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PATENTED MAY 8, 1906.

H. E. PERCIVAL.
REINFORCEMENT FOR CONCRETE RAILROAD TIES.
APPLICATION FILED JULY 17, 1905.

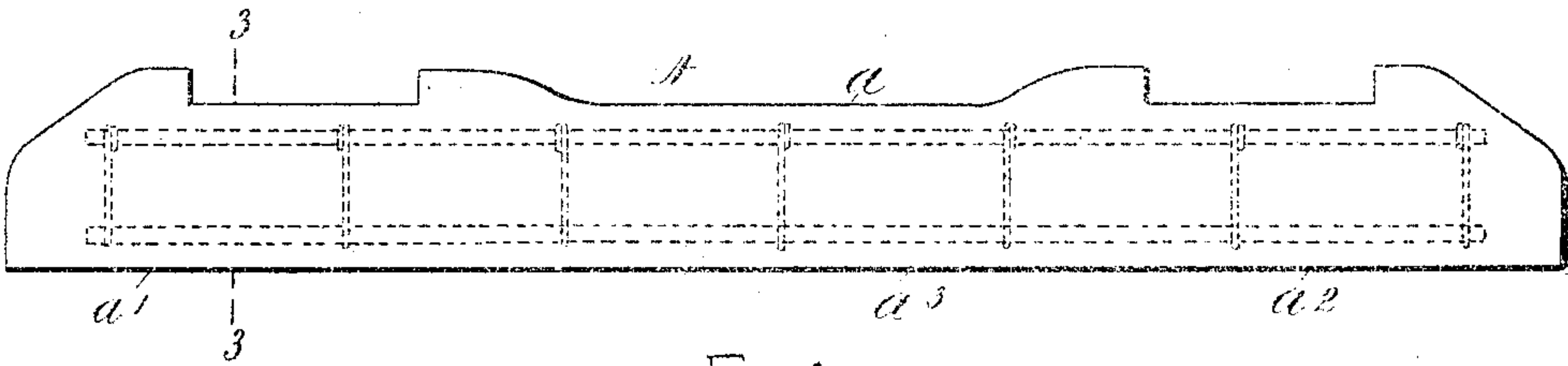


Fig. 1.

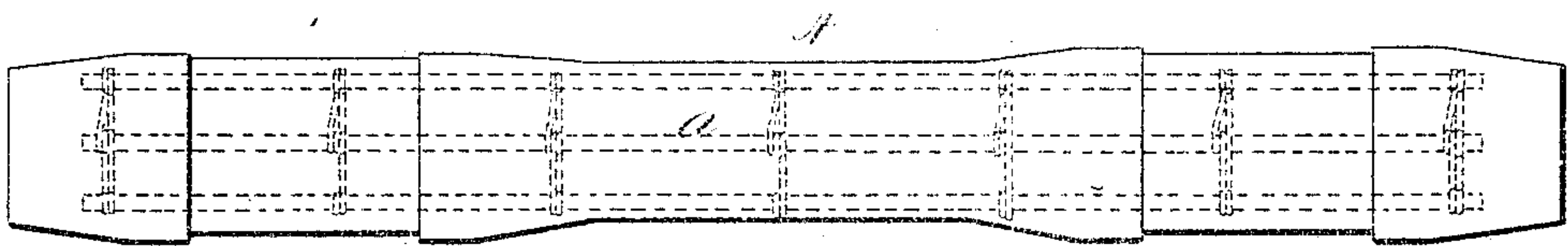


Fig. 2.

