

US005893364A

United States Patent [19]

[11] Patent Number: 5,893,364

Haar et al.

[45] Date of Patent: Apr. 13, 1999

[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

[75] Inventors: **Hans-Peter Haar**, Wiesloch; **Matthias Essenpreis**, Gauting; **Rainer Fritsche**, Brühl, all of Germany

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

[21] Appl. No.: **08/752,629**

[22] Filed: **Nov. 19, 1996**

[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

Primary Examiner—Ruth S. Smith

Attorney, Agent, or Firm—Nikaido, Marmelstein, Murray & Oram LLP

[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

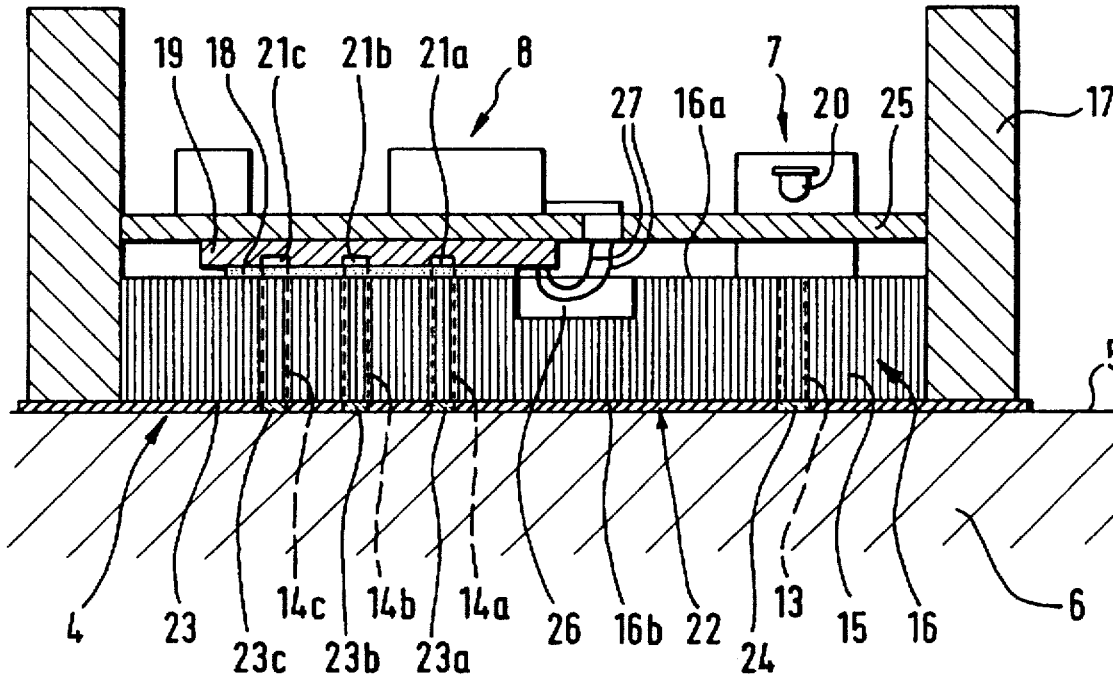


Fig. 1

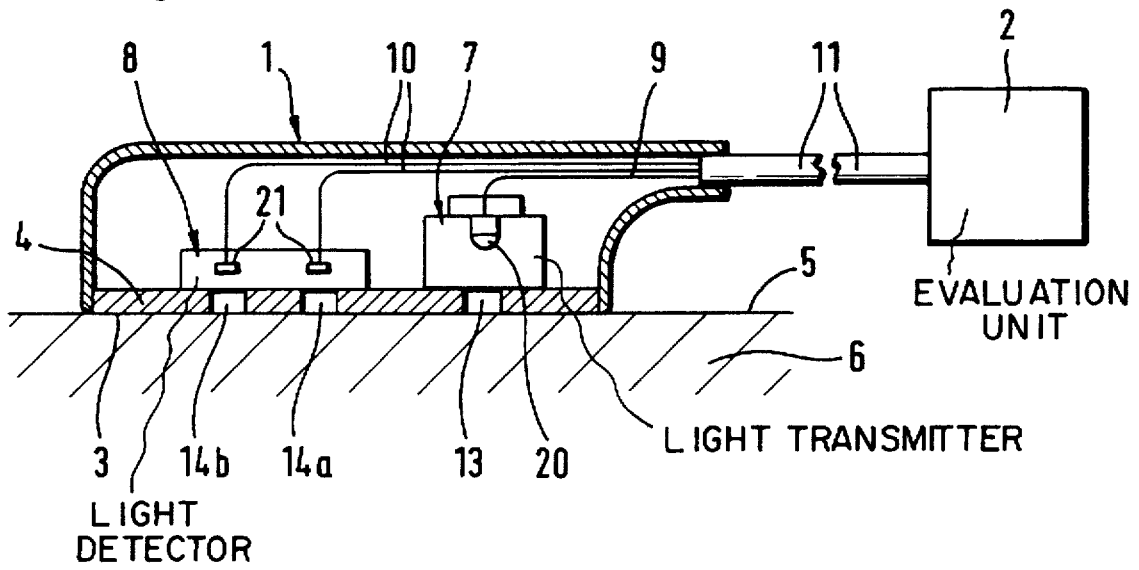


Fig. 2

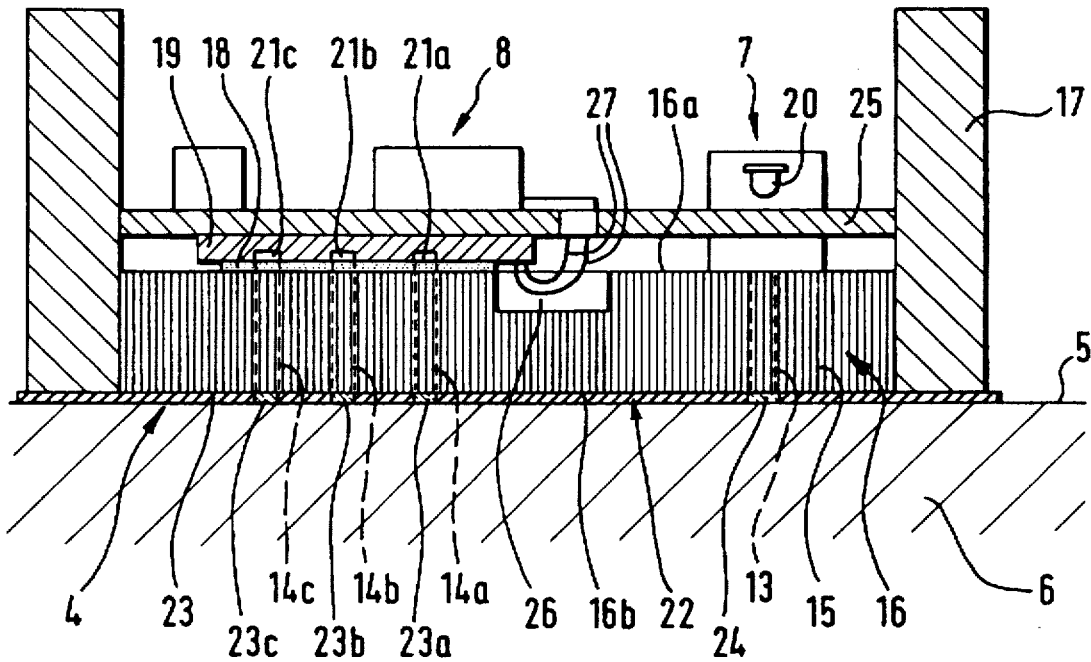


