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Aug. 25, 1925.

1,551,146

W. S. GODWIN

PAVED RAILWAY

Filed Nov. 10, 1923

2 Sheets-Sheet 1

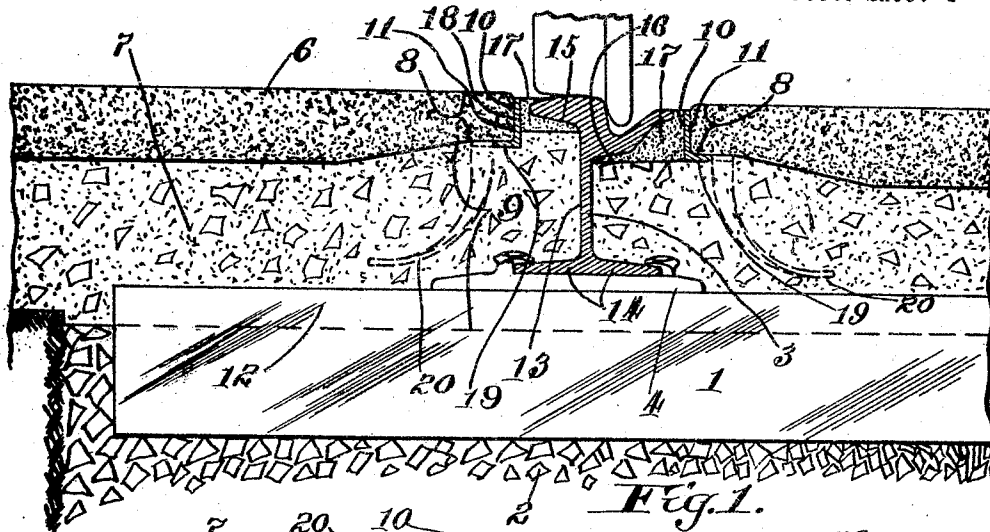


Fig. 1.

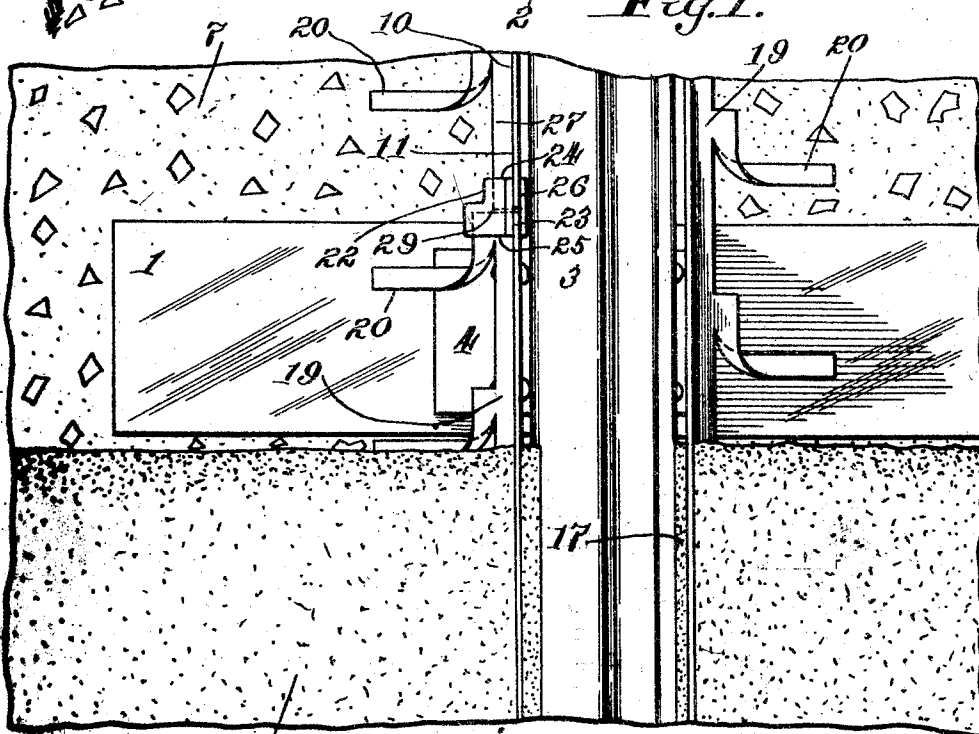


Fig. 2.

