No. 798,024. PATENTED AUG. 22, 1905.

B. W. ELLICOTT.

METALLIC RAILROAD TIE.

APPLICATION FILED DEC. 21, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

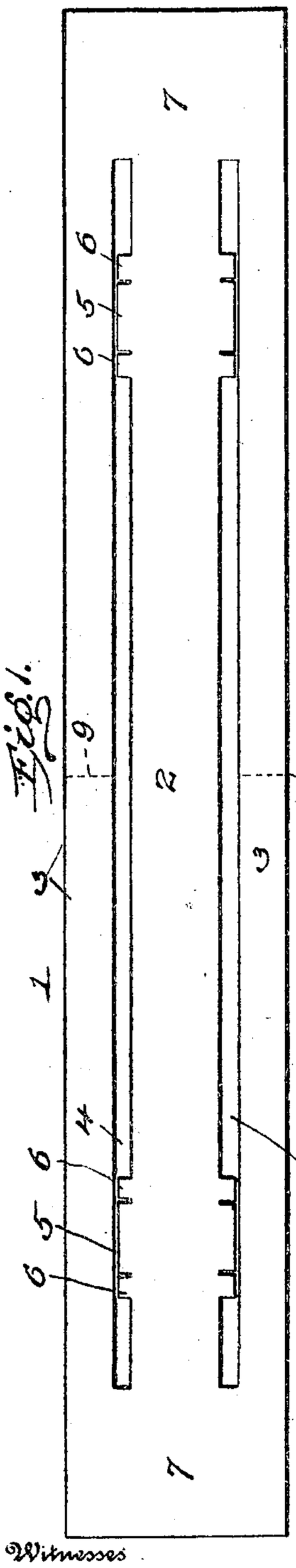

Fig. 2

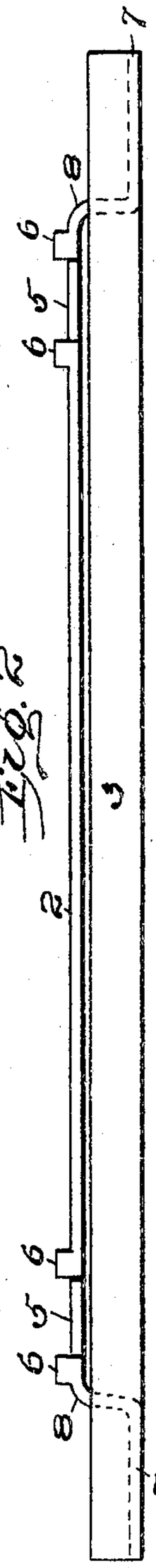

Fig. 4.

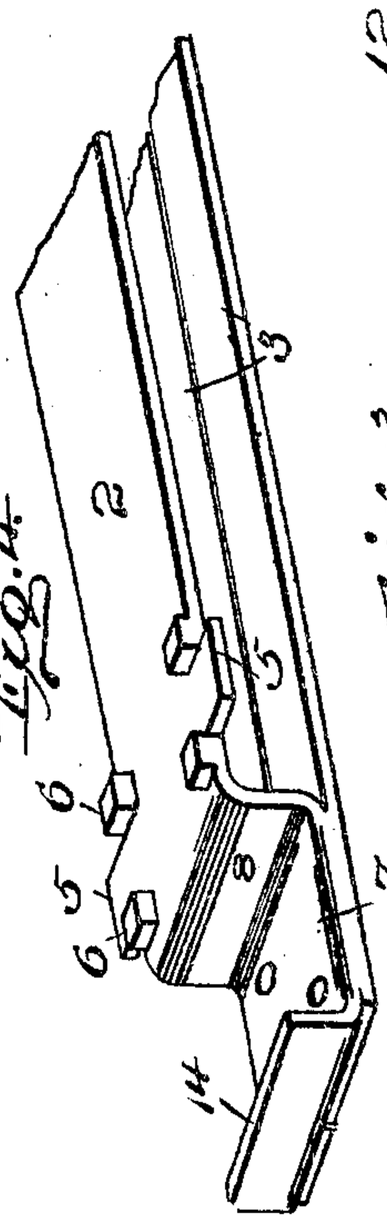

Fig. 3.

