

March 2, 1954

T. P. WALL
SALIVA EJECTOR

2,670,539

Filed July 12, 1952

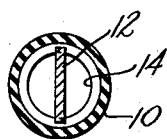
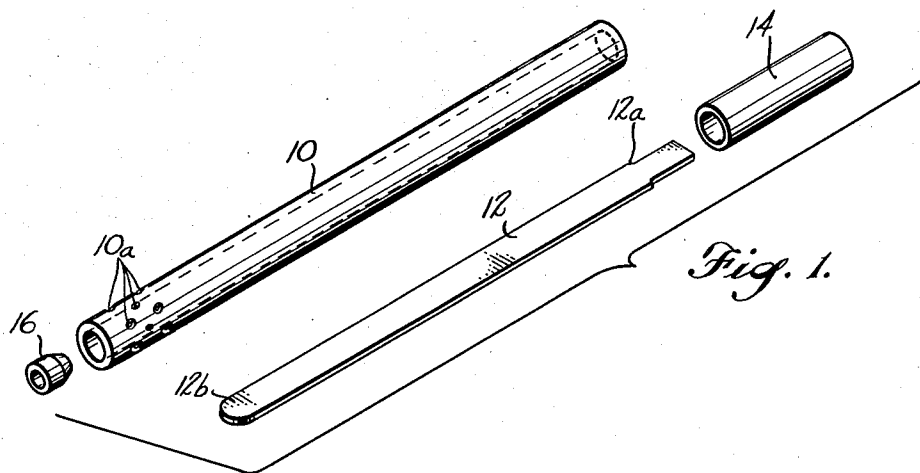


Fig. 3.

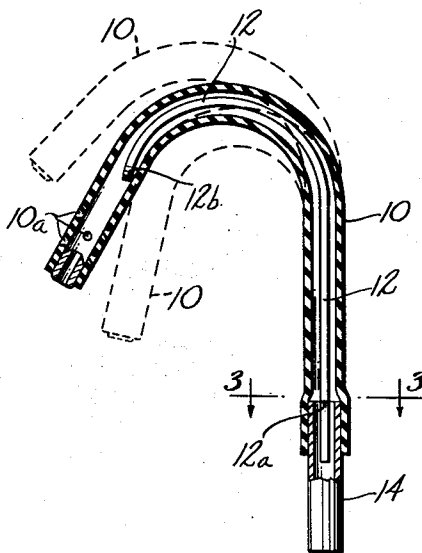


Fig. 2.

INVENTOR.
THOMAS P. WALL

BY
Reynolds, Beach & Christensen
ATTORNEYS

UNITED STATES PATENT OFFICE

2,670,539

SALIVA EJECTOR

Thomas P. Wall, Seattle, Wash.

Application July 12, 1952, Serial No. 298,500

4 Claims. (Cl. 32—33)

1

This invention relates to an improved saliva ejector or the like for use primarily in dentistry practice, and a general object thereof is to provide such a device which can be made more comfortable to patients and more efficient in its operation than previous known types. The invention is herein illustratively described by reference to its preferred form, but it will be appreciated that various changes and modifications therein may be made without departing from the underlying principles involved.

The filling or treatment of teeth following accepted standards of dental practice requires the use of a saliva ejector to prevent accumulations of saliva which would moisten the exposed dentine prior to filling, and thus lead to possible infections and otherwise unsatisfactory results. The modern dentistry office, therefore, includes suitable saliva-removing equipment, such equipment comprising a source of suction, a nozzle element, properly termed a saliva ejector, which hooks over the patient's lower front teeth to position its intake end at the base of the gum where the saliva collects, and a flexible hose connecting the outer or depending end of the saliva ejector nozzle tube to the suction source. The present invention concerns itself only with the saliva ejector which engages the patient's mouth, and relates directly in no way to the type nor to the details of the suction source, nor to the means by which the saliva ejector is connected to such source.

Because of the widely variant shapes and sizes of human lower jaw structures, ranging from the extremes of small children to the extremes of large adults, it has been difficult, if not virtually impossible with previous types of saliva ejectors to maintain in a dentistry office the necessary graduation and range of sizes of saliva ejectors sufficient to provide one of optimum fit for every patient treated. Ideally, with reference to the matter of fit, the combined weight of the saliva ejector and connecting hose should be borne almost entirely by the lower front teeth of the patient over which the element hooks, with the shank of the hook-shaped ejector nozzle tube hanging down alongside the patient's chin, and with the opposite or saliva intake end of the ejector positioned just out of contact with or very lightly touching the soft tissue between the root of the tongue and the base of the lower gum, so that collecting saliva will be withdrawn through one or more openings in that end of the ejector, yet the sensitive tissue will not be irritated due to pressure, nor will such tissue

2

tend to close the intake openings because of excessive pressure against the ejector surface. Previous types of saliva ejectors have been made in one or more standard sizes of fixed shape, and if suited to one individual patient would be uncomfortable and inefficient in operation for another.

