June 25, 1957 E. RIGBY 2,797,150

APPARATUS FOR COLLECTING A LIQUID SAMPLE

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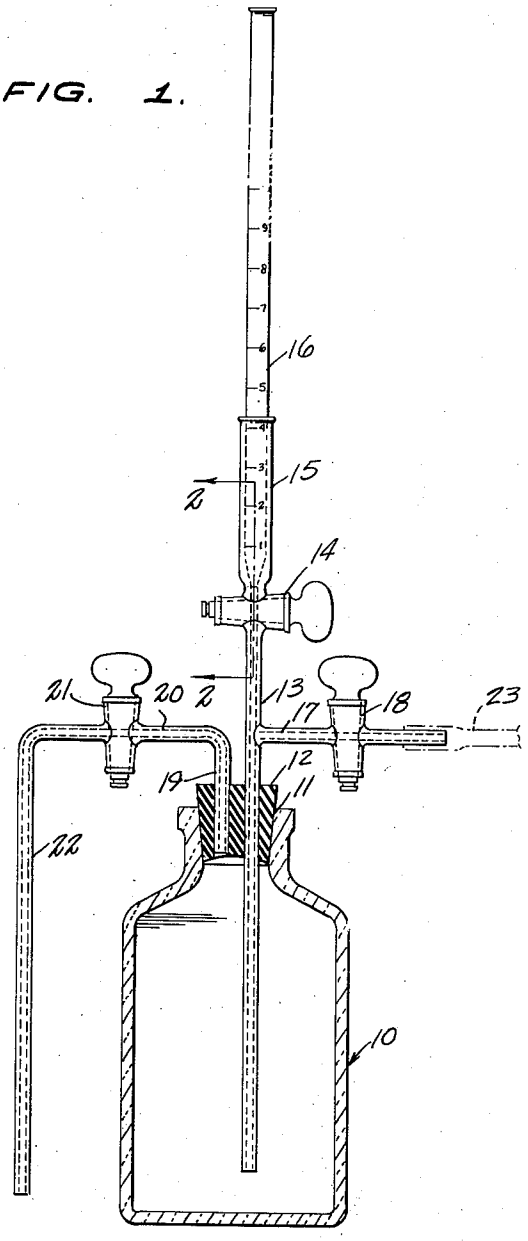
FIG. 1.



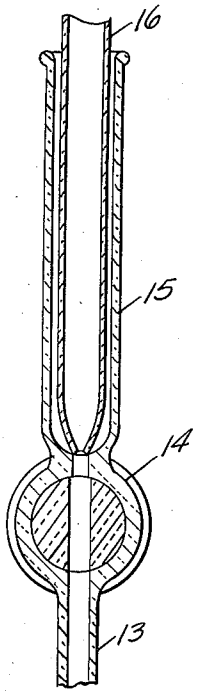


FIG. 2.

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APPARATUS FOR COLLECTING A LIQUID SAMPLE

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3 Claims. (Cl. 23—259)

The present invention relates to an apparatus for collecting a liquid sample in an air free container.

An object of the present invention is to provide an apparatus for collecting a liquid sample in a container in such a way as to have the sample totally uncontaminated by air.

Another object of the present invention is to provide an apparatus for collecting a liquid sample in an air free container which has means for introducing treating solutions to the collected sample without exposing the collected sample to the air.

A further object of the present invention is to provide an apparatus for collecting a liquid sample in an air free container which has means for introducing treating solutions to the collected sample, and one which enables the user to shake or swirl the container to mix the treating solutions with the collected sample.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in connection with the annexed drawing, in which:

Figure 1 is an elevational view of the apparatus of the present invention shown installed in a bottle, the bottle and the stopper of the bottle being shown in cross-section, and

Figure 2 is a sectional view, on an enlarged scale, taken on the line 2—2 of Figure 1.

