Cl 148

Published May 11, 1943

Serial No. 360,936

ALIEN PROPERTY CUSTODIAN

PRODUCING RAILS OF HIGH RESISTANCE TO WEAR

Fritz Hofmann, Starachowice, Poland; vested in the Alien Property Custodian

No Drawing. Application filed October 12, 1940

The present invention relates to a method of producing highly wear-resistant rails.

The increase in traffic density, travelling speed and axle pressure in connection with most railroads and tramways which pressure particularly in the last 20 years had to be used to maintain competitive such means of traffic were accompanied by a permanently increasing need of rails of a high quality and of a high resistance to wear. After many failures the most various qualities of wear-resistant rails were developed.

With regard to the wear resisting property rails showing the martensite texture and compound steel rails are best. Disadvantages of the hitherto known wear-resistant rails are the large production risk and the high costs caused thereby, or even a not sufficient resistance to wear.

The great need of cheap wear-resistant rails may be gathered from the many debates which were held at International Sessions and which were directed to such rails without, however, succeeding in satisfying the hitherto existing need of a wear-resistant rail which may continuously be produced in steel plants as well as in rolling mills with the use of simple means and without special preparations and the production costs of which are low.

In summary, it could be said that the following demands should be required of wear-resistant rails:

(1) Normal production in a steel plant;

(2) Normal rolling property in a rolling mill in the same manner as with carbon steel rails;

(3) High safety against fracture, even at frost;

(4) At least a wear-resisting property sufficiently high relatively to the costs with regard to a normal carbon steel rail having a C-content of about 0,50% and 1% manganese;

(5) No essential higher costs of manufacture than occurring with the production of carbon steel rails.

Starting from these considerations the present invention relates to a rail of high resistance to wear which fully suffices the above mentioned requirements. The invention consists in using, for the production of highly wear resisting rails, an iron-manganese-silicon-base-alloy known per se and having a C-content of 0,35 to 1,0%, a Mn-content of 1,3 to 2,0% and a Si-content of 0,5 to 1,5%. After termination of the rolling operation, cooling of the finished rail, still having the rolling temperature, is effected in such a manner that a hardening texture between the sorbitic to the martensitic state occurs, whereupon, for the purpose of removing inner stresses as far as possible, cooling is retarded at a temperature of about 620° C, for instance, by embedding in sand.

The above mentioned base alloy further may contain known additions of chromium, molybdenum, vanadium and the like within normal limits.

Example

An iron-manganese-silicon-base-alloy containing 0,62% C, 1,87% Mn and 0,69% Si and normal amounts of S, P and impurities had been used to produce rails. These rails showed a tensile strength of 109,1 kg/mm² and an elongation of 9%.

The rails, after having been embedded in snow and subjected to frost during a whole night, were cold bent at a radius of 32,5 m and cold buckled as is usual in connection with wing-rails without a fracture being caused.

The rails were built in at places of highest traffic in a curve having a radius of 150 m at 12 o/oo slope, whereby wearing values were ascertained equal to those of the best known most expensive rails of high resistance to wear.

FRITZ HOFMANN.