

June 25, 1968

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3,389,468

DISPOSABLE PRE-CHARGED DENTAL HANDPIECE

Filed Dec. 23, 1964

3 Sheets-Sheet 1

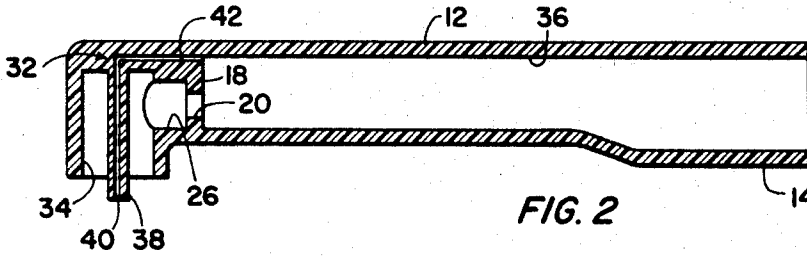


FIG. 2

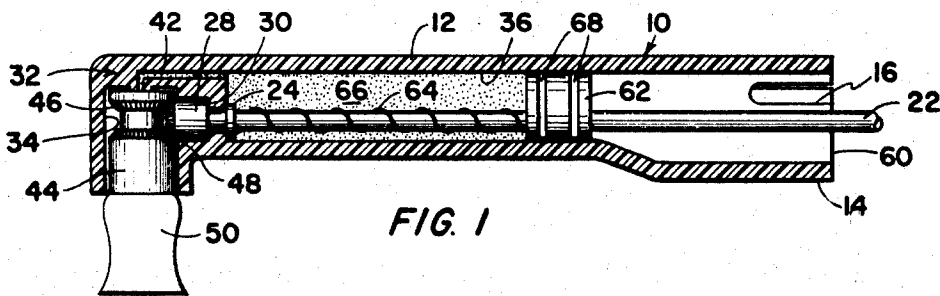


FIG. 1

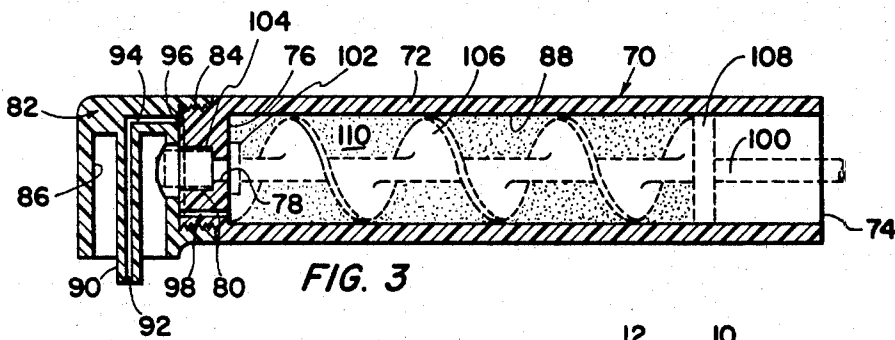


FIG. 3

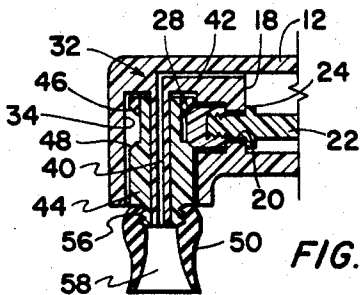


FIG. 4

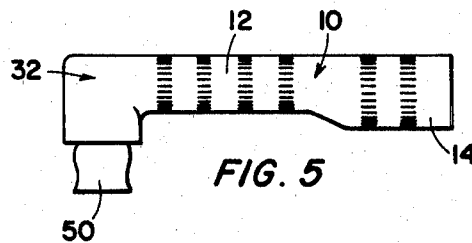


FIG. 5

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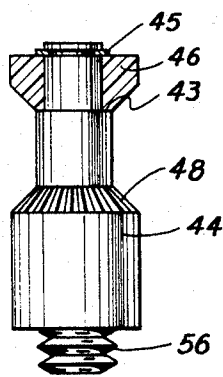
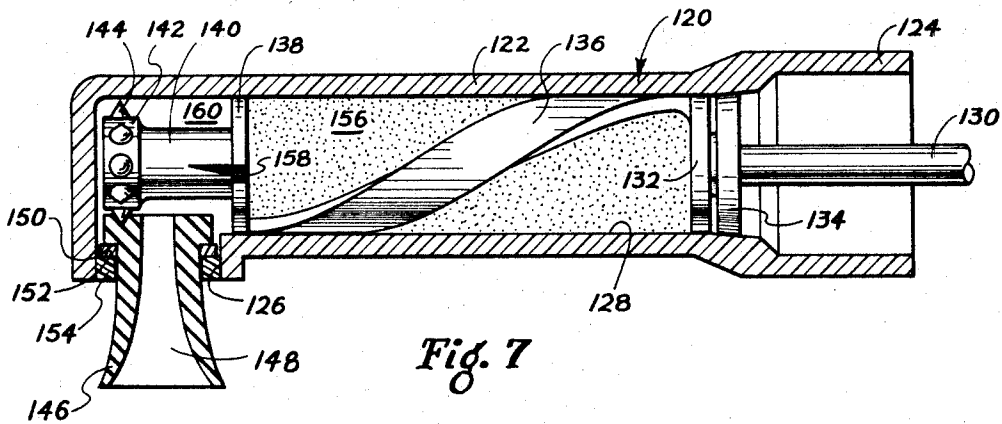
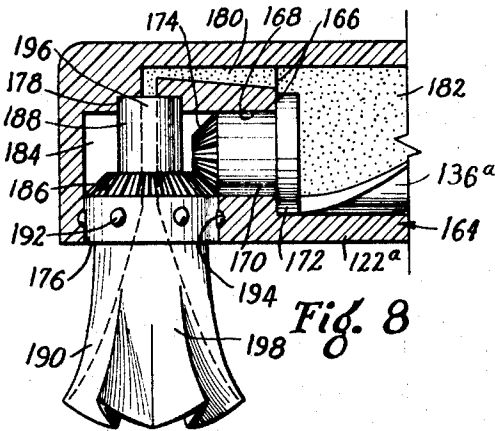


