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(71) Applicant (for all designated States except US): **CARL ZEISS SMT AG** [DE/DE]; Carl-Zeiss-Strasse 22, 73447 Oberkochen (DE).

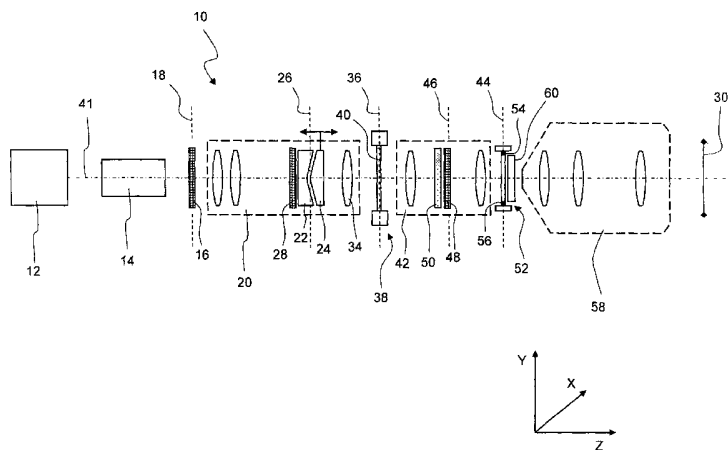
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- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **DEGÜNTHER, Markus** [DE/DE]; Liebigstrasse 2, 73432 Aalen (DE). **MAUL, Manfred** [DE/DE]; Elchweg 29, 73434 Aalen (DE). **FIOLKA, Damian** [DE/DE]; Heckenrosenweg 36, 73447 Oberkochen (DE).
- (74) Agent: **SCHWANHÄUSSER, Gernot**; Ostertag & Partner, Eibenweg 10, 70597 Stuttgart (DE).

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[Continued on next page]

(54) Title: ILLUMINATION SYSTEM FOR A MICROLITHOGRAPHIC PROJECTION EXPOSURE APPARATUS



(57) Abstract: An illumination system for a microlithographic projection exposure apparatus includes a light source (12) for generating a projection light beam, a first objective (20) and a masking system (38, 52) for masking a reticle (30). The masking system (38, 52) includes adjustable first blades (40) for masking in a first spatial direction (X) and adjustable second blades (54, 56) for masking in a second spatial direction (Y). The first blades (40) are arranged in the region of a first field plane (36) and the second blades (54, 56) are arranged in the region of the second field plane (44) which are different to the first field plane (36). The masking system can therefore be made spatially less concentrated, whereby constructional difficulties in the region of the field plane before the masking objective resulting from space requirement problems are reduced. A further contribution is made to solving the space requirement problem if an attenuation system for achieving the most uniform possible light intensity in the wafer plane (122) includes a transmission filter (162) which has locally varying transmissivity and can be moved synchronously with traversing movements of the reticle (30).

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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

International Application No

PCT/EP2004/007926

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G03F7/20

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 G03F

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)

EPO-Internal, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 356 341 B1 (MURAKAMI MASAICHI ET AL) 12 March 2002 (2002-03-12) column 2, line 11 - line 43 column 5, line 25 - column 6, line 30; figures 1,2	1,6
X	----- US 6 211 947 B1 (TSUJI TOSHIHIKO) 3 April 2001 (2001-04-03) column 5, line 1 - column 6, line 25; figure 1	1
X	----- US 5 486 896 A (HAZAMA ET AL) 23 January 1996 (1996-01-23) column 6, lines 38-52 column 15, line 1 - line 10 figures 5,21 -----	1

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"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

"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

"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

"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.

"&" document member of the same patent family

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Eisner, K

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2004/007926

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

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

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
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:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

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

see additional sheet

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.:

1-10

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10

prior art features: illumination system with a first adjustable blade in a first field plane and a second adjustable blade in a second field plane

Special technical features: specifically arranged optical raster elements

problem solved by these special technical features: expansion of the light beam in specific directions

2. claims: 11-17

prior art features: illumination system with a first adjustable blade in a first field plane and a second adjustable blade in a second field plane

Special technical features:

transmission filter with locally varying transmissivity

problem solved by these special technical features: homogenising the light energy

3. claims: 18-19

prior art features: illumination system with a first adjustable blade in a first field plane and a second adjustable blade in a second field plane

Special technical features:

special arrangement of two objectives and two raster elements

problem solved by these special technical features:

reduction of undesired disturbances of the illumination angle distribution caused by axicon lenses

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No PCT/EP2004/007926

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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