W. S. GODWIN.

STREET RAILWAY CONSTRUCTION.

APPLICATION FILED FEB. 21, 1917.

1,246,907.

Patented Nov. 20, 1917.

2 SHEETS—SHEET 1.

FIG. 1.

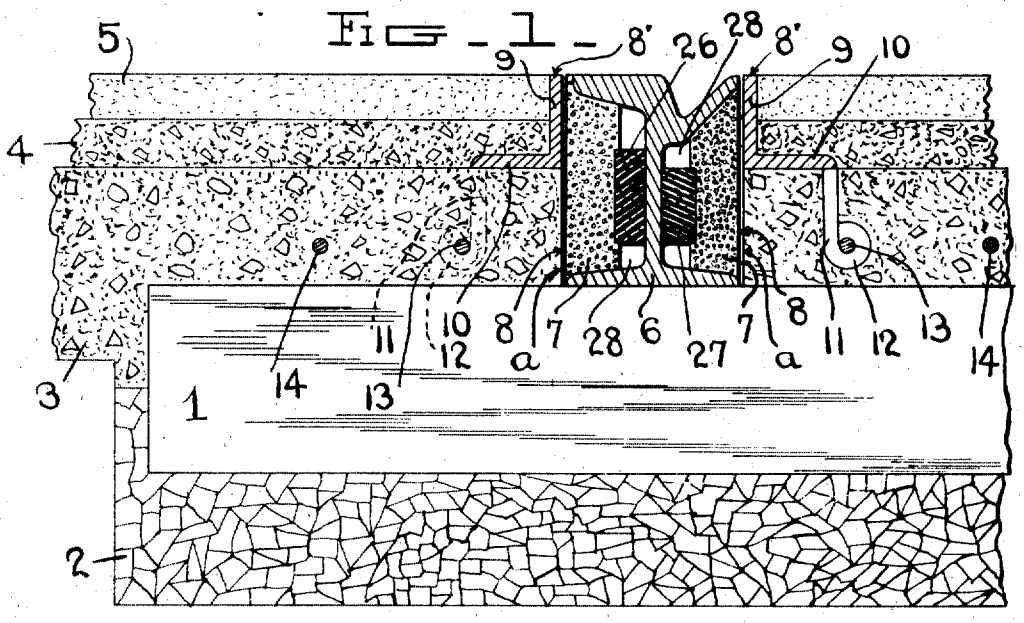
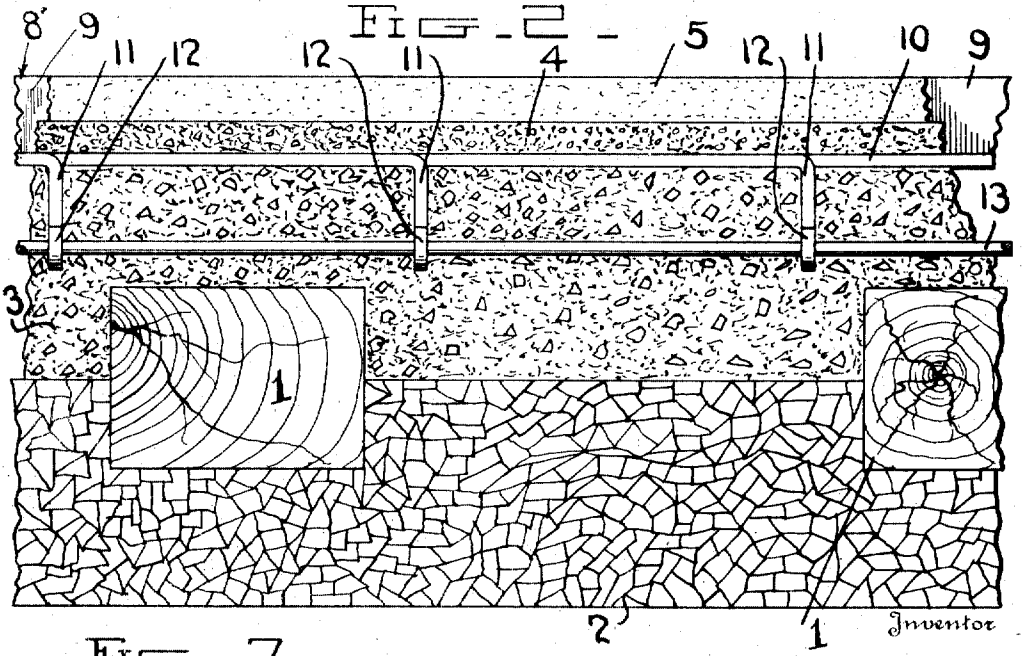
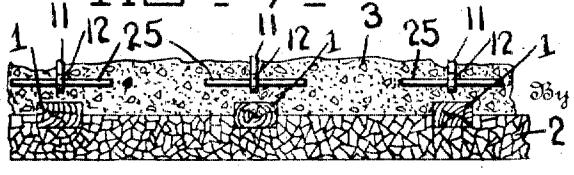


FIG. 2.



