March 2, 1948. R. E. CUNNINGHAM 2,437,017

AIR OR WATER ATTACHMENT FOR DENTAL ENGINES

Filed Feb. 21, 1947 2 Sheets-Sheet 1

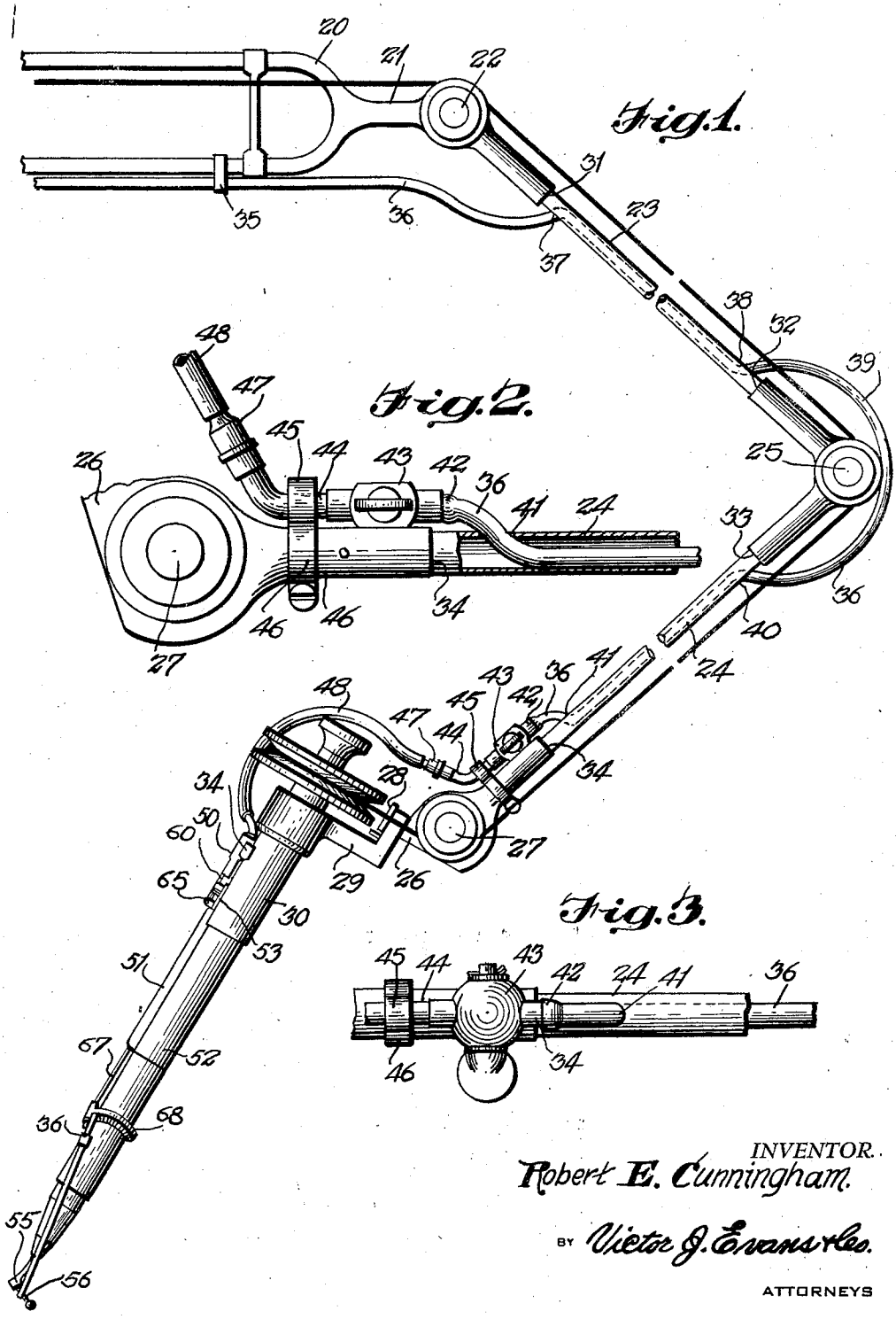


Fig. 1.

Fig. 2.

Fig. 3.

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Fig. 4.

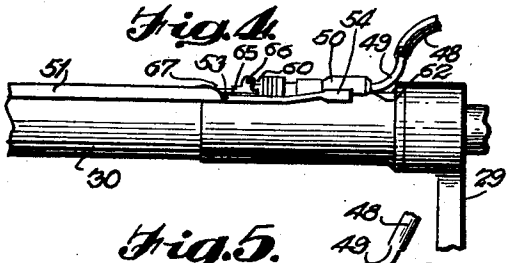


Fig. 5.