Referring in greater detail to the drawing in which like numerals indicate like parts in the two views, the apparatus of the present invention comprises an upstanding bottle 10 having an open top 11. A stopper 12 closes the open top 11 of the bottle 10. A first upstanding tube 13 extends through the stopper 12 through a hole provided in the latter and has its lower end adjacent to and spaced above the bottom of the bottle 10. The portion of the tube 13 adjacent the upper end of the latter is exteriorly of and above the stopper 12.

A first stop cock 14 extends transversely through the exterior portion of the tube 13 inwardly of the upper end of the latter. An auxiliary tube 15 of a cross-sectional area larger than the tube 13 extends vertically from the upper end of the tube 13. An upstanding pipette 16 is loosely received in and supported in the auxiliary tube 15.

A branch tube 17 projects transversely from the portion of the tube 13 which is exteriorly of the bottle 10 between the stop cock 14 and the stopper 12. A second stop cock 18 extends vertically through the branch tube 17 intermediate the ends of the latter.

The bottom face of the stopper 12 is concave and a second upstanding tube 19 extends into the stopper 12 through a hole provided therein and has its lower end adjacent to and spaced above the concave lower end of the stopper 12. The upper end of the second tube 19 is exteriorly of and spaced above the stopper 12. A second branch tube 20 projects transversely from the upper end of the second tube 19 and a third stop cock 21 extends vertically through the second branch tube 20 intermediate the ends of the latter.

A third upstanding tube 22 is positioned exteriorly of and in parallel relation with respect to the bottle 10 and has its lower end below the lower end of the tube 13 and has its upper end dependingly secured to the free end of the second branch tube 20. Preferably, the bottle 10, the tubes 13, 15, 19, and 22, and the stop cocks 14, 18, and 21 are each fabricated of heat-resistant glass, the stop cocks 14, 18, and 21 having ground glass matching surfaces which make them airtight and watertight when in closed position. A rubber tube 23, shown in dotted lines in Figure 1, is provided and has one end surrounding and secured to the portion of the tube 17 exteriorly of the stop cock 18. The rubber tube 23 should be of a length more than sufficient to extend to a source of liquid to be sampled.

The apparatus of the present invention may be used to collect a liquid sample in the following manner:

The free end of the rubber tube 23 is connected to a source of liquid to be sampled, such as the cooling coil of a liquid cooler or liquid-treating device. Each of the stop cocks 14, 18, and 21 is then opened and the liquid is permitted to flow into the tube 13 and thence into the bottle 10 expelling the air therefrom through the tube 19, the tube 20, and through the tube 22 to a place of discharge or waste. The liquid as it fills the bottle 10 will drive all of the air out of the bottle 10 and any air clinging to the underside of the stopper 12 can be removed therefrom by shaking the bottle 10. If the underface or end of the stopper 12 is first thoroughly moistened before insertion in the neck of the bottle, no air will be found to cling to the underface of the stopper 12. The liquid is permitted to flow freely through the bottle 10 until all of the air is driven therefrom and then the stop cock 21 is closed so that the liquid rises in the tube 13 through the stop cock 14 into the auxiliary tube 15 and overflows from the latter. The stop cock 18 is then closed, shutting off the flow of liquid from the source, and the stop cock 14 is also closed to isolate the liquid within the bottle 10 and within the tube 13 in a totally air free condition. Fixing solutions and treating solutions may now be introduced by means of the graduated pipette 16, the pipette being inserted into the auxiliary tube 15 displacing some of the liquid therefrom. The lower end of the pipette 16 should have a close fit with the upper end of the tube 13 above the stop cock 14 so that upon opening of the stop cock 14 and the stop cock 21 the treating liquid within the pipette 16 will flow into the tube 13 and thence into the bottle 10. When the treating liquid within the pipette 16 has been introduced into the tube 13 the stop cocks 14 and 21 are again closed and the bottle 10 may be swirled or shaken to mix the treating liquid with the liquid within the bottle 10. The extra length of the rubber tube 23 permits this shaking or swirling of the bottle without disconnecting the rubber tube 23 from the tube 17. Should more liquid be required or should more liquid be needed so that it extends in the auxiliary tube 15 to a point sufficiently above the lower end of the pipette 16 to insure that the lower end of the pipette 16 has an air free connection with the tube 13, the stop cocks 14 and 18 are again opened to permit liquid to flow upwardly into the auxiliary tube 15. To replenish the liquid within the bottle 10 it is only necessary to open the stop cocks 18 and 21.