WITNESSES
Robert A. Thayer
Emma Wehmer

Inventor
William S. Godwin
 By *Edmund Hamels*
 Attorney

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2 Sheets-Sheet 2

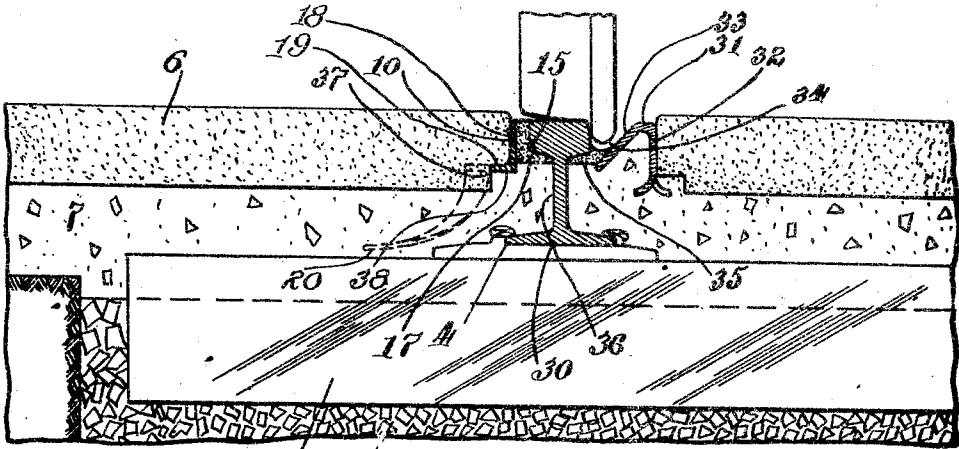


Fig. 3.

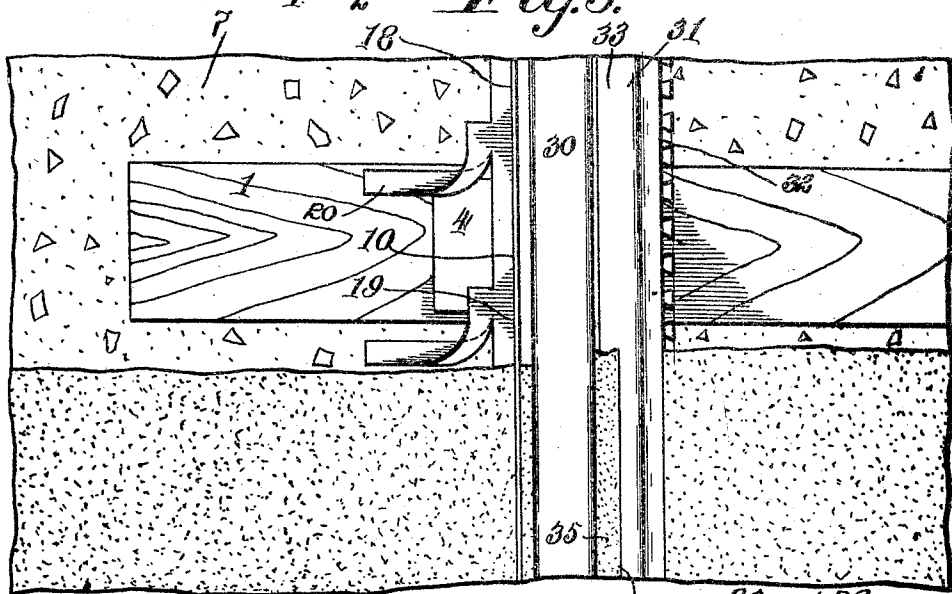


Fig. 4.

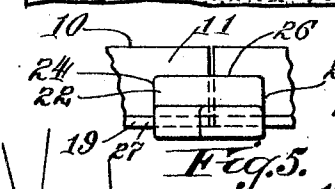


Fig. 5.

