No. 757,467. PATENTED APR. 19, 1904.

W. S. JONES.

TIE PLATE.

APPLICATION FILED OCT. 16, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1

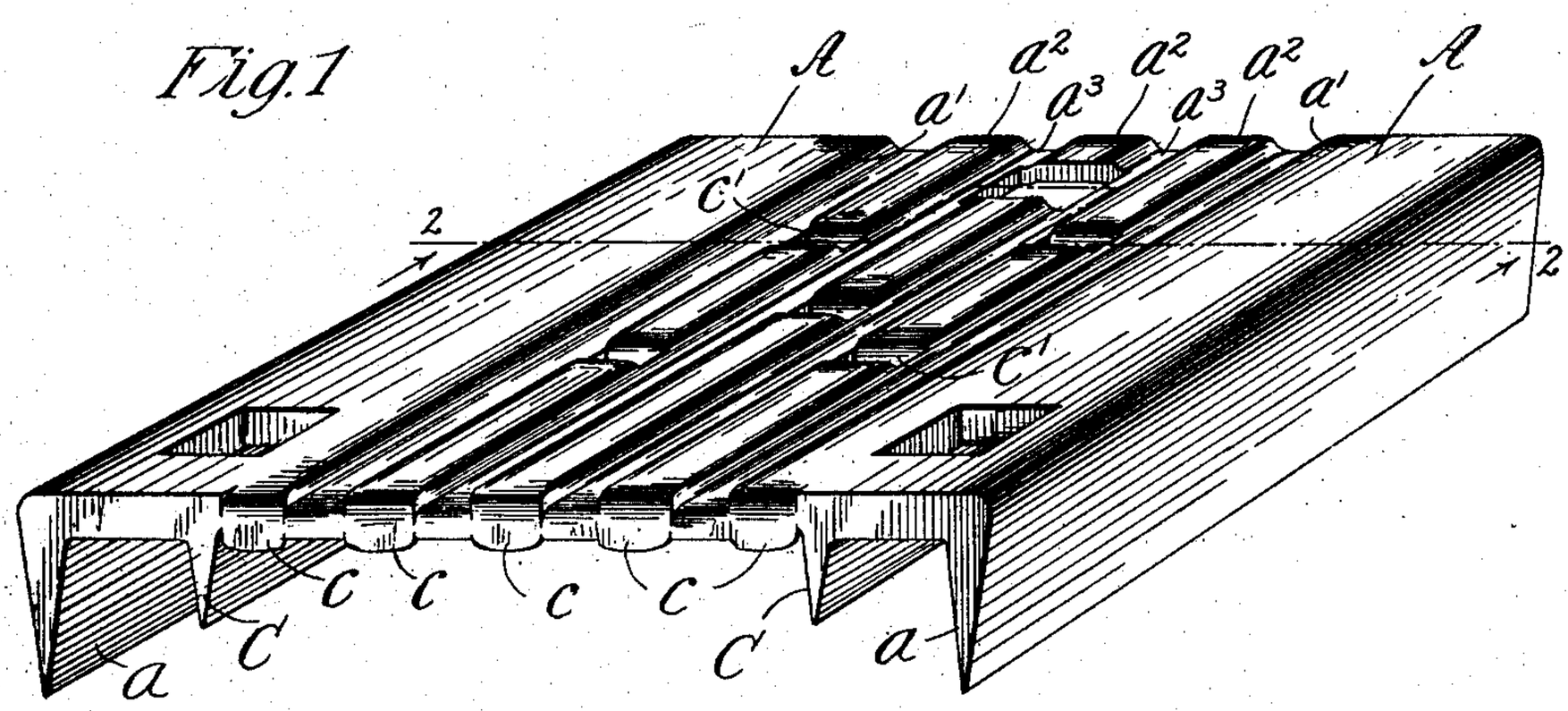


Fig. 2.