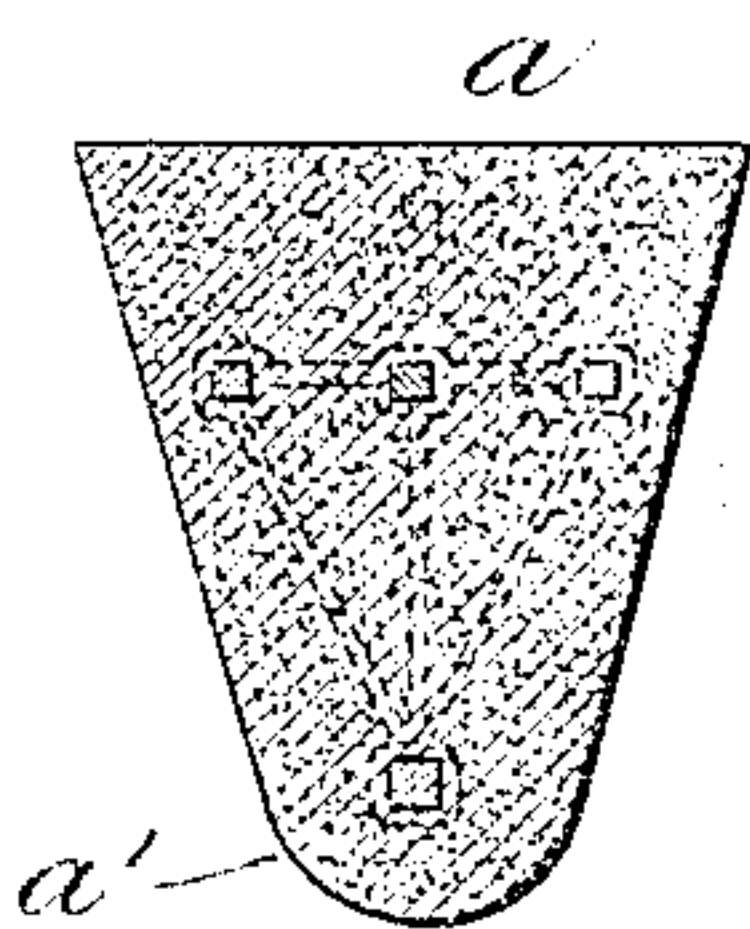


Fig. 3.

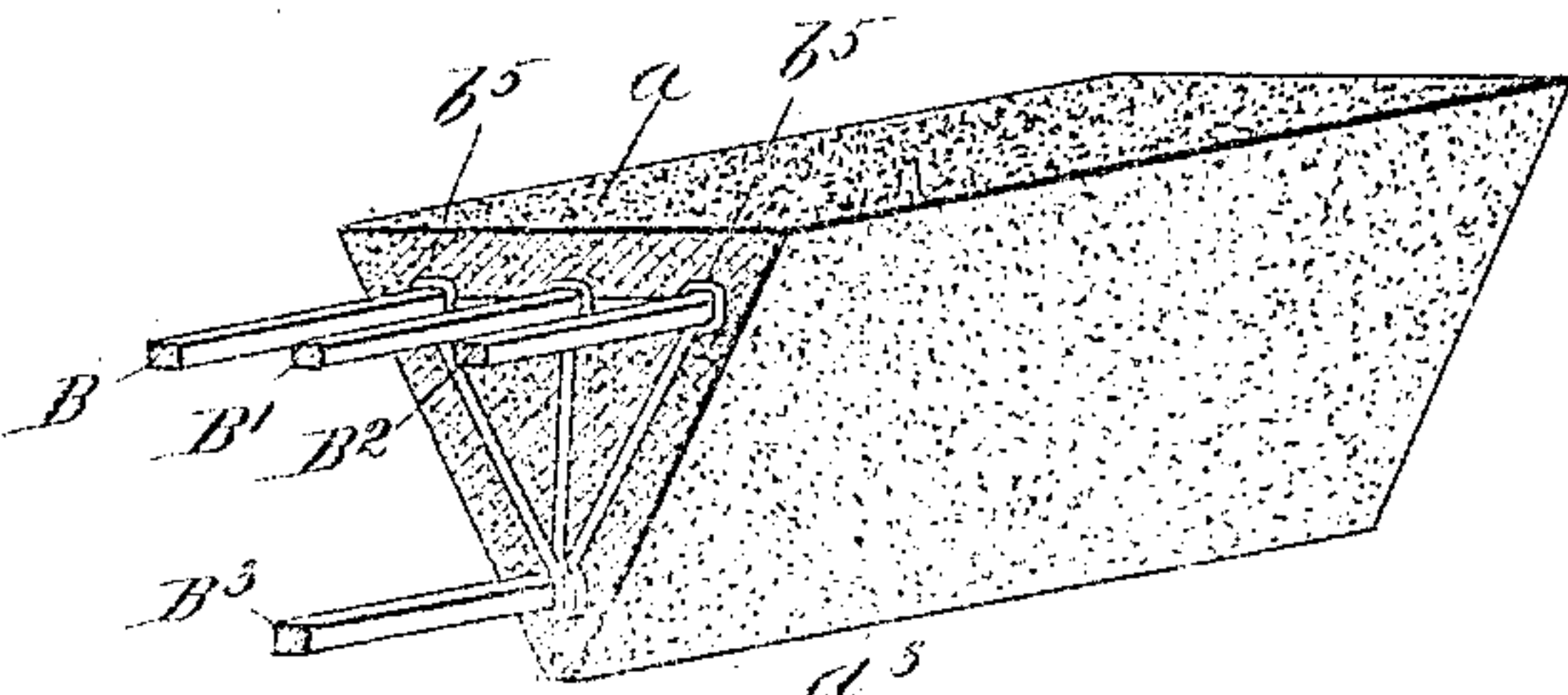


Fig. 4.

