(No Model.) 2 Sheets—Sheet 1.

W. F. ELLIS.

RAILWAY FROG AND FOOTGUARD THEREFOR.

No. 539,677. Patented May 21, 1895.

Fig. 1.

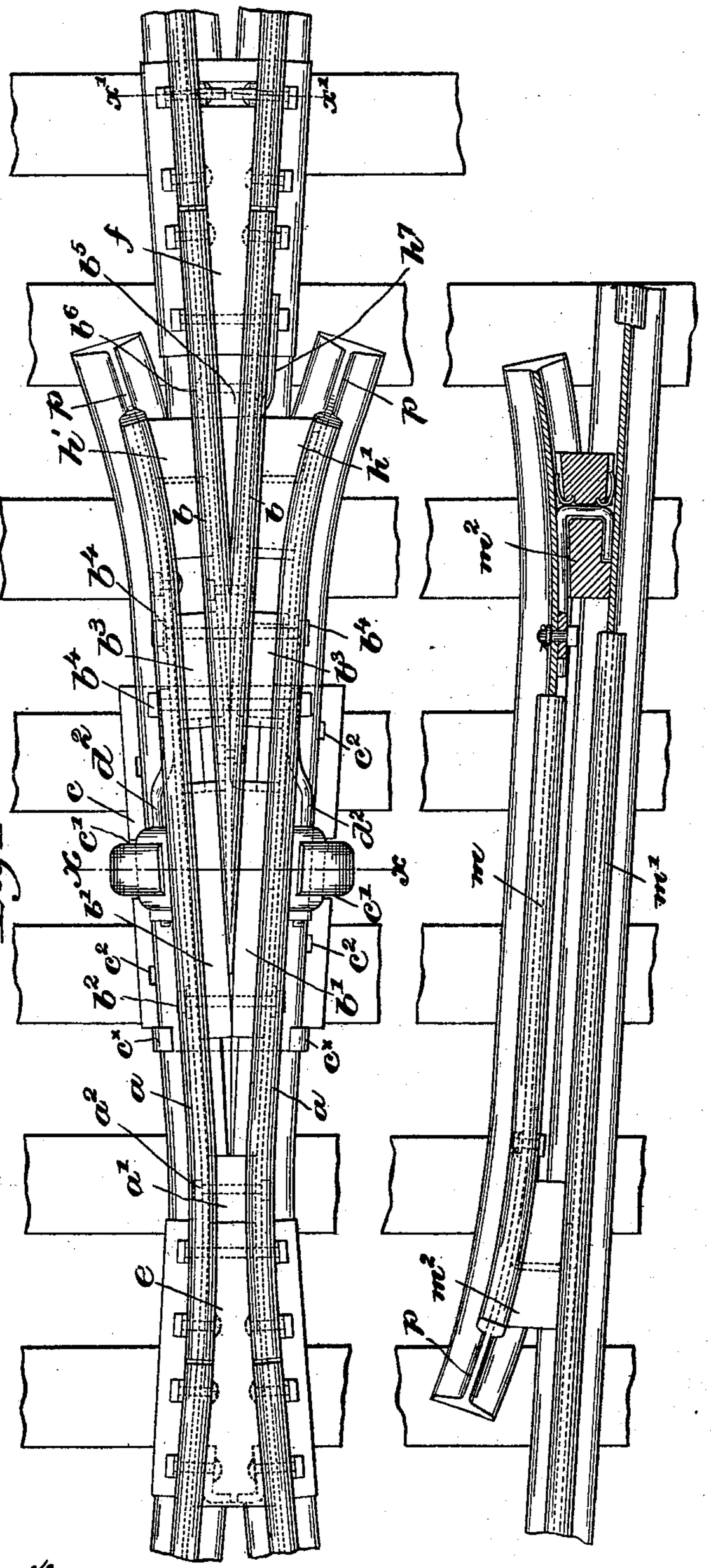

Fig. 5.

