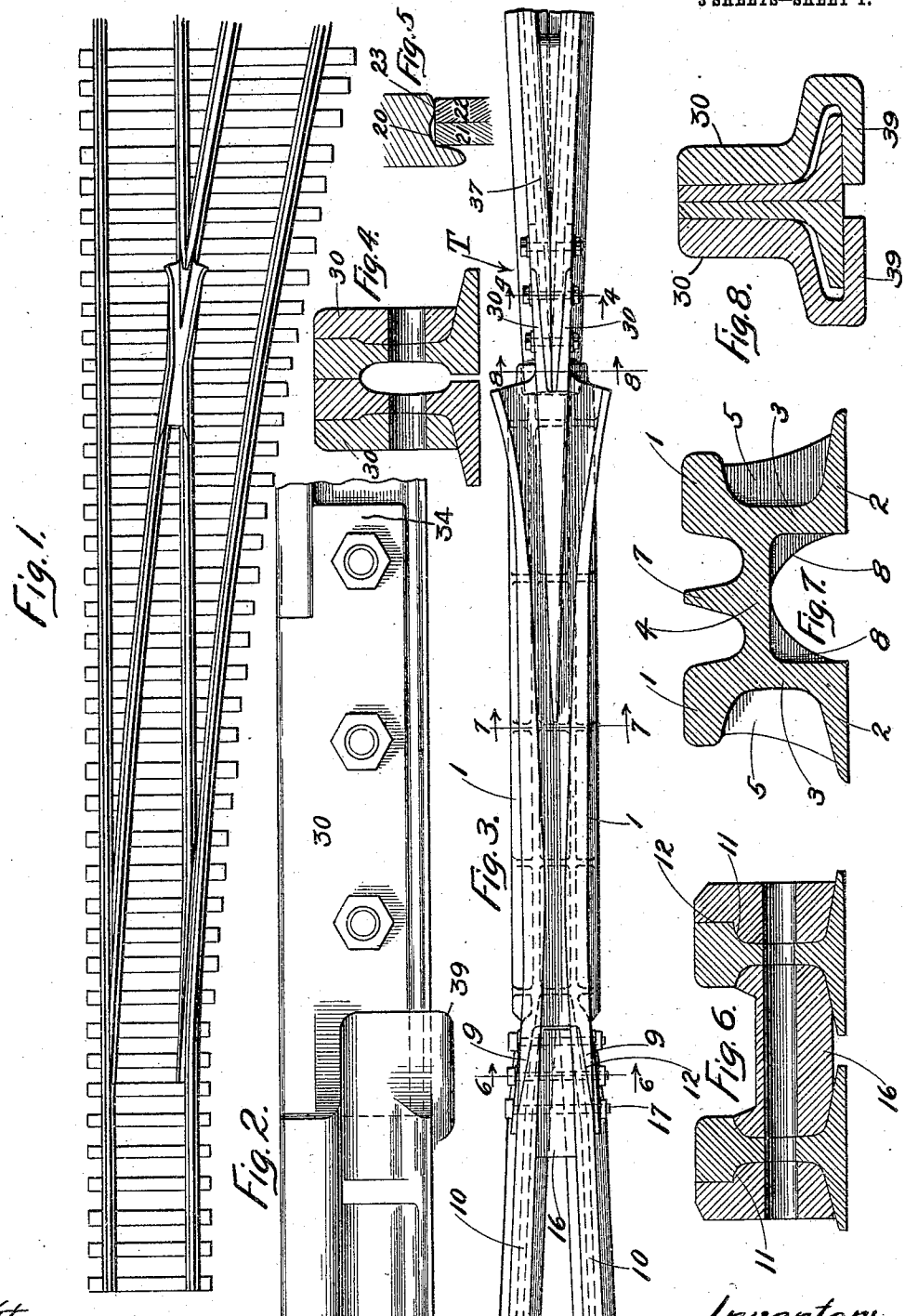
H. G. ELFBORG.

RAILWAY FROG.

APPLICATION FILED DEC. 7, 1908.

940,864. Patented Nov. 23, 1909.