Fig. 6

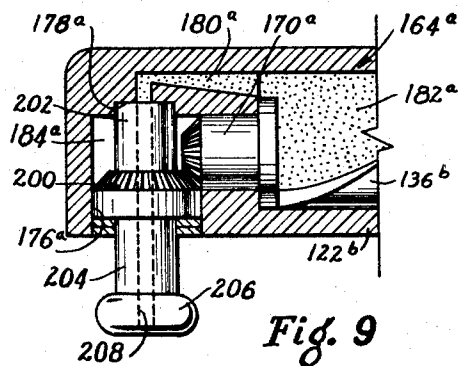


Fig. 9

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3 Sheets-Sheet 3

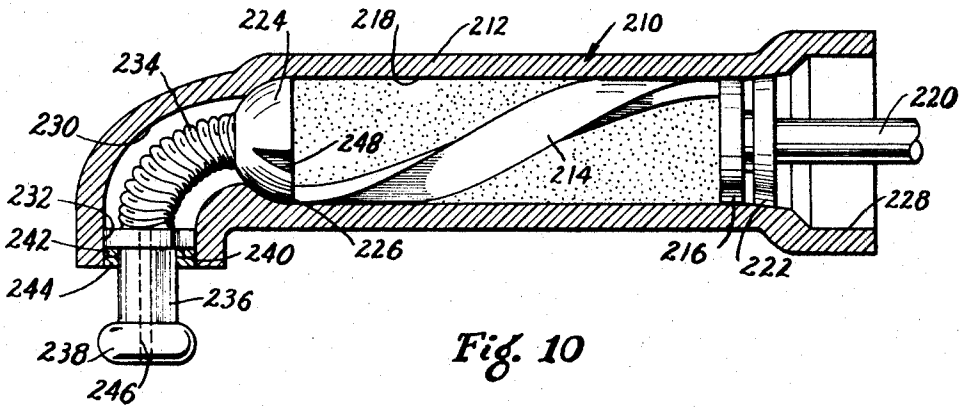


Fig. 10

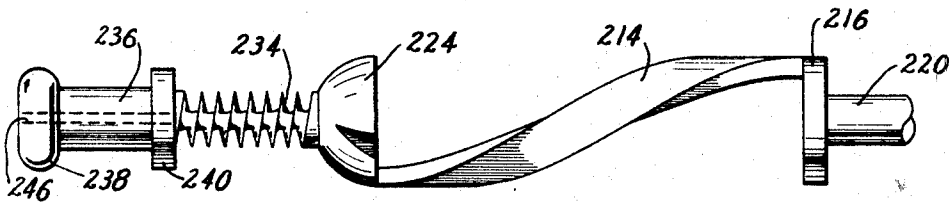


Fig. 11

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**DISPOSABLE PRE-CHARGED DENTAL  
HANDPIECE**

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Filed Dec. 23, 1964, Ser. No. 420,495  
16 Claims. (Cl. 32—59)

**ABSTRACT OF THE DISCLOSURE**

A dental handpiece comprising a disposable cartridge preloaded with a quantity of paste-like material and having means for ejecting the paste from the cartridge and into a rotatable cup whereby the paste material may be applied to the teeth of a patient by the cup for cleaning or otherwise treating the teeth.

This invention relates to improvements in dental appliances and more particularly, but not by way of limitation, to a disposable or partially disposable prophylactic dental handpiece having a supply of an abrasive paste, or the like, provided therein for direct application to the tooth surface in the proximity of the polishing cup member.

The most common method in widespread use today among dentists for the cleaning of teeth consists of the utilization of an abrasive polishing paste in combination with a dental handpiece having a rotatable polishing cup member thereon. The paste is normally carried or disposed in a relatively small jar or container and the polishing cup is manually dipped into the supply of paste for coating of the cup with the polishing or cleaning material. The coated polishing cup is then applied to the surface of the teeth and the handpiece is actuated by the dentist's usual power equipment for rotating of the cup. This procedure of dipping the polishing cup into the supply of paste and applying the coated cup to the surface of the teeth is not only time consuming for the dentist, but also, the normal rotational speed of the coated cup member causes portions of the paste to be thrown from the cup due to centrifugal force. As a result, the polishing of the teeth is unduly time consuming and of discomfort to both the patient and the dentist.

In order to overcome the disadvantages of the above methods for cleaning of teeth, some attempts have been made to provide a dental handpiece having an internal supply of polishing paste which may be ejected directly onto the surface of the teeth rather than requiring dipping of the polishing cup into the paste. One type of device is depicted in the V. E. Britt et al. Patent No. 2,400,912, issued May 28, 1946, and entitled "Dental Appliance." However, this device is of an extremely complex and expensive structure, and recharging of the device with a supply of paste is difficult. Another example of an attempt to eject the paste directly onto the tooth surface is shown in the D. S. Fridge, Sr. Patent No. 2,738,528, issued Mar. 20, 1956, and entitled "Prophylactic Dental Handpiece." With this structure it is somewhat difficult to achieve any uniform ejection of the paste onto the tooth surface.

The present invention contemplates a novel dental handpiece of the type hereinbefore set forth and which is particularly designed and constructed for providing a disposable handpiece which is precharged or preloaded with a prophylaxis polishing paste, or the like, in sufficient quantities for one cleaning application. Subsequent to the cleaning of a patient's teeth, the entire device, or at least a portion thereof, may be thrown away, and a new cartridge or handpiece may be utilized for the next cleaning

operation. The novel device comprises a main housing adapted to be secured to the usual power equipment normally found in a dentist's office for operation thereby. The housing is precharged with a supply of suitable paste for performing the desired operation on the teeth and is provided with means for ejecting the paste from the housing continually during operation of the tool. A head portion carrying a polishing cup thereon is provided on the outer extremity of the housing for receiving the paste during operation of the tool and for directing the paste to the interior portion of the polishing cup. The drive mechanism provided in the main housing is suitably connected between the cup member and the power equipment to transmit rotation to the cup simultaneously with the ejection of the paste from the housing, thus providing an efficient and economical method and means for the cleaning of teeth.

