A frog point of a crossing frog supports a freely suspended support plate such that relative longitudinal movement between the frog point and the support plate is provided. The support plate carries clamp members which are engageable with a drive rod and with locking boxes so as to transport the frog point transversely between stationary longitudinal wing rails and lock the frog point in abutment positions with the wing rails.

6 Claims, 2 Drawing Figures
CROSSING FROG WITH A MOBILE FROG POINT

BRIEF SUMMARY OF THE INVENTION

This invention relates to a crossing frog with a movable frog point and particularly to structure for transversely displacing the frog point between longitudinal wing rails.

U.S. Pat. No. 3,521,053 shows a crossing frog with a movable frog point which is moved by means of a driving mechanism, similar to that of railway switches, to alternately come into abutment with the stationary wing rails, and the point is locked in the contact position by means of a locking device similar to the clamp locking device of railway switches, wherein dovetail-shaped heads of both clamps of the locking device connected to the point are alternately received in a recess of a sliding drive rod of the driving mechanism (and are thus unlocked and coupled with the driving mechanism) or pressed behind the end of a lock box (and are thus locked).

According to the above patent, both clamps of the point-locking device are directly joined to the base of the frog point. Under certain conditions, this can result in breakdowns, as the frog point on the one hand and the wing rails on the other hand are subject to longitudinal relative movements in opposite directions as a result of temperature expansion and contraction of the adjoining railway tracks, and these movements result in change of position of the clamps of the point-locking device in the lock boxes. This can result in jamming of the locking device, which must be prevented, and accordingly the lock boxes are manually re-adjusted in accordance with the season of the year in a manner which is known from clamp point-locking devices of the railway switches.

It is an object of the present invention to avoid the above drawbacks and, in particular, to avoid the necessity of readjustment of the lock boxes.

This is achieved according to the invention in that the base of the frog point is longitudinally displaceable in a special sliding plate, and the sliding plate is laterally movable with respect to the base plate of the locking device, and both clamps of the point-locking device are pivotably connected to the sliding plate.

As the frog point is no longer rigidly connected to any parts of the point-locking device, but can freely move in the longitudinal direction of the rail in relation to the locking device, the jamming of the locking device as a result of temperature changes and corresponding movements of the rail is rendered impossible and the need for readjustment of the lock boxes is avoided.

According to a feature of the invention, the sliding plate is guided between front and rear abutments on the base plate, and the guiding surfaces of the sliding plate and those of the abutments are advantageously shaped so as to form a circular arc corresponding to the angular movement of the frog point during reverse movement of the point.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a top plan view of a clamp point-locking device with a corresponding portion of the frog point; and

FIG. 2 is a transverse cross-section as taken along line II—II of FIG. 1; the wing rails, which are omitted in FIG. 1, being shown.

DETAILED DESCRIPTION

FIGS. 1 and 2 show a crossing frog of a switch which comprises a frog point or middle block 23 which is laterally movable in FIG. 1, left and right, between fixed wing rails 21 and 22. The wing rails are not shown in FIG. 1 for simplification purposes, these wing rails extending longitudinally of the frog point 23 as is conventional and shown in FIG. 2 of U.S. Pat. No. 3,521,053.

The frog point 23 is guided in a laterally movable sliding plate 24 such that the point 23 can be moved laterally by lateral movement of plate 24. The frog point 23 is longitudinally movable in sliding plate 24 and consequently can undergo relative movement in opposite directions with respect to the wing rails due to temperature changes. The plate 24 embraces the lower end of the point 23 as seen in FIG. 2 and the plate 24 is suspended from point 23 and requires no additional external support. It is to be understood that the point 23 is freely supported by point rails (not shown) which extend beyond point 23 and are secured at a remote location from point 23 whereby the frog point 23 can be shifted laterally about a center determined by the fixation of the point rails.

A reinforcement plate 25 is welded to the lower surface of the point 23 and serves to enlarge the lateral guiding surfaces and thus reduce the surface pressure in view of the high pressures applied to the point during the reversal process and at the time of instantaneous contact with the wing rails.

The point 23 is slidably supported on a frame-shaped base plate 26 of a locking device, which plate is rigidly connected to the railway ties 27 and 28. The base plate 26 is provided with two abutment surfaces 29 and 30, between which the sliding plate 24 is supported for lateral movement in relation to the rails 21 and 22. Since the frog point 23 travels along a slightly arcuate path whose center is at the point of fixation of the point rails, the abutment surfaces 29, 30 and the corresponding side surfaces of plate 24 are curved to this arcuate path. Opposed lock boxes 31 and 32 are arranged on the base plate 26, and a continuous sliding rod 33 of a driving mechanism (not shown) slidably and adjustably guided in the lock boxes. Clamps 34 and 35 of the locking device are also adjustably and slidably guided in the locking boxes 32. The clamps 34 and 35 have outer ends of dovetail shape which may either extend into a recess of the sliding rod 33, as shown for the unlocked clamp 34 in FIG. 1, or they may become hooked behind the edge of the lock box, as shown for the locked clamp 35 at the lock box 32.