3 SHEETS—SHEET 1.



Witnesses:
C. Burnap
Lillian A. Tibby

Inventor:
Henry G. Elfborg
By Sheridan & Wilkinson
Attys

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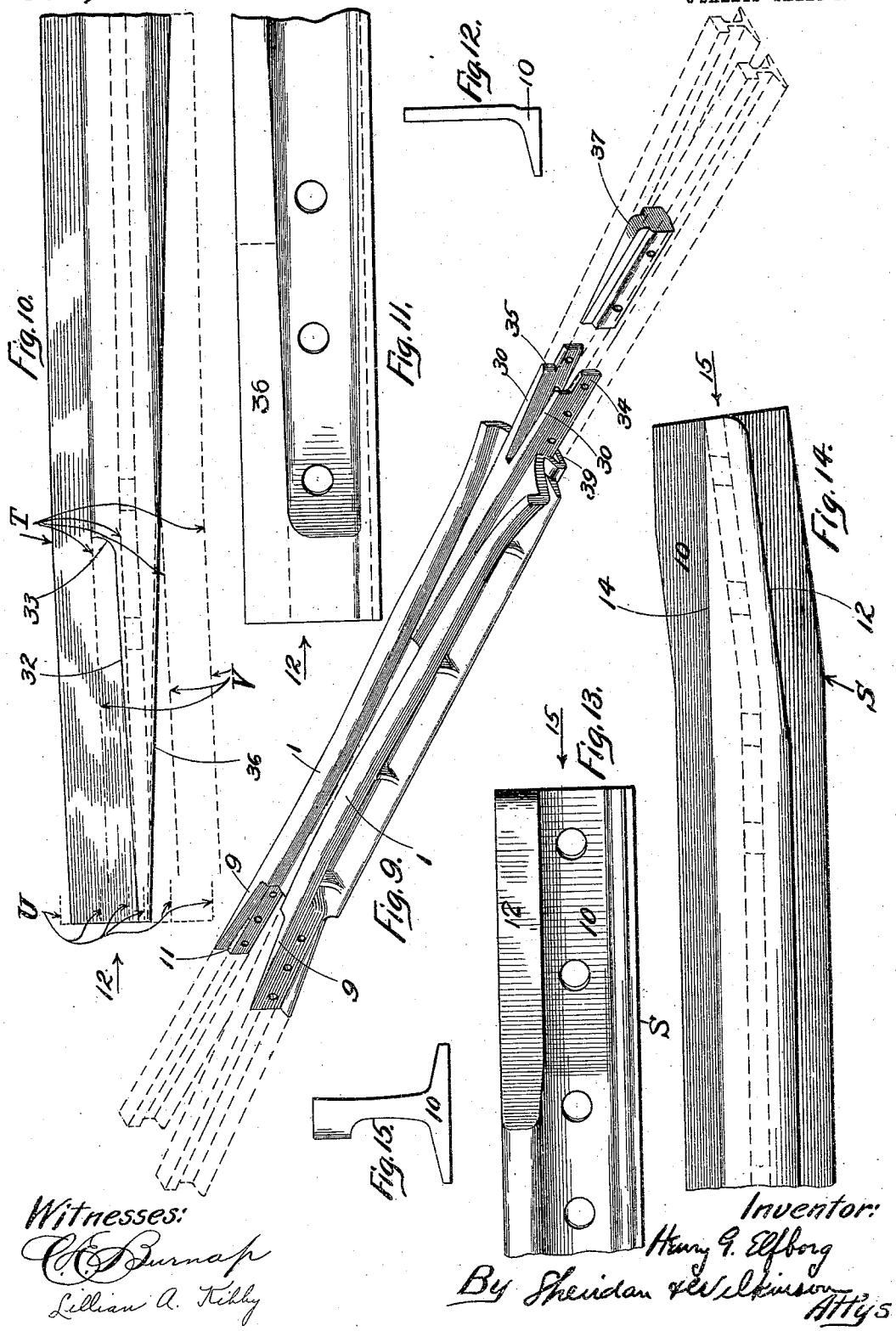

