FASTENING OF RAILS ON SLEEPERS BY RESILIENT CLIPS

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ABSTRACT

Fastening of rails on wooden or concrete sleepers by a metal pressure plate-clip in the form of a trapezoid (1.5) and a plastic tie-plate (1.4). The metal pressure plate-clip and the plastic tie-plate constitute an entirety, and provides a continuous pressure along its entire edge (2.1). The edge leaning on the rail base is formed in the way to enable a smooth gliding along the rail base during pulling on, preventing unnecessary resistance and damage. The other, narrower side of the pressure plate is formed in the way that it has a fixation edge at its end (3.2), preventing any shifting. The plastic tie-plate has a fixation groove at its outer end (4.2) in which the narrower, outer end of the pressure plate enters. The groove is formed in the way that it forms a firm connection with the outer end of the metal pressure plate-clip, so that taking out of the pressure plate is not possible. The tie-plate also contains a bigger groove (4.4), which allows deformation of the pressure plate during dismounting.
FIGURE 2
FASTENING OF RAILS ON SLEEPERS BY RESILIENT CLIPS

TECHNICAL FIELD

[0001] The invention relates to a solution, which comprises the fastening of rails on sleepers by resilient clips. According to the International Patent Classification, the invention belongs to the field indicated under E 01 B 9/28.

TECHNICAL PROBLEM

[0002] The fastening of rails on sleepers is a very time consuming, hard and responsible work, which requires the engagement of a large number of workers or the use of very specialized machinery. The fastening of rails on sleepers is carried out in practice on the location itself, where the fastening by sleeper screws is a very time consuming job, while the quality and firmness of the connection as carried out is very hard to be examined. In addition to a large number of screws required to be fastened, there is a high possibility that particular screws remain unfastened or insufficiently fastened, which along with the vibrations generated by trains, may eventually result in the unscrewing of other screws and weakening of the clamping power on the rail, and thereby the weakening of the whole connection between a sleeper and a rail. Such a weakening of the connection between a sleeper and a rail is potentially a great risk for the safety of the railway traffic. Examination of the connection firmness, and checking whether the clip generates the prescribed pressure on the rail is almost not allowable or feasible.

[0003] The rails fastened on sleepers by the use of the classic system are not safe from vandalism, or unauthorized dismounting, which, taking into consideration the current risk of terrorism, must not be disregarded. In the systems as known and applied thus far, anyone having relatively simple tools may dismount a rail making the traffic unsafe.

[0004] On the other hand, the dismounting itself is carried out very slowly, because each and every clip must be dismounted individually, which is a very time consuming process, requiring engagement of a large number of workers and use of specialized machinery, which increases costs.

STATE OF THE ART

[0005] A solution to the problem comprising regular and adequate fastening of rails on sleepers was carried out in several different ways in the past. One of the methods, known under the title “pandrol system” includes the fastening by clips made of spirally shaped spring round steel described in the application GB 1510244. The fastening of a rail on a sleeper requires that the flat end of every clip be inserted in the eye, so that one end of the clip enters the eye, while the other end makes pressure on the rail. One of the disadvantages of this solution is the high consumption of time for the installation of such clips, giving the fact that the worker has to insert every clip individually.

[0006] The further disadvantage of such a solution comprises the fact that the clip makes pressure on the rail in one spot only, so as the time passes, and due to heavy loads and vibrations, the clip becomes deformed at such a spot, loosing its pressure force. This solution contains deficiencies also when using the insulation material between the clip and the rail, which may become thinner and even broke by the time. It is practically impossible to control every clip used on a route. Dismounting as well as mounting is for the mentioned reasons very slow and inconvenient.

[0007] The further solution, known under the title “SKL system” is described in the patent file U.S. Pat. No. 5,096,119, and is also using spring round steel. The solution consists of a clip, made of round spring steel, bent into the modified letter “M”, and a tie-plate. The connection between a rail and a sleeper is achieved by screwing a sleeper screw through a clip and a tie-plate into the sleeper. One part of the clip makes pressure on the tie-plate, lying on the sleeper, and the other part of the clip makes pressure on the rail. Here the pressure of the clip on the rail is achieved through two spots, and disadvantages of such a connection are similar to the ones indicated in the previous example. In order to achieve the desired pressure force the screw has to be screwed in its entirety to press the middle part of the clip against the tie-plate. The disadvantage consists just of checking whether each screw has achieved the required force, or whether it is screwed in its entirety, respectively, which is not very simple to be carried out. This fact shows that this system is unreliable too.

