

Description

Arrangement for switching a tongue rail

The invention relates to an arrangement for switching a tongue rail to a stock rail comprising a holder with at least one roller element which is the support for the tongue rail, the holder being adjustable relative to the stock rail.

A corresponding arrangement is found in DE 10 2004 013 347 A1. In this regard, a holder receiving at least one roller element is connectable to an insert having several holes in order to position the holder having the roller element at the required distance from the stock rail.

In a rolling device for supporting a switch blade according to DE 10 2005 032 417 B4, a supporting roller holder is connected to a clamping device fastenable to the rail foot of the stock rail via a toothed rail running in the direction towards the tongue rail.

A switch blade lifting and rolling device according to DE 10 2008 052 152 A1 offers the possibility that a roller support can be adjusted in its height with an inclined plane.

EP 1 627 954 A2 provides a roller device for supporting a tongue rail where a frame carrying the rollers is fixed using a toothed strip that permits an engaged horizontal adjustment of the frame.

The subject matter of DE 10 2004 004 784 B4 is a device for displacing a tongue rail. The device has two rollers emanating from a base body, which is designed integrally with a cover arranged between the rollers.

The object underlying the present invention is to improve an arrangement of the type previously described such that an adjustment of the roller elements both horizontally and vertically to the stock rail is enabled by simple design measures. This should enable problem-free adjustment, yet at the same time ensure that an uncontrolled rotation of the holder does not happen.

To achieve that object, the invention substantially provides that the holder is connected to a base plate having a wedge-shaped geometry or to a region designed wedge-shaped, in which the holder is supported on the base plate, that the base plate is adjustable in guided manner in the direction running transversely to the longitudinal direction of the stock or

tongue rail, and that the holder is adjustable step-by-step relative to the base plate transversely to the longitudinal direction of the stock or tongue rail.

In accordance with the invention, the holder emanates from a base plate, permitting a guidance of the holder transversely to the longitudinal direction of the tongue rail. This permits simple positioning and alignment of the holder relative to the stock rail, since the latter is positively connected to the base plate using an engaging mechanism. This prevents at the same time rotation or uncontrolled adjustment of the holder relative to the base plate.

The wedge-shaped geometry of the base plate or of that region of the base plate receiving the holder ensures problem-free horizontal and vertical adjustment of the holder relative to the stock rail and hence of the at least one roller element.

To permit guidance of the base plate and hence of the arrangement itself with simple design measures, the invention in an embodiment provides that the base plate is connected to a support such as a ribbed plate and is guided transversely or at right angles to the tongue rail longitudinal direction.

According to a first alternative, a first guide element running transversely or at right angles to the tongue rail longitudinal direction can to that end emanate from the support and interact with a second guide element emanating from the base plate for guided adjustment of the base plate transversely to the longitudinal direction of the tongue rail.

It is in particular provided here that the first guide element is preferably a single strip and the second guide element is a groove-like longitudinal recess running on the bottom side in the base plate, or vice versa.

Alternatively, a recess running transversely or at right angles to the tongue rail longitudinal direction can be provided as a first guide element in the support, its width corresponding to that of the base plate, such that the latter is received by the support in a manner permitting guided displacement transversely or at right angles to the tongue rail longitudinal direction.

There is also the possibility that at least one web-like or strip-like projection emanates from the base plate bottom surface facing towards the support, the width extent of said projection being adjusted to a recess provided in the support such that guidance of the base plate transversely or at right angles to the tongue rail longitudinal direction is likewise available.

It is preferably provided that the first guide element such as the strip or recess is passed through by holes in which engages a bolt element via which the holder can be subjected to a force in the direction of the base.

To permit continuous horizontal adjustment, the invention provides that the holder and/or the base plate, preferably both the holder and the base plate, have a slot running transversely or at right angles to the tongue rail longitudinal direction and passed through by a bolt element.

In an embodiment it is provided that a roller element is mounted in the respective end regions of the holder, i.e. both in front of and behind the slot.

To permit an engaged or stepped adjustment of holder and base plate, it is provided that the holder and the base plate have a tooth engagement mechanism or a structure having an identical effect in some of the regions in which they are in contact.