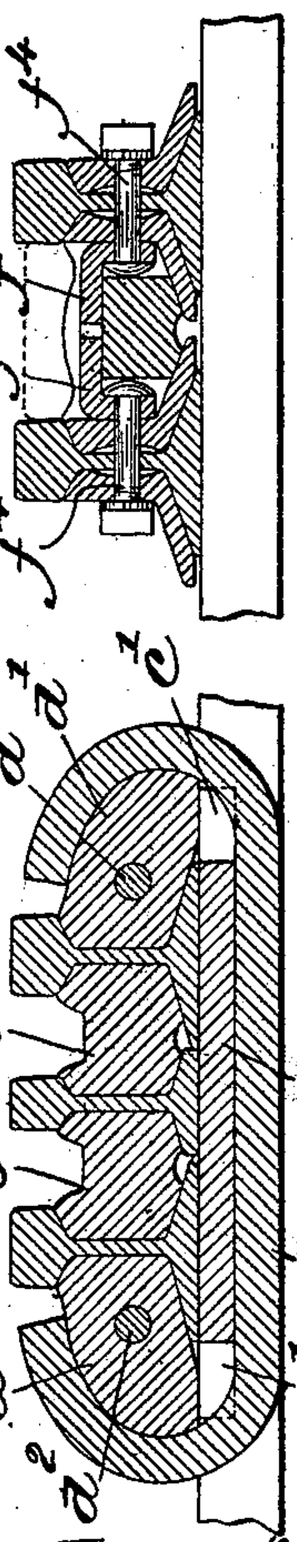

Fig. 6.

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Thomas L. Drummond

Inventor:
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by Crosby Gregory. Attys.

(No Model.) 2 Sheets—Sheet 2.

W. F. ELLIS.

RAILWAY FROG AND FOOTGUARD THEREFOR.

No. 539,677. Patented May 21, 1895.

Fig: 3.

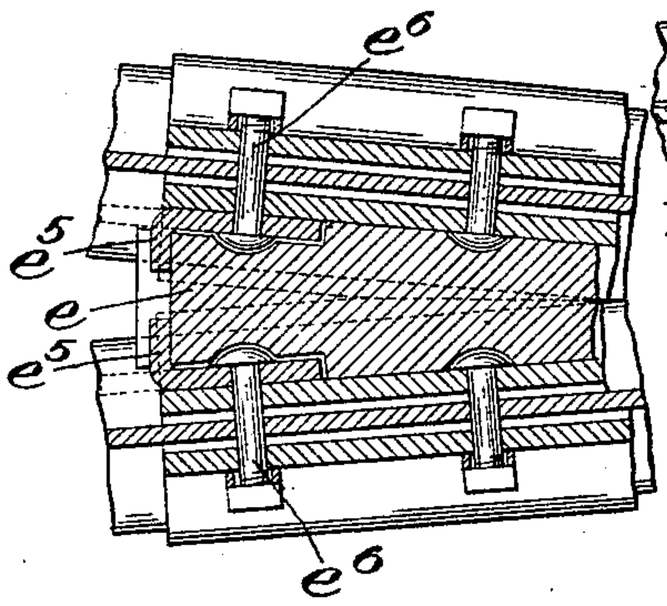


Fig: 4.

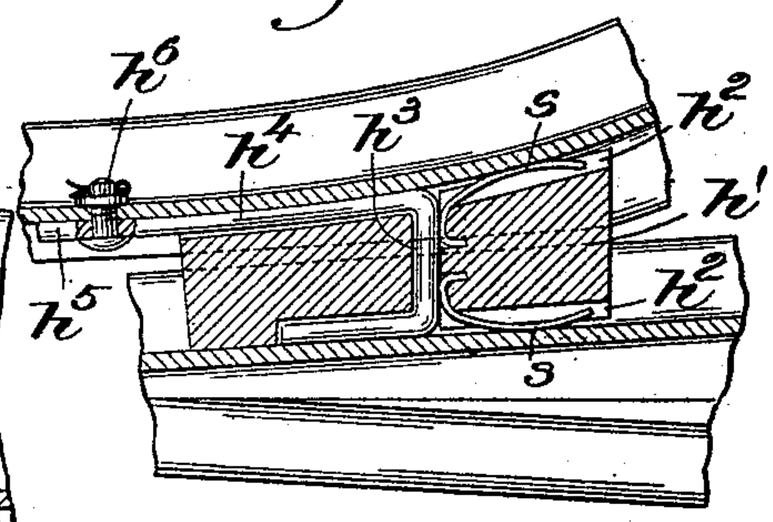


Fig: 6.

