Aug. 21, 1934. D. P. WOLHAUPTER 1,970,588

RAILWAY RAIL

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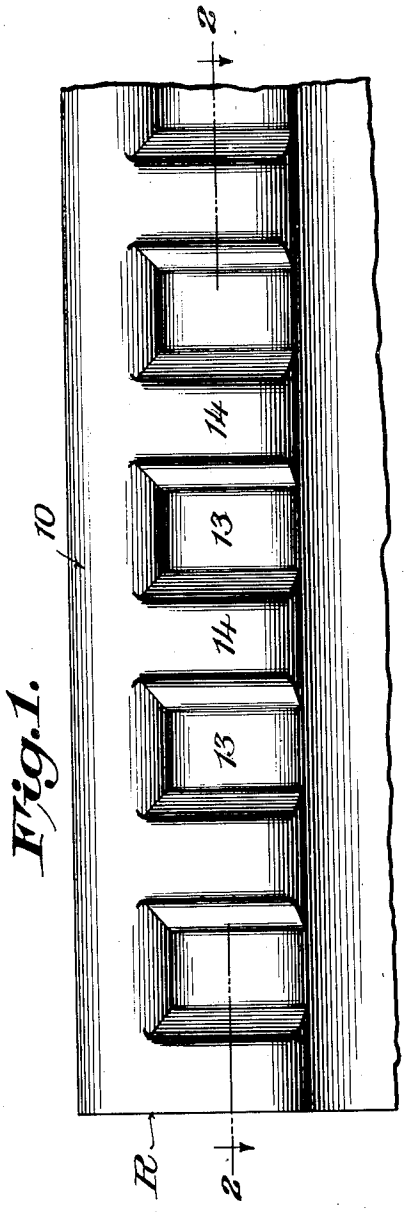


Fig. 1.

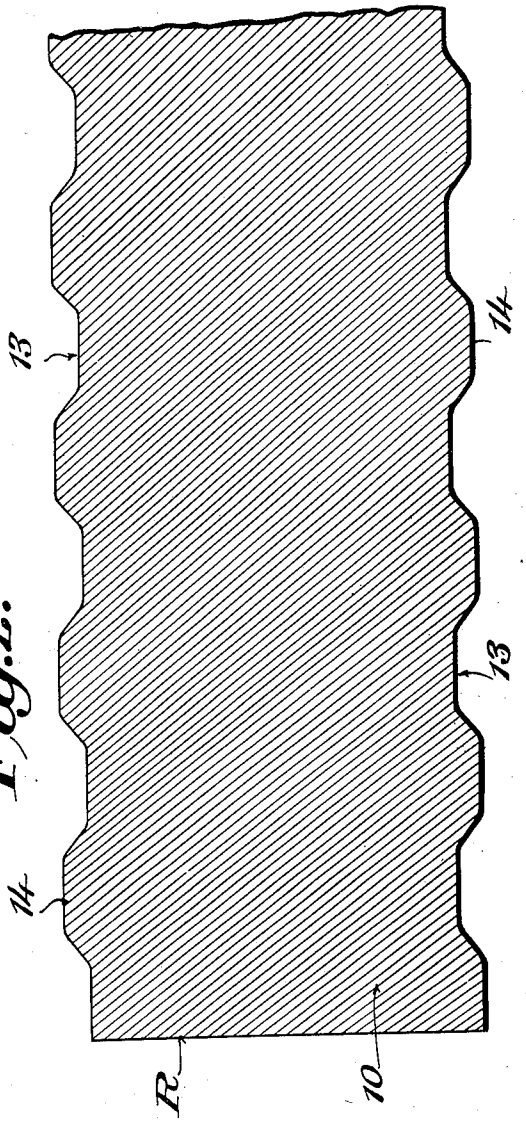


Fig. 2.