It is an important object of this invention to provide a novel dental appliance particularly designed for facilitating the cleaning of teeth.

Another object of this invention is to provide a novel dental handpiece containing an internal supply of cleaning or polishing paste which may be ejected efficiently to the surface of teeth during a cleaning operation.

Still another object of this invention is to provide a novel dental handpiece containing a precharged supply of dental paste and which is of an economical construction wherein at least a portion thereof is readily disposable.

A further object of this invention is to provide a novel disposable cartridge containing a preloaded supply of dental paste.

A still further object of this invention is to provide a novel disposable dental handpiece for facilitating the cleaning of teeth and which may be utilized with the usual power equipment normally present in a dentist's office.

Other and further objects and advantageous features of the present invention will hereinafter more fully appear in connection with a detailed description of the drawings in which:

FIGURE 1 is a sectional elevational view of a dental appliance embodying the invention.

FIG. 2 is a sectional elevational view of a housing structure for the device depicted in FIGURE 1.

FIGURE 3 is a sectional elevational view of a modified housing structure for a dental appliance embodying the invention.

FIGURE 4 is a sectional elevational view of the head portion of the dental appliance depicted in FIGURE 1.

FIGURE 5 is an elevational view of a dental appliance embodying the invention as shown in FIGURE 1, but on a reduced scale.

FIGURE 6 is an enlarged elevational view of the vertical gear depicted in FIGURES 1 and 4.

FIGURE 7 is a sectional elevational view of a further modification of the invention with portions depicted in elevation for purposes of illustration.

FIGURE 8 is a broken sectional view partly in elevation showing a modified gear arrangement and cup member.

FIGURE 9 is a view similar to FIGURE 8 depicting another type of cup member.

FIGURE 10 is a sectional elevational view of another modification of the invention with portions depicted in elevation for purposes of illustration.

FIGURE 11 is a side elevational view of the propellant member shown in FIGURE 10.

Referring to the drawings in detail, reference character 10 generally indicates a dental handpiece adapted for use with the usual power equipment (not shown) normally utilized in a dental office and comprises a main substantially cylindrical housing portion 12 preferably con-

structed of a suitable plastic material for an economy of construction wherein the entire tool may be disposable. The housing 12 is preferably enlarged at 14 for ready insertion or disposition on the power equipment in the usual manner of dental handpieces. In addition, the outer extremity of the housing 12 may be provided with a longitudinally extending slot 16 for receiving a portion of the power or dental equipment therein as is common in this type of hand tool. The left end of the housing 12 as viewed in the drawings is provided with an inwardly directed annular shoulder 18 having a bore 20 extending there-through for receiving one end of a drive shaft 22.

The drive shaft 22 may be coupled with the dental equipment power supply in the usual manner (not shown) for rotation thereby. The drive shaft 22 is provided with an outwardly extending collar member 24 spaced slightly from one end thereof for engaging the shoulder 18 for a purpose as will be hereinafter set forth. The bore 20 is enlarged at 26 for receiving a suitable bevel gear member, or the like, 28 which is threadily or otherwise secured to the outer end of the drive shaft 22. It will be apparent from FIGURE 1 that the gear 28 provides a shoulder 30 for engaging the shoulder 18 of the housing 12 and cooperates with the collar 24 for retaining the drive shaft 22 in position within the housing 12. As shown in FIGURES 1 and 2, the bore 20 is offset from the longitudinal axis of the main housing 12, thus positioning the shaft 22 offset with respect to the longitudinal axis of the housing for a purpose as will be hereinafter set forth.

A head portion generally indicated at 32 is provided on the housing 12 and comprises an internal bore 34 extending substantially perpendicularly with respect to the internal bore 36 of the housing 12. The bore or enlarged portion 26 extends into communication with the bore 34 as clearly shown in FIGURE 2. A centrally disposed rod member 38 extends longitudinally through the bore 34 and is provided with a central passageway 40 extending therethrough into communication with a perpendicularly arranged passageway 42 which, in turn, extends into communication with the bore 36 of the housing 12. The head member 32 is preferably constructed of a similar plastic material, or the like, as that of the housing 12 and may be either an integral part thereof or a separate piece united therewith in any suitable manner, such as by fusing, or the like.

A hub member 44 is journaled on the rod member 38 in any suitable manner (not shown) and is provided with an idler bevel gear member 46 journaled adjacent one end thereof and supported by an annular shoulder 43. A suitable lock ring 45, or the like, may be provided for retaining the gear 46 on the hub 44. A second bevel gear member 48 is spaced from the first gear 46 whereby both gears 46 and 48 engage the gear 28 as clearly shown in FIGURES 1 and 2 for rotation thereby. The gear 48 may be either keyed to the hub 44 or integral therewith for transmitting rotation from the gear 28 to the hub 44.

A polishing cup member 50 is secured in any suitable manner such as by threading as shown at 52 in FIGURE 4 and rotates simultaneously with the hub 44. The cup 50 may be constructed of any suitable flexible or resilient material such as rubber, plastic, or the like, and is provided with an interior chamber 58 in communication with the longitudinal passageway 40 for a purpose as will be hereinafter set forth.

The drive stem 22, as shown in FIGURES 1 and 4, extends longitudinally through the housing 12 and is off-set from the central or longitudinal axis thereof. However, the off-set portion 14 is so arranged that the open right hand end 60 of the housing 12 is concentric with respect to the drive shaft 22 in order to facilitate connection of the drive shaft and tool 10 with the power equipment (not shown) as hereinbefore set forth. A plunger 62 is carried by the drive shaft 22 and is provided with an offset bore (not shown) extending therethrough for receiving the drive shaft whereby the drive shaft is offset from the axial

center of the piston 62. An outwardly extending spiral or helical shoulder portion 64 is provided around the outer periphery of a portion of the shaft 22 and cooperates with a complementary groove (not shown) provided on the inner periphery of the bore of the piston 62. As the drive shaft rotates, the piston 62 can not rotate therewith due to the offset disposition of the shaft with respect to the longitudinal axis thereof. Consequently, the spiral shoulder 64 and complementary groove provided in the piston 62 move the piston 62 longitudinally within the housing 12 as the shaft 22 is rotated. It will be apparent that rotation of the drive shaft 22 in one direction will move the piston 62 in a direction toward the shoulder 18 whereas rotation of the drive shaft in an opposite direction will move the piston 62 in a direction away from the shoulder 18.

