April 18, 1939. T. W. STEDMAN 2,155,155

TIE PLATE ARRANGEMENT FOR RAILROADS

Original Filed Sept. 19, 1933

Fig. 1.

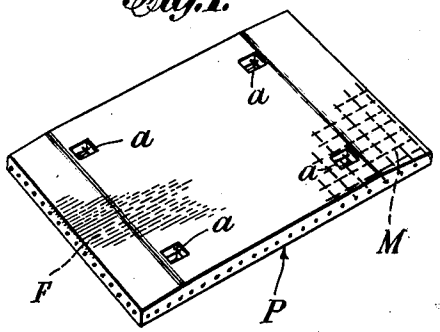


Fig. 2.

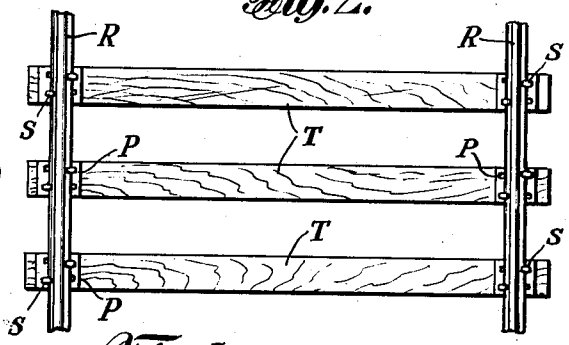


Fig. 5.

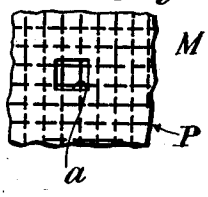


Fig. 4.

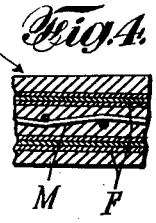


Fig. 3.

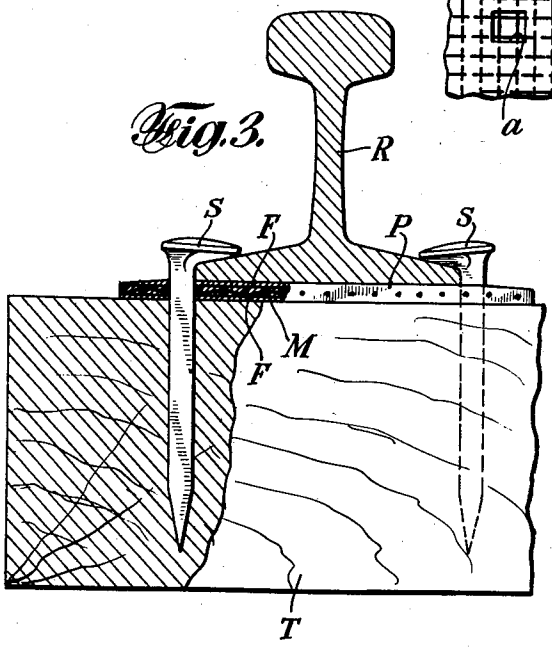


Fig. 6

Fig. 7.

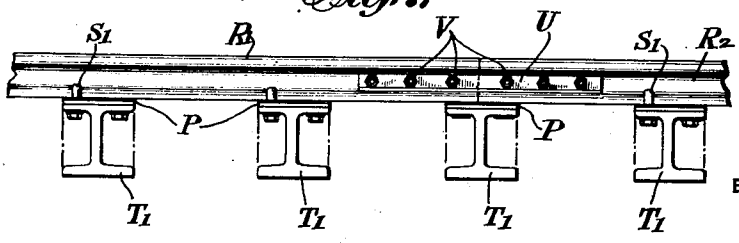
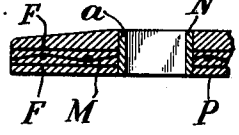


Fig. 8.



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Patented Apr. 18, 1939

2,155,155

UNITED STATES PATENT OFFICE

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TIE PLATE ARRANGEMENT FOR RAILROADS

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Application September 19, 1933, Serial No. 690,084
Renewed March 16, 1938

2 Claims. (Cl. 238—283)

My invention relates to a resilient tie plate adapted for railroad use.

