# United States Patent

**Gilbert**

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[45] **June 6, 1972**


## [54] DIVERTER VALVE ASSEMBLY


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[73] Assignee: **Hydro Manufacturing Inc.,** Encino, Calif.



[22] Filed: **Feb. 25, 1970**

[21] Appl. No.: **17,995**

**Related U.S. Application Data**

[62] Division of Ser. No. 623,676, Mar. 16, 1967, Pat. No. 3,500,824.

[52] **U.S. Cl.** ..... **239/428.5,** 239/446

[51] **Int. Cl.** ..... **E03c 1/084**

[58] **Field of Search** ..... 239/428.5, 289, 25, 26, 27, 239/443, 444, 446; 128/66, 229, 224



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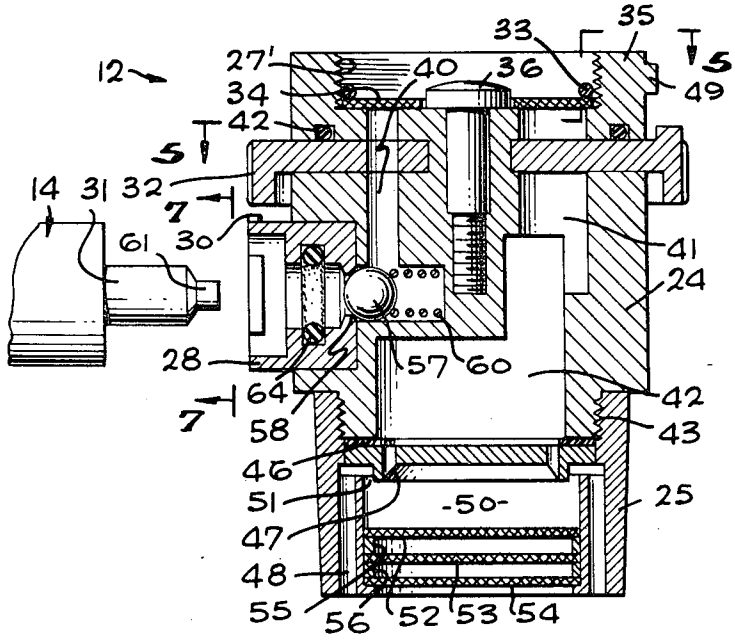
[57] **ABSTRACT**

The invention described herein is an oral syringe which dispenses fluid under pressure for the purpose of cleaning teeth and massaging gums. A finger operated push button carried on the syringe handle allows the user to meter desired amounts of mouthwash from a container into the pressurized fluid stream through interconnecting valve passages and chambers. An aerator-valve assembly permits the syringe to be detachably coupled to an ordinary water faucet and additionally allows the user to by-pass fluid from the syringe without the necessity of detaching the entire assembly.


**4 Claims, 15 Drawing Figures**



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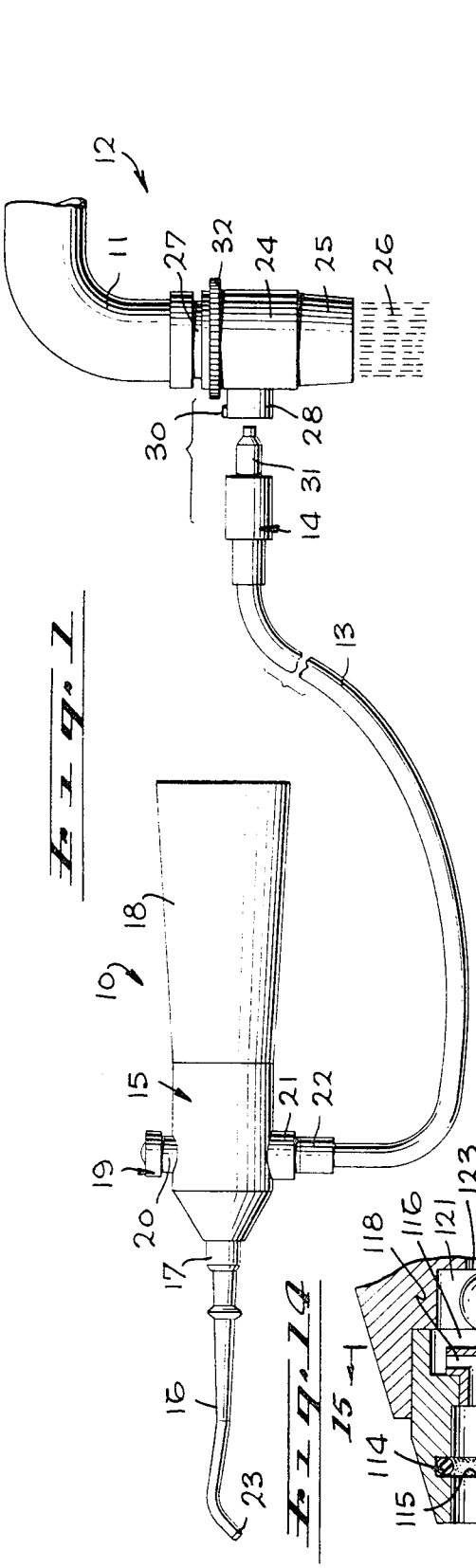

