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FLUID DISPENSING ATTACHMENT FOR DENTAL ENGINES

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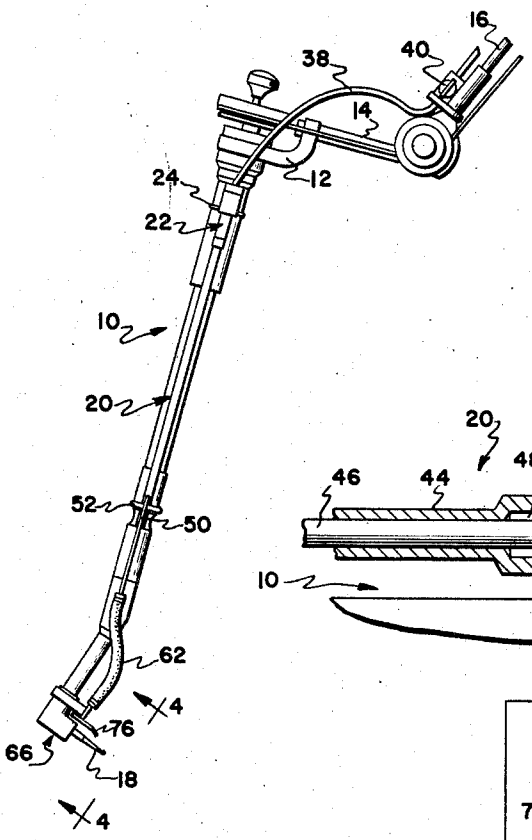
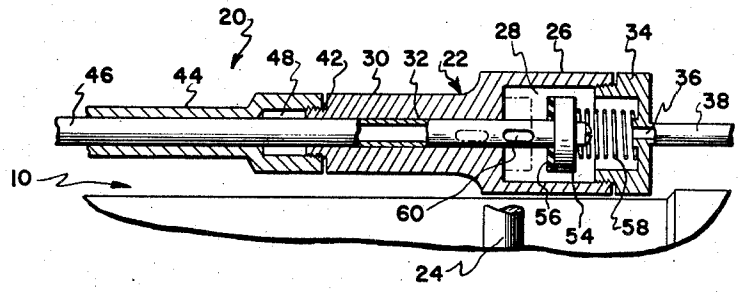


Fig. 1.

Fig. 2.



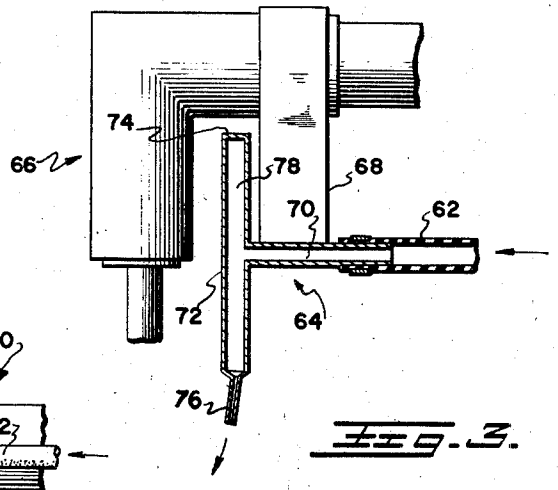


Fig. 3.

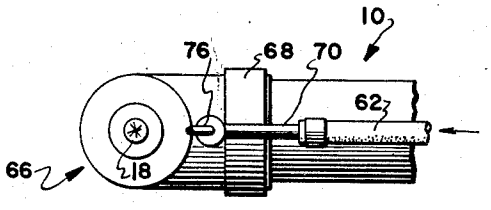


Fig. 4.

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FLUID DISPENSING ATTACHMENT FOR DENTAL ENGINES

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3 Claims. (Cl. 32—28)

This invention relates to a fluid dispensing attachment for dental engines, and more particularly to a device which may be attached to the handpiece of a dental engine for dispensing a fluid, such as air or water, into the patient's mouth.

