# United States Patent

**Sonneville**

[15] **3,688,984**

[45] **Sept. 5, 1972**

[54] **ELASTICALLY YIELDABLE INSULATING RAIL FASTENING DEVICE**

[72] Inventor: **Roger Paul Sonneville,** Saint-Cloud, France

[73] Assignee: **Societe d'Etudes Ferroviaires,** Paris, France

[22] Filed: **Feb. 10, 1971**

[21] Appl. No.: **114,123**

**Related U.S. Application Data**

[63] Continuation-in-part of Ser. No. 802,952, Feb. 27, 1969, abandoned.

[30] **Foreign Application Priority Data**

Feb. 16, 1970 France....................7005419

[52] **U.S. Cl.**..............................**238/349,** 238/283

[51] **Int. Cl.** ......................................**E01b 9/34**

[58] **Field of Search**.....................238/349, 283, 310

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*Primary Examiner*—James B. Marbert
*Assistant Examiner*—Richard A. Bertsch
*Attorney*—Robert E. Burns and Emmanuel J. Lobato

[57] **ABSTRACT**

Elastically yieldable and electrically insulating fastening device for fastening a rail on a sleeper. The device comprises a clip of insulating plastics material having a body and two branches extending from the upper part of the body. A metal strip bears on the upper face of the body and branches. A tightening-down bolt adapted to be anchored in the sleeper extends through apertures in the strip and clip body.

An improved device is also described having an additional metal strip bearing on the aforementioned strip so as to modify the performance of the device, in particular for high-speed railway tracks.

