

Title (en)  
Single-body double spiral and method for manufacturing same

Title (de)  
Monoblock-Doppelspirale und ihr Herstellungsverfahren

Title (fr)  
Double spiral monobloc et son procédé de fabrication

Publication  
**EP 2104006 A1 20090923 (FR)**

Application  
**EP 08153094 A 20080320**

Priority  
EP 08153094 A 20080320

Abstract (en)  
The spiral (21) has a collet (27) formed by patterns. One of the patterns is projected from a hairspring (23) and formed in a silicon based layer. The hairspring is coaxially mounted on the collet. Another pattern is extended into another silicon based layer so as to be coaxial with another hairspring (25) for forming the monoblock double spiral in silicon based material. The hairspring (23) made of silicon based material is oxidized. An internal spire of one of the hairsprings is provided with a Grossmann curve. An independent claim is also included for a method for fabricating a double spiral.

Abstract (fr)  
L'invention se rapporte à un spiral double (21) comportant, réalisés dans une couche de matériau à base de silicium (11), un premier ressort-spiral (23) monté coaxialement sur une virole (13, 27), la virole (13, 27) comportant une partie (9) en prolongement faisant saillie dudit ressort-spiral et qui est réalisée dans une deuxième couche (5) de matériau à base de silicium. Selon l'invention, ladite partie en prolongement est prolongée (17) dans une troisième couche (7) de matériau à base de silicium de manière coaxiale avec un deuxième ressort-spiral (25) afin de former un spiral double (21) monobloc en matériaux à base de silicium. L'invention se rapporte également à une pièce d'horlogerie comportant un tel spiral et à son procédé de fabrication. L'invention concerne le domaine des mouvements horlogers.

IPC 8 full level  
**G04B 17/06** (2006.01); **G04D 3/00** (2006.01)

CPC (source: EP KR US)  
**G04B 17/066** (2013.01 - EP KR US); **G04B 17/34** (2013.01 - KR); **G04D 3/0041** (2013.01 - EP KR US); **Y10T 29/49609** (2015.01 - EP US)

Citation (applicant)  
• EP 1422436 A1 20040526 - CSEMCT SUISSE D ELECTRONIQUE E [CH]  
• EP 1655642 A2 20060510 - ETA SA MFT HORLOGERE SUISSE [CH]  
• EP 1584994 A1 20051012 - NIVAROX SA [CH]  
• EP 1837722 A2 20070926 - ETA SA MFT HORLOGERE SUISSE [CH]

Citation (search report)  
• [A] FR 2447571 A1 19800822 - SCHIEBUHR ERICH [DE]  
• [A] EP 0732635 A1 19960918 - SUISSE ELECTRONIQUE MICROTECH [CH]  
• [A] SUIBERTW: "Basel2007\* Moser's New Double Straumann Hairspring Escapement", INTERNET ARTICLE, 12 April 2007 (2007-04-12), pages 1 - 5, XP002502705, Retrieved from the Internet <URL:http://basel.watchprosite.com/show-nblog.post/ti-360412/> [retrieved on 20081106]

Cited by  
EP3907565A1; EP3483666A1; EP2405312A1; EP2405313A1; CN111001558A; EP3081996A1; EP2154583A1; EP2523053A1; EP2613206A1; EP2579104A3; US9594350B2; US11703804B2; US9004748B2; US8480294B2; WO2019092666A1; WO2021224804A1; WO2019180558A1; TWI796444B; JP2016206179A

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**EP 2104006 A1 20090923; EP 2104006 B1 20100714**; AT E474250 T1 20100715; CN 101539754 A 20090923; CN 101539754 B 20120808; DE 602008001778 D1 20100826; HK 1136358 A1 20100625; JP 2009229463 A 20091008; JP 5280903 B2 20130904; KR 20090101118 A 20090924; SG 155864 A1 20091029; TW 201007394 A 20100216; TW I463280 B 20141201; US 2009236782 A1 20090924; US 9459589 B2 20161004

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**EP 08153094 A 20080320**; AT 08153094 T 20080320; CN 200910134680 A 20090319; DE 602008001778 T 20080320; HK 10102763 A 20100316; JP 2009069979 A 20090323; KR 20090023836 A 20090320; SG 2009018870 A 20090318; TW 98109210 A 20090320; US 40813009 A 20090320