Fig. 1

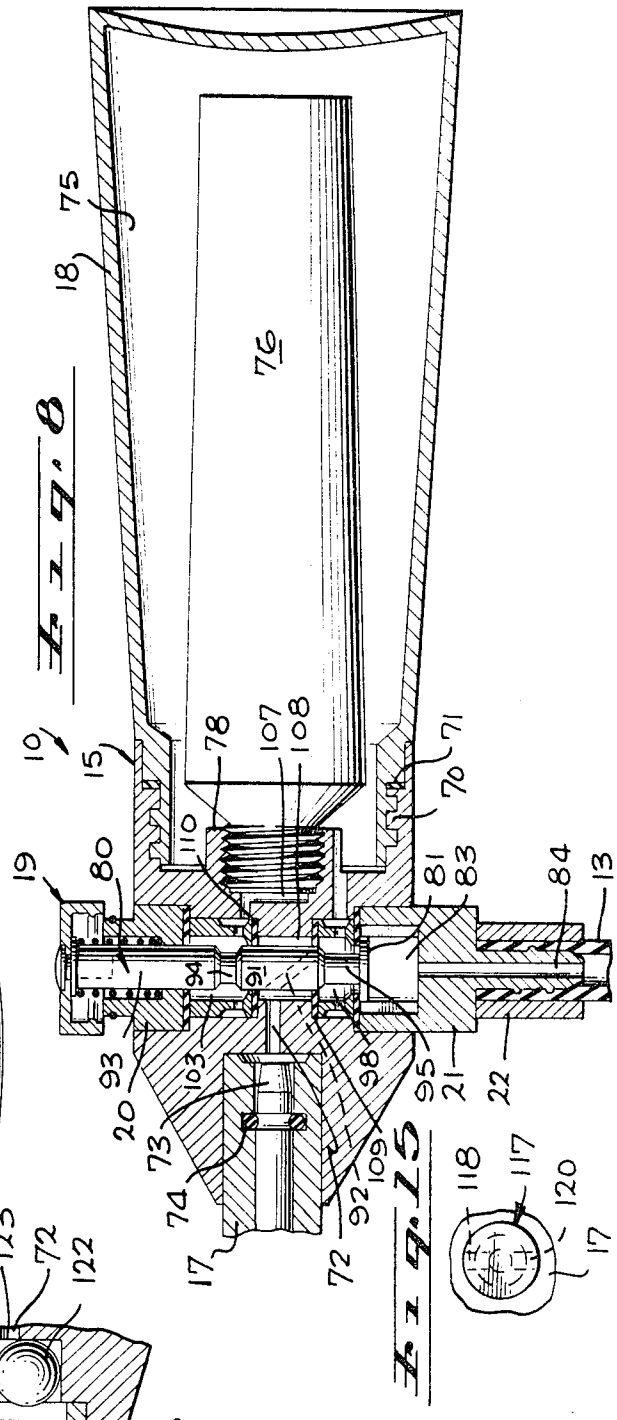

Fig. 8



Fig. 14



Fig. 15

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Fig. 2

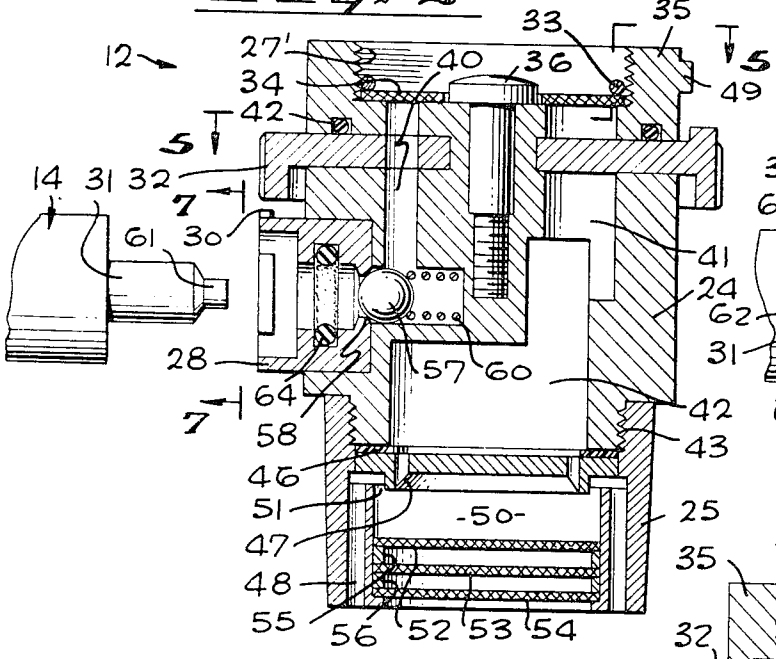



Fig. 3

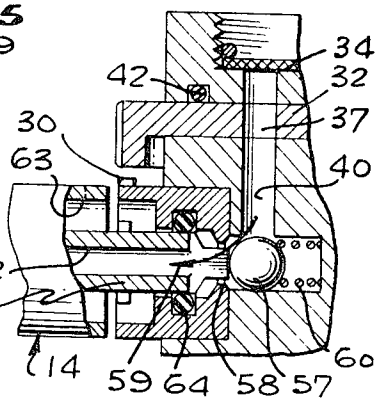



Fig. 6

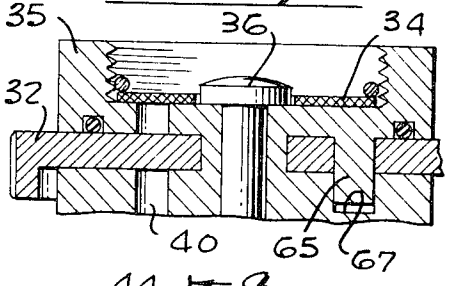
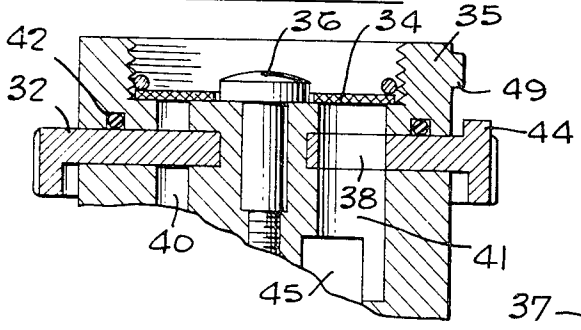



