No. 891,390. PATENTED JUNE 23, 1908.

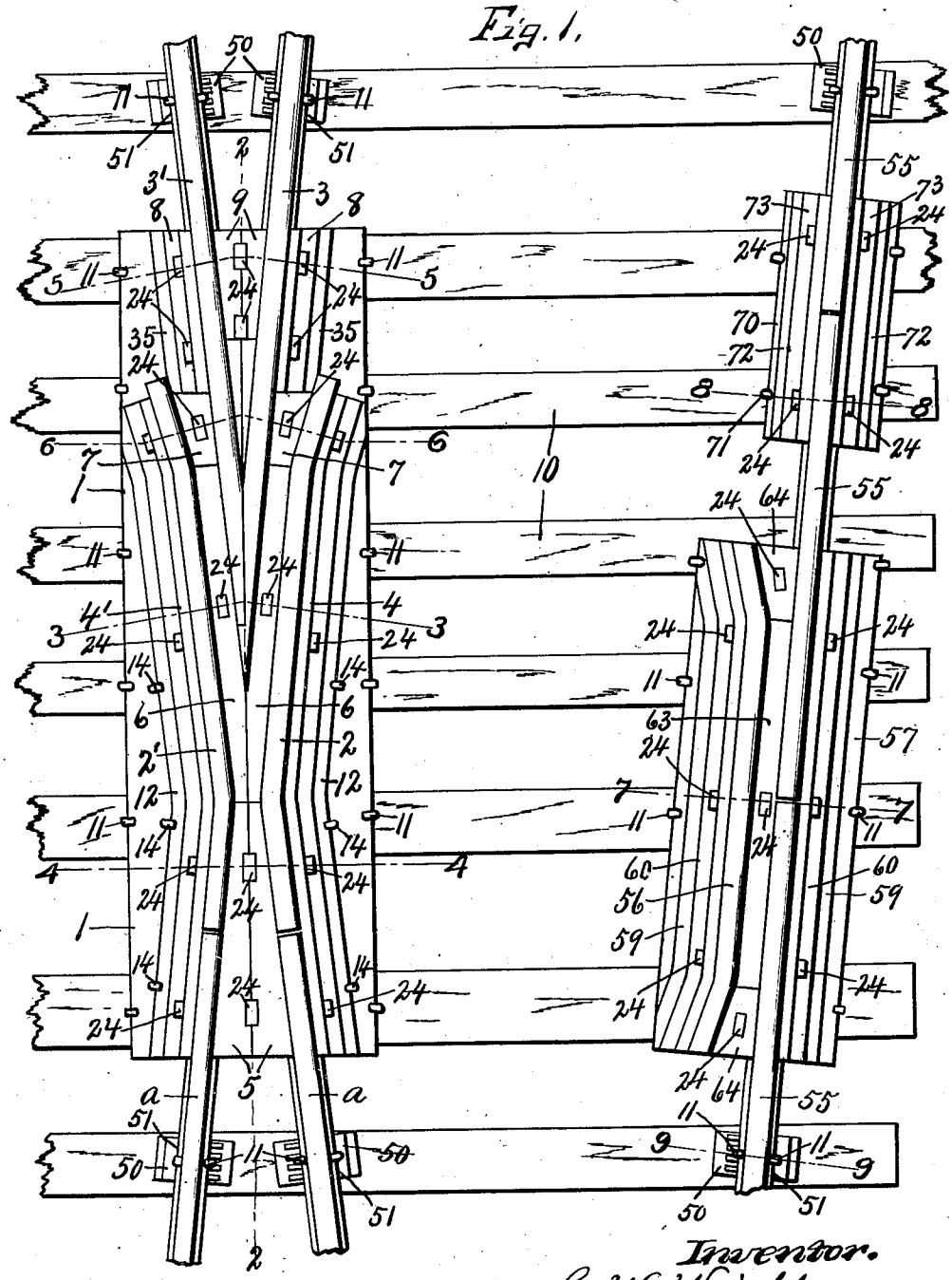
G. W. WRIGHTSON.

RAILWAY CROSSOVER.

APPLICATION FILED DEC. 17, 1907.

4 SHEETS—SHEET 1.

Fig. 1.



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H. E. Chace

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4 SHEETS—SHEET 2.

Fig. 2.

