E. H. BELL.

METALLIC RAILWAY TIE.

APPLICATION FILED JAN. 12, 1909.

945,364.

Patented Jan. 4, 1910.

3 SHEETS—SHEET 1.

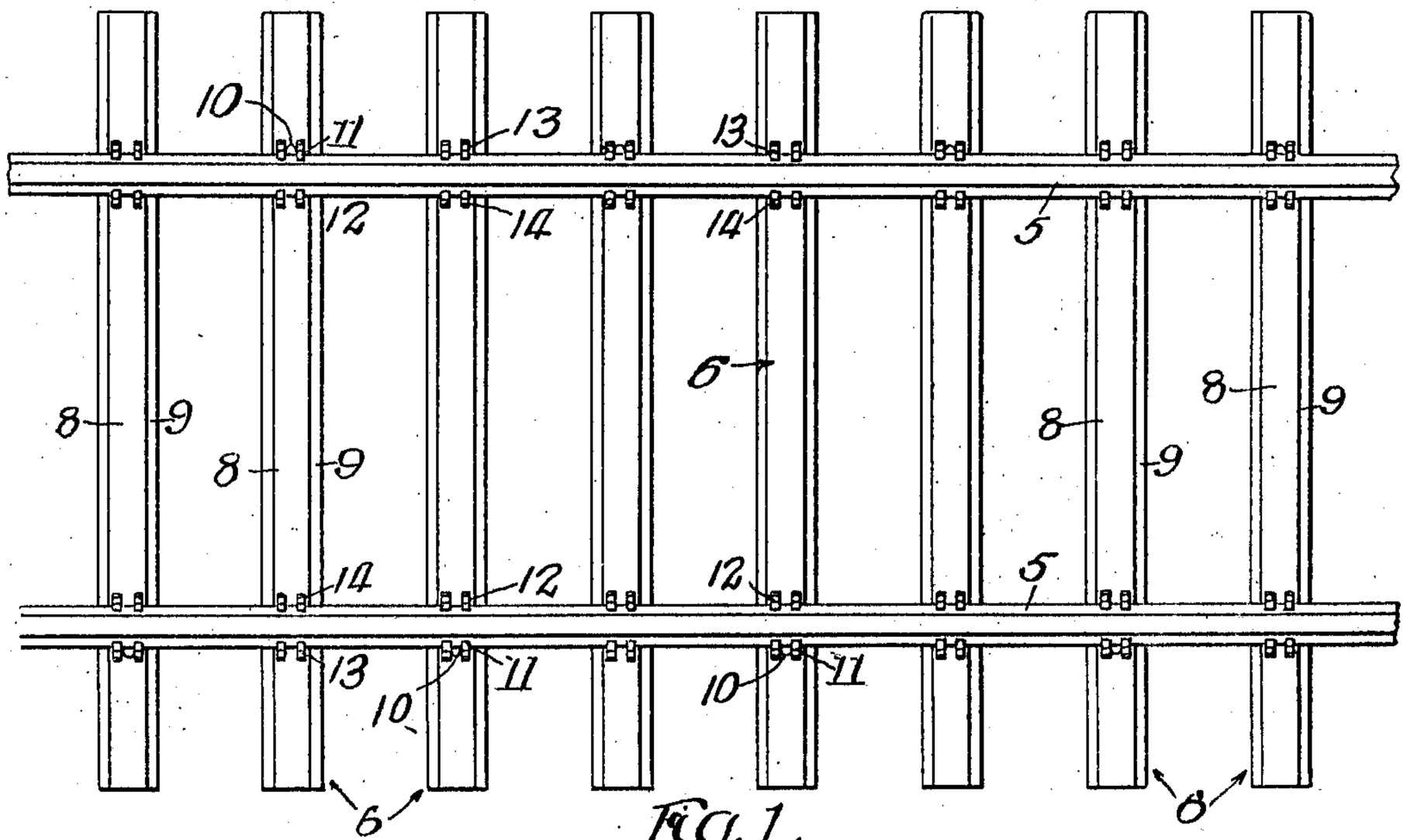

Fig. 1.

