Oct. 29, 1929. W. S. CONNELL 1,733,779

FABRICATED WALL SUPPORT

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Fig. 1.

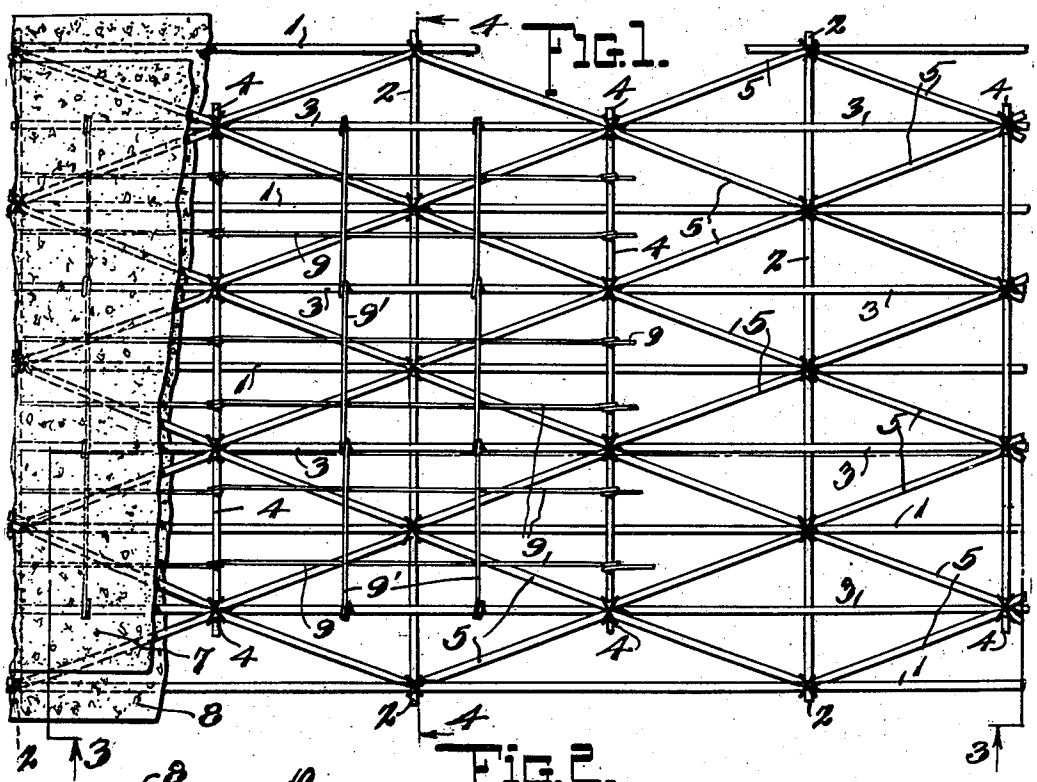
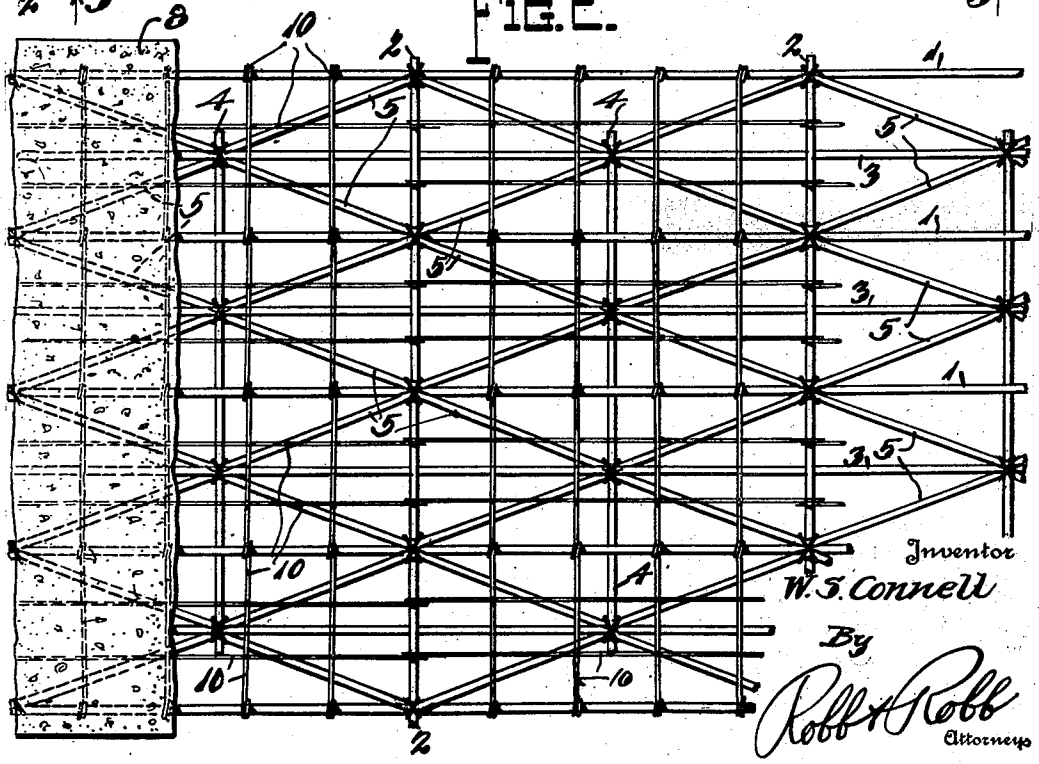


