

(No Model.)

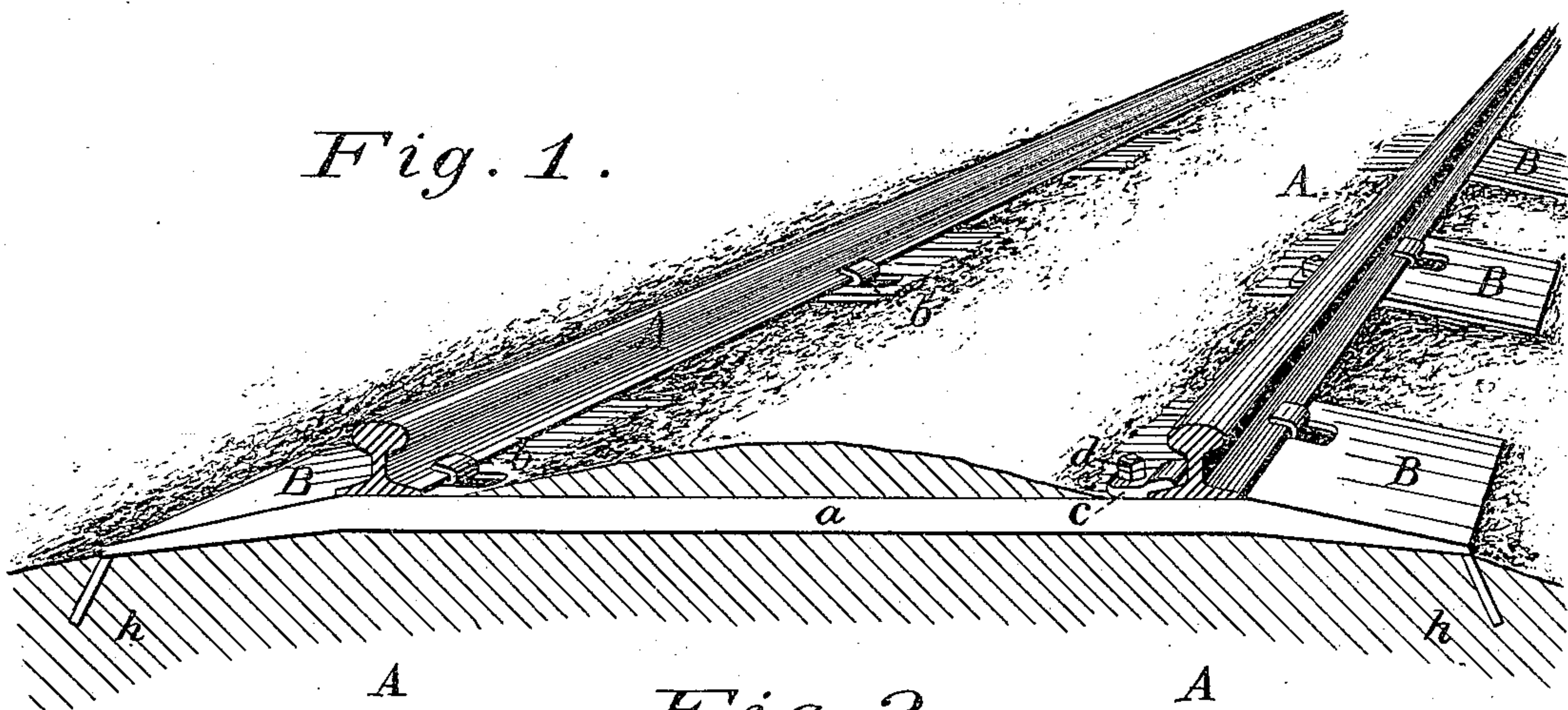
S. D. LOCKE.

RAILWAY CROSS TIE AND FASTENING.