Inventor

FIG. 7.



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2 SHEETS—SHEET 2.

Fig. 3.

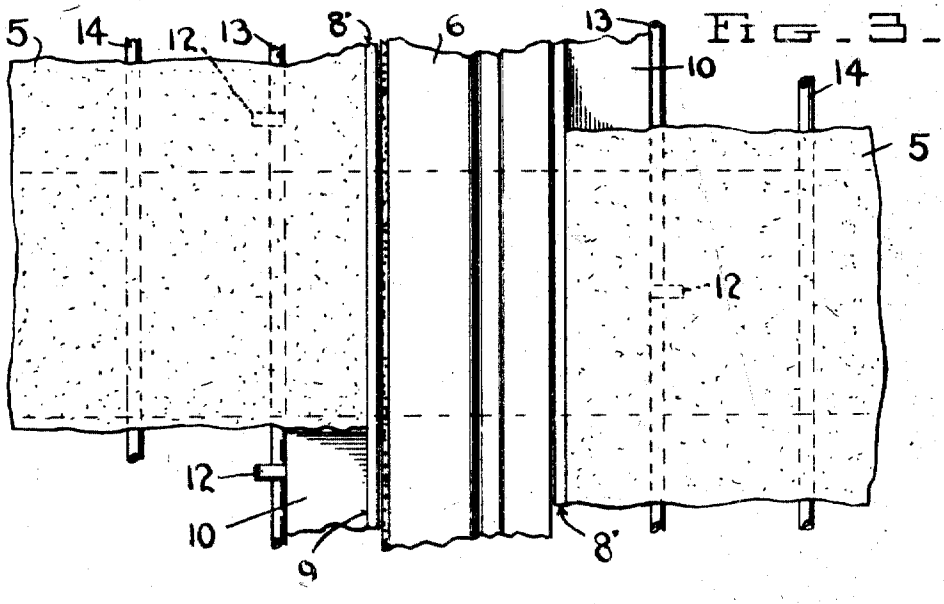


Fig. 4.

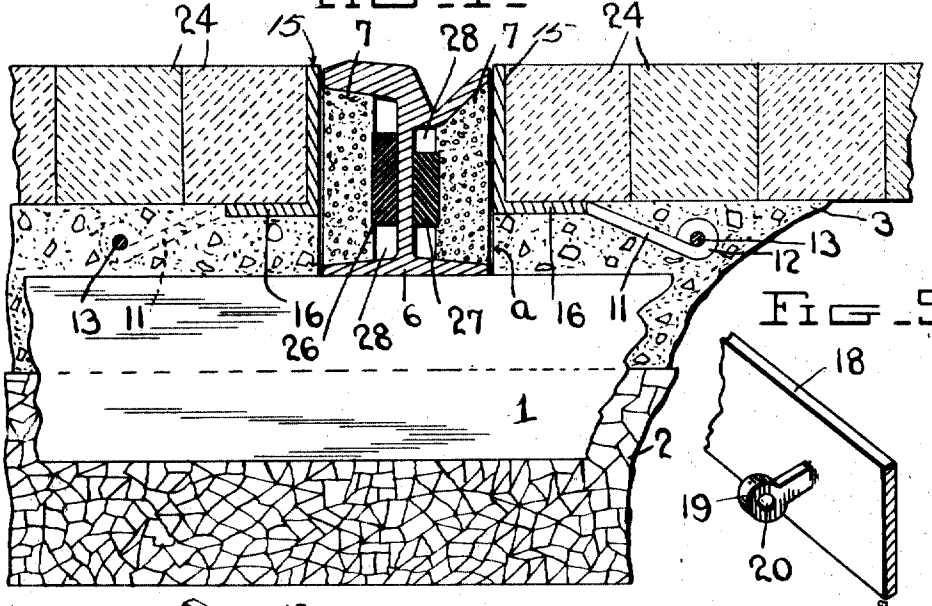
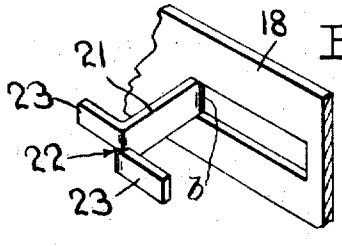


Fig. 5.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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STREET-RAILWAY CONSTRUCTION.

