TREATMENT OF RAILS, SWITCH POINTS, FROGS, AND CROSSINGS.

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TREATMENT OF RAILS, SWITCH-POINTS, FROGS, AND CROSSINGS.


To all whom it may concern:

Be it known that I, NELSON H. BRAY, a citizen of the United States, and resident of San Francisco, county of San Francisco, and State of California, have invented certain new and useful Improvements in the Treatment of Rails, Switch-Points, Frogs, and Crossings, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to an improved method for the local heat treatment of rails and the like, the object of the invention being to improve the durability of railway tracks particularly at those places where excessive wear and violent shocks occur, as in crossings, switch points and frogs. While it is now common practice to manufacture rails from steel containing sufficient carbon to respond to hardening by heat treatment, rails which are so hardened throughout cannot be used because of their liability to crack or break in service. For this reason, certain alloy steels, especially those containing considerable amounts of manganese, have been proposed for the manufacture of the parts of railway tracks which are exposed to excessive wear and violent shocks, but track crossings and the like which have been produced from these materials are exceedingly expensive and they have not shown that reliability in service which was expected of them.

The present invention accordingly contemplates the hardening by heat treatment of high carbon steel rails but only in those parts which are directly exposed to the abrasion and pounding of heavy traffic, thereby leaving the under portion of the rail head and the web and flange of the rail in the original unhardened state. To this end, the improved method comprises the local heating of the upper part of the rail head with the oxy-acetylene torch followed by quenching of the heated portion of the rail.

In the accompanying drawings:

Figure 1 is a plan view of a track crossing with the portions of the rails which have been treated by the improved method indicated with surface shading;

Figs. 2 and 3 are similar views of a railway frog and switch respectively, and

Fig. 4 is a detail side elevation of one of the rails of a track crossing, frog or switch with the treated portion adjacent the end of the same indicated by surface shading.

While the rails, as 10 (Fig. 4) commonly employed in the construction of a track crossing 11 (Fig. 1), frog 12 (Fig. 2), or switch 13 (Fig. 3) usually comprise a broad foot flange 14, a relatively thin upright web 15 and a heavy head 16, it is only the top surface 17 and one of the side faces 18, of the head 16 which are directly exposed to the abrasive action and pounding of heavy traffic. Furthermore, this abrasive action and pounding are much more pronounced near the end 27 of the rail adjacent the intersection, as 19 (Fig. 1), 20 (Fig. 2) and 21 (Fig. 3) of the different lines of traffic, as 22, 23; 24, 25 or 26, 27, over the corresponding crossing, frog or switch. It has accordingly been found that if the rail, as 10, is composed of steel containing sufficient carbon to respond to heat treatment, remarkable results with respect to the durability of crossings, frogs and switches in service are obtained by heating the head 16 of the rail in the limited area adjacent the said end of the same, indicated by the shading 28 in each of the several figures of the drawing, with the oxy-acetylene torch and quenching the same from a temperature above that of decarboxylation of the metal.

For this purpose the flame of the torch is directly applied to the part of the rail to be heated, care being taken to properly adjust the flame for heating without oxidation which would reduce the carbon content of the metal, and the subsequent quenching may be accomplished by merely pouring water over the heated portion of the rail. If desired, the treatment may be practised upon crossings, frogs and switches while they occupy the place in the track of which they form a part and broken portions may be restored by welding, in a well known manner, when required, but in such cases quenching from the welding temperature should be avoided.

The result of the treatment is to produce a hard and tough sorbitic structure in that part of the upper portion of the head of the rail adjacent the end of the same which is directly exposed to the more severe abrasion and pounding of the traffic while retaining the normal pearlitic structure in the remainder of the rail. Furthermore, while the treatment is preferably so confined as not to...
affect the structure of the lower portion of the head 16 of the rail immediately adjacent the web 15, it is nevertheless extended to a substantial depth within the head 16 and is distinguished from a mere surface or skin hardening of the metal. It is also to be noted that the manner of treatment is such as to promote a gradual merging of the sorbitic structure of the rail into the pearlitic structure of the untreated part, thereby avoiding any sharp line of demarcation between the two with consequent weakness in the completed product.

While crossings, frogs, and switches made from steel containing about .60 carbon are preferred for the treatment herein described, it will be understood that the application of the invention is not limited in respect to the carbon content of the steel as all rail steels in common use are believed to contain sufficient carbon to be noticeably responsive to heat treatment. Crossings, frogs and switches produced from straight carbon steels by means of the invention have been found superior in durability and reliability to those produced from high manganese or other alloy steels and it will be recognized that the latter are vastly more expensive. The described method of quenching which consists in pouring water over the highly heated portion of the rail is preferred to complete immersion of the rail in a cooling medium since it permits a slower cooling of the under part of the head, the web and the foot flange and insures that these parts of the rail are retained in the softest possible condition consistent with the high carbon content of the metal.

I claim as my invention:

The treatment of railway tracks comprising a plurality of rails arranged in alignment with adjacent rail ends unconnected in the tread portions thereof and with each of such rails comprising a head and an upright web formed integral from steel containing sufficient carbon to be responsive to heat treatment in a marked degree, which consists in local heating of parts only of the rail heads at the said adjacent rail ends to a temperature above that of decalcecence of the metal by the direct application thereto of an oxy-acetylene flame without heating the remainder of the structure except by conduction of heat from the said part to which the flame is applied and rapidly cooling the said heated portions.

NELSON H. BRAY.