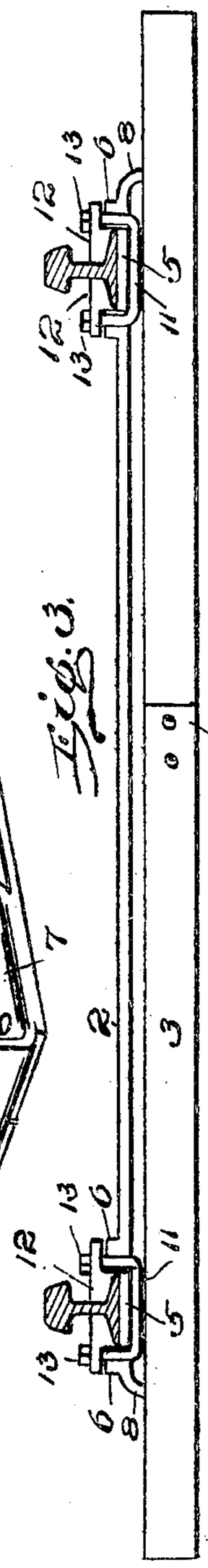

Fig. 6

Fig. 5.

Witnesses

J. M. Forder Jr.

Severance.

Inventor

Benjamin W. Ellicott,

By Mason, Fenwick & Lawrence

Attorneys

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2 SHEETS—SHEET 2.

Fig. 7.

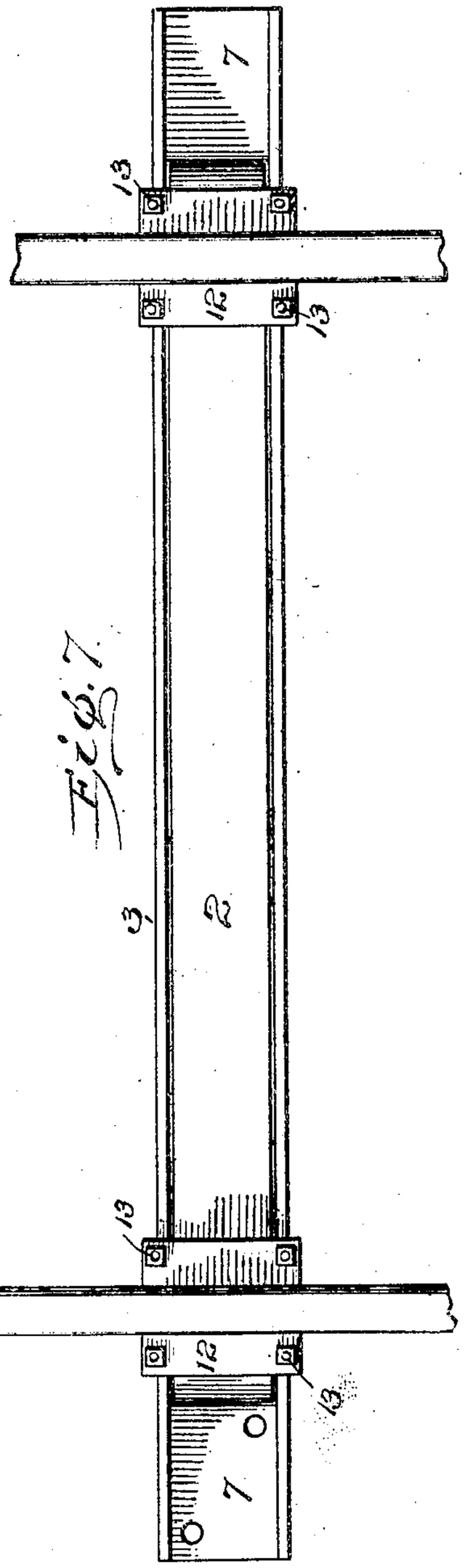


Fig. 9.

