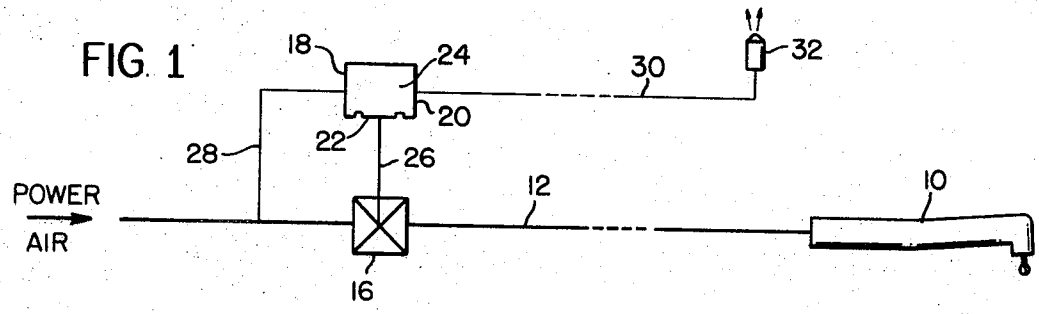
March 9, 1971 J. C. MARTIN 3,568,318

CONTROL FOR DENTAL HANDPIECES AND THE LIKE

Filed May 1, 1969 2 Sheets-Sheet 1

FIG. 1



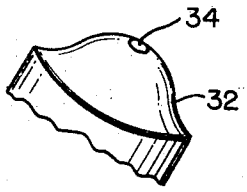


FIG. 2

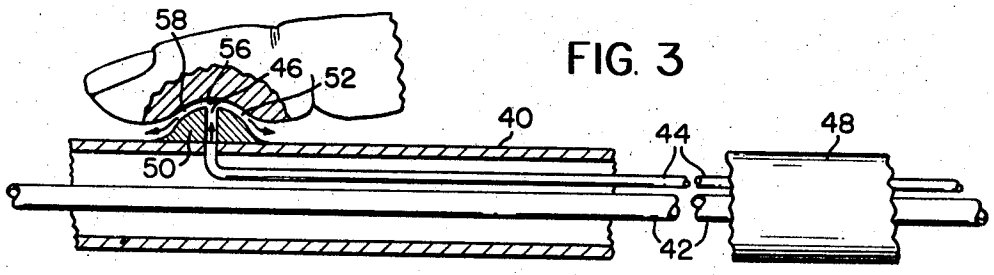


FIG. 3

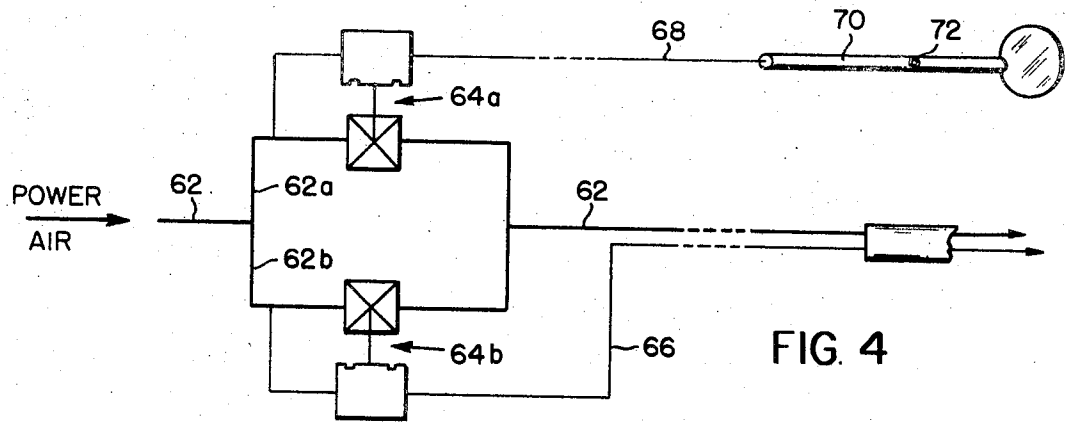


FIG. 4

INVENTOR.
JAMES C. MARTIN
BY Theodore B. Roesel
ATTORNEY