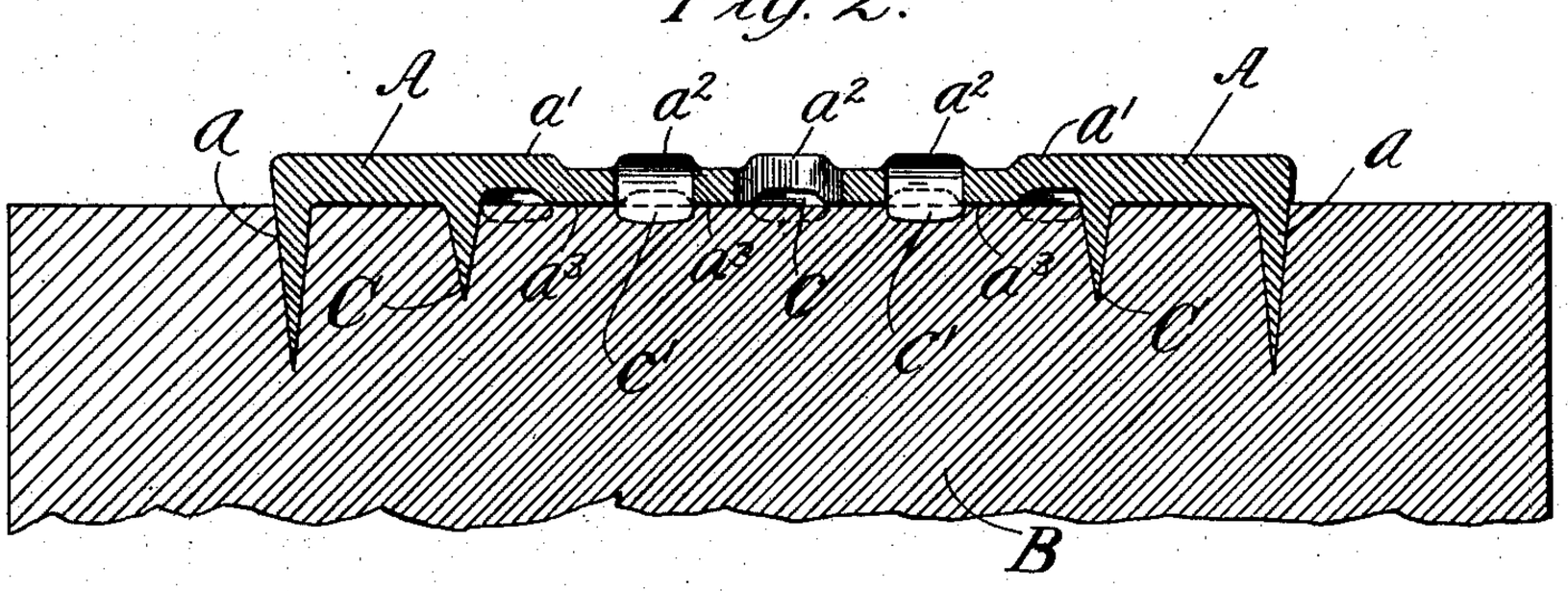
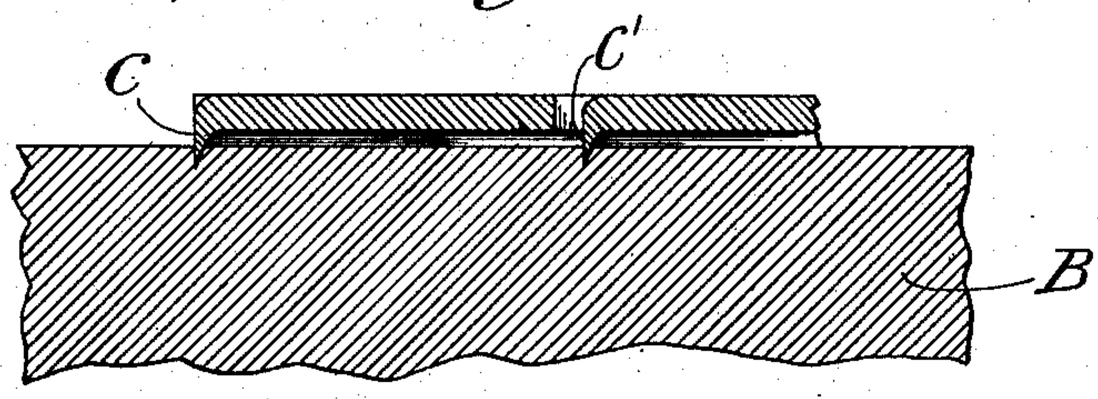