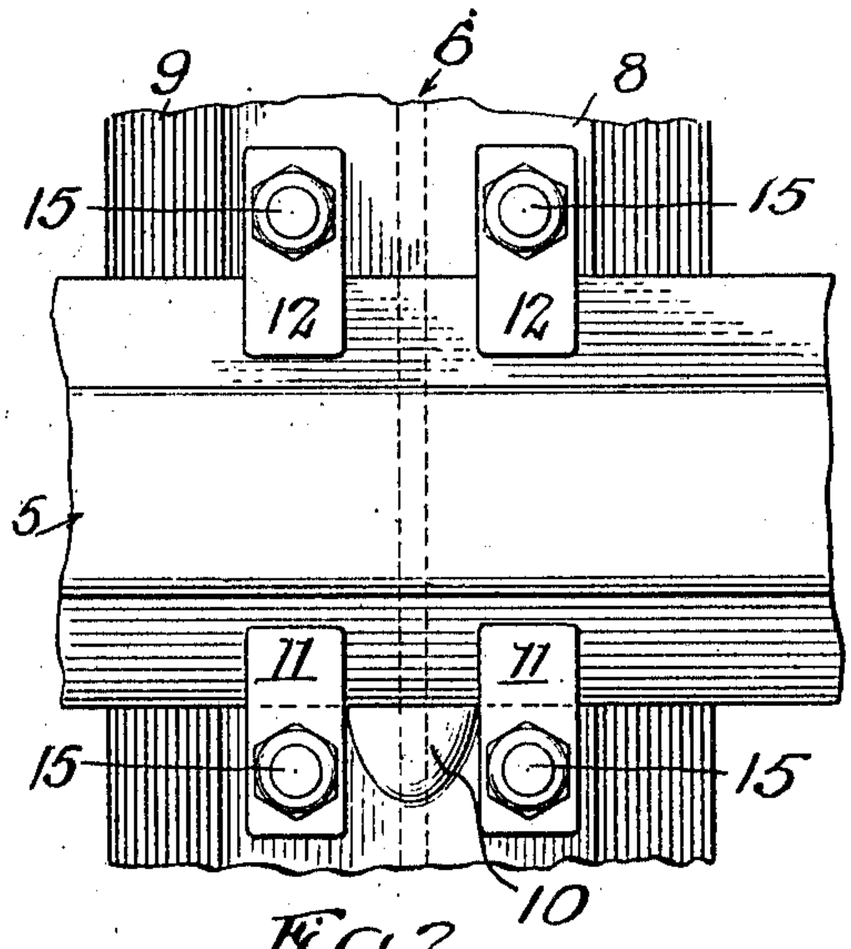

Fig. 2.

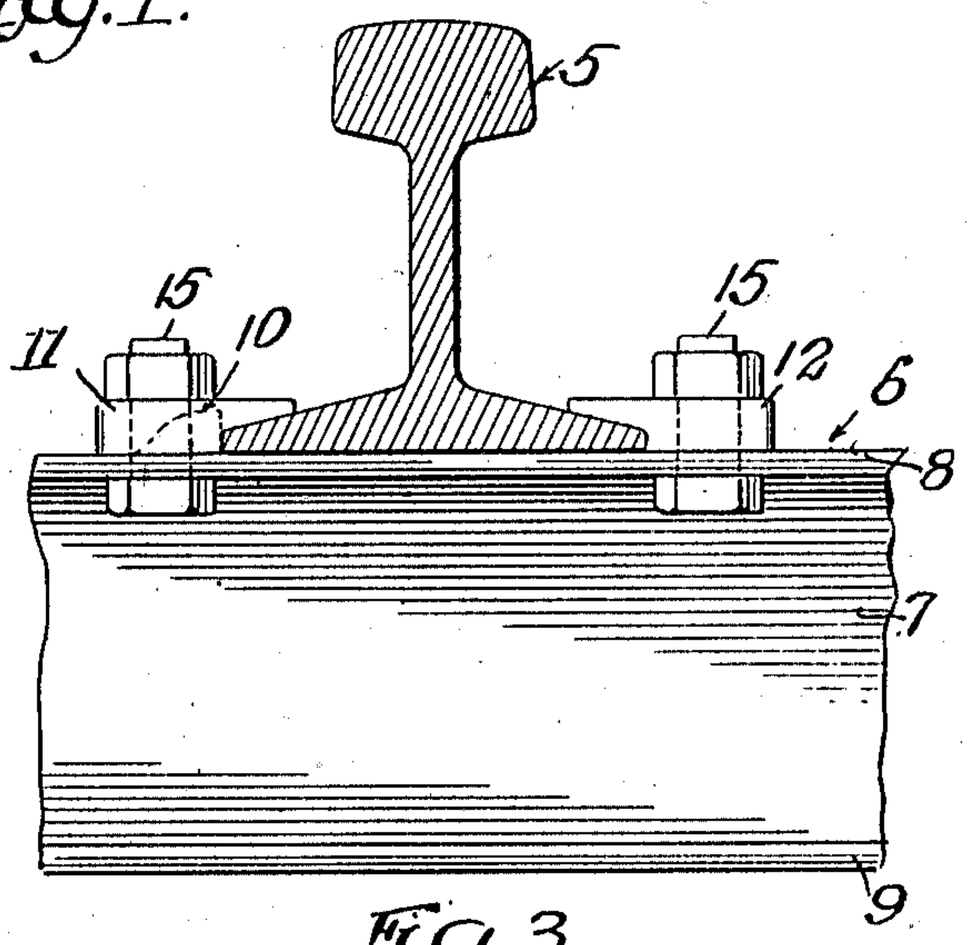

Fig. 3.

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Fig. 4.

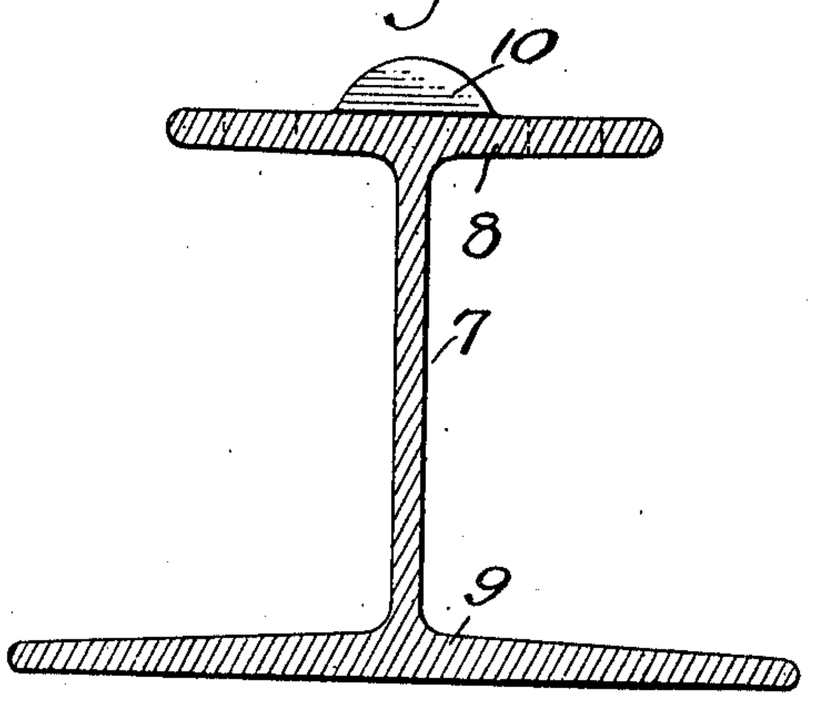


Fig. 5.