Fig. 4



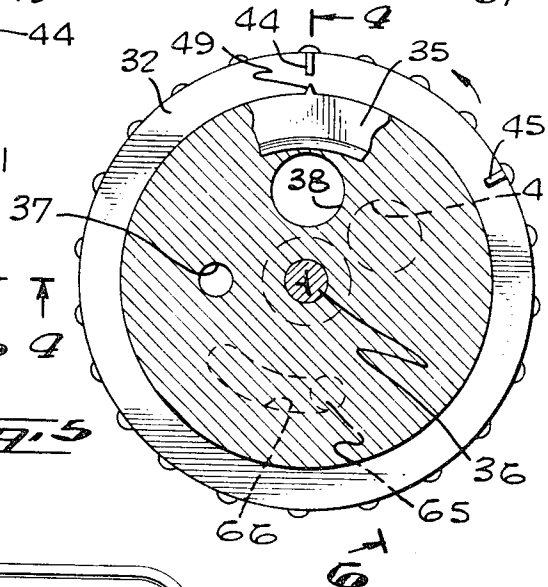




Fig. 7

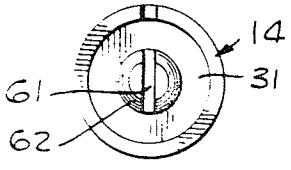



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Fig. 5

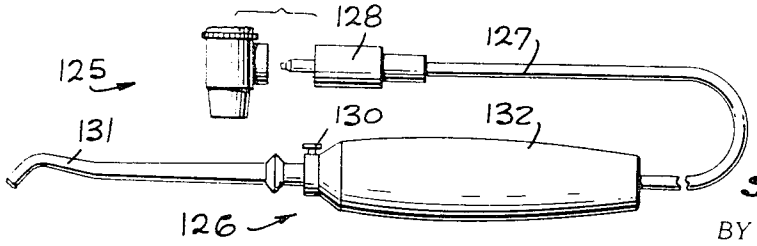


Fig. 13

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Fig. 9

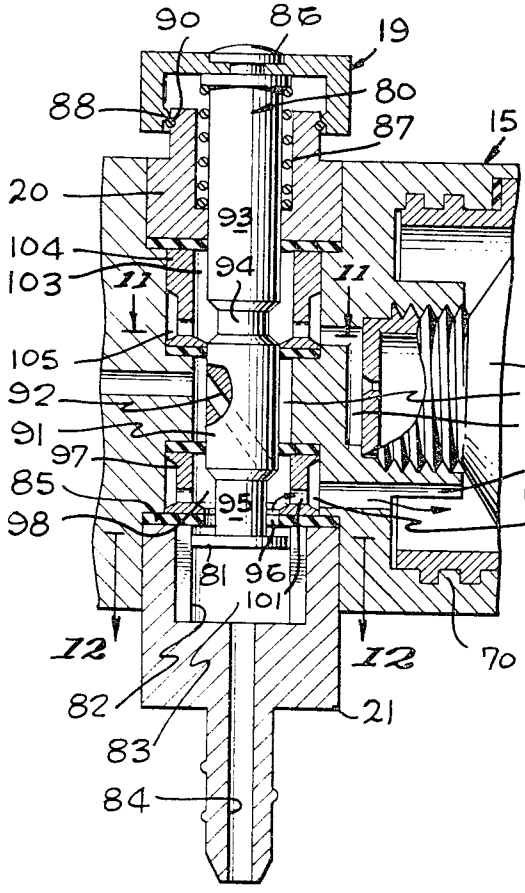



Fig. 10

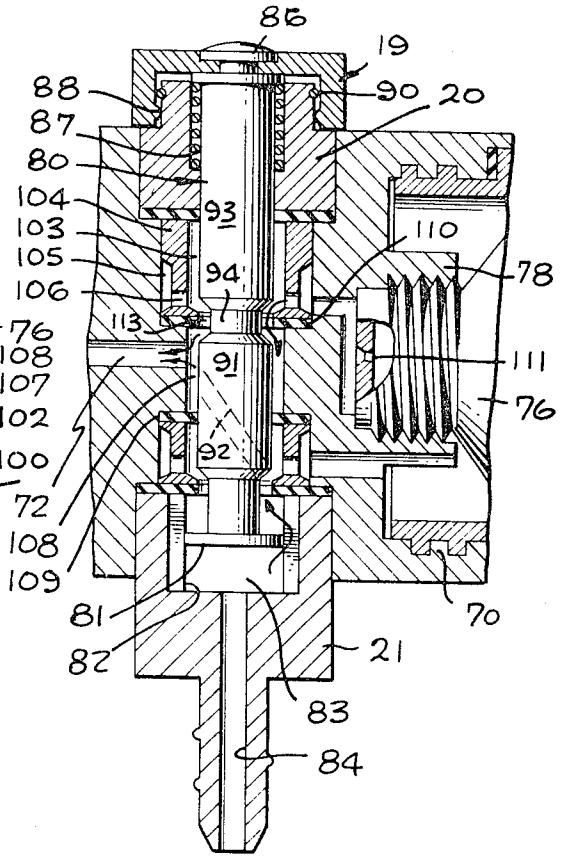



Fig. 11

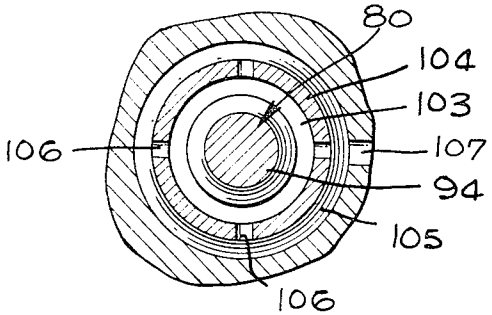
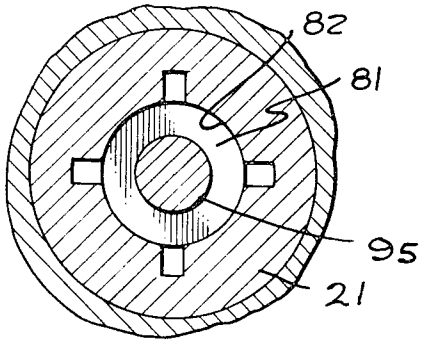



Fig. 12

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# DIVERTER VALVE ASSEMBLY

This is a division of application Ser. No. 623,676, filed Mar. 16, 1967, now U.S. Pat. No. 3,500,824, entitled "Oral Hydrotherapeutic Apparatus."

## BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to an apparatus for the promotion of oral hygiene and, more particularly, to an improved oral hydrotherapeutic syringe for removing tartar and food particles from between teeth while additionally acting to massage and disinfect the surrounding gums.

2. Description of the Prior Art

Medical science has demonstrated in the past that a thorough cleansing of teeth and gums greatly assists in protecting and promoting human health and comfort. Where trapped debris and microorganisms (and their metabolic products) are removed from the cervical surfaces of the teeth next to gum margins, calculus accumulation or tartar is prevented since the inorganic salts necessary for producing such accumulation will deposit and calcify only when the organic matrix of this deposit is present. When this removal process is accomplished by a fluid stream, the inherent cyclic pressure and relation results in increased circulation in the underlying tissues thereby promoting healthier gums.

For these reasons, mechanical devices for cleaning teeth and massaging gums have been heretofore widely proposed and, probably the instrument most commonly used today for such purposes is the toothbrush. There are, however, several serious disadvantages inherent in the utilization of toothbrushes for gum massage and teeth cleaning. For one thing, patience and practice are required to develop the necessary skill needed, since careless brush placement and vigorous scrubbing can puncture, lacerate and/or seriously bruise the facial gingiva. As a result, it is quite common for punctate lesions to appear as red pin-point dots corresponding to the tips of the toothbrush bristles or as linear scratches where the bristle tips were drawn over the gums with excessive pressure. Consequently, it is not unusual for an overzealous toothbrush user with a new stiff-textured toothbrush to brush too long in one or two areas and thereby remove the surface epithelium, producing a raw, painful bruise.

While oral hydrotherapeutic syringes are known to be of great assistance and value for loosening debris adhering to and/or trapped between teeth, their utilization has heretofore been severly curtailed as a result of their complexity, costliness and the fact that they have been difficult to use and control. Perhaps more importantly, for such devices to achieve general acceptance, they must be able to be attached to, and detached from, common fluid sources such as home water faucets with a minimum of time and effort.

While numerous devices for this general purpose have been proposed in the past, they have generally fallen short of the accomplishment of the desired ends in various aspects. Many, for example, have been designed to become permanently affixed to the fluid source which, in the case of a home water faucet, necessarily interferes with the normal operation and utilization thereof.

Another aspect in which the prior art has fallen short is the narrow scope or purpose for which such devices have heretofore been proposed such as in the device described in U.S. Letters Pat. No. 3,225,759. This scope has been expanded by the present invention which, in art, permits the user thereof to meter desired amounts of mouthwash into his or her mouth under pressure so that portions of the gums (or gingiva) between the teeth can be rinsed, disinfected and the debris flushed out from between crevices.

By selectively utilizing a mouthwash in conjunction with the cleaning and massaging action of the syringe, the soft tissues within the mouth are soothed, resulting in accelereated healing of sore spots. The removability feature of the mouthwash container also permits the user to utilize a variety of washes which are particularly suited to his or her needs such as



mouthwashes containing various germicidal, astringent, deodorant, buffering or therapeutic properties.

## SUMMARY OF THE INVENTION

The problems and difficulties encountered with conventional dental brushing and syringe devices for the promotion of oral hygiene are obviated by the present invention which provides, in one embodiment thereof, a novel oral hydrotherapeutic syringe having a body incorporating a plurality of chambers which are selectively intercommunicated in response to movement of a slidable valve means under finger control of the user. The valve means comprises a plurality of reduced diameter portions separated by thickened portions such that different chambers are connected as the valve means is manually positioned and having a central passageway so that the flow of a main pressurized fluid carrier stream is diverted from an input port through the selected chambers to an output port. A flexible thin-walled container of mouthwash or other selected fluid is coupled to the body for supplying a quantity of mouthwash to one of the chambers preparatory to mixing with the carrier stream in response to valve means actuation. The mouthwash container is enclosed within a handle of the syringe and a surrounding cavity is connected to one of the plurality of chambers so that a portion of the main carrier stream is diverted into the cavity to effect a pressurized squeezing action on the container to expel the mouthwash contents thereof into said one of the chambers. A nozzle is carried on the body at the output port for discharging the main carrier stream with or without mixed mouthwash as determined by the position of the valve means. The syringe is coupled to a pressurized fluid source by means of an aerator-valve assembly having a ball check valve disposed therein which effectuates the channeling of fluid to by-pass, or be routed through, the syringe upon connection therewith.

In essence, the present invention provides a novel hand-held fluid dispensing syringe having valve means positionable to discharge the main carrier stream either with or without mixed mouthwash. An aerator valve assembly coupled to a conventional water faucet is effective to discharge either aerated water directly from its nozzle or to furnish a main carrier stream to the syringe. The diversion of the main stream from the aerator valve assembly nozzle to the syringe is brought about by a diverter means in the assembly and by attachment of the syringe to the assembly.

Therefore, it is a primary object of the present invention to provide a novel oral syringe for introducing a therapeutic mouthwash into the mouth under pressure in conjunction with a pressurized main carrier stream of fluid for cleaning the teeth and massaging the gums.

Another object of the present invention is to provide a hand operable dental syringe capable of storing mouthwash within a flexible, thin-walled container disposed therein which may be selectively dispensed into the mouth under pressure in conjunction with a pressurized main carrier stream of fluid.

Another object of the present invention is to provide a dental syringe operably coupled to a faucet mounted aerator-valve assembly for selectively dispensing pressurized fluid therethrough.

Another object is to provide an oral syringe operably coupled to a faucet mounted aerator-valve assembly and wherein as the syringe is decoupled, the valve will automatically rechannel the fluid for normal faucet operation.

Still another object is to provide an oral hydrotherapeutic syringe which is of relatively simple construction and which can be operated without special skill and training.

