

(No Model.)

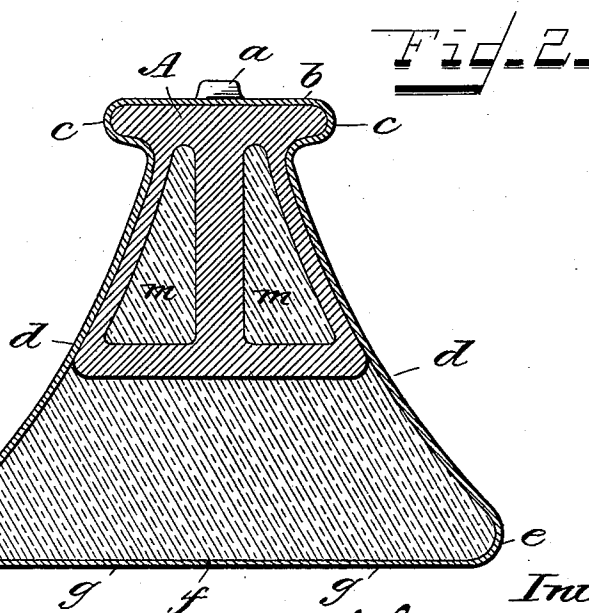
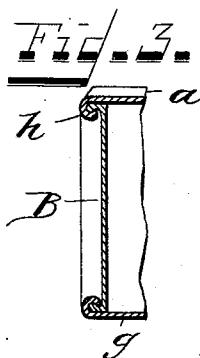
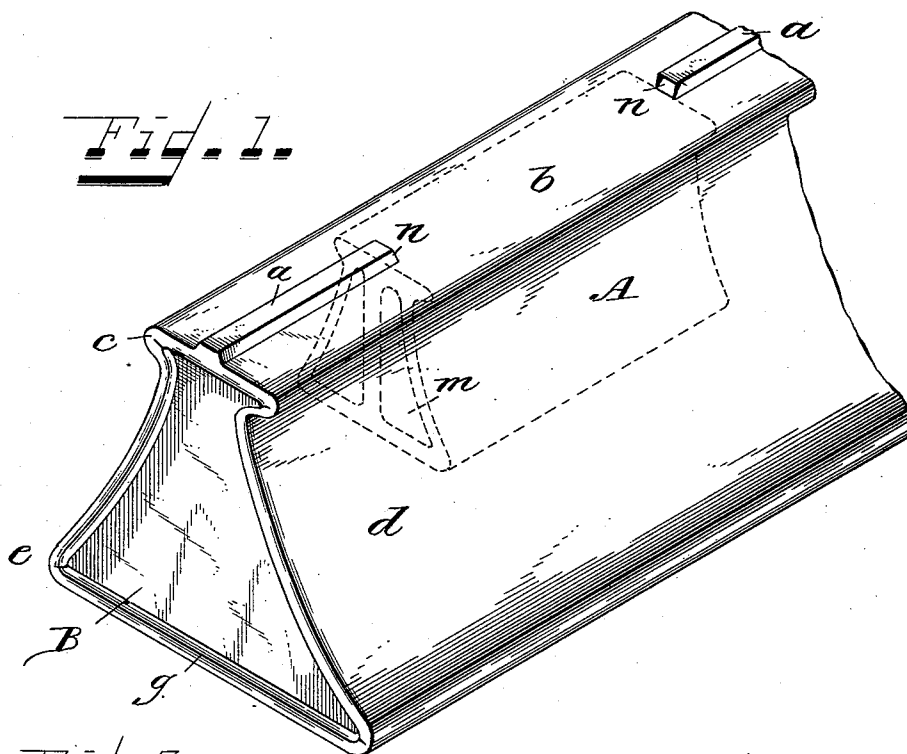
2 Sheets—Sheet 1.

S. HAZARD.

METALLIC CROSS TIE FOR RAILWAY TRACKS.

No. 540,662.

Patented June 11, 1895.



Witnesses.

J. Thomson Cross.
George J. Heidman

Inventor:

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by Steu Allen
Attorneys.