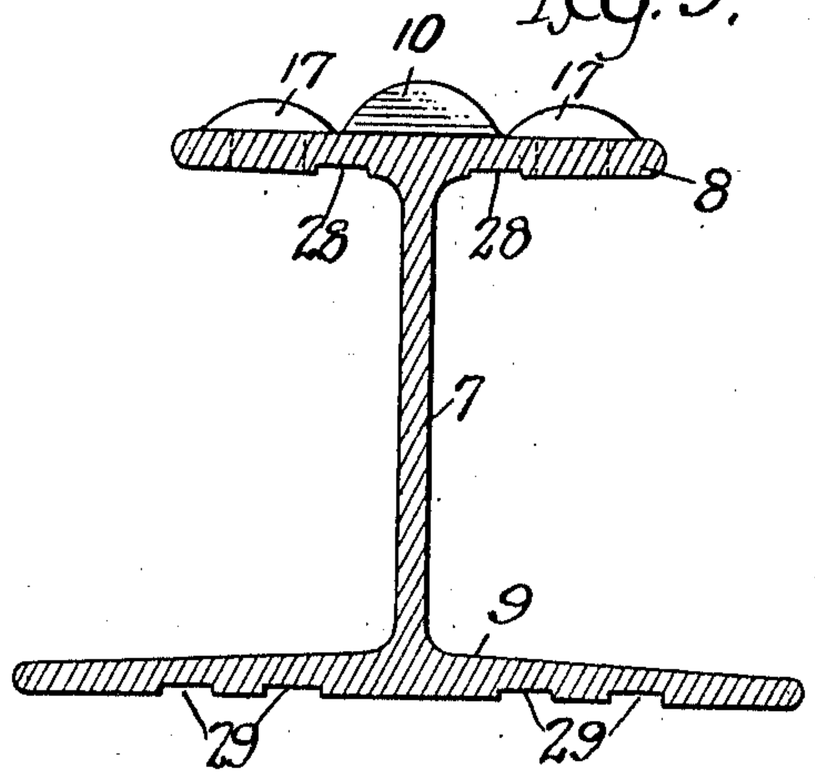


Fig. 6.

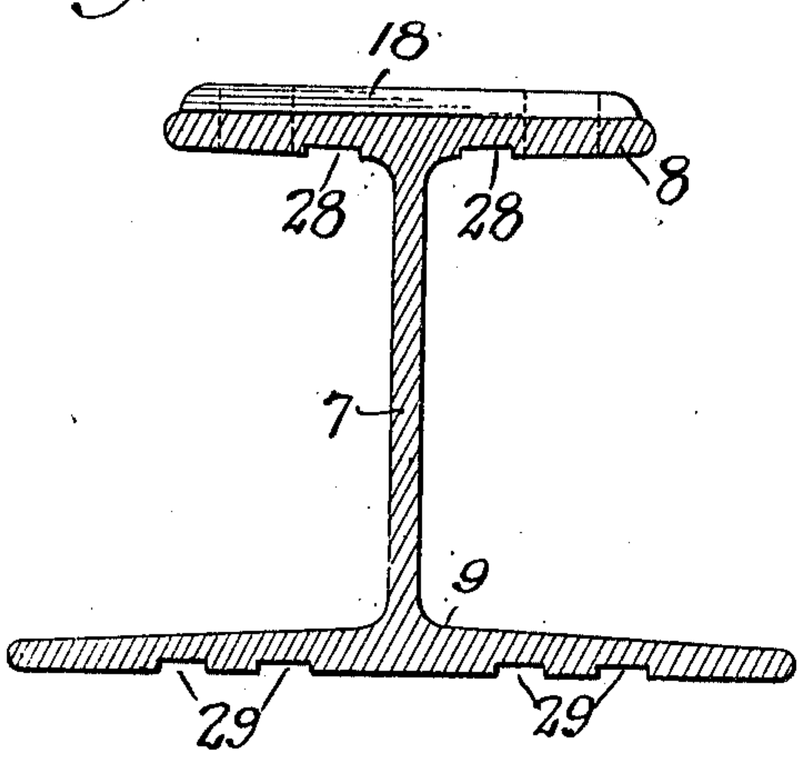


Fig. 7.