Still another object of the present invention is to provide a novel main carrier stream distribution system incorporating a novel aerator-valve assembly adapted to be coupled to a conventional water faucet and effective to operate for normal faucet operation or to furnish the main carrier stream to an oral syringe where the main stream may or may not be mixed with another fluid contained therein as determined by the manual positioning of a valve means.

Yet another object of the present invention is to provide a novel main carrier stream distribution system including a novel hand-held oral syringe adapted to discharge a clear or mixed stream as selected by a valve means and including an aerator valve assembly adapted to selectively supply the main carrier stream to either the oral syringe or to a discharge nozzle wherein said latter selectivity is dependent upon the coupling of the oral syringe to the valve assembly.

## BRIEF DESCRIPTION OF THE DRAWINGS

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings, in which:

FIG. **1** is a side elevational view of the present invention incorporating the novel oral hydrotherapeutic syringe and the novel aerator valve assembly coupled to a conventional water faucet and including means detachably connecting the syringe to the valve assembly;

FIG. **2** is an enlarged cross-sectional view of the aerator valve assembly shown in FIG. **1** illustrating the components of the valve assembly located in their respective locations for blocking the passage of the main carrier stream therethrough;

FIG. **3** is a fragmentary sectional view of the aerator valve assembly similar to FIG. **2** illustrating the valve assembly components positioned to divert the main carrier stream to the syringe;

FIG. **4** is a fragmentary cross-sectional view of the valve assembling showing the main carrier stream diverter positioned so as to permit the main carrier stream to be discharged from the aerator nozzle;

FIG. **5** is a cross-sectional view of the aerator valve assembly illustrating the registration of ports in the diverter with the primary passageways in the body as taken in the general direction of arrows **5**—**5** of FIG. **2**

FIG. **6** is a sectional view of the aerator valve assembly illustrating a guide means for limiting the rotation of the diverter as taken in the direction of arrows **6**—**6** of FIG. **5**

FIG. **7** is a front elevational view of the stem portion of the detachable connector carried by the hose of the syringe as illustrated in FIG. **2** in the direction of arrows **7**—**7** thereof;

FIG. **8** is an enlarged longitudinal sectional view of the oral hydrotherapeutic syringe shown in FIG. **1** and illustrating the main carrier stream input port, output port and valve means disposed therebetween for effecting mixture of a suitable fluid material held within a container with the main carrier stream;

FIG. **9** is an enlarged sectional view of the syringe valve means showing the position of the valve means effective to permit the pressurized main carrier stream to be directly connected to the output port so as to discharge a clear stream therefrom and to be applied about the container to forcibly expel the fluid material contained therein;

FIG. **10** is a sectional view, similar to that of FIG. **9**, illustrating the movable valve means in another position adapted to effect the mixing of the expelled fluid material held in the selected chamber with the main carrier stream;

FIG. **11** is a transverse cross-sectional view of the movable valve means shown in FIG. **9** as taken in the direction of arrows **11**—**11** thereof;

FIG. **12** is an enlarged transverse cross-sectional view of the movable valve means as taken in the direction of arrows **12**—**12** of FIG. **9**;

FIG. **13** is a side elevational view of another embodiment of a syringe incorporated into the present invention operable in connection with the aerator valve assembly illustrated in FIGS. **2**–**5** inclusive;

FIG. **14** is a fragmentary view, in sections, of a modification to the oral syringe shown in FIG. **8** for producing a pulsating fluid discharge; and

FIG. **15** is a sectional view of the means for obtaining a pulsating discharge as taken in the direction of arrows **15**—**15** of FIG. **14**.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. **1**, a main carrier stream distribution system is shown in accordance with the present invention that incorporates a novel oral hydrotherapeutic syringe indicated in the general direction of arrow **10** which receives a supply of fluid, such as water, constituting the main carrier stream from a conventional water faucet **11** via a novel aerator valve assembly indicated in the direction of arrow **12**. The water faucet **11** is coupled to a suitable pressurized source or supply of water and the faucet may be located in sink or basin installed in a typical bathroom, restroom, comfort station, etc. The oral syringe **10** is detachably connected to the aerator valve assembly **12** by means of a flexible supply conduit or hose **13** having a detachable coupling **14** carried on the free end thereof. The syringe **10** further includes a body portion **15** having a nozzle **16** outwardly projecting from one end thereof by means of a sealing ring **17**. A handle is detachably connected to the other end of the body portion **15**, indicated by the numeral **18**, which is employed for convenience of operation and handling. Preferably, the handle **18** is cylindrically configured so as to be readily hand-held against the palm of a user's hand so that the four fingers of the hand embrace the body while the thumb is in a suitable position for operating a pushbutton arrangement **19** adapted to position a valve means, movably held between a pair of mounts **20** and **21**, to be described later. The end of the valve means opposite to its end terminating in the pushbutton arrangement **19** is carried in element **21** which is adapted to receive a retainer ring **22** carried on the end of hose **13**. The nozzle **16** terminates in a fluid discharge end **23**.

The aerator valve assembly **12** includes a body portion **24** from which a nozzle **25** downwardly depends which is adapted to discharge an aerated fluid stream, such as is indicated by numeral **26**. The aerator body **24** attaches to the conventional faucet **11** at its threaded end **27** which is threadably received within a cavity provided in the top of the valve body **24**. Outwardly projecting from the side of body **24**, there is provided a receiver member **28** having a plurality of projections, such as projection **30**, carried on the peripheral edge thereof which are adapted to mate with internal slots provided in the detachable coupling **14** to effect securement therebetween. The coupling **14** further includes a stub member **31** adapted to be inserted into the receiver member **28** to effect fluid communication between the valve assembly and the oral syringe **10**.

In essence, the aerator valve assembly **12** provides a dual passage system in which the main carrier stream can be routed for discharge through the aerator nozzle **25** or through the receiver member **28** and hence through hose **13** to the syringe **10**. For determining into which of the fluid discharge paths the main carrier stream shall be branched, a positionable diverter **32** is employed which can be manually and selectively rotated to cause the fluid to by-pass or be discharged through the syringe **10**.