[0008] Like as in the previous examples, the mounting and dismounting are carried out very slowly, because every screw has to be screwed or unscrewed, requiring stopping intervals at each sleeper.

[0009] The mentioned solutions do not allow pre-assembling in workshops and transportation of the complete structure to the location where only the rails would have to be added.

[0010] The embodiment of a clip enabling even transmission of the force to the rail, and thereby a more reliable connection, is described in the patent file U.S. Pat. No. 5,125,573. A metal plate of trapezoid form serves as a clip, lying with its wider end on the track, ensuring thereby even distribution of the pressure force. After installing a rail, the metal plate is put in its final position. This solution allows pre-assembling. Dismounting is still time consuming, because every screw has to be unscrewed individually enabling the clip to be removed from the bedding, and finally the rail to be removed itself.

[0011] The mentioned solutions address the problem in different ways, but none of them solves problems in a satisfactory way. The fact that the mounting and dismounting are almost equally time consuming constitute a very significant deficiency. Every screw has to be unscrewed in its entirety to release completely the rails from the clips fastening them.

DISCLOSURE OF THE ESSENCE OF THE INVENTION

[0012] A solution to the problem comprising the fastening of rails on sleepers and their dismounting is carried out according to this invention by a metal pressure plate—a clip, in the form of trapezoid and a plastic tie-plate. The metal pressure plate-clip and the plastic tie-plate, form an entirety, which allows pre-assembly of the entire assembly in the factory, and subsequent incorporation of a rail on the spot. The form of the metal pressure plate-clip, ensures a continued pressure along the entire edge, providing a firm and reliable connection. The edge leaning against the rail is formed in the way to allow smooth gliding along the base of the rail during pulling on, and prevents unnecessary resistance and damage. The other side of the pressure plate is formed in the way to prevent any shifting, after the plate is pulled on the rail and the mounting is finished. The plastic pressure plate has a groove...
on its outer end, in which enters a narrower, outer end of the pressure plate. The groove is formed in the way that it forms a firm connection with the outer end of the pressure plate, preventing the pressure plate to be taken out. The tie-plate also contains one bigger groove, which allows deformation of the pressure plate and the dismounting thereof.

[0013] The coloured edge of the tie-plate allows a very simple and quick visual checking and establishing whether all the pressure plates are put correctly on the rail base, which prevents the wastis of time on the control of every screw and pressure plate.