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RAILWAY RAIL

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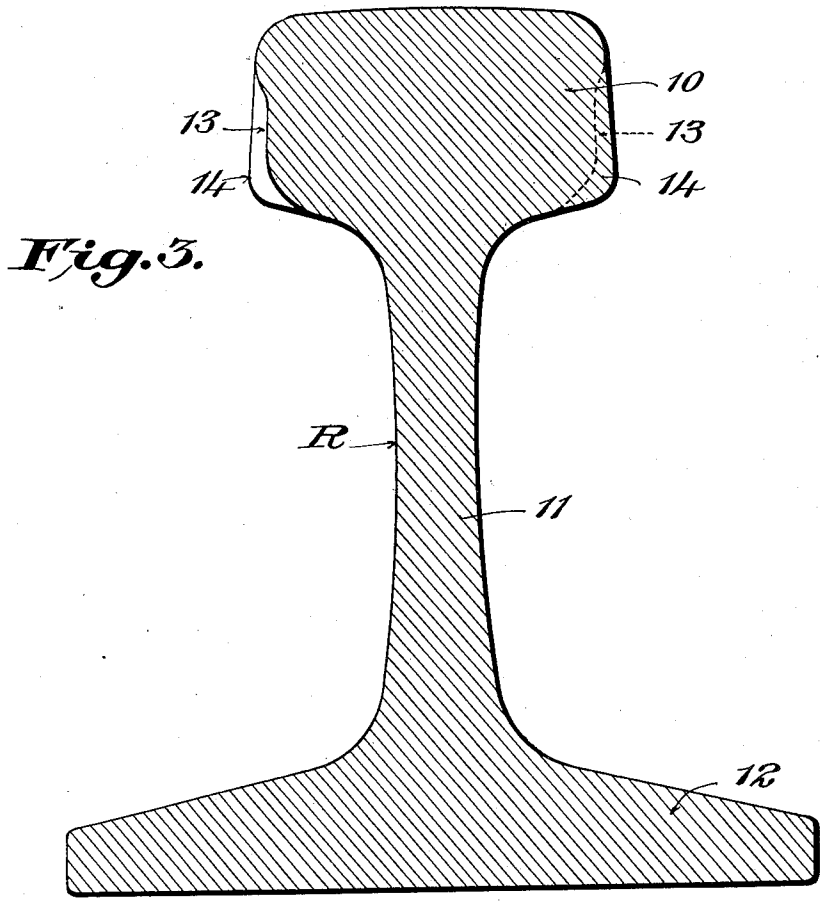


Fig. 3.

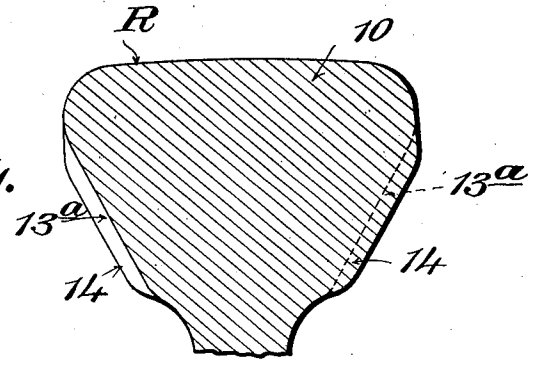


Fig. 4.

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RAILWAY RAIL

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Fig. 5.

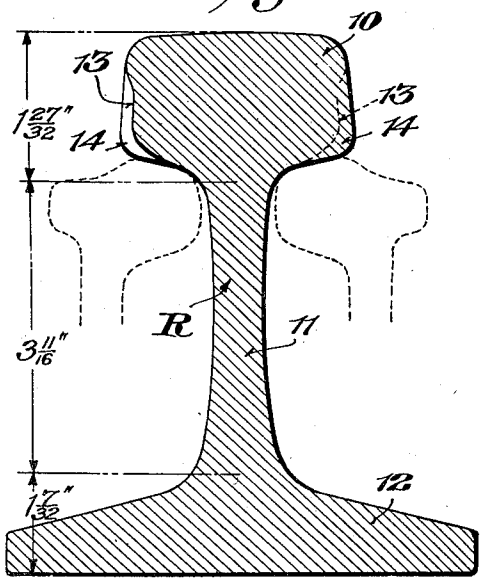


Fig. 6.

