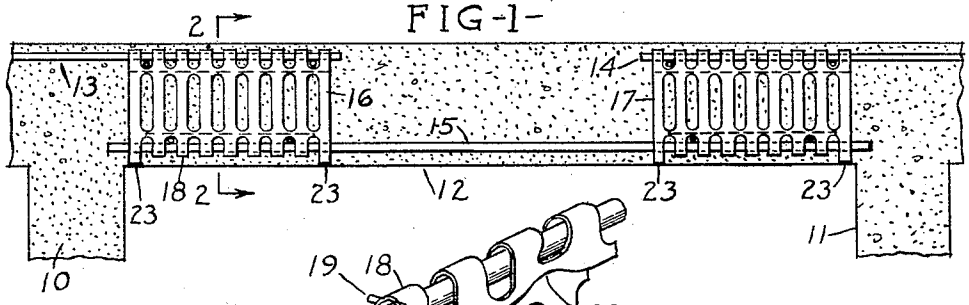
Aug. 11, 1925. 1,549,192

W. E. FOSTER ET AL

CONCRETE REENFORCEMENT

Filed June 10, 1922

FIG-1-



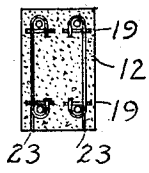


FIG-2-

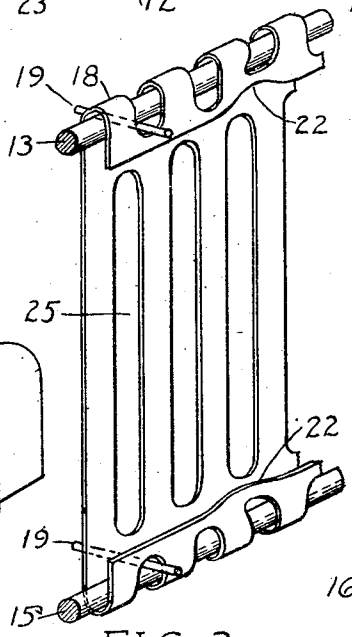


FIG-3-

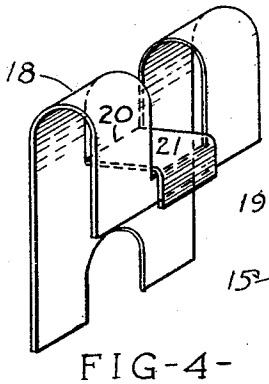


FIG-4-

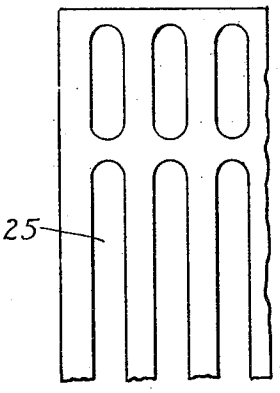


FIG-5-

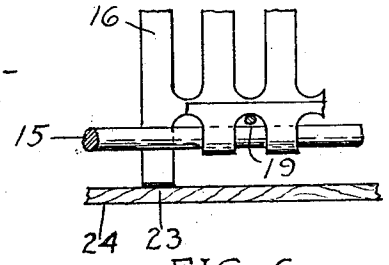


FIG-6-

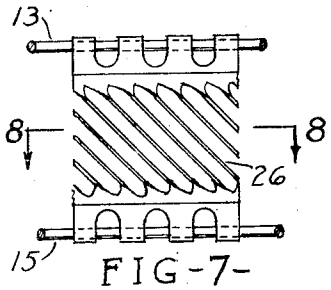


FIG-7-

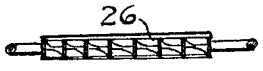


FIG-8-

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Patented Aug. 11, 1925. 1,549,192

UNITED STATES PATENT OFFICE.

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CONCRETE REENFORCEMENT.

Application filed June 10, 1922. Serial No. 567,263.

To all whom it may concern:

Be it known that we, WILLIAM E. FOSTER, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, State of Ohio, FRANCIS G. STEWART, a citizen of the United States, and a resident of Lakewood, county of Cuyahoga, State of Ohio, and LYMAN C. SHANK, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Concrete Reeforcements, of which the following is a specification.

This invention relates to concrete reenforcement and more particularly to an improved type of metal web to connect the upper and lower bars of the reenforcement for a beam.

One of the objects of the invention is to provide an extremely simple and economical web that may be readily transported and assembled in position with the reenforcement bars.

Another object of the invention is to provide a type of reenforcement that will have all of the advantages of the existing and more complicated types of reenforcement and yet require the minimum amount of metal and labor in assembling.

Other objects and the features of novelty will be apparent from the following description taken in connection with the accompanying drawings, of which:

Figure 1 is a somewhat diagrammatic section through a concrete beam and its supports, the beam embodying a reenforcement employing my invention;

Fig. 2 is a transverse section of the same on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged perspective view of a fragment of the reenforcement illustrated in Fig. 1;

Fig. 4 is a perspective view of a fragment of the reenforcing web showing a slight modification of the construction illustrated in Fig. 3;

Fig. 5 is a plan of a fragment of one of the sheets used to form the web of the reenforcing element;

Fig. 6 is an enlarged fragment of Fig. 1;

Fig. 7 is an elevation of another form of web construction; and

Fig. 8 is a section on the line 8—8 of Fig. 7.

Referring to the drawings, 10 and 11 indicate fragments of columns which support a concrete beam 12. The reenforcement for the beam 12 consists of the upper bars 13 and 14, which may be of any of the ordinary forms of bars used for concrete reenforcement, and 15 indicates the lower bar. From Fig. 1 it will be noted that the bars 13 and 14 do not extend the full length of the beam 12 whereas the bar 15 extends the full length of the beam and overlaps the adjacent ends of the bars 13 and 14. These overlapped ends are connected by webs 16 and 17 and these webs constitute the principal feature of our invention.