A SHORT DESCRIPTION OF DRAWINGS

[0014] FIG. 1 A fastening assembly in a pre-assembled condition

[0015] Position 1.1 a sleeper

[0016] Position 1.2 a rail

[0017] Position 1.3 a rail base

[0018] Position 1.4 a tie-plate

[0019] Position 1.5 a metal pressure plate—a clip

[0020] Position 1.6 a sleeper screw

[0021] Position F a pressure screw

[0022] FIG. 2 A fastening assembly in an assembled condition

[0023] Position 2.1 edge of the metal pressure plate—clip

[0024] Position 2.2 coloured part of the tie-plate

[0025] Position Fb fastening force

[0026] Position Fc force used for dismounting

[0027] FIG. 3 A metal pressure plate—a clip

[0028] Position 3.1 cross-section of the metal pressure plate-clip

[0029] Position 3.2 fixation edge

[0030] Position 3.3 pressure plate

[0031] Position 3.4 curvature line

[0032] Position 3.5 oval opening for a sleeper screw

[0033] FIG. 4 Tie-plate

[0034] Position 4.1 cross-section of the tie-plate

[0035] Position 4.2 fixation groove

[0036] Position 4.3 fixation delimiters

[0037] Position 4.4 groove—space for deformation of the metal pressure plate

[0038] Position 4.5 a hole for a sleeper screw

[0039] Position 4.6 a support of the edge of the metal pressure plate—clip

[0040] Position 4.7 inclination of the tie-plate

[0041] Position 4.8 leaning surface of a tie-plate and a sleeper

A DETAILED DESCRIPTION OF AT LEAST ONE OF THE METHODS FOR CARRYING OUT THE INVENTION

[0042] A solution comprising a reliable and fast fastening of rails on wooden and concrete sleepers includes two basic components. The first is a metal pressure plate (FIG. 3), or a clip, respectively, exerting the required force on the rail base (FIG. 1 Pos. 1.3). The metal pressure plate-clip (FIG. 3) has a form of equilateral trapezoid, the longer side of which is bent at a certain radius (FIG. 3 Pos. 2.1) along a smooth gliding along the tie-plate (FIG. 1, Pos. 1.4) as well as along the rail base (FIG. 1, Pos. 1.3), during pressure. The opposite, shorter side of the metal pressure plate-clip (FIG. 3) is also bent to the same side as the longer one, but in the manner that its edge, resulting from bending is sharp, or making an angle of 90°, respectively (FIG. 3, Pos. 3.2). Such an edge is designed to be within the groove provided on the tie-plate (FIG. 4, Pos. 4.2) in its final, assembled position.

[0043] The pressure surface (FIG. 3, Pos. 3.3) developed after bending of the shorter side of the metal pressure plate-clip (FIG. 3, Pos. 3.1) serves as the spot to be exerted a force upon acting vertically on such surface, with a purpose of pressing and pulling on the metal pressure plate-clip the rail base. Additional function of the pressure plate (FIG. 3, Pos. 3.3) is to prevent any shifting of the metal pressure plate-clip after finishing the pulling on or the assemblage, respectively. This is achieved by leaning of the pressure surface (FIG. 3, Pos. 3.3) against the inner edge (FIG. 4, Pos. 4.3) of the groove (FIG. 4, Pos. 4.2) carried out on the tie-plate (FIG. 4). The metal pressure plate-clip (FIG. 3) contains along its central line an oval opening (FIG. 3, Pos. 3.5) designed for the screw to pass through it (FIG. 3, Pos. 3.4). The metal pressure plate-clip (FIG. 3) on its curved line bent at an obtuse angle (FIG. 3, Pos. 3.4), giving the metal pressure plate-clip a resilient pre-stress to exert the required pressure force upon the rail base (FIG. 1, Pos. 1.3).

[0044] The second component of the solution is a plastic tie-plate (FIG. 4) containing a round hole (FIG. 4, Pos. 4.5) designed for the sleeper screw to pass through it (FIG. 1, Pos. 1.6). The tie-plate (FIG. 4) contains a groove (FIG. 4, Pos. 4.2) designed for the fixation or locking, respectively of the metal pressure plate (FIG. 3) in its final, assembled condition, in the manner that the lower edge (FIG. 3, Pos. 3.2) of the metal pressure plate-clip (FIG. 3) fits in it. The form and depth of the fixation groove (FIG. 4, Pos. 4.2) allows locking. The form of the fixation groove (FIG. 4, Pos. 4.2) is such as to correspond completely to the lower edge of the metal pressure plate-clip (FIG. 3, Pos. 3.2).

[0045] The pressure surface (FIG. 3, Pos. 3.3) of the metal pressure plate-clip, and the surface of the fixation delimiters (FIG. 4, Pos. 4.3), leaning against each other, ensures a firm locking in the final, assembled position and prevents any shifting of the pressure plate and possible disengagement of the fixation end (FIG. 3, Pos. 3.2) from the fixation groove (FIG. 4, Pos. 4.2). The tie-plate (FIG. 4) also contains a bigger groove (FIG. 4, Pos. 4.4), which is designed for plastic deformation of the metal pressure plate-clip, as applied in the pressure plate dismounting process.

[0046] The tie-plate (FIG. 4) also contains a surface (FIG. 4, Pos. 4.6) on which the edge of the metal pressure plate-clip (FIG. 3, Pos. 3.4) lies in a pre-assembled condition. The height of the surface (FIG. 4, Pos. 4.6) of the tie-plate corresponds to the height of the rail base itself (FIG. 1, Pos. 1.3), being in contact with it, meaning that those two points are at the same level.