In order to overcome this problem while satisfying the requirements of moderate cost, durability, ease of sterilization, low bulk and weight, and similar requirements obvious to those familiar with the art, the present invention provides an adjustable saliva ejector which may be conveniently manufactured in a single standard form and size and thereafter formed or adjusted to any effective operating shape and size required in order to provide an optimum fit for every case with that one ejector or others like it.

The desired results are achieved in accordance with the preferred construction of the improved saliva ejector by forming the hook-shaped ejector nozzle tube of soft rubber or the like having provision at one end for connection to a suction hose or the like, and provided at its opposite end with one or more suction openings adapted to eject or draw saliva from the patient's mouth when suction is applied to the tube. In addition, a stiffener element, preferably of readily bendable ductile metal or the equivalent, amply stiff to retain its form, extends lengthwise along or through the rubber nozzle tube interior and permits establishing and varying the general hook form imparted to the nozzle tube so as to meet the requirements of various different cases presented. Such stiffener element, preferably internal to the nozzle tube instead of external thereto, is of a lesser cross section of the nozzle tube so that it does not interfere with a free flow of air and saliva through the nozzle tube. Preferably this stiffener element is suitably anchored by one end to a metal sleeve by which the flexible nozzle tube is conveniently secured to a suction hose or the like when in use.

The softness, flexibility, ability to withstand boiling temperatures for sterilization purposes, and other properties of surgical rubber are properties of that material which render it ideally suited for the purposes of the nozzle tube according to the invention. The stiffness, ductility and ability to withstand repeated bendings without crystallization together with the convenience of working and shaping are properties which render lead and similar metals or metal alloys ideal for the stiffener element which, if formed

as a wire or strip, extends internally throughout a substantial part of the length of the nozzle tube. It should be understood, however, that the invention in its broader aspects is not necessarily limited to particular materials, nor is it necessarily limited to specific details of construction by which the principles are herein illustratively described.

The foregoing and other features, objects and advantages of the invention will become more fully evident from the following description by reference to the accompanying drawings.

Figure 1 is a perspective view, showing the disassembled parts of the improved saliva ejector representing the preferred form of the invention.

Figure 2 is a sectional side view, taken on a longitudinal plane passing through the axis of the nozzle tube, illustrating the saliva ejector bent into a hook-shaped form ready for use, the view showing by dotted lines two different alternative forms of which there are any number that may be achieved in order to suit individual cases.

Figure 3 is a transverse sectional view taken on line 3-3 in Figure 2.

The several parts of the saliva ejector as illustrated in Figure 1 comprise the elongated flexible nozzle tube 10, the elongated stiffener element 12, the mounting sleeve 14 to which one end of the tube 10 and stiffener element 12 may be connected for convenient detachable securement to a suction hose (not shown), and the nozzle tip orifice insert sleeve 15 which fits into the otherwise open intake end of the nozzle tube.

The illustrated stiffener element 12, preferably of lead or other readily bendable and non-resilient or ductile material, is in the form of an elongated flat metal strip of a sufficient thickness to afford the desired stiffness in one plane and of a width preferably slightly less than the internal diameter of the nozzle tube, so as to preclude bending in a perpendicular plane and so as to tend to maintain itself approximately centered in the tube perpendicularly to the strip's general plane. The length of the strip projecting beyond the inner end of the mounting sleeve 14 (Fig. 2) is preferably somewhat less than the corresponding length of the nozzle tube. For purposes of support, one end of the stiffener strip 12 is reduced slightly in width in order to fit snugly inside the inner end of the mounting sleeve. This width reduction forms shoulders 12a which abut the end of the sleeve 14 and limit the amount of insertion of the stiffener element inside the sleeve. If desired, a permanent connection between the end of the stiffener element 12 and the mounting sleeve 14 may be made as by brazing, soldering, or otherwise. The opposite end of the stiffener element is rounded, as indicated at 12b, in order to minimize any tendency for sharp corners to wear through the wall of the nozzle tube 10 after repeated bendings and use of the saliva ejector.

