

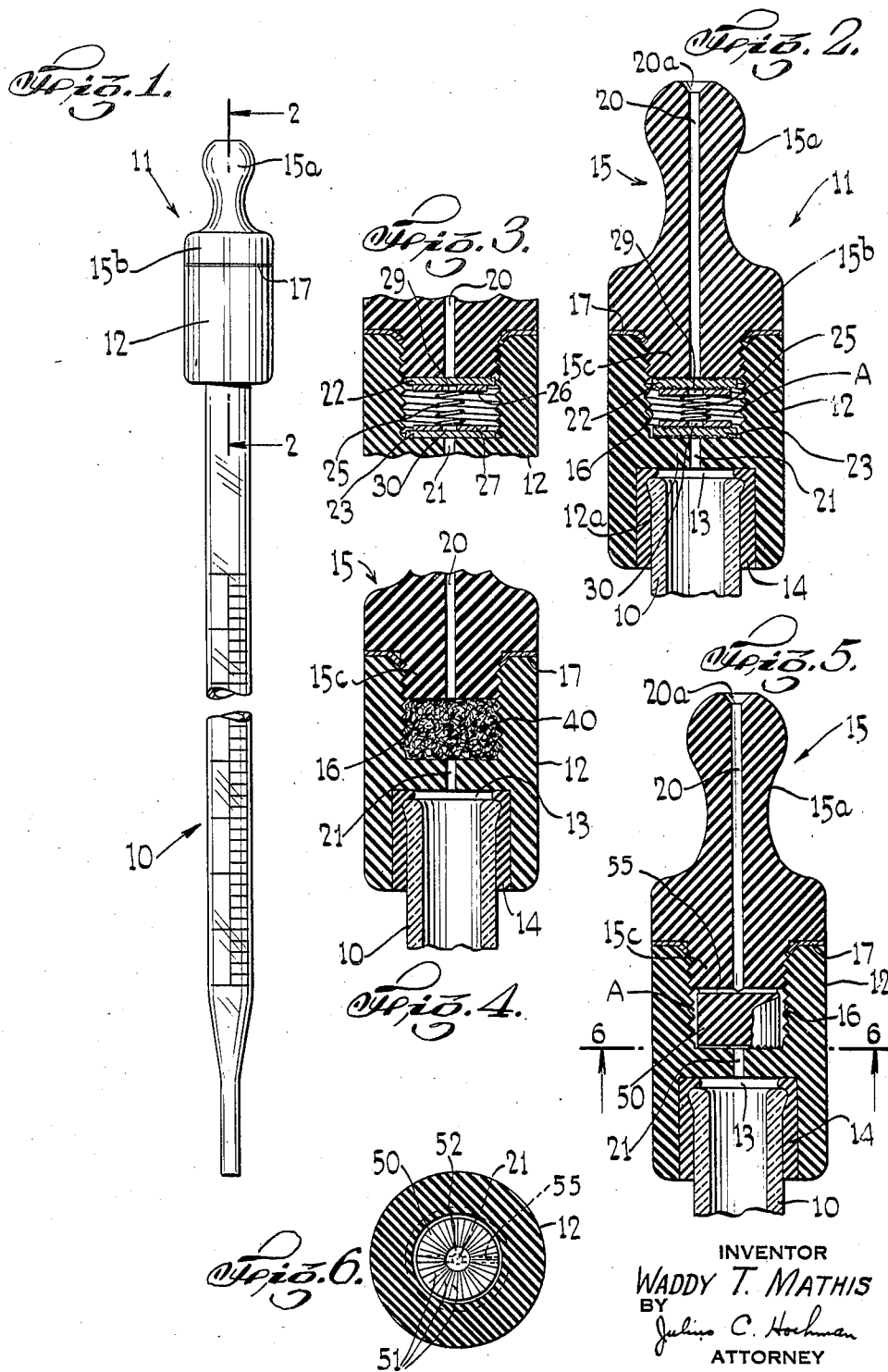
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SAFETY DEVICE FOR PIPETTES

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SAFETY DEVICE FOR PIPETTES

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This invention relates generally to pipettes and similar laboratory apparatus. More particularly my invention is directed toward an improved and novel safety device for use with pipettes or the like.

