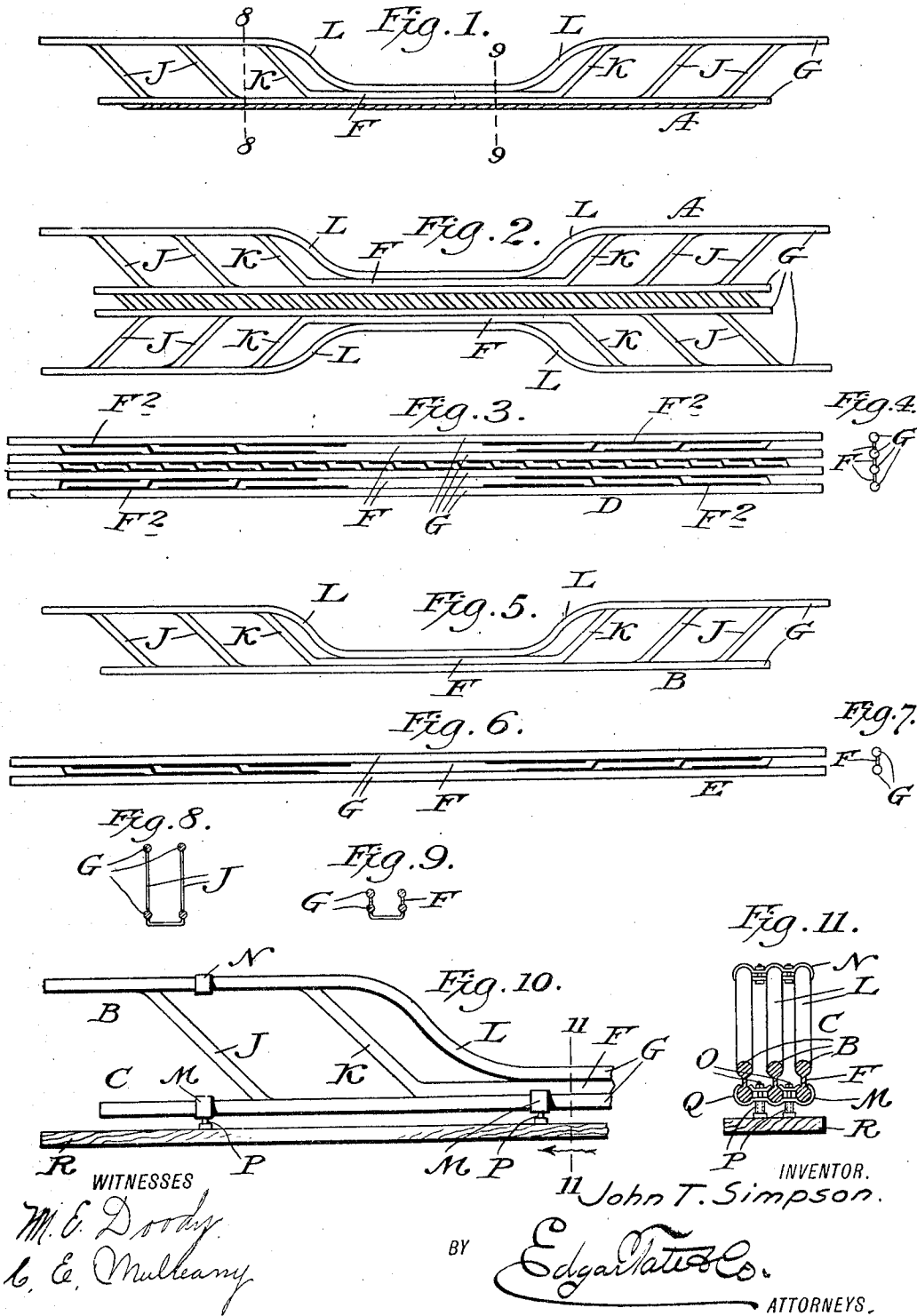


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 REINFORCING DEVICE FOR CONCRETE STRUCTURES.
 APPLICATION FILED DEC. 17, 1907.