Fig. 2.



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Fig. 3.

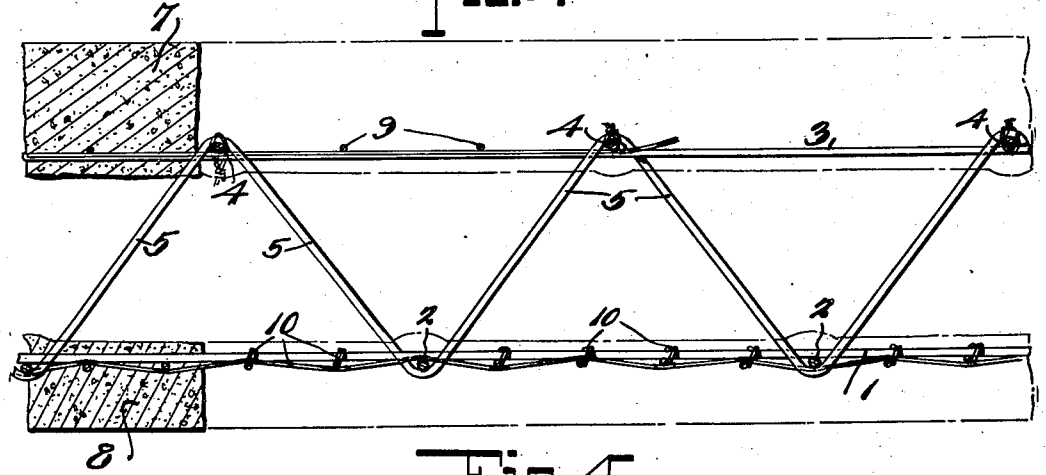


Fig. 4.