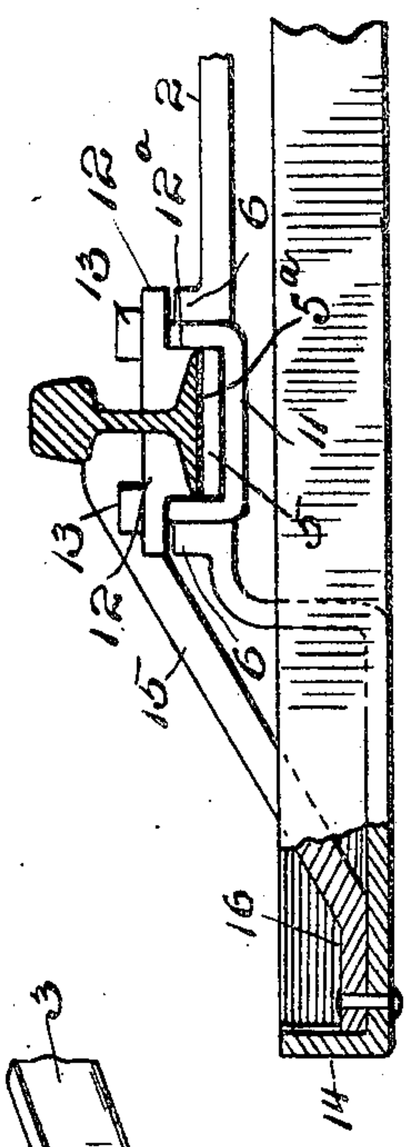


Fig. 8.

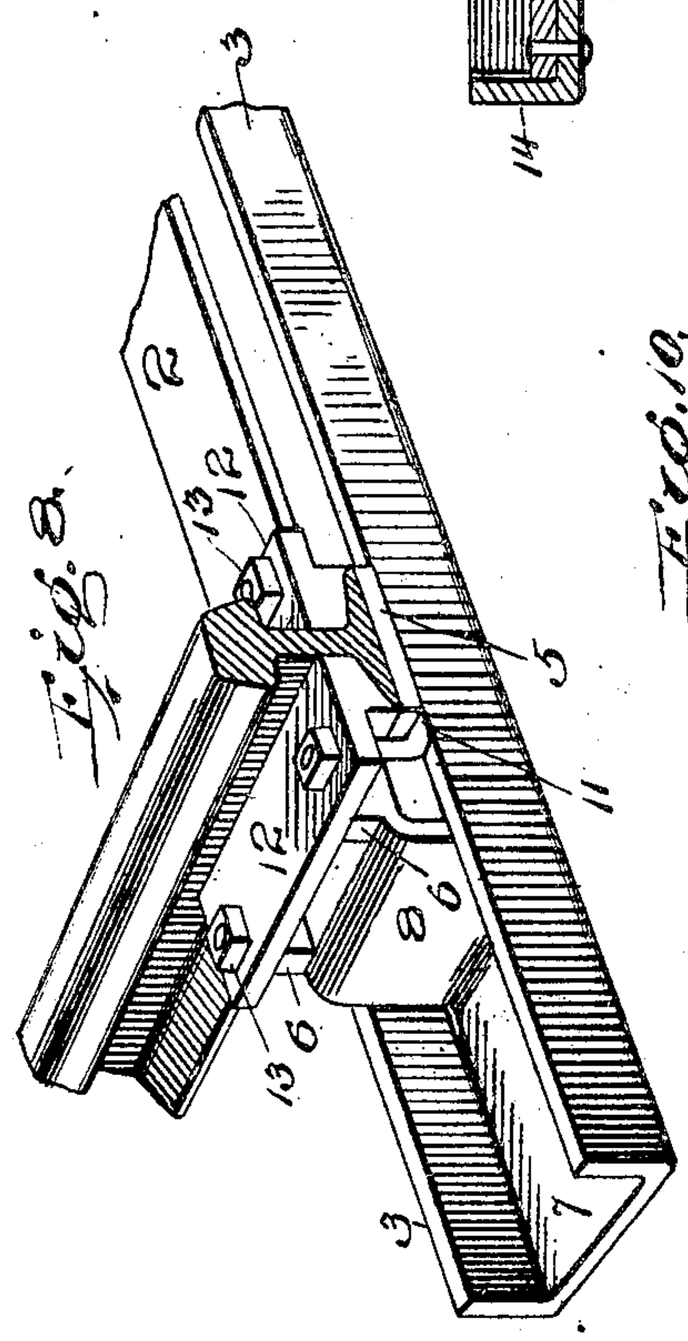
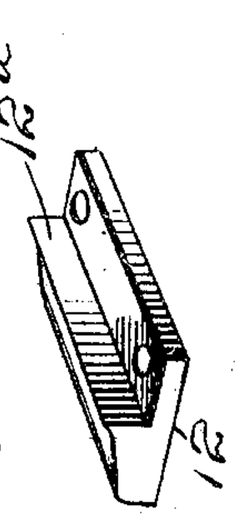


Fig. 10.



