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United States Patent [19]

Haar et al.

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[54] APPARATUS FOR LIGHT REFLECTION MEASUREMENTS

5,598,843 2/1997 Caisey et al. 600/476
5,638,818 6/1997 Diab et al. 600/310

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FOREIGN PATENT DOCUMENTS

0 104 772 4/1984 European Pat. Off. .
28 23 769 12/1979 Germany .
29 27 814 1/1981 Germany .
31 13 248 3/1987 Germany .
38 09 084A1 9/1989 Germany .
91 03 974 8/1991 Germany .
43 14 835 11/1994 Germany .
0 631 137 A2 12/1994 Germany .
43 37 570 5/1995 Germany .
1-138507 5/1989 Japan .
2 253 070 8/1992 United Kingdom .

[73] Assignee: **Boehringer Mannheim GmbH**, Mannheim, Germany

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[30] Foreign Application Priority Data

Nov. 29, 1995 [DE] Germany 195 44 501.5

[51] Int. Cl.⁶ **A61B 5/00**

[52] U.S. Cl. **600/310**; 600/476; 356/338

[58] Field of Search 600/310-317,
600/322-324, 336, 473, 474, 476, 477;
356/39-41, 337, 338; 435/4; 436/43

[56] References Cited

U.S. PATENT DOCUMENTS

2,706,927 4/1955 Wood 88/14
4,671,612 6/1987 Sakurai et al. 350/96.27
4,942,481 7/1990 Yoshinouchi et al. 357/471
5,030,000 7/1991 Kanda 356/40
5,052,776 10/1991 Fukushima et al. 385/120
5,077,476 12/1991 Rosenthal 600/316
5,213,105 5/1993 Gratton et al. 600/476
5,259,057 11/1993 Cook 385/120
5,284,149 2/1994 Dhadwal et al. 600/476
5,349,954 9/1994 Triemann et al. 600/476
5,551,422 9/1996 Simonsen et al. 128/633

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[57] ABSTRACT

An apparatus for light transport measurements on a test object with a measuring head which includes a contact surface for placing against an interface of the test object, light irradiation device with a light transmitter for irradiating light through the contact surface and an interface into the test object, and detection device with a light receiver for detecting light leaving the test object. The contact surface comprises at least one optically transparent light passage point for the light, on which a large number of rigid light-conducting elements are arranged, wherein an optical connection with a light transmitter or light receiver assigned to a light passage point is produced by the whole of the light-conducting elements of the light passage site.

