Fig. 1

Fig. 2

Fig. 3

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METHOD OF FORMING A COMPROMISE RAIL JOINT BAR

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This invention relates to compromise or step joint bars for connecting and holding the ends of rails of different section, with the gage and surface of the rails in alignment, and has particular reference to improvements in bars of that type which are squeezed or pressed, i.e., bulldozed from rolled or forged bars or blanks, and to improvements in the dies and the method employed to produce said bars. A joint bar of the general type with which the present invention is concerned is disclosed in Armstrong Patent 1,663,619.

Bulldozing a bar or blank to produce a compromise rail joint bar involves reducing the height and vertically and laterally offsetting a portion of the bar to compensate for the difference in section and height of the rails to be united.

According to methods and means heretofore employed to produce a bulldozed compromise joint bar, squeezing of the bar to reduce the height of a portion thereof to provide the low fishing section invariably resulted in the web of the low fishing section being bulged or caused to protrude outwardly, which necessitated planing off or suitably removing the bulged metal, as otherwise the low fishing section of the bar would be too wide for the length of standard bolts, and a suitable bearing face for the heads and nuts of the bolts would not be afforded. This machine step of planing or finishing the outer contour of the web of the bar not only involved considerable expense but resulted in weakening of the bar and variations in the weight and strength of different bars.

Accordingly the present invention has in view on the one hand to provide for the manufacture of bulldozed compromise joint bars without the necessity of removing any metal from the bars following the bulldozing operation, and, on the other hand, to provide a bulldozed compromise joint bar in which the low fishing section of the bar will be at least of equal weight and strength to that of the high fishing section of the bar.

With the foregoing general purpose in view, the invention consists in the features of novelty as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the drawings, wherein like characters of reference denote corresponding parts in the different views:

Fig. 1 is a side elevation of a straight bar or blank from which a compromise joint bar is adapted to be produced by a bulldozing operation.

Fig. 2 is an end elevation of the bar or blank shown in Fig. 1.

Fig. 3 is a sectional view showing the bar or blank positioned in a holding die, impressed in accordance with the present invention, in readiness to be subjected to a bulldozing operation by a moving die.

Fig. 4 is a side elevation of the compromise form of joint bar produced as a result of a bulldozing operation employing dies impressed in the manner illustrated in Fig. 3, a step-joint combination of rails with which said bar is adapted for use being shown by dotted lines; and

Fig. 5 is an end elevation of the structure shown in Fig. 4.

As is well known, the function of a compromise joint bar is to connect and hold the ends of a pair of rails of different height and section with their surface and gage in alignment. This is illustrated in Figs. 4 and 5 of the drawings wherein high and low rails of different section are designated R, R', respectively, and the compromise joint bar is designated generally as B. Essentially a compromise joint bar is inclusive of high and low fishing sections of a height and section to fit the high and low rails, respectively, of the particular compromise or step joint combination of rails with which the bar is intended for use. These high and low bar fishing sections are designated H and L in the present instance and, as is usual, they are vertically and laterally offset with respect to one another to compensate for the difference in the height and cross section of the rails.

According to general practice a compromise joint bar may be produced in either of
three ways—by casting, by forging, or by bulldozing.

The present invention is concerned with bulldozed compromise joint bars, and to a method and means of producing them whereby proper fishing fit of the bar with the rails is secured and whereby the objection, as previously pointed out, concerning the necessity of planing off outwardly bulged metal, the increased production cost resulting from the necessity of this operation, and the variation in weight and strength of the bars is entirely eliminated.

In carrying out the invention the usual practice is followed of providing a rolled or forged bar or blank having a straight section, throughout its length, which may fit, or approximately fit the high rail of the compromise or step joint combination of rails with which the bar is intended for use, it being understood, of course, that the bar or blank may be of any form desired so long as it is susceptible of being changed into compromise form by a bulldozing operation. Such a bar or blank is designated generally at A in Figs. 1 and 2 of the drawings, a foot flange form of bar having been selected for purposes of illustration merely because of the extensive use of this form of bar. As usual, said bar is composed essentially of a head 10, a web 12 and a base 14, which latter is inclusive of a heel 16 and a foot flange 18 terminating in a toe 20, the head 10 and the heel 16 extending inwardly beyond the inner face of the web 12 in accordance with common practice.

For bulldozing the bar A into compromise form a pair of cooperating dies D and D* are employed, it being understood, of course, that suitable means (not shown) are provided for forcing one of said dies termed the moving die, D* in this instance, towards the other or holding die D, to effect bulldozing of a bar or blank A positioned between said dies.

