United States Patent [19]

Eisinger et al.

[11] Patent Number: 4,943,522

[45] Date of Patent: Jul. 24, 1990

[54] **LATERAL FLOW, NON-BIBULOUS MEMBRANE ASSAY PROTOCOLS**

[75] Inventors: **Robert W. Eisinger; Mohammed H. Khalil**, both of San Diego; **David H. Katz**, La Jolla; **Robert B. Sargeant**, Ramona, all of Calif.

[73] Assignee: **Quidel**, San Diego, Calif.

[21] Appl. No.: **230,642**

[22] Filed: **Aug. 10, 1988**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 57,273, Jun. 1, 1987, abandoned, and a continuation-in-part of Ser. No. 57,271, Jun. 1, 1987, abandoned.

[51] **Int. Cl.**^{5} G01N 33/53
[52] **U.S. Cl.** 435/7; 435/805; 435/810; 436/512; 436/514; 436/518; 436/520; 436/523; 436/531; 436/535; 436/807; 436/808; 436/810; 422/55; 422/56; 422/57; 422/58; 422/101
[58] **Field of Search** 422/55–61, 422/70, 101, 102; 424/11; 435/7, 5, 805, 810; 436/514–520, 512, 523, 531, 535, 807, 808, 810; 210/431

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,323,536 4/1982 Columbus 422/56

4,361,537 11/1982 Deutsch et al. 422/56
4,608,246 8/1986 Bayer et al. 424/11
4,623,461 11/1986 Hossom et al. .... 422/101 X
4,693,834 9/1987 Hossom et al. .... 422/101 X
4,729,961 3/1988 Avrameas et al. .... 435/7 X
4,740,475 4/1988 Paul .... 422/58 X

FOREIGN PATENT DOCUMENTS

0209378 1/1987 European Pat. Off. 436/518
8803650 5/1988 World Int. Prop. O. 436/518

Primary Examiner—Esther M. Kepplinger
Assistant Examiner—Carol A. Spiegel
Attorney, Agent, or Firm—Irell & Manella
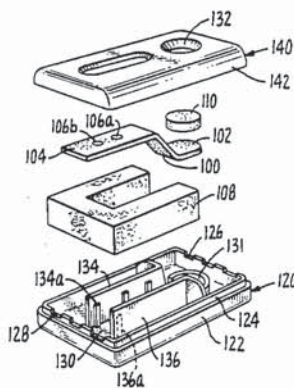
[57] **ABSTRACT**

A method and apparatus for conducting specific binding pair assays, such as immunoassays, is described. A porous membrane capable of non-bibulous lateral flow is used as assay substrate; a member of the binding pair is affixed in an indicator zone defined in the substrate. The sample is applied at a position distant from the indicator zone and permitted to flow laterally through the zone; any analyte in the sample is complexed by the affixed specific binding member, and detected. A novel method of detection employs entrapment of observable particle in the complex. Blood is a particularly preferred sample as the red blood cells can be used as the observable particles for detection of the complex.

46 Claims, 4 Drawing Sheets

132
146a 146b
3
3
140

FIG.1.

