

March 15, 1960

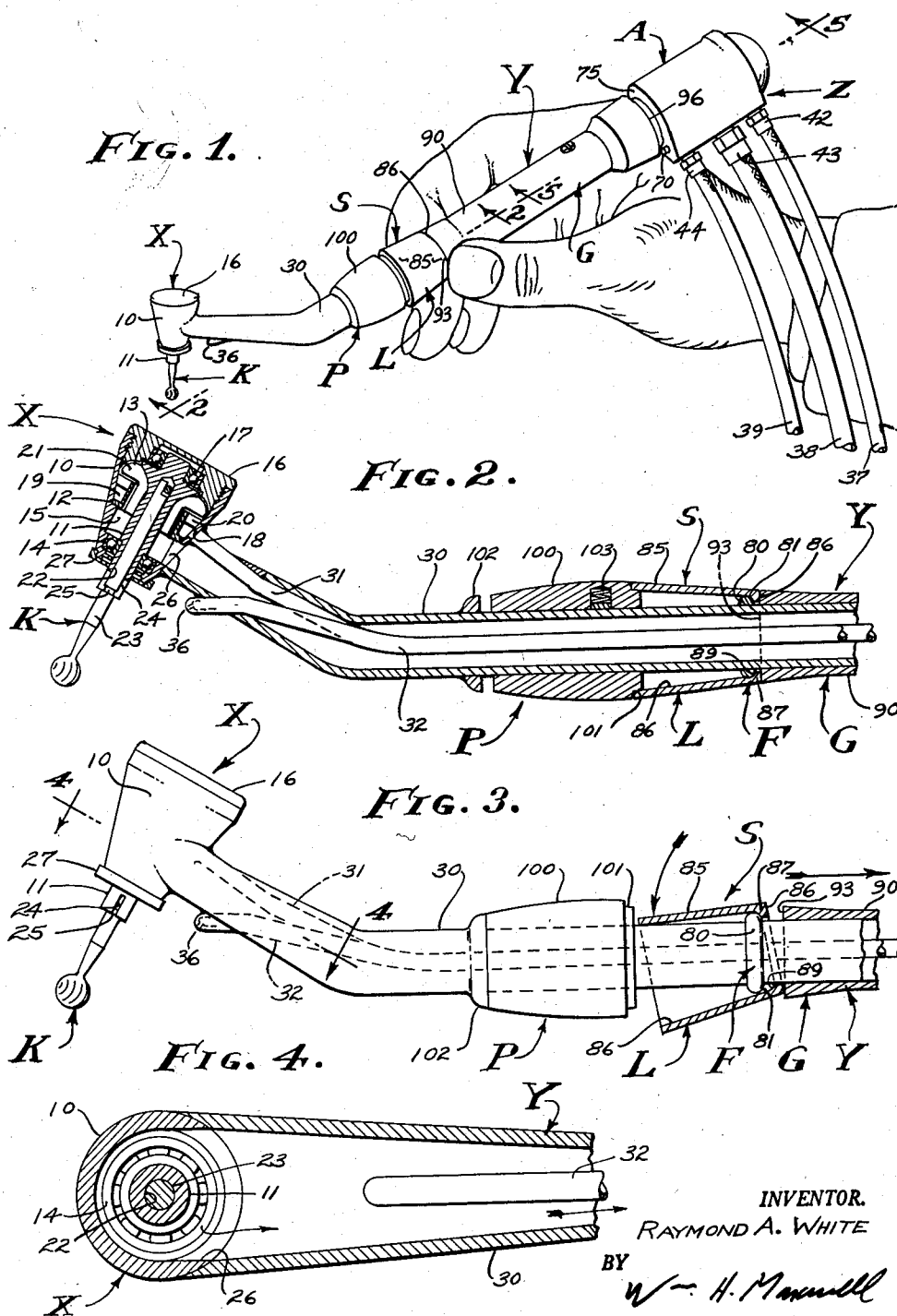
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2,928,174