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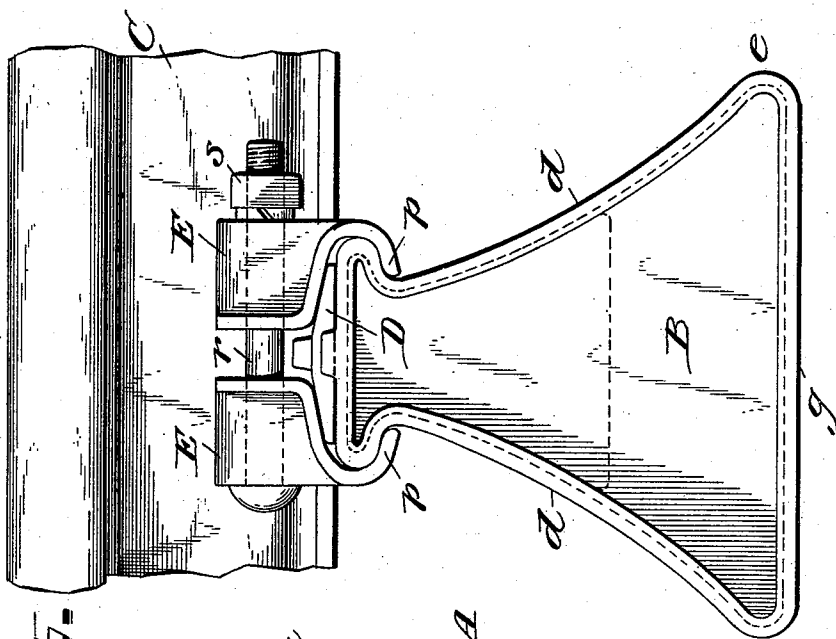


Fig. 5.

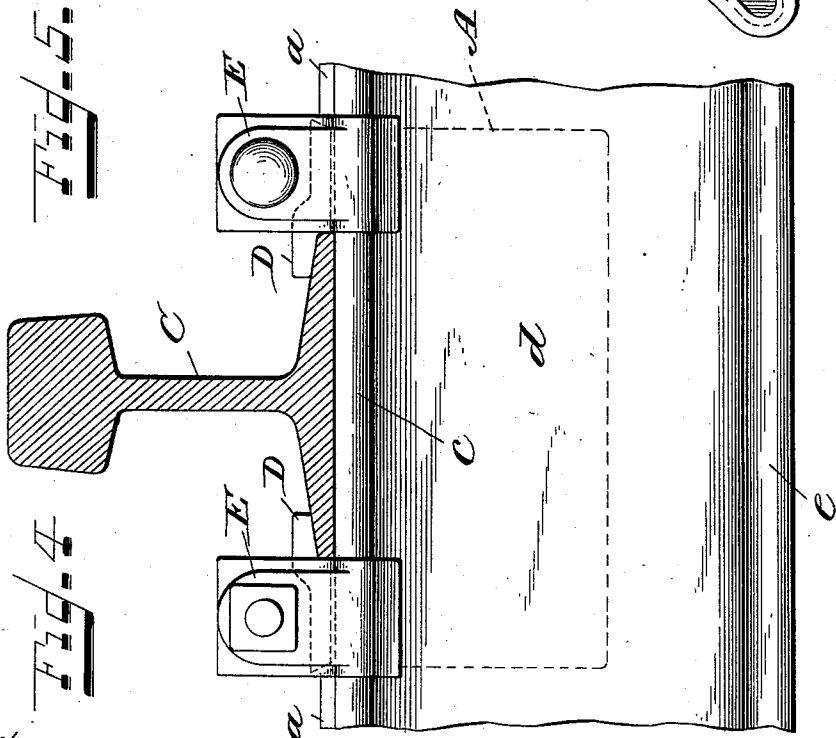


Fig. 4.

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UNITED STATES PATENT OFFICE.

SCHUYLER HAZARD, OF HOME CITY, OHIO.

METALLIC CROSS-TIE FOR RAILWAY-TRACKS.

SPECIFICATION forming part of Letters Patent No. 540,662, dated June 11, 1895.

