E. A. SULLIVAN.

JOINT BAR.

APPLICATION FILED APR. 30, 1909.

944,703. Patented Dec. 28, 1909.

Fig. 1.

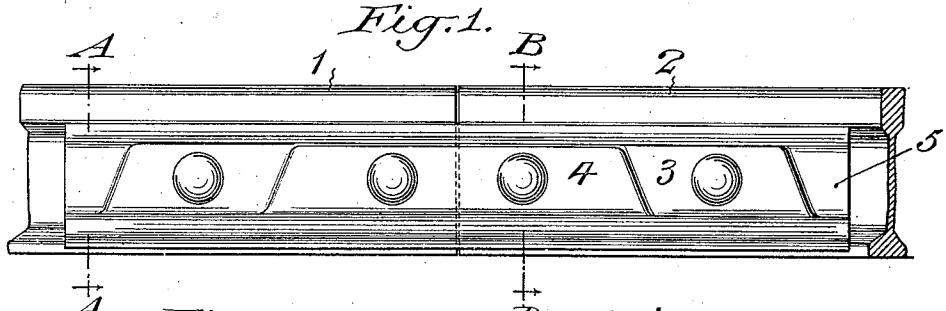


Fig. 2.

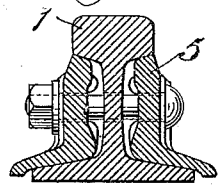


Fig. 3.

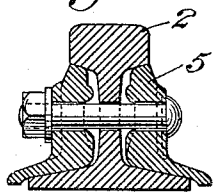


Fig. 5.

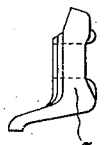


Fig. 4.

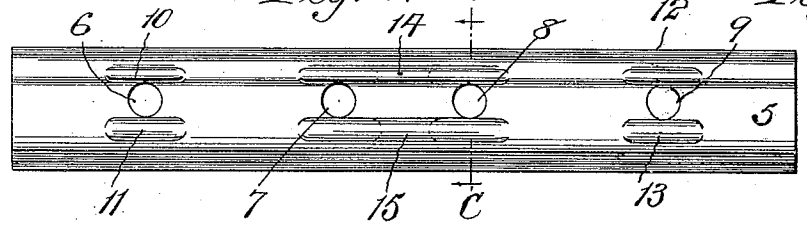


Fig. 6.

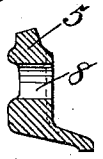


Fig. 8.

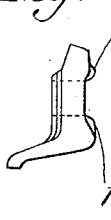


Fig. 7.

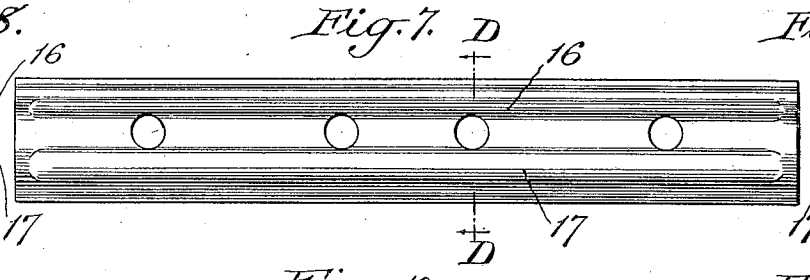


Fig. 9.

Fig. 10.

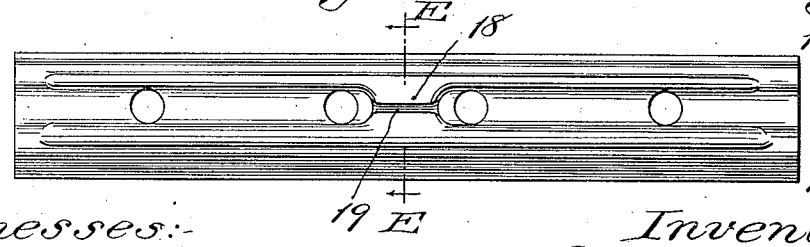
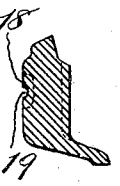


Fig. 11.



Witnesses:-
F. George Barry.
Henry Thieme.