**19 Claims, 7 Drawing Figures**

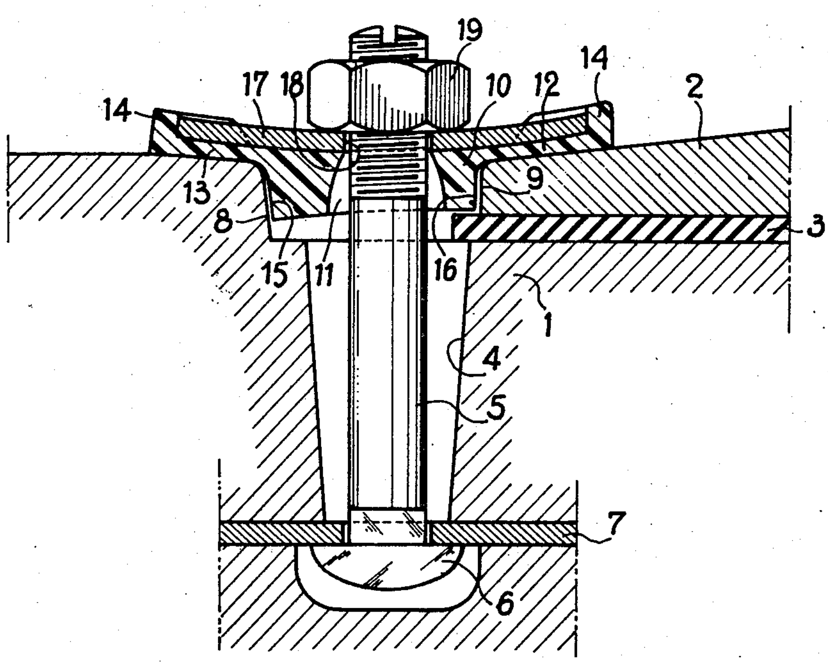


Fig. 1

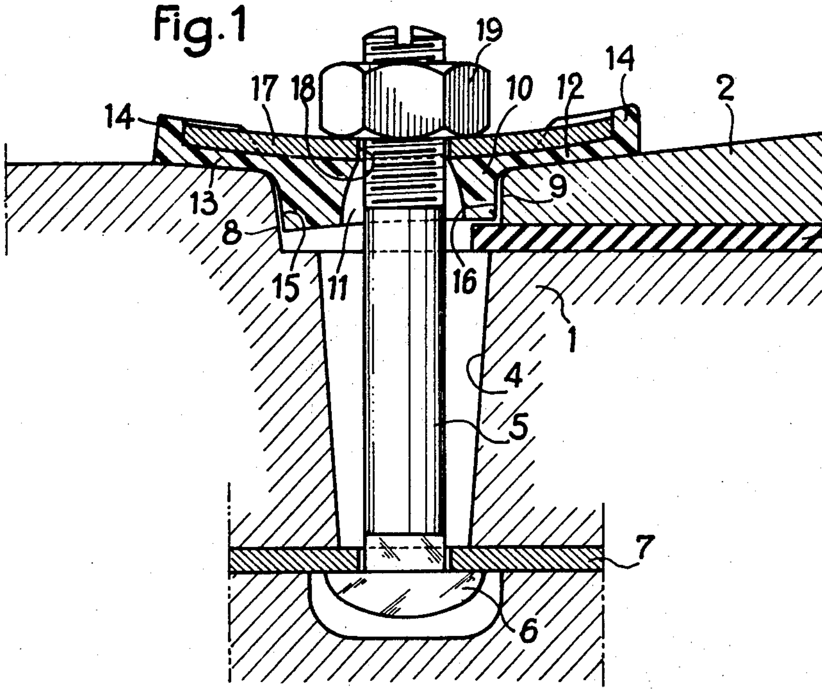



Fig. 2

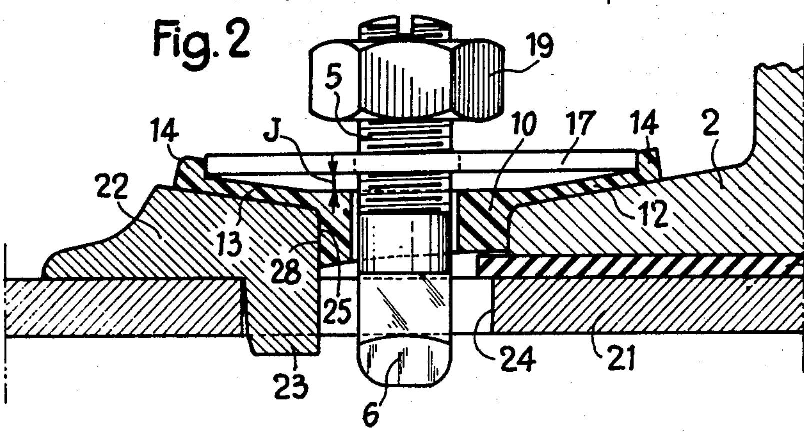



Fig. 3

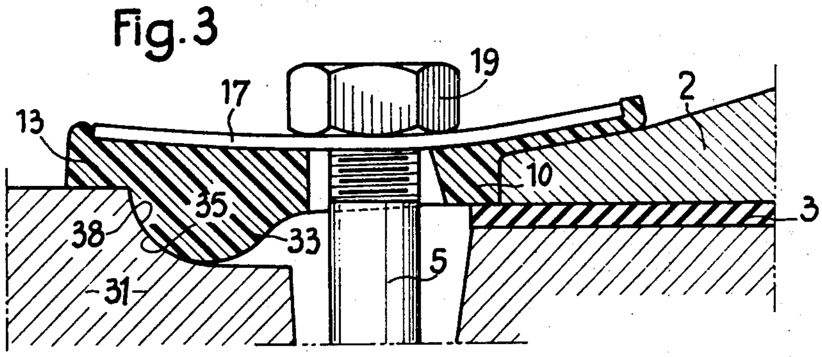


Fig.4

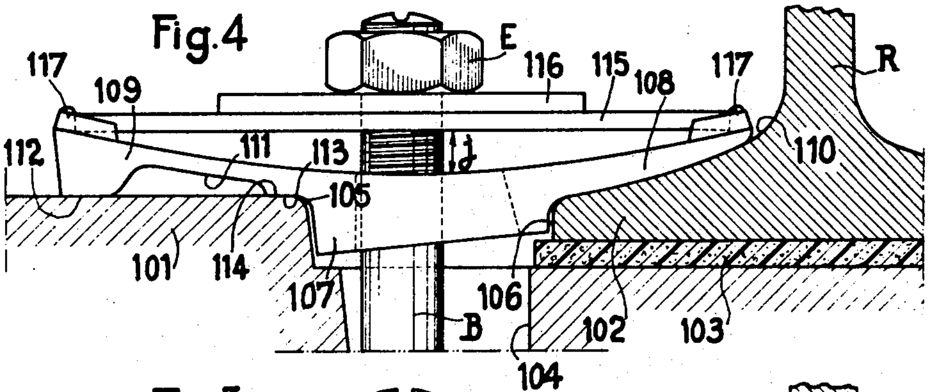



Fig.5

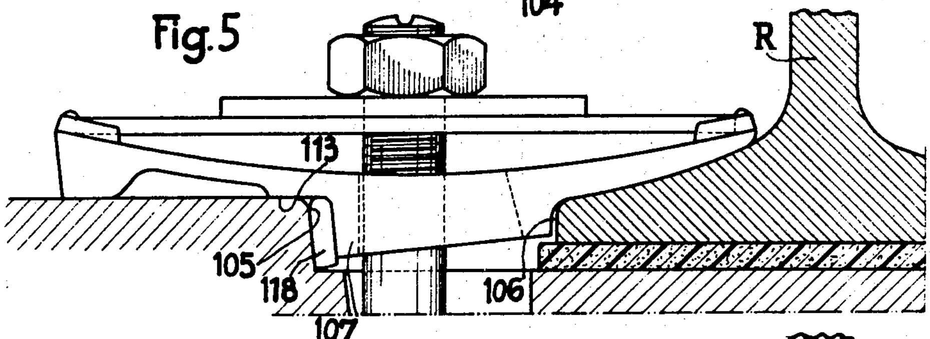



Fig.6

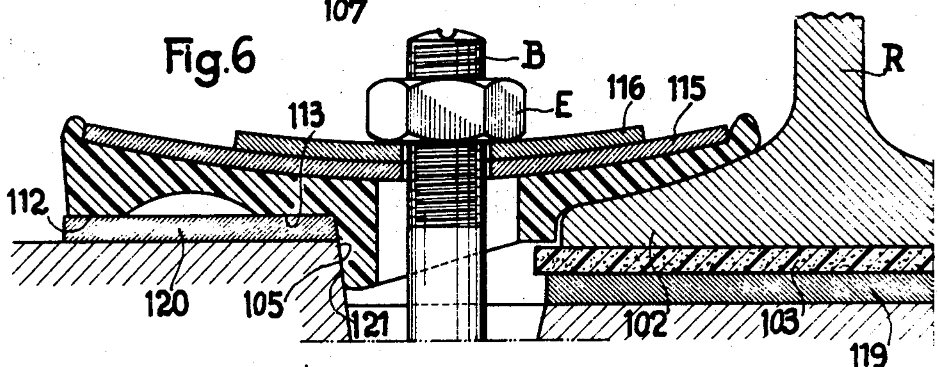
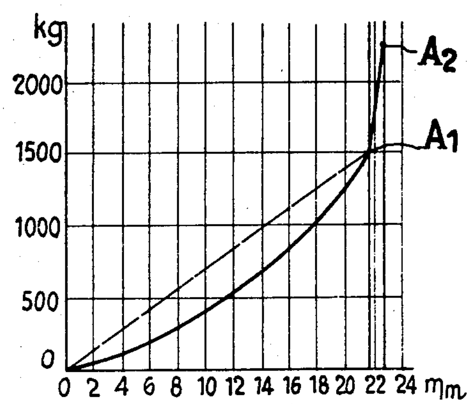



Fig.7



# ELASTICALLY YIELDABLE INSULATING RAIL FASTENING DEVICE

This application is a continuation-in-part of my application Serial No. 802,952, filed Feb. 27, 1969, now abandoned.

The present invention relates to rail fastening devices for railway tracks.

The design of railway tracks employs, to an increasing extent, rail supports of a material other than wood and in particular sleepers of concrete and of steel. However, although wood is by nature insulating and enables the rails to be employed for establishing track signalization circuits, concrete and steel are conductive or insufficiently insulating materials which cannot be employed as rail supports in tracks equipped with signalization employing track circuits unless fasteners are used which are specially designed for electrically insulating the rails from these sleepers.

One of the most commonly employed rail fastening devices comprises a metal clip, usually consisting of two roughly parallel strips interconnected by a loop portion, which acts as a bearing point on the sleeper either directly or through a bearing member. Whereas the upper strip of the clip is longer and bears against the flange of the rail, the lower shorter strip positions the rail laterally by the abutment of its free end against the edge of the rail flange.

Various ways of insulating rails from sleepers are known with such fastening devices, in which insulating means are interposed between its various elements, the sleeper and the rail.

However, these known and sometimes widely used arrangements usually have the drawback of subjecting the insulating parts wherever they are employed to static and dynamic stresses which adversely affect their resistance and usually do not permit the use of moulded or injected plastics materials whose price is advantageous but whose mechanical performances are insufficient, in particular as concerns shear and flow resistance under permanent stress.