32 Claims, 5 Drawing Sheets

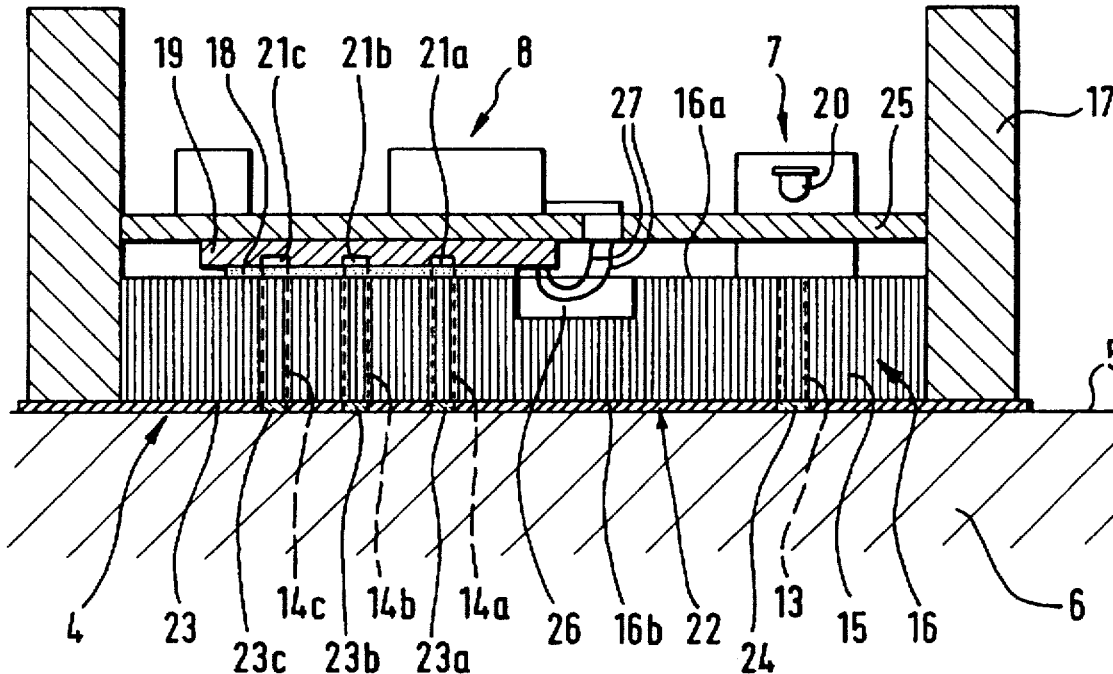


Fig. 1

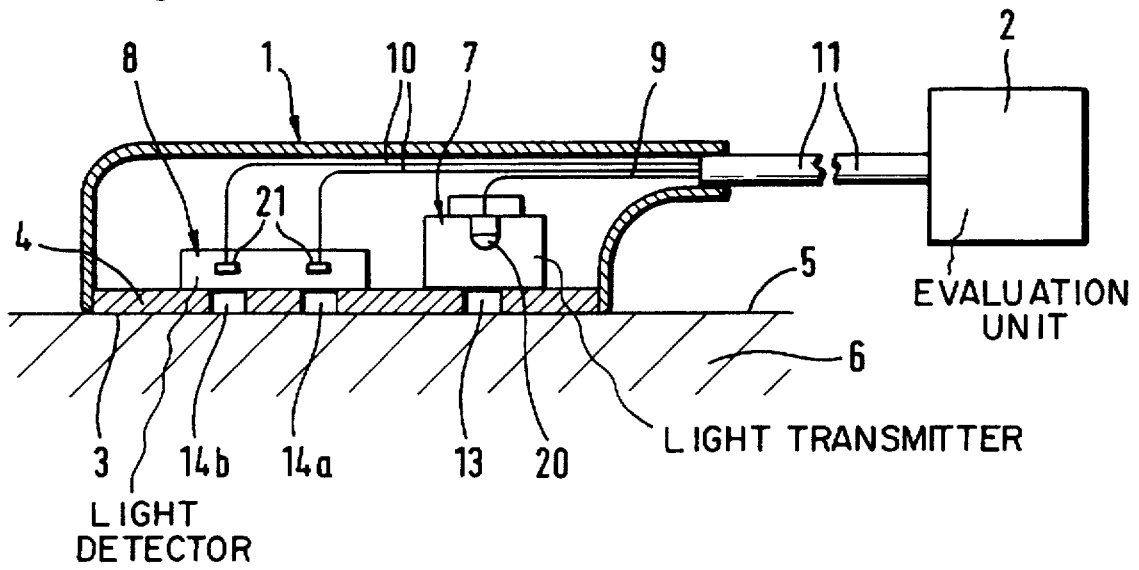


Fig. 2

