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[54] STEEL FOR SAW BLADES

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[58] **Field of Search** ..... 75/128 V, 128 W; 148/36; 29/95, 103, 183; 143/133 T; 30/166

[56] **References Cited**

UNITED STATES PATENTS

1,464,174	8/1923	Finkl	148/36
1,660,790	2/1928	Herman	75/128 W
2,289,081	7/1942	Shortell et al.	29/95
3,131,056	4/1964	Gullotti et al.	75/128 W
3,507,633	4/1970	Dewez	29/183
3,528,088	9/1970	Seghezzi et al.	148/36 X

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[57] **ABSTRACT**

A sawblade consisting essentially of 0.6–0.9% C, 0.5–1.0% Si, 0.4–1.0% Mn, 0.4–1.0% Cr, 0.2–0.8% Mo, 0.3–1.0% Ni, at least one element in an amount of up to 0.3% selected from the group consisting of Ti or V, remainder iron and residual impurities; the microstructure of the sawblade being bainitic which has been hardened to a hardness range of 46–54 HR_c.

3 Claims, No Drawings

STEEL FOR SAW BLADES

The invention relates to saw blades having baintic microstructure.

Generally in the fabrication of blades for power-saws, chain-saws, resaws, wide-band saws and wood/timber-saws, steels are used which possess on one hand a very hard surface and on the other a relatively tough core. To satisfy the requirements for this purpose, the German standard steel designations C 70 Wl, C 87 WS and C 85 WS (according ASI-W 1) are suggested for the fabrication of such sawblades. For more severe service conditions the sawblades are fabricated of 80 Cr, V 2.

All these steels are used in quenched and tempered conditions. In service saws blades must be wear-resistant as well as tough. These contrary properties are practically unobtainable in one tool. High wear resistance which means a high hardness usually means a such great loss in toughness which causes the sawblades to be replaced because the single chain-links of sawblades fracture. If one lowers the wear-resistance to obtain a higher toughness, then the service-life of the sawblades is very much reduced by early wear.

Extensive experiments have shown, that it is possible to use machine-saw-steels for sawblades having bainitic instead of martensitic microstructure in tempered condition. It was discovered, that steels with 0.6–0.9% C, 0.5–1.0% Si, 0.4–1.0% Mn, 0.4–1.0% Cr, 0.2–0.8% Mo, 0.3–1.0% Ni, possibly up to 0.3% Ti and/or V, remainder iron and residual impurities, possess when in bainitic hardened condition with a hardness of 46–54 Hr_c, an optimal toughness.

For example, a steel with 0.68–0.73% C, 0.80–1.00% Si, 0.35–0.50% Mn, 0.45–0.60% Cr, 0.25–0.35% Mo, 0.55–0.75% Ni, remainder iron, was austenitised between 860°–880° C, followed by a treatment in a molten bath between 290°–330° C. After an isothermal holding time of approximately 60–90 minutes the cooling took place in still air. After this heat treatment the steel was in a bainitic condition.

The hardness of this steel was 51–52 HR_c.

The notch impact strength measured on five test pieces, was between 29 and 31 mkp/cm². For comparison, test pieces of the same steel were heat treated by the conventional method of quenching followed by tempering and were found to possess a hardness of 51–52 HRc as well. The notch impact strength of these samples however was only at the 2.5–3.5 mkp/cm².

The instant invention is therefor the use of particular steels having 06–09%C, 0.5–1.0% Si, 0.4–1.0% Mn, 0.4–1.0% Cr, 0.2–0.8 % Mo, 0.3–1.0% Ni, possibly up to 0,3 % Ti and/or V, remainder iron and residual impurities, in bainitic hardened condition with a hardness of 46–54 HRc for the manufacture of chain saws.

This steel is also very suitable for long-band-saws, which are particularly stressed by buckling at the sides.

Although the invention has been described in detail, it is to be understood that this does not delimit the invention. The spirit and scope of this invention is limited only by the language of the appended claims.

What we claim is:

1. A sawblade consisting essentially of 0.6–0.9% C, 0.5–1.0% Si, 0.4–1.0% Mn, 0.4–1.0% Cr, 0.2–0.8% Mo, 0.3–1.0% Ni, at least one element in an amount of up to 0.3% selected from the group consisting of Ti or V, remainder iron and residual impurities; the microstructure of the sawblade being bainitic which has been hardened to a hardness range of 46–54 HR_c.

2. The sawblade as claimed in claim 1 wherein the composition is 0.68–0.73% C, 0.80–1.00% Si, 0.35–0.50% Mn, 0.45–0.60% Cr, 0.25–0.35% Mo, 0.55–0.75% Ni, the remainder iron and residual impurities.

3. The sawblade as claimed in claim 1 which has a notch impact strength of between 29 and 31 mkp/cm².

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