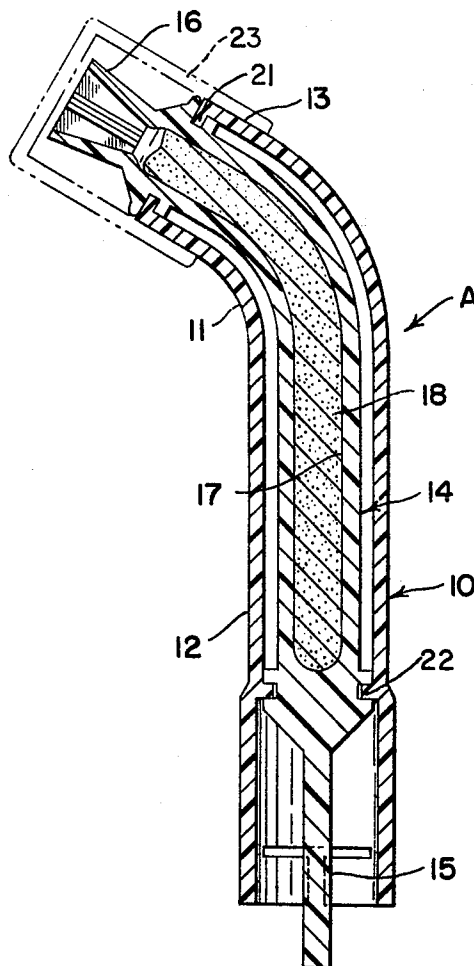


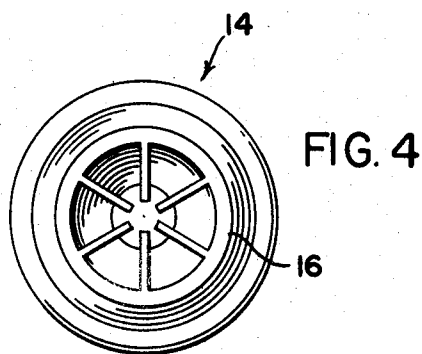
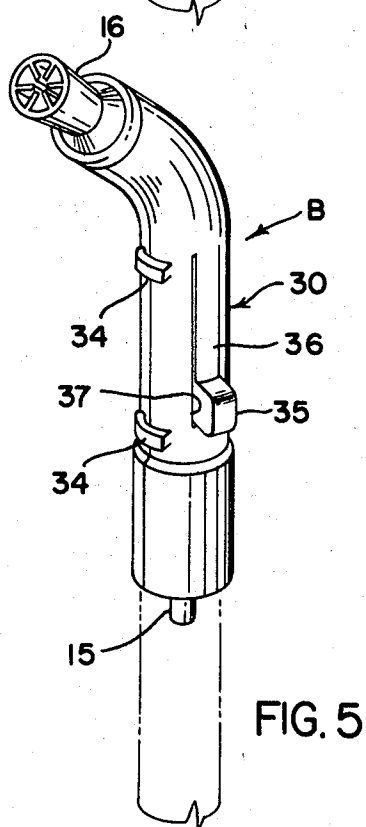
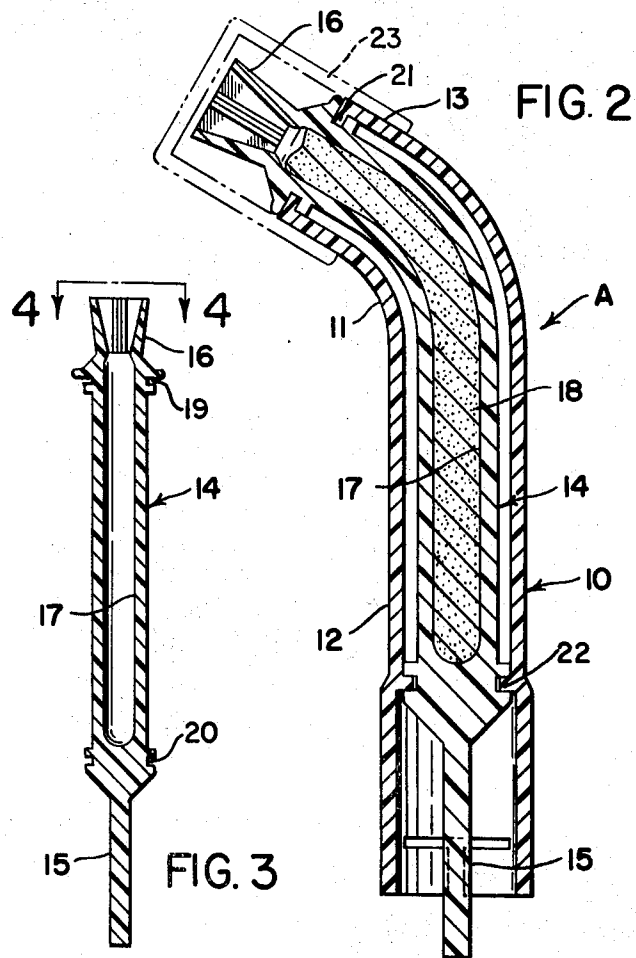
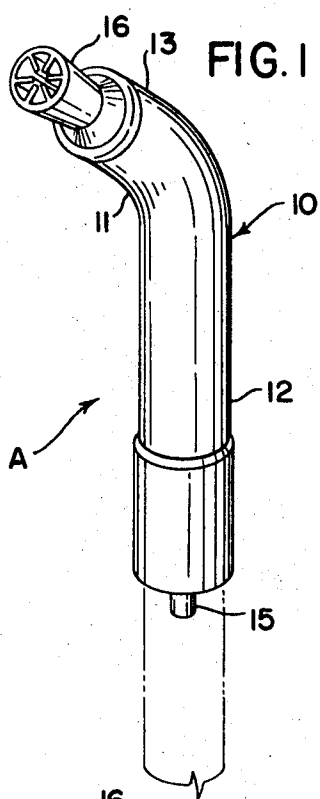
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 [22] Filed **Jan. 6, 1969**
 [45] Patented **May 25, 1971**

