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ROAD BED AND TRACK FOR RAILROADS

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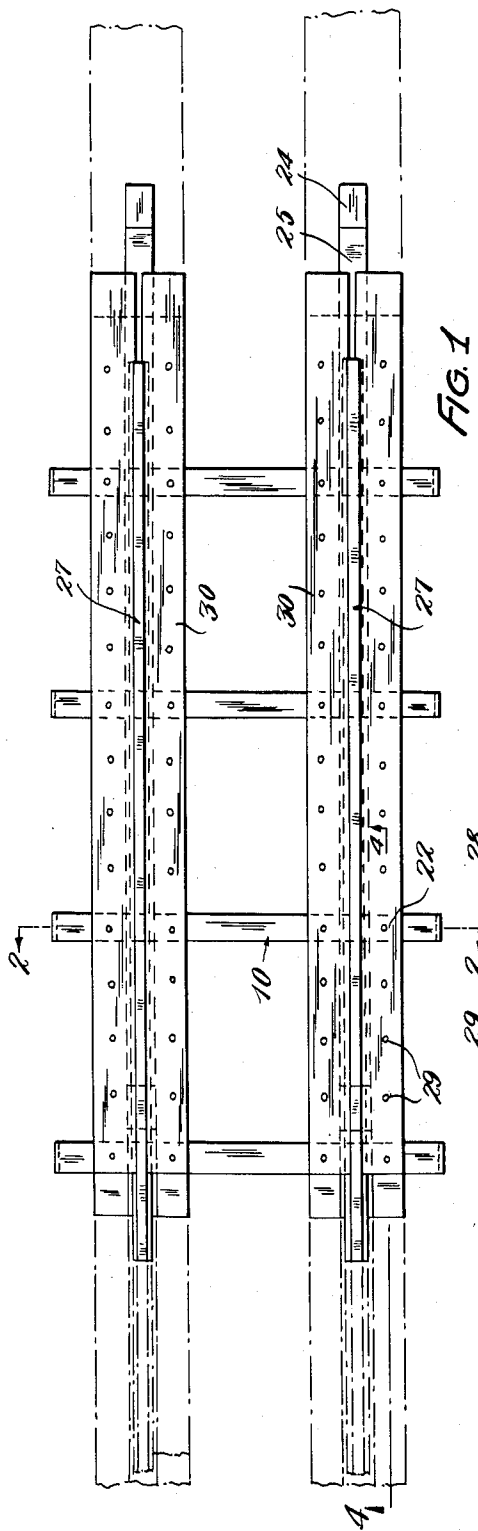


