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T. HAULTON

RAIL BOND

Filed Sept. 15, 1919

Fig-1-

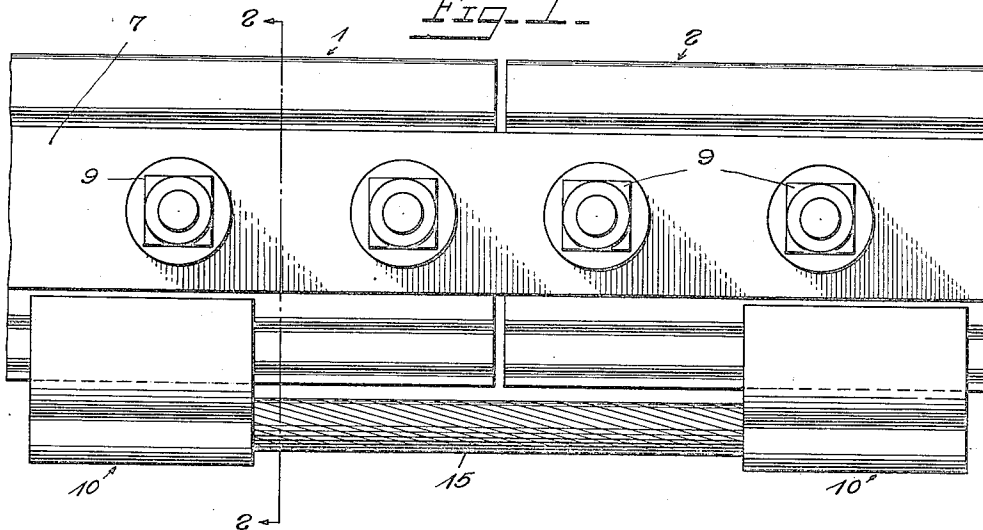


Fig-2-

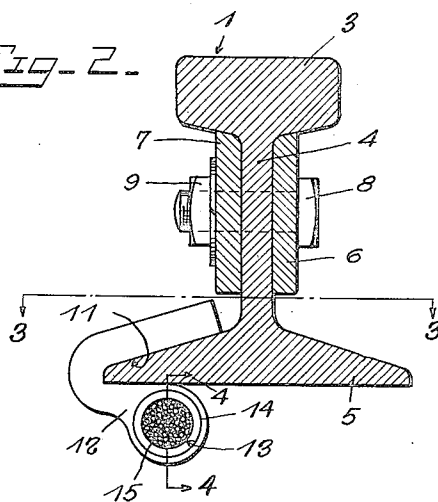


Fig-3-

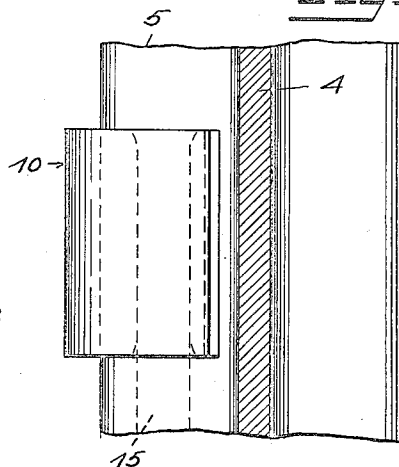


Fig-4-

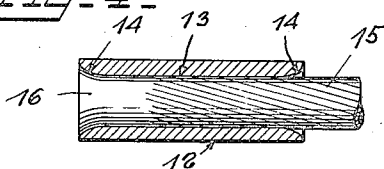
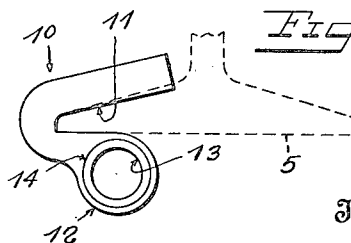


Fig-5-



Witness

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## UNITED STATES PATENT OFFICE.

THOMAS HAULTON, OF JOHNSTOWN, PENNSYLVANIA.

## RAIL BOND.

Application filed September 15, 1919. Serial No. 323,757.

To all whom it may concern:

Be it known that I, THOMAS HAULTON, a citizen of the United States, residing at Johnstown, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Rail Bonds; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in rail bonds which are used to electrically connect adjacent or aligned rail sections.

The principal object of the invention is to provide a rail bond, the terminals of which are constructed so as to snugly fit around one edge of the base flanges of the aligned rail sections and be welded thereto, and the electrical conductor disposed between the terminals being welded to the same.

Another object of the invention is to provide a rail bond in which the electrical conductor is disposed beneath the base flanges of the aligned rail sections so that it is out of the way and not likely to become injured.