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FIG. 5

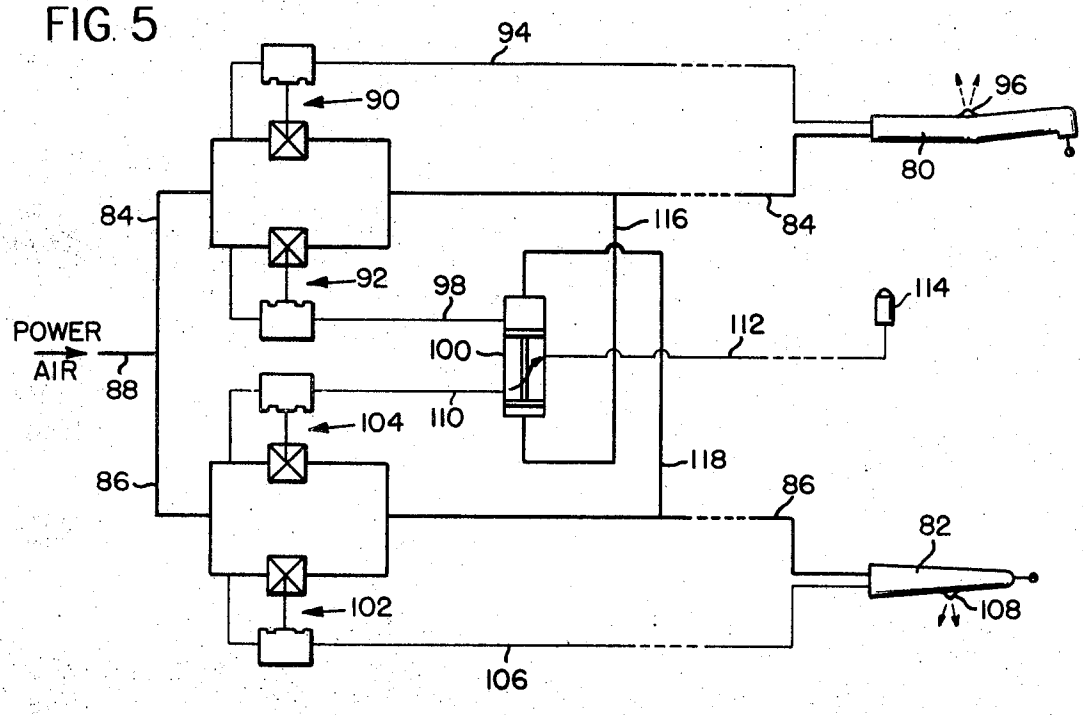

FIG. 6

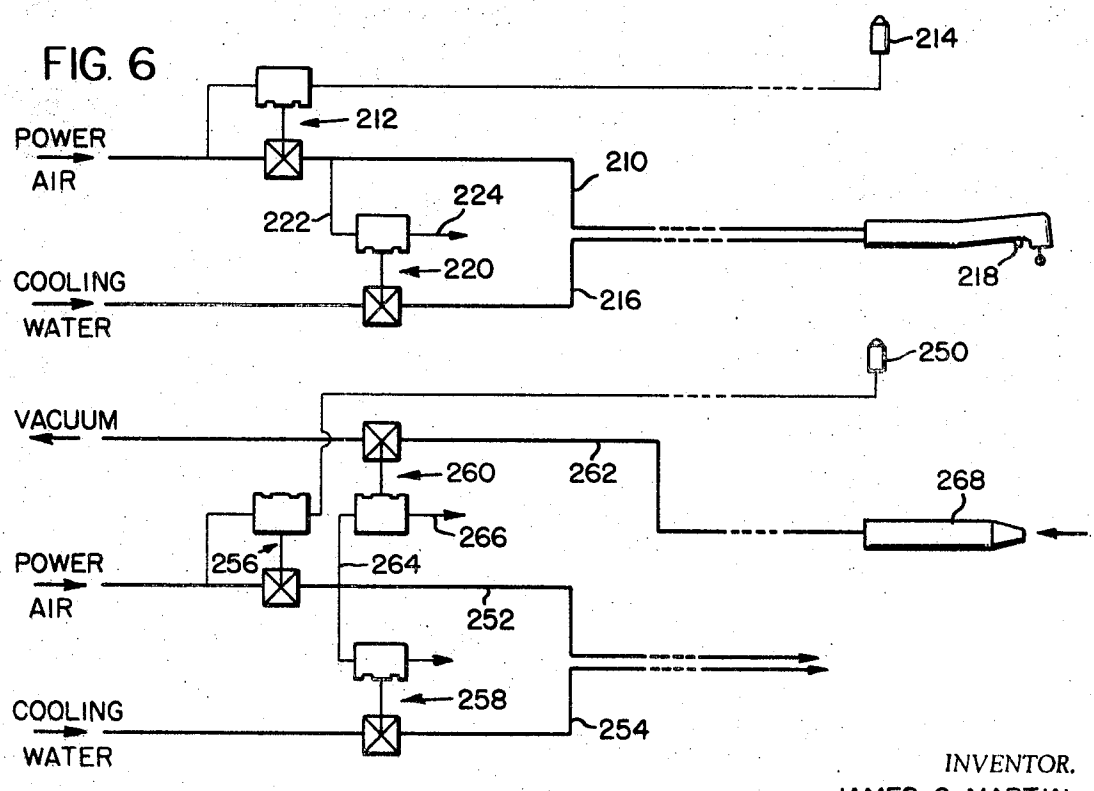

FIG. 7

INVENTOR.
JAMES C. MARTIN

BY Theodore B. Roesel

ATTORNEY

United States Patent Office 3,568,318
Patented Mar. 9, 1971

3,568,318

CONTROL FOR DENTAL HANDPIECES AND THE LIKE

James C. Martin, Pittsford, N.Y., assignor to Sybron Corporation, Rochester, N.Y.

