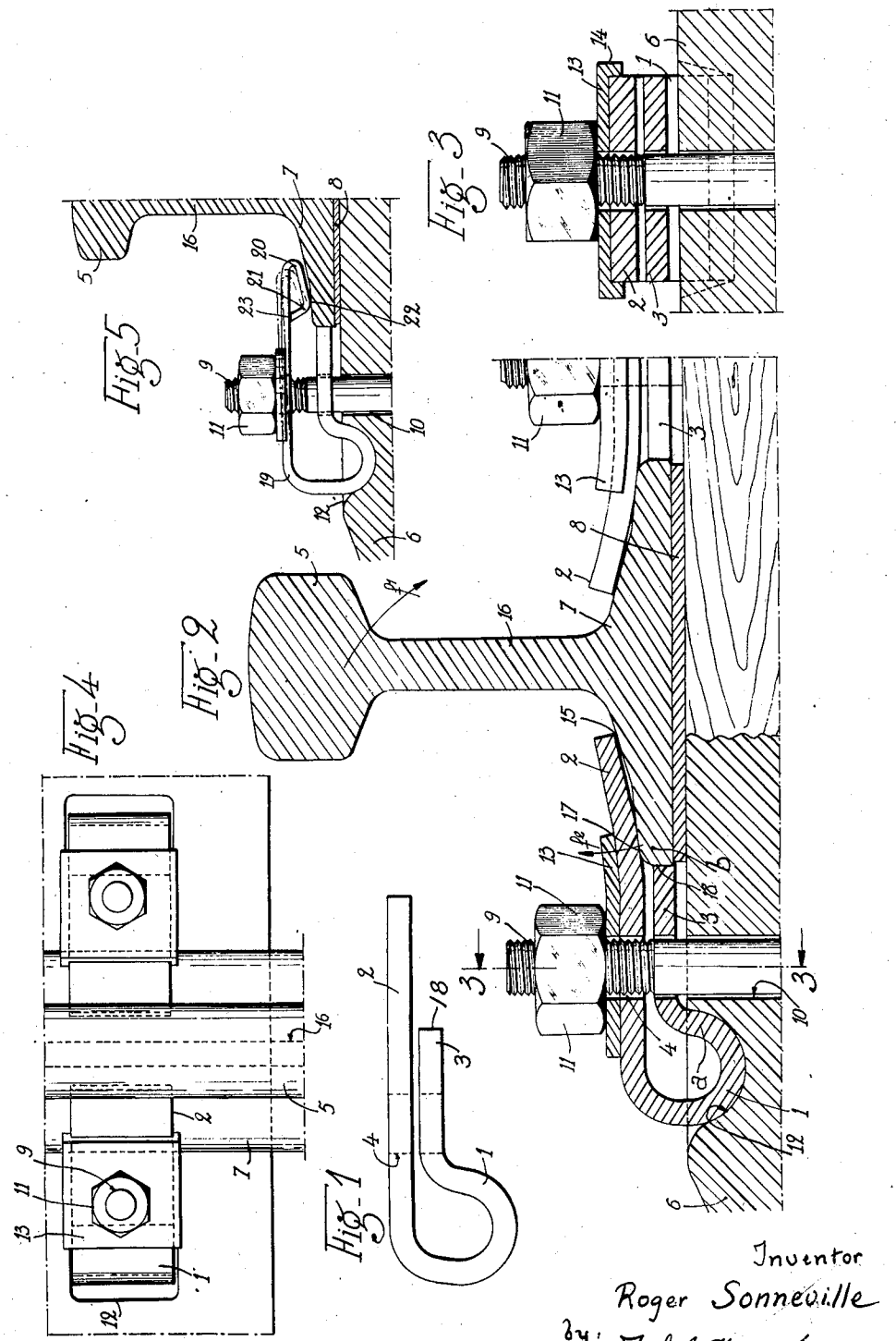
Aug. 30, 1949. R. SONNEVILLE 2,480,388

RAILWAY RAIL HOLDING DEVICE

Filed March 16, 1948 2 Sheets-Sheet 1



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Fig. 6

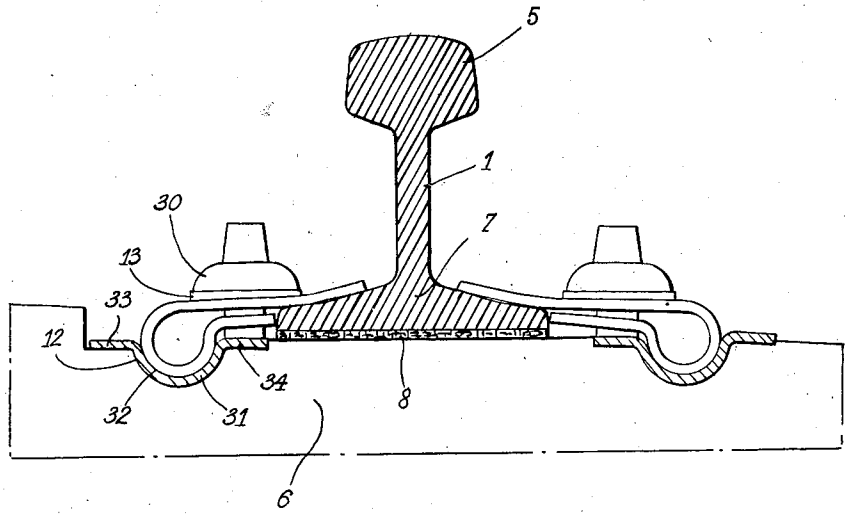
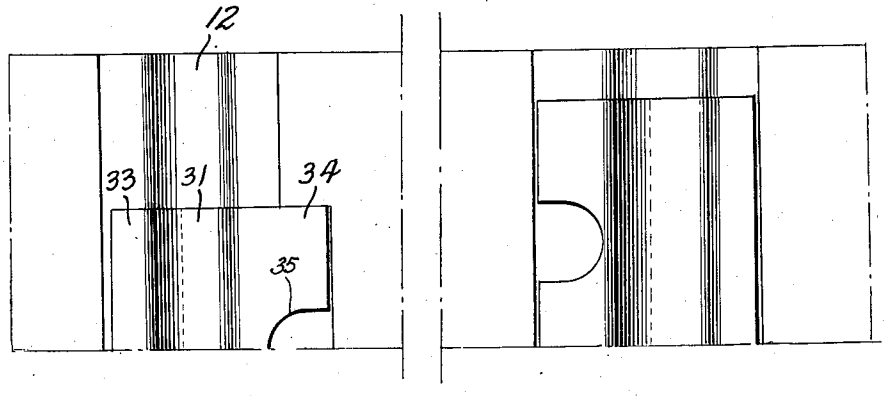


Fig. 7



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RAILWAY RAIL HOLDING DEVICE

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4 Claims. (Cl. 238—349)

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The devices normally used heretofore for fixing a rail to wooden sleepers (coach-screws, dog-spikes) are rigid. Consequently, when the fastening means (coach-screw for example) has just been tightened, the rail is held against the sleeper with the maximum force; but if the slightest play occurs, owing to wear or to a slight loosening, the force holding the rail against the sleeper becomes zero or nearly zero.

The elimination of the force exerted by the fastening means allows creeping movements and jarring to occur, and the play increases according to a rapidly increasing law, to which it is necessary to put an end periodically by an upkeep operation.

It may be said that, in practice, the rail is only actually fixed to the sleepers and held by the fastening means during the transient periods that follow the tightening or servicing of the fastening means and that, between these periods, the rail is free and takes advantage of its freedom to creep, wear and dislocate. If, owing to its nature, wood withstands shocks and vibrations fairly well, this is not the case with reinforced concrete sleepers which are quickly and irreparably disintegrated.

