

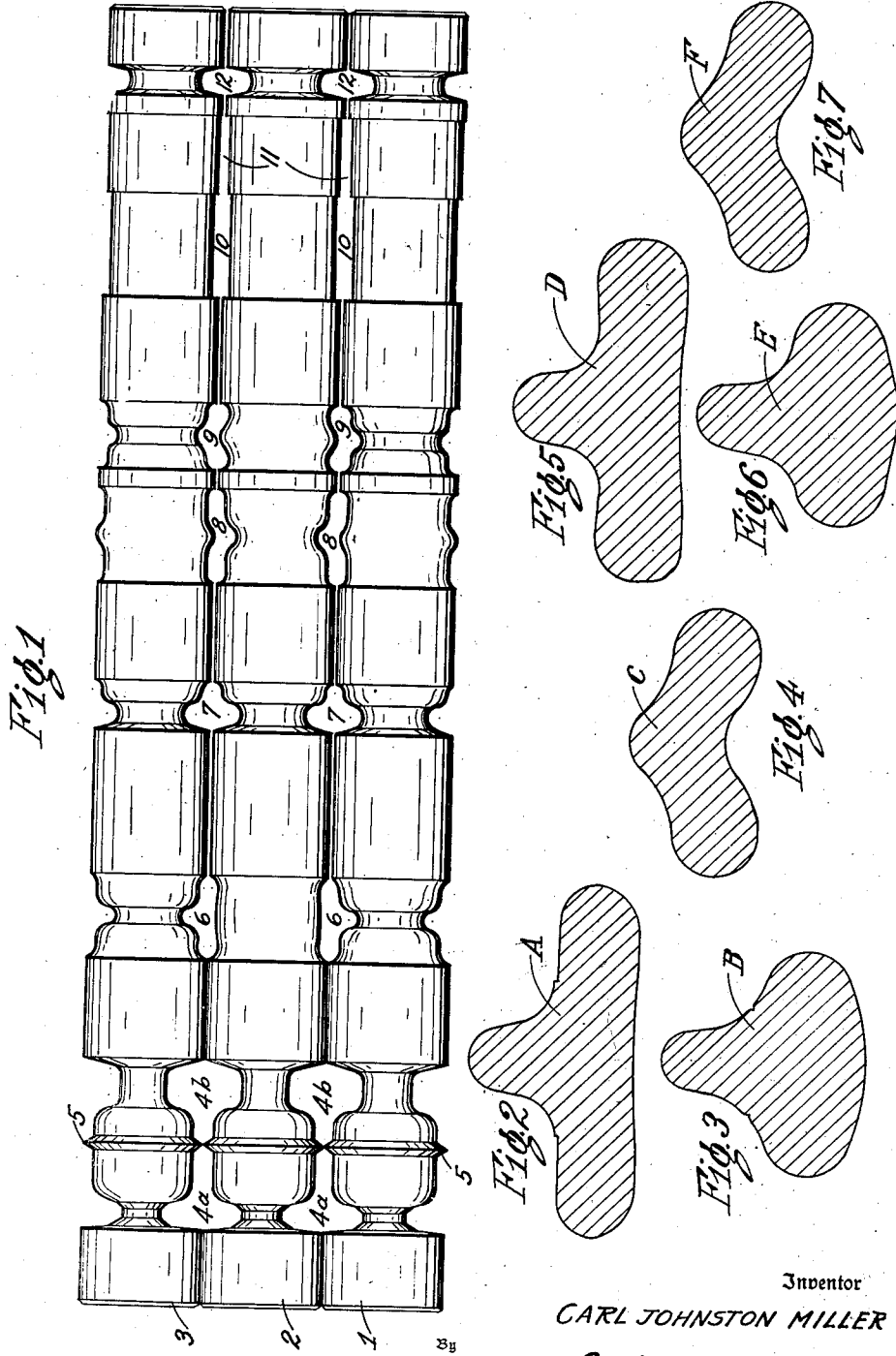
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METHOD OF REWORKING RAILS

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METHOD OF REWORKING RAILS

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This invention relates to the art of metal working, and more particularly to a new and improved method of making articles from scrap railway rails.