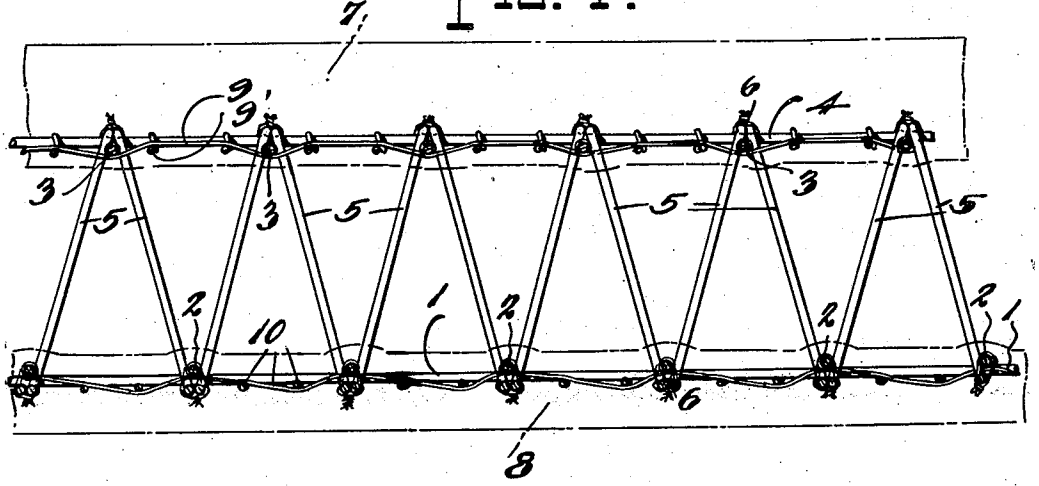
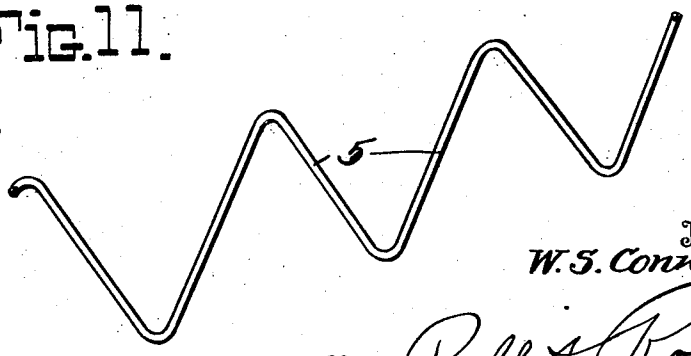


Fig. 11.



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Fig. 5.

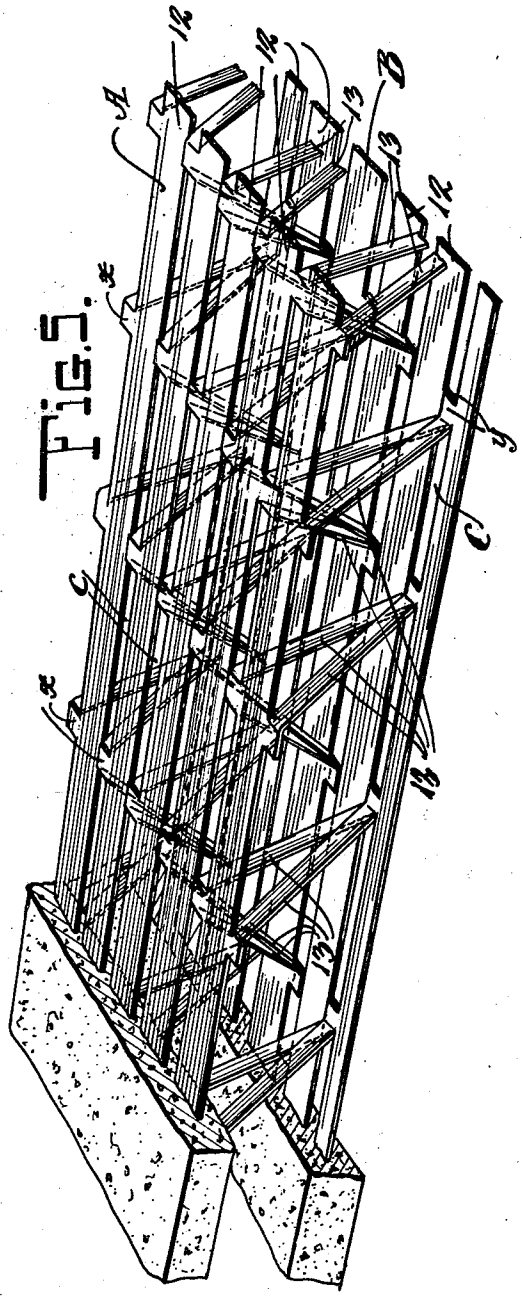
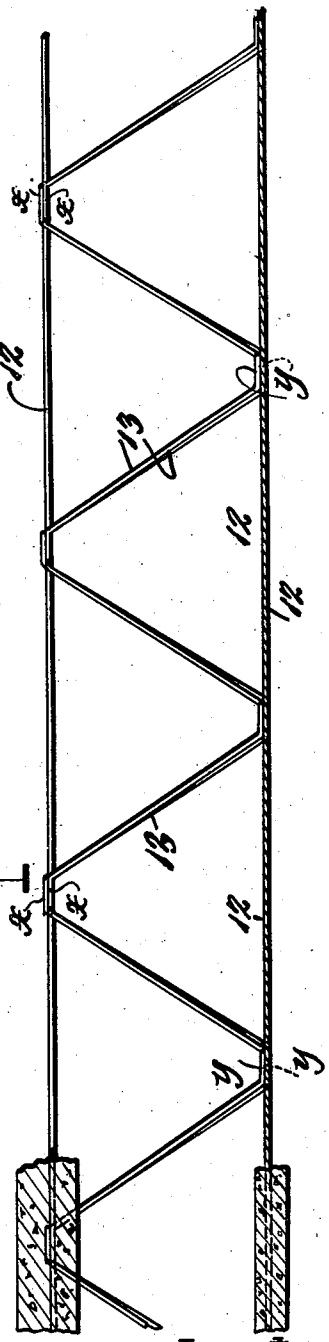