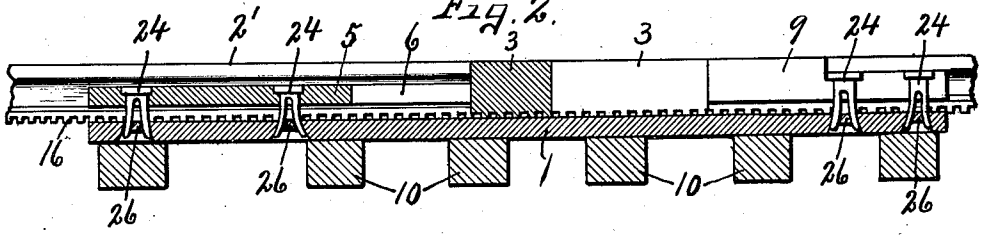


Fig. 3.

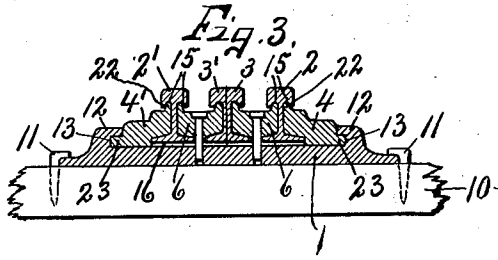


Fig. 4.

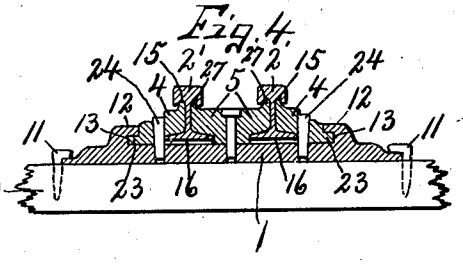


Fig. 5.

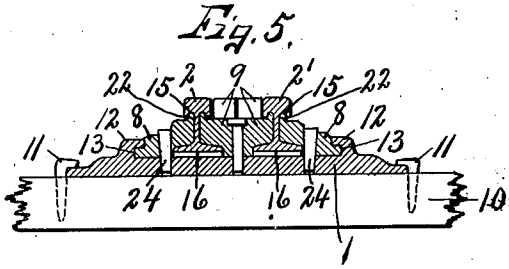


Fig. 6.

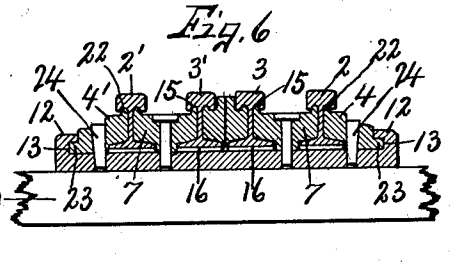


Fig. 7.

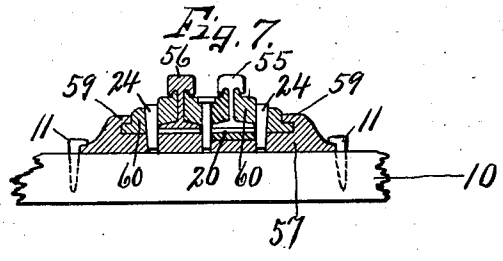


Fig. 8.

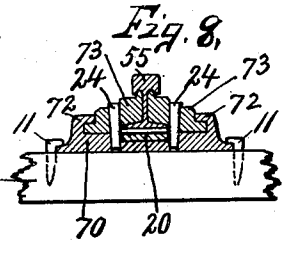
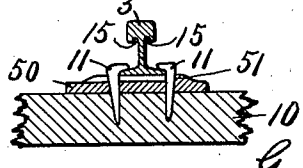


Fig. 9.



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4 SHEETS—SHEET 3.

Fig. 10.

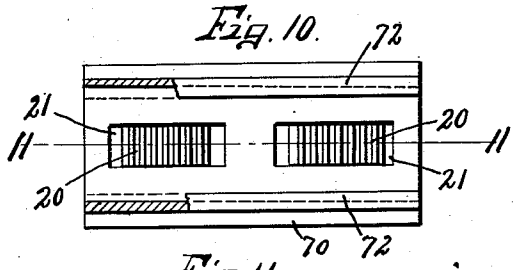


Fig. 11.

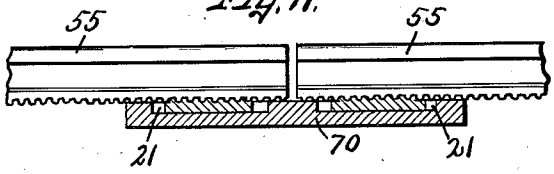


Fig. 12.

