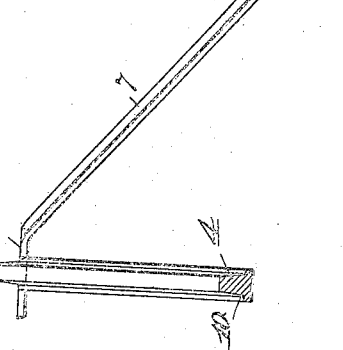
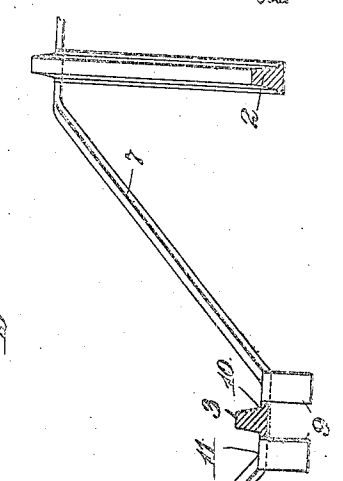
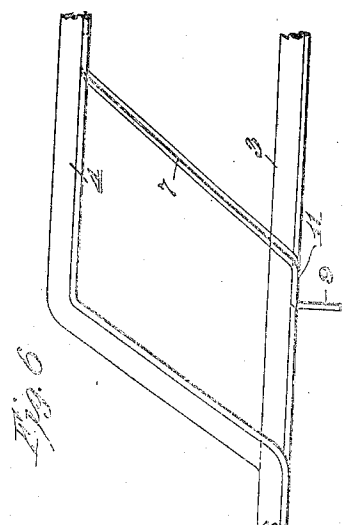
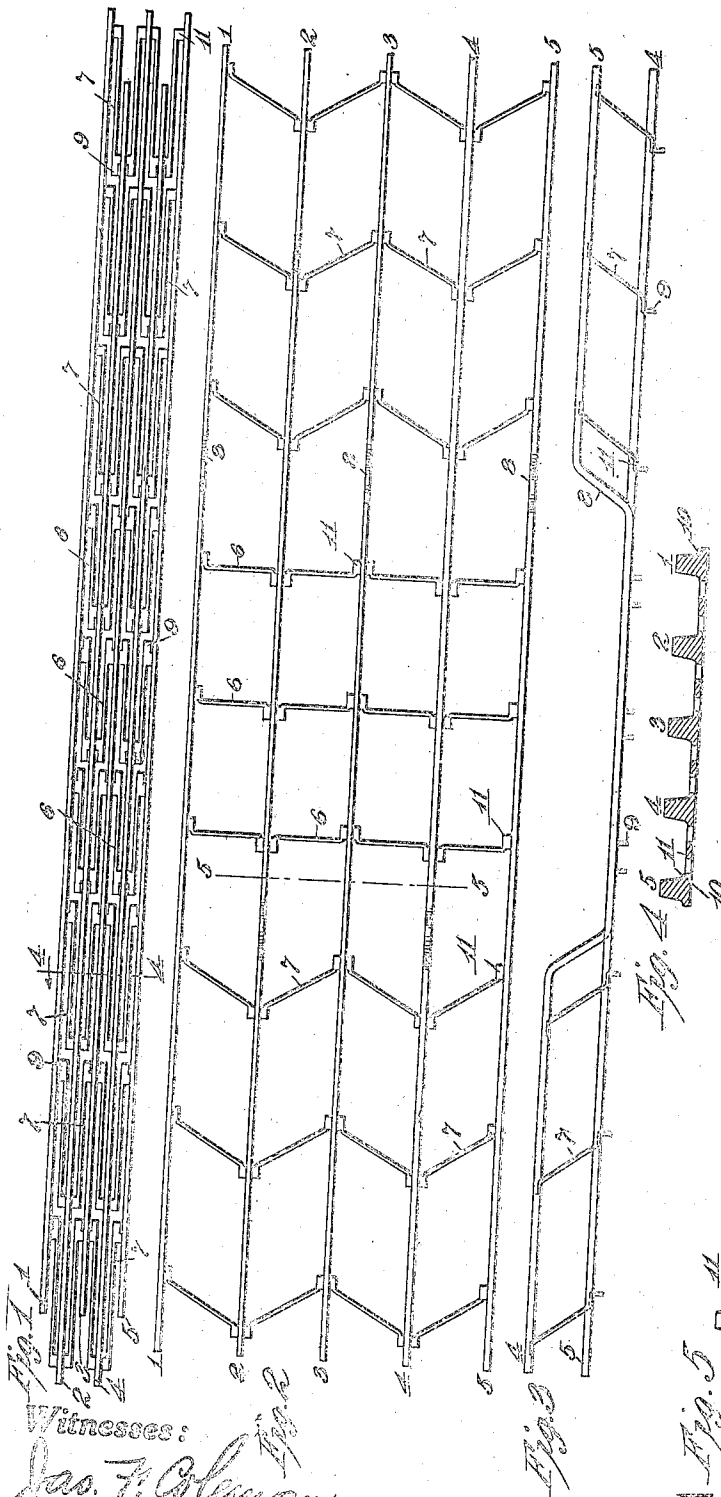