DENTAL HANDPIECE AND CONTROL THEREFOR

Filed April 8, 1957

2 Sheets-Sheet 1



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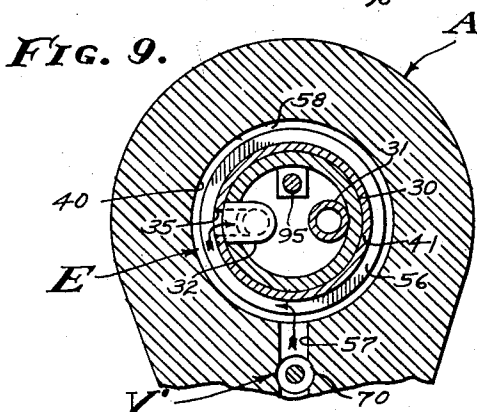
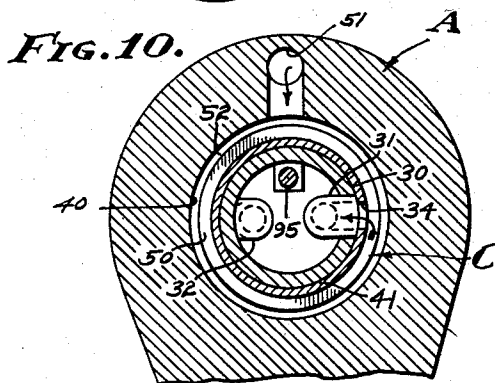
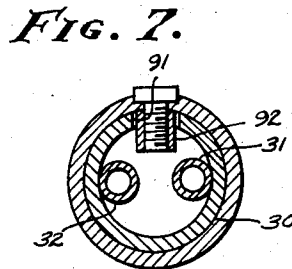
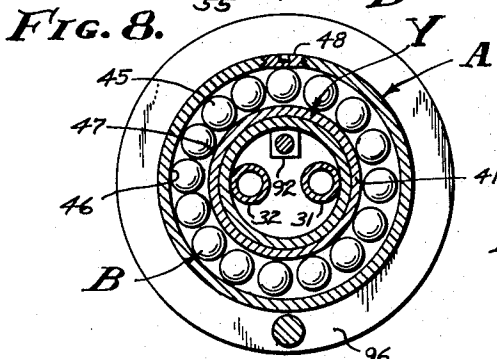
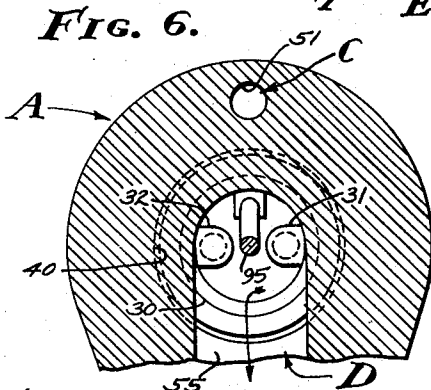
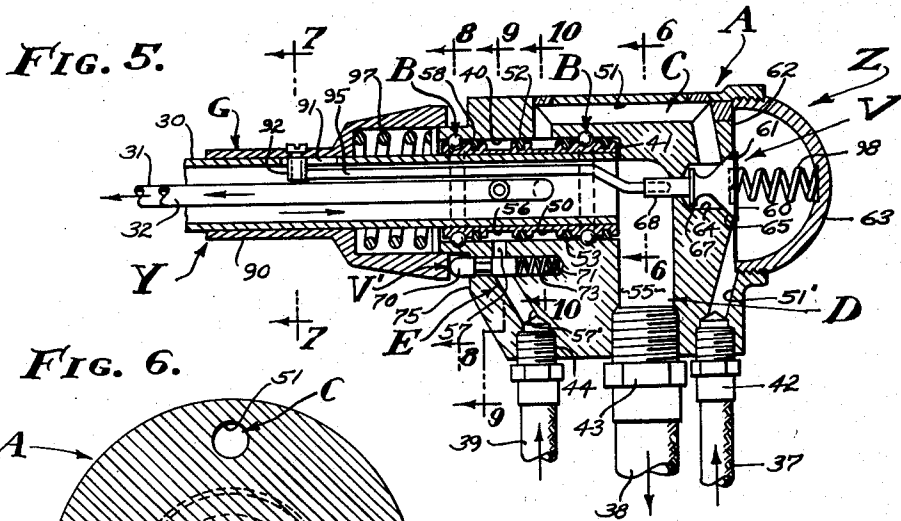
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DENTAL HANDPIECE AND CONTROL THEREFOR

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1

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DENTAL HANDPIECE AND CONTROL THEREFOR

Raymond A. White, San Pedro, Calif.

Application April 8, 1957, Serial No. 651,310

16 Claims. (Cl. 32—27)

This invention relates to a dental handpiece and control therefor and is particularly concerned with a handpiece construction that lends itself to easy handling or manipulation and control thereof, it being a general object of this invention to provide a compact self contained handpiece with the controls therefor incorporated in the handpiece itself.

