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TEST SAMPLE CONTAINER
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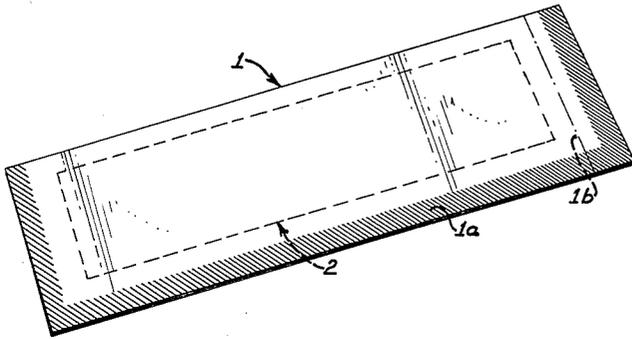


Fig. 3

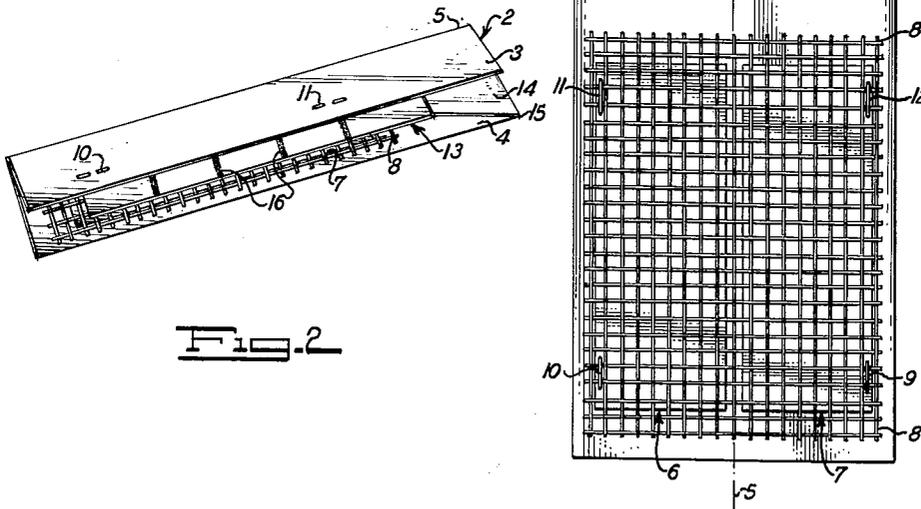
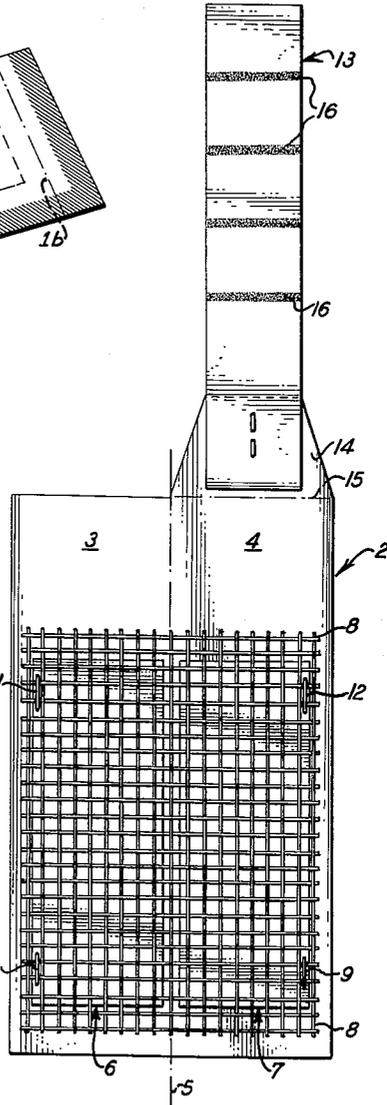


Fig. 2

Fig. 1



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TEST SAMPLE CONTAINER

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4 Claims. (Cl. 206-46)

This invention relates to new and useful improvements in containers for collecting, shipping and testing devices for liquid specimens for industrial and diagnostic sampling. More particularly it embraces improved devices for collecting biological fluids, such as urine, blood and the like for preservation during storage and transportation by mail and similar means to a laboratory where the specimens may be readily tested for the determination of the presence of various materials for diagnostic and therapeutic purposes.

In certain industrial processes fluids may be present in various degrees of concentration and hence necessitate constant checking. In addition, the chemical contents of fluids used in various processes may likewise necessitate such close supervision as is possible only with the aid of a complete laboratory and laboratory staff. Small concerns may with the aid of the device of this invention, sample their various chemical formulations, and ship these samples in the compact, unitary mailable container herein described by air or mail without incurring an excessive amount of expense or necessitating an expert chemist or technologist.