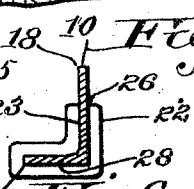


Fig. 6.

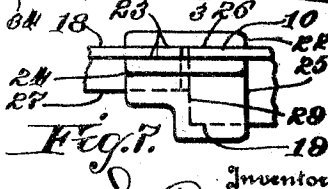


Fig. 7.

WITNESSES
Emma Wehmer

Inventor
William S. Godwin
By Edmund Samuels
Attorney

Patented Aug. 25, 1925.

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UNITED STATES PATENT OFFICE.

WILLIAM S. GODWIN, OF BALTIMORE, MARYLAND.

PAVED RAILWAY.

Application filed November 10, 1923. Serial No. 673,885.

To all whom it may concern:

Be it known that I, WILLIAM S. GODWIN, a citizen of the United States of America, residing in the city of Baltimore, State of Maryland, have invented certain new and useful Improvements in Paved Railways, of which the following is a specification.

The first requisites of good paving and of good track engineering are exactly opposite, a good paving is rigid and a good track structure is elastic.

The object of the present invention is to provide for the construction of a street railway in connection with a highway pavement, combining the elements of these two structures in such a way as not to interfere with the functioning of either in accordance with the above requirements, and at the same time to so arrange them as to make the resulting structure practically permanent without deterioration, necessitating frequent repair and replacement.

The invention is described and shown herein as applied to a street railway structure and highway pavement, the foundation or base being of concrete, or other suitable material, the pavement having an asphalt, block or concrete wearing surface, the edges of which are protected and supported adjacent the rail by paving guards. This structure is, however, subject to wide variation within the scope of the invention.

In various prior art structures these paving guards have been placed immediately against the rail head and a separate filler has been provided against the web between the head and bottom flange of the rail, so that the paving base is practically separated by the rails into sections which are insufficiently supported adjacent the rail. In all of the prior known structures where there is a paving guard, the guard is placed close to the rail head, but the guards have not been connected to the rails as the vibration of the rails did not permit of a permanent and rigid joining of the guards to the rails. This construction is subject to failure by breaking of the edge of the concrete base side of the rail under the heavy loads applied to it, and aside from the expense of the fillers previously used, this arrangement is subject to the defect that water seeps in between the paving guard and the rail, and on freezing and thawing disintegrates the paving and causes comparatively rapid deterioration of the entire structure.

In instances where the paving proper or the paving guard extends into close proximity with the head of the rail, there is not only the tendency to destroy the edges of the pavement by vibration, but the car wheel tread destroys or loosens the guard and shatters the edges of the pavement.

By the improved structure herein described the various difficulties stated have been avoided and the structure has been greatly cheapened, strengthened and its length of life increased. This improved structure differs from the previous practice referred to by the fact that the base is laid close to the web of the rail, carrying the edge of the base under the top flange of the rail, and the top surface of the base is raised adjacent the rail, thickening the base and giving increased support at the point or zone near the rail and at the edge of the traffic bearing portions; also the paving guards which protect the edge of the wearing surface or top, are spaced back from the rail, and an elastic adhesive filler, usually asphaltic, is placed between the paving guards and the head of the rail, adhering to both and forming a tight joint, preventing absolutely the entrance of water into the paving and foundation structure around the rail and providing for the admission of the flanges and edges of the wheels between the rail and guard, and for free vibration of the rail without injury to the paving or the foundation or base, for there is no bond between the vertical sides of the rail webs and the concrete base where the two are in contact.

The structure outlined providing for the extension of the edge of the base beneath the rail head where it is protected and for the thickening of the base adjacent the rail at the edge of the traffic bearing portion where failure has occurred, attains this increased thickness and improved construction without additional expense, and in some instances with a reduction of cost because the arrangement described not only provides for the extension of the base up to the web where it occupies the space between the rail head and flange, dispensing with the filler at this point, but makes it possible to reduce the height of the paving guard and the thickness of the wearing surface adjacent the rail, giving a considerably increased cross-section of base without loss of efficiency as to the wearing surface for the

bottom edge portion of the wearing surface which is removed is not effective. At the same time the structure is so simplified as to give increased economy in assembling it.

