Oct. 15, 1940. R. T. SCHOLES 2,218,156

RAIL FASTENING MEANS

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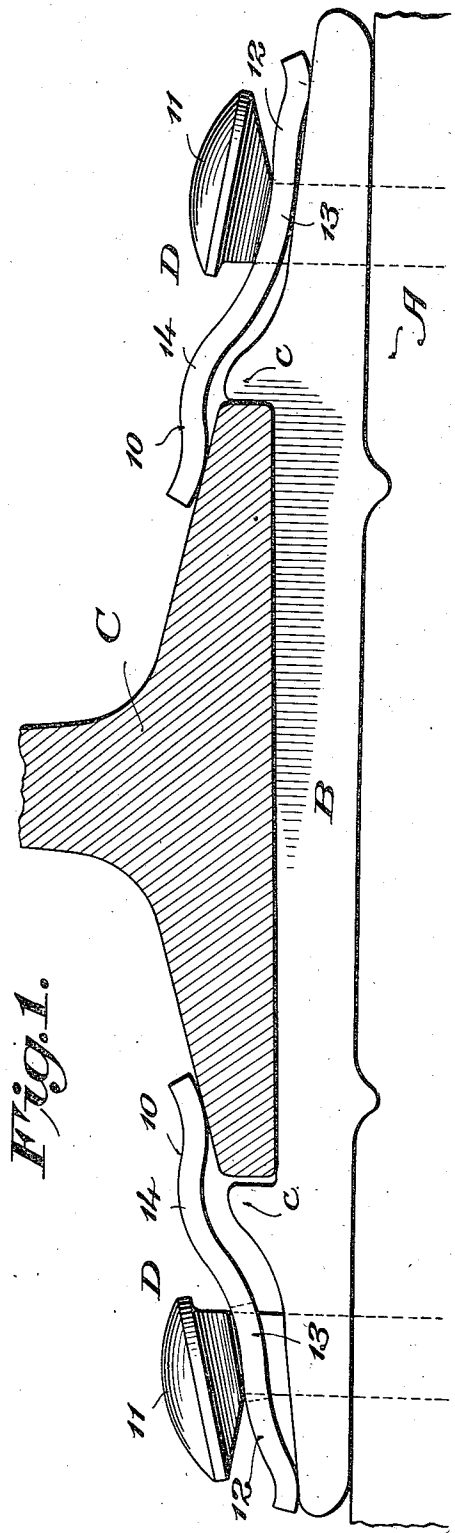


Fig. 1.

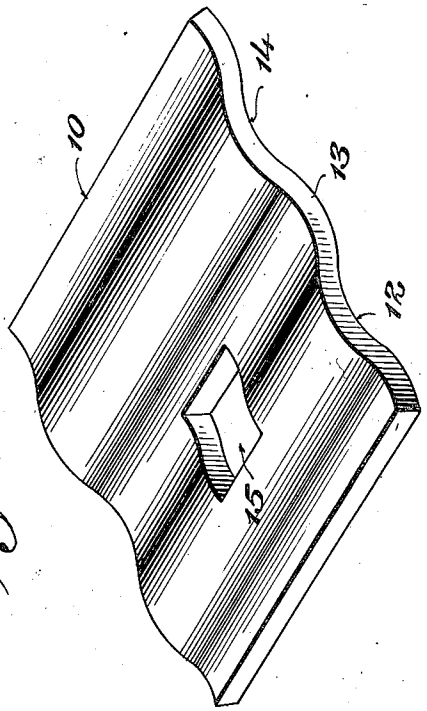


Fig. 2.

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Fig. 3.

