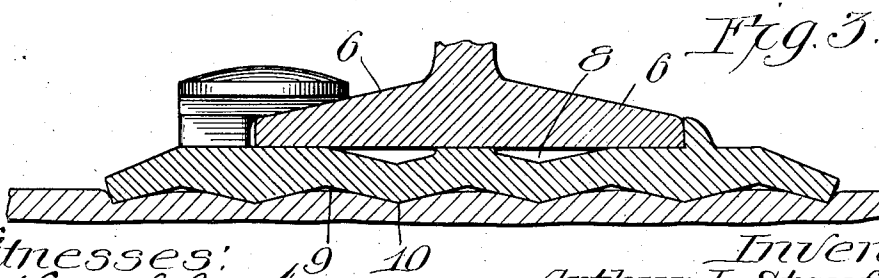
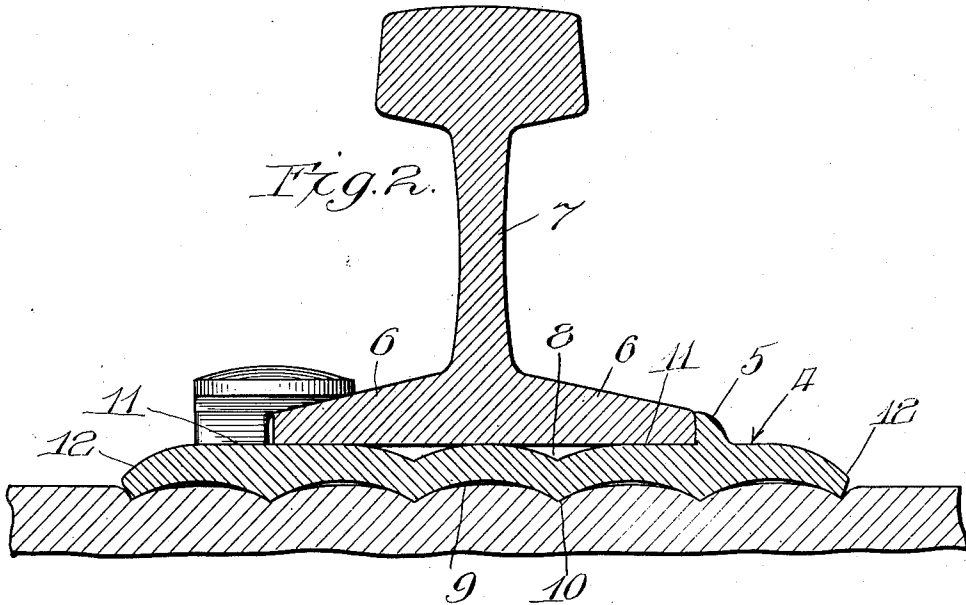
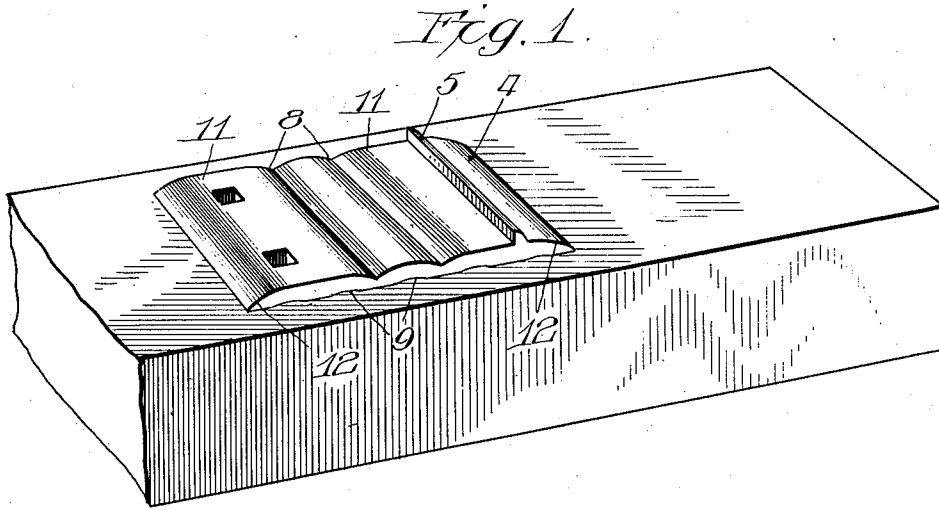


A. L. STANFORD.
TIE PLATE.
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1,056,716.

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TIE-PLATE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ARTHUR L. STANFORD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tie-Plates, of which the following is a specification.

