

W. P. & S. G. THOMSON.  
 SPLICE BAR FOR RAIL JOINTS.  
 APPLICATION FILED MAR. 13, 1908.

960,237.

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Fig.1. Fig.2.

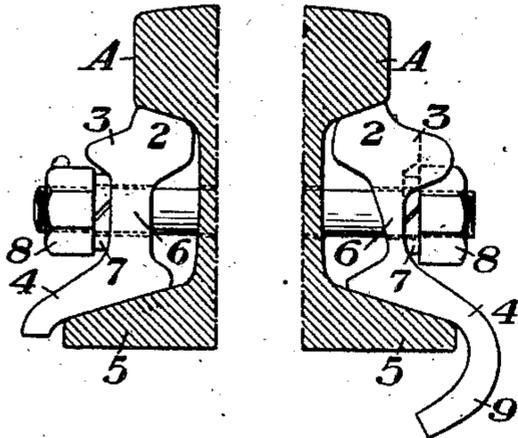


Fig.3. Fig.4.

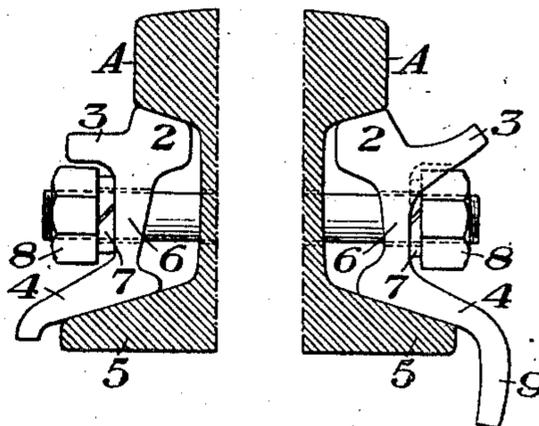


Fig.5. Fig.6.

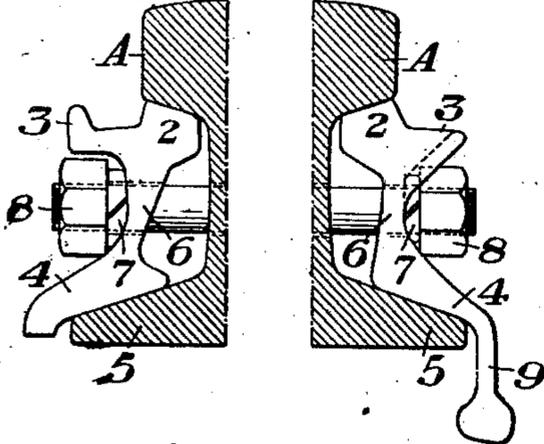


Fig.7. Fig.8.

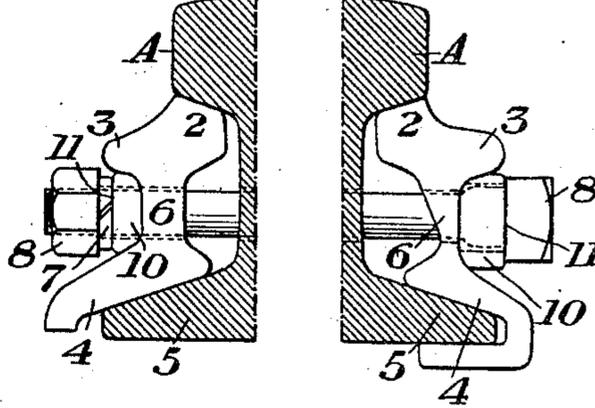


Fig.9. Fig.10.