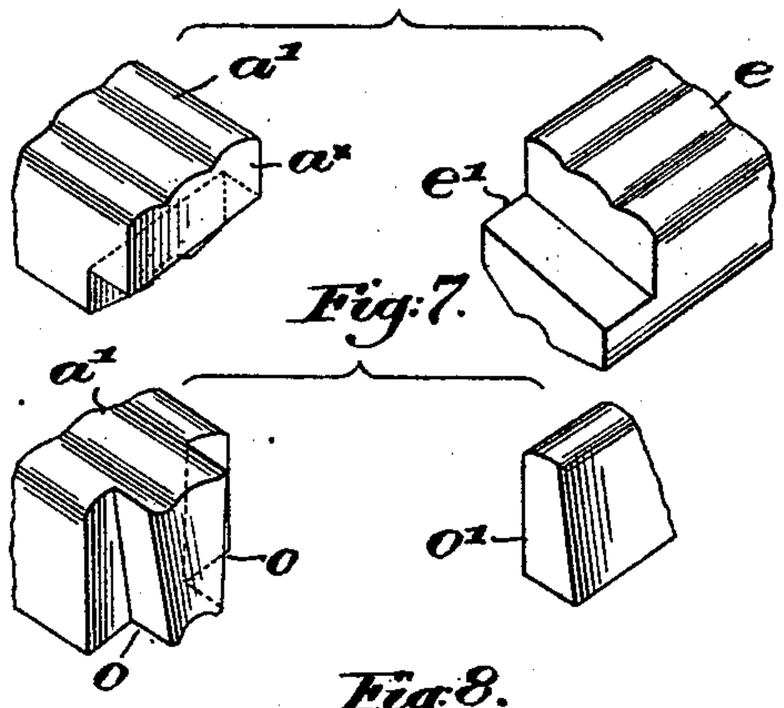


Fig: 7.

Fig: 8.

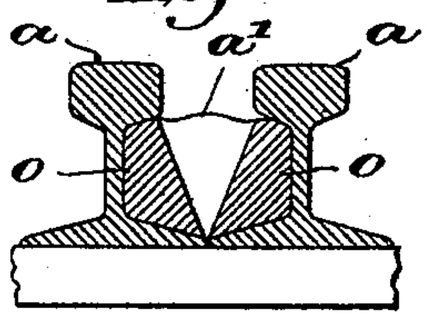


Fig: 5ª

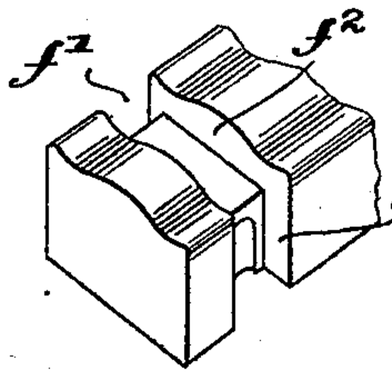
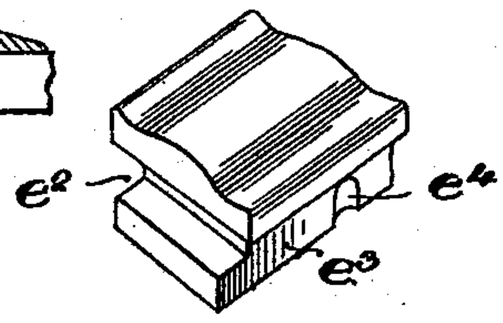


Fig: 3ª



Witnesses.

Edward F. Allen.

Thomas J. Drummond.

Inventor:

William F. Ellis.

by Crosby & Gregory.

Attys.

UNITED STATES PATENT OFFICE.

WILLIAM F. ELLIS, OF SOMERVILLE, MASSACHUSETTS.

RAILWAY-FROG AND FOOT-GUARD THEREFOR.

SPECIFICATION forming part of Letters Patent No. 539,677, dated May 21, 1895.

Application filed December 29, 1894. Serial No. 533,294. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. ELLIS, of Somerville, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Railway-Frogs and Foot-Guards Therefor, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to that class of track fittings commonly known as frogs or crossings.

The object of my invention is to improve the construction of fittings of the above class, which I shall hereinafter denominate "frogs," in a manner to provide greater safety both to traffic and workmen, but without adding materially to the cost of the frog.

