Feb. 20, 1940. D. E. STOVER 2,190,808

SEROLOGICAL DROP REACTION MEANS

Filed June 23, 1937

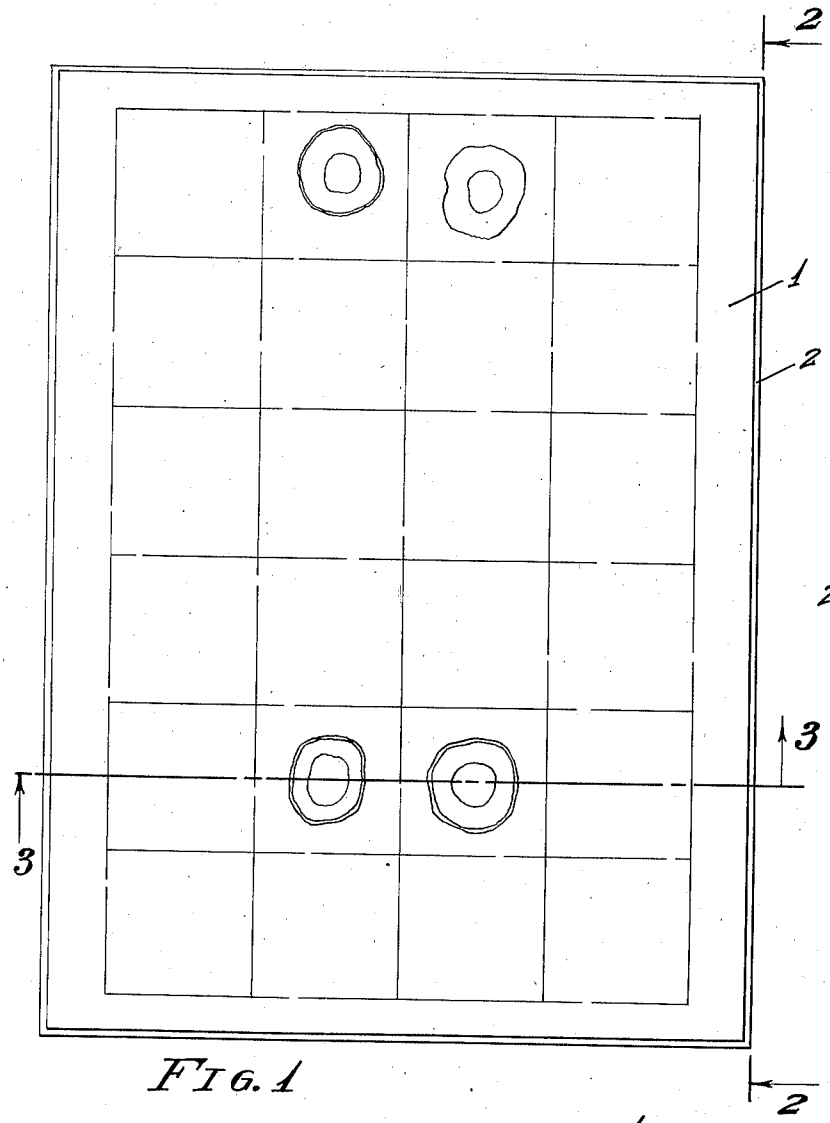


FIG. 1

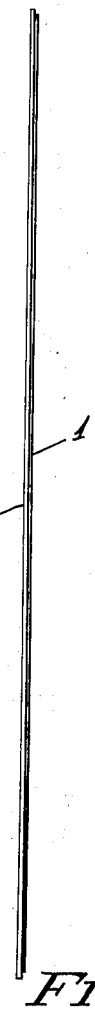


FIG. 2

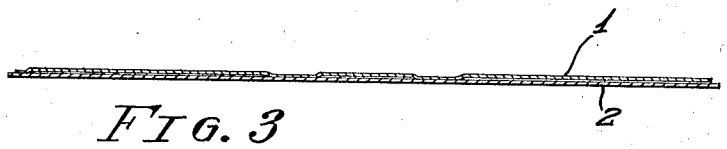


FIG. 3

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Patented Feb. 20, 1940

2,190,808

UNITED STATES PATENT OFFICE

2,190,808

SEROLOGICAL DROP REACTION MEANS

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Application June 23, 1937, Serial No. 149,934

3 Claims. (Cl. 73—51)

My invention relates to a means for conducting the serological and other tests under which tests it is required that small solid particles suspended in a drop of liquid shall be separated from said liquid for the provision of increased visibility of the test reaction, and the objects of my invention are:

First, the provision of a means of this class which permits said particles suspended in a drop of liquid to separate from said liquid more completely and more rapidly and thus become more easily visible than would be the case if the means used heretofore were employed;

Second, to provide a means of this class which is very efficient in its action;

Third, to provide a means of this class which is very durable and stable.