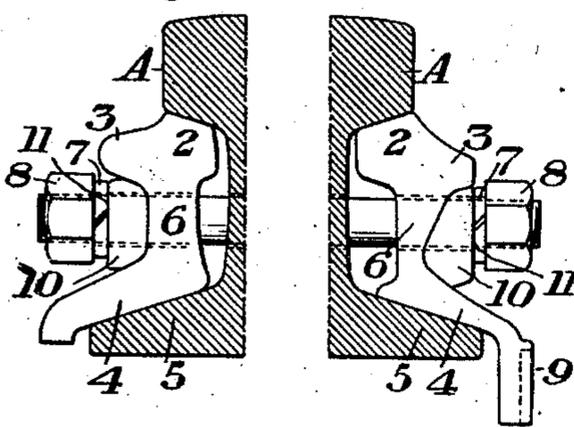
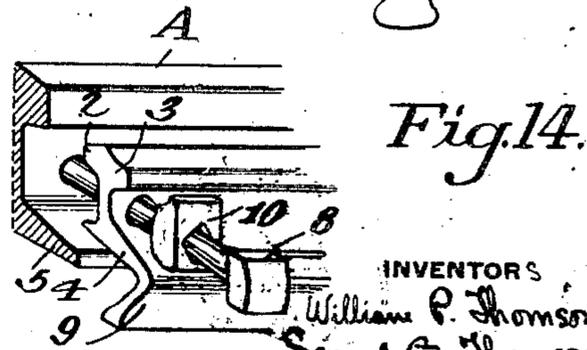
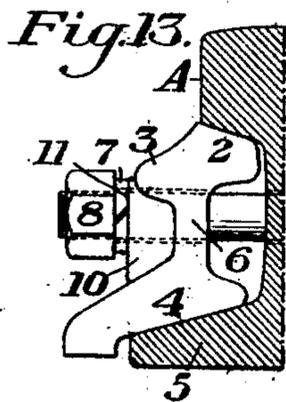
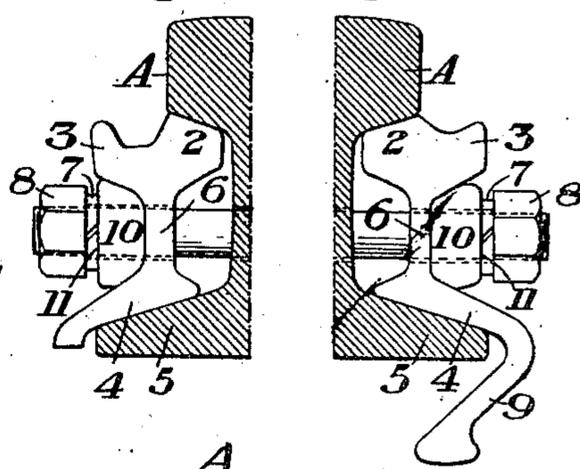


Fig.11. Fig.12.



WITNESSES

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# UNITED STATES PATENT OFFICE.

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SPLICE-BAR FOR RAIL-JOINTS.

960,237.

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*To all whom it may concern:*

Be it known that we, WILLIAM P. THOMSON and SAMUEL G. THOMSON, both of Philadelphia, Philadelphia county, Pennsylvania, have invented a new and useful Improvement in Splice-Bars for Rail-Joints, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1 to 13, inclusive, are sectional views illustrating different forms of our improved splice bar. Fig. 14 is a perspective view showing a typical manner in which the bolts may be made to interlock with the washers.

The essential feature of the present invention consists in the forming of an abrupt head or rib portion on the outside of a splice bar adjacent to its top, of such a size that it would interfere with the tightening of the nuts or turning of the bolt head if the washer or nut lock or milling-out features embodied in our invention were not used. This abrupt head portion or rib is formed on the outer side of the bar, of such a size that the outwardly extending metal may give only sufficient clearance above for the wheel flange on a badly worn rail head, and below occupy space usually reserved for nuts and bolt heads, and the utilization of which space is a characteristic feature of this improvement. The other characteristic and new feature is the use of washers or nut locks bearing against a splice bar embodying this enlarged rib and having a substantially vertical bolting web, the function of the washers or nut-locks being to provide a vertical gripping face of sufficient size and at such distance from the bar as to allow the nuts to turn into a tightened position.

The size and shape of the entire head of our bar and the location of the upright web embodies other novel and essential characteristics as follows:—The enlarged head projects to both sides of a substantially vertical web member to at least as great a distance inside of a vertical plane through the center of the web as it does to the outside of it, and at the same time stands free from the rail web. All bars heretofore con-

structed with a head projecting beyond both sides of an upright web have the web of the bar located sufficiently close to the rail web to cause the greater portion of the head to lie outside of a vertical plane through the center of the web. We desire to obtain the advantage of having a clearance between the head of the bar and the rail web to provide for wear, and at the same time to have the web of the bar located sufficiently far from the rail web so that it will provide for the large inwardly extending head portion and at the same time join the foot portion of the bar adjacent to its middle or at its outer end near the outer edge of the rail base. A web located in this way permits a very large and widely projecting head on the inside of the bar without extending it against the rail web. By adding our outer rib to this already large head, we obtain a practicable bar with the maximum possible efficiency in its top chord, which portion has always been the weakest part. The feature that makes possible this widely projecting head with its outer rib is the concaving of the upper face of the bar and the top of the rib. This concaving prevents worn wheel flanges from striking the bar.

