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A. S. PIERSON.

REINFORCING DEVICE FOR CONCRETE STRUCTURES.

APPLICATION FILED MAR. 17, 1905.

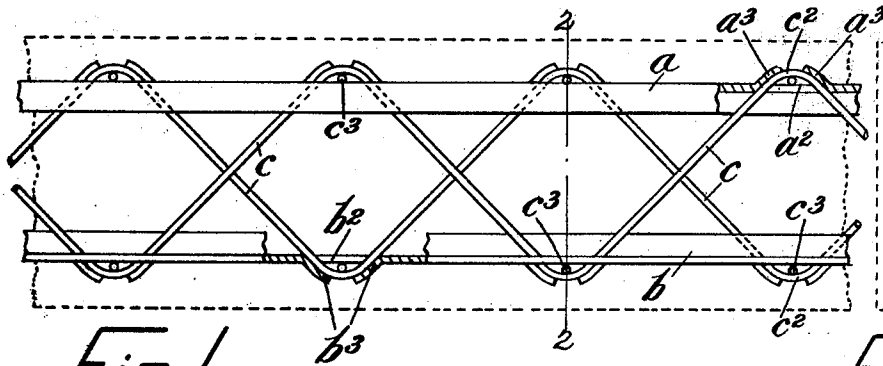


Fig. 1.

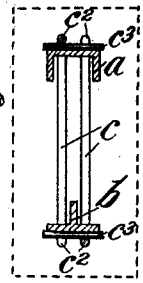


Fig. 2.

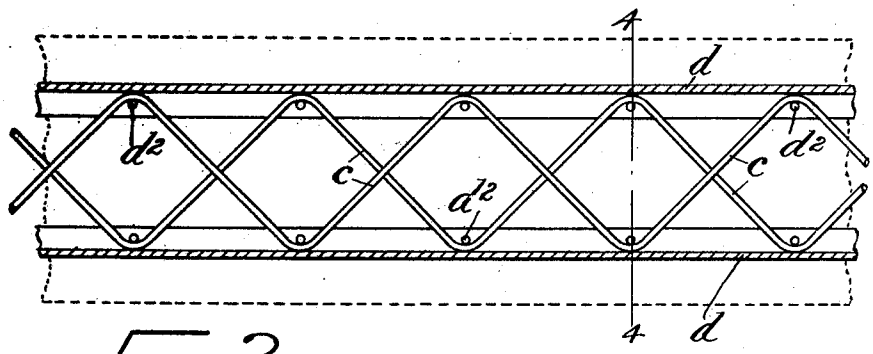


Fig. 3.

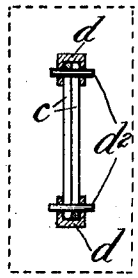


Fig. 4.

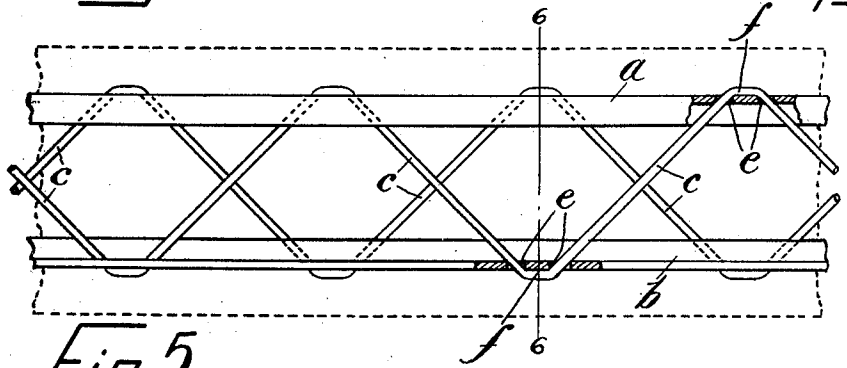


Fig. 5.

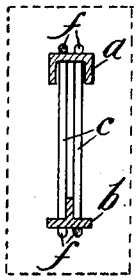


Fig. 6.

WITNESSES.

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REINFORCING DEVICE FOR CONCRETE STRUCTURES.

No. 810,220. Specification of Letters Patent. Patented Jan. 16, 1906.

Application filed March 17, 1905. Serial No. 250,571.

To all whom it may concern:

Be it known that I, ARTHUR S. PIERSON, a citizen of the United States, residing at Morristown, in the county of Morris 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.

This invention relates to what are known as "fireproof" structures or buildings, and particularly buildings of this class which employ columns, beams, girders, and the like composed of concrete reinforced with steel bars, ties, or other devices of various kinds and classes which are embedded in the concrete material; and the object of the invention is to provide an improved reinforcing or strengthening device for use in structures of the class specified and which may be employed in columns, beams, and girders composed of concrete or similar material and which may also be employed in floor and ceiling construction or in making slabs or plates of any size.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which—

Figure 1 is a side view of a reinforcing device of the class specified made according to my invention, parts being sectioned; Fig. 2, a section on the line 2 2 of Fig. 1; Fig. 3, a view similar to Fig. 1, but showing a modification; Fig. 4, a section on the line 4 4 of Fig. 3; Fig. 5, a view similar to Fig. 1, but showing another modification; and Fig. 6, a section on the line 6 6 of Fig. 5.