Referring now to FIGS. **2**, **3** and **4**, the aerator valve assembly **12** of the present invention, is illustrated wherein it can be seen that the threaded cavity **27'** formed in the upper end of the body **24** is adapted to receive the threaded end **27** of the faucet **11** which is directed to bear against a seal **33** thus assuring a fluid-tight engagement. An inlet screen **34** is attached to a top fitting portion **35** of the body by means of a conventional screw type fastener **36**. The diverter **32** is adapted to rotate about the top fitting portion **35** and is provided with a pair of ports **37** and **38** which can be selectively registered alternately with either a passageway **40** or a passageway **41**, respectively, to distribute the main carrier stream for discharge either through the aerator nozzle **25** or the syringe **10**.

A seal 42 assures a fluid-tight engagement between the upperside of diverter 32 and the top fitting portion 35 as the diverter is rotated to register the respective ports and passageways. Passageway 41 merges in the valve body 24 with a chamber 45 terminating with an annular seal 46 adapted to provide a fluid-tight attachment via a threaded arrangement 43 between the aerator nozzle 25 and the lower end of the body 24. A diverging annular nozzle 47 opening in communication with chamber 4 causes the fluid flowing therethrough to expand and aspirate air furnished by an annular inlet 48 as the fluid is introduced to an aspirating chamber 50 directly beneath the diverging nozzle 47. The annular inlet is ported to chamber 50 via an annular outlet 51 through which air from inlet 48 is introduced to the aspirating chamber 50. The mixing of air and the oncoming main carrier stream from chamber 45 are forcibly urged against a plurality of screens 52, 53 and 54 which are coaxially disposed within the aerator nozzle 25. The plurality of screens are separated by means of spacers 55 and 56 so as to cause the air liquid combination to be thoroughly mixed before being discharged from the nozzle 25.

It is to be noted in FIG. 2 that the diverter 32 is positioned so that port 38 is not in registry with passageway 41 so that passage of the main carrier stream is blocked from entering the chamber 45 and discharging through the nozzle 25. However, port 37 is registered with passageway 40, but, the main carrier stream is blocked from being supplied to the syringe by a ball check valve 57 which is urged against an annular shoulder 58 by an expansion spring 60 to close and seal an opening defined by the annular shoulder 58. By this construction, a fail-safe valve is provided so that even if the diverter 32 is moved to one of its two alternate positions, fluid will not flow through the passageway 40 and through the outlet opening defined by shoulder 58 when the syringe attachment is disconnected from the valve body 24. However, when the male stem 31 is attached to the receiver member 28, an extended portion 61 thereof engages the ball 57 and displaces it against the normal bias of spring 60 so as to open the outlet opening defined by annular shoulder 58. Such action is illustrated more clearly in FIG. 3 wherein an arrow 59 indicates fluid flow. As the ball vale 57 is displaced, fluid passing into the passageway 40 is allowed to pass into a pair of slot passageways 62 located on opposite sides of the stem 31. The entrance to the passageway 62 is made possible by reducing the thickness of the extended neck portion 61 so that this portion is operative only to engage with the ball valve 57 and sufficient space is provided around the neck portion 61 to permit the fluid to enter the passageways 62.

The detachable coupling 31 may be connected to the receiver member 28 by any suitable means such as by a pressure fit or a locking arrangement such as may be represented by the conventional bayonet and slot construction in which the projections 30 are adapted to engage with a slot track 63 formed on the inside of the coupling 14. A seal 64 restricts the flow of fluid around the stem 31 of the coupling so that no leakage path is present when the coupling is engaged. As the fluid is directed through the passageways 62, the fluid is introduced into the connecting flexible conduit 13 and thereon to the oral syringe 10.

Referring to FIG. 4, the diverter 32 is shown in its alternate position from the position shown in FIG. 3 so that port 38 is registered with passageway 41 to allow the main carrier stream to flow into chamber 45 for discharge through nozzle 25 in a normal faucet dispensing manner.

FIG. 5 illustrates the diverter 32 in its position to register port 37 with passageway 40 while port 38 is spaced away from passageway 41 to prevent or block the flow of the main carrier stream therethrough. The alternate rest position of the diverter corresponding to the registrations of ports 37 and 38 with respect to passageways 40 and 41, respectively, are indicated by a pair of spaced markers 44 and 45 carried on the diverter in conjunction with an indicator marker 49 carried on the body. Alignment of indicator 49 with marker 44 presents a visual indication that the valve assembly is adjusted for syringe operation while when aligned with marker 45, normal faucet operation is indicated. The rotational movement, as seen in FIGS. 5 and 6, of the diverter is limited by the engagement of a downwardly depending projection 65 carried by the top fitting portion 35 with the opposite ends of an arcuate slot 66 formed in the diverter and the opposite ends of a corresponding groove 67 formed in the body immediately below the diverter. The length of the slot and the spacing between markers 44 and 45 are related so as to permit approximately 60° of diverter rotational movement.

FIG. 7 more clearly illustrates the openings to the passageways 62 in the stem 31 and the reduced thickness of the extended neck portion 61.

Referring now to FIG. 8, an enlarged sectional view of the oral syringe 10 is shown wherein the handle 18 is illustrated as being threadably attached to one end of the body 15 by means of a threaded arrangement 70. A seal 71 provides a water-tight engagement so as to prevent the flow of liquid externally of the body or handle at this junction. The nozzle 16 is in fluid communication with an outlet passageway 72 formed along the central axis of the body 15. The extreme terminating end of the nozzle 16 which passes through the coupling or sealing ring 17 terminates in an end 73 surrounded by an elastomeric seal 74. Seal 74 is placed in an oversized chamber so that fluid normally flowing through the end 73 may seep into the oversized chamber and further press the seal 74 against an abutting adjacent shoulder as well as the external periphery of the end 73 to effect a more positive sealing arrangement.