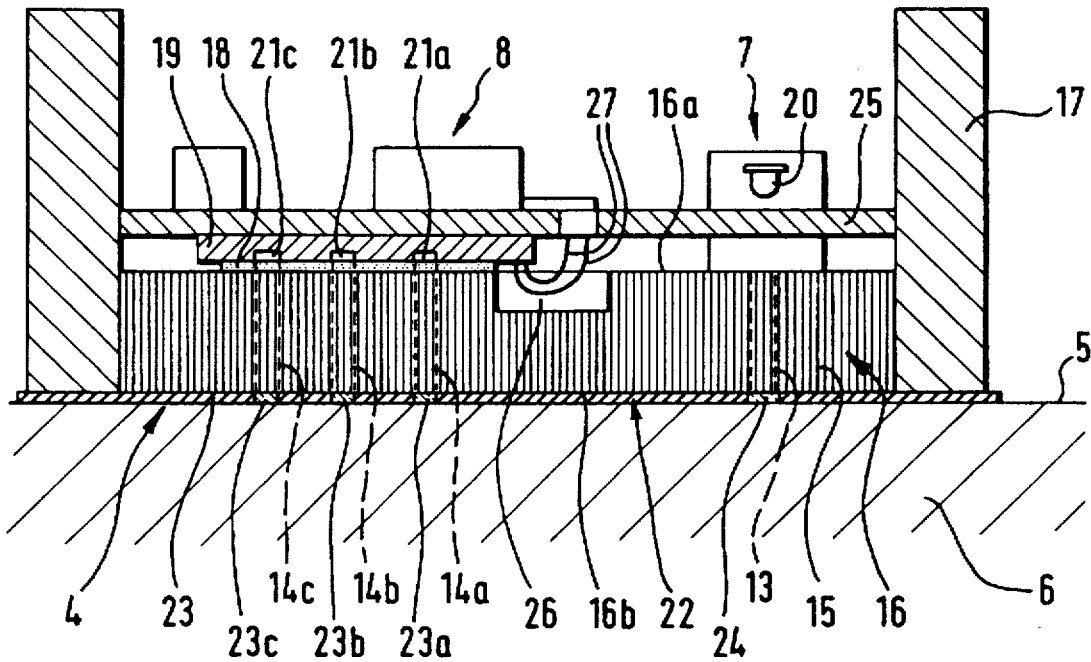


Fig. 3

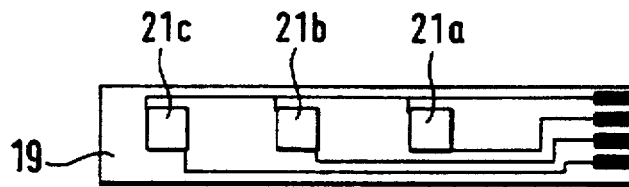


Fig. 4

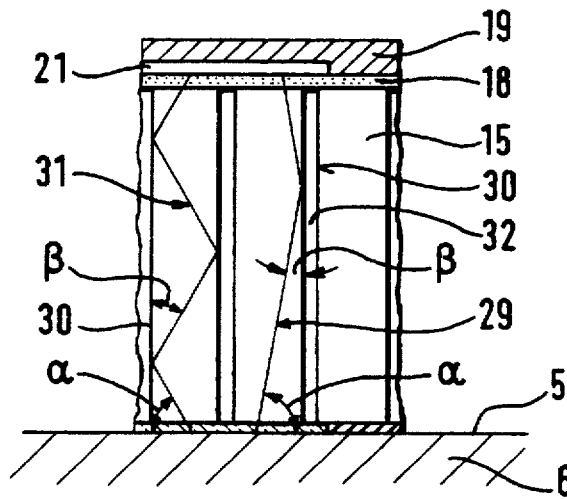