Filed May 1, 1969, Ser. No. 820,884
Int. Cl. A61c 1/10
U.S. Cl. 32—27 12 Claims

ABSTRACT OF THE DISCLOSURE

A finger operated means for controlling the speed of an air driven handpiece, flow of cooling water, and/or vacuum aspiration wherein bleed air from the power air line is fed to a pressure operated valve and then exhausted through a nozzle to atmosphere. Placing a thumb or finger over the exhaust nozzle creates a back pressure to operate the valves which control the speed of the handpiece, flow of cooling water and/or vacuum aspiration. The nozzle has a convex shape which seats the nozzle in the flesh of the thumb or finger overcoming the tendency of the finger to slip off the nozzle due to the low friction created by air exhausting through the nozzle and against the surface of the finger. This control nozzle can be mounted in any convenient location such as on the dental handpiece itself or on a dental mouth mirror.

BACKGROUND OF THE INVENTION

The present invention relates generally to control means for use with dental handpieces and, more specifically, to means for controlling for example, the speed of fluid-driven handpieces and the like. The present invention also provides a control means which can be activated directly from the handpiece and which can be used, if desired, to control not only the speed of the handpiece but also various other functions of the dental equipment such as flow of cooling water and vacuum.

Fluid-driven dental handpieces, and particularly, air-driven handpieces, are known in the art and have been widely accepted by dentists. The cutting speeds generated by these handpieces greatly reduce the time involved in preparing a tooth for filling as well as eliminating much of the physical and psychological pain of the patient during the drilling operation.

In one type of control apparatus for air-driven handpieces, the airflow is set to provide the desired cutting speed before each operation. With such a device, the dentist must stop the drilling operation and reset the controls each time a speed change is required.

In another type of prior-art controller, the airflow regulators are mounted in a foot-operated controller. Foot controllers permit the dentist to change the speed of the handpiece without stopping the drilling operation and also frees both hands of the dentist for holding and manipulating not only the handpiece but also other instruments which might be used in connection with the drilling operation. One drawback of foot controllers is that the dentist must rest only on one foot while his other foot operates the controller while, at the same time, using both hands to manipulate the drill and other instruments in the patient's mouth. Foot controllers also limit somewhat the dentist's range of movement, that is, he cannot range so far from the controller that he can no longer reach the controller with his foot. In the alternative, the dentist must physically move the controller after him as he moves, for example, from one side of the dental chair to another.

The present invention overcomes the disadvantages of the prior art by providing a control for the air-driven dental handpiece which can be mounted, for example, directly on the handpiece itself so that the dentist can vary the speed of the handpiece with the same hand that is holding the handpiece and without stopping the drilling operation. The present invention also eliminates the disadvantages of foot controllers; namely, limits on the ability of the dentist to work from a position away from the controller, the necessity of moving the controller from one side of the chair to another, and the requirement that the dentist balance on one foot while operating the controller with another foot. Also eliminated are the disadvantages of hand-operated controllers wherein the dentist must stop the drilling operation to reset the controls for each speed change.

It is also contemplated in the present invention that an auxiliary controller can be provided on any other instrument as well as the handpiece so that the dentist can elect to use the most convenient controller during the drilling operation. For example, to further facilitate the regulation of the speed of the handpiece during the drilling operation, the controller can be mounted on a dental mouth mirror which is used during the drilling operation, on a band worn by the doctor as a ring or on a clip for attachment to any other instrument or location convenient to the dentist. The invention further contemplates use of a single controller to regulate simultaneously, the speed of the handpiece, coolant flow and/or vacuum aspiration.

SUMMARY OF THE INVENTION

In one embodiment of the present invention, flow of drive fluid to the fluid-driven handpiece is regulated by a valve which in turn is controlled by a pressure operated fluid motor wherein control fluid for operating the fluid motor is normally vented to atmosphere through a nozzle. The dentist may impede the flow of control fluid from the nozzle with his thumb or finger to create a proportionate back pressure in the fluid motor which causes a proportionate opening or closing of the valve to increase or decrease respectively the speed of the handpiece. One feature of the present invention is that this nozzle can be mounted on any suitable location such as on the dental handpiece itself and/or on any instrument which the dentist may use in connection with the drilling operation; as for example, a dental mirror. With this arrangement, the speed of the handpiece can be selectively controlled from either the nozzle on the handpiece or from the nozzle on the dental mirror. As the dentist may employ one fluid driven handpiece for high speed operation and another for low speed operation, the present invention also provides for the operation of either handpiece from a master control nozzle mounted, for example, on the dental mouth mirror as well as operation directly from a nozzle associated with or mounted on the handpiece itself.

Further, it is common practice in high speed dentistry to direct cooling water to the tooth surface. In the present invention, flow of cooling water can also be controlled from the speed control nozzle so that flow of cooling water, when used, is proportionate to the speed of the handpiece. Since it is also common practice to utilize a vacuum aspirator to remove cooling water from the pa-

tient's mouth, the present invention also provides direct control of the vacuum, when used, from the speed control nozzle so that all operations; namely, the speed of the handpiece, flow of cooling water and amount of vacuum are maintained proportionate one to another.

