(No Model.)

W. GOLDIE.

TIE PLATE.

No. 540,356. Patented June 4, 1895.

Fig. 1.

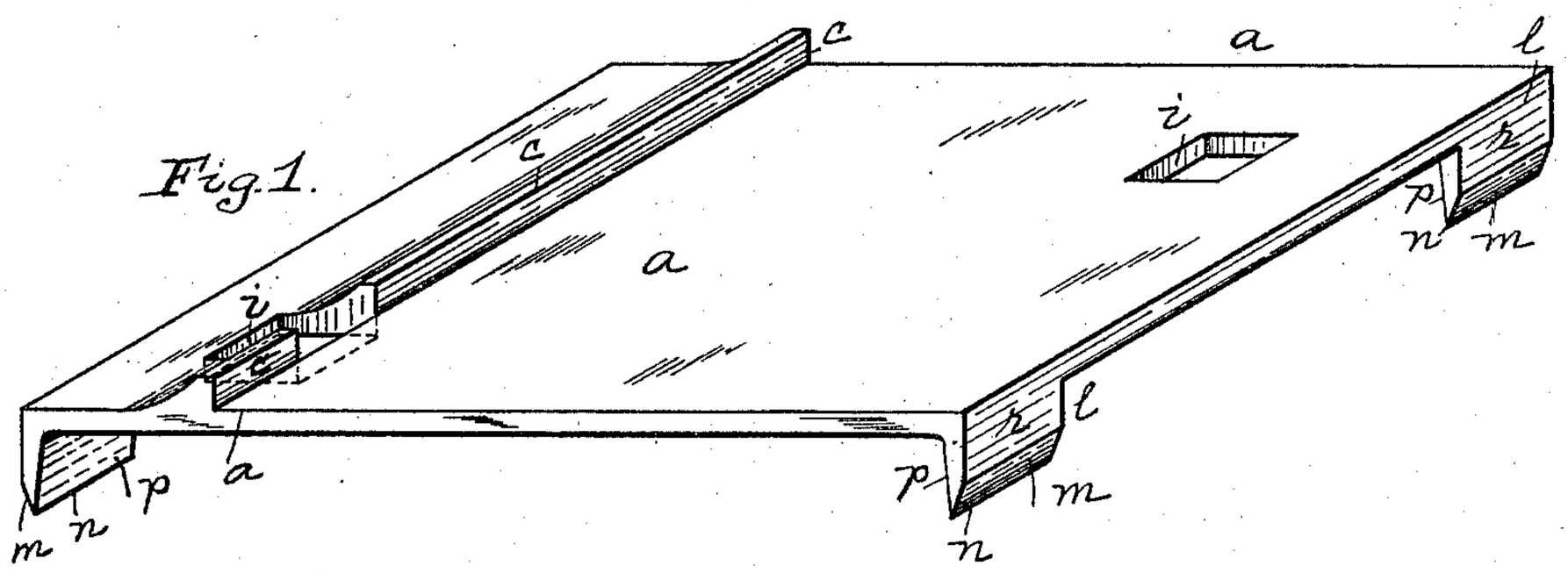


Fig. 2.

