(No Model.) 3 Sheets—Sheet 1.

A. C. FRASER.

METALLIC RAILWAY TIE AND RAIL FASTENING THEREFOR.

No. 558,939. Patented Apr. 28, 1896.

Fig. 1.

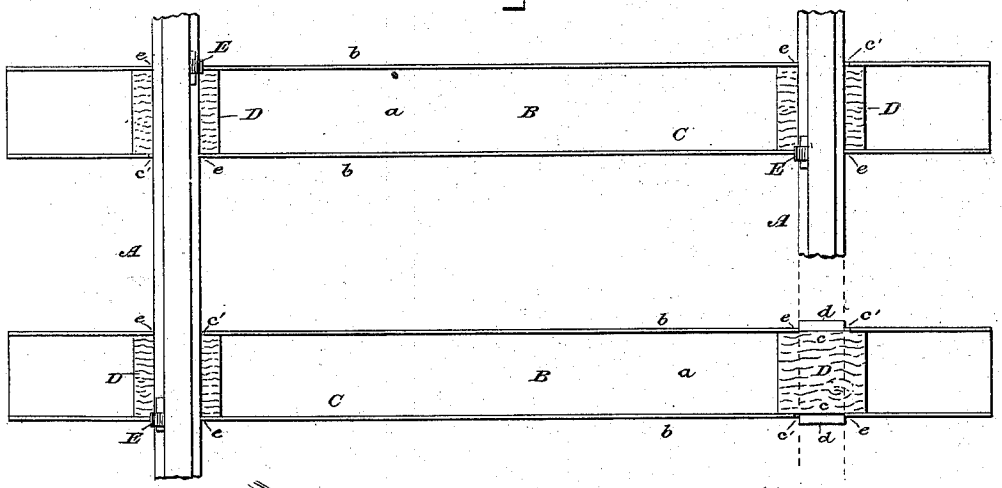
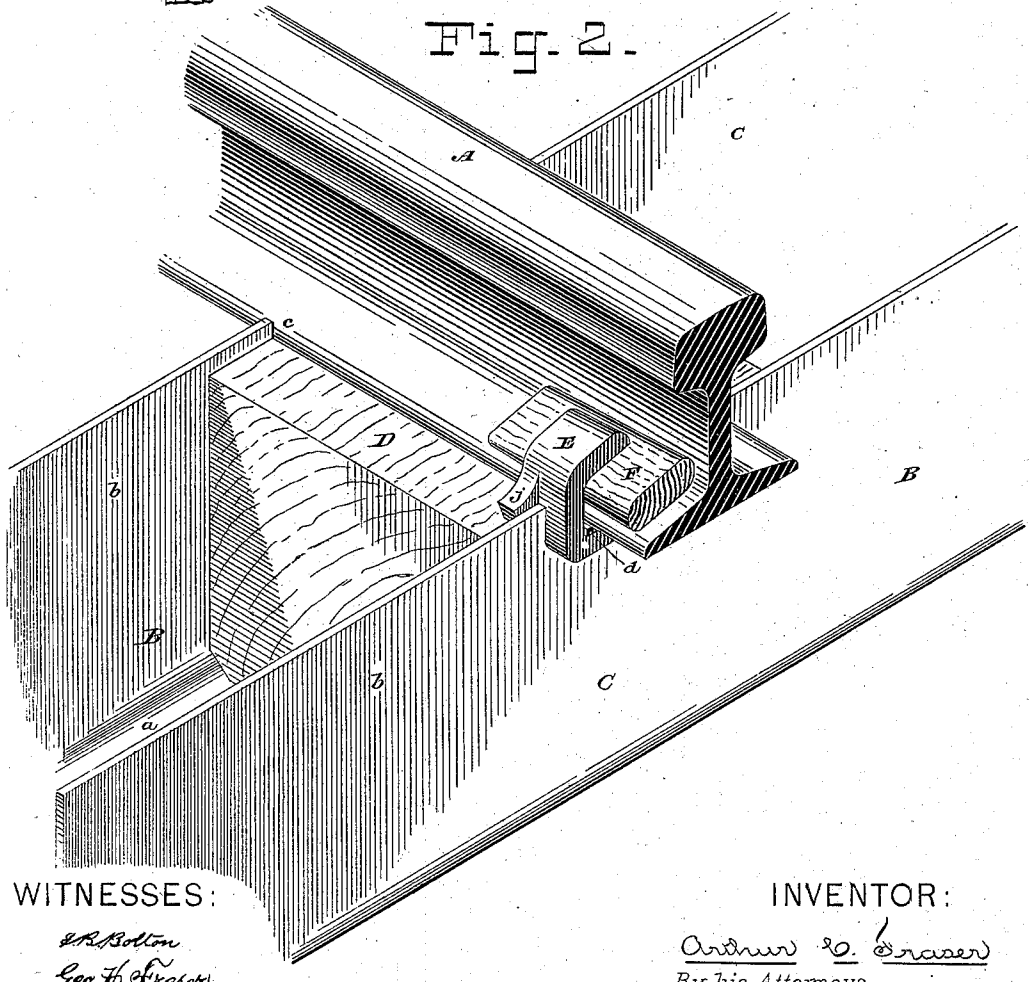


