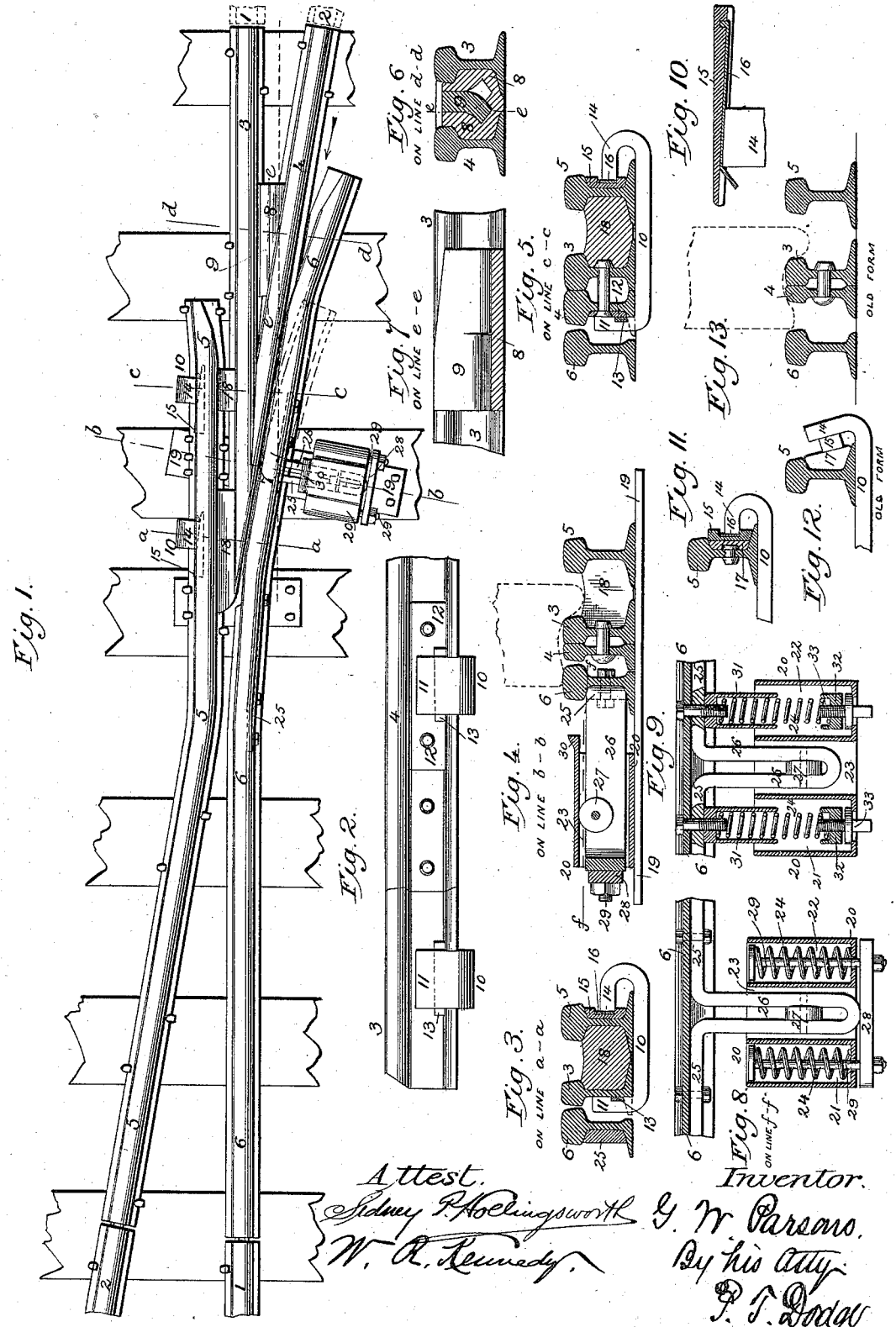
(No Model.)

G. W. PARSONS.

RAILWAY FROG.

