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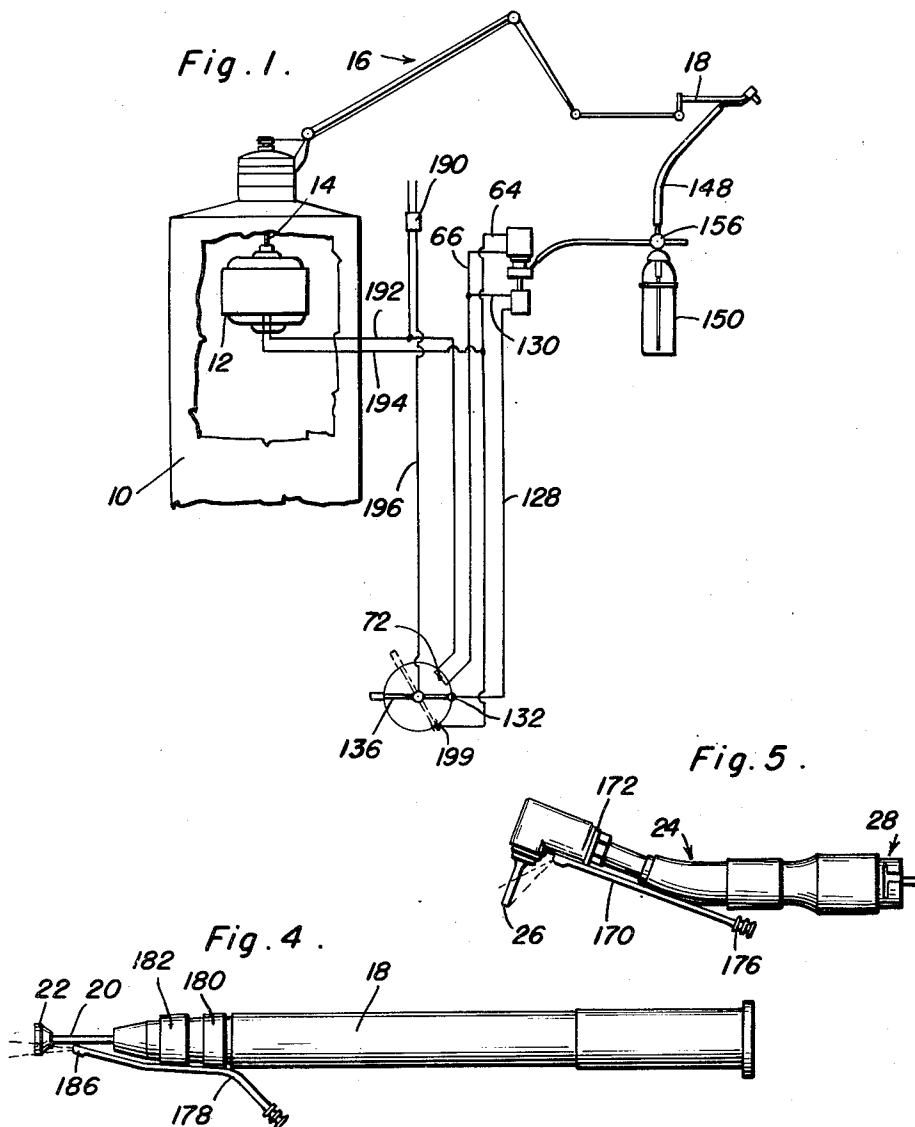
R. J. BROUSSARD ET AL