Prior to my invention the rails of railway frogs have usually been secured in position in either of three principal ways, viz:—by means of bolts passed laterally, through and through the rails, uniting the latter together; by riveting the rails to an iron or steel supporting plate, or by clamping the rails together by means of yokes or clamps extended under and embracing the rails between their upturned ends. The first of these constructions, while probably used the most extensively is expensive to keep in repair, because of the rapidity with which the bolts shear or break by reason of the working of the rails, one with relation to the other, under the action of passing trains. The second construction is little used because of its great cost, but it is nevertheless a desirable construction, because of the supporting plate which prevents undue vertical movement of the rails with relation to each other, and thereby prevents shearing or working loose of the bolts or other fastenings. The last construction possesses great strength and is extensively used because of its moderate cost, but experience has shown that the vertical movement of the rails with relation to each other under the action of passing trains,—the rails having no under support,—acts after a time to loosen the yoke support.

In devising a fitting or frog embodying my present invention, I have employed the yoke because of its great permanent strength, combined with moderate first cost, and to support the rails against undue vertical play, which is the only movement which loosens the yoke construction, I provide, in combination with a yoke, a large metallic supporting plate, which is inserted between the yoke and the bases or feet of the rails, and is thereby held firmly in position supporting the rails without the expensive rivets or bolts heretofore considered necessary in the plate construction.

My invention also comprehends novel foot guards and means for securing the same to the rails of the frog, whereby drilling and removal of the rails for fitting the guards is rendered unnecessary.

Other features of my invention will be hereinafter described and pointed out in the claims.

In the drawings, Figure 1, in plan view, shows a frog with its accompanying guard-rail embodying my invention, the ties being broken away to narrow the figure. Fig. 2 is a cross-section taken on the dotted line $x\,x$, Fig. 1; Fig. 3, a horizontal section through the left or toe end of the frog and its connected track-rails, illustrating one manner of attaching a filling-block or foot-guard in position without drilling the rails especially therefor; Fig. 3^a, a perspective detail showing the filling-block or foot-guard shown in Fig. 3; Fig. 4, a horizontal section through one of the track and wing rails of and at the heel of the frog, illustrating another manner of securing a filling-block or foot-guard in position, Fig. 4, however, embodying the same idea or means as illustrated in Fig. 3; Fig. 5, a section shown in dotted line $x'\,x'$ at the right, Fig. 1, showing the fastenings as bent over the top of the filling-block or foot-guard, instead of bent horizontally, as in Figs. 3 and 4; Fig. 5^a, a perspective detail showing the filling-block or foot-guard shown in Fig. 5; Figs. 6, 7, and 8, details relating to the application of the "Hart" guard, to be referred to.

In the particular construction selected to enable my invention to be understood, and therefore shown in the drawings, referring to Figs. 1 and 2, a, a, are the usual outside or wing rails, and b, b, the usual point rails curved and arranged in usual manner, the toe of the frog being at the left, Fig. 1, and the heel at the right.

In the construction shown, the rails *a*, *a*, near the toe of the frog are shown as separated by a usual spacing block *a'*, through which and the said rails is passed a fastening rivet or bolt a^2, binding the whole firmly together. At the throat of the frog, the rails *a*, *a*, and *b*, *b*, are held in proper relative position by like spacing blocks *b'*, *b'*, through which and the several rails is passed a fastening bolt b^2, while farther on toward the heel of the frog are arranged other similar spacing blocks b^3, b^3, through which and the several rails are passed suitable fastening bolts b^4, all as common in frogs now constructed. Yet another spacing block b^5 is arranged between the point rails *b*, *b*, near the ends of the wing rails, through which is passed a bolt b^6, as shown.

Beneath the several rails composing the frog, and extending for a considerable distance at or about the middle thereof, adjacent the point, I have arranged a supporting plate *c*, of suitable material, as of iron or steel, the said supporting plate, herein at its middle, being notched as at *c'*, at its opposite edges to receive the yoke *d*, carried under the said plate, and having its ends curved upwardly through the said notches and bent over toward the outer faces of the outside rails, upon or over the filling blocks *d'* interposed between said upturned ends and the said outer rails, as best shown in Fig. 2. This yoke, commonly known as the "Offut" or "Ramapo" yoke, firmly binds the several rails of the frog together, and as herein constructed also firmly holds the supporting plate *c* in position, avoiding the use of rivets or bolts passed through the feet of the rails, as has heretofore been necessary when supporting plates have been used.