Fig. 2.



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Geo. H. Fraser.

INVENTOR:

Arthur C. Fraser

By his Attorneys,

Burke, Fraser & Coombs

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

(No Model.) 3 Sheets—Sheet 2.

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METALLIC RAILWAY TIE AND RAIL FASTENING THEREFOR.

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Fig. 3.

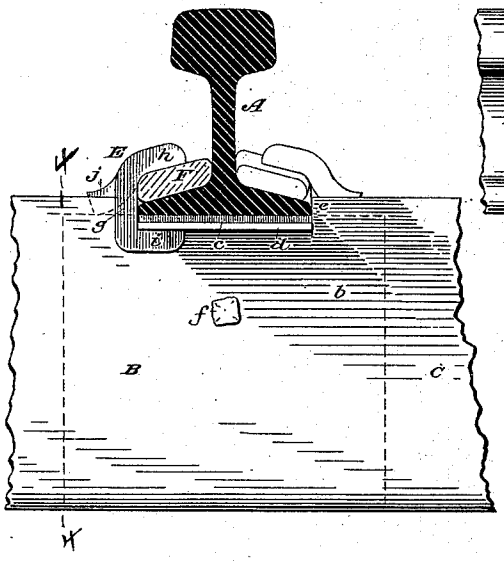


Fig. 4.

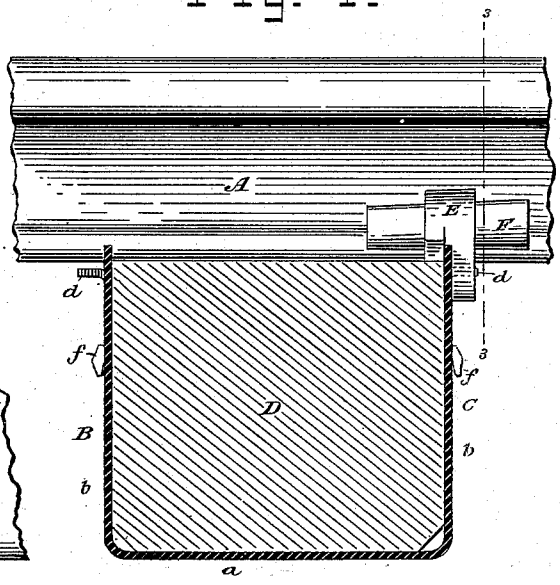


Fig. 5.

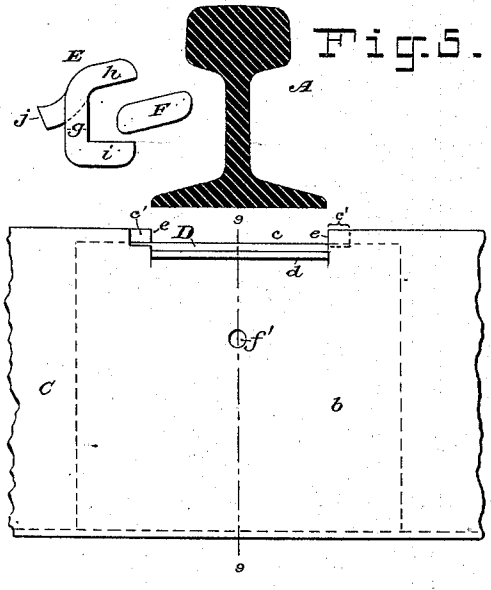


Fig. 6.

