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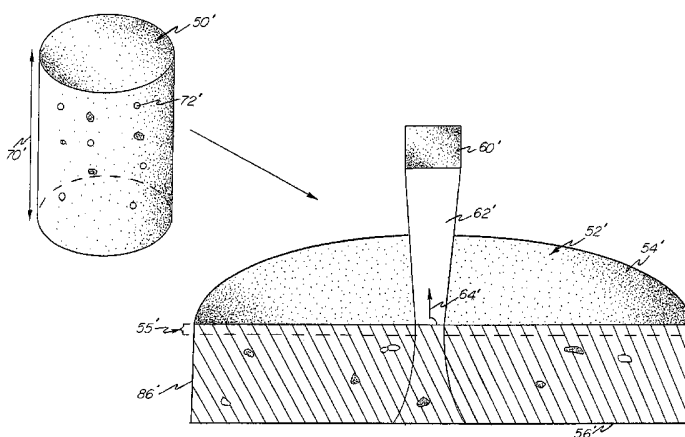
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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND APPARATUS FOR NON-DESTRUCTIVE TARGET CLEANLINESS CHARACTERIZATION BY TYPES OF FLAWS SORTED BY SIZE AND LOCATION



(57) Abstract: A preferred, non-destructive method for characterizing sputter target cleanliness includes the steps of sequentially irradiating the test sample (52') with sonic energy (62') predominantly of target sputter track areas; detecting echoes (64') induced by the sonic energy (62'); and discriminating texture-related backscattering noise from the echoes (64') to obtain modified amplitude signals. These modified amplitude signals are compared with one or more calibration values so as to detect flaw data points at certain positions or locations where the comparison indicates the presence of at least one flaw (72'). Most preferably, groups of the flaw data pixels corresponding to single large flaws are bound together so as to generate an adjusted set of flaw data points in which each group is replaced with a single, most significant data point. The adjusted set of flaw data points is used to calculate one or more cleanliness factors, or to plot a histogram, which characterizes the cleanliness sample.



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/23362

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G01N 24/00, 29/00, 29/04; 33/00; C23C 14/00; B07C 5/00

US CL : 73/620, 627, 628, 866; 204/192.11, 192.12; 209/590

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)

U.S. : 73/620, 627, 628, 866; 204/192.11, 192.12; 209/590

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,887,481 A (LEROY et al) 30 March 1999 (30.03.1999), see entire document.	1-13
Y	US 6,269,699 B1 (GILMAN et al) 07 August 2001 (07.08.2001), see entire document.	1-13
Y	WO 99/64854 (LEYBOVICH et al) 16 December 1999 (16.12.1999), see entire document.	1-13



Further documents are listed in the continuation of Box C.



See patent family annex.

* 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 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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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US02/23362

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claim Nos.: 14 and 15
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Claims 14 and 15 are dependent, however it is unclear as to what claim 14 and 15 depends.
3. ☐ Claim Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.