904,283.

Patented Nov. 17, 1908.



UNITED STATES PATENT OFFICE.

JOHN T. SIMPSON, OF NEWARK, NEW JERSEY.

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No. 904,283.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN T. SIMPSON, a citizen of the United States, and residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Reinforcing Devices for Concrete Structures, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

My invention consists of an improved reinforcing metal bar or frame for use in slabs, beams, girders, columns, partitions, arches, walls and the like, of concrete and where the same can be strengthened and cheapened by the introductions of a reinforcing element to provide for tension and shearing stresses.

The essential features of this invention are to provide a metal reinforcing bar, frame or device formed from a rolled shape, and consisting of a unit in which the total area of the bar or frame is used to provide for the tension stresses at the center near the bottom of the reinforced member where the tension stresses are generally maximum, and at the same time to form a trussed frame or device in which a part of the area is used to provide for the horizontal and vertical shearing stresses near the ends of the reinforced member where the shearing stresses are generally maximum; and all parts of which are firmly attached to each other without resorting to mechanical, electrical, chemical or other means of attachment, thus providing a reinforcing bar, frame or device in which there are no loose bars, rods or other parts which through carelessness or ignorance of the workmen may be omitted during the installation, thus weakening the structure; a further object of my invention is to provide a reinforcing bar, frame or device formed from rolled shapes that can be kept in stock at convenient points for distribution, and from which reinforcing frames or devices to suit any given requirements of reinforcing can be quickly made and delivered, thus eliminating long and costly delays, and which devices or frames can be made singly or in multiples and which when made in single units can be readily made into multiple units by the use of clamps or other similar attachments when the stresses in the member being reinforced requires more area of metal than is provided in a single unit.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which a multiple and single unit bar or frame and the manner of forming multiples from single units in the preferred form are shown and in which the separate parts are designated by suitable reference characters in each of the views, and in which;

Figure 1 is a side view of a multiple frame after being expanded and formed ready for use, Fig. 2 a top view of a multiple frame after being expanded and before being bent into shape for use as shown in Figs. 8 and 9, Fig. 3 a top view of the rolled metal shape for multiple frames as it comes from the rolls and before any work has been done on same, Fig. 4 an end view of the shape shown in Fig. 3, Fig. 5 a side view of a single frame after being expanded and ready for use, Fig. 6 a top view of the rolled metal shape for single unit bars or frames as it comes from the rolls and before any work has been done on same, Fig. 7 an end view of the shape shown in Fig. 6, Fig. 8 a cross section of Fig. 1 on line 8—8, Fig. 9 a cross section of Fig. 1 on line 9—9, Fig. 10 a side view of a part of a multiple bar or frame composed of three single units and showing the method of assembling the same before placing in the forms; it also shows the method of keeping the frame at the proper distance from the soffit board forming the bottom of the member that is reinforced, and;—Fig. 11 a cross section of Fig. 10, taken on line 11—11 and showing further the method of assembling the single units into multiples and the supports for the frame.

Referring to the drawing A represents a multiple unit frame, B a single unit frame, C a multiple frame made of two or more single units, D a rolled shape from which the multiple units are formed, and E a rolled shape from which the single units are formed, and the shape D consists, in the form of construction shown, of four parallel rod, flange or thickened members G connected by intermediate web members F, while the shape E consists of two parallel rod, flange or thickened members G connected by an intervening longitudinal web member F. The multiple unit frames A are formed from rolled metal shapes D by severing the webs F longitudinally and diagonally at in-

tervals as shown at F² in Fig. 3, the length of the cut depending on the width and depth of the frame desired, and forcing the rods, bars or thickened members G apart and into the form shown in Fig. 2, which expanded shape is then bent longitudinally into the form shown in Fig. 8 which is U-shaped in cross section.