Likewise, in the diagnosis of various body fluids for sugar content, albumin, blood and the like or where some of the more complex immunological or pathological tests necessitating excessively complex laboratory procedures are necessary, it is a decided advantage to be able to transmit a sample of the biological fluid to a laboratory where adequate means is provided for the carrying out of the necessary tests. Such a device is also primarily adapted for use in emergencies where a patient cannot be readily moved or cannot afford the expense of travel to a properly equipped test laboratory or where urine samples must be shipped daily in order to provide a constant check on the patient's diet and progress.

It is a primary object of this invention to provide a simple improved means for collecting a biological fluid specimen such as urine, drying the specimen, preserving it and providing means for shipping it by mail or otherwise without deterioration or decomposition of the sample.

Another object hereof is to provide a shipping container which includes a desiccant for drying the specimen.

Still another object is to provide a sampling device which has a number of individual areas which may be separately tested without risking contamination by a previous test.

It is an additional object to provide an economical sample container and shipping container which can be easily disposed of and necessitates no cleaning and washing of laboratory equipment.

Another object is to provide a sampling device which has its own individual coding number impressed adjacent the sample for facilitating and simplifying the keeping of records with respect to the various tests undertaken.

These and other objects will be readily understood and the novel features of the present invention will become obvious upon reference to the accompanying drawing wherein:

FIGURE 1 is a top plan view of a shipping folder constructed in accordance with the present invention;

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FIGURE 2 is a perspective view of the sample container in closed condition; and

FIGURE 3 is a view of a metallic foil, moisture impervious envelope with the urine sample shipping folder sealed therein.

Referring in more detail to the drawings illustrating a preferred embodiment of this invention, 1 is a moisture-proof envelope of plastic or preferably of metallic-foil construction. The edges 1a of metallic-foil envelope 1 are preferably sealed by crimping. The envelope is opened by cutting with a pair of scissors along one edge as indicated by the broken line 1b, whereafter the folder 2 may be extracted by shaking. The folder 2, FIGS. 1 and 2, comprises cardboard front cover 3 and back cover 4 folded along edge 5 to form a composite unit. Inside front cover member 3 is a sheet or porous cellulose package or pad of desiccant material 6, i.e. silica gel. A similar type of desiccant material 7 is on the inside back cover member 4. A porous woven plastic, glass cloth or similar porous non-wettable material 8 covers both sheets of desiccant material 6 and 7 and is fastened to the inside of folder covers 3 and 4 by staples 9, 10, 11, 12. A tab of cellulose 13 or similar bibulous urine sample absorbing material is stapled or otherwise fastened to a flap 14 of folder 2. Flap 14 may be folded along edge 15 so that cellulose tab 13 may be made to lie over sheet of desiccant material 7 with the non-wettable woven plastic 8 sandwiched in between. Then by folding front cover 3 along edge 5, the sheet of desiccant material 6 will overlie cellulose tab 13 with the porous non-wettable woven plastic material 8 sandwiched in between. In this assembled folder the cellulose tab 13 impregnated with the urine sample is separated from and kept out of direct contact with desiccant pads 6 and 7 by the porous woven plastic material 8 which, however, allows free passage of water vapor from the urine sample on absorbing tab 13 to the sheets of desiccant material 6, 7.

Preferably, the cellulose tab 13 is divided into separate individual areas or sections for each test run by being provided with water-proof barriers or separator strips 16 which are formed by impregnating tab 13 transversely along narrow areas with a solution of cellulose acetate, or a similar plastic dissolved in acetone and thereafter evaporating the solvent to form discrete sample holding areas. These barriers 16 ensure the proper degree of saturation of each area when water is added to one unit area in order to carry out a diagnostic test while maintaining an adjoining unit area dry. Thus each separate area is uncontaminated and available for use in specific test reactions for subsequent diagnostic tests. These barriers 16 also serve as guides for cutting off unit portions of urine specimens for use in test tube reactions and solvent extraction of urine ingredients.

For most biological samples, the sample collecting cellulose tab 13 is impregnated with a suitable preservative agent such for example as a 0.1% aqueous solution of phenylmercuric acetate and the impregnated tab 13 is then dried leaving the phenylmercuric acetate preservative in the cellulosic tab 13. Various other preservative agents such as phenylmercuric nitrate, phenylmercuric gluconate, and similar preservative compounds may be used.