This application is a continuation-in-part of my copending application entitled "Fluid Dispensing Attachment for Dental Engines," Serial No. 405,096, filed January 20, 1954.

In drilling teeth, the discomfort of the patient can be greatly alleviated by directing the said fluid, such as air or water, into the region where the drilling is being performed. Furthermore, the delivery of fluid to the drilling zone also facilitates the drilling operation since the dentist does not have to stop to flush out the cavity being drilled in order to observe the progress of the drilling operation. Air or water attachments on dental engines are also useful in connection with other types of dental work, such as cleaning teeth, for example.

There is disclosed in my said copending application Serial No. 405,096 an attachment for a dental engine for delivering fluid, such as air or water, to the patient's mouth in the region where dental work is being performed. In the construction disclosed in this copending application, the fluid-carrying tubular member is mounted on the handpiece carried by the dental engine and extends into the region adjacent the drilling tool. The fluid-carrying tube is slidably movable to perform a valving operation and thus controls the flow of fluid from the outlet end of the tube and into the patient's mouth.

While the fluid dispensing attachment of this prior application is very satisfactory and represents a substantial improvement over the prior art, the invention of the present application has the further advantage that movement which is imparted to the fluid-carrying tube in connection with the valving operation does not change the position of the outlet of the tube relative to the tool carried by the handpiece of the dental engine.

Accordingly, it is an object of this invention to provide a fluid-carrying attachment for dental engines in which the outlet of the fluid-carrying tube or conduit remains fixed with respect to the handpiece of the dental engine but in which the fluid-carrying tube is movable to regulate the fluid flow through the tube.

It is a still further object of this invention to provide an improved nozzle for use in a fluid dispensing attachment of a dental engine.

In achievement of these objectives, this invention provides an air and water attachment for a dental engine in which the fluid-carrying tube or conduit is anchored to a point adjacent the outer end of the handpiece so that the outlet end of the fluid-carrying tube remains in a fixed position relative to the tool carried by the handpiece. The fluid-carrying tube incorporates a part of the valve operating system which controls the fluid flow and is slidably movable to effect the opening or closing of the flow control valve. To permit movement of the fluid-carrying tube while its outlet end remains anchored, the fluid-carrying tube includes an elastic fluid-carrying tubular portion which normally biases the fluid-carrying tube toward a valve closing position. The use of the elastic fluid-carrying tubular portion as a part of the fluid-carrying tube permits sliding movement of the fluid-carrying tube to effect the valving operation without

causing any movement of the outlet end of the tube relative to the tool carried by the handpiece of the dental engine.

As a further feature of the construction, there is provided a nozzle member for attachment to the fluid-carrying tube which includes a closed pocket defining an air chamber which serves to improve the fluid dispensing characteristics of the nozzle.

The invention, both as to its organization and use, together with further objects and advantages thereof, may best be understood by reference to the following description taken in conjunction with the accompanying drawing in which:

Fig. 1 is a side elevation view of a dental handpiece which includes the fluid dispensing attachment of the invention;

Fig. 2 is an enlarged fragmentary longitudinal sectional view of the valve operating mechanism which controls fluid flow through the tube;

Fig. 3 is an enlarged sectional view illustrating the details of the outlet nozzle assembly of the fluid dispensing attachment; and

Fig. 4 is an enlarged fragmentary sectional view along line 4—4 of Fig. 1.

Referring now to the drawing, there is shown a dental handpiece generally indicated at **10** supported by a bracket member **12** carried by hinged arms **14** and **16** of a dental engine. At the outer end of handpiece **10**, a dental tool **18** is supported for rotation.

Supported upon the outer surface of handpiece **10** is the fluid dispensing attachment generally indicated at **20**. The fluid dispensing attachment **20** includes a valve housing generally indicated at **22** which is rigidly secured to the outer surface of the upper end of handpiece **10** by a ring member **24** which is rigidly secured, as by soldering, to the surface of valve housing **22**.