It is well known that in using pipettes for measuring, transferring or collecting liquids, the customary practice is to draw the liquid into the pipette by means of suction created by the mouth. Since the liquids in connection with which these pipettes are used are often of a poisonous or otherwise injurious nature it is obvious that this practice of sucking in the liquids is fraught with great danger because the liquid is apt to be inadvertently drawn into the mouth of the user.

It is therefore one of the objects of my invention to provide a safety device for pipettes and the like having certain novel and improved constructional features whereby the above described dangers attending the customary use of pipettes will be prevented.

Another object of my invention is to provide a pipette safety device of the character described which shall be simple in construction and operation and which at the same time shall be efficient and practical in use.

Other objects of my invention will in part be obvious and in part hereinafter pointed out.

In the accompanying drawing,

Fig. 1 is an elevational view of a pipette and safety device therefor, constructed in accordance with my invention;

Fig. 2 is an enlarged vertical cross-sectional view of the said safety device and a portion of said pipette;

Fig. 3 is a fragmentary view of the device shown in Fig. 2, but illustrating the action thereof;

Figs. 4 and 5 are cross-sectional views similar to Fig. 2, but showing modified forms of my invention; and

Fig. 6 is a cross-sectional view taken substantially on the line 6—6 of Fig. 5.

Referring now in detail to the drawing there is shown a pipette or tube 10 which may be of any suitable standard construction and adapted for use as a piece of laboratory apparatus for measuring, transferring or collecting liquids in the well known manner. As hereinbefore described, the customary practice in using the pipette is to create a suction in the tube by the mouth of the user to draw in the liquid. In accordance with my invention I have provided a safety device 11 for automatically preventing the liquid which has been drawn into the tube 10

from coming into contact with the lips or entering the mouth of the user.

The said device 11 may be made of any suitable material such as rubber, Bakelite or the like and comprises an attachment member 12 having a bottom opening 13 into which there is rigidly attached a resilient sleeve 14 designed to frictionally receive and hold therein the upper open end of the tube 10 as clearly shown in Fig. 2 of the drawing. To facilitate the creating of a suction in the tube 10 by means of the mouth there is provided a mouthpiece 15 comprising an upwardly extending nipple-shaped portion 15a and a base portion 15b. Depending from the base portion 15b is an externally threaded reduced shank 15c designed to be threadedly received in an internally threaded opening 16 in the top of the member 12. A suitable packing member 17 interposed between the base 15b of the nipple 15 and the member 12 renders the connection leakproof.

As shown in the drawing the mouthpiece 15 is provided with a vertically disposed through aperture 20 terminating at the top in a countersunk portion 20a, communicating with the surrounding atmosphere and communicating at the bottom thereof with the opening 16 in the member 12. The transverse wall 12a of the member 12 is also provided with an aperture 21 communicating with the openings 13 and 16 to thereby form a continuous air passageway from the mouthpiece 15 to the tube 10.

It is noted that the depending shank 15c is spaced a predetermined distance from the transverse wall 12c to provide a chamber A.

Disposed within the chamber A and overlying the apertures 20 and 21 are a pair of mats or washer members 22 and 23. A spring 25 interposed between the said members 22 and 23 normally urges them into contactive engagement with the adjacent surfaces surrounding the apertures 20 and 21 respectively. If desired, the spring 25 may have rigidly attached, to opposite ends thereof, metallic discs 26 and 27 designed to contactively engage the washer members 22 and 23.

In accordance with my invention and as shown in Fig. 2 the said mats or washer members 22 and 23 are made of a material which when dry present porous or roughened surfaces to the apertures 20 and 21, and are further so designed as to be of sufficient strength, when dry, to resist the tension of the spring 25. It is also noted that the members 22 and 23 are of such size as to be slightly spaced from the wall surrounding the chamber A.