The tie plate of the present invention relates to that style employed in railroad construction and which is interposed between the lower face of the rail and the upper face of the tie to prevent wearing away of the tie by reason of the vibratory action imparted to the rail by the pounding to which it is subjected.

The objects of the present invention are to provide a tie plate for the purpose indicated which will be cheap and simple of construction, which will have its upper face cut away at intervals to decrease the metal in the plate and give a certain amount of resiliency to the same, and which will have its upper surface configured to be in parallelism with the cut away upper portion so as to eliminate any decrease in the thickness of the plate by reason of said cutting. To provide an increased thickness of the plate at the points where the edges of the flanges of the rail lie on the surface of the plate which increased thickness will be due to the method of configuring the upper surface of the plate at this point. To provide an abutment or shoulder on the top surface of the plate which will extend parallel with the longitudinal dimensions of the rail section and against which a flange of the rail will abut. To provide a series of arched surfaces or sections on the under face of said plate extending parallel to said shoulder, and to provide for a gradual decreasing in the thickness of the plate from the point where the rail flange terminates to the edges of the plate and to provide for the necessary protrudance of the plate beyond the edges of the rail flange. And the invention further consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings: Figure 1 is a perspective showing a tie plate of the present invention in operative position upon a rail tie. Fig. 2 a cross section of a rail section positioned upon a tie plate of the present invention; and Fig. 3 a view similar to Fig. 2 showing a somewhat modified form of construction.

In the present invention I contemplate the

construction of a tie plate in which a series of arch sections extend parallel with the longitudinal dimension of the rail and crosswise of the grain of the tie, and these arch sections merging as they do into one another, produce a serrated gripping surface on the bottom face of the plate. By this arrangement several important features of construction are made possible which will more fully hereinafter appear.

By employing the construction above mentioned I am enabled to give to the plate certain characteristic features which are of material advantage in the practical use of the same, and such a plate in addition to presenting certain important practical advantage is of a character which is extremely simple of manufacture, since the rolling of a plate in which the shoulder and arch sections extend parallel, is a simpler operation than the rolling of a plate where the shoulder and arch sections are lying at an angle to one another. Thus by designing a plate which possesses substantial and important practical points of merit in construction, I have in so doing also designed a plate which by its nature is more easily manufactured than the ordinary plate. The elimination, however, of the difficulties of manufacture follows as a matter of course after the designing of the plate so as to vest it with the features of practical construction, since such features could not be obtained in a similar manner in a style of plate in which the arch surfaces extended at an angle to the abutment or shoulder for the rail.

Referring now to the drawings, the tie plate consists of a body 4 of suitable metal and of a unitary formation and extending from the top surface of said plate is a shoulder or rail abutment 5 which is intended to engage the side face of one of the flanges 6 of a rail section 7.

By referring to Figs. 2 and 3 it will be seen that a series of depressions 8 are formed on the top face of the tie plate and that such depressions are so arranged as to lie upon each side of the center of the rail section and approximately equi-distant from said center. The depressions referred to produce an undulated surface on the top of said plate which lies beneath the central portion of the rail section. The under face of the plate comprises a series of undulations 9 which in the form shown extend from edge to edge

thereof. These undulations produce a series of arch sections which merge together and form points 10 on said under face, which, when the plate is in the position shown in Fig. 1 extend crosswise of the grain of the wood of the tie. When the plate is subject to pressure the points 10 will penetrate into the body of the tie, compressing the wood of the tie in between said points as shown in Figs. 2 and 3, filling in the arch sections and establishing a close bond or union between the tie plate and the tie so that said plate is efficiently and securely anchored in place upon the tie whereby it will effectually resist the tendency of the rail section to move by reason of its vibration and will prevent any chafing or wearing away of the tie.

