May 12, 1953 K. STAMM 2,638,276

RAIL FASTENING

Filed May 27, 1950

Fig. 4




Fig. 1

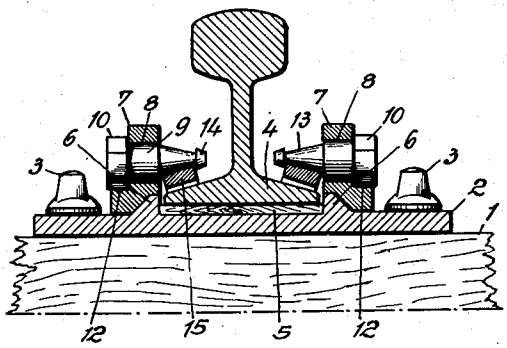



Fig. 3

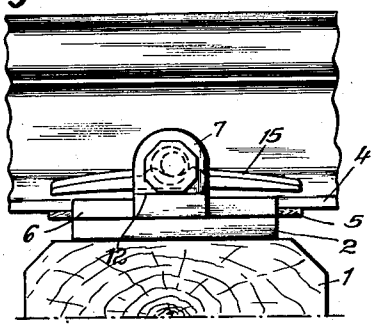



Fig. 2

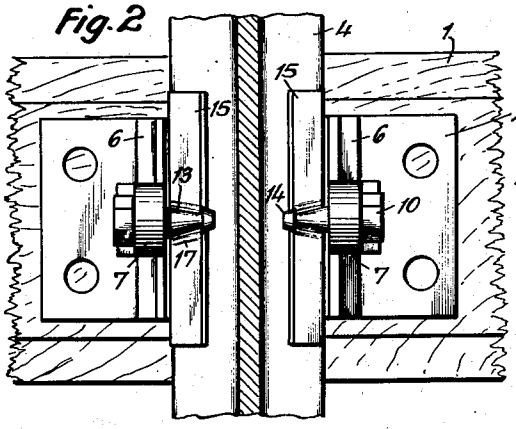



Fig. 5

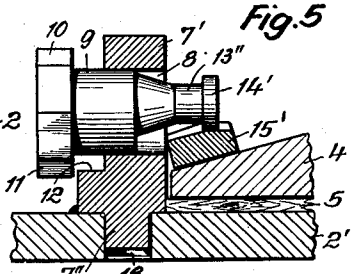



Fig. 6

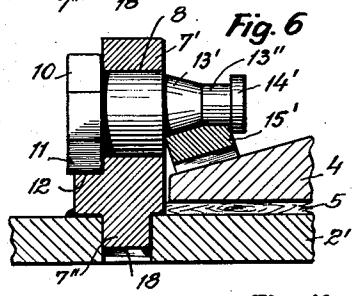



Fig. 7

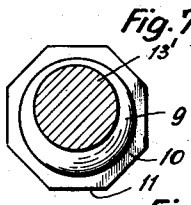



Fig. 9

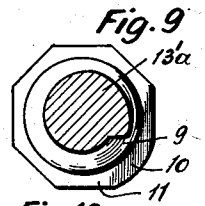



Fig. 8

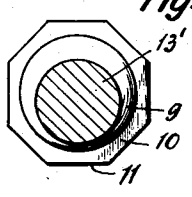



Fig. 10

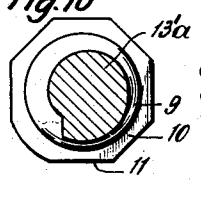
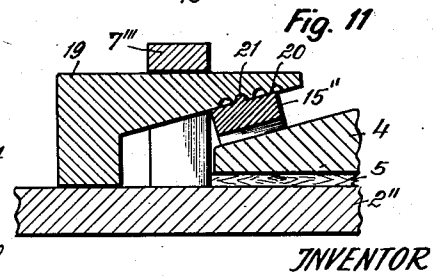



Fig. 11




INVENTOR

KARL STAMM

BY

Wasellins, Lake & Co.