It is thus seen from the above described construction that when a suction is applied at the opening 20a of the aperture 20, a free passage of air will be provided to withdraw the air from the tube 10. The path of travel of the air exhausted from the tube 10 will be through the aperture 21 and, due to the roughened surface of the member 23, in the interstices between the member 23 and the adjacent wall of the chamber A, and into the chamber A via the space between the edge of the member 23 and the surrounding wall of the chamber A. From the said chamber A the air will continue to be drawn into the aperture 20 via the space between the edge of the member 22 and the surrounding wall of the chamber A and in the interstices between the roughened surface of the member 22 and the adjacent surface of the shank 15c. If the members 22 and 23 are sufficiently porous, air will also travel directly through the material of the said members 22 and 23. To permit the free passage of such air through the members 22 and 23 I provide apertures 29 and 30 in the discs 26 and 27, respectively, as shown.

After an interval of time if the suction is continued fluid will be drawn into the pipette 10 to fill the same, after which it will be drawn up into the aperture 23. At this point the fluid will contact and be absorbed by the mat 23 to become wet and soft and thereby cause the roughened surface of the said members 23 to collapse under the tension of the spring 25 and to appear as shown in Fig. 3 of the drawing. Thus a smooth soft seal will be provided against the aperture 21 to prevent the fluid from rising any further. A similar action will occur with the member 22 to present a smooth soft seal against the aperture 20.

Any suitable type of material having the above described characteristics may be employed for the members 22 and 23. One such material which I have found to be highly satisfactory is asbestos paper.

The wet members 22 and 23 may be readily replaced by dry pads by unscrewing the mouthpiece 15 from the member 12.

In Figs. 4 to 6 I have shown two ways in which my invention may be satisfactorily accomplished without the use of pads 22 and 23 and the spring 25.

One such modified form, shown in Fig. 4, comprises a batch of glass wool 40 substantially filling the chamber A and overlying the apertures 20 and 21. When dry, the glass wool 40, being porous, will permit the passage of air there-through in its travel from the tube 10 to the aperture 20. When the fluid is brought into contact with the glass wool 40 it will enter into and fill up the interstices thereof to block the passage of the liquid therethrough.

In Figs. 5 and 6, instead of the glass wool 40, I provide an integral extension 50 on the threaded shank 15c, which is slightly smaller in diameter than the chamber A, to provide an annular space between the extension 50 and the adjacent wall of the opening 16, for the same purpose and function as described above in connection with the pads 22 and 23. The height of the extension is substantially the same as that of the chamber A, so that the bottom surface of the extension is in firm contact with the surface surrounding the aperture 21. The bottom surface of the extension 50, overlying the aperture 21 is provided with a series of fine grooves 51 to provide pas-

sages for the travel of the air from the tube 10 into the chamber A. It is noted that the upper portion of the extension 50 is provided with a horizontal cross-drilled opening 55 communicating with the aperture 20 to complete the air passageway from the chamber A to the aperture 20. When the bottom grooved surface of the extension 50 is dry, a suction may be created to draw fluid into the pipette 10. When the said fluid contacts the grooved surface of the extension, the greatly constricted passage presented by each individual groove acts as an effective barrier to the flow of the fluid. The viscosity of some fluids will prevent it from entering the fine grooves 51, while with other fluids the grooves will slowly fill up, to seal the aperture 21 and thus prevent fluid from being drawn up into the aperture 20. To provide greater efficiency for the action of the grooved extension 50, a central recessed area 52 may be provided in the bottom surface thereof directly overlying the aperture 21 and communicating with the grooves 51.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

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

1. A safety device for pipettes or the like comprising an attaching member provided with a mouthpiece and adapted to be attached to one end of said pipette, a chamber in said attaching member, a first aperture in said attaching member communicating with said chamber and with said pipette and a second aperture communicating with said chamber and extending through said mouthpiece so that a suction may be created in said pipette to draw fluid therein by withdrawing air from said second aperture and means for preventing said fluid from entering said second aperture.