Fig. 6.



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FABRICATED WALL SUPPORT

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Fig. 8.

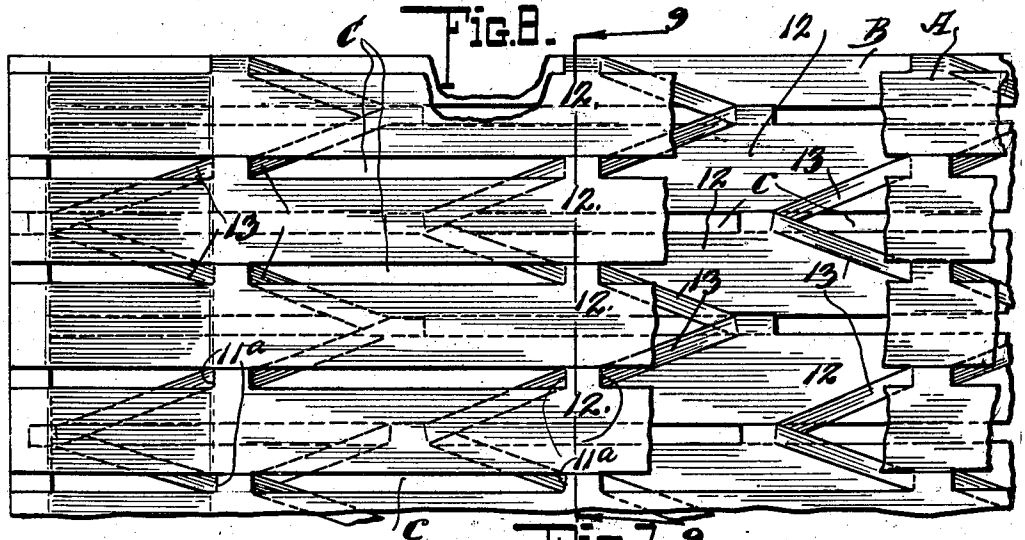


Fig. 7.

