June 23, 1931. J. KUMAMOTO 1,811,016

SLEEPER

Filed April 14, 1930

Fig. 1.

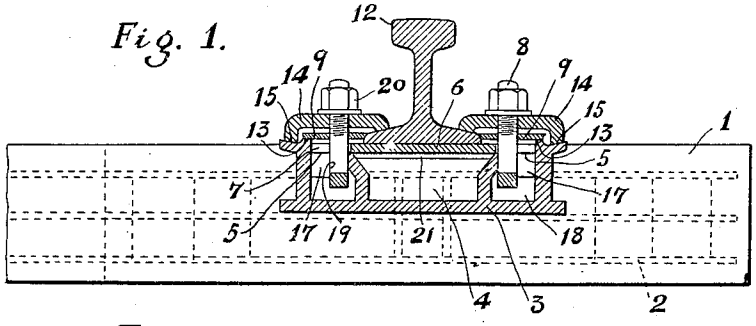


Fig. 2.

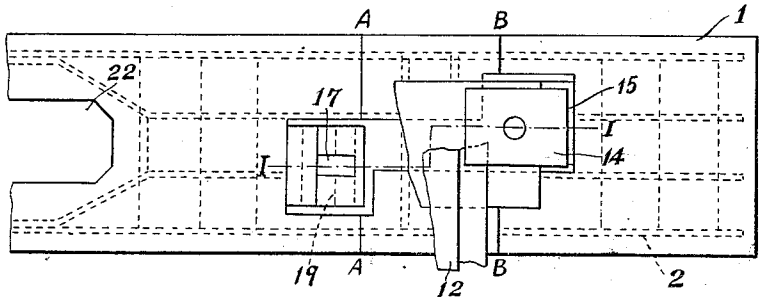


Fig. 3.

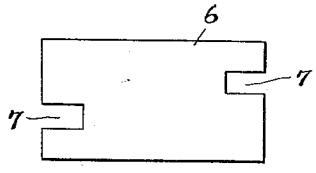


Fig. 4.

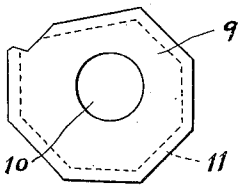


Fig. 6. Fig. 7.

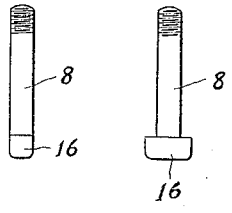
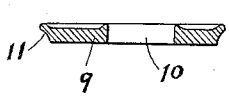


Fig. 5.



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UNITED STATES PATENT OFFICE

JINICHI KUMAMOTO, OF TOKYO, JAPAN

SLEEPER

Application filed April 14, 1930, Serial No. 444,224, and in Japan May 3, 1929.

This invention relates to improvements in sleepers for railway track, especially the railway sleepers made of concrete.

According to this invention, the sleeper is provided with a bed plate embedded in the body of concrete. The bed plate has a hollow space opened upwardly, over the banks of which is bridged a resilient floor plate to receive the rail thereon. The floor plate has thereunder a free clearance space and is supported at its ends in such a manner that it can bend freely as a free-end-beam when the load imposed thereon fluctuates. In this wise, a sufficient elasticity to absorb shocks and vibrations unavoidable in railway track is imparted to the rigid structure consisting mainly of concrete.

The holding plate, by means of which the rail is pressed on to the floor plate, rests on one hand on the upper inclined surface of the rail flange and on the other hand on the longitudinal edge formed on the bed plate, the upper surface of the said edge being inclined in the opposite sense with respect to the said upper surface of the rail flange. The holding plate, in this manner, resting on two oppositely inclined surfaces, is effectively prevented from slipping outwardly due to vibrations. The bolt, which is of T-form and which clamps the holding plate on to the rail flange, is inserted into a cavity formed in the bed plate and is caused to abut, at its head, with a shoulder formed in the cavity, and is thus prevented from being dislocated.