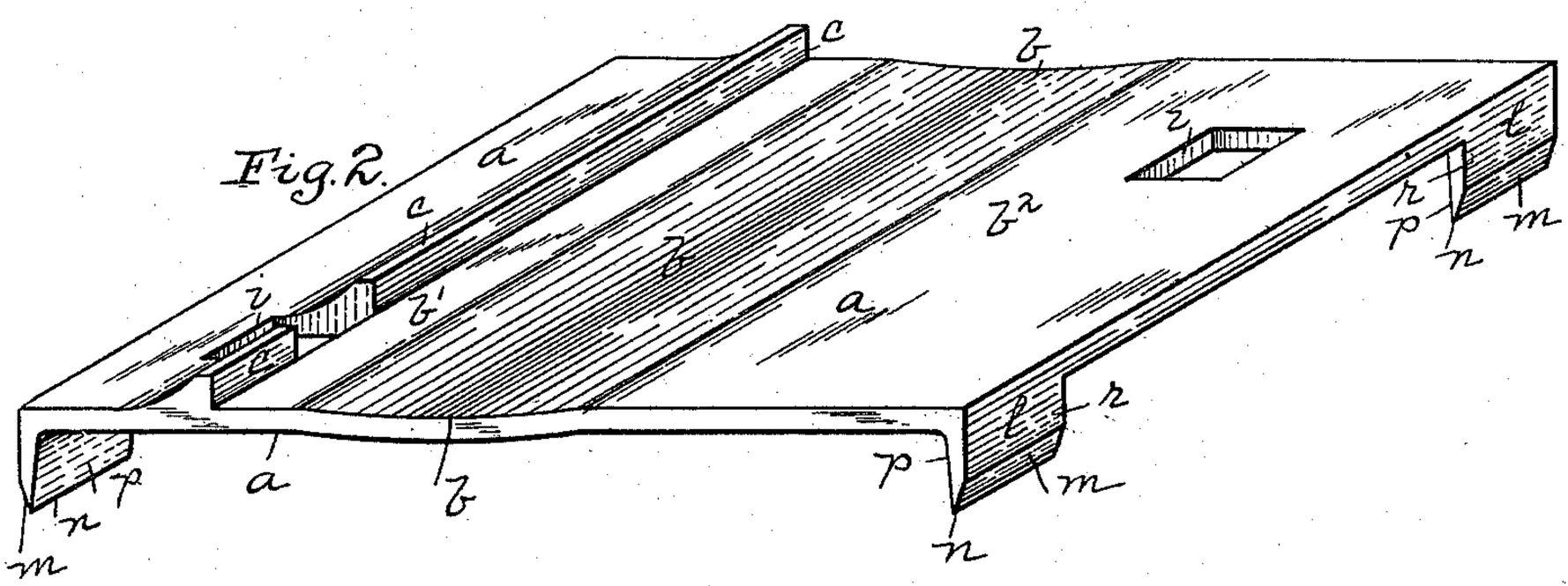
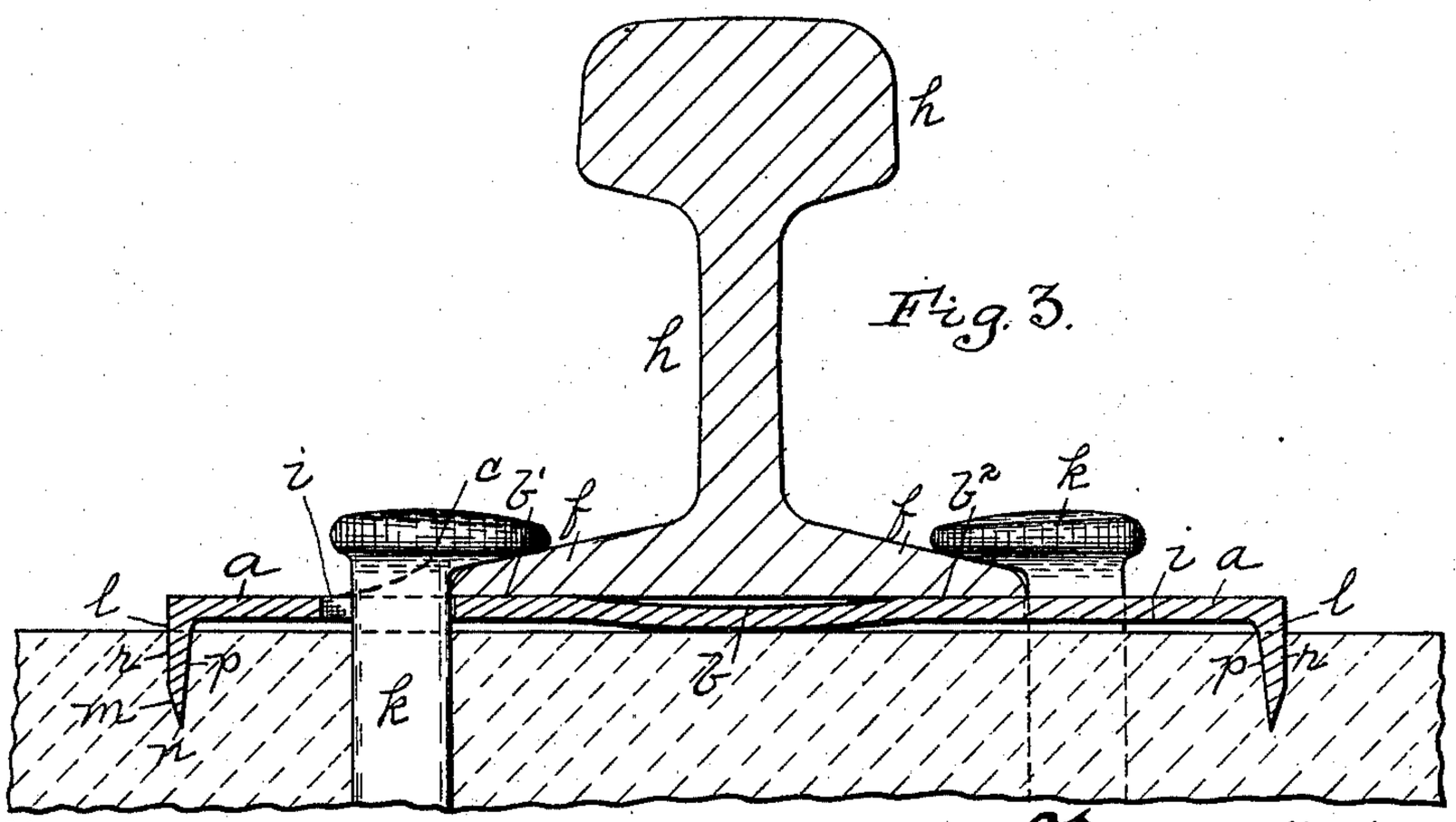


