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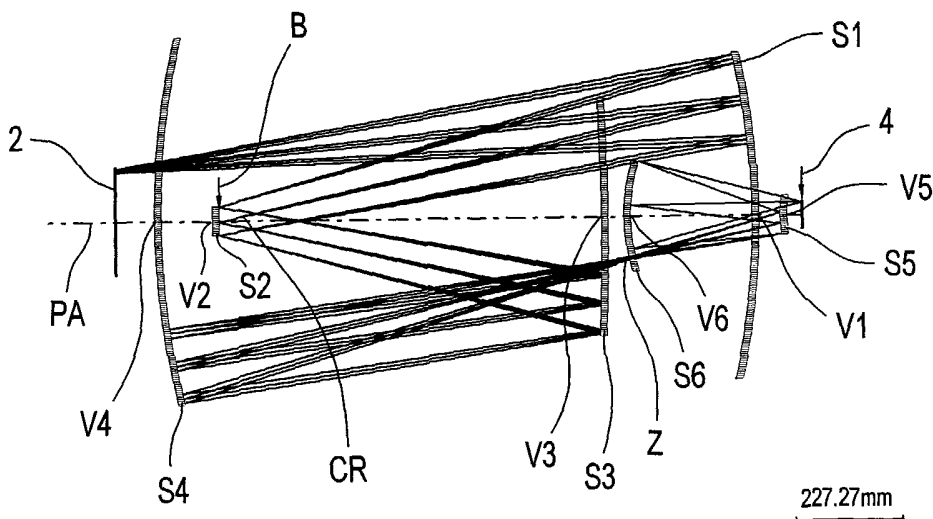
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  - (71) Applicant (for all designated States except US): CARL ZEISS SMT AG [DE/DE]; Carl-Zeiss-Stasse 22, D-73447 Oberkochen (DE).
  - (72) Inventors; and
  - (75) Inventors/Applicants (for US only): SINGER, Wolfgang [DE/DE]; Egerlandstrasse 45, D-73431 Aalen (DE). MANN, Hans-Jürgen [DE/DE]; Katzenbachstrasse 49, D-73447 Oberkochen (DE). WANGLER, Johannes [DE/DE]; An der Reute 15, D-89551 Königsbronn (DE). ULRICH, Wilhelm [DE/DE]; Lederackerring 44, D-73434 Aalen (DE).
  - (74) Agent: WEITZEL & PARTNER; Friedenstrasse 10, D-89522 Heidenheim (DE).
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- (88) Date of publication of the international search report:  
29 July 2004
- 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: PROJECTION OBJECTIVE FOR A PROJECTION EXPOSURE APPARATUS



(57) Abstract: The invention concerns a projection objective for a projection exposure apparatus, said projection exposure apparatus having a primary light source for emitting electromagnetic radiation with a wavelength  $\leq 193$  nm. The projection objective comprises an object plane (2), a first mirror (51), a second mirror (52), a third mirror (53), a fourth mirror (54), and an image plane (4). The object plane, the first mirror, the second mirror, the third mirror, the fourth mirror, and the image plane are arranged in a centred arrangement around a common optical axis (PA). The first, second, third and fourth mirror are situated between the object plane and the image plane. A chief ray of said electromagnetic radiation incident on an object situated in the object plane is inclined away from the optical axis in a direction from the primary light source toward the image in the image plane.

WO 2004/010224 A3

**INTERNATIONAL SEARCH REPORT**

International Application No

PC/EP 03/00485

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 G03F7/20 G02B17/06

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 G02B

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

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 962 830 A (ZEISS CARL ;ZEISS STIFTUNG (DE)) 8 December 1999 (1999-12-08) paragraphs [0002], [0058] - [0060]; claims 1-3,12,13; figures 3,4 -----	1-7
X	EP 1 209 503 A (ASM LITHOGRAPHY BV) 29 May 2002 (2002-05-29) abstract; claims 1,2,4 -----	1-7
A	US 2001/002155 A1 (SUENAGA YUTAKA ET AL) 31 May 2001 (2001-05-31) abstract; figures 1,2 -----	1
A	US 6 255 661 B1 (BRAAT JOSEPHUS J M) 3 July 2001 (2001-07-03) figures 1,2 -----	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
- "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)
- "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

Date of the actual completion of the international search

24 October 2003

Date of mailing of the international search report

29. 04. 2004

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

Scheu, M

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP 03/00485

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 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:

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.:

1-7

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: 1-7

Projection objective comprising four mirrors centrally arranged around a common optical axis wherein a chief ray is inclined away from an optical axis

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2. claims: 8-18

Projection exposure apparatus for microlithography and method comprising an illumination system having a plurality of raster elements for receiving light from a primary light source, wherein the illumination system uses light from said plurality of raster elements to form a field having a plurality of field points in an image plane and a projection objective

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 03/00485

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