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Attorney—Bosworth, Sessions, Herrstrom and Cain

[54] **DENTAL PASTE DISPENSING TOOL**
10 Claims, 12 Drawing Figs.
 [52] U.S. Cl..... **32/58**
 [51] Int. Cl..... **A61c 3/06**
 [50] Field of Search..... **222/191;**
 32/58, 59

ABSTRACT: A rotary dental tool is provided with self-contained means for automatically feeding a dentifrice to an applicator. The dentifrice is contained in an elongated tubular element that serves as a flexible coupling extending between a rotary drive and the tool head. During operation, the drive causes twisting of the tubular element, thereby urging the dentifrice toward the applicator.





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FIG. 6

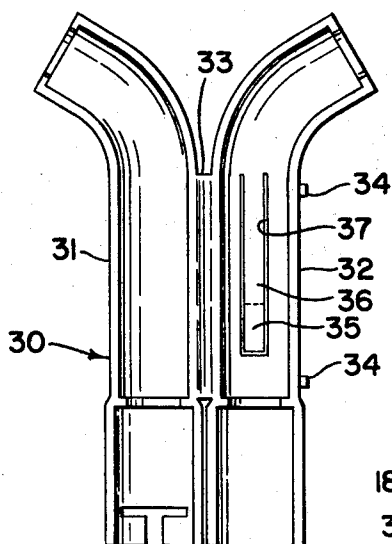


FIG. 10

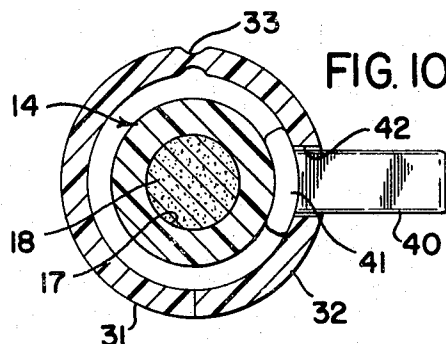


FIG. 8

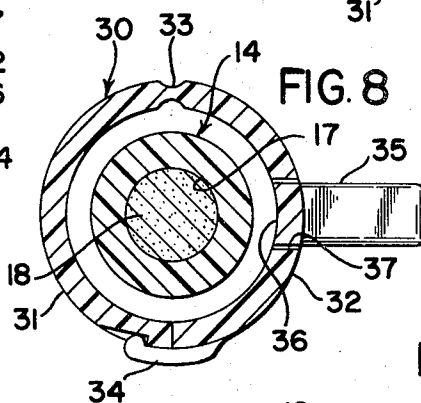


FIG. 11

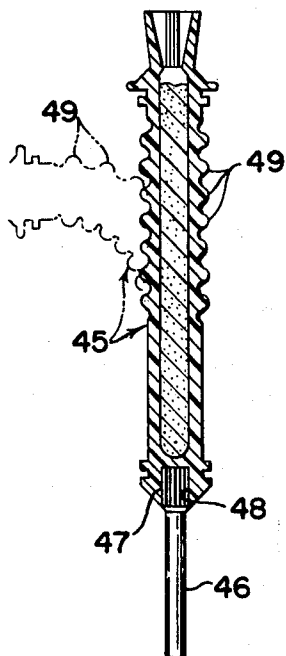


FIG. 12

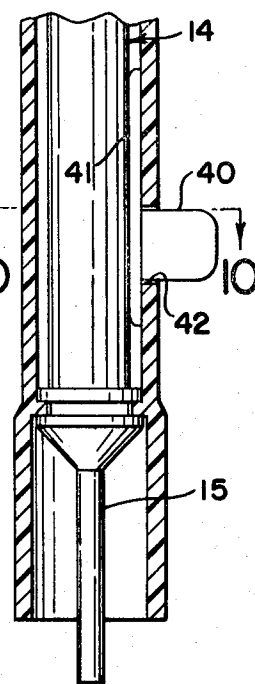
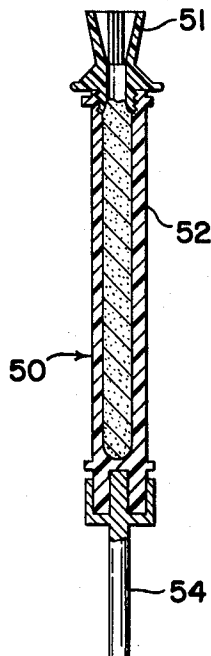
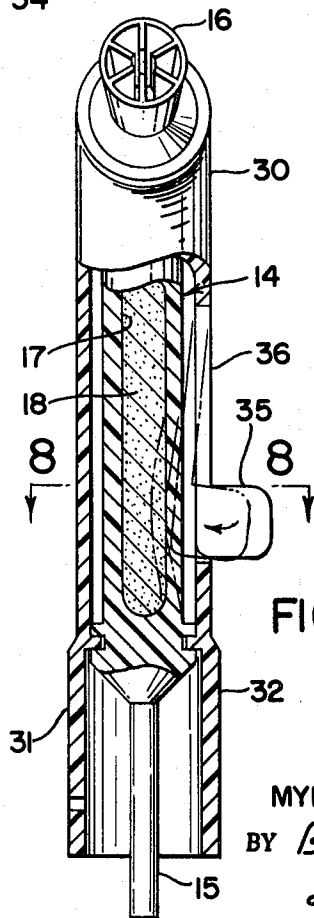


FIG. 9

FIG. 7



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DENTAL PASTE DISPENSING TOOL

BACKGROUND OF THE INVENTION

This invention relates to rotary dental tools and especially to cleaning and polishing tools for use with a dentifrice or the like. More particularly, the invention has to do with a tubular-coupling element connecting the drive system and the applicator. The dentifrice is supplied to the applicator from a reservoir in the tubular-coupling element.

An important part of modern professional dental care is the cleaning and polishing of a patient's teeth preferably using a prophylactic paste containing for example a fluoride to inhibit tooth decay. This is most commonly accomplished with a powered rotary tool having an angular bend or "contra angle" as it is known in the art. The tool is held by the dentist and periodically dipped in a container of prophylactic paste. Frequent paste renewal is important even for cooling the teeth in view of the frictional heat developed.

The need for periodically removing the applicator from the patient's mouth and dipping it in the paste is burdensome to the dentist and lengthens the period of time needed to complete a cleaning and polishing procedure. Also, the paste after being in the patient's mouth only a short period of time becomes diluted by the patient's saliva and a proper concentration of chemicals (such as fluoride compounds) may not be applied to the teeth.

While certain techniques for the continuous automatic feeding of dental paste to the tool head have been attempted, none have filled the professional needs of the dentist and none have been effective to provide a continuous uniform supply of paste to the patient's mouth. The device of the present invention, however, meets the long felt need described above and affords other features and advantages heretofore not obtainable.