Fig. 3.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

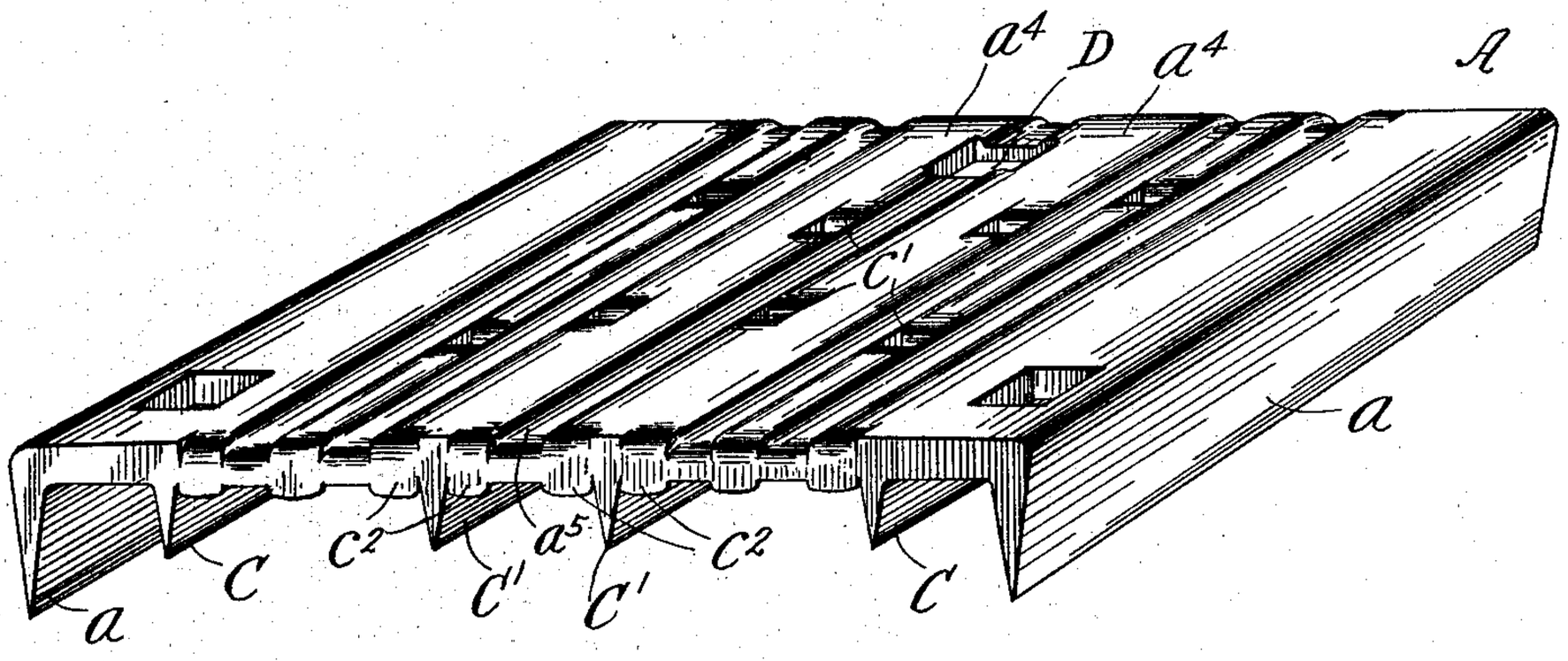