[0047] The surface (FIG. 4, Pos. 4.6) is followed by the inclined surface of the tie-plate (FIG. 4, Pos. 4.7) at an angle corresponding to the angle (FIG. 3, Pos. 3.4) at which the metal pressure plate-clip is bent. At the upper surface there is a surface coloured by a bright colour (FIG. 2 and FIG. 4, Pos. 2.2), which is in a pre-assembled condition, covered by the pressure plate (FIG. 1, Pos. 1.5). After pulling the pressure plate on in the final assembling position (FIG. 2, Pos. 1.5), this coloured surface (FIG. 2, Pos. 2.2) becomes visible, giving the sign that the pressure plate is in the final position. Thus, using visual checking, it can be established that the mounting of the plate is finished.

THE MANNER OF INDUSTRIAL OR OTHER APPLICATION OF THE INVENTION

[0048] The technical solution according to the invention can be applied in all the cases in which the fastening of rails
on concrete or wooden sleepers are concerned. This technical solution provides a high degree of automation in the process of fastening the railway rails on and removing them from sleepers. A self-propelled maintenance vehicle or a device mounted on it, which would continually shift pressure plates in their final position, may be used.

[0049] The advantage of this solution over the existing ones is the possibility of pre-assembly, meaning that the whole process, except the installation of rails, which is done at the location itself, may be carried out at the workshop. Thus, individual transportation of sleepers, tie-plates and fastening clips is avoided.

[0050] This solution is applicable under and on all the conditions and locations where rails are fastened on sleepers and where a significant reduction of costs and time consumption is desired.

A SOLUTION TO THE TECHNICAL PROBLEM DESCRIBED IN THE DESCRIPTION OF THE INVENTION

[0051] A solution to the technical problem according to the invention concerned is based on the embodiment of the metal pressure plate-clip (FIG. 3) and plastic tie-plate (FIG. 4) and their use in the assembly in the manner such as follows.

[0052] The assembly, which is in a pre-assembled condition, and is shown in FIG. 1, consists of a railway sleeper (FIG. 1, Pos. 1.1) and a tie-plate (FIG. 1, Pos. 1.4, and FIG. 4), placed on the sleeper, while a metal pressure plate-clip (FIG. 1, Pos. 1.5 and FIG. 3) is placed on the tie-plate in the way that its wider side (FIG. 1 and FIG. 3, Pos. 2.1) is leaned against the surface of the tie-plate (FIG. 1 and FIG. 4, Pos. 4.6) while the rest of the metal pressure plate-clip is placed on the upper surface of the tie-plate (FIG. 1, Pos. 1.4) while the outer, narrower side, together with the fixation and locking edge (FIG. 3, Pos. 3.3) extends beyond the edge of the tie-plate (FIG. 1, Pos. 1.4).

[0053] The tie-plate (FIG. 1, Pos. 4.6 and FIG. 4) has at its lower part, which is opposite to the groove—a space designed for deformation of the metal pressure plate (FIG. 4, Pos. 4.5), a corresponding protrusion (FIG. 4, Pos. 4.8) made in the same direction as the groove, the surface of which is carried out in such a way as to lean against a similar groove carried out on the sleeper (Pos. 4.8, FIG. 1 and FIG. 2), meaning that they have the same leaning surface (Pos. 4.8, FIG. 1 and FIG. 2) and prevent any shifts between the tie-plate (Pos. 1.4, FIG. 1 and FIG. 2) and the sleeper (Pos. 4.8, FIG. 1 and FIG. 2).

[0054] The assembly as formed, which consists of the tie-plate (FIG. 1, Pos. 1.4) and the metal pressure plate-clip (FIG. 1, Pos. 1.5) is fastened on a sleeper (FIG. 3, Pos. 1.1) by screwing a sleeper screw (FIG. 1, Pos. 1.6) in the railway sleeper (FIG. 1, Pos. 1.1), which screw passes through the oval opening (FIG. 3, Pos. 3.5) made on the metal pressure plate-clip (FIG. 3), and continues through the round hole made on the tie-plate (FIG. 4, Pos. 4.4).