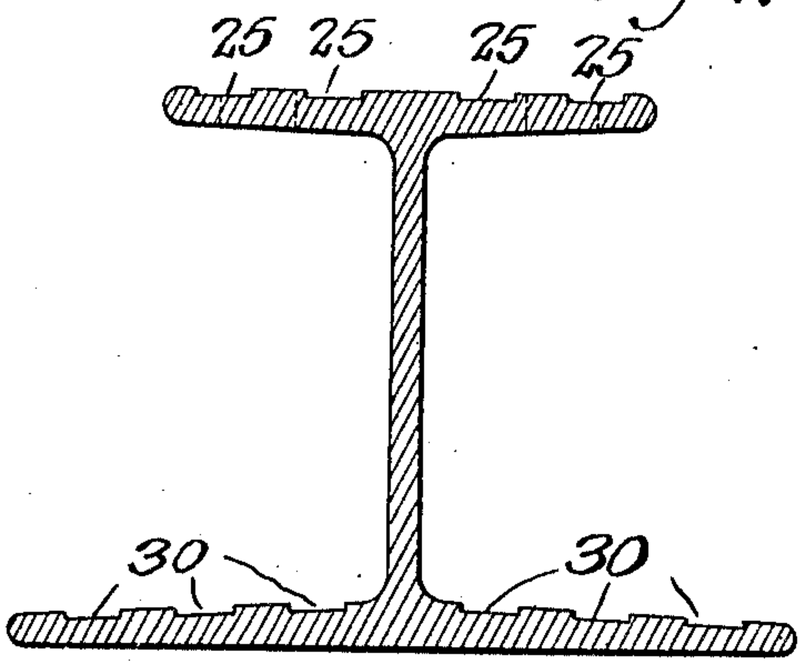
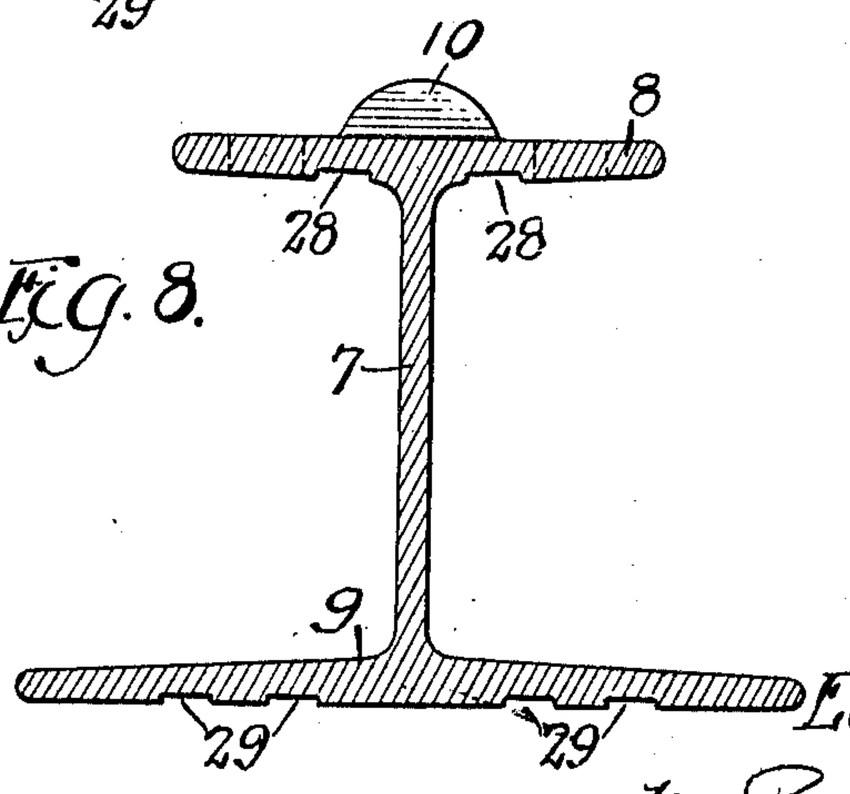


Fig. 8.



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3 SHEETS—SHEET 3.

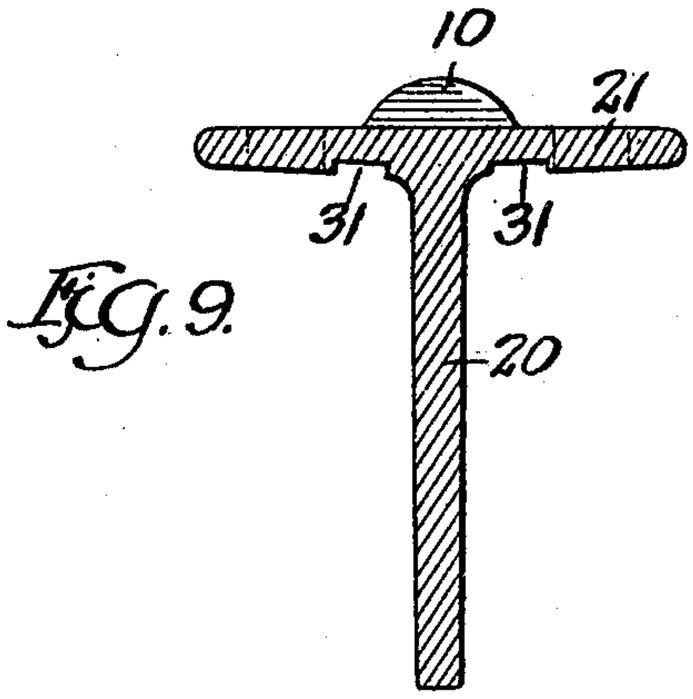

Fig. 9.

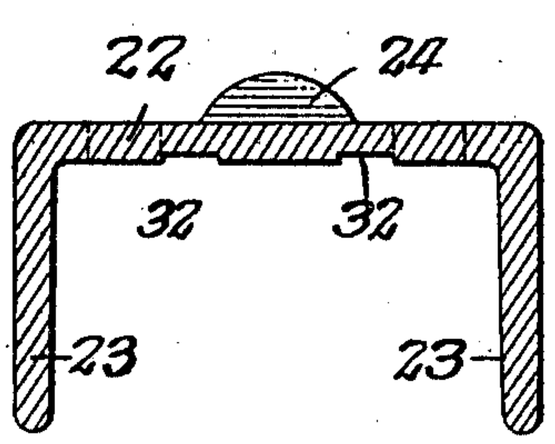

Fig. 10.