J. T. SIMPSON.  
 EXPANDED METAL.  
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1,006,505.

Patented Oct. 24, 1911.



Witnesses:  
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 Attorney

# UNITED STATES PATENT OFFICE.

JOHN THOMAS SIMPSON, OF NEWARK, NEW JERSEY.

## EXPANDED METAL.

1,006,505.

Specification of Letters Patent.

Patented Oct. 24, 1911.

Application filed April 7, 1909. Serial No. 488,435.

*To all whom it may concern:*

Be it known that I, JOHN THOMAS SIMPSON, a citizen of the United States, and residing in Newark, in the county of Essex and State of New Jersey, have invented a certain new and useful Expanded Metal, of which the following is a specification.

The object I have in view is the production of trussed expanded metal adapted for the reinforcement of concrete slabs.

By means of my invention I seek to strengthen and cheapen the use of a reinforcement providing against both the tension and shearing stresses.

Another object is the production of means for insuring the placing of the reinforcement for the concrete in its correct position on the forms before the concrete is molded.

These and further objects will appear from the following specification and accompanying drawings considered together or separately.

In the drawings, Figure 1 is a top view of a metal sheet punched ready for expanding, Fig. 2 is a top view of the sheet expanded and trussed, Fig. 3 is a side view of the same, Fig. 4 is a sectional view on the line 4—4 of Fig. 1 but on an enlarged scale, Fig. 5 is a sectional view on the line 5—5 of Fig. 2, and Fig. 6 is a side view of Fig. 5.

In all of the views like parts are designated by the same reference characters.

The drawings and following description are of one embodiment of my invention; modifications will suggest themselves to those skilled in the art.

The expanded metal is in the form of a structure which comprises longitudinal bars 1, 2, 3, 4 and 5, and connecting ties, consisting of lateral tension bars 6—6—6, and diagonally inclined shear bars 7—7. The longitudinal bars are shown as parallelly arranged. The lateral tension bars 6 are substantially at right angles with the longitudinal members, while the diagonally inclined shear bars preferably incline vertically and laterally at an angle of about 45°. The parallelism of the longitudinal bars, the lateralism of the tension bars and the exact angle of inclination of the shear bars is not essential to the invention and may be departed from within wide limits. The lateral tension bars 6—6 are arranged in the center of the structure, while the diagonally inclined shear bars are arranged toward the ends. This is for the purpose of supporting

the arch upon the well understood principle of tension and shear members.

For the purpose of locating the shear bars with vertical and lateral inclination, and to secure the proper reinforcement at the ends of the concrete slab, certain of the longitudinal bars are trussed in a manner which will be described. As illustrated in Figs. 2 and 3, the bars 1, 3 and 5 are trussed, being bent upward at 8 on the right of the figure, the right hand ends of the alternate bars being straight. At the other end of the structure the bars 2 and 4 are trussed, the other bars continuing horizontal and straight. This produces a structure to which the lateral bars are alternately trussed.

