

Title (en)
HAIRSPRING FOR CLOCK MOVEMENT AND METHOD FOR MANUFACTURING SAME

Title (de)
SPIRALFEDER FÜR UHRWERK, UND IHR HERSTELLUNGSVERFAHREN

Title (fr)
RESSORT SPIRAL POUR MOUVEMENT D'HORLOGERIE ET SON PROCÉDÉ DE FABRICATION

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Abstract (en)
[origin: CN109946945A] The present invention relates to a spiral spring for balance wheel of niobium and titanium alloy with an essentially single-phase structure, and a manufacturing method which comprises: a step of producing a blank in a niobium-based alloy consisting of: niobium: balance at 100% by weight, titanium: between 40 and 49% by weight, trace elements selected from the group consisting of O, H, C, Fe, Ta, N, Ni, Si, Cu, Al between 0 and 1600 ppm by weight individually, with a total of less than 0.3% by weight, a step of type beta quenching of said blank to a given diameter, so that the titanium of the alloy based on niobium is essentially in the form of a solid solution with niobium in the beta-phase, the alpha-phase titanium content being less than or equal to 10% by volume, at least one step of deforming the said alternating alloy with at least one heat treatment step, the number of stages of heat treatment and d formation being limited so that the resulting niobium-based alloy retains a structure in which the titanium of the niobium-based alloy is substantially in the form of a solid solution with niobium in the beta-phase, the alpha-phase titanium content being less than or equal to 10% by volume and has a yield strength greater than or equal to 600 MPa and a modulus of elasticity of less than or equal to 100 GPa, a step of strapping to form the spiral spring being performed before the last step heat treatment.

IPC 8 full level
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• WO 2018172164 A1 20180927 - UNIV DE LORRAINE [FR]
• EP 2993531 A1 20160309 - PREC ENGINEERING AG [CH]

Citation (opposition)
Opponent : e-Patent SA
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DOCDB simple family (publication)

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