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Vollick et al.

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[54] **GAS BLAST WIPING COLLAR FOR CLEANING PIPETTES**

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[52] **U.S. Cl.** ..... **73/425.4 P,** 15/316 R, 15/404, 23/259, 134/37

[51] **Int. Cl.** **B01l 3/02,** B08b 5/02

[58] **Field of Search** ..... 134/37, 34, 166 C, 167 C, 134/168 C, 169 C; 73/425.4 P; 15/104.04, 404, 405, 406, 303, 306 R, 316 R, 316 A, 312 R, 312 A; 23/259

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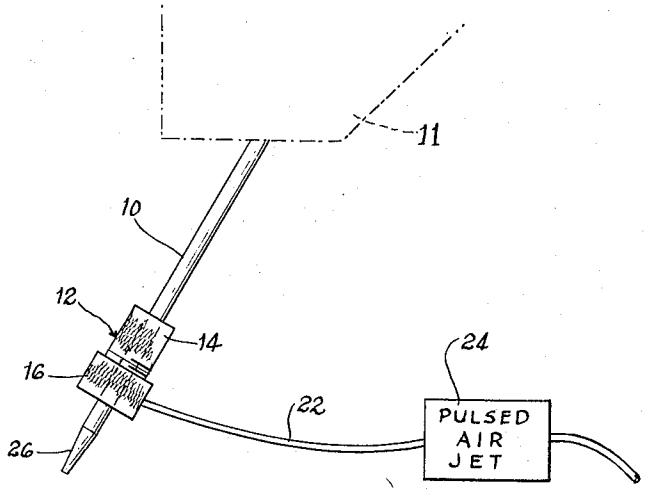
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[57] **ABSTRACT**

A system for cleaning a pipette includes a gas dispensing means attached to the pipette and defining an orifice for directing gas onto the pipette surface. By controlling the application of gas through the dispensing means, the pipette surface can be maintained free of liquid thereby avoiding inaccurate testing while also avoiding possible contamination of the pipette.