Application filed December 12, 1894. Serial No. 531,547. (No model.)

To all whom it may concern:

Be it known that I, SCHUYLER HAZARD, a citizen of the United States, residing at Home City, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Metallic Cross-Ties for Railway-Tracks, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to metal cross ties for use in supporting rails for railways and which are intended to be employed as a substitute for the wooden ties more commonly in use.

Certain advantages of metal ties over wood are obvious in that with their use the road bed does not have to be torn up so frequently for renewals, the life of metal ties being five or ten times that of wood, while a better class of track, much more solid and durable, and increased safety for traffic are some of the results incident to this substitution of metal for wood. In cross ties for rails where the tie is rectangular in cross section, it is clear that inasmuch as the resultant pressure of the load moves from one vertical edge across the face of the tie, the tendency is to rock the tie in its bed, and further it is plain that, just as soon as the tie has begun to rock and to make a curved bed for itself, subsequent loads only tend to increase the damage, as the resultant pressure at the edge of the tie falls without the base. To keep the track in good condition therefore, frequent tamping and building up of ballast under the tie are necessary thus largely increasing the expense of maintenance. Further in rectangular ties the resistance to lateral motion is governed only by the resistance of the end and the resistance of the earth resting against the sides of the tie. It will be seen, therefore, that the best form of tie should resemble an isosceles triangle in cross section. With this form, the tendency to tip or roll is reduced to a minimum, and the resistance to lateral motion is increased by the weight of the ballast or earth resting upon the flaring sides of the tie. A tie strictly triangular in cross section is however not of much value as there seems to be no feasible method of securing the rails thereto except by bolting through holes formed in the tie, a process which weakens the structure

at the very point it should be strongest. In my invention I endeavor to obtain the advantages of the triangular shape, without its disadvantages, while at the same time I remedy the defects found in the metal ties heretofore most largely in use. The typical shape of these older ties shows in cross section a flat top with inclined sides flaring outward from the top and either with or without narrow horizontal flanges at the bottom edges. The ends of these ties are usually closed so that the tie is, in effect, an inverted trough, which is filled with ballast when in use. In the maintenance of track with such ties, tamping is frequently necessary under each tie to keep the ballast within the same. Moreover openings must be made in the ties through which the rails may be secured thereto, and the ties are consequently considerably weakened thereby.

My invention consists of an improved construction and arrangement to be hereinafter more particularly pointed out and claimed in which the defects of previous constructions are sought to be overcome.

In the drawings, Figure 1 is a perspective view of one end of my cross-tie. Fig. 2 is a cross-section of the tie, taken under the rail. Fig. 3 is a reduced detail view, in vertical section, of one of the ends of the tie. Fig. 4 is a side elevation showing the rail in place. Fig. 5 is an end elevation of same.

My cross tie is manufactured out of rolled steel plate, bent by suitable machinery into the shape shown in Fig. 2. The steel plate is of any desired thickness but the best results can probably be obtained with sheets about one-eighth to three-thirty-seconds of an inch thick for the sides and base, and somewhat thicker for the top. At the center of the sheet, the plate is of double thickness, so that a rib, *a*, is left on the finished tie, and the sheet is bent so as to leave a flat top, *b*, and flanges, *c*, *c*, at the upper surface. The sides *d*, *d*, of the tie are left flaring and slightly re-curved as shown, for a purpose hereinafter mentioned, and the outer edges of the sheet are bent with a short curve *e*, *e*, at the bottom and brought together at the center *f*, where they are locked together with a copper-smith's joint so as to leave a flat and smooth base *g*, for the tie. A tie formed in this way

