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# United States Patent [19] Sun

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[54] **MULTI-TEST PANEL**

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[52] **U.S. Cl.** ..... **436/518**; 422/55; 422/56;  
422/58; 422/61; 435/287.1; 435/287.2;  
435/287.7; 435/287.9; 435/805; 435/810;  
435/970; 435/973; 435/975; 436/514; 436/169;  
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[58] **Field of Search** ..... 422/55-58, 61;  
435/287.1, 287.2, 287.7, 287.9, 805, 810,  
970, 973, 975; 436/514, 518, 169, 810,  
805

[56] **References Cited**

### U.S. PATENT DOCUMENTS

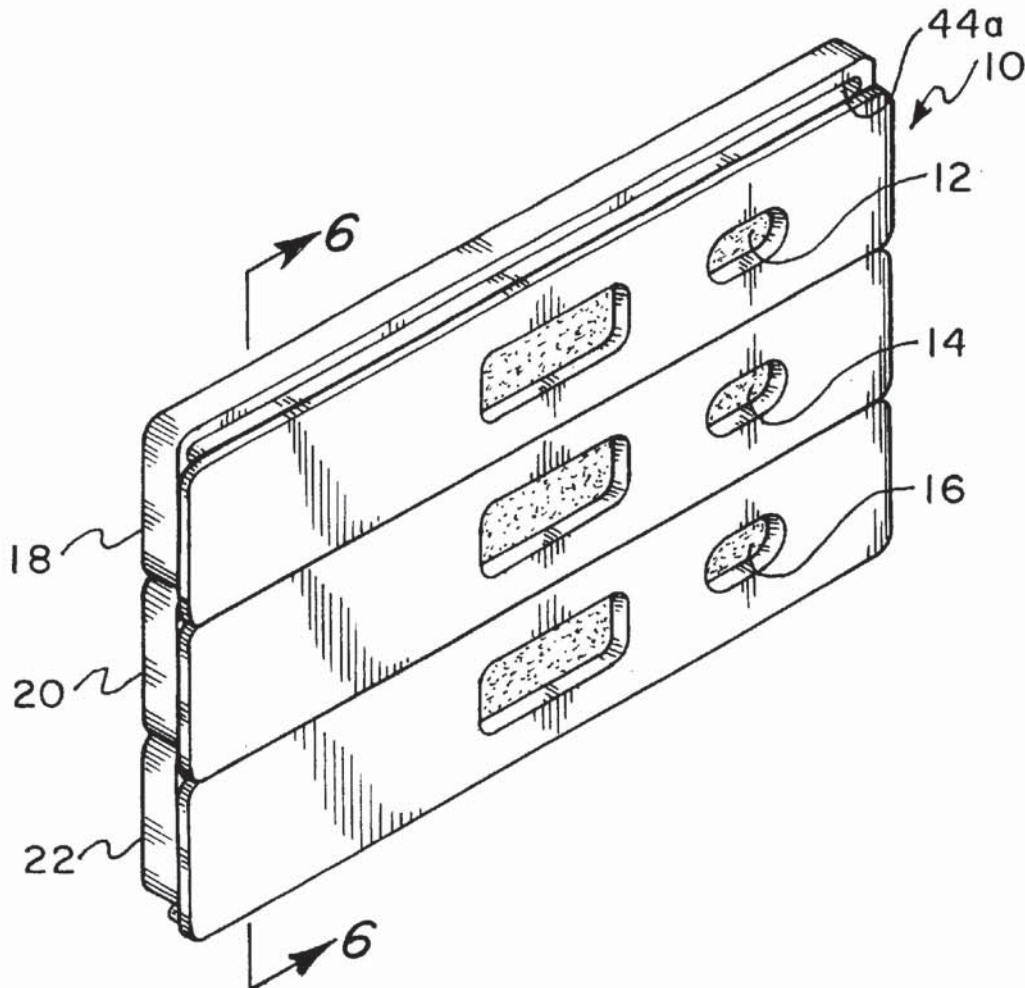
4,981,786	1/1991	Dafforn et al.	422/56
5,017,342	5/1991	Haberzettl et al.	436/535
5,238,652	8/1993	Sun et al.	422/61
5,260,194	11/1993	Olson	435/7.91
5,508,200	4/1996	Tiffany et al.	436/44
5,709,838	1/1998	Porter et al.	422/101

*Primary Examiner*—Christopher L. Chin  
*Attorney, Agent, or Firm*—Norman E. Lehrer