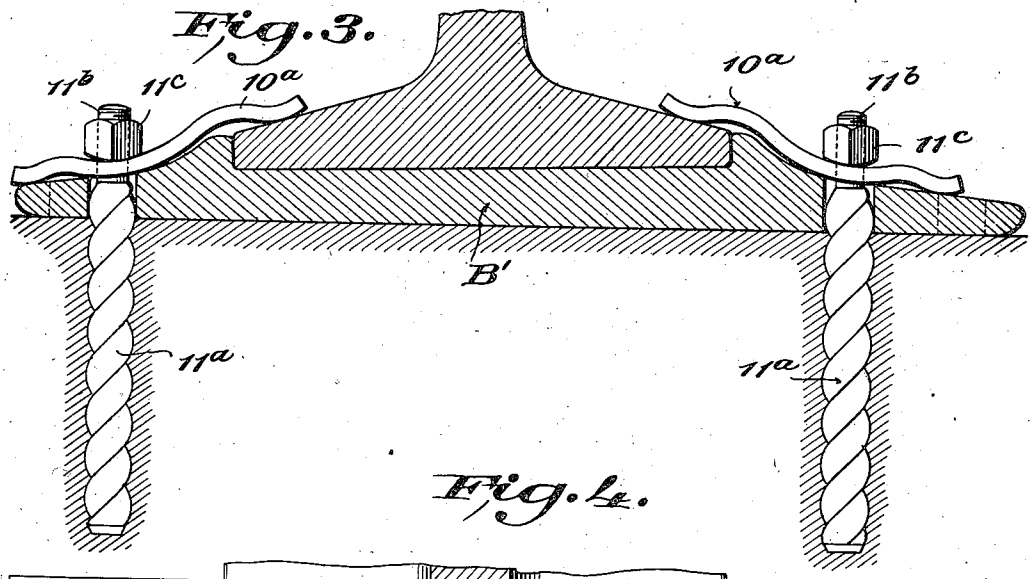
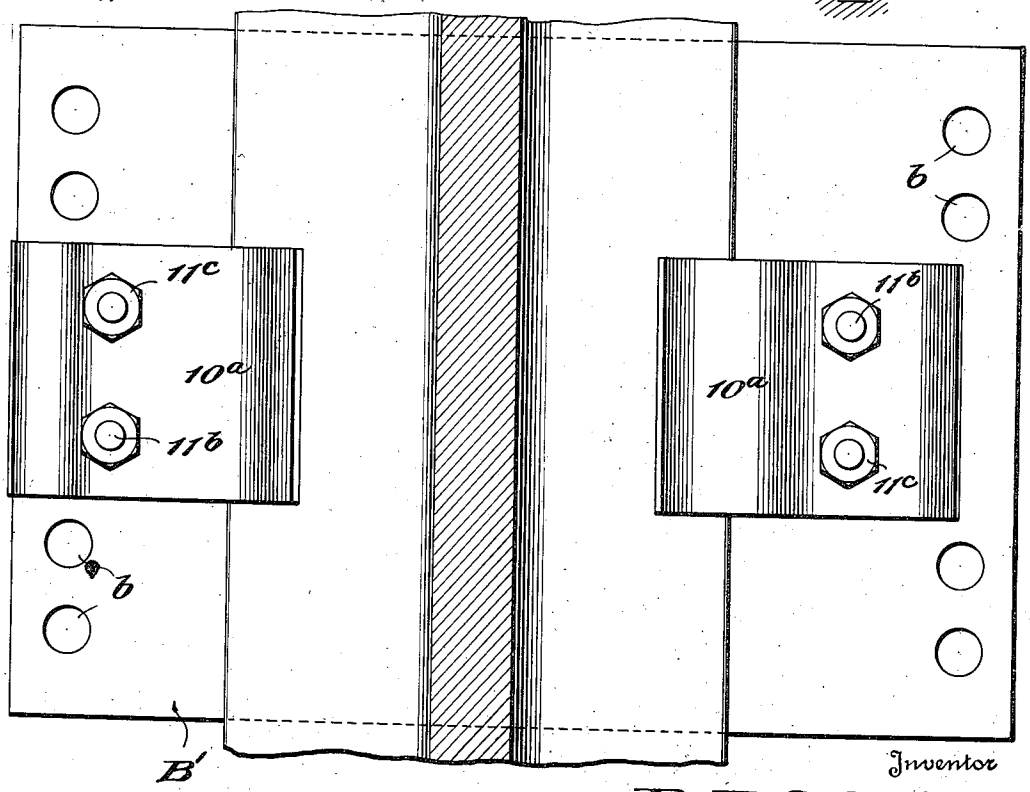


Fig. 1a.



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RAIL FASTENING MEANS

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Application July 12, 1939, Serial No. 284,122

3 Claims. (Cl. 238—349)

This invention relates to fastening means for railway rails, and has generally in view to provide an improved rail fastening means of the spring clip type adapted to be secured by a spike or lag-screw upon a tie or tie plate and having a resilient lip portion to overlie the rail flange and to resiliently retain the rail upon the tie or tie plate.

