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METHOD OF REPAIRING RAIL JOINTS

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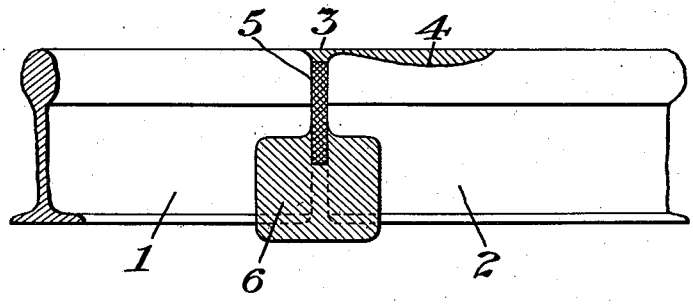


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## METHOD OF REPAIRING RAIL JOINTS.

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The invention relates to a novel method of repairing worn or defective rail joints and has for its object to provide a simple and effective mode of restoring the worn tread sections of rails at or adjacent the joints therein, and also to minimize the tendency of the rails to wear at the repaired or restored sections. To these ends the invention comprises the formation of a solid, homogeneous joint between the repaired rail ends, which is preferably effected by an alumino-thermic weld which may embrace the entire ends of both abutting rails, or in the alternative, may extend only over the base and web sections, but which, in all events, is sufficient to prevent relative motion between the rail ends, and finally restoring the worn portions of the rail treads by welding a body of steel to each of said tread portions to fill up the depressions.

A simple mode of carrying out the invention is illustrated in the accompanying drawing, which discloses the ends of two ordinary T-rails, connected by an alumino-thermic cast metal joint and having the depressions in the tread portions filled with steel or the like, which is welded to said tread portions.

It is a well known fact that the ordinary mode of connecting the ends of railway rails by fish plates, splice bars, and the like, leaves a certain space between the adjacent rail ends and renders the respective ends susceptible to movement relative to one another under the wheels of traffic, and the effect of the wheels passing over the relatively flexible rail ends and jumping the gap between the ends is to wear off the end of one rail tread, as the wheels leave the latter, and grind or scour out a section of the tread of the adjacent rail, in the manner illustrated in the drawing. As these depressions increase in depth, the shocks to the rolling stock, the road bed, and the foundation of the latter, continually increase in severity to the consequent damage of the rolling stock and danger of derailment of the latter. In fact, so pronounced are these impairments of the rail at or adjacent the joint that they require constant attention, in order to keep the roadway in serviceable condition, even though all of the other portions of the rails are sound and serviceable in all respects. Various expedients have been suggested and attempted to obviate the difficulty and to repair the damage where the latter could not be avoided, but, at best, all such expedients have proven to be mere makeshifts which afford only temporary relief and in the end invite only more serious impairment of the rails adjacent the joint, so that the defective ends have to be severed or the entire rails discarded.

The present invention is designed to impart to the impaired rail joint, as nearly as possible, the same structural and physical characteristics as those possessed by the body of the rail, so that no greater amount of wear will subsequently occur at the joint than is developed in the body of the rail, under the ordinary conditions of traffic, the result being that the joint will stand up and maintain its integrity without further impairment during the entire life of the rail.

In carrying out the invention, the adjacent ends of the rails are leveled up and brought into substantial registry with each other and, preferably, the ends are separated by a relatively short space and are retained in this relation until the succeeding operations are concluded. Preferably, the space between the adjacent rail ends is filled by a metallic insert, such as 5, which may consist of either a single shim like element, or a series of such elements, after which a suitable mold, such as is commonly employed for effecting the alumino-thermic joint between rail ends, is applied and a body of alumino-thermic steel or the like, such as 6, is cast about and integrally united with the rail ends, preferably at the base and web sections constituting the lower portions of the rail. Obviously, if found desirable, the alumino-thermic joint may include the entire sections of the rail ends, but, under ordinary conditions, it will be found sufficient if the casting and jointure, by means of the alumino-thermic steel, include only the lower portions of the adjacent rail ends and the lower portions of the insert 5, which, like the rail ends, is integrally united with and welded to the adjacent rail ends and the casting 6. This has the effect of rendering the joint between the rails absolutely rigid, so that there is no relative movement between the rail ends. In the event that the filling shims 5 are of the same type or character

as the metal of the rails and the alumino-thermic casting 6 forming the joint, the said shims will be likewise welded and merged into the structure of the rails and the joint by the latter, so as to produce a substantially homogeneous rigid structure at the joint. Even though the shim or filler 5 is not welded to the rail sections, it will necessarily be held rigidly in position, as it will be embedded in the casting 6.

After the ends of the rails 1 and 2 have been rigidly connected by the alumino-thermic joint, the impaired portions of the tread, represented by the worn lip of the tread of rail 1, the space 3 between the rails above the shim 5 and the depression 4, which has been ground out of the tread of the rail 2 by the effect of traffic, is completely filled with steel, which is fused and welded to the rails either by the well known electric welding method, or by the alumino-thermic welding operation, either of which will fill the cavities in the tread of the rails and between the rail ends with molten steel, which merges and fuses with the steel of the rails and forms a homogeneous union therewith. By careful manipulation, just sufficient steel may be applied to fill up the cavities and restore the normal contour of the worn rail sections, and fill the gap between the rail ends. In case more steel than is necessary to effect this result is applied, the surplus metal may be ground away, after the joint has been formed, to bring the treads and adjacent sections of the repaired rail ends to the desired contour.

By the application of this particular method, it will be noted that the joint between the rail ends is practically eliminated and the rails materially strengthened at the region of the original joint by the alumino-thermic welding of the body of metal 6 to the rail ends, the original contour of the rail heads, including the treads, is effectively restored, and the gap between the rail ends eliminated, so that there is no longer any relative movement between the respective rail sections 1 and 2, and the substantial uniformity of structure and contour and the continuity of the tread at the former joint will completely obviate any tendency of the rails to wear at the points which have been restored.

What I claim is:

1. The method of repairing worn or defective rail joints, which comprises uniting the adjacent ends of the rails by an alumino-thermic weld, and restoring the tread portions by welding a body of steel to said tread portions to fill up the depressions.

2. The method of repairing worn or defective rail joints, which comprises uniting the adjacent ends of the rails by an alumino-thermic weld, and restoring the tread portions by filling the depression therein with steel alumino-thermically welded to said tread portions.

3. The method of repairing worn or defective rail joints, which comprises applying a metallic insert between the ends of the rails, uniting the rail ends by an alumino-thermic weld, and restoring the tread portions by welding a body of steel to said portions to fill up the depressions.

4. The method of repairing worn or defective rail joints, which comprises applying a metallic insert between the ends of the rails, uniting the rail ends by an alumino-thermic weld, and restoring the tread portions by filling the depressions therein with steel alumino-thermically welded to said portions to fill up the depressions.

5. The method of repairing worn or defective rail joints, which comprises applying a metallic insert between the ends of the rails, uniting the base and web portions of the rail ends by an alumino-thermic weld, and restoring the tread portions and filling the gap between the rail ends by welding a body of steel to said tread portions to fill up the depressions.

6. The method of repairing worn or defective rail joints, which comprises applying a metallic insert between the ends of the rails, uniting the base and web portions of the rail ends by an alumino-thermic weld, and restoring the tread portions and filling the gap between the rail ends by filling the depressions therein with steel alumino-thermically welded to the tread portions.

In testimony whereof I affix my signature.

C. L. DELACHAUX.