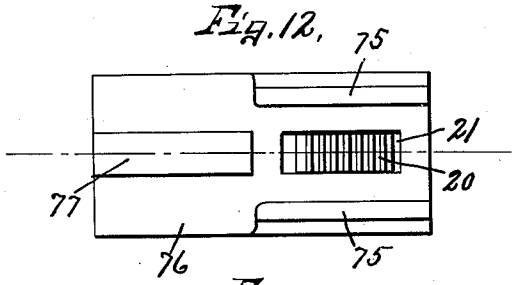
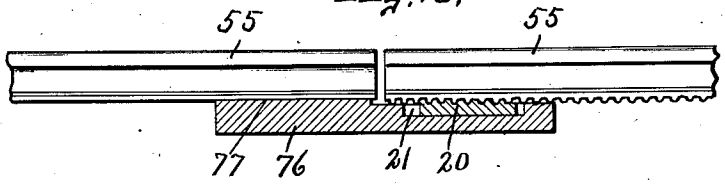


Fig. 13.



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4 SHEETS—SHEET 4.

Fig. 14

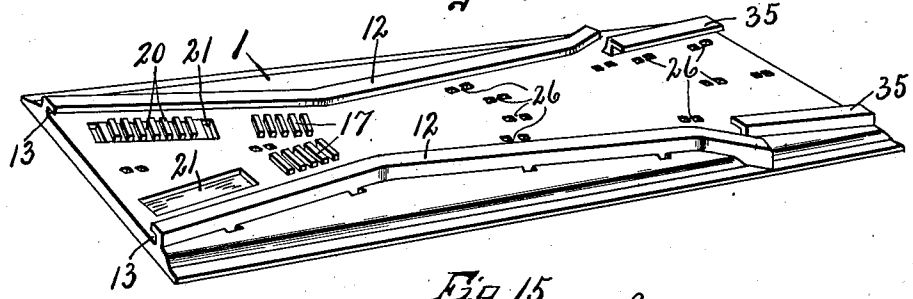


Fig. 15

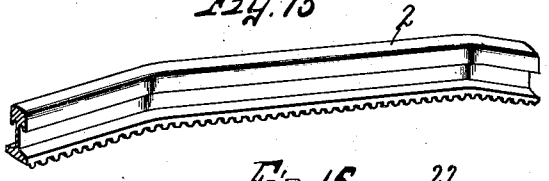


Fig. 16.

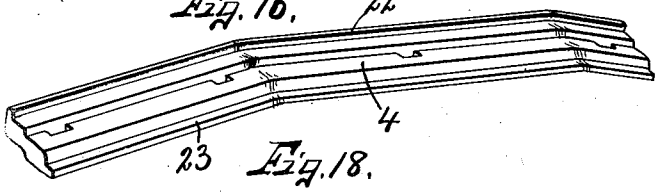


Fig. 18.

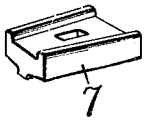


Fig. 17.

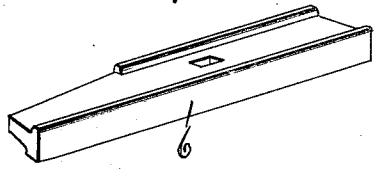


Fig. 19.

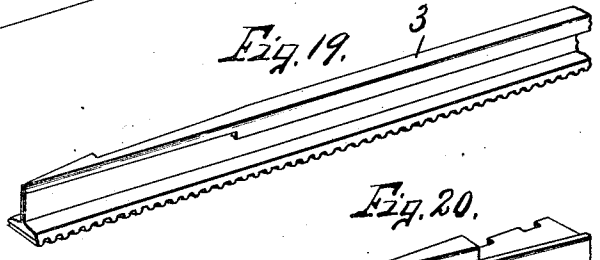


Fig. 20.

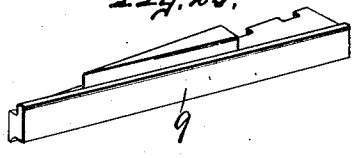


Fig. 21.

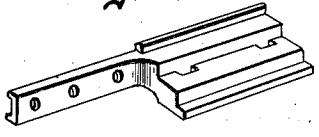
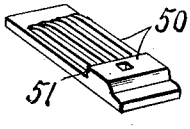


Fig. 22.



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UNITED STATES PATENT OFFICE.

GEORGE W. WRIGHTSON, OF EAST SYRACUSE, NEW YORK.

RAILWAY-CROSSOVER.

No. 891,390. Specification of Letters Patent. Patented June 23, 1908.

Application filed December 17, 1907. Serial No. 406,882.