1,246,007. Specification of Letters Patent. Patented Nov. 20, 1917.

Application filed February 21, 1917. Serial No. 150,154.

To all whom it may concern:

Be it known that I, WILLIAM S. GODWIN, a citizen of the United States, residing at Baltimore, State of Maryland, have invented certain new and useful Improvements in Street-Railway Constructions, of which the following is a specification.

This invention relates to improvements in street railway construction, and more particularly to a means of reinforcing and protecting the pavement adjacent to the tracks, and to prevent vibration of the rails from being communicated to the paving adjacent to the rails.

It is well known that the expense of maintaining track streets in towns and cities, is greatly increased by reason of the vibration of the rails being imparted to the street adjacent to the rails, thus causing the pavement to disintegrate and permit the entrance of water which greatly accelerates the further destruction or disintegration of the pavement.

The primary object of this invention is to provide a construction wherein the movement of the tracks is entirely independent of the adjacent pavement, thus preventing the vibration necessarily incident to travel, from being communicated to the pavement.

A further object is to provide a construction wherein the pavement itself is greatly strengthened or reinforced adjacent the rails, so that the concrete foundation or base for the surface layers of the pavement, will be more firmly supported.

A still further object of the invention is to provide a construction wherein the expansion and contraction of the pavement adjacent to the rails, is compensated for, so that a close joint will, at all times and under all weather conditions, be maintained between the rail filler and the pavement, and by close joint, I mean one that while being close enough to prevent seepage of water between the rail fillers and pavement, will not be so close or tight as to in any sense lock the rail and filler to the adjacent pavement, and prevent the independent vertical movement of the rail and parts carried thereby. This contemplates the provision of a substantially non-elastic filler for the rails, backed by the members which are in effect, elastic, in that the fillers may be contracted and expanded in accordance with the adjacent pavement.

I am aware that guards in the way of plates have been positioned adjacent to the rails, but so far I am aware, these have been entirely impracticable or useless in practice, for many reasons, primarily because they are usually tied or locked to the rail in such a way that the movement of the rail imparts movement to the guards or that the plates or guards have been constructed in sections, so short as to virtually, in effect, serve merely the purpose of paving block, or section like that commonly used in the way of blocks and bricks.

My construction contemplates the use of comparatively long guard-plates extending for the distance of two ties or more, and indeed, in practice, the guards would be in the neighborhood of fifteen or sixteen feet long, thus insuring a very long and solid support for the guards in the concrete base which I employ.

Further, the construction is such that an exceptionally heavy concrete foundation may be used for the monolithic or block pavement, thus adjacent to the tracks, as well as elsewhere, a very solid foundation is made for the pavement, the guards being such adjacent to the rails, as to form a perfect boundary for the edges of the wearing portion of the street, without bringing the edges directly into contact with the rails or the fillers therein.

With these and other objects in view, the invention consists in the arrangement and combinations hereinafter described and set forth in the claims.

In the drawings:

Figure 1 is a sectional view of a portion of a roadway or pavement, showing my improved construction.

Fig. 2 is a longitudinal sectional view showing the manner of tying the guards to the concrete base, and the manner in which the guards serve as a boundary for the upper layers of street material, such as the top concrete wearing plate, and the binder below the same.

Fig. 3 is a top plan view of a section of a pavement or roadway.

Fig. 4 is a section showing a slightly modified form of guard suitable for use when bricks or blocks are used.

Fig. 5 is a detail perspective view of a modification showing a different manner of tying or locking the guards to the concrete base, and

Fig. 6 is a similar view of still another modification, and

Fig. 7 is a longitudinal sectional view of a portion of a pavement showing the use of comparatively short reinforcing rods or members above each tie.

Referring to the drawings, the numeral 1 designates a cross tie which may be of any usual or approved construction, and for the tie shown, it will be understood that the ordinary metallic yokes commonly used in the construction of underground street railways may be substituted.