2. A safety device for pipettes or the like comprising an attaching member provided with a mouthpiece and adapted to be attached to one end of said pipette, a chamber in said attaching member, a first aperture in said attaching member communicating with said chamber and with said pipette and a second aperture communicating with said chamber and extending through said mouthpiece so that a suction may be created in said pipette to draw fluid therein by withdrawing air from said second aperture and means for preventing said fluid from entering said second aperture, said last named means comprising a member in said chamber having a surface thereof overlying said first aperture, said surface being roughened and so arranged that when dry air will be permitted to flow into said chamber through said first aperture and when wet will seal the said first aperture from communication with said chamber.

3. A safety device for pipettes or the like comprising an attaching member provided with a mouthpiece and adapted to be attached to one end of said pipette, a chamber in said attaching member, a first aperture in said attaching mem-

ber communicating with said chamber and with said pipette and a second aperture communicating with said chamber and extending through said mouthpiece so that a suction may be created in said pipette to draw fluid therein by withdrawing air from said second aperture and means for preventing said fluid from entering said second aperture, said last named means comprising a member in said chamber overlying said first aperture, said last named member being of porous nature so that when dry, air will be permitted to pass therethrough from said first aperture and into said chamber and when wet will seal said first aperture from communication with said chamber.

4. A safety device for pipettes according to claim 2 in which said member in said chamber is resiliently urged into overlying relationship with respect to said first aperture.

5. A safety device for pipettes according to claim 2 in which a second member is provided in said chamber, said second member being similar in function and design to said first member in said chamber and adapted to overlie the said second aperture.

6. A safety device for pipettes according to claim 2 in which a second member is provided in said chamber, said second member being similar in function and design to said first member in said chamber and adapted to overlie the said second aperture and a spring in said chamber interposed between said first and second members to normally urge said first and second members into overlying position with respect to said first and second apertures respectively.

7. A safety device according to claim 2 in which said member in said chamber is made of asbestos paper or the like material.

8. A safety device according to claim 1 in which said means for preventing the fluid from entering said second aperture comprises a member in said chamber having a hard rough surface of such nature that when subjected to the action of a fluid it will soften and collapse under light pressure.

9. A safety device according to claim 1 in which said means in said chamber comprises glass wool or the like material.

10. A safety device for pipettes or the like

comprising an attaching member provided with a mouthpiece and adapted to be attached to one end of said pipette, a chamber in said attaching member, a first aperture in said attaching member communicating with said chamber and with said pipette and a second aperture communicating with said chamber and extending through said mouthpiece so that a suction may be created in said pipette to draw fluid therein by withdrawing air from said second aperture and means for preventing said fluid from entering said second aperture, said last named means comprising a member in said chamber having a surface thereof overlying said first aperture, and a second member in said chamber having a surface overlying said second aperture, said surfaces of said first and second members in said chamber being hard and rough and of such nature that when subjected to the action of a fluid they will soften and collapse under light pressure to seal said first and second apertures from communication with said chamber.

11. A safety device for pipettes according to claim 2 in which a second member is provided in said chamber, said second member being similar in function and design to said first member in said chamber and adapted to overlie the said second aperture and a spring in said chamber interposed between said first and second members to normally urge said first and second members into overlying position with respect to said first and second apertures respectively, the opposite ends of said spring being fixedly attached to washers which in turn contactively engage said first and second members in said chamber.

12. A safety device according to claim 1, in which the means for preventing the fluid from entering said second aperture, comprises a series of fine capillary grooves formed between a pair of opposed surfaces in said chamber.

13. A safety device according to claim 1 in which the means for preventing the fluid from entering said second aperture comprises a member in said chamber, integral with said mouthpiece and having a surface thereof overlying said first aperture, said last named surface comprising a series of fine grooved passageways for the purposes set forth.

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