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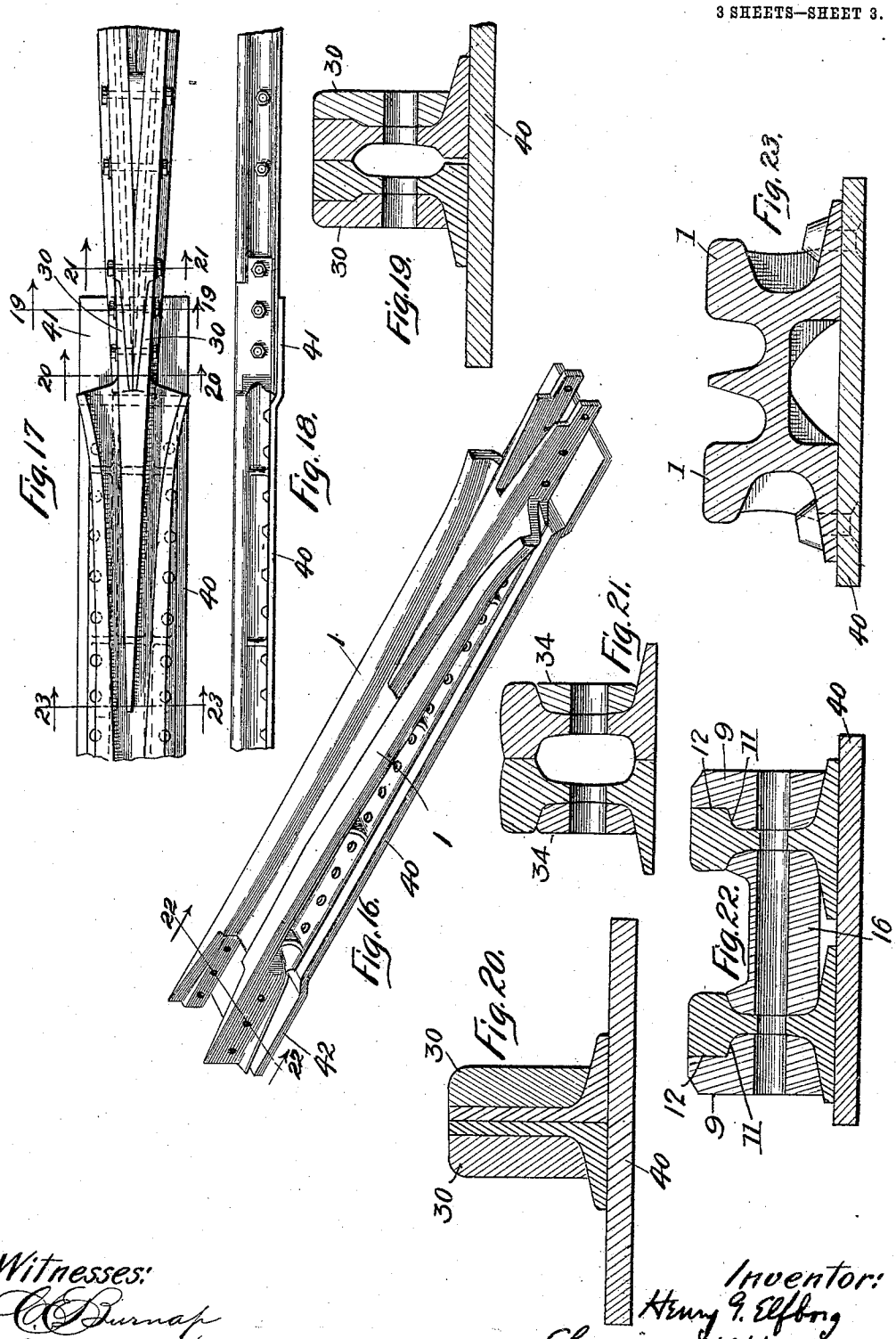

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Attys

UNITED STATES PATENT OFFICE.

HENRY G. ELFBORG, OF CHICAGO, ILLINOIS.

RAILWAY-FROG.

940,864. Specification of Letters Patent. **Patented Nov. 23, 1909.**

Application filed December 7, 1908. Serial No. 466,340.

To all whom it may concern:

Be it known that I, HENRY G. ELFBORG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Railway-Frogs, of which the following is a specification.

The object of my invention is to provide a railway frog constructed of hard metal, such as manganese-steel, or other suitable alloy, the frog being so constructed as to provide a junction with the rails of such form that the passage of the wheels thereover will not result in rapid wear; and to provide means whereby the frog and rails may be assembled and laid in place with the minimum amount of labor.