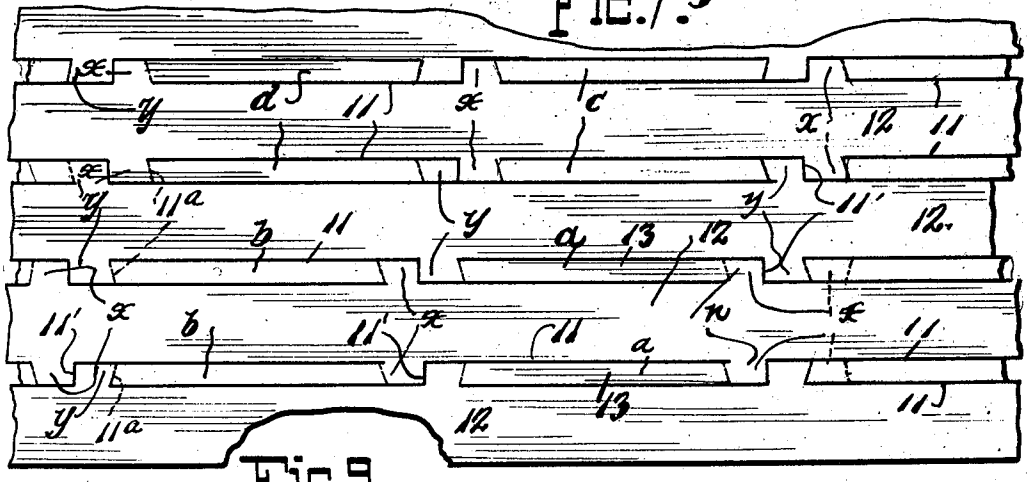


Fig. 9.

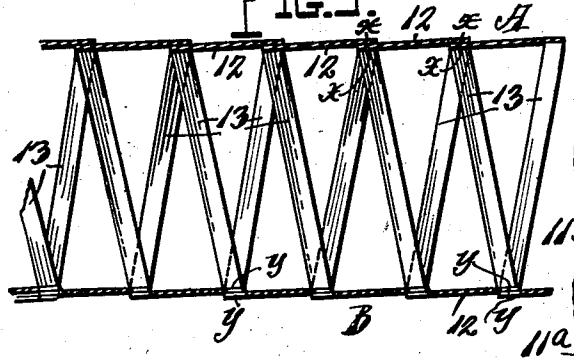
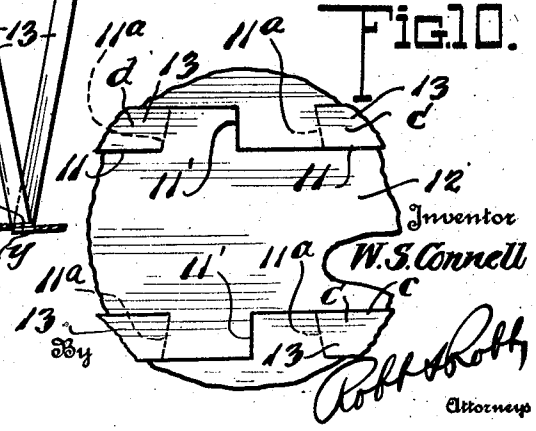


Fig. 10.



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UNITED STATES PATENT OFFICE

WILLIAM S. CONNELL, OF CLEVELAND, OHIO

FABRICATED WALL SUPPORT

Application filed June 20, 1927. Serial No. 200,229.

In building structures, it is common to employ a skeleton or framework of commercial shapes, such as angle bars, flats, channels bars, crosses, T-bars, Z-bars, and the like, each providing, usually in a single integral structure, the several elements of a truss or multiples thereof, whereby compression and tension stresses, as from crushing and lateral loads, are distributed and carried, and such commercial shapes have been assembled in almost innumerable relations, but the lateral bracing between such shapes has invariably depended upon extraneous or supplemental means, as for example bridging members between the flanges of spaced I-beams or other commercial shapes.