The housing 12 is precharged or preloaded with a preselected quantity of suitable material, such as an abrasive polishing paste, or the like, prior to the insertion of the piston 62 within the housing 12. The piston 62 may then be disposed within the housing 12 and preferably at the juncture of the enlarged portion 14 and bore 36. The piston 62 thus seals the paste within the chamber 66 which is formed between the piston 62 and shoulder 18. It will be apparent that O-rings, or the like, (not shown) may be provided in the annular grooves 68 provided on the outer periphery of the piston, if desired. Rotation of the drive shaft 22 in a direction for moving the piston 62 toward the shoulder 18 forces the paste within the chamber 62 outwardly through the passageway 42 and through the passageway 40 into the interior chamber 58 of the cup 50. Simultaneously the rotation of the drive shaft 22 rotates the gear 28 which, in turn, transmits rotation to the hub 44 and cup 50. Thus, the paste or material from the chamber 66 is urged into the interior 58 of the cup 50 continually during rotation of the drive shaft 22 and rotation of the cup 50.

As hereinbefore set forth, the housing 12 and head 32 may be of a unitary construction or the head 32 may be a separate piece united with the housing 12 in any suitable manner. In the event the housing 12 and head 32 are of a unitary construction, it may be preferable to provide two substantially identical half sections with the housing 12 and head 32 split substantially along the axial center line thereof in order to facilitate insertion of the shaft 22 and hub 44 therein. Of course, the two half sections may be fused together or otherwise united to provide a unitary structure. In the event the head portion 32 is a separate piece from the housing 12, the head 32 may be of a snap on design (not shown) for facilitating assembly of the head 32 and hub 44 with the housing 12 and drive shaft 22. In any event, the entire structure is of an extremely economical construction and may be thrown away or otherwise disposed of subsequent to the utilization of the paste preloaded in the chamber 66.

#### OPERATION

The hand tool 10 may be readily attached to the usual dentist's power equipment (not shown) in any well known manner whereby the drive shaft 22 is coupled to the output shaft of the dental power supply and the enlarged portion 14 of the housing 12 is inserted in the usual manner on the equipment. As the power equipment is actuated, rotation is transmitted to the shaft 22 for simultaneously rotating the cup 50 and moving the plunger or piston 62 in a direction toward the hub 44. The movement of the piston 62 forces the preloaded supply of paste within the chamber 66 outwardly through the passageways 42 and 40 for discharge into the chamber 58 within the cup 50. The paste may thus be applied directly to the surface of the teeth being cleaned and the rotation of the cup provides the polishing and cleaning action as is usual in this type of tool.

It is preferable that the charge or preloaded quantity of paste within the chamber 66 be sufficient for a single tooth

cleaning operation or for the cleaning of the teeth of one patient. When the cleaning operation has been completed, the tool 10 may be removed from the power equipment and discarded.

### MODIFIED STRUCTURE

Referring now to FIGURE 3, a modified tool generally indicated at 70 is depicted which is generally similar to the tool 10, but of a slightly different construction. The hand piece 10 comprises a substantially cylindrical housing 72 constructed of any suitable plastic or other disposable material and having one end 74 thereof open for disposition on the usual power equipment as is well known and the other end thereof being provided with an inwardly directed annular shoulder 76. A substantially centrally disposed bore 78 is provided in the shoulder 76 and is enlarged at 80 for a purpose as will be hereinafter set forth. A head portion generally indicated at 82 is threadily secured to the housing 72 at 84 and may be constructed from a similar plastic material or may be metallic, or the like, as desired. It will be apparent that the head 82 may be secured to the housing 72 in any suitable manner and is not limited to the threaded connection depicted herein. For example, a snap on type connection may be provided therebetween.

The head 82 is of a generally similar construction to the head 32 in the first embodiment and is provided with a bore 86 extending substantially perpendicularly with respect to the internal bore 88 of the tube or housing 72. A centrally disposed rod member 90 extends through the bore 86 and is provided with a centrally disposed longitudinally extending bore or passageway 92. A perpendicularly disposed passage 94 which, in turn, communicates with an annular groove 96 provided on the exposed surface of the shoulder 76. A passageway 98 extends through the shoulder 76 to provide communication between the annular groove 96 and the interior of the housing or cartridge 72. The rod member 90 is adapted for receiving the hub member 44 in a similar manner as hereinbefore set forth in the first embodiment.

A drive shaft 100 (depicted in dotted lines in FIGURE 3) similar to the drive shaft 22 extends longitudinally through the housing 72 and is preferably substantially centrally disposed therein. An outwardly extending collar member 102 similar to the collar 24 is provided on the outer periphery of the drive shaft 100 and is slightly spaced from one end thereof for abutment with the shoulder 76 as hereinbefore set forth in the first embodiment. A bevel gear 104 is threadily or otherwise secured to the left hand end of the shaft 100 as viewed in FIGURE 3 and extends into abutment with the shoulder 76 for securely positioning or retaining the shaft 100 in position within the housing 72. Of course, the gear 104 is similar to the gear 28 and functions for transmitting rotation to the hub 44 as hereinbefore set forth. A spirally extending auger or inner peripheral wiping blade member 106 is provided on the outer periphery of the drive shaft and extends from the shoulder 76 to a circumferential flange member 108 which may be integral with or secured to the drive shaft 100. The auger 106 rotates simultaneously with the drive shaft 100.

The chamber 110 provided between the shoulder 76 and the flange 108 may be preloaded with a supply of prophylaxis polishing paste, or the like, and is preferably provided with a sufficient quantity for a single teeth cleaning operation. The tool 70 may be secured to the dental power equipment as hereinbefore set forth with the drive shaft 100 coupled to the output shaft of the power equipment for rotation thereby. As the shaft 100 rotates in one direction, the auger forces or moves the ingredients contained within the chamber 110 in a direction toward the shoulder 76. The paste is then forced outwardly through the passageway 98 and into the annular groove 96. From the groove 96, the paste is forced through the complementary passageways 94 and 92 and into the interior chamber 58 of the cup 50.