AGENTS

Patented May 12, 1953 2,638,276

# UNITED STATES PATENT OFFICE

2,638,276

## RAIL FASTENING

Karl Stamm, Berlin-Wilmersdorf, Germany

Application May 27, 1950, Serial No. 164,756
In Germany November 10, 1948

5 Claims. (Cl. 238—349)

1

This invention relates to a rail fastening comprising bent tensioned leaf springs bearing on the rail flanges, the said springs abutting against bolts or pins overlapping the rail flange. The said bolts or pins are arranged to be fitted substantially perpendicularly to the rail flange and to be secured by rib-like projections extending in the longitudinal direction of the rail and attached to the tie plate.

In the known rail fastenings of this type, the bolts are L-shaped and are so dimensioned that the arm supported by the tie plate bears against the rib of the tie plate and loosening of the bolt is prevented by a lug provided on the other arm of the bolt and engaging behind the rib of the tie plate. The spring is of triangular form, the point thereof being directed towards the rail web, while the width of the spring is such that it practically fills the space between the web of the rail and the rib of the tie plate. The spring is thus secured against springing out.

In the known rail fastening, no provision is made for adjustment, so that owing to unavoidable tolerances in the individual parts, the spring movement and consequently the pressure of the leaf spring on the rail flange may fluctuate considerably.

Moreover, disassembly of this rail fastening is rendered very difficult by the lug of the bolt and is in some cases impossible. In addition, the triangular springs must be replaced at the rail joints by springs reduced in width to the extent of the thickness of the fish-plates provided at the joints.

An object of the invention is to provide an improvement in rail fastenings of the aforesaid type by providing for adjustment for the purpose of allowing for unavoidable tolerances in the individual parts of the rail fastening, while at the same time preventing undesired loosening of the individual parts.

According to the present invention there is provided a rail fastening comprising a tie-plate for supporting the rail, a leaf spring lying on a rail flange, a pin for forcing the spring against said flange, guide means anchored to said tie-plate for securing said pin in relation to said tie-plate and for permitting guided movement of said pin substantially horizontally, a pin surface for bearing on said spring, said surface being inclined to the horizontal, and inter-engagement means as between the pin and the spring for preventing undesired withdrawal of said pin from said guide means when the spring and pin are operatively positioned for fastening the rail to the tie-plate.

2

Rotation of the pin can be prevented by providing the pin at its outer end with a polygonal collar which, when the pin has been pushed into the position of use, overlaps by its outer surfaces a suitably arranged counter-surface on the guide means which latter projects upwardly from the tie-plate.

The pin or pin-like bolt is preferably locked against longitudinal axial displacement by a widened portion in the form of a collar which overlaps the leaf spring on the side facing the rail web. In order to lock the bolt against rotation, the pin-like bolt may have, instead of the polygonal collar on its outer end, a polygonal external surface in that part which is mounted in the guide means or in that part which overlaps the leaf spring.

The new rail fastening is preferably of substantially equal width over its whole length and may be fashioned as a support of equal resistance to bending over its whole length.

The leaf spring has a recess at the point at which it bears against the pin-like bolt. This recess is shaped to conform with the bearing surface of the bolt and serves to lock the leaf spring against longitudinal displacement.

The pin portion mounted in the guide means, and the pin portion holding down the leaf spring, which latter portion may be eccentrically set, are preferably fashioned in cylindrical form, but the pin portion serving to hold down the leaf spring could alternatively be tapered.

The pin portion holding down the leaf spring may also be adjusted to different levels if the outer surface of this portion extends spirally to the axis of the pin.

In the preferred embodiment of the invention, the pin portion serving to hold down the leaf spring is tapered over approximately one half of its length and fashioned cylindrically towards the end of the pin. A cylindrical widened portion in the form of a collar is also provided on the inner end of the pin-like bolt. The leaf spring is so fashioned in respect of its width and upper surface at the bearing surface of the pin portion by which it is overlapped, that it lies flush thereon.

To fit the new rail fastening the leaf spring mounted on the flange of the rail is first pressed down by a tensioning device, whereafter the securing pin is pushed through a hole in the guide means until the collar-like projection on the inner end of the pin bears against the spring. The securing pin is then pushed completely home if necessary after having been turned back to

bring its outer polygonal head into such a position that the pin can be pushed into the position of use, so that the leaf spring, which is now detensioned, can bear against that portion of the pin by which it is held down.

