Jan. 22, 1952 L. ROSENBLATT ET AL 2,583,278

ADJUSTABLE RAILWAY CROSSING

Filed March 14, 1950 2 SHEETS—SHEET 1

FIG. 1.

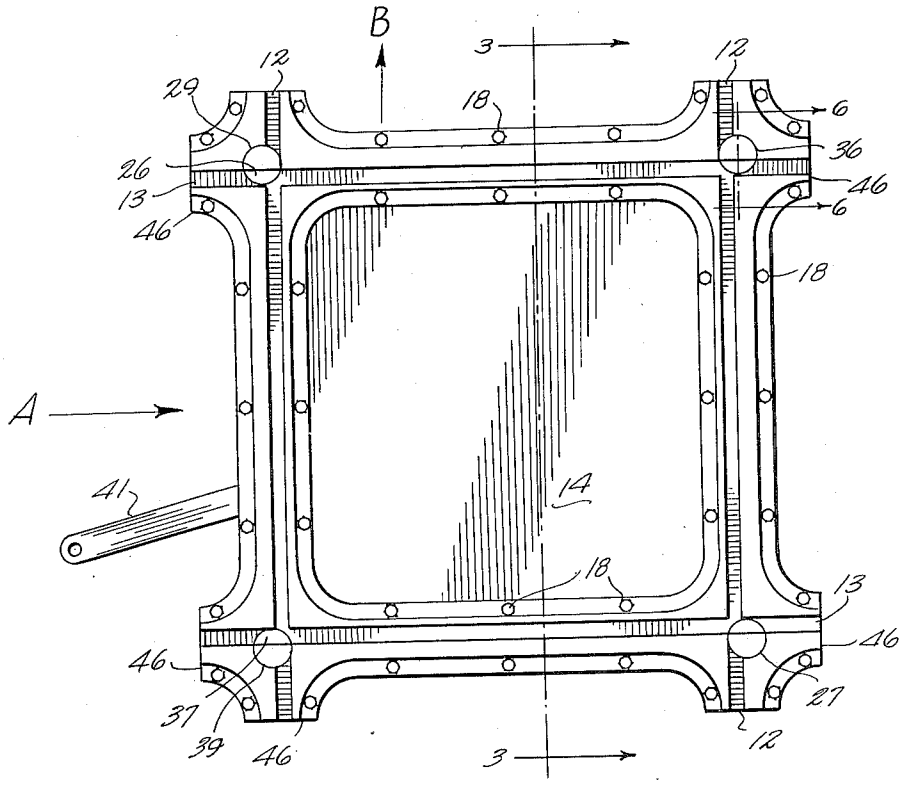


FIG. 3.

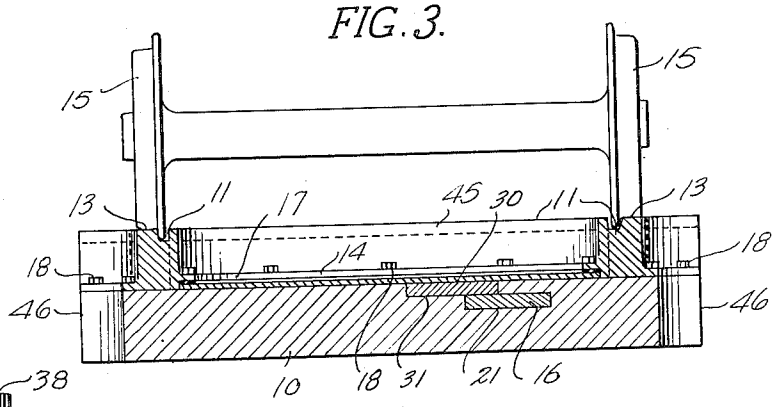
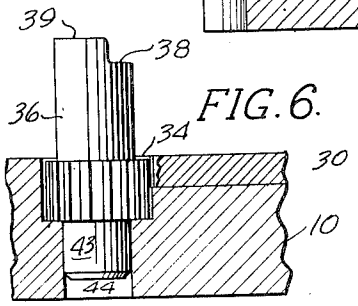


FIG. 6.



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FIG. 2.

