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(54) Title: METHOD OF MINIMIZING STACKING ELEMENT DISTORTIONS IN OPTICAL ASSEMBLIES

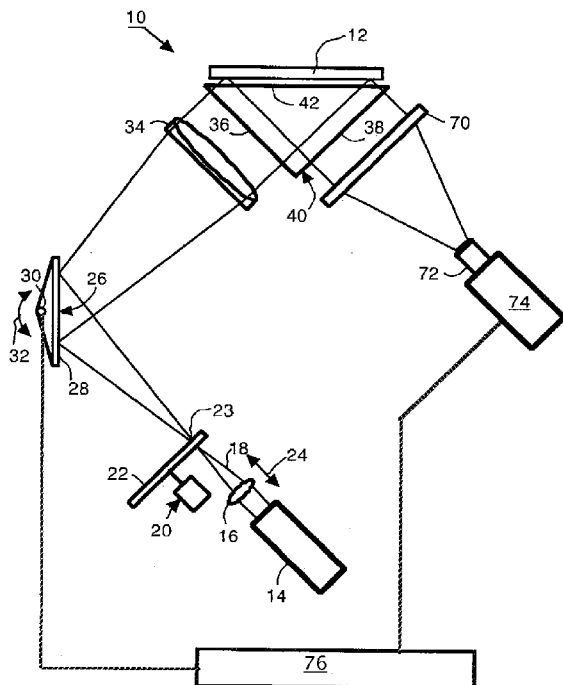


FIG. 1

(57) Abstract: A compound optical assembly is constructed from a plurality of stacking elements for spacing, aligning, and retaining optical elements within the assembly. Stacking faces of the stacking elements are measured and low-order surface errors are extracted, represented by mathematical approximations having a primary angular frequency. The stacking elements including the optic holders are relatively oriented to promote complementarity between the low-order surface errors of mating stacking faces.





MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
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A. CLASSIFICATION OF SUBJECT MATTER
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B. FIELDS SEARCHED
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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 practicable, 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.
A	JP 2000 066075 A (NIPPON KOGAKU KK) 3 March 2000 (2000-03-03) paragraph [0024] - paragraph [0056]; figure 4	1-20
A	DE 102 59 599 A1 (ZEISS CARL SMT AG [DE]) 1 July 2004 (2004-07-01) abstract; figures 1-3	1-20
A	EP 1 850 161 A1 (FUJINON CORP [JP] FUJIFILM CORP [JP]) 31 October 2007 (2007-10-31) paragraph [0020]; figures 4A-4G	1-20
A	WO 2010/074743 A1 (TESSERA NORTH AMERICA INC [US]; ELLIOTT PAUL [US]; CARRIERE JAMES [US]) 1 July 2010 (2010-07-01) abstract; figure 1A	1-20

Further documents are listed in the continuation of Box C.

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Date of the actual completion of the international search 8 October 2014	Date of mailing of the international search report 23/10/2014
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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, Fax: (+31-70) 340-3016	Authorized officer Lehtiniemi, Henry
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2000066075	A	03-03-2000	NONE

DE 10259599	A1	01-07-2004	NONE

EP 1850161	A1	31-10-2007	AT 543114 T 15-02-2012
			EP 1850161 A1 31-10-2007
			JP 4823755 B2 24-11-2011
			JP 2007298533 A 15-11-2007
			US 2007253077 A1 01-11-2007

WO 2010074743	A1	01-07-2010	NONE