FIG. 1

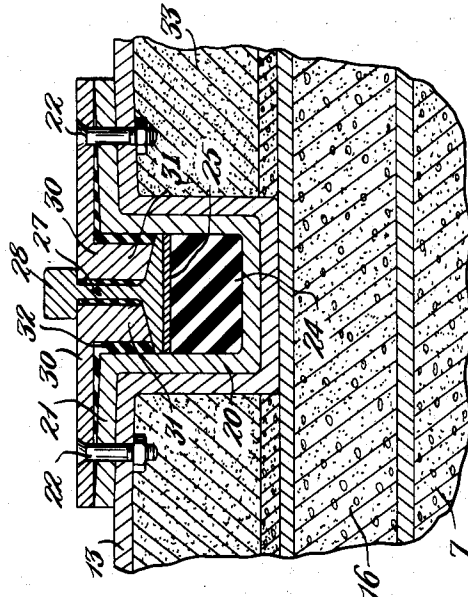


FIG. 3

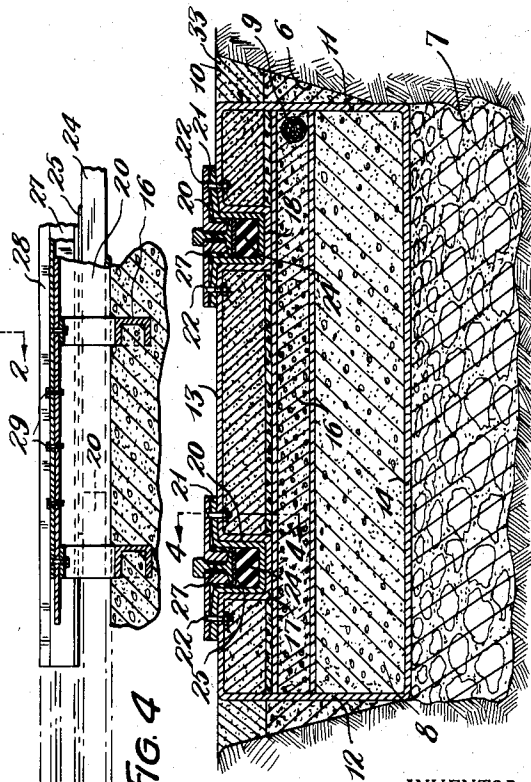


FIG. 2

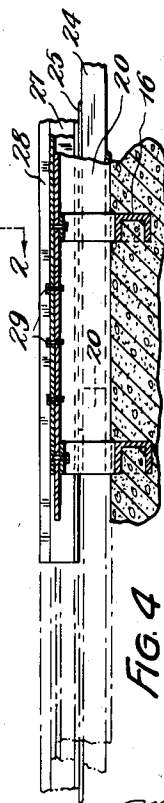


FIG. 4

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**ROAD BED AND TRACK FOR RAILROADS**

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7 Claims. (Cl. 238—24)

The present invention relates to railroads, and more particularly, to the roadbed and track structures of railroads.

Present day railroads comprise a graded roadway having ballast in the form of gravel or the like in which wooden ties are more or less embedded, and rails attached to the ties by spikes. These railroads are expensive to maintain as the ties must be replaced from time to time and the ballast which continually shifts due to the passage of heavy trains over the rails and the action of water, ice, etc., must be frequently relocated. It is difficult to maintain the rails level and generally the uneven condition of the rails limits train speeds and causes discomfort to the train passengers. In addition, the ballast becomes dirty and it must be cleaned from time to time. For those reasons a large labor force as well as expensive equipment is required for proper maintenance of railroads.

The principal object of the present invention is the provision of a new and improved railroad which requires virtually no maintenance, is consistently smooth and which enables safe travel at considerably higher speeds than is possible on the usual present day railroads.

Another object of the invention is the provision of a new and improved railroad having a permanent concrete track bed and a resilient support structure between the track and bed to absorb load shocks which would otherwise tend to break up the bed.

A further object of the invention is the provision of a new and improved railroad having metal ties substantially embedded in concrete so that the ties will endure indefinitely.

Still another object of the invention is the provision of a new and improved railroad having channel members for supporting the track rails, and plates for securing the rails in the channels, which plates retain the rails upright and permit slight resilient vertical movement of the rails as loads pass thereover.

A still further object of the invention is the provision of a new and improved railroad having means engaging the rails throughout the length thereof to secure the rails in place, thereby eliminating danger of derailment due to breakage of a rail.

Other objects and advantages of the invention will be apparent from the following detailed description of the preferred form of the invention, reference being had to the accompanying drawings, where:

Fig. 1 is an elevational plan view of a segment of a railroad embodying the invention;

Fig. 2 is a sectional view taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary view of a cross section of the railroad taken on line 2—2 of Fig. 1, but on a larger scale;

Fig. 4 is a sectional view taken on line 4—4 of Figs. 1 and 2.

The invention contemplates the provision of a railroad having a foundation or bed formed in a graded roadway. The foundation of the railroad preferably comprises one

or more beds of aggregate over which a heavy layer of concrete is laid having rail ties embedded therein. The ties preferably comprise rectangular steel frames having an intermediate beam extending lengthwise thereof and which frames rest edgewise on the road foundation. The ties are spaced apart from four to six feet and the upper portions preferably extend above the concrete bed.

The top member of each tie frame has two spaced recessed portions which support channel members attached therein, which members are arranged end to end and form a continuous recessed support for the track rails, which may be of conventional construction. The channel members have a bed of resilient material, such as rubber, in the bottom thereof and extending the length of the railroad and on which the rails rest. The rails, which extend slightly above the tops of the channels, are held in the latter by elongated plates which project inwardly from the sides of the channel members and engage the rails, preferably immediately beneath the rail heads and on the base flanges. The rail engaging plates are attached to the channel members, as by bolts, and they are arranged end to end and engage the rails substantially throughout the length of the railroad.