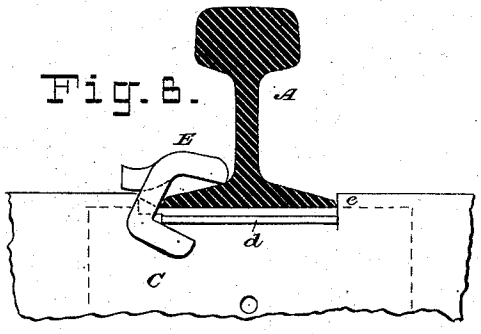


Fig. 7.

Fig. 8.

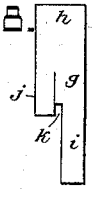
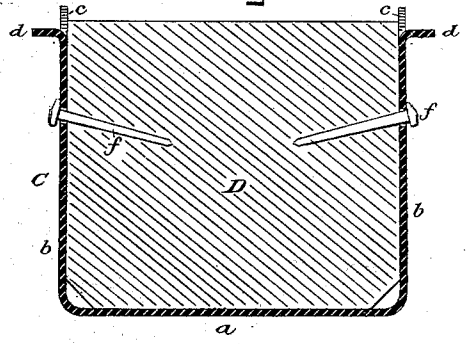


Fig. 9.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 10.

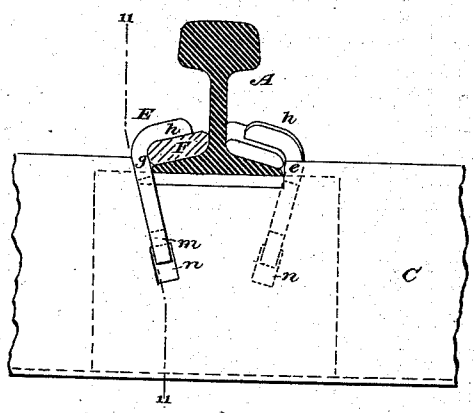


Fig. 11.

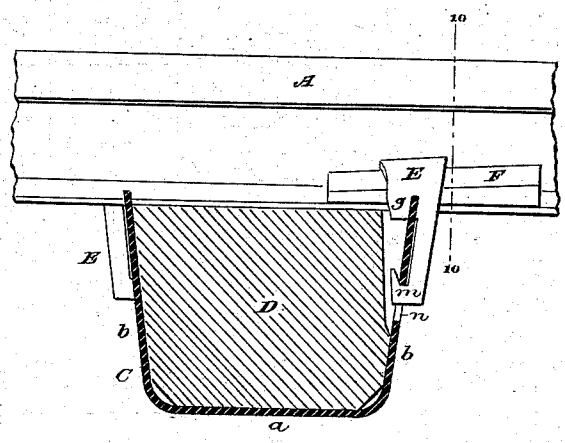


Fig. 12.

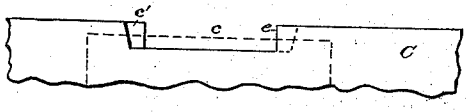


Fig. 13.

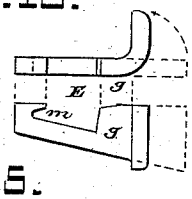
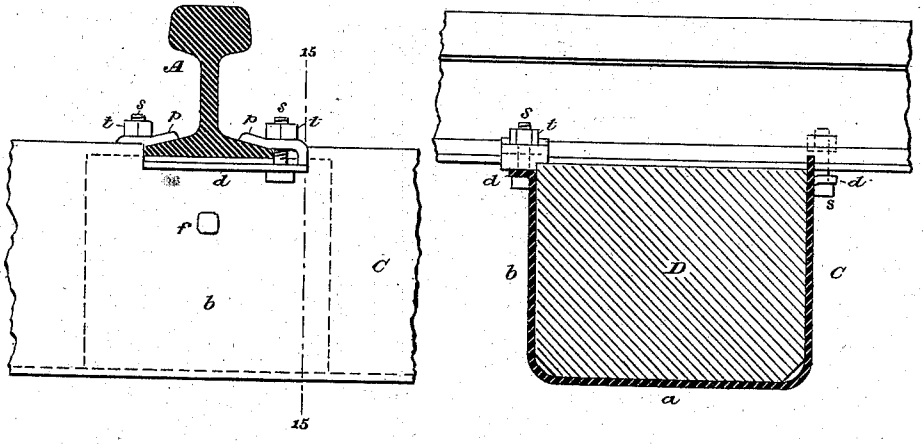


Fig. 14

Fig. 15.



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INVENTOR:

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UNITED STATES PATENT OFFICE.

ARTHUR C. FRASER, OF BROOKLYN, NEW YORK.