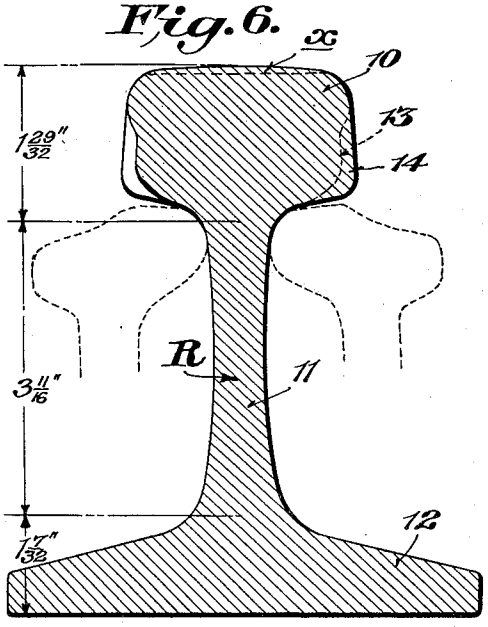
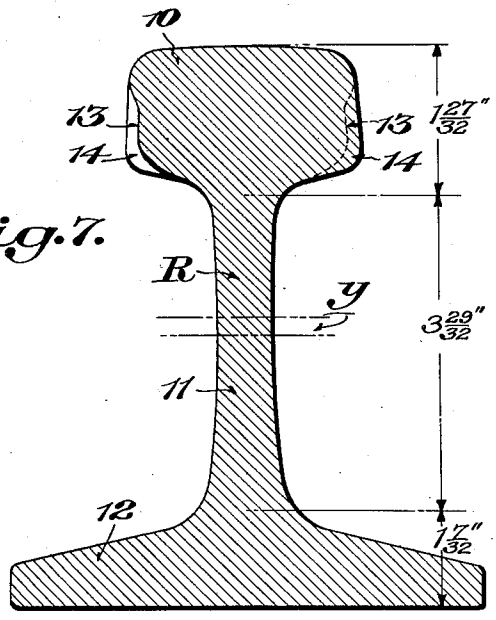


Fig. 7.



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RAILWAY RAIL

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Fig.8.

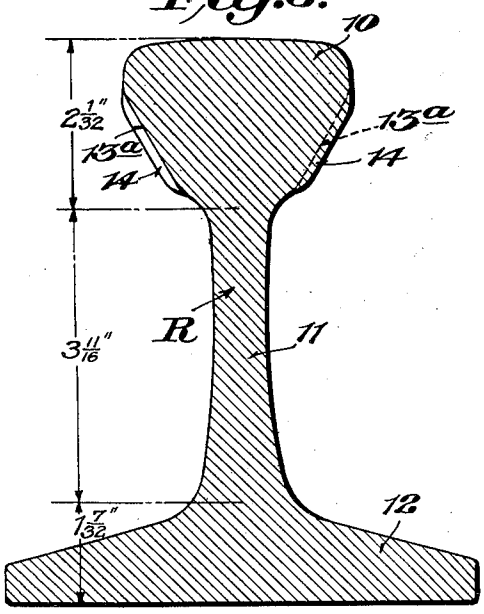


Fig.9.