5 In the accompanying drawing I have illustrated a street railway construction and pavement embodying the features of my invention in the preferred form.

In the drawing—

10 Figure 1 is a transverse vertical section showing a grooved rail with a straight steel paving guard on each side.

Figure 2 is a plan view of this structure.

15 Figure 3 is a transverse vertical section through the paving and rail and base, showing a T-rail, a straight steel paving guard on one side and a flange-way paving guard on the other side.

20 Figure 4 is a plan of the same, portions of the wearing surface being removed to expose the underlying structure.

Figure 5 is an elevation of a paving guard coupling including adjacent portions of the guard.

25 Figure 6 is a transverse section through a paving guard, the coupling being shown in elevation.

Figure 7 is a plan of the coupling.

30 In the accompanying drawing I have illustrated a street railway and paving structure embodying the features of my invention in the preferred form.

Referring to the drawings by numerals and having particular reference to Figures 35 1 and 2, the structure in connection with which the invention is shown and described comprises cross ties 1 resting on a bed of rubble 2 or other suitable material, with rails 3 laid on the ties, the rails being in the form of the invention shown directly supported on tie plates 4, the particular form of tie structure not being material to the present invention.

45 A paving or wearing surface 6 is laid between and outside of the rails on a base 7 of concrete or other suitable material which is extended beneath the top flanges 15, 16 or head of the rail and thickened adjacent the rail, the thickness of the paving or wearing surface 6 being correspondingly reduced as to the edge portions 8, 8 thereof, making it possible to so increase the thickness of the base 7 at 9, and at the same time to maintain a flat or substantially flat road surface adjacent the rail. This reduction of the thickness of the road surface adjacent the rail not only provides for the thickening of the concrete base but for the use of relatively shallow paving guards 10 covering the reduced lateral vertical edges 11 of the paving adjacent the rails, and carrying the edge portion of the base beneath the rail head and thickening the adjacent portion which protects the portion of the base near the rail 65 where it has been notably subject to failure

and gives increased support beneath the edge of the paving adjacent the rail where it is most needed.

It is of interest to note that while the resilience of the rails is maintained, they 70 have the lateral support of the base shown as of concrete which extends up to and contacts the lateral surfaces of the web 13 of the rail, being carefully tamped in to fill the space between the bottom flanges 14 of the rail and the web 13, but being preferably spaced slightly below the top flanges 15 and 16 to maintain the elasticity of the rail and to keep traffic noise to a minimum.

The edges of the paving and the paving 80 guards 10 are spaced from the rails, the spaces thus formed being filled with an adhesive elastic filler 17 which is usually of an asphaltic material, and which while it conforms to the vibratory and yielding action 85 of the rail without injury, completely seals the opening between the paving guards 10 and the rail, preventing the entrance of water which tends to seep in between the rail and the base or filler, and which when admitted, gradually disintegrates the structure, particularly by the expansion of the seepage in freezing and by alternate freezing and thawing, and to some extent by its oxidizing and solvent effect. 95

By the spacing of the guards and pavement from the rails, injury to the edges of the pavement or wearing surface due to the vibration of the rail and injury to and loosening of the paving guards on this account, and by the contact with the overhang of the wheel tread is avoided. 100

The paving guards 10 have been referred to as of a width corresponding to the width of the edge of the wearing surface or paving proper 6. These guards are shown as of angular cross-section, and to avoid displacement under traffic conditions, it is desirable that they should rest on and be rigidly secured to the base as shown. The paving 110 guards, as illustrated in Figure 1, have an upright flange 18 which engages and covers the lateral surface 11 of the paving proper 6, and a horizontal flange 19 which rests on the base being secured by anchor straps 20 115 which are preferably cut from the horizontal flanges 19, as illustrated in Figure 2, being preferably bent downward and outward, and seated in the base which is tamped about them. 120

These paving guards extend continuously along the edges of the paving and the rails, and are connected together in alignment end to end by paving guard couplings 22 which are preferably of cast metal, as cast iron, 125 cast steel, or the like. The external outline of these couplings is to a large extent immaterial except in so far as it provides sufficient thickness of metal to support the stresses to which the coupling is subjected. 130

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The important feature of the couplings is that they are provided each with a longitudinal slot 23 of L-shaped cross-section, the slot being open at the ends 24 and 25 to admit the paving guards so that they can be thrust in, in a longitudinal direction, and also open as to one longitudinal side, preferably the top side, at 26, permitting the upright flange 18 of the guard to extend upwardly from the coupling, which in turn permits the coupling to be set down below the surface of the pavement.