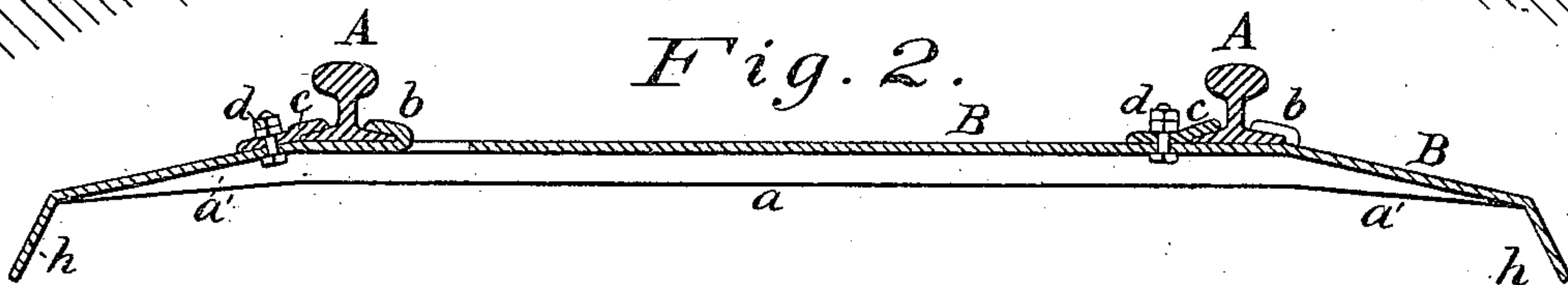
No. 356,002.

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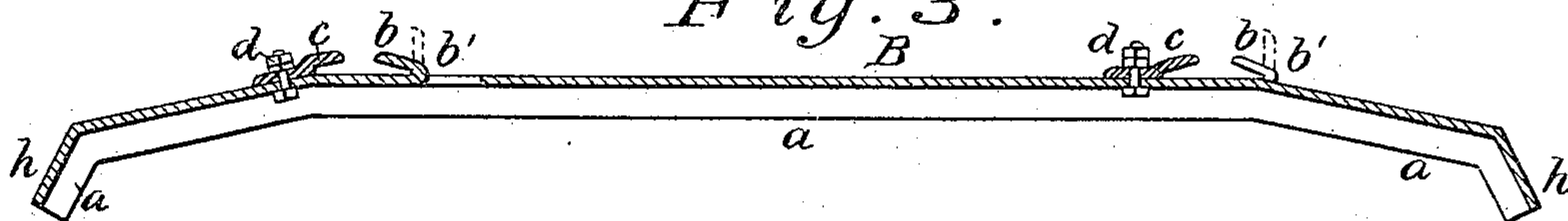
*Fig. 1.*



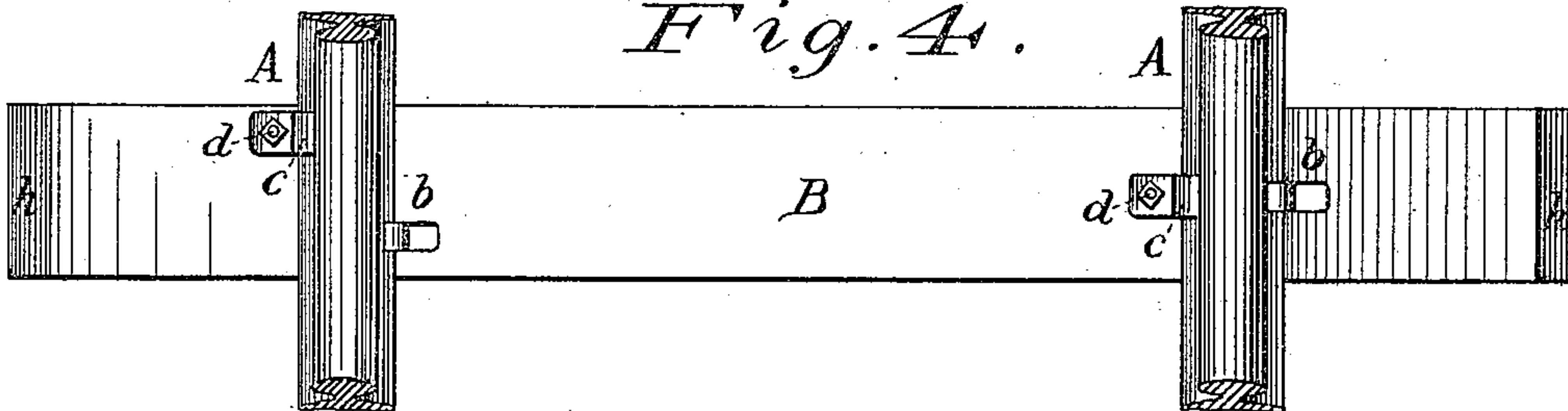
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



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SYLVANUS D. LOCKE, OF HOOSICK FALLS, NEW YORK.