Another feature of the invention is that the nozzle discharges control fluid through a generally convex surface which is raised above the surface on which the nozzle is mounted. The raised convex shape of the nozzle acts to form a seat in the flesh of the dentist's thumb or finger to stabilize the finger over the nozzle. Otherwise, the thumb or finger would tend to slide off of the nozzle due to the low friction caused by the air streaming from the nozzle opening and flowing between the dentist's finger and the surface of the nozzle.

OBJECTS OF THE INVENTION

It is an object of the present invention to provide a simple, finger operated means for controlling the speed of fluid-driven handpieces.

Another object of the present invention is to provide a plurality of finger operated means for controlling the speed of a fluid-driven handpiece so that the dentist may select the particular control most convenient during any particular drilling operation and to change speeds during that operation without loss of speed or control.

A further object of the present invention is to provide finger operated control means for fluid driven dental handpieces mounted directly on the handpieces.

Still another object of the present invention is to provide control means for air driven handpieces which controls flow of cooling water in proportion to the speed of the handpiece.

A still further object of the present invention is to provide control means for air driven handpieces wherein the speed of the handpiece, flow of cooling water and operation of a vacuum aspirator are proportionately controlled from a single finger operated means.

A yet further object of the present invention is to provide a control system for a plurality of fluid driven instruments wherein operation of each instrument can be directed from either a master controller or from the instrument itself.

These and other objects, advantages and characterizing features of the present invention will become more apparent upon consideration of the following detailed description thereof when taken in conjunction with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic representation of the control means of the present invention;

FIG. 2 is an enlarged perspective view of the nozzle portion of the present invention;

FIG. 3 is a sectional view showing the nozzle portion of the invention integral the handpiece housing and seated in an indentation formed in the flesh part of a thumb or finger;

FIG. 4 is a schematic view of another embodiment of the invention wherein control of a single handpiece can be directed from either of two locations;

FIG. 5 is a schematic of another embodiment of the invention showing means for operating either of two handpieces from a master controller;

FIG. 6 is a view similar to FIG. 1 showing another embodiment of the invention for proportionately controlling both the speed of the handpiece and the flow of cooling water; and

FIG. 7 is a view similar to FIG. 1 showing still another embodiment of the invention for proportionately controlling the speed of the handpiece, flow of cooling water and vacuum aspiration.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawing, FIG. 1 shows, in schematic representation, the fluid-driven handpiece **10** which is supplied through a flow line **12** with drive fluid under pressure from a source (not shown). While any suitable fluid can be used to drive handpiece **10**, the most common fluid is air. Located in the flow line is a valve **16** operated by any suitable pressure operated fluid motor **18** which in its simplest configuration comprises an open ended housing **20**, the open end of the housing being sealed by a diaphragm **22** so as to form a fluid tight chamber **24**. Diaphragm **22** is connected to valve **16** by a valve stem **26** so that movement of the diaphragm responsive to pressure in chamber **24** will operate valve **16**. A bleed line **28** located upstream of valve **16** conducts a bleed portion of the drive fluid to chamber **24** and an exhaust line **30** terminating in a nozzle **32** exhausts bleed fluid from the chamber to atmosphere. Fluid motor **18** and valve **16** together with exhaust line **30** and nozzle **32** comprise the means for controlling the speed of the handpiece.

The operation of the control means is such that with the bleed exhausting freely from nozzle **32**, fluid motor **18** will maintain valve **16** in a fully closed position so that handpiece **10** is stopped. As flow from the nozzle is impeded by applying pressure at the nozzle opening, a back pressure is created in chamber **24** which deforms diaphragm **22** causing the valve **16** to open. Since the valve opens proportionate to back pressure in chamber **24**, control of the bleed air exhausting through nozzle **32** will increase or decrease the flow of air to the handpiece and, therefore, the speed of the handpiece. It should be appreciated that a gradual application of pressure at nozzle **32** results in a proportionate opening of valve **16** so that the speed of handpiece **10** can be regulated infinitely from a full stop to its maximum speed of operation.

One feature of the present invention is the configuration of nozzle **32**. As shown in FIG. 2, nozzle **32** has a raised generally convex surface with a nozzle opening or orifice **34** in the convex surface for exhausting bleed air through the convex surface to atmosphere. It should be apparent that when bleed air exhausted through orifice **34** impinges against a resilient surface such as the flesh of a thumb or finger, the resilient surface will be indented slightly by the force of the air, forming a concave seat for the nozzle. The mirror image of this concave indentation comprises the preferred convex shape of nozzle **32** for purposes set out hereinbelow.

Whereas, FIG. 1 shows exhaust bleed line **30** and nozzle **32** to be separate and apart from handpiece **10**, it should be appreciated that it would be advantageous to provide the bleed line and nozzle with a clip-on adaptor to permit easy attachment of the nozzle to the exterior of the handpiece so that speed of the handpiece can be controlled directly from the handpiece itself. In the alternative, as shown in FIG. 3, the exhaust bleed line may extend within the handpiece and the nozzle made an integral part of the handpiece housing.

