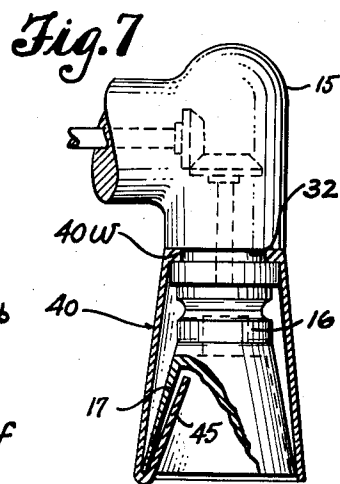
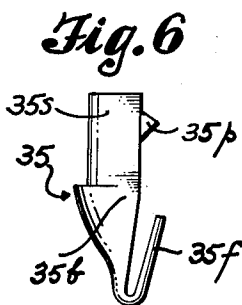
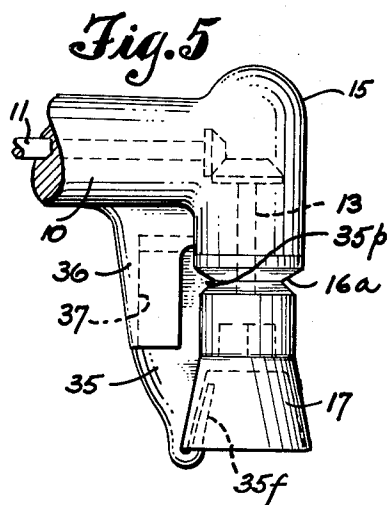
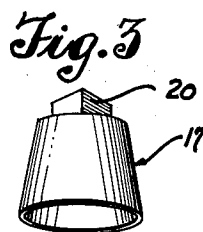
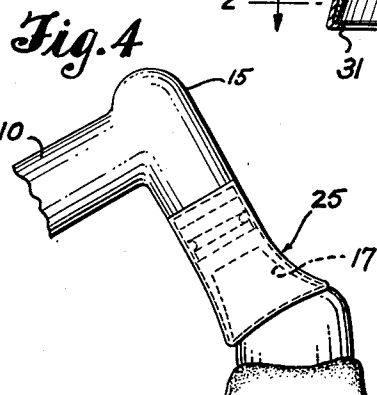
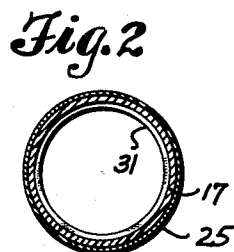
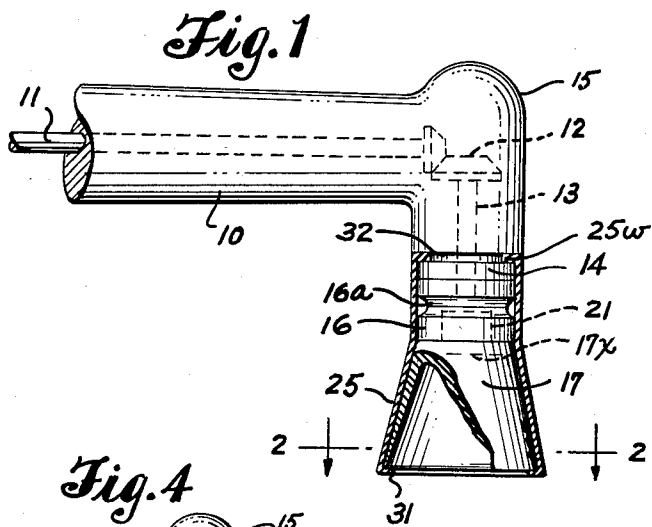


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B. JANKELSON  
TOOTH POLISHING DEVICE  
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2,943,343

## TOOTH POLISHING DEVICE

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This invention relates to tools of those kinds used by the dental profession for cleaning and polishing teeth and more particularly to improvements in electrically driven tooth cleaning and polishing tools wherein the revolvably driven tooth cleaning and polishing element is composed of a soft and flexible rubber in the form of a conical or bell shaped cup and wherein abrasive paste is applied to the cup to facilitate the tooth cleaning and polishing operation.

Although such devices have been used for years there has been no completely satisfactory and simple solution for two problems which are inherently present and which are irritating to both the patient and the operator. One problem is the splatter and throw-off of the abrasive material and saliva. The other problem is the abrasion and injury of the patient's gums.