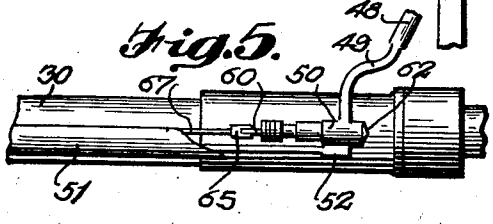


Fig. 7.

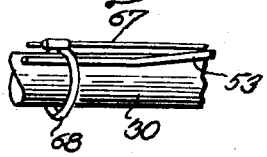


Fig. 8.

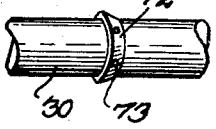


Fig. 10.

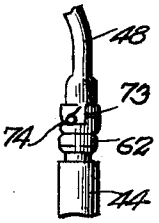


Fig. 6.

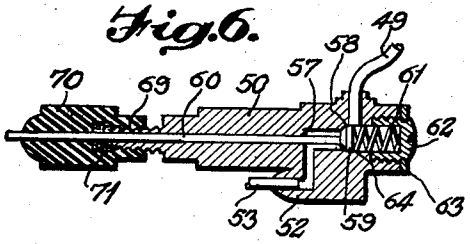


Fig. 9.

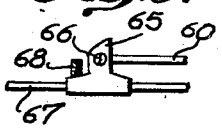


Fig. 11.

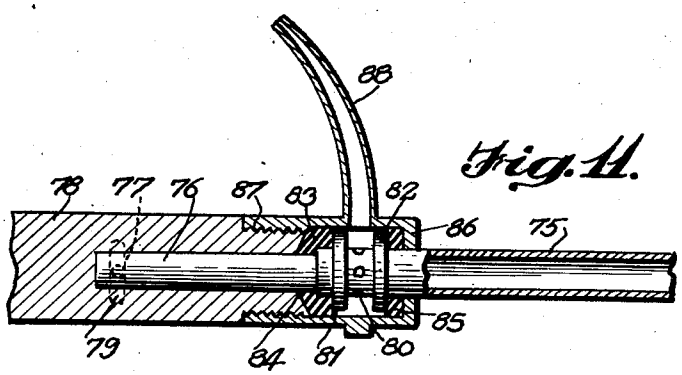
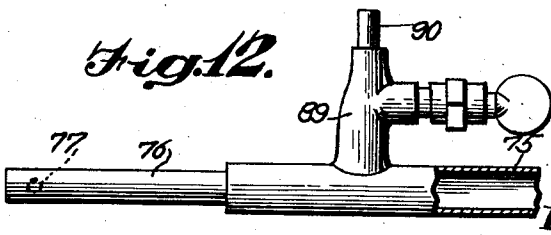


Fig. 12.



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AIR OR WATER ATTACHMENT FOR DENTAL ENGINES

Robert E. Cunningham, Jackson, Miss.

Application February 21, 1947, Serial No. 730,102

3 Claims. (Cl. 32—28)

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This invention relates to an improved air or water attachment for dental engines.

An object of the invention is to provide a hollow supporting arm for dental engines which is adapted to carry a flexible conduit which will lead and direct a liquid from a source of supply to a point adjacent the tool attaching end of the dental engine.

Another object of the invention is to provide a hollow supporting arm which will carry water to the dental engine, and the arm is provided with a rotary valve to control the flow of liquid within the arm.

In drilling teeth, the friction caused by the rapid rotation of the stone or burr carried by the dental tool produces most of the pain felt by the individual. It is, therefore, a further object of the invention to provide means for directing a cooling fluid to the stone or burr in the dental engine to cool the heat produced by the friction of grinding. This is also a time saver in drilling teeth, since the dentist will not have to stop to flush out the cavity being drilled, to observe the progress of the drilling operation. The speed of the delivery of the cooling fluid is consistent with the speed of the tool being used.

A further object of the invention is to provide a continuous or intermittent supply of fluid or air to the patient's mouth during any dental work therein.

The control of the fluid or air is under the direct control of the dentist at all times.

A further object of the device is that of supplying a stream of water or other fluids such as air at a predetermined point at the end of the device being employed, which flow of fluid is at all times under exact control of the instrument's user.

A still further object of the invention is that it is subject to such adjustment that it can meet the individual needs of the user of the instrument, at any location, up or down, or around.

Other objects of the invention comprise simplicity of construction and means by which fluid may be conveyed from its source to the point of outlet in a simple and convenient manner, without hampering the use of the instruments, and with the purpose of eliminating frequent replacements of several of the working parts.

