

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
29 November 2001 (29.11.2001)

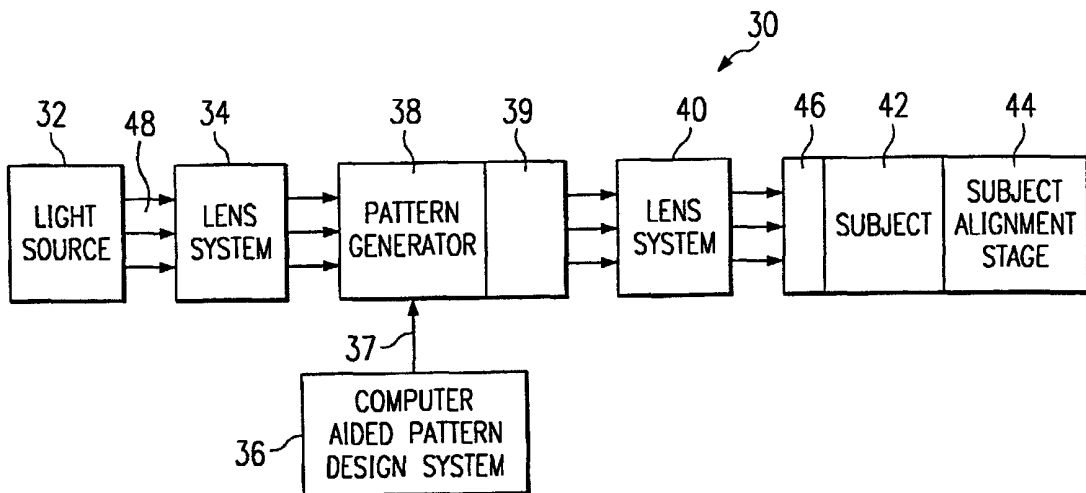
PCT

(10) International Publication Number
WO 01/90814 A3

- (51) International Patent Classification⁷: **G03B 21/14** (74) Agents: O'DELL, David, M. et al.; Haynes and Boone, LLP, Suite 3100, 901 Main Street, Dallas, TX 75202 (US).
- (21) International Application Number: PCT/US01/14397
- (22) International Filing Date: 4 May 2001 (04.05.2001) (81) Designated State (national): JP.
- (25) Filing Language: English (84) Designated States (regional): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).
- (26) Publication Language: English
- (30) Priority Data: 09/577,453 24 May 2000 (24.05.2000) US Published: — with international search report
- (71) Applicant: BALL SEMICONDUCTOR, INC. [US/US]; 415 Century Parkway, Allen, TX 75013 (US). (88) Date of publication of the international search report: 21 March 2002
- (72) Inventors: MEI, Wenhui; 4539 Oak Shores Drive, Plano, TX 75024 (US). KANATAKE, Takashi; 2900 Amherst, Dallas, TX 75225 (US). POWELL, Karlton; 1009 Sandy Trail Drive, Allen, TX 75002 (US). 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: MASKLESS EXPOSURE SYSTEM



(57) Abstract: A photolithography system for providing a pattern (38) to a subject such as a wafer (42). The system includes a pixel panel, such as a digital mirror device or a liquid crystal display, for generating for creating a plurality of pixel elements of the pattern. The pixel elements are simultaneously directed to a first site of the subject by a lens system (40). The system also includes a manipulator for moving the pixel elements, relative to the subject, to a second site of the subject so that a portion of the second site overlaps a portion of the first site.

WO 01/90814 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/14397

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : G03B 21/14
US CL : 353/30, 94; 355/53
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)
353/8, 20, 30, 38, 46, 94, 122 : 355/50, 51, 53, 75, 77; 348/742, 743, 771

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)
NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	US 6,124,876 A (SUNUGAWA) 29 September 2000 (26.09.2000), see entire document.	1-6, 8-9
X	US 5,121,983 A (LEE) 16 June 1992 (16.06.1992), see entire document.	15-16, 18
X	US 5,905,545 A (PORADISH et al.) 18 May 1999 (18.05.1999), see entire document.	15-17
X	US 5,300,966 A (UEHIRA et al.) 05 April 1994 (05.04.1994), see entire document.	15, 20-21
X	US 5,995,129 A (SUNAGAWA et al.) 30 November 1999 (30.11.1999), see entire document.	1-2, 4-6, 8-9

Y		7, 11
Y	US 5,109,290 A (IMAI) 28 April 1992 (28.04.1992), see entire document.	7, 11

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	

Date of the actual completion of the international search 11 October 2001 (11.10.2001)	Date of mailing of the international search report 06 DEC 2001
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer <i>Shawn S. Hogue</i> William Dowling Telephone No. 703-308-1287