One of the objects of the invention is to remedy these drawbacks and provide an electrically insulating rail fastening device which is elastically yieldable and has a long life and employs as insulators cheap materials, such as plastics materials or synthetic resins.

In the device according to the invention, the clip is of an insulating plastics material and comprises a body having an aperture and two branches in its upper part on which is disposed a metal strip, also provided with an aperture, a bolt extending through said strip and said body for fastening the assembly to said sleeper by bearing against the latter and the flange of said rail.

According to another feature of the invention, one end of the body of the clip is adapted to abut against the edge of the flange of the rail, whereas the opposite end is adapted to bear directly, or indirectly, against the sleeper, said branches extending over the flange and over the surface of the sleeper, and said strip having a length less than that of the branches and maintaining the assembly in position when the bolt anchored in the sleeper is screwed tight.

It will be understood that, owing to this arrangement, the metal strip which maintains the rail on the sleeper is insulated from the flange of the rail and from the sleeper by the branches of the clip whose body insulates the shank of the bolt from the edge of the flange.



The head of the bolt is for example a hammer head anchored to the sleeper in a conventional manner.

Fatigue tests carried out with the rail fastening device defined hereinbefore have shown that no breakage is to be feared of its component parts, and in particular of the spring steel strip, so long as the extent of the vertical movements of the rail on its support does not exceed about 0.5 mm. Such a movement corresponds in practice to the maximum limit of the vertical movement of a rail bearing on a sleeper through an elastically yieldable rubber sole element which has grooves and has a thickness of 4 to 6 mm, such as that currently employed in France and many foreign countries.