132
140
142
110
106b 106a
104
102
100
108
126 131
134a 134
128
120
124
130 136 122
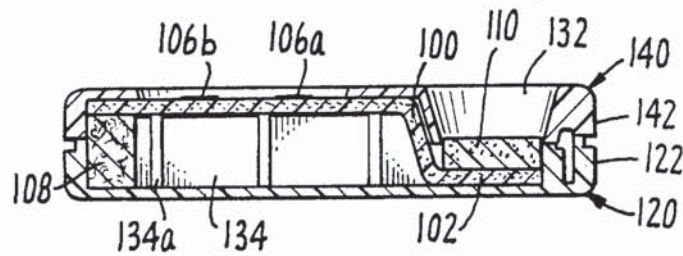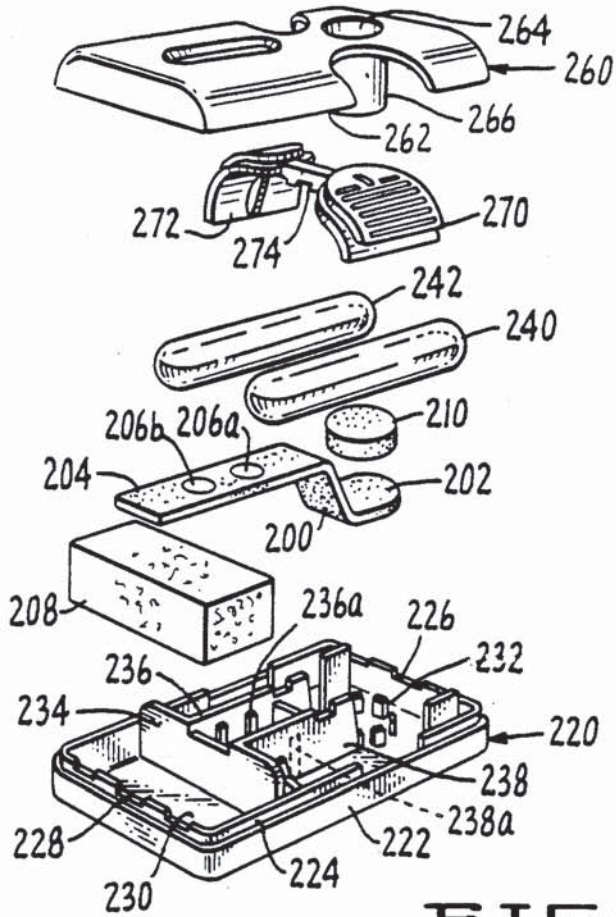136a