No. 385,066. Patented June 26, 1888.



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RAILWAY-FROG.

SPECIFICATION forming part of Letters Patent No. 385,066, dated June 26, 1888.

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To all whom it may concern:

Be it known that I, GEORGE WELLMAN PARSONS, of Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain Improvements in Railway-Frogs, of which the following is a specification.

My invention relates more particularly to that form of railroad-frogs commonly called "spring-frogs," in which one of the wing-rails of the frog is movable and normally lies close against the point of the frog to support the wheels passing on the main-line track and save them from the jar and concussions that the wheels receive when crossing the throat or flangeway of the ordinary frogs.

The object of my invention is to prevent the strains and jars caused by the worn and guttered wheels of locomotives passing over the frog from heel to point by providing a filling-piece between the rails of the point of the frog with an inclined surface, upon which worn and guttered wheels that have a portion of the tread lower than the worn portion on which the wheel usually rolls may be brought up more gradually to the height of the surface of the point; further, to prevent wheels in the condition and moving in the direction above referred to from crowding the spring-rail away from the point of the frog and causing derailments; further, to provide more efficient means of holding the spring-rail against the point of the frog and guiding its vibrations both vertical and lateral; further, to provide improved clamping devices for binding together the fixed part of the frog.

In the accompanying drawings, Figure 1 is a top plan view of my frog. Fig. 2 is a side elevation of the "point." Figs. 3, 4, 5, and 6 are respectively cross-sections of the frog on the lines indicated. Fig. 7 is a longitudinal section on the line *e e*. Fig. 8 is a section of the spring-box on the line *f f*, Fig. 4. Fig. 9 is a cross-section of a modified form of the spring-box. Fig. 10 is a longitudinal section of the locking-wedge, showing the steel lining. Fig. 11 is a cross-section of a modification of the rail-clamp. Fig. 12 is a cross-section of the old form of clamp. Fig. 13 is a diagram showing how trains are derailed by the old form of spring-frog.

Referring to the drawings, 1 1 represent one rail of the main-line track, and 2 2 one rail of a turn-out or siding. As will be seen on referring to Fig. 1, the track-rails 1 and 2 on the right are fastened in the usual manner to two short rails, 3 4, which, converging, are suitably fitted together to form what is usually termed the point of the frog. Adjacent to the point of the frog is a wing-rail, 5, which is bound to the point with suitable clamps, and extends as a guard a considerable distance back of the end of the point of the frog, suitable distance-pieces or filling-blocks being placed between the point of the frog and the wing-rail 5. The wing-rail is maintained at the required distance from the throat or flangeway, and then bends outward and continues in line with the opposite rail, 3, of the frog-point.

The spring-rail 6 for the greater portion of its length is in line with the main-line track, but bends immediately in front of the point of the frog and then extends along the side of the point, being made of a shape and length to fit closely to the point (from point to heel) until the width of the point of the frog exceeds the width of the tread of the widest wheel which may be expected to pass over the frog, and then bends or inclines from the point to admit the flange of the wheel to open the frog when a train is traveling on the turn-out.

The spring-rail 6 is fastened in the usual manner to the main-line rail 1 on the left, but is free to slide in a sidewise direction when force is applied, being kept to place by springs.

The foregoing parts are common to frogs such as are now known.

It is well known that locomotive-wheels are frequently found to have on the "tread" or periphery a groove worn into the tread at the place usually in contact with the rails near the flanges, so that the outer surface of the tread has acquired a form similar to a flange, frequently termed the "extra flange," and when the wheels are resting on rails of usual width it hangs over and extends lower down than the surface of the rail, so that when such wheels come to frogs or switches where they must pass over parts much wider than an ordinary rail such worn wheels inflict considerable wear and injury.