As will best be seen in the view of Fig. 2, valve housing **22** includes a main body portion **26** which contains a hollow valve chamber **28** and a body portion **30** of reduced outer diameter having an axial passage **32** which extends from the end of body portion **30** into communication with hollow chamber **28**. Valve housing **22** is provided at its outer end with a cap member **34** which is in screw-threaded engagement with the outer end of main body portion **26** of the valve housing. Valve cap **34** is provided with a fluid inlet **36** which communicates with hollow chamber **28**. A flexible tubular conduit **38** is connected to inlet end **36** of the valve housing. The opposite end of conduit **38** is connected to a manually controlled shut-off valve **40** supported by arm **16** of the dental engine.

The lower end of valve body portion **30** is provided with a screw-threaded neck **42** of reduced diameter engaging an elongated tubular sleeve member **44** which serves as a guide and a bearing for a slidable fluid-carrying tube **46**. The end of guide sleeve **44** which engages threaded neck portion **42** may be provided with a packing in the space **48** to prevent leakage from the valve housing **22** of any fluid which may get between the outer surface of slidable tube **46** and the inner surface of axial passage **32**. Guide sleeve **44** extends for a substantial portion of the length of handpiece **10** but terminates at a point spaced approximately one-third the length of the handpiece from the end of the hand-piece. The lower end of sleeve **44** has approximately 180 degrees of its surface cut away for a short distance as indicated at **50** in Fig. 1, the remaining surface portion of the guide sleeve in the cut-away region resting on the surface of handpiece **10** and serving as a bearing for a slidable actuating ring **52** which is rigidly secured to the slidable tube **46** in the region of the cut-away portion **50** of guide sleeve **44**.

Fluid-carrying tube 46 is a rigid tubular member which extends through guide sleeve 44, through axial passage 32 of valve housing 22, and into valve chamber 28. Tube 46 carries at its end which is disposed in valve chamber 28 a valve head 54 which carries a gasket-like sealing means 56 on its surface which is disposed toward axial passage 32. A spring 58 is seated on the outer surface of valve head 54, the opposite end of spring 58 engaging the inner surface of valve cap 34. Spring 58 serves to normally bias tube 46 toward the left with respect to the view shown in Fig. 2 so that valve head 54 is normally seated on the end wall of chamber 28 in the position shown in dotted outline in Fig. 2.

Fluid-carrying tube 46 is provided adjacent but spaced from valve head 54 with one or more fluid inlet slots or openings 60. In the normal spring-biased position of tube 46, inlet slots 60 assume the dotted outline position shown in Fig. 2 along the axial passage 32 of the valve housing and are therefore out of communication with chamber 28. In this position of tube 46, no fluid is admitted to the tube through inlet slots 60. However, when tube 46 is manually pushed to the position shown in full line in Fig. 2 in which valve head 54 is moved away from its seat, fluid inlet slots 60 extend into chamber 28 and permit fluid which has entered the chamber 28 through inlet 36 to pass into openings 60 of the tube 46.

The construction thus far described is substantially in accordance with the disclosure of my prior patent application Serial No. 405,096. However, instead of having the rigid slidable fluid-carrying tube 46 extend to the region of tool 18, as in the case of my previous application, I modify the previous construction by interposing an elastic fluid-carrying conduit portion 62 between the end of tube 46 and the outlet nozzle assembly generally indicated at 64. This permits nozzle assembly 64 to be rigidly fixed to housing 66 for the tool 18 which is disposed at the outer end of handpiece 10. Elastic conduit portion 62 may be made of rubber or other elastic material which may be elongated by the application of tension and having the characteristic of returning to its original dimension after the release of tension.