Inventor

Witnesses
J. M. Fowler Jr
Severance.

Benjamin W. Ellicott,
By Mason, Fenwick & Lawrence
Attorneys.

UNITED STATES PATENT OFFICE.

BENJAMIN W. ELLICOTT, OF DOVER, NEW JERSEY.

METALLIC RAILROAD-TIE.

No. 798,024. Specification of Letters Patent. Patented Aug. 22, 1905.

Application filed December 21, 1904. Serial No. 237,819.

To all whom it may concern:

Be it known that I, BENJAMIN W. ELLICOTT, a citizen of the United States, residing at Dover, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Metallic Railroad-Ties; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in metallic railroad-ties; and it consists in a tie comprising a compression load-supporting member, base portions, and a chord or tension member, all struck or made from a single piece of material.

It also consists in a blank or plate for forming a tie, the blank being cut and pressed to form a central load-supporting portion and base or foot portions, together with a base-connecting chord or tension member.

The invention further consists in certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a plan view of a blank or plate cut in the required shape and in readiness for pressing to form a railroad-tie embodying the features of my invention. Fig. 2 is a side elevation of a tie formed by the pressing and shaping of the blank shown in Fig. 1. Fig. 3 is a side elevation of a metallic tie, showing the chord member cut and lapped and rails in position upon the compression or supporting member of the tie. Fig. 4 is a detail perspective view of one end of my improved tie, the sections of the chord or tension member being folded upon the under surface of the base portion. Fig. 5 is a detail cross-sectional view through the blank preferably employed for the construction of my improved tie. Fig. 6 is a similar view, but showing the blank provided with strengthening-ribs. Fig. 7 is a top plan view of my improved tie. Fig. 8 is a detail perspective view, on an enlarged scale, showing one end of the tie with a portion of a rail clamped thereto. Fig. 9 is a detail view, partially in elevation and partially in section, illustrating the manner of bracing the rail for curves and showing an end abutment-wall. Fig. 10 is a detail perspective view of one of the rail-clamping plates inverted.

The metallic tie forming the subject-matter of the present invention is so formed as to embody the advantageous features of the wooden tie without its disadvantages, as well as to obtain the improved results accompanying the use of metal with its strength and durability. The invention contemplates a tie which is primarily formed with a central upwardly-arched compression member for supporting the load with a yielding strength, the tie having rigid bases for supporting the compression member and being connected by chords or tension members, the whole being preferably struck up from a single blank or piece of metal.

In the accompanying drawings I have illustrated the manner in which I generally construct the tie and will proceed to describe the invention, reference being had to the said illustration. As shown in Fig. 1, a suitable blank or sheet of metal is provided, the said blank 1 being cut longitudinally near each side to form a central portion 2 and side portions 3. The spaces formed by the cutting out of the metal, as at 4, are sufficient to permit of the forming of lugs 5 and 6, which project laterally from the central body portion 2. The blank thus formed is then shaped by bending, swaging, or pressing either when cold or heated so that the central portion is raised above the end portions, as clearly illustrated in Fig. 2. The end portions thus become supporting-bases or foot portions 7 7, while the central portion becomes an arched suspended load-supporting compression member. The side flanges or pieces 3 form connecting members extending from one foot or base portion to the other, and said connecting-pieces may be turned upwardly along the sides of the tie, as shown in Figs. 2, 3, 7, 8, and 9 of the drawings. The tie formed as just described is thus virtually a truss structure having an upper compression or load-supporting member suspended between the end supports or bases 7 and strengthened and prevented from flattening or spreading by the tension or chord members 3. It will be observed by reference to the drawings that the weight which comes upon the tie is suspended upon the compression member, which because of its formation has a yielding action to a slight degree limited by the action of the chord members or pieces 3 and its own inherent strength.