Another object of the invention is to generally improve upon devices of this class by the provision of an extremely simple, strong, durable and inexpensive construction, and one which will be well adapted to the purpose for which it is designed.

With these and other objects in view, the invention consists of the novel features of construction, and the combination and arrangement of parts as will be hereinafter fully described and claimed.

In the accompanying drawings in which similar reference characters designate like parts throughout the several views;

Figure 1 is a side elevation of a pair of aligned rail sections, showing the application of a rail bond constructed in accordance with this invention.

Fig. 2 is a transverse sectional view across one of the rail sections, said view being taken on the plane indicated by the line 2—2 of Fig. 1.

Fig. 3 is a horizontal sectional view taken on the plane indicated by line 3—3 of Fig. 2.

Fig. 4 is a longitudinal sectional view through a portion of one of the terminal elements taken on the plane indicated by the line 4—4 of Fig. 2, and

Fig. 5 is an end view of one of the terminal

elements illustrating that the angle between the walls of the notch for receiving one edge of the base flange of the rail is less than the angle between the upper and lower sides of the base flange of the rail.

In the embodiment illustrated the numerals 1 and 2 represent adjacent and aligned sections of the rail, each of said sections being provided with the usual head 3, web 4, and base flange 5. The rail sections 1 and 2 are connected together by means of plates 6 and 7 disposed on opposite sides of the webs 4 and by bolts 8 and nuts 9.

The numeral 10 represents rail bond terminals which are preferably in the form of malleable iron castings having notches 11 in one of their edges to receive one of the edges of the base flanges 5 of the rail. The notches 11 form the terminals into substantially C-shaped clips having enlarged lower members and flat rectangular-shaped upper members. As clearly shown in Fig. 5 of the drawings the angle between the walls of the notches 11 is smaller than the angle between the upper and lower sides of the base flanges 5 of the rail so that the terminal elements 10 have to be forced onto said base flanges in order to spread the upper and lower members of the terminal elements or clips apart and to effect a clamping engagement. This may be done by driving the terminal elements 10 upon the base flanges. When this is done the angle between the walls of the notches 11 will change to correspond with the angle between the upper and lower sides of the base flanges. Owing to the fact that the terminal elements 10 are malleable castings, they will not be ruptured when they are distorted in this manner.

The portions 12 of the terminal elements 10 which are disposed beneath the base flanges 5 of the rail are provided near their inner or free longitudinal edges with aligned longitudinally extending openings 13, the ends of which are flared outwardly as at 14. A flexible electric cable 15, that is to say, a cable made of strands of copper wire, is disposed beneath the base flanges 5 of the rail sections between the terminal elements 10 and has its ends disposed in the openings 13. As shown in the drawings the diameter of the cable 15 is substantially equal to the diameter of the openings 13 so that the cable fits rather snugly in said openings. After the ends of the cable are inserted in the openings 13, they are spot welded so

that approximately one-third of the portions of the cable disposed in said openings are welded together to form solid bodies 16 which are integrally united by the welding process to the adjacent portions of the terminal elements 10. This provides a simple and yet an everlasting means for securely anchoring the ends of the cable to the terminal elements. Much importance is to be paid to this means for anchoring the ends of the cable to the terminal elements. Prior types of rail bonds employing flexible copper cables anchored to terminal elements which are welded to the rail sections have proven impractical because the high heat necessary to weld the terminal elements to the rail section has oxidized the copper cable and weakened it so that it could not withstand much strain or vibration without breaking. The present invention overcomes this defect because of the fact that only portions of the ends of the cable are welded to the terminal elements while the other portions of the ends of the cable are fitted tightly in the openings through the terminal elements so that the weakened welded portions are reinforced. The portions of the cable which emerge from the terminal elements will therefore readily bend upon vibration without breaking or without fracturing the weakened welded parts. To further reduce the danger of injuring the cable as it emerges from the openings in the terminal elements, the ends of these openings are flared outwardly to provide a bending radius so that any bending of the cable will not be concentrated at a sharp point. In view of the fact that the terminal elements are welded to the upper sides of the base flanges of the rail sections, while the cable is disposed entirely beneath the base flanges of the rear sections and welded to the terminal elements at this point, no injury will be done to the cable or to its connection with the terminal elements when the latter are being welded to the rail sections.

The upper members of the terminal elements or clips 10 are wider than the distance between parallel planes passing through one edge of the base flange of the rail sections and the corresponding edge of the heads of the rail sections, so that said upper members extend under the heads of the rail sections.