On double-track railroads a large proportion of the frogs are used in "cross-overs," (a term applied to an arrangement of two switches and two frogs with suitable cross-rails, by which a

train may be transferred from one track to the other,) and the common practice is to place the cross-over switches, &c., so that trains moving in the usual directions on the main tracks will run trailing over the switches—*i. e.*, from heel toward point—thus avoiding dangers from slight inaccuracies in the position of the points of the split switches, which would be dangerous if trains were running "facing" or against the points. As such cross-overs are often placed at frequent intervals and between stations where the trains should move at maximum speed, the spring-rail frogs are preferably used, and it becomes specially important to render them more safe and durable. When used in such cross-overs most of the wheels come to the frog "trailing," and the extra flanges above mentioned come abruptly against the inside edge of the turn-out side of the frog-point and tend to spread open the point and loosen the fastenings by which the rails composing the point are bound together.

In my improved frog I insert a block, 8, between the point-rails 3 and 4, making it preferably of a tapering form to fit the tapering space between the point-rails 3 and 4, with a portion of the surface level and even with the top surface of the point-rails and the remainder of its surface sloping and inclined toward the heel of the frog, so as to present an incline upon which the extra flanges may be guided and carried to the height of the level of the point-rails, and thus avoid the shock occasioned when such extra flanges come abruptly against the side of the point-rail. The block 8 may be of one or more pieces for economy of production, preferably of cast metal, steel being preferred for durability. To secure durability with least cost I use cast-iron with an inserted piece, 9, of steel, usually made from a bar, the lower edge cut and bent in opposite directions, as shown in Figs. 6 and 7, which is placed in the mold and cast-iron poured around it, by which I am able at small cost to make the blocks to fit the space properly and have the requisite durability on the surface.

This improvement is useful to increase the durability of all frogs, whether made with a spring-rail or otherwise. In such constructions but a small proportion of the point has the spring-rail against it, the common form being shown by dotted lines in Fig. 1, beginning at or near a point marked 7, leaving a space between the spring-rail and the point opposite that part of the point which is narrower than the gutters or grooves in some of the worn wheels.

Referring to Figs. 1, 4, and 13, it will be seen that in the spring-rail frogs as heretofore constructed it has been customary to make the spring-rail of the same length as the stationary wing-rail, bending and forming the end into a curved and deflecting portion suitable in form to be actuated by the backs of the flanges of the wheels going from the turn-out onto the main line, as they pressed and crowded the spring-rail away from the point, permitting the flanges of the wheel to crowd by the point. In such frogs the spring-rails were in contact with only a short portion of the point of the frog, as shown in dotted lines in Fig. 1, beginning at or near the point marked 7. Therefore opposite to a portion of the point, which was narrower than the groove or gutter worn into some locomotive-wheels, a space was left where such worn wheels had no support; but the point of the frog and the extra flange would of necessity be below the surface of the point and the spring-rail, and when the train was proceeding in the trailing direction the tendency would be to crowd away the spring-rail, the edge of the wheel continually crowding and pressing the spring-rail away from the point until the wheel finally mounted the spring-rail and rolled over it, or, failing to do this, the spring-rail would be altogether pushed away, and when the wheel arrived at the end of the point it dropped to the ground and wrecked the train. With the locomotive-wheels in reasonably good condition the wheels would always pass over in safety, and such an accident has therefore seldom occurred, but, nevertheless, has occurred so frequently on some railroads that it was deemed best to abandon the use of spring-rail frogs and submit rather to the increased expense attending the more rapid wearing and destruction of ordinary frogs. By my improvement such accidents are entirely prevented, and all wheels of whatever width or condition are carried safely over the frog.

