

Title (en)
Paired balance wheel - hairspring resonator

Title (de)
Gepaarter Spiralunruh-Schwinger

Title (fr)
Résonateur balancier - spiral appairé

Publication
EP 2703910 A3 20140514 (FR)

Application
EP 13179958 A 20130809

Priority
• EP 12182973 A 20120904
• EP 13179958 A 20130809

Abstract (en)
[origin: EP2703909A1] The resonator (1) has a balance spring (5) formed in a single crystal quartz with three crystallographic axes, where the first and second axes are electrical axis and mechanical axis, respectively. The thermal expansion coefficient of a balance (3) lies between + 6 part per million degree Celsius -1 and + 9.9 part per million degree Celsius -1. Cut angle ranging between - 5 degree and + 5 degree is formed between the balance spring and the third axis of the single crystal quartz such that the resonator is less sensitive to temperature variation. A portion of the balance is made of titanium, platinum or durimphy.

IPC 8 full level
G04B 17/06 (2006.01)

CPC (source: CH EP RU US)
G04B 17/063 (2013.01 - EP US); **G04B 17/066** (2013.01 - EP US); **G04B 17/20** (2013.01 - CH); **G04C 3/04** (2013.01 - US);
G04B 17/22 (2013.01 - RU)

Citation (search report)
• [ID] EP 1519250 A1 20050330 - ASULAB SA [CH]
• [I] EP 1605182 A1 20051214 - SUISSE ELECTRONIQUE MICROTECH [CH]
• [A] WO 2008080570 A2 20080710 - COMPLITIME S A [CH], et al
• [A] EP 2395661 A1 20111214 - SWATCH GROUP RES & DEV LTD [CH]
• [A] EP 1596260 A1 20051116 - WATCH U LICENSE AG [CH]
• [A] US 3645123 A 19720229 - AUGÉ ANDRÉ

Designated contracting state (EPC)
AL 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 RS SE SI SK SM TR

Designated extension state (EPC)
BA ME

DOCDB simple family (publication)
EP 2703909 A1 20140305; CN 103676600 A 20140326; CN 103676600 B 20160907; EP 2703910 A2 20140305; EP 2703910 A3 20140514;
EP 2703910 B1 20190508; JP 2014052374 A 20140320; JP 6328392 B2 20180523; RU 2013140777 A 20150310; RU 2643195 C2 20180131;
US 2014064044 A1 20140306; US 9030920 B2 20150512

DOCDB simple family (application)
EP 12182973 A 20120904; CN 201310397316 A 20130904; EP 13179958 A 20130809; JP 2013182787 A 20130904;
RU 2013140777 A 20130903; US 201314011892 A 20130828