Fig. 3

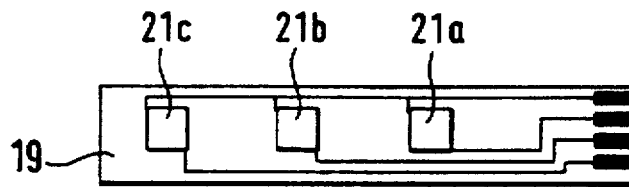


Fig. 4

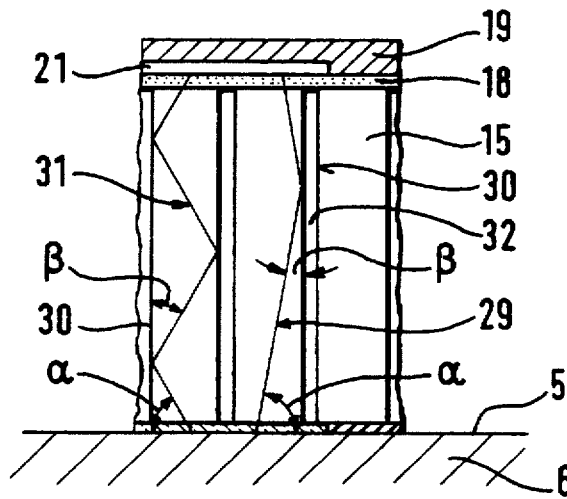


Fig. 6

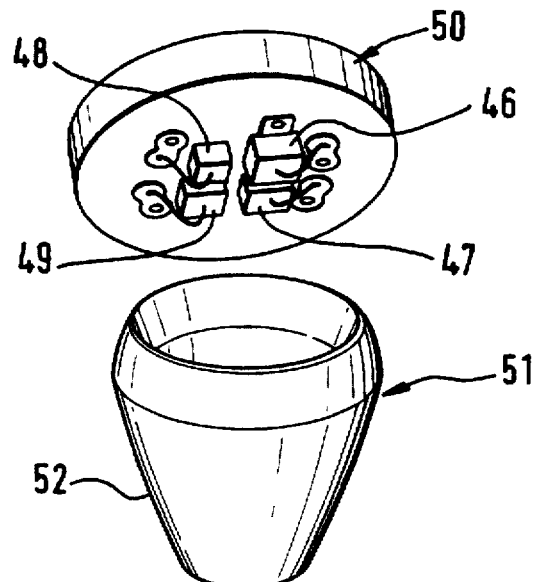


Fig. 5

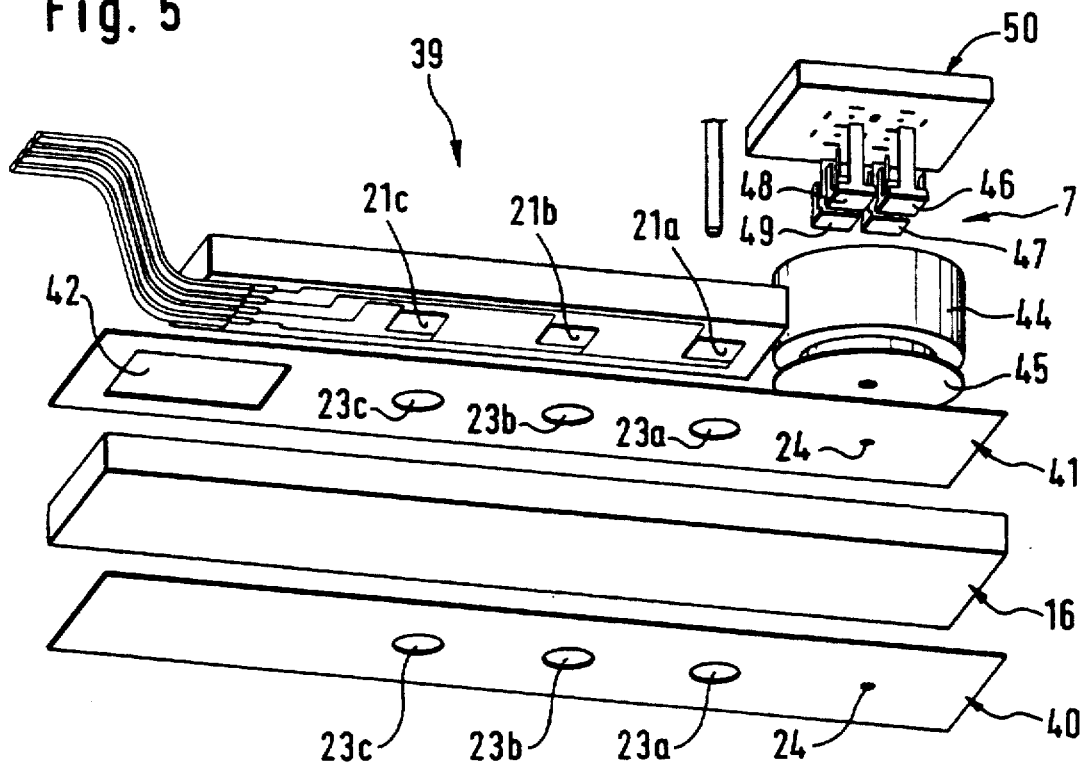
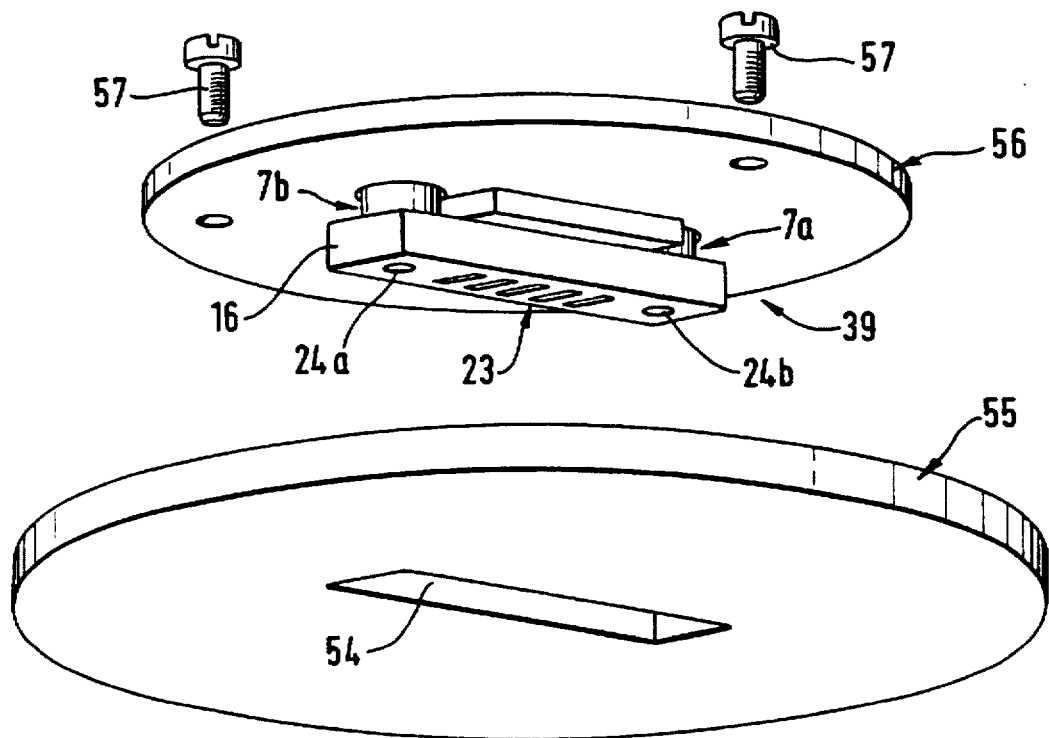