OBJECTS OF THE INVENTION

It is among the objects of the invention to continuously feed a dental paste to the insert head of a dental tool during a dentist's cleaning and polishing procedure.

Another object of the invention is to reduce the time required to replenish the dental paste on the rotary head of the tool during the cleaning and polishing procedure.

Still another object is to provide a disposable tool insert of low cost construction which serves as a paste dispenser for the cleaning and polishing of a patient's teeth.

These objects are accomplished by means of a dental polishing tool provided as explained below with self-contained means for storing and feeding a dentifrice to the tool head.

The tool includes a handpiece, preferably one taking the form of a casing of the contra-angle type. It is adapted to receive a disposable insert equipped with a mandrel extending coaxially of the trailing end of the insert. The insert itself takes the form of a resilient, flexible element of tubular construction containing a charge of a dentifrice such, for example, as dental paste. The mandrel with which the insert is equipped is designed to be rotated about its axis by a cooperating drive system.

An applicator of suitable type is attached to the other end of the flexible element. Rotation of the mandrel by the drive system twists the flexible element about its axis and reduces the interior cross section thereof. The result is to squeeze the paste out through the applicator.

According to one embodiment of the invention the dispensing of dental paste is assisted by means of a manually operated pressure element or shoe which is located in the casing and which when depressed pushes against the flexible element to force paste out to the tool head.

According to another embodiment the flexible element is held in a hinged casing formed by two semicylindrical halves which may be easily opened to replace the flexible element when desired.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a dentist's rotary polishing tool embodying the invention;

FIG. 2 is a longitudinal sectional view on an enlarged scale of the polishing tool of FIG. 1;

FIG. 3 is a longitudinal sectional view of the flexible tubular element contained within the casing of FIG. 1 but shown in its unflexed condition prior to insertion in the casing;

FIG. 4 is a much enlarged end elevation of the flexible element as viewed from the line 4-4 of FIG. 3;

FIG. 5 is a perspective view similar to FIG. 1 but showing a modified form of the invention;

FIG. 6 is an elevational view of the embodiment of FIG. 5 showing the hinged casing in its open position;

FIG. 7 is an elevational view on an enlarged scale of the embodiment of FIG. 5 with parts broken away and shown in section for the purpose of illustration;

FIG. 8 is a transverse cross-sectional view on an enlarged scale taken on the line 8-8 of FIG. 7;

FIG. 9 is a fragmentary sectional view on an enlarged scale showing a modified form of the embodiment of FIGS. 5 to 8;

FIG. 10 is a transverse cross-sectional view on an enlarged scale taken on the line 10-10 of FIG. 9;

FIG. 11 is a longitudinal sectional view of a modified form of flexible tubular element embodying the invention; and

FIG. 12 is a longitudinal sectional view similar to FIG. 11 but showing still another variation of the flexible tubular element.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring more particularly to the drawings, FIGS. 1 to 4 show a rotary dental-polishing tool A embodying the invention and adapted for connection to a rotary drive. The drive is transmitted by belts and pulleys through a mechanical arm with flexible joints as is customary in the art. The end of the mechanical arm is shown in phantom lines in FIG. 1. Tool A has a tubular casing 10 with an angular bend 11 (contra angle) which divides the casing into a rearward leg 12 and a forward leg 11, the casing defining therein a space for a flexible insert 14 with a mandrel 15 at one end, a polishing head 16 at the other end and a flexible resilient tubular portion intermediate its end which serves to transmit the rotary drive around the angular bend 11 in the casing and which also serves as a reservoir 17 for a charge 18 of dental paste.

The insert 14 is preferably formed of rubber or resilient plastic and has a groove 19 at its forward end and a bearing groove 20 at its rearward end. The groove 19 is adapted to receive a bearing ring 21 formed inside the forward end of the casing 10 and the groove 20 is adapted to receive a bearing ring 22 at the rearward end of the casing 10 to keep the angularly disposed ends of the insert in their proper positions during operation of the tool. The insert 14 is shown in its natural unflexed condition in FIG. 3, prior to its insertion in the casing 10. FIG. 2 shows a cover 23 in phantom lines which may be used in connection with the casing if desired.

