

The opinion in support of the decision being entered today was not written for publication in a law journal and is not binding precedent of the Board.

Paper No. 16

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte NOZOMU KAWABE and TERUYUKI MURAI

Appeal No. 2003-0668
Application No. 09/530,451

ON BRIEF

Before KIMLIN, PAK and POTEATE, Administrative Patent Judges.

KIMLIN, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-9, all the claims pending in the present application. Claims 1 and 7 are illustrative:

1. A highly fatigue-resistant steel wire comprising a pearlite structure containing 0.8-1.0 mass % of C and 0.8-1.5 mass % of Si, wherein in the cross section of the steel wire an average hardness in a region up to 100 μm from the surface thereof is at least 50 higher than that of an inner region based on micro-Vickers hardness.

Appeal No. 2003-0668
Application No. 09/530,451

7. A method of manufacturing a highly fatigue-resistant steel wire comprising the steps of:

shaving a steel wire rod of pearlite structure containing 0.8-1.0 mass % of C and 0.8-1.5 mass % Si;

patenting the shaved wire rod;

drawing the patented wire rod into wire;

subjecting the resultant wire to strain relief annealing at 350-450° C without subjecting the same to quenching and tempering process; and

shot peening the resultant wire.

The examiner relies upon the following references as evidence of obviousness:

Yamao et al. (Yamao)	5,904,830	May 18, 1999
Takahashi (JP '833) (Japanese patent)	57-140833	Aug. 31, 1982

Appellants' claimed invention is directed to a highly fatigue-resistant steel wire comprising a pearlite structure, and the method of manufacturing it. A surface region of the wire has an average value of micro-Vickers hardness that is 50 higher than the average value of an inner region. According to appellants' specification,

it is a primary object of the present invention to provide a steel wire and spring having a high thermal resistance and a high fatigue strength that can be produced without applying a quenching and tempering process, namely, produced through a drawing process and

Appeal No. 2003-0668
Application No. 09/530,451

a method of manufacturing such a steel wire and spring
[page 2, paragraph three].

Appealed claims 1-6 stand rejected under 35 U.S.C. § 103 as being unpatentable over Yamao in view of JP '833. Appealed claims 7-9 stand rejected under 35 U.S.C. § 103 as being unpatentable over the same combination of references.

Upon careful consideration of the opposing arguments presented on appeal, we will not sustain the examiner's rejections.

We consider first the examiner's § 103 rejection of claims 1-6. While Yamao discloses a method of making a steel wire comprising amounts of C and Si which overlap the claimed ranges, Yamao does not disclose that the steel wire has a cross section having the presently claimed difference in average hardness between the surface and inner regions. Cognizant of this deficiency in the referenced disclosure, the examiner reasons that since Yamao discloses making a steel wire that is substantially similar to appellants' wire in composition and methodology, one of ordinary skill in the art would have reasonably expected the wire of Yamao to have the claimed difference in hardness between the surface and inner regions. In

Appeal No. 2003-0668
Application No. 09/530,451

essence, the examiner's reasoning is based on the principle of inherency.

The flaw in the examiner's position, as emphasized by appellants, is that the process of Yamao is not substantially the same as appellants' process for making the steel wire. Whereas Yamao exemplifies quenching and tempering steps for achieving a steel wire having a tensile strength of at least 2,000 N/mm², appellants' process specifically excludes such quenching and tempering steps. While it is the examiner's position that Yamao "does not teach that the steel must be quenched and tempered, only that it is possible" (page 8 of Answer, second paragraph), appellants have properly noted that the examiner has pointed to no specific disclosure in Yamao which indicates that the quenching and tempering steps are optional. In relevant part, Yamao discloses "[b]y subsequent quenching and tempering, steel wires having the mechanical characteristics shown in Table 2 were produced" (column 4, lines 16-18). Consequently, we cannot agree with the examiner that the processes of Yamao and appellants are so similar that one of ordinary skill in the art would have reasonably expected that the wires produced by Yamao's process would necessarily exhibit the claimed discrepancy in hardness between the surface and inner regions. As for the examiner's

Appeal No. 2003-0668
Application No. 09/530,451

reasoning that JP '833 would have motivated one of ordinary skill in the art to modify the process of Yamao by eliminating the quenching and tempering steps in order to avoid the delayed fracture of the steel, we must agree with appellants that the examiner has not established that one of ordinary skill in the art would have been motivated to eliminate two of the exemplified process steps of Yamao with the expectation of still achieving the target tensile strength of at least 2,000 N/mm². Appellants have accurately pointed out that the process of JP '833 produces wires having tensile strengths significantly lower than the 2,000 N/mm² achieved by Yamao.

Concerning method claims 7-9, which contain the limitation "without subjecting the same to quenching and tempering process," we find, for the reasons given above, that the examiner's stated reason for modifying the process of Yamao requires the use of impermissible hindsight. Also, although JP '833 discloses a method of making a steel wire of pearlite structure comprising the claimed steps of patenting, drawing and annealing, the examiner has not demonstrated that it would have been obvious for one of ordinary skill in the art to incorporate the claimed "shot peening" into the method of JP '833.

Appeal No. 2003-0668
Application No. 09/530,451

In conclusion, based on the foregoing, the examiner's
decision rejecting the appealed claims is reversed.

REVERSED

EDWARD C. KIMLIN)	
Administrative Patent Judge)	
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CHUNG K. PAK)	BOARD OF PATENT
Administrative Patent Judge)	APPEALS AND
)	INTERFERENCES
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)	
LINDA R. POTEATE)	
Administrative Patent Judge)	

ECK:clm

Appeal No. 2003-0668
Application No. 09/530,451

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