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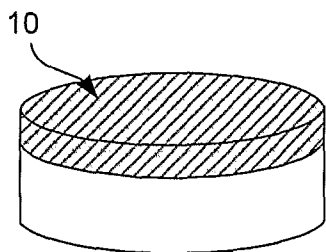
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(54) Title: WELDABLE ULTRAHARD MATERIALS AND ASSOCIATED METHODS OF MANUFACTURE



(57) Abstract: A weldable ultrahard insert (12) can include an ultrahard working layer (14) and a weldable metal layer (18) metallurgically bonded with the working layer (14). The ultrahard working layer (14) can be any ultrahard material such as PCD, PCBN, metal carbide, ceramic, diamond, or the like. The weldable ultrahard inserts (12) can be formed by charging a reaction vessel with ultrahard materials, including precursors thereof, and placing a weldable metal layer in the reaction vessel with an optional intermediate layer. The assembly can be subjected to a pressure and a temperature sufficient to metallurgically bond the weldable metal layer (18) to the ultrahard material. The weldable layer is formed as part of the insert in situ which facilitates subsequent welding of the insert to a tool substrate without risking damage to the ultrahard material.



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INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER
IPC(8): C23C 16/22 (2007.01)
USPC: 264/241
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)
US: 264/232,241,440,625; 427/577,587

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
GOOGLE PATENT SEARCH -- TERMS/PHRASE(S): weldable, insert, transition, metal, ultrahard, polycrystalline, steel, low carbon steel, layer, tool, tungsten carbide

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
USPTO WEST [USPT, JPAB] -- TERMS/PHRASE(S): weldable, insert, transition, metal, ultrahard, polycrystalline, steel, low carbon steel, layer, tool, tungsten carbide

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ----- Y	US 4,906,528 A (Cerceau, et al.) 06 March 1990 (06.03.1990), Column 1, lines 33-34 and line 63 to Column 2, line 7; Column 4, lines 35-44; Column 6, line 5-21; and Figures 1 and 5.	1-3, 12, 15, 21 and 22 ----- 4-11, 13, 14 and 16-20
Y	US 5,075,053 A (Bernadic, et al.) 24 December 1991 (24.12.1991), Column 1, lines 8-10; and Column 2, lines 50-58.	4-11 and 16-20
Y	US 6,454,027 A (Fang, et al.) 24 September 2002 (24.09.2002), Column 3, lines 33-40.	13
Y	US 5,030,276 A (Sung, et al.) 09 July 1991 (09.07.1991), Column 27, line 66 to Column 28, line 5.	14

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"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
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"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	

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