Owing to the fact that no direct mechanical connection exists between the bolt and the resilient floor plate, the latter is free to bend in response to the fluctuations of the load thereon, and no force will be transmitted to the bolt which would pull it out from the bed plate, wherefrom follows the fact that no damage will be caused to the concrete body at the portion where the bed plate comes in contact with the concrete body. In this wise, an intimate contact between the two is always preserved.

A gauge adjuster provided around the bolt is substantially of a polygonal shape possessing the sides, the radial distance of which gradually increases from one to the next. The peripheral edge surface of this eccentric polygonal piece is inclined inwardly so that when it is placed on the bolt it contacts with the inclined shoulder of the rail flange at one of its sides. In case the rail tends to creep, the gauge adjusters would rotate on the respective bolts and adjust themselves between the bolts and the rail on their longer radii, thereby pinching the rail from both sides with an increased pressure, and in this manner the creeping of the rail is effectively prevented.

In the accompanying drawings,

Figure 1 is a vertical section taken along the line I—I of Figure 2.

Figure 2 is a plan of the sleeper in accordance with the invention, some of the parts being removed and some of them being broken away.

Figure 3 is a plan view of the floor plate.

Figure 4 is a plan view of the gauge adjuster.

Figure 5 is a cross sectional view thereof.

Figure 6 is a side view of the bolt.

Figure 7 is a front view thereof.

Referring more particularly to the numerals and characters of the drawings, 1 is the body of the sleeper made of concrete and reinforced as by metallic wires 2 of any suitable construction and arrangement. Within the concrete body 1 is embedded a bed plate 3 which is provided centrally thereof with a hollow space 4. Over the hollow space and bridging the two shoulders 5, 5 is a resilient floor plate 6. The floor plate 6 is provided with two notches 7, 7 to allow a free passage of the bolts 8, 8. Around the respective bolts 8 are provided gauge adjusters 9, 9 substantially of polygonal shape whose sides are of gradually increasing distances from the center of the axial bore 10. This eccentric polygonal piece 9, which is disposed so as to be free from contact either with the floor plate 6 or with the holding plate 14, abuts at an inclined lateral wall 11 thereof with the inclined foot of the flange of the rail 12. The gauge adjuster 9 rests at the opposite side on the projecting edge 13 formed on the bed plate 3. 14 is the holding plate engaging on

one hand with the inclined flange of the rail and on the other with the longitudinal edge 15 formed on the bed plate 3, which is inclined in the opposite sense with respect to the said rail flange.

In assembling, the bolt 8 is passed through the gauge adjuster 9 and the holding plate 14. Then the head 16 of the T-bolt is passed through the elongated holes 17 into the cavity 18 formed in the bed plate 3, the bolt is then rotated by a right angle to bring the head 16 in close contact with the abutment 19 so as to hold the bolt at a fixed angular position with respect to the bed plate. The gauge of the rails is properly adjusted by a suitable setting of the eccentric polygonal pieces 9, and finally the bolts are tightened by means of the nuts 20.

If desired, the hollow space 4 of the bed plate can be filled with concrete leaving a clearance space 21 underneath the floor plate 6. The filling of the hollow space 4 by concrete is very important from the point of view to firmly set the bed plate in the body of the concrete sleeper. The hollow space 4 communicates with the outside, that is, the bed plate is formed with the hollow space 4 extending transversely of the sleeper through all the breadth of the bed plate, so that the concrete filled in the space 4 forms a solid integral body with the concrete material constituting the sleeper itself.

The portion of the concrete body between the shoulders 5, 5 of the bed plate, as indicated by the lines A—A and B—B in Fig. 2, is made of slightly lower level to allow free bending of the floor plate 6.

According to the invention, the resilient floor plate 6, being provided with the open notches 7 for the bolts to pass through, is entirely free to bend between the shoulders 5 of the bed plate 3 in response to every fluctuation of the load imposed thereon. In this manner, shocks and vibrations are effectively absorbed by the resilient metallic plate and the possibilities of breakage of the concrete body are prevented. Moreover, on account of this fact, the bolts are free from the actions to pull them out from the bed plate 3, and consequently the close contact of the bed plate with the body of concrete is always assured.