METALLIC RAILWAY-TIE AND RAIL-FASTENING THEREFOR.

SPECIFICATION forming part of Letters Patent No. 558,939, dated April 28, 1896.

Application filed May 8, 1884. Serial No. 130,743. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR C. FRASER, a citizen of the United States, residing in the city of Brooklyn, county of Kings, and State of New York, have invented certain Improvements in Metallic Railway-Ties and Rail-Fastenings Therefor, of which the following is a specification.

This invention has reference to railway-ties consisting of troughs made of wrought iron or steel with blocks or cushions placed therein under the rails. This type of tie unites the qualities of strength and lightness, which are essential to render metallic ties both practicable and economical, while the cushions on which the rails rest furnish a support sufficiently yielding to avoid the harsh vibration which results when the rails rest directly on metallic ties, and the open portion of the trough forms a receptacle for ballast, by which the weight of the tie may be greatly increased when it is laid, in order that it shall afford a solid foundation for the rails.

Prior to my present invention the advantages inherent in this trough-shaped type of ties have been practically unavailable because of the difficulty experienced in providing a fastening for the rails. Attempts have been made to fasten the rails by screw-bolts passing vertically through the blocks or through flanges turned out on the sides of the trough and engaging chairs or plates for bearing down upon the base of the rail, and various methods of fastening the rail through the medium of spikes entering the blocks or cushions have been suggested; but all the methods heretofore proposed, so far as I am aware, have been subject to inherent objections which would condemn them for practical use upon a railway.

My present invention contemplates an improved construction of the tie or metal trough, which greatly facilitates the application of a practicable fastening, and also a novel rail-fastening specially applicable to such construction of the trough. This fastening consists of a clamp or frame, the lower portion of which engages the side walls of the metal trough, while its upper portion overhangs the base of the rail, a wooden wedge being driven between this portion and the base of the rail to hold the latter firmly down upon its seat. This wedge is employed in substantially the same manner and for the same purpose as the wooden wedges used on the best English railways to fasten double-headed rails in their supporting-chairs.

My present invention is the one referred to in the specification of my application, Serial No. 50,915, filed January 24, 1882, as an improvement in the means for fastening the rail to the metallic tie therein described.

Figures 1 to 9 of the accompanying drawings show my invention in its preferred form. Fig. 1 is a plan of a portion of track laid with my ties. Fig. 2 is a perspective view of a fragment of one rail and tie at their intersection. Fig. 3 is a side elevation of the said fragment, the rail being in section, cut along the line 3 3 in Fig. 4. Fig. 4 is a transverse section of the tie cut along the line 4 4 in Fig. 3. Fig. 5 is a view corresponding to Fig. 3, showing the several elements separated. Fig. 6 is also a view similar to Fig. 3, showing the method of applying the fastening. Fig. 7 is a rear view of the clamp detached, viewed in the same direction as in Fig. 4. Fig. 8 shows the blank from which the clamp is bent up; and Fig. 9 is a cross-section of the tie alone, cut in the plane of the line 9 9 in Fig. 5.

The remaining figures illustrate modifications, and will be described hereinafter.

Let A A designate the rails, and B B the ties as a whole. Each tie B consists of a metal trough C, which may be of wrought-iron, and two blocks D D, which may be of wood and are arranged in the trough, one under each rail. The trough C consists of a bottom portion *a* and two side walls *b b*. The latter are notched at *c c* to admit the bases of the rails and preserve the latter in gage. After the blocks D are put in the trough, nails or spikes *f f* are driven through holes *f'* in the side walls *b b* of the trough to hold the blocks in place and keep the side walls from spreading. As the walls of the trough must be made quite thin, (about one-eighth or three-sixteenth of an inch thick,) some such fastening as this is needed to impart rigidity to the tie.

So far as described the construction is the same as in my said previous application. Instead of cutting out the metal to form the

notches *c c*, I now bend it outward, as shown best in Figs. 5 and 9, forming thereby flanges *d d* to which to fasten the rails. The tie formed with these flanges constitutes one feature of my present invention. Each notch *c* is extended at one end by cutting out a small portion of the plate, as shown at *c'* in Fig. 5. The two notches *c* for each rail are extended in opposite directions, the extension *c'* of one notch being on one side of the rail and tie, while that of the other notch is on the other side of the rail and tie, as shown in Fig. 1. By this arrangement the rail is gaged by one side *e* of each of the two notches *c c* in which it rests, as shown in Figs. 1 and 5, while on the other side of each notch is a space formed by the extension *c'*, which space is designed to be filled by the fastening device for the rail. The two notches *c c* in each side wall *b* are both extended at *c' c'* in one direction, so that the fastening devices may all be alike instead of being rights and lefts. This construction of the notches constitutes an additional feature of my invention.