It will be seen therefore that the apparatus of the present invention enables the user thereof to obtain a sample of liquid and to maintain the sample of liquid in a totally uncontaminated condition.

What is claimed is:

1. Apparatus for the collection of a liquid sample and retaining it against contamination comprising an upstanding bottle having an open top, a stopper closing the

open top of said bottle, a first upstanding tube extending through said stopper and having the lower end adjacent to and spaced above the bottom of said bottle and having the portion of said tube adjacent the upper end exteriorly of and above said stopper, a first stop cock extending transversely through said exterior portion of said tube inwardly of the upper end of said tube, a branch tube projecting transversely from said exterior portion of said tube between said stop cock and said stopper, a second stop cock extending vertically through said branch tube intermediate its ends, a second upstanding tube extending into said stopper and having the lower end adjacent to and spaced above the lower end of said stopper and having the upper end exteriorly of and spaced above said stopper, a second branch tube projecting transversely from the upper end of said second tube, a third stop cock extending vertically through said second branch tube intermediate its ends, and a third upstanding tube positioned exteriorly of and in parallel relation with respect to said bottle and having the lower end below the lower end of said first tube and having the upper end dependingly secured to the free end of said second branch tube.

2. Apparatus for the collection of a liquid sample and retaining it against contamination comprising an upstanding bottle having an open top, a stopper closing the open top of said bottle, a first upstanding tube extending through said stopper and having the lower end adjacent to and spaced above the bottom of said bottle and having the portion of said tube adjacent the upper end exteriorly of and above said stopper, a first stop cock extending transversely through said exterior portion of said tube inwardly of the upper end of said tube, an auxiliary tube extending vertically from the upper end of said tube, said auxiliary tube being of a cross-sectional area larger than said tube, a branch tube projecting transversely from said exterior portion of said tube between said stop cock and said stopper, a second stop cock extending vertically through said branch tube intermediate its ends, a second upstanding tube extending into said stopper and having the lower end adjacent to and spaced above the lower end of said stopper and having the upper end exteriorly of and spaced above said stopper, a second branch tube projecting transversely from the upper end of said second

tube, a third stop cock extending vertically through said second branch tube intermediate its ends, and a third upstanding tube positioned exteriorly of and in parallel relation with respect to said bottle and having the lower end below the lower end of said first tube and having the upper end dependingly secured to the free end of said second branch tube.

3. Apparatus for the collection of a liquid sample and retaining it against contamination comprising an upstanding bottle having an open top, a stopper closing the open top of said bottle, a first upstanding tube extending through said stopper and having the lower end adjacent to and spaced above the bottom of said bottle and having the portion of said tube adjacent the upper end exteriorly of and above said stopper, a first stop cock extending transversely through said exterior portion of said tube inwardly of the upper end of said tube, an auxiliary tube extending vertically from the upper end of said tube, said auxiliary tube being of a cross-sectional area larger than said tube, a branch tube projecting transversely from said exterior portion of said tube between said stop cock and said stopper, a second stop cock extending vertically through said branch tube intermediate its ends, a second upstanding tube extending into said stopper and having the lower end adjacent to and spaced above the lower end of said stopper and having the upper end exteriorly of and spaced above said stopper, a second branch tube projecting transversely from the upper end of said second tube, a third stop cock extending vertically through said second branch tube intermediate its ends, a third upstanding tube positioned exteriorly of and in parallel relation with respect to said bottle and having the lower end below the lower end of said first tube and having the upper end dependingly secured to the free end of said second branch tube, and an upstanding pipette loosely received in and supported in said auxiliary tube.

References Cited in the file of this patent

UNITED STATES PATENTS

2,294,655	Einstein	Sept. 1, 1942
2,533,726	Floyd	Dec. 12, 1950
2,539,082	Hustinx	Jan. 23, 1951