To ensure problem-free assembly and at the same time secure fastening, it is provided that the base plate is non-positively connected to the base with a single bolt element passing through the holder and the base plate and supported on the holder.

The invention is further characterized in that the base plate and/or the holder, in particular both the base plate and the holder, consist of plastic, in particular of polyamide for example with a glass fiber content of for example 15 - 30 % by weight.

In particular, it is provided that the base plate with the holder passes between sections of a slide chair which is fastened on the support such as the ribbed plate.

Further details, advantages and features of the invention can be gathered not only from the claims and in the features to be found therein, singly and/or in combination, but also from the following description of a preferred embodiment to be found in the drawing.

The drawing shows in:

Fig. 1 a perspective illustration of a rail fastening element in the region of a tongue device of a switch,

Fig. 2 elements of the section according to Fig. 1 in an exploded view,

Fig. 3 a roller device,

Fig. 4 the roller device according to Fig. 3 in an exploded view
and

Fig. 5 an illustration corresponding to Fig. 2 with an alternative guidance.

Switches are important transition points in railway technology for goods or passenger traffic. The function of the switch is to support and guide the train along a predetermined track. This includes various branches and intersections. The formation, splitting, crossing and overtaking of trains is one of the main tasks of a switch.

A tongue roller device is proposed in accordance with the invention which creates the possibility of adjusting the rollers supporting a tongue rail relative to a stock rail both horizontally and vertically, enabling in addition to problem-free assembly and maintenance a readjustment both in the horizontal and in the vertical direction without major effort. At the same time it is assured that clear positioning of the rollers supporting the tongue rail is guaranteed.

Fig. 1 shows a section from a rail fastening point of a tongue device of a switch, in which a tongue rail 14 is to be adjusted relative to a stock rail 12 in order to guide a vehicle passing over the switch in a required direction depending on the position of the tongue rail 14.

The section shows an intermediate plate 16 (Fig. 2) resting on for example a sleeper or concrete slab which can be rigid or elastic and supported on a ribbed plate 18 on which the stock rail 12 is fixed in the usual manner. On the one hand a tension clamp 20 and on the other hand tension springs 22, 24 are used to do so. The tension springs 22, 24 are here clamped between counter-bearings 32, 34 emanating from the ribbed plate 18 on the one hand and sections of a slide chair 36 on the other hand, the slide chair having according to the drawing representation a U-shape and resting in the region of its transverse leg 38 on a section 28 of the rail foot 30 of the stock rail 12. The tension clamp 20 is supported on the opposite section 26. To that extent, reference is however made to sufficiently well-known designs.

Furthermore, it is shown in the drawing representation that an intermediate layer 40 for example of EVA (ethylene vinyl acetate) is arranged between the rail foot 30 and the ribbed plate 18. An intermediate layer 47, 49 can also be provided between the longitudinal

legs 42, 44 of the U-shaped slide chair 36 and the ribbed plate 18.

The stock rail 12 is as already mentioned held down on the one hand by the tension clamp 20 and on the other hand by the transverse leg 38 of the slide chair 36. To do so, the tension clamp 20 is passed through by a bolt 46 connected to the support of the switch.

The components and designs relating thereto can basically be found in the prior art and are also generally described in DE 10 2004 013 347 A1, to the disclosure of which reference is expressly made.

During switching of the tongue rail 14 it is lifted with the aid of a roller device 10 extending between the longitudinal legs 42, 44 of the slide chair 36 and connected to the ribbed plate 18. The roller device 10 consists in accordance with the invention of a wedge-shaped base plate 48 and a carrier 54 supporting rollers 50, 52 and likewise having a wedge shape.

The base plate 48 and the carrier can according to the prior art consist of metal, in particular spheroidal graphite iron.

According to a proposal in accordance with the invention, there is however also the possibility to manufacture the base plate 48 and/or the holder 54, in particular both the base plate 48 and the holder, of plastic, in particular of polyamide, which can for example have a glass fiber content between 15 and 30 % by weight.