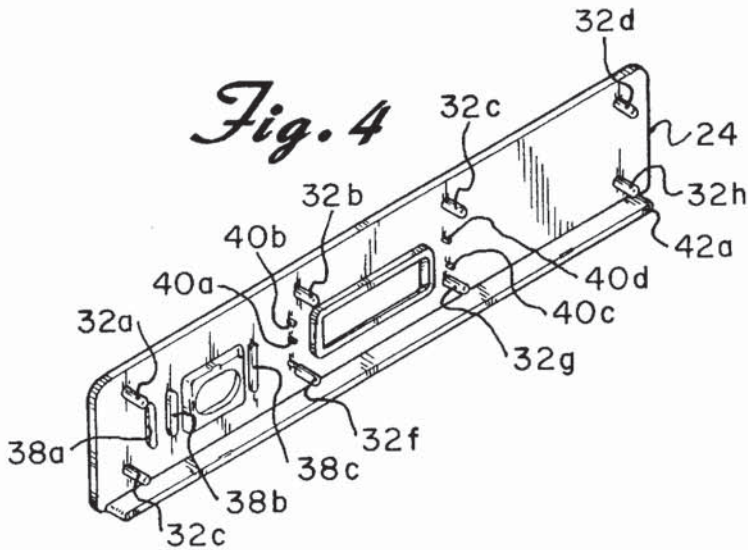
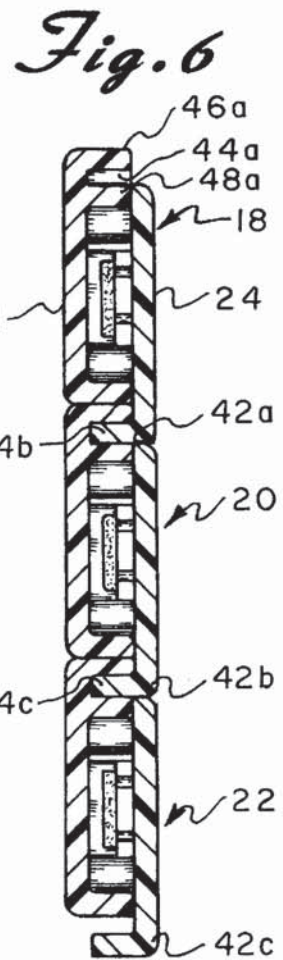
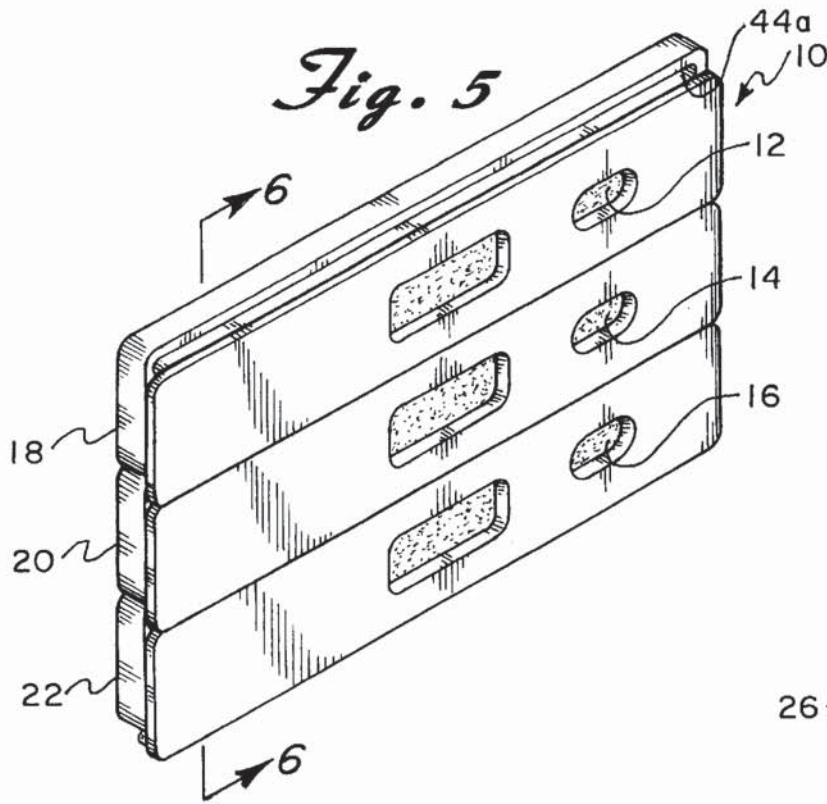
[57] **ABSTRACT**