To all whom it may concern:

Be it known that I, GEORGE W. WRIGHTSON, of East Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Railway-Crossovers, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in railway cross overs and refers more particularly to the construction and approaches of the frog and also to the mechanism for securing the associate rails and guard rails in position. In this class of devices considerable difficulty is experienced in keeping the various parts of the cross over in permanent position and repair thereby not only involving considerable expense in maintaining this part of the railway system in perfect and safe wearing order but also increasing the liability of accident particularly in switch yards and other localities where these cross overs are numerous and over which the employees and other pedestrians necessarily travel. These disadvantages are usually due to the creeping of the ties and superposed portions of the cross over resting thereon, and also to the fact that heretofore the fish plates and other parts of the cross over for securing the rails in position have been joined together by bolts and nuts which it is well known soon work loose and unless they are frequently inspected and tightened allow the rails to become displaced thereby causing excessive wear upon the rolling stock and rails and also frequent disasters at these points.

My main object is to obviate the use of the usual bolts and nuts in securing the rails of the system in place by supporting the rails at the cross over upon suitable bed plates and locking the rails thereto by separate lock bars or retainers held to the bed by automatically clenching keys so that the bed plate may cover and be secured to a series of ties while the lock bars or retainers for each rail section may be separately removed or replaced without disturbing the corresponding lock bars for the other rails.

Another object is to enable the rails of the frog and associated guard rails to be easily and quickly installed and to secure them in such manner that the pressure of the flanges of the wheels will operate to more firmly secure and hold the locking members and rails held thereby in place.

A still further object is to provide for a limited expansion and contraction of the rails upon the bed plates without in any way loosening their fastening elements.

A still further object is to provide the intervening space between the merging rails at the point of the frog with a suitable filling, portions of which at the apex are substantially level with the top face of the rails so as to reduce the liability of employees and other pedestrians getting their feet caught or wedged in said spaces.

A still further object is to provide the bases of the cross over rail sections with integral corrugations adapted to lock with projections on the upper face of the bed plate whereby such rail sections and the bed plates will become interlocked against relative endwise movement.

Other objects and uses will be brought out in the following description.

In the drawings—Figure 1 is a top plan of a portion of a railway cross over showing the frog and guard rails. Figs. 2, 3, 4, 5, 6, 7, 8 and 9 are sectional views taken respectively on lines 2—2, 3—3, 4—4, 5—5, 6—6, 7—7, 8—8 and 9—9, Fig. 1. Fig. 10 is a top plan of one of the detached bed plates for supporting the meeting edges of the rail sections in proximity to one of the guard rails, portions of said bed plate being broken away to show the tapering ways. Fig. 11 is a sectional view taken on line 11—11 Fig. 10 showing the meeting ends of the rails resting upon the bed plate. Figs. 12 and 13 are respectively top plan and sectional views similar to Figs. 10 and 11 showing a modified form of bed plate in which only one sliding block is used. Figs. 14 to 22 inclusive are perspective views of different parts of the frog, Fig. 14 showing the bed plate; Fig. 15 one of the rail sections; Fig. 16 one of the outer lock bars; Fig. 17 one of the longer lock bars; Fig. 18 one of the shorter inner lock bars; Fig. 19 one of the frog point rail sections; Fig. 20 one of the lock bars in front of the frog point; Fig. 21 a fish plate, and Fig. 22 one of the rail locks for the tie.

In order to demonstrate the practicability

of my invention I have shown the portion of a railway cross over including the frog and associated guard rail together with one of the fish plates and a series of tie plates for the rails operating the guard rail and frog.

The frog comprises essentially a metallic bed plate —1—, opposite rail sections —2— and —2′—, additional rail point sections —3— and —3′—, outer lock bars or retainers —4— and —4′— for the rail sections —2— and —2′—, additional intervening lock bars —5—, —6— and —7— for the rail sections —2— and —2′— and point locking sections —8— and —9—.

The bed plate —1— is preferably made of wrought iron or steel, rectangular in form and of sufficient area to underlie a series of superposed rail sections and their locking devices and is usually of sufficient length to cover a series of ties —10— to which it is secured by suitable fastening means as spikes —11— thereby firmly locking the bed plate to the series of ties which it covers and preventing movement of said ties and bed plate relatively to each other.

By locking the bed plates in the manner just described to a series of ties, it is obvious that by embedding such ties in the road bed they are caused to cover a large surface area which reduces to a minimum the liability of shifting or creeping of the frog and parts resting thereon endwise. This bed plate —1— is provided near its outer longitudinal edges with opposite lengthwise flanges —12— preferably formed integral therewith and rising from its top face and having their inner adjacent sides formed with lengthwise grooves —13— opening toward each other substantially coincident with the top face of the bed plate —1— for receiving corresponding ribs or flanges on the locking members or retainers —4— presently described, said flanges diverging from the intermediate portion of the bed plate toward the opposite ends thereof to conform to the angle at which one track intersects the other at the cross over.