When a cleaning operation has been completed or when the ingredients within the chamber 110 has been consumed or expended, the tool 72 may be discarded or if the head 82 is constructed from a more permanent or metallic material, the head 82 may be removed from the cartridge 72 and the cartridge 72 may be discarded. A new cartridge 72 may be utilized with the head 72 for a subsequent cleaning operation. Of course, the cup 50 may also be an expendable or disposable structure and may be renewed or replaced for each new cleaning operation.

It will be readily apparent that the auger 106 may be utilized in the embodiment depicted in FIGURES 1 and 2, if desired. In this event, it will be preferable to position the drive shaft 22 centrally within the housing 12. It will be further apparent that there is no limitation to cleansing or polishing paste in combination with the novel handpiece but any suitable ingredients may be utilized in conjunction therewith.

Referring now to FIGURE 7, a further modification of the invention is generally indicated at 120 and comprises an outer housing 122 preferably of a substantially tubular construction, but not limited thereto. The housing 122 is enlarged at 124 for facilitating installation thereof on the power equipment as hereinbefore set forth and is provided with a bore 126 at the opposite end thereof of extending substantially perpendicularly with respect to the internal bore 128 of the housing 122.

A drive shaft 130 extends through the enlarged portion 124 and into the internal bore 128 as clearly shown in FIGURE 7. A disc member 132 is secured in any suitable manner to the inner end of the shaft 130 or integral therewith and is disposed within the bore 128. A wedge member 134 is disposed around the shaft 130 in any suitable manner and may be securely wedged in the bore 128 and in engagement with the disc 132 for retaining the disc 132 within the bore 128. A helical or spiral web member 136 is secured to or integral with the disc 132 and extends longitudinally therefrom in a direction opposite from the shaft 130. A second disc 138 is secured at the outer end of the web 136 or may be integral therewith, as desired, and is disposed within the bore 128. A spool member 140 is secured to or integral with the disc 138 and is provided with an enlarged annular shoulder portion 142 at one end thereof spaced from the disc 138. A plurality of radially outwardly extending teeth or spikes 144 are circumferentially spaced around the outer periphery of the shoulder portion 142 for a purpose as will be hereinafter set forth.

A cup member 146 having an interior chamber 148 is disposed within the bore 126 and extends inwardly into the bore 128 into engagement with the teeth 144 as clearly shown in FIGURE 7. An outwardly extending annular flange 150 is provided on the cup 148 for seating adjacent a spacer ring 152 which, in turn, is supported by an O-ring 154, or the like, which is wedged in the bore 126 around the cup 146. The ring 154 being tightly wedged in the bore 126 remains stationary but the spacer ring 152 is free to rotate with the cup 146 as will be hereinafter set forth.

All of the parts of the tool 120 are preferably constructed of a suitable plastic material such as known by the trade names Delrin, Teflon, or the like, but not limited thereto. It is preferable that the cup member 146 be made of a soft plastic or rubber material but there is no limitation to the exact materials to be utilized. Suitable ingredients, such as an abrasive polishing paste, or the like, is disposed within the interior chamber 156 of the housing 122 and upon assembly of the tool 120 the paste is contained between the spaced discs 132 and 138. A suitable recess 158 may be provided in the disc 138 and spool 140 for permitting passage of the paste from the chamber 156 into the chamber 160 surrounding the spool. It has been found that a portion of the ingredients normally contained in this type of paste are lubricants for the plastic materials from which it is desirable to construct the tool 120.

In operation of the tool 120 shaft 130 may be coupled or secured to the output shaft of the power supply in any well known manner for transmitting rotation to the disc 132. Rotation of the disc 132 transmits rotation to the web 136 and disc 138 for rotating the spool 140. Rotation of the web 136 urges the ingredients from chamber 156 into the chamber 160 for discharge into the interior chamber 148 of the cup 146. Rotation of the spool 146 causes the teeth 144 to bite into the upper end of the cup 146 for transmitting rotation thereto during a teeth cleaning or polishing operation. It will be readily apparent that the paste will be supplied to the interior of the cup 146 continually during operation of the tool 120. When the ingredients have been expended or when a cleaning operation has been completed, the shaft 130 may be disconnected from the power equipment and the entire tool 120 may be discarded.

Referring now to FIGURE 8, a tool 164 is depicted which is generally similar to the tool 120 and includes a web 136a similar to the web 136 disposed within a housing 122a generally similar to the housing 122. The housing 122a is provided with an inwardly directed circumferential shoulder 166 having a bore 168 extending there-through for receiving a gear member 170. The gear member 170 is provided with an enlarged head portion 172 at one end thereof which is secured to or integral with the web 136a and bears against the shoulder 166. The gear 170 is provided with beveled gear teeth 174 oppositely disposed from the head 172 for a purpose as will be hereinafter set forth.

The bore 160 extends into communication with a bore 176 which is disposed substantially perpendicularly with respect thereto. A recess portion 178 is provided in the bore 158 spaced above the bore 176 and co-axial with respect thereto and an angled passageway 180 provides communication between the chamber 182 of the housing 122a and the chamber 184 formed in the bore 168 by the gear 170. A bevel gear member 186 is disposed in the bore 176 and is provided with an upstanding hub portion 188 journaled in the recess 178 in any suitable manner (not shown). A downwardly flaring cup portion 190 (as viewed in FIGURE 8) is integral with the gear 186 for a purpose as will be hereinafter set forth. A plurality of radially outwardly extending buttons or projections 192 are circumferentially spaced around the outer periphery of the gear 186 for engagement with an annular groove 194 provided in the bore 176 whereby the entire gear 186 may be snapped into position therein. In addition, a longitudinally extending centrally disposed passageway 196 extends through the gear 186 and is enlarged at 198 by outwardly flaring sidewalls formed within the cup portion 190.