As can be seen from the figures, the regions in contact with one another, i.e. on the one hand the surface 56 which runs obliquely to the underside of the base plate 48, and on the other hand the facing surface 58 of the holder 54, have a structure permitting step-by-step adjustment and designed in the embodiment as tooth engagement mechanism 60, 62. Other structures permitting step-by-step adjustment are likewise possible. Due to the wedge shape of the base plate 48, a vertical adjustment of the holder 54, also referred to as the roller cassette, takes place during its adjustment in the longitudinal direction of the base plate 48, i.e. a vertical adjustment of the rollers 50, 52. At the same time the horizontal distance between the rollers 50, 52 and the stock rail 12 is changed.

Since the rollers 50, 52 should always run horizontally regardless of the position of the holder 54 relative to the base plate 48 in their regions of contact with the tongue rail 14, the holder 54 has a geometry corresponding to the wedge shape of the base plate 48, or the

axles 78, 80 are positioned in the holder 54 such that the required horizontal alignment is always present.

In particular, it is provided that the engaging teeth 60, 62 have a spacing a of 3 mm. The angle between the underside of the base plate 48 and its upper side (surface 56) should be in the region of about 6° , so that lifting and lowering of the holder 54 and hence of the rollers 50, 52 from tooth to tooth results in approx. ± 0.3 mm. Other dimensioning configurations are of course also possible.

To ensure that no uncontrolled rotation of the roller device 10 takes place without having to take expensive design measures, it is provided in accordance with the invention in a first alternative that the base plate 48 has on the bottom side a longitudinal groove 64 running in its longitudinal direction, preferably rectangular in section, and is geometrically adjusted to a strip 66, referred to as a roller base, which emanates from the ribbed plate 18 and runs in its longitudinal direction. This ensures that the base plate 48 and hence the roller device 10 is basically adjustable substantially only in its longitudinal direction, i.e. transversely or at right angles to the longitudinal direction of the stock rail 12.

For guidance of the base plate 48, it is only required that it has a single guide element, in particular a single strip 66.

The strip 66 furthermore has holes, some of which are identified as examples with the reference numbers 68, 70. A fastening bolt 72 can be screwed into one of the holes and passes through both the holder 54 and the base plate 48, such that when the bolt 72 is tightened the roller device 10 is connected non-positively to the ribbed plate 18, and the base plate 48 and the holder 54 are connected both non-positively and positively to one another.

To permit to the required extent horizontal adjustment of the roller device 10, i.e. at right angles to the longitudinal direction relative to the stock rail 12 without a height adjustment of the rollers 50, 52 taking place, the fastening bolt passes through slots 74, 76 of the base plate 48 and of the holder 54. The position of the roller device 10 relative to the stock rail 12 can here be set depending on the hole in which the fastening bolt 72 is screwed into the strip 66. An additional fine adjustment is achieved using the slots 74, 76.

As is shown in Fig. 4, the rollers 50, 52 designed as hollow cylinders are passed through by

axles 78, 80 which in turn are mounted in legs, not identified in detail, of the roller cassette or holder 54. To that extent the figures are, as already mentioned, self-explanatory.

The strip 66 and the groove 64 therefore form a guide for the roller device 10 such that it can be substantially adjusted exclusively transversely or at right angles to the longitudinal direction of the stock rail 12.

Hence a single fastening bolt is sufficient to fix the roller device 10 securely and clearly relative to the ribbed plate 18 and hence to the stock rail 12.

As is shown in the drawing representation, two rollers 50, 52 emanate from the holder 54 and are rotatably mounted in the respective end region of the holder 54. The slot 76 runs between the rollers 50, 52 and its longitudinal direction runs transversely or at right angles to the axles 78, 80.

During assembly of the roller device 10 with the aid of a feeler gauge, a distance of for example around 1 mm from the tongue foot bottom edge to the roller 50, 52 can be set. If it turns out that the rollers 50, 52 are too low or too high, raising or lowering respectively of the rollers 50, 52 with simultaneous horizontal adjustment can be achieved with the aid of the inclined plane of the surface 56 and the engaging teeth 60, 62. Once the required dimension has been set, the roller device 10 is fixed by means of the fastening bolt 72 and for example a lock washer.

Fig. 5 shows an alternative embodiment of the guidance of the base plate 48 and hence of the holder 54.