In the preferred form of the invention, a layer of relatively resilient, water impervious material, such as asphalt, is provided over the concrete and embeds the upper portion of the tie frames and forms a shock absorbing upper portion of the railroad and a cohesive weather-proof surface for the road foundation.

Referring to the drawings, I have shown a short section of a railroad embodying the preferred form of my invention. In constructing the railroad the roadway is first graded in the usual manner, after which a trench is excavated throughout the length thereof. The depth of the trench may be from two to three feet, depending upon the soil conditions, and the upper portion thereof is flared, as at 6.

After the trench has been formed, a foundation bed 7 is prepared comprising a bottom layer of rocks six to eight inches in depth and several inches of gravel over the rock, which gravel and rocks are embedded in concrete.

After the rock and gravel foundation bed 7 has been prepared, ties 10 are placed on top thereof. The ties 10 comprise a rectangular frame, preferably of steel bars having end members 11, 12 and top and bottom members 13, 14. An intermediate U-shaped channel bar 16 extends between the end members 11 and 12 slightly above the center of the frame and is preferably welded to the side members of the frame. The top members 13 of the ties have rectangular recesses 17, 18 formed therein, the bottoms of which rest on the intermediate channel bar 16, and rail support channel members 20, are supported in the recesses.

Concrete 8 is then poured over the bed 7 and around the ties and to a depth that brings the level thereof to the bottoms of the channel members 20. The concrete firmly holds the ties in place and prevents corrosion of the portions embedded therein and supports the channels throughout the length thereof.

If desired, telephone conduits 9 may be extended throughout the length of the railroad and supported in openings in the channel members 16.

The channel members 20 may be of any suitable length and are arranged with the ends thereof abutting one another and supported by common ties. The channel members have laterally extending flanges 21 which are attached to the top frame member 13 of the tie by bolts and nuts indicated generally at 22.

Strips 24 of resilient material, such as "neoprene" or rubber or any other suitable rubber like material is placed in the bottoms of the channel members 20 and metallic strips 25 are placed over the resilient strips. Track rails

27 are then set on strips 25 and the heads 28 thereof project somewhat above the top edge of the channel members 20. The rails 27 are secured in the channel members 20 by elongated rail plates or strips 30, which plates are preferably located on opposite sides of the rails and are attached to the channel member flanges 21 by bolts 29 also to the tie members by bolts 22 and project inwardly over the channel sides and engage the rails. Preferably, the plates have downwardly extending heads or flanges 31 which engage the base flanges of the rails adjacent to the rail webs, and the upper portions of the plates engage the rails immediately beneath the heads thereof. The undersides of plates 30 extend upwardly at a slight angle relative to the channel flanges 21 and when a load is placed on the rails the plates are deflected downwardly, knocking the rails therebetween whereby the rails are more firmly gripped when supporting a load.

Rail plates 30 with their heads 31 are arranged in sequence upon opposite sides of each rail and the engagement of the oppositely disposed heads 31 with respect to the rail and further noting that the plates or flanges 30 are attached to the flanges of the channels 20, results in providing a support and suspension of the rails within the channels 20, for as before noted each rail is of lesser height than the depth of the channel in which it is located.

True, there is provided a resilient material in the channel and beneath the lower flange of each rail, but obviously such provision would not form an effective rail support, in and of itself, bearing in mind that the rail is subject to carrying heavy loads or moving freight cars and the like.

As heretofore described, flanges of the plates 30 are so mounted as to permit of some deflection and this accentuates the fact that the rails are supported and suspended within the channel member and by the very nature of the suspension have at least a certain amount of flexibility of mounting.

As shown, the ends of the respective channel members 20 and the rail plates 30 are preferably offset i. e., the rails overlap the abutting ends of the channel members so that the rail joints are firmly supported. This arrangement obviates the necessity of staggering rail joints of the parallel track rails as is the practice in conventional railroad construction.

Preferably, rubber 32 in liquid form is poured into the channels 20 filling the spaces between the rails and plates 30 and the plates and the walls of the channel. This rubber is preferably of the type which congeals and sets after it has been exposed to the atmosphere. The rubber 32 fills voids which otherwise would collect water and cause rusting and it is sufficiently resilient when set to yield when the rails and rail plates 30 are depressed by the passage of a train.