To overcome these serious defects, various resilient holding members have already been proposed, but they did not exert a sufficient pressure or hold the rail satisfactorily to prevent transverse and longitudinal movements.

A feature of this invention is to provide a resilient device for fixing rails to sleepers, which holds the rail satisfactorily on its support and prevents the transverse and longitudinal movements of the rail, as well as the overturning of the fastening means. Said device is remarkable in that it comprises a resilient clip formed by a spring blade which is folded over and bent round in such a manner as to form a loop which is extended by two unequal superposed arms, both of which are provided with a hole for the insertion of suitable headed fastening means, bolt or coach-screw, said clip being adapted to bear by means of said loop against the sleeper or support and to press on the one hand, by means of its longer arm, against the upper face of the flange of the rail so as to exert a vertical resilient pressure on said flange, and to bear on the other hand, by means of its shorter arm which is spaced from the sleeper, against the side edge of the flange, so as to form a lateral abutment for said flange, the loop of the clip projecting towards the sleeper and fitting into a hollow housing or recess of corresponding shape provided in the sleeper.

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In order to distribute more evenly the pressure on the surface of the loop that bears against the sleeper and to decrease the wear of said surface, the housing in the sleeper that accommodates the loop is so arranged as to have an improved surface which is adapted to decrease the wear on the sleeper and distribute the pressure more evenly over said sleeper.