The tie may rest upon any suitable foundation, such as soil, ballast, concrete, etc., and in the present monolithic system of paving illustrated, the tie is superimposed upon a concrete base 3 which supports the binder 4, and wearing surface 5 of asphalt, but it should be understood that my invention is equally appropriate to pavements wherein the wearing surface is of concrete, bricks, blocks, etc.

The numeral 6 designates the rail of ordinary construction having fillers 7, of concrete or any suitable material, and in the present instance, the outer faces of the filler are straight, as indicated at 8, so as under no circumstances to form a lock between the rail and filler, and the adjacent portions of the pavement. Where the top portion of the rail, above the web is narrower than the base, the upper portion of the filler is extended so as to be in direct vertical line with the base, and where the base of the rail is narrower than the top portion, the filler is extended at the bottom, so that in all cases, the side surface of the fillers will be straight.

The numeral 8′ designates a metallic guard, two of which are preferably employed, one on each side of the rail, adjacent to the track. They are identical in form, and one of the guards on which ever side of the rail desired, may be omitted, but as before stated, it is preferable to employ two guards as in such a case, obviously, the pavement on both sides of the rail is protected. These guards comprise in the main, vertical portions 9 and integral horizontal portions 10, and are of considerable length, in practice being ten or more feet long, for a purpose which will presently become apparent.

Depending from the outer edges of the horizontal portions 10 of the guard at suitable intervals are anchor members 11 provided with eyes 12 which embrace reinforcing rods 13 which are embedded in the concrete base 3, and serve the double function of anchoring the guards and reinforcing the concrete and consequently the paving, adjacent to the rails, and to further reinforce the base, I preferably provide additional reinforcing rods 14 which run longitudinally of the rails, and are in sections sufficiently long to reinforce the concrete above the tie, or they may be continuous, that is to say, only limited in length by the necessities which characterize the easy or practical handling of the rods.

In the form shown in Figs. 1 and 2, the guards serve as a boundary for the pavement, wherein the wearing surface and binder are brought entirely up to the rails, which is rendered entirely practical by the position of the parts shown, in that the vibration of the rail is not in any way imparted to the upper portion of the road bed, the same being entirely independent of the vertical movements of the rails, which is one of the most important features of the present invention. Where the pavement is of a type other than monolithic these guards form a boundary for the bricks or blocks adjacent to the rails.

Referring back to the Figs. 1 and 4, the numerals 26 and 27 designate filler-backers arranged on opposite sides of the web of the rail. These are preferably slightly seated in the concrete filler 7, and are preferably formed of asphalt, or a material having yielding or flowing characteristics. Spaces or voids as indicated by 28, are left between base and ball of the rail, at the top and bottom of these members, so as to provide space into which the material of said members may flow or expand, to correspond to any inward and outward movement the rail fillers may have. These members are substantially continuous and extend for the entire length of the rails, and of course correspond in length to the filler. This arrangement provides for the contraction and expansion of the rail fillers and the pavement adjacent thereto, so as to maintain a comparatively tight joint between the parts at all times, but not sufficiently tight to prevent the independent vertical movement of the rail and parts carried thereby, which as has been stated, is one of the principal objects of the present invention.

In Fig. 4 a modification is shown wherein the guards are so shaped as to adapt them to receive the bricks or blocks commonly used in street railway construction. In this instance, vertical portions 15 of the guards are considerably longer than that shown in Figs. 1 and 2, and the horizontal portions 16 are, or may be, of the same length as horizontal portions of the guard shown in Figs.

1 and 2. These guards are also provided with anchor members 17, which embrace the rods 13, as in the main figures.

Fig. 5 shows a modified form of guard, which comprises a plate 18, which extends to the surface of the roadway, and downwardly to a point some distance above the cross tie 1, it being important that this plate stop short of the tie, so as not to have any of the vibrations of the tie incident to travel to be communicated to the plate, and through it to the pavement. In this form, I provide laterally extending lugs 19 at intervals, having apertures 20 therethrough to embrace the rods 13, to keep the plate firmly tied to the paving base, and to insure its true vertical position relative to the rail and filler.

In Fig. 6, is illustrated another form of anchor for the guard plate 18. This contemplates punching or separating a longitudinal section 21 from the plate and splitting it, as indicated at 22, which section is bent at the point *b* at right angles to the plate, and then the split ends of the portion 21 are bent in opposite directions to form oppositely extending anchor arms 23 parallel with the main body of the plate.