In practice, I preferably allow the opposite longitudinal edges of the bed plate to extend some distance laterally beyond the flanges and these marginal edges are provided at intervals with apertures for receiving additional fastening members as spikes —14— which are driven therethrough into the underlying ties to more securely lock the bed plate and ties against relative movement so that in effect the ties become a portion of the bed plate covering a large area of ground and thereby reducing the liability of the endwise creeping or shifting of the frog to a minimum.

The rail sections —2— and —2′— are spaced apart in the usual manner and diverge in opposite directions toward their ends from an intermediate point corresponding to the divergence of the flanges —12— and to the angle at which one track crosses the other, said rails being of standard form except that the under sides of their heads are formed with lengthwise grooves —15— at opposite sides of the webs, the outer grooves receiving corresponding ribs on the locking members or retainers —4— and —4′— while the inner grooves are adapted to receive similar ribs on the locking members —5—, —6— and —7— hereinafter described, the lower faces of said rail sections —2— and —2′— being preferably corrugated transversely at —16— to intermesh with one or more corresponding corrugations —17— on the upper face of the bed plate whereby the rail sections —2— and —2′— are locked to the bed plate against endwise movement thereupon. These rail sections —2— and —2′— preferably terminate short of the ends of the bed plate to afford ample support for the point sections —3— at one end and similar support for the ends of the main rails as —*a*— at the opposite end of the bed plate.

The corrugations —17— are located directly under and interlock with the ends of the rail sections —2— and —2′— near their meeting ends with the main rails —*a*— and are, therefore, locked with the bed plate at one end only, leaving the remaining portions to expand and contract longitudinally upon the top face of said bed plate.

The main rails —*a*— are of standard length and, therefore, their degree of expansion and contraction is considerable and in order that they may have a limited expansion and contraction movement on the bed plate, the portions of the rails —*a*— which overlap thereupon are corrugated on their under sides to intermesh with corrugated sliding blocks —20— which are movable in longitudinally elongated recesses —21— in the upper side of said plate, said recesses being closed at their ends to limit the movement of the sliding blocks —20—.

The locking bars —4— and —4′— as best seen in Figs. 5 to 8 inclusive serve also as spacing bars to hold the rail sections —2— and —2′— a fixed distance from their corresponding flanges —12— and are provided at their inner upper edges with ribs —22— interlocking with the outer grooves —15— in the under side of the head of the rail sections —2— and —2′— and their outer edges are formed with lengthwise ribs —23— which interfit in the grooves —13— of the flanges —12—. These lock bars or retainers —4— and —4′— are held in place by bifurcated keys —24— which are passed through registering apertures in the locking bars and underlying bed plate between the base flanges of the rail sections —2— and —2′— and corresponding bed plate flanges —12—, the openings in the bed plate being divided by transverse wedge-shaped bars —26— against

which the prongs or tines of the bifurcated keys are driven and whereby such prongs are spread apart or clenched against opposite sides of the openings in the bed plate to hold the keys firmly in operative position against accidental withdrawal or displacement. It is obvious that these keys are driven downwardly from the top and that while their upper ends are exposed it is clear that any downward pressure which is brought to bear upon them will tend to further clench them and thereby more effectively lock the retainer bars —4— and —4′— in their adjusted positions to prevent outward displacement or separation of the rail sections —2— and —2′—. These rail sections are locked against lateral inward movement toward each other by the locking plates —5—, —6— and —7— which are arranged end to end.

The locking members —5— are wedge-shaped and together conform to the angle of the diverging ends of the rail sections —2— and —2′— in front of the converging rail points —3— and —3′—, said locking members —5— consisting of opposite triangular metal wedges meeting edge to edge substantially midway between the rail sections —2— and —2′— and are provided at their outer edges with ribs —27— Fig. 4 which fit in the inner grooves in the under sides of the heads of the rail sections —2— and —2′— and have their under sides resting upon the base flanges of said rail sections so as to substantially fill the intervening space below the heads of the rails and are held in place by keys —24— which are like those described and are passed through recesses in the meeting faces thereof and also through apertures in the bed plate where their lower bifurcated ends are clenched or spread by wedge-shaped cross bars —26— similar to those previously described, it being understood that all of these keys are provided with heads which are somewhat larger than the apertures or recesses through which they pass so that when their lower ends are clenched by the cross bar —26—, their upper ends or heads are engaged by the top face of the locking members to retain the latter in their adjusted positions.