After the railplates 30 have been bolted in place, the concrete 8 is covered with a layer of asphalt or other similar surfacing compound 33 and the asphalt is brought up level with the top of the ties and is filled in beneath flanges 21 of the channel members. The asphalt is somewhat resilient and yields to the depression of the rails when loads pass thereover and a portion of the load and load shocks are absorbed thereby. The asphalt also provides a moisture impervious surface to prevent water from seeping into the road foundation. Preferably, drain pipes, not shown are provided at appropriate intervals extending from between the rails to the side of the road bed to carry away water from between the rails.

It is apparent that my improved railroad requires virtually no maintenance as the foundation, ties and top surfaces are of relatively permanent cohesive construction and the deflection of the rails due to loads and load shocks is entirely absorbed within the rail supporting structure and serves to prevent pounding and cracking of the concrete bed. The rails are so supported that the likelihood of breakage is practically eliminated, but should there be a break, derailment of trains would not occur as the rail

parts would be held in tracking alignment by the channel members.

In the event a rail should be replaced it is only necessary to unbolt the adjacent rail plates 30, remove and replace the rail and rebolt the rail plates to the channels.

My improved railroad not only eliminates maintenance of the roadbed and track but it provides for a smooth, more permanent, stable railroad having safer trackage than is possible in existing railroads, which, in turn, permits higher train speeds.

While I have described a preferred form of the invention it is to be understood that other forms might be adapted, all coming within the scope of the claims which follow.

Having thus described my invention, I claim:

1. A railroad comprising tie members extending transversely thereof, elongated channel members arranged end to end in two parallel tracks extending longitudinally of the railroad, said channel members being U shape in transverse cross section and having side flanges extending laterally from opposite sides of the top thereof, said ties having recesses receiving said channel members and supporting said side flanges at opposite sides of said recesses therein, track rails, each comprising a base flange and a vertical web extending from said base flange and having a head on which car wheels are adapted to ride, located in said channel members with said base flanges thereof appreciably below the plane of said side flanges and appreciably spaced from the bottom of the channel members and the bottom portion of said heads thereof adjacent to the plane of said side flanges, means for supporting and suspending each rail in its channel member, said means including elongated plates arranged end to end longitudinally of said channel members and on opposite sides of the rail in its channel member, said plates being L shape in transverse cross section and having one side thereof attached to said side flanges and to the ties and the other side thereof depending into the channel members and extending alongside the vertical web of said rails in the channel members, the inner edge portions of said plates engaging the undersides of said heads and the lower edges of said other side engaging the top of said base flanges.

2. A railroad comprising tie members extending transversely thereof, elongated channel members arranged end to end in two parallel tracks, said channel members being U shape in transverse cross section and having side flanges extending laterally from opposite sides of the top thereof, said ties having recesses receiving said channel members and supporting said side flanges at opposite sides of said recesses therein, track rails, each comprising a base flange and a vertical web extending from said base flange and having a head on which car wheels are adapted to ride, located in said channel members with said base flanges thereof appreciably below the plane of said side flanges and appreciably spaced from the bottom of the channel members and the bottom portion of said heads thereof adjacent to the plane of said side flanges, means for supporting and suspending the rail in its channel members, said means including elongated plates arranged end to end and extending longitudinally of said channel members and on opposite sides of the rail in its channel members, said plates being L shape in transverse cross section and having one side thereof attached to said side flanges respectively and the other side thereof depending into the channel and extending alongside the vertical web of said rails, the inner edge portions of said plates engaging the undersides of said heads and the lower edges of said other side engaging the top of said base flanges, the first mentioned sides of said L shape plates sloping upwardly and inwardly relative to the side flanges of said channel members and adapted to deflect downwardly.

3. A railroad comprising tie members extending transversely thereof, elongated channel members arranged end to end in two parallel tracks extending longitudinally of

the railroad, said channel members being U shape in transverse cross section and having side flanges extending laterally from opposite sides of the top thereof, said ties having recesses receiving said channel members and supporting said side flanges at opposite sides of said recesses therein, track rails, each comprising a base flange and a vertical web extending from said base flange and having a head on which car wheels are adapted to ride, located in said channel members with said base flanges thereof appreciably below the plane of said side flanges and appreciably above the bottom of the channel members and the bottom portion of said heads thereof adjacent to the plane of said side flanges, means for supporting and suspending the track rails in their channels, elongated plates end to end and extending longitudinally of said channel members and on opposite sides of the rails in said channel members, said plates being L shape in transverse cross section and having one side thereof attached to said side flanges respectively and the other side thereof depending into the channel formed by said channel members and alongside the vertical web of said rails, the inner edge portions of said plates engaging the undersides of said heads and the lower edges of said other side engaging the top of said base flanges, and an elastic filler interposed between the depending sides of said plates and the sides of the channels in which said rails are seated.