The invention herein described is a modification of and in some respects similar to that covered by my copending application for patent Serial No. 464,799, filed November 27, 1908. The invention herein described is more especially designed for use upon roads not subject to the heaviest class of traffic or in railway yards where less expensive structures may be safely used.

The character of my invention and its relation to that described in my copending application above referred to will more clearly appear from the following description, taken in connection with the annexed claims.

In the drawings—Figure 1 is a diagrammatic view of a main track and switch showing the frog in place. Fig. 2 is a side view of the heel end of the frog, that is, the end at which the point is located. Fig. 3 is an enlarged plan view of the frog and connected rails. Fig. 4 is a cross sectional view on the line 4—4 of Fig. 3. Fig. 5 is a fragmentary view showing the relation of a car wheel to the converging track rails. Fig. 6 is a cross sectional view on the line 6—6 of Fig. 3. Fig. 7 is a cross sectional view on the line 7—7 of Fig. 3. Fig. 8 is a cross section on the line 8—8 of Fig. 3. Fig. 9 is a perspective view of the frog illustrated in the preceding views. Fig. 10 is a plan view of one of the rails prepared for connection to the heel end of the frog, the condition of the rail before bending and after bending but before trimming being shown in dotted lines. Fig. 11 is a side view of the end of the rail shown in Fig. 10. Fig. 12 is an end view of the rail shown in Figs. 10 and 11. Fig. 13 is a side view of one of the rails prepared for connection to the toe end of the frog. Fig. 14 is a plan view of the rail shown in Fig. 13. Fig. 15 is an end view of the rails shown in Figs. 13 and 14. Fig. 16 is a perspective view of a modification. Fig. 17 is a plan view of the heel end of the frog shown in Fig. 16, together with the attached rails. Fig. 18 is a side elevation of the structure shown in Fig. 17. Fig. 19 is a section on the line 19—19 of Fig. 17. Fig. 20 is a section on the line 20—20 of Fig. 17. Fig. 21 is a section on the line 21—21 of Fig. 17. Fig. 22 is a section on the line 22—22 of Fig. 16. Fig. 23 is a section on the line 23—23 of Fig. 17.

As is well-known, the wear upon railway frogs is much more rapid as a result of the violent blows to which they are subjected, than upon other parts of a railway track. In order to overcome this difficulty, it has been previously proposed to construct the frog point and some of the adjacent parts of manganese-steel, or other hard alloy, but the use of such devices has developed other difficulties at the point of junction between the hard alloy and steel rails, and the assemblage of the parts in some instances leads to more or less difficulty on account of their complicated form.

As clearly shown in Figs. 3, 9 and 16, I construct the hard metal frog in a single integral piece, the wing rails and point rails terminating at the end thereof, and substitute for the wing rails, integral wing flanges 1 cast upon and forming part of the frog.

Referring to the sectional views and especially to Fig. 7, it will be apparent that the frog comprises a body portion made up of base flanges 2, vertical webs 3, a floor plate 4, strengthening webs 5 extending upwardly from the base flanges to the wing flanges 1, and a point 7, together with strengthening webs 8 between the vertical webs 3 and floor plate 4.

The invention herein claimed relates more particularly to the heel end of the frog, that is, the end at which the point is located, and a brief description of the toe end will therefore suffice for the purpose of this application, that part of the structure being more specifically described and claimed in my copending application above referred to. At the toe end, the frog is provided with integral extensions 9 projecting outwardly substantially in line with the wing flanges. The ends of the wing rails 10, 10 are re-