I have herein shown two tightening bolts d^2, d^2, extended through the filling blocks *d'* and having their rear ends provided with eyes, through which one of the fastening bolts b^4 is passed, to enable the said yoke to be drawn toward the heel of the frog when necessary, for tightening purposes. I have also herein shown the two corners $c^\times$, $c^\times$, of the supporting plate as struck up and over the outer edges of the outside rails, to assist in holding the supporting plate in its proper position against lateral movement, especially during transportation, the said plate being also provided with the usual holes c^2 for spiking the plate to the ties.

When the frog is placed in position, the supporting plate is of such length that it reaches from one to the other of and rests necessarily upon the two or three ties at opposite sides the depending yoke, so that the said plate prevents undue vertical play of the individual rails during the passage thereover of the trains, yet the fastening of the rails to the plate in my improved construction is not so rigid as to prevent that wave motion produced by a passing train, but which is not so excessive as to destroy the frog. On the contrary, it is desirable to provide for this wave motion.

By notching the supporting plate for the supporting yoke, longitudinal play or movement of the plate is prevented, and while I have herein shown a single yoke, it is evident more than one yoke or any other form of clamp may be employed as desired, as in frogs now commonly employed.

At the present time it is extremely difficult to provide suitable foot guards for frogs and other track fittings, the expense attending the use of efficient guards being at present so great that few permanent ways are properly protected by guards. To remedy this danger and to enable all frogs and fittings to be provided with proper guards, I have herein so constructed my improved frog, as to enable foot guards to be applied in a novel manner.

Referring now to the toe end of the frog, Figs. 1 and 6, the filling block *e* properly shaped to fit between the converging rails thereat, is shown as having its inner end provided at the bottom with a toe or projection *e'*, adapted to fit under the top projection $a^\times$ on the filling block *a'* so that the said filling block securely holds the inner end of the foot guard in position.

The outer end of the foot guard, as shown in Fig. 3ª, is provided at its end with a horizontal groove or channel e^2, while the sides of the foot guard are provided with end recesses or undercuts e^3 in which are the hollow or semi-circular recesses e^4.

Before the foot guard *e* is placed in position, two bars e^5 of Norway or other suitable iron or steel, perforated at one end, are placed as washers beneath the heads of the bolts e^6 employed to clamp the usual angle bars to the ends of the rails abutting the toe of the frog, the said bars e^5 then standing in the positions indicated in dotted lines Fig. 3.

After the foot guard has been placed in position with its toe *e'* under the projection on the spacing block *b'*, the end recesses e^3 permitting it to be replaced over the projecting bars e^5, the latter by suitable means are bent over or around the outer end of the foot guard and into the groove or channel e^2, as shown in Fig. 3, to thereby effectually hold the said outer end in position. The recesses e^3, may, if desired, be extended along its sides for its entire length, to clear the heads of the bolts uniting the angle bars to the rails, or separate semi-circular recesses, as e^4, provided at each bolt head.

Referring now to the heel end of the frog, I have shown a foot guard *f* arranged similar to the foot guard *e* at the toe end of the frog, its inner end or apex being provided with a toe which is inserted under the projection of the spacing block b^5 as with the spacing block *a'* referred to, but the outer end of the said foot guard block *f*, while held by holding bars bent over on the principle described in reference to Figs. 3 and 3ª, yet in this instance are

bent in a different manner. Best illustrated in Figs. 5 and 5ª. Referring to said figures the outer end of the foot guard block is shown as provided with the side recesses f', f', and with the top channel f^2, and the top of this foot guard block may, if desired, be brought up to nearly the top of the rail heads, as shown in dotted lines. Before the guard block is placed in position, two bars f^3, f^3, are placed as washers beneath the heads of the bolts f^4 uniting the angle bars to the track rails joining the heel of the frog, said bars f^3, however, in this construction being left in a vertical position instead of in a horizontal position as in Figs. 3 and 3ª. The filling block f is first inserted with its inner end under the spacing block b^5, its outer or wider end being then pushed or dropped into place, the side recesses f' clearing the vertical standing bars f^3, and after the guard block has been pushed into position, said bars f^3 are bent down over the same into the channel f^2, as shown in Fig. 5, to retain the block firmly in position. I have herein shown two ways of bending the holding bars over for the purpose of retaining the foot guard blocks in position, yet my invention is not restricted to the particular construction shown. The advantage of securing the foot guard blocks in position in this manner is that no holes need be drilled in the rails through which bolts may be passed to clamp the blocks in position, for the holding bars described, may be first secured by any of the usual bolts employed in the construction of the frog or track fitting or in securing the same to adjoining rails by means of usual angle or splice bars or plates, and made of sufficient length to enable them to be carried to and around the end or top of the block to be held in position.