Nozzle assembly 64 is suitably anchored by means of band member 68 to tool housing 66. As will best be seen in the enlarged fragmentary view of Fig. 3, nozzle assembly 64 includes a tubular portion 70 which is open at its outer end and connected at that end to elastic conduit portion 62. Tubular portion 70 is connected to a second tubular portion 72 at substantially the mid-point of the length of tubular portion 72 and at substantially right-angles thereto. Tubular portion 72 is closed at one end as indicated at 74 and is provided at its outer end disposed toward tool 18 with a nozzle tip 76 through which the fluid being dispensed passes to the patient's mouth. The closed end 74 provides an air pocket 78 in the tubular portion 72 between the inlet connection of tubular portion 70 and the closed end 74 of tubular portion 72. Air pocket 78 provides a mixing chamber in which air and water may mix to produce a more perfect spray at nozzle tip 76.

Biasing spring 58 in valve chamber 28 may be eliminated if desired, since elastic conduit portion 62 biases valve head 54 to seated position; or, alternatively, a relatively weak spring 58 may be used.

In operating the fluid dispensing dental attachment hereinbefore described, the operator grasps ring 52 attached to rigid slidable tube 46 and moves the ring and the attached tube 46 in the direction of valve housing 22. This causes valve head 54, which had been previously biased into valve closing position by spring 58, to move from its valve seat to permit slots 60 to move into communication with the interior of valve chamber 28. This perimts fliud in valve chamber 28 to pass through slots 60 and into tubular conduits 46, 62 and thence to nozzle assembly 64 where the fluid passes through nozzle tip 76 into the mouth of the patient.

Although the nozzle assembly 64 remains anchored to the tool housing 66 at the end of hand tool 10, sliding movement of fluid-carrying tube 46 is permitted due to the interposed elastic fluid-carrying conduit portion 62. As soon as the operator releases manual pressure on ring 52, the elasticity of tubular fluid-carrying section 62, assisted by the biasing action of spring 58 in valve housing 22, returns slidable tube 46 to a position in which valve head 54 is in its dotted-outline seated position as shown in Fig. 2.

It can be seen from the foregoing that there is provided in accordance with this invention a fluid dispensing attachment for dental engines which is an improvement over the construction shown in my prior patent application Serial No. 405,096 in that the fluid outlet of the dental attachment remains in a fixed position with respect to the tool carried by the handpiece despite the sliding movements imparted to the fluid-carrying tube to control the flow of fluid through the tube.

While there has been shown and described a particular embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein wtihout departing from the invention and, therefore, it is aimed to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim as my invention is:

1. A fluid dispensing attachment for a dental engine comprising a fluid-carrying conduit having an outlet and an inlet, said conduit including a rigid conduit portion and an elastic conduit portion connected in series with each other between the outlet and inlet ends of said conduit, the outlet of said conduit being adapted to be fixedly positioned on the dental engine, the portion of said conduit extending between said fixed outlet and said inlet being slidably movable, and a valve means carried by said slidably movable conduit portion.

2. A fluid dispensing attachment for a dental engine comprising a fluid-carrying conduit having a fluid dispensing outlet and a fluid inlet, means connecting the inlet of said conduit to a source of fluid supply, a nozzle anchored to said dental engine, the outlet end of said conduit being fixedly connected to said nozzle, said conduit including a rigid conduit portion and an elastic conduit portion connected in series with each other between said outlet and inlet ends of said conduit, the portion of said conduit extending between said fixed outlet and said inlet being movable to control fluid flow through said conduit, and said nozzle including an inlet connected to said conduit, a nozzle outlet in communication with said nozzle inlet, and a closed air chamber communicating with said nozzle inlet and said nozzle outlet.

3. A fluid dispensing attachment for a dental engine comprising a fluid-carrying conduit having a fluid dispensing outlet and a fluid inlet, means connecting the inlet of said conduit to a source of fluid supply, a nozzle anchored to said dental engine, the outlet end of said conduit being fixedly connected to said nozzle, said conduit including a rigid conduit portion and an elastic conduit portion connected in series with each other between said outlet and inlet ends of said conduit, the portion of said conduit extending between said fixed outlet and said inlet being movable to control fluid flow through the conduit, and said nozzle including a first tubular portion closed at one end and having an outlet opening at its opposite end, and a second tubular portion in fluid communication with said first tubular portion, said second tubular portion being connected to said conduit.

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