Now, investigations carried out for the purpose of laying tracks on concrete foundations or supports capable of allowing high speeds, for example exceeding 200 kph, have revealed the necessity of increasing the elasticity of the sole element placed between the rail and its support. The extent of the vertical movement of the rail upon passage of the wheels, necessary for suitably absorbing or damping the dynamic effects, resulting from imperfections in the wheels and in the surface of the rail, then becomes equal to at least about 1 mm.

According to research carried out, this result can be obtained, not with grooved sculptured or apertured rubber sole elements whose thickness would be excessive to afford the desired compressibility, but with plane, relatively thin, sole elements smooth on both faces and constituted by a cellular elastomer having a closed structure. Thus, a plane sole element having a thickness of 8 mm and composed of elastomer of which about 30 percent of its volume is constituted by microscopic nitrogen bubbles, has an elasticity upon compression exceeding 1 mm, under loads corresponding to the passage of wheels of vehicles loaded with about 15 metric tons per axle.

The fastening device defined hereinbefore is not altogether satisfactory for purposes of maintaining a rail which bears on a flexible sole element of, for example, cellular elastomer, for two main reasons :

the variations in the stresses produced in the spring steel strip by the vertical oscillations having an amplitude of the order of 1 mm would result in fracture due to fatigue of the steel in the vicinity of the aperture provided in the center of the strip which is the most highly stressed zone;

if there were chosen simply for the spring strip and the branches of the clip of plastics material on which the strip bears lengths sufficient to impart to the fastener great flexibility adapted to movements of the order of 1 mm of the end bearing on the rail, the force exerted on the rail would then be too weak to oppose the longitudinal movement of the rail under the effect, in particular, of forces due to braking and expansion. The tightening-down force is indeed limited by the characteristics of the spring steel.

Further, tracks designed for high speeds require high precision in the straightness of the rails, their distance apart and their longitudinal and transverse levelling so that the fastener must allow an easy correction in the course of repair of maintenance.

Moreover, it is known to reinforce by means of a metal strip the median part of a conventional fastener which, owing to the presence of the aperture for the passage of the bolt and to the manner in which the fastener operates, is both the weakest zone and the zone subjected to the highest stresses. Such an arrangement is described in particular in French Pat. No. 1,228,126 . However, it will be seen from the ensuing description that the arrangement according to the invention differs in a substantial manner from this known arrangement as to the purpose and the manner of operating.

Another object of the invention is to improve the fastening device defined hereinbefore so as to adapt it to the particular conditions mentioned hereinbefore.

The invention provides a device comprising a clip composed of insulating plastics material having a body provided with an aperture and two branches extending from the upper part of the body and respectively bearing on the flange of the rail and on the support, a spring steel strip having a aperture in the center part of the strip, and a bolt-and-nut assembly for fastening the rail to the support, wherein there is provided at least one additional spring strip disposed above the first strip and having a length, perpendicular to the longitudinal direction of the rail, which is at least equal to the distance between the edge of the flange of the rail and the opposed lateral abutment face of the support.

Preferably, said branches extend on each side of the body, the branch bearing on the rail flange extends up to the vicinity of the fillet between the flange and the web of the rail, and the main spring strip also has an increased length on each side of its center part.

Owing to the presence of the two strips, there is obtained a fastener having a variable flexibility, the values of this flexibility being maximum when the rail moves downwardly and compresses the elastically yieldable sole on which it bears. On the other hand, this flexibility is reduced and the force exerted on the rail increases considerably, when the rail tends to rise beyond its normal position of equilibrium corresponding to the absence of rolling loads.

Further features and advantages of the invention will be apparent from the ensuing description with reference to the accompanying drawings.

In the drawings :

FIG. 1 is a sectional view of an insulating and elastically yieldable fastening device according to the invention combined with a concrete sleeper;

FIG. 2 is a similar view of a fastening device according to the invention combined with a metal sleeper;

FIG. 3 is a similar view of a modification of the device according to the invention combined with a concrete sleeper.

FIG. 4 is an elevational partly sectional view, in a vertical plane perpendicular to the longitudinal axis of the rail, of an improved elastically yieldable insulating rail fastening device according to the invention applied to a sleeper or other support of concrete or other suitable material;

FIGS. 5 and 6 are views similar to FIG. 4 of two modifications of the device, showing in particular packing blocks for modifying the geometry of the assembly of the fasteners, and

FIG. 7 is a chart showing the response curve of a fastener comprising two spring strips according to the present invention.

In the embodiment shown in FIG. 1, a concrete support or sleeper 1 supports the flange 2 of a rail through a pad of insulating material 3.

Moulded in sleeper 1 is an aperture 4 for the passage of the bolt 5 having a hammer head 6 which is anchored in a retaining plate 7 in a conventional manner.

Also moulded in the sleeper 1 is a bearing face 8 consisting of a shoulder formed in the upper part of the aperture 4 and constituting a dihedral portion whose apex is parallel to the rail.

Note that the bearing face 8 can also consist of a member embedded in or adhered to the concrete.