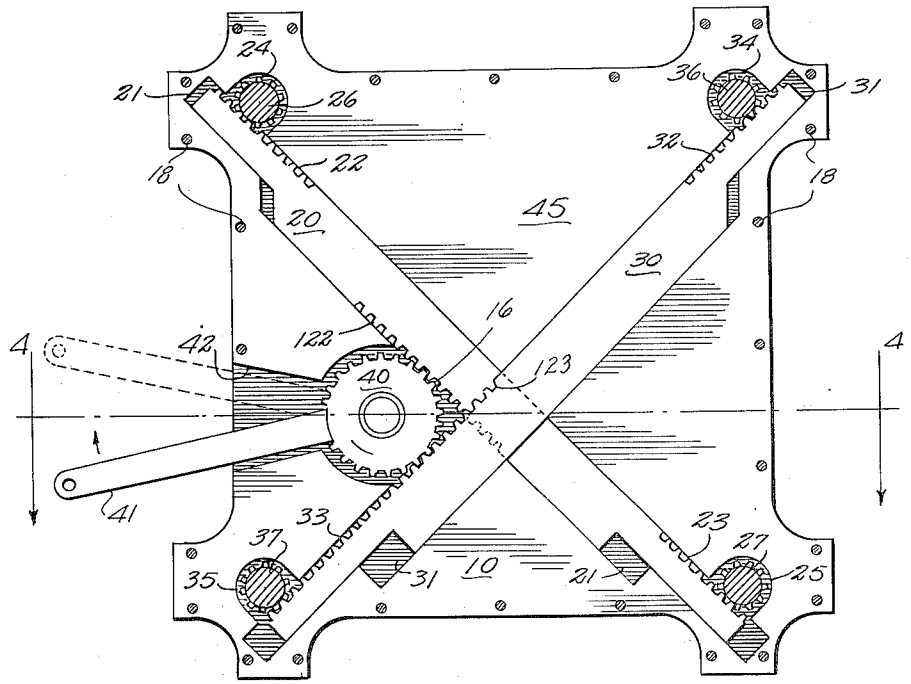
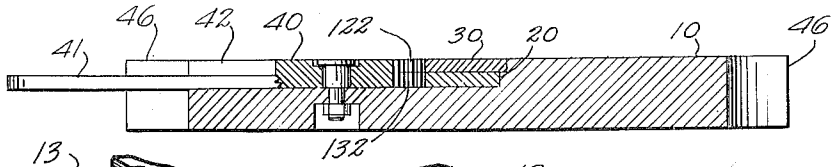


FIG. 4.



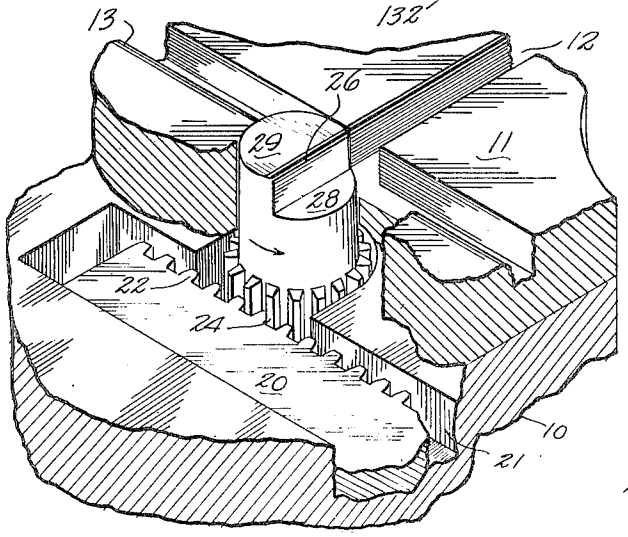


FIG. 5.

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Patented Jan. 22, 1952 2,583,278

UNITED STATES PATENT OFFICE

2,583,278

ADJUSTABLE RAILWAY CROSSING

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Application March 14, 1950, Serial No. 149,474

3 Claims. (Cl. 246—378)

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This invention relates to an improved railway crossing.