The handle 18 includes an enlarged cavity indicated by numeral 75 into which a flexible thin-walled container 76 projects from its threadable engagement represented by numeral 77 with a receptacle portion 78 formed in the rearmost end of the body 15. The container 76 is adapted to store a quantity of mouthwash or other beneficial substance which is intended to be mixed with the main carrier stream to be dispensed from the oral syringe 10 via the fluid discharge end 23. As previously mentioned, elements 20 and 21 are fixedly mounted on opposite sides of the body 15 and serve to slidably mount a valve means including a plunger 80 having an enlarged diameter portion indicated by numeral 93 slidably carried in a bore provided in one end of element 20 and having an enlarged flange 81 carried on its opposite end slidably carried within the confines of guides 82 formed in the element 21. The opposing guides 82 define an inlet chamber 83 in fluid communication with conduit 13 via passageway 84. Movement of the plunger 80 is one direction is arrested by engagement of the flange 81 with a seal 85 which is secured to a shoulder on the body 15 at the end of the element 21. Movement of the plunger in the opposite direction is limited by engagement of the end of button 19 with the external surface of body 15 and a portion of element 20 when the pushbutton is depressed. It is to be noted that pushbutton 19 is secured to the extreme end of plunger 80 by means of a conventional screw type fastener 86. The plunger 80 is normally biased to the position shown in FIG. 8 by means of a compressive spring 87 carried within a cavity of the element 20 and urging against one end of the cavity and against the underside of the button 19.

Movement of the plunger between the opposite limits is slightly restricted by means of an internally projecting annular bead 88 formed on the button 19 with a ring 90 carried about the external periphery of element 20. Construction in this manner permits the plunger 80 to have three distinct positions which are made evident to the user by feel so that the plunger is in its first position when the user's thumb is not on the pushbutton, a second position when interference of the bead 88 with the ring 90 occurs and a third position when the latter interference has been overcome by finger pressure and the pushbutton is depressed to its limit.

The plunger 80 includes an enlarged central portion or midsection 91 through which a fluid passageway 92 is transversely formed. The enlarged portion 91 is separated from a mounting portion 93 of the plunger by an annular groove formed in the plunger to provide a first reduced portion 94. The enlarged

portion 91 is separated from the flange 81 by a second annular groove forming a second reduced portion 95 in the plunger. The second groove is selectively placed in communication with the inlet chamber 83 through a port 96 when the plunger has been moved to remove flange 81 from the port. A cylindrical element 97 is disposed within the cavity provided by the second groove so as to define an inner chamber 98 and an outer annular chamber 100 which are intercommunicated by a plurality of apertures, such as aperture 101. The outer annular chamber 100 is in fluid communication with cavity 75 formed in the handle 18 by means of a passageway 102 so that pressurized fluid comprising the main carrier stream may be supplied to the chamber 75 which will fill the chamber and exert a positive pressure on the thin-walled container 76.

A pre-mixing chamber 103 is formed about the first groove and reduced portion 94 by means of an element 104 which is provided with an annular chamber 105 in communication with the pre-mixing chamber 103 by means of a plurality of apertures, such as aperture 106. The outer chamber 105 communicates with a passageway 107 formed in the body 15 for furnishing substance from the container 76 to the pre-mixing chamber 103 when the walls of the container are squeezed by the presence of the pressurized main carrier stream in the chamber 75. The pressurizing of the container 76 causes the substance contained therein to be expelled into passageway 107 and hence, into the pre-mixing chamber 103.

A central chamber 108 is defined at its ends by seals 109 and 110, respectively. The mid-section of the plunger 80 is adapted to move through the chamber 108 so as to place either chamber 103 or chamber 98 in fluid communication therewith. Hence, the interconnection of the various chambers and cavities within the body portion 15 are selectively interconnected by the various passageways in response to the rectilinear movement of the pushbutton 19 as the pushbutton is finger actuated to one of its three alternate positions.

Referring now to FIG. 9, it can be seen that the pushbutton 19 is depressed so that bead 88 is temporarily in abuttment against the ring 90 against the expansion pressure of spring 87. When the pushbutton has been so actuated, it can be seen that the plunger 80 of the valve means has moved within its mounting elements 20 and 21 to the extent that flange 81 is spaced apart from the port 96 such that pressurized fluid constituting the main carrier stream will flow in accordance with the arrows indicated from inlet chamber 83 through port 96 into inner chamber 98 and through apertures 101 to outer chamber 100 and then through passageway 102 to the cavity 75. Once the cavity 75 has been pressurized by the presence of the main carrier stream, a positive pressure is placed on the walls of the container 76 and the substance contained therein is forcibly urged through a dispensing aperture 111 formed in the top of the container into passageway 107 and then through outer chambers 105 into inner chamber 103 via apertures 106. Inasmuch as a portion of the mid-section portion 91 of the plunger 80 prevents communication of chamber 103 with chamber 108, the substance expelled from the container will be charged or preloaded into chamber 103 and not mixed with the main carrier stream.

As further indicated in FIG. 9, when the plunger 80 is in the intermediate position, passageway 92 intercommunicates chamber 98 with central chamber 108 so that the main carrier stream is conducted to outlet passageway 72 and hence permitted to discharge through the nozzle end 23 in a clear stream.

Referring now to FIG. 10, it can be seen that the pushbutton 19 has been depressed to its fullest extent so that the bottom of the button rests against a portion of the body 15 and the element 20. For this occasion, bead 88 was forcibly urged to override the ring 90. The plunger 80 is further slid in its mountings 20 and 21 to the extent that flange 81 extends further into inlet chamber 83 to maintain the inlet port 96 open so that the main carrier stream will be branched into central chamber 108 as well as into cavity 75 in the same fashion as described with respect to FIG. 9. However, it is to be noted that mid-section portion 91 has moved a considerable distance through the central chamber 108 to the extent that the reduced portion 94 is immediately adjacent a seal 110 so as to define a port 113 communicating the pre-mixing chamber 103 with the central chamber 108. Inasmuch as the chamber 103 contains substance temporarily stored therein when the pushbutton 19 was in its intermediate position, and inasmuch as the container 76 is still under pressure, the substance within chamber 103 will be urged through port 113 into the central chamber 108 where the substance and fluid of the main carrier stream are mixed and commingled for combined discharge through the outlet passage 72.