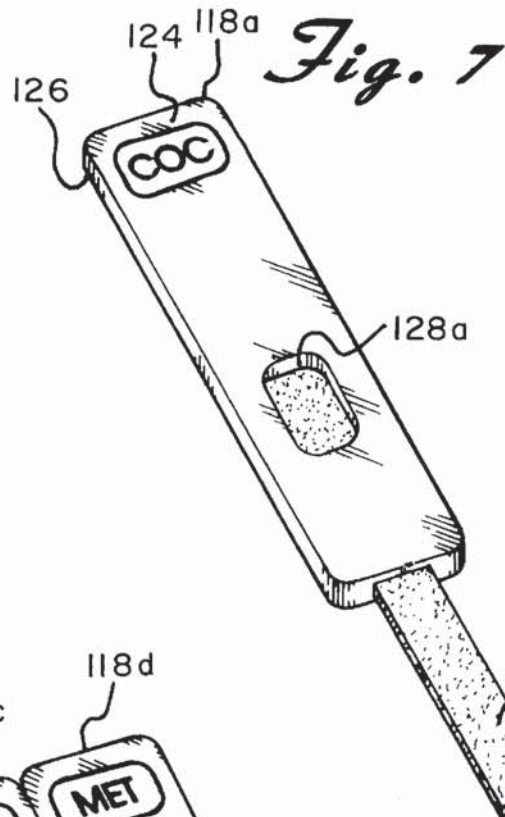
A multi-test panel with several test strips containing a separate and different immunochromatographic system, each strip being housed in a separate structure so that the structures may be joined together and interchanged, depending upon what substances within a fluid sample are being detected.

**9 Claims, 3 Drawing Sheets**

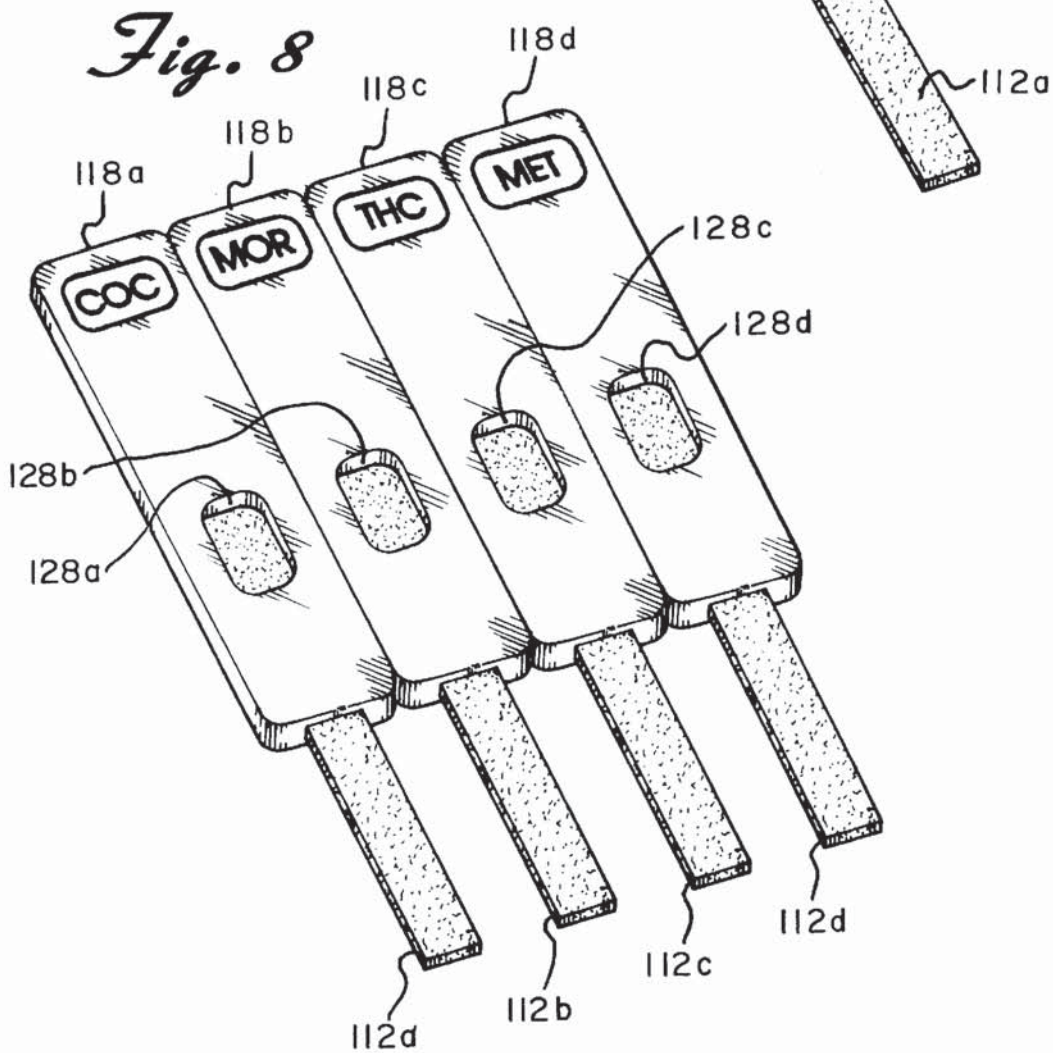








*Fig. 7*



*Fig. 8*

## MULTI-TEST PANEL

## BACKGROUND OF THE INVENTION

The present invention is directed toward an analytical test device for analyzing body fluids using immunochromatography, and more particularly toward a panel which consists of multiple tests which may be varied.