Fig. 11.

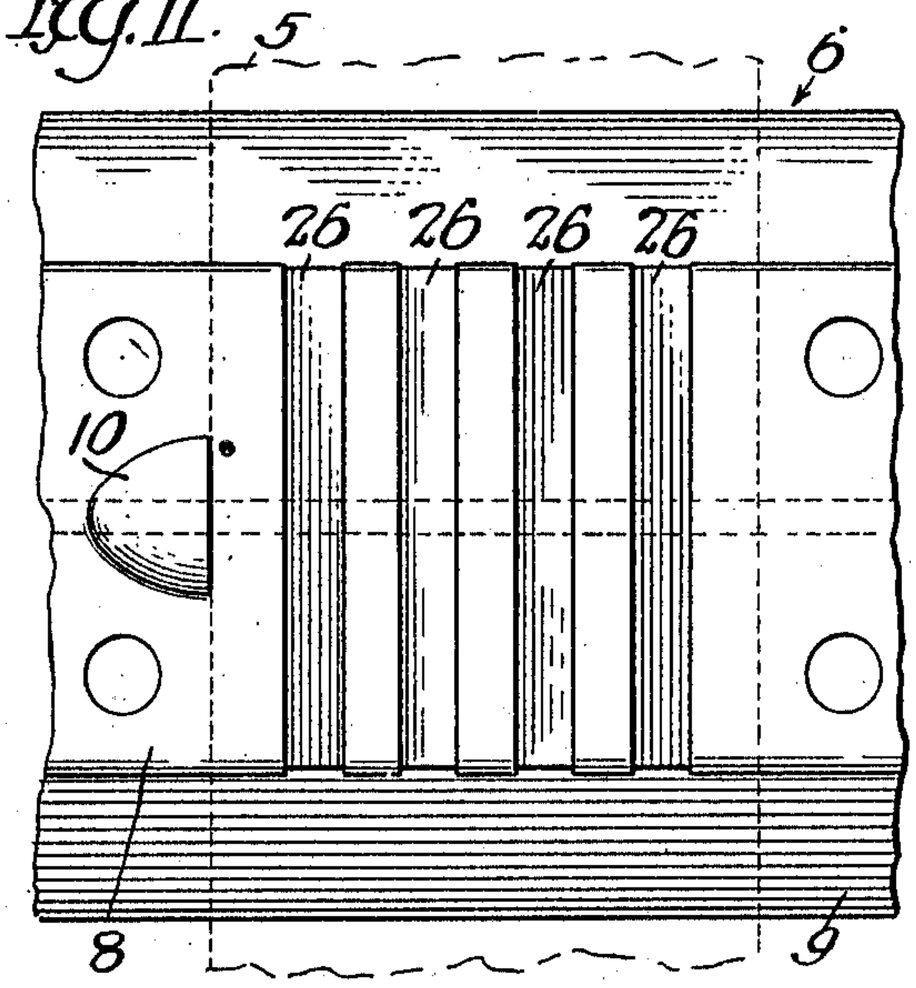

Fig. 12.

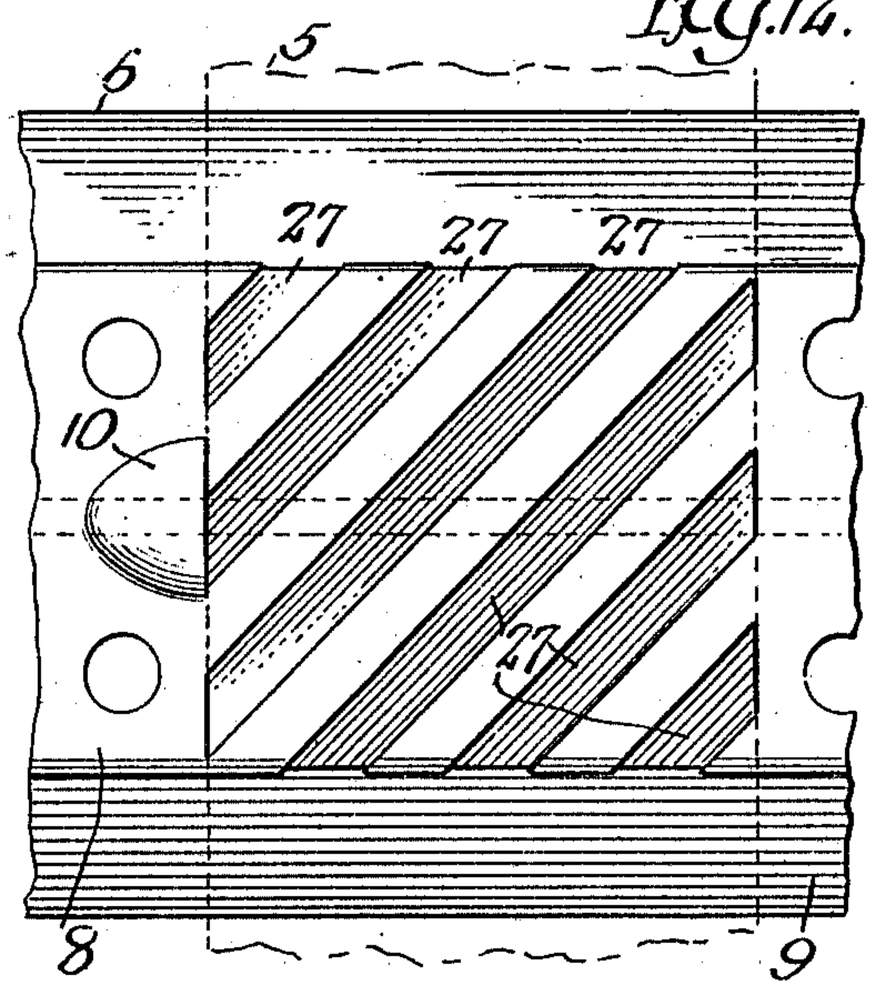

Fig. 13.