In operation, the mandrel 15 is connected to a conventional drive spindle to transmit the rotary drive through the insert 14 to the applicator 16. During the polishing operation friction between the applicator and the teeth of the patient causes a high torsional load in insert 14 and this in turn causes "necking down" or reduction in cross-sectional size of the reservoir 17 thus putting a squeezing force on the charge 18 of dental paste located within. This force causes a gradual expression of the paste during the cleaning and polishing procedure, charge 18 being of a volume calculated to serve the needs of one patient.

Referring next to FIGS. 5 to 8 there is shown an alternative form B of dental-polishing tool embodying the invention. The casing 30 in this instance is formed of two semicylindrical halves 31 and 32 connected together at an integral hinge 33 best shown in the open position illustrated in FIG. 6. When the

casing 30 is closed as shown in FIG. 5 the two halves 31 and 32 are latched together by integral clasp-type connections indicated by the numeral 34.

As viewed in cross section the embodiment of FIGS. 5 to 8 appears generally the same as shown in FIG. 2 and the insert 14 within the casing 30 is identical to that of the first embodiment.

As another aspect of the alternative form B of FIGS. 5 to 8, one of the casing halves is provided with a dispensing button 35 located at the end of a lever arm 36 which is formed integrally with the casing 30 and which fits in a rectangular slot 37 in the casing wall. When the dispensing button 35 is depressed (FIG. 7) it bears inwardly against the resilient tubular wall of insert 14 and helps squeeze the paste out through applicator 16. With this arrangement the dentist may very easily increase the rate that the paste is dispensed by pressing the button 35 with his thumb or finger during the cleaning and polishing procedure.

FIGS. 9 and 10 show a variation of the embodiment of FIGS. 5 to 8 wherein a dispensing button 40 is connected to a pressure shoe 41 located entirely within the casing 30 rather than to a lever 36 as shown in FIG. 7. The button 40 extends through a rectangular opening 42 in the casing wall and is initially positioned from the inside. This arrangement permits dispensing pressure to be applied over a greater length of the insert 14.

FIGS. 11 and 12 show alternate of an insert forms within the purview of the invention. FIG. 11 shows an insert 45 with a metal mandrel 46 having a splined head 47 inserted in a matching socket 48 at the rearward end of insert 45. This arrangement is adapted for certain types of standard dental equipment. In the same FIG. is illustrated a variant wherein circumferential corrugations 49 are formed in the forward portion of the insert. The corrugations provide improved flexibility for contra-angle bends of up to as much as 90°, and at the same time assure a more uniform rate of bend with a reduced tendency to form a sharp crease at any particular location.

FIG. 12 shows still another insert 50 wherein applicator 51 is threaded into the end of an intermediate body portion 52 and the lower end 53 has a coupling fork connected to an interlocking mandrel 54.

It will be apparent from the foregoing description and drawings that by using a dental tool embodying the invention, the need for periodic replenishment of the dental paste at the tool head is eliminated and the cleaning and polishing procedure can be accomplished in a much shorter period of time with a much more uniform dispensing of dental paste to the teeth during the procedure. Also, it will be apparent that the insert is of simple low cost construction and can be economically disposed of after each operation. If desired, a whole new casing may be coupled to the mechanical arm of the apparatus prior to work on each patient.

While the invention has been shown and described with respect to specific embodiments thereof, this is for the purpose of illustration rather than limitation and other modifications and variations will be apparent to those skilled in the art within the intended spirit and scope of the invention. Wherefore, the patent is not to be limited in any way that is incon-

sistent with the extent to which the progress in the art has been advanced by the invention.

I claim:

1. In a dental tool with self-contained means for storing a dentifrice and feeding it to the tool head, a handpiece taking the form of a casing of the contra-angle type; a disposable insert in the casing taking the form of an elongated rotatable element of generally tubular construction that is capable of flexing to conform to the shape of the handpiece; means in the tubular portion of the insert forming a dentifrice reservoir that is closed at the trailing end and in open communication with the tool head at the leading end of the insert; a dentifrice applicator at the leading end of the insert; and means at the trailing end of the insert for coupling it to a rotary drive system whereby, when torsional forces are exerted on the trailing end of the insert, the dentifrice in said reservoir is urged toward the tool head and out of the casing through said applicator.

2. Apparatus as defined in claim 1 wherein said casing is formed of two symmetrical halves connected by a hinge to permit opening of said casing for removal and replacement of the insert.

3. Apparatus as defined in claim 1 wherein said casing has a slot formed in the sidewall thereof and extending therethrough and a pushbutton in said slot extending outwardly