The polishing of teeth by the dentist or hygienist has been a tedious and messy operation because the task is mainly performed by using a rubber cup which carries an abrasive polishing paste and revolves at several thousand revolutions per minute. This results in considerable splatter on the patient's face and clothes and on the operator as the paste and saliva are whirled or thrown out by the centrifugal force of the revolving cup. In an effort to reduce the amount of splatter, operators must work slower and with greater difficulty, including stopping the cup when moving from tooth to tooth. Analyzing the problem, it will be apparent that the polishing paste and saliva are thrown off from both the outside of the cup, from its lower peripheral edge and from the inside. This can be partially prevented in the manner taught in U.S. Patent No. 1,834,726 by providing a shielding cover about the cup. However, this solution is not entirely effective because while it prevents material from being thrown off from the outside of the cup, there is no provision to stop throw-off from the inside and the lower peripheral edge. Unless some means is provided for removing the material thrown off by the centrifugal force on the inside and on the lower edge, the splatter or throw-off still occurs.

Since the splatter or throw-off problem is created by the centrifugal force throwing off the semi-liquid material, my solution to this problem is to remove the excess material from the rotating cup. I accomplish this by a wiping device made of rubber or similar flexible material and the device is so associated with the cup that the material is wiped from all parts of the cup during each revolution.

In addition to solving the problem of splatter or throw-off, my preferred form of device is so constructed and associated with the revolving rubber cup that it acts as a guard or shield to protect the sensitive gum margin and the epithelium between the gum and teeth. This eliminates abrasion or irritation of the gums and discomfort to the patient.

As will be hereinafter more fully described, my preferred method and structure for solving the problem is to provide a stationary shielding member, also of cup-

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like form, which lightly engages the exterior of the polishing cup. This prevents throw-off of material from the outside of the cup and protects the gum margin. To prevent splatter or throw-off of material from the lower edge and inside of the cup, I provide a radially projecting flange on the lower edge of the shielding cup which goes over the edge of the polishing cup and is adapted to engage the lower edge and the inside wall thereof. Because of its flexibility and resiliency, the flange portion will be engaged against the lower inside wall of the polishing cup when the polishing cup is pressed against a tooth in the cleaning and polishing operation.

In view of the foregoing explanation, it is the principal object of this invention to equip power driven tooth cleaning and polishing tools of the above character with wiping means which will wipe away whatever portion of the polishing paste that works itself to a position for centrifugal discharge from the polishing cup and thus prevent the paste and other matter from being thrown onto the patient's or operator's clothes, hands or face and simultaneously and with the same device protect the gum from abrasion by the polishing cup.

More specifically stated the present invention resides in the application to the head portion of the tool, of a form of wiper and protector which will adapt itself to the cup in its different positions of use and will wipe the abrasive material from the peripheral edge and outside and inside surfaces of the polishing cup and temporarily retain it.

Further objects of my invention reside in the details of construction of the wiper and protector and of various parts associated therewith, and in their combination and mode of use, as will hereafter be described.

In the accomplishing of the above mentioned and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a side view of the outer end portion of a dentist's tooth polishing tool embodying the improvements of the present invention therein; the view showing the parts partially broken away and substantially enlarged for better illustration and understanding.

Fig. 2 is a cross-section taken on the line 2—2 in Fig. 1.

Fig. 3 is a perspective view of the tooth cleaning and polishing cup.

Fig. 4 is a view illustrating the use of the tool as equipped with the wiper of Fig. 1 in the polishing of a tooth.

Fig. 5 is a side view of an alternative form of wiper as applied to the tool.

Fig. 6 is an enlarged, perspective of the wiper illustrated in Fig. 5 removed from the tool.

Fig. 7 is a side view of another alternative form of wiper and protector as applied to the tool with parts shown broken away.

Referring more in detail to the drawings:

In Fig. 1, 10 designates what will be herein referred to as the shank portion of a conventional dentist's hand piece. Contained axially of and within this shank is a drive shaft 11 which, at its outer end, is connected through suitable bevel gearing, designated at 12, with a mandrel 13 which, in this view, is shown to extend downwardly from a bearing 14 contained in the shank head 15. At its lower end the mandrel mounts a chuck 16 which carries a tooth cleaning and polishing element which is designated in its entirety by numeral 17 and which herein will be referred to as the cleaning and polishing cup.

The shank 10 extends from a handle portion (not shown) whereby the tool is held and manipulated in use, and through which power is applied to shaft 11 in the usual manner to drive the cleaning and polishing cup.