Heretofore, dental handpieces have been driven by remote stationary motor drives with a rather complex transmission mechanism between the motor and handpiece. Said transmission mechanisms usually involve articulated arms carrying pulleys, and a drive belt threaded over or strung on said pulleys. More recently, however, handpieces have been made with the drive motor incorporated therein, in which case power or energy is conducted to the handpiece and is utilized in the said handpiece to drive the rotating elements thereof. The later type handpiece with the drive incorporated therein may be driven as by fluids under pressure, either a gas or a liquid, or by energy in the form of an electric current. In any case, whether remotely driven, or directly driven by a fluid or by electricity, the handpieces have been controlled by remote means, as by a foot pedal actuating a valve or switch.

The present invention involves, generally, a handpiece and a manually operable control therefor. The handpiece is held in the hand of the user, that is, it is held in the hand of the dentist, and it is controlled completely by said dentist's hand. More specifically, the starting and stopping of the motor is controlled as well as the speed of rotation thereof, and further, other fluids are controlled, as for example, coolants in the form of water or water mist.

It is an object of this invention to provide a handpiece for use in dentistry that incorporates therein the control means therefor. With the structure that I provide the single hand of the user is employed to manipulate the handpiece as a whole and also to manipulate the control that I provide in accordance with the invention.

It is another object of this invention to provide a handpiece of the character referred to that incorporates therein the drive for the rotating elements thereof and also the control for governing action of said drive. The above mentioned features are all cooperatively related in a single structural unit that is operable by manipulation with but a single hand of the user.

It is still another object of this invention to provide a handpiece as above set forth wherein the drive incorporated therein is a fluid operated drive and in which means is provided to conduct fluids to the drive to operate the same.

It is also an object of this invention to provide a handpiece as above set forth wherein the drive and means conducting fluids thereto are governed by a control that is adapted to be manipulated by the hand of the user, which hand is also used to support and generally manipulate and position the handpiece.

Further, it is an object of this invention to provide

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a compact self contained dental handpiece that includes the drive and control therefor and also the controls for other fluids used in dentistry processes, and which is simple and reasonably inexpensive of manufacture.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of my invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a perspective view of the dental handpiece that I have provided showing the manner in which it is handled or manipulated by the single hand of the user, or dentist. Fig. 2 is an enlarged sectional view of the forward portion of the structure taken as indicated by line 2—2 on Fig. 1. Fig. 3 is a view similar to Fig. 2 showing certain parts in elevation and showing the control element that I provide in a different operative position. Fig. 4 is an enlarged sectional view taken as indicated by line 4—4 on Fig. 3. Fig. 5 is an enlarged sectional view of the rear portion of the structure taken as indicated by line 5—5 on Fig. 1. Figs. 6, 7, 8, 9 and 10 are each enlarged sectional views taken as indicated by lines 6—6, 7—7, 8—8, 9—9 and 10—10 on Fig. 5, respectively.

The dental handpiece and control therefor that I have invented may be of the same size and same general configuration as a common handpiece of the type under consideration. However, the drive thereof is incorporated in the head X in the manner set forth and fully claimed in my copending application for Letters Patent entitled Turbine Driven Dental Handpiece, Serial No. 588,757, filed June 1, 1956. In the particular construction illustrated the handpiece is of the "contra angle" type wherein the axis of the head X is at an angle to the axis of the handpiece body Y. Further, the power or energy for driving the rotating elements is conducted to the body Y and head X through a fluid supply means Z. As shown, the head X is fluid driven in which case the means Z is a fluid conducting means. It is to be understood that an electrical drive may be employed in which case the means Z will take the form of electrical cables.

In addition to the above mentioned head X, body Y and fluid supply means Z, the invention involves a manually operable control S adapted to be manipulated by the fingers of the hand used to hold and support the handpiece.

The driving head X, as best illustrated in Fig. 2 of the drawings, is a drive unit or prime mover and involves, generally, a case 10, a shaft 11 rotatably carried in the case to project from one end thereof, a stator 12 in the case to receive and direct fluid handled by the driving head X, and a rotor 13 preferably integral with the shaft 11 to receive fluid directed by the stator and adapted to rotate the shaft.