As shown in Figs. 1, 2 and 3, the webs 16 and 17 are formed from sheet metal and have their upper and lower edge portions provided with loops 18 to enclose the bars and to give the requisite stiffness to the sheet to permit it to be safely handled without being bent out of shape. These edge portions are perforated to permit the escape of air and thus prevent the formation of air pockets and to expose the bars, and the latter may be retained in the loops by pins 19, placed through the perforations or the metal that is cut out to form the perforation may be left attached to the sheet, along one edge, as indicated at 20 in Fig. 4, thereby providing a tongue 21 which may be bent across to connect the opposite sides of the loop 18 together and to confine the bars. The loops 18 are preferably of such size as to provide sufficient space therein, around the bars, to allow for concrete, which may flow through the perforations in the loops to enter therein and form a bond between the bars and the web. Instead of using the pins 19 or the tongue 21 to secure the bars in the loops, the edge of the sheet may be closed around the bars, as indicated at the points 22 in Fig. 3.

The lower corners of the webs 16 and 17 preferably extend beyond the loops 18, as indicated at the points 23, and these exten-

sions serve as supports for the reenforcement by resting upon the form 24 used for the concrete, as indicated in Fig. 6. The extensions 23 thus serve to properly position the reenforcement in the concrete.

In Figs. 1 to 6 the intermediate portion of the web between the loops is provided with elongated openings or perforations 25 to permit a thorough bonding of the web and the concrete, and in Figs. 7 and 8 we have shown the intermediate portion of the web as slotted diagonally and the metal between the slots is turned at right angles to the plane of the web, as indicated at 26.

The reenforcement illustrated in the different views has the characteristics of simplicity and ease of fabrication, as well as being readily assembled in the field. The bars and the webs may be transported unassembled and readily assembled in the field by unskilled workmen. The extensions 23 serve to accurately position the reenforcement and the arrangement of the web and the provisions for securing a thorough bond between it and the concrete insures the requisite reenforcement of the beam to take care of the shearing stresses to which the beam is subjected in the regions where the webs are indicated in Fig. 1.

The web may be readily manufactured from sheet steel and, in this connection, we contemplate first perforating the sheet, as indicated in Fig. 5 or in Fig. 7, and then, by means of a special rolling machine, to form the loops 18 as a continuous operation, thereby insuring a very low cost of manufacture and uniformity in the product.

Having thus described our invention, what we claim is:

1. A reenforcing unit for concrete, comprising upper and lower bars arranged in the same vertical plane and a perforated sheet metal web having its upper and lower edge portions looped around said bars but spaced therefrom to provide space for the concrete to fill and form a bond between the bars and said web.

2. A reenforcing unit for concrete, comprising upper and lower bars arranged in the same vertical plane and a perforated sheet metal web having its upper and lower edge portions looped around said bars and spaced therefrom, said looped portions having perforations to admit the concrete and allow the escape of air and for the reception of members to lock the bars in place.

3. A reenforcing unit for concrete, comprising spaced bars and a connecting web having its edge portions looped around said bars, the intermediate portion of the web being slotted and having the metal between the slots turned at an angle to the plane of the web.

4. A reenforcing unit for a concrete beam, comprising vertically spaced bars and webs connecting said bars and having their upper and lower edge portions perforated and formed into loops to surround said bars, the intermediate portion of the web being slotted and having the metal between the slots turned at an angle to the plane of the web.

5. A reenforcing unit for a concrete beam, comprising spaced bars arranged in the same vertical plane and a perforated sheet metal web having its upper and lower edge portions formed with loops to surround said bars, said loops being larger than said bars and being perforated to allow the concrete to enter and surround said bars and form a bond between the bars and the loops so that stresses will be transferred between the web and the bars through the concrete bond.

6. As a new article of manufacture, an element of concrete reenforcement consisting of a metal sheet having opposite edge portions perforated and formed with loops adapted to receive reinforcing bars and to stiffen the element, the intermediate portion of said sheet between said loops being perforated and portions of said loops extending continously throughout the length of the sheet.

7. As a new article of manufacture, an element of concrete reenforcement consisting of a metal sheet having opposite edge portions perforated and formed with loops, portions of the metal of said loops extending continously throughout the length of the element and the intermediate portion of the sheet between said loops being slotted and having the metal between the slots turned at an angle to the plane of the sheet.

8. As a new article of manufacture, an element of concrete reenforcement consisting of a metal sheet having opposite edge portions perforated and formed with loops, the metal of said perforations being connected along one edge to the sheet and adapted to connect the opposite sides of the loops together.

9. As a new article of manufacture, an element of concrete reenforcement consisting of a metal sheet having opposite edge portions perforated and formed with loops, the metal of said perforations being connected along one edge to the sheet and adapted to connect the opposite sides of the loops together, and the intermediate portion of said sheet being slotted and having the metal between the slots turned at an angle to the plane of the sheet.

10. As a new article of manufacture, an element of concrete reenforcement consisting of a metal sheet having opposite edge portions perforated and formed with loops, and the intermediate portion of said sheet being slotted and having the metal between the slots turned at an angle to the plane of the sheet.

11. A reenforced concrete structural ele-

ment having reenforcements comprising spaced bars extending longitudinally of the element and perforated metal sheets having opposite edge portions perforated and formed with loops to receive said bars, portions of the metal in said loops extending unbroken the entire length of the sheet in a direction parallel to said bars and there being a concrete bond within said loops to bond said bars thereto.

In testimony whereof we affix our signatures.

WILLIAM E. FOSTER.
FRANCIS G. STEWART.
LYMAN C. SHANK.