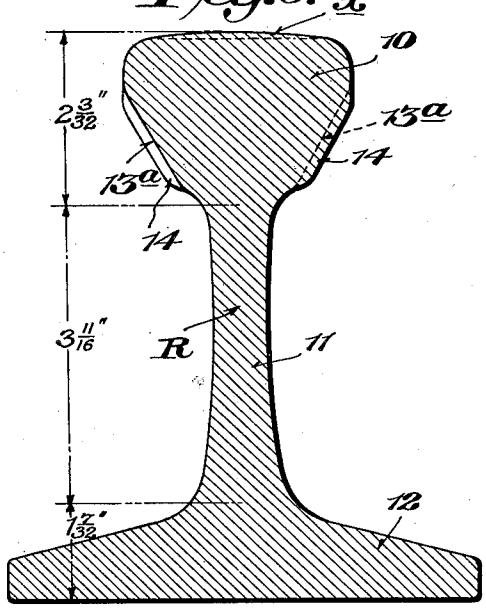
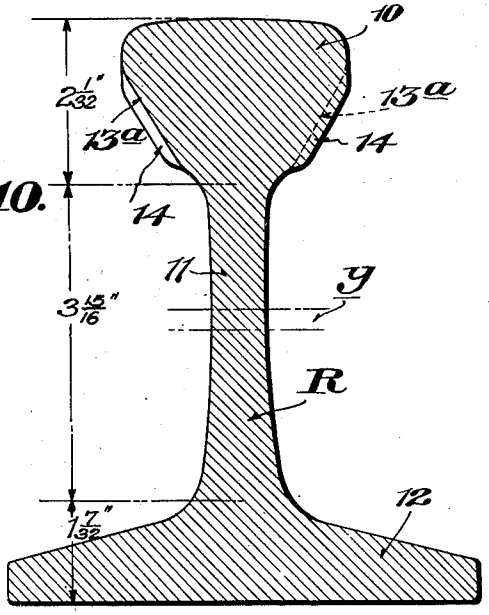


Fig.10.



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UNITED STATES PATENT OFFICE

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RAILWAY RAIL

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Application October 19, 1932, Serial No. 638,610

3 Claims. (Cl. 238—125)

This invention relates to an improvement in the conventional type railway T-rail and primarily has for its object a novel and advantageous distribution of metal, particularly in the rail head, providing increased strength and wearing life for the rail, while at the same time preserving its conventional form and shape so that any type of rail joint, whether of the head contact or headfree type, may be available for use therewith.

Accordingly, a primary object of the invention is to provide a novel rail head formation which produces a section of the same weight per yard but having an increased girder depth, thereby to afford greater stiffness in the section, and also permitting an increase in the amount of metal available for wear, thus materially increasing the wearing area and therefore the wearing life in the rail head before the safe limit of production and total area is reached.

A further object of the invention is to provide a rail head formation which materially increases the surface area thereof whereby a better section is provided from a cooling standpoint, thus insuring uniform and satisfactory cooling of the rail head with the resultant better metal texture.

Furthermore, it is well known that entirely aside from the comparatively short life of railway rails due to the wearing down of the top wearing surface, early deterioration and loss of life in rails, particularly when subject to heavy traffic conditions, is due in considerable measure to the material loss of metal from the inner faces of the rail heads from wearing contact with the wheel flanges of the cars and locomotives. Especially is this true of the high rails on curves, with respect to which the shearing off of long slivers of metal from the inner faces of the heads thereof is a common occurrence. Breaking away of a sliver at one point produces a tearing action tending to break it away at adjacent points, and the strength and life of the rail is correspondingly and rapidly reduced. Moreover, the formation of elongated slivers on the inner faces of the rail heads, affording shoulders upon which the flanges of locomotive and car wheels may ride, frequently is the direct cause of derailings and wrecks. Accordingly, another important object of the invention is to provide a rail embodying a design such that the rapid loss of metal due to the formation, breaking and tearing away of slivers from the inner face of the head thereof is greatly reduced, and such that in any event the possibility of the formation of elongated slivers is eliminated.

Another important object of the invention is to provide a rail embodying a structural design such that the strength of the rail is increased as compared with present types of rails of the same weight.

With the foregoing and other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in the novel construction and in the novel combination and arrangement of features as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the drawings, wherein are illustrated certain practical embodiments of the invention:—

Figure 1 is a side elevation of a portion of a rail of standard type constructed in accordance with the invention.

Figure 2 is a horizontal section on the line 2—2 of Fig. 1.

Figure 3 is a cross section through the rail illustrated in Figs. 1 and 2.

Figure 4 is a view similar to Fig. 3 illustrating a rail of the headfree type constructed in accordance with the invention.

Figures 5, 6 and 7 are a series of study-views illustrative of the advantages and scope of the invention as applied to a conventional 130-R. E. type railway T-rail.