The case 10 is an elongate shell-like part with a cone-shaped outer wall tapered inwardly toward the lower end thereof. A seat is provided at the lower end of the case 10 to carry an anti-friction bearing 14, and a shoulder is provided intermediate the ends of the case 10 to support the stator 12 in the case. Intermediate the bearing 14 and stator 12 there is an exhausting chamber 15 defined by the wall of the case 10 and surrounding the shaft 11. A cover 16 closes the top of the case 10 and has a seat to carry an anti-friction bearing 17. The bearings 14 and 17 rotatably support the shaft 11 within the case 10, the lower end of the shaft 11 projecting somewhat from the bottom of the case.

The stator 12 receives fluid under pressure, preferably air or the like, through a port 18 in the wall of the case 10. The stator 12 is characterized by an annular cham-

ber 19 defined by the wall of the case 10 and an inner wall of the stator 12. Fluid received by the stator 12 is directed upwardly through vanes 20 that are carried thereby, the vanes 20 being in a continuous annular series.

The rotor 13 receives fluid directed upwardly by the stator 12 is adapted to handle the fluid so that it is conducted inwardly and downwardly imparting driving force to the rotor 13. The rotor 13 is preferably integral with the shaft 11 and has a continuous annular series of blades 21. The vanes 20 and blades 21 are suitably pitched, in the direction of rotation, and as circumstances require, in order to gain the desired speed of rotation, etc.

The head X is employed to drive a cutter K, for example, a burr cutter, as shown. Shaft 11 has a straight bore 22 entering the lower end thereof to slidably receive the shank 23 of the cutter. The upper end of the cutter shank 23 is notched to engage with a key in the bore 22. In order to retain the cutter K in working position, I may provide a friction exerting or detent type collet at the lower end portion of the shaft 11. For example, the lower end portion of the shaft 11 is split at 24 and provided with inward projections that engage in a groove 25 in the shank 23.

In operation, fluid used to drive the rotor is received from the lower end of the rotor by the exhausting chamber 15, and it is directed from the chamber through an enlarged exhaust port 26 in the side wall of the case 10 (see Figs. 2 and 4). A seal 27 is carried at the lower end of the case 10 to surround the shaft 11, preferably a labyrinth type seal.

The body Y, in accordance with the preferred form of the invention, is a multi-tubular element adapted to conduct fluids to and from the head X. The body Y involves an outer case 30 and one or more inner tubes housed within the case 30. In the particular case illustrated there is an inner tube 31 adapted to conduct fluid under pressure to the inlet port 18 in the head X, and an inner tube 32 adapted to conduct fluid coolant to the vicinity of the head X. The outer case 30 is of substantial cross sectional configuration and is adapted to receive exhaust fluid from the port 26 in the head X. As shown, the case 30 is round with a flow passage extending coextensively therethrough and opening at both the front and rear ends of the case.

In accordance with the invention, the outer case 30 is flattened at the forward end portion thereof, in a horizontal plane, to be coextensive with the height and width of the exhaust port 26. The port 26 is coextensive with the inner diameter of the case 10 and the side walls of the case 30 are tangent to the walls of the case 10 (see Fig. 4). The forward end of the case 30 is suitably shaped and the head X secured thereto as by brazing, or the like. It will be observed that the forward portion of the case 30 may be gradually flattened, and that it may be upturned, as shown, to form a "contra-angle" handpiece.

The inlet port 18 is located in the head X immediately above the exhaust port 26, and is substantially smaller than the port 26. The inner tube 31 is considerably smaller in diameter than the outer case 30 and extends longitudinally of the interior of the case. The inner tube 31 is provided to conduct fluid under pressure for operation of the driving head X and extends between the port 18 and an inlet passage 34 in the side of the outer case 30 (see Fig. 10). The inner tube 32, like the tube 31, is considerably smaller in diameter than the outer case 30 and extends longitudinally of the interior of the case. The inner tube 32 is provided to conduct a coolant, or the like, to the vicinity of the head X and extends from the head X to an inlet passage 35 in the side of the outer case 30 (see Fig. 9). As shown, the tube 32 projects through an opening in the wall of the outer case 30 and has a suitable tip that has a jet 36 to direct fluid coolant in the area of the cutter K.

