

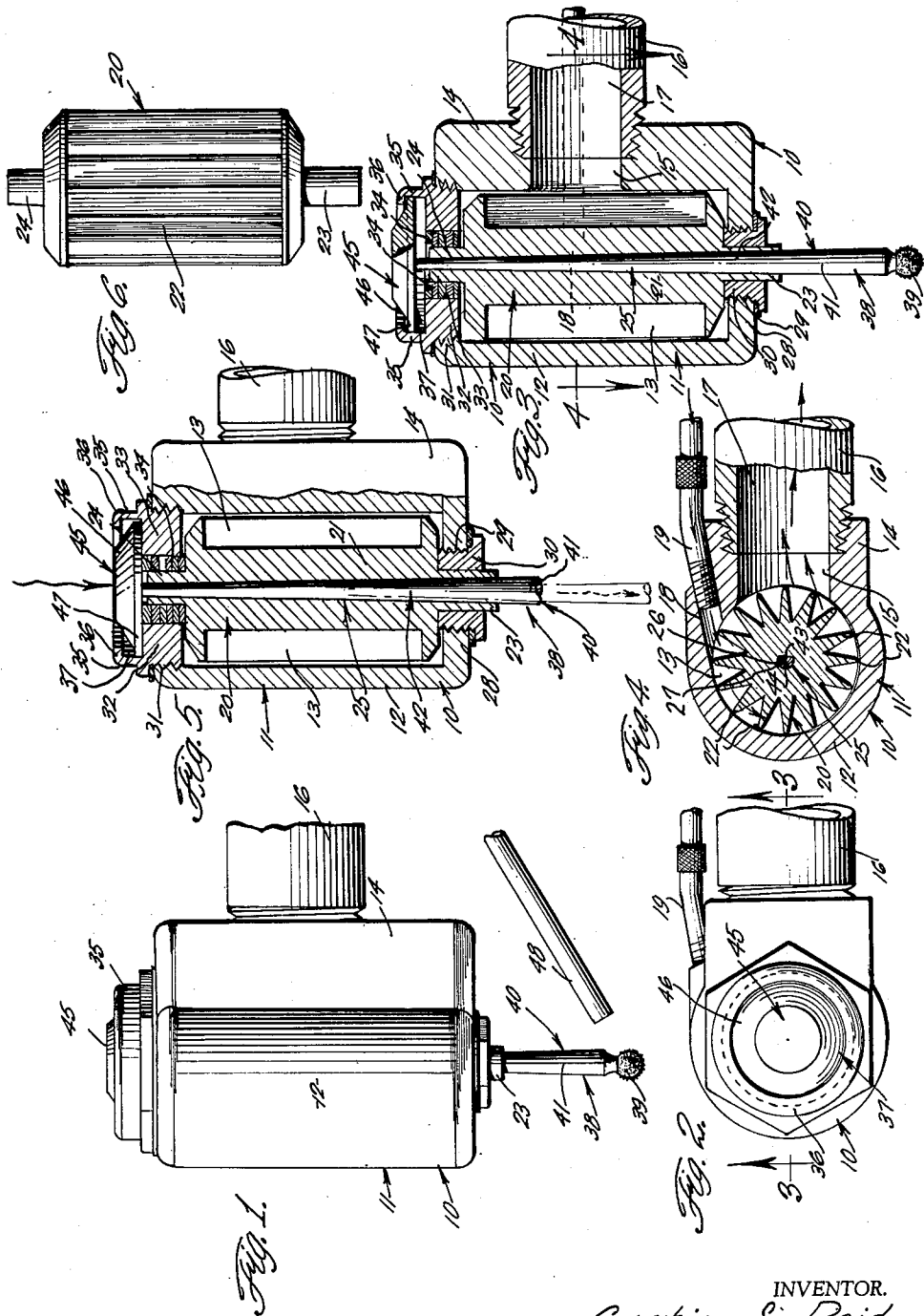
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DRILL EJECTOR

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DRILL EJECTOR
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1 Claim. (Cl. 32-27)

The present invention relates to a drill ejector, and more particularly to a drill ejector for a dental unit or appliance.

An object of the present invention is to provide a mechanism whereby a drill such as a dental drill can be readily ejected or removed from its port whenever desired or required, and wherein the ejection can be accomplished conveniently and readily or easily.

Another object is to provide a drill ejector which is constructed so that a drill can be removed by manual or finger pressure on a finger piece or actuator, and wherein the drill ejector of the present invention is especially adaptable or suitable for use with a dental appliance of the type that includes a revolving rotor which is driven or actuated by a suitable actuating medium such as water under pressure.

Another object is to provide a device of the character described that may be utilized speedily and with precision by dentists or the like, and further objects and advantages are to provide improved elements and arrangements thereof in a device of the character described that is economical to produce and durable in form, and conducive to the most economical use of material and uniformity of members formed therefrom.

Still further objects and advantages will become apparent in the subsequent description and the specification.