Heretofore, several methods have been proposed for converting scrap railway rails into billets, bars, and other similar articles. The Hewitt Patent No. 220,240 illustrates one such proposal, according to which the scrap rail is slitted lengthwise at the junction of the head and web, the head part being subsequently rolled into a bar or billet or used without rolling, and the base and web part being passed through several roll passes to shape it into a bar or billet of substantially rectangular shape. The Browne Patent No. 294,757 illustrates another proposed method in which the scrap rail is slit lengthwise and approximately in the middle of the web, after which the flanges of the base part are flattened and bent into arc shape, while the head part is flattened and widened until it can be passed thru the roll passes which are used to flatten and bend the flanges of the base part. The Connors Patent No. 1,883,338 illustrates a third proposed method according to which scrap rails are slitted lengthwise in two places, i. e., at the junctions of the web with the head and with the base. The web part is used in the slitted form as a plate or billet, or may be rolled into other shapes, while the head and base parts are passed through separate roll passes specifically designed for each part.

In none of the prior proposed methods, with which I am familiar, has it ever been suggested that scrap T-rails of the general character as is disclosed in the Connors Patent No. 1,883,338, might be slitted lengthwise along approximately the medial line of the web to form two dissimilar sections and then to pass such sections thru the same roll passes and thus to form compact articles of practically the same cross-sectional shape from both sections.

The term "compact articles" as used in this specification is intended to mean and include articles the cross section of which is a convex figure. There are many difficulties which would stand in the way of such a proposed method, and means by which such difficulties might be avoided are not obvious, which doubtless explains the fact that such a process has not heretofore been proposed. I have devised a process, however, by which such a procedure may be carried out and by which the resulting articles will be substantially free from defects such as cold laps, deep surface cracks, and the like.

Briefly stated, the present invention includes the steps of slitting a scrap rail lengthwise along the web, that is, intermediate its sides or its junctions with the head and base sections, then passing the thus slitted sections in succession thru the same roll passes in which the metal of each section is worked into a generally rectangular cross-section without cold laps, deep cracks or the like, and used as such, or rolled into articles of the desired shapes, such as rounds, squares, octagons, hexagons and the like.

In the drawing accompanying and forming a part of this specification,

Figure 1 is a side elevation of a three-high set of rolls by which the present invention may be practiced;

Figures 2, 3 and 4 are cross-sectional views of the base part of a rail rolled in accordance with the present invention; and,

Figures 5, 6 and 7 are cross-sectional views of the head part of a rail rolled in accordance with the present invention.

In Fig. 1 parts of a "three-high" rolling mill are shown. The bottom, middle and top rolls, designated respectively by numbers 1, 2 and 3 are driven (by means not shown) and are provided with suitable passes for the rail to be rolled. The bottom one is driven in one direction and the top one in the opposite direction, so that the articles may be passed back and forth, between the bottom and middle roll in one direction and between the top and middle roll in the reverse direction, as is well understood by those skilled in the art.

Rolls 1, 2 and 3 are cut away to form two substantially similar passes, each consisting of the parts 4a and 4b, separated by slitting edges 5. The rolls are also provided with the passes 6, 7, 8, 9, 10, 11 and 12. It is not necessary that all these passes be present in one set of rolls, for obviously a set of rolls might be provided for each pass and a two-high mill could then be used instead of a three-high mill. Moreover, for certain articles, only a few of the passes shown in Fig. 1 may be required, while for other articles a different combination of passes may be used. The passes shown in the rolls of Fig. 1 may, however, be advantageously incorporated in a single set of rolls, and thus a variety of products may be obtained with but one set of rolls, thereby economizing in plant equipment and space required.

In practicing my invention by the use of rolls, such as shown in Fig. 1, the scrap rail, cut into pieces of the suitable length if desired, is first

passed between the rolls thru passes 4a and 4b. In these passes the web is slit or severed lengthwise intermediate its sides, leaving a more or less accurately predetermined amount of the web attached to the base part of the rail. The flange of the base part is narrowed somewhat in width and thickened by this pass, so as preferably to fill the pass 4a substantially completely. Since the size of the head part of the old rail is not uniform due, for example, to different amounts of wear, the head part may not completely fill part 4b of the first pass, but the amount of web metal left attached to the head part will be substantially uniform after slitting regardless of the thickness of the head. Up until the time the head and base sections are ready for rolling, after the slitting operation, the height of the rail has not been materially decreased. After slitting, the head and base parts are passed in succession thru pass 6 in the opposite direction. The flange portion of the base part is thereby further decreased in width coincident with some decrease in height of the web portion. Pass 6 decreases the head part of the rail in thickness and increases it in width, and also decreases the weight of the web portion. Then, both parts of the slitted rail may be passed in succession thru pass 7, wherein the metal is gathered into a cross sectional shape narrower in width and of increased thickness. Then the rail parts may be passed in succession thru pass 9, wherein the thickness is made substantially uniform, the height of the web is decreased, and the radii of curvature between the surfaces thereof and the adjacent metal are increased and a groove is formed on the side opposite to the web, and then passed in succession thru either of passes 10 or 11, and, if desired, thru pass 12 or a similar pass of different shape.

