

United States Patent

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[72] Inventor **George William Littrell, Jr.**
Aurora, Colo.
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[73] Assignee **Densco Division of William Getz Dental Products**
Denver, Colo.

[56]

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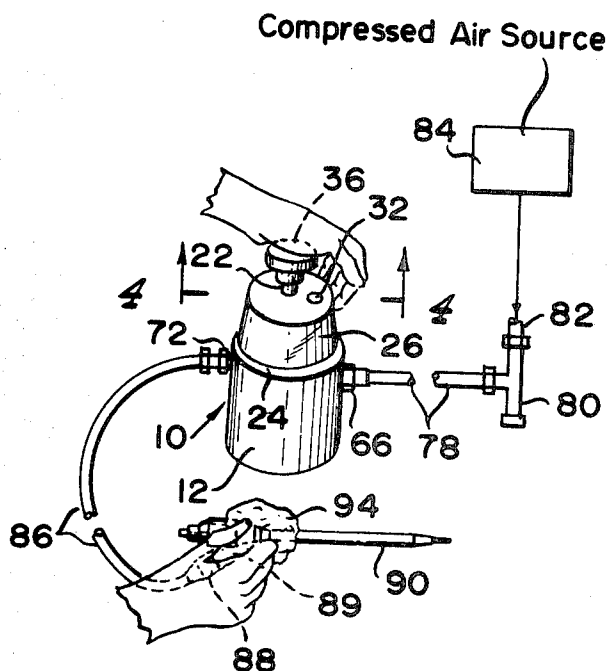
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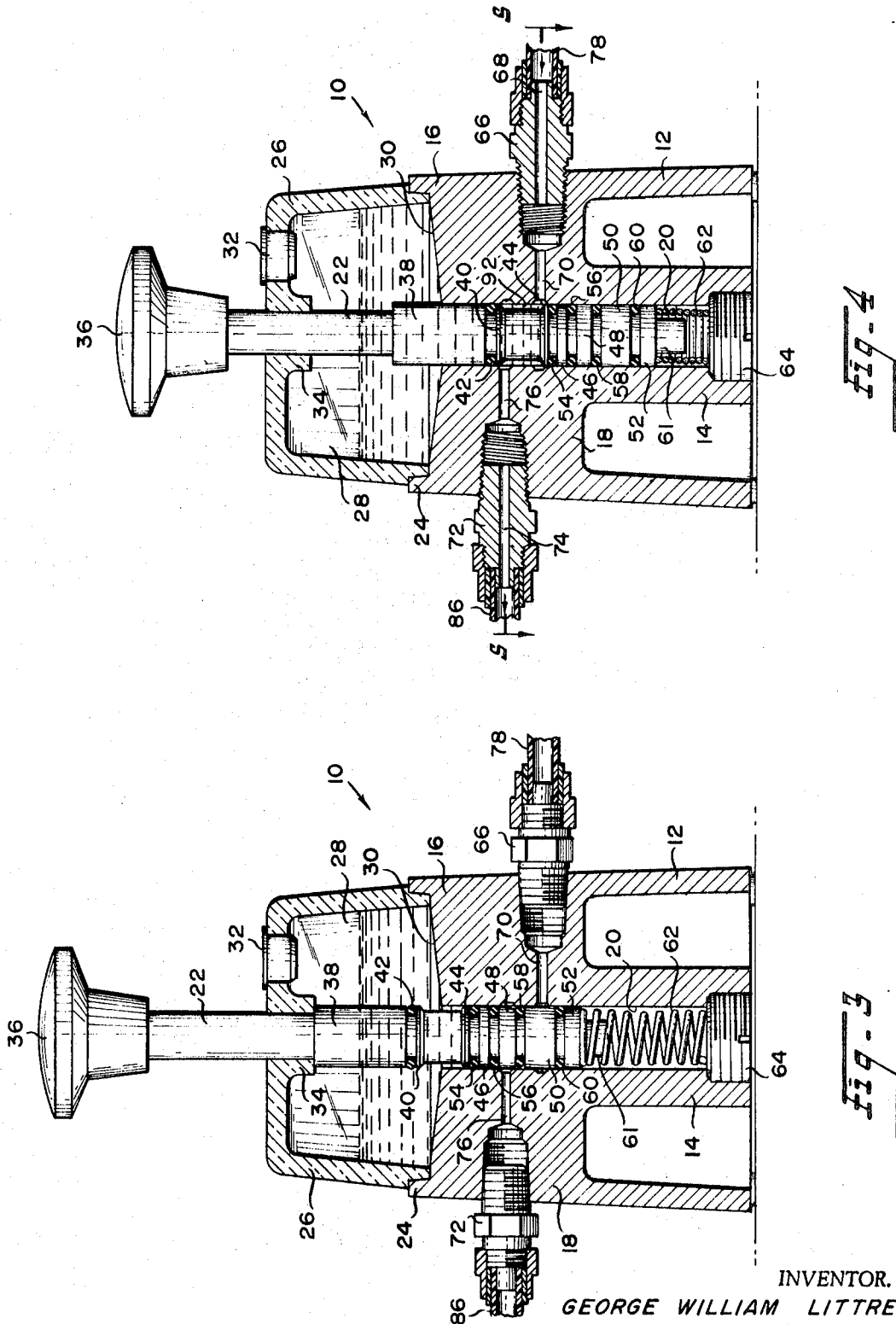
Primary Examiner—Robert L. Bleutge
Attorney—Shlesinger, Arkwright & Garvey