2,532,054

AIR AND WATER SPRAY FOR DENTAL ENGINES

Filed April 30, 1948

2 Sheets-Sheet 1



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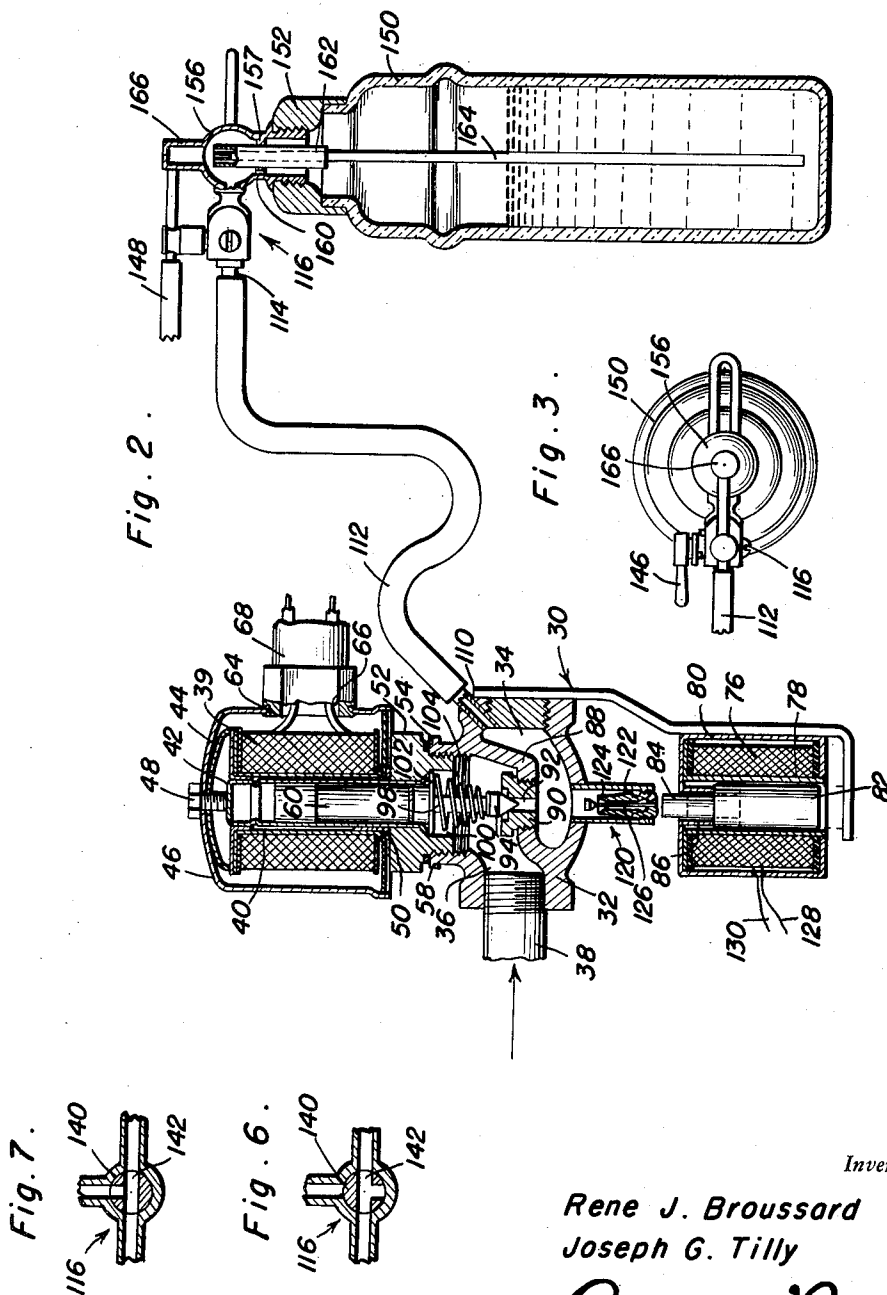
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UNITED STATES PATENT OFFICE

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AIR AND WATER SPRAY FOR DENTAL
ENGINES

Rene J. Broussard, New Iberia, and Joseph G. Tilly, Opelousas, La.; Lelia Gonsoulin Broussard, Harvey J. Broussard, Nat Broussard, and Rene Broussard, sole heirs of said Rene J. Broussard, deceased; said Lelia Gonsoulin Broussard natural tutrix of said Nat Broussard and said Rene Broussard, minors

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4 Claims. (Cl. 32—28)

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This invention appertains to novel and useful improvements in attachments for use in association with dental equipment.

