

UNITED STATES PATENT OFFICE.

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SPRING-RAIL RAILWAY-FROG.

SPECIFICATION forming part of Letters Patent No. 462,296, dated November 3, 1891.

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To all whom it may concern:

Be it known that I, NATHANIEL W. BOYD, a citizen of the United States, residing at Carlisle, in the county of Cumberland and State of Pennsylvania, have invented certain new and useful Improvements in Spring-Rail Railway-Frogs; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to improvements in spring-rail railroad-frogs, which will be hereinafter fully explained.

In railway-frogs of that class which employ a spring-rail arranged normally in contact with the point of the frog there is very little or no liability of accidents in running through the frog in the direction indicated by the arrow 1; but when a train moves in the reverse direction (indicated by the arrow 2) the spring-rail is liable to be moved away from the point of the frog by "false flanges" on the drive-wheels, which are formed by such wheels becoming worn or concaved on the tread, the false flanges of the drive-wheels fitting in the space between the frog-point and spring-rail between the points 3 4, (indicated in the drawings,) and operating to move the spring-rail away from or exposing the point, thus allowing the drivers and wheels to drop down upon the ties and cause the accident. In my improved frog for railway-rails I obviate this difficulty by dropping or lowering the top surface of the spring-rail or elevating the body of the frog above the spring-rail a distance sufficient to compensate for the depth of the false flanges on the drivers or wheels, so that the false flanges will not penetrate or fit into the space between the frog-point and spring-rail; but the drivers and wheels pass readily over the frog-point onto the spring-rail, and the false flanges thereafter bear against the outside of the spring-rail and have a tendency to clamp or force the spring-rail against the frog-point. The point of the frog adjacent to the spring-rail is beveled or inclined on its top surface, so that there is a gradual slope from the elevated part of the frog-point to the spring-rail, to enable the car-wheels and drivers to pass readily from the frog-point to the spring-rail without appreciable or undue jarring

motion, and the point-rail adjacent to the spring-rail is stiffened and braced by a re-enforcing plate bolted to the web of such point-rail. As the train passes from the point-rail onto the spring-rail the weight of the train, when the drivers and wheels pass over the spring-rail at about the point 5, has a tendency to throw the free end of the spring-rail upwardly; and to overcome this objection I provide means which operate to confine the free end of the spring-rail in its normal position relatively to the body of the frog, and at the same time permit the spring-rail to have the necessary movement or play laterally to the frog-point. One embodiment of this means comprises a reinforce-plate bolted to the web of the spring-rail, and having the end thereof adjacent to the free end of the spring-rail bent downward and inward to form a guide that extends underneath the body of the frog. This guide operates to prevent the free end of the spring-rail from jumping or lifting up when the weight of a car is imposed on the spring-rail, and it enables the spring-rail to have the necessary play laterally to the frog-point. I also contemplate a novel form of spring-rail bridle designed to prevent the spring-rail from "creeping" or gradually shifting its position in relation to the frog-point when acted on by the false flanges of the drivers and wheels, which bridle is doubled or bent around a block or casting, and the bridle is confined in place on the stiff rail by a bolt which passes through the casting, the end of the bridle, and the web of the stiff rail, the block or casting serving in a measure to clamp the bridle to the web of the stiff rail and thus more firmly secure the bridle in place. The other end of the spring-bridle extends along the web of the spring-rail to a point near the point-rails, and it is united to the spring-rail by a bolt which passes through the bridle, the web of the spring-rail, and the re-enforce thereof.

My invention further consists in the combination and organization of devices and detailed construction of parts, as will be more fully pointed out hereinafter.

To enable others to readily understand my invention, I have illustrated the same in the accompanying drawings, in which—

Figure I is a plan view of my railway-frog. Fig. II is a side elevation thereof. Fig. III is

an enlarged sectional view taken horizontally through the webs of the stiff rail and the spring-rail, the spring-bridle, and the block or casting. Fig. IV is a vertical transverse sectional view on the plane indicated by the line *a a* of Fig. I. Fig. V is a similar sectional view on the line *b b* of Fig. I. Fig. VI is another sectional view on the line *c c* of Fig. I, and Fig. VII is another sectional view on the line *d d* of the same figure. Fig. VIII is a view in side elevation of one of the point-rails of the frog.