Fig. 3.



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UNITED STATES PATENT OFFICE.

WILLIAM GOLDIE, OF WILKINSBURG, PENNSYLVANIA.

TIE-PLATE.

SPECIFICATION forming part of Letters Patent No. 540,356, dated June 4, 1895.

Application filed February 17, 1894. Serial No. 500,486. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GOLDIE, a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Tie-Plates; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to tie-plates, that is, to the plates placed upon wooden railroad ties between the same and the base of the rail to take the wear of the rail, the plate in some cases having been used to sustain the lateral strain brought upon the rail when the train passes over the same, especially at curves and like places. It is now generally recognized among road masters or the engineers having charge of the maintenance of way on railroads that the ordinary railroad spike is inadequate to sustain the very heavy lateral strain brought upon the same by the heavy loads which modern railway practice demands, as it is this lateral strain and the chafing pressure of the rail upon the spike which loosens the spike and reduces its frictional hold upon the tie. This lateral pressure upon the spike causes the mechanical abrasion or wear of the tie, while the ordinary railroad tie is crushed or broken by the spike in driving, and the heavy loads now carried soon render the spike loose, so making liable the spreading of the rails and the disastrous accidents therefrom.

It has been recognized that tie-plates to support the rail upon the tie would largely overcome these difficulties, and such plates have been devised, among others, the plates shown in Patent No. 457,584, granted to me August 11, 1891, which provided a shoulder on the upper face of the plate against which the outer edge of the rail flange pressed, and had at the ends of the plate downwardly projecting triangular prongs or claws which were adapted to enter the tie and to cut the same across the grain thereof, and so obtain a hold upon the tie to resist the lateral strain; the spikes passing through this plate and engaging with the rail flange to hold the same firmly to the tie. While this plate embodied certain valuable improvements there were some difficulties encountered in connection with the same, among others, the fact that, as the prongs or claws were triangular, there was liability of rocking action when the plate was driven to its place by the trackmen, and therefore it was difficult to drive. It was also objectionable in the fact that the triangular prongs, though extending some distance down into and cutting the tie for that distance, did not take any great hold upon the body of the tie except near the top face thereof, as that was the only part of the triangular body which was sufficiently broad to offer great resistance to the strain brought upon the tie-plate. It was also difficult to form this plate by a rolling operation and to produce cutting edges on the triangular prongs which would be sufficiently sharp to cut the wooden fiber without crushing or breaking the same. Experience has demonstrated that any tie-plate, to be successful in use, must, when driven to place, adhere with sufficient force to render it substantially a part of the tie, so that in case of any movement of the rail it must occur between the rail and tie-plate and not between the tie-plate and the tie, as any movement between the tie-plate and the tie results in mechanical abrasion and cutting of the tie as badly as if no plate were used.

The tie-plate forming the subject matter of this application overcomes the objections heretofore found in these plates, and fulfills the requirements of an efficient plate.