[54] **APPARATUS FOR CLEANING AND
CONDITIONING DENTAL HANDPIECES**
9 Claims, 5 Drawing Figs.

[52] U.S. Cl..... **134/102,**
134/166 R, 137/604
[51] Int. Cl..... **B08b 9/00,**
B08b 13/00
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134/94, 102, 166 R, 166 C, 171; 137/604

ABSTRACT: This invention is an apparatus for cleaning and conditioning air-driven dental handpieces, the apparatus including a valve body which supports a reservoir containing a cleaning and conditioning fluid. A piston is operable through the reservoir and valve body for delivering a predetermined amount of cleaning and conditioning fluid carried by the piston, into a stream of a carrier gas, the carrier gas and fluid being expelled under pressure from the valve body through the dental handpiece, for removing foreign material from the internal parts and conditioning these parts.





INVENTOR.
GEORGE WILLIAM LITRELL, JR.

BY

Shelving, Arnsight & Arnsight
ATTORNEYS

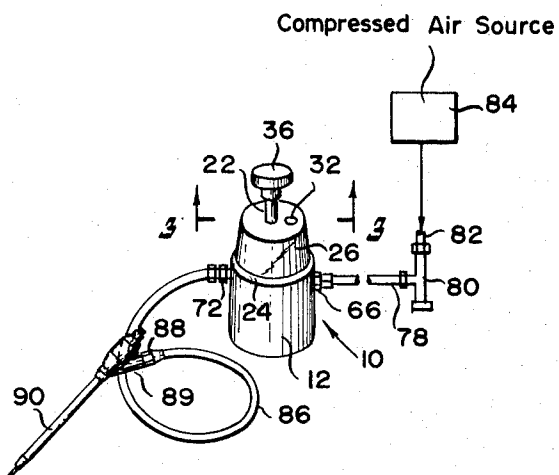


Fig. 1

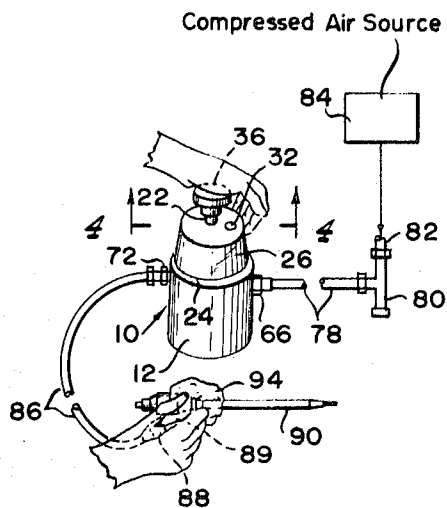


Fig. 2

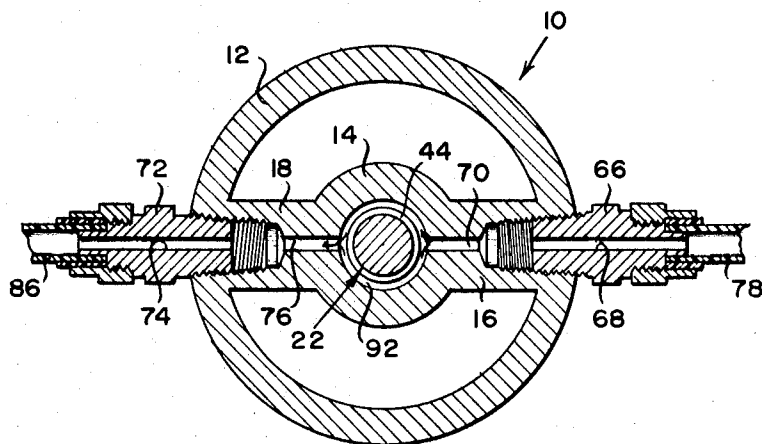


Fig. 5

INVENTOR.
 GEORGE WILLIAM LITTRELL
 BY
Shelving, Ashworth & Garvey
 ATTORNEYS

APPARATUS FOR CLEANING AND CONDITIONING DENTAL HANDPIECES

BACKGROUND AND OBJECTS

Air-driven dental handpieces are very susceptible, even in normal use, to the collection of grit and other foreign materials, which work their way internally of the handpiece and collect on the moving parts, thereby decreasing the efficiency of the handpiece. Because of the multiplicity of parts in the handpiece, disassembly thereof, for cleaning, is a laborious and time-consuming task, particularly since the handpiece should be cleaned after every day's usage.

It is an object of this invention to provide apparatus for attachment to an air-driven dental handpiece for forcing a cleaning and conditioning fluid therethrough, to remove grit and other foreign materials, without the necessity of removing parts of the handpiece for cleaning.

Another object is to provide a device of the character described which is of simple, economic construction, and which delivers a metered amount of a cleaning and conditioning fluid under a constant and predetermined pressure to the dental handpiece, the fluid being forced longitudinally through the handpiece and expelled therefrom, together with foreign material adhering to internal portions of the handpiece.

A further object is to provide apparatus of the character described which includes a valve body on which is mounted a reservoir containing a cleaning and conditioning fluid, a piston operable through the reservoir and valve body for delivering a predetermined amount of fluid to a stream of carrier gas, the fluid and carrier gas being expelled under pressure from the valve body through the handpiece.