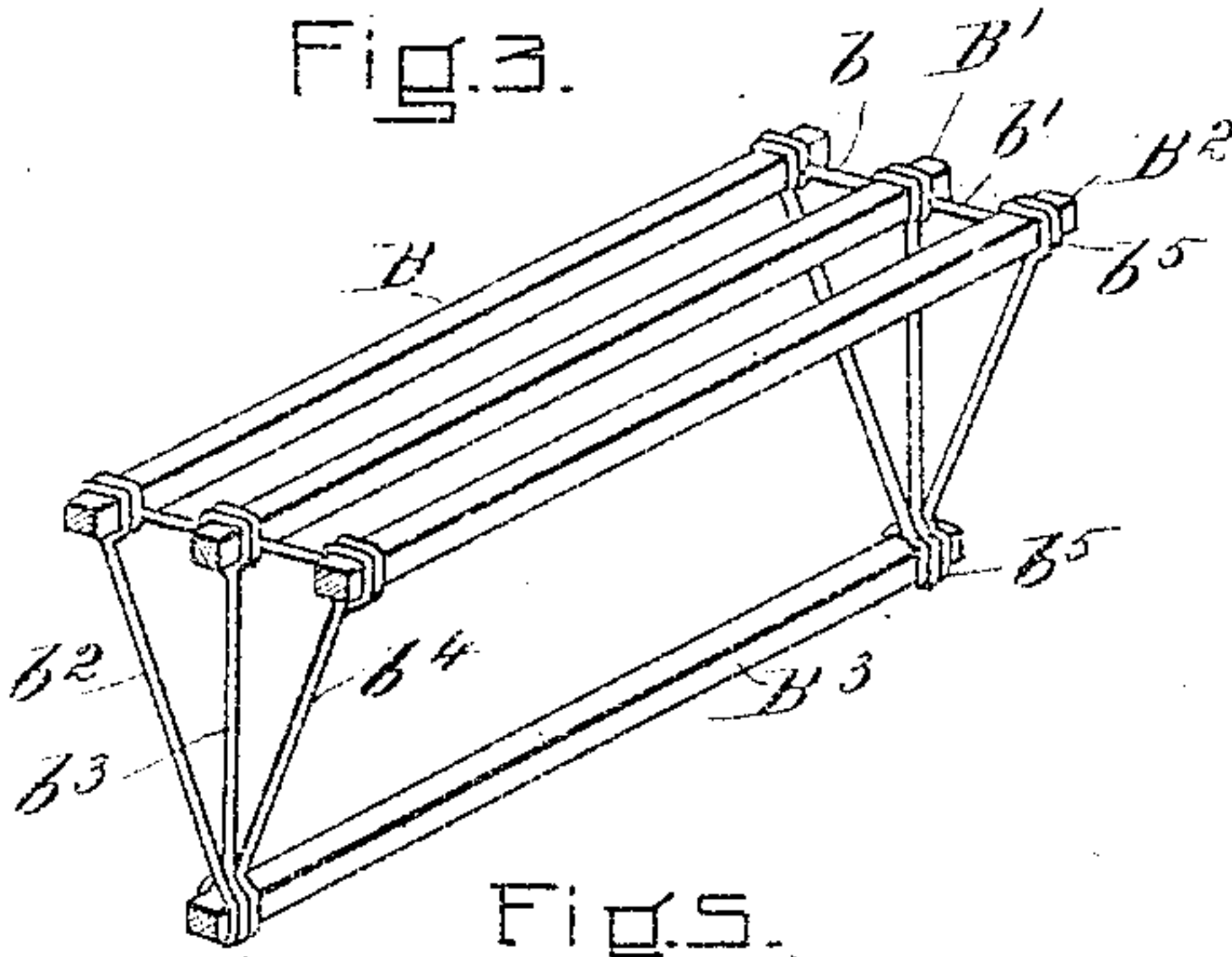


Fig. 5.

