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L. C. VANDIS

3,449,831

DENTAL HANDPIECE CONTROL

Filed July 3, 1967

Fig. 1.

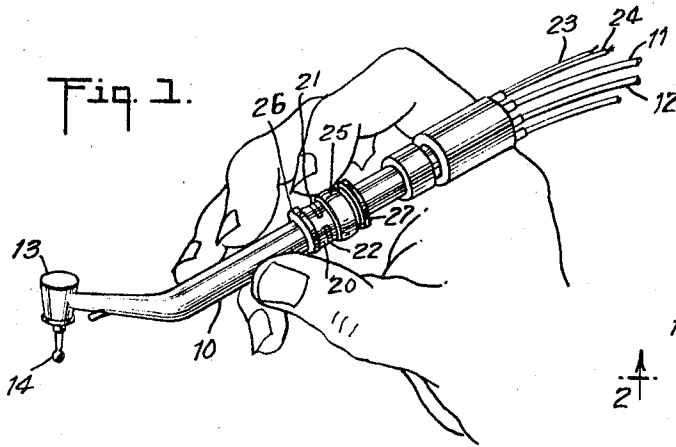


Fig. 1A.

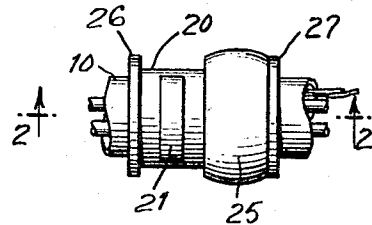


Fig. 2.

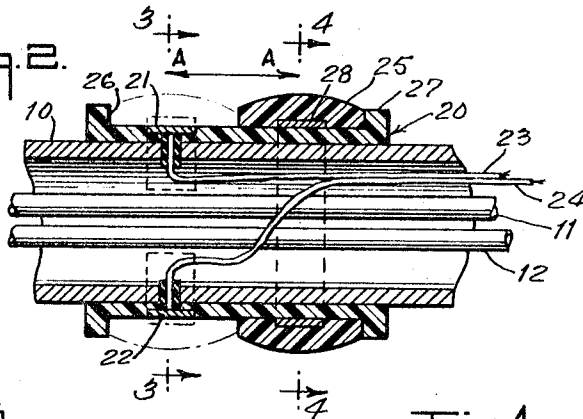


Fig. 3.

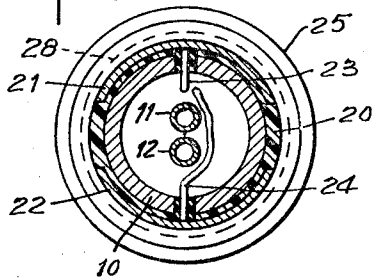


Fig. 4.

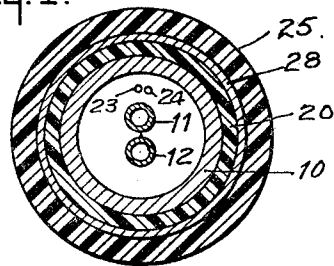
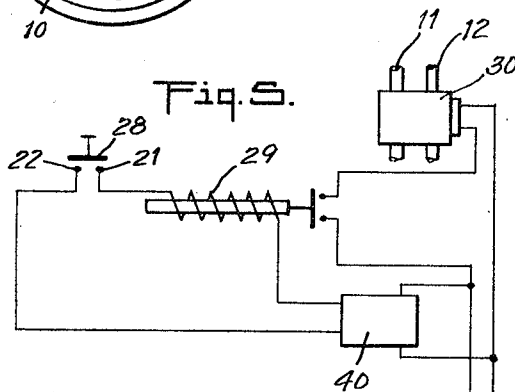


Fig. 5.



INVENTOR
LAZAROS C. VANDIS

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3,449,831

DENTAL HANDPIECE CONTROL
Lazaros C. Vandis, 13 Cartridge Road,
Concord, N.H. 03301

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U.S. Cl. 32—26

4 Claims

ABSTRACT OF THE DISCLOSURE

This invention relates to a control switch assembly having particular application to dental handpieces having air-driven motors. This invention features a finger-iontrolled sliding contact, operable by the dentists and eliminates entirely the existing foot-control mechanism of conventional dental handpieces. A line voltage circuit is used to operate the valve means for admitting pressurized fluid for driving the dental motor; and a low voltage circuit is employed in the handpiece switch controlled by the operator but is connected to the line voltage circuit by a solenoid. Using these two separate circuits virtually eliminates any hazard to the patient.

This invention relates generally to dental handpieces and more particularly relates to an air-driven dental handpiece carrying a finger-controlled operating switch.

Conventional dental handpieces are controlled by a foot-actuated switch mechanism. This is obviously an awkward arrangement for the dentist because such foot-operated controls force him to stand on one foot while the other is manipulating the switch for the handpiece performance.

There have been prior art attempts to provide fulcrum-type finger controlled switches for dental handpieces, typically represented by U.S. Patent 3,125,809. However, these types of switch controls exhibit a potential deficiency in that because of their lever-type actuation, a spontaneous, uncontrolled reflex by the patient's jaws could easily activate such a tool-bit, thereby placing the patient within a potential zone of danger.

This invention discloses a novel combination of components which overcome these prior art deficiencies by providing generally a dental handpiece which carries at its holding location a slidable finger-actuated microvolt switch used to activate the air and water valves which respectively power the handpiece and provide a cooling waterspray in the tool work region.

It is therefore among the various objects of this invention to provide a dental handpiece having a slidable finger-operated speed control member operable from any finger position.

It is a further object of this invention to provide a slidable finger-operated switch mechanism for a dental handpiece which can be supplied as an accessory item permitting its incorporation into existing handpieces already in use.