Inventor:-
Edward Alan Sullivan
By Brown Durand
his Attorneys

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWARD ALAN SULLIVAN, OF TORONTO, ONTARIO, CANADA, ASSIGNOR TO RAILWAY SUPPLIES LIMITED, OF TORONTO, CANADA, A CORPORATION OF CANADA.

JOINT-BAR.

944,703. Specification of Letters Patent. **Patented Dec. 28, 1909.**

Application filed April 30, 1909. Serial No. 493,202.

To all whom it may concern:

Be it known that I, EDWARD ALAN SULLIVAN, a subject of the Crown of Great Britain, and resident of Toronto, in the county of York, Dominion of Canada, have invented a new and useful Improvement in Joint-Bars, of which the following is a specification.

My invention relates to an improvement in joint bars, commonly known as splice or angle bars and more particularly to joint bars used for uniting channel beams and railway rails where the joint bars are provided with a series of bolt holes through which they are secured to the webs of the beams or rails.

I have chosen to illustrate my invention the form of joint bar adapted for use in connection with the uniting of the adjacent ends of two railway rails where it is desirable that the joint bars be made sufficiently strong to withstand any load which may be applied to the rails and at the same time not interfere seriously with the wave of deflection which passes along the rail as the railway trains move thereon. It is also desirable that while the bar shall be amply strong for the purposes required, the metal which composes it shall be so disposed as to obtain maximum strength with a minimum amount of metal.

My present invention is directed more particularly to the reinforcing of the joint bar on its inner face, either alone or in combination with reinforcements on its outer face, in proximity to those points where the bar is reduced in strength by punching bolt holes, so that the bar shall not only be amply strong at these bolt hole points but may be made even thinner at the points where it is punched than has hitherto been considered safe.

In the accompanying drawings, Figure 1 is a view in side elevation of the adjacent ends of two railway rails, showing a joint bar in position thereon; Fig. 2 is a transverse section in the plane of the line A—A of Fig. 1, Fig. 3 is a transverse section in the plane of the line B—B of Fig. 1; Fig. 4 is an inner face view of the joint bar, showing in full lines individual reinforcements above and below the two end holes and reinforcements common to the two middle holes and in dotted lines where individual reinforcements for the two middle holes might extend to, if so desired; Fig. 5 is an end view of the same, Fig. 6 is a section in the plane of the line C—C of Fig. 4; Fig. 7 is a face view of a joint bar, showing the reinforcements extending continuously above and below the series of holes in the bar; Fig. 8 is an end view of the same; Fig. 9 is a section in the plane of the line D—D of Fig. 7; Fig. 10 is a face view of a joint bar, showing the reinforcements extending continuously above and below the series of bolt holes, these reinforcements being connected at the center intermediate of the two middle bolt holes by an upright reinforce, and Fig. 11 is a section of the same in the plane of the line E—E of Fig. 10.

The adjacent ends of the two railway rails are denoted by 1 and 2. The joint bar for connecting them is here shown as provided on its outer face with vertically tapered reinforcements 3 and 4 and while this is the form in which I prefer to build the joint bar, my present invention applies as well to joint bars which do not have these reinforcements on their outer faces.

The body of the joint bar, Figs. 1 to 6 inclusive, is denoted by 5. It has the usual general concave inner face, leaving a space between this face and the web of the rail when the upper and lower edges of the joint bar are drawn into close contact with the tapered underside of the head of the rail and upper side of the base of the rail. The bolt holes, here shown as four in number, are denoted respectively by 6, 7, 8 and 9. The body of the bar on its inner face, is provided with an elongated projection 10 above the bolt hole 6 and spaced from the upper edge of the bar, and an elongated projection 11 below the bolt hole 6, and spaced from the lower edge of the bar, the projection 11 being preferably somewhat wider and having a greater transverse sectional area than the projection 10. The bolt hole 9, in like manner, has located above and below it on the inner face of the body 5, reinforcing projections 12 and 13, quite similar to the projections 10 and 11 respectively.