The measurement of physiologically important substances in urine, serum, and tissue using immunological principles is well known. In particular, drug-specific antibodies and antigens have been used in a variety of immunological assay procedures for detecting antibodies or antigens in bodily fluids of humans and animals. Test devices are known which can identify the presence or absence of drugs of abuse, such as cocaine, opiates, and marijuana, using the protein conjugates of these drugs and their accompanying antibodies. Multiple tests for detecting various drugs in a fluid sample where the tests are contained within a single device in a predetermined arrangement that cannot be varied are also known.

Such a multi-test device is disclosed in U.S. Pat. No. 5,260,194 to Olson which is directed toward a method and device for determining the presence of an antigen or drug which specifically binds to an antibody contained on a test strip. The strip may be a single structure such as a sheet with several lanes so that a separate and different assay may be performed in each lane. However, this device does not provide for varying the tests to be conducted so that a wide variety of tests may be performed, as needed.

U.S. Pat. No. 5,508,200 to Tiffany et al discloses a method for conducting multiple chemical assays which involves placing small volumes of samples/reagent combinations at discrete locations about a common test area on an analytical medium in order to test bodily fluids for various substances. Again, the tests contained in this device cannot be varied to suit the needs of the individual performing the test.

Also, U.S. Pat. No. 5,238,652 to Sun et al discloses an analytical test for assaying various drugs using immunochromatography. The patent discloses the use of multiple test strips in one structure but it does not disclose a structure where the test strips can be easily rearranged and varied, depending upon the needs of the individual conducting the test.

As indicated above, the problem with these multiple test devices is that the individual tests contained within the device cannot be varied. Frequently, the person conducting the test may not have a need for all of the tests contained in the device. For example, a laboratory may find that they only test for marijuana, cocaine, and heroin in the bodily fluid samples they collect. The only multi-test device available may be one that tests for marijuana, cocaine, and opium. Another, separate test would be needed to test for heroin. In this case, the multi-test device does not contain the combination of tests that the lab needs. As a result, the lab will waste the opium test every time they conduct the tests if they used the multi-test device. They must also find a separate test for heroin which may become time-consuming and expensive. If they don't use the multi-test device, they must find three individual tests, which may also become time-consuming and expensive. Furthermore, they will have at

least two devices which will have to be labeled and kept together. Clearly, such a multi-test device does not fully suit the needs of the lab.

## SUMMARY OF THE INVENTION

The present invention is designed to overcome the deficiencies of the prior art discussed above. It is an object of the present invention to provide a versatile multi-test panel structure which allows for testing various substances simultaneously.

Another object of the invention is to provide several test strips, each contained in separate structures where the structures may be joined to one another.

A further object of the invention is to provide a cost efficient and simple way of testing a bodily fluid sample for various drugs, disease, or pregnancy, as needed.

In accordance with the illustrative embodiments, demonstrating features and advantages of the present invention, there is provided a multi-test panel with several test strips containing a separate and different immunochromatographic system, each strip being housed in a separate structure so that the structures may be joined together and interchanged, depending upon what substances are being detected in a bodily fluid sample.

Other objects, features, and advantages of the invention will be readily apparent from the following detailed description of preferred embodiments thereof taken in conjunction with the drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

For the purpose of illustrating the invention, there is shown in the accompanying drawings forms which are presently preferred; it being understood that the invention is not intended to be limited to the precise arrangements and instrumentalities shown.

FIG. 1 is a front perspective view of a first embodiment of a test strip in one of the housings of the panel of the present invention;

FIG. 2 is a rear perspective view of one of the housings of the panel of the first embodiment;

FIG. 3 is an exploded view of one of the housings and test strips of the panel of the first embodiment;

FIG. 4 is a perspective view of the inside of the top half of the housing viewed in the direction of the line 4—4 of FIG. 3;

FIG. 5 is a front perspective view of the multi-test panel of the present invention;

FIG. 6 is a cross-sectional view of the multi-test panel of the invention taken through line 6—6 of FIG. 5;

FIG. 7 is a diagrammatic view illustrating a second embodiment of a dip strip within a housing, and

FIG. 8 is a diagrammatic view illustrating the second embodiment of the multi-test panel of the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings in detail wherein like reference numerals have been used throughout the various figures to designate like elements, there is shown in FIG. 5 a multi-test panel constructed in accordance with the principles of the present invention and designated generally as 10.

The multi-test panel includes two or more test strips where each strip is contained in a separate housing. FIG. 5

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