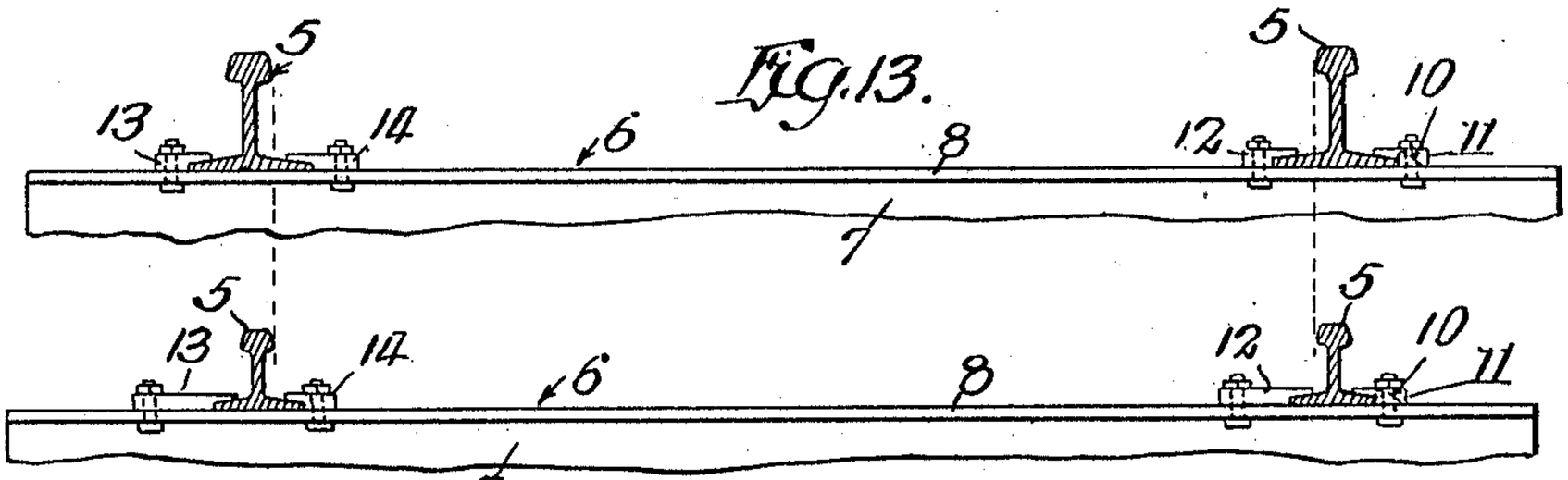

Fig. 14.

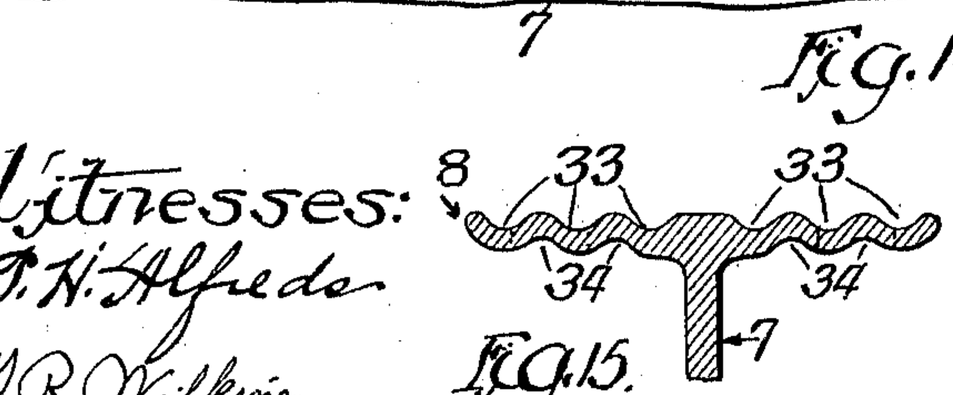

Fig. 15.

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UNITED STATES PATENT OFFICE.

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METALLIC RAILWAY-TIE.

945,364. Specification of Letters Patent. Patented Jan. 4, 1910.

Application filed January 12, 1909. Serial No. 471,956.

To all whom it may concern:

Be it known that I, EDWIN H. BELL, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Metallic Railway-Ties; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention relates to railway tracks of that kind embracing metal cross-ties provided with fastening or holding means for securing the rails thereto.

A structure embracing the main features of my invention includes cross-ties consisting of rolled metal and provided with stiffening flanges, rail supporting seats and integral ribs or lugs adapted to form shoulders located in position for contact with the flanges of the track rails and adapted to hold the rails from spreading or shifting laterally upon the ties, each tie having such an integral rib or lug at one end only, and the ties being arranged with the ends thereof which bear the ribs or lugs at opposite sides of the track in the case of alternate ties.

The invention also embraces a construction in the rail seats by which the same are provided with a grooved, ridged or corrugated surface on which the rail rests, and means for securing the rails to the ties.

The invention consists in the matters hereinafter described and pointed out in the appended claim.