The object of the present invention is the obviating of the lateral space bridges, and a further object is the unifying of a truss in both lateral and longitudinal directions, so that whereas an ordinary commercial shape spans a definite space, a structure embodying the invention will as effectively span such space and bridge the space edgewise or laterally of the space commonly occupied by the commercial unit.

Considering a wall as a space cover or bridge, whether horizontally, vertically or otherwise disposed, and therefore whether a floor, a side wall, partition, roof, or other space cover, the present invention contemplates production of dual trussing in a unitary structure for affording a complete skeleton wall adapted to be used alone or in conjunction with a supporting frame of commercial shapes of individually larger calibre, and also adapted to be covered or bonded with surfacing or complete filler of lithic mass, such as plaster or concrete.

More specifically the invention comprises spaced chords and tie stays connecting the same both laterally and longitudinally for distributing therebetween both compression and tension stresses in all directions.

An important object of the invention as thus indicated includes construction of a wall area of such trussing from wires or like rods, and the value of the invention is accentuated by the fact that an embodiment of the invention expressive of this object may include particularly light gage of wire for producing an unusually rigid wall structure susceptible of carrying a maximum load.

A further object is the affording of maximum temporary support, as for instance when the wall is a floor and the embodiment of the invention is utilized as a supporting surface for workmen while the building is being completed. Temporary flooring is obviated, and the value of this particular phase of the invention is accentuated when the entire wall truss is formed from a single sheet of expanded and bent sheet metal.

The invention resides not only in the fabricated support itself but also in the method of making the same from a single sheet of material so as to provide spaced foraminous layers, so to speak, of metal with double trussing spacers.

Many other important objects and results are contemplated and attained by and in the invention in and throughout its numerous possible embodiments, as will hereinafter in part be pointed out and in part be stated.

In the accompanying drawings:—

Figure 1 is a top plan view of a portion of the fabricated wall member, the plastic material being broken away to show the details of construction more clearly;

Figure 2 is a bottom plan view similar to the top plan above referred to;

Figure 3 is a longitudinal sectional view on the line 3—3 of Figure 1;

Figure 4 is a transverse sectional view on the line 4—4 of Figure 1;

Figure 5 is a perspective view of a modified form of structural member made from a sheet of metal and embodying all the principles of my invention;

Figure 6 is a longitudinal sectional view of the form shown in Figure 5;

Figure 7 is a fragmentary plan view of the blank from which the structure member is made, showing the arrangement of the slits previous to the expansion of the metal;

Figure 8 is a plan view of the structural unit shown in Figure 5, a portion of the top layer being broken away;

Figure 9 is a sectional view on the line 9—9 of Figure 8;

Figure 10 is an enlarged detail view of a portion of the blank as shown in Figure 7; and

Figure 11 is a detail view of one of the wire strands employed to form the stays in the wire fabric form.

Like reference numerals designate corresponding parts throughout the several figures of the drawing.

Referring to the form of the invention illustrated in Figures 1 to 4, 1 designates a series of parallel, longitudinally extending chord members, held in proper spaced relation by the transverse members 2 which are suitably joined to the members 1 by spot welding, soldering, or otherwise, this forming the bottom "layer" of the unit. Above this level are arranged a corresponding series of spaced, longitudinally extending chord members 3 which likewise are joined together by the transverse members 4, each of the members 3 being disposed in a plane intermediate two of the lower chord members 1.

Between the upper series and the lower series of these chord members are the stays or trussing elements 5 which have a peculiar arrangement. They may consist of single strands of stock longitudinally extending from one end of the unit or structure to the other in a zig-zag manner so as to form triangular stress resisting trusses, said trusses being joined to the lower series at the points of juncture between the members 1 and 2. The corresponding apexes of two such adjoining strands are brought together and joined to the upper intermediate member 3. This produces a truss arrangement comprising a series of rows of rigid stays having pyramidal formation.