Although I may, as stated, turn the chord or tension members into vertical positions, the said chords are preferably folded in the opposite direction and beneath the tie, as shown in Fig. 4. In this way the chord mem-

bers will form a continuous flat base for the tie extending from one end thereof to the other. It is important, however, that the rigid portions of the base be located at or near each end of the tie to prevent any chance of a rocking movement of the tie upon the road-bed or ballast. This is likely to occur in ties where the central portion of the tie is of a solid character and not so constructed as to be capable of yielding.

In the constructions above described it will be seen that there is no chance for a solid packing of the ballast beneath the central portion of the tie in such a way as to prevent the end portions of the tie from always having a solid support. In the event of the chord members or pieces 3 being turned in a vertical position there is of course considerable space left beneath the central part of the compression member 2 which cannot be well tamped, while the ballast beneath the end portion can be well and solidly tamped. In the event of the chord being turned horizontally beneath the tie the ballast beneath the central portion will not engage the compression member and there will always be a sufficient yielding action of the central portions of the chord to prevent the loosening of the end portions of the tie or the transfer of the weight of the tie from said end portions.

In further forming the tie the lateral lugs 6 are pressed or swaged so as to be turned into a vertical position, as clearly illustrated in Figs. 2, 3, 4, 8, and 9 of the drawings. The lugs 6 are spaced longitudinally of the tie sufficiently to just receive the base-flanges of the rails, as shown in Fig. 3. The flanges or lugs 5 are not turned upwardly, but are left in the same plane as the remainder of the body portion 2. When the lugs 6 have been turned upwardly, the lugs 5 project sufficiently beyond the sides of the compression member 2 to form the anchorage for the rail-securing means which will be hereinafter described. In forming the tie of a single piece of metal I preferably use a blank which is thickened longitudinally at its central portion, as shown in Fig. 5. By this means when the central part is bent or pressed upwardly to form the arched or compression member the thickened metal will permit of the body portion being stretched or lengthened in the center, as is found necessary when the chord member is permitted to remain uncut. The end portions of the compression member are bent so as to form supporting-standards 8, which rise from the bases or foot portions 7. If it is not desired to stretch the metal of the compression member in forming the tie, the chord-pieces 3 may be cut intermediate their length, as indicated in dotted lines at 9 in Fig. 1. The cutting of the chord members permits of the drawing in of the ends of the tie in bending or pressing the compression member, and the severed ends of the said chords are then lapped and bolted, riveted, welded, or otherwise secured together, as shown at 10 in Fig. 3. In either case the chord members so connect the supporting-bases as to prevent the spreading of the standards 8 under the action of loads passing over the rails which rest upon the ties.

The formation of the ties with the lugs or shoulders 6 and the lugs 5 affords a simple and yet effective means for positioning and clamping the rails in place upon the ties. When the rails are placed upon the compression member between the upturned lugs or shoulders 6, it is impossible for the base of the rails to move laterally upon the tie. When the rail is thus located upon the tie, it may be easily clamped thereto by the use of U-shaped bolts or clips 11 and clamping-plates 12. The clamping-plates 12 are made in such form as to fit the upper surface of the lower flanges of the rails and provide a shoulder to engage the inner surfaces of the lugs 6. The outer edges of the said clamps are perforated to receive the bolts or clips 11. By applying nuts 13 to the ends of the clips after passing them through clamp-plates 12 the said plates are drawn and held tightly to place and made to grip the base-flanges of the rails for holding them firmly in their seats. The shoulders 12^a, formed on clamp-plates 12, by their engagement with the lugs 6 are prevented from slipping from the flanges of the rail.

I do not wish to be understood as limiting myself to the use of the precise means described for securing the rails to the tie, for it is evident that other means may be employed for securing the rail to the compression member of the tie, all within the spirit of the invention. I prefer, however, to employ the means described and illustrated in the drawings for securing the rails to the tie, since it is a simple and yet strong manner of accomplishing the purpose.

It is generally advantageous to provide the tie with abutment means against longitudinal movement of the tie in the road-bed, and this purpose I accomplish in a very simple manner by turning up the end of the base or foot portion of the tie, as at 14. The blank in this instance should be made of sufficient length to permit of this formation, and the portion turned up at the end is usually made of about the same height as the turned-up edge portions or chords 3.