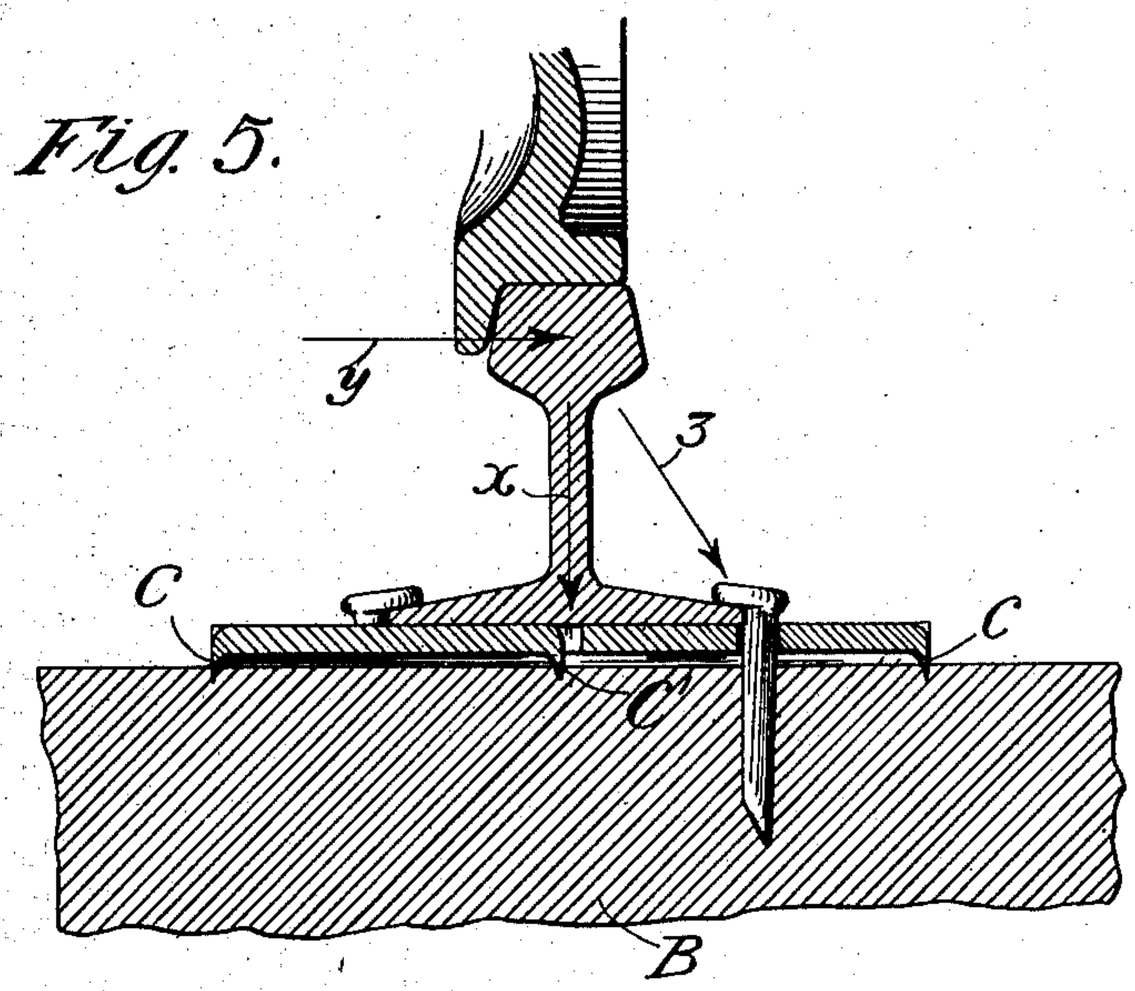


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIS S. JONES, OF CHICAGO, ILLINOIS.