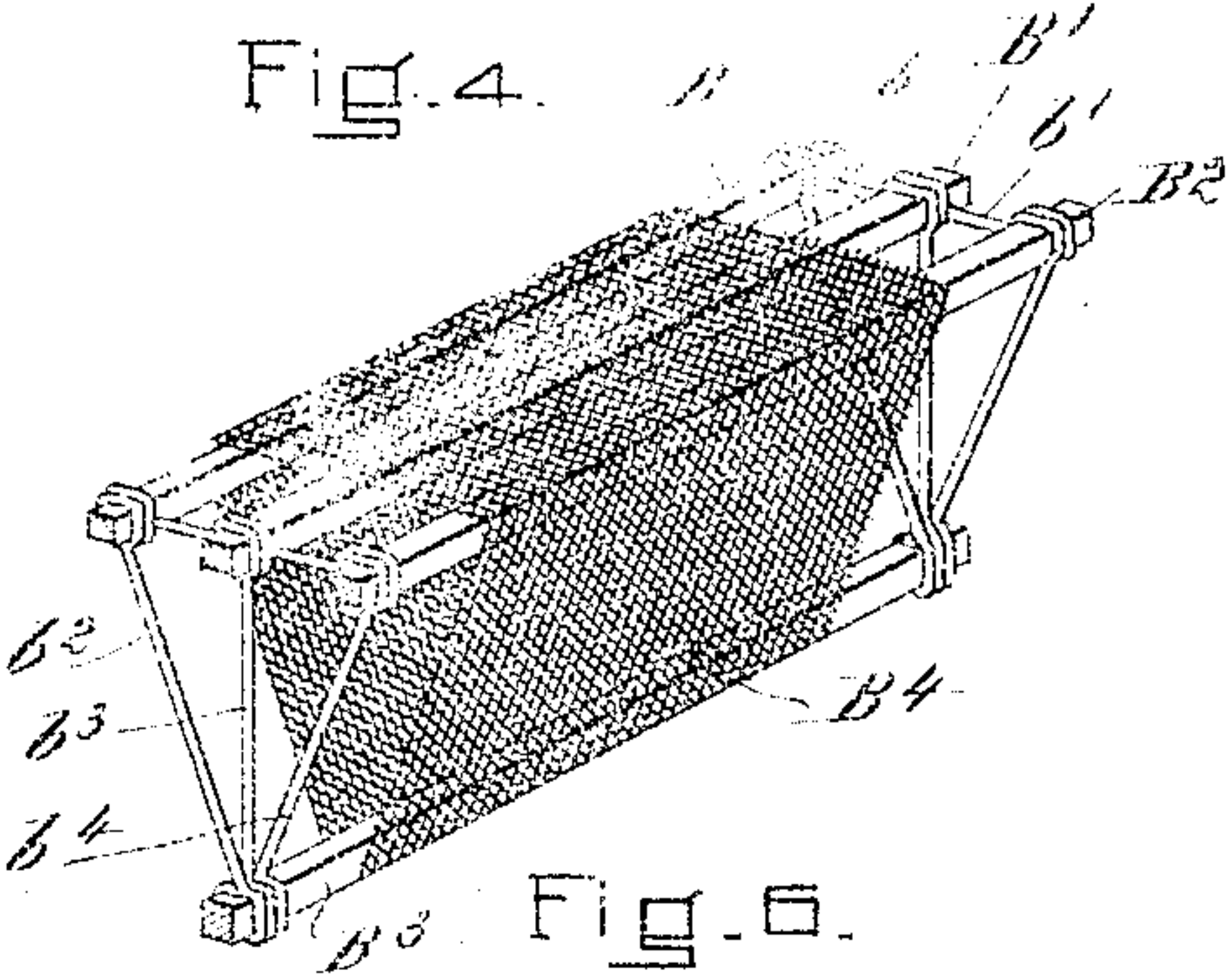


Fig. 6.

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REINFORCEMENT FOR CONCRETE RAILROAD-TIES.

No. 819,919.

Specification of Letters Patent.

Patented May 8, 1906.

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To all whom it may concern:

Be it known that I, HERBERT E. PERCIVAL, a citizen of the United States, and a resident of Galveston, in the county of Galveston and State of Texas, have invented a new and useful Improvement in Reinforcements for Concrete Railroad-Ties, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The object of my invention is to provide a reinforcement for a cement or concrete tie like that shown and described in my application for Letters Patent of the United States, entitled "Railroad-ties," filed July 11, 1904, Serial No. 215,974, allowed January 4, 1905. As described in said application the form of the tie is such as to relieve it from becoming centerbound. For this purpose the head of the tie is made relatively broad. The ends of the tie are made broad with relatively wide bearing-surfaces in order that when pressure or weight is applied they may withstand it without undue sinking, while along the center of the tie the sides converge or slope inwardly in such manner that they present a narrow, almost sharp, cutting bottom edge or surface to the filling or ballasting in which the tie is laid.