My invention has particular reference to a tie plate formed from resilient or cushioning material, such as rubber material, hereinafter generically referred to as including such resilient or cushioning material, the arrangement being such that the tie plate has great durability, high efficiency as regards cushioning qualities, and marked value in preventing decay of wooden cross ties.

Further objects, advantages and characteristics of my invention will become apparent from the following detailed description.

My invention resides in the tie plate, features, and improvements of the character hereinafter described and claimed.

For an understanding of my invention and for an illustration of one of the forms thereof, reference is to be had to the accompanying drawing, in which:

Figure 1 is a perspective view of a tie plate as constructed in accordance with my invention;

Fig. 2 is a plan view of a section of a railroad track;

Fig. 3 is a vertical sectional view, partly in elevation, showing my improved tie plate in operative position;

Fig. 4 is an enlarged sectional view of my improved tie plate;

Fig. 5 is an enlarged plan view of my improved tie plate;

Fig. 6 is a vertical sectional view, partly in elevation, showing my improved tie plate positioned on a metallic cross tie;

Fig. 7 is an elevational view showing a section of a single track; and

Fig. 8 is an enlarged vertical sectional view illustrating a modified tie plate arrangement.

In the art of railroad track construction, it is customary to dispose a metallic plate between the upper surface of wooden cross ties and the base of the rail. Certain advantages are gained by utilizing a construction of this character although, at the same time, there are certain disadvantages incident thereto as well recognized in the art.

In accordance with my invention, I dispense with the metallic tie plate of the prior art and utilize, in lieu thereof, a tie plate formed of rubber material, such tie plate including structural features substantially enhancing the life or durability of the tie plate and increasing the efficiency thereof particularly as regards preservation of the cross ties, elimination of abrasion and noise, decreasing the wear on the rolling stock, largely eliminating the noise incident to traffic operation, etc.

Referring now to Figs. 2 and 3, T represents the wooden cross ties and R the parallel steel rails of a railroad track, the rail being secured to the ties by spikes S. The rails R do not contact directly with the ties T since, as clearly shown, tie plates P are disposed between the rail bases and the upper surfaces of the respective ties.

In accordance with the invention, the tie plates P are of suitable rubber material capable of withstanding the wear of pounding locomotive and car wheels. The rubber forming said tie plates P should be relatively hard but it should not be brittle to any substantial extent. For example, the rubber may be compounded with zinc oxide and/or carbon black, or equivalent, preferably without sulphurizing agents, but with accelerates and sufficient sulphur and age-improving substances to give good vulcanization and durability.

As shown on the drawing, the width of the tie plates P may be and preferably is substantially the same as that of the ties T while the length thereof somewhat exceeds the width of the rails R. In accordance with the invention, these tie plates, during the manufacturing operation, are provided with a plurality of spaced passages *a* through which extend the respective spikes S, the latter serving, as stated above, to secure the rails to the ties. These passages *a* may be located on the plates P in such manner as is suitable or desirable. Preferably, four of the passages *a* are provided and they are so positioned on said plates P as shown in Figs. 1 and 3 of the drawing that two of them are located adjacent one side of the rail and two of them adjacent the other side of said rail.

The herein described spikes S are of the same character as have heretofore been utilized for securing railroad rails to their supporting wooden ties. Such spikes S are substantially square in horizontal section and, therefore, in accordance with the invention, it is highly desirable that the passages *a* be substantially square in horizontal section to conform with the configuration of said spikes S.

Furthermore, it is also desirable and important that the cross-sectional area of the passages *a* be somewhat smaller than the cross-sectional area of the shanks of the spikes S immediately adjacent the head thereof or at the upper shank sections so that the movement of a spike S

through a passage *a* causes the adjacent rubber material to be placed under some degree of compression whereby said rubber material, when the spike S is seated in position, tightly engages the shank of the spike immediately below the head thereof. It results, therefore, that the opening for each spike S is substantially sealed and, accordingly, passage of rain or other water longitudinally along a spike S into the opening formed thereby in the tie T is substantially or entirely prevented. This is highly desirable because preventing deterioration of the wooden ties T by action of water finding its way into the recesses formed by the spikes.