Referring now again to Figs. 2 and 3, the top surface of the plate will be seen to embody flat surfaces lying upon opposite sides of the center of the rail section and extending from the termini of the top undulated portion to a point up to or beyond the edges of the rail flanges, and I desire to state that I contemplate constructions in which the flat surfaces either extend to or beyond the rail flanges, as in either case the same effect would be brought about. These surfaces 11 are substantially parallel with the base of the rail. Continuing to refer to Figs. 2 and 3 it will be seen that the undulations on the bottom face of said plate are so arranged as to a point of mergence of said undulations in substantial alinement with the edges of the rail flanges 6 when said rail is in position, thus by forming the upper surface of the tie plate flat and locating a point of mergence beneath the edge of the flange of the rail section, an increased thickness in the plate is produced at this point. This feature is deemed to be an important one, because of the fact that experience has shown that the pressure upon the rail will tend to buckle the tie plate around the edges of the flanges of the rail, and this reinforcing of the tie plate at this point materially strengthens and improves the plate as a practical article. This reinforcement is obtained not by adding metal to the under surface of the plate, but by so configuring the top surface of the plate as to get an increased amount of metal at this point over that which is provided at other points of said plate. It might be said that it consists in filling in any depressions which might be formed by undulating the entire top surface, so it is strictly a reinforcement obtained by adding metal to the top of the plate and at the same time this addition is obtained without configuring said top surface so as to eliminate the desired firm resting surface for the bottom surface of the rail on the top of the plate. In fact by providing the flat surfaces 11 a more substantial resting surface for the rail is provided than

as though the tie plate were undulated or waved across the entire top face. Thus by using undulations only a portion of the way across the top face and by filling in other portions so as to make a flat surface, an efficient engaging surface is provided for the rail and a reinforcement is provided at the point where the edges of the flange of the rail rest. To refer back again to the depressions 8 and still referring more particularly to Figs. 2 and 3 it will be seen that a point of mergence of the undulations on the under face of the plate is positioned in alinement with each of said depressions and that the undulations on the top surface of the plate are parallel to the undulations on the lower surface so that an equal thickness of metal is maintained throughout that portion of the plate which is undulated on both its top and bottom surface, thus eliminating any weakening of the plate by reason of cutting away the top surface. Thus, although, the amount of metal used in manufacturing the plate and the weight of the plate is reduced by cutting away certain portions of the top surface the thickness of the plate is not lessened, and the strength thereof is in no wise weakened. This is another material point in the present invention. These two points, namely reinforcing the tie plate at the point where the edges of the flanges of the rail rest and the cutting away of the top surface without reducing the thickness of the plate and weakening the same, are both features which are only possible with a plate in which the arch section or undulations are extending parallel to the shoulder for the rail flange and crosswise of the tie, for in each instance the position in which the juncture of the arch sections lie produces or makes possible the obtainance of the features above mentioned. It is obvious that if said arch section or undulations were running at right angles to the shoulder, auxiliary parts would have to be furnished in order to provide a reinforcement of the nature set forth, and to provide a plate of a common thickness of metal although portions of the top surface were cut away, and by using arch sections so positioned as to enable these characteristics to be vested in the tie plate I produce a plate which by its very nature is easily rolled and is, therefore, an easy article to manufacture.

Referring again to the construction illustrated in the drawings, it will be noted that the edges 12 of the tie plate terminate a distance beyond the termination of the flange of the rail section. This is a desirable feature in such construction, but it is not necessary or essential to form these edges as thick as the remaining portions of the plate, and I therefore so arrange the undulations on the under surface of the face of the plate as to have one of them extend

from a point approximately in alinement beneath the edges of the flanges of the rail, to the end or edge of the plate, and the upper surface of the plate I slope from the termini of the flat surface to the edges. This produces a gradual decrease in the amount of metal in the plate at the edges thereof. Said decrease commencing at the point of the greatest thickness of the plate, namely beneath the ends of the rail flanges and continuing to the edges of the plate. Said decrease is of a continued and constant graduation throughout and results in a saving of metal by eliminating any extra amount of metal at any place where it is not necessary and at the same time in no wise impairs the strength of the plate at the places where strength is needed. This latter feature of thinning the tie plate toward its edges can be brought about in the simple manner described, only in tie plates in which the arch sections on the under face thereof extend parallel to the rail abutment and is another practical feature of importance which is made possible by forming the tie plate in the manner prescribed by the present invention.

To summarize: I have found it possible to vest in the tie plate certain characteristics which are important from a practical standpoint, by forming the tie plate with arch sections or undulations extending parallel with the rail abutment or shoulder and in producing a tie plate in which these characteristics are present I have produced a tie plate which is cheap and simple of manufacture and eliminates any difficulties which may have been present in rolling a tie plate in which the arch sections extend at an angle to the upper shoulder. It will be noted that the undulations given to the surfaces of the tie plate act in themselves to reinforce and strengthen the plate, it being a well known fact that such undulations or arch sections better equip the article to withstand strain.

