



METHOD AND APPARATUS FOR SELECTIVELY DISPENSING PASTES FROM DEFORMABLE TUBES

Field of the Invention

[0001] The present invention generally relates to paste dispensers. In particular, the invention relates to a method and apparatus for selectively dispensing pastes from deformable tubes.

Background of the Invention

[0002] Storage of semi-solid flowable materials such as paste, gel, ointments have traditionally been in deformable tubes. A good example of such deformable tubes and their contents are tubes of toothpastes. To dispense the toothpaste from the deformable tube, the body of the deformable tube is squeezed mechanically to force the paste out of the deformable tube through a nozzle on the deformable tube.

[0003] The use of such deformable tubes for storage and dispensing of such pastes have not been limited to toothpastes, but also to glue, medication and even to food substances. However, there are some concerns when using such deformable tubes with toothpastes.

[0004] One concern is the manner in which the paste is dispensed from the nozzle of the tube. The toothbrush would have to be positioned near the nozzle and the deformable tube is "squeezed" to force the toothpaste onto the toothbrush. While this action of dispensing toothpaste onto toothbrush is considered easy, more often than not, it is disadvantageously messy with toothpaste overflowing from the nozzle and onto the toothbrush. The amount of toothpaste dispensed is determined by the strength of the "squeezing" action on the deformable tube.



[0005] More often than not, the overflowing toothpaste is left on the nozzle and exposed. Later dispensing of toothpaste would likely also include the overflowed toothpaste that has been exposed. This can be a hygiene problem as the exposed toothpaste may have disadvantageously come into contact with insects or undesirable contaminants in the air.

[0006] Furthermore, mechanically squeezing the deformable tube may also result in damage to the deformable tube, further allowing toothpaste to become exposed. The caps and covers that are used to cover the nozzles of the deformable tubes may also be lost, also resulting in the toothpaste being exposed.

[0007] There is also a concern that having many tubes of toothpaste would disadvantageously clutter shelves or vanity tops. This is of a particular concern when different members of a family or community living together have their own preference of toothpastes.

[0008] It can thus be seen that there exists a need for a simple and effective apparatus and method for selectively dispensing pastes from deformable tubes that can overcome the disadvantages of the existing art.

Summary of the Invention

[0009] The present invention seeks a method and apparatus for using selectively dispensing pastes from deformable tubes..

[0010] Accordingly, in one aspect, the present invention provides, an apparatus for selectively dispensing paste from deformable tubes, the apparatus comprising: at least two bushings, each bushing for the receiving and securing of a nozzle of a deformable tube; at least two receptacles, each having a cavity for the receiving and securing of one of the at least two bushings, the receptacles having an inlet port for

communicating with the nozzle of the deformable tube; the inlet port further in communication with a delivery tunnel; a selector having a through hole and an open tunnel in communication to and orthogonal to the through hole, the selector when in position indicating selection of one of at least two deformable tubes having the open tunnel in communication with the delivery tunnel, the through hole of the selector is in communication with a dispensing tunnel, the dispensing tunnel is in communication with a dispensing chamber which is in communication with a dispensing outlet tunnel and an outlet port; a plunger chamber coaxially in communication with the dispensing chamber; a plunger having a plunger extension biased by a spring in the plunger chamber, the plunger extension for varying the volume of the dispensing chamber by entering or exiting the dispensing chamber against bias of the spring; wherein by increasing the volume of the dispensing chamber, paste from the deformable tube may be drawn into the inlet port, through the delivery tunnel, through the open tunnel and through hole of the selector into the dispensing tunnel and into the dispensing chamber; further wherein by decreasing the volume of the dispensing chamber, paste from the deformable tube may be forced into the dispensing outlet tunnel and out of the outlet port.