Fig. 6

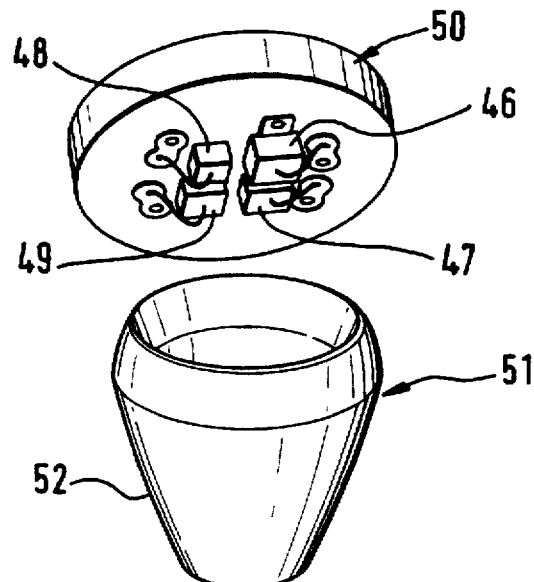


Fig. 5

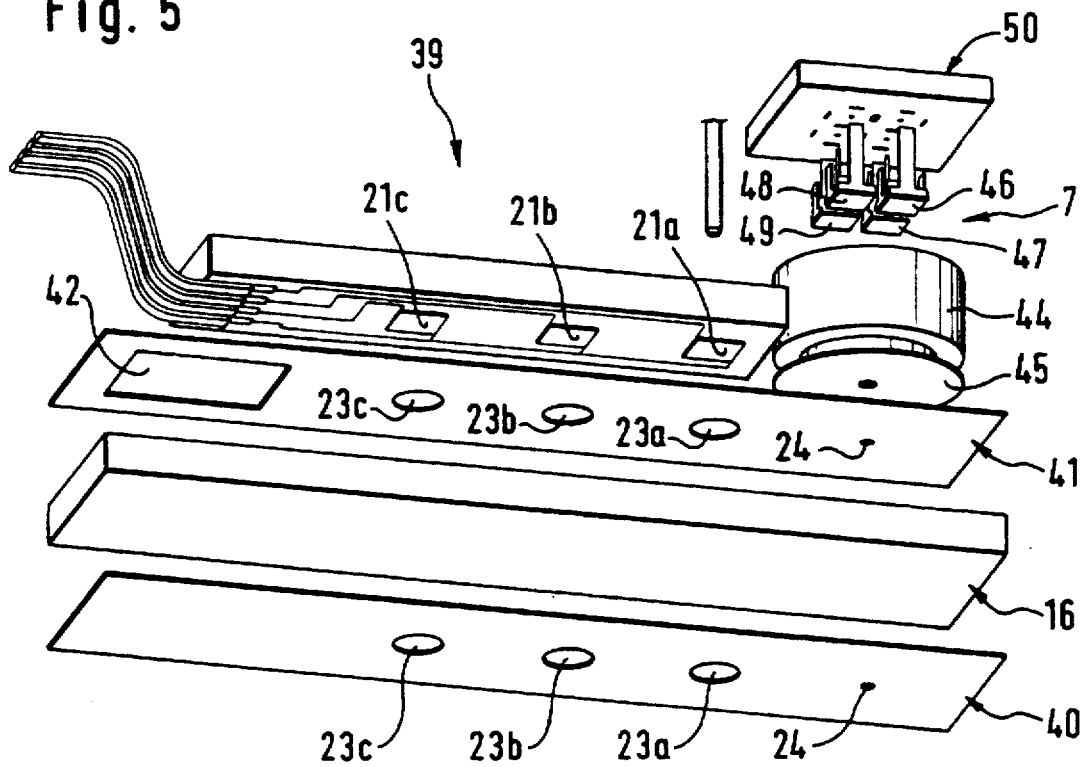
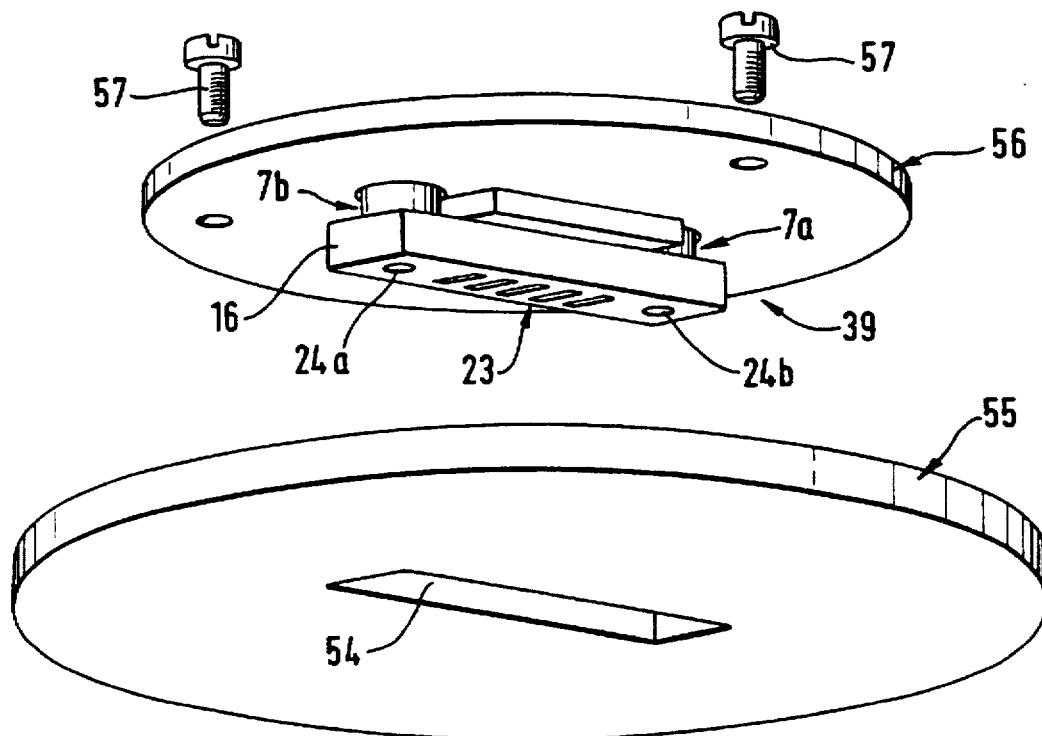