4. A railroad comprising tie members extending transversely thereof, elongated channel members arranged end to end in two parallel tracks extending longitudinally of the railroad, said channel members being U shape in transverse cross section and having side flanges extending laterally from opposite sides of the top thereof, said ties having recesses receiving said channel members and supporting said side flanges at opposite sides of said recesses therein, track rails, each comprising a base flange and a vertical web extending from said base flange and having a head on which car wheels are adapted to ride, located in said channel members with said base flanges thereof appreciably below the plane of said side flanges and appreciably above the bottom of the channel members and the bottom portion of said heads thereof adjacent to the plane of said side flanges, means for supporting and suspending the track rails in their channel members, elongated plates arranged end to end and extending longitudinally of said channel members and on opposite sides of the rails in said channel members, said plates being L shape in transverse cross section and having one side thereof attached to said side flanges respectively and the other side thereof depending into the channel formed by said channel members and alongside the vertical web of said rails, the inner edge portions of said plates engaging the undersides of said heads and the lower edges of said other side engaging the top of said base flanges, the first mentioned side of said plates sloping upwardly and inwardly relative to the side flanges of said channel members, and elastic filler material interposed between said side flanges and first mentioned sides of said plates, said filler material extending downwardly between the webs of said rails and said depending sides of said plates.

5. A railroad construction comprising elongated channel members arranged end to end and forming two parallel lines, means for supporting and transversely spacing the said channel members each of said channel members being provided with outwardly extending side flanges, a track rail located in each channel member, the said track rail having a base flange, a head portion and an intermediate vertical flange the depth of each channel member being greater than the height of the track rail, means for supporting and suspending each track rail in its channel member comprising members disposed upon opposite sides of each track rail each of said supporting and suspending members having an outwardly extending flange which engages with the top of and is attached to a side flange of the channel member, each of said sup-

porting and suspending members being provided with a head which engages with the underside of the head of the track rail and also with the top of the lower flange of the track rail whereby the track rail is supported and suspended by the said latter members within a channel member.

6. A railroad construction comprising elongated channel members arranged end to end and forming two parallel lines, means for supporting and transversely spacing the said channel members each of said channel members being provided with outwardly extending side flanges, a track rail located in each channel member the said track rail having a base flange, a head portion and an intermediate vertical flange the depth of each channel member being greater than the height of the track rail, means for supporting and suspending each track rail in its channel member comprising members disposed upon opposite sides of each track rail each of said supporting and suspending members having an outwardly extending flange which engages with the top of and is attached to a side flange of the channel, each of said supporting and suspending members being provided with a head which engages with the underside of the head of the track rail and also with the top of the lower flange of the track rail, the inner portion of the flange of the portions of the flanges of the said supporting and suspending members which are adjacent to the track rails and also adjacent to the inner end of the flanges on the channel members being slightly separated from the flanges of the channel members, whereby upon the imposition of a train load upon the track the heads of the said supporting and suspending members are moved to more securely engage the opposite sides of the track rails.

7. A railroad construction comprising elongated channel members arranged end to end and forming two parallel lines, means for supporting and transversely spacing the said channel members each of said channel members being provided with outwardly extending side flanges, a track rail located in each channel member, the said track rail having a base flange, a head portion and an intermediate vertical flange the depth of each channel member being greater than the height of the track rail, means for supporting and suspending each track rail in its channel member comprising members disposed upon opposite sides of each track rail each of said supporting and suspending members having an outwardly extending flange which engages with the top of and is attached to a side flange of the channel, each of said supporting and suspending members being provided with a head which engages with the underside of the head of the track rail and also with the top of the lower flange of the track rail, and resilient means between the bottom of the channel members and the underside of the lower flange of the track rails.

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