Disposed between the bearing face 8 of the sleeper and the vertical edge 9 of the flange 2 of the rail is the body 10 of a clip produced by the moulding or by the injection under pressure of a plastics material or of a suitable insulating synthetic resin, which is thermosetting or thermoplastic, or comprises vulcanized elastomer or of any other material having the appropriate strength properties.

The body 10 of the clip has roughly the shape of a rectangular-sided body, a thickness equal to or exceeding that of the flange 2, and a width which depends on the desired position of the rail relative to the bearing face 8 of the sleeper. This body is also provided with a roughly central aperture 11.

The clip comprises two branches 12, 13 which are in one piece with the body 10 and extend on each side of the upper part of the body.

The ends of the branches 12, 13 comprise an upstanding flange 14 and their upper face is advantageously slightly curved with an upwardly facing concavity, the generatrices of this face being parallel to the rail.

The side 15 of the body 10 of the clip is in contact with the bearing face 8 of the sleeper 1 and its opposite side 16 is in abutting relation the edge 9 of the flange 2, the branches 12 and 13 extending respectively over the flange 2 and over the face of the sleeper 1 adjacent the bearing face 8.

Disposed on the branches 12, 13 is a metal strip 17, preferably of spring steel, having a center aperture 18 and extending between the flanges 14 of the ends of the branches 12, 13.

The shank of the bolt 5 extends through the body 10 of the clip and the aperture 18 of the strip 17, and a nut 19 is screwed on its upper end.

When the nut 19 is screwed on the bolt 5, the strip 17 bends and conforms to the concave shape of the face of the branches 12, 13 and maintains the flange 2 applied against the sleeper 1, while the edge 9 of this flange is maintained in abutting relation to the side 16 of the body 10 of the clip.

The length of the rectangular-sided body 10 of the clip, measured in a direction parallel to the edge of the flange of the rail and to the longitudinal axis of the track, is substantially equal to the corresponding dimension of the bearing face and is chosen to be sufficient so that the stresses in the synthetic material of the clip remain within the elastic range and below values which might create permanent deformations by flow under compression. The distance between the edge of the flange of the rail and the abutment face **28** is so chosen as to impart to the transverse support for the rail a suitable elasticity, depending on the modulus of elasticity of the insulating material of the clip. It will also be observed that the desired variations in the width of the track are easily achieved by varying either the width of the body **10** or the width of the lug **23** of the abutment member **22** or both of them.

The rail is maintained elastically in position vertically of the sleeper by the bolt **5** (shown before tightening in FIG. **2**) the nut of which bears on the spring steel strip **17**.

The suitable extent of the tightening can be easily ascertained at a glance if there has been given to the relative profile of the strip **17** and of the top of the branches of the clip on which it bears such shape that, before any tightening, there exists a clearance J between the strip and the clip midway of its length.

In the embodiment shown in FIG. **2**, this clearance J results from the upwardly concave cylindrical shape of the upper face of the branches, this curvature and the clearance J being calculated in such manner that the strip bears throughout its length on the clip, the clearance J being taken up, when the tightening of the bolt, and the corresponding vertical force transmitted to the flange of the rail, have reached the desired value.

It will be understood that modifications can be made to the relative profiles of the strip and the upper part of the clip, to obtain the same result, for example in starting with a plane upper face of the clip and a spring steel strip which is forged with a downwardly facing concavity.

The spring strip **17** thus performs a triple function :

It imparts to the fastening device the required elasticity in the vertical direction while it permits checking the clearance J which determines the effective tightening force of the bolt in the manner of a dynamometer.

It distributes the tightening force of the bolt over the branches **12, 13** through large areas of the insulating clip and the pressure exerted on the branches can thus be limited to a permissible rate which does not result in flow under compression.

It relieves the part of the clip located between the edge of the flange of the rail and the abutment on the support, of any bending, since the strip **17** constitutes a bridge between the bearing points on the rail on one hand and on the abutment member **22** of the rail support on the other, whereas observation of the clearance J permits avoiding any excessive tightening which might result in permanent deformation of not only the strip **17** but also the insulating clip.

Shown in FIG. **3** is a modification of the device according to the invention intended to be employed with a concrete sleeper **31** of conventional type manufactured with a curved support face **38** adapted to receive the loop portion of a metal clip of conventional type. In this case, the body **10** of the clip comprises a radiused or rounded boss **33** which is in one piece with the body **10** and with the branch **13**, which has been thickened, the face **35** of this boss having a shape which is complementary to that of the face **38** of the sleeper.

In the embodiment shown in FIG. **4**, there is seen a sleeper, tie or support of concrete such as a slab **101** supporting the flange **102** of a rail R through an electrically insulating elastically yieldable sole element **103**.

The concrete support comprises, moulded therein, a vertical passage **104** for the passage of a bolt B whose head (not shown) is anchored in the support in the conventional manner and on which a nut B is screwed.

The support also comprises, moulded thereon, a bearing face **105** constituted by a shoulder formed in the upper part of the passage **104** and constituting a dihedral whose corner is parallel to the rail.

