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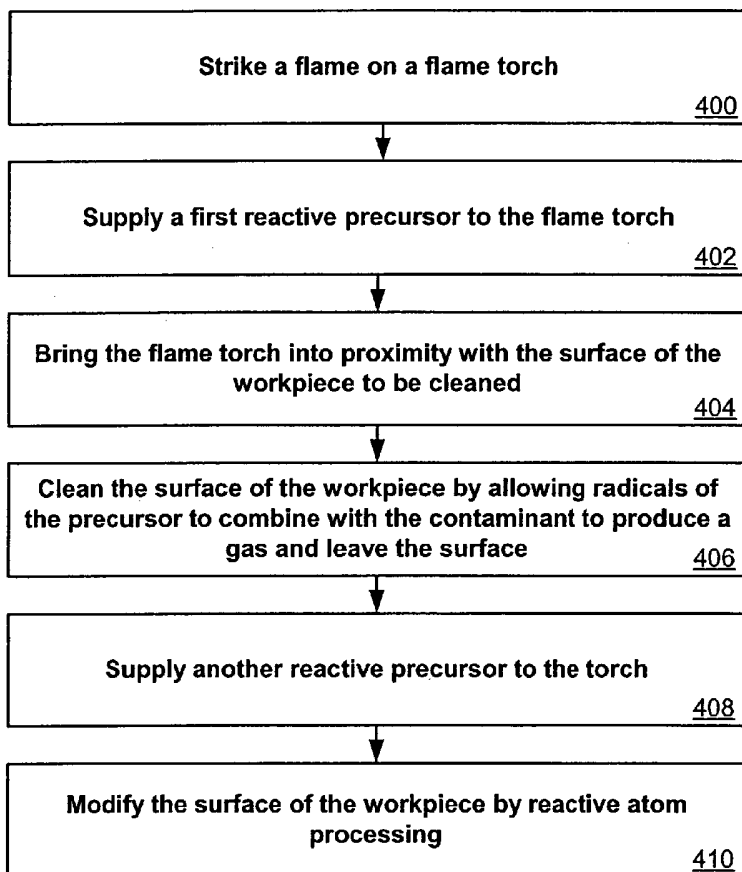
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[Continued on next page]

(54) Title: APPARATUS AND METHOD FOR NON-CONTACT CLEANING OF A SURFACE



(57) Abstract: A flame torch can be used to clean the surface of a contact-sensitive object, such as a glass optic, extremely thin workpiece, or semiconductor wafer by providing a reactive precursor gas to the feed gases of the torch. Reactive atom plasma processing can be used to clean the surface of a contaminant that chemically combines with the atomic radicals of the precursor without affecting the surface. The torch can also be used to modify the surface after cleaning, without transferring the object or engaging in any intermediate processing, by supplying a second reactive precursor that reacts with the surface itself. The flame torch can be used to shape, polish, etch, planarize, deposit, chemically modify and/or redistribute material on the surface of the object. This description is not intended to be a complete description of, or limit the scope of, the invention. Other features, aspects, and objects of the invention can be obtained from a review of the specification, the figures, and the claims.

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Declarations under Rule 4.17:

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A. CLASSIFICATION OF SUBJECT MATTER

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B. FIELDS SEARCHED

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
 118/723r, 723i

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.
A	US 6,218,640 B1 (SELITSER) 17 APRIL 2001, SEE ENTIRE DOCUMENT.	1-46
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Y		18-20
Y	US 3,953,704 A (BEJAT ET AL) 27 APRIL 1976, SEE ENTIRE DOCUMENT.	1-46
A	US 6,262,523 B1 (SELWYN ET AL) 17 JULY 2001, SEE ENTIRE DOCUMENT.	1-46
A	US 6,424,091 B1 (SAWADA ET AL) 23 JULY 2002, SEE ENTIRE DOCUMENT.	1-46

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See patent family annex.

* Special categories of cited documents:	"T"
"A" document defining the general state of the art which is not considered to be of particular relevance	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
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"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

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