A special object of the invention is to provide a rail fastening means of the type mentioned in which the spring clip-member is formed not only to be flexed into resilient holding engagement with the rail flange by spike or lag-screw fastening of the same, but also to serve, following a predetermined amount of flexure thereof, as a stop to limit further penetration of the spike or lag-screw or other fastening means, whereby the latter may be driven or turned home without special regard to the holding force it exerts on the spring clip, and also whereby the spring clip has a predetermined amount of energy stored therein, to exert a predetermined, resilient holding force upon the rail, regardless of how tightly the spike or lag-screw is driven or turned home. Thus, expert attention to driving of the spike or turning of the lag-screw or unit, as the case may be, to assure exertion by the same of a definite amount of force upon the clip-member is not required, and all of any given number of the said clip-members, when securely fastened, will exert substantially equal holding forces upon the rail.

Another special object of the invention is to provide a rail fastening means of the type mentioned which is thoroughly reliable and highly efficient in service, and in which the rail retaining clip or clip-member is of exceedingly simple form and embodies a construction such that it may be produced at very low cost.

Another object of the invention is to provide an improved tie plate.

With the foregoing and other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in the features of novelty as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the accompanying drawings, wherein like characters of reference denote corresponding parts in the different views:

Figure 1 is a sectional view illustrating a rail and a pair of the present fastening means for holding same resiliently seated upon a tie plate, the clip-member of one of said fastening means being illustrated in the position it occupies just prior to having spring energy stored therein by spike securing of the same, and the clip-member of the other fastening means being illustrated in the position it occupies after storing of spring energy therein by spike securing of the same.

Figure 2 is a perspective view of the rail holding clip-member of one of the rail fastening means.

Figure 3 is a view similar to Fig. 1 illustrating an alternative embodiment of the invention; and

Figure 4 is a plan view of the Fig. 3 form of the invention.

Referring to the drawings in detail, first with particular reference to the form of the invention illustrated in Figs. 1 and 2, A designates a portion of a cross tie, B designates the tie plate seated upon the top of said cross tie, C designates the base portion of a rail seated upon said tie plate between the usual tie-plate shoulders *c*, *c* and D, D, designate the new rail fastening means of the present invention.

While a tie plate is illustrated in Fig. 1, the same is not essential to the use of the present invention. On the contrary, in lieu of employing a tie plate between the tie and the rail, the rail may be seated directly upon the tie. In that event those portions of the rail fastening means D that cooperate with a tie plate when the same is used, will cooperate directly with the tie. Moreover, in connection with any given tie, there may be used only a single one of the fastening means D disposed at either side of the rail, or any desired plurality of said fastening means disposed at either or both sides of the rail.

Each device or fastening means D, consists simply of a spring clip-member 10 and a fastener therefor, either in the form of a spike 11 as illustrated in the present instance, or, equivalently, in the form of a lag-screw or other suitable means.

The clip-member 10 may be of any suitable length, width and thickness and is inherently resilient, being formed and cut, for example, from spring steel plate or strip. By a rolling or pressing operation or in any other suitable manner it has imparted to it sinuous undulations, of the hill and valley type, which extend transversely thereof, that is to say, longitudinally with respect to a rail with which it is operatively associated. From a point near its outer end to a point spaced a suitable distance inwardly from its outer end the clip-member is arched as indicated at 12. Continuing inwardly from its arched portion 12 it is depressed or curved downwardly

as indicated at 13, and continuing inwardly from its depressed or downwardly curved portion 13, it again is arched as indicated at 14, the arched portion 14 extending to, or nearly to, its inner end. In other words, said clip-member 10 is medially depressed and, inwardly and outwardly of its medial depression, is arched, its depressed and arched portions merging gradually into one another. In the normal or unflexed condition of said clip-member the bottom face of its medial, depressed portion 13 may be disposed either in or above or below a plane including the bottom faces of its inner and outer end portions, but if the bottom face of said medial, depressed portion 13 is disposed below said plane, it should not be disposed so far therebelow as to contact with the upper face of the tie plate, or the tie, as the case may be, when the clip-member is disposed on a slope or canted, as illustrated in Fig. 1, with its inner end portion or lip seated upon the upper face of the rail flange and its outer end portion seated upon the tie plate, or the tie, as the case may be, at a point outwardly of the outer edge of the rail flange. In other words, in the normal, unflexed condition of the clip-member 10, the bottom face of its intermediate depressed portion 13 is spaced above the upper face of the tie plate, or the tie, as the case may be, when said clip-member is positioned on a slope or canted, as stated. This phase of the invention, that is, the spacing of the clip in its normal unflexed condition above the face of the tie plate, refers to what has been previously termed a predetermined amount of flexure in the clip. In further explanation of this important part of the invention it is to be noted that the spring clip must be so proportioned that, after taking into account its length, width, thickness, the physical properties of the steel of which it is made, section modulus, moment of inertia, modulus of elasticity, etc., the clearance between the clip and the tie plate at the center of flexure of the clip must be such an amount that when the fastening means is driven home and the intermediate portion of the clip comes in solid contact with the tie plate, there results a certain definite predetermined spring pressure on the rail flange. Therefore, in carrying out the main object of the invention of providing rail clips for track having predetermined spring holding pressure upon the rail a necessary and contributing factor is that of the predetermined clearance in the unflexed condition of the clip between the clip and the tie plate so that the clip has a definite flexure of definite extent of movement from its unflexed condition to its point of contact with its stop element, namely, the tie plate.

