Jan. 2, 1945. J. TANNENBERG 2,366,369

METHOD AND APPARATUS FOR TREATING PIPETTES AND THE LIKE

Filed Dec. 2, 1942 2 Sheets-Sheet 1

FIG. 5.

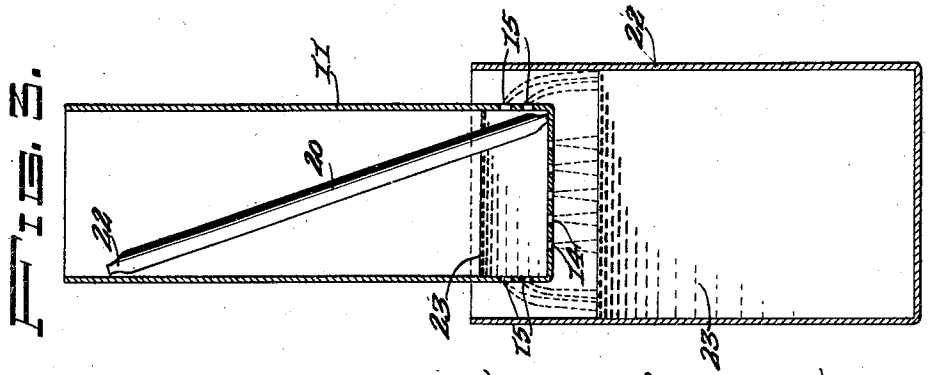


FIG. 4.

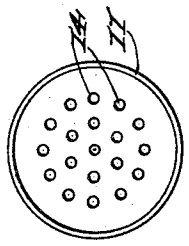


FIG. 2.

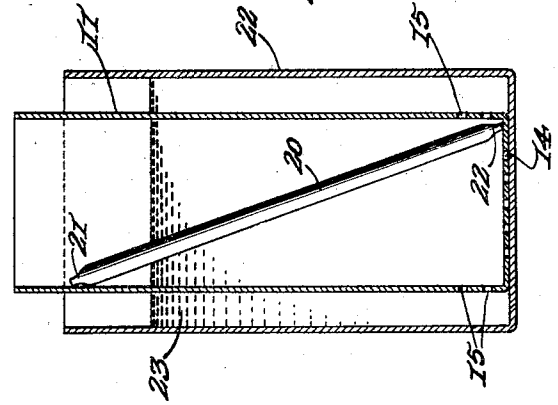
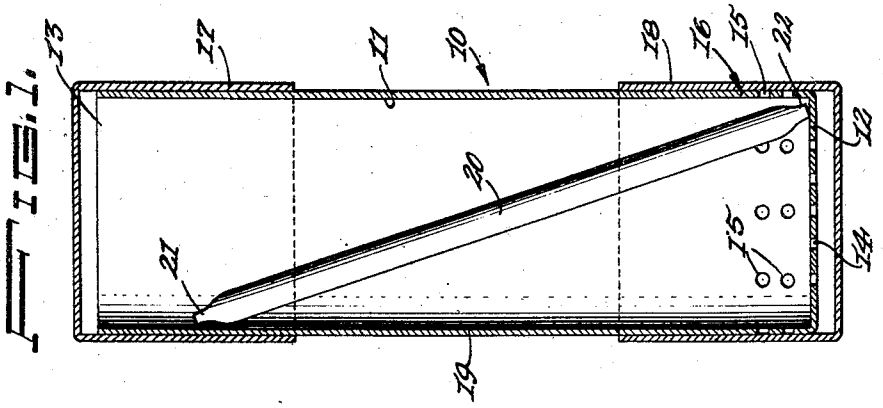


FIG. 1.