The devices according to the invention are particularly suitable for fixing rails resting on concrete sleepers or stringers through the medium of a resilient sole-plate.

The ensuing description, made with reference to the accompanying drawing which is given by way of a non-limitative example, will clearly illustrate the use and operation of the invention.

Fig. 1 shows a side view of one embodiment of a clip according to the invention.

Fig. 2 shows a transverse section of a rail with the clip in operative position.

Fig. 3 is a section through 3—3 of Fig. 2.

Fig. 4 is a plan view corresponding to Fig. 2, on a smaller scale.

Fig. 5 shows a modified form of a device according to the invention.

Fig. 6 shows a similar device with coach-screw attachment and a bushing inserted between the loop and the support, and

Fig. 7 is a partial plan view corresponding to Fig. 6 with the clip and coach-screw removed.

Referring to Fig. 1 the clip comprises a blade of treated spring steel, which has been bored by punching and shaped in the hot state by bending and then swaging in such a manner as to form a rounded loop 1, a long upper arm 2 and a shorter lower arm 3, each of the two arms being thus provided with a hole 4 of larger diameter than the fastening bolt 9 so as to provide a clearance.

As shown in particular in Fig. 2, the rail 5 rests on the sleeper 6 by means of its flange 7, a strip 8 of rubber or other flexible or resilient material being preferably interposed between said flange and said sleeper. On either side of the rail, a clip such as the one shown in Fig. 1 is held in position by a bolt 9 which is engaged in a hole 10 of the sleeper and is provided with a nut 11; furthermore, the loop 1 of the clip fits into a rounded cavity 12 of the sleeper, which forms a shoulder.

The upper arm 2 of the clip is preferably capped by an intermediate member 13 and the action of the nut 11 is exerted on said member 13. At the beginning of the tightening operation, the end of the arm 2 comes into contact at 15, near the web 16 of the rail 5, with the flange 7 of said rail;

as the tightening increases, the arm 2 becomes curved and abuts at 17 against the edge of the flange 7.

As regards the short lower arm 3, its length is such that its end 18 is in contact with the side edge of the flange 7 and thus forms an abutment which prevents or limits the transverse movements or creeping of the rail.

Said arm 3 does not bear against the sleeper 6 and no filler plate is inserted between the clip and the sleeper.

Furthermore, a clearance is preferably left between the two arms 2 and 3 of the clip so as to increase the resilience of the clip.

It will be seen that at 15 a predetermined resilient pressure is obtained, which remains substantially constant while the loads are passing over it, such loads only having the effect of resiliently compressing the rubber sole-plate 8.

On the other hand, the pressure at 17 is for the greater part eliminated owing to the downward movement of the rail while the loads are passing over it, which compensates for the compression of the sole-plate 8 due to the passing of said loads. Consequently, when there is no load immediately above the sleeper, the pressure of the clip is high and prevents any lateral or longitudinal movement of the rail, but when a load is passing, the table of the sleeper 6 and the sole-plate 8 only support a limited pressure and not the sum of the pressures produced by the rolling load and the clamping pressure of the clip.

For ascertaining the useful limit of the tightening of the clip, it should be noted that as soon as contact has been obtained at 17, the operator who continues to tighten the nut 11 quickly encounters a stiff resistance which tells him that it is useless to endeavour to tighten it further; the use of specially trained labour is therefore unnecessary.

The stresses supported by the rail when the loads are passing over it are of three kinds; the longitudinal stresses (creeping), the transverse stresses and the overturning stresses, which tend to produce corresponding movements of the rail.

The longitudinal movements are prevented by the pressure exerted on the flange of the rail by the long arm 2. On the other hand, the fitting of the loop 1 of the clip in the corresponding housing 12 of the sleeper prevents such rotation of the clip in the horizontal plane as may be due to the pulling force exerted on the arm 2 by the rail during its creeping movement.

The transverse movements are prevented by the short arm 3 which abuts against the edge of the flange of the rail; during this transverse thrust, the lower portion of the clip which is free since it does not bear against the sleeper and is provided with a hole 4 or larger diameter than the bolt 9, can move slightly and the portion *a* of the loop thus acts as a spring; this arrangement eliminates frictional wear and particularly the shearing of the bolt 9.