## RAILWAY CROSS-TIE AND FASTENING.

SPECIFICATION forming part of Letters Patent No. 356,002, dated January 11, 1887.

Application filed April 27, 1886. Serial No. 200,268. (No model.)

*To all whom it may concern:*

Be it known that I, SYLVANUS D. LOCKE, of Hoosick Falls, in the county of Rensselaer and State of New York, have invented certain  
5 new and useful Improvements in Railway Cross-Ties and Fastenings, of which the following is a specification.

My invention relates to the employment in  
10 railways of iron or steel for cross-ties for supporting the rails; and the objects of my improvements are, first, to reduce the weight and cost of iron or steel cross-ties within the limit of their adoption by railway managers while at the same time maintaining their requisite  
15 strength and stiffness as well as the necessary superficial area to support the great loads carried; second, to provide iron or steel ties with sure anchors, holding them from slipping endwise or the track from lateral displacement;  
20 and, third, to afford cheap and effective fastenings of the rails to the cross-ties that shall allow, without disturbing the rest of the track, any rail or cross-tie to be readily removed.

That others skilled in the art may make and  
25 use my invention, I will describe its construction and operation, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view, with a cross-  
30 section in the foreground, of a railway showing my improvements. Fig. 2 is a longitudinal section of one of the cross-ties, showing the longitudinal ribs or flanges tapering from the rails outward and entirely omitted in  
35 the bent-down or anchoring ends. Fig. 3 is also a longitudinal section showing the ribs or flanges continued to the ends of the tie. Fig. 4 is a plan or top of a cross-tie, showing broken sections of the rails secured thereto. Fig. 5  
40 is a view in cross-section of a cross-tie, showing one form of the tie; and Fig. 6 is also a cross-section showing another form of the tie.

Heretofore the cross-ties supporting the rails  
45 have been made of wood, that only last, on an average, about six years. Many attempts have been made to construct them of iron, that, properly coated to prevent oxidation, would be almost indestructible. These attempts, for one reason or another, have all been failures.  
50 Either the ties have been too costly or too heavy and massive, or they have offered too

narrow a seat for the rails, or have covered too small an area of the road-bed. The demand is for an iron or steel tie; but it must be cheap and must be even lighter than the wooden  
55 tie. If heavy and massive, as those made of stone, the track, if uneven, is too unyielding, and the rails and rolling-stock are sooner pounded or worn out. If the rails rest on a narrow seat on the tie, they are much more  
60 liable to break, and the number of ties to the mile will be greatly increased.

A very serious difficulty in the use of the iron or steel tie has been the insecurity of the track against lateral displacement.  
65

The light iron or steel ties, and particularly the rolled ties, as heretofore made, offer but little resistance against end slipping or displacement. Not being anchored in the road-  
70 way, as is the wooden tie with its embedded ends and irregular outline, the metal tie has been insecure in its position, and the track therefore liable to dangerous lateral slidings or displacement. The iron or steel tie must be firmly anchored in the roadway, and at the  
75 same time must be cheap, light, strong, and inflexible.

To meet all of these requirements—some of them conflicting—I have invented the cross-tie  
80 B, on which, in the drawings, the rails A rest and are secured. This cross-tie I make, preferably, of steel rolled in the form shown, with the main or upper part spread out into a broad sheet or plate. To give a broad firm seat for the rails and present sufficient area covering  
85 the road-bed to prevent depression, the width of this plate ought not to be less than eight inches nor its length less than eight feet. To secure the requisite strength and stiffness, this upper plate has one or more deep  
90 flanges or ribs, *a*, running along its under side. Preferably this flange (or flanges) tapers off from the outside of the rails to nothing at the ends of the plate or tie, as shown at *a'* in Figs. 1 and 2; but they may be kept at full depth,  
95 as shown in Fig. 3.

The portion of the ties immediately outside of the rails I prefer to bend or curve down to conform to the slope of the road-bed, their centers between the rails being covered by the  
100 earth or ballast, as shown in the drawings.

