May 26, 1964 L. F. KLEIN 3,134,127

TEETH CLEANING AND TREATING DEVICE

Filed Oct. 12, 1961

FIG. 1

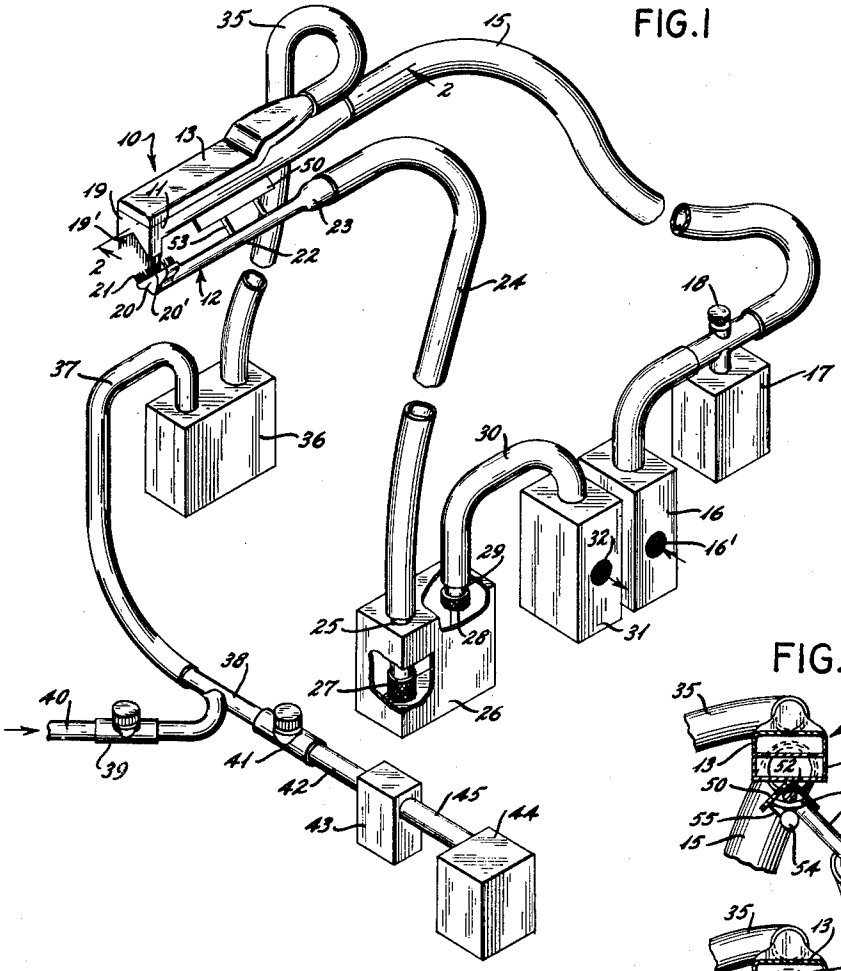


FIG. 3

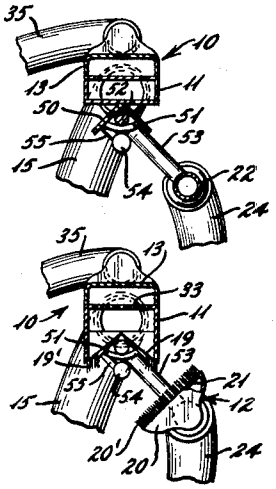


FIG. 4 INVENTOR

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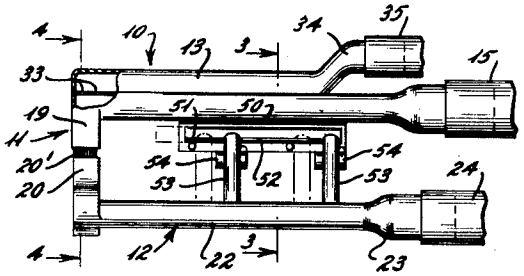


FIG. 2

BY

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TEETH CLEANING AND TREATING DEVICE

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4 Claims. (Cl. 15—321)

This invention relates to personal hygiene including care of the teeth and to apparatus or equipment employed in the care and preservation of the teeth regardless of whether of natural or artificial character.

The invention relates particularly to apparatus for dislodging and removing matter from between and around the teeth and the application of cleaning agents and additives utilizing air and liquid under positive and minus pressure.

Much attention has been given to the care and preservation of the teeth, to substances used, and to various types of brushes, and some attention has been given to equipment by which a limited amount of cleaning and flushing of the teeth can be accomplished but this has not resulted in adequate apparatus for most effectively accomplishing the desired result.

It is an object of the invention to provide apparatus for cleaning and treating the teeth and the surrounding soft and hard tissue by which fluid under both positive and negative or suction pressure and in either liquid or gaseous form can be supplied and with which an additive can be employed and having means for removing both fluid and solid matter.