With the above and other objects and advantages in view, the invention consists of the novel details of construction, arrangement and combination of parts more fully hereinafter described, claimed and illustrated in the accompanying drawings in which:

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Figure 1 is a side elevational view of a portion of a dental engine having an embodiment of the invention secured thereto;

Figure 2 is a fragmentary side elevational view of one of the joints of the supporting arms partly in section to show the manner in which the flexible conduit is mounted therein;

Figure 3 is a fragmentary top plan view of the valve controlling the supply of the fluid to the flexible conduit;

Figure 4 is a fragmentary side elevational view of the dental engine with the shut-off valve mounted thereon;

Figure 5 is a top plan view of Figure 4;

Figure 6 is an enlarged sectional view of the shut-off valve;

Figure 7 is a fragmentary elevational view of the control mounting for the end of the valve control rod;

Figure 8 is a fragmentary elevational view of the end of the dental engine coacting with the control shown in Figure 7;

Figure 9 is a fragmentary view of the adjustable rod connection;

Figure 10 is a fragmentary view of the hose connection employed in the device;

Figure 11 is a sectional view of a modified form of the invention and

Figure 12 is an elevational view, partly in section, of the control valve used with the form shown in Figure 11.

Referring now to the drawings in which like numerals designate like parts, the numeral **20** designates the supporting frame of the dental engine, which is of standard construction and design. At the outer end **21** of the frame **20** is a hinge joint **22** to which is attached the extension rod **23** in hinged relationship thereto. The rod **23** is connected to the extension rod **24** by the hinge **25**. At the lower end thereof the rod **24** is connected to the supporting arm **26** by the hinge **27**, the arm **26** supporting in pivotal relationship thereto, at **28**, the bracket **29** fixed to the handpiece **30**. The rod **23** is hollow from the point **31** to the point **32**, and the rod **24** is of similar construction to the rod **23**, being hollow from the point **33** at the upper end thereof to the point **34**.

Carried by the frame **20**, by means of a clip **35**, is a flexible conduit **36** which enters the rod **23** at **37** adjacent the point **31**, to emerge therefrom at **38**, adjacent the point **32** to curve around the hinge **25** at **39** to enter the rod **24** at **40**, and to emerge therefrom at **41** to be connected at **42** to the rotary valve **43** having the curved out-

let 44 which is received in the ring portion 45 of the spring clamp 46, whereby the valve 43 is supported on the hinge 27.

The outlet 44, at the outer end thereof is provided with a coupling 47 which is connected by a flexible conduit 48 with the inlet 49 of the shut-off or control valve 50.

Disposed horizontally on the upper side of the hand piece 30 is the housing 51 supported on the handpiece 30 by the clip 52. The housing 51 supports the tube 53, the rear end thereof connecting with the valve 50 at the outlet 54 thereof, and the front end thereof extending to a point 55 adjacent the tool 56 in the handpiece 30 as illustrated in Figure 1. A clip 56 is attached to the front of the tube 53, and is adapted to partially encircle the handpiece 30, as illustrated in Figure 1.

The valve 50, a cross-section of which is illustrated in Figure 6, connects directly with the tube 53 through the valve chamber 57, and the inlet 49 connects with the valve chamber 57 rearward and opposite to the connection with the tube 53 with said chamber 57. The chamber 57 is provided with a valve seat 58, into which is seated the valve head 59, to which is attached the valve stem 60, which valve stem 60 extends centrally forward through the valve 50 from the chamber 57, as illustrated in Figure 6. A compression spring 61 is disposed within the end of the valve chamber 57 and bears against the valve head 59, as illustrated in Figure 6, thus normally closing the valve seat 58 in the chamber 57, and thereby preventing fluid from passing through the inlet 49, through the valve chamber 57 and into the tube 53. By pushing the valve stem 60 rearward, there is cleared, an opening directly from the inlet 49 through the valve chamber 57 to the tube 53, and a tensioning screw 62 threadably mounted in the end of the valve 50 is provided with a seat 63 to receive the spring 61, and manipulation of the screw 62 will increase or decrease the tension of the spring 61 as desired. A gasket 64 intermediate the head of the screw 62 and valve 50 provides a water tight connection therebetween.

The forward end of the valve 50 is provided with a reduced threaded portion 69 to receive the packing nut 70 which encircles the stem 60 and compresses the packing 71 about the stem 60 to form a water tight joint, as shown in Figure 6.

The valve stem 60 is connected at its outer extremity with the coupling 65, by means of the screw 66. To the coupling 65 is connected the rod 67 in slidable relation therewith, being held in a predetermined fixed position by the set screw 68'. The rod 67 extends through the housing 51, as illustrated in Figures 4 and 5, having disposed on the outer end thereof, the ring 68, which encircles the forward end of the handpiece 30, as illustrated in Figure 7, and the inner periphery of the ring 68 is beveled toward the outer edge thereof.