TIE-PLATE.

SPECIFICATION forming part of Letters Patent No. 757,467, dated April 19, 1904.

Application filed October 16, 1902. Serial No. 127,495. (No model.)

To all whom it may concern:

Be it known that I, WILLIS S. JONES, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tie-Plates; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates more particularly to tie-plates designed to provide great strength with much less weight than in the constructions heretofore used and also to afford rigid engagement with the tie independent of spikes.

Heretofore many different forms of tie-plates have been constructed, some of which have varied in thickness at different parts of the plate. Ordinarily, however, the thickness of the plate has been approximately uniform throughout its entire extent, or if reduced in thickness at certain parts adequate provision has not been made to afford a positive support for the rail on the plate and for the plate on the tie at said reduced portions.

The object of this invention is to provide a plate of light weight and of much greater than ordinary strength and so constructed as to afford large surface of contact and positive support upon the tie and for the rail-base.

It is also an object of the invention to provide means for firmly gripping the plate in position on the ties and to so construct the plate as to afford maximum resistance against the lateral thrust of the rail.

The invention consists in the matters hereinafter described, and more fully pointed out and defined in the appended claims.

In the drawings, Figure 1 is a perspective view of a device embodying my invention. Fig. 2 is a section taken on line 2 2 of Fig. 1. Fig. 3 is a fragmentary longitudinal section of the same. Fig. 4 is a perspective view of a slightly-modified form of my invention. Fig. 5 is a section taken transversely of the rail and illustrating a feature of my invention.

As shown in said drawings, the tie-plate constructed by rolling, forging, or other desired means comprises a plate of metal provided with relatively thick side bars A, provided at their outer sides with integral downwardly and slightly inwardly turned sharp flanges *a a*, extending, as shown, for the length of the plate and adapted for engagement in the tie, (indicated by B.) Said side bars A are integrally connected by a web of metal of materially less thickness, as shown in Fig. 2, and which, as shown, is corrugated longitudinally of the plate to provide a plurality of alternately raised and depressed ribs a', a^2, and a^3, which extend approximately in the plane with the upper surfaces of the side bars A and in the plane of the under surfaces of said side bars, respectively. Said folds or corrugations in said web are reversely turned and provide approximately flat upper and lower surfaces, affording large surface contact with the rail-base and with the tie. Along the inner side of each side bar A at the point of connection with said web is provided a downwardly-depending sharpened flange C, which, as shown, is of less depth than the flanges *a* and also engages in the tie and is firmly bedded therein, as shown in Fig. 2. At each end of each of the said upwardly-turned ribs a' and a^2 in said web the metal is turned downwardly to provide a sharp end flange *c*, which extends below the ribs a^3 and engages transversely of the grain of the tie. Said downwardly-turned flanges are preferably chisel-pointed and present a flat vertical outer face against the grain of the tie, as more plainly is shown in Figs. 3 and 5. Said corrugations or folds in said web may be of any desired number. Preferably, however, they are of such width that when the plate is perforated with two spike-apertures through the side bars A at one end of the plate the single aperture near the other end of the plate passes through one of the ribs a^2 and notches into the ribs a^3 on each side thereof, thus affording a positive bearing for the spike on each side of the aperture of a thickness approximately equal to the maximum thickness of the plate. The width of the webs and number of corrugations will of course be dependent upon the width of the plate as a whole. As a further improvement I have provided apertures through the up-

wardly-turned ribs a^2, near the middle of the plate, and in each of said apertures a portion of the metal is turned downwardly and shaped to provide a sharp chisel-pointed flange c', corresponding generally with the flanges c and each providing a flat vertical face for engagement against the grain of the tie, said flat faces being directed toward the outer end of the plate, affording great resistance to lateral stress applied to the track-rail, as indicated in Fig. 5. Obviously any desired number of said apertures and downwardly-turned flanges c' may be provided in each of the ribs a^2 of said web or elsewhere.

