

[54] SALIVA EJECTOR

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[57] ABSTRACT

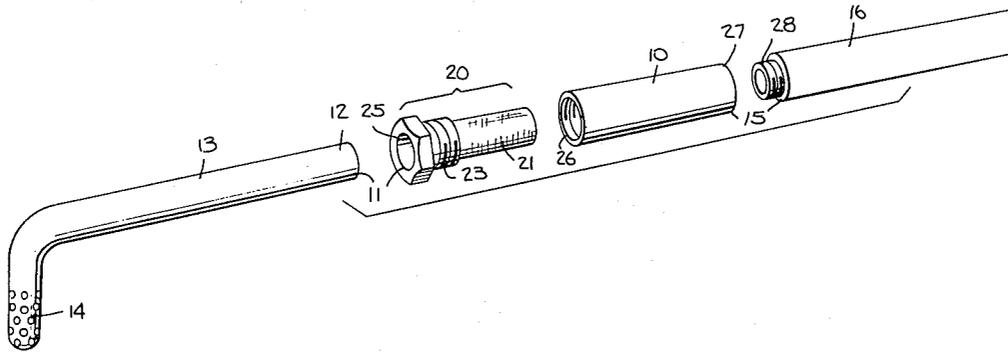
An extension unit for use in conjunction with a dental saliva ejector apparatus is provided comprising a strainer section. One embodiment provides for a removable strainer employing a threaded section while alternate embodiments provide for multi-unit removable strainers and for self contained strainer extension units.

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9 Claims, 7 Drawing Figures



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SALIVA EJECTOR

BACKGROUND OF THE INVENTION

The present invention relates to an improved saliva ejector, and, more specifically, to an improved end unit for a saliva ejector including a strainer unit designed and positioned to provide for prolonged use with maximum efficiency. Additionally, the invention affords means for easy removal and replacement of the strainer unit.

During certain dental procedures, it becomes necessary for a dentist to remove saliva and water from a patient's mouth. This has historically been done utilizing an apparatus referred to as a saliva ejector. This saliva ejector generally comprises a suction pump connected by tubing to an end piece which is placed in the patient's mouth. The end piece comprises a tubular extension of pliable, semi-rigid material thereby providing for selected shaping thereof to comfortably fit the mouth of the patient. The suction draws out the saliva, water, and any solid particles which might result from dental procedures such as drilling, through the device into a drain located in close proximity to the pump.

A problem frequently experienced with this type of apparatus is the clogging of the drain with the solid fragments. These fragments tend to be drawn along with the saliva and water through the saliva ejector apparatus. Heretofore, in order to prevent these fragments from passing through the tubes into the suction pump, a screen or trap was inserted in a section of the tubing which passed from the suction pump to the end section which fits into the patient's mouth. This trap was generally of a cylindrical shape with a head which fit over the edge of one of the tube sections and allowed connection to another tube section. Holes or perforations were located along the curved surfaces of the cylinder, which was generally about one-half inch in length, to effect a straining function.

The problem generally experienced with this type of straining unit is that, due to its relatively short length, it tended to become filled with debris rather rapidly and, consequently after two or three patients, required either cleaning or changing. In either case, due to its construction and positioning, the dentist, in order to remove and clean the trap, was forced to manually remove the strainer unit. Such frequent cleaning not only was time consuming but required the dentist to wash his hands after each cleaning since his hands would have to come in contact with the trap.

Accordingly, a primary object of the present invention is to provide a saliva ejector extension and strainer unit which does not require replacement as often as that of the prior art; and when replacement or cleaning is necessary may be changed with a minimum amount of difficulty and without the necessity of having the dentist's hands come in contact with the strainer unit.

It is a further object of the present invention to provide strainer units of the same description for multiple saliva ejector extensions for use as a single unit.

It is also an object of the invention to provide a disposable saliva ejector extension unit which includes an integral trap.

SUMMARY OF THE INVENTION

In accordance with the present invention, a saliva ejector strainer unit is provided comprising an elongated cylindrical structure threadably engaged within the apparatus tubing. The cylindrical section may be constructed of plastic or metallic composition and contains numerous perforations on both the curved and lower surfaces. This allows passage of liquids but results in a trapping of the solid fragments. The particular dimensions of the strainer unit permit for long use without need for replacement or cleaning. Alternatively, disposable semi-rigid, pliable extension units, including an integral strainer type trap are provided which permit for disposal thereof after use.

There has thus been outlined rather broadly the more important features of the invention in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art might be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception upon which this disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of the invention.

Specific embodiments of the invention have been chosen for purposes of illustration, and are shown in the accompanying drawings, forming a part of the specification, wherein:

FIG. 1 is a plan view of the device of the present invention in an assembled form;

FIG. 2 is an exploded view of the device illustrated in FIG. 1;

FIG. 3 is a partial cut-away view taken along lines 3—3 of FIG. 1;

FIG. 4 is a partial longitudinal cross section of an alternate embodiment of the device of the present invention in an assembled form;

FIG. 5 is a partial longitudinal cross section of a disposable extension unit of the invention;

FIG. 6 is an exploded plan view of a strainer unit adapted to receive multiple extension units according to the invention; and

FIG. 7 is a cross section view taken along lines 7—7 of FIG. 6.