It consists, generally stated, in a tie-plate having a body portion provided on its upper surface with a rib to support or receive the thrust of the rail, and having at intervals at its edges downwardly projecting square claws extending parallel with the body of the plate and having the edges thereof beveled to form sharp, chisel cutting edges for the entire widths of the claws; so that when the plate is driven to place the sharp, chisel cutting edges will rest on the flat surface of the tie, providing for the easy adjustment of the same against the rail, and on account of their long chisel cutting edges parallel with the body portion they will drive properly into the tie, will cut the same cleanly, will sufficiently wedge out the wood fiber to obtain a strong hold of the claws upon the tie, and provide a broad surface for the full width of the claws, extending down for the full distance that the tie is cut by the claws, so obtaining as broad bearing surfaces to resist lateral thrust on the

tie-plate at the bases of the claws as at the top thereof, and giving such adhesion that the plate becomes practically part of the tie, so that the wooden tie, when thus equipped, is as efficient for the preservation of gage as a metallic tie, while retaining the elasticity, cheapness, and other advantages of the wooden tie.

The particular points of invention desired to be covered will be hereinafter more particularly set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figures 1 and 2 are perspective views of tie-plates embodying my invention. Fig. 3 is a sectional view of the same, showing the tie-plate on the tie and the rail resting and spiked down thereon.

Like letters of reference indicate like parts in each view.

The tie-plate illustrated has the body portion *a*, which may either be flat throughout as shown in Fig. 1, or which is depressed in the center thereof where the rail flange rests, as at *b*, as described in Patent No. 485,030, granted to me October 25, 1892, to prevent buckling of the plate. The plate has on one side of the upper surface thereof the rib *c*, against which the edge of the rail flange *f* rests, by which the outward, spreading, or lateral strain on the rail *h* is sustained by the tie-plate. At suitable points in the body of the plate are the spike holes *i* through which the spikes *k* are driven, their heads extending over the rail flanges *f*. Projecting down from the body *a* of the plate at intervals on the outer or side edges thereof are the claws *l*, to which this invention more particularly relates. These claws are formed parallel to the length of the rail so that they will enter the tie in such position as to sustain the tie-plate against the lateral or spreading strain brought upon the rail by the passing train. They are formed at intervals on the plate so that there will be no greater cutting of the tie by the use of the tie-plate than is necessary to obtain a firm hold on the tie, it being preferred that the plate shall have one such claw at each corner thereof, though such claws may be employed between the ends, such, for example, as in long plates employed on ties where two rails meet, in which one or more claws may be employed between the ends of the plate. These claws *l* are square, or, as it may be termed, rectangular in surface or area, being as wide at the bases as at the upper ends thereof, and the lower edges thereof are beveled to form sharp, chisel cutting edges for the entire width of the claws, so that the plate is provided with a series of claws having such sharp cutting edges that they will sever the fiber of the tie without crushing the same, and will by the beveled faces *m* forming the cutting edges *n* compress such fiber sufficiently to obtain a strong frictional hold thereon, the fiber being forced back by the beveled face so that it bears directly on the body of the square claw and gives great frictional hold of the claw upon the tie, while, as the claw is of the same width throughout its entire length, or for the depth to which it enters into the tie, a strong hold is obtained upon the tie for the full depth of the claw, it being found that by this special construction of the claws the hold of the tie-plate upon the tie is increased largely over triangular claws. It will be noticed that the body portions of these claws are slightly tapering, the drawings showing the inner face *p* of the claw tapering from the body portion *a* to the cutting edge *n*, while the outer face *r* of the tie-plate above the beveled face *m* is at right angles to the body portion. I prefer this construction of the claw, and prefer to form the beveled face *m* which provides the cutting edge *n* on the outer face, because the tapering inner face tends to compress the wood fiber cut, while the tapering bevel *m* has the same action, and, as the claw is not of any great thickness, compression of the wood fiber can be obtained without the crushing of the same, and the compressed body of the wood fiber bears against the straight or perpendicular face *r* of the claw above the bevel *m*, the combined action of the inner tapering face, the sharp chisel cutting edge, the bevel on the outer face, and the straight or perpendicular portion above the same giving an exceedingly strong hold of the claws upon the body of the tie. In this way, without cutting any great portion of the wooden tie, I obtain so strong an adherence of the plate upon the tie that the plate becomes substantially part of the tie, and any movement of the rail upon the tie necessarily occurs between the rail and tie-plate, and the wooden tie is entirely protected from mechanical abrasion by the rail.