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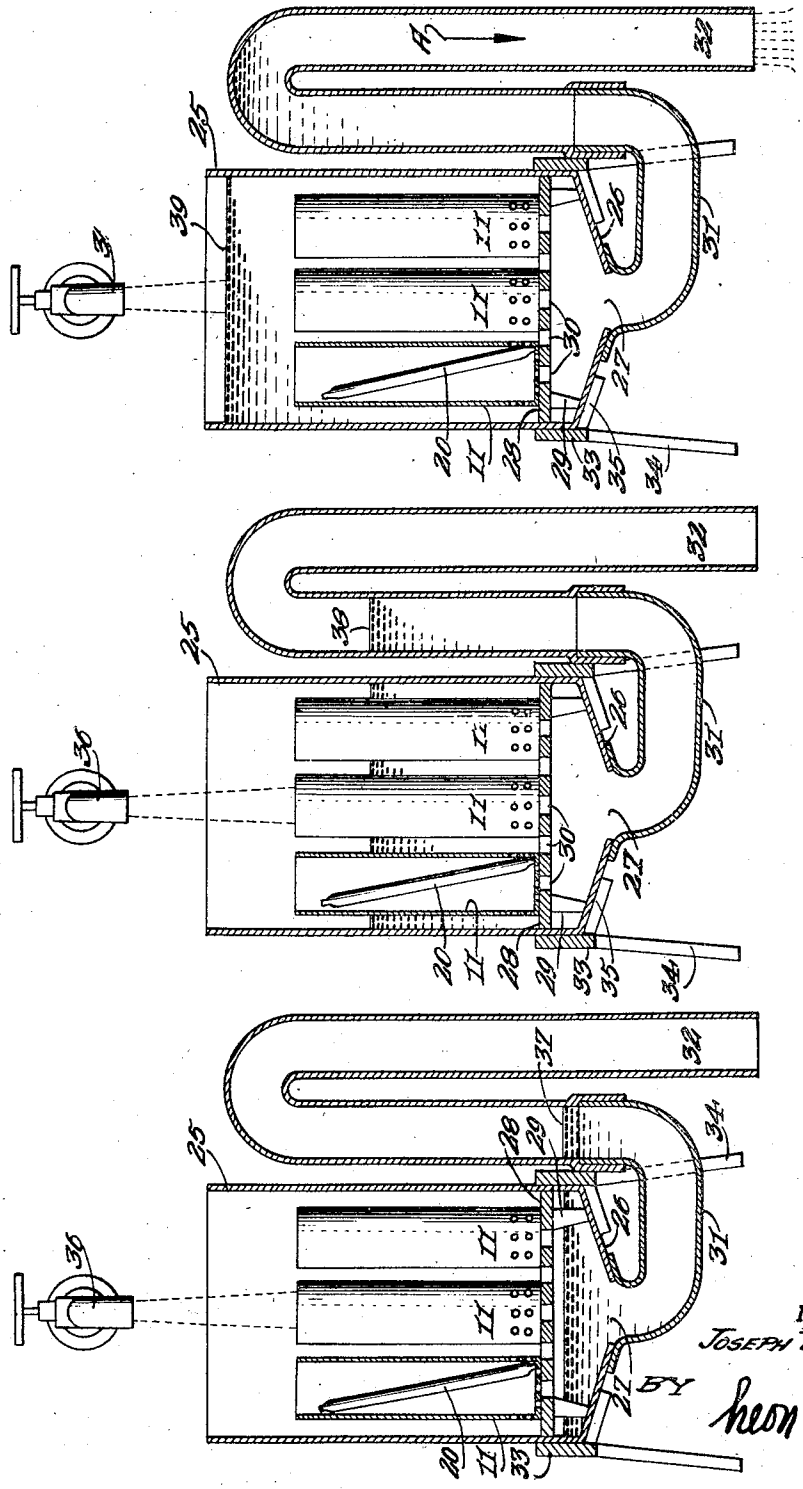


FIG. 7.

FIG. 8.

FIG. 9.

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UNITED STATES PATENT OFFICE

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METHOD AND APPARATUS FOR TREATING PIPETTES AND THE LIKE

Joseph Tannenberg, Batavia, N. Y.

Application December 2, 1942, Serial No. 467,672

6 Claims. (Cl. 21—2)

This invention relates to method and apparatus for treating and storing pipettes for use in connection with bacteriological purposes or other capillary or relatively narrow, preferably tubular receptacles.

It is the object of the present invention to provide a very efficient and simplified method for chemically and/or mechanically treating pipettes or similar capillary, tubular receptacles after their usage, so as to render them readily serviceable for renewed use or further purposes.

It is another object of the present invention to provide means for holding pipettes or like capillary tubes during cleansing and sterilizing treatments in the course of the aforesaid method, said pipettes being manipulated without being brought in contact with the fingers or hand of the laborant or operator.