In the drawings:

FIGURE 1 is an elevational view illustrating the present invention, and with parts broken away.

FIGURE 2 is a top plan view.

FIGURE 3 is a sectional view taken on the line 3-3 of FIGURE 2.

FIGURE 4 is a sectional view taken on the line 4-4 of FIGURE 3.

FIGURE 5 is a view similar to FIGURE 3 but showing an actuator or finger piece pressed down to eject the drill.

FIGURE 6 is an elevational view of the rotor per se.

Referring in detail to the drawings, the numeral 10 indicates a portion of a dental appliance which includes a body member that is indicated by the numeral 11, and the body member 11 is shown to comprise a somewhat or generally rounded portion 12 which has a hollow interior that defines an inner chamber 13, FIGURE 4. The body member 11 further includes a generally flattened portion 14 which has a hollow interior that defines a compartment or chamber 15, and the numeral 16 indicates a hollow handle which is connected to the flattened portion 14 in any suitable manner as for example by means of a threaded connection, and the interior of the handle 16 is hollow as at 17 whereby water or the like can exhaust therethrough.

As shown in the drawings, the body member 11 is provided with a port 18, and the numeral 19 indicates a fluid inlet conduit which is adapted to supply an actuating means such as water under pressure from a suitable source of supply to the port 18. In FIGURE 6 the numeral 20 indicates a rotor that is rotatably arranged in the chamber 13.

As shown in the drawings, the rotor 20 includes a central hub portion 21 which has a plurality of radially disposed vanes or blades 22 affixed thereto or formed integral therewith, and there is provided first and second diametrically opposed extensions 23 and 24 which project outwardly from opposite ends of the rotor 20, FIGURE 5.

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The numeral 25 indicates a bore which extends longitudinally through the center of the hub 21 and through the extensions 23 and 24, and the bore 25 has a generally tapered formation so that the bore 25 is of greater size adjacent the extension 23 than it is adjacent the extension 24. As shown in FIGURE 4 the bore 25 is shaped to include a flat surface 26 as well as an arcuate or somewhat rounded surface 27 so that the bore 25 is non-circular in cross section.

The body member or housing 11 includes the bottom wall 28 or end wall 28 which is provided with a threaded opening 29 therein, FIGURE 5, and the numeral 30 indicates a fastener or nut which is arranged in threaded engagement with the opening 29. There is provided in the upper portion of the body member 11 a threaded opening or aperture 31, and the numeral 32 indicates a retainer or nut which is arranged in threaded engagement with the threaded portion 31. The retainer 32 is provided with a central opening or recess 33 for the projection therethrough of the extension 24, and the packing 34 is arranged on the extension 24 within the recess 33.

Secured to or formed integral with the retainer 32 is a circular flange or wall portion 35, and there is provided on the upper edge portion of the wall 35 an inwardly directed circular shoulder 36 whereby there is defined a space 37 within the shoulder 36 and wall 35. The numeral 38 indicates a drill such as a dental drill which includes the usual drilling tip 39 as well as a shank 40, and the shank 40 includes a lower portion 41 of generally cylindrical formation, and the shank 40 also includes a main portion 42 of the tapered formation so that the portion 43 is of greater size adjacent the section 41 than is the other end thereof. As shown in FIGURE 4, the section 42 has a non-circular formation to conform to the configuration of the bore 25, so that it will be seen that the section 42 of the shank includes a flat face or surface 43 as well as a rounded or arcuate face or surface 44, whereby the surfaces 43 and 44 are adapted to snugly fit and engage the surfaces 26 and 27 of the bore 25 when the drill is properly seated and mounted in the appliance.

The numeral 45 indicates a finger piece or actuator which is movably mounted in the space 37, and the actuator 45 is adapted to abut the upper end of the shank 40, and the actuator 45 is shown to comprise a tapered section 46 as well as a circular rim portion or section 47.

From the foregoing, it is apparent that there has been provided a drill ejector which is especially suitable for use with a dental appliance and in use with the parts arranged as shown in the drawings, it will be seen that when the drill is being used for drilling teeth, the parts are in the position of FIGURE 3, and when it is desired to eject the drill 38, as for example to change or replace the drill the actuator or finger piece 45 is adapted to be manually moved from the position shown in FIGURE 3 to the position such as that shown in FIGURE 5. Since the upper end of the shank 40 engages or abuts the finger piece 45, it will be seen that as the finger piece 45 is moved downwardly from the position of FIGURE 3 to the position of FIGURE 5, that the shank 40 will be pushed downwardly through the bore 25 a sufficient distance whereby the shank will move out of wedging or locking engagement with the bore so that the shank can be readily manually pulled the rest of the way out of the bore. The shank 40 includes the section 42 of non-circular formation that is adapted to snugly fit in the non-circular portion of the bore 25 whereby when the shank is properly seated in the bore, the flat face 43 of the shank abuts or engages the flat surface 26, and the rounded surface 44 engages the arcuate or rounded surface 27 of the bore so that in effect the shank is keyed in the bore so

that as the rotor 20 turns, the tool 38 will turn or rotate therewith.