It is well known that railroad crossings commonly are a source of extra maintenance expense both to the tracks and the rolling stock using them. Further, they are a source of considerable noise, bouncing of the equipment, and disturbance of the roadbed. They are built generally as a unit welded from pieces of standard rails, with the intersections being reinforced and welded together in the form of a rectangular spider. The connecting rails of the tracks passing towards the crossing are attached to the rail spurs projecting from the unit. Where the actual crossing points or intersections of the unit are situated, there are usually grooves of lesser depth than the size of the wheel flanges requires, so that when the rolling stock passes over the unit, the wheels are lifted and then bounced with resulting hammering of the rails. If the train is going very fast over the crossing, there is great danger of its being derailed, with the consequent damage and trouble. In this invention, the matter of the wheel flange interference is eliminated and overcome by providing a special frog component at each intersection point that carries the wheels of the trains without interfering with the flanges thereof to any degree that is noticeable. Each frog component is rotatable in a framework of false rails that is mounted on a substantial bed plate and is actuated by a gear and rack mechanism. The frog components rotate at each particular intersection point and incorporate themselves into the pair of track rails meeting in that vicinity, so that these rails will be solidly aligned or joined for the wheels to pass over without obstruction, while the other pair of rails is open or non-continuous with the respective frog rotated into the way of any wheels that pass over it at the moment. The frogs are renewable and readily replaceable, and they are rotated by a gear and rack mechanism lying flat on the bed plate.

It is an object of this invention to provide a new and improved track crossing assembly that will avoid one or more of the disadvantages and limitations of the previous art.

Another object of the invention is to provide a new and improved track crossing assembly that will provide for practically noiseless passage over of a train.

A further object of this invention is to provide a new and improved track crossing assembly that will provide an effective connection between tracks crossing it from different directions, and

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which can be varied at the crossing to facilitate the movement of the train having the right of way across it at the predetermined times.

An additional object of the invention is to provide a new and improved track crossing assembly that can be actuated by a simple mechanism that operates effectively and positively without much effort.

Still another object of the invention is to provide a new and improved crossing assembly that will rigidly align with the tracks it connects to, will retain switching arrangements for diverting the trains to the proper direction, and will have its components arranged for easy inspection and replacements.

Other objects will become apparent as the invention is more fully outlined.

For a clearer comprehension of the invention and its objects, reference is made to the attached drawings wherein an illustrative form of the invention is shown only by way of example.

In the drawings:

Figure 1 is a plan view of a track crossing embodying this invention;

Figure 2 is a plan view of the operating mechanism of the crossing with its cover and the false crossing base removed;

Figure 3 is a transverse vertical section taken on the line 3—3 of Figure 1; train wheels on an axle being included to show their relation;

Figure 4 is a transverse vertical section taken on the line 4—4 of Figure 2;

Figure 5 is an enlarged perspective detail of the switching frog mechanism used in this embodiment;

Figure 6 is a fragmentary transverse vertical sectional detail of frog structure taken on the line 6—6 of Figure 1.

Similar parts throughout the drawings are designated by the same reference numerals.

The particular form of railway crossing shown in the drawings comprises a rectangular bed plate 10 which is the foundation on which the assembly components rest and is installed flat on the ground or ties below the track level. An open rectangular false track crossing base plate 11 mounted on the bed plate 10 is formed with grooves 12 and 13 to simulate the conventional track rail cross-section on which the wheels 15 of a train usually run. The grooves 12 and 13 are arranged in this instance parallel to the sides of the false base plate and to intersect without continuity at right angles in the form of a square to conform to the usual layout of a railway track crossing, and has a central square opening 15.

The false base 11 is strengthened by the attachment thereto of a square cover plate 14 which extends across the opening 15 and has a gasket 17 installed between it and the bed plate 10 to make it watertight. The cover plate 14 is held in place by stud bolts 18 threaded into the bed plate 10 and is easily removable.