5 Claims, 4 Drawing Figures



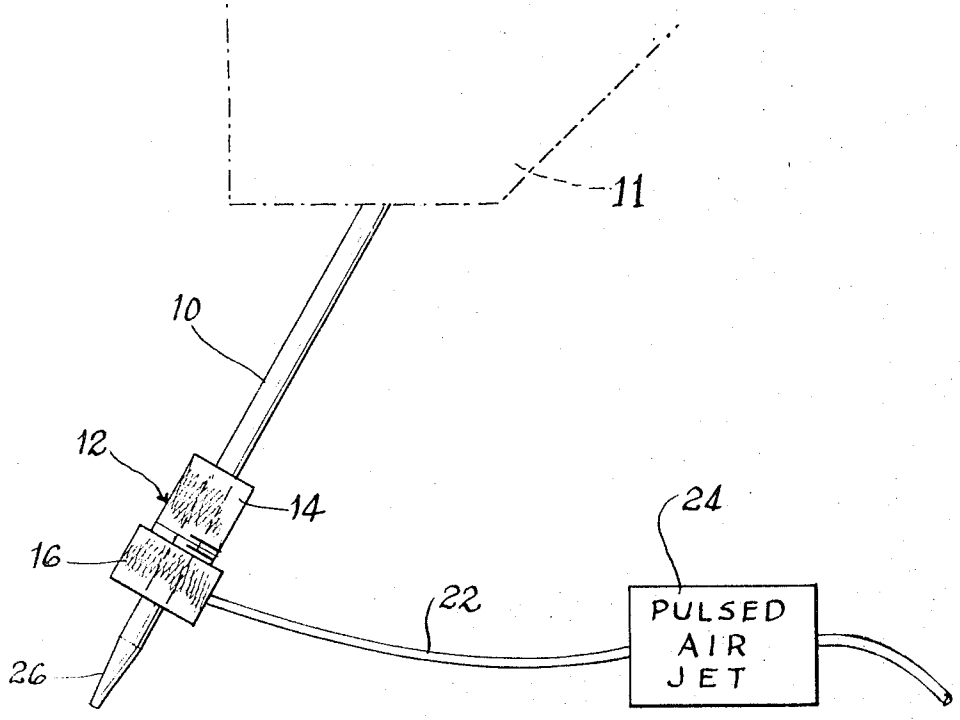


FIG. 1

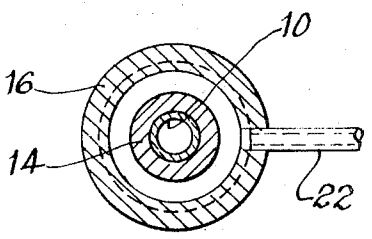


FIG. 3

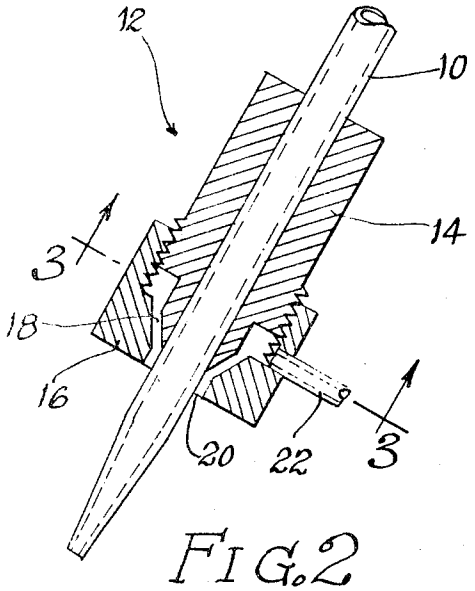


FIG. 2

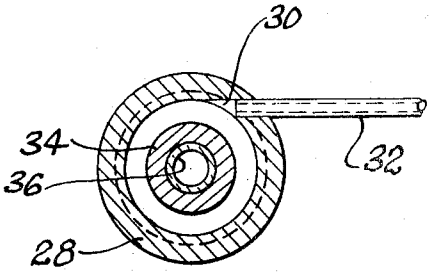


FIG. 4

GAS BLAST WIPING COLLAR FOR CLEANING PIPETTES

This invention relates to pipette constructions. In particular, the invention is directed to the use of pipettes for obtaining samples of liquids in accurately measured amounts.

In various testing operations, for example, in the analysis of blood and urine samples, it is often necessary to obtain accurately measured liquid portions. In the testing referred to, it is also often necessary to dilute the samples to fixed and known values.

Scientific instruments are available for accomplishing the operations referred to. Commercial diluters, for example, of the type manufactured by Hobbs Scientific, Inc. provide an example of the type of instruments useful for applications of the type referred to. In such constructions, a pipette is employed for drawing a sample which is mixed with a diluent and then delivered by the pipette as a diluted sample.

In the course of such operations, the pipette, and in particular the external surfaces thereof, are in contact with liquid. This liquid tends to cling to the pipette surfaces, and must be removed so that the liquid will not enter into the measured samples and thereby destroy the accuracy of amounts handled or of the diluent ratio. Typically, the exterior surfaces of pipettes are cleaned by wiping liquid particles with a tissue; however, this leads to certain problems. Specifically, incomplete wiping will result in a contaminated solution. Furthermore, the presence of a tissue at the end of a pipette can readily draw off a portion of a sample which affects the diluent ratio. Since a typical sample drawn into a pipette may be only 50 microliters, even very small disruptions of the liquid amounts can lead to major errors.

It is an object of this invention to provide an improved system for the handling of samples through the use of pipettes.

It is a more specific object of this invention to provide an improved cleaning arrangement for pipettes whereby complete and reliable cleaning can be accomplished with great efficiency.

These and other objects of this invention will appear hereinafter and for purposes of illustration, but not of limitation, specific embodiments of the invention are shown in the accompanying drawings in which:

FIG. 1 is an illustration of a pipette construction associated with liquid cleaning means of the type contemplated by this invention;

FIG. 2 is an enlarged cross-sectional view of the cleaning means in association with a pipette;

FIG. 3 is a horizontal sectional view taken about the line 3—3 of FIG. 2; and,

FIG. 4 is a horizontal sectional view illustrating the alternative form of the invention.

This invention relates to a method and means for use in conjunction with pipettes being employed for handling liquid samples. In particular, the invention is concerned with means for cleaning the exterior surfaces of the pipette after exposure of the pipette to liquid.

The structure of the invention comprises a collar structure which is fit onto a pipette body. The collar includes a dispensing opening and a source of fluid, for example air, is connected to the collar. In use, the fluid is dispensed onto the pipette surfaces for removal of any liquid thereon thus insuring accurate sampling and minimizing the possibility of contamination. The collar orifice is preferably adjustable, and the fluid source is preferably provided with pulsating means whereby various conditions of operation can be achieved.