In the position of use, the pin-like bolt is locked against axial displacement by the collar on the inner end of the pin which end overlaps the leaf spring, and is locked against rotation by the bearing of one face of the polygonal pin head at the outer end of the bolt against a face of the guide means anchored to the tie plate.

With the new rail fastening, it is possible, owing to the eccentric arrangement of that portion of the pin which overlaps the leaf spring, to compensate for unavoidable clearances between the individual parts of the fastening to such an extent by turning the pin-like bolt that a substantially regular leaf spring tension is obtained in practically all cases.

In a modified form of embodiment of the invention, adjustment for the purpose of compensating for clearances in the individual parts of the fastening can be obtained by employing instead of the rotatably mounted pin-like bolt, an L-shaped bolt of a type known per se which is adjustable perpendicularly to the rail web and is locked against loosening in the position of use. This locking may be effected by a metal strip inserted between the rib-like projection of the tie-plate and the bolt, the inner upwardly bent-over end of which strip bears against the inside of the rib, while the outer end is downwardly bent about the outer edge of the bolt when the latter has been driven into the position of use.

Preferably, that surface of the bolt which bears on the leaf spring has a number of grooves or the like extending in the longitudinal direction of the rail, and the upper side of the leaf spring is provided with a corresponding rib or the like which, according to the end position of the bolt, enters one of the grooves and thus secures it against loosening.

The guide means which are preferably rib-like projections, against which the bolts of the rail fastening abut, may be welded to the upper side of the rail tie plate or to small rail-guiding ribs on this plate. The projections may alternatively be formed by means of studs of preferably rectangular cross-section in corresponding gaps in the tie-plate, the studs being, if desired, additionally connected to the tie-plate by welding. In the latter case, the small rail guiding ribs of the tie-plate are preferably dispensed with, so that the rib-like projections effect the lateral guiding of the rail.

If the rail fastening is constructed in this way, the tie-plate may be formed of simple metal strips.

Rail fastenings constructed in accordance with the invention are illustrated by way of example in the accompanying drawings, in which:

Figure 1 shows a constructional form of the rail fastening in cross-section,

Figure 2 shows the same rail fastening in plan view,

Figure 3 shows the same rail fastening in side elevation,

Figure 4 shows a leaf spring in longitudinal section,

Figure 5 shows in cross-section, on a larger scale, one side of a modified constructional form of the rail fastening during the introduction of the pin-like bolt with the leaf spring depressed,

Figure 6 shows the same part of the rail fastening as Figure 5, in the position ready for operation, in cross-section,

Figure 7 shows a cross-section of a pin-like bolt with an eccentrically arranged bolt portion of circular cross-section for holding down the leaf spring, said portion being in the uppermost position, and the cross-section being taken through said portion of the bolt,

Fig. 8 shows the same pin-like bolt with said portion in the lowermost position,

Figure 9 shows in cross-section, in the uppermost position, a part of a bolt (which part holds down the leaf spring), said part of the bolt being of spiral cross-section,

Figure 10 shows the same pin-like bolt part in the lowermost position, and

Figure 11 shows in cross-section, on a larger scale, one side of a further constructional form of the rail fastening in the position ready for use.

In the rail fastening shown in Figures 1–3, 1 is a wooden sleeper and 2 an iron tie-plate connected by screws 3 to the sleeper 1. The flange 4 of the rail rests on a thin slab 5 of poplar wood lying on the iron tie-plate 2. The rail is laterally guided by ribs 6 on the tie-plate 2.

Centrally of the ribs 6, rib-like projections 7 are mounted on the iron tie-plate 2 and connected thereto preferably by welding. The rib-like projections 7 each have a hole 8 to receive the circular cross-sectioned portion 9 of a pin-like bolt. Provided at the outer end of the pin-like bolt is an octagonal collar 10 which lies, when the bolt is in the position of use as shown in Figure 6, with its lowermost face 11 on the bearing surface 12, which is formed externally on the rib-like projection 7.