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The polishing cup 17 is of slightly tapered or flared form as best shown in Fig. 3. Such cups are generally molded from suitable rubber, or a similar flexible and resilient material. The sidewalls of the cup decrease in thickness from the closed upper end wall 17x to the lower periphery and are quite flexible. At its upper end, the cup is formed with a central, upwardly extending mounting neck 20; this being square in cross-section as seen in Fig. 3 or of other angular form and is fitted in a similarly shaped socket 21 opening to the under surface of the chuck, thus to functionally mount the cleaner and polisher for use and readily removable therefrom.

In the normal use of the above described cleaner and polisher, the powered tool is held by the operator in such manner as to permit him to press the inside surface of the revolving rubber cup 17 against the tooth as shown, for example, in Fig. 4. It is usual in the use of this kind of tool, as an aid to cleaning and polishing, to apply an abrasive substance within the cup; this substance being of a semi-fluid or paste-like character which, under centrifugal force created by the rotation of the cup, will be discharged therefrom partly into the patient's mouth and partly onto the clothes and uniform of the patient and operator. As previously stated, one of the objects of my invention is to overcome this centrifugal discharge of abrasive paste or polishing material and saliva from the patient's mouth.

The characterizing features of the invention are herein shown to be embodied in three forms, the first as shown in Fig. 1, the second as shown in Fig. 5 and the third as shown in Fig. 7. In each device, the construction includes the novel feature of a wiper that coacts with the cleaning and polishing cup 17 to remove the abrasive and saliva before such material can be centrifugally discharged from the cup.

The wiper and protector used in conjunction with the cleaner and polisher of Fig. 3 is designated in its entirety by reference numeral 25. It is of inverted cup-like form, slightly flared and of such size that, when applied it will enclose the cleaning and polishing cup therein with minimum clearance as shown in Figs. 1 and 2. The wiper and protector cup is closed at its top end by a wall 25w which has a central opening therethrough permitting the lower end of the shank head 15 to extend through and below the wall. The head of the shank is formed with an encircling channel 32 to seat that part of the wall 25w that forms the periphery of the wall opening. The cup 25 encloses the cleaning and polishing cup 17 and extends slightly below the lower edge thereof. At the lower edge of the cup 25, I provide an inwardly extending peripheral flange 31 which is slightly spaced from the cup 17 or very lightly in contact therewith and the inward extent thereof is beyond the lower portion of the inside wall surface as is shown in Figs. 1 and 2. Fig. 4 illustrates the manner in which the flange 31 engages the inside wall surface when the cup 17 is pressed against the teeth in the cleaning and polishing operation. The flange 31 will wipe the lower edge and adjacent inside wall of the cup 17 and thereby overcome the effect of centrifugal force and resulting throw-off irrespective of whether the cup 17 is engaging the teeth or is being moved from tooth to tooth. An additional and important function of the flange 31 is the protection which it provides for the delicate and sensitive gum margin from the abrasive action of the revolving cup. Under past conditions, the epithelium has been unavoidably abraded during the cleaning and polishing. Even the most careful and competent operator often causes the revolving cup to engage the gum. This causes smarting or soreness of the gums and discomfort to the patient. The enclosing cup 25 and the integral, radial flange 31 act as a gum retractor and protector and permit the cleaning and polishing of the teeth by the inside surface of the cup 17 without injury to the gum.

In Figs. 5 and 6, I have an alternative form of wiper which is designated in its entirety by reference numeral

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35. It comprises a body portion 35b equipped with a mounting stem portion 35s at its upper end. This stem is holdingly fitted within a holder 36 that is formed on or fixed to the underside of the shank 10 adjacent and extending below the head 15. This holder has a vertical socket 37 formed therein which is open at its lower end and along the side thereof that is faced toward the chuck and polishing cup. Also, at its lower end the body is formed with an upwardly directed extension finger 35f that extends upwardly within the cup to engage with the inside surface of the cup wall as shown. The purpose of this finger is to maintain the body of the wiper in close wiping relationship to the sidewall of the polishing cup regardless of the fact that the cup might be flexed laterally or otherwise deformed in its application against a tooth. Also, the finger wipes the inside of the cup.

The wiper 35 may be removed from the holder for replacement when worn or damaged, merely by pulling its stem from the socket of the holder. Then a new wiper can be readily placed in position.