With these and other objects in view as will appear hereinafter, my method consists of the certain novel means as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawing, and to the characters of reference thereon which form a part of this application in which:

Figure 1 is a diagrammatic view of a sheet including my means with a test illustrated thereon; Fig. 2 is an edge view thereof from the line 2—2 of Fig. 1; and Fig. 3 a sectional view from the line 3—3 of Fig. 1.

For the sake of brevity and clarity the means to which my invention relates will be designated in the following specification as a composite sheet, while the means heretofore used will be designated as a single sheet, and the above mentioned tests will be designated in both the following specification and appended claims, as the drop reaction tests.

The conventional single sheet consists simply of a single piece of absorbent paper upon which drops of serological mixtures are deposited. The procedure involved is for the purpose of determining if agglutination or precipitation has occured in the particular test mixture under consideration. For example, in the agglutination test for undulant fever in man, a drop of a serum-antigen mixture, when deposited on a sheet of absorbent paper will form a spot in which in the case of a positive reaction the large clumps of bacteria will have massed together in the center of the spot. The single sheet gives very good results when clumps of bacteria or other particles of solid material suspended in a drop of liquid are large; but when small, there is a tendency for these clumps, or particles, to spread out during the process of absorption and thereby become barely visible.

The applicant, while working on such tests, has devised a composite sheet to be used in place of the single or conventional sheet. This composite sheet consists of a piece of lens paper 1 and a piece of thick filter paper 2 placed face to face and fastened together at the corners or along the borders and at points and places not actually intended for use in the tests and with an adhesive for securing them together. If the two pieces of paper are fastened together smoothly, the composite sheet appears almost as one piece of paper and is very substantial in spite of the fragility of the lens paper when handled alone.

In operation when a drop of liquid to be tested is dropped upon the lens paper side of the composite sheet, the lens paper serves as a filter so that particles of solid material suspended in said liquid become enmeshed in the lens paper, while the liquid itself passes through the lens paper and on to the filter paper. As soon as the drop of liquid contacts the two papers simultaneously, it spreads very rapidly by capillary action in the small air space between and is quickly absorbed by both pieces of paper. The filtration and rapid spreading of the fluid by said capillary action contribute toward the improvement of one of the more desirable features of the drop reaction tests; namely, the massing together of solid particles and their separation from the liquid in which they have been suspended. Another advantage offered by the composite sheet, particularly as it may be used for conducting agglutination tests, is the action of the lens paper in masking the spot formed by the bulk of the liquid on the filter paper beneath. In the case of agglutination, this masking of the lower spot permits a small amount of dye-stained bacteria on the lens paper to stand out very prominently against a comparatively light background.

Although I have described a particular composite sheet, it is obvious that it is possible for said sheet to have several variations in structure and still function in an almost identical manner. In view of this fact, I do not wish to confine my invention to the sheet whose specification has been presented above, but desire to include in the scope of my invention the several variations in the structure of this sheet as will be hereinafter described in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A means for conducting drop reaction tests, such as serological tests or the like, consisting of a serological test composite sheet consisting of a thin sheet of lens paper positioned face to face with a comparatively thick sheet of filter paper and both sheets fastened so that they are held in apposition but with the major portion of their contacting surfaces free from each other and disconnected.

2. A means for conducting drop reaction tests, such as serological tests or the like, consisting of a thin sheet of absorbent material positioned face to face with a comparatively thick sheet of absorbent material and both sheets fastened so that they are held in apposition but with the major portion of their contacting surfaces free from each other and disconnected.

3. A means for conducting drop reaction tests consisting of a drop reaction test composite sheet which consists of a relatively thin sheet of lens paper and a relatively thick sheet of filter paper positioned against each other but free and disconnected from each other except a small area at the edges of said sheets.

DONALD E. STOVER.