[0011] In another aspect, the present invention provides, a method for selectively dispensing paste from deformable tubes, the method comprising the steps; providing an apparatus comprising: at least two bushings, each bushing for the receiving and securing of a nozzle of a deformable tube; at least two receptacles, each having a cavity for the receiving and securing of one of the at least two bushings, the receptacles having an inlet port for communicating with the nozzle of the deformable tube; the inlet port further in communication with a delivery tunnel; a selector having a through hole and an open tunnel in communication to and orthogonal to the through hole, the selector when in position indicating selection of one of at least two deformable tubes having the open tunnel in communication with the delivery tunnel, the through hole of the selector is in communication with a dispensing tunnel, the dispensing tunnel is in

communication with a dispensing chamber which is in communication with a dispensing outlet tunnel and an outlet port; a plunger chamber coaxially in communication with the dispensing chamber; a plunger having a plunger extension biased by a spring in the plunger chamber, pushing the plunger and the plunger extension against bias of the spring to and fro into the plunger chamber thereby varying the volume of the dispensing chamber; and dispensing paste from the outlet port; wherein by increasing the volume of the dispensing chamber, paste from the deformable tube may be drawn into the inlet port, through the delivery tunnel, through the open tunnel and through the though hole of the selector into the dispensing tunnel and into the dispensing chamber; further wherein by decreasing the volume of the dispensing chamber, paste from the deformable tube may be forced into the dispensing outlet tunnel and out of the outlet port.

Brief Description of the Drawings

[0012] A preferred embodiment of the present invention will now be more fully described, with reference to the drawings of which:

[0013] FIG.1 illustrates the apparatus in accordance with the present invention;

[0014] FIG.2 illustrates an exploded view of the apparatus of FIG.1;

[0015] FIG.3 illustrates a selector of FIG.1 and FIG.2

[0016] FIG.4 illustrates a rear view of the apparatus of FIG.2; and

[0017] FIG.5 illustrates a cross sectional view of the apparatus of FIG.2.

Detailed description of the Drawings

[0018] A method and apparatus system for selectively dispensing pastes from deformable tubes. In the following description, details are provided to describe the preferred embodiment. It shall be apparent to one skilled in the art, however that the invention may be practiced without such details. Some of the details may not be described at length so as not to obscure the invention.

[0019] Referring to FIG.1, a toothpaste dispenser 10 in accordance with the present invention comprises of a dispensing module 50, a backplate 16, and a toothpaste housing unit 12. The dispensing module 50 comprises of at least two bushings 52 each capable of accepting and securing nozzles 32 of a deformable tube 30 typically used for storing of toothpaste. The dispensing module 50 further has a selector 60 for selecting between one of the deformable tubes secured to the bushings 52 for the dispensing of toothpaste. Activating the selector switches between the dispensing of one or the other deformable tubes secured to the bushings 52.

[0020] A toothbrush 20 is inserted into a dispenser orifice 56 of a dispenser door 54 in the direction of arrow 21. A plunger 57 is retained insider the dispenser module 50 by the dispenser door 54. The plunger 57 is pumped to and fro in the direction of the arrow 21 until toothpaste is dispensed onto the toothbrush 20.

[0021] The dispenser module 50 and the toothpaste housing unit 12 are mounted on the backplate 16 allowing the toothpaste dispenser 10 to be attached or mounted onto a wall or vertical fixture. The toothpaste housing unit 12 serves to house the deformable tubes 30. The toothpaste housing unit 12 has a housing door 14 for allowing access to the deformable tubes 30 housed inside. The housing door 14 may further comprise of a window for visually inspecting the condition of the deformable tubes 30 housed inside.

[0022] The dispenser module 50 uses the principle of vacuum suction for “sucking” toothpaste out of the deformable tubes 30 and dispensing toothpaste onto the toothbrush 20. Referring to FIG.2, the dispenser module 50 further comprises at

least two bushing receptacles 51 for receiving the bushings 52. Each receptacle 51 having an inlet port 53 in communication with a delivery tunnel 67.

[0023] The delivery tunnel 67 is further in communication with the selector 60. Referring to FIG. 3, the selector 60 in the present example comprises of a disc having a through hole 64 in the center of the disc and an open tunnel 63 through the disc that also communicates with the through hole 64. Referring to FIG.4, when the selector 60 is in position and a selector switch 62 on the selector 60 is in position to indicate selection of one toothpaste, the open tunnel 63 of the selector 60 is in communication with the delivery tunnel 67 of the dispenser module 50 and consequently in communication with the through hole 64 of the selector 60.

[0024] Referring to FIG.2 and FIG.5, the through hole 64 of the selector 60 is further in communication with a dispensing tunnel 69 which is further in communication with a dispensing chamber 71. The through hole 64 and the dispensing tunnel 69 are however separated by a first one-way valve 68.

[0025] The dispensing chamber 71 is in communication with a dispensing outlet tunnel 73 having an outlet port 74 where toothpaste may be discharged or dispensed. The dispensing outlet tunnel 73 further has a second one-way valve 72.