The locking members or retainer bars —4— and —5— extend some distance beyond the meeting ends of the rail sections —2— and —2′— and their corresponding rails —*a*— thereby serving the double purpose of fish plates to hold said meeting ends of the rails in alinement with each other without the use of bolts and at the same time allowing the meeting ends of the rails —*a*— to move a slight distance longitudinally relatively thereto under expansion and contraction to which they are susceptible, the retainer bars —4— and —4′— serving to hold the rails from spreading while the wedge-shaped locking members or retainers —5— perform a similar function in holding the rails a fixed distance apart.

The bed plate —1—, rail sections —2— and —2′— and —3— and —3′— together with the locking members or retainer bars —4—, —5—, —6—, —7—, —8— and —9— constitute what may be termed a railway frog, the rail point sections —3— and —3′— resting upon and extending forwardly from the heel of the bed plate so that their converging ends merge between the rearwardly diverging portions of the rail sections —2— and —2′— and are held in place by the locking members —6—, —7—, —8— and —9—.

The locking members —6— are formed in two parts, each locked between the one side of the point of the frog and adjacent rail sections —2′— and are locked in place by keys —24— which are similar to and are held in place in substantially the same manner as that described for the previously described keys, that is they are passed through registering apertures in their respective locking members —6— and underlying portion of the bed plate and are clenched or spread apart at their lower end by wedge-shaped cross bars —26— similar to those previously described. These locking bars —6— substantially fill the spaces between the rail points —3— and —3′— and rails —2— and —2′— and their forward ends extend some distance beyond the point of the rail sections —3— and —3′— where they preferably abut against the heel ends of the wedge-shaped locking members —5— leaving sufficient clearance for slight expansion under temperature changes. In like manner, the locking members —7— are interposed between the rail point sections —3— and —3′— and rail sections —2— and —2′— substantially filling the intervening space and are held in place by bifurcated keys —24—, the latter passing through registered openings in the locking members —7— and underlying portion of the bed plate where they are clenched by wedge-shaped cross bars —26— similar to those previously described.

The locking members —8— are somewhat similar in construction to the locking members —4— and —4′— and are interlocked with fixed flanges —35— on the bed plate —1— and are also interlocked with grooves in the under side of the heads of the rail sections —3— and —3′— and are held in place by keys —24— which are like those described and are interlocked with the bed plate in the same manner as the keys previously described. These bed plate flanges —35— are located at the heel of the rail sections —2— and —2′— the same distance from and at the outer side of the bases of the rail points —3— and —3′— and are preferably formed integral with said bed plate.

The outer edges of the locking members

—8— are formed with lengthwise flanges entering the grooves in the flanges —35— while the inner upper edges of said locking members —8— are also formed with lengthwise ribs or flanges which interlock with corresponding grooves in the under side of the same rail sections thereby holding said rail sections against outward lateral movement.

The locking members —9— are wedge-shaped and arranged side by side to substantially fill the intervening space between the rail sections —3— and —3′— with their meeting edges in close contact where they are held in position by keys —24— of substantially the same construction as the others previously described, said locking members —9— having their outer upper edges formed with lengthwise ribs which interfit in the corresponding grooves in the under side of the heads of the rail points —3— and —3′— while their lower faces bear upon the base flanges of said rail sections.

The upper faces of the front portions of the locking members —9— are substantially coincident with the top faces of the rail sections —2— and —2′— so as to form additional bearings for the rim of the wheels in passing over the point while the upper surfaces of the remaining portions or heels of these locking members —9— are slightly depressed below the top face of the rail sections —3— and —3′— to receive the keys —24— where the latter are protected more or less from contact with the rim of the wheels of the cars in passing over the rails.

In assembling the parts of this frog, the base plate —1— is first secured to the ties —10— by means of the fastening members as spikes —11— and —14—, the latter being driven through apertures in the plate into the ties while the spikes —11— are preferably driven into the ties and engaged with the outer longitudinal edges of the plate.