Two crossed shuttle rack bars 20 and 30, respectively, which are flat, are reciprocable endwise in slots 21 and 31, respectively, formed in the top of the bed plate 10 and extending diagonally through corners of the bed plate. The bar 20 is equipped with sets of rack teeth 22 and 23 at opposite ends of and on the same side of the bar, which are meshed with pinions 24 and 25, respectively, which are in turn keyed on axially rotatable, vertical cylindrical frogs 26 and 27. The shuttle bar 30 has sets of rack teeth 32 and 35 at its opposite ends which are in mesh with pinions 34 and 35 which are keyed to the frogs 36 and 37, respectively. The frogs 26, 27 and 36, 37 are notched at one side of their upper ends to conform to the contour of the wheel flange grooves 12 and 13 in the false base 11, the notches defining ledges 28 and 38 which are on a level with the bottom surfaces of the grooves 12 and 13. The tops of the frogs are on a level with the upper surface of the false base 11. Thus, in one position of the frogs the ledges align with the bottoms of the grooves 12 and 13 running in one direction across the crossing and allow the flanges of wheels 15 of a train to pass unobstructedly through the grooves and the frog notches while, at the same time, the semi-circular heads 29 and 39 on the frogs 26, 27 and 36, 37, respectively, defined by the notches, close the grooves running in the other direction across the crossing, as shown in Figure 5.

The shuttle bars 20 and 30 are provided with main rack teeth 122 and 123 at their middles on the sides thereof opposite the first-mentioned sets of rack teeth 22, 23 and 32, 33. The rack teeth 122, 123 are meshed with the main operating pinion 40. The pinion 40 is journalled in the bed plate 10 in a suitable recess therein and at a point offset slightly toward two adjacent sides of the bed plate, and is operated by hand through a single hand lever 41 projecting radially from the pinion 40 and extending out beyond the base plate 11 and the bed plate 10 of the assembly, so that it can be readily manually actuated. The hand lever 41 is secured in a tapering slot 42 in the bed plate 10 and is limited in its swing by the sides of the slot 42 which are set at an angle of about 20°. The relative diameter of the operating pinion, which is substantially larger in diameter than the frog pinions, are such that swinging the hand lever 41 in either direction can turn the frogs 90° in either direction. All of the pinions are set in recesses formed in the top of the bed plate 10 to allow them to operate properly and without projecting above the top of the bed plate, where they might interfere with other moving parts of the mechanism. The shuttle bars 20 and 30, are, for similar reasons, arranged in their slots so as to place them at different levels, one above the other, below the top of the bed plate 10.

The operation of the device set forth in the following description is predicated upon movement of a train from left to right across the crossing assembly, as indicated in Figure 1 by the arrow A. Similarly, the arrow B indicates movement

of a train across the device at right angles to direction A.

In Figure 1, the crossing assembly being adapted to permit trains to pass in the direction of the arrow A, the wheels of a train moving across the assembly in the direction of the arrow B are obstructed by the heads 29, 39 of the frogs, with the result that the flanges of the train wheels would be raised out of the grooves 12 and 13 in striking these heads.

In Figure 2 the shuttle bars 20 and 30 have been moved toward the top of the drawings, the handle 41 having been swung in a counterclockwise direction. If trains moving in the direction of the arrow B have to be served, the hand lever 41 is swung in a clockwise direction until it strikes the upper side of the slot 42 and is stopped thereby. This rotates the pinion 40 clockwise and causes the shuttle bars 20 and 30 to move toward the opposite side of the assembly, thereby rotating the frogs through angles of 90° and opening the grooves in the device running in the direction of the arrow B and closing the grooves running in the direction of the arrow A. The frogs 26, 27 and 36, 37 are mounted on their cylindrical spindles 43 in the holes 44 with their centers offset from the grooves 12 and 13 to enable the above described functions of the frogs to take place, as shown in Figure 1. The shuttle bars are retained in place in their respective slots by the cover plate 14. The sides of these slots guide the shuttle bars, which are made long enough to provide for any adjustment desirable in their positions. The use of the rack and pinion arrangement, while particularly effective for moving the bars and frogs, serves to prevent creeping thereof when in a shifted position, because such arrangements do not move out of position easily.

It will be noted that the mechanism structure is relatively simple, and that the shuttle bars may be conveniently and expeditiously placed in position. Also, if it is desired to remove the mechanism, it may be done without much trouble. This is done by taking off the cover 14 and lifting the bars 20, 30, with the pinions and frogs out of the recesses; no bolts or fastenings other than those for the cover being involved. If it is desired to use the crossing without the switching frogs, it can be done. The frogs are simply lifted out of their positions in the assembly by unkeying or unfastening them from their respective operating pinions. This leaves the rail grooves free of any impediment or the need to switch them from one set of tracks to the other, but the lack of continuity at the intersections will be a source of bumping, as in conventional crossings.