It is a further object of this invention to provide a suitable container for holding one or more pipettes or similar tubular articles ready for use, storing purposes and future employment, and to utilize also said container in the aforesaid method according to which used pipettes placed in such container are subjected to cleansing, disinfecting, heat treating and other steps of said method.

It is another object of the present invention to provide a container or similar device equipped with closure means for storing pipettes or the like, a part of said device being utilizable in the method for cleansing and sterilizing the pipettes after usage thereof.

A still further object of the present invention is to provide means to automatically rinse or wash tubes or pipettes and the like, preferably contained in several containers.

Still another object of the present invention is to provide means for rinsing and cleaning pipettes, or similar tubes, etc., the rinsing or cleaning substance or liquid applied to said pipettes being intermittently and automatically drained off by means of siphon effect.

These and other objects and advantages will result from the ensuing description and attached drawings, which illustrate certain steps of the method and means by which said method may be performed, it being understood, however, that the drawings and the disclosure derived therefrom reveal only one of many possible embodiments of the invention, which is not to be considered limited thereby in any way.

In the drawings—

Fig. 1 is a sectional elevational view of a container or device enclosing therein between top and bottom closures a pipette ready for use.

Figs. 2 and 3 illustrate two different stages in the method according to this invention.

Fig. 4 is a bottom view of the container proper.

Figs. 5 to 7 show means and further stages of the said method for automatically cleaning and washing pipettes.

Pipettes or similar capillary tubular receptacles mostly made from glass or other preferably transparent material have an average length of about 5 to 10 inches or longer with an inner diameter of a fraction of one millimeter or more.

Pipettes are generally used for measuring small amounts of biological matters or fluids, such as blood, plasma, bacterial substances or suspensions, or any other appropriate chemical fluids.

In practice, it has been found very difficult and very complicated to thoroughly clean pipettes so that they can be used again for further examinations and experimental purposes.

In order to overcome these and other difficulties and disadvantages, the following method and means according to the present invention, are proposed by which a quick and thorough cleaning and sterilization of pipettes or like tubular receptacles may be effected.

Referring now more particularly to the drawings, there is disclosed in Fig. 1 a container 10 made from metal, glass or any suitable resinous composition, the material of said container requiring certain properties, as will be explained herein further below. Container 10 may be circular in cross-section or may assume any appropriate shape, as desired, and comprises the tubular body or container part 11 having perforated bottom 12 and open end 13.

Bottom 12 and lower part 16 of tubular body 11 are provided with a plurality of relatively small (about one to two millimeters) perforations 14, 15. Instead of perforated bottom 12 as depicted in Fig. 1, a wire or like mesh (not shown) may be used, which may be attached to one of the open ends of tubular body 11. Container 10 is fitted with cup-shaped top cover 17 and cup-shaped bottom cover 18 which close said container 10 substantially airtight, both covers 17, 18 slidably engaging the wall of tubular body 11. As can be seen in Fig. 1, both covers are made sufficiently long to embrace the ends of tubular container part 11, so as to leave middle portion 19 of container 10 uncovered. Bottom cover 18 extends beyond perforations 15 of tubular part 11, as shown in the drawings.

Container 10, as shown in Fig. 1, encloses pipette or similar tube 20 of well known configura-

tion and material which has the open and contracted ends 21, 22.

As above mentioned, container 10 may be made of any suitable material which sustains dry heat up to several hundred degrees Fahrenheit (approximately 350 to 400° F.) and which is substantially free from attack by disinfecting or chemical cleansing solutions and acids, in particular cresylic acid or cresol, sulfuric acid and potassium chromates.

It is, of course, understood that container 10 closed by covers 17, 18 may hold a plurality of pipettes, which may be stored therein in sterilized condition and ready for biological use.

When pipettes are needed for laboratory work, the container cover 17 is removed and the pipettes are removed one after another from container 10. After the pipettes have been employed and have fulfilled their purpose, they are cleaned and made ready for renewed use in the following manner:

The used pipettes are placed in the empty part 11 of container 10 (Fig. 2) whose top and bottom covers are removed, the container part 11 thus filled with one or more pipettes being then caused to sink into a vessel 22 containing disinfecting solution 23, such as 5% cresol in water. It is quite evident that the disinfectant 23 will pass through the bottom and lower side wall perforations 14, 15 of container part 11 and will also penetrate the lower open end 22 of pipette 20 and ascend therein. This will prevent any drying and adhering of any residues, precipitates or portions of biological fluids employed, to the inner wall of pipette 20.