ceived between the extensions 9, 9. The extensions 9, 9 are recessed, forming shoulders 11 adapted to lie directly beneath the heads of the wing rails and support the same, and the outer side of the rail head is planed away at 12 sufficiently to form a right angle joint with the extension 9, thus avoiding the difficulty of fitting said extension over the rounded top corner of the rail head. The extensions 9 are tapered on their inner faces from the body of the frog outwardly for the purpose of forming a diagonal junction with the attached rails, which are received between said extensions. The rails 10 are prepared for attachment to the frog by first bending them at about the point indicated by the arrow S in Fig. 14. The inner side of the rail head is then planed away at 14 to make the gage line of the bent part of the rail continuous with that of the remainder thereof. The extent of the bend in the rail is such that the planing away at 14 to straighten the gage line cuts the head substantially down to the web at the end of the rail, as shown in Fig. 14. As previously explained, the outer side of the rail head is planed off at 12, for the purpose of making a squared joint with the extension 9. Owing to the bending of the rail, the edge 12 lies on a diagonal line corresponding to the inside taper on the extension 9 of the frog, thus forming an oblique junction therewith. The effect of the diagonal joint along the line 12 is to cause the tread of a passing wheel to pass gradually from the steel rail to the hardened frog, thus avoiding the shock incident to riding over a square transverse joint. Furthermore, the shoulder 11, shown in Fig. 6, lying beneath the rail head firmly supports the rail and keeps the upper surface of the extension 9 in the same plane with the head of the rail. Registering bolt holes are provided in the extensions 9 and the ends of the rails 10, and also in the wedge 16, as shown in Figs. 3 and 6. After the ends of the rails 10 are inserted between the extensions 9, the wedge 16 is driven home and the parts secured together by bolts 17, as shown in the drawing. In some instances, it will be found desirable to construct the wedge 16 in two parts, divided on a transverse line, in order to avoid the frictional resistance encountered in driving the entire wedge to its seat at once.

The structure above described, that is, the toe end of the frog, is substantially the same as that described in my copending application above referred to.

I will now proceed to describe the heel end of the frog, in which the invention herein claimed more particularly resides. Owing to the high cost of manganese-steel and other hard alloys, it is desirable to secure the necessary results with as little of this material as possible. Upon tracks subjected to heavy traffic and the passage of locomotives, it is necessary that the heel end of the frog be continued out from the point far enough to prevent the flange of a passing wheel from overlying the ends of both of the converging point rails. The wide treads upon locomotive driving wheels, in some instances such treads being as much as four inches in width, necessitates a very long extension of the frog at the heel end. The necessity for preventing passing wheels from overlying both of the converging rails arises from the fact that the wheels become worn at the throat forming a groove, as indicated at 20 in Fig. 5. In that figure, the converging rails 21, 22 are shown in relation to a passing wheel overlying them in the manner above pointed out as objectionable in the case of heavy traffic upon main lines. It will be apparent from an inspection of Fig. 5 that the unworn part of the wheel 23 will tend to cut a groove in the rail 22, and that the repeated passage of wheels will result in serious damage to the converging rails. Hence, the necessity of continuing the hard alloy frog to a point where the rails are so far separated as to prevent the action above described. This necessity, however, is not imperative in the case of frogs used upon electric railways where the rolling stock is lighter and where it is not necessary to provide against the injurious effect of the broad wheels of locomotives. Also, in railway yards the same necessity does not exist for guarding against the action above described. For the uses last described and analogous purposes, I have devised the structure embodied in the heel end of the frog represented in the drawings.

Instead of providing a tongue projecting from the heel end of the frog between the converging rails and discontinuing the converging rails at a point where they are sufficiently spread to avoid the effects above described, I, in the present instance, form the heel end of the frog with two extensions 30 springing from the base of the frog point and on their outer sides forming continuous gage lines therewith. The converging rails are received between the projections 30 and the opening between said projections tapers toward the frog to a point where its width may, if desired, be about equal to the thickness of the webs of the converging rails. The converging point rails are prepared for attachment to the heel end of the frog, as illustrated in Figs. 10, 11 and 12, and as shown in section in Figs. 4 and 8. The rails are bent inwardly at about the point indicated by the arrow designated T, the condition of the rail before bending being shown by the dotted lines leading from the letter U, and the condition after bending and before trimming being indicated by the arrows leading from the letter V. The head

of the rail is then trimmed along the diagonal line 32 and curved line 33 to conform to the projection 30. At the points 35, the projections 30 are reduced in height by cutting away the upper corners, thus forming a reduced extension 34 adapted to lie between the base flange and head of the rail. As shown in Fig. 4, the inner face of each of the projections 30 is fitted to lie snugly against and beneath so much of the head of the rail as is not cut away and to support the same from the base flange of the rail. After bending, the rails are also trimmed along their inner sides upon the line 36, for the purpose of reducing their width sufficiently to permit them to form a tapering point which will fit the space between the extensions 30. The frog and rails are held in alinement with a smooth upper surface by engagement of the inner faces of the extensions 30 which conform with the outer faces of the rails as shown in Fig. 4 and by the reduced extensions 34 which fill the space between the base flanges and heads of the rails. A riser 37 of a form in common use is inserted between the converging rails, and bolts passing through the rails, riser and projections 30 hold the assembled structure together.