Another object of the invention is to provide teeth cleaning and treating apparatus for simultaneously treating both sides of the teeth and associated gum tissue and capable of being adjusted both as to position, proximity and direction, and which can be reversed for counter operational action.

A further object of the invention is to provide equipment in which fluids in gaseous or solid state, solids, and solutions may be mixed or integrated and introduced into the mouth and the resulting substance removed by suction.

Other objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing wherein:

FIG. 1 is a perspective of apparatus in accordance with the present invention;

FIG. 2, a side elevation; and

FIGS. 3 and 4, sections respectively on the lines 3—3 and 4—4 of FIG. 2.

Briefly stated, the present invention comprises a device for cleaning and treating the teeth and the surrounding soft and hard tissue and includes a head assembly having a directional air pressure tip, a suction pick-up tip, and a solution adding tip. The suction pick-up tip is adjustable from side to side relative to the directional tip so that the head assembly can be utilized to clean opposite sides of the teeth. The directional tip has a flexible tube connected to one end and air under pressure is introduced into the head assembly through such tube by a pressure pump. A mixing vat is interposed along the length of the flexible tube and contains gases, liquids, solid matter or solutions thereof which may be integrated with the air under pressure and introduced into the mouth through the directional tip. The suction pick-up tip has one end disposed in opposed relation with the directional tip and the opposite end is provided with a flexible tube connected to a container for foreign matter. The end of the suction pick-up tube is provided with a filter within the foreign matter container and the air picked up by the suction pick-up tip will pass through a second filter and through a tubing into the suction side of a vacuum pump. In this manner air under pressure is forced through the directional tip where it impinges upon the teeth to force any foreign matter between such teeth out the opposite side where it is picked

up by the suction pick-up tip and deposited in a container from which it may be subsequently removed. Water and additional additives such as gases, liquids, solids or solutions thereof may be added to the air under pressure through the adding tip. The additive tip dispenses material into the air under pressure through a series of apertures in the directional tip and such material is delivered to the additive tip through a flexible tube from an additive container. Pressure is applied to the additive container through a tube connected to water under pressure from a source of supply controlled by a valve or from a pump which may be connected to an additional additive container and controlled by a second valve.

With continued reference to the drawing, the present invention includes a head assembly **10** having a directional tip **11**, a suction pick-up tip **12** and an additive tip **13**. The suction pick-up tip **12** is movable from side to side relative to the directional tip **11** in a manner which will be described later.

The directional tip **11** has a flexible tube **15** connected to one end and such tube is supplied with air under pressure from a container **16** which contains a conventional air pressure pump not shown, the tube **15** being connected to the high pressure side of such pump. The container **16** has an inlet port **16'** to permit air to be drawn into such container for discharge through the tube **15**.

A mixing vat **17** is interposed along the length of the tube **15** for the introduction of gases, liquids, solids or various solutions of the same into the air under pressure to assist in the cleaning of the teeth or the treating of the tissue surrounding the same. The material within the mixing vat is dispensed under the influence of a pressure valve **18** which can be operated to permit the air to bypass the mixing vat or be opened to cause a desired amount of the material within the vat to be mixed with the air under pressure.

The air under pressure which may or may not contain material from the mixing vat enters one end of the directional tip and is discharged at the opposite end through an opening **19** substantially at right angles to the direction of flow thereof. Bristles **19'** are disposed about the periphery of the opening **19** to assist in removing foreign matter from between the teeth. The air thus discharged is directed against the teeth and into the interproximal area, the subgingival area, the gum and into grooves, pits, fissures and all anatomical structural surfaces of the teeth to loosen any material or debris in the area of the teeth.

In order to remove such material, debris, or waste as well as the air under pressure, the suction pick-up tip **12** is located in opposed relation to the directional tip **11** and has an enlarged head portion **20** with one end open to provide a mouth **21** in which is received the foreign matter and debris removed from the teeth as well as the air discharged by the directional tip **11**. The head portion **20** may have bristles **20'**.

The suction pick-up tip **12** has a body portion **22** generally of cylindrical configuration with an enlarged portion **23** on the end opposite the head **20**. One end of a flexible tube **24** is attached to the enlarged end **23** of the suction pick-up tip and the opposite end of such tube is connected to a sleeve **25** mounted in a debris or waste container **26**. A filter **27** may be mounted on the lower end of the sleeve **25** to filter any matter from the air in the suction line. The debris and foreign matter discharged in the container will be caused to remain therein while the air passes through a second filter **28** attached to one end of a sleeve **29** which passes through the upper wall of the container **26**, and to which is attached one end of a tube **30**, the opposite end of which tube is connected to the low pressure side of a conventional vacuum pump (not shown) within a container **31**. The container

31 has an exhaust port 32 for the discharge of air from the vacuum pump.