When the plate is firmly secured in place in the manner just described, the locking members —4— and —4′— are interlocked with the outer faces of their respective rail sections —2— and —2′— and are then rested upon the bed and moved laterally and outwardly until their flanges —23— enter their respective grooves —13— in the flanges —12— with which they now become interlocked, in which position the key openings of the locking members —4— and —4′— are registered in the corresponding opening in the base plate whereupon the keys —24— are driven from the top downwardly through said registering openings and their prongs or tines are spread or clenched against the under side of the bed plate by the wedge-shaped bars —26—, the latter being preferably integral with the metal bed plate. After this operation is completed, the wedge shaped locking members —5— are interlocked with the grooves on the under side of the adjacent face of the rails —2—, —2′— and are driven inwardly or toward the point of the frog until their meeting faces are brought into close contact as shown in Fig. 1 in which position the key openings formed by the recesses in the adjacent faces of the locking members —5— are registered with those in the base plate and the keys —24— are then driven downwardly from the top until clenched by the underlying wedge-shaped cross bars —26—. This locking operation brings the meeting ends of the rails —*a*— into alinement with those of the rail sections —2— and —2′— of the frog and together with the outer locking members —4— and —4′— firmly hold the rails against lateral displacement and in fixed relation to each other and at the same time permits the adjacent ends of the rails —*a*— to move slightly endwise by expansion and contraction due to thermal changes, it being understood that the ends of the rails —*a*— which rest upon the plate are interlocked with the sliding plates —20— which permits such endwise movement and it is also to be understood that the adjacent ends of the rail sections —2— and —2′— are similarly interlocked with the fixed corrugations —17— on said plate to lock said rail sections —2— and —2′— to the bed plate against relative movement.

When the rail sections —2— and —2′— and their locking members —4— and —4′— are installed in the manner just described, the locking members —6— are interlocked with the grooves in the under side of the heads of their respective rail sections —2— and —2′— and are then driven or moved forwardly until their forward ends engage the rear ends of the members —5— or approximately so whereupon the key openings in the locking members —6— are brought into registration with the corresponding key openings in the bed plate and the keys —24— are then driven from the top downwardly until clenched by the underlying wedge bars in the bed plate. In like manner the locking members —7— are interlocked with the grooves in the under sides of the heads of their respective rail sections —2— and —2′— and are secured in place by the keys —24— in substantially the same manner as that described for the other keys —24—.

It will thus be seen that the locking members —4—, —5—, —6— and —7— and keys —24—, serve to firmly lock the rail sections —2— and —2′— against lateral displacement and in fixed relation to each other. The locking members —8— are thus interlocked with the grooves in the under sides of the heads of the rail point sections which together with the locking members —8— are rested upon the top face of the adjacent end of the bed plate with the merging points between the rearwardly diverging portion of the rail sections —2— and —2′— and the

base flanges at the outer longitudinal edges of the locking members —8— are then brought into interlocking engagement with the grooved flanges —35—, the key openings therein being brought into registration with those in the bed plate whereupon the keys —24— are driven downwardly until clenched by the underlying wedge bars in said bed plate.

The rail point sections are now positioned with their outer edges substantially parallel with and a slight distance from the inner diverging edges of the rail sections —2— and —2'— after which the wedge-shaped locking members —9— are slidably interlocked with the grooves in the under sides of the heads of the rail sections —3— and —3'— and are driven toward the point until their meeting faces come into close contact and their key openings are brought into registration with the underlying openings in the bed plate after which the keys are driven downwardly into place and clenched by the underlying wedge-bars —26— thereby firmly locking the rail points —3— and —3'— against inward displacement or rather holding said rail points a fixed distance apart and against the inner faces of the locking members —8—.

The rail point sections —3— and —3'— are allowed to extend some distance beyond the heel of the frog or bed plate —1— and in as much as their lower faces are corrugated, I provide corrugated tie plates —50— Fig. 22 which are spiked to the adjacent ties some distance beyond the adjacent end of the bed plate so as to add additional resistance to the creeping or endwise movement of the frog. These corrugated plates —50— have their corrugations meshing with those on the under side of the rail points —3— and —3'— and are usually driven laterally between the rails and ties and are provided with raised shoulders —51— forming stops to limit the inward movement of the plates when driven into position, said plates being preferably provided with spike openings for the reception of spikes —11— as best seen in Fig. —1—.

In the installation of these cross overs, the outer rail as —55— of one of the cross over tracks is usually provided with a guard rail —56— associated with the frog to cause the flange of the wheel to travel in the proper channels in passing over said frog and I have shown this guard rail as mounted upon a bed plate —57— which is secured to a series of ties by spikes —11— and is provided with lengthwise flanges —59— similar to the flanges —12— for receiving locking members or retainer bars —60— of similar cross section to the bars —4— and —4'—, the heads of the guard rail —56— as well as the rail —55— being provided with grooves on their under sides for the reception of lengthwise flanges on the locking members —60—, said locking members being held in place by keys —24— similar to the other keys —24— while the bed plate is provided with wedge-shaped bars extending across their key openings to spread or clench the lower bifurcated ends of the keys in the same manner as described for the keys —24—.

The guard rail —56— is locked at the inside of and a slight distance from the main rail —55— and is additionally held in place by interposed locking members —63— and —64— corresponding respectively to the locking members —6— and —7—, said locking members —63— and —64— being secured in place by bifurcated keys —24—, which are similar to the other keys —24— and are clenched in place in substantially the same manner.

