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METHOD OF PRODUCING WEAR RESISTANT STEEL RAILS

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2 Claims. (Cl. 148—12.4)

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This invention relates to the manufacture of steel rails having a high degree of wear resistance.

Numerous processes have been developed to achieve this important object. Most of these prior art processes are based on a treatment of the rails which consists of a succession and a variety of heating and cooling steps with the purpose in view to secure optimum hardening conditions.

In conformity with a known process of this type the rail is heated to a temperature of over 850° C., quenched to a temperature of about 500°–700° C. and then slowly cooled; a reheating step may be introduced between the quenching and the slow cooling procedure.

In accordance with a modification of this method the rail is upon leaving the rolls quenched, reheated to about 730° C. and finally cooled at a slow rate. The method, therefore, includes the combination of at least three different temperature steps.

In accordance with another prior art method the rail is, as it comes from the rolls, directly and rapidly cooled to a temperature between 550 to 310° C., hereupon annealed at a temperature of between 550 to 660° C. and then cooled. Also this method requires a succession of at least three temperature treating steps.

It has also been suggested to cool the rails on the hot bed below the critical temperature range which is given to be between about 450 to 300° C. Hereupon the rail is slowly cooled in a closed vessel to about 50° C. and then exposed to air for the final cooling.

The characterizing feature of this method is the quick cooling to a temperature below the critical range and the subdivision of the slow cooling procedure into separate steps. Also this method comprises three distinct temperature treating stages.

In conformity with still another method the rail is heated to a temperature above the thermal critical range, quenched to a temperature of not less than 250° C., reheated to below the thermal critical temperature and then slowly cooled to atmospheric temperatures. Also in this case three different temperature treating steps are required.

The invention utilizes the combination of a rapid and a slow cooling step, but it is based on the recognition that the rapid cooling from the rooling temperature of the rails must be directly carried-out in such a manner that a well defined hardening structure results; this aim is achieved by rapidly cooling the rail as it comes from the rolls to a temperature of about between 620 to 660° C.

Hereupon the rail is slowly cooled to atmospheric temperatures.

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The invention, therefore, is based on the maintenance of two cooling steps of which the one is rapid cooling from the rolling temperature to about between 620 to 660° C., and the second is represented by slow cooling from a critical temperature to atmospheric temperatures.

The steel used for the production of the rails in conformity with this invention should contain .35 to 1.0% carbon, 1.3 to 2.0% manganese, and .5 to 1.5% silicon; the steel may additionally contain chromium, molybdenum, vanadium and other steel components within customary limits.

The invention will now be described more in detail.

The rail is rolled from a steel containing .55% carbon, .75% silicon and 1.5% manganese, in addition to normal percentages of sulphur and phosphorus. The rail is rolled from the steel at a temperature of between about 1050 to 1180° C.

As the rail leaves the rolls it is rapidly cooled to a temperature of about 640° C. at which point the cooling is slowed down by embedding the rail in sand until atmospheric temperature is reached.

What I claim is:

1. A method for producing a wear resistant steel rail comprising the steps of rolling the rail from a steel having 0.35 to 1.0 per cent carbon, 1.3 to 2 per cent manganese and 0.5 to 1.5 per cent silicon, rest iron at a temperature of about 1050 to 1180° C., cooling the rail as it comes from the rolling mill directly and rapidly until the rail reaches a temperature of between 660 to 620° C. and hereafter cooling the rail at a slower rate than before until it reaches atmospheric temperature.

2. A method for producing a wear resistant steel rail comprising the steps of rolling the rail in a rolling mill from a steel having 0.35 to 1.0 per cent carbon, 1.3 to 2 per cent manganese and 0.5 to 1.5 per cent silicon, rest iron at a temperature of about 1060 to 1180° C., quenching the rail directly upon its emergence from the rolling mill to a temperature of about 660 to 620° C., hereafter cooling the rail at a slower rate than before by embedding the same into sand until it reaches atmospheric temperature.

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