The fluid supply means Z, as clearly shown in Fig. 5

of the drawings, is provided to handle the passage of fluids to and from the head X of the handpiece. That is, the means Z handles the flow of compressed air to the inner tube 31 through passage 34, it handles exhaust air from the interior of the outer case 30, and it handles coolant to the inner tube 32 through the passage 35. The means Z involves, generally, a cap A engaged over the rear end portion of the body Y, means B rotatably coupling the cap A to the body Y, a fluid pressure inlet C, a fluid outlet D, and a coolant inlet E. The means Z is in the nature of a swivel at the rear end of the handpiece and connects with a fluid pressure supply line 37, with an exhaust line 38, and with a coolant supply line 39.

The cap A may be fabricated in various ways and is shown as a block of material with a straight cylindrical bore 40 entering the forward end thereof. Since the case 30 of body Y is thin walled there is provided a fitting 41 that slides over and which may be secured to the rear end portion of the body as by brazing, or the like. Lateral fluid connections 42, 43 and 44 project from the cap and are each threaded into openings in a boss-like part at one side of the cap, preferably the lower side thereof. The connections 42, 43 and 44 join with the fluid handling lines 37, 38 and 39, respectively.

The means B that rotatably couples the cap A to the body Y is an anti-friction type bearing means involving one or more annular series of balls 45 engaged in mating grooves or channels 46 and 47 in the cap A and body Y, respectively. I have shown two spaced series of balls 45 the grooves 47 being formed in the fitting 41. The balls 45 are retained in working position by providing plugs 48 that close openings that enter the channels 46 from the exterior of the cap. It will be apparent that the cap A is free to swing relative to the body Y.

The fluid pressure inlet C is provided to conduct fluid from the connection 42 and line 37 to the passage 34 in the wall of the body Y. In practice, the passage 34 extends through the side wall of the outer case 30 and also through the fitting 41 that surrounds the case, and there is an annular channel 50 in the exterior of the fitting and in communication with the passage. Suitable drilled ducts 51 are formed in the cap A, as by drilling and plugging, to open into the bore 40 at the channel 50, and annular seals 52 and 53 are carried to act between the cap A and body Y at either side of the channel 50. It will be apparent that fluid under pressure in the ducts 51 will be communicated to the channel 50 and to the passage 34 to be delivered to the head X through the inner tube 31.

The fluid outlet D is provided to conduct fluid from the exhaust port 26 in the head X to the connection 43 and line 38. In accordance with the invention a duct 55 extends laterally through the cap A between the inner or rear end of the bore 40 and the connection 43 to be in open communication with the interior of the body Y. It will be apparent that exhausted fluids are free to flow from the handpiece through the duct 55 and finally through the line 38.

The coolant inlet E is provided to conduct fluid from the connection 44 and line 39 to the passage 35 in the wall of the body Y. In practice the passage 35, like the passage 34, extends through the side wall of the outer case 30 and also through the fitting 41, that surrounds the case, and there is an annular channel 56 in the exterior of the fitting and in communication with the passage. A suitable duct 57 is formed in the cap A to open into the bore, and the channel 56, and an annular seal 58 and the seal 52 are carried to act between the cap A and body Y at either side of the channel 56. It will be apparent that the coolant will be conducted to the channel 56 and to the passage 35 to be delivered to the jet 36 at the head X.

In accordance with the preferred form of the inven-

tion when fluid under pressure is employed to operate the driving head X, I provide a throttling valve V that is adapted to admit the desired volume of fluid to the head X. In the form of the invention illustrated (see Fig. 5) the valve V involves a shiftable element 60 engageable with a seat 61. I provide the rear end of the cap A with a face 62 and a portion 51' of the duct 51 opens at said face from the connection 42. A cover 63 overlies the face 62 forming a fluid pressure supply chamber, and a bore or opening 64 enters the face 62 and extends axially of the cap A, preferably concentric with the central axis of the handpiece. The valve element 60 is shiftable carried in the opening 64 and has a forwardly and inwardly tapered face 65 that normally engages the seat 61 which is also tapered and which faces rearwardly. An outwardly flared flange 67 is provided at the forward end portion of the valve element 60 in order to direct moving fluids outward or radially of the valve element 60 to enter the duct 51 that enters the bore or opening 64. The forward end portion of the bore 64 is of reduced diameter and the valve element has a reduced forwardly projecting part 68 that extends into the duct 55, to be operated by the control S later described.