Disposed between the bearing face **105** of the sleeper and the vertical edge **106** of the rail flange **102**, is the body **107** of a clip composed of moulded or injected insulating material. The clip also comprises, moulded with the body **107**, two branches **108** and **109**, the upper face of the body **107** and of the branches **108** and **109** constituting a portion of a cylinder having an upwardly facing concavity and generatrices parallel to the longitudinal axis of the rail R.

The branch **108** has a lower face moulded in such manner as to marry up with the shape of the rail flange **102** and is long enough to cover the flange up to the vicinity of the fillet **110** between the flange and the web of the rail.

The opposite branch **109** has a lower face bearing against the concrete and a length roughly equal to the length of the branch **108**. A recess or hollow **111** imparts a certain flexibility to the branch **109** and two bearing zones bearing against the concrete are thus defined, namely a zone **112** at the end of the branch **109** and a zone **113** in the vicinity of the upper edge **114** of the dihedral **105**.

Disposed on the branches **108** and **109** is a spring constituted by two strips **115** and **116** which are plane in the free state so that a clearance *j* is formed, before tightening down, between the center part of the strip **115** and the upper face of the body **107** of the clip. The longer strip **115** bears against the branches **108** and **109** in the vicinity of their free ends, where projecting positioning abutments **117** are moulded on the branches **108** and **109**. The shorter upper strip **116** has however a length greater than the horizontal distance between the edge **106** of the rail flange and the concrete shoulder **105**.

The shank of the bolt B extends through the two strips **115** and **116**, which have an aperture in the vicinity of their centers, and through the body of the clip **107**. When the nut E is screwed on the bolt, the spring composed of the two strips bends downwardly and finally marries up with the curvature of the branches **108** and **109** and of the body **107** and the clearance *j* which existed before the tightening down disappears. The curvature of the upper face of the clip has been so calculated and arranged that, when the clearance *j* is eliminated, the force exerted by nut E on the upper strip **116** and, through the latter, on the lower strip **115** and on the flange **102** of the rail through the branch **108**, corresponds to the values chosen in particular as a function of the characteristics of the spring consisting of the strips **115, 116**.

By way of example, laboratory tests have given the following results : if the spring structure consists of a strip **115** having a length of 160 mm, a width of 70 mm and a thickness of 4.5 mm and an upper strip **116** having the same section but a length of 90 mm, the clearance $j$ of 10 mm is taken up by a tightening down of the nut E on the bolt B with a force of 1,500 kg without exceeding the elastic limit of the treated spring steel of which the strips **115** and **116** are composed. It was with strips of these dimensions that the elasticity curve shown in FIG. **7** was obtained, this curve representing the value of the force exerted on the rail by a pair of fasteners as a function of variations in the level of the rail (in millimeters). This curve reveals an interesting feature which results from the construction of this fastener : the curve shows a sudden change of slope at point $A_1$ which corresponds to the normal tightening down by the nut and bolt means in the absence of a rolling load on the rail. Between the origin O and the point $A_1$ the mean slope of the curve (segment $O-A_1$) corresponds to a spring coefficient C of about 70 kg/mm. On the other hand, beyond the point $A_1$ and near $A_2$ the spring coefficient is about 600 kg/mm. Now, this portion of the curve beyond $A_1$ corresponds to a raising of the rail with respect to its support beyond its position of equilibrium.

This designed characteristic of the invention results from the fact that the upper strip **116**, which is stiffer because shorter than the strip **115**, bears, at the end of the tightening down of the faster, on one hand against the edge of the rail flange and, on the other hand, against the shoulder **105** of the support through the bent long strip **115** and the respective branches **108** and **109** of the clip. The assembly therefore constitutes a spring structure of variable flexibility. The flexibility and consequently the amplitude of the movement allowed without risk of fracture by fatigue, is maximum when the rail moves downwardly upon compression of the elastically yieldable sole element **103** by the passage of rolling loads. On the other hand, the flexibility is reduced, and the force exerted by the fastener on the rail considerably increased, when the rail tends to rise beyond its position of equilibrium corresponding to an absence of a rolling load.

This fastener is therefore particularly well adapted to the utilization of elastically yieldable sole elements which are very compressible and there is no risk of the fastener breaking owing to fatigue when the rail is pushed down for example a little more than 1 mm upon the passage of each wheel.

On the other hand, this fastener opposes the raising of the rail and the expansion or release of the elastically yieldable sole element in the course of the vibrations set up by the rolling movement of the trains. This is the essential condition for effectively preventing rail creep under the effect of the forces of train braking, expansion of the rail, etc.

It will be understood that there may be chosen for the strip **116** a section which is different from that of the main strip **115** and even a section which is not constant along the length of the strip.

FIGS. **5** and **6** show by way of example how the geometric arrangement of the fastener can be modified and how the fastener can be adapted in accordance with the invention to the correction of the level of the rail on its support.

