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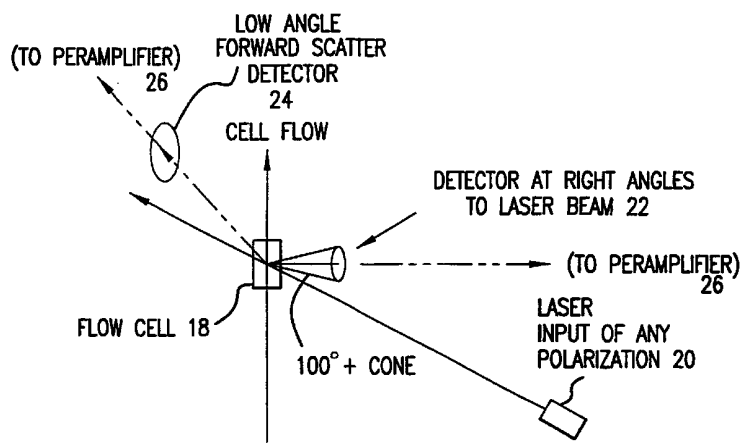
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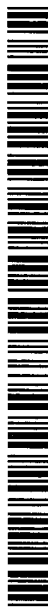
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[Continued on next page]

(54) Title: HIGH NUMERICAL APERTURE FLOW CYTOMETER AND METHOD OF USING SAME



(57) Abstract: The high numerical aperture flow cytometer of the present invention includes a flow cell and a laser input. The laser input emits a beam of light that is oriented substantially orthogonally to the flow of blood cells through the flow cell such that laser light impinges upon the blood cells as they pass through the flow cell. A portion of the beam from the laser input that impinges upon the blood cells in the flow cell is scattered at a substantially right angle to the beam of laser input ("right angle scatter"). A second portion of the beam from the laser input that impinges upon the cells in the flow cell is scattered at a much lower angle than 90°. This scatter is termed "low angle forward scatter light" and has an angle of from about 2° to about 5° from the orientation of the original beam from laser input. A right angle scatter light detector is oriented to receive the previously mentioned right angle scatter light. A low angle forward scatter light detector is oriented to capture the previously mentioned low angled forward scatter light oriented at about 2° to about 5° beam from laser input.



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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.*

# INTERNATIONAL SEARCH REPORT

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**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G01N15/14

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)

IPC 7 G01N

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 practical, 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	US 4 606 636 A (MONIN JEAN ET AL) 19 August 1986 (1986-08-19) figure 1 ---	1,17
X	US 5 650 847 A (MALTSEV VALERI PAVLOVICH ET AL) 22 July 1997 (1997-07-22) column 6, line 9-25; figure 5 ---	1,17
X	US 4 818 103 A (THOMAS RICHARD A ET AL) 4 April 1989 (1989-04-04) column 17, line 44-53 ---	1,17
X	US 4 954 715 A (ZOELD TIBOR) 4 September 1990 (1990-09-04) column 8, line 40 -column 9, line 3 --- -/--	1,17

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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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.
X	US 5 631 165 A (CHUPP VERNON L ET AL) 20 May 1997 (1997-05-20) column 44, line 5-24; figure 22 -----	1,17

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/04069

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
US 4606636	A	19-08-1986	NONE	
US 5650847	A	22-07-1997	NONE	
US 4818103	A	04-04-1989	US 4673288 A	16-06-1987
US 4954715	A	04-09-1990	NONE	
US 5631165	A	20-05-1997	AU 3235095 A	04-03-1996
			AU 3271895 A	04-03-1996
			CA 2192835 A	15-02-1996
			CA 2193971 A	15-02-1996
			EP 0774112 A	21-05-1997
			EP 0774113 A	21-05-1997
			EP 0810026 A	03-12-1997
			JP 2863511 B	03-03-1999
			JP 10160730 A	19-06-1998
			JP 2963541 B	18-10-1999
			JP 9508703 T	02-09-1997
			JP 9508705 T	02-09-1997
			WO 9604543 A	15-02-1996
			WO 9604544 A	15-02-1996
			US 5631730 A	20-05-1997
			US 5812419 A	22-09-1998
			AU 3071895 A	04-03-1996
			CA 2193510 A	15-02-1996
			EP 0774111 A	21-05-1997
			JP 2870665 B	17-03-1999
			JP 9508704 T	02-09-1997
			WO 9604542 A	15-02-1996
			US 5589394 A	31-12-1996
			US 5601234 A	11-02-1997
			US 5656499 A	12-08-1997
			US 5891734 A	06-04-1999
			US 5939326 A	17-08-1999