[0055] The sleeper screw (FIG. 1, Pos. 1.6) by screwing it into the sleeper in the described manner may be fastened even in the factory, using a force, which is pre-determined and sufficient to make the assembly to be firm in its final, assembled condition (FIG. 2), and to make the metal pressure plate-clip (FIG. 1, Pos. 1.5) to exert the force which is required to press the rail base (FIG. 1, Pos. 1.3) against the sleeper, keeping the rail (FIG. 2, Pos. 1.2) in the required position. In such a position, the pressure plate (FIG. 3, Pos. 1.5) covers the vividly coloured upper surface of the tie-plate (FIG. 2, Pos. 1.4), making it invisible.

[0056] The assembly as finished is ready to be transported to the location where rails would be fastened on sleepers.

[0057] After the rail (FIG. 1, Pos. 1.2) is put in situ to a defined position on sleepers (FIG. 1, Pos. 1.1), the final fastening of the rail on sleepers may start by shifting the metal pressure plate-clip (FIG. 1, Pos. 1.5) along the tie-plate (FIG. 1, Pos. 1.4) by the action of Fa force (FIG. 1, Pos. Fa) perpendicularly to the surface of the pressure plate (FIG. 3, Pos. 3.3), which is, at the same time, perpendicularly to the rail.

[0058] Free movement of the metal pressure plate-clip (FIG. 1, Pos. 1.5) in the Fa force direction (FIG. 1, Pos. Fa) is enabled by the oval opening (FIG. 3, Pos. 3.5), the dimensions of which are sufficient enough to enable free passage of the sleeper screw body (FIG. 1, Pos. 1.6), but not sufficient to enable the passage of the screw head. By the use of Fa force (FIG. 1, Pos. Fa) on the surface of the metal pressure plate-clip (FIG. 3, Pos. 3.3), the metal pressure plate-clip is shifted towards the rail base (FIG. 1, Pos. 1.3), until its upper sharp fixation edge, at its opposite side (FIG. 3, Pos. 3.2), enters the fixation groove (FIG. 4, Pos. 4.2), made on the tie-plate. The form of the fixation edge made on the metal pressure plate-clip (FIG. 3, Pos. 3.2) and the depth of the groove made on the tie-plate (FIG. 4, Pos. 4.2) are completely leaning against each other, not allowing thereby the pressure plate-clip (FIG. 3, Pos. 3.3) to return to the previous position.

[0059] The Fb force (FIG. 2, Pos. Fb), by which the metal pressure plate-clip, in its assembled condition (FIG. 2, Pos. 1.5), acts using its edge (FIG. 2, Pos. 2.1) on the rail base (FIG. 2, Pos. 1.3) is in fact the force created by the sleeper screw (FIG. 2, Pos. 1.6), as screwed in the sleeper (FIG. 2, Pos. 1.1), by the fastening force used on the metal pressure plate-clip (FIG. 1, Pos. 1.5), made of spring steel metal with resilient characteristics, and in the manner that it is, in a non-assembled condition, previously bent according to a curving line (FIG. 3, Pos. 3.4) at a corresponding angle in the direction of Fb force activity.

[0060] The process of fixation of a rail on a sleeper ends by putting the metal pressure plate-clip (FIG. 2, Pos. 1.5) in the final position in which its lower sharp fixation edge (FIG. 3, Pos. 3.2) enters the final groove, made on the tie-plate (FIG. 4, Pos. 4.2). After the pressure plate is put in the final position, a surface coloured by a bright colour (FIG. 2 and FIG. 4, Pos. 2.2) becomes visible, confirming that the metal pressure plate-clip is in the final position, and that the rail (FIG. 2, Pos. 1.2) is fastened on the sleeper (FIG. 2, Pos. 1.1) by the action of sufficient Fb force.

[0061] A rail assembled in such a way is ready for traffic and no work performed manually, comprising the fastening of rails on sleepers at that location, is required.

[0062] Removal of a rail (FIG. 2, Pos. 1.2) from a sleeper (FIG. 2, Pos. 1.1) is achieved by the Fc force (FIG. 2, Pos. Fe), which acts perpendicularly to the surface of the metal pressure plate-clip (FIG. 2, Pos. 1.5), achieving its bending deformation, to fill the groove—space for deformation of the metal pressure plate-clip (FIG. 4, Pos. 4.4).