The cable 15 and its two terminal elements to which it is welded is made as a unit and applied to the base flanges of a pair of aligned rail sections in the manner above described. After the elements 10 have been driven as far as they will go upon the base flanges of the rail sections, the upper members of the elements 10 are arc welded to the same. This provides a simple means for securely fastening the terminal elements to the rail sections.

By having the cable 15 welded to the ter-

minal members 10 and the latter in turn welded to the rail sections, a perfect union between these parts is formed and a perfect electrical connection between the rail sections is also formed.

By having the cable 15 disposed entirely beneath the base flanges of the rail sections it will be out of the way and not liable to be broken, for instance in case the wheels of railway rolling stock become derailed at the points where the rail bonds are located. In case such derailed members roll upon the terminal elements 10, or in fact the portions of said elements which are disposed above the base flanges of the rail sections, the only injury which would likely be done to said terminal elements would be to distort them as the union by the welding process between the terminal elements and the base flanges of the rail sections could not be easily broken.

Another important feature of the invention resides in the fact that the angle between the walls of the notches 11 in the terminal elements is less than the angle between the upper and lower sides of the base flanges of the rail sections so that when the terminal elements are driven on the base flanges they will lock themselves to the base flanges and no extra device or apparatus is necessary to hold the terminal elements to the base flanges while said elements are being welded.

The invention is applicable with many advantages to all types of railroads, but it is especially applicable to mine haulage railroads where the most severe conditions are met with and must be overcome. As is known, the tracks of mine haulage roads are very poorly laid and cared for and the joints between the rail sections are generally loose, so that there is considerable movement of the rail sections at the joints for every wheel that passes thereover. The present invention withstands this condition by reason of the fact that the electric cable is flexible and because of the secure manner in which the ends of the cable are connected to the terminal elements and the latter to the rail sections.

The beds of mine haulage roads are usually wet and often the rails are entirely covered with water which is generally of high acid content causing corrosion of metal mechanism or devices moistened thereby. Under this state of circumstances good electrical connection between the rails and bonds is difficult to obtain except by actual welding such as in this invention where the terminal elements are welded to the rail sections and the electric cable is welded to the terminal elements.

The tracks of mine haulage roads are constantly being taken up and relaid, which obviously requires detachment of the bonds from the rails. Wherever this is contemplated

plated the welding of the terminal elements to the rail sections is done only along the inner longitudinal edges of the upper members of the terminal elements, so that when the rails are taken up the terminal elements may be cut by means of a cold chisel or the like along the inner longitudinal edges of their upper members away from the rail sections without damaging the remaining portions of the terminal elements which then can be used again.

In mine haulage railroads car derailment is very frequent, and an effective rail bond for such roads must be constructed so as to not be damaged by derailed cars. The present invention withstands this by reason of the fact that the electric cable is positioned entirely beneath the base flanges of the rail sections where it cannot be engaged by derailed wheels, and the portions of the terminal elements which extend over the base flanges of the rail sections are so strongly constructed and connected to the base flanges of the rail sections in such a manner that derailed wheels will not injure them so as to cripple their functions. The inner longitudinal edges of the upper members of the terminal elements which are welded to the base flanges of the rail sections are disposed entirely beneath the heads of the rail sections so that derailed wheels cannot engage the terminal elements at the points where the latter are welded to the rail sections.

From the foregoing description, taken in connection with the accompanying drawings, the construction and use of the invention will be readily understood.

Various changes in form, proportion, and in the minor details of construction may be resorted to without departing from the spirit of the invention as defined in the claim.

What is claimed is:

The combination with a pair of alined rail sections, of a bond electrically connecting the rail sections and comprising a pair of terminal elements clasped around one edge of the base flanges of the rail sections, said elements being made of malleable metal of a low degree of conductivity and being in the form of substantially C-shaped clips having flat substantially rectangular shaped upper members and enlarged lower members disposed respectively above and below the base flanges of the rail sections, said members being relatively arranged normally at a smaller angle than the angle between the upper and lower surfaces of the base flanges of the rail sections and being spread into clasp engagement with the base flanges of the rail sections by said clips being forced upon one edge of said base flanges, the said upper members being of such a width as to extend under the heads of the rail sections and being welded only along their inner edges to the base flanges of the rail sections, whereby said clips can be easily separated from the base flanges of the rail sections by cutting them along the inner edges of their said upper members, the said lower members being provided near their inner edges with longitudinally extending openings, and a flexible conductor located entirely beneath the base flanges of the rail sections and connecting said clips and having its ends disposed in said openings and welded to said lower members, said conductor being of a metal of a comparatively high degree of conductivity.

In testimony whereof I have hereunto set my hand.

THOMAS HAULTON.