An object of this invention is to spray selectively air and air mixed with liquid to a zone adjacent a drill or other dental apparatus.

Another object of this invention is to provide improved means for carrying out the above mentioned functions, which improved means includes solenoid actuated valves to be electrically connected with a circuit, forming a portion thereof, which includes the motor for driving or actuating the conventional dental apparatus.

A still further object of this invention is to selectively control the flow of fluid, whether it be air solely or air and liquid, by a manually operative valve which is conveniently located and accessible.

Another object of this invention is to provide a simplified device of the character to be described which lends itself well to commercial manufacture and which is efficient in operation.

Ancillary objects and features of novelty will become apparent to those skilled in the art, in following the description of the preferred form of the invention, illustrated in the accompanying drawings, wherein:

Figure 1 is an elevational view of a portion of the invention, showing portions schematically and showing the invention applied thereto;

Figure 2 is a sectional view of certain details of construction;

Figure 3 is a plan view of the invention shown in Figure 2, showing only the valve and liquid container construction;

Figure 4 is an elevational view of a portion of a dental apparatus utilized in association with the invention;

Figure 5 is an elevational view showing another type of dental apparatus whereon the invention is applied;

Figure 6 is a sectional view of the manually operative valve structure forming a portion of the invention, and;

Figure 7 is a sectional view of the valve illustrated in Figure 6, showing the core in a different position.

This invention has been provided in order to supply dental apparatus such as that used in drilling, cleaning, buffing or sanding teeth, with an attachment whereby a fluid may be supplied adjacent the cutting portion of the tool. This fluid may be air only or a mixture of air and liquid as desired.

The attachment is interwoven with the con-

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ventional apparatus in such a manner as to be rendered operative when the drill and the like are operative. A conventional switch is utilized for such a purpose.

A solenoid actuated valve structure is supplied in a suitable support in order to control the flow of fluid to a receptacle or fluid container. A specially provided valve is associated with the container in order to direct the fluid to the discharge nozzle or direct the fluid first in association with the interior of the liquid container and then to the discharge nozzle. By such means the issuing fluid is of the selectivity described hereinbefore.

Referring now to Figure 1 it will be seen that a conventional apparatus is illustrated including a housing 10 having a motor 12 therein in order to drive a flexible shaft 14. This flexible shaft extends through a conventional linkage 16 which supports a head 18. This head 18 has a tool 20 attached thereto with a grinding disk 22 rigidly secured thereto. As is conventional in the apparatus a second type of head generally indicated at 24 may be supplied in lieu of the head 18 and a drill 26 may extend from this head. The usual attachment means generally indicated at 28 is supplied on each of the heads in order to detachably engage with a complemental attaching means in the linkage construction 16. This portion of the illustration is entirely conventional.

Referring now to Figure 2 it will be seen that a support generally indicated at 30 is supplied with a valve body member 32 therein. This valve body member includes a pair of valve chambers 34 and 36 respectively, the last mentioned chamber having a conduit 38 in communication therewith. This conduit also communicates with a suitable air supply providing means which is known in the dental art and trade.

A conventional solenoid coil 39 is supplied within a small housing 40. This small housing 40 has a sleeve 42 positioned therein and a bonnet 44 thereover. The bonnet 44 has a cover 46 attached thereto through the medium of a conventional screw 48 or the like and this cover seats on a sleeve type bearing member 50 which in turn seats upon a nipple 52. The said nipple is supplied with a reduced threaded terminal portion which is received in the valve body member 32. A conventional gasket or packing member 54 is interposed between a shoulder formed on the said nipple 52 and on a peripheral flange 56 of the said valve body member 32.

A solenoid core or armature 60 is reciprocally

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received within the sleeve 42, being actuated in a conventional manner by means of the solenoid coil 39. Of course, electrical conductors 64 and 66 extend from the solenoid field coil and project through a suitable socket 68.

