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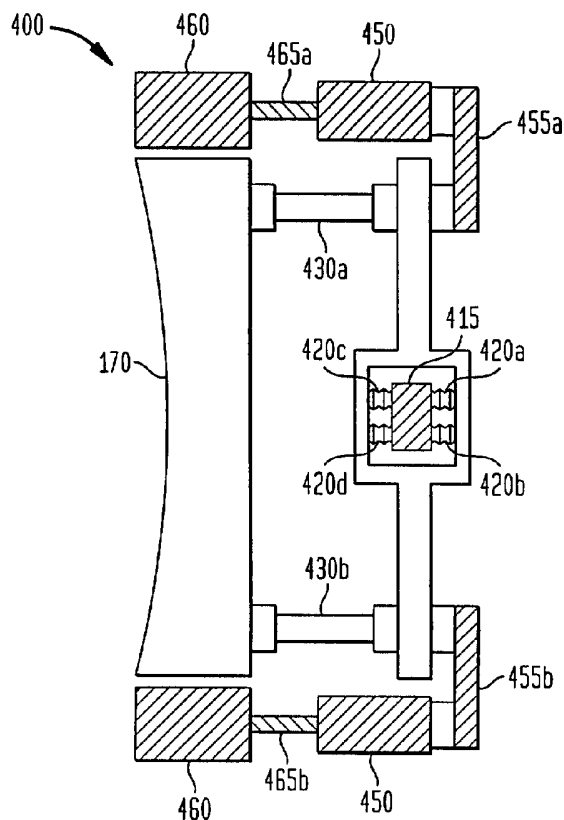
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[Continued on next page]

(54) Title: APPARATUS, SYSTEM, AND METHOD FOR ACTIVE COMPENSATION OF ABERRATIONS IN AN OPTICAL SYSTEM



(57) Abstract: Active compensation of aberrations in an op-  
tical system involves attaching first and second force bars to  
a mirror. The first force bar is bifurcated to form an open-  
ing near its longitudinal midpoint. This opening defines first  
and second opposed surfaces. A second force bar is substan-  
tially perpendicular to the first force bar and extends thro-  
ugh the opening of the first force bar so that a medial por-  
tion of the second force bar is disposed in the opening of the  
first force bar. The second force bar is connected to the first  
surface by at least one actuator. Longitudinal movement of  
the actuator causes a displacement of the mirror. A support  
structure is used to support the weight of the force bars and  
actuator. The force bars are connected to the support struc-  
ture by a plurality of flexures. A control module receives in-  
formation from a sensing module and controls the actuator.  
Other embodiments use more than two force bars and are ca-  
pable of more fully compensating for any aberrations in the  
optical system.



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**Published:**

— *with international search report*

*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/US 01/13020

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 G02B27/00 G02B26/06 G02B26/08 G02B7/185		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 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		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 664 488 A (SAWICKI RICHARD H ET AL) 12 May 1987 (1987-05-12) column 4, line 22 - line 68 column 5 -column 7 column 8, line 1 - line 57 figures 3-6 ---	1-10
A	US 4 022 523 A (LINDONEN LAURIE R ET AL) 10 May 1977 (1977-05-10) abstract; figures ---	1-10
A	US 5 365 379 A (SAWICKI RICHARD H) 15 November 1994 (1994-11-15) abstract; figures ---	1-10
A	US 5 963 374 A (ENDOU TETSUYA ET AL) 5 October 1999 (1999-10-05) abstract; figures -----	1-10
<input type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> 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 12 June 2002		Date of mailing of the international search report 02. 10. 2002
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 WARD, S

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 01/13020

## 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.:

1-10

### 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

2. Claims: 11-26

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/13020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4664488	A	12-05-1987	NONE
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