With a tie thus made it becomes necessary to provide for internal reinforcing means which will give a strength and rigidity to the tie, especially along the center, where, owing to the lesser amount of cement or concrete, it might otherwise become broken and which will provide also a reinforcement to this central portion of the tie in order that strength and rigidity may be given it to cut through the filling in which the tie is laid.

It is accordingly the special object of my invention to provide the tie with as simple and inexpensive a reinforcing means as possible without resorting to any expensive and elaborate truss-support.

The invention can best be seen and understood by reference to the drawings, in which—
Figure 1 shows the tie in side elevation. Fig. 2 shows the same in plan. Fig. 3 shows a cross-section on the line 3-3 of Fig. 1. Fig. 4 shows in perspective a portion of the tie, illustrating especially the reinforcement. Fig. 5 shows in perspective the reinforcement apart from the tie; and Fig. 6 shows a modi-

fied method of constructing the same, to which reference will hereinafter be made.

Referring to the drawings, A represents a form of tie which is the subject-matter of my said former application. The tie has the broad head *a*, the wide bearing end portions *a'* *a''*, and the narrow cutting central portion *a'''*.

The mode of reinforcing the tie is as follows: There are laid longitudinally in the cement along the head of the tie rigid metal bars *B B' B''*, preferably of steel. In the base of the tie is also placed longitudinally another bar *B'''*. For bracing and reinforcing these bars that they when combined may form a "frame," as it were, I unite them by stiff rods or wires. These rods or wires for convenience in understanding their method of connection I have lettered *b, b', b'', b''', and b''''*, the rods *b b'* joining or connecting the head-bars *B* and *B'*, *B'* and *B''*, respectively, and the rods *b'' b''' b''''* joining or connecting the head-bars *B B' B''* with the base-bar *B'''* laid along the bottom of the tie. These sets of connecting rods or wires are located or arranged substantially as shown in the dotted lines of Fig. 1, one set at about the middle of the tie, other sets at the ends of the tie, and one or more sets intermediately arranged at periodical distances along the same. This arrangement may of course be varied, and in this connection attention is called to the fact that the rods may have turned or preformed ends or heads *b''* by which they may be slipped over the ends of the reinforcing-bars and then arranged individually in such places as to give the most structural strength. The operation of these bars and connecting-rods is that the bars, set longitudinally in the cement of the tie, reinforce the same, and the connecting rods or wires reinforce and strengthen the bars. In other words, they strengthen the bars, so that they cannot easily become bent, holding them, so that they cannot bend away or toward one another. This may be said especially of the base-bar *B'''*, which is located at a point where a single reinforcing-bar only can well be employed and where also a maximum amount of reinforcing strength is required. Now the three head-bars *B B' B''* provide a maximum of strength and rigidity and they, through the connecting-rods, impart their strength and rigidity to the single base-bar *B'''*. In Fig. 6 I have shown a slight modification of the reinforcement, in

that there is wound around the metal bars a sheet of woven or meshed wire B⁴. This not only assists in reinforcing and strengthening the bars, but also gives a base to which the cement may adhere in the formation of the tie.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

10 1. A tie of the character specified having a reinforcement consisting of a plurality of rigid metal bars inserted in the head of the tie, a reinforcing-bar inserted in the base of the tie, and rods or wires connecting said top
15 bars and each of said top bars with said bottom bar.

2. A tie of the character specified having a reinforcement consisting of a triangular frame, the same comprising a bar inserted in
20 the base of the tie and a plurality of bars inserted in the head thereof, and means connecting said head and base bars for imparting to the base-bar a reinforcing strength and rigidity as against force or pressure acting to
25 move or bend the same in the direction of said head-bars.

3. A tie of the character specified having a reinforcement consisting of a series of bars set into the head of the tie, a bar set into the
30 base thereof, and separate rods or wires connecting each of said head-bars with said base-

bar, each rod or wire making such connection with the bars which it connects as to be adjustable along the same.

4. A tie of the character specified having a reinforcement consisting of a plurality of rigid metal bars inserted in the head of the tie, a reinforcing-bar inserted in the base of the tie, rods or wires connecting said bars, and a screen of woven wire wound around the
40 same, substantially as described.

5. A tie of the character specified having a reinforcement consisting of a plurality of rigid metal bars inserted in the head of the tie, a reinforcing-bar inserted in the base
45 thereof and rods or wires connecting each of said top or head bars with said bottom or base bar for imparting added rigidity and strength thereto.

6. A tie of the character specified having a reinforcement consisting of a series of bars set into the head of the tie, a bar set into the base thereof, separate rods or wires connecting each of said head-bars with said base-bar, each rod or wire making such connection
55 with the bars which it connects as to be adjustable along the same.

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In presence of—

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