After a certain lapse of time allowed for the disintegration or dissolution of the remaining residue in the pipette, the container part 11 holding pipette 20 is lifted and removed from vessel 22, as indicated in Fig. 3.

The watery disinfectant 23 is thus drained off and several of said container parts 11 are then placed into a crock (not shown) containing a chemical cleaning solution, such as 10% sulphuric acid and potassium bichromate. This cleaning solution penetrates from below through the perforations 14, 15 of container part 11 and passes through pipette opening 22 and remains in said crock for several hours or over night, if desired.

The pipette container part 11 is then removed from said crock in a manner similar to that, as shown and described with respect to Figs. 2 and 3; the cleansing solution being allowed to be discharged through said perforations or passages 14, 15, when said container part 11 is being lifted. Several container parts 11 holding the thus treated pipette or pipettes are then subjected to an automatic rinsing or washing step, as will be thereafter described with reference to Figs. 5 to 7. After the pipettes are washed with tap water for one or more hours, they are then immersed or dipped in distilled water, drained off and placed in a drying oven or other heated dryer. The container parts 11 carrying the pipette or pipettes are then closed at bottom and top, as illustrated in Fig. 1, are then stored and the pipette is again ready for use.

Containers with pipettes for bacteriological purposes after the drying step may be further sterilized by dry heat in any suitable way. The closed pipette container may thereafter be stored until needed for further use.

The washing or rinsing step hereinabove referred to is now about to be described. Several container parts 11 containing one or more pipettes 20 are placed on a tray 28 having the supporting legs 29 and perforations 30, the legs resting on oblique wall extension 26 of receptacle 25. Receptacle 25 is supported by tripod 33 having the legs 34. The tripod has inwardly projecting lugs 35 for supporting the extension 26. Tripod 33 together with receptacle 25 is preferably placed in a sink (not shown) and below the water faucet 36. Removably attached to the open end 27 of receptacle 25 is tube or pipe bend 31 to which the inverted U-shaped tube 32 is attached, as seen in Figs. 5, 6, 7. The perforations 30 of tray 28 communicate with the opening 27 and tubes 31, 32.

As will be well apparent from the above, the water supplied from faucet 36 will first enter the tube 31 and rise both in receptacle 25 and U-shaped tube 32 up to level 37 (Fig. 5), will further rise to level 38 (Fig. 6) and finally to level 39. As soon as the water level 39 will be reached, the well known siphon effect will be produced whereby the water column in receptacle 25 and tubes 31 and 32 will be lowered below level 37, while the water escapes through tube 32 according to arrow A of Fig. 7. It is well understood that any known throttle or valve means (not shown) may be built in pipe 32 to accomplish or improve this siphoning effect.

As will be seen in the drawing, the U-shaped tube 32 is elevated with respect to container parts 11, so that before the siphon effect takes place, a water level will be reached according to which the container parts 11 are first fully immersed within the water contained in receptacle 25.

Due to the siphon effect the hereinabove described washing step will take place intermittently although the water flow from the faucet may be continuous. As soon as the water level reaches the level of the inverted U-shaped pipe or tube 32, the water is beginning to flow out, and then being siphoned off very quickly. Provided the diameter of the tube or pipes 31, 32 is large enough in comparison to the steady supply of the water, the washing apparatus is quickly drained off in the moment the siphon effect starts (which may be regulated by the aforesaid built-in valve means). The high water level is thus moved down to a level corresponding to the height of the perforated tray 28 on which the pipette containers 11 are placed. The pipette container parts 11 and the pipettes themselves will be completely drained off, leaving only a small amount of water drops therein at the time when the siphon effect is interrupted. While the washing apparatus is being slowly filled again, the water rises again to approximately level 39 and the rinsing or washing effect will repeat itself until the flow from the water faucet is shut off.

As mentioned hereinabove, the container parts 11 with the pipettes are thereafter removed from the receptacle 25 and are finally treated, as aforesaid, for sterilization.