For the purpose of supporting the structure upon the forms both prior and during the operation of molding the concrete, there are provided spacing chairs 9. These chairs are connected to and carried by the longitudinal bars, preferably adjacent to the points of jointure of the tension and shear bars. These chairs are of the proper height to support the structure the requisite distance above the forms.

I prefer to make my structure of a narrow sheet of metal, which is rolled, or otherwise punched to form the bars and is afterward expanded and trussed. It is to be understood however that my invention is not limited to a structure in which the bars are integral, as the several bars may be separately made and connected together either before or after being formed to the proper shape.

Fig. 1 represents a sheet punched ready for expansion. This sheet may be punched by a rolling operation, which will form the longitudinal bars of the proper cross-section and shape the connecting ties to the desired thickness. As shown in Fig. 4 the longitudinal bars are of tapered cross-section, being narrower at the top than at the bottom, which is an advantage, as it permits the use of rolls for the purpose of punching the sheet. At the base of each longitudinal bar is a fillet 10, which is desirable for the purpose of adding strength to the structure and also to facilitate the punching operation. The connecting ties are shown as of a thickness equal to the depth of this fillet. Each connecting tie is joined to a longitudinal bar by a foot 11, so that when the sheet is expanded and

trussed the connecting ties will bend outward at the joint, without becoming curved, remaining straight except at their immediate ends. I prefer to make the spacing chairs 9 by continuing the feet 11, such continued portions each being cut like a flap and bent downward to form a chair. Such an unbent flap is shown at 9 in Fig. 1. I prefer to make the longitudinal bars 1, 2, 3, 4 and 5 all of the same length, but arranged in staggered relation, as shown in Fig. 1, the bars 2 and 4 protruding beyond one end, and the bars 1, 3 and 5 protruding beyond the other end. The length and location of these bars is such that when the sheet is expanded and trussed all of the longitudinal bars will be in alinement.

It is apparent that by my invention a reinforcement for concrete slab is provided, which can be quickly set in large areas on the forms, with all parts held in true position both vertically and laterally. It is also apparent that it may be used in any situation where the construction can be strengthened by the use of trussed bars.

In accordance with the provisions of the patent statutes, I have described the principle of my invention, together with one embodiment which I consider to be the preferable one, but I desire to have it understood that such embodiment described and illustrated is merely for purposes of illustration and may be varied in many ways.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. Expanded metal, having a plurality of sections integrally connected, each section being formed of two parallel members continuous across the structure, and bent to different planes at alternate ends, said members being connected by diagonal shear members.

2. Expanded metal which comprises more than two parallel longitudinal members continuous across the structure, and lying on different vertical planes, the said members being bent at alternate ends each bent end

being connected to the adjacent unbent end by diagonal shear members.

3. Expanded metal which comprises more than two members continuous across the structure, and lying on the same horizontal plane for the major portions of their lengths and bent at alternate ends, the bent portions lying on planes parallel with the rest of the members, and said bent ends being connected to the adjacent unbent ends by diagonal shear members.

4. Expanded metal which comprises more than two parallel longitudinal members continuous across the structure, and lying on different vertical planes, said members having the major portions of their lengths on one plane and being bent at alternate ends to a position on another plane parallel to the first plane, and being connected by diagonal shear members at the bent portions and by horizontal members at the unbent portions.

5. Expanded metal formed of more than two longitudinal members continuous across the structure, and bent at alternate ends and on different vertical planes said metal being laterally expanded, the longitudinal members being connected by lateral members, said lateral members being connected to the longitudinal members by feet, said feet having depending portions forming chairs.

6. Trussed expanded metal having all parts in a common horizontal plane at the center portion and formed of longitudinal members, which are continuous across the structure, an alternate end of each member being bent up into a second plane above the first plane, each member being integrally attached to the next adjacent member with spaces at the central portion and with diagonal shear members at the ends.

This specification signed and witnessed this third day of April, 1909.

JOHN THOMAS SIMPSON.

Witnesses:

M. W. BABBITT,  
A. W. SIMPSON.