It is, of course, to be understood that while I prefer the construction above described, the claw may have its bevel on the inner face with a straight face above the same and the outer face slightly tapering, practically the same result being obtained.

In the use of the plate, after the rail has been extended over the ties and properly gaged, the tie-plate is slipped under the rail and the rib *c* brought against the edge of the outer flange *f* thereof, so bringing the plate to the exact position desired. The tie-plate then rests upon the tie, the four broad chisel cutting edges of the claws giving a broad bearing on the tie. When the plate is driven into the tie the blows of the maul act upon a plate having wide cutting edges, and the rocking action found where triangular claws were employed does not occur, the plate being driven solidly to place by a few sharp blows. As it is driven to place the lower cutting edges of the upper claws cut the course for the same for the full width of the claws, and the fibers so cut are sufficiently compressed to give the firm frictional hold of the claws upon the tie above described. The rail is then spiked to

the tie, the spikes passing through the spike holes *i* in the usual way.

When in use the lateral strain brought upon the rail is transferred from the same through the rib *c* to the tie-plate, but as that plate is held firmly down by the spikes and the rail resting on it, as well as the weight of the passing train, the claws *l* give a strong support to the plate against such lateral strain, offering the resistance of their broad faces extending for the full depth of the claws into the body of the tie and efficiently resisting such lateral strain, as has been practically and successfully tested, the plate having been shown to resist a greater lateral strain than any other plate upon the market. At the same time, as all lateral strain is removed from the spikes themselves, and they are only required to hold against the vertical strain upon the rail, they offer a much stronger resistance to such vertical strain because relieved from the chafing action of the rail thereon, and their hold upon the tie is increased in duration as well as strength, as lateral pressure of the spikes upon the wood fiber is entirely prevented. For these reasons a very efficient tie-plate is thus provided.

I prefer to form the plate with the slight longitudinal depression extending under the rail as at *b*, Fig. 2, in which case the rail rests on the flat faces *b'* b^2 on each side of the depression, and in case the lower surface of the rail is slightly rounding, prevents the buckling of the plate by the pressure directly under the rail-web, which has a tendency to buckle the plate and raise the outer edges thereof, as described in said Patent No. 485,030, granted to me October 5, 1892. Such depression also performs another special function when employed with a tie-plate having claws parallel with the rail and at the outer edges of the plate or beyond the tread or bearing point of the rail body. In that case the pressure caused by the weight of the load on the rail on each side of the depression, which bears on the tie, acts by leverage from the depression as a fulcrum to force the claws into the tie, and hold them firmly to place while the load is passing over the rail, so insuring a firm hold of the tie-plate to the tie just at the time that the strain is brought thereon.

The tie-plate can be rapidly and cheaply formed by rolling the same with the rib and with continuous flanges along the outer edges thereof; cutting the plates to length, punching out the metal between the claws; and then shearing the edges of the claws obliquely and in the direction of their length so as to form the cutting edges; this forming the subject matter of a separate application of even date herewith.

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

1. A tie-plate having a body portion provided at intervals at its edges with downwardly projecting square claws extending parallel with the rail, and having the lower edges thereof beveled to form sharp chisel cutting edges for the full width of the claws, substantially as set forth.

2. A tie-plate having a body portion provided at intervals at its edges with downwardly projecting square claws extending parallel with the rail and having tapering bodies, and having the edges thereof beveled to form sharp chisel cutting edges for the full width of the claws, substantially as set forth.

3. A tie-plate having a body portion provided at intervals at its edges with downwardly projecting square claws extending parallel with the rail and having tapering bodies, and having the edges thereof beveled on the outer surfaces to form sharp chisel cutting edges for the width of the claws, substantially as set forth.

4. A tie-plate having a body portion provided at intervals at its edges with downwardly projecting square claws having the inner faces thereof tapering for the full length, and having the outer faces at right angles to the upper face of the body portion, and provided with bevels at the base thereof to form sharp chisel cutting edges for the full width of the claws, substantially as set forth.

5. A tie-plate having a body portion having a slight depression under the rail tread, and provided at intervals beyond the tread of the rail with claws extending parallel with the rail, substantially as set forth.

In testimony whereof I, the said WILLIAM GOLDIE, have hereunto set my hand.

WILLIAM GOLDIE.

Witnesses:
L. H. KNOX,
J. N. COOKE.