In the wiper of the type illustrated in Figs. 5 and 6, I provide a projection 35p which extends from the stem 35s into the groove 16a at the point where the chuck emerges from the main drive structure. The abrasive cleaning paste works into the bearings through this area and causes excessive wear of the bearings and gears. The projection 35p wipes the abrasive material from this area and this minimizes the wear which has heretofore been caused by the abrasive material at this point.

Another or modified form of wiper and protector is designated 40 and is illustrated in Fig. 7. It is similar to Fig. 1 in that it is of inverted cup-like form, slightly flared and of such size that, when applied, it will enclose the polishing cup therein with minimum clearance. This form of wiper and protector has an end wall 40w with a central opening to receive the lower end of the shank head 15. The head is formed with an encircling channel 32 to seat that part of the wall 40w that forms the periphery of the wall opening. The cup 40 encloses the polishing cup 17 and also it extends slightly below the lower edge of the polisher where it is tapered to a thin edge.

Formed on the lower edge of the enclosing cup 40 is an upwardly and inwardly directed finger 45 that engages the inner surface of the polisher 17 as it revolves, and operates to remove the abrasive material before it can be thrown off by the centrifugal force.

The close proximity of the interior of the cup 40 to the exterior of the cup 17 limits or prevents the abrasive material or saliva from collecting on the exterior of the cup 17 and in conjunction with the finger 45 substantially eliminates the throw-off of material due to the centrifugal force.

Wipers and protectors of the types herein described are easy to apply and easy to remove when replacement is desired. The mounting means for such devices may be of various forms or details of construction and need not be limited to the specific forms which I have illustrated and described. In either form, the wipers and protectors operate, without interference to the functioning of the cleaning and polishing cup, to remove the abrasive material from the rim of the cup before it can be centrifugally discharged.

My invention embodies the broad and novel concept of providing means to wipe the abrasive cleaning and polishing material and saliva from the rotating cup before it is thrown off by the centrifugal force. In addition, I provide means for protecting the gums from injury. For the results to be completely satisfactory, it is necessary to provide means for wiping the outside surface, the inside surface and the lower peripheral edge of the cleaning and polishing cup and to shield the revolving cup from engagement with the gums. My invention is designed primarily for use in association with a conical shaped rubber cup whereby the cleaning and polishing is performed by the

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inside surface of the cup. It is not readily useable with brushes wherein the ends of bristles are utilized for cleaning and polishing.

What I claim as new is:

1. In combination, a dental hand piece including a chuck and means to revolve said chuck, an inverted resilient cup-shaped cleaning and polishing device, means for removably securing said polishing device to said chuck, a wiper device secured to said hand piece, and functionally associated with polishing device, said wiper device including means adapted for wiping engagement with the outside, inside and lower peripheral edge of said polishing device.

2. In combination, a dental hand piece including a chuck and means to revolve said chuck, an inverted resilient cup-shaped cleaning and polishing device, means for removably securing said polishing device to said chuck, a wiper device secured to said hand piece above the chuck, said wiper device including a shielding portion which surrounds said polishing device with a minimum of clearance therebetween, an inwardly projecting radial flange at the lower end of the wiper device, said flange projecting inwardly beyond the lower edge of the polishing device and adapted to wipe the lower edge and inside surface thereof when the polishing device is revolving and is pressed against a tooth.

3. In combination, a dental hand piece including a chuck and means to revolve said chuck, an inverted, tooth cleaning and polishing cup, means for removably securing the cup to said chuck, a wiper device secured to said hand piece above the chuck, said wiper device including a shielding portion which surround the cleaning and polish-

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ing cup with a minimum of clearance therebetween, a wiping finger integral with said wiping device at the lower end thereof, said finger projecting into said cleaning and polishing cup and adapted to wipe the inside surface and lower edge thereof.

4. A combination as in claim 3 wherein the said wiping finger is of relative thin, resilient rubber and extends a substantial distance into said cleaning and polishing cup.

5. In combination, a dental hand piece including a chuck and means to revolve said chuck, an inverted tooth cleaning and polishing cup, a rubber wiper device removably secured to said hand piece, said wiper device including a body portion adapted to wipe the exterior of said cleaning and polishing cup and a resilient, flexible finger extending from said body portion into the interior of said cleaning and polishing cup and adapted to wipe the lower edge and inside surface thereof.

6. A combination as in claim 5 wherein the hand set is provided with a socket and said body of the wiper device is formed with a stem adapted to be removably fitted into said socket.

7. A combination as in claim 5 wherein a projection is provided on said body portion of the wiper device adapted to wipingly engage said chuck.

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