The gear 186 is preferably constructed from a suitable plastic, such as the aforementioned Delrin or Teflon, or the like, wherein the more solid hub and gear portion thereof are substantially rigid whereas the cup portion is of a more flexible structure due to the tapered sidewalls thereof as clearly shown in FIGURE 8. In addition, the cup portion 190 is preferably of a pleated type construction whereby the centrifugal force of the rotating cup combined with the pressure of the cup against the surface of the teeth being polished or cleaned will urge the sidewalls of the cup portion radially outwardly for improving the efficiency of the cleaning operation. Of course, it is also preferable that the remaining portions of the tool 164 be constructed of a similar plastic material.

When the web 136 a is rotated as hereinbefore set forth, the gear 170 will be rotated simultaneously therewith for transmitting rotation to the gear 186 and cup portion 190. Simultaneously, the ingredients within the chamber 182 will be urged into the passageway 180 and through the passageway 196 as the web 136a is rotated. Whereas the gear 170 is depicted in FIGURE 8 in such a manner that the rotational axis thereof is off-set from the rotational axis of the web 136a, the flexibility of the

web permits efficient rotation of the gear 170. Of course, the gear 170 may be positioned in axial alignment with the web 136a if desired.

Referring now to FIGURE 9, a tool 164a is depicted generally similar to the tool 164. The housing 122b is substantially identical with the housing 122a and is provided with an internally disposed web 136b carrying a gear 180a. An angled passageway 180a provides communication between the chamber 182a and the chamber 184a formed by the gear 170a as set forth in the embodiment shown in FIGURE 8. A bore 176a similar to the bore 176 is provided in the housing 122b for receiving a bevel gear member 200 therein. The gear 200 is generally similar to the gear 186 and is provided with an upwardly extending hub portion 202 journaled in a recess 178a. A cup portion 204 extends downwardly as viewed in FIGURE 9 and is preferably an integral portion of the gear 202. A rounded radially extending annular flange 206 is provided on the outer extremity of the cup 204 for engaging the tooth surface during a cleaning operation. A passageway 208 extends completely through the gear member 200 and into communication with the angular passageway 180a.

Rotation of the web 136b is hereinbefore set forth transmits rotation to the gear 170a which, in turn, transmits rotation to the gear 200 for rotation of the cup member 204. Simultaneously, the ingredients within the chamber 182 are forced through the angled passageway 180a and longitudinal passageway 208, thus providing a continual supply of the paste through the cup 204 during rotation thereof. Whereas the axis of rotation of the gear 170a is shown in FIGURE 9, as being off-set from the axis of rotation of the web 136b, it is to be noted that the gear 170a may be disposed in such a manner as to provide a common axis of rotation therebetween.

As shown in FIGURES 10 and 11, a further modification of the invention is depicted wherein a handpiece or tool generally indicated at 210 comprises an outer housing 212 having a spiral web or inner peripheral wiping blade 214 generally similar to the web 136 disposed therein. The web 214 is carried by a disc 216 rotatably disposed within the internal bore 218 of the housing 212. The disc 216 is carried by a suitable drive shaft 220 which may be coupled to the power supply as hereinbefore set forth and the disc 216 is retained within the bore 218 by a wedge member 222.

A substantially semi-spherical member 224 is carried by the web 214 and is spaced from the disc 216 as clearly shown in the drawings. The bore 218 is provided with a complementary semispherical seating shoulder 226 for receiving the member 224 thereagainst. The bore 212 is enlarged at one end 228 for facilitating disposition of the tool 210 on the usual power equipment and opened for facilitating disposition of the member 214 therein. The opposite end of the bore 218 extending beyond the spherical seat 226 is reduced and of an arcuate configuration, as shown at 230, and terminates in a bore or aperture 232 which is disposed at substantially right angles with respect to the bore 218.

A helical or spiral member 234 is carried by or integral with the semi-spherical member 224 and carries a cup member 236 on the outer extremity thereof. Of course, it is to be understood that substantially any type of cup may be utilized in lieu of the cup 236. The cup 236 is provided with a rounded radially outward extending circumferential shoulder 238 on the outer extremity thereof for engagement with the surface of the teeth to be cleaned. An outwardly extending annular shoulder 240 is provided at the juncture between the cup 236 and spiral member 234 for disposition within the bore 232. A pair of suitable split washers 242 and 244 are disposed within the bore 232 for engagement with the shoulder 240 to retain the cup member therein. The ring 244 may be wedged within the bore or otherwise secured therein, such as by snapping, or the like, (not shown) and the ring 242 may be rotatably disposed within the bore 232 for rotation

simultaneously with the cup 236 as will be hereinafter set forth. A centrally disposed bore 246 extends longitudinally through the cup portion 236 and is in communication with the arcuate bore 230 in any suitable manner, such as by radially extending or angularly disposed bores (not shown) extending through the cup. In addition, a recess or groove 248 is provided in the member 224 in order to establish communication between the bore 218 and the bore 230 for a purpose as will be hereinafter set forth.

The entire structure of the tool 210 is preferably constructed from a suitable plastic material wherein the entire device is of an economical nature and may be readily discarded subsequent to the utilization thereof. In addition, as clearly shown in FIGURE 11, it is preferable that the web 214, disc 216, shaft 220, semi-spherical member 224, spiral portion 234 and cup 236 be of a unitary construction. When the tool 210 is assembled, the cup 235 may be inserted longitudinally through the bore 218 and moved therethrough until the lip or rounded flange 238 engages the sidewalls of the arcuate bore 230. Continued movement of the cup through the housing 212 causes a flexing of the spiral portion 234 whereby the cup moves through the arcuate bore 230 and into the bore 232. Further movement in this direction is limited by the engagement between the member 224 and the seat 226. This position the web 214 within the bore 218 and the wedge ring 222 may then be inserted around the disc 216 for securing the web 214 in position. The retaining washers 242 and 244 may then be inserted around the cup 236 and within the bore 232 for completing the assembly. Of course, it is to be understood that the desired quantity of cleansing or polishing paste, or the like, is inserted into the bore 218 in any suitable manner (not shown) prior to the complete assembly of the tool 210.

Rotation of the shaft 220 by the power equipment as hereinbefore set forth is transmitted to the web 214 and to the member 224 for twisting or rotating the spiral portion 224 and transmitting rotation to the cup 236. Simultaneous rotation of the web 214 forces the ingredients in the bore 218 through the groove 248 and into the arcuate bore 230 where it passes through the longitudinal bore 246 and is thus continually supplied to the surface of the teeth during rotation of the cup for a cleaning operation. Upon the completion of a cleaning operation, the entire tool 210 may be removed from the power equipment and discarded.