Instead of rolling the rail parts thru passes 7, 9, 10 or 11 and/or 12, as just described, they may alternatively be passed in succession from pass 6 thru passes 8, 10 or 11, and 12. In pass 8 the metal rolled by pass 6 is not gathered as in pass 7 but on the contrary is changed into a section of substantially uniform thickness with a web part of decreased height and increased radii of curvature, and with a groove on the other side opposite to the web.

In Figs. 2, 3 and 4, A indicates the cross section of the base part of a rail as it comes from pass 6; B indicates the cross section of the same part as it comes from pass 7; and C indicates the cross section of the same part as it comes from pass 9.

In Figs. 5, 6 and 7, D indicates the cross section of the head part of the rail as it comes from pass 6; E indicates the cross section as the head part comes from pass 7; and F indicates the cross section of the head part as it comes from pass 9.

It will be observed that when passes 6, 7 and 9 are used, pass 7 decreases the width and increases the thickness of the flanges, and the section is increased in thickness along the axis of the web part. In pass 9 the width of the section coming from pass 7 has been increased somewhat coincident with a thinning thereof, a decrease in height of the web with an increase in the radii of curvature at the junction with the flanges of the section, and a recess or groove has been formed in the section opposite to the web and of a shape somewhat similar to that of the web. Cold laps and deep cracks near the junction

of the web with the other portion of these articles must be avoided and have been avoided partly by the formation of the groove opposite to the web in passes 8 or 9 and with or without the gathering action of pass 7. In this manner the radii of curvature at the base of the web have been greatly increased and all tendencies to formation of cold laps, or cracks which are more than skin deep, have been avoided. Subsequent flattening of such a section into substantially rectangular form may then readily be accomplished.

Having thus described my invention so that those skilled in the art may be able to practice the same, what I desire to secure by Letters Patent is defined in what is claimed.

What I claim is:

1. The method of making compact articles from steel railway rails which includes the steps of slitting a heated T rail lengthwise of the web between head and base and simultaneously narrowing and thickening the flange portion of the base section without substantially decreasing the height of the web portion attached thereto, passing the thus formed head and base sections in succession thru the same roll passes, and rolling the said sections into compact articles of substantially the same cross-sectional shape and size and substantially free from defects such as cold laps, by steps including the formation of a groove opposite the web portion thereof and coincident decrease in height of the web portion and increase in the radii of curvature between the surfaces thereof and the adjacent metal.

2. The method of making compact articles from steel railway rails which includes the steps of slitting a heated T rail lengthwise of the web between head and base and simultaneously narrowing and thickening the flange portion of the base section without substantially decreasing the height of the web portion attached thereto, passing the thus formed head and base sections in succession thru a plurality of roll passes to form substantially similar generally compact sections substantially free from cold laps and the like, the roll passes serving to decrease the area of the slitted sections and make the height of the web parts substantially equal, followed by formation of a groove opposite the web portion on and coincident decrease in height of the web and increase in the radii of curvature between the surfaces thereof and the adjacent metal.

3. The method of making compact articles from steel railway rails which includes the steps of slitting a heated T rail lengthwise of the web between head and base and simultaneously narrowing and thickening the flange portion of the base section without substantially decreasing the height of the web portion attached thereto, passing the thus formed head and base sections in succession thru a plurality of roll passes to form substantially similar generally rectangular compact sections substantially free from cold laps and the like, the passes serving to decrease the area of the slitted sections and to make the height of the web portions substantially equal, followed by formation of a groove opposite the web portion and coincident decrease in height of the web and increase in the radii of curvature between the surfaces thereof and the adjacent metal, and then flattening the thus recessed sections to substantially rectangular compact cross section.

4. The method of making compact articles from steel railway rails which includes the steps of slitting a heated T rail lengthwise of and between head and base and simultaneously narrow-

ing and thickening the flange portion of the base section without substantially decreasing the height of the web portion attached thereto, passing the thus formed head and base sections in succession thru a plurality of roll passes to form substantially similar generally compact sections substantially free from cold laps and the like, the passes serving to decrease the area of the slitted sections and to make the height of the

web parts substantially equal, then gathering the metal into a cross-sectional shape which is narrower and thicker, followed by formation of a groove opposite the web portion and with coincident decrease in height of the web and increase in the radii of curvature of the surfaces thereof and the adjacent metal.

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