Other objects of the invention will be apparent from the following description of the presently preferred form of the invention taken with the appended drawings.

DESCRIPTION OF FIGURES OF DRAWING

FIG. 1 is an elevational view of the apparatus of the present invention illustrating its use, the apparatus being shown in the inoperative position;

FIG. 2 is a view similar to FIG. 1, showing the apparatus in operative position;

FIG. 3 is an enlarged sectional view taken along the line 3—3 of FIG. 1 looking in the direction of the arrows;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 2 looking in the direction of the arrows, and

FIG. 5 is a sectional view taken along the line 5—5 of FIG. 4 looking in the direction of the arrows.

DESCRIPTION OF FIGURES OF DRAWING

Referring now to FIGS. 3 and 4, the apparatus of the present invention includes a valve body 10 which is preferably of integrally molded, plastic construction. Valve body 10 includes an outer cylindrical member 12 and an inner cylindrical member 14, the inner and outer cylindrical members being joined by connecting portions 16 and 18. An axial bore 20 is coextensive with inner cylindrical member 14, in which bore is movably positioned a piston 22.

The upper limit of valve body 10 is provided with an annular flange 24. A dome 26 of inverted cup shape is mounted on valve body 10, the lower extremities of the dome being cemented or secured in any other suitable manner to flange 24 of valve body 10, thereby forming a reservoir 28 within the dome for cleaning and conditioning fluid. It will be noted from a consideration of FIGS. 3 and 4 that the upper surface of valve body 10 is inclined inwardly towards bore 20, as indicated at 30, in order to permit gravitation of the cleaning and conditioning fluid towards the bore.

A removable filler plug 32 is located in the top wall of dome 26 in order to permit the addition of cleaning and conditioning fluid to the reservoir.

The upper portion of piston 22 extends through a central boss 34 in dome 26. A palm button 36 is fitted over the upper terminal of piston 22 to permit ready depression of the piston.

At a point spaced from the upper terminal thereof, piston 22 is provided with a collar 38, the upper end of the collar being in contiguous engagement with boss 34 of dome 26 when the apparatus is in the inoperative position shown in FIG. 3. An annular, upwardly beveled rib 40 extends from the outer periphery of piston 22 in spaced relation to the lower end of collar 38. A sealing ring 42 is interposed between rib 40 and collar 38.

