

Title (en)
Barrel spring

Title (de)
Zugfeder für Federhaus

Title (fr)
Ressort de barillet

Publication
EP 2133756 B1 20160720 (FR)

Application
EP 09405089 A 20090527

Priority
• EP 08405153 A 20080610
• EP 08405192 A 20080804
• EP 09405089 A 20090527

Abstract (en)
[origin: EP2133756A2] The mainspring is formed from a metallic glass monolithic ribbon, where thickness of the mainspring amounts approximately between 50 and 150 micrometers. Shape of the mainspring in a free state is defined by a radius of an nth turn in a wound state so that the mainspring, which is wound into Archimedean spiral, is stressed to the maximum bending stress over the entire length. The radius is produced by adding the radius of a barrel core with multiplication of a number of winding turns and the ribbon thickness.

IPC 8 full level
G04B 1/14 (2006.01); **G04D 3/00** (2006.01)

CPC (source: EP US)
G04B 1/145 (2013.01 - EP US)

Citation (opposition)
Opponent : ICB Ingenieurs Conseils en Brevets SA
• EP 08405153 A 20080610
• EP 2154581 A1 20100217 - ROLEX SA [CH]
• EP 0942337 A1 19990915 - SEIKO EPSON CORP [JP]
• US 2007133355 A1 20070614 - HARA TATSUO [JP], et al
• WO 2012010941 A1 20120126 - ROLEX SA [CH], et al
• "Dictionnaire professionnel illustré de l'horlogerie", 1961, FÉDÉRATION DE L'INDUSTRIE HORLOGÈRE SUISSE FH, article "Ressort-moteur", XP055374931
• A. MAIRE: "Etude énergétique de l'organe moteur d'une montre", ANNALES FRANÇAISES DE CHRONOMÉTRIE, vol. 1, 1957, pages 23 - 46, XP055374924
• F.G. YOST: "On the use of Ti50Be40Zr10 as a spring material", JOURNAL OF MATERIALS SCIENCE, vol. 16, no. 11, November 1981 (1981-11-01), pages 3039 - 3044, XP055374882
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• S. ISHIHARA ET AL.: "Production of Glassy Coil Springs by Warm Coiling of Zr-based Glassy Alloy Wires", MATERIAL TRANSACTIONS, vol. 45, no. 8, 2004, pages 2788 - 2790, XP055374896

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Designated contracting state (EPC)
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR

DOCDB simple family (publication)
EP 2133756 A2 20091216; EP 2133756 A3 20110413; EP 2133756 B1 20160720; CH 698962 A2 20091215; CH 698962 B1 20141031; CN 101604141 A 20091216; CN 101604141 B 20120627; CN 102057336 A 20110511; CN 102057336 B 20130703; EP 2286308 A1 20110223; EP 2286308 B1 20220504; EP 4092489 A1 20221123; JP 2009300439 A 20091224; JP 2011523066 A 20110804; JP 5518852 B2 20140611; JP 5656369 B2 20150121; US 2009303842 A1 20091210; US 2011072873 A1 20110331; US 8348496 B2 20130108; US 8720246 B2 20140513; WO 2010000081 A1 20100107

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EP 09405089 A 20090527; CH 2009000191 W 20090609; CH 8092009 A 20090526; CN 200910159542 A 20090609; CN 200980121741 A 20090609; EP 09771888 A 20090609; EP 22170104 A 20090609; JP 2009136880 A 20090608; JP 2011512804 A 20090609; US 47994709 A 20090608; US 99654209 A 20090609