It is sometimes necessary to still further secure and brace the rails upon the ties, especially upon the curves in a road. This is very effectively accomplished by the use of inclined braces, as indicated at 15 in Fig. 9. The braces are formed with a securing-base 16, which is bolted to the base of the tie, and the upper end of the said brace is extended to the head of the rail and made to fit the under edge thereof, the end of the brace preferably extending to the web of the rail, as shown in

Fig. 9. The lateral movement or tipping of the rail or any spreading action which might occur under the unusual strains brought to bear upon the rails in curves in a railroad are thus entirely prevented.

If it is desired to still further strengthen the tie, especially the compression member thereof, the blank employed for forming the tie may be provided with one or more longitudinally-extending ribs or flanges 17. Two of such flanges, as indicated in Fig. 6, are usually sufficient and are preferably rolled upon the edges of the thickened portion of the blank in its formation. In the finished tie the vertical ribs 17 operate to stiffen and strengthen the suspended portion or compression member of the tie.

It will be evident that the tie above described is not only well adapted for use upon an ordinary road-bed with any usual ballast, but that the said ties are admirably adapted for use upon culverts, bridge constructions, or the like. With such structures it is only necessary to perforate the bases or foot portions 7 of the tie to make it possible to firmly bolt or rivet the ties to the structural material of the bridges.

To avoid perforating, cutting, or otherwise weakening the structure upon which the ties are to be used, lugs or other means may be employed, either formed upon the tie or attached thereto, for preventing any lateral movement of the tie on said structure. It will be noted that the fastening of such a tie to structural-steel bridges, trestle constructions, or the like does not in the least prevent the yielding or resilient action of the supporting or compression member, for the said member is in every instance trussed or arched between the rigid end supports of the tie and will in all instances yield without affecting the position of the foot portions of the tie.

Whether the said tie be used upon the ground and tamped with ordinary ballast or whether it be secured to a bridge, trestle, or any structure using metal girders or structural material the rails are mounted upon a yielding support which is suspended between rigid bases, and the loads passing over the said ties will be found to be carried without unnecessary jar, securing all the comfort for passenger travel which is usual in the use of the wooden regulation or other railroad cross-tie in common use and with greater safety than is now secured thereby.

While the rails can of course rest directly upon the metal of the tie, I preferably interpose a non-metallic material in the form of a sheet, plate, or washer, as at 5^a, between the rail and the tie. A piece of asbestos or like material is admirably adapted for the purpose, and this prevents the metal-to-metal contact between the rail and the tie. It is of course not necessary that any material be placed between the rail and the tie, and I do not wish to be understood as limiting my invention to such a washer or interposed piece.

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

1. A tie comprising a compression load-supporting member, base portions, and a chord or tension member, all struck from a single piece of material.

2. A truss-tie, comprising separated base portions or feet, a compression member sprung between the base portions, and a chord or tension member connecting the said base portions.

3. A truss-tie, comprising base portions a compression member sprung between the said base portions, and a chord member connecting the base portions, all struck from a single piece of material.

4. A blank for an integral tie, comprising a plate cut and slitted, the central portion of the plate thus shaped, being capable of forming a compression member while the ends and sides form bases and connecting chord members respectively.

5. A metallic tie formed of a single piece comprising a central compression member or load-support, end foot portions or bases and side chord or tension members.

6. A metallic tie and rail-rest formed with rigid portions and an intermediate yielding portion for supporting a load and standards supporting the said yielding portion.

7. A railroad-tie and rail-rest comprising rigid portions, standards rising therefrom, and an intermediate yielding load-supporting portion supported by the standards and rail-retaining means carried by the load-supporting portion, all formed of homogeneous metal.

8. A metallic tie and rail-rest having rigid supporting-bases, a load-supporting portion suspended between the rigid bases, and rail-retaining means carried by the supporting portion, all formed from a single piece of material.

9. A metallic tie and rail-rest struck from a single piece of metal and shaped to form a central suspended yielding portion, rail-retaining means projecting therefrom, standards supporting the suspended yielding portion, and base portions carrying the standards.