Figures 8, 9 and 10 are a series of study-views illustrating advantages and scope of the invention applied to a headfree 130-R. E. type railway rail.

Referring to the drawings in detail, it will be observed that the rail, designated generally as R, is illustrated in Figs. 1 to 3 as being of the well known standard type, and in Fig. 4 as being of the well known headfree type, including in each instance a head 10, a web 11 and a base 12 in accordance with common practice.

The invention in its primary aspect, as above indicated, consists in so modifying the structural formation of the head of a railway rail as to provide for an elimination of metal therein that may be utilized for metal saving, but which preferably is an incident to accomplishing several desirable results without interfering with the use of the rail with either a head-contact type as indicated by the dotted lines in Fig. 5, or headfree type of rail joint, as indicated by dotted lines in Fig. 6. Principally among these desirable results to be accomplished is a transferring of the metal from the sides of the rail head to either the top surface of the rail head or into the body or web of the rail to increase the girder height of the section,

thereby improving the moment of inertia; also to provide a fluted construction for the sides of the rail head which prevents the formation of and breaking off of long slivers of metal due to wheel flange wear, and also to materially increase the surface area of the rail head to greatly improve the rate of cooling of the metal, thus insuring a more homogeneous texture of metal. To accomplish these various practical and important results the invention contemplates in its specific aspect the novel head construction which may be obtained by providing the sides of the rail head and preferably the bottom corners of the rail head with a multiplicity of recesses or cavities representing the removal or elimination of metal at these locations, the eliminated metal preferably being caused to distribute itself as an additional thickness to the top wearing surface of the rail head, thereby increasing the life of the wearing surface, or into the web part of the rail, in either of which cases the girder strength or moment of inertia of the rail section is greatly improved.

The recesses or cavities in the sides of the rail head, representing elimination or reducements of metal, are designated by the reference numeral 13 in Figs. 1, 3, 5, 6 and 7 of the drawings, and by the reference numeral 13ª in Figs. 4, 8, 9 and 10 of the drawings. It will be observed that the recesses or cavities necessarily alternate with metal rib portions 14 which represent normal wall portions of the rail head, as it is understood that the present invention contemplates a construction wherein the normal width or thickness of the rail head is maintained at the locations 14, and between these normal wall portions of the rail head the metal is displaced, producing the subnormal cavities or recesses 13 in the T-rail and 13ª in the headfree rail when the invention is applied to the latter type of rail.

Furthermore, it will be understood that the alternating reducements or depressions 13 in the rail head sides are preferably provided at both sides of the rail head in order that the rail may have a uniform or substantially uniform area of metal through its length and also preferably the alternating depressions 13 and rib portions 14 are staggered or disaligned transversely of the rail as clearly illustrated in Fig. 2 of the drawings, thereby providing for a uniform increased cooling surface for the rail head.

Although the depressions 13 may be formed in any preferred manner they preferably are formed by a roll or rolls of suitable contour in the final roll pass of the mill, and, as is apparent, said depressions may extend either throughout or only partially throughout the height of the rail head as may be desired, but preferably in the T-rail head these depressions or reducements extend into or around the bottom corners of the rail head to positively prevent the development of continuous slivers of metal at these locations due to wheel flange wear, as above explained, with the consequent loss of substantial amounts of metal from the rail as occurs in the ordinary T-rail head generally in use.

In Figs. 1 to 3 the invention is illustrated as embodied in a T-rail of well known standard type characterized by a head which has flat fishing surfaces at the underside thereof, and which type of rail can be spliced at the joints by rail joint bars of either the head-contact or well-known headfree type. In a T-rail of this type the depressions 13 preferably extend from the underside of the rail head upwardly through and around the bottom corners of the rail head to a line spaced suitably below the top of the head, as best illustrated in Fig. 3 of the drawings, while as illustrated in Figs. 1 and 2, the depressions and the intervening rib portions preferably are of equal or substantially equal width, although they may be of any relative width desired.