Preferably, the folder 2, having an over-all dimension of 2½ by 5 inches in size, may be readily placed in its moisture impervious metallic foil or plastic container 1, FIG. 3, which in turn can be inserted into an ordinary envelope and mailed to a testing laboratory. At the laboratory satisfactory tests may be made by effecting appropriate adaptations of existing tests for glucose, protein, and blood. Thus in the case of a glucose test the procedure is modified by adding 3 drops of water to one of

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the sections of tab 13 and allowing the test section to soak for about 30 seconds whereupon a test stick of a prepared type containing glucose oxidase, a peroxidative type of reactant and an indicator is pressed against the water saturated test section and after removal a reading such as by indicator color change may be made from the test stick. Similarly a protein test may be carried out by simply using the requisite stick tests pressed against other water saturated sections of tab 13.

In the case of a test for blood in urine the procedure is modified by placing a prepared test tablet directly on a dry section of tab 13. The tablet preferably contains an indicator such as orthotolidine, a peroxide such as strontium peroxide, calcium acetate, tartaric acid, sodium bicarbonate and perhaps a masking red dye. Three drops of water are added to moisten the tablet and the reagents are washed down onto the dry section of tab 13. At the end of two minutes, the development of a blue color on the section of the tab 13 immediately around the tablet indicates the presence of blood in the urine sample.

A more exact test for glucose in urine, a test of a more quantitative type than the stick test, can be carried out by the following modification of a tablet type test. A section of the dry device (i.e. tab 13) is cut off and placed in a test tube. Then 1 ml. of water is added to extract the glucose and the test tube shaken vigorously and intermittently for about one minute. The paper is then removed from the test tube and a glucose test reagent tablet added. The tablet preferably contains copper sulfate, citric acid, sodium hydroxide and sodium carbonate. Heat sufficient to boil the solution is provided by the solution of the sodium hydroxide and the reaction between sodium hydroxide and citric acid. Fifteen seconds after the boiling stops, the test tube is shaken gently and the color reaction is compared with a special color chart for the two-drop method of determining the glucose content of a sample. This gives a quantitative determination whereas the stick test above described is merely qualitative and indicates the presence or absence of glucose.

It is to be noted that by using the device of this invention, the problems due to spilling or leaking of urine and the danger of breaking the container during transportation are all eliminated. In addition the use of a preservative insures no deterioration of the urine specimen and the small compact size of the sample holding device renders it easily carried in the pocket or purse. In addition the dry type pack hereindescribed is readily available.

A number of other advantages accrue in the use of the device of this invention. Thus, the dry unused portions of the tab 13 may be filed away for future testing. Furthermore, the specimens are odorless and have a much

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more acceptable appearance than normal urine samples. With the preservative present in the tab 13, the samples may be stored indefinitely.

It is to be noted that a number of changes and modifications in the form, construction and arrangement and combination of the various parts of this shipping and preserving container may be made without departing from the principles herein described and the scope of the appended claims.

10 What is claimed is:

1. A device for collecting and transporting a urine sample comprising a front sheet and a back sheet each sheet having an inner and outer face and being joined along a common edge to form a folder which in closed position places the inner face of a front sheet in closely contiguous position with an inner face of a back sheet, a layer of moisture absorbent material on the inner face of each sheet, a non-wettable porous screen on each layer of moisture absorbent material, a section of bibulous urine sample absorbing material affixed to one edge of the folder and foldable into the opened folder between the non-wettable porous screens and out of direct contact with the layers of absorbent material and a deposit of urine preservative material on the bibulous material to stabilize the urine sample.

2. A device for collecting and transporting a urine sample according to claim 1 wherein the moisture absorbent material on the inner face of each sheet is silica gel.

3. A device for collecting and transporting a urine sample according to claim 1 wherein the urine preservative material on the bibulous material is selected from the group consisting of phenylmercuric acetate, phenylmercuric nitrate and phenylmercuric gluconate.

4. A device for collecting and transporting a urine sample comprising a front sheet and a back sheet each sheet having an inner and outer face and being joined along a common edge to form a folder which in closed position places the inner face of a front sheet in closely contiguous position with an inner face of a back sheet, a layer of moisture absorbent silica gel on the inner face of each sheet, a non-wettable porous screen on each layer of moisture absorbent silica gel, a section of bibulous urine sample absorbing material affixed to one edge of the folder and foldable into the opened folder between the non-wettable porous screens and out of direct contact with the layers of absorbent silica gel and a deposit of phenylmercuric acetate as a urine preservative material on the bibulous material to stabilize the urine sample.

50 No references cited.