As shown in the accompanying drawings:—Figure 1 is a plan view of the section of a railway track constructed in accordance with my invention. Fig. 2 is a detail plan view of the parts of a tie and rail, showing the portion of the tie adjacent to the rail seat. Fig. 3 is a cross-sectional view, taken transversely through the rail, showing in side elevation the portion of the tie adjacent to the rail. Fig. 4 is a view in cross-section of the form of tie shown in Figs. 1 to 3. Fig. 5 is a like sectional view showing a shoulder-forming rib consisting of a series of rounded projections. Fig. 6 is a like sectional view showing a tie provided with a transverse rib. Fig. 7 is a like sectional view showing the tie provided with longitudinal grooves on its top surface. Fig. 8 is a like sectional view, showing a tie like that shown in Fig. 4, but with longitudinal grooves in its downwardly facing surfaces. Fig. 9 is a sectional view of a tie of T-shape in cross-section. Fig. 10 is a sectional view of a tie of U-form in cross section. Fig. 11 is a plan view of part of a tie provided with a rail seat having transverse grooves and intervening rail supporting ribs. Fig. 12 is a like view of part of a tie provided with a rail seat having obliquely extending grooves and intervening rail supporting ribs. Figs. 13 and 14 are detail views showing the holding clips for securing the rails to the tie as applied in the use of track-rails of different sizes in connection with like cross-ties. Fig. 15 is a sectional view of the upper part of a tie provided with flanges of corrugated form.

As shown in said drawings, 5, 5 indicate track rails and 6, 6 the metallic ties to the top surfaces of which the rails are secured. Said ties are flanged to afford the necessary stiffness therein without undue weight. The ties may be made of various cross-sectional forms. In Figs. 1 to 8, both inclusive, they are shown as having the form of I-beams; in Fig. 9 as having the form of a T-beam and in Fig. 10 as having the form of a channel beam.

First referring to the form of tie shown in Figs. 1 to 4, inclusive, having generally the form of an I-beam, the same consists of a vertical web portion 7, a horizontal top member 8 and a horizontal bottom or base member 9; said top and bottom members 8 and 9 being in the form of laterally extending flanges on the upper and lower margins of the web portion and said lower member 9 being considerably wider than the top member 8. On the top surface of the tie, exterior to the rail seat, or the portion of the tie on which the rail rests, is formed an integral, upwardly extending lug 10, the inner face of which is upright and forms a vertical shoulder adapted for bearing contact with the outer margin of the base of the rail. Said lug 10 is located centrally between the side margins of the tie and is formed integrally therewith in the rolling operation. 11, 12, 13 and 14 indicate rail holding clips secured to the tie by bolts 15, 15, which pass through bolt holes formed in the horizontal, upper portion of the tie. Each of said clips has a flat, bottom bearing face which rests upon the tie adjacent to the base of the rail and is provided with a notch to receive the margin of said

base; the lower surface of the part of the clip which overhangs, or extends inwardly over, the base being inclined to correspond with the inclination of the top surface of the base. As shown in the figures of the drawings referred to, each tie is provided at each end with four holding clips arranged in pairs at opposite sides of the rails. The clips 11, 11 which are located at the outer side of the rail, adjacent to the lug 10, are arranged at opposite sides of the said lug, as clearly seen in Fig. 2.

While each tie may be provided with integral rail-holding lugs at both ends adapted to engage the bases of both rails, yet ties so constructed would be adapted to be used with rails of one size only or with rails having base flanges of the same width. In order to enable the same ties to be used in connection with rails of different sizes, or with rails having bases of different widths, I provide each tie, as shown in Fig. 1, with a holding lug at one end only and I arrange the alternate ties with the holding lugs thereon at opposite sides of the track. When each tie is thus provided with a holding lug at one end only and the ties are arranged with the holding lugs on adjacent ties alternately at opposite sides of the track, it will be seen that by slight endwise shifting of the alternate ties to bring the lugs at opposite sides of the track at a greater or less distance apart, said lugs may be brought into position to accurately engage the outer margins of the bases of the rails, and thereby preserve the gage of the track, notwithstanding the fact that rails of different sizes are used. In other words, when each tie is provided with a rail-engaging, integral shoulder at one end only and each pair of adjacent ties has the shoulders therein at opposite sides of the track, the shoulders may be adjusted laterally of the track by relative endwise shifting of the two ties constituting the pair so as to bring the said shoulders accurately into position for contact with the rail-bases, regardless of the width of such bases in any particular instance. Moreover, the extent of such endwise shifting of adjacent ties will be slight in proportion to the length of the ties because the differences between the width of the rail bases in rails of different sizes is slight and the ends of the ties will not, therefore, be thrown out of alinement with each other to an extent that will be material or objectionable. As a further means of providing for the use of like cross-ties in connection with the track-rails of different sizes, holes are provided to receive the bolts 15, 15 at both ends of the ties, located in uniform relation to the holding lugs 10, and holding clips of different lengths are employed to conform to the width of the bases of the rails that are used in any particular instance.

In Fig. 13 are shown holding clips 11, 12, 13 and 14 such as are used for rails of maximum size. Fig. 14 shows the holding clips used for narrower rails. The ties shown in Figs. 13 and 14 are identical with respect to the location of the lugs 10 and the bolt holes, but the tie shown in Fig. 14 has been shifted endwise to bring its lug 10 into contact with the outer margin of the base flange of the narrower rail. The clip 12 shown at the right hand end of Fig. 14 is so made that the distance from the notched end of the clip, which engages the base flange of the rail, to the bolt hole in the clip, is considerably greater than in the case of the corresponding clip shown in Fig. 13. In other words, the bolt holes at opposite sides of the rail being at the same distance apart, the inner clip 12 is longer than the outer clip 11 in order to correspond with the narrower width of the rail-base. In the case of the inner clip 14, for the left hand rail, the said clip is shorter than the clip 14 of Fig. 13, because its bolt hole has been shifted to the left, relatively to the left hand rail, a distance equal to that required to compensate for the narrower width of the base of the smaller rail. In the case of the clip 13 at the outer side of the left hand rail, the same is made longer than the clip 12 to compensate for the shifting of the bolt holes to the left and also for the narrower width of the rail base. It will, of course, be understood that the holding clips used at the side of the rail adjacent to the lug 10 may be alike in all instances so far as the distance from the bolt holes in the clips to their rail engaging ends is concerned, but that the other clips on each tie differ in dimensions from those adjacent to the holding lug to an extent required to compensate for the differences in widths of the bases of the different sizes of rails used.