Referring to FIG. 3, reference numeral **40** represents a section of the tubular wall of the handle portion of a fluid-driven handpiece. A nozzle **50** which contains a nozzle opening orifice **46** is fixed to the exterior of tubular wall **40** and is shown in cross section to illustrate the generally convex surface **52** of the nozzle which is raised above the level of tubular wall **40**. A flowline **42** extending through the tubular handle carries power air from a source not shown to the handpiece motor, also not shown. Also contained within the tubular handle of the handpiece is a bleed exhaust line **44** which extends through the tubular wall **40** and communicates with orifice **46**. It should be understood that when flowline **42** and exhaust line **44** extend from the handpiece handle,

they can be encased in a flexible sheath **48** and that any suitable connector means (not shown) may be used to attach one end of sheath **48** and the fluid lines therein to the fluid lines in the handpiece and to attach the other end of the sheath and the fluid lines therein to a valve and fluid motor of the type schematically shown in FIG. 1.

FIG. 3 also shows the position of a thumb or finger in place over the nozzle for purposes of controlling the bleed exhausting through orifice **46** and, therefore, the speed of the dental handpiece. In this respect as set out hereinabove with respect to FIG. 1, increasing the pressure of the finger against the nozzle and orifice will increase the back pressure in the exhaust bleed line to increase the speed of the handpiece, whereas releasing the pressure of the finger against the nozzle will permit the bleed to exhaust freely from the orifice and reduce the back pressure to reduce the speed of the dental handpiece.

The raised convex surface **52** of the nozzle together with the air exhausting through orifice **46** forms an indentation or seat **56** in the finger wherein the air flowing from orifice **46** flows over the nozzle to create an air gap **58** between the surface **52** of the nozzle and the finger. The thin film of air in the air gap acts as an air bearing to reduce the friction between the nozzle and the finger which would ordinarily cause the finger to slip from the nozzle destroying the control over the speed of the handpiece. However, the seat **56** formed in the finger by the raised convex nozzle surface acts as a seat to stabilize the finger so that the finger will not tend to slip from the nozzle. The raised concave shape of the nozzle further increases the degree of control over the amount of air being exhausted through the orifice and, therefore, the control over the speed of the handpiece. In this respect, the convex shape of the nozzle and the concave shape of the indentation permits air exhausting from orifice **46** to flow evenly over the nozzle surface and between the nozzle surface and the indentation surface so that the air exhausts evenly from about the periphery of air gap **58**. If the orifice opening were in a flat surface, for example, the exhausting air would tend to bubble in spurts from under the finger first from one side, then another, thereby reducing the degree of control over the flow of air exhausting through the orifice.

FIG. 4 shows another embodiment of the invention wherein two controllers are connected in parallel so that the flow of power air and therefore, the speed of the handpiece can be controlled from either of two locations. This embodiment will be described for purposes of illustration as if the two locations for controlling the speed of the handpiece were from the handpiece itself or from a dental mouth mirror used in the drilling operation. As shown in FIG. 4, a flow line **62** for power air has two branch passages **62***a* and **62***b* connected in parallel. Each branch passage is provided with a paired fluid motor and valve generally indicated at **64***a* and *b* respectively. Fluid motors and valves **64***a* and *b* are of the type shown in FIG. 1 wherein bleed lines located upstream of each valve conducts a bleed of the power air to each fluid motor. A bleed exhaust line **66** communicating with one fluid motor extends into a handpiece (not shown) and terminates in a nozzle, as shown, for example, in FIG. 3. A second bleed exhaust line **68** communicates with the other fluid motor and extends into the handle **70** of a dental mouth mirror and terminates in a nozzle **72** mounted on the handle.

With this arrangement, it should be appreciated that the dentist can control the speed of his handpiece from either the dental mouth mirror or from the handpiece itself. For example, with bleed air exhausting freely from both nozzle **72** and the nozzle on the handpiece (not shown) both valves are closed and the handpiece stopped. Exerting pressure against nozzle **72** to impede the exhaust of bleed air creates a back pressure in bleed exhaust line **68** to operate fluid motor and valve **64***a* for driving the handpiece. In like manner, exerting pressure against the nozzle on the handpiece creates a back pressure in bleed line **66** to operate fluid motor and valve **64***b*. Accordingly, the dentist can select the control means most convenient during any phase of the drilling operation and can control the speed of the handpiece with either hand and without slowing the speed of the handpiece merely by exerting pressure on the nozzle mounted on the handpiece itself or in the alternative, by increasing pressure against the nozzle mounted on the dental mirror.

The embodiment of FIG. 5 shows an arrangement wherein the speed of either of two air driven handpieces can be controlled from a single master controller or from the handpiece itself. It should be understood, however, that control of two handpieces is shown for illustration only and that the invention can be easily adapted to control of any number of handpieces. Referring to the drawings, FIG. 5 shows two air driven handpieces as, for example, a high speed contra-angle handpiece **80** and a low speed straight handpiece **82**. Each handpiece is supplied with power air from a branch **84** and **86** respectively of a power air mainline **88**. Branch **84** supplying power air to the high speed handpiece has two parallel connected branch passages similar to those shown in FIG. 4 wherein a pair of valves and fluid motors generally indicated at **90** and **92** respectively control flow through each branch passage. Valve and fluid motor **90** has its bleed exhaust line **94** extending to a nozzle **96** on the high speed handpiece whereas valve and fluid motor **92** has its bleed exhaust line **98** connected to a double piston cylindrical valve **100** for purposes set out hereinbelow.