The pin-like bolt is thus effectively locked against rotation when in the position of use.

The bolt portion 13' overlapping the leaf spring 15 and serving to hold down the leaf spring is eccentrically arranged with respect to the bolt portion 9 and is of conical form. The bolt portion 13' has at its inner end a collar 14 which engages over the inside of the leaf spring 15 and effectively prevents the latter from springing out towards the rail web.

In the rail fastening shown in Figures 5 and 6, the bolt portion 13' is again eccentrically arranged in relationship to the bolt portion 9. The eccentrically set bolt portion is, however, half tapered and half cylindrical. The tapered bolt portion 13' adjoins the bolt portion 9, while the cylindrical portion 13'' forms the inner end of the bolt portion overlapping the leaf spring 15''. The collar 14' provided on the inner end of the bolt also has a cylindrical outer surface. The leaf spring 15'' is so fashioned on its upper side at the point at which the pin-like bolt portion bears thereon, that the conical surface 13' and the cylindrical surface 13'' bears flush thereagainst when the rail fastening is in the operative position, as shown in Figure 6.

Figure 5 shows the introduction of the pin-like bolt during the fitting of the rail fastening. When the leaf spring is depressed, the bolt is first entered in the hole 8 from the outside so that the collar 14' just bears against that surface of the leaf spring which extends parallel to the axis of the bolt, the octagonal collar 10 on the outer end of the bolt still being situated in front of the surface 12 of the rib-like projection 7'. The pin-like bolt is then turned back in its bearing until one outer face of the octagonal collar 10 extends parallel to the bearing surface 12. The

pin-like bolt is then pushed into the position of use shown in Figure 6, so that as the leaf spring expands it bears against the surfaces 13' and 13'' of the bolt portion.

Displacement of the leaf spring 15 or 15'' in the longitudinal direction of the rail is prevented in the rail fastenings shown in Figures 1 to 6 by the groove 16 on the upper side of the spring 15 (Figure 4) and the ribs 17 provided on either side of the groove 16.

While in the constructional form shown in Figures 1 to 3 the tie-plate 2 has small lateral rail-guiding ribs 6 to which the rib-like projections 7 are welded, the tie-plate 2' in the constructional form shown in Figures 5 and 6 consists of a simple metal strip on which the rail flange 4 is mounted with the interposition of a thin plate 5 of poplar wood. The rib-like projections 7' which receive the pin-like bolts serve at the same time to guide the rail laterally. The projections 7' have at their lower end extensions 7'' preferably of rectangular cross-section, the longitudinal sides of which extend parallel to the rail. The extensions 7'' engage in corresponding apertures 18 in the tie-plate 2' and are connected to the tie-plate by welding.

If the extensions 7'' are of circular cross-section, they may also be of such length that they engage in a correspondingly bored sleeper under the tie-plate and thus provide additional means for preventing the tie-plate from shifting on its sleeper.

Figures 7 to 10 show in the uppermost and lowermost positions two constructional forms of the locking pin.

While in Figures 7 and 8 the portion 13' of the pin which holds down the spring is of circular cross-section, Figures 9 and 10 show this portion 13'a of the pin with a spiral cross-section. In the case of Figures 9 and 16, the extent of the vertical adjustment and consequently the possibility of allowing for clearance or tolerance corresponds to a rotation of nearly 360° of the pin 9 and is greater than in the constructional form shown in Figures 7 and 8, where it corresponds to a rotation of nearly 180°.

In the further modified constructional form of the rail fastening shown in Figure 11, the tie-plate consists of a simple metal strip 2'', on which the rail flange 4 is mounted with the interposition of a thin plate 5 of poplar wood. Rib-like projections 7''' lie one on each side of the rail flange 4. These projections on the one hand serve to guide the rail flange laterally and on the other hand act as an abutment for the bolt holding down the leaf spring 15''. The projections 7''' are welded to the tie-plate 2'.

