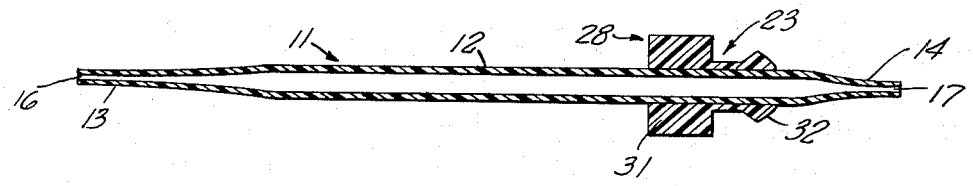
April 13, 1965 E. M. PEDERSEN 3,177,723

PIPETTE AND METHOD

Filed May 1. 1961

FIG. 1.



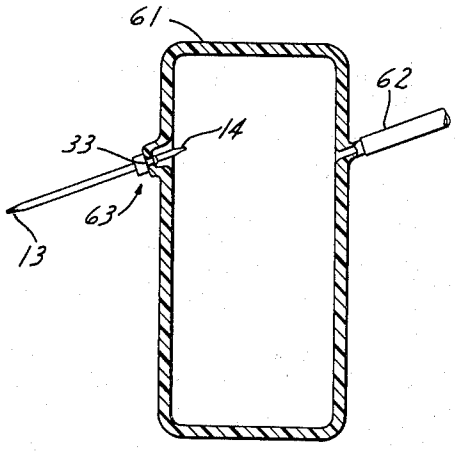


FIG. 2.

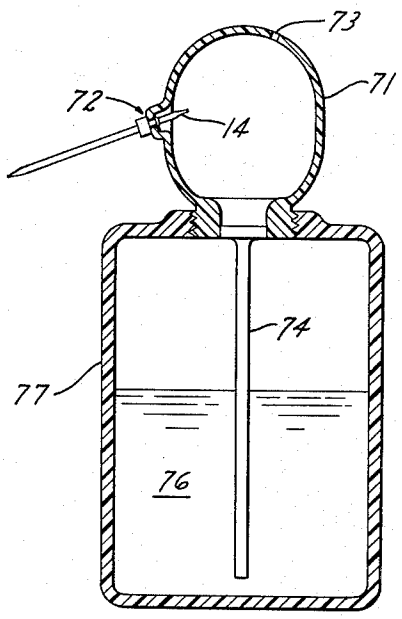


FIG. 3.

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PIPETTE AND METHOD

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This invention relates generally to an improved pipette.

Pipettes are employed to remove, transfer or measure small amounts of liquids. As is well known, pipettes are generally in the form of cylindrical tubes, usually glass. In one class of pipette, the tubes are graduated. In another type, the tubes have a predetermined length and inside diameter whereby in their full state, a predetermined fixed volume of liquid is retained between the meniscuses formed at the ends of the pipette.

Pipettes of the latter type are generally formed by cutting a piece of long tubing of uniform inside diameter into sections of predetermined length to form the individual pipettes having the desired volume. It is apparent that the accuracy is dependent upon the uniformity of the inside diameter of the tubing and of the length the sections.

Pipettes made of glass are relatively fragile and must be carefully handled. In recent years, pipettes have been formed which are made of plastic material whereby they are flexible.

It is a general object of the present invention to provide an improved pipette.

It is a further object of the present invention to provide an accurate pipette made of plastic material which is simple to manufacture.

It is a further object of the present invention to provide a pipette having a bore which is restricted at its ends to form capillary passages whereby it can retain a sample by capillary action which can be simply calibrated.

These and other objects of the invention will become more clearly apparent from the following description when taken in conjunction with the accompanying drawing.

Referring to the drawing:

FIGURE 1 shows a cross-sectional view of a pipette in accordance with the present invention;

FIGURE 2 shows a pipette of the type shown in FIGURE 1 in conjunction with a container; and

FIGURE 3 shows a pipette of the type shown in FIGURE 1 incorporated with an automatic pipette.

Referring to FIGURE 1, the pipette **11**, preferably made of a thermoplastic material, has a body portion **12** of substantially uniform predetermined inside diameter and end portions **13** and **14** of reduced diameter forming capillary openings or passages **16** and **17**, respectively.

The volume can be accurately adjusted by cutting the end **13** to the requisite length. A substantial error can be made in the location of the cut with only a minor error occurring in the volume. The percent error in volume due to a given error in length is dependent upon the relative volume of the body portion and the capillary portion.

A ferrule **28** is carried by the body portion **12** adjacent one end. The ferrule includes a collar portion **31** and an adjacent spaced raised portion. Together they form an annular groove **33**. The ferrule may for example be formed on the body portion by injection molding.

A pipette of the foregoing character can be inserted in a vessel **61** of the type shown in FIGURE 2 which includes an opening adapted to receive a tube **62**. The tube may, for example, be connected to a source of vacuum or pressure to control the vacuum or pressure within the vessel. The chamber also includes an opening **63** having rounded edges which receives the ferrule portion **28** of the pipette. The ferrule is inserted therein and snapped into place with the rounded portion of the

opening fitting into the annular groove **33** of the ferrule to retain the pipette and form a seal.

Operation of the apparatus is to insert the tip **13** of the pipette in a fluid to be measured, create a vacuum in the vessel by connecting the tubing **62** to a vacuum source. As soon as a drop of fluid is observed at the other end of the pipette, it is full and retains a predetermined volume of liquid. A subsequent application of pressure to the chamber by connecting the tube **62** to a source of pressure delivers the predetermined volume of liquid. If the vessel is made of deformable material, the increased and reduced pressure can be obtained by squeezing the vessel.

In FIGURE 3, there is shown an automatic pipette which the pipette is inserted in a dome **71** provided with an opening **72** for receiving the pipette. The dome also includes an opening **73**. The dome is connected to a tube **74** which extends downwardly into a liquid **76** retained in a plastic vessel **77**. Upon application of pressure to the vessel **77**, the liquid will rise upwardly into the dome and submerge the end **14** of the pipette. If, subsequently, the opening **73** is closed, the liquid will be forced outwardly into the pipette to fill the same. When the pipette is full, the opening **73** can be opened, pressure released on the vessel, and the liquid will flow downwardly back into the vessel having a predetermined measured amount in the pipette. Upon a subsequent application of pressure to the vessel with the opening **73** closed, pressure will be created in the dome **71** to deliver the measured amount of liquid.

I claim:

1. A pipette adapted to cooperate with a supporting means having an opening to receive the same comprising a body portion of tubular material, the ends of said body portion terminating in elongate drawn end portions each gradually converging to capillary dimension to define between said drawn end portions a measured volume, the interior surface of said body portion and said end portions forming a continuous surface between said drawn end portions, and a ferrule carried by said body portion adjacent one of said drawn end portions and disposed to support the last named end portion in cantilever style projecting through said opening so that the drawn end portions are free of the support, said ferrule including a collar portion and a raised portion adjacent said collar portion but spaced therefrom to form in combination with said collar portion an annular groove adapted to accommodate the material defining the opening to support the pipette from the support.

2. A pipette as in claim 1 wherein said ferrule is is molded onto a length of preformed tubular material.

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