The alinement of the rails and frog at the heel end is further secured by means of supports 39 which project from the body of the frog beneath the rails. This support preferably takes the form, as shown in Fig. 8, of a web projecting outwardly and downwardly and then inwardly from each of the projections 30, and the rails rest thereon, as clearly shown in Fig. 8.

By means of the structure above described, I am enabled to materially shorten the heel end of the frog, thus effecting a great economy in the amount of hard alloy used, while at the same time producing a frog of great strength and durability.

In some instances it may be found desirable instead of spiking the frog directly to the ties, to construct the same of less depth and superpose it upon a steel plate riveted to its base; such a structure is shown in Figs. 16 to 23 of the drawings. In these views, the frog is of substantially the same formation as that above described, excepting that the hard metal casting is of less depth and the entire structure brought to the required height by the steel plate 40 which is secured to the casting by means of rivets, as illustrated. The support 39 which, in the form above described, is cast integral with the body of the frog is, in the modification, formed by depressing the end 41 of the plate 40 where it extends beneath the projections 30, the amount of depression being sufficient to bring the part 41 beneath the attached track rails. The opposite end 42 of the plate 40 is also depressed, thus forming a similar pocket or support for the attached ends of the wing rails.

I would have it understood that I do not desire to limit myself to the precise construction and arrangement shown in the drawings and herein described, as various modifications or alterations may be made without departing from my original invention.

I claim:

1. A railway frog comprising in one integral structure, a body portion, a point, wing flanges, diverging extensions from the base of said point, and rails received between and secured to said extensions.

2. A railway frog comprising in one integral structure, a body portion, a point, wing flanges, and diverging extensions from the base of said point, said extensions being of reduced height adjacent their ends forming parts adapted to fit between the head and base of attached rails.

3. A railway frog comprising in a single integral structure, a body portion, wing flanges, a point, diverging extensions from the base of said point, and a support extending outwardly from said body portion beneath said extensions.

4. A railway frog comprising in one integral structure, a body portion, a point, wing flanges, extensions of said flanges at one end, and diverging extensions from the base of said point.

5. A railway frog comprising in one integral structure, a body portion, a point, wing flanges, extensions of said flanges at one end, and diverging extensions from the base of said point, said last named extensions being of reduced height adjacent their ends forming parts adapted to fit between the head and base of attached rails.

6. A railway frog comprising in one integral structure, a body portion, a point, wing flanges, and diverging extensions from the base of said point, said extensions being beveled on their inner sides outwardly from the main body of said frog.

7. In combination, a railway frog comprising in a single integral structure, a body portion, a point, wing flanges, diverging extensions from the base of said point, the inner faces of said extensions being tapered outwardly, and track rails the ends of which are received between and lie against said extensions, the end portions of said rails being bent toward each other and tapered on the outer sides of the rail heads to conform to the inner faces of said extensions.

8. In combination, a railway frog comprising in a single integral structure, a body portion, a point, wing flanges, diverging extensions from the base of said point, the inner faces of said extensions being tapered outwardly, and track rails the ends of which are received between and lie against said

extensions, the end portions of said rails being bent toward each other and tapered on the outer sides of the rail heads to conform to the inner faces of said extensions, and on the inner sides where said rails abut against each other.

9. In combination, a railway frog comprising in a single integral structure, a body portion, a point, wing flanges, diverging extensions from the base of said point, the inner faces of said extensions being tapered outwardly, and track rails the ends of which are received between and lie against said extensions, the end portions of said rails being bent toward each other and tapered on the outer sides of the rail heads to conform to the inner faces of said extensions, and on the inner sides where said rails abut against each other, said extensions being of reduced height at their outer ends forming parts fitting between the base and head of the attached rails.

10. In combination, a railway frog comprising in a single integral structure, a body portion, wing rails, a point, extensions projecting from the base of said point, and converging rails between said extensions, said converging rails lying against each other and being cut away on their abutting sides.

In testimony whereof, I have subscribed my name.

HENRY G. ELFBORG.

Witnesses:
J. R. CALLAN,
FRANK MCDONALD.