The assembly avoids the need of conventional rails in its make-up. Instead, it provides a very substantial false track crossing base in their place grooved or channeled for the same purpose. This makes a more rigid unit, and thereby prevents misalignments that can happen in the conventional types of crossings. The joining of the train tracks leading to the extension spurs 46 of the unit can be arranged readily. The groove or channel arrangement, with the frogs in place switched for train passage, avoids any open spots or lack of continuity to cause noise and bumps as the wheels roll over the intersections. This also eliminates the possibility of derailment at these points. The assembly is also adaptable to an automatic block system, as it only requires the coupling of the system to the

hand lever of the device. The operation can be made practically noiseless, and the mechanism is concealed and protected. The installation of the whole assembly can be done easily and expeditiously and its structure lends itself to accurate leveling and other desirable operations involved in replacement, maintenance and adjustment.

While only one particular form of the invention is illustrated and explained herein, it is not desired to limit its construction to that form specifically, as it is appreciated that other forms could be developed and made that would use the same principles and come within the scope of the appended claims.

Having thus described the invention, what is claimed is:

1. In a railway crossing, a rectangular bed plate, a rectangular base plate mounted on said bed plate, said base plate being formed with pairs of laterally spaced wheel flange grooves intersecting at right angles with respect to each other with the grooves positioned parallel to adjacent sides of the bed plate, vertical cylindrical frogs mounted on said base plate in the region of the intersections of the wheel flange grooves for rotation on vertical axes, said frogs including laterally offset semi-cylindrical heads on their upper ends and pinions, two crossed shuttle bars mounted on said bed plate for endwise movement and extending diagonally between corners of said bed plate, said shuttle bars having rack portions at their opposite ends in mesh with related ones of the frog pinions and intermediate rack portions intermediate their ends, and a single lever operated pinion mounted on said bed plate in mesh with said intermediate rack portions of the shuttle bars.

2. In a railway crossing, a rectangular bed plate, a rectangular base plate mounted on said bed plate, said base plate being formed with pairs of laterally spaced wheel flange grooves intersecting at right angles with respect to each other with the grooves positioned parallel to adjacent sides of the bed plate, vertical cylindrical frogs mounted on said base plate in the region of the intersections of the wheel flange grooves for rotation on vertical axes, said frogs including laterally offset semi-cylindrical heads on their upper ends and pinions, two crossed shuttle bars mounted on said bed plate for endwise movement and extending diagonally between corners of said bed plate, said shuttle bars having rack portions at their opposite ends in mesh with related ones of the frog pinions and intermediate rack portions intermediate their ends, and a single lever operated pinion mounted on said bed plate in mesh with said intermediate rack portions of the shuttle bars, said shuttle bars crossing each other at right angles with said single pinion offset from the center of said bed plate toward two adjacent sides of said bed plate.

3. In a railway crossing, a rectangular bed plate, a rectangular base plate mounted on said bed plate, said base plate being formed with pairs of laterally spaced wheel flange grooves intersecting at right angles with respect to each other with the grooves positioned parallel to adjacent sides of the bed plate, vertical cylindrical frogs mounted on said base plate in the region of the intersections of the wheel flange grooves for rotation on vertical axes, said frogs including laterally offset semi-cylindrical heads on their upper ends and pinions, two crossed shuttle bars mounted on said bed plate for endwise movement and extending diagonally between corners of said bed plate, said shuttle bars having rack portions at their opposite ends in mesh with related ones of the frog pinions and intermediate rack portions intermediate their ends, and a single lever operated pinion mounted on said bed plate in mesh with said intermediate rack portions of the shuttle bars, said semi-cylindrical frog heads being eccentric with respect to the vertical axes of the frogs and positioned in the intersections of the grooves whereby said heads close one pair of wheel flange grooves running in one direction across the base plate while opening the other pair of grooves running in the other direction across the base plate in accordance with the position of said hand lever operated pinion.

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