The single unit frames B are formed from a rolled shape E shown in Fig. 6, by severing the webs F longitudinally and diagonally at intervals, the length of the cut depending on the depth of the frame required and forcing the rods, bars or thickened members G apart and into the form shown in Fig. 5.

In forming both the multiple units A and the single units B the webs F are so severed as to form the web members K near the bend L of the top flange, rod or bar G of the frame thus strengthening the frame at this point. The web members J and K incline towards the rods, flanges or bars G, or range diagonally thereto, in the preferred form, but they may be formed at right angles thereto if desired; and in severing the webs F to form the web members J and K no metal is wasted but the whole area of the shapes are retained as is also the original attachment of the web members J and K to the flanges, rods or bars G.

The multiple frames C formed of single units B are assembled, in the preferred form, at the building site by means of improved clamps M and N, the clamps M forming a chair by means of bolts O and pipe sleeves P which when attached to bent plates Q support the frames at the proper distance from the bottom of forms R to permit the concrete to pass under the frames. The bolts O can afterwards be removed and the nuts used for attaching hanger bolts etc.

It will be understood, that in practice, my improved reinforcing devices are placed in between the parts of a steel or similar frame, and the concrete cast in position around the same in the usual manner, and the said reinforcing devices may also be used in the usual manner in forming concrete beams, girders, columns, arches, walls and the like and for various other purposes.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is;—

1. A metal reinforcing device for concrete constructions, consisting of one or more pairs of bars, one bar of a pair being substantially straight from end to end, the other bar having its middle portion in close relation to the straight bar, but having its end portions bent away from the straight bar but parallel therewith, the two bars being connected together at their middle and ends by thinner metallic portions integral with said bars, the

bars of a pair being in a common plane, substantially as described.

2. A metal reinforcing device for concrete constructions, consisting of one or more pairs of bars, one bar of a pair being substantially straight from end to end, the other bar having its middle portion in close relation to the straight bar, but having its end portions bent away from the straight bar but parallel therewith, the two bars being connected together at their middle and ends by thinner metallic portions integral with said bars, the bars of a pair being in a common plane, the straight bars of two or more pairs being also connected by thinner metallic portions integral with said bars and extending in a straight line from one to the other, substantially as described.

3. A metal reinforcing device for use in concrete constructions consisting of four parallel bars connected throughout their lengths by web members of less thickness than said bars, the end portions of the outer parallel bars being curved outwardly and expanded or separated from the inner parallel bars except at the middle portion of the device, but remaining parallel therewith at the middle and end portions and the end portions thereof being connected therewith at intervals by oblique ribs formed by expanding or separating the slitted outer web members, said bars being continuous throughout their lengths and the distance between the outer and inner bars at the middle portion of the device being the same as the width of the original webs, the inner web member being slitted longitudinally and diagonally throughout its length, and the inner parallel bars being expanded or separated but remaining parallel throughout their lengths, and the expanded outer bars and outer web portions being bent at right angles to the inner web portion.

4. A metal reinforcing device for use in concrete constructions consisting of four parallel bars connected throughout their lengths by web members of less thickness than said bars, the end portions of the outer web members being provided at intervals with parallel longitudinal and diagonal slits, and the end portions of the outer parallel bars being curved outwardly and expanded or separated from the inner parallel bars except at the middle portion of the device, but remaining parallel therewith at the middle and end portions and the end portions thereof being connected therewith at intervals by oblique ribs formed by expanding or separating the slitted outer web members, said bars being continuous throughout their lengths and the distance between the outer and inner bars at the middle portion of the device being the same as the width of the original webs, the inner web member being slitted longitudi-

nally and diagonally throughout its length, and the inner parallel bars being expanded or separated but remaining parallel throughout their lengths, and the expanded outer bars and outer web portions being bent at right angles to the inner web portion.

In testimony that I claim the foregoing as

my invention I have signed my name in presence of the subscribing witnesses this 16th day of December 1907.

JOHN T. SIMPSON.

Witnesses:

C. E. MULREANY,

MAY E. DOODY.