The wing-rail 5 and the point are firmly secured together by clamps 10, such as are shown in Figs. 1, 2, 3, and 5. These clamps may be made of heavy iron or steel, flat and sufficiently broad to afford a firm bearing on the rails. The inner end, 11, is turned up at right angles and bears against the web of the rail between the point and spring-rail 6, the flange being cut away to allow the clamp to come up squarely against the web, as shown in Figs. 2 and 3; or a filling-plate, 12, may be riveted to the web on which the clamp bears, as shown in Figs. 2 and 5. Steel keys 13 are inserted in grooves cut in the inner faces of upturned ends 11, as shown, which bear on the flange of the rail and prevent the clamps from being jarred or forced down out of place. The opposite end, 14, of the clamp is turned up and back on itself in a ⊃ form, as shown, the face or end near the rail finished square or inclined, as desired, and a wedge, 15, such as shown in Figs. 3, 5, 10, and 11, driven between the web of wing-rail 5 and the end 14 of the clamp. The wedge has a steel filling-piece, 16, inserted in one face, held in place by a lug at one end entering a recess in the wedge, as shown. The other end is free to be turned out against the end 14 of the clamp when driven to place, as shown in Fig. 10.

The wedge, as shown in the several figures, is grooved or recessed to a greater depth than

the thickness of the filling-piece 16. This extra depth of slot affords a bearing at the lower side for the end 14 of the clamp, as shown in Figs. 3 and 5. A weight or pressure from above—such as a wheel of a derailed car—is not liable to open the clamp, as in the old form of clamp, (shown in Fig. 12,) the wedge forming a support for the same.

If desired, a filling-block, 17, may be inserted between the rail and wedge, as shown in Fig. 11. Blocks 18 are inserted in the throat or space between the point and wing-rail 5, preserving the proper distance between the parts, and as distance-pieces receive the strain of the clamps. The spring-rail 6 being free to move and connected only at the rear end to the rail 1, a wheel passing over the frog on the spring-rail in front of the point has a tendency by the springing down of the rail to cause the end of the spring nearest the heel of the frog to spring up. Various devices have been employed to overcome this tendency; but I provide an arm riveted to the spring-rail 6, sliding under and bearing against a keeper or guide-casing rigidly secured to keep the end from rising.

Referring to Figs. 1, 4, and 8, beneath the frog a suitable distance from the forward end I spike to the ties or timbers a plate, 19, to which is secured in any suitable manner a guide-casing or keeper, 20, made in any form desired, a convenient one being shown in the drawings. In this form I divide it into three compartments, 21, 22, and 23—21 and 22 for the springs 24, and 23 in the center for the retaining-arm to prevent lifting. Along the outer side of the web of the spring-rail I secure, by bolts, rivets, or in any suitable manner, a long bar, 25, of flat or other form, with an arm, 26, (formed by looping the bar,) extending out at nearly right angles and entering the division 24 of casing 20, and serving as a retaining-arm. An anti-friction roller, 27, attached to the arm, bears on the upper side of the casing to reduce friction.

On referring to Figs. 1, 3, 4, and 5, it will be seen that the flange of the spring-rail has been cut away to allow it to approach and lie in contact with the point. This cutting away impairs the strength of the rail both vertically and horizontally. By extending the bar 25 beyond where the flange is cut away it serves to greatly strengthen and re-enforce the rail.

The loop or bend 26 of the bar projects from the outer end of the guide or casing 20 and bears against a yoke, 28, to the ends of which are attached bolts 29, which engage one end of the spiral springs 23, which surround the said bolts and bear against the outer ends of the guide-casing. The upper side of the casing 20 is shaped, as shown at 30, to serve as a limit bearing or stop for the rail when forced over by the wheels.

When a car or train on the turn-out is moving in the direction of the arrow, or vice versa, the backs of the wheels on the rail 4 press against spring-rail 6, forcing it outward and compressing the springs 23. As soon as the wheels have passed, the springs restore the rail to its normal position.

I have shown in Fig. 9 a modified form of housing. To two of the bolts which secure the bar 25 to the rail I fasten cups 31, which receive and retain in position one end of springs, the other ends of which rest in similar cups, 32, of less depth, screwed to collar-bolts 33, by which the tension of the springs may be adjusted. The collars of the bolts bear on the back of casing 20, with long square heads projecting through slots in the wall to receive a wrench when it is desired to adjust the tension of the springs. The loop 26 is similar to first form shown, but shorter.