In the practice of my invention as shown in Figs. 1 and 2 I provide two parallel bars *a* and *b*, the bar *a* in the form of construction shown being composed of channel-iron and the bar *b* being an ordinary T-bar, and these bars are connected and at the same time separated to a predetermined extent by binding-rods *c*, which are arranged diagonally and in opposite directions and which cross each other longitudinally of the center space between said bars. In the form of construction shown the rods *c* are continuous and the bar *a* is provided at intervals with longitudinal slots or openings a^2 and the bar *b* with corresponding slots or openings b^2, which are punched therein from the inner side outwardly in the process of making said bars or after the bars have been made, as may be desired, and the binding-rods *c* are passed through the slots or openings and form on the outer sides of the bars *a* and *b* loops c^2, through which are passed key pins or wedges c^3, which may be of any desired shape and size, and in the process of forming or punching the slots or openings a^2 and b^2 corresponding outwardly-directed lugs, ears, or projections a^3 and b^3 are formed on the outer sides of the bars *a* and *b* and at the opposite ends of the slots or openings a^2 and b^2; but the lugs, ears, or projections a^3 and b^3 are not an essential feature and may or may not be employed; but said lugs, ears, or projections when formed in the manner described give additional strength to the reinforcing device comprising the parallel bars *a* and *b* and the longitudinally-arranged binding-rods *c*, which connect said bars in the manner described. When the bars *a* and *b* have been connected in the manner described, they form a rigid trusswork, the bars of which cannot be pressed together or separated, and in practice a reinforcing device of this kind may be placed in a column or in a beam or girder, or a number of them may be placed parallel in the floor and ceiling construction, composed of concrete or similar material, and in all of these cases the concrete or similar material entirely incloses the reinforcing device, as indicated by the dotted lines in Figs. 1 and 2.

In Figs. 3 and 4 I have shown a modification in which parallel bars *d* are employed, said bars being composed of ordinary channel-iron, and passed through the side walls thereof at regular intervals are pins d^2, and binding-rods *c*, similar to those shown in Figs. 1 and 2, are employed for connecting the parallel bars *d*, and in this operation the binding-rods are passed around the oppositely-arranged pins *d* and in opposite directions and crossing each other between said pins and at the center of the space between the bars *d*, the binding-rods *c* being also continuous, as in Figs. 1 and 2. This arrangement of the binding-rods *c* firmly connects the bars *d* and also holds them at a suitable distance apart, and a comparatively strong and staple reinforcing device is thus formed, and in practice this device is embedded in concrete either in the form of columns, beams, or girders

or in floor and ceiling construction, or wherever it may be desired, in the same manner as with the construction shown in Figs. 1 and 2.

In Figs. 5 and 6 I have shown another modification, which is similar in all respects to that shown in Figs. 1 and 2, except that instead of forming one slot or opening at the points where the binding-rods *c* connect with the bars *a* and *b* two holes *e* are formed, and the binding-rods *c* are passed through these holes, and these separate holes form a web portion or tongue *f*, over or around which the binding-rods *c* are passed.

It will be understood that in all these forms of construction the binding-rods *c* are tightly drawn, this operation being performed by suitable machinery, and with each form of construction the reinforcing device so formed possesses the greatest possible strength in proportion to the weight thereof, and the arrangement of the separate parts is such in each form of construction as to give the reinforcing device the required tensional resistance and also the necessary resistance against compression.

Instead of arranging these reinforcing devices singularly in columns, beams, girders, floor and ceiling construction or in slabs a number of them may be placed parallel with each other and bound together by horizontal rods, thus making a horizontal trestle-work, and this method may also be employed in making vertical walls, and it will be understood that in employing columns, beams, girders, and the like in structural work the ends of said columns, beams, girders, and the like will be provided with the usual means of connection and supports.

Although I have shown but two forms of bars—namely, channel-iron and T-iron—in the various forms of reinforcing or strengthening devices herein shown and described, it will be apparent that the parallel side bars may be made in any desired shape in cross-section.

In addition to the uses herein specified for my improved reinforcing device the same may also be used in railway ties, sleepers, and the like, and it will also be apparent that a structure of this kind may be employed in certain relations or wherever such devices are required.

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

1. A device of the class described, comprising parallel side bars and connecting-rods arranged diagonally between said bars and crossing each other at regular intervals centrally and longitudinally between said bars, said connecting-rods being connected with said bars so as to prevent their outward and inward movement, and said connecting-rods being continuous, substantially as shown and described.

2. A reinforcing device for use in concrete and similar structures, comprising parallel side bars and connecting-rods arranged diagonally between said bars and crossing each other at regular intervals centrally and longitudinally between said bars, said connecting-rods being connected with said bars so as to prevent their outward and inward movement, and said connecting-rods being continuous, and said bars being provided with attaching devices around which said rods are passed, substantially as shown and described.

3. A reinforcing device for use in concrete structures, said device comprising parallel bars having holes punched therethrough at regular intervals, and continuous connecting-rods arranged diagonally between said bars and crossing each other in opposite directions and formed into loops which pass through said holes and through which key-pins are passed on the outer sides of said bars, substantially as shown and described.

4. A reinforcing device for use in concrete structures, comprising parallel side bars, and connecting-rods arranged between said bars and extending longitudinally thereof and arranged diagonally and crossing each other at regular intervals longitudinally and centrally of the space between said bars, said bars being provided with holes through which said connecting-rods are passed, substantially as shown and described.

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 March, 1905.

ARTHUR S. PIERSON.

Witnesses:
C. J. KLEIN,
F. A. STEWART.