The object of our invention is to provide a splice bar having a very greatly increased vertical stiffness and a maximum amount of metal in the head which is at the same time given sufficient clearance from the rail web to make ample provision for taking up wear; this is attained by the location of an upright web at a substantial distance from the rail web, by the abruptness of the extension of our enlarged rib and by utilizing space heretofore reserved for the nuts and bolt heads. To still further increase the metal in the rib, it may be turned upwardly at its outer edge at a point where it would clear the inside of a wheel flange. This results in the forming of a bar with an enlarged groove in the top to clear the wheel flange, which groove is located immediately outside of the head of the rail.

We preferably use a spacing member in combination with a substantially vertical bolting web and an enlarged rib, with the parts so arranged that the nuts either will

be provided with a vertical bolting face which overlaps a portion of the rib or will be spaced at sufficient distance from the bar to clear the rib. The latter may be accomplished by the use of a washer or a nut-lock smaller than the diameter of the nut and sufficiently thick to permit the nut as it turns in engagement to clear the rib, while the former may be obtained by the use of a wider washer or a bar fitting a splice bar having an irregularly formed outer face, in which case the washer or bar extends partly over the rib and provides a vertical gripping face for the full diameter of the nut or nut-lock. The bar, as mentioned, may extend lengthwise of the joint to provide gripping faces for two or more nuts. Such an arrangement of washers, nut-locks or bars allows the use of an abrupt rib of large dimensions upon the upper member of a splice bar of any shape or type; but the construction is especially advantageous for a plain angle bar which does not have the benefit of stiffening parts extending below the rail base. In practice it has been found that the head of the bar is always the place where the bar fails first, and our invention is designed to strengthen this point by the use of this enlarged abrupt rib.

The benefit of our improved construction in combination with the washer is very apparent, from the fact that it is not necessary to cut away any of the rib to provide a vertical gripping face for the nut, although this may be done when it is not desired to use bolts of increased length, but rather to have a bar that can be interchanged with the ordinary bars that may be in track use and that can be used with the standard length bolt.

From the foregoing, it will be seen that the primary object which we seek is a maximum practical increase in the size of the outside of the head of the splice bar and it is essential that the abrupt lower face of the rib should join the normal contour of the bolting face of the bar at a point within the cylindrical plane circumscribing the nut.

Our invention is susceptible of various modifications and may be embodied most advantageously in modified designs of various types of splice bars which are in general use, provided they have applied to them the essential features of our invention, described herein, and set forth in the appended claims. In the drawings, we have shown a number of these modifications, but desire it to be understood that our invention is not limited exclusively thereto. In these drawings, we have shown our improved form of bars applied to T-rails, but they may be used in connection with rails of any other section.

In the drawings the numeral 2, wherever

seen, designates the head of the bar, which has a bearing at its upper edge underneath the head A of the rail, and which, in all the forms shown, has an abrupt reinforcing rib 3. This head 2 is joined by a substantially vertical web 6 to a foot member 4, which fits the upper surface of the rail base 5.

In Figs. 2, 4 and 6, the bars have a cut-away portion which provides clearance for the upper portions of the nuts 8 and nut locks 7, and also have freely depending portions 9, extending below the rail base. In the forms shown in Figs. 10 and 12, these freely depending portions 9 are also shown. Figs. 7 to 13, inclusive, show a washer or filler 10, fitted to the contour of the outer face of the bar and having a vertical gripping face 11, for the nuts 8. In Figs. 1, 3 and 5, neither the cutting away of the outer face of the bar nor the irregularly shaped washers are necessary, since the nut-lock provides sufficient clearance for the nut 8.

In Fig. 8 we show the bolt head in combination with the washer and enlarged rib, and an enlarged or irregular hole through the washer. This construction is used when it is not desired to have upset bolt heads fitting the curved or irregular outer face of the splice bar. It is evident, therefore, that our improvements apply equally to a washer combination with the bolt head as well as with the nut. In this specification, whenever the nut is mentioned, we wish to include also the bolt head in a similar manner to the nut. When the gripping face of the bolt head is vertical and a washer is used between it and the bar, it is evident that the bolt may be prevented from turning by fitting an enlarged or projecting portion of the bolt on the under side of the bolt head into an elongated hole or key way in the washer, and by so doing allow round holes to be drilled through the splice bars instead of the usual elongated ones.

Figs. 4, 5, 11 and 12 show bars with the outer end of the abrupt reinforcing rib 3 turned upward to form a groove located immediately outside of the head A of the rail, forming a clearance for the wheel flange.

This invention is particularly valuable in its application to a splice bar having a vertical bolting web lying close up to the web of the rail and spaced therefrom to a comparatively small extent. Referring especially to Fig. 9, it is apparent that in such a case the only way to substantially increase the head of the bar without the use of a prohibitive amount of metal or the introduction of features which are objectionable, is by the use of an abrupt reinforcing rib and the required spacing members embodied in our invention.