Referring now to Figs. 1 and 4, h', h', are two foot guard blocks arranged between the point and wing rails at the ends of the latter. These blocks, as herein shown, are grooved at their opposite edges, preferably throughout their entire length, as at h^2, h^2, see Fig. 4, and are also shown as perforated at their middle from one to another of the said grooves or channels by a perforation or hole h^3. The block h' is shown as held in position by a bar h^4 herein shown as passed through the perforation h^3 and secured therein or to said block in suitable manner, it being herein shown as bent over at opposite sides the block, one of the bent ends, as h^5, being carried forward far enough to receive the pin or bolt h^6 passed through the web of the adjacent wing rail. The bar h^4 is bent as described before the block is placed in position, the said block being thereafter pushed in from the end of the wing until it is in position, after which it is fastened by the pin or fastening h^6. The advantage of this fastening is that the block can be fastened to the rail at one side after the block has been placed in position, and the frog in use, which is impossible at the present time. The block h' is secured in position in a similar manner, the holder-bar h^7, however, being extended rearwardly far enough to enable it to be held by one of the bolts clamping the angle bars to the rails as shown.

Referring to Fig. 4, I have shown two springs s, s, suitably attached to the sides of the block h', and which press against the sides of the adjacent rails to prevent the block rattling while in use, said springs also serving to take up slack or lost space between the block and adjacent rails when the latter are spread slightly in excess of the spread for which the block was particularly designed.

While I have herein shown two springs applied to the blocks h', said springs may be similarly employed in connection with the other block described, and one or more springs may be employed, as found necessary.

Heretofore foot guard blocks have been placed between the rails and bolted rigidly thereto by passing bolts through the same and the adjacent rails. Such method is objectionable, first, because the rigid bolting of the blocks between the rails at or near the ends of the frogs where the greatest play takes place does not give opportunity for the rails to have the necessary slight play one with relation to the other during the passage of the trains over some and not over others, the result being that the bolts holding the blocks are frequently sheared off or broken. Again, when the blocks are placed in position between two rails as heretofore, the rails must be either especially drilled for the holding bolts, or the bolts for holding the angle plates must be employed, they being made of sufficient length to reach through both rails, which is not desirable, inasmuch as the bolts would not then stand at right angles to the angle plates, which they are to hold. It is very necessary, however, that the foot guard block be secured to the rails instead of to the ties upon which the rails rest, for there is always more or less play between the rails and their ties and especially in the winter and spring of the year is this play most pronounced for at such times the frost acts most damagingly upon the ties, and frequently heaves or drops the same to such an extent as to require the rails to be shimmed up from the ties all the way from one half to two or more inches, and if the foot guards are attached to the ties it is evident that under such circumstances they will be either twisted from position and possibly heeled up above the rail heads thereby rendering it dangerous for the passage of trains, or they will be torn from their fastenings on the ties and left loose upon the rails, a constant menace to the lives of passengers on passing trains. With my improved construction, however the blocks are firmly held in position to the rails which they must guard, therefore free from the twisting action to which anything secured to the ties is subjected by the play of the latter, yet there is sufficient flexibility to the holding devices to permit free play of the rails

within the usual limits, without danger of breaking the fastenings, and by carrying the fastening bars to the nearest bolt used in the construction of the frog or the securing of the same in position, extra drilling of the rails is obviated, and also the use of the extra long fastening bolts for the angle plates, referred to.

