June 30, 1970 W. BIRNBACHER 3,518,423

CROSSING FROGS FOR RAILWAY POINTS

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FIG. 1

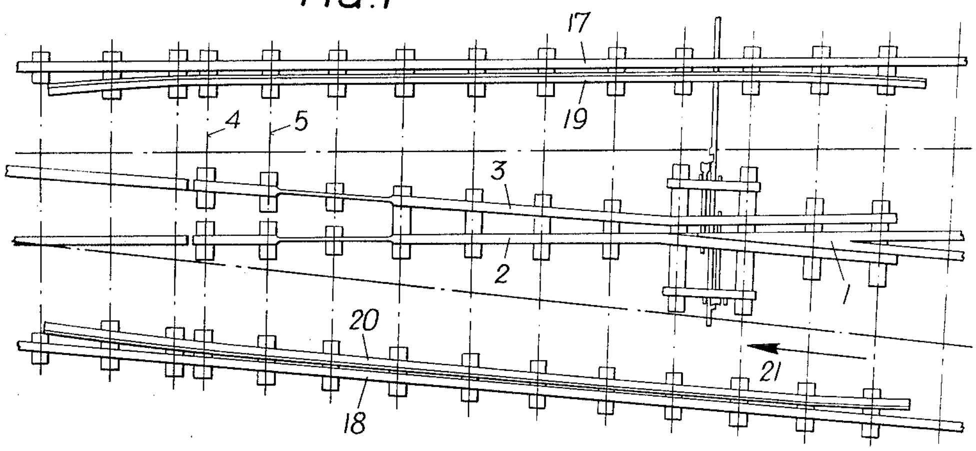

FIG. 2

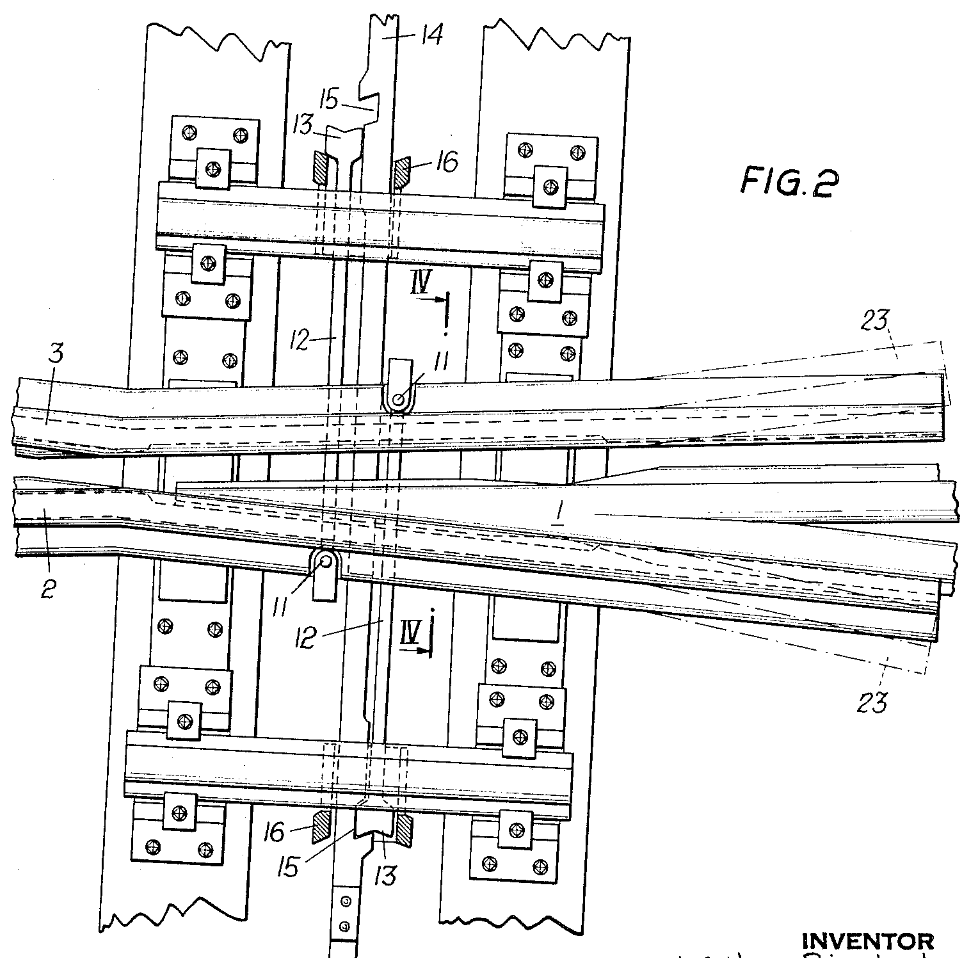

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FIG. 3

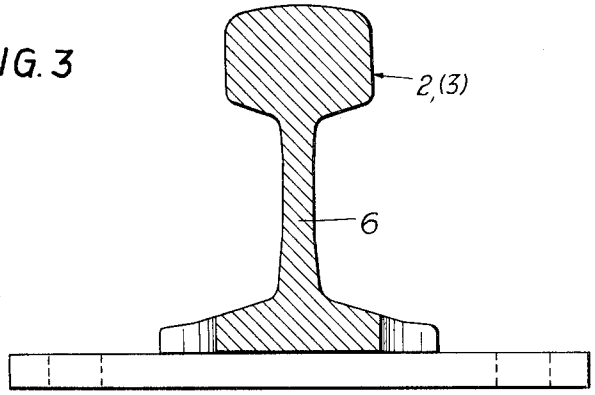


FIG. 4

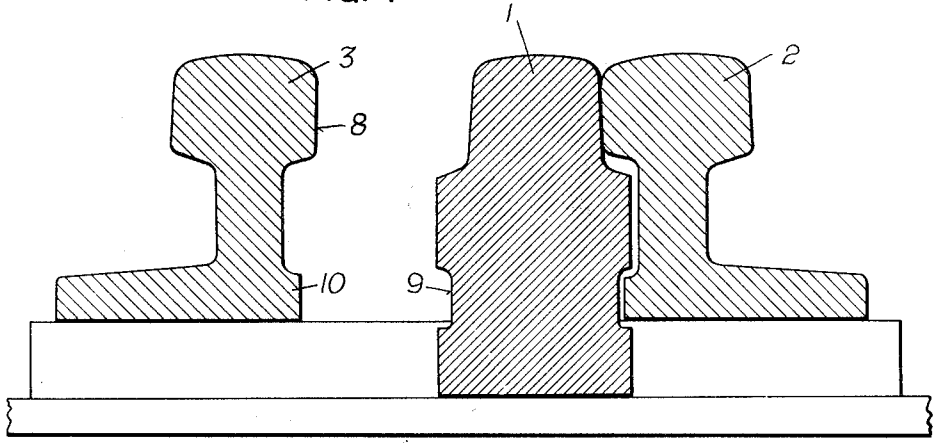
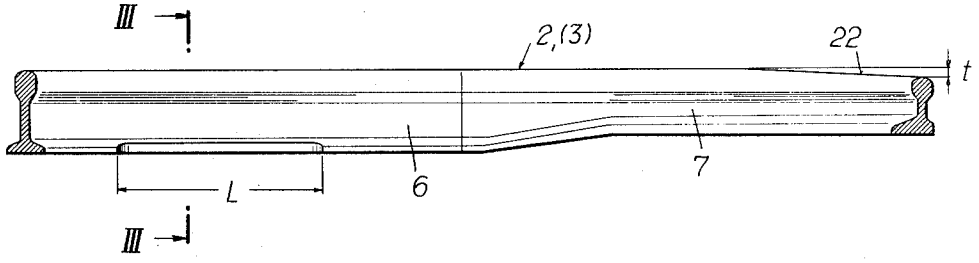


FIG. 5



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CROSSING FROGS FOR RAILWAY POINTS

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U.S. Cl. 246—468 4 Claims

ABSTRACT OF THE DISCLOSURE

Crossing frog for rails including a frog tip and two vane rails surrounding the frog tip wherein both of the vane rails are arranged for swivelling movement such that one of the two vane rails is always in contact with the frog tip in the end position of the swivelling range. The frog tip and each of the vane rails include mutually corresponding lateral projections and recesses which engage when one of the vane rails contacts the frog tip. The vane rails may include a shortened rail base portion, a recess being provided in the vane rails between the rail head and the shortened rail base portion for engagement with lateral projections on the frog tip. An ascent may be provided at the free end of each of the vane rails to prevent a train from being de-railed in the event of a maladjustment of the rail switch or of one of the vane rails.