[0063] With regard to the fact that the wider side of the metal pressure plate-clip (FIG. 2, Pos. 1.5), leaning against the rail base (FIG. 2, Pos. 1.3), is fastened by the sleeper screw, the other side of the pressure plate having a fixation edge (FIG. 3, Pos. 3.2) comes out from the groove (FIG. 4, Pos. 4.2) due to permanent plastic deformation created by the
action of Fc force, and allows the metal pressure plate-clip (FIG. 2, Pos. 1.5) to be shifted to the previous position, which it had in a pre-assembled condition, acting on it by a corresponding force, in the direction which is opposite to the direction of the Fa force.

Thus, the shifting itself of the deformed metal pressure plate-clip to the previous position, which it had in a pre-assembled condition, by the force acting opposite to the direction of Fa force, releases the rail. Such a dismounting method leaves no waste material on the track to be subsequently collected or transported.

The technical solution comprising the fastening of rails on sleepers by resilient clips according to the invention, includes the use of the corresponding device, which can for mounted on the maintenance vehicle, and the whole process of fastening the rails on sleepers as well as removing them from the sleepers may be carried out fast with a high degree of automation, reduced costs, reduced number of workers, and reduced time to be spent on mounting and dismounting activities.

A technical solution comprising the fastening of rails (FIG. 1, Pos. 1.2) to wooden or concrete railway sleepers (FIG. 1, Pos. 1.1) by resilient clips according to the invention, using the corresponding screws and also sleeper screws (FIG. 1, Pos. 1.6) is characterized by the fact that a tie-plate (FIG. 1, Pos. 1.4 and FIG. 4) containing a round hole (FIG. 4, Pos. 4.5), designed for a corresponding, regularly a sleeper screw (FIG. 1, Pos. 1.6) to pass through it, has a groove in the form of a right-angle triangle (FIG. 4, Pos. 4.2) on its upper surface, and a groove—space for deformation in the form of equilateral triangle (FIG. 4, Pos. 4.4), which surface is followed by the inclination surface of the tie-plate (FIG. 4, Pos. 4.7) at the angle corresponding to the angle (FIG. 3, Pos. 3.4) at which the metal pressure plate-clip is bent, which continues as a surface, supporting the edge of the metal pressure plate-clip (FIG. 4, Pos. 4.6), while at the lower side of the tie-plate (FIG. 1, Pos. 1.4 and FIG. 4), opposite to the groove—space for deformation of the metal pressure plate (FIG. 4, Pos. 4.5) and in the same direction as this groove, there is a corresponding protrusion (FIG. 4, Pos. 4.8), the surface of which is carried out in the way that it leans against the same groove carried out on the sleeper (Pos. 4.8, FIG. 1 and FIG. 2), and the metal pressure plate-clip (FIG. 1, Pos. 1.5 and FIG. 3) in the form of equilateral trapezoid, the wider side of which, as bent at a particular radius (FIG. 1 and FIG. 3, Pos. 2.1) is leaned against the surface of the tie-plate (FIG. 1 and FIG. 2, Pos. 4.6), while the rest of the metal pressure plate-clip lies on the upper surface of the tie-plate (FIG. 1, Pos. 1.4), and its opposite, narrower side, also bent at the same side as the longer one, but thus, that its edge created by bending is sharp, or at 90° (FIG. 3, Pos. 3.2), and together with the fixing and locking edge (FIG. 3, Pos. 3.3) goes beyond the edge of the tie plate (FIG. 1, Pos. 1.4), while the metal pressure plate-clip (FIG. 1, Pos. 1.5 and FIG. 3) contains an oval opening (FIG. 3, Pos. 3.5) designed for a sleeper screw to pass through it (FIG. 3, Pos. 3.4), while the metal pressure plate-clip (FIG. 3) is at its curvature line bent at an obtuse angle to one side (FIG. 3, Pos. 3.4) giving the metal pressure plate-clip a resilient pre-stress to exert the required force pressure on the rail base (FIG. 1, Pos. 1.3)