When coolant fluid is to be handled by the handpiece I provide a valve V' that is adapted to open and close the supply of coolant to the inner tube 32 and jet 36. In the form of the invention illustrated the valve V' involves a shiftable element 70 slidably carried in a bore 71 that extends axially of the cap A at one side thereof. The bore 71 intersects the duct 57 and the element 70 normally closes said duct. A portion 57' of the duct 57 extends between the connection and the bore 71 so that coolant is conducted to the valve V'. A spring 73 is provided to yieldingly urge the valve element 70 forwardly and the element is provided with a reduced portion that aligns with the duct 57 when said element is moved rearwardly. The valve element 70 has a forwardly projecting portion that normally extends from the front face 75 of the cap A to be engaged and operated rearwardly by the control S, later described.

The present invention is characterized by the control S that I provide for actuating the valves V and V' in order to admit fluids to the head X of the handpiece. In accordance with the invention the control S is adapted to be operated by any one or more of the fingers of the hand supporting the structure and involves, generally, a fulcrum F, a lever L, and a shiftable driver G. Further, the means S may include a lock or safety means for engaging the lever and preventing accidental movement thereof.

The fulcrum F may be a simple pivot, however, in accordance with the preferred form of the invention it is a circular element that extends continuously around the body Y of the handpiece. As illustrated in Figs. 2 and 3 of the drawings, the fulcrum F is in the form of a ring 80 engaged over and projecting from the outer wall of the body Y, and it may be secured intermediate the ends of the body as by brazing or the like. As shown, the outer wall 81 is curved about a radius to have bearing engagement with lever L, as hereinafter described.

The lever L may be a simple pivoted lever, however, in accordance with the preferred form of the invention it is a circular element that surrounds the body Y to be manually engageable at any point or position around the body. As illustrated in Figs. 2 and 3, the lever L is in the form of a collar 85 that encircles the body Y with some clearance therebetween. The inner wall 86 of the collar 85 is larger in diameter than the body Y and engages over the ring 80 that forms the fulcrum F. A flange 87 extends inwardly at the rear end portion of the collar 85 and is provided with a rearwardly disposed operating face 86 and with a curved annular seat 89 that has bearing engagement with the matching curved wall 81 of the ring 80. Both the wall 81 and the seat 89 are

continuous annular parts that are adapted to have bearing contact with each other at any point around the structure. Further, the collar 85 is flared somewhat outwardly as it extends forward in order to increase the pivotal movement thereof.

By depressing the forward end portion of the collar 85 inwardly, at any point around the circumference thereof, the flange 87 is rocked, from its normally transverse plane normal to the axis of the handpiece, so that the peripheral part thereof diametrically opposite the pivot point is moved axially rearward. It will be apparent that depression of the collar 85 at any point will rock the flange 87 and will cause maximum motion at a point on the operating face 86 diametrically opposite the pivot point.

The drive G, may vary widely, and is preferably in the form of a sleeve 90 that is slidably engaged over the body Y to reciprocate relative thereto. The sleeve 90, in the particular form of the invention illustrated, forms the grip of the handpiece and is therefore, substantially elongate, and it is keyed to the body Y to prevent rotation of the parts. I have provided a slot 91 in the body Y and a lug 92 carried by the sleeve 90 to project inwardly to be guided by the slot and to enter the interior of the body. The sleeve has a flat front end 93 in a plane normal to the axis of the structure and opposed to and normally in flat engagement with the face 86 on the lever L. When the lever L is depressed, as above described, the end 93 of the sleeve 90 is engaged and the sleeve is shifted rearwardly.

In order to operate the valve V I provide an operator 95 in the form of a push rod that is moved rearwardly by the sleeve 90, to shift the valve element 60. The rod-shaped operator 95 is shown in Fig. 5 of the drawings and is secured to the lug and extends axially to the center of the structure and connects with the forwardly projecting portion 68 of the valve element 60. In practice, the rear end of the operator slidably fits into an opening in the valve element to be centered thereby, and so that the valve element can be removed separately from the operator 95.

In order to operate the valve V' I provide a flat rear end 96 on the sleeve 90 that engages with the valve element to shift the said element when the sleeve moves rearwardly. It will be apparent how the valve V' is opened by rearward shifting of the sleeve 90. In accordance with the invention the sleeve 90 is yieldingly held in a forward position by means of a spring 97, and a separate spring 98 yieldingly urges the valve element 60 to a seated position. As shown the sleeve 90 is telescopically engaged over the forward part of the cap A in a manner to house the spring 97. Spring 98 is housed within the cover 63 that closes the rearmost end of the structure.