The rail —55— is preferably divided transversely substantially midway between the ends of the plate —57— and the locking members —60— and —63— serve to keep the meeting ends of the rail sections in alinement and also to hold them down upon the bed plate.

One or both of the meeting ends of the rail sections —55— where they rest upon the bed plate may be corrugated to engage similar corrugations upon said bed plate in substantially the same manner as described for the rail sections —*a*— and —2— although one of the meeting ends of the rail —55— may rest upon a sliding corrugated block similar to the corrugated sliding block —20—.

In order to further show the application of my invention, that is, the bed plate, locking members and keys for securing the meeting ends of the rail to the ties I have shown in Fig. 1 a bed plate —70— which underlies the meeting ends of the rails —55— and is secured to the ties —10— by spikes —71— said bed plate —70— being provided with lengthwise parallel grooved flanges —72— running along its opposite longitudinal edges for receiving the outer longitudinal edges of the locking members or retainers —73— having their upper inner edges provided with lengthwise ribs which interlock with lengthwise grooves in the adjacent under sides of the head of the rail —55—, said latter members —73— being held in place by keys —24— similar to the keys —24— and clenched in place in substantially the same manner. In this last construction, the locking members —72— are parallel and interchangeable from side to side and serve as an effective fish plate for securing the meeting ends of the rails to the bed plate and by means of said bed plate to the tie with bolts or nuts thus permitting the rails to slide endwise limited distances by expansion and contraction under thermal changes.

It will be seen from the foregoing description that all the parts entering into the installation of the frog, guard rail and fish

plate may be quickly and economically assembled or removed and if one part should become impaired it may be readily replaced and still permit the use of the other parts which are not impaired thereby enabling this part of the railway system to be easily and economically maintained in a safe wearing condition thus reducing the liability to accidents to a minimum. Another important advantage is that the locking members between the rails, especially at the point of the frog avoids to a large extent the liability of employees and other pedestrians getting their feet wedged or caught between the rails by reason of the fact that in all instances these intervening locking members are brought up at least to a plane coincident to the under side of the heads of the rails while the points of the locking members —9— where the danger is greatest are actually brought up to a plane coincident with the top faces of the rails.

The main object of the invention as previously stated is to maintain the frog in sections so that the rails may be secured in place without the use of bolts or nuts while all of the sections may be readily installed or either of them quickly and easily replaced when impaired.

What I claim is:

1. In a railway, a bed plate having opposite fixed flanges, a rail having a grooved head, flanged retainer bars between the rail and flanges and interlocked therewith, and keys passed through the retainer bars and bed plate.

2. In a railway, a plurality of ties, a metallic bed plate resting upon and secured to the ties, a lengthwise flange rigid with the plate, a rail resting upon and interlocked with the bed plate against endwise movement, a retainer bar between and interlocked with the bed plate and flange, and keys passed through the retainer bar and bed plate.

3. In a railway, a plurality of ties, a metallic bed plate resting upon and secured to the ties, a lengthwise flange rigid with the plate, a rail resting upon and interlocked with the bed plate against endwise movement, a retainer bar between and interlocked with the bed plate and flange, a furcated key passed through the retainer bar and bed plate, and means for spreading the tines of the key when entering the bed plate.

4. In a railway, a metallic bed plate, rails having their meeting ends resting on said bed plate, and an auxiliary plate interlocked with one of the rails and slidable on said bed plate, as the latter rail expands and contracts.

5. In a railway, a plurality of ties, and a metallic bed plate resting upon the ties and secured thereto, opposed fixed flanges on the plate, retainer bars between and interlocked with the rails and flanges, separate wedge blocks between and interlocked with the rails, and keys passed through the retainer bars and blocks and into the bed plate.

6. In a railway, a plurality of ties, and a metallic bed plate resting upon the ties and secured thereto, opposed fixed flanges on the plate, retainer bars between and interlocked with the rails and flanges, separate wedge blocks between and interlocked with the rails, keys passed through the retainer bars and blocks and into the bed plate, and means to clench said keys as they are driven into the bed plate.

7. In a railway, a metallic bed plate and a rail resting thereon, said plate and rail having interlocking shoulders on their contiguous faces, an additional rail partially resting on the bed plate and a slidable interlocking connection between the last named rail and bed plate to allow for the expansion and contraction of the connected parts relatively to each other.

In witness whereof I have hereunto set my hand this 29th day of November, 1907.

GEORGE W. WRIGHTSON.

Witnesses:

H. E. CHASE,

CAROLINE M. MCCORMACK.