The invention refers to crossing frogs of railway points, i.e. to that part of railway points where the leading edges of two rails are crossing one another and where grooves are provided for the passage of a wheel flange. Such a crossing frog for railway points has a so-called frog tip which is formed of the two rails converging in direction to the respective switch-tongue and being connected with one another. Adjacent to said frog tip vane rails are arranged which represent extensions of the other two rails converging at the frog tip. In view of different wear of the wheel flanges it is not possible to relatively adjust the height of vane rails and frog tips such that a silent, shock-free passage of the wheel is secured. At passage of a wheel over the frog tip, frog tip and vane rail are subjected to strong shocks accompanied by heavy wear of said both parts. Further, such shocks also give rise to strong stress of the rolling material and noise production which is quite disturbing for the passengers. For these reasons it has been tried to reduce such shock stresses by specially constructing single constructional parts, for instance by giving the vane rails an excessive height, by tapering or otherwise changing the height of the frog tip or by selecting materials of improved quality, but a substantial success has not been attained.

Further, there has been proposed a frog tip for railway points in which an interruption of the leading edge is avoided. To accomplish this, it has been proposed to pivotally support the frog tip and to selectively adjust this frog tip such to lie closely to the right-hand or left-hand vane rail in dependence on the position of the railway points. Such a frog tip did not prove successful in practice. With such a known construction it was, above all, not possible to sufficiently secure the frog tip against rising movement, which movement might cause railway cars to go off the rails.

Guiding means for the pivotable frog tip with known constructions were not only provided on the railway sleepers, which have too great a distance for sufficiently supporting the frog tip particularly at its thin end portion, but also at the stationary vane rails. For this reason it was not possible to pivotally arrange the vane rails, because such arrangement is not suitable for sufficiently

guiding the frog tip. In a further known construction one vane rail is movable such that it may resiliently lie on the frog tip and the other vane rail is stationary, whereby the end portion of the frog tip is connected to the stationary vane rail by means of spacing elements and such is reliably supported. Such an arrangement suffers from the drawback that in view of only one vane rail being movably arranged an improvement is only achieved for one position of the railway points (railway switch). Said known construction further suffers from the drawback that the vane rail arranged resiliently can be brought to oscillations at passage of rapid trains, which oscillations might cause opening of the vane rail. The known construction mentioned therefore does not provide absolute security.

The present invention now aims at avoiding the drawbacks mentioned above and at providing a crossing frog for railway switches, which can be surpassed in both directions without an interruption of the leading edge of the rails and the frog tip of which is reliably guided and secured in its position, respectively. The invention essentially consists in that both vane rails are swivel-mounted and in one end position of the swivelling range one of these vane rails lies closely to the frog tip and in that the frog tip is provided with lateral projections, which engage recesses in the vane rail being contacted by the frog tip. With this shape of vane rails and frog tips, the frog tip is reliably secured to the just contacting vane rail such that a rising movement of the vane rails is completely made impossible. The frog tip of a crossing frog according to the invention is not rigidly connected to the vane rails, but releasably connected to the respective contacting vane rail, whereby, however, the same effect is obtained as with a rigid connection between frog tip and vane rail, but additionally swivelling movement of both vane rails is possible. By this arrangement of the frog tip it is made possible to give the end portion of the frog tip a very small tapering angle and in spite of this to give the frog tip in its end portion also the necessary cross section. It is convenient to provide the recess within the vane rail between the shortened rail base and the rail head, so that rails of normal profile can be used as vane rails with little modification.

According to a further feature of the invention the vane rails can be locked in both end positions of their swivelling range so that unintended maladjustment of the vane rail during train passage is avoided.

Anchoring of the frog tip can be further improved by fixedly connecting, preferably welding, the frog tip to a base plate, preferably forming a guide for the vane rails.

According to railway regulations it is necessary to provide means for preventing trains travelling in direction to the switch tongues of the railway switch to get off the rails. For this purpose the vane rails are, according to the invention, provided at their free end with an ascent onto which the wheel flange is smoothly running such that it may pass over the frog tip. For the same purpose the vane rails may alternatively or additionally be bent outwardly such that the wheel flange runs between vane rail and frog tip and pushes away the frog tip.

The invention is further illustrated with reference to the drawing in which an embodiment of a crossing frog according to the invention is shown.

FIG. 1 shows in principle a crossing frog of a railway switch according to the invention. FIG. 2 shows constructional details of said crossing frog. FIG. 3 is a section along line III—III of FIG. 5 and FIG. 4 is a section along line IV—IV of FIG. 2. FIG. 5 is a side elevation of a vane rail showing features according to the invention.