Referring now to Figure 1 it will be seen that the conductor 64 leads to the dental motor 12 and a terminal 199 of a foot actuated switch to be described subsequently. The terminal 66 is fed through this switch at the pole 72 to the dental motor 12 and to be employed by means of the plug 190 (also to be described subsequently). The switch is to selectively use the motor in a conventional manner or with the invention, as desired.

The support 30 has an opposed solenoid field coil 76 seated in a suitable bushing 78. An outer case or cover 80 encircles the field coil 76 and is attached to the support 30 by any suitable means. A sleeve 82 may be positioned within the housing 78 and also within the field coil 76. The usual armature or core 84 is reciprocally received in the sleeve 82, extending between an internally turned flange 86 of the cover 80.

A partition 98 is provided in the valve body portion 32 thus defining the said chambers 34 and 36. This partition has an aperture therein with a plug 90 fitted in the said aperture. A passage 92 is formed centrally of the said plug 90 and seats a valve head 94 therein. The valve head has a valve stem 96 secured thereto, which stem is adapted to be engaged by the core 60. Also, if it is found desirable the core 60 and valve stem 98 may be formed integral.

The said bushing or nipple 52 has an enlarged chamber 100 at one end thereof wherein a ring or washer 102 is seated. This ring has a central aperture in order to receive the core 98 there-through. Also, suitable resilient biasing means such as the spring 104 is seated on the head 94 and reacts on the washer or ring 102 thereby resiliently biasing the valve head 94 into engagement with the passage 92. It is now readily appreciated that upon actuation of the solenoid under discussion the valve head 94 will be urged from engagement with the passage 92 thereby permitting air to pass through the chamber 36 and into the chamber 34. The said chamber 34 is supplied with a tube 110 having a flexible conduit 112 detachably secured thereto. This flexible conduit 112 terminates in attachment with a sleeve 114 which is secured to a valve structure generally indicated at 116. It is apparent that the valve head and its appurtenant mechanism is used for selectively controlling the flow of air to the valve structure 116.

An additional valve assembly generally indicated at 120 is supplied in communication with the chamber 34. This valve structure includes a valve body 122 having a central bore 124 and a poppet type valve 126 reciprocally mounted therein. This poppet valve type is actuated by the solenoid armature 84 through the medium of operative engagement therewith. Gravity pulls the valve 124 to the seated or closed position when the solenoid associated with the armature 83 is inoperative. As is seen in Figure 1 the conductors 128 and 130 respectively terminate in a contact 132 of the switch, which may be of the foot actuated type, and in the line 66. Thus, the lower valve assembly 120 is rendered operative and inoperative upon selective manipulation of the switch arm 136.

The valve assembly 140 has a T-shaped passage 142 therein. By manual operation of the

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arm 146 of the valve structure 116 the air issuing through the conduit 112 may be selectively directed immediately through a conduit 148 or through a liquid receptacle 150 first and then through the conduit 148.

The container or receptacle 150 is substantially conventional having a conventional fitting or collar 152 at the top portion thereof. A pressure dome 156 has a threaded collar associated therewith with which is received in the collar 152. A small partition 157 is in the dome 156 and has an orifice 160 therein. This orifice communicates the pressure dome 156 with the interior of the liquid receptacle. A sleeve 162 extends through the partition and has a pipe 164 projecting through the central portion or bore thereof. Of course the pipe 164 also projects through the partition, the pipe and sleeve terminating adjacent a reduced portion 166 of the pressure dome.

When the valve structure 116 is set as in Figure 6 the compressed air is received in the pressure dome and applies the pressure to the upper surface of the liquid therein. This forces a small amount of liquid through the pipe 164 and an amount of air through the sleeve 162 thereby partially atomizing the same. The amount of air pressure on the upper surface of the liquid within the container 150 is regulated by means of the calibrated orifice 160. Of course, some of the air which is refused entry into the container 150 by means of the orifice 160 extends directly through the conduit 148. By this means a mixture of air and liquid issues.