In Fig. 1, I have shown a guard rail m, arranged against its adjacent track rail m' and provided at opposite ends with guard blocks m^2, such as are shown in connection with the frog, this serving to illustrate the application of my novel method of securing the blocks to other track fittings than the frog. Between the spacing blocks a', b', and b', b^3, foot guards should also be arranged, but in such places, as in other similar places, in connection with track fittings, railroad officials frequently wish to use what is known as the "Hart" foot guard. Shown at the right in Fig. 7.

The usual method of attaching the "Hart" guards is to bolt them to the adjacent rail or spike them to ties, or both, but neither of these methods is satisfactory, the first because of the necessity for drilling the rail, and the second for lack of security and because of the movements of the tie described to which the same may be spiked.

Referring to Fig. 7, illustrating the construction Fig. 1, on an enlarged scale, I have provided the spacing block a' with a recess o shown as in the corner of the block into which the end of the "Hart" guard o' is inserted, as shown in Figs. 1 and 8. This end of the "Hart" guard is thus securely held in posisition by the said spacing block and the other end may be similarly held, it being deemed unnecessary to illustrate the same, the spacing blocks being preferably provided at each side with a recess o' in order that they may hold the ends of two "Hart" guards.

The holding recess for the Hart guard need not necessarily be exactly as I have shown it, I considering myself to be the first to hold the guard by inserting its end or a part thereof into a recess or under the end of the filling block.

My invention is not limited to the particular construction of parts herein shown nor so far as concerns the application of the foot guards to the particular track fitting shown.

In the claims I have used the term "frog" but it is evident a crossing or other equivalent fitting where there are two diverging rails to be guarded will be included within the said term.

I claim—

1. A frog, consisting of a plurality of rails, a supporting plate therefor, and a yoke extended under said supporting plate, and embracing the outer rails, substantially as described.

2. A frog containing a plurality of rails, and a yoke extended under and having its ends formed to embrace the same, and a supporting plate for the rails interposed between the same and said yoke, and notched at its edge to receive the end of said yoke, substantially as described.

3. In a frog, a plurality of rails, and a yoke embracing the same, combined with a supporting plate arranged between said yoke and rails, and having one or more ears bent up and over the edges of said rails, substantially as described.

4. In a frog, the combination of a plurality of rails, spacing blocks separating the same and the blocks d', combined with a yoke embracing the said rails and blocks, and the interposed supporting plate held by said yoke, substantially as described.

5. In a railway track fitting, the combination with two rails, and a substantially solid foot guard block filling the space between the same, of a holding bar independent of and secured to said block and carried longitudinally of the block beyond its end and secured to one of the adjoining rails, whereby said block remains always with the rails substantially as described.

6. In a railway track fitting, the combination with two rails, and a foot guard or filling block arranged between the same, of a holding bar arranged between the said filling block and the rail at its side and secured to one of the said rails the end of said bar being turned over and to hold said block in position, substantially as described.

7. The combination with two diverging rails, and foot guard or filling block arranged between the same, and grooved, of a fastening bar secured to one of said rails, and bent at its end into the said groove, substantially as described.

8. The combination with a frog, and adjacent track rails united thereto by angle plates and bolts as described, of a guard block adapted for insertion between adjacent rails, and a fastening bar held at one end by one of said bolts, and at its opposite end bent to engage and thereby hold the said block, substantially as described.

9. The combination with a frog, and adjacent track rails united thereto by angle plates and bolts as described, of a guard block adapted for insertion between adjacent rails, and grooved to clear the heads of said fastening bolts, and a fastening bar held at one end by one of said bolts, and at its opposite end bent to engage and thereby hold the said block, substantially as described.

10. In a railway track fitting, the combination with two rails, and a block interposed between the same and provided with a holding recess, of a guard or block adapted at its end to enter said recess, whereby said block operates to hold the adjacent end of said guard or block without the use of bolts or other fastening devices, substantially as described.

11. In a track fitting, the combination with two rails, and a block between the same, and

provided with a holding recess, of a guard block interposed between said rails, and having one end projected into and held in said recess, and a fastening bar secured to one of said rails or a continuation thereof, and at its opposite end bent over and to hold the said guard block, substantially as described.

12. In a railway track fitting containing two rail sections, a foot guard, combined with a spacing block separating said rails and socketed at its corner to receive the end of said foot guard, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM F. ELLIS.

Witnesses:
FREDERICK L. EMERY,
AUGUSTA E. DEAN.