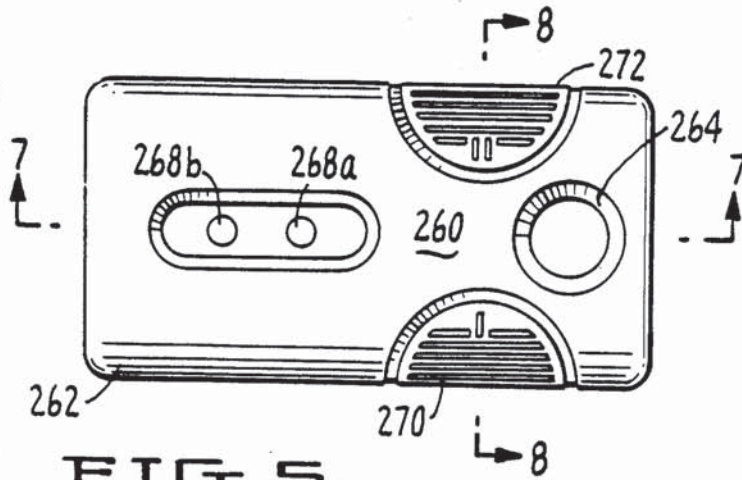**FIG.2.**

106b 106a 100 110 132 140
142
122
108
134a 134 102 120
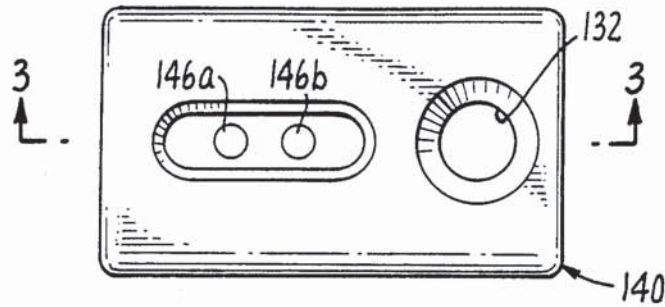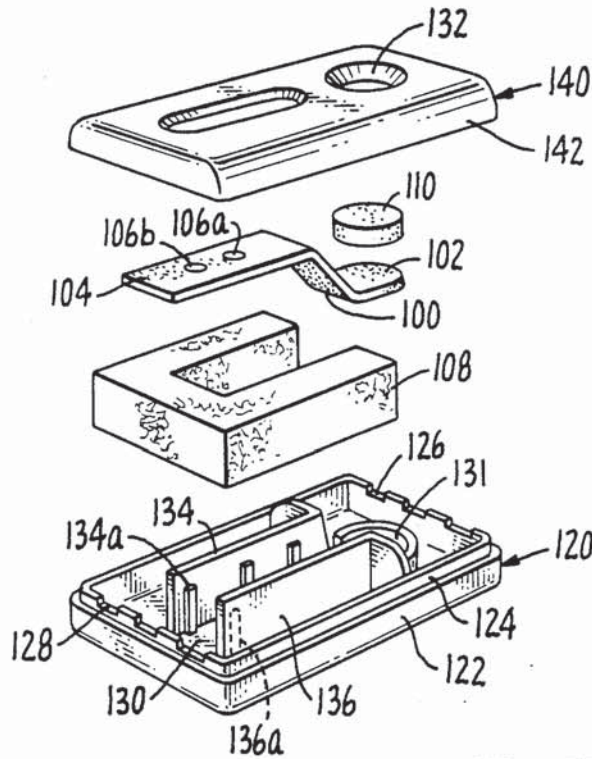
FIG.3.

FIG.4.

FIG.5.
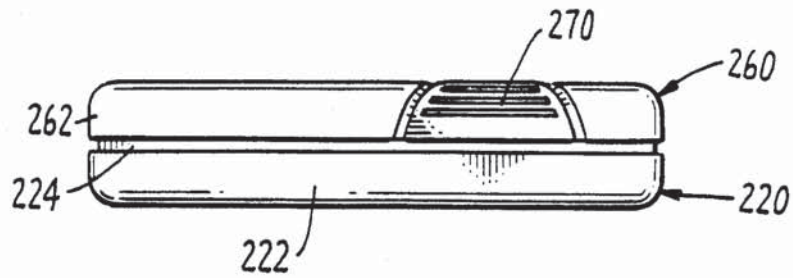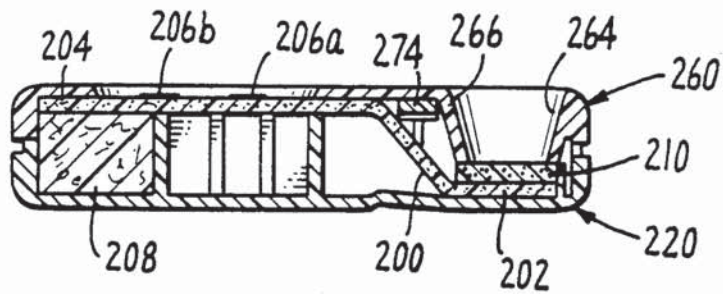
FIG. 6.

FIG. 7.

FIG. 8.

FIG.9

FIG.10.

DOCKET ALARM
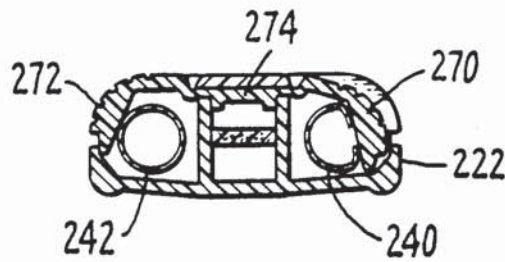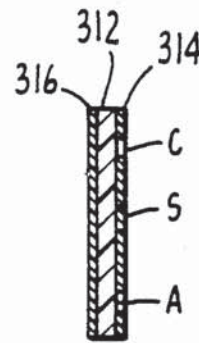
Explore Litigation Insights

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.

fastcase
Smarter legal research.