The larger sizes of plates may be constructed as before described, or, if preferred, at each side of the center of the plate a broader corrugation or rib a^4 is provided, as shown, in Fig. 4, beneath each of which is provided an intermediate downwardly-turned flange C'. Said flanges C' are similar to the flanges C (shown on Fig. 1) and are arranged a distance apart sufficient to permit a spike inserted in the aperture indicated at D to pass between the same near the end of the plate and act to provide lateral support for said spike when driven therein. In the construction shown a downwardly-turned transverse flange c^2 is provided on each side of each of the flanges C' and affords resisting-surfaces against the lateral thrust of the rail.

The operation is as follows: The tie-plate when inserted in position to support the rail beds into the tie, the flanges a, C, and C' thereof sinking into the tie and acting to materially compress the tie beneath the same. Owing to the inward inclination of the outer side of the flanges, the material of the tie is greatly compressed at each side of the plate. The flanges C' C' also compress the material of the tie beneath the spike-aperture D, thereby affording better engagement for the spike therein. The downwardly-turned bends or corrugations a^3 a^5 rest upon the tie in the plane of the bottoms of the side ribs A A and afford a positive support for the plate on the tie, except below the upwardly-turned ribs a^2 a^4. These, however, are also positively supported upon the tie by means of the downwardly-turned transverse flanges c c' c^2, which not only act to support said ribs on the tie and close the ends of the corrugations, excluding dirt and moisture from beneath the tie-plate, but also afford an integral transverse brace of great strength, materially stiffening the plate and affording approximately as great strength as would be the case had the plate been made of uniform thickness throughout, while permitting the same to be made very much lighter. Furthermore, owing to the fact that said end and intermediate flanges c c' c^2 present flat vertical faces against and transversely of the grain of the tie resistance is afforded to the outward or lateral thrust of the rail imparted to it by the wheel-base, any outward stress serving to grip the plate more positively.

The central apertures and downwardly-turned flanges c' are preferably arranged to break joints on the plate, and the flange of each affording a material increase in the vertical thickness of the plate at said points the strength of the plate at its middle part is not materially reduced because of said apertures. The stiffness of the plate at the center point, however, is of comparatively slight importance, owing to the fact that the maximum stress on the plate is near the outer end of the same, as shown in Fig. 5, in which the arrow x indicates the stress due to the weight on the wheel-base, y the stress due to the lateral thrust of the wheel on the rail, and z the resultant of the two.

Obviously plates embodying my invention may be made of any desired width or weight of material and by any desired method and many details of construction may be varied without departing from the principles of my invention.

I claim as my invention—

1. A corrugated tie-plate comprising upwardly-turned ribs adapted to support the rail and downwardly-turned ribs arranged alternately therewith adapted to afford engagement upon the tie at a plurality of points and lateral sharp inturned flanges adapted for engagement in the tie.

2. A tie-plate comprising thick side bars and an intermediate comparatively thin web, corrugations in said web providing alternate raised ribs approximately in the plane of the top of said side bars and downwardly-turned ribs intermediate the same in the plane of the bottom of said side bars.

3. A tie-plate comprising thick side bars and an intermediate comparatively thin web, corrugations in said web providing alternate raised ribs approximately in the plane of the top of said side bars and downwardly-turned ribs in the plane of the bottom of said side bars forming a plurality of points of contact with the tie and longitudinally-extending sharpened inturned flanges adapted to engage the tie.