As is shown in FIGS. 1 and 2, a crossing frog of a railway switch consists of a frog tip 1 and of two vane rails 2 and 3 surrounding said frog tip 1. The vane rails 2 and 3

are fixedly attached to the sleepers **4** and **5** and consist, as is shown in FIG. 5 and is the case also with resilient switch tongues, of a portion **6** with normal rail profile and of a portion **7** of reduced height, both portions being welded to a single unit. For facilitating lateral adjustment movement of the resilient vane rail the portion **6** thereof has over a length L a rail base of reduced width, as is shown in FIG. 3. The frog tip **1** is welded to a base plate as shown in FIG. 4 which also provides a guide for both vane rails **2** and **3** and securely supports the frog tip in its end portion.

As is shown in FIG. 4, the vane rails **2** and **3** are provided with an inclined contacting face **8** at the area with which these vane rails are contacting the frog tip **1**, said inclined face being arranged to suit the head portion of the frog tip **1**. Furthermore, the frog tip **1** is provided in the area of contact with the vane rails **2** and **3**, respectively, with a recess **9** which is engaged by a projection **10**, represented by a shortened half of the rail base of the vane rails **2** and **3**, respectively.

For unobjectionable performance of a crossing frog of a railway switch according to the invention it is essential that both end positions of the swivelling range of the vane rails be lockable, so that the respective vane rail contacting the frog tip **1** is securely anchored in its position. This is achieved by a locking means known per se in connection with switch tongues. As is shown in FIG. 2, one clamp **12** is provided for each vane rail **2** and **3**, respectively, and connected to its associated vane rail by means of a joint **11**, whereby the clamp **12** is provided at its end distant from the joint **11** with a clamp head **13**. Both clamps are shifted by a rod **14**, which is provided with recesses **15**. A locking part **16** for each of the clamps is also provided. In locking position of the clamp its head **13** is situated outside the locking part **16**, whereas in released position of the clamp its head **13** engages the associated recess **15** of the rod **14**. By stationary locking the clamp head **13** with the aid of the locking parts **16** and the rod **14** movement of the vane rail **2** or **3** is impossible also under the influence of heavy shocks as occurring at passage of rapid trains. Control of movement of the rod **14** and, with this, control of swivelling movement of the vane rails conveniently is coupled to the control for swivelling the associated switch tongue, coupling being effected either mechanically by means of suitable links or by electrical means.

As it is not possible to laterally support the vane rails in their position contacting the frog tip, with the outermost rails **17** and **18**, guide rails **19** and **20** are cooperating which extend over the whole length of the movable vane

rails **2** and **3**, respectively. With this arrangement the vane rails **2** and **3** are not subjected to laterally acting forces.

To prevent a train travelling in direction of arrow **21** from getting off the rails in case of maladjustment of the rail switch or of the vane rails, respectively, the vane rails **2** and **3** are, as is shown in FIG. 5, provided at their free ends with an ascent **22**, the height *t* thereof being dimensioned such that also wheel flanges maximally worn out are smoothly travelling onto said ascent. For the same purpose instead of the ascent mentioned the vane rails **2** and **3** may at their free ends be bent outwardly, as is shown in FIG. 2 in dash-dotted lines at **23**. With this arrangement in case of a maladjustment of the rail switch the wheel flanges are penetrating between vane rail **2** and frog tip **1** such that the frog tip **1** is pushed away. In this latter mentioned case the clamps **12** must be interchanged such that the clamp **12**, being attached to the vane rail **2** as shown in FIG. 2, is attached to the vane rail **3**, and vice versa.

What I claim is:

1. Crossing frog for rails, comprising a frog tip and two vane rails surrounding the frog tip, means supporting each of said vane rails for swivelling movement such that one of said two vane rails is always contacting said frog tip in the end positions of the swivelling range, said frog tip and each of said vane rails including mutually corresponding lateral projections and recesses which engage when one of said vane rails contacts said frog tip.

2. Crossing frog according to claim **1**, wherein each of said vane rails are formed by Vignol-rails having a shortened rail base, each of said vane rails including a recess in the region of the stem of the rail between the rail head and the shortened rail base, said frog tip including lateral projections engaging in said recess of a vane rail in contact therewith.

3. Crossing frog according to claim **1** further including means for locking each of said vane rails in both end positions of their swivelling range.

4. Crossing frog according to claim **1**, further including an ascent at the free ends of each of said vane rails.

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