The material from which this skeleton framework is made may consists of light rods or wire of a diameter calculated to be sufficient for the particular stresses to which the unit will be subjected and having in view the particular formation of the framework in the manner above set forth. When such a form is employed for the purposes of floor construction, a layer of cementitious material 7 is applied on top to form the floor slab and the layer 8 applied to the bottom to form the ceiling slab. This material necessarily strengthens the joints between the elements, embedded therein, to a very great degree. To the top of the frame I preferably apply the intersecting wires 9 and 9′ which are wrapped around the members 2 and 3 or otherwise connected thereto for the purpose of forming a netting to better hold the plastic material and to act in the nature of reinforcement which will strengthen and prevent cracking of the material. In like manner similar wires 10—10 are applied to the bottom layer of the framework, said wires not necessarily being of the same gage as those used with reference to the upper layer.

In Figures 5 to 10 I have illustrated a modified construction made from a single sheet of material of proper dimension and gage. This material is slit longitudinally at intervals, each slit designated 11 being of zig-zag form. That is to say, there is a relatively short transverse portion of the slit designated 11′ approximately midway of the two main sections of the slit. This transverse cut determines the width of the relatively narrow strips hereinafter referred to. The slits 11 run in parallel rows, suitably spaced apart so as to leave the long strips 12 extending from end to end of the fabric with relatively short and narrow strips 13 therebetween. These latter strips, by virtue of the short transverse slit sections 11′, fall into opposing pairs *a*—*a*, *b*—*b*, *c*—*c*, *d*—*d*, etc. Each alternate strip 12 is now pressed out of the plane of its adjacent strips, the bend of the connecting narrow strips, designated 11^a being along an angle less than a right angle which causes the strips 12 of the respective layers to move edgewise toward each other.

When the metal is expanded in the manner above described, the respective points of connection marked *x* will lie in the upper plane and the points marked *y* in the lower plane. The connections or tabs *x* between the respective strips 12 and also the connections *y* will overlap each other, and these connections may then be spot welded so as to positively secure the points to each other with the result that a fabricated structure such as shown in Figure 5 is produced in which we have the upper level A and the lower level B joined by angularly related truss members, the formation of which is similar to that described with reference to the first mentioned construction. That is to say, considering these stays or truss members by groups, it will be observed that the elements of each group have a pyramidal formation so that they are disposed to resist stresses in all directions. It will be noted from Figure 5 that the sheet metal unit when thus formed has in its upper and lower surfaces elongated slots C through which the material of the floor or ceiling passes for keying purposes.

It is comprehended that either of these forms of fabricated units may be manufactured to include the plastic material so that a wall unit complete in slab form of reasonable dimensions would be obtainable. It is also to be understood that these units may be utilized in the construction of vertical walls, partitions, and the like, and when desired the plastic material may be filled into the skeleton structure to provide a solid wall rather than a hollow one.

From the foregoing it will be apparent that the fabrication is made up preferably in

unit form for facility of manufacture and handling, and when applied in use to building structures for the formation of floors, for example, such units are disposed upon the flanges of the beams, spanning the space from beam to beam, in which position they afford completely rigid supports to which the floor and ceiling materials are applied at opposite sides. Such supports are to be distinguished from reinforces the prime function of which is to distribute the stresses to the cementitious material in which they are embedded, for in this invention the cementitious floor on top is spaced from the ceiling at the bottom and yet as efficient a structure is obtained as when the material is constructed in the usual manner by form-molding around reinforcing rods or tiles.

The advantages of these improvements are extremely important when the respective methods of construction referred to are considered. For instance, when constructing floors of cement, boards are tied to the bases of the beams to form the bottom mold wall; adjustable shoring supports or jacks are then closely distributed beneath the same to sustain the weight of the material; reinforcing rods are then positioned between the beams above the boards by a very laborious and time-consuming operation; and finally the cement poured to fill the space between the ceiling level and the floor level. Similarly, it is necessary to support hollow tile when used as a filler medium, and the expense is very great, relatively speaking, because of these operations and material adjuncts.