In similar manner, branch **86** supplying power air to the low speed handpiece **82** has a pair of parallel branch passages similar to those shown in FIG. 4 wherein a valve and fluid motor generally indicated at **102** controls flow through one branch passage and a valve and fluid motor generally indicated at **104** controls flow through the other branch passage. Valve and fluid motor **102** has its bleed exhaust line **106** connected to a nozzle **108** on the low speed handpiece whereas valve and fluid motor **104** has its bleed exhaust line **110** also connected to the double piston valve **100**. Extending from valve **100** is a single bleed exhaust line **112** which terminates in a master control nozzle **114**, it being understood that nozzle **114** can be associated with any dental instrument used in connection with the drilling operation such as the dental mirror shown in FIG. 4. Extending from each branch **84** and **86** at a point downstream from the fluid motor and valve pairs is a flow line **116** and **118** respectively which communicates with opposite ends of double piston valve **100**.

The operation of the embodiment of FIG. 5 will be described for purposes of illustration as if low speed handpiece **82** was being used by the dentist. It should be obvious that the speed of the handpiece can be controlled from the handpiece itself in the manner similar to that described hereinabove with respect to FIG. 4 simply by impeding the exhaust of bleed air from nozzle **108**. Further, as FIG. 5 shows, bleed exhaust line **112** is connected by means of the double piston valve **100** to bleed exhaust line **110** so that the speed of handpiece **82** can also be controlled by inpeding the exhaust of bleed air through master control nozzle **114**. If the dentist now desires to operate with the high speed handpiece **80**, the control function of master control nozzle **114** can be switched from the low speed handpiece to the high speed handpiece **80** in the following manner.

With exhaust bleed air streaming freely from nozzles **96**, **108** and **114**, branch lines **84** and **86** are both closed so that both handpieces are stopped. By applying pressure against nozzle **96** to impede the exhaust of bleed air, sufficient back pressure is created in bleed exhaust line **94** to operate fluid motor and valve **90**, permitting power air to flow down branch passage **84** and to the handpiece. The flow of power air in branch **84** also

pressurizes line **116** to move the piston of double valve **100** upward as viewed in FIG. 5. This connects bleed exhaust line **98** to bleed exhaust line **112** and master control nozzle **114** so that nozzle **114** may now be used to control the speed of high speed handpiece **80**. Thus, with this arrangement, the speed of high speed handpiece **80** can be controlled from either exhaust nozzle **96** associated with the handpiece or from master control nozzle **114**. Should the dentist now desire to use low speed handpiece **82**, pressure is merely exerted against nozzle **108** to operate fluid motor and valve **102** so that power air is channeled through branch **86** to the low speed handpiece. With power air flowing through branch **86**, line **118** is pressurized which moves the piston of double piston valve **100** downward to the position shown in FIG. 5. This connects bleed exhaust line **112** and nozzle **114** to bleed exhaust line **110** thereby permitting the dentist to control speed of handpiece **82** with either master control nozzle **114** or nozzle **108** associated with the low speed handpiece.

As stated hereinabove, it is common practice in connection with high speed dentistry to supply cooling water to the drill bit during the drilling operation. The embodiment shown in FIG. 6 allows the dentist to control the flow of cooling water in proporton to the speed of the handpiece so that as the speed of the handpiece increases, the flow of cooling water will also increase. The embodiment shown in FIG. 6 is similar to that shown in FIG. 1 in that flow of power air through line **210** for driving the handpiece is controlled with a fluid motor and valve **212** by regulating the exhaust of bleed air from nozzle **214**. In addition to power air, cooling water is also supplied to the handpiece through a flow line **216** wherein the cooling water can be discharged from a handpiece opening **218** directly onto the drill bit.

Flow of cooling water through line **216** is controlled by a fluid motor and valve generally indicated at **220**. A bleed line **222** connects this fluid motor and valve to the power air line at a point downstream of fluid motor and valve **212**. A bleed exhaust **224** is provided for venting air from fluid motor and valve **220** to atmosphere.

In operation, the speed of the dental handpiece is controlled by fluid motor and valve **212** in a manner similar to that described hereinabove with respect to FIG. 1. In addition, the operator can elect to run the handpiece either wet or dry, that is, with or without cooling water. Further, when the handpiece is operated with cooling water, the flow of water is proportionate to the speed of the handpiece. In this respect, when the handpiece is in operation, power air is bled through bleed line **222** to fluid motor and valve **220**. With exhaust **224** open, no back pressure is created in fluid motor and valve **220** so that cooling water line **216** remains closed. When exhaust **224** is closed by any suitable means (not shown) such as a valve or simply by putting a finger over the exhaust, a back pressure is created in fluid motor and valve **220** which is proportionate to the flow through power air line **210**. As back pressure in fluid motor and valve **220** will open cooling water line **216**, the flow of cooling water through line **216** will increase or decrease in proportion to the flow of power air through line **210**. Thus, in this embodiment of the invention, both the speed of the handpiece and rate of flow of cooling water can be controlled from a single nozzle **214**.