4. A tie-plate comprising thick side bars, downwardly and inwardly turned sharp flanges integral therewith, an intermediate thin web connecting the side bars and corrugated longitudinally to provide upwardly-extending ribs approximately in the plane of the tops of said side bars and alternate downwardly-extending ribs lying in the plane of the bottom of said side bars, and a plurality of sharp longitudinal flanges intermediate of the middle and edges of the plate and together with the lateral flanges adapted to engage in and compress the material of the tie beneath and at the sides of the plate.

5. A tie-plate comprising thick side bars, an intermediate comparatively thin web connect-

ing the same, a plurality of wave-like corrugations in said web, the upper surfaces of said corrugations corresponding with the upper surfaces of the side bars and the lower surfaces thereof corresponding with the bottom of the side bars, the ends of alternate bends in the web being permanently closed, and means on the under side of said plate adapted to positively engage in a tie or the like.

6. A tie-plate comprising lateral supporting-bars and an intermediate web of less thickness integrally connecting the same, integral downwardly and longitudinally extending sharp flanges at the margins of said side bars and of said web adapted to engage in the tie, corrugations in said web providing upwardly-turned bends and downwardly-directed bends adapted to support the rail and for engagement on the tie respectively, and downwardly-turned sharp flanges at the ends of one or more of said corrugations presenting vertical flat faces against the grain of the tie and acting to resist lateral thrust.

7. A corrugated tie-plate provided transversely at one or both ends with downwardly-directed vertical-faced chisel-pointed flanges adapted to engage transversely the grain of the tie and to resist lateral thrust from the rail.

8. A tie-plate comprising thick side bars, an intermediate thin web integral therewith and corrugated longitudinally to provide ribs having thin contact-surfaces alternately in the planes of the top and the bottom of said side bars, and downwardly-turned vertically-faced, chisel-pointed flanges on one or more of the upper ribs of said corrugations adapted to engage transversely in the grain of the tie and to resist lateral thrust and closing the space below said ribs.

9. As an article of manufacture, a tie-plate comprising alternate upwardly and downwardly directed corrugations, and a plurality of integral longitudinal sharp flanges disposed along the margins and intermediate of the margins of said plate, and transverse chisel-pointed flanges integral with one or more of said upwardly-directed corrugations, acting positively to engage in the grain of the tie and closing the ends of said corrugations.

10. A tie-plate provided at one end and intermediate of its ends with a plurality of sharp downwardly-turned, vertical-faced, transverse flanges extending below the lower surface of the plate.

11. A corrugated tie-plate provided intermediate of its ends on its lower side with a plurality of integral, downwardly-turned, sharp-edged flanges extending transversely of the plate and arranged staggering thereon and each having a vertical, flat face directed toward one end of the plate and acting to resist lateral thrust from the rail when supported thereon.

12. A tie-plate comprising thick side bars having integral downwardly and inwardly turned sharp flanges along each edge thereof, an intermediate thin corrugated web connecting said side bars and a plurality of downwardly-directed transverse flanges at the ends and intermediate of the ends of the plate, some of which close corrugations.

13. A corrugated tie-plate having integral sharp depending longitudinal flanges at the sides and intermediate of the sides of the plate and sharp-edged transverse flanges each presenting an approximately vertical face toward the outer end of the plate.

14. A tie-plate corrugated longitudinally and having a central portion thinner than its sides, sharp depending integral flanges extending longitudinally of the corrugations and a plurality of transverse sharp flanges extending below and closing certain of the corrugations at the ends and intermediate of the ends.

15. A corrugated tie-plate having thick sides and a thin corrugated intermediate portion, a plurality of sharp longitudinal flanges extending at right angles with the plate below the corrugations and transverse chisel-pointed flanges at the ends and intermediate of the ends of the corrugations presenting flat vertical faces toward the end of the plate.

16. A corrugated tie-plate provided transversely with one or more downwardly-directed vertical-faced flanges adapted to engage transversely the grain of the tie and to resist lateral thrust from the rail.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

WILLIS S. JONES.

Witnesses:
A. C. ODELL,
W. W. WITHENBURY.