In the modified form of the tie shown in Fig. 5, instead of the single holding lug 10, located at the center of the top surface of the tie, two additional laterally disposed lugs 17, 17 are employed, the three lugs 10, 17, 17 together constituting in effect a transverse rib formed by a plurality of rounded projections.

In Fig. 6 a tie is shown corresponding generally in cross-sectional shape with those shown in Figs. 4 and 5, but in which a rail-engaging shoulder is formed by a single rib 18 extending practically across the top surface of the tie. The tie shown in Fig. 9 has a vertical web 20 and a horizontal top member 21 provided with a single holding lug 10. The tie shown in Fig. 10 has the form of a channel beam, consisting of a horizontal top member 22 and two depending flanges 23, 23, the top member 22 having an integral holding lug 24.

As a further improvement in cross-ties of the character described, I provide in the

upper surface thereof grooves or depressions with intervening ribs or elevated parts, which latter form the bearing surface on which the rail rests. As shown in the cross-sectional view, Fig. 7, such grooves, indicated by 25, 25, extend longitudinally of the tie throughout the entire length thereof. As shown in Figs. 11 and 12 the parts of the upper surface of the tie constituting the rail seats only are provided with such grooves and ribs. In Fig. 11 grooves 26, 26 are shown as arranged to extend transversely of the tie; the elevated parts or ribs between said grooves forming the bearing surface on which the rail rests. As shown in Fig. 12, the rail seat is provided with obliquely extending grooves 27, 27 and intervening ridges or ribs, the latter constituting the bearing or rail supporting surface of the rail seat. In said Figs. 11 and 12 the grooves and intervening ribs are employed in connection with an integral holding lug 10, such as is shown in Figs. 1 to 4, inclusive. The ribbed or grooved construction in the bearing or supporting surface of the tie may, however, be employed in connection with a holding lug or rib forming a rail-abutting shoulder, or they may be employed in a tie having no such rail-abutting shoulder, as illustrated in Fig. 7. The grooved construction in the rail seats, whether the grooves extend longitudinally, transversely or obliquely of the tie, serves to provide grooves which receive sand or grit which, if it remained between the rails and their seats, would tend to produce rapid wear in or cutting away of the surfaces of both the tie and rail.

As shown in Figs. 5, 6 and 8, the upper horizontal part 8 of the tie is provided on its under surface with longitudinal grooves 28, 28, and the lower horizontal base member 9 is provided with like longitudinal grooves 29, 29, preferably arranged two on each side of the center line of the tie. The longitudinal grooves thus arranged serve to lessen the weight of, or quantity of metal in, the tie without materially lessening the effective rigidity or strength of the same.

In the construction shown in Fig. 7, the tie serves both to afford sand receiving spaces beneath the rails and to reduce the quantity of metal in the tie as a whole. In said Fig. 7, the bottom member 9 of the tie is provided on its upper surface with longitudinal grooves 30, 30, serving the same purpose as the longitudinal grooves employed in the other instances illustrated. A like grooved construction in the ties of other cross-sectional forms is shown in Figs. 9 and 10. In Fig. 9 the top member 21 is provided in its under surface with two longitudinal grooves 31 and in Fig. 10 the top member 22 is provided in its under surface with two longitudinal grooves 32, 32. Still another construction in a longitudinally grooved tie is shown in Fig. 15. In this instance the horizontal flanges of the tie are provided on the upper surfaces thereof with grooves 33, 33, and on the lower surfaces thereof with grooves 34, 34; the grooves in the bottom surfaces being arranged in intermediate relation to those in the top surfaces so as to give corrugated form to the flanges. Such corrugated flanges have the advantage of possessing a large degree of stiffness to prevent vertical flexure in proportion to the weight of, or quantity of metal in, the tie.

In cases where the tie is provided with three lugs, as shown at 10, 17, 17 in Fig. 5, and two clips 11, 11 are employed, as shown in Fig. 2, the clips are cut away or recessed in their under surfaces to receive the lateral or smaller lugs 17 and permit the clips to bear against the flat surface of the tie exterior to and at both sides of the said smaller or lateral lugs 17, 17. It will be observed that the bolt holes for the bolts 15, 15 for the clips 11, 11 extend through the lugs 17, 17, as shown in dotted lines in Fig. 5, so that considerable portions of said lugs are removed in punching the bolt holes.

I claim as my invention:—

A railway track structure comprising track rails, and a plurality of metal ties each provided at both of its ends with means for securing a rail thereto, adapted to engage both of the base flanges of the rail, and each provided, at one end thereof only, with an integral projection which rises from its top surface to form a rail-abutting shoulder, the ends of the ties bearing the rail-abutting shoulders, in the case of each pair of adjacent ties, being arranged to engage opposite track rails.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 9th day of January A. D. 1909.

EDWIN H. BELL.

Witnesses:
A. H. Smith,
Chester H. Sage.