a situation where a column or opening is to be built round. In such case if the opening or column is quadrangular it can be built up to and around in the manner above described in the case of an insert. If the column or opening is circular or has more than four sides a wooden or other insert is used having an opening of the desired shape and the elements are built up to and around said insert. This insert may be in one piece or sectional; in Fig. 3 such a sectional insert providing for a circular opening is illustrated by way of example at 26.

In Fig. 4 the adaptation of my invention to a surface having corners other than

ninety degrees is illustrated, the elements being simply lapped in a diagonal manner to meet the situation.

By varying the overlap of the individual elements the requirements due to variation in load may be met, the down-turned edges 20 of adjacent elements being placed closer together in proportion as the load increases.

In the illustrative embodiment of the invention shown it has been illustrated in its application to floor slab forms, but it will be apparent that the invention is equally applicable to wall forms, roof slab forms, piers or other cases with a fairly large contact area. In the case of a vertical or steep-pitched surface it may be necessary to secure the elements in place. This may be done in any suitable manner and by any suitable means. As one convenient means for this purpose I have shown in Fig. 5 perforations 24 through which nails, wire or other suitable means may be inserted to secure the elements to the joists or other supporting means.

Means are thus also provided for holding the overlapping edge of a unit in contact with the unit or other member overlapped thereby. This prevents nails or other articles from getting under the overlapping edge of a unit after the units have been placed in position and before the concrete is poured, whereby the concrete surface would be marred. It also prevents the poured concrete from penetrating under said overlapping edge.

My invention is applicable to curved surfaces as well as to plane surfaces, providing the radius of curvature be not too small. The elements or units 18 may be of any suitable size and elements of unequal size may be used in one and the same section, indiscriminately, as will be readily understood by those skilled in the art.

It will be observed that in accordance with my invention the units are adapted to overlap in any direction or arrangement relatively to each other and to any extent, or as may be required to fill in the space no matter what its shape, the result being a substantially smooth contact surface.

It will be apparent that it is not indispensable that all of the features of the invention be used conjointly since they may be used to advantage separately in various combinations and sub-combinations. It will also be understood that while the invention is herein described as embodied in the details illustrated, the invention is not to be considered as circumscribed by or limited to these details, or any of them, but that the said details may be variously modified within the true scope of the invention which is definitely set forth by the claims.

Claims:

1. In a form for concrete work, a contact surface comprising a plurality of overlapping sheet metal units of substantially rectangular shape having one toothed marginal portion angularly disposed relative to the unit body, and having a cutaway portion at each end.

2. In a form for concrete work, a contact surface comprising a plurality of overlapping sheet metal units of substantially rectangular, oblong shape, having one of its longer marginal portions toothed and angularly positioned relative to the unit body and provided with a cutaway portion at each end.

3. In a form for concrete work, in combination a support and a substantially plane contact surface comprising a plurality of units of sheet material adapted to overlap and having a marginal portion angularly disposed relative to the unit body and resting on the upper surface of said support, and means to hold the overlapping edge of a unit tightly against the unit overlapped thereby.

4. In a form for concrete work, in combination, a support and a substantially plane contact surface comprising a plurality of units of sheet metal adapted to overlap and having a marginal portion angularly disposed relative to the unit body and resting on the upper surface of said support, perforations in the unit body, and fastening means passing through said perforations and engaging said support to hold the overlapping edge of a unit in contact with the unit overlapped thereby.

5. In a form for concrete work, a contact surface comprising a plurality of overlapping units of sheet material, having one toothed marginal portion angularly disposed relative to the unit body.

6. In a form for concrete work, a contact surface comprising a plurality of overlapping units of sheet metal, having one toothed marginal portion positioned at an angle to the unit body.

7. In a form for concrete work, a contact surface comprising a plurality of units of sheet material, having a toothed marginal portion angularly disposed relative to the unit body.

8. In a form for concrete work, a contact surface comprising a plurality of units of sheet metal, having a toothed marginal portion positioned at an angle to the unit body.

9. A metal concrete form unit, having a flat body, an angularly disposed stiffening member provided with a cut-away end portion, and perforations in said body for inserting fastening devices.

10. A form for concrete work comprising, in combination, a plurality of metal units having a flat body, a support for said units, an angularly disposed stiffening member on said units provided with a cut-away end

portion, and perforations in said unit bodies for inserting fastening means to secure said units to said support.

11. In a form for concrete work, a contact surface comprising a plurality of overlapping sheet metal units of substantially rectangular shape having one marginal portion angularly disposed relative to the unit body, and having a cutaway portion at each end, the portion angularly disposed to the unit body being toothed, and said unit body being provided with perforations.

12. In a form for concrete work, a contact surface comprising a plurality of overlapping sheet metal units having one toothed marginal portion angularly disposed relative to the unit body, and having a cutaway portion at each end.

13. In a form for concrete work, a contact surface comprising a plurality of overlapping units of sheet material, having one toothed marginal portion angularly disposed relative to the unit body, the main body having perforations for inserting nails, wire or other fastening devices.

14. A metal concrete form unit, having one marginal portion angularly disposed relative to the unit body, the portion angularly disposed to the unit body being toothed.

15. A metal concrete form unit of substantially rectangular shape, having one marginal portion angularly disposed relative to the unit body, the portion angularly disposed to the unit body having a portion cut away at the ends.

16. A metal concrete form unit, having one marginal portion angularly disposed relative to the unit body, the portion angularly disposed to the unit body having a portion cut away at the ends, the main body having perforations for inserting nails, wire or other fastening devices.

In testimony whereof, I have signed my name to this specification.

LEO I. BRUCE.