To prevent the ties from slipping endwise,



as they are greatly liable to do when the road-bed is wet and slippery, I anchor each one firmly against movement endwise. There are several ways of so anchoring them. An effective way is shown in the drawings, and consists in simply bending the ends of the ties down perpendicularly, or nearly so, to form anchor-plates to be embedded in the roadway. This way only requires that the ties shall be rolled enough longer to make the anchor-plates, or they (the anchor-plates) may be made separately and afterward riveted to the ties.

I use on one side of the rail the solid lip *b*, and on the other side the removable clip *c*. The clip is fastened by a bolt, *d*, and the lip is first punched up out of the tie, as shown by dotted lines *b'* in Fig. 3, and afterward bent down over the flange of the rail. I use the solid or fixed lip on one side—say the left side—of the rail and the removable clip on the other or right side. This combination of the rigid lip and the removable clip secures the advantage of a fastening solidly formed on and with the tie on that side of the rail receiving the greatest stress or thrust, (experienced on sharp curves,) and also allows each rail or tie to be removed without disturbing the other rails or ties, and without bending up, and so weakening or breaking the lips and ruining the tie. These lips and the holes for the bolts *d* should be so punched as to give to each tie a fastening on both sides of each rail and adjacent to the ribs or flanges. They can be so punched as to secure, without thought or inspection by the trackmen, perfect uniformity in the width or gage of the track throughout the entire length of any line. The portion of the ties where these lips or bolt-holes are punched in them requires to be somewhat thicker than is necessary for the requisite weight and strength of the tie. To secure this necessary thickness, as well as the necessary strength, while at the same time economy in weight and cost is secured, I prefer a double-flanged cross-tie having the central portion of the connecting web or plate rolled much thinner than the portion near the flanges, where the bolt-holes and the lips are punched or formed in them, as shown in Fig. 6.

I prefer to roll this cross-tie from a low grade of steel, and as such, and made as herein described, it need not weigh over sixty pounds, nor cost much more than one dollar.

Heretofore cast-iron railway-ties have been rounded or slanted at the ends, so that when partially embedded in the road-bed said rounded ends would occupy in the road-bed a position somewhat similar to an anchor-plate;

but not being extended below the plane of the body portion of the tie they fail to perform the function of anchors, one of the essential features of which is that it should project into the road-bed below the line on which the tie rests, and at such an angle to the tie as to offer a positive resistance to endwise movement thereof. It is also preferable that the strengthening-ribs should not be extended along the anchor-plate unless the angle of the deflection of the latter be quite sharp.

What I claim is—

1. A railway-tie made of iron or steel, having thick side portions, and rail-retaining lips formed from said thick side portions, and having a thin web connecting said thicker portions, substantially as specified.

2. A railway-tie made of iron or steel, deflected at the ends to form inclinations conforming to the slope of the road-bed, and terminating at the ends in the form of anchors, substantially as specified.

3. A railway-tie made of iron or steel and having a flat top entirely across, thickened side portions, a thinner connecting-rib, depending ribs or flanges, and anchors, substantially as specified.

4. The combination, with a railway-tie formed of iron or steel and having thicker side portions, retaining-lips formed therefrom, strengthening ribs or flanges, and anchors, of removable clips arranged with relation to the retaining-lips, substantially as and for the purpose set forth.

5. A railway-tie made of iron or steel, consisting of the main body portion *B*, provided with strengthening ribs or flanges *A*, the anchors *h*, the clips *b*, and the intermediate inclined portions, which substantially conform to the slope of the road-bed, substantially as specified.

6. A railway-tie made of rolled iron or steel and provided with anchors at the ends, said anchors being formed by deflecting the ends and extending the same below the strengthening-ribs of the tie, substantially as specified, and for the purpose of preventing endwise movement of the tie in the road-bed.

7. In a railway, a cross-tie of iron or steel rolled with the thicker side portions, *g*, extended downward at their edges as stiffening or strengthening ribs *a*, and joined by a thin web or plate, *f*, substantially as and for the purpose described.

SYLVANUS D. LOCKE.

Witnesses:

N. W. LOCKE,  
E. J. LOCKE.