It is well known in the art that the pound of traffic on metal railway rails supported by metallic tie plates causes abrasion of the ties and loosening of the spikes so that, during continued usage, the spikes are held in or to the ties less and less tightly. By utilizing rubber tie plates having openings through which the spikes S, or equivalent, extend, the rails are resiliently supported and, accordingly, by virtue of this shock-absorbing medium, the loosening of the spikes is largely or substantially obviated. However, in the event that the spikes should become loose, the above noted sealing action of the rubber material on the spike shanks prevents entrance of moisture into the spike recesses and thereby prevents decay of the wooden cross ties.

As clearly shown on the drawing and in accordance with an important phase of the invention, a reinforcing section M of metal may be associated with the tie plate P. This metallic section M may be a sheet of metal having suitable thickness which is embedded in said tie plate P and, if desired, the metal sheet may be corrugated or provided with prongs extending laterally into the rubber material. Where a metallic sheet is thus utilized, it may be provided with passages which, during the molding or manufacturing operation, are so positioned that, in the completed tie plate, they aline, respectively, with the passages *a*.

In accordance with the present preferred form of the invention, the aforesaid metallic section M is of mesh construction, the wires or members forming the mesh preferably being relatively heavy and suitably embedded in the rubber material of the tie plate. Such an arrangement is well shown in Fig. 5 which also shows one mesh opening symmetrically arranged with respect to and alined with respect to a passage *a* of the completed tie plate.

Preferably, the aforesaid passages through the metallic plate M and the mesh opening last described correspond in cross-sectional configuration with that of a spike S. The cross-sectional area of said passages or opening, however, should be somewhat smaller than that of a spike S immediately below the head thereof. Accordingly, when the spike is passed through the tie plate reinforced with the described metal section and driven home into the tie, it results that the metallic reinforcing section grips and tightly engages said spike.

Numerous advantages flow from the provision of a metallic reinforcement M of the character described above. A member of this character increases the compressional resistance to the traffic load as applied downwardly in substantially a vertical direction. The tensile strength of the tie plate is thereby greatly increased to correspondingly increase the resistance set up by the rubber material of the tie plate to a spreading action under the influence of the vehicular load. Furthermore, the provision of said metallic reinforcement M serves to more firmly anchor the spikes S in their driven position to thereby prevent track spreadage.

In addition to or in lieu of the above noted metallic reinforcing section M, there may be utilized a reinforcement F formed in suitable manner from fabric strands. This reinforcement F may be either of the "fabric" or "cord" type such as is well known to the art of constructing automobile tires and it should be disposed preferably layerwise in the rubber material. The fabric strand reinforcement F functions in generally the same manner as the metallic section M to retain the rubber material of the tie plate in its proper and intended configuration while subjected to the stresses incident to traffic operation.

In Fig. 2, the wooden cross ties T are shown as disposed in spaced, parallel relation with the rails R extending longitudinally thereof. Each tie T is equipped with two of my novel tie plates P which are disposed, respectively, adjacent opposite ends of said tie and upon which the rails R are supported in the manner hereinbefore described.

In Figs. 6 and 7, metallic cross ties T' of I-beam configuration are utilized in lieu of the wooden ties T and the rails R are secured to those ties T' by bolts S' having the same office as the above described spikes S. As shown, the novel tie plates of my invention are utilized with the metallic cross tie arrangement of Figs. 6 and 7, said tie plates being disposed between the otherwise contacting metal surfaces of the cross ties and rails.

When metal cross ties are utilized, the sealing action of the rubber material to the spike S or bolt S' assumes less importance than with wooden cross ties. However, where non-yielding surfaces such as metal ties and metal rails are employed, it becomes extremely important to provide a flexible cushion between them and this, in accordance with the invention, is accomplished by the utilization of my novel tie plates.