In this rail fastening, the rotatable pin-like bolt 9 is replaced by a non-rotatable bolt 19 of L-shape. The vertical arm of the bolt bears against the tie-plate 2'', while the horizontal arm, which is tapered engages over the leaf spring 15''. The horizontal arm extends through an opening in the rib-like projection 7''' and abuts against this projection. After the leaf spring has been pressed down by means of a tensioning device, the bolt 19 is driven in. Regardless of any clearance of the individual parts of the rail fastening, the desired spring tension can always be obtained. According to the extent of the existing clearances, the vertical arm of the bolt will lie at a varying distance from the outer surface of the rib-like projection 7''' when the bolt is in the position of use.

In order to prevent loosening of the bolt 19, the surface by which the bolt bears on the leaf spring 15'' has a number of grooves 20 extending parallel to the rail. The leaf spring has a corresponding rib 21 which in the operative position of the bolt enters one of the grooves 20.



Again in this constructional form of the rail fastening, the leaf spring may be of substantially equal width over its entire length and may be fashioned as a support having equal resistance to bending over its whole length.

Displacement of the leaf spring 15'' in the longitudinal direction may be prevented by means of ribs (not shown in the drawings) provided on the upper side of the leaf spring.

I claim:

1. A rail fastening comprising a tie-plate for supporting the rail, a leaf spring lying on a rail flange, a pin for holding down the spring against said flange, guide means anchored to said tie-plate for securing said pin in relation to said tie-plate and for permitting relative guided movement of said pin, said pin being operatively positioned with its longitudinal axis substantially parallel to the flange surface, said pin having a surface for bearing on said spring, said surface extending between two points differently spaced from the pin axis, and interengagement means as between the pin and the spring for preventing undesired withdrawal of said pin from said guide means when the spring and pin are operatively positioned for fastening the rail to the tie-plate.

2. A rail fastening as claimed in claim 1, wherein the inter-engagement means comprises grooves on the pin which grooves extend in the direction of the longitudinal axis of the rail, and at least one rib projecting from the upper surface of said spring for co-operating with one of said grooves.

3. A rail-fastening comprising a tie-plate for supporting the rail, a leaf spring lying on a rail flange, an upstanding projection on said tie-plate, said projection having a substantially horizontal hole therethrough, a pin for holding down said spring against said flange, a portion on said pin for fitting in said hole, a frusto-conical surface on said pin, said frusto-conical surface bearing upon the upper surface of said spring, a laterally extending projection on the pin and adjacent the web of the said rail, said laterally extending projection abutting against the side of the spring which side is adjacent the rail web when the fastening is ready for use, and means for limiting axial movement of the pin towards said rail web.

4. A rail fastening comprising a tie-plate for supporting the rail, a leaf spring lying on a rail flange, a pin for holding down said spring against said flange, an upstanding projection secured to said tie-plate, said projection having a substantially horizontal circular cross-sectioned hole therethrough, a cylindrical portion on said pin for co-operating with said hole, an eccentric projection on said pin extending substantially horizontally from said cylindrical portion and serving to bear on the upper surface of said spring, a collar on the free end of said eccentric projection for abutting against the side of the spring which side is adjacent the rail-web, a polygonal head upon said pin for abutting against said upstanding projection and thereby limiting movement of said bolt towards said rail flange, and at least one locking face on said upstanding projection for co-operating with one of the side faces of said polygonal head to prevent rotational

movement of the pin when the rail fastening is ready for use.

5. A rail fastening as claimed in claim 4 including the feature that the eccentric projection comprises a cylindrical portion and a tapered portion, this cylindrical portion being at the pin end nearest the rail web and the smaller end of the tapered portion being adjacent this cylindrical portion.

KARL STAMM.

**References Cited** in the file of this patent



UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 1,077,720 | Kendrick | Nov. 4, 1913 |
| 1,214,689 | Laas | Feb. 6, 1917 |
| 1,249,161 | Mathews | Dec. 4, 1917 |
| 1,778,887 | Crabtree | Oct. 21, 1930 |
| 1,798,357 | Ruping | Mar. 31, 1931 |
| 1,815,815 | Vosslok | July 21, 1931 |
| 2,151,026 | Gorick | Mar. 21, 1939 |
| 2,386,315 | Holstein | Oct. 9, 1945 |
| 2,479,932 | Hunnicutt | Aug. 23, 1949 |