The accompanying drawings illustrate a pipette **10** which is maintained in a suitable receptable **11.** This receptacle may be a part of a diluter of the type previously referred to. In the use of such structures, the pipette surfaces are brought into contact with liquid during drawing of a sample and during delivery of a diluted sample.

An air dispensing structure **12** is employed in conjunction with the pipette **10.** This dispensing structure comprises a collar formed of a first tubular member **14** and a second tublar member **16.** The internal diameter of the member **14** approximates the external diameter of the pipette whereby the member **14** can be conveniently held or attached in position on the pipette body.

The member **14** is externally threaded for receipt within the threaded bore of the member **16.** An annular fluid channel **18** is defined between the surfaces of the members **14** and **16,** this channel terminating in a dispensing opening **20.** The dimensions of the channel **18** can be varied by rotating the member **14** so that some control is provided for the dispensing of fluid.

A hollow tube **22** is fit within an opening defined by the member **16.** This tube thus serves to deliver air or other fluid for movement of the air through the passage **18** and out of the opening **20.** The tube **22** is connected to a source **24** of pulsating air. This air supply means may be of any conventional type resulting in the application of bursts of fluid onto the pipette surfaces.

FIG. **4** illustrates a modified version of the invention. In this instance, the air dispensing structure comprises an outer tubular member **28** defining a passage **30** which receives the end of tube **32.** The inner tubular member **34** fits around pipette **36** in the manner previously described.

The introduction of air through the tube **32** results in a swirling action of the air relative to the pipette surface. This provides a highly effective alternative means for cleaning the surface.

In the use of a pipette of the type described, the tip **26** is immersed in a liquid sample, and liquid is drawn into the pipette body. When the proper amount of a sample has been drawn, the pipette is removed from the sample, and the cleaning mechanism of the invention is operated. By providing short bursts of air, it has been found that the exterior pipette surfaces become dry very quickly. This is accomplished without any contact with the surfaces, for example, by means of a tissue. Without this contact, there is no danger of contamination by any portions of the tissue or by any other substance. In addition, contact by a tissue at the outlet end of the tip **26** can result in the premature discharge of at least some liquid contents of the pipette. With the arrangement of this invention, that problem is completely eliminated.

In the event that the air is being dispensed in amounts which are too small or too large to achieve the desired results, the member **14** can be readily turned to increase or decrease the size of the passage **18.** Such variations are particularly desirable when different types of liquids are to be handled.

After a sample has been drawn and diluted, the pipette is again utilized for delivering the diluted sample to a desired container. Once this has been accomplished, the cleaning mechanism can again be em-

ployed to eliminate any residue which might be present on the body of the pipette.

It will be understood that various changes may be made in the above description which provide the characteristics of the invention without departing from the spirit thereof.

That which is claimed is:

1. In a pipette construction wherein the pipette is immersed in a liquid during use, the improvement in means for cleaning the pipette comprising a gas dispensing means attached to the pipette, means for supplying gas to said dispensing means, said dispensing means comprising a member attached to the body of the pipette in a position spaced from the end of the pipette through which liquid passes into and out of the pipette, said member comprising a first tubular portion defining a central passage approximating the exterior configuration of said pipette, said first tubular portion being attached onto said pipette for maintaining the tubular portion in spaced relationship relative to the end of the pipette, and a second tubular portion threaded onto said first tubular portion thereby forming an orifice surrounding the pipette body and opening in a direction toward said end of the pipette, and including means for adjusting the size of said orifice, said orifice being defined between the tubular portions and being adjustable upon relative rotation of the tubular portions, and operation of said dispensing means applying a gas stream through the orifice to the exterior surface of said pipette thereby removing liquid particles from the pipette surface.

2. A construction in accordance with claim **1** wherein said end of the pipette comprises a small diameter portion with the pipette body tapering outwardly away from said end to a juncture with a large diameter portion which comprises said exterior configuration of the pipette.

3. A construction in accordance with claim **1** wherein said gas comprises air, and means connected to said gas supplying means for intermittently supplying air to said dispensing means.

4. A construction in accordance with claim **1** wherein the means for supplying gas to said dispensing means comprise an air tube connected to said dispensing means, said air tube directing air radially inwardly toward said first tubular portion.

5. A construction in accordance with claim **1** wherein the means for supplying gas to said dispensing means comprise an air tube, said tube directing gas tangentially relative to the axis of said pipette.

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