Title (en)

SPRING STEEL HAVING SUPERIOR FATIGUE LIFE, AND MANUFACTURING METHOD FOR SAME

Title (de)

FEDERSTAHL MIT VERBESSERTER ERMÜDUNGSLEBENSDAUER UND VERFAHREN ZU SEINER HERSTELLUNG

Title (fr)

ACIER À RESSORT PRÉSENTANT UNE DURÉE DE VIE EN FATIGUE SUPÉRIEURE, ET SON PROCÉDÉ DE FABRICATION

Publication

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Application

EP 19841872 A 20190719

Priority

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Abstract (en)

A spring steel having a superior fatigue life, and a manufacturing method for the same. The chemical components thereof are as follows in weight percentage: C: 0.52-0.62%, Si: 1.20-1.45%, Mn: 0.25-0.75%, Cr: 0.30-0.80%, V: 0.01-0.15%, Nb: 0.001-0.05%, N: 0.001-0.009%, O: 0.0005-0.0040%, P: ≤ 0.015%, S: ≤ 0.015%, and Al: ≤ 0.0045%, with the remainder being Fe and incidental impurities, wherein the following condition is also met $0.02 \leq (2Nb+V)/(20N+C) \leq 0.40$. The spring steel of the present invention has a microstructure of tempered troostite + tempered sorbite, a prior austenite grain size less than 80 um, a size of alloy nitride and carbide precipitates being 5-60 nm, and a maximum width of single-grain inclusions being less than 30 μm. The spring steel has a handling strength greater than 2020 MPa, superior ductility and toughness (the reduction of area ≥ 40%), and a fatigue life ≥ 800,000 times, thereby meeting application requirements of high-stress springs in industries, such as automobiles, machinery, and the like.

IPC 8 full level

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