It is yet a further object of this invention to provide a finger-actuated switch control for a dental handpiece which does not encumber the handpiece nor permit actuation by inadvertent movement of a patient's jaw.

With these and other objects and features in mind as will hereinafter more fully appear and which will be more particularly pointed out in the appended claims, reference is now had to the following description taken in conjunction with the accompanying drawings in which:

FIGURE 1 illustrates a perspective view of a dental handpiece carrying the switch combination of this invention;

FIGURE 1a illustrates an elevation view of the switch portion only of the handpiece;

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FIGURE 2 illustrates an enlarged cross-sectional view taken on line 2—2 of FIGURE 1a depicting the details of construction of the switch;

FIGURE 3 illustrates a cross-sectional view taken on line 3—3 of FIGURE 2;

FIGURE 4 illustrates a cross-sectional view taken on line 4—4 of FIGURE 2; and

FIGURE 5 schematically depicts a circuit diagram of this invention.

Referring now to the drawings, there is shown in FIGURES 1 and 2 a typical contra-angle dental piece comprised of a hollow housing member 10 carrying there-within an air conduit 11 and a water conduit 12. The air conduit supplies pressurized air to drive air-motor 13 which conventionally drives tool-bit 14. Simultaneously, water carried through conduit 12 is sprayed around the tool in a conventional manner.

As shown in FIGURES 2, 3 and 4, coaxially mounted on the outer periphery of housing member 10 is an electrically nonconductive annular sleeve member 20 of nylon or other suitable material. Recessed into the periphery of this sleeve are two conductive segments 21, 22 is non-contacting (i.e., electrically insulated) relation and which serve as electrical terminals for conductors 23 and 24 joined thereto, respectively. The other ends of these conductors are electrically connected to solenoid 29 in a conventional manner as shown in FIGURE 5 depicting the electrical circuit. This solenoid is not carried by the handpiece, but can be mounted at a remote location at the dental console.

Ring member 25 is adapted for sliding relation between stops 26, 27 along sleeve 20 shown by arrow A—A. Recessed within the inner periphery of ring 25 is an annular electrical conductor or ring segment 28. The exposed surfaces of segments 28, 21, 22 are located with respect to their carrier surfaces so that as ring 25 slides back and forth over sleeve 20, segment 28 will contact segments 21, 22 thereby completing the electrical circuit, schematically shown in FIGURE 5.

Completing this circuit activates solenoid 29 which in turn energizes valve 30 to supply air and water to conduits 11, 12 respectively for operating motor 13.

Referring now to the schematic circuit diagram of FIGURE 5, there is shown a primary circuit carrying standard line voltage to valve means 30, and a secondary circuit fed from transformer 40 and containing the finger-switch contacts 21, 22, and 28. Solenoid 29 electrically connects these two circuits. The finger-switch circuit voltage in the disclosed embodiment is suitably stepped down from the standard line voltage of 115 volts to 6 volts by employing transformer 40. It is, of course, to be understood that other sources, as for example a battery, could provide the desired 6 volts. By utilizing solenoid 29 with a 6-volt circuit to actuate air-motor 13, I have virtually eliminated any electrical hazard to the patient or operator.

In operation the operator grasps this handpiece in his hand with the index finger resting on slide 25 as shown in FIGURE 1. At such time as tool-bit rotation is desired, slide 25 is pushed forward against stop 26 which is located so as to bring segment 28 into electrical contact with segments 21, 22; this then completes the 6-volt circuit and actuates solenoid 29, which in turn electrically opens valve means 30, from the line voltage circuit permitting the flow of air and water through their respective conduits 11 and 12.

It is to be noted that in the illustrated embodiment for purposes of clarity, I have depicted an arrangement which merely provides an on-off operation for the tool-bit rotation and water spray. This invention, however, envisions as an equivalent to the switch herein disclosed, a minia-

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ture rheostat arrangement as a substitute for segments 21, 22 whereby when sleeve 25 is moved to and fro along the rheostat segment this will provide a variable speed control for tool-bit rotation.

I claim:

1. In a dental handpiece formed of an elongated housing carrying a fluid-driven rotary tool and carrying a co-operating coolant spray means, an improved control means in combination therewith for controlling tool rotation and coolant spray, comprising:

(a) a finger-slidable switch carried on the handpiece, said switch comprising:

a dielectric sleeve member carried on the handpiece, a pair of electrically conductive terminals carried on the outer periphery of said sleeve member in noncontacting relation with one another, an annular dielectric ring slidably engaged around the aforesaid sleeve member, and conductor means carried on the inner periphery of the annular ring for bridging the aforementioned pair of conductive terminals when brought into contact therewith;

(b) a solenoid operated valve means remotely located from said handpiece for controlling the flow of fluids for driving and cooling the rotary tool; and

(c) electrical circuit means operatively connecting said slidable switch and solenoid operated valve means.

2. The control means set forth in claim 1 in which the electrical circuit means comprises:

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(a) a primary circuit carrying line voltage;

(b) a secondary circuit carrying a substantially stepped-down voltage relative to the line voltage; and

(c) a solenoid electrically connecting said primary and secondary circuits together.

3. The structure set forth in claim 2 wherein:

(a) an electrically operable valve means is connected to the primary circuit; and

(b) the finger-controlled switch is connected into the secondary circuit.

4. The structure set forth in claim 1 wherein the electrical circuit means operatively connecting said slidable switch and solenoid operated valve means comprises:

(a) a primary circuit including an electrically operable valve means carrying line voltage;

(b) a secondary circuit including the finger-controlled switch means, carrying a stepped-down voltage; and

(c) a solenoid electrically connecting said primary and secondary circuits together.

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ROBERT PESHOCK, *Primary Examiner.*