In predetermined spaced relation to rib 40 is an annular, downwardly beveled rib 44. A series of spaced annular flanges are indicated at 46, 48, 50 and 52, between which are sealing rings 54, 56, 58 and 60. The purpose and function of these flanges and sealing rings will be hereinafter more fully set out.

The lower terminal of piston 22 is reduced and extended at 61, said extension being adapted for the reception of a convolute spring 62 which extend downwardly through bore 20 into engagement with a removable bottom plug 64, which is threadedly engaged with inner cylindrical member 14. Spring 62 abuts flange 52 and thereby urges piston 22 into the inoperative position shown in FIG. 3.

A fitting 66 is threaded into the sidewall of outer cylindrical member 12 and extends into connecting portion 16, the fitting having a longitudinal passage 68. Passage 68 communicates with a conduit 70 which, in turn, extends to axial bore 20 of inner cylindrical member 14. Conduit 70 and passage 68 comprise a carrier gas inlet.

A second fitting 72 is threadedly engaged with outer cylindrical member 12 and connecting portion 18 of valve body 10, in vertically spaced relationship to fitting 66. Fitting 72 is provided with a longitudinal passage 74 which communicates with a conduit 76 extending to axial bore 20 of inner cylindrical member 14.

As shown to advantage in FIGS. 1 and 2, fitting 66 is connected by a hose 78 to a T connection 80, one branch of which is joined by a hose 82 to a source 84 of a carrier gas, such as compressed air. This enables air under pressure to be admitted to axial bore 20 of inner cylindrical member 14 through longitudinal passage 68 of fitting 66 and conduit 70.

Conduit 76 and longitudinal passage 74 of fitting 72 comprise a fluid and gas outlet which is connected to a hose 86 having complementary means 88 on one end thereof for connection with the switch housing 89 of a standard air-driven dental handpiece, such as set out in U.S. Pat. No. 3,566,471.

It will be noted from a consideration of FIG. 3 that when the apparatus of the present invention is in the inoperative position, no carrier gas is admitted to axial bore 20 through conduit 70 by virtue of the blockage thereof by rib 50, having an upper sealing ring 58 and a lower sealing ring 60 to prevent leakage of air and fluid along the wall of axial bore 20. Additionally, outlet conduit 76 is blocked by rib 48, which is sealed by an upper sealing ring 56 and a lower sealing ring 58.

It will be further noted from a consideration of FIG. 4 that, when palm button 36 is depressed to lower piston 22 to its operative position, conduits 70 and 76 are no longer blocked but are in communication with an annular passage 92 formed by the spaced relationship of piston 22 to the wall of inner cylindrical member 14 defining axial bore 20. Annular passage 92 extends between ribs 40 and 44 of shaft 22, the distance between the ribs being substantially equal to the vertical distance between conduit 70 and 76. In this manner, the carrier gas flowing under pressure through fitting 66 and conduit 70 enters the fluid-filled annular passage 92, and forces the latter upwardly through conduit 76 and passage 74 of fitting 72, and then through hose 86 to dental handpiece 90.

OPERATION

In use of the apparatus of the present invention, hose 78 with T connection 80 is attached to a compressed air source or other source of a carrier gas which is capable of delivering approximately 50 p.s.i. Filler plug 32 is removed to fill reservoir 28 with a cleaning and conditioning fluid which may be any standard type. Next the air-driven handpiece 90 is connected to hose 86, and the rear end of the handpiece is preferably

wrapped in a paper towel 94, restricting exhaust from the rear end of the handpiece.

Palm button 36 is next depressed to trap a portion of the reservoir fluid in the annular passage 92 formed between piston 28 and the wall defining axial bore 20, comprising the lateral limits, and ribs 40 and 44, comprising the vertical limits.

After button 36 is depressed to the point illustrated in FIG. 4, it is held in this position for approximately 30 seconds in order to allow the air flowing under pressure into axial bore 20 through passage 68 of fitting 66 and conduit 70 to mix with the fluid in annular passage 92, the conditioner being expelled under pressure through conduit 76 and passage 74 to switch housing 89 of handpiece 90, where it is passed longitudinally through the handpiece, carrying grit and other foreign material with it, for expulsion out of the handpiece head around the spindle and burr removal hole.