The directional tip 11 is provided in its upper wall with a plurality of apertures 33 adjacent its discharge end and such apertures are in communication with the additive tip 13 mounted on the directional tip 11. The free end of the additive tip terminates in a hollow cylindrical portion 34 (FIG. 2) to which is attached one end of a flexible tube 35, the opposite end of which is connected to an additive container 36. The container 36 is adapted to receive additives in the form of gases, liquids, solids or solutions thereof which are used to assist in the cleaning of the teeth and the treating of the associated tissue.

In order to cause the additives in the container 36 to flow into the additive tip 13, a tube 37 has one end connected to the container 36 and its opposite end connected to a Y-shaped fixture 38. One branch of the Y-shaped fixture 38 is connected to a valve 39 which governs the supply of water through an inlet 40 connected to a source of supply. The other branch of the fixture 38 is connected to a valve 41, the opposite end of which is connected by a tube 42 to a pump 43 whereby additional additives retained within a container 44 may be supplied by a tube 45 to the pump and regulated by the valve 41 to pass through the tube 37 into the additive container 36 and subsequently into the additive tip 13.

In order to move the suction pick-up tip 12 from side to side relative to the directional tip 11, an angular guide member 50 is mounted on the bottom of such directional tip and the suction pick-up tip 12 is slidably mounted thereon. This is accomplished by providing a pair of arcuate retaining members 51 which extend between the angularly disposed walls of the guide member 50 in spaced relation to the apex and such arcuate retaining members slidably receive an elongated bar 52 to permit axial movement thereof. A pair of depending rods 53 are fixed at one end to the bar 52 in spaced relation along the axis of such bar. The opposite ends of the rods 53 are connected to the body 22 of the suction pick-up tip 12.

In order to retain the suction pick-up tip in adjusted position, a pair of stop members 54 are connected by supporting rods 55 to the angularly disposed walls of the guide member 50 and are located in a position whereby the depending rods 53 may be received between the stops 54 and the angular guide member 50. When it is desired to shift the suction pick-up tip from one side to the other, the suction pick-up tip is moved forwardly to a position where the depending rods 53 clear the end of the stops whereupon the suction pick-up tip can be swung around to the opposite side and then moved rearwardly between the opposite side of the stop 54 and the guide member 50 until the rods 53 strike the supporting rods 55.

In the operation of the device, the suction pick-up tip is arranged on one side of the directional tip and the device is inserted in the mouth with the teeth located between the directional tip and the suction pick-up tip so that air under pressure, which may or may not contain additives to assist in cleaning the teeth, impinges upon the teeth and forces debris and foreign matter therethrough. The air under pressure, additives and foreign matter enter the suction pick-up tip and are deposited in a debris receptacle. The air which enters such receptacle passes out the opposite side through a tube connected to a source of vacuum.

When cleaning the teeth, the head is positioned at the midline of the lower arch with directional tip 11 on the outside of the teeth. The head is then moved through the lower left quadrant by following the contour of the mouth through the molar region and then back to the midline position whereupon the head assembly is rotated 90° and the lower right quadrant is cleaned in a similar manner.

The upper right and left quadrant are similarly cleaned and then the suction pick-up tip 12 is rotated 90° relative to tip 11 after which the cleaning operation is repeated with the flow of air under pressure and additives reversed by locating the directional tip 11 on the inside of the teeth. Operation from this new position permits the air and additives to be directed through and between the teeth in the opposite direction reaching crevices that could not be reached by a flow in a single direction and applies cleaning action to both the inside and the outside of the teeth.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is illustrated in the drawing and described in the specification, but only as indicated in the accompanying claims.

What is claimed is:

1. Apparatus for cleaning and treating the teeth and associated tissue comprising a head having a fluid directional tip with angularly disposed faces for directing fluid under pressure against said teeth, means for supplying said fluid directional tip with fluid under pressure, a suction tip pivotally mounted on said head, means for connecting said suction tip with a source of suction, means for rotating said suction tip relative to said fluid directional tip so that it is in opposed relation with at least one of said faces, means for maintaining said suction and fluid directional tips in adjusted rotational position, whereby foreign matter may be removed from the teeth by fluid under pressure directed along said teeth from one side thereof and a suction on the opposite side for removing the foreign matter.

2. The structure of claim 1 in which said fluid directional tip and said suction tip include bristles for engaging the teeth to assist in the removal of foreign matter.

3. The structure of claim 2 including an additive tip fixed to said fluid directional tip and having communication therewith, and selective means for supplying cleaning agents to said fluid under pressure.

4. Apparatus for cleaning and treating the teeth and associated tissue comprising a head having a fluid directional tip with portions for simultaneously directing fluid under pressure against at least one side and the bite portion of said teeth, means for supplying said fluid directional tip with fluid under pressure, a suction tip pivotally mounted on said head, means for connecting said suction tip with a source of suction, means for rotating said suction tip relative to said fluid directional tip so that it is in opposed relation with at least one of the portions thereof, means for maintaining said suction and fluid directional tips in adjusted rotational position, whereby foreign matter may be removed from the teeth by fluid under pressure directed along said teeth from one side thereof and a suction on the opposite side for removing the foreign matter.

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