Like letters and numerals of reference denote corresponding parts in the several figures of the drawings.

A designates the spring-rail; B, the stiff rail, and C D the point-rails, which are inclined to meet each other and form the point of the frog, all of these rails being arranged in the manner familiar to those skilled in the art to provide a frog which bears a resemblance similar to the ordinary spring-rail frog. These rails rest upon and are supported by one or any desired number of plates E, two of which are shown in the accompanying drawings, although the number can be varied as deemed necessary or desirable.

The point-rails C D or body of the frog are elevated slightly above the spring-rail A, or the spring-rail may be depressed somewhat below the frog-point, so that the upper surface of the spring-rail lies in a horizontal plane below the top surface of the body of the frog to an extent equivalent to the depth of the false flanges on the drivers or wheels and thus prevent the false flanges from forcing between the spring-rail and the point-rail D. I prefer to place the spring-rail directly on the plate E and to interpose a plate *e* between the point-rails and the plate E to elevate the point-rails slightly, as shown in the sectional view, Fig. VI, of the drawings. The difference between the height of the point-rails and spring-rail may be from one-fourth ($\frac{1}{4}$) of an inch to three-eighths ($\frac{3}{8}$) of an inch; but these proportions are not essential, as it is sufficient for the purposes of my invention that the spring-rail is low enough below the point for the false flanges on the drivers and wheels of a train to pass from the point-rails upon the spring-rail without penetrating between the rails D and A. The top or upper surface of the point-rail C, or the two point-rails C D, may slope or incline slightly for a short distance as the point-rails approach the spring-rail, as indicated at *f f'* in Fig. VIII, and thus insure the car-wheels passing readily from or to the spring-rail without appreciable jar or undue strain and wear on the rails.

By constructing and arranging the point-rails and spring-rail, as herein shown and described, I am enabled not only to prevent lateral displacement of the spring-rail by the action thereon of the false flanges, and to insure the safe transit of the car-wheels without undue jar, but I am also able to utilize the false flanges on the drivers and wheels to

force or clamp the spring-rail laterally against the frog-point after the false flange has passed the point of danger.

The spring-rail is held tightly against the frog-point by the tie-rods and springs G G' and H H', which are utilized in addition or auxiliary to the tension or elasticity of the spring-rail itself. The tie-rod and springs G G' lie at a short distance in advance of the frog-point, and said rod G passes through the webs of the spring-rails and its headed ends receive the coiled springs G' G', which are inclosed within the cases or shells *g g*, also fitted on the tie-rod and held in place by fitting against the outer sides of the stiff and spring rails, as usual. The other tie-rod H has a head *h*, which bears against the outer side of the web of the stiff rail B, and said tie-rod H passes through the webs of the stiff rail B, the point-rails C D, and the spring-rail A, the other end of the tie-rod receiving the coiled spring H', which is inclosed within the shell or case *h'*, and confined in place by the nuts *h''*, fitted on the end of said tie-rod H. (See Fig. VI.) I also employ a spring-bridle I for preventing the spring-rail from creeping or gradually shifting its position longitudinally away from the frog-point when acted on by the false flanges on the drivers or wheels of the train. The spring-bridle I is clamped or held in place rigidly to the web of the stiff rail B by means of a block or casting J arranged between the stiff and spring rails and in the horizontal plane of the webs of said rails. The one end of the spring-bridle is doubled or bent around the block or casting and fitted between said block and the web of the stiff rail. The other end of the spring-bridle is extended along the web of the spring-rail to a point near the extremity of the point-rails C D, where said end of the spring-bridle is fastened or secured to the spring-rail by a bolt *j'*, (see Fig. III,) which passes through the bridle, the web of the spring-rail, and the re-enforce presently described. The block or casting in addition to bracing or strengthening the connection of the spring-bridle to the stiff rail performs the function of a guard in preventing a man's foot getting caught in the space between the stiff and spring rails, and I provide another guard-block K between the two point-rails C D for the purpose of preventing a foot from being caught between the point-rails of the frog, said guard-block being suitably bolted to the point-rails.