[0026] A plunger chamber 58 is coaxially in communication with the dispensing chamber 71. The plunger 57 further comprises of a plunger extension 75 which fits smoothly into the dispensing chamber 71. A spring 59 is biased between the dispensing chamber 71 and the plunger 57 and forces the plunger 57 and the plunger extension 75 out of the dispensing chamber 71. The plunger 57 also blocks the outlet port 74 of the dispensing outlet tunnel 73 when the spring 59 is normally biased. The plunger 57 is prevented exiting the dispenser module by the dispenser door 54 which also acts as a guide for the insertion of the toothbrush 20.

[0027] During operation, the nozzles 32 of two deformable tubes 30 of toothpaste are inserted into the bushings 52 of the dispenser module 50. The bushings 52 are made of a resiliently deformable material which would easily deform to accept the nozzles of the deformable tubes 30. Consequently, many variations or types of nozzles 32 may be advantageously accepted by the bushings 52. The bushings may further be threaded to allow for ease of securing of the nozzles 32.

[0028] Next, the selector 60 is selected such that the selector switch 62 indicates one of the toothpaste or deformable tube 30 to be used. When the selector 60 is in position, the open tunnel 63 in communication with the delivery tunnel 67 of the selected toothpaste.

[0029] Following that, the toothbrush 20 is inserted into the dispenser orifice 56 of the dispenser door 54 and pushed against the plunger 57. Pushing the plunger to and fro varies the volume of the dispensing chamber 71 as the plunger extension 75 enters and exits the dispensing chamber 71.

[0030] As the plunger 57 is pushed forward, the volume of the dispensing chamber 71 decreases and the pressure within increases. The second one-way valve 72 opens and allows passage of toothpaste (if any) in the dispensing outlet tunnel 73 to the outlet port 74. In the beginning, there is usually no toothpaste in the dispensing outlet tunnel 73 and this action is meant for priming purposes.

[0031] The plunger 57 is allowed to be biased back by the spring 59 and the toothbrush 20 is released backwards. The volume of the dispensing chamber 71 now increases and the pressure in the dispensing chamber 71 drops. This causes suction and the opening of the first one-way valve 68. Which thus allows the suction through the through hole 64 of the selector 60, via the delivery tunnel 67 and the inlet port 53 which is in communication with the nozzle 32 of the deformable tube 30.

[0032] Toothpaste is thus sucked from the nozzle 32 of the deformable tube through the inlet port 53 into the delivery tunnel 67. The toothpaste is further sucked into the open tunnel 63 and then into the through hole 64 of the selector. The through hole of the selector 64 is in communication with the dispensing tunnel 69 and thus allows toothpaste to enter the dispensing tunnel 69 past the first one-way valve 68 into the dispensing chamber 71. The first one-way valve 68 thus prevents back flow of toothpaste into the through hole 64 of the selector 60 from the dispensing tunnel 69.

[0033] Next, the toothbrush 20 is again pushed forward to push the plunger 57 forward and again reducing the volume of the dispensing chamber 71. Now that the dispensing chamber 71 already contains toothpaste, this reduction of volume causes the toothpaste to flow into the dispensing outlet tunnel 73 where the toothpaste is then dispensed out through the outlet port 74 into the toothbrush 20.

[0034] For the dispenser module 50 to effectively make use of the “vacuum suction” principle to draw the toothpaste from the deformable tube 30 into dispensing chamber 71 of the dispense module 50; the fittings of the parts and components of the dispenser module 50 have to be airtight. It will be obvious to one skilled in the art that the making airtight of such internal components would involve the use of a variety of sealing means such as o-rings, bushings, gaskets, sealant creams and other packing materials.

[0035] The present invention allows a user to advantageously select between two different toothpastes in deformable tubes 30. Selecting of the toothpastes is simply a matter of activating the selector switch 62, then engaging the plunger 57 through the plunger door 54 using a toothbrush 20. Next, pumping the plunger 57 to and fro until toothpaste is dispensed onto the toothbrush through the outlet port 74.

[0036] The user is assured of the ability to choose between two toothpastes. The user is also assured that the toothpaste is clean and not exposed as the plunger 57 is

biased by a spring to block off access to the outlet port 74. Furthermore, there is an added advantage that allows the user for one-handed operation for the dispensing of the toothpaste.