Fig. 7



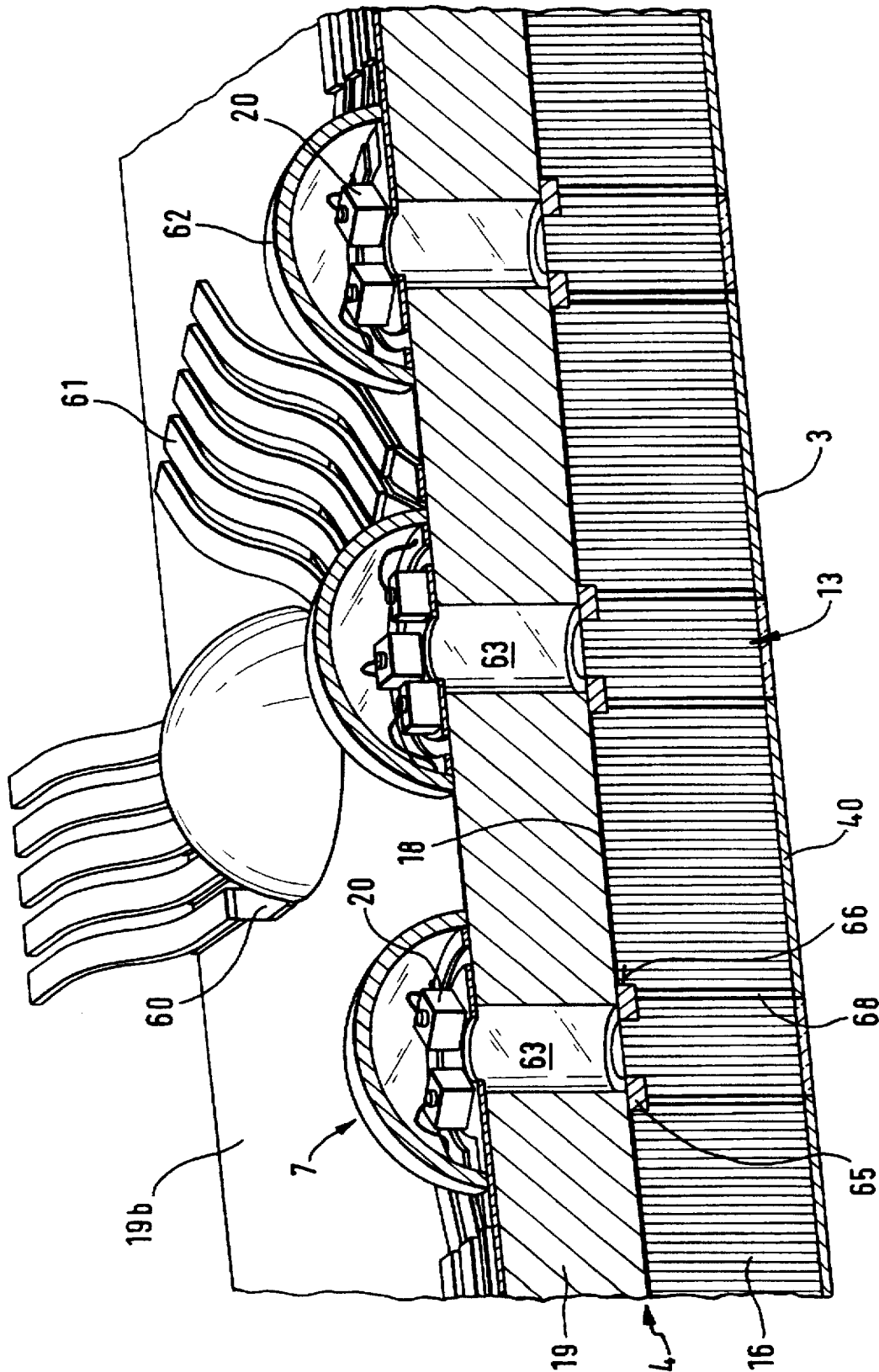


Fig. 8

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.