The safety means P that I provide involves a slider 100 that is shiftable engaged over the body Y forward of the lever L. The slider 100 is a circular part that surrounds the body Y and has a step 101 at the rear end thereof that fits with the forward end of the lever L. The slider 100 is adapted to be shifted rearward where it centers the lever L so that the lever cannot be depressed, and it is adapted to be shifted forwardly to clear the lever L so as not to interfere with the movement thereof. A stop 102 is provided to limit forward motion of the slider and a suitable friction means 103 is provided, as shown, to prevent accidental shifting of the slider.

From the foregoing it will be apparent that I have provided a very convenient and practical dental handpiece that is completely manipulated and controlled entirely by the single hand of the user. It is merely necessary to couple the handpiece to suitable fluid supply lines, preferably flexible supply lines, whereupon the device is ready for operation. The operation of the structure involved is clearly set forth above, the actual operation of the control that I have provided being easily determined

by observing the lever L that I provide and by depressing it to admit operating fluid under pressure to the driving head X.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. A dental handpiece including, an elongate cylindrically shaped body, a driving head at the forward end of the body and adapted to operate a cutter, a fulcrum intermediate the ends of the body and in the form of a ring surrounding the body, and a manually operable lever pivoted on the fulcrum and in the form of a collar engaged over the body and having bearing engagement with the fulcrum, said lever controlling operation of the driving head.

2. A dental handpiece including, an elongate cylindrically shaped body, a driving head at the forward end of the body and adapted to operate a cutter, a fulcrum intermediate the ends of the body and in the form of a ring surrounding the body, a manually operable lever pivoted on the fulcrum and in the form of a collar engaged over the body and having bearing engagement with the fulcrum, and an axially shiftable operator in the form of a sleeve slidably carried over the body and actuated by the lever, said operator controlling operations of the driving head.

3. A dental handpiece including, an elongate cylindrically shaped body, a driving head at the forward end of the body and adapted to operate a cutter, a fulcrum intermediate the ends of the body and in the form of a ring surrounding the body, a manually operable lever pivoted on the fulcrum and in the form of a collar engaged over the body and having bearing engagement with the fulcrum, said collar having a flange with an axially disposed face normally in a plane normal to the longitudinal axis of the body, and an axially shiftable operator in the form of a sleeve slidably carried over the body, said operator having an axially disposed face normally in flat engagement with the face of the collar, said operator being shifted axially of the body upon movement of the lever and displacement of the flange from its normal position to control operation of the driving head.

4. A dental handpiece including, an elongated cylindrically shaped body, a driving head at the forward end of the body and adapted to operate a cutter, a fulcrum intermediate the ends of the body and in the form of a ring surrounding the body, a manually operable lever pivoted on the fulcrum and in the form of a tapered collar engaged over the body and having bearing engagement with the fulcrum, and an axially shiftable operator in the form of a sleeve slidably carried over the body and actuated by the lever, said operator controlling operation of the driving head.

5. A dental handpiece including, an elongate cylindrically shaped body, a driving head at the forward end of the body and adapted to operate a cutter, a ring surrounding the body intermediate the ends thereof, a manually operable collar engaged over the body with clearance therebetween and having a flange at one end thereof adapted to have bearing engagement with the ring, and an axially shiftable operator slidably carried over the body and engaged by the collar to be shifted when the collar is depressed laterally toward the body.

6. A dental handpiece including, an elongate cylindrically shaped body, a driving head at the forward end of the body and adapted to operate a cutter, a ring surrounding the body intermediate the ends thereof and having a convex outer wall, a manually operable collar engaged over the body with clearance therebetween and having a flange at one end thereof and with a concave

seat adapted to have bearing engagement with the said convex wall, and an axially shiftable operator slidably carried by the body and engaged by the collar to be shifted when the collar is depressed laterally toward the body.

7. A dental handpiece including, an elongate cylindrically shaped body, a driving head at the forward end of the body and adapted to operate a cutter, a ring surrounding the body intermediate the ends thereof and having a convex outer wall, a manually operable collar engaged over the body with clearance therebetween and having a flange at one end thereof and with a concave seat adapted to have bearing engagement with the said convex wall, an axially shiftable operator slidably carried by the body and engaged by the collar to be shifted when the collar is depressed laterally toward the body, and means yieldingly urging the operator into engagement with the flange of the collar.

