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(54) Title: IRON-BASED ALLOYS AND METHODS OF MAKING AND USE THEREOF

(57) Abstract: An iron-based alloy includes, in weight percent, carbon from about 2 to about 3 percent; manganese from about 0.1 to about 0.4 percent; silicon from about 0.3 to about 0.8 percent; chromium from about 11.5 to about 14.5 percent; nickel from about 0.05 to about 0.6 percent; vanadium from about 0.8 to about 2.2 percent; molybdenum from about 4 to about 7 percent; tungsten from about 3 to about 5 percent; niobium from about 1 to about 3 percent; cobalt from about 3 to about 5 percent; boron from zero to about 0.2 percent; and the balance containing iron and incidental impurities. The alloy is suitable for use in elevated temperature applications such as in valve seat inserts for combustion engines.



# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2014/046981

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. B23P19/00	C21D1/18	C21D6/00	C21D9/00	C22C38/02
C22C38/04	C22C38/44	C22C38/46	C22C38/48	C22C38/52
C22C38/54	C22C38/56	F01L3/02		

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)  
C22C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 436 338 B1 (QIAO CONG YUE [US]) 20 August 2002 (2002-08-20) page 1, line 11 - line 13 claims 1,13 page 3; table 1 -----	1-20
A	DE 10 2007 017092 A1 (MAHLE INT GMBH [DE]) 16 October 2008 (2008-10-16) the whole document -----	1-20
A	US 6 702 905 B1 (QIAO CONG YUE [US] ET AL) 9 March 2004 (2004-03-09) the whole document -----	1-20
A	EP 1 614 762 A2 (ALLOY TECHNOLOGY SOLUTIONS INC [US] WINSERT INC [US]) 11 January 2006 (2006-01-11) the whole document -----	1-20

Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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