I will now describe in detail the fastening for confining the rail to the tie. E is a clamp. (Shown in side view in Fig. 5 and in rear view in Fig. 7.) If made of wrought-iron, it will be bent up from the blank shown in Fig. 8. It consists of an upright intermediate portion *g* and two laterally-projecting portions, an upper one *h* and a lower one *i*. The upright portion *g* is designed to enter the notch or space *c'* and should be of a thickness nearly equal to the distance from the wall of such notch to the base of the rail when the latter is in place. The lower portion *i* extends under the flange *d* and bears upwardly against it, and the upper portion *h* extends over the base of the rail when the latter is in place and is preferably inclined so that the space between its under surface and the upper surface of the base of the rail will be parallel when viewed as in Fig. 3. The upper portion *h* is wider than the parts *g* and *i*, and from it a tailpiece *j* projects backward and downward, so that when the clamp is in place this tailpiece is on the opposite side of the wall *b* from the portion *i*, thereby preventing any displacement of the clamp longitudinally of the rail. The tail *j* is separated from the portions *g* and *i* in the blank, Fig. 9, by a recess *k* of a width at least equaling the thickness of the wall *b*. By making the portion *i* in this manner narrower than the portion *g* the former may rest against the surface of the wall *b*, while the latter fits into the notch *c'* and abuts against the vertical edge of the wall therein, and by this abutment the clamp is retained against the rail and kept from moving backward away therefrom. The clamp is applied to the rail and tie by first placing it, as shown in Fig. 6, with its portion *i* close against the wall *b* thereof and then turning it into vertical position while keeping its portion *g* close against the base of the rail. A wedge F is then driven between the portion *h* and the base of the rail, thereby forcing the rail down firmly onto the wooden cushion D. The wedge F is preferably of wood and of the shape shown. This fastening is easily and quickly applied, is thoroughly durable and reliable, is accessible in case it becomes necessary to take up the rails, and is inexpensive.

Of the remaining figures of the drawings, Figs. 10 to 13, inclusive, show one modification of my invention, and Figs. 14 and 15 show another. Figs. 10 and 11 are views corresponding to Figs. 3 and 4. Fig. 12 is a fragmentary side elevation of the trough, showing the notches; and Fig. 13 shows the clamp removed. Figs. 14 and 15 correspond, respectively, to Figs. 3 and 4.

In the construction shown in Figs. 10 to 13 the flanges *d d* are or may be omitted, and the clamp E is formed with a hook *m* at its lower end, which enters a hole *n* in the side wall of the trough. The driving of the wedge F draws up the clamp until it bears upwardly upon the upper side of this hole, while it is held from moving away from the rail by its portion *g* bearing against the edge of the notch *c'*. The clamp is arranged on an incline, so that its upper part *h*, which is parallel to the surface of the base of the rail, is at right angles to its lower portion. This reduces the tendency of the clamp to recede from the rail. The trough is here shown as made with side walls inclined or flaring instead of perpendicular, which enables the tail *j* on the clamp used in the construction shown in Figs. 1 to 8 to be dispensed with.

Figs. 14 and 15 show the same fastening as that shown in Figs. 15 and 16 of my said previous application. It consists of a screw-bolt *s*, passed up through a hole in the flange *d*, (which flange is here extended the entire width of the notch *c* and its extension *c'*,) and has a clip or clamp *p* placed over it, which overhangs the base of the rail and is pressed down by a nut *t*, screwed upon the bolt. The bolt comes by preference close against the base of the rail, and its head is half cut away, so that it comes close against the side wall of the trough, thus preventing its rotation. The clip enters the notch *c'*, bears upon the bottom thereof, and is confined by the side thereof. This I consider the best means of applying a screw-fastening to a trough-shaped tie; but I much prefer the wedge-fastening, because of the liability of screw-nuts to work loose and the difficulty of keeping proper watch of so many bolts as would be required if they were used for fastening the rails to the ties. The trouble now experienced with the comparatively few bolts used at the fish-joints is well known. Wooden wedges on the contrary are not liable to become loose, and when they do work out the defect is readily noticeable by the track-walker, and a blow or two from his hammer is sufficient to replace them tightly.