When cooling water is used during the drilling operation, it is also common practice to provide for withdrawal of water from the patient's mouth through a vacuum aspirator. In the embodiment shown in FIG. 7, the dental handpiece can be operated dry wherein the speed of the handpiece is controlled from a nozzle **250** or the handpiece can be operated wet wherein the flow of cooling water is proportionate to the speed of the handpiece and is also controlled from nozzle **250**; or the handpiece can be operated wet wherein the cooling water is removed by a vacuum aspirator. In this latter case, the speed of the handpiece, flow of cooling water and vacuum aspiration are all controlled from nozzle **250**. Referring to FIG. 7, a power air line **252** and a cooling water line **254** are both connected to a dental handpiece (not shown). A pair of fluid motors and valves generally indicated at **256** and **258** are provided for controlling the flow of power air and cooling water respectively in a manner set out hereinabove. In addition, a third fluid motor and valve generally indicated at **260** is provided in a vacuum line **262** for controlling the vacuum aspiration of cooling water from the patient's mouth. A bleed line **264** connects fluid motor and valve **260** to the power air line downstream of fluid motor and valve **256** and an exhaust **266** vents air from the fluid motor and valve to atmosphere.

In operation and with cooling water being supplied to the patients' mouth in a manner described hereinabove, the operator may provide for the aspiration of water from the patient's mouth through vacuum line **262** in the following manner. With exhaust **266** open, no back pressure is created in fluid motor and valve **260** so that vacuum line **262** is closed. When exhaust **266** is closed by any suitable means such as a valve or simply by placing a finger over the exhaust opening, the pressure in bleed line **264** and, therefore, the back pressure in fluid motor and valve **260** will vary in proportion to power air flowing through line **252**. Since the operation of both valve and fluid motors **258** and **264** is proportionate to the flow of air through line **252**, the amount of cooling water flowing to the patient's mouth will be proportionate to the operation of the vacuum. Thus, all three functions; namely, speed of the handpiece, flow of cooling water and vacuum aspiration are proportionate one to another and can be simultaneously controlled from nozzle **250**.

Another feature of this embodiment is that in prior art devices, the valve for controlling the amount of vacuum is located adjacent the tip portion **268** of the vacuum aspirator. Thus, with a constant vacuum being applied to the line by a vacuum pump remote from tip **268**, the throttling of the tip opening to increase or decrease the amount of suction created a noise level which can be disturbing to both patient and dentist. In the present invention, however, the throttling of valve and fluid motor **260** occurs at some distance from the tip so that the noise level at the tip is greatly reduced.

Accordingly, it should be appreciated that the present invention accomplishes its intended objects providing a control means for air driven dental handpieces which are both simple to operate and which can be mounted directly on the handpiece itself. The present invention also provides means for controlling any number of air driven handpieces from a single master controller which can be mounted, for example, on a dental mouth mirror. The invention also permits the operator to switch the control function from one controller to another without stopping the drilling operation or losing drilling speed. Still other embodiments of the invention provide for the control of several dental operations such as the flow of cooling water and/or the amount of vacuum aspiration from a single control center.

While the preferred embodiments of the invention have been described in connection with air driven handpieces, it should be appreciated that the invention can be adapted to the control of electrically driven handpieces simply by connecting the fluid motor as described in the invention to a rheostat. It is also within the scope of the invention to combine various embodiments described in various other combinations; for example, the control of cooling water as shown in FIG. 6 and the control of cooling water and/or vacuum aspiration as shown in FIG. 7, could be associated with both the high speed contra angle handpiece **80** and low speed handpiece **82** of FIG. 5 so that nozzle **114** would control both the cooling water and/or vacuum aspiration in proportion to the speed of either handpiece.

Having thus described the invention in detail, what is claimed as new is:

1. In combination with a fluid driven dental handpiece, a line for drive fluid communicating with the handpiece and a valve for regulating flow of drive fluid to the handpiece, means for controlling the operation of the valve and therefore the speed of the handpiece comprising:
   (a) a pressure operated fluid motor operatively connected to said valve, said fluid motor having an inlet and outlet for control fluid;
   (b) an exhaust line extending from the outlet of said fluid motor; and
   (c) a nozzle communicating wtih said exhaust line, said nozzle having a generally convex surface and an orifice in said surface through which said control fluid is exhausted to atmosphere, said nozzle receiving a resilient surface thereagainst to impede the exhaust of control fluid from said orifice and create a back pressure in said exhaust line for operating said fluid motor and, therefore, said valve.

2. A combination as set forth in claim 1, wherein a bleed line extends from said inlet and communicates with the flow line for said drive fluid at a point upstream of said valve, wherein control fluid for operating said fluid motor is a bleed portion of said drive fluid.

3. A combination as set forth in claim 1, wherein said nozzle is mounted on said fluid driven handpiece and said generally convex surface is raised above the surface of said handpiece.