It is to be noted that instead of the container part 11 as shown, an open ended tube may be used which telescopically receives at one of its ends a formaminous or sieve-like part which since it may be extended may regulate the height of the container or tubular part according to the length of the pipettes employed.

It will thus be seen that there has been provided by this invention a method and apparatus of the character described, in which the various objects hereinabove set forth, together with many thoroughly practical advantages are successfully achieved.

As many possible embodiments may be made of the above invention, and as many changes might be made in the embodiment above set forth, it is well understood that all matters herein disclosed or shown in the accompanying drawings are to be interpreted as illustrative and not in a limiting sense.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. The method of preparing pipettes or the like for renewed use comprising substantially the following steps: first subjecting said pipettes while placed in a foraminous container, to a liquid disinfecting agent, removing and draining off said agent from said container carrying said pipettes, thereafter placing the container with said pipettes in a receptacle containing a chemical cleanser, removing said container with the pipettes from said cleanser and allowing the cleanser to drain off from said container, then subjecting the container together with the pipettes repeatedly to automatic washing action, thereafter introducing said container with the pipettes into distilled water and allowing draining off of said distilled water, subjecting said container with the pipettes to the influence of a heated drier, then sealing said container at its bottom and top to encase said pipettes, and finally allowing container and pipettes to be sterilized by application of dry heat.

2. A device for treating used pipettes comprising a receptacle, a perforated tray placed in said receptacle, an inverted substantially U-shaped pipe connection communicating with the lower portion of said receptacle and extending substantially with its bend toward the upper portion of said receptacle, and a tubular container having an open top and a perforated bottom carried by said tray and holding a pipette, whereby upon supply of liquid to said receptacle in sufficient quantity to raise the level of said liquid substantially up to said U-shaped bend, said container and pipette will be automatically rinsed due to a thereby produced siphon effect.

3. A device for treating used pipettes and the like comprising a receptacle having an open upper end and open bottom, a perforated tray placed in said receptacle, an inverted substantially U-shaped pipe connected to said bottom and communicating with said receptacle, the bend of said pipe being positioned substantially at the level of said open upper end of said receptacle, and a tubular container holding a pipette placed on said tray, whereby upon supply of sufficient liquid through said receptacle into said pipe a siphoning effect will be produced in said U-shaped bend, thus effectuating an automatic washing treatment of said pipette in said tubular container.

4. The method of preparing pipettes or similar tubular articles for renewed use comprising substantially the following steps: first placing said pipettes in a foraminous container, subjecting said pipettes to a disinfecting agent, removing said agent from said container holding said pipettes, placing the container with said pipettes in a receptacle containing a chemical cleanser, removing said container with the pipettes from said cleanser and allowing the cleanser to drain off, then repeatedly washing the container together with the pipettes, thereafter introducing said container with the pipettes into distilled water, removing said distilled water from said container and pipettes, subjecting said container with the pipettes to the influence of dry heat, then closing said container at its bottom and top to encase said pipettes in said container, and finally sterilizing the thus closed container and pipettes therein by further application of dry heat.

5. An apparatus for treating pipettes and like tubular elements comprising a receptacle having an open top, a perforated support removably positioned within said receptacle and adapted to carry at least one tubular container having a perforated bottom and holding a plurality of pipettes to be treated, and an inverted U-shaped pipe connected with said receptacle and in communication with the interior thereof, the U-shaped bend of said pipe being located at about the level of said open top, whereby upon supply of sufficient liquid to the interior of said receptacle and into said pipe a siphoning effect will be produced in said U-shaped bend, thus effectuating rinsing treatment of said pipettes within said tubular container.

6. An apparataus for treating pipettes and like tubular elements comprising a receptacle having an upper end, a perforated support positioned within said receptacle and adapted to carry one or more tubular containers each having a perforated bottom and each being adapted to hold a plurality of pipettes to be treated, and an inverted U-shaped pipe connected with said receptacle and communicating with the interior thereof, the U-shaped bend of said pipe being located at about the level of said upper end, whereby upon supply of a sufficient quantity of liquid to the interior of said receptacle and into said pipe a siphoning effect will be produced in said U-shaped bend, thus effectuating rinsing treatment of said pipettes within said tubular containers.

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