It will also be noted that in accordance with the illustration, the anchor straps 20 are cut from the edges of the horizontal flange 19 of the paving guard, leaving the flange of reduced width as at 27 for the greater portion of its length, and in the form illustrated the horizontal flanges 19 of the respective paving guards are of different widths as to the respective meeting ends thereof, and the slots or longitudinal openings 23 in the couplings are preferably made as to the bottom or horizontal leg 28 of the L-shaped slot with a step or shoulder 29, see particularly Figures 2 and 7, the bottom leg 28 of the slot being of different widths at the two ends 24 and 25 to fit the corresponding ends of the paving guard, the respective portions of different widths meeting at the shoulder 29.

In Figures 3 and 4 I have shown the structure of my invention slightly varied as to detail and applied to a T-rail 30 instead of a grooved rail, and incident to dispensing with the groove in the rail and substituting a T-section, I have shown a flange way guard 31 having a vertical flange 32 covering the lateral surface of the paving, and an angular flange 33 extending downward and toward the rail at an acute angle from the top of the flange 32 which is adjacent the top surface of the paving. This provides a groove 34 for the wheel flange which is closed at the bottom by elastic filler 35 extending beneath the head of the rail and sealing the space between the rail and the guard. The arrangement of the pavement guard and filler on the opposite side of the rail is similar to that in Figure 1 and will not be separately described. On both sides the elastic filler preferably extends beneath the flange providing for the motion of the rail relatively to the base.

In the structures of Figures 3 and 4 the base is tamped in around the web 36 carrying the edge of the base under the top flange or head of the rail, and as shown the edge 37 of the paving 6 is reduced in width providing for a comparatively shallow paving guard by constructing the base with a longitudinally extending projecting shoulder 38 beneath the guard. This gives an increased thickness of base adjacent the rail, and results in a saving of the paving material in

addition to strengthening the edge of the base and providing for economy by reducing the width or height of the paving guard.

The operation and advantages resulting from the improved structure are fully set forth in the preamble and in the description.

I have thus described specifically and in detail structures embodying my invention in the preferred form, however, the specific terms herein are used descriptively rather than in a limiting sense, the scope of the invention being defined in the claims.

What I claim and desire to secure by Letters Patent is:

1. A paved railway structure comprising a railway rail having a head and a web, a paving base extending beneath the head and having a raised and thickened portion adjacent the rail.

2. A paved railway structure comprising a railway rail having a head and a web, a resilient support for the rail, a paving base extending beneath the head and having a raised and thickened portion adjacent the rail.

3. A paved railway structure comprising a railway rail having a head, a paving base having a raised and thickened portion adjacent the rail, a top wearing pavement overlying the base including part of the raised portion, the pavement being of reduced thickness adjacent the rail to compensate for the raised portion of the base, giving a substantially level top surface.

4. A paved railway structure comprising a railway rail having a head, a resilient support for the rail, a paving base extending beneath the head and having a raised and thickened portion adjacent the rail, a top wearing pavement overlying the base including part of the raised portion, the pavement being of reduced thickness adjacent the rail to compensate for the raised portion of the base, giving a substantially level top surface.

5. A paved railway structure comprising a railway rail, a base having a raised and thickened portion adjacent the rail, a top wearing pavement overlying the base including part of the raised portion, the pavement being of reduced thickness adjacent the rail to compensate for the raised portion of the base, giving a substantially level top surface, a paving guard secured to and seated on the base and protecting the lateral edge of the paving adjacent the rail, the same being of a width corresponding to the thickness of the edge of the paving surface.