I' is the re-enforce to the free end of the spring-rail, which is applied laterally against the web of said spring-rail on the outer side thereof and bolted through the web by suitable bolts. This re-enforce has its end adjacent to the free or unconfined end of the spring-rail bent downward or inward under the rails or body of the frog to form a guide or detaining arm M, which is carried by or movable with said free end of the spring-rail; but I do not restrict myself to making this detaining-arm M in one piece with the re-en-

force, as it is evident that said arm can be made separate from the re-enforce and rigidly fastened to the unconfined end of the spring-rail. This detaining or guide arm M closely embraces the foot of the spring-rail and extends under the point-rails C D, against the lower side of which said arm bears or impinges, and the detaining-arm operates to prevent the free end of the spring-rail from lifting or moving vertically under the influence of the weight of the train when the drivers and wheels pass the point 5 on the spring-rail, and at the same time the detaining-arm permits the spring-rail to have the necessary play or movement laterally to the frog-point. As a further precaution against upward play or spring of the spring-rail under the weight of a train I employ the keepers N N', which are fixed to the bottom of the spring-rail and engage with the plate E by slide-joints to permit the spring-rail to have the necessary lateral movement and prevent upward play of said spring-rail. These keepers are bolted or otherwise suitably fastened to the foot of the spring-rail, and they are bent or curved to take under the fixed supporting-plate E in the manner shown in Fig. II.

To brace and strengthen the frog-point at its weakest point where the drivers and wheels pass from the point-rails to the spring-rail, or vice versa, I provide a re-enforce O, which is bolted laterally to the point-rail C and bears against the web of the said rail.

The usual keepers P are provided on the plates E, laterally of the rail A, to limit the outward movement thereof from the frog-point, and the point-rails are fastened to the stiff rail by the keyed bolts O'. (Shown in Figs. I and V.)

The operation and advantages of my improvements will be readily understood and appreciated by those skilled in the art from the foregoing description taken in connection with the drawings.

I am aware that changes in the form and proportion of parts and details of construction of the mechanism herein shown and described as an embodiment of my invention may be made, and I would therefore have it understood that I reserve the right to make such modifications as fairly fall within the scope of my invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A spring-rail railway-frog having its point beveled or inclined on the upper surface thereof, the spring-rail having its upper surface lying in a different horizontal plane relatively to the upper surface of the body of the frog, and the re-enforce united rigidly to the web of the spring-rail below the head thereof, combined with the detaining devices M N', operating in conjunction with said spring-rail and a base-plate, substantially as described.

2. In a spring-rail railway-frog, the combination, with a spring-rail, of a plate rigid with said rail and having its free end bent or twisted to project under the body of the frog, substantially as described.

3. In a spring-rail railway-frog, the combination, with a spring-rail, of the re-enforce having its end bent or twisted to form a detaining-arm, which extends from the spring-rail under the point-rails of the frog, substantially as described.

4. In a spring-rail railway-frog, the combination, with a spring-rail, of a re-enforce bolted laterally to the web of the spring-rail, and the detaining-arm rigid with the re-enforce which is carried by the unconfined end of the spring-rail and operating under the point-rails of the frog, substantially as described.

5. In a spring-rail railway-frog, the combination, with a spring-rail, of a re-enforce bolted to the web of the spring-rail and having its free end formed into a detaining-arm which extends beneath the point-rails of the frog, substantially as described.

6. In a spring-rail railway-frog, the combination, with the point-rails, the spring-rail, and the bed-plate, of the re-enforce having the detaining-arm carried by the spring-rail and operating beneath the point-rails, and the sliding keepers fixed to the spring-rail and engaging the bed-plate, substantially as described.

7. In a spring-rail railway-frog, the combination, with the spring-rail and the stiff rail, of the block united to the stiff rail, and the spring-bridle having one end confined between the stiff rail and the block, and its other end fastened to the spring-rail, substantially as described.

8. In a spring-rail railway-frog, the combination, with the spring-rail and the stiff rail, of the block or casting, the spring-bridle having one end doubled or bent around said block or casting and fitted between said casting and the stiff rail, and a bolt or bolts which unite the spring-bridle and casting to the stiff rail, the other end of said spring-bridle being fastened to the spring-rail, substantially as described.

9. In a spring-rail railway-frog, the stiff rail, the spring-rail, the point-rails, the block or casting between the spring and stiff rails, and serving as a guard, the spring-bridle having one end clamped between the stiff rail and casting and its other end fastened to the spring-rail, and the guard-block fixed between the point-rails, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

NATHANIEL W. BOYD.

Witnesses:

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