As previously mentioned, nozzle tube 10 is preferably of rubber, although other flexible materials which would reasonably maintain their tubular form when bent and subjected to the internal partial vacuum required for operation of the saliva ejector are applicable in lieu of rubber. A good grade of soft surgical rubber is extremely durable and can withstand numerous sterilization treatments in steam baths; moreover it is soft and its feel to the patient's mouth is very comfortable. This in itself is a distinct advantage over the hard metallic tube saliva ejectors in common use heretofore.

In addition to the central suction orifice pro-

vided by the sleeve 16 inserted retentively into the orifice end of tube 10 opposite the mounting sleeve 14 (Fig. 2), a group of suction orifices 10a in the tube wall near its tip are also provided. These extend around the tube's periphery and insure the availability of one or more saliva intake openings clear of possible impeding mouth tissue at all times.

On a mass production basis, the stiffener strip 12 is conveniently made by die-cutting the same in quantities out of sheet metal stock, and in any event is normally flat or straight when first made, as is the flexible nozzle tube 10, which is made simply by cutting the desired lengths of tube from tubing stock. There are added advantages in having these principal parts straight to begin with, which include facilitating the insertion of the stiffener element into the tube and permitting storage of a number of saliva ejectors very compactly, arranged like wood matches for instance, in shipping boxes or other suitable containers.

With the parts assembled as indicated in Figures 2 and 3 the tube is grasped in the hands and bent to any desired shape in a plane perpendicular to the general plane of strip 12. The nature and amount of curvature of the hook thus formed may be varied very easily in a matter of seconds in order to secure a comfortable yet secure fit on a particular patient, while locating the intake end of the nozzle tube in an optimum operating position to remove saliva as fast as it accumulates. By use of proper materials for the tube and stiffener elements an almost indefinite number of rebendings may be attained without causing fatigue or other type of failure of the two parts affected, namely the rubber tube and the ductile metal stiffener element.

I claim as my invention:

1. A dentistry saliva ejector comprising an elongated relatively flexible tube having a saliva intake nozzle end and an opposite end adapted for connection to a suction source, and an elongated relatively nonresilient stiffener element extending lengthwise throughout a substantial portion of the length of said tube internally thereof and being of materially lesser cross section than the interior of said tube to permit passage of liquid therethrough, said stiffener element comprising a ductile metal strip of a width approaching that of the internal tube width and of a thickness comprising a fraction of its width but sufficient to impart form retentive stiffness to the strip while permitting said strip to be bent readily for varying the curvature of said tube at will in order to fit different individual mouths.

2. The saliva ejector defined in claim 1, wherein the saliva intake nozzle end of the flexible tube has a plurality of saliva intake apertures in the wall of such tube, and a cylindrical sleeve element retentively fitted in the adjacent tip of the tube and having a restricted opening therein permitting passage of saliva into said tube.

3. The saliva ejector defined in claim 1, wherein the elongated stiffener element extends lengthwise from the suction source end of the flexible tube to a point of termination located materially short of the saliva intake end of the tube whereby the intervening portion of said tube is relatively free to flex and thereby minimize pressure of the nozzle end thereof against the tissue inside the patient's mouth.

4. A dentistry saliva ejector comprising an elongated relatively flexible tube having a saliva intake nozzle end and an opposite end adapted for connection to a suction source, and an elongated relatively nonresilient stiffener element extending lengthwise throughout a substantial portion of the length of said tube internally thereof and being of materially lesser cross section than the interior of said tube to permit passage of liquid therethrough, said stiffener element comprising a ductile metal strip of a width approaching that of the internal tube width and of a thickness comprising a fraction of its width but sufficient to impart form retentive stiffness to the strip while permitting said strip to be bent readily for varying the curvature of said tube at will in order to fit different individual mouths.

5

gated relatively nonresilient stiffener element extending lengthwise throughout a substantial portion of the length of said tube internally thereof from the latter end of said tube to a point of termination materially short of the nozzle end 5 thereof and being of materially lesser cross section than the interior of said tube to permit passage of liquid therethrough, said stiffener element having form retaining stiffness yet being readily bendable to permit varying the curvature 10 of said tube at will in order to fit different individual mouths, while permitting flexure of the

6

portion of said tube between the terminal end of said stiffener element and the nozzle end of said tube minimizing pressure of contact of said nozzle end against the mouth tissue.

THOMAS P. WALL.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,116,868	Anzelewitz	Nov. 10, 1914