In the construction shown, it will be readily seen that by the provision of long guard plates firmly tied in the base, a long durable wearing surface is formed adjacent to the rails and that the construction is such that I can provide a much heavier concrete base than is possible in ordinary construction, strengthening the wearing surface adjacent to the tracks, and thus giving it structural strength at the points where needed, it being well known that the usual wearing surface has little or no structural strength.

The strength of the concrete 3 is further greatly increased by the presence of the rods 13 and 14 and by tying the guards to the rods 13, the guards are prevented from having any rocking or lateral movement and their inner faces, adjacent to the rail and rail filler, are kept always in true vertical position.

The concrete base is stopped in true vertical line with the inner face of the vertical portions 9 of the guards, as indicated at *a*, so that from the top edge of the guard to the tie or support for the rail, there is a true vertical surface and the rail filler and rail, are entirely independent of all portions of the roadway above the tie, so that the vibrations of the rail, which are invariable and cannot be obviated, are not transmitted in any degree to the street structure adjacent to the rails, thus completely protecting the street and adding to its durability.

It will be further noted that in the construction shown in Figs. 1 and 2, and in the construction shown in Fig. 3, the wearing surface 5 and binder 4 adjacent to the rails, and the blocks or bricks adjacent to the rails are given a substantial sup[illegible], so that disintegration usually resulting from heavy vehicles passing over the roadway or pavement is reduced to a minimum. It is well known that this wear which I am seeking to avoid is caused by the vibrations of the rails caused by the cars passing over them, as well as by heavy vehicles using the roadway adjacent to the tracks.

In Fig. 4, 24 designates bricks or blocks commonly used in street railway constructions and as before indicated, the vertical portions of the guards are made deeper than in the form shown in Fig. 2, and the blocks abut against the outer faces of the guards and rest upon the horizontal angle portion 16, and the overhang of the blocks are supported in the concrete base 3, as shown.

I am aware that it is not broadly new to provide a rail with guards having for their purpose the prevention of vibrations of the rail being imparted to the pavement adjacent the rails, but so far as I am aware, these have never been of practical construction or operation, either because their form was such that in their use they were somewhat tied to the rail and naturally partake of its movement, or that they have been made so short as to virtually become the equivalent of bricks or blocks laid as stretchers or headers adjacent to the rails, and subject to the same condition of strain and vibration as the bricks or blocks would be, whereas, in my construction, the guards are of such length as to cover or span two or more cross ties, and as a matter of fact in practice, as before suggested, will be from ten to sixteen feet in length, or really limited in length only by the condition incident to conveniently handling and laying the guards.

Referring to Fig. 7 which is a detail longitudinal view of so much of a section of pavement as is necessary to illustrate the idea, the numeral 25 designates a series of comparatively short reinforcing rods which are placed in the concrete at intervals along the track, immediately above the ties 1, thus reinforcing the concrete, and consequently the pavement, where the greatest strain comes upon it, as shown. The manner of anchoring the guards to the reinforcing rods is the same as that shown in Figs. 1 and 2.

In the kind of pavement illustrated in Fig. 4, or one in which blocks or bricks are used, the anchor members 11 are bent farther away from the track, and the reinforcing rods 13 are also placed farther from the track, so as to reinforce the pavement at points farther out. This is on account of the fact that the pavement adjacent to the track is sufficiently reinforced for this sort

of pavement by the angle portions 16 of the guard plates.

Having thus described my invention, what I claim is:

1. In a construction of the character described, a rail, a rail support, a concrete foundation above the rail support and having its inner surface adjacent to the rail outside of the edges of the rail, a pavement on the concrete base, and a longitudinally extending guard interposed between the wearing surface of the pavement and the rail, and outside of the edges thereof and spaced from the rail support.

2. In a construction of the character described, a rail, a rail support, a concrete foundation above the rail support, and having its inner surfaces adjacent to the rail outside of the edges of the rail, a pavement on the concrete base, and a longitudinally extending guard interposed between the wearing surface of the pavement and the rail, and outside of the edges thereof and spaced from the rail support, and means for locking the guard to the concrete base.

3. In a construction of the character described, a rail, a rail support, a concrete base having its surface adjacent to the rail outside the edges thereof, so as not to partake of the vibrations of the rail, a pavement on the concrete foundation, longitudinally extending reinforcing members embedded in the concrete above the ties, a longitudinally extending guard interposed between the pavement and the rail and outside of the edges thereof.