On the other hand, with my invention the units are simply laid in place on the beam flanges and then the cementitious material is plastered onto the surfaces as is done in the practice employing metal lathing. Incidentally, as before stated, the units may be walked upon freely before the application of the cement, so that no scaffolding or planking is necessary during the preliminary building construction.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:—

1. A wall structure comprising a plurality of substantially parallel chord members, similarly disposed chord members spaced therefrom, and laterally inclined and longitudinally running stays connecting the several chord members, and chord members of a different gauge secured to the first named chord members and lying therebetween.

2. A wall structure comprising a plurality of substantially parallel chord members, similarly disposed chord members spaced therefrom, and longitudinally running continuous stays connecting the several chord members and each having portions inclined both laterally and longitudinally relative to the chord members.

3. A structural unit designed to constitute a sectional element of a wall structure and comprising a series of longitudinally arranged chord members and transverse chord members connected thereto, a second series of longitudinal and transverse chord members disposed in spaced relation to the first series, a third series of longitudinally arranged stress resisting members each formed into a plurality of triangular shapes and each connected to the respective series of chord members at the points of juncture between the longitudinal and transverse chord members, the apexes of pairs of such stress resisting members having a common point of connection with the chord members of one of the series so as to provide longitudinally and transversely inclined truss elements, each of said stress resisting members being connected to but one chord of each of the first two series throughout its length.

4. A fabricated structural unit comprising upper and lower tiers of fabric having parallel, longitudinal and transverse wires, and trussing members intermediate the two tiers composed of a series of wires each of which is bent upwardly and downwardly and connected to the wires of the respective tiers at the bends, said trussing members extending longitudinally of the wires connected thereby and the portion thereof between the connections being inclined laterally thereto, adjacent portions of the trussing members lying in oppositely inclined directions.

5. A fabricated structural unit comprising superposed tiers of parallel wires and transverse wires for each tier connecting the parallel wires thereof together and holding them in spaced relation, and means for holding the wire fabric of one tier spaced in relation to the fabric of the other tier comprising stay wires, each having rigid connection alternately at a plurality of points of adjacent wires, one of each of the respective tiers and bearing an angular relation in two directions with regard to the parallel wires aforesaid.

6. A wall structure composed of spaced series of chord members, the chord members of one series being staggered relatively to those of the other series, transverse connecting members for the chord members of each series, and a plurality of trussing members extending from end to end of the respective chord members between the respective series, each of said trussing members connecting fixedly with each series at the junctures of the transverse connecting members and the chord members so that sections of the trussing members are inclined both laterally and longitudinally to resist stresses in all directions.

7. A wall structure comprising a fabric of connected longitudinal and transverse chord members, a second corresponding fabric arranged in spaced relation to the first fabric with the respective chord members of one fab-

ric arranged in transverse planes different from those of the corresponding members in the other fabric, and trussing members extending from end to end of the structure and each rigidly connecting with both fabrics at intermediate points so as to have portions thereof inclined both longitudinally and laterally.

8. A wall structure including upper and lower tiers of reinforcing wires arranged in parallelism, the wires of the upper and lower tiers being in staggered relation to each other, stay rods extending longitudinally of the reinforcing wires and being bent at intervals and connected at alternate bends, alternately with adjacent wires of the two tiers, the stay rods being each connected to two only of said wires.

9. A wall structure including groups of substantially parallel spaced chord members, the chords of both groups lying in parallelism with each other, the adjacent chords of one group lying in staggered relation to those of the adjacent group, stay rods connecting the adjacent chords of one group with those of the other, said stay rods in their general direction running longitudinally of the rods connected and having a plurality of connections alternately with the adjacent chords of the said groups, the portions of the stay rods between such connections being inclined laterally and longitudinally with respect to the chords connected thereby.

In testimony whereof I affix my signature.

WILLIAM S. CONNELL.