It is to be understood that each embodiment of the invention depicted herein is particularly designed for economy of construction in order that the entire tool may be discarded subsequent to a single cleaning operation. Of course, it is also to be noted that the cartridge portion containing the ingredients may be of a disposable nature and utilized in combination with a permanent head member, if desired.

From the foregoing it will be apparent that the present invention provides a novel dental handpiece of a disposable construction. The expendable cartridge is preloaded or precharged with a quantity of cleansing or polishing paste, or the like, and is particularly designed and constructed for feeding or ejecting the paste into the interior of a polishing cup continually during operation of the tool. Subsequent to the completion of a teeth cleaning operation, the entire tool may be discarded or the paste containing cartridge thereof may be discarded. The novel dental handpiece tool is simple and efficient in operation and economical in construction.

Changes may be made in the combination and arrangement of parts as heretofore set forth in the specification and shown in the drawings, it being understood that any modification in the precise embodiment of the invention may be made within the scope of the following claims, without departing from the spirit of the invention.

What is claimed is:

1. A dental handpiece comprising a plastic disposable

unitary housing, a drive shaft journaled within the housing and extending longitudinally therethrough for connection with an independent power source for rotation thereby, a chamber provided within the housing for receiving a preloaded quantity of paste like ingredients therein, gear means carried at one end of the drive shaft and rotatable thereby, a head portion provided on the housing and having an internal bore disposed substantially perpendicularly with respect to the internal bore of the housing, hub means journaled within the bore of the head member, gear means carried by the hub means and engageable by the first mentioned gear means for rotation thereby, cup means carried by the hub passageway means disposed within the head portion and rotatable simultaneously therewith, means providing communication between the interior of the cup and the chamber in the housing, and inner peripheral wiping blade means driven by the drive shaft for progressively ejecting substantially all of the paste like material from the chamber to the interior of the cup simultaneously with rotation of the drive shaft and cup.

2. A dental handpiece comprising a plastic disposable unitary housing, a drive shaft journaled in the housing and extending longitudinally therethrough, a chamber provided in the housing for receiving a paste like material therein, a head member provided on one end of the housing and integral therewith and having an internal bore disposed substantially perpendicularly with respect to the longitudinal axis of the housing, a centrally disposed rod member extending through the head member and integral therewith, passageway means extending through the rod and head member and into communication with the chamber, a hub member disposed within the bore of the head member and journaled on the rod member, first gear means provided on one end of the drive shaft and extending into the bore of the head member, second gear means provided on the hub member and engageable with the first gear means for rotation thereby whereby rotation is transmitted to the hub member, cup means carried by the hub member and rotated simultaneously therewith, said cup member being provided with an internal chamber in communication with the passageway means, means carried by the drive shaft and rotatable therewith for progressively and continuously ejecting the paste like material from the chamber through the passageway means and into the internal chamber of the cup member during rotation of the drive shaft.

3. A disposable dental handpiece as set forth in claim 2 wherein the ejecting means carried by the drive shaft comprises spiral means provided on the outer periphery of the drive shaft for cooperating with rotation of the drive shaft to urge the paste in a direction toward the passageway means for ejection thereof from the chamber.

4. A plastic disposable dental handpiece comprising a main housing portion having one end thereof open and the opposite end thereof provided with an inwardly directed annular shoulder, a drive shaft journaled in the housing and extending longitudinally therethrough, means carried by the drive shaft and cooperating with the shoulder and housing for forming an internal chamber therein for receiving a paste like material therein, a head member provided on the housing and oppositely disposed from the open end thereof, said head member being provided with an internal bore disposed substantially perpendicularly with respect to the longitudinal axis of the housing, a centrally disposed rod member provided in the head member and integral therewith and extending longitudinally through said bore, a central passageway extending longitudinally through the rod and into communication with a perpendicularly arranged passageway provided in the head member and in communication with the chamber, a hub member journaled on the rod member, a pair of spaced gear members provided on the outer periphery of the hub member, a complementary gear member provided on one end of the drive shaft for rotation simultaneously there-



with and in engagement with the pair of spaced gear members carried by the hub member for transmitting rotation to the hub member, cup means carried by the hub member and having an internal chamber in communication with the longitudinal passageway of the rod member, means carried by the drive shaft and rotatable therewith for progressively ejecting the paste like material from the chamber through the passageways and into the internal chamber of the cup upon rotation of the drive shaft.

5 5. A disposable dental handpiece as set forth in claim 4 wherein the ejecting means comprises an inner peripheral wiping blade means provided on the outer periphery of the drive shaft for forcing the paste like material from the chamber and through the passageways during rotation of the drive shaft.

6. A plastic disposable dental handpiece comprising a main housing portion having one end thereof open and the opposite end thereof provided with an inwardly directed annular shoulder, a drive shaft journaled in the housing and extending longitudinally therethrough, means carried by the drive shaft and cooperating with the shoulder and housing for forming an internal chamber therein for receiving a paste like material therein, a head member provided on the housing and oppositely disposed from the open end thereof, said head member being provided with an internal bore disposed substantially perpendicularly with respect to the longitudinal axis of the housing, a centrally disposed rod member provided in the head member and integral therewith and extending longitudinally through said bore, a central passageway extending longitudinally through the rod and into communication with a perpendicularly arranged passageway provided in the head member and in communication with the chamber, a hub member journaled on the rod member, a pair of spaced gear members provided on the outer periphery of the hub member, a complementary gear member provided on one end of the drive shaft for rotation simultaneously therewith and in engagement with the pair of spaced gear members carried by the hub member for transmitting rotation to the hub member, cup means carried by the hub member and having an internal chamber in communication with the longitudinal passageway of the rod member, a piston member carried by the drive shaft and longitudinally movable therealong, a spiral shoulder provided on the outer periphery of the drive shaft for cooperation with the piston member for moving the piston in a direction toward the shoulder upon rotation of the drive shaft in one direction for ejecting the paste like material from the chamber and through the passageways and into the internal chamber of the cup.