4. In a construction of the character described, a rail, a rail support, a concrete base having its surface adjacent to the rail outside the edges thereof, so as not to partake of the vibrations of the rail, a pavement on the concrete foundation, longitudinally extending reinforcing members embedded in the concrete above the rail support, a longitudinally extending guard interposed between the pavement and the rail and outside of the edges thereof, and connections between the guard and reinforcing members, whereby the guards are anchored to the concrete base.

5. In a construction of the character described, a rail, a support for the rail, a pavement, a concrete base above the rail support, having its surface adjacent to the rail stopped short of the outer edges of the rail for the purpose set forth, a monolithic pavement supported by the base, a longitudinally extending metallic guard interposed between the pavement and the rail and outside of the edges thereof and spaced rail support, from the rail support, and means for anchoring the guard in the concrete.

6. In a construction of the character described, a rail, a rail support, a concrete base above the tie, and having its surfaces adjacent to the rails stopped short of the edges of the rails, so as not to partake of the vibrations of the rails, longitudinally extending angular guard plates arranged on each side of the rails, and spaced from the rail support, a pavement supported by the concrete base, and having its portions adjacent to the rail bounded by the guards and means for anchoring the guard plates in the concrete base.

7. In a construction of the character described, a rail, a rail support, a concrete base above the rail support having its inner surfaces adjacent to the rail stopped short of the outer edges of the rail for the purpose set forth, reinforcing members embedded in the concrete above the rail supports, longitudinally extending guards having their inner surfaces outside of the edges of the rail, connections between the guards and the reinforcing members, whereby the guards are anchored in the concrete base, and a pavement supported by the base and having its portions adjacent to the rails bounded by the guards.

8. In a construction of the character described, a rail, a rail support, fillers of suitable material, between the tread and base of the rail, the fillers extending laterally to an extent as great or greater than the entire width of the rail and presenting on both sides of the rail true vertical surfaces, a concrete base above the rail, longitudinally extending guards spanning two or more ties, and having their surfaces adjacent to the rails outside of the edges of the rails, said guards being also spaced from the rail support, and means for locking the guards to the concrete base.

9. In a construction of the character described, a rail support, a rail carried by said support, material responsive to temperature conditions, and having its outer surface even with or outside of the edge of the rail and its inner face stopped short of the web of the rail, a backer of material responsive to the movement of the filler, and interposed between the filler and the web of the rail, for the purpose set forth.

10. In a construction of the character described, a rail support, a rail carried by said support, a concrete filler for the rail extending to a point short of the web of the rail, and a backing of yielding material interposed between the concrete and the web to permit a lateral movement of the filler.

11. In a construction of the character described, a rail support, a rail carried by said support, a concrete filler for the rail having its inner face stopped short of the web of the rail, a backing for the filler of yielding material, there being a void between the concrete filler and rail to permit the expan-

sion or flow of the backing, for the purpose set forth.

12. In a construction of the character described, a rail support, a rail carried by said support, a concrete filler having a vertical outer face outside the edges of the rail, and its inner face stopped short of the rail, a pavement adjacent the rail having its inner surface adjacent to the rail outside the filler, and parallel with said filler, and a backing of yielding material interposed between the filler and the web of the rail so as to compensate for expansion and contraction of the filler and pavement adjacent thereto.

13. In a construction of the character described, a rail support, a rail carried by said support, a concrete filler having a vertical outer face outside the edges of the rail and its inner face stopper short of the rail, a pavement adjacent the rail, having its inner surface adjacent to the rail outside the filler and parallel with said filler, and a backing of asphalt interposed between the filler and the web of the rail, so as to compensate for expansion and contraction of the filler and pavement adjacent thereto.

14. In a construction of the character described, a rail support, a rail carried by said support, a concrete filler having a vertical outer face outside the edges of the rail and its inner face stopped short of the rail, a pavement adjacent the rail, having its inner surface adjacent to the rail outside of the filler and parallel with said filler, and a backing of asphalt, there being a void between the filler and rail, to permit the expansion or flow of the backing, so as to compensate for the expansion or contraction of the filler and pavement adjacent thereto.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM S. GODWIN.

Witnesses:
JAMES L. CRAWFORD,
FRANK G. BRENTON.