In the embodiment shown in FIG. **5**, the moulded sides of the body **107** have been so arranged as to define a lateral clearance. This clearance is filled by a block or plate **118** composed of metal or plastics material or of wood impregnated with resin for example, whose thickness is so chosen as to practically take up the clearances and adjust the position of the rail flange **102** with respect to the shoulder **105** as a function of the desired width of the track. Sets of blocks **118** of suitable thickness therefore enable the track width and the alignment of the track to be adjusted.

The level of the rail R on its support **101** can be corrected, for example to compensate a local sinking in of the foundation of the track or to achieve a transition ramp if the track is locally raised by the freezing of the subjacent ground, in a conventional manner by means of a block, plate or shim **19** interposed between the rail flange and its support (FIG. **6**). This shim **119** is of wood, plastics material or any other only slightly compressible material.

It will be clear that if the manner in which the fastener bears on its support is not corrected at the same time, the geometric arrangement of the assembly of the fastener would be incorrect. In particular, the bolt B would no longer be substantially perpendicular to the strips **115** and **116** and the bearing face **113** would be in mid-air.

This correction is made possible in accordance with the invention by a block or shim **120** of only slightly compressible material placed under the branch **109** of the fastener, the block or shim **120** having of course roughly the same thickness as the shim **119**. Sets of shims **119** with blocks **120** of the same thickness thus enable the level of the rail to be easily corrected while conserving the correct geometric arrangement of the whole of the fastener. The extent of the possible correction is merely limited by the height of the lateral contact between the abutment face **121** of the body **107** of the clip and the shoulder **105** of the support.

It will be understood that the correction of the transverse position of the rail by the block **118** shown in FIG. **5** and the correction of the levels of the rail and fastener by the shims **119** and **120** are not limited solely to the fastener having two strips according to the invention. For example, it is applicable to the fastener shown in FIGS. **1** and **2**.

Having now described my invention what I claim and desire to secure by Letters Patent is:

**1.** An elastically yieldable and electrically insulating fastening device for fastening a rail having a flange to a sleeper, said device comprising a clip composed of an insulating plastics material having a body, two branches extending from the upper part of the body and an upper face extending over said body and said branches, a metal strip having a first portion bearing on said upper face and a second portion bearing on said upper face, an aperture in said strip and an aperture in said body coaxial with said aperture in said metal strip, and a screw-threaded fastening means extending through said apertures for fastening said clip body and said strip to said sleeper, a first of said branches extending from said body in a first direction and adapted to bear downwardly on said rail flange and a second of said branches extending from said body in a direction opposed to said first direction and adapted to bear against means separate from and independent of said bolt and defining a bearing face associated with said sleeper, said first portion of said strip overlying said first branch and said second portion of said strip overlying said second branch, said strip having a bottom face which defines with said upper face of said clip between said first and second portions of said strip a gap of sufficient dimensions that when said device is fastened to said sleeper by a force exerted on said strip by said screwthreaded fastening means, said strip can be initially deformed and finally applied against said upper face in a region of said strip intermediate said first portion and second portion of said strip.

2. In an assembly comprising a sleeper and a rail having a flange and supported by said sleeper, an elastically yieldable and electrically insulating fastening device located on one side of said rail and fastening said rail flange on said sleeper, said device comprising a clip composed of an insulating plastic material having a body, two branches extending from the upper part of the body and an upper face extending over said body and said branches, a metal strip bearing on said upper face, means defining an aperture in said strip and an aperture in said body coaxial with said aperture in said metal strip, and screw-threaded tightening means extending through said apertures and anchored in said sleeper tightening said clip and strip onto said sleeper and onto said flange, said branches extending from said body in opposite directions, a first of said branches overlapping and bearing downwardly on said flange and a second of said branches bearing on means defining a bearing face associated with said sleeper separate from and independent of said bolt and located on a side of said screw-threaded tightening means remote from said rail, said strip having a first portion overlying said first branch of said clip and a second portion overlying said second branch of said clip, and said strip being subjected to a deflection between said first portion and said second portion of said strip exceeding any possible deflection of said clip due to the fact that before said screw-threaded tightening means tightens said strip and clip down said strip initially defined with said upper face of said clip a gap between said first portion and said second portion of said strip.

3. An assembly as claimed in claim 2, wherein said means defining a bearing face comprise an upper face on said sleeper, said sleeper having an upstanding face, said body having a face in abutting relation to the edge of said flange of said rail and an opposite face supported by said upstanding face of said sleeper, said metal strip having a length less than the overall length of said body and said branches and engaging upwardly projecting portions on the clip so as to maintain said clip and bolt in correct relative position when said bolt anchored in said sleeper is tightened.

4. An assembly as claimed in claim 2, wherein said means defining a bearing face comprise an abutment member independent of said screw-threaded tightening means and having a lug engaged in an aperture in said sleeper, said abutment member having a face against which said second branch bears and a bearing face which cooperates with a face on said body of said clip and is parallel to said rail, whereby said clip is supported by said abutment member transversely of said rail.