6. A paved railway structure comprising a railway rail, a base having a raised and thickened portion adjacent the rail, a top wearing pavement overlying the base including part of the raised portion, the pavement being of reduced thickness adjacent the rail to compensate for the raised portion

of the base, giving a substantially level top surface, a paving guard secured to and seated on the base and protecting the lateral edge of the paving adjacent the rail, the same being of a width corresponding to the thickness of the edge of the paving, the paving guards on each side being spaced away from the rail, and an elastic adhesive filler filling the space between the paving guard and the rail, and sealing the same against the entrance of water into the structure.

7. A street railway and paving structure comprising a rail having a top flange, a resilient support for the rail, a base extending beneath the flange and having a raised and thickened portion adjacent the rail, a top wearing pavement overlying the base including part of the raised portion, the pavement being of reduced thickness adjacent the rail to compensate for the raised portion of the base, giving a substantially level top surface, a paving guard secured to and seated on the base and protecting the lateral edge of the paving adjacent the rail, the same being of a width corresponding to the thickness of the edge of the paving, the paving guards on each side being spaced away from the rail, and an elastic adhesive filler filling the space between the paving guard and the rail, and sealing the same against the entrance of water into the structure and extending beneath the head of the rail on both sides.

8. In a paved railway structure, a base, a rail, a top surface pavement, a paving guard for the same extending along the rail and spaced therefrom, and an elastic filler filling the space between the paving guard and the rail.

9. In a paved railway structure, a base, a rail, a resilient support for the rail independent of the base, a top surface pavement, a paving guard for the same extending along the rail and spaced therefrom, and an elastic adhesive filler filling the space between the paving guard and the rail.

10. In a paved railway structure, a base, a rail having top and bottom flanges, a resilient support for the rail, the rail being independent of the base, the base extending between the top and bottom flanges substantially to the web of the rail, a top pavement, a paving guard for the same spaced away from the rail, and a resilient filler filling the space between the paving guard and the rail.

11. In a street railway and paving structure, a base, a rail having top and bottom flanges, a resilient support for the rail, the rail being free to flex relatively to the base, the base extending between the top and bottom flanges substantially to the web of the rail, a top pavement, a paving guard for the

same spaced away from the rail, and an elastic adhesive filler filling the space between the paving guard and the rail, the base being spaced downwardly from the top flange of the rail and the filler extending into said space.

12. In a street railway and paving structure, a base, a rail having a head and a bottom flange, a resilient support for the rail, the rail being independent of the base, a top pavement, a paving guard for the same spaced away from the rail, and an elastic adhesive filler filling the space between the paving guard and the rail, the base having a raised portion adjacent and extending along the rail, the top pavement being of correspondingly reduced thickness, the paving guard being of a width corresponding to the thickness of the edge of the top pavement, and an elastic filler closing the space between the paving guard and the rail.

13. In a street railway and paving structure, a base, a rail having a head and a bottom flange, a top pavement, a paving guard for the same spaced away from the rail, and an elastic adhesive filler filling the space between the paving guard and the rail, the base having a raised portion adjacent and extending along the rail, the top pavement being of corresponding reduced thickness, the paving guard being of a width corresponding to the thickness of the edge of the top pavement, and an elastic filler closing the space between the paving guard and the rail.

14. A paving guard coupling having an L-shaped slot extending longitudinally thereof and open at the ends and along one side.

15. A paving guard coupling having an L-shaped longitudinal slot open at the ends and along one side, the other leg of the slot being narrower at one end than at the other.

16. The combination with a paving guard made in sections, placed end to end of a coupling having an opening to receive and fit the respective ends of the guard, the opening being of L-shaped cross-section and being open at the top, forming a longitudinal slot to permit the guard to project above the coupling to the top of the pavement, so that the coupling is not exposed in use.

17. The combination with a paving guard of L-shaped cross-section having anchor strips cut from one leg or flange reducing the width of the flange at some points and leaving it the full width at others, a coupling having an L-shaped opening to fit the guard, one end of the opening being formed to fit the reduced portion of the bottom flange, and the other end of the opening fitting the full width of the flange.

Signed by me at Baltimore, Maryland,
this 8th day of November, 1923.

WILLIAM S. GODWIN.