In operation, as the user of the device depresses the valve means by applied thumb pressure to the pushbutton 19, the plunger 80 is moved from its position shown in FIG. 8 to its position shown in FIG. 9 so that fluid of the main carrier stream is introduced into chamber 98 from input chamber 83 past the flange 81 and branched for clear discharge through outlet passage 72 via central chamber 108 and transverse passageway 92 and, in addition, into the chamber 75 via outer chamber 100 and passageway 102. Substance held by container 76 will be dispensed through opening 111 into the chamber 103 for storage purposes preparatory to the mixing operation.

When the user desires to discharge combined mouthwash or other substance contained in the container 76 with the fluid of the main carrier stream, the pushbutton is further depressed to the position shown in FIG. 10 which causes the plunger 80 to open port 113 so that the pressurized substance within chamber 103 is conducted to the central chamber 108 where it is mixed with the fluid of the main carrier stream and discharged through the outlet passageway 72 through the nozzle. Upon release of the button 19, spring 87 will cause the button to return to its original position as shown in FIG. 8 such that flange 81 will close the inlet port 96 which terminates the discharge of the main carrier stream from the nozzle.

Referring now to FIGS. 14 and 15, a modification to the syringe 10 is illustrated so as to provide a pulsating discharging water stream, if desired. The end nozzle 16 is connected to the body 15 by means of a seal 114 mounted in a corresponding groove 115 of the nozzle. Intermediate the seal 114 and a nozzle orifice 116 is a "T" coupling 117 which acts to divide the inflowing water between its two input ports 118 and 120, respectively. The input ports 118 and 120 communicate with a cavity 121 having a ball valve 122 disposed therein. As the water rushes into the cavity 121 from outlet passageway 72, it causes the ball valve 122 to oscillate back and forth over an outlet port 123, thereby interrupting the flow therethrough and creating a pulsating discharged stream.

Referring to FIG. 13, another embodiment of the present invention is shown which includes a faucet valve assembly 125 which is identical to the assembly 12 shown in FIG. 1 to which is detachably connected a syringe indicated in the direction of arrow 126 by means of conduit 127 and detachable connector 128. The detachable connector 128 is identical to the connector 14 shown in FIG. 1. However, the syringe 126 does not provide for the valve means including the plunger 80 and is modified to the extent that an "ON/OFF" pushbutton 130 is provided for controllably terminating or commencing the discharge of the main fluid stream from a nozzle 131. A handle 132 is provided which is hand-held so that the button 130 may be thumb operated and the handle 132 is torpedo shaped in configuration so as to provide a ready grasp by the user in his hand.

Therefore, it can be seen that the novel oral hydrotherapeutic apparatus of the present invention provides a novel oral syringe which is detachably coupled to a novel aerator valve assembly so that distribution of a main carrier stream from a conventional faucet may be selectively branched for various operating procedures. The aerator valve assembly provides for distribution of the main carrier stream in a clear aerated form as in normal faucet usage or the main carrier stream can be branched to the syringe. The syringe may be adapted to

discharge a clear fluid stream or the valve means may be actuated so as to provide a mixing of a desired substance with the main stream. The aerator valve assembly is provided with means for preventing the branching of the main carrier stream to the syringe outlet when the syringe is not properly fastened to the assembly.

While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects, and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

What is claimed is;

1. An aerator valve assembly adapted to be detachably connected to a water faucet for processing a main carrier stream, comprising;

a cylindrical body having an auxiliary outlet for supplying the main carrier stream to a suitable device for discharge therethrough and an aerator nozzle for discharging an aerated main carrier stream;

a pair of parallel fluid passageways of different diameters disposed in said body and separated by the longitudinal central axis of said body and each in fluid communication with the outlet of said faucet;

diverter means including a finger operated disc rotatably carried on said body for rotation about a vertical axis and having a pair of spaced apart ports of different diameters separated by said vertical axis and adapted to be selectively registered with each of said parallel passageways of said body in alignment with said body ports of the same diameter so as to direct the main carrier stream for discharge through either said auxiliary outlet or said nozzle;

said aligned port and passageway of said disc and body having the smaller diameters than the other of said aligned port and passageway leading to said auxiliary outlet;

a ball check valve disposed in said passageway of smallest diameter for axial movement normal to said vertical axis for releasably blocking the flow of the main carrier stream to said device;

said ball check valve being yieldable to permit main carrier stream flow therethrough in response to forcible engagement therewith by said device; and

limit stop means operably connected between said diverter means and said body for restricting the rotational movement of said diverter disc about said vertical axis comprising an arcuate slot formed in said body coaxially related to said vertical axis and a projection downwardly depending from said disc confined in said slot.

2. The invention as defined in claim 1, including visual indicating means carried on said body and diverter means corresponding to the registration of each of the passageways of said body with a selected one of said ports.

3. The invention as defined in claim 1, wherein said device comprises:

a handle, said handle having an input port and an output port;

a nozzle secured to said output port and in fluid communication therewith;

valve means carried on said handle and positioned intermediate said nozzle and said input port for selectively interrupting the discharge of fluid from said nozzle responsive to operator action;

fluid passage means connected at one end thereof to said input port for delivering fluid thereto; and

connector means secured to the other end of said fluid passage means and in fluid communication therewith, said connector means having an extended neck portion;

whereby as said connector means is attached to said valve assembly, said neck portion engages said ball check valve displacing it, thereby permitting fluid to pass into said fluid passage means for selective discharge from said nozzle.

4. The invention as defined in claim 1, wherein said device comprises:

a handle having a fluid passageway extending therethrough;

a flexible conduit coupling at one end to said handle in fluid transmitting relationship with said handle fluid passageway; and

coupling means carried on the other end of said flexible conduit including an extended neck portion adapted to engage with and operate said ball check valve.

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