In Fig. 4 the invention is illustrated as embodied in a rail of the well known headfree type characterized by a head, the lower portion of which is of inverted, truncated pyramidical shape in cross section. In a rail of this type the depressions 13ª preferably are formed in the downwardly and inwardly inclined side faces of the lower portion of the head and, as in the case of the standard rail illustrated in Figs. 1 to 3, terminate at their upper ends below the top of the rail.

Obviously a considerable saving of metal is obtained by reason of the depressions 13, and since this metal is taken from those portions of the rail head where it is of little strength value it follows that a rail constructed in accordance with the invention and although having actually less metal in the head than either a standard or headfree rail of the same size, is, nevertheless, substantially equally as strong as a corresponding standard or head free rail. On the other hand, if the metal which is saved by reason of the provisions of the depressions 13 is added to the top of the rail head, thereby increasing the height of the girder, the result is a rail having a greater moment of inertia and greater strength than a rail of either the standard or headfree type of the same weight, at the same time increasing the wearing life of the rail.

By reason of the depressions 13 serving to produce a series of the intervening rib portions 14 spaced apart longitudinally of the rail head, it follows that the formation of elongated slivers along the side of the rail head cannot occur, since the greatest length of any sliver cannot exceed the width of the individual raised portions. The possibility of breaking or tearing away of elongated strips of metal from the rail head thus is effectively eliminated with consequent increased life of the rail. Moreover, since elongated slivers cannot form on the side of the present rail and since short slivers do not tend so readily as long slivers to cause the wheels of cars and locomotives to ride upwardly and off of the rail due to contact of the wheel flanges with said slivers, the possibility of derailings due to this cause is correspondingly reduced as compared with rails of such structural design that the formation of elongated slivers along the sides of their heads is permitted.

By way of further illustrating the advantages and scope of the present invention reference is now made to the series of study views 5, 6 and 7 of the drawings. In Fig. 5 of the drawings there is shown the conventional 130 R. E. T-rail having the cavity or recessed formation at the sides of the rail head and extending around the bottom corners thereof and into the bottom head fishing surfaces of the rail head. By reason of the alternations of these cavities, recesses or depressions with the intervening ribs 14 the use of the rail with any type of rail joint is not interfered with. The head-contact types of joint bars take fishing bearing at the undersides of the rail heads against the rib portions 14 even where these rib portions extend around into the head fishing surface as shown in the drawings. Also, the headfree type of rail joint bars are not inter-

fered with because this type of rail joint takes a loading engagement in the head fillets of the rail. In Fig. 5 of the drawings the invention is represented as producing the cavities or reducements with resultant saving of metal, but in Fig. 6 the metal eliminated from the cavities or reducements 13 is shown transferred to the top of the rail head as indicated at X, thereby materially increasing the wearing life of the rail head surface and also increasing the moment of inertia or girder strength of the structure. In Fig. 7 of the drawings the metal eliminated by the cavities or recesses in the sides of the rail head is shown transferred to the web of the rail as indicated at Y, with the result of more substantially increasing the moment of inertia due to the greater depth provided for the girder section.

In the application of the invention to the headfree type of rail, which is only useful with the headfree type of rail joint and cannot use a head-contact type of rail joint, the invention possesses the advantage shown in Fig. 8 of the drawings of contributing a material saving in weight of metal in the rail. In Fig. 9 of the drawings the metal removed from the sides of a headfree rail is shown transferred to the top of the rail head as indicated at X, with the resultant improvement in wearing life and in its moment of inertia or girder strength, and in Fig. 10 of the drawings the eliminated metal is shown transferred to the web of the rail as indicated at Y with a still greater improvement in its moment of inertia or girder strength.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

I claim:—

1. A railway rail inclusive of a head having side recesses therein spaced apart longitudinally of the rail and terminating at their upper ends below the top of the rail head.

2. A railway rail inclusive of a head having a bottom portion of inverted truncated pyramidical section, one side at least of said bottom portion having spaced apart recesses formed therein.

3. A railway rail inclusive of a head having a bottom portion of inverted truncated pyramidical section, one side at least of said bottom portion being composed throughout the length of the rail of a series of alternate recesses and ribs.

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