DESCRIPTION OF THE INVENTION

With reference to FIG. 1, the device of the present invention generally comprises a cylindrical tube 10 which is joined at junction 11 to an extension unit 13 which is designed to be placed in a patient's mouth for the removal of saliva and both liquids and solid particles. The extension unit 13 comprises numerous perforations 14 on its distal end to permit the saliva and other wastes to be drawn into the apparatus. The extension unit is generally constructed of a pliable semi-rigid material to permit selected shaping thereof according to its intended use. The diameter and length of the extension unit 13 are standard and are well known in the art. Cylindrical tube 10 is connected at junction 15 at its other end to another cylindrical tube 16 which leads to a vacuum pump and drain (not shown).

FIG. 2 more clearly shows the invention in that in its disassembled form the strainer unit 20 is now clearly shown. Strainer unit 20 is composed of a closed hollow cylindrical tube 21 containing numerous perforations 22, a threaded section 23, and a head 24. The head 24 defines a centrally disposed orifice 25 extending

through the threaded section 23 to communicate with the closed hollow cylindrical tube 21.

The orifice 25 is dimensioned to closely receive the end 12 of extension unit 13 in a friction fit, whereby the extension unit 13 is readily attached thereto. The strainer unit 20 is designed to be threadably secured to cylindrical tube 10 by means of matching threads 26 disposed within cylindrical tube 10. At its opposite end, cylindrical tube 10 also includes a threaded section 27 matching threads 28 of tube 16 for attachment thereto. As stated above, the tube 16 leads to a suction unit (not shown) which is well known in the art.

The invention essentially operates in this embodiment by the activation of a suction pump (not shown). The resulting suction draws out through the perforations 14 in the extension unit 13, which has been placed in a patient's mouth, any saliva, water or solid particles. This is drawn through the opening 25 of the strainer unit 20 and into the closed hollow perforated cylindrical tube 21 which is contained in cylindrical tube 10. The liquid wastes are drawn through the perforations 22 of the closed hollow perforated cylindrical tube 21, through lower tube 16 into the drain of the suction pump (not shown). The solid particles are, however, unable to pass through the perforations 22 in the closed hollow perforated cylindrical tube 10 and are trapped on its internal surface.

The outer diameter of the strainer section 21 of strainer unit 20 is dimensioned to be slightly less than the inner diameter of the tubular section 10. Thus, there is a clear space between the strainer 21 and tube 10 to permit for gradual filling of the strainer without loss of suction. Additionally, the length of the strainer 21 is selected depending upon the available apparatus. Preferably, the strainer 21 extends the substantial length of the intermediate tube 10; and this is preferably about 2 inches. Due to its construction, the strainer unit 20 permits for extended use, usually for up to two or three months without loss of suction due to clogging. When the strainer unit 20 becomes clogged with solid particles which impede the passage of the saliva and water to the pump and drain, the unit can either be replaced or cleaned by removal of the extension 13 and unscrewing cylindrical tube 10 from tube 16.

The entire cylinder tube 10 with strainer unit 20 can be replaced or merely the strainer unit 20 can be removed by grasping the head 24 and then replacing a new strainer unit 20 in the same cylinder tube 10. In either event, it is evident that it is unnecessary for the dentist to come in contact with the strainer 21 thus avoiding contamination of his hands.

With reference to FIG. 3, the end 12 of extension unit 13 is shown connected, by friction fit, within the orifice 25 of head 24 and extending within the hollow threaded portion 23. The inner threaded portion 26 of tube 10 is shown in engagement with the threaded portion 23 of the strainer unit 20. At the opposite end, the threaded portion 28 of the tube 16 is shown threadably engaged to threaded portion 27 of tube 10.

An alternate embodiment of the instant invention is depicted in FIG. 4 which eliminates the intermediate tube 10 and provides for direct attachment of the strainer unit 20 into the tube 16 by engaging the threads 32 and 23 of the tube 16 and of the strainer unit 20 respectively. Means are provided utilizing the orifice 25 through head 24 of the strainer unit 20, for attachment, by friction fit, of end 12 of extension unit 13.

The end 12 of extension unit 13 extends through the head 24 and into the hollow portion of the threaded area 23. With respect to this particular embodiment, for cleaning and replacement purposes, the end 12 of extension unit 13 is removed from the orifice 25 in head 24 and the strainer unit 20 is unscrewed from the tube 16. The strainer unit 20 may either be replaced or cleaned with compressed air and reinstalled.