4. A combination as set forth in claim 1, wherein said generally convex nozzle surface is adapted to form a generally concave seat for said nozzle in said resilient surface so that control fluid exhausting from said orifice flows over said nozzle surface and between said nozzle surface and seat and exhausts to atmosphere from about the periphery of said seat.

5. A combination as set forth in claim 1, wherein said nozzle has a raised, generally convex surface adapted to receive a human finger thereagainst, said convex nozzle surface being substantially the shape of the mirror image of the generally concave surface formed in the finger by fluid exhausting through said orifice and against the finger, said nozzle forming a substantially concave indentation in said finger for seating said nozzle.

6. A combination as set forth in claim 1 further comprising:
   (a) a pair of said pressure operated fluid motors associated with said handpiece for controlling the speed of said handpiece;
   (b) an exhaust line extending from the outlet of each fluid motor;
   (c) a first nozzle mounted on said handpiece communicating with one of said exhaust lines; and
   (d) a second nozzle remote from said handpiece and communicating with another of said exhaust lines whereby the speed of said handpiece can be controlled by impeding the exhaust of control fluid from either said nozzle mounted on said handpiece or from said nozzle remote from said handpiece.

7. A combination as set forth in claim 6 wherein said nozzle remote from said handpiece is mounted on a dental mouth mirror.

8. A combination as set forth in claim 1 having a plurality of fluid driven handpieces or the like further comprising:
   (a) at least two of said fluid motors for controlling the operation of each handpiece;
   (b) a plurality of said nozzles, one nozzle being associated with each handpiece and in communication with one fluid motor of the at least two fluid motors controlling each handpiece;
   (c) a master control nozzle associated with all of said handpieces, said master control nozzle being adapted for communication with a second fluid motor of the at least two fluid motors controlling each handpiece; and
   (d) switch means for selectively placing said master control nozzle in communication with a selected one of said second fluid motors whereby each handpiece may be controlled by impeding the exhaust of control fluid from either a nozzle associated with said handpiece or by said master control nozzle.

9. A combination as set forth in claim 1 further comprising a line for conducting a coolant to said handpiece, a valve for regulating flow of coolant and means for controlling the flow of coolant in proportion to the flow of drive fluid said coolant control means comprising:
   (a) a pressure operated fluid motor operatively connected to said coolant valve, said fluid motor having an inlet and an exhaust for control fluid;
   (b) a bleed line connecting said inlet to said drive fluid line at a point downstream from said drive fluid valve; and
   (c) means for opening and closing said exhaust, said exhaust being open for freely exhausting control fluid from said fluid motor to close said coolant valve and said exhaust being closed to permit pressurizing said fluid motor by a bleed of drive fluid to open said coolant valve, the pressure in said fluid motor and therefore the flow of coolant being proportionate to the flow of drive fluid and therefore the speed of said handpiece.

10. A combination as set forth in claim 9 further comprising:
   (a) a vacuum line for aspirating said coolant;
   (b) a valve in said vacuum line for regulating vacuum aspiration of said coolant;
   (c) a pressure operated fluid motor operatively conconnected to said vacuum control valve, said fluid motor having an inlet and an exhaust for control fluid;
   (d) a bleed line connecting said inlet to said drive fluid feed line at a point downstream from said drive fluid control valve; and
   (e) means for opening and closing said exhaust wherein said exhaust is opened to freely vent control fluid from said motor and close said vacuum control valve and said exhaust is closed to permit pressurizing said fluid motor with bleed from said drive fluid, the pressure in said fluid motor and therefore the operation of said vacuum control valve being proportionate to the flow of drive fluid and therefore the speed of said handpiece.

11. Means for controlling the speed of a plurality of fluid driven dental handpieces or the like comprising:
   (a) a pair of pressure operated fluid motors associated with each handpiece for controlling the flow of drive fluid to said handpieces, said fluid motors being of the type in which linear motion is produced responsive to back pressure of control fluid in said motor, each fluid motor having an inlet and outlet for control fluid;
   (b) means for continuously feeding control fluid to each fluid motor;
   (c) an exhaust line extending from the outlet of each fluid motor;
   (d) a master control nozzle associated with one of said exhaust lines from each pair of fluid motors;
   (e) a plurality of secondary control nozzles, each of said secondary exhaust nozzles being associated with one of said dental handpieces and in communication with the second exhaust line from each pair of fluid motors;
   (f) said master control nozzle and secondary control nozzle each having a generally convex surface and an orifice in said surface for venting control fluid from said motors to atmosphere, said nozzle surface being engagable with a resilient member to form a generally concave seat in said member so that fluid vented from said orifice flows between said seat

and said nozzle surface and exhausts about the periphery of said seat, the pressure of said seat against said nozzle surface being increased or decreased to increase or decrease respectively the back pressure in said motor; and

(g) switch means for selectively placing said master control nozzle in communication with one or another of the exhaust lines associated with said master control nozzle whereby the speed of each handpiece may be controlled either from the secondary control nozzle associated therewith or from said master control nozzle.

12. Means as set forth in claim 11 wherein one of said secondary control nozzles is mounted on each handpiece.

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ROBERT PESHOCK, Primary Examiner