Having thus described my invention, what I claim is—

1. In a railway-frog, the point consisting of the rails 3 and 4, in combination with the block 8, secured firmly between them, said block having its top surface inclined gradually upward from the heel to the level of the top of the point-rails, whereby the extra flange on grooved or guttered wheels is prevented from falling between and displacing the point-rails.

2. The wheel-bearing plate for a railway-frog, consisting of the hard-metal plate having the metal body cast thereon.

3. In a spring-frog, the combination of a stationary point and a spring-rail lying in contact with its side from the forward end rearward to a place at which the point is of a width equal to or greater than the width of the tread of the wheels.

4. In a railway-frog, the combination of a fixed point and a spring-rail lying in contact with the side thereof from the forward end of the point rearward in position to receive and sustain the outer edge of the tread of the wheels as soon as they begin to project laterally beyond the point in passing thereover, whereby any extra flange on the outside of the wheel is prevented from descending between the point and the spring-rail.

5. A railway-frog having its spring-rail extended along and in contact with the point and toward the heel of the latter until the point has a width equal to or exceeding that of the tread of the wheels, whereby the derailment of the train by extra flanges on the outside of the wheels is prevented.

6. In a railway-frog, the combination of the spring-rail, the lateral arm attached rigidly thereto, and the stationary guide or housing for said arm.

7. In a railway-frog, the combination of the spring-rail, the lateral arm fixed thereto, the rigid guide or housing, and the anti-friction roller attached to the arm.

8. In a frog, the spring-rail having its flange removed and the strengthening-bar 25 fixed thereto, substantially as described, said bar having the lateral guide-arm formed integral therewith.

9. In a railway-frog, the combination of the point, the spring-rail having its flange cut away that it may close against the point, and a strengthening-bar fixed to the side of the rail and extended beyond the reduced portion, as described, whereby the springing or bending of the rail is prevented.

10. In a railway-frog, the combination of the spring-rail, the lateral arm fixed thereto, a stationary guide or housing for said arm, and springs applied, substantially as described, to urge the rail toward the point.

11. In a railway-frog, the combination of the spring-rail, its lateral arm, the guide or housing for said arm, the yoke-bar acting on the arm, and the springs applied to the yoke bar.

12. In a railway-frog, the combination of the point, the stationary wing-rail, the movable spring-rail, the underlying stationary plate 19, fixed to the stationary wing-rail at one end and provided with a guide or housing at the opposite end, the lateral arm fixed to the movable rail and acting in said guide, and the springs tending to urge the movable rail inward.

13. In combination with the spring-rail provided with the lateral arm, the guide or housing having a shoulder, 30, to resist and support the movable rail.

14. In a railway-frog, and in combination with the point and wing-rail, the clamping-bar having its end returned in a horizontal position, and the wedge-shaped bearing-plate, against which said end is seated, substantially as described, whereby the derailed wheels are prevented from opening the clamp.

15. In a railway-frog, the combination of the point, the stationary wing-rail, and the clamp 10, having its outer end returned horizontally toward the wing-rail and its inner end extended vertically through the flange of the point-rail and secured by a key, substantially as described.

16. The improved clamp for a railway-frog, consisting of the bar 10, having one end curved upward and inward horizontally and the opposite end turned to a vertical position and provided with a recess for a fastening-key.

17. The combination of the point, the stationary wing-rail, the bearing-plate 15, the clamping-bar 10, having the vertical and the horizontal ends, the fastening-key 12, the bearing-wedge 15, and the fastening-plate 16.

18. In a railway-frog, the combination of the rail, the clamp having its end presented horizontally toward the outer side of the rail, the intermediate wedge, and the fastening plate or strip 16, applied as described and shown.

In testimony whereof I hereunto set my hand, this 5th day of October, 1886, in the presence of two attesting witnesses.

GEORGE WELLMAN PARSONS.

Witnesses:
WM. B. IRWIN,
H. L. HENDERSON.