Disposed on the forward end of the handpiece 30 is the beveled ring 72, as illustrated in Figure 8, this beveled ring 72 being beveled inwardly, as illustrated, and having disposed therein set screws 73, by means of which the ring 72 may be set in fixed relationship on the handpiece 30 at any predetermined position. On adjustment of the ring 72 on the handpiece 30, the ring 72 is positioned in close relationship therewith on the handpiece 30 by adjustment of the rod 67 at the coupling 65 by the set screw 68'.

It is thus seen that by slight pressure of the finger downward on the ring 68, said ring 68 bears against the inward bevel of the ring 72, thereby forcing rearward the rod 67, which being connected with the valve stem 60, as heretofore described, forces the valve head 59 rearward and thereby opens the valve 50 for passage of fluid therethrough, as heretofore described. By removing the pressure on the ring 68, the valve 50 is immediately closed by reason of the pressure exerted at all times on the valve head 59 by the spring 61, as heretofore described.

It is thus seen that the entire assembly is of very simple construction, and of easy operation, being so simple that anyone understanding the operation of such an instrument could easily handle the same without hindrance in the carrying on of the work for which the principal instrument is intended. Heretofore other devices designed along somewhat similar lines have been so cumbersome of construction that they interfered with the delicate handling of the instrument, and thereby prevented the satisfactory use thereof. In this device, all unnecessary tubing and working parts have been eliminated, and thus there has been obtained thereby a device by means of which fluid may be conveyed from its source to the end of the instrument by means of tubular members so joined together that the fluid may be conveyed easily without interference and without leakage.

The connection 47 shown in Figure 1 may be replaced by the connection shown in Figure 10, which comprises the socket 72 formed on the outlet 44 having the bayonet slot 73 to receive the pin 74 of a short length of tubing that is positioned in the end of the flexible tubing 48. This connection, as well as connection 47, is used to permit removal and replacement of the handpiece 30 as desired.

In Figures 11 and 12, the hollow control rods 75, which will replace the rods 23 and 24 previously described, are provided with a solid end 76, having a spring pressed lug 77 therein, which is inserted into the hinge stem 78, and the lug 77 will be received in the circular seat 79 in the stem 78 to retain the stem 76 therein.

The rod 75 is provided adjacent to the end 76 with a row of apertures 80 on each side of which are positioned the collars 81 and 82 in opposed relation to each other, and collar 81 engages the gasket 83 positioned in the complementary shaped seat 84 in the stem 76, and collar 82 engages the gasket 85 carried by the hollow coupling 86 which is threadably mounted at 87 on the stem 76, and when tightened will provide a water tight connection at this point and the other points of connection that will be substituted for the support previously described.

The coupling 86 is provided with a tubular connection 88 which will connect to a flexible conduit such as the conduit 36 at the points 37, 38, 40 and 41 previously described.

In this construction, the valve 43 is replaced by the valve 89, having direct communication with the hollow control rod 75, and the outlet 90 thereon will be connected to a flexible conduit such as the flexible conduit 48.

In this form of the invention, the flexible conduit 36 is eliminated except at the curve 39, as previously described.

The construction, operation and advantages of the invention will, it is believed, be understood and appreciated by those skilled in the art, when the foregoing description has been read in con-

nection with the accompanying drawings. The degree of adjustment of the several members in relation to each other is such as to take care of any expected requirements; and while there is here shown and described the pointed out, certain novel features of the invention, it is to be understood that various omissions, substitutions and changes in the form and details of the device may be made by those skilled in the art, and that the invention is not restricted to the precise structure disclosed, but changes may be made therefrom, as fairly fall within the scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A device of the character described, in combination with a dental engine having a hand piece and a dental tool in the hand piece, of a plurality of hinged hollow control rods connected to said hand piece, a flexible conduit mounted in said control rods for supplying a fluid to said hand piece adjacent the tool therein, a valve in said conduit for cutting off the supply of fluid to said hand piece and a valve on the hand piece for controlling the amount of fluid supplied thereto.

2. A device of the character described, in combination with a dental engine having a hand piece and a dental tool in the hand piece, of a plurality of hinged hollow control rods connected to said hand piece and adapted for supplying a fluid to said hand piece adjacent the tool therein,

swivelled joints connecting said control rods, a connection on each of said joints, means on said connection for by-passing the joints of said control rods, a valve in said rods for cutting off the supply of fluid to said hand piece and a valve on the hand piece for controlling the amount of fluid supplied thereto.

3. The invention as in claim 1, wherein the valve stem of the valve mounted on the hand piece is provided with a control adjacent the end of said hand piece for the manual control of said valve and said control comprises a rod connected to said stem, a ring piece on said rod sleeved on said hand piece and a bevelled ring piece on said hand piece coacting with the ring piece on said rod, whereby pressure on the ring piece on the rod will cause said ring piece to slide over the bevelled ring piece on said hand piece, and cause said rod to actuate said valve stem to control said valve.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
902,942	Craig	Nov. 3, 1908