Nuts screwed on bolts are liable to loosen when they are subjected to shocks and vibrations, as in railway tracks. In my device, so long as the bolts do not get loosened very much, however, the holding plate 14, on account of the fact that its toes rest on two oppositely inclined footings, will be held at its initially set position, and will keep the bolts 8 in an upright position. Owing to this fact and also on account of the fact that the gauge adjusters rest on the inclined shoulder of the rail flange, they will firmly be pinched between the inclined shoulders of the rail flange and the bolts, even in the case the central bore of the gauge adjusters become enlarged by wear after years of service. In case the rail tends to creep forwardly, the eccentric polygonal pieces 9 will grip the rail from both sides on their longer radii and in this manner will effectively prevent the creeping.

In case it is desired to lay the rails in an inclination in such a manner that they are perpendicular to the wheel tread, it is only necessary to embed the bed plate 3 in the concrete body in a correspondingly inclined manner.

When it becomes desirable, after the completion of track rails, to modify the setting of the rails in the above mentioned manner, this can be effected by inserting suitable distance pieces between the shoulders 5 of the bed plate and the floor plate 6.

The concrete body should preferably be provided with a suitable aperture 22 to facilitate the mounting of the sleeper and to prevent the creepage thereof.

If desired, the clearance space 21 provided underneath the floor plate 6 can be completely filled up by concrete, whereby the floor plate is rendered non-yieldable, making the sleepers adapted for street tramways.

What I claim is:—

1. In a railway sleeper made of concrete, a combination comprising a bed plate formed with a hollow open upwardly and a resilient floor plate for seating a rail thereon, which is disposed on the said bed plate and over the said hollow so that it is resiliently yieldable to the load placed on it.

2. In a railway sleeper made of concrete, a combination comprising a bed plate formed with a hollow open upwardly, a resilient floor plate disposed on the said bed plate and over the said hollow for seating a rail thereon, and a bolt for holding the rail upon the said floor plate, the said floor plate being provided with an elongated aperture for the bolt to pass through.

3. In a railway sleeper made of concrete, a combination comprising a bed plate formed with a hollow open upwardly, a resilient floor plate provided with an elongated aperture for a clamping bolt to pass through and disposed over the said hollow of the bed plate, and a holding plate for holding the rail upon the floor plate.

4. In a railway sleeper made of concrete, a combination comprising a bed plate formed with a hollow open upwardly, a resilient floor plate provided with an elongated aperture for a clamping bolt to pass through and disposed over the said hollow of the bed plate, a holding plate for holding the rail upon the floor plate and a polygonal member provided around the said bolt and in contact with the longitudinal edge of the rail flange, the sides of the said polygonal member being of varying radial distances from the bolt.

5. In a railway sleeper made of concrete, a combination comprising a bed plate formed with a hollow open upwardly, a resilient floor plate provided with an elongated aperture for a clamping bolt to pass through and disposed over the said hollow of the bed plate, a holding plate for holding the rail upon the floor plate and a polygonal member having the sides at varying radial distances provided around the said bolt, the said polygonal member being adapted to contact with the longitudinal sloping edge of the rail flange at its inwardly sloping peripheral wall.

6. In a railway sleeper made of concrete, a combination comprising a bed plate formed with a hollow open upwardly, a resilient floor plate provided with an elongated aperture for a clamping bolt to pass through and disposed over the said hollow of the bed plate, a holding plate for holding the rail upon the floor plate and a polygonal disc-like member having the sides at varying radial distances, provided around the said bolt, the said holding plate resting on one hand on an inclined upper surface of the rail flange and on the other hand on an oppositely inclined longitudinal edge formed on the said bed plate.

In testimony whereof, I affix my signature.

JINICHI KUMAMOTO.