7. A plastic disposable dental handpiece comprising a main housing portion having one end thereof open and the opposite end thereof provided with an inwardly directed annular shoulder, a drive shaft journaled in the housing and extending longitudinally therethrough, means carried by the drive shaft and cooperating with the shoulder and housing for forming an internal chamber therein for receiving a paste like material therein, a head member provided on the housing and oppositely disposed from the open end thereof, said head member being provided with an internal bore disposed substantially perpendicularly with respect to the longitudinal axis of the housing, a centrally disposed rod member provided in the head member and integral therewith and extending longitudinally through said bore, a central passageway extending longitudinally through the rod and into communication with a perpendicularly arranged passageway provided in the head member and in communication with the chamber, a hub member journaled on the rod member, a pair of spaced gear members provided on the outer periphery of the hub member, a complementary gear member provided on one end of the drive shaft for rotation simultaneously therewith and in engagement with the pair of spaced gear members carried by the hub member for transmitting rotation to the hub member, cup means

carried by the hub member and having an internal chamber in communication with the longitudinal passageway of the rod member, inner peripheral wiping blade means carried by the drive shaft and driven directly thereby and disposed within the chamber for urging the paste like material in a direction toward the shoulder upon rotation of the drive shaft in one direction for ejecting the paste like material from the chamber and through the passageways for discharge into the internal chamber of the cup.

8. A dental handpiece comprising a plastic disposable cartridge having an internal chamber preloaded with a quantity of paste like material, a drive shaft journaled within the cartridge and extending longitudinally therethrough, a head member provided on the cartridge and having an internal bore provided therein, a centrally disposed rod member integral with the head member and extending longitudinally through the bore, passageway means extending through the rod and head member and into communication with the internal chamber, a hub member journaled on the rod member, first gear means carried by the hub member, second gear means carried by the drive shaft and engageable with the first gear means for transmitting rotation to the hub member, cup means carried by said hub member and rotatable simultaneously therewith, said cup means having an interior chamber in communication with the passageway means, and means carried by the drive shaft and driven thereby for progressively and continually ejecting the paste like material from the internal chamber and through the passageway for discharge into the interior chamber of the cup during rotation of the drive shaft.

9. A dental handpiece comprising a plastic disposable housing having an internal chamber preloaded with a quantity of paste like material, a drive shaft journaled in the housing and extending longitudinally therethrough, a head member provided on the housing and having an internal bore provided therein disposed substantially perpendicular to the longitudinal axis of the housing, a centrally disposed rod member integral with the head member and extending longitudinally through the bore, a passageway extending longitudinally through the rod and through a portion of the head member into communication with the internal chamber, a hub member journaled on the rod member, a pair of oppositely disposed spaced gear members provided on the outer periphery of the hub member, a complementary gear member secured on one end of the drive shaft and in engagement with the spaced gear members for transmitting rotation from the drive shaft to the hub member, a cup member secured to the hub member and having an internal chamber in communication with the longitudinal passageway of the rod member, and means carried by the drive shaft and operable by the rotation thereof for continually ejecting the paste like material from the internal chamber of the housing and through the passageway for directing the paste like material into the interior chamber of the cup continually during rotation of the drive shaft.

10. A dental handpiece as set forth in claim 9 wherein the ejecting means includes an inner peripheral wiping blade disposed within the internal chamber of the housing.

11. A dental handpiece comprising a plastic disposable cartridge preloaded with a paste like material, means connecting the cartridge with a rotatable cup member, means extending through the cartridge for transmitting rotation to the cup member, inner peripheral wiping blade means for ejecting the paste like material from the cartridge continually during rotation of the cup, and means for directing the paste like material to the rotatable cup.

12. A plastic disposable dental handpiece comprising a plastic disposable housing having an internal chamber preloaded with a paste like material, a plastic disposable head means carried by the housing, a disposable rotatable cup member carried by the head member, plastic disposable means extending through the housing and cooperating with the head means for transmitting rotation to the cup

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member, and inner peripheral wiping blade means for ejecting the paste like material from the internal chamber and to the rotatable cup member.

13. A plastic disposable dental handpiece comprising a unitary outer housing, a chamber provided in the housing for containing a preloaded quantity of a paste like material therein, inner peripheral wiping blade means journaled in the housing and extending through the chamber and surrounded by the paste like material, spool means carried by the inner peripheral wiping blade means and rotatable thereby, cup means journaled in the housing and engageable with the spool means for rotation thereby, said inner peripheral wiping blade means being rotatable for progressively ejecting substantially all of the paste like material from the chamber, and passageway means within the housing for providing communication between the chamber and the interior of the cup means whereby the paste like material is continually directed to the interior of the cup upon rotation of the inner peripheral wiping blade means.

14. A disposable dental handpiece as set forth in claim 13 wherein the spool means comprises a rotatable body portion having a plurality of radially outwardly extending teeth for engagement with the cup for transmitting rotation thereto.

15. A disposable dental hand tool comprising an outer housing, a chamber provided in the housing for receiving a preloaded quantity of a paste like material therein, a rotatable drive shaft extending into the housing, a rotatable spiral web member carried by the drive shaft and extending through the chamber, wedge means disposed around the shaft for securing the web member within the chamber, a spool member carried by the web member and rotatable therewith, a cup member journaled within the housing, teeth means provided on the spool member for engaging the cup to transmit rotation thereto, and means providing communication between the chamber and the interior of the cup whereby the paste like material is continuously directed to the interior of the cup on rotation of the web member.

16. A plastic disposable dental handpiece comprising an outer housing, a chamber provided in the housing for receiving a preloaded quantity of a paste like material therein, inner peripheral wiping blade means journaled

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in the housing and extending through the chamber, and surrounded by the paste like material, first gear means carried by the spiral inner peripheral wiping blade means and rotatable therewith, second gear means journaled in the housing and engageable with the first gear means for rotation thereby, cup means carried by the second gear means and rotatable therewith, said inner peripheral wiping blade means being rotatable for ejecting the paste like material from the chamber, and means providing communication between the chamber and the interior of the cup whereby the paste-like material is continuously directed to the interior of the cup during rotation of the inner peripheral wiping blade means.

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