A technical solution comprising the fastening of rails on wooden or concrete railway sleepers by resilient clips according to claim 1, is characterized by the fact that the assembly as formed, which consists of the tie-plate (FIG. 1, Pos. 1.4) and metal pressure plate-clip (FIG. 1, Pos. 1.5) is fastened on the railway sleeper (FIG. 3, Pos. 1.1) by screwing in the sleeper (FIG. 3, Pos. 1.1) a sleeper screw (FIG. 1, Pos. 1.6), which passes through the oval opening (FIG. 3, Pos. 3.5) made on the metal pressure plate-clip (FIG. 3), continuing through the round hole, made on the tie-plate (FIG. 4, Pos. 4.4), achieving tightening by force, which is pre-determined, and sufficient to make the connection firm in the assembled condition (FIG. 2) and the metal pressure plate-clip (FIG. 1, Pos. 1.5) to achieve the required force, which would press the rail base (FIG. 1, Pos. 1.3) towards the rail sleeper and keep the rail (FIG. 2, Pos. 1.2) in the required position.

A technical solution comprising the fastening of rails on wooden or concrete railway sleepers by resilient clips according to claims 1 and 2, is characterized by the fact the final fastening of rails on sleepers is achieved by shifting the metal pressure plate-clip (FIG. 1, Pos. 1.4) on the rail base (FIG. 1, Pos. 1.4) using Fa force (FIG. 1, Pos. Fa), which acts perpendicularly to the pressure surface (FIG. 3, Pos. 3.3), and at the same time at the direction which is perpendicular to the rail, while free movement of the metal pressure plate-clip (FIG. 1, Pos. 1.5) in the Fa force direction (FIG. 1, Pos. Fa) is enabled by the oval opening (FIG. 3, Pos. 3.5), the dimensions of which are sufficient enough to enable free passage of the sleeper screw body (FIG. 1, Pos. 1.6), but not sufficient to enable the passage of the sleeper screw head, in the way that the action of Fa force (FIG. 1, Pos. Fa) to the surface of the metal pressure plate-clip (FIG. 3, Pos. 3.3) shifts the metal pressure plate-clip towards the rail base (FIG. 1, Pos. 1.3), until its lower sharp fixation edge, at its opposite side (FIG. 3, Pos. 3.2), enters the fixation groove, made on the tie-plate (FIG. 4, Pos. 4.2), providing that he form of the fixation edge made on the metal pressure plate-clip (FIG. 3, Pos. 3.2) and the depth of the groove made on the tie-plate (FIG. 4, Pos. 4.2) are completely leaning against each other, not allowing the pressure plate-clip (FIG. 3, Pos. 3.3) to return to the previous position.

A technical solution comprising the fastening of rails on wooden or concrete railway sleepers by resilient clips according to claims 1, 2, and 3 is characterized by the fact that the Fb force (FIG. 2, Pos. Fb), by which the metal pressure plate-clip in its assembled condition (FIG. 2, Pos. 1.5) acts by its edge (FIG. 2, Pos. 2.1) on the rail base (FIG. 2, Pos. 1.3), is in fact a force resulting from the action made by the sleeper screw (FIG. 2, Pos. 1.6) as screwed in the sleeper (FIG. 2, Pos. 1.1), by the tightening force on the metal pressure plate-clip (FIG. 1, Pos. 1.5), which is made of spring metal sheet, as a material with resilient characteristics, and which is also made in the manner that in the non-assembled condition, it is previously bent at its curvature line (FIG. 3, Pos. 3.4) at a corresponding angle in Fb force direction.

A technical solution comprising the fastening of rails on wooden or concrete railway sleepers by resilient clips according to claims 1, 2, and 3 is characterized by the fact that driving of the metal pressure plate-clip (FIG. 2, Pos. 1.5) along the tie-plate (FIG. 2, Pos. 1.5) in its final position, in which its lower sharp fixation edge (FIG. 3, Pos. 3.2) enters the fixation groove made on the tie-plate (FIG. 4, Pos. 4.2), ends the fastening of a rail on a sleeper, in which position a brightly coloured surface (FIG. 2 and FIG. 4, Pos. 2.2) becomes visible, showing that the metal pressure plate-clip is in its final position, and that the rail (FIG. 2, Pos. 1.2) is fastened to the sleeper (FIG. 2, Pos. 1.1) by the action of Fb force.

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