The bolt holes 7 and 8 have in proximity thereto, above and below them, elongated reinforcing projections 14, 15, these projections 14, 15, either extending, as shown in full lines Fig. 4, continuously past the two

bolt holes 7 and 8, or, as indicated in dotted lines in this figure, the projections might be separated, leaving independent projections above and below each of the holes 7 and 8, in a manner quite similar to the projections above and below the bolt holes 6 and 9. These reinforcing projections are of such thickness that their inner faces will not touch the web of the rail, the intention being to place in these reinforcing projections a sufficient quantity of metal to make the transverse sectional area of metal through the bolt hole substantially equal to the transverse sectional area of metal through the bar intermediate of the end and middle bolt hole reinforcements, thereby making the bar as capable of sustaining a load through that portion weakened by the punching of the bolt hole as it is through the non-reinforced sections adjacent thereto. These projections are so planned that they may be formed during the process of rolling the angle bars, the faces of the finishing rolls employed for this purpose being provided with suitable depressions to form the reinforced projections at the proper intervals.

Instead of individual reinforcements for two or more of the bolt holes, the reinforcements may be made continuous over the series of bolt holes, as shown in Fig. 7, where the reinforcement extending continuously above the series of bolt holes, is denoted by 16 and the reinforcement below the series by 17. Furthermore, in order to increase the stiffness of the joint bar at the point opposite the meeting ends of the rails, the reinforcement which extends above the series of holes may be connected with the reinforcement which extends below the series of bolt holes by a central vertical reinforcement denoted by 18, Fig. 10. In this structure, which is particularly desirable, the vertical central reinforcement may be provided with a transverse conduit 19 for the passage of bonding wire or wires. By providing these reinforcements on the inner face above and below the bolt holes, it is feasible to make the web or body of the joint bar where the bolt holes are located, of a lesser thickness than has hitherto been required, thereby not only facilitating the punching of the bolt holes but also reducing the strains and stresses upon the metal adjacent to the bolt holes which takes place when the punch is forced through the body of the bar. These reinforcements, located on the inner surface of the joint bar, are entirely out of the way of the flange of the wheel in passing along the rail and may readily be formed on the face of the bar, without any complicated rolling machinery, simultaneously with the formation of the reinforcements on the outside of the bar when it is desired to form the bar as an exteriorly reinforced instead of a plain bar. It is further to be particularly noted that the nearer any reinforcement can be brought to the web of the rail, the greater its value from a structural point of view, since it is more directly in the line of stress, and furthermore, the inner face reinforcement above set forth naturally increases the lateral stiffness of the bar and so tends to prevent any slack between the bolt nut and bar at the moment when the bar is under stress and hence prevents the loosening of the nut.

What I claim is:

1. A joint bar provided with bolt holes therethrough, the said bar being provided on its inner face with reinforcing projections above and below the bolt holes, a reinforcing projection above the bolt hole being of less transverse sectional area than the reinforcement below the bolt hole.

2. A joint bar provided with bolt holes therethrough, reinforcements on its outer face tapered in the vertical longitudinal plane of the bar, the said bar being provided on its inner face with reinforcing projections above and below the bolt holes, a reinforcing projection above the bolt hole being of less transverse sectional area than the reinforcement below the bolt hole.

3. A joint bar provided with bolt holes therethrough, the inner face of said bar being provided with elongated reinforcements above and below the bolt holes and with a vertical reinforcement on its inner face connecting the reinforcements above and below the bolt holes, the said reinforcement above the bolt holes being of less transverse sectional area than the reinforcement below the bolt holes.

4. A joint bar provided with bolt holes therethrough, the inner face of said bar being provided with elongated reinforcements above and below the bolt holes and with a vertical reinforcement on its inner face connecting the reinforcements above and below the bolt holes, said vertical reinforcement being provided with a transverse wire conduit.

5. A joint bar provided with bolt holes therethrough and with reinforcements on its outer face tapered in the vertical longitudinal plane of the bar, the inner face of the said bar being provided with elongated reinforcements above and below the bolt holes and with a vertical reinforcement on its inner face connecting the reinforcements above and below the bolt holes, the reinforcement above the bolt holes having a less transverse sectional area than the reinforcement below the bolt holes.

6. A joint bar provided with bolt holes therethrough and with reinforcements on its outer face, the inner face of the said bar being provided with elongated reinforce-

ments above and below the bolt holes and with a vertical reinforcement on its inner face connecting the reinforcements above and below the bolt holes, said vertical reinforcement being provided with a transverse wire conduit.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two witnesses, this 23rd day of April, 1909.

EDWARD ALAN SULLIVAN.

Witnesses:

E. MERNER,

R. N. SCHEFFEY.