5. An assembly as claimed in claim 2, wherein said body of said clip is roughly in the shape of a rectangle.

6. An assembly as claimed in claim 2, wherein said means defining a bearing face comprise a bearing face on said sleeper, said body of said clip comprising on one side of the body a boss which is in one piece with said body and has a shape which is complementary to that of a recess in said sleeper.

7. An assembly as claimed in claim 2, wherein the upper face of said branches has an upwardly concave curved shape, the generatrices of said shape being parallel to said rail.

8. An assembly as claimed in claim 2, wherein each of said branches comprises at its end upstanding flange means for retainingly engaging a corresponding end of the strip.

9. An assembly as claimed in claim 2, wherein said metal strip is of spring steel and has a length a little less than the overall length of said branches and said body.

10. An assembly as claimed in claim 3, wherein the width of said body of said clip, measured between said faces of said body, determines the position of said rail relative to said sleeper.

11. An assembly as claimed in claim 2, wherein said clip is of a suitable moulded, electrically insulating, plastics material.

12. An assembly as claimed in claim 2, wherein said clip is of synthetic resin.

13. An elastically yieldable and electrically insulating fastening device for fastening a rail having a flange to a sleeper, said device comprising a clip of an insulating plastics material having a body portion and two branches extending away from each other in opposite directions from an upper part of said body portion, an upper first bearing face extending over said body portion and said branches, a metal strip having a bottom second bearing face and two end portions which bear on said first bearing face, an aperture in said strip and an aperture in said body coaxial with said aperture in said strip for receiving screwthreaded means adapted to bear on said strip for fastening said clip and said strip to said sleeper, said branches being adapted to be disposed on the same side of said rail, a first of said branches being adapted to exert in use of the device a downward rail retaining force on said flange and a second of said branches being adapted to be supported in use of the device by means defining a third bearing face associated with said sleeper, said first and second bearing faces having different contours in vertical section and defining therebetween a clearance which increases from said end portions to said apertures whereby when said device is fastened to said sleeper by a force exerted on said strip by said screw-threaded means, said strip is initially deformed and finally applied substantially fully against said first bearing face of said clip in the position of use of the device.

14. In an assembly comprising a sleeper and a rail having a flange and supported by said sleeper, an elastically yieldable and electrically insulating fastening devices located on one side of said rail and fastening said flange to said sleeper, said device comprising a clip of an insulating plastics material and having a body and two branches extending away from each other in opposite directions from an upper part of said body, said clip having an upper bearing face extending over said body and said branches, a metal strip bearing closely against said upper bearing face, an aperture in said strip, an aperture in said body coaxial with said strip aperture, a first of said branches exerting a downward

flange-retaining force on said flange and a second of said branches being supported by means defining a support face associated with said sleeper, screw-threaded anchoring means extending through said apertures and anchored in said sleeper and exerting a holding down force on said strip, said strip being under a bending stress which is greater than the bending stress of said clip due to the fact that said strip and said upper bearing face initially defined a clearance therebetween which tapered from said apertures to outer ends of said branches.

**15.** In an assembly comprising a support and a rail having a web and a flange and supported by said support, an elastically yieldable and electrically insulating fastening device located on one side of said rail and fastening said rail flange on said support, said device comprising a clip composed of an insulating plastics material having a body, two branches extending from the upper part of the body and an upper face extending over said body and said branches, a first spring metal strip bearing on said upper face, a second spring metal strip bearing on said first strip, means defining coaxial apertures in said first strip, said second strip and said body, and screw-threaded means extending through said coaxial apertures and anchored in said support tightening said clip onto said support and onto said flange through said strips, said branches extending from said body in opposite directions, means defining an upper bearing face and a lateral abutment face associated with said support separate from and independent of said bolt and located on a side of said bolt remote from said rail, a first of said branches overlapping and bearing downwardly on said flange and a second of said branches bearing on said upper bearing face, said first strip having a first portion overlying said first branch of said clip and a second portion overlying said second branch of said clip, and said first strip being subjected to a deflection between said first portion and said second portion of said first strip exceeding any possible deflection of said clip due to the fact that before said screw-threaded means tighten said clip down said first strip initially defined with said upper face of said clip a gap between said first portion and said second portion of said first strip, said second strip having a length perpendicular to the rail which is equal to at least a distance between said edge of said flange and said lateral abutment face.

**16.** An assembly as claimed in claim **15**, wherein said first branch extends up to the vicinity of a fillet between said flange and said web of the rail.

**17.** An assembly as claimed in claim **15**, wherein said second branch has a lower recess defining two bottom faces bearing on said upper bearing face.

**18.** An assembly as claimed in claim **15**, further comprising a block between said body and said lateral abutment face.

**19.** A device as claimed in claim **15**, further comprising a first packing member interposed between said upper bearing face and said second branch, and a second packing member having the same thickness as said first packing member interposed between said flange and said support for correcting the level of said rail.

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