After 30 seconds, the button 36 is released and, under urging of spring 62, piston 22 moves upwardly to the inoperative position shown in FIG. 3.

The procedure is repeated as many times as necessary until only clear cleaning and conditioning fluid is expelled from the handpiece.

With the apparatus of the present invention, an automatically predetermined amount of cleaning and conditioning fluid is mixed with a carrier gas and forced under constant pressure into the dental handpiece, thereby providing cleaning and conditioning thereof in a minimum of time. In this manner, no disassembly of the handpiece is necessary, and cleaning may be effected rapidly and thoroughly by unskilled persons.

While there has been herein shown and described the presently preferred form of the present invention, it is to be understood that such has been done for purposes of illustration only, and that various changes may be made therein within the scope of claims hereto appended.

What I claim is:

1. Apparatus for cleaning and conditioning dental handpieces including
 - a. a body portion,
 - b. a reservoir for a cleaning and conditioning fluid supported by said body portion,
 - c. a carrier gas inlet conduit in said body portion,
 - d. means for delivering a carrier gas to said carrier gas conduit,
 - e. a bore in said body portion in communication with said reservoir,
 - f. a piston slidably mounted in said bore for reciprocating movement therein,
 - g. means on said piston forming a storage area for delivering a predetermined amount of fluid downwardly into said bore for communication with said carrier gas conduit when said piston is depressed, and
 - h. a gas and fluid outlet conduit in said body portion in communication with said bore, proximate said carrier gas inlet conduit,
 - i. said gas and fluid outlet conduit being connected to a dental handpiece,
 - j. whereby carrier gas from the carrier gas inlet conduit is mixed with the predetermined amount of fluid and expelled through the gas and fluid outlet conduit and through the dental handpiece.
2. The apparatus of claim 1, wherein

- a. said means on said piston includes spaced ribs extending outwardly from the piston periphery,
- b. said ribs, when the piston is in raised position, allowing free flow of fluid in the reservoir therebetween,
- c. said ribs, when the piston is in lowered position being in substantially contiguous relation with the wall of said body portion defining the bore therein,
- d. thereby forming an annular fluid passage between the piston and the wall of said body portion defining the bore.
3. The apparatus of claim 2, with the addition of
 - a. sealing means on said piston above and below the annular fluid passage to prevent leakage of fluid into, or out of, the passage, when the piston is depressed.
4. The apparatus of claim 3, with the addition of
 - a. means carried by said piston for blocking said gas inlet and gas and fluid outlet conduits, when said piston is in the raised or inoperative position,
 - b. said means carried by said piston being moved out of blocking relation with said gas inlet and gas and fluid outlet conduits, when said piston is in the lowered or operative position.
5. The apparatus of claim 4, with the addition of
 - a. sealing means on said piston above and below said means carried by said piston.
6. The apparatus of claim 4, wherein
 - a. said means carried by said piston comprise annular ribs.
7. Apparatus for cleaning and conditioning dental handpieces, including
 - a. a valve body,
 - b. said valve body being provided with a vertical, axial bore,
 - c. a reservoir for a cleaning and conditioning fluid supported by said valve body,
 - d. a piston extending through said reservoir into the axial bore of said valve body, for reciprocal movement therein,
 - e. spaced annular ribs extending outwardly from the periphery of said piston, thereby forming an annular passage for the reception of a predetermined amount of fluid from said reservoir when the piston is depressed to position said ribs in substantially contiguous relation with the valve body wall defining the axial bore,
 - f. a carrier gas inlet conduit in said valve body in communication with the axial bore,
 - g. a carrier gas source connected to said inlet conduit,
 - h. whereby fluid in the annular passage is delivered to the area of said carrier gas inlet, for mixture with the carrier gas,
 - i. a gas and fluid outlet conduit in said valve body, for delivering the fluid and gas mixture exteriorly of said valve body, and
 - j. means for delivering the fluid and gas mixture to the dental handpiece.
8. The apparatus of claim 7, with the addition of
 - a. annular ribs carried by said piston,
 - b. said annular ribs being in blocking relation with said carrier gas inlet conduit and said gas and fluid outlet conduit, when said piston is in the raised or inoperative position,
 - c. said annular ribs being moved out of blocking engagement with said carrier gas inlet conduit and said gas and fluid outlet conduit, when said piston is in the depressed or operative position.
9. The apparatus of claim 8, wherein
 - a. the carrier gas is compressed air.

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