Heretofore it has been general practice to form the impressions in the dies D and D* so that the direction of relative movement between the dies, i.e. the direction of the bulldozing pressure, paralleled or was in the plane of the web of the bar or blank A, with the result that the web of the bar was bulged outwardly as aforesaid. As distinguished from this prior practice, the present invention contemplates, in its broader aspects, forming the impressions in the dies so that the bulldozing pressure will be in a direction at such an angle between 0° and 90° to the plane of the web of the bar that all bulging of the metal of the web due to the bulldozing operation will be directed inwardly, i.e., away from the outer face of the web and towards the inner face thereof. To accomplish this purpose satisfactorily one of the dies, the holding die D in this instance, is provided with a low fishing impression d conforming to the entire outer contour and also to the contour of the top and the inner face of the head of the low fishing section of the compromise bar to be produced. The other die, the moving die D* in this instance, is provided with a cooperating low fishing impression d' conforming only to the inner face of the toe, the base and the heel of the bar, this impression being formed so that when a bar or blank A is squeezed between the dies the metal in the web of the bar or blank is free only to bulge inwardly.

Thus, when a bar or blank A is positioned to the holding die D as illustrated in Fig. 3 of the drawings, a face 23 of the impression d conforming to the outer face of the web of the low fishing section of the compromise bar will prevent the web of the bar or blank from bulging outwardly under pressure of the moving die D*, while an opposite face 24 of said impression, conforming to the contour of the top and the inner face of the head of the bar, as far as the lower fillet thereof, will hold the head against any lateral deflection relative to the outer contour of the web. Consequently, when the moving die is forced against the base of the bar or blank, with the result of shoving the base 14 towards the head 10 thereof, reducing the height of a portion of the bar and thus forming the low fishing section L thereof, as shown in Fig. 4, the only direction in which the metal of the bar may swell is away from the outer contour of the web 12. Manifestly, therefore, all bulging or swelling of the web will be in the direction of the inner contour thereof, more or less filling up the space between the head 10 and the heel 16. Consequently, the low fishing bar section L thus formed will include the same amount of metal and be at least of equal weight and strength as the high fishing bar section H, and all necessity of removing any metal from the bar following the bulldozing operation is avoided. This swelling of the metal of the low fishing section L into the inner contour of the bar is illustrated in Figs. 3 and 5 of the drawings, from which figures it will be noted that the web of the low fishing section L, originally the same as the web of the high fishing section, is of materially greater width than the web of the high fishing section and that all increase in the width of the web of the low fishing section is directed inwardly as at 26.

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, pro.
portion and minor details of construction may be resorted to, without departing from
the spirit of the invention and scope of the
appended claims.

1. The method of making a step-joint rail
splice bar which consists in subjecting a rail
splice bar, having a head, a base and a con-
necting web, to pressure to reduce the fishing
height of one end portion of the bar relative
to the other end portion thereof, vertically
and laterally offsetting the respective end
portions of the bar relative to one an-
other.

In testimony whereof I hereunto affix my
signature.

DANIEL LAWRENCE BRAINE.

2. The method of making a step-joint rail
splice bar which consists in subjecting a rail
splice bar, having a head, a base and a con-
necting web, to pressure to reduce the fishing
height of one end portion of the bar relative
to the other end portion thereof, holding
the outer faces of the head, the web
and the base respectively, of said end por-
tion against outward deflection while reduc-
ing the fishing height thereof, whereby all
displacement of the metal of said end por-
tion, incident to reducing the fishing height
thereof, is directed toward the inner face of
the bar and vertically and laterally offset-
ting the respective end portions of the bar
relative to one another.

3. The method of making a step-joint rail
splice bar which consists in subjecting a rail
splice bar, having a head, a base and a con-
necting web, to pressure to reduce the fishing
height of one end portion of the bar relative
to the other end portion thereof, holding
the outer faces of the head, the web
and the base, respectively, of said end por-
tion against outward deflection and holding
the inner face of the head of said end por-
tion against inward deflection relative to the
outer face thereof while reducing the fishing
height of said end portion, and vertically
and laterally offsetting the respective end
portions of the bar relative to one another.

4. The method of making a step-joint rail
splice bar which consists in subjecting a rail
splice bar, having a head, a brace and a con-
necting web, to pressure to reduce the fishing
height of one end portion of the bar relative
to the other end portion thereof, holding the outer faces of the head and the
web, respectively, of said end portion of the bar against outward deflection and holding
the inner face of the head of said end portion against inward deflection relative to the outer face thereof while reducing the fishing height of said end portion, and ver-
tically and laterally offsetting the respective

end portions of the bar relative to one an-
other.