Finally, the overturning of the rail is eliminated owing to the fact that should overturning of the rail tend to occur for example in the direction of the arrow f_1, when a load is passing over it, the edge *b* of the flange has a tendency to be lifted in the direction of the arrow f_2, but its movement is stopped by the abutment of said edge *b* against the upper arm 2 of the clip at the point 17. On the other hand, since the holes 4 are of larger diameter than the bolt 9, the clip can rock slightly about the bearing point of its loop 1 on the sleeper 6 without causing the bolt 9 to shear.

It is obvious that, without exceeding the scope of the invention, it is possible to make modifications in the embodiment which has just been described. In particular, it is possible to eliminate the intermediate member 13, the nut 11 in that case acting directly on the arm 2 of the clip; furthermore, the bolt 9 may be replaced by a usual coach-screw. Finally, the diameter of the holes 4 should be so chosen as to prevent contact between the bolt and the clip under normal conditions of use.

Fig. 5 shows a modification of the invention, in which a clip 19 has its upper arm bent downwardly at the end thereof facing the rail, and forms a kind of hook 20, the end 21 of which is in turn bent upwards so that said hook bears against the flange 7 at a single point 22. Before the nut 11 is tightened on bolt 9, there is a space between the upwardly bent end 21 of hook 20 and the underwall of the longer upper arm of clip 19. When the nut 11 is further tightened, a second abutting contact occurs at 23 between the end 21 of hook 20 and the wall of the upper arm of the clip. The contacts 22 and 23 respectively perform the same function as the bearing contact 15 and the abutment contact 17 of the clip shown in Fig. 2.

Instead of making the blade which forms the clip of constant cross-section, it may be made of variable thickness, for example of continuously decreasing cross-section from the lower arm to the upper arm.

Fig. 6 shows a method of attachment by means of a coach-screw 30 in which the loop of the clip fits in the substantially cylindrical bearing surface of a bushing 31 which engages in a corresponding housing 12 of the sleeper 6. The movements of the bushing 31 are prevented by means of two diametrical lugs 33 and 34 with which it is provided. An aperture 35 (Fig. 7) is provided in the lug 34 for the coach-screw 30 to pass through.

The bushing 31 may be formed by a metal blade or by a sheet of resilient or plastic material, rubber for example.

The insertion of this bearing bushing 31 is very important when wooden or cement sleepers are used, since it enables damage to such sleepers to be prevented when sudden stresses are transmitted thereto.

In the case of metal sleepers, the surface of the loop 1 of the clip may be made to bear onto its housing through a special member fixed to the sleeper by bolting, riveting, welding or otherwise.

In the case of wooden sleepers, the hardness and the resistance to wear of the housing or recess of the loop or of the bushing may be increased along the periphery of said housing by a suitable known process such as the compression of the wood fibres, hardening by heat, impregnating with a resin or a lacquer, cementing a member of hard wood, fibre or plastic material.

This particular arrangement may furthermore be combined with the insertion of a metal or other filling member between the loop and the improved sleeper.

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

1. A railway rail holding device comprising in combination with a rail supported by its flange on a sleeper, a U-shaped clip including a substantially circular loop portion which ends in

an upper arm and a lower arm, said lower arm being substantially parallel with but shorter than the other and said loop portion projecting outwardly from the plane of the shorter arm, two coaxial holes being provided respectively in said arms at a point intermediate the loop portion of the clip and the end of the shorter arm, the sleeper having a recess spaced from the rail and adapted to receive the lower part of said loop portion, in such manner that, upon the loop portion of the clip being received in said recess, the end of the shorter arm abuts the edge of the rail flange without contacting the sleeper, while the longer arm bears upon the flange, and headed fastening means adapted to be inserted with clearance in said holes and secured in the sleeper for pressing vertically the longer arm against the rail flange, the clip acting as a lever fulcrumed at the loop portion thereof with said longer arm and as an abutment for the rail with said shorter arm.

2. A railway rail holding device according to claim 1 wherein the longer upper arm of said clip extends nearly to the web of the rail so that, before tightening of the fastening means said arm bears on the flange along a line located adjacent to the web of the rail and, after tightening, said arm bears on the said flange along a line near the edge of the flange.

3. A railway rail holding device according to

claim 1 wherein the longer upper arm of said clip ends in a downwardly bent hook portion adapted to bear upon the flange of the rail, the end of said hook portion being directed toward the wall of said upper arm and normally spaced from said wall, so that when the tightening of said fastening means has been completed, said end contacts said wall.

4. A railway rail holding device according to claim 1, wherein a bushing is interposed between the loop portion of the clip and the wall of said recess in the sleeper, said bushing being provided with side lugs adapted to bear upon the sleeper for transmitting to the same the pressure from the loop and preventing any rocking movement of said bushing.

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