The rotor 20 is adapted to revolve in the chamber 13 as an actuating medium such as water under pressure is introduced into the chamber 13 through the port 18 from the conduit 19, and as this actuating medium impinges on the vanes or blades 22, the rotor 20 will revolve in the chamber 13, and since the tool or drill 38 is keyed to the rotor, it will be seen that as the rotor turns, the drill 38 will turn therewith. Thus, the tip 39 can be used for drilling teeth in the desired manner. After the water or other actuating medium has performed its work in revolving or rotating the rotor 20, the medium or fluid discharges out through the passageway 15 and then through the passageway 17 into a suitable receptacle, conduit or the like.

The packing 34 helps to maintain a fluid tight seal at the end of the rotor, and the fasteners 30 as well as the retainer 32 are arranged and constructed so that the rotor will be maintained in its proper position as the appliance is actuated or used. The wall 35 is of a sufficient length so that the space 37 is of a proper size to permit the actuator 45 to move back and forth in the space 37 a sufficient distance to allow the tool 38 to be selectively ejected or held in place as desired or required. The shoulder 36 is adapted to be formed as for example as being wedged over or pinned over after the actuator 45 has been positioned in the space 37, and the shoulder 36 serves to restrain the actuator 45 so as to prevent the actuator from falling completely out of the space 37.

Any suitable material can be used for making the various parts or elements, and it is to be understood that the parts can be made in different shapes or sizes as desired or required.

The dental appliance is adapted to utilize a suitable hollow handle and housing which is adapted to form part of the water driven dental handpiece. The present invention is constructed so that leakage will be prevented, and wherein the desired rotation can take place with a minimum amount of friction.

It will be seen that according to the present invention there is provided a hydraulically driven handpiece which includes the enclosed turbine or rotor 20 which is adapted to be water driven, and wherein the drill shank 40 is held in place by friction, the drill shank extending longitudinally through the turbine hub and as shown in FIGURE 3, the shank extends upwardly to the head of the housing to permit the drill to be removed by finger pressure on the member 45 when desired or required. Primarily the present invention provides an improved hydraulically driven handpiece for clinical use and wherein there is incorporated a dental drill that is easier to remove from the handpiece than previous devices of this type. While the present invention has been described specifically for use with water under pressure, it is to be understood that it is capable of being used with other actuating medium such as air under pressure. The present invention is especially suitable or adaptable to clinical work due to the construction thereof, and the rotor 20 is capable of a 360° rotation. With the present invention a direct water high pressure line is adapted to be incorporated into the bottom of the handpiece and is adapted to be one solid line from the turbine chamber to a swivel joint, and in FIGURE 1 the numeral 48 indicates a portion of the water spray for

the drill. The water spray to the drill is adapted to be connected to the direct water line instead of the retaining water line so that the amount of water going to the spray can be controlled. With the present invention there is a water tight joint and yet the construction is such that it still allows the necessary rotation of the handpiece, and the drill can be readily removed by merely pressing on the small disc or actuator 45 at the top thereof. With the present invention drills can be readily interchanged to permit different types of drills or tools to be used as desired or required, depending upon the type of work being performed by the dentist or the like. With the present invention a friction type dental drill can be used so that the top of the turbine chamber provides part of a drill ejector, whereby the dental drill bur can be ejected by finger pressure on the member 45.

Minor changes in shape, size and rearrangement of details coming within the scope of the invention claimed may be resorted to in actual practice, as desired.

What is claimed is:

A dental appliance comprising a body member including a rounded portion having a hollow interior defining an inner chamber, said body member further including a generally flattened portion having a hollow interior which defines a compartment, a hollow handle connected to said flattened portion and communicating with said compartment, there being a port in said body member and said port communicating with said chamber, a fluid inlet conduit connected to said port, a rotor rotatably positioned in said chamber and said rotor including a central hub portion having a plurality of radially disposed vanes projecting therefrom; a first and second opposed extensions projecting outwardly from opposite ends of said rotor, said body member including a bottom wall having a threaded opening therein, a fastener surrounding said first extension and said fastener being arranged in threaded engagement with respect to said threaded opening, there being a threaded aperture in the upper portion of the body member, a retainer arranged in threaded engagement with respect to said aperture, and said retainer having a central recess therein for the projection thereof through of said second extension, packing surrounding said second extension, a circular flange extending upwardly from said retainer and affixed thereto, an inwardly directed shoulder projecting inwardly from the upper edge portion of said flange; there being a longitudinally extending bore in said hub portion and in said extension, said bore tapering inwardly from said first extension to said second extension and being adapted to receive there-through the tapered shank of a dental drill, and an actuator movably positioned in said retainer recess and engageable with the end of said drill shank when in said bore so that the application of finger pressure to said actuator will loosen said drill shank when in said bore and shift said drill shank outwardly of said bore.

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