of thin steel plate would not be sufficiently strong in itself to stand the strains to which it is, to be subjected, and to use plate of sufficient thickness in itself would so largely increase the cost of manufacture and transportation charges, as well as make it so unwieldy and cumbersome, that it would be of little value. To enable me therefore to use thin steel plate which can be readily manipulated and can be used to form a base plate for the tie, without adding too much to the cost of manufacture, or to the weight of the tie, I use in connection with my steel sheet a filler of wood or paper pulp, previously formed, in suitable presses, into a shape to exactly fit the steel case. This pulp form is preferably made slightly larger than the case it is to fit so that when driven into place the steel shell will be completely and solidly filled with the pulp core. To enable the shell to withstand this internal pressure when the slightly larger wood pulp core is driven to place, I recurve the sides *d, d*, of the tie as shown. The wood pulp can be indurated or not as may be thought best. To receive the direct weight of the load under the part of the tie occupied by the rails, and to distribute the pressure more completely through the core, I embed in the wood pulp core a malleable iron casting A recessed at *m, m*, within which recesses these pulp is driven so that the casting will be held rigidly in the core, the castings being placed in the pulp molds before the cores are formed. These malleable iron fillers however are not essentials of my invention and the wood core can be used without them. The ends of the tie are closed by plates B, the steel sheet being split and rolled over the bead *h* on the end plate as shown in Fig. 3.

The rails are secured to the tie in the following manner: The rib, *a*, is cut away at each end of the tie to allow the rail C, to rest on the top *b*, the portion cut away being somewhat wider than the base of the rail. The edges *n, n*, of the cut portion of the rib *a*, are beveled as shown and washers D, D, with their ends beveled to correspond with the bevels on the rib are placed between the base of the rail on each side and the rib *a*. These washers are at first made slightly larger than the space to be filled and a pair of clips E, E, with curved ends *p, p*, are placed over the washer and under the flanges *c, c*, of the tie and the washer forced down between the end of the rib *a*, and the base of the rail by drawing the two clips together by bolt *r*, and nut *s*. In this way the rail is securely locked to the tie and as it wears loose it is at once tightened by screwing up the nut *s*. In this way the rail is secured to the tie without the necessity for any holes being formed in the tie. The rails cannot spread so long as the clips are intact and the gage of the track

can be readily widened at curves by providing washers of different sizes.

The advantages of my tie over older constructions have already been suggested herein. The triangular shape reduces the rocking of the tie and the consequent cost of maintenance of road bed to a minimum. The upper flanges serve as a means for attaching the rail to the tie while the rib, *a*, both strengthens the top and serves as an abutment for attaching the rail. The wood pulp core enables me to construct the tire of thin sheet metal and enables me to supply a base plate for the tie which rests firmly on the ballast or road bed and does not require to be kept always packed with ballast as in the inverted trough construction of tie. No slots or openings of any kind have to be drilled or punched in the tie to secure attachment of the rails, while the cut away portion of the rib *a*, within which the base of the rail rests being wider than the rail, the gage can be readily lessened or increased at curves and other places where necessary by merely using shorter or longer washers than those for use on the straight track. The use of comparatively thin metal for the casing with wood pulp core, enables me to supply a tie both heavy enough to make a firm track to stand the wear and tear and to give ample strength, and light enough to be of reasonable cost both in manufacture and for transportation and handling.

My wood pulp core for the metal casing also gives the tie other advantages. A common objection to metal ties heretofore in use is that the contact of metal rail with metal tie makes a track exceedingly noisy and unpleasant to ride over. The metal tie acts almost as a sounding board for the hammering of the train on the rails, so that unless a perfectly tight contact is had at all times between rails and tie, the vibration and noise are very unpleasant. In my tie however, the wood pulp core, deadens and destroys this vibration so that quiet and easy riding may be had, while at the same time the tie is much more elastic than those heretofore in use.

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

1. In a metallic cross tie, a metallic shell triangular in cross section with flattened top and side flanges, in combination with a wood pulp core, substantially as shown and described.

2. In a metallic cross tie, a metallic case, triangular in cross section, with flattened top and side flanges and broad base, in combination with a wood pulp core, substantially as shown and described.

3. In a metallic cross tie, a metallic shell, in combination with a wood pulp core for same, having embedded therein metallic cast-

ings to receive and distribute the pressure under the rails, substantially as shown and described.

4. In a metallic cross tie, a metallic shell
5 with rib and side flanges at the top, the rib being cut away to receive the rail, in combination with washers fitting between the base

of rail and the rib, and means for securing said washers in place, substantially as shown and described.

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