According to the embodiment of Figs. 1 – 4, guidance is therefore achieved by the strip-like projection 66 emanating from the ribbed plate 18.

According to the illustration in Fig. 5, a longitudinal recess 67 is provided whose width corresponds to the width of the base plate 48, so that guidance transversely or at right angles to the tongue rail longitudinal axis 14 is achieved corresponding to guidance with the strip 66.

Alternatively, guidance can also be achieved in that at least one strip-like projection running in the longitudinal direction of the base plate 48 emanates from the underside of the base plate 48. Corresponding to the width of the projection, a recess is provided in the

ribbed plate 18 such that the required guidance transversely or at right angles to the tongue rail longitudinal axis is also assured. In all other respects the design features of the rail fastening point are identical to those explained in connection with Figs. 1 – 4.

Claims

Arrangement for switching a tongue rail

1. Arrangement for switching a tongue rail (14) to a stock rail (12) comprising a holder (54) with at least one roller element (50, 52) which is the support for the tongue rail, the holder being adjustable relative to the stock rail,
w h e r e i n
the holder (54) is connected to a base plate (48) having a wedge-shaped geometry or to a region designed wedge-shaped on which the holder is supported on the base plate, the base plate is adjustable in guided manner in the direction running transversely to the longitudinal direction of the stock or tongue rail (12, 14), and the holder is adjustable step-by-step both horizontally and vertically relative to the base plate transversely to the longitudinal direction of the stock or tongue rail.
2. Arrangement according to claim 1,
w h e r e i n
the base plate (48) is connected to a support such as a ribbed plate (18) having a first guide element (66, 67) running transversely to the stock rail longitudinal direction, which interacts with the base plate or a region of the base plate as a second guide element (64) for guided adjustment of the base plate transversely to the longitudinal direction of the tongue rail.
3. Arrangement according to claim 1 or 2,
w h e r e i n
the first guide element (66) is preferably a single strip and the second guide element is a groove-like longitudinal recess (64) running on the bottom side in the base plate (48), or vice versa.
4. Arrangement according to claim 1 or 2,
w h e r e i n
a recess (67) running transversely to the stock rail longitudinal direction and whose width corresponds to that of the base plate (48) is provided in the support as a first guide element in the support.

5. Arrangement according to at least one of the preceding claims,
w h e r e i n
the first guide element (66, 67), like the strip or the recess, has holes (68, 70) each having an internal thread, and in one of the holes a bolt element (72) engages via which the holder (54) can be subjected to a force in the direction of the base (18).
6. Arrangement according to at least one of the preceding claims,
w h e r e i n
the holder (54) and/or the base plate (48) have a slot (74, 76) running transversely to the longitudinal direction of the tongue rail and passed through by the bolt element (72).
7. Arrangement according to at least one of the preceding claims,
w h e r e i n
a roller element (50, 52) is mounted in the respective end region of the holder (54).
8. Arrangement according to at least one of the preceding claims,
w h e r e i n
the holder (54) and the base plate (48) have a tooth engagement mechanism (60, 62) or a structure having a geometrically identical effect in some of the regions in which they are in contact.
9. Arrangement according to at least one of the preceding claims,
w h e r e i n
the base plate (48) is non-positively connected to the base (18) with a single bolt element (72) passing through the holder (54) and the base plate and supported on the holder.
10. Arrangement according to at least one of the preceding claims,
w h e r e i n
the holder (54) rests on a surface of the base plate (48) inclined from the horizontal at an angle α of preferably $4^\circ \leq \alpha \leq 8^\circ$, in particular $\alpha \approx 6^\circ$.
11. Arrangement according to at least one of the preceding claims,
w h e r e i n
the spacing a of successive teeth of the tooth engagement mechanism (60, 62) is 2.5

$\text{mm} \leq a \leq 3.5 \text{ mm}$, in particular $a = 3 \text{ mm}$.

12. Arrangement according to at least one of the preceding claims,

w h e r e i n

the base plate (48) and/or the holder (54) consist of plastic, in particular of polyamide and preferably have a glass fiber content of for example 15 - 30 % by weight.