Regardless of the shape of the bar in use,

our rib reinforcement may be added thereto as a modification in design which will afford a positive increase in the stiffness of the bar. It has been found in practice that when more stiffness has been sought by making the bolting web thicker than usual, the increased thickness not only places the metal where it affords the least service, but it introduces such difficulties in the manufacture of such bars that the advantage of the greater thickness is neutralized, by the damage incurred by the punching of bolt holes in the web. We overcome these objections by restricting a bolting web to a reasonable thickness and by adding metal abruptly in the form of a reinforcing rib above the top of the bolt holes through the web, thus doing away with any interference with easy punching and consequent damage to the bars. We have also found in practice that the substantial reinforcement of the head of the splice bar permits a decrease in the essential thickness of the web, as compared with the webs of angle bars as found in common use, and that a bar of our improved construction, although having practically the same amount of metal, will be greatly increased in stiffness. This permits us, by saving metal in the web, to add our rib to the head of the bar without increasing the weight of the bar to any appreciable or objectionable extent. We thus secure much greater efficiency without material increase in cost of material or cost of finishing.

By referring to Fig. 2, which shows the normal location of the nut with reference to the rail head when used with the usual types of rail joints, it will be seen how limited is the space for adding a rib to the bar above the clearance for the nut. Such a small rib as could be added would be of no perceptible use in stiffening and increasing the head of a splice bar, and it is only by the extending of our rib down into the space heretofore reserved for the turning of the nut that this large increase in the head can be attained.

We claim:

1. In a rail joint, a splice bar, clamping bolts and nuts, said bar having bolt holes through its upper member and having a portion of the outer face of said member formed by a substantially vertical face extending above the bolt and interposed between two other faces which diverge outwardly from points below a horizontal plane at the top of the nuts, part of the lower one of said divergent faces lying vertically below said nuts, said splice bar having a concave upper face slanting downwardly and outwardly from the lower edge of the rail head.

2. In a rail joint, a splice bar, clamping bolts and nuts, and a nut-bearing member,

said splice bar having a concave upper face slanting downwardly and outwardly from the lower edge of the rail head and also having adjacent to the bolt holes a substantially vertical outer face of greater height than the diameter of said bolts and of less height than the long diameter of the nuts, said bar also having a foot member extending outwardly beyond the plane of the inner face of said nut.

3. In a rail joint, a splice bar, clamping bolts, nuts, and a nut-bearing member, said splice bar having a foot member and a substantially vertical web and a head lying entirely below the lower edge of the rail head, said foot member extending outwardly beyond said nut-bearing member and beyond the outer edge of said head, said head projecting outwardly beyond the outer face of said web, the greater portion of the under face of the projection slanting upwardly and outwardly between horizontal planes at the top of the bolts and at the top of the nuts to form a bearing for said nut-bearing member.

4. In a rail joint, a splice bar fitted under the rail head, and a nut-bearing member, said bar having an outwardly extending stiffening rib adjacent to its top and along its outer face and also having a reinforcing and spiking member extending outwardly a substantial distance beyond said rib, said bar also having a concave face inclined downwardly and outwardly from the lower edge of the rail head, and said rib having a downwardly and inwardly slanting under face extending below the top of the nut to form a bearing for said nut-bearing member.

5. In a rail joint, a splice bar fastened to both rails and having a longitudinal stiffening rib extending along its outer face adjacent to its top, clamping bolts and nuts, and a nut-bearing member engaging the outer face of the bar, said stiffening rib having a concave upper face inclined downwardly and outwardly from the lower outer edge of the rail head and an outer face inclined downwardly and inwardly, said nut-bearing member lying wholly below the top of the nuts, and being of sufficient thickness to space the overlapping nuts a sufficient distance from the bar to clear a portion of said rib; substantially as described.

6. In a rail joint, a splice bar, said bar having a web member intersected by a vertical plane at the outer edge of the rail head, and a T-head which extends to a substantially equal distance at each side of said web member, the outer portion of said head having its upper face grooved for a wheel flange clearance and its under face extending downwardly and inwardly to a point below the horizontal plane of the top of the nuts; substantially as described.

7. A splice bar lying entirely below the lower outer edge of the rail head and having portions of its upper surface lying outside of the rail head sloping upwardly in opposite directions to form a channel extending lengthwise of the bar in this upper surface, said bar having a web intersected by a plane at the outer edge of the rail head and a head portion projecting substantially equal dis-

tances beyond each side of said web portion; 10 substantially as described.

In testimony whereof, we have hereunto set our hands.

WILLIAM P. THOMSON.  
SAMUEL G. THOMSON.

Witnesses:

S. E. PATTERSON,  
E. McNEAL.