The clamps are pivotally connected to the sliding plate 24 at their inner ends, so that the clamps can undergo a pivotal movement during passage from the unlocked to the locked position and vice versa, as it is known from the clamp point-locking devices of railway switches and particularly as shown in FIG. 2 of U.S. Pat. No. 3,521,053.

For this purpose, the clamps can be directly connected to the sliding plate. However, in order to make possible fine adjustment of the distance between the
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dovetail head of the clamp and the point of the frog, adapters 36 and 37 are interposed between respective inner ends of the clamps and the sliding plate as shown in FIG. 2. The adapters are adjustably connected with the sliding plate 24 and pivotably connected to the respective clamps 34 and 35. These connections are described hereafter in greater detail.

According to FIG. 2, each adapter is provided with a fork-shaped end and with joint pins 38 and 39. The joint pin 38 is smooth and secured against rotation by means of a longitudinal slot or key, and is retained against falling out by means of a cotter pin, whereas the joint pin 39 is provided with a hexagonal head and is screwed into the respective adapter and secured against loosening by means of a cotter pin in the head. The bore in the clamp receiving the joint pin 38 is provided with a rubber bushing which is vulcanized between two metallic sleeves (not shown). The outer sleeve is press-fit in the clamp, whereas the inner sleeve is secured against rotation on the joint pin by means of a longitudinal slot and key arrangement. This construction serves the purpose of holding the rubber bushing in the unlocked position (intermediate position) stress-free and to apply stress to the bushing in the locked position (contact position), so that a return torque is produced. Thus, the ends of the clamps will be biased to enter the recesses of the rod 33, and, for example, when the rod 33 is moved to the left in FIG. 1 head 35 will enter the recess of the rod and become unlocked from locking box 22. The bore in the adapter receiving the joint pin 39 is provided with an eccentric bushing 41 which can be rotated after loosening of the joint pin 39 and thus permit fine adjustment of the distance between the head of the clamp and the point. In order to fix this connection after adjustment, a key 42 is driven into the gap in the fork of the adapter, and the key is secured in position by a metal plate 43 slanted on its both ends.

In operation, the rod 33 is driven to shift the point 23. In the position illustrated in FIG. 1, the plate 24 is locked in its rightmost position and the point 23 is in abutment with wing rail 22 as seen in FIG. 2. To shift the point 23, the rod 33 is longitudinally displaced to the left in FIG. 1 whereby head 35 resiliently springs into the recess in the rod 33 due to the bias action of the bushing 40 and the plate 24 is carried laterally to the left by the rod when the right edge of the aforesaid recess abuts head 35. When the plate 24 has reached its leftmost position of travel at which time the point 23 abuts wing rail 21, the head 34 is pushed from its recess in rod 33 to become locked behind lock box 31 thereby preventing rightward travel of plate 24 and the point 23 carried thereby.

It is seen from the above that the plate 24 serves as a first means freely suspended from frog point 23 to shift the frog point laterally through the intermediary of second means constituted by clamp members 34 and 35 and drive rod 33, the frog point 23 and plate 24 being relatively movable in longitudinal direction to enable displacement of the frog point relative to the wing rails as occasioned by temperature variations.

What is claimed is:

1. In a crossing frog having a frog point which is laterally displaceable by a drive rod between station ary, longitudinal wing rails and is lockable by lock boxes in abutment positions with the wing rails, an improvement comprising a plate suspended from the frog point and providing relative longitudinal movement therebetween, said plate being freely suspended from the frog point for movement in a lateral direction, said frog point having a base engaged in said plate for relative longitudinal displacement, means coupling the plate with the drive rod to shift the plate and the frog point therewith between the abutment positions with the wing rails and to lock said frog point in the abutment position, said coupling means including clamp members coupled to said plate for engaging the drive rod and the lock boxes, means guiding said plate in its movement in a lateral direction, said means guiding the plate comprising a base frame with abutment surfaces engaging said plate, the locking boxes being supported on the base frame, said frog point being adapted to travel in a lateral direction along a curved path, said abutment surfaces and plate being curved in correspondence with the curved path of travel of the frog point between the wing rails.

2. An improvement as claimed in claim 1 comprising means pivotably connecting the clamp members to said plate and providing adjustment of the length of projection of the clamp members from the plate.

3. An improvement as claimed in claim 2 wherein said means pivotably connecting the clamp members to said plate comprises an adapter pivotably connected to each clamp member and a coupling adjusably securing the clamp member to said plate.

4. An improvement as claimed in claim 3 wherein said coupling includes a fixable pivot connection between the plate and each clamp member, and an eccentric bushing in said pivot connection.

5. An improvement as claimed in claim 3 comprising in the pivotable connection between the plate and clamp member for urging the clamp member towards the drive rod.

6. An improvement as claimed in claim 1 wherein said plate includes an upper portion embracing said base of the frog point to provide relative sliding movement in a longitudinal direction.

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