8. A fluid operated dental handpiece including, an elongate tubular body, a fluid-operated driving head at the forward end of the body and adapted to turn a cutter, a fulcrum intermediate the ends of the body, and a manually operable lever pivoted on the fulcrum and in the form of a collar engaged over the body and having bearing engagement with the fulcrum, said lever actuating a valve controlling operation of the driving head.

9. A fluid operated dental handpiece including, an elongate tubular body, a fluid operated driving head at the forward end of the body, and adapted to turn a cutter, a fulcrum intermediate the ends of the body, a manually operable lever pivoted on the fulcrum and in the form of a collar engaged over the body and having bearing engagement with the fulcrum; and an axially shiftable operator carried by the body and engaged by the lever and actuating a valve controlling operation of the driving head.

10. A fluid operated dental handpiece including, an elongate tubular body, a fluid operated driving head at the forward end of the body and adapted to turn a cutter, a ring surrounding the body intermediate the ends thereof, a manually operable collar engaged over the body with clearance therebetween and having a flange at one end thereof adapted to have bearing engagement with the ring, and an axially shiftable operator slidably carried over the body and engaged by the collar to be shifted when the collar is depressed laterally toward the body, said operator actuating a valve controlling operation of the driving head.

11. A fluid operated dental handpiece including, an elongate tubular body, a fluid operated driving head with an inlet port and an exhaust port and adapted to turn a cutter, the interior of the body being in communication with the exhaust port, a fluid handling tube within the body and in communication with the inlet port, a fulcrum intermediate the ends of the body, and a manually operable lever pivoted on the fulcrum and in the form of a collar and having bearing engagement with the fulcrum, said lever actuating a valve governing flow of fluid through said tube controlling operation of the driving head.

12. A fluid operated dental handpiece including, an elongate tubular body, a fluid operated driving head with an inlet port and an exhaust port and adapted to turn a cutter, the interior of the body being in communication with the exhaust port, a fluid handling tube coextensive with the body and in communication with the inlet port, a fulcrum intermediate the ends of the body, a manually operable lever pivoted on the fulcrum, and an axially shiftable operator carried by the body and engaged by the lever and actuated thereby to control a valve governing flow through said tube.

13. A fluid operated dental handpiece including, an elongate tubular body, a fluid operated driving head with an inlet port and an exhaust port and adapted to turn a

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cutter, the interior of the body being in communication with the exhaust port, a fluid handling tube within the body and in communication with the inlet port, a ring surrounding the body intermediate the ends thereof, a manually operable collar engaged over the body with clearance therebetween and having a flange at one end thereof adapted to have bearing engagement with the ring, and an axially shiftable operator slidably carried by the body and engaged by the collar to be shifted when the collar is depressed laterally toward the body, said shifting of the operator operating a valve governing flow through said tube.

14. A fluid operated dental handpiece including, an elongate tubular body, a fluid operated driving head with an inlet port and an exhaust port and adapted to turn a cutter, the interior of the body being in communication with the exhaust port, a fluid handling tube within the body and in communication with the inlet port, an inlet valve within the body and governing flow through said tube, a manually operable lever accessible at the exterior of the body to open the valve, and a cap at the rear end of the body and swivelly connected thereto and having a fluid supply connection in communication with the valve.

15. A fluid operated dental handpiece including, an elongate tubular body, a fluid operated driving head with an inlet port and an exhaust port and adapted to turn a cutter, the interior of the body being in communication with the exhaust port, a fluid handling tube within the body and in communication with the inlet port, an inlet

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valve within the body and governing flow through said tube, a manually operable lever accessible at the exterior of the body to open the valve, and a cap at the rear end of the body and swivelly connected thereto and having a fluid supply connection in communication with the tube, and a fluid exhaust connection in communication with the interior of the body.

16. A fluid operated dental handpiece including, an elongate tubular body, a fluid operated driving head at the forward end of the body and with an inlet port and an exhaust port and adapted to turn a cutter, the interior of the body being in communication with the exhaust port, a fluid handling tube within the body and in communication with the inlet port, and opening at the exterior of the body a cap engaged over the rear end of the body and swivelly connected thereto and having a bore therein forming a chamber surrounding the body, a fluid handling duct entering the cap and in communication with the chamber, and a seal at each side of the duct and operating between the cap and body to channel fluid into said tube opening at the exterior of the body.

References Cited in the file of this patent

UNITED STATES PATENTS

2,276,748	Thompson	Mar. 17, 1942
2,664,632	Norlen	Jan. 5, 1954
2,799,934	Kern	July 23, 1957