[0037] It will be obvious to a person skilled in the art, that the present invention is not limited to just the dispensing of toothpastes. Any paste or semi-fluid material that is capable of being stored in a deformable tube may be used with the present dispenser. When used with other pastes, the toothbrush may be replaced by any handheld implement or even with a user's fingers. It will be appreciated that various modifications and improvements can be made by one skilled in the art without departing from the scope of the present invention.

Claims

1. An apparatus for selectively dispensing paste from deformable tubes, said apparatus comprising:

at least two bushings, each bushing for the receiving and securing of a nozzle of one of at least two deformable tubes;

at least two receptacles, each having a cavity for the receiving and securing of one of said at least two bushings, said receptacles having an inlet port for communicating with said nozzle of one of at least two said deformable tubes;

said inlet port further in communication with a delivery tunnel;

a selector having a through hole and an open tunnel in communication to and orthogonal to said through hole, said selector when in position indicating selection of one of at least two deformable tubes having said open tunnel in communication with said delivery tunnel, said through hole of said selector is in communication with a dispensing tunnel, said dispensing tunnel is in communication with a dispensing chamber which is in communication with a dispensing outlet tunnel and an outlet port;

a plunger chamber coaxially in communication with said dispensing chamber;

a plunger having a plunger extension biased by a spring in said plunger chamber, said plunger extension for varying the volume of said dispensing chamber by entering or exiting said dispensing chamber against bias of said spring;

wherein by increasing said volume of said dispensing chamber, paste from said deformable tube may be drawn into said inlet port, through said delivery tunnel, through said open tunnel and through said through hole of said selector into said dispensing tunnel and into said dispensing chamber;

further wherein by decreasing said volume of said dispensing chamber, paste from said deformable tube may be forced into said dispensing outlet tunnel and out of the outlet port.

2. The apparatus in accordance with claim 1, further comprising a plunger door for retaining said plunger in said plunger chamber against bias of said spring.

3. The apparatus in accordance with claim 2, wherein said plunger door further comprises a dispenser orifice allowing access to said plunger through said dispenser orifice.
4. The apparatus in accordance with claim 1, further comprising a paste housing unit for housing said deformable tubes.
5. The apparatus in accordance with claim 4, further comprising a housing door having a window for inspecting of said deformable tubes.
6. The apparatus in accordance with claim 4, further comprising a backplate for mounting onto a wall or flat surface.
7. The apparatus in accordance with claim 1, wherein said bushings are made of a resiliently deformable material for receiving and securing any of a variety of nozzles of said deformable tubes.
8. A method for selectively dispensing paste from deformable tubes, said method comprising the steps;
 - a) providing an apparatus comprising:
 - at least two bushings, each bushing for the receiving and securing of a nozzle of one of at least two deformable tubes;
 - at least two receptacles, each having a cavity for the receiving and securing of one of said at least two bushings, said receptacles having an inlet port for communicating with said nozzle of one of said at least two deformable tubes;
 - said inlet port further in communication with a delivery tunnel;
 - a selector having a through hole and an open tunnel in communication to and orthogonal to said through hole, said selector when in position indicating selection of one of at least two deformable tubes having said open tunnel in communication with said delivery tunnel, said through hole of said selector is in communication with a dispensing

tunnel, said dispensing tunnel is in communication with a dispensing chamber which is in communication with a dispensing outlet tunnel and an outlet port;

a plunger chamber coaxially in communication with said dispensing chamber;

a plunger having a plunger extension biased by a spring in said plunger chamber,

- b) selecting one of said at least two deformable tubes by switching said selector;
- c) pushing said plunger and said plunger extension against bias of said spring to and fro into said plunger chamber thereby varying the volume of said dispensing chamber; and
- d) dispensing paste from said outlet port;

wherein by increasing said volume of said dispensing chamber, paste from said deformable tube may be drawn into said inlet port, through said delivery tunnel, through said open tunnel and through said though hole of said selector into said dispensing tunnel and into said dispensing chamber;

further wherein by decreasing said volume of said dispensing chamber, paste from said deformable tube may be forced into said dispensing outlet tunnel and out of the outlet port.

9. The method in accordance with claim 8, wherein said step c) further comprises using of a handheld implement for pushing said plunger.

10. The method in accordance with claim 9, wherein said handheld implement is a toothbrush.

11. The method in accordance with claim 8, wherein said step c) further comprises a user using fingers for pushing said plunger.