Formed partly through the hill or arch 12, and the medial, depressed portion 13 of the clip-member 10 is a hole 15 to accommodate the shank of either a spike 11 or a lag-screw. In order to obtain the results indicated and to provide for a cantilever action the spike hole is so disposed in the said depressed stop portion 13 of the clip that the center of flexure is at the point where the spike is applied and therefore practically is in the plane of the vertical center of the spike, and the most practical results have been obtained by having the said spike hole arranged eccentric in the plate, that is, to one side of the transverse center of the plate and nearer to the outer end of the plate than toward the inner edge of the plate which overlies and engages the rail flange. Whether a spike or a lag-screw is used to fasten the clip-member 10 to the tie, it is apparent that, due to the bottom face of the medial, depressed portion 13 of the clip-member being spaced above the upper face of the tie plate or tie, as the case may be, driving home of the spike or turning home of the lag-screw or nut, will result in downward flexure of the medial portion of the clip-member. It will be equally apparent that downward flexure of the medial portion of the clip-member will result in the storing of spring energy in the clip-member tending to urge its end portions downwardly. Consequently, the inner end portion or lip of the clip-member will exert a resilient holding force downwardly upon the rail flange.

The clip-member 10 can be flexed downwardly only until the bottom face of its intermediate portion 13 contacts with the upper face of the tie plate or tie as the case may be, and when the clip-member has been flexed this amount or distance its said portion 13 acts as a stop to limit further penetration of the spike or lag-screw, as is evident from the illustration at the right hand side of Fig. 1. In this operation the outer arch or hill of the clip-member flattens and in so doing increases the downward spring pressure of the inner end or lip on the rail flange. Consequently, expert attention to driving of the spike or turning of the lag-screw or nut is not required. On the contrary, the spike, or lag-screw, or nut, as the case may be, simply is driven or turned until it is tight, which results when the portion 13 of the clip-member 10 has been depressed, against the resistance of the outer arch or hill 12, into engagement with the top face of the tie plate or tie, as the case may be. Therefore, it will be observed that with the eccentric arrangement of spike hole, as shown and described, which disposes the center of flexure at the point where the spike is applied, the major part of the spring action involved is provided for by that part of the spring clip plate between the inner edge of the spike hole and the outer edge of the plate.

The dimensions and resiliency of the clip member 10 may be predetermined so that when it is disposed in operative relationship to a rail and its medial portion is depressed into solid engagement with the tie plate, or tie, its inner end portion or lip exerts a predetermined spring holding force downwardly upon the rail flange. Thus, all of any given number of the clip-members 10, when operatively applied, will exert substantially equal holding forces upon the rail, which is highly desirable.

Referring now to Figs. 3 and 4 of the drawings, it will be observed that the combination of parts is the same as in the form of the invention illustrated in Figs. 1 and 2, but that, instead of ordinary spikes or lag-screws being employed as fastening means for the resilient clip-members, designated as 10^a, ribbed holding studs 11^a, preferably of a spirally twisted or threaded type, are driven or threaded into holes in the tie and have threaded upper end portions 11^b which extend through the fastener holes in the clip-members 10^a and have threaded thereon, above said plates, nuts 11^c for drawing said clip-members downwardly to operative positions as described in connection with the Figs. 1 and 2 embodiment of the invention. Of course, only a single holding stud and nut, or any desired plurality of studs and nuts, may be employed to fasten any clip-member 10^a.