Where the term undulations is used in the specification and claims it is understood to designate a surface which alternately rises and falls and is not a limitation in any other manner than so indicated.

I claim:

1. A tie plate provided with a shoulder on the top surface thereof extending parallel with the longitudinal dimension of the rail section, a series of merging undulations on the bottom face of said plate parallel with said shoulder, said top surface being cut away upon each side of the center of the rail, a point of mergence of said undulations underlying the center of each of said cut away portions producing parallel surfaces on the upper and lower edges of the plate at these points whereby an equal thickness of metal is maintained, said plate

having flat portions extending from the outer termini of said cut away portions a distance sufficient to underlie the remainder of the base of the rail section, a point of mergence of said undulations being positioned in alinement with the ends of said flanges providing an increased thickness and reinforcement for the plate at this point, substantially as described.

2. A tie plate provided with a shoulder on the top surface thereof, extending parallel with the longitudinal dimension of the rail, a series of merging undulations on the bottom face of said plate parallel with said shoulder, said upper surface being cut away for a distance upon each side of the center of the rail section, a point of mergence of said undulations underlying the center of each cut away portion, producing parallel surfaces on the upper and lower faces of the plate at these points whereby an equal thickness of metal is maintained, said plate having flat portions extending from the outer termini of said cut away portions a distance to underlie the remainder of the base of the rail, one of said points of mergence being positioned in alinement with the edges of the flanges of the rail whereby the plate is given a reinforcement at this point, said plate gradually decreasing in thickness from the point of reinforcement to the edges thereof, substantially as described.

3. A tie plate provided with a shoulder on the top surface thereof, extending parallel with the longitudinal dimension of the rail section, a series of merging undulations on the bottom of said plate extending parallel with said shoulder, a series of undulations, on the top surface of said plate extending from a point beneath the center of the rail to points intermediate the center and opposed edges of the flanges of the rail, said top and bottom undulations extending parallel, said bottom undulations being positioned to locate a point of mergence of said undulations beneath the edges of said rail flanges, said plate having flat upper surfaces extending from the termini of said top undulations to underlie the remainder of said rail flanges whereby a reinforcement is given to the plate beneath the edges of the rail flanges, substantially as described.

4. A tie plate provided with a shoulder on the top surface thereof extending parallel with the longitudinal dimension of the rail section, a series of merging undulations on the bottom of said plate extending parallel with said shoulder, a series of undulations on the top surface of said plate underlying the central portions of the flanges of the rail sections, said top and bottom undulations being parallel, said bottom undulations being positioned to locate a point

of mergence beneath the edges of the rail flanges, said plate having flat upper surfaces extending from the termini of said top undulations a distance to underlie the remainder of the rail flanges whereby a reinforcement is given to the plate at the edges of the rail flanges, said plate sloping downwardly from the termini of said flat surfaces to the edges of the plate, said sloping surfaces extending out of parallelism to the undulations on the lower face of said plate whereby a gradual thinning of the plate is produced extending from the edges of the rail flanges to the edges of the plate, substantially as described.

5. A tie plate provided with a shoulder on the top surface thereof extending parallel with the longitudinal dimension of the rail section, a series of merging undulations on the bottom of said plate extending parallel with said shoulder, a series of undulations on the top surface of said plate lying centrally of the rail section, said upper and lower undulations extending parallel, said lower undulations being positioned to locate a point of mergence beneath the point where the edges of the rail flanges rest, said plate having flat upper surfaces extending from the termini of said top undulations a distance to underlie the remainder of the flanges of the rail whereby the plate is reinforced at the edges of said flanges, said plate gradually decreasing in thickness from the points of reinforcement to the

edges of the plate, substantially as described.

6. A tie plate provided with a shoulder on its upper surface extending parallel with the longitudinal dimension of the rail and a series of merging undulations extending across the entire under surface of said plate and running parallel with said shoulder, substantially as described.

7. A tie plate provided with a shoulder on its upper surface extending parallel with the longitudinal dimension of the rail section, a series of undulations on its top surface lying beneath said rail section, a series of undulations extending across the entire bottom of said plate and parallel to said top undulations, said top and bottom undulations running parallel with said shoulder, substantially as described.

8. A tie plate provided with a shoulder on its upper surface extending parallel with the longitudinal dimension of the rail section, a series of merging undulations on the bottom of said plate extending parallel with said shoulder, said bottom undulations being arranged to locate a point of mergence thereof beneath the edges of the rail flanges whereby a reinforcement is given to the plate at these points, substantially as described.

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