Fig. 7



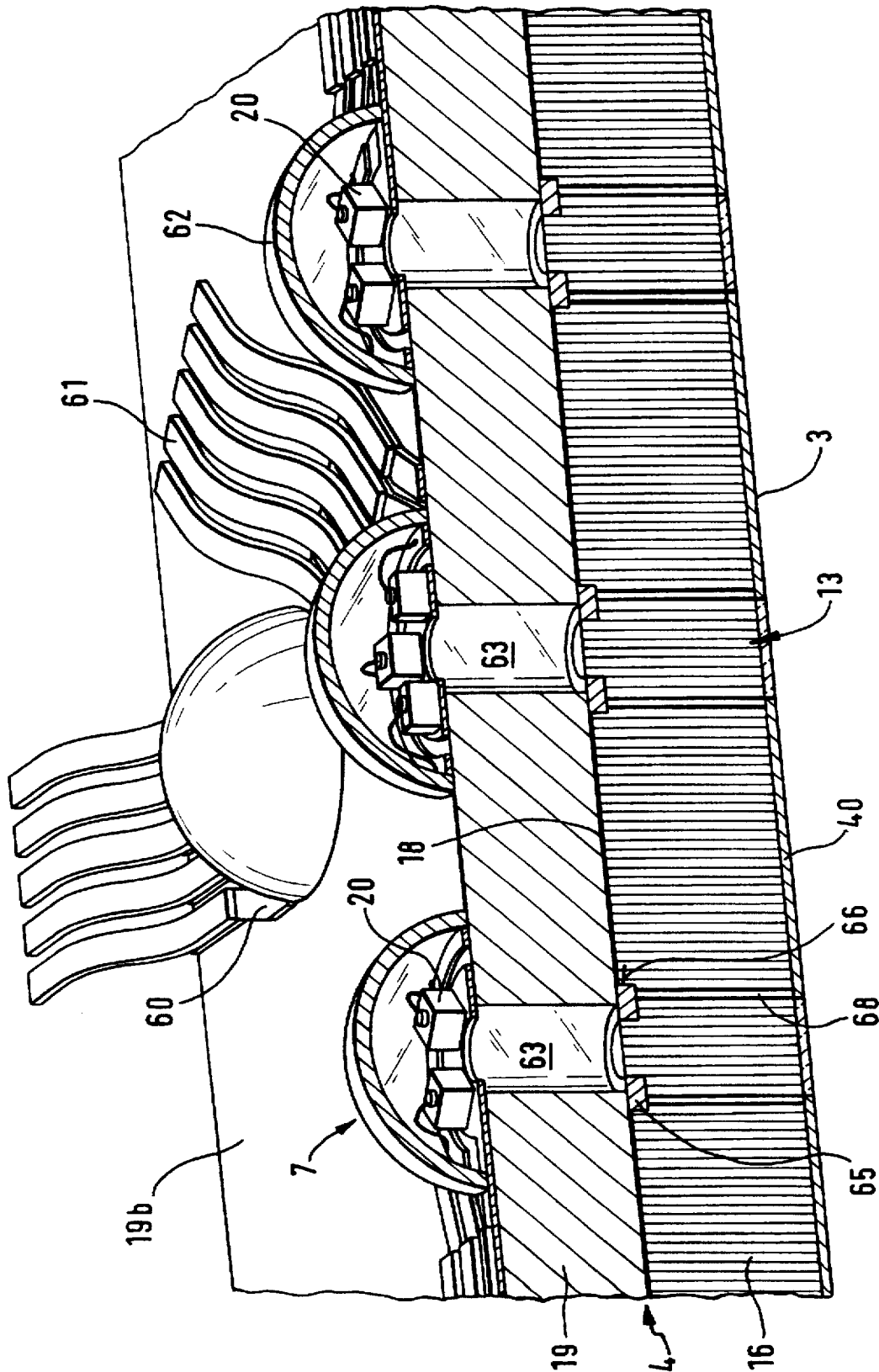


Fig. 8

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