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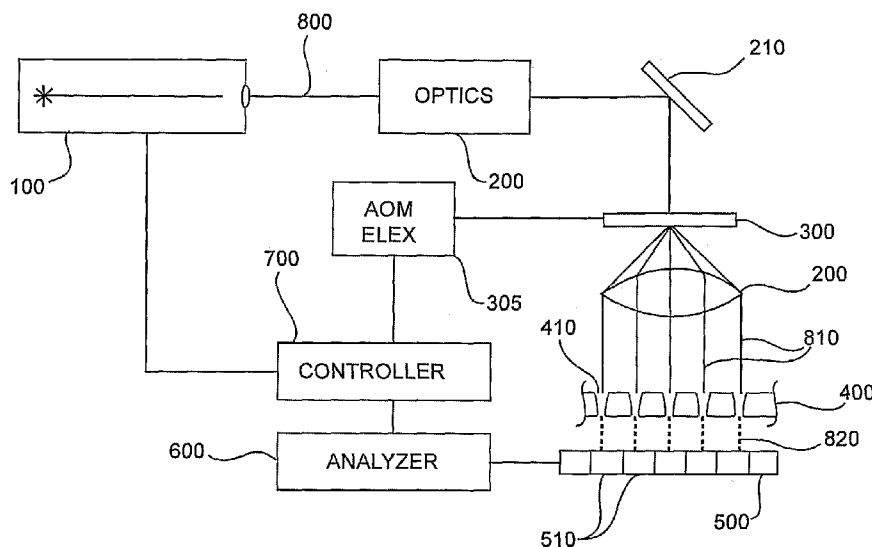
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(54) Title: METHOD AND SYSTEM FOR LASER MACHINING



(57) Abstract: The invention provides a method of rapidly machining multiple, often similar or nearly identical, features using a LASER machining system. During LASER machining, light of a wavelength and intensity that will modify the workpiece to be machined is directed at the workpiece and interacts to produce the desired change. If several features are to be machined, the processing speed can be increased by operating on a multiplicity of features at once. In one embodiment of the invention, this is achieved by separating the LASER beam into multiple beams and machining the desired features simultaneously.

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**INTERNATIONAL SEARCH REPORT**

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A. CLASSIFICATION OF SUBJECT MATTER  
 IPC(8): B23K 26/00, B23K 26/067, B23K 26/38 (2007.01)  
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B. FIELDS SEARCHED

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
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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 2001/0040151 A1 (Isaji et al.) 15 November 2001 (15.11.2001), entire document: abstract; summary; para [0199]-[0204], [0007]-[0009], [0097], [0311], [0036], [0027]	1-16, 27-28 ----- 17-26, 29-51
Y	US 2003/0116545 A (Kaji) 26 June 2003 (26.06.2003), para [0026], [0094]	17-26
Y	US 2002/0139786 A1 (Amako et al.) 3 Oct 2002 (03.10.2002), para [0228]	29
Y	US 2001/0045419 A1 (Dunsky et al.) 29 November 2001 (29.11.2001), para [0062] and Fig [2] para [0088] and Fig [8]	30, 48-51
Y	US 2003/0006220 A1 (Cummings et al.) 9 January 2003 (09.01.2003), para [0023]	31-39
Y	US 2003/0111447 A1 (Corkum et al.) 19 June 2003 (19.06.2003), para [0034]	40-42
Y	US 6,822,191 B2 (De Steur et al.) 23 November 2004 (23.11.2004), para [0003]	43-47
Y	US 2002/0158051 A1 (Heitel et al.) 31 October 2002 (31.10.2002), para [0023], [0036]	37-39
X --- Y	US 6,857,365 B2 (Juffinger et al.) 22 February, 2005 (22.02.2005), para [0011], [0019]	1-3 --- 4-11, 16

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,268,554 A (Ream) 7 December 1993 (07.12.1993), para [0012]	27
P,Y	US 2003/0201578 A1 (Li et al.) 6 June, 2006 (06.06.2006), para [0006], [0027]	28, 49
Y	US 4,924,321 (Miyagawa et al.) 8 May 1990 (08.05.1990), para [0009], figure 1	4
Y	US 2002/0148818 A1 (Satou et al.) 17 Oct 2002 (17.10.2002), para [0007]; figure 12	5-7
Y	US RE35446 E (Stone) 11 Feb 1997 (11.02.1997), para [0021], figure 13	8
Y	US 2002/0040893 A1 (Arai et al.) 11 April 2002 (11.04.2002), para [0070]; figure 1.	9-11, 31-36
Y	US 2005/0045604 A1 (Talwar) 3 March, 2005 (03.03.2005), para [0060], para [0069]	12, 25, 26, 27, 28
Y	US 5,705,788 A (Beyer et al.) 6 January, 1998 (6.01.1998), para [0017]	12, 17
Y	US 5,882,572 A (Lutze et al.) 16 March 16 1999 (16.03.1999), para [0008]	16