It shall be understood that the invention is not to be limited to the utilization of either wooden or metallic material for the cross ties. Obviously, for this purpose, any other suitable material such as concrete, reinforced or otherwise, may be employed. Therefore, in the appended claims, the reference to a "supporting cross tie" shall be understood as generically comprehending or including the ordinary wooden cross ties, metal cross ties or supports, concrete supports, and equivalent rail supporting arrangements.

When the novel tie plates of my invention are secured by bolts S' to metallic or concrete cross ties, as distinguished from wooden cross ties, the passages *a* through the tie plates (including the passages through the metallic reinforcement M) may be smaller in cross-sectional area than that of the bolts S' so that said bolts are gripped by the tie plate in substantially the same manner as hereinbefore described in connection with the spikes S. However, as illustrated in Figs. 6, 7 and 8, in a more preferred arrangement, there is utilized a metallic sleeve N which is disposed longitudinally in each of the tie plate passages *a*, these sleeves being secured to the rubber tie plate material in any suitable manner. For example, the interior diameter of the passages *a*, including the passages through the metallic reinforcement M, may be somewhat smaller than the ex-

terior diameter of the sleeves N and therefore, said sleeves N are held in position by pressure of the rubber material.

The interior diameter of the sleeves N should be slightly greater than the exterior diameter of the bolts S1 whereby said bolts pass freely therethrough. The sleeves N are provided principally so as to insure that the reinforcing material shall not project into the tie plate passages *a*. If this should happen, free movement of the bolts S1 through the tie plate passages might be prevented and this, of course, would be objectionable.

In Fig. 7, I have shown a section of track which comprises the rails R1 and R2 disposed in abutting relation and secured together by plates U and bolts V, said rails being supported either by wooden, concrete or, as illustrated, I-beam steel cross ties T1, and said rails being secured to the cross ties by bolts S1. A tie plate P as constructed in accordance with my invention is disposed on the upper surface of each cross tie for the resilient support of the rails R1 and R2.

As illustrated, the joint between the rails R1 and R2 is disposed immediately above one of the cross ties T1 which, as stated, is cushioned by a tie plate P. Due to the resilient character of said tie plate, an arrangement of this character becomes practical and, therefore, in accordance with my invention, it is unnecessary to break joints between cross ties as customarily practiced in the prior art.

Under some circumstances, it may be desirable to provide a tie plate arrangement for each cross tie which comprises, for example, the usual metal tie plate of the prior art and one of the novel rubber ties plates as disclosed herein. For example, my novel tie plate may be disposed in engagement with the cross tie surface, the metallic tie plate being supported thereon, and the rail resting upon said metallic tie plate.

In view of all the foregoing, it becomes obvious that the utilization of my novel tie plates prevents wear and tear, to great extent, on railway rolling stock and roadbeds. Abrasion and decay of wooden ties at the spike holes is substantially prevented and shocks are taken up at points and crossings. Noise is greatly reduced in subway and elevated operation and there is more physical comfort for passengers. All of these and various other advantages are characteristic of my invention.

While the invention has been described with respect to certain particular preferred examples which give satisfactory results, it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended therefore in the appended claims to cover all such changes and modifications.

What is claimed as new and desired to be secured by Letters Patent is:

1. In a tie plate arrangement adapted to cushion the impact of a railroad rail on its supporting cross tie, a member formed from rubber-like material and having pre-formed openings through which are adapted to extend the respective elongated members securing the rail to its cross tie, the lateral dimensions of said openings being smaller than the lateral sectional area of said elongated members at their upper shank sections whereby the latter are tightly gripped by and sealed to said member.

2. In a tie plate arrangement adapted to cushion the impact of a railroad rail on its supporting cross tie, a member formed from rubber-like material and having pre-formed openings through which are adapted to extend the respective elongated members securing the rail to its cross tie, the lateral dimensions of said openings being smaller than the lateral sectional area of said elongated members at their upper shank sections whereby the latter are tightly gripped by and sealed to said member, and sheet-like reinforcing means disposed in the plane of said member and embedded in the rubber-like material forming the same, said reinforcing means substantially increasing the compressional resistance and the tensile strength resistant to spreading of said member when subjected to the weight of traffic.

THEODORE W. STEDMAN.