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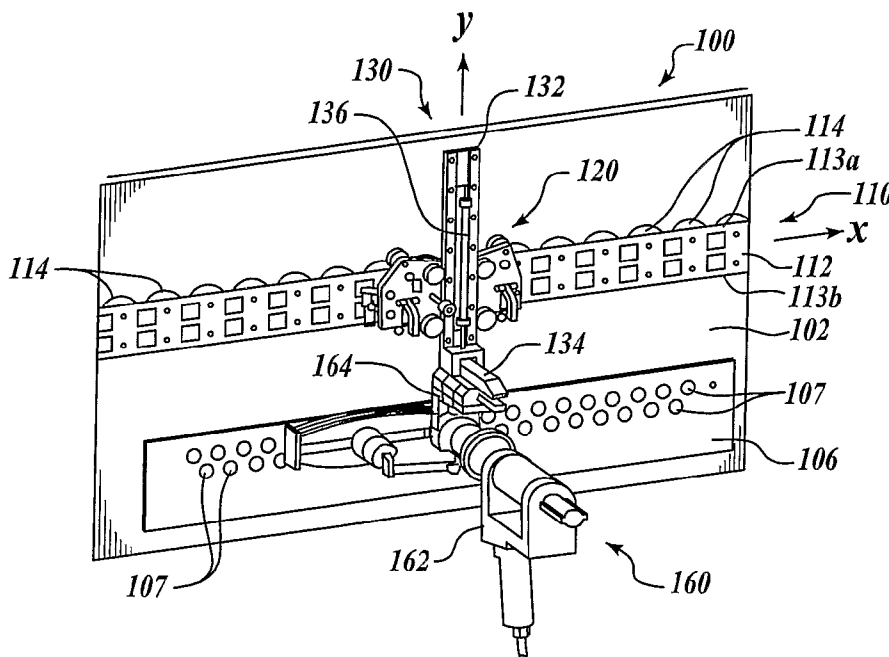
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(54) Title: METHODS AND APPARATUS FOR MANUFACTURING OPERATIONS



(57) Abstract: Methods and apparatus for manufacturing operations are disclosed. In one embodiment, an apparatus for supporting a tool relative to a surface of a workpiece includes a base adapted to be attached to the workpiece, a tool support coupled to the base, and a biasing device coupled to both the base and the tool support. The tool support is moveable relative to the base along a translation axis, and the biasing device is biasable along a biasing axis that is at least partially along the translation axis. The biasing device is adapted to at least partially counterbalance a force (e.g. a gravitational force) exerted on the tool support along the translation axis.

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B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 U.S.: Please See Continuation Sheet

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)
 EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,031,931 (Balcombe) 28 June 1977 (28.06.1977)	1-4,8-11,14-17,21-24,27-32,35-37
X	US 4,468,159 (Oster) 28 August 1984 (28.08.1984)	1,4,8,9,14,17,21,22,28,30,31,32,36,37
X.P	US 6,612,792 B2 (Barclay) 02 September 2003 (02.09.2003)	1-5,8-10,14-18,21-23,28-33,36
X	US 3,627,436 (Adams) 14 December 1971 (14.12.1971)	43,44,52-56,64,66-
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Y		93,96,97,102-104
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Y.P	US 2004/0076484 A1 (Alam et al.) 22 April 2004 (22.04.2004)	46,58,73
X	US 3,874,244 (Rasmussen et al.) 01 April 1975 (01.04.1975)	77-79,82,83

Further documents are listed in the continuation of Box C. See patent family annex.

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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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X --- Y	US 5,468,099 A (Wheatley et al.) 21 November 1995 (21.11.1995)	119,121,124- 126,131,145,151,154, 155 ----- 120,122,123,127- 130,132-135,136- 144,147- 150,152,153,156
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Y	US 4,720,897 (Orrell et al.) 26 January 1988 (26.01.1988)	202-204
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Continuation of B. FIELDS SEARCHED Item 1:

408/1R,9,56,57,76,77,78,79,88,97,100,102,137,138,234,235; 409/131,132,175,178,179,181,235,237; 74/29,30,422,457; 74; 108; 414