10. A metallic tie and rail-rest, comprising base portions, a central suspended load portion, a tension member or chord, rail-retaining lugs or shoulders upon the suspended portion, and rail-securing projections near the said lugs for receiving rail-fastening means.

11. A metallic tie formed from a single piece of metal and provided with base portions, standards rising therefrom, a load-supporting body portion suspended between the said standards, rail-holding lugs and rail-fastening lugs formed upon the said body portion.

12. A metallic tie comprising a body por-

tion forced upwardly at the center for forming a load-supporting compression member, the ends forming foot portions or bases and side connecting members extending from one base to the other and folded at an angle to the said bases, the whole being made of homogeneous metal.

13. A metal tie formed of a blank which is cut and slit to form separable portions, the central portion being pressed upwardly forming an arch or compression member and the side portions form chord or tension members, the said chord or tension members being folded with respect to the body portion of the tie.

14. A metal tie formed of a single piece of metal and shaped to produce a central yielding rail-support, foot portions at the ends of the tie, tension members formed upon the foot portions and folded upon the base of the tie, and an auxiliary brace secured to the foot portion of the tie and extending above the rail-supporting portion so as to engage the head of the rail and prevent its tipping or canting.

15. A metallic tie formed with an arched central or yielding load-supporting portion, foot portions supporting the arched portion, lugs extending vertically from the load-supporting portion for engaging and holding in position rails, laterally-projecting lugs formed upon the load-supporting portion and clamping means engaging the said lateral lugs and the rails for holding them between the vertical lugs.

16. A metallic tie comprising bases, a compression member sprung between the bases and lateral rail-securing lugs projecting therefrom.

17. A metallic tie formed of a single piece of metal and comprising a load-supporting compression member, foot-supports, strengthening-ribs formed upon the compression member and extending longitudinally thereof, and rail-securing means projecting from the compression member.

18. A metallic tie struck up from a single piece of metal having longitudinal strengthening-ribs thereon, the central portion of the metal forming an arched compression member while the end portions form supporting-feet with standards rising therefrom which carry the compression member, while the edges of the blank form foot-connecting chords, the strengthening-ribs of the metal extending along the surface of the compression member and the supporting-standards thereof.

19. A metallic tie struck up from a single piece of metal and so shaped as to have a central load-supporting yielding portion and end feet or bases, side chords or connecting portions joining the said bases and upturned end portions forming abutment means against the longitudinal movement of the tie.

20. A railroad-tie, comprising a yielding load-supporting portion, base portions carrying the same, a tension portion connecting the bases, projections extending from the sides of the load-supporting portion, clamp-plates engaging the flanges of the rails, and clips passing about the projections upon the tie and engaging the clamp-plates for binding them in place.

21. A metallic railroad-tie, comprising a yielding load-supporting portion, foot base portions, a tension portion or chord, clamp-plates for engaging the flanges of the rails formed with thickened rail-engaging portions shaped to fit the said flanges, clips engaging the said clamps and laterally-projecting clip-engaging lugs formed upon the said load-supporting portion.

22. A metal tie, comprising a yielding compression member, bases supporting the same, chords or tension members connecting the same, lugs projecting from the compression member and elongating the rail-supporting surface thereof, a non-metallic sheet or plate mounted upon said rail-supporting surfaces preventing the metal-to-metal contact between the rails and their support, and means for clamping the rails upon the said supports.

23. A metallic tie, comprising a compression member, foot or base portions, and a chord member struck from a single piece of material, the chord member being cut centrally, and secured with its ends lapped.

24. A blank for a metallic tie, comprising a plate having a longitudinal central thickened portion and edge flanges or thin portions, the central portion forming a compression member when the tie is shaped and the side portion forming integral chord or tension members.

25. A metallic tie comprising a load-supporting suspended member, foot portions carrying the same, chord portions connecting the foot portions, rail-engaging lugs projecting upwardly from the load-supporting portion, clamp-plates for engaging the flanges of the rail, each clamp-plate being provided with a shouldered portion which fits upon the flange of the rail, and engages the inner sides of the rail-holding lugs, and means for clamping the said plates in position against the rail.

In testimony whereof I affix my signature in presence of two witnesses.

BENJAMIN W. ELLICOTT.

Witnesses:
CASSELL SEVERANCE,
JOHN L. FLETCHER.