In FIG. 5, a disposable extension unit 13 is illustrated having an integral strainer unit 40 disposed therein. The strainer unit 40 is substantially of the same dimensions as described hereinabove. The extension unit 13 is also as described hereinabove, i.e., of semi-rigid pliable material for selected shaping. However, when constructed, the strainer unit 40 is positioned within and firmly attached to the internal walls of the unit 13. This may be accomplished in numerous ways known to the art. Preferably, the strainer unit 40 is positioned near the end of the extension 13 proximate to tube 16 so as not to hinder the pliability of the extension 13. As in the above described embodiments, the end 12 extension unit 13 is designed to be connected to the tubing 16 by means of a friction fit. To facilitate the connecting procedure, an annular flange 42 is affixed to the end of tube 16. The annular flange 42 further defines the connection orifice and facilitates grasping of the tube 16. As stated above, this embodiment is intended to be disposable, and when the strainer unit 40 is substantially filled with particular matter so as to impede suction, the entire unit is removed and discarded. Alternatively, the extension unit may be constructed with a smaller screening unit whereby the extension unit 13 is discarded after every use.

FIGS. 6 and 7 illustrate still another alternate embodiment for use with those embodiments illustrated in FIGS. 1 through 4. However, strainer unit 48 is designed to accommodate the ends of two or more extension units 53 and 54 is connected to a single tube 16 leading to the pump and drain. As illustrated in FIG. 7 the strainer unit 48 includes a head 50 of a rectangular shape defining two orifices 51 and 52 adapted to receive the ends of two extension units. Orifice 51 leads directly, through channel 62, and through the threaded portion 23 into the closed hollow perforated cylindrical tube 21. Orifice 52 is to be used in conjunction with a second extension unit 54 and, is directed through passageways 61 and 62 to the strainer 21. When a second extension 54 is not in use, means are provided to seal orifice 52 by use of a hinged cover 59. Biasing means 60 are provided for normally maintaining the cover 59 closed whereby suction is not lost while only one extension unit 53 is in operation. A torsion spring is generally preferred for biasing the cover, however, any means is applicable. This unit is designed for use in conjunction with cylinder tube 10 of FIGS. 1, 2 and 3 or in conjunction with tube 16 of FIG. 4. Threads 23 are provided for threadably engaging the unit 48 with the threads 28 of FIGS. 2 and 3 or 4.

It is apparent that this unit provides for utilizing multiple extension units 13, when a single unit would not be sufficient. It will also be appreciated that the head 50 can be constructed to accommodate more than two extension units by simple modifications.

What is claimed is:

1. An improved saliva ejector comprising:

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a pliable semi-rigid tubular end piece being open at one end and defining a perforate closure at the other end;

a strainer unit of integral construction adapted to receive, in friction fit, said tubular end piece;

first connecting means to secure said strainer unit to a suction tube;

said strainer unit including a head which defines an orifice dimensioned to frictionally receive said tubular end piece, an elongated cylindrical strainer open at one end to communicate with said orifice and closed at its other end and an intermediate section disposed between said head and said strainer with externally threaded second connecting means for securing said strainer unit to said first connecting means, said strainer having an exterior diameter less than the interior diameter of said first connecting means to provide an annular space therebetween.

2. An improved saliva ejector according to claim 1 wherein said first connecting means for securing said strainer unit to said suction tube comprises an intermediate tubular section having inwardly disposed threaded portions at each end thereof, one of said threaded portions adapted to threadably engage said second connecting means of said strainer unit and the other of said threaded portions adapted to threadably engage a corresponding threaded portion of said suction tube.

3. A disposable saliva ejector extension unit which comprises:

a pliable semi-rigid tube, open at one end and defining a perforated closure at the other end;

an elongated cylindrical strainer fixed secured within said tube, said strainer having an exterior diameter less than the interior diameter of said tube to provide a space therebetween and

means for connecting said tube to a suction tube.

4. An improved strainer unit for saliva ejectors which comprises:

a head member defining at least two orifices, each of said orifices communicating interiorly with a common passage, said orifices dimensioned to receive, in friction fit, tubular end members;

an integral cylindrical strainer communicating at one end with said common passage and closed at its other end;

means for connecting said head and strainer to a suction tube whereby said strainer extends within said suction tube, said strainer being dimensioned so that its exterior diameter is less than the interior diameter of said suction tube to provide an annular space therebetween; and

cover means mounted to said head to cover at least one of said orifices and including spring means to normally bias said cover to close said orifice.

5. A strainer unit according to claim 4 wherein said connecting means comprises a threaded section disposed between said head member and said strainer, said threaded section being dimensioned to threadably engage corresponding threads disposed on said suction tube.

6. A strainer unit according to claim 4 wherein said connecting means comprises a threaded section disposed between said head member and said strainer, and a tubular section having inwardly disposed threads at each end thereof, one of said ends being threadably engageable with said threads one said strainer unit and the other of said ends being threadably engageable with said suction tube.

7. An improved saliva ejector according to claim 1 wherein said first connecting means comprises internal threads at one end of said suction tube.

8. An improved saliva ejector according to claim 1 wherein said cylindrical strainer is about two inches in length.

9. An improved strainer unit according to claim 4, wherein said cylindrical strainer is about two inches in length.

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