The fastening shown in Figs. 9, 10, and 11

of my said previous application, but not specifically claimed therein, forms also a part of my present invention. I have not here illustrated it because it does not differ in principle from the construction shown in Figs. 1 to 9.

In Figs. 10 and 11 and in Figs. 14 and 15 I have shown two fastenings applied to the rail for securing it to one tie, the fastenings being applied on opposite sides of the rail and on opposite sides of the tie. It is not necessary, however, to fasten both sides of the rail to every tie, but it is quite sufficient to clamp the right-hand side of the rail to every alternate tie and the left-hand side to the intermediate alternate ties, as clearly shown in Fig. 1. This fastening is so much more secure and reliable than the spikes now used with wooden ties that half as many fastenings will answer the same purpose.

I do not herein claim the notching of the ties for the reception of the rails, as that is claimed in my said previous application. In this respect the feature of novelty of my present invention consists in extending these notches at c', one notch being extended on one side and the other notch for the same rail on the other side. Nor do I claim the turning down of a horizontal flange along the top of the side walls of the trough, as I am aware that it is old to form the trough with such flanges running the entire length of the trough, and in this respect I claim only the flanges d d, when produced by turning out the metal to form the notches c c. This feature of my invention is also applicable if the flanges be turned inwardly, as shown in Fig. 18 of my said previous application. Nor do I claim, broadly, a clamp-and-wedge fastening as applied to a metallic railway-tie, as I am aware that such a combination, broadly speaking, is old.

My improved fastening is confined in its application to a trough-shaped tie, wherein the clamp engages the side wall of the trough.

No special or particular form of trough is essential with my invention, although I consider the forms shown to be the best.

What I claim as new, and desire to secure by Letters Patent, is—

1. As a metallic railway-tie, a trough of metal having gaging-notches for the rails formed in the upper edges of its side walls, each notch being extended laterally beyond the width of the base of the rail, and each notch being so extended in the opposite direction from the opposite notch for the same rail, whereby the rail is gaged by one side of one notch and the other side of the opposite notch, substantially as set forth.

2. As a metallic railway-tie, a metal trough C the side walls b b of which are formed with gaging-notches c c for the rails, each of which notches has a lateral extension c' for the reception of the fastening device, the two notches in one side wall being extended at c' in one direction, and the two notches in the other side wall being extended at c' in the opposite direction, whereby each rail is gaged by one side e of one notch and by the opposite side e of the other notch, and the fastening devices may be all alike instead of being rights and lefts, substantially as set forth.

3. As a metallic railway-tie, a metal trough the side walls of which are provided with gaging-notches in their upper edges to receive the bases of the rails, and horizontally-projecting flanges beneath the rails, produced by turning down the metal to form said notches, substantially as set forth.

4. The combination with a trough-shaped metallic railway-tie of a clamp for fastening the rail, adapted to engage the side wall of the metal trough and formed to overhang the base of the rail, and a wedge adapted to be driven between said overhanging portion and the base of the rail, substantially as set forth.

5. The combination with a trough-shaped metallic tie C formed with notches c' in the upper edges of its side walls beyond the sides of the rail, of a clamp E adapted to engage and bear upwardly upon the side wall of the trough, to enter one of said notches, and to overhang the base of the rail, and a wedge F adapted to be driven between the overhanging portion of said clamp and the base of the rail, substantially as set forth.

6. The combination with a trough-shaped metallic tie C formed with gaging-notches c c in the upper edges of its side walls, and with extensions c' c' of said notches, of a fastening device engaging the side wall of the trough, overhanging the base of the rail, and prevented from receding from the rail by entering one of said notch extensions c' and bearing against the side thereof, substantially as set forth.

7. The combination with a trough-shaped metallic tie C having gaging-notches c c and a flange d beneath the rail, of a clamp E formed with a portion i to take under said flange d, with a portion g to extend up along one side of the rail, and with a portion h to overhang its base, and a wedge F adapted to be driven between the portion h, and the base of the rail, substantially as set forth.

8. The combination with a trough-shaped metallic tie C of a clamp E adapted to engage the side wall of the trough, provided with a tailpiece j to overhang the wall of the trough and with a portion h to overhang the base of the rail, and a wedge F adapted to be driven between the portion h and the base of the rail, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ARTHUR C. FRASER.

Witnesses:
HENRY CONNETT,
GEO. BAINTON.