A special feature of the form of the invention illustrated in Fig. 4 is the provision of a number of fastener or spike holes b in the tie plate B' in

addition to the holes in the clip-members that accommodate the studs 11a. There may be any desired number of the fastener or spike holes b located wherever desired, but preferably said holes are located near the outer ends of the tie plate to either side of the longitudinal center thereof. In the present instance there are illustrated two holes b at each side of the longitudinal center of the tie plate B' adjacent to each end thereof. These holes may be square or round but preferably are round to accommodate round spikes.

In straight stretches of track the fasteners for the clip-members 10a ordinarily will amply suffice to hold the tie plates upon the ties, but in any instance where additional fastenings for the tie plates are needed or desired, as, for instance in curved sections of track, additional spikes may be driven through any or all of the holes b.

The old-fashioned cut spike of square cross section, chisel point and large head was designed to be driven into a tie and to have its head bear on the rail flange to hold the rail against the tie, or against the tie plate, as the case might be. However, with the advent of rail clips, there no longer is any necessity for the use of chisel-point, square-shank, large head spikes, which inherently are disadvantageous for various reasons, principal among which may be mentioned their high production cost as compared with round-shank spikes or nails and their tendency to badly split and spike-kill ties. Small round-shank spikes have more holding power per pound of metal, are cheaper and easier to manufacture and comparatively have little tendency to split or spike-kill ties. Accordingly, the holes b are, as aforesaid, preferably round to accommodate any desired number of round-shank spikes within practicable limits as holding means for the tie plates in addition to the fasteners for the rail clips in any instance where additional fasteners for the tie plates are desired.

In locating the spike holes b adjacent to the outer ends of the tie plate, advantage is taken of the space along the end margins of the tie plate where its bearing value on the tie is quite low because of the tendency of the plate to curl up under load. Moreover, providing the holes b in the tie plate near the ends of the latter effects a saving in metal where the removed metal, if not removed, would have little or no value and has the further advantage that it tends to prevent sliding of the tie plate on the tie even in instances where additional spikes, driven through said holes, are not employed. A small area has more bearing power per square inch than a larger area. Because of the holes b the tie plate B', has a lesser bearing upon the tie than a tie plate of equal length and width devoid of holes such as the holes b. Consequently, the plate B' has more bearing power per square inch upon the tie than an ordinary tie plate. As a result the tie is compressed around the areas underlying the holes b and in line with said holes the wood of the tie more or less enters said holes, thus locking the tie plate against sliding relative to the tie. To a lesser extent the same action occurs at the margins of the tie plate.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will, of course, be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

I claim:

1. Rail holding means comprising in combination with a rail and its support, a resilient spring clip and fastening means cooperating between said spring clip and the said rail support whereby said spring clip is securely held to said rail support, the spring clip having inner and outer flexing end portions which contact, in working position, respectively with the rail flange and with the rail support, and also having at the point of application of the said fastening means an intermediate flexing portion forming at its underside a stop element adapted, upon downward application of said fastening means, to be moved into a full stop engagement with the rail support whereby the spring clip will thereupon exert a predetermined amount of downward spring pressure upon the rail flange, and also upon the rail support.

2. Rail holding means comprising in combination with a rail and its support, a resilient spring clip and a fastener therefor, the said spring clip formed of a single plate of spring metal and having a flexible inner end portion overlying and engaging the rail flange, an outer flexible outer end portion overlying the rail support, and a flexible intermediate portion, between said flexible inner and outer portions, constituting the center of flexure of the clip and which in its unflexed and unstressed condition has a predetermined clearance from the rail support, the said center of flexure of the clip being substantially coincident with the center of the point of application of the fastening means whereby upon downward application of said fastener and the downward flexing of the intermediate portion of the clip until it comes to a full stop on said rail support the spring clip thereupon exerts a predetermined amount of downward spring pressure upon the rail flange and upon the rail support.

3. Rail holding means comprising in combination with a rail and its support, a resilient spring clip and a fastening spike therefor, the said spring clip formed of a single plate of spring metal and having a flexible inner end portion overlying and engaging the rail flange, an outer flexible outer end portion overlying the rail support, and a flexible intermediate portion, between said flexible inner and outer portions, apertured to receive the fastening spike and constituting the center of flexure of the clip and which in its unflexed and unstressed condition has a predetermined clearance from the rail support, the said center of flexure of the clip being substantially coincident with the center of the point of application of the fastening spike whereby upon downward application of said fastening spike and the downward flexing of the intermediate portion of the clip until it comes to a full stop on said rail support the spring clip thereupon exerts a predetermined amount of downward spring pressure upon the rail flange and upon the rail support.

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