When the valve structure is set as is seen in Figure 7 the air takes the course of least resistance which is substantially entirely directly through the conduit 148. This causes the flow through the conduit 148 to be substantially entirely air.

Referring now to Figures 4 and 5 it will be seen that a nozzle structure including a tube 170 with a discharge opening at one end thereof is supplied. This may be attached to the conventional head 24 by any suitable means such as by soldering or any other firm attaching means. It is seen that the discharge portion of the tube 170 projects a spray on the tool 26. Further, the end of the tube or body member 170 may have enlargements 176 at one end thereof in order to quickly and firmly attach the conduit 148 thereto.

In Figure 4 it will be seen that a second type of discharge nozzle is supplied. Here, the shank 178 has a pair of bands 180 and 182 respectively attached thereto which firmly embrace the head 18. The discharge orifice 186 at the terminal portion of the element 178 projects a spray adjacent and on the grinding element 22. The bands 180 and 182 may be welded, brazed or soldered for firm gripping as found desirable. These bands may also be attached by means of rivets, screws or other fastening means in this general class.

In actuation of the invention the outlet plug 190 is received in any suitable source of current and directs the current through the lines 192 and 194 respectively to the motor 12 and to the contact 72 of the switch. The conductor 196 extending from the plug 190 terminates in the foot actuated switch structure.

In operation of the invention it is readily appreciated from an inspection of Figure 1 that upon utility of the solenoid for actuation of the valve head 94 the lower solenoid is inoperative. Thus, the poppet valve 126 closes the passage in

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which it operates. Thus, compressed air is permitted to flow directly into the receptacle 150 or through the conduit 148 as described. However, under certain conditions of operation there will be a residual pressure within the receptacle 150. Therefore, upon manipulation of the switch structure the lower solenoid is actuated thereby lifting the poppet valve slightly. The core 84 of the solenoid is limited in its travel through the medium of the said flange 86 and by engagement with an arm of the support 30. Thus, in order to relieve this back pressure the lower solenoid raises the poppet valve 124 a predetermined amount. This permits the issuing air and liquid to be stopped substantially immediately upon the desire of the operator of the invention.

From the foregoing a clear understanding of the operation of the invention is deemed apparent. However, it is apparent that variations may be made without departing from the spirit thereof.

Having described the invention, what is claimed as new is:

1. In dental apparatus including a head having a tool associated therewith, a spray nozzle attached to said head, a receptacle for retaining liquid, means for applying air pressure within said receptacle, means for by-passing the air, and means for conducting the by-passed air and the air from the receptacle to said nozzle, a solenoid actuated valve associated with said air conducting means to relieve residual pressure from said receptacle, and means for controlling the actuation of said solenoid.

2. In a dental apparatus which includes a manually operative tool with a spray nozzle secured to said tool and a motor for operating said tool, a valve body member having a pair of valves disposed therein, a solenoid for operating each of said valves, and an air inlet conduit secured to said valve body member and one of said valves controlling the passage of air through said body

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member, the other valve relieving residual pressure in said valve body member when operated by the solenoid which is operatively connected therewith, and means for conducting air from said valve body member to said spray nozzle.

3. In a dental apparatus which includes a manually operative tool with a spray nozzle secured to said tool and a motor for operating said tool, a valve body member having a pair of valves disposed therein, a solenoid for operating each of said valves, and an air inlet conduit secured to said valve body member and one of said valves controlling the passage of air through said body member, the other valve relieving residual pressure in said valve body member when operated by the solenoid which is operatively connected therewith, a conduit secured to said valve body member, a receptacle having said conduit connected therewith so that air from the valve body member is introduced into the receptacle, a line extending from said receptacle to said spray nozzle and a bypass valve operatively connected therewith so as to conduct compressed air selectively through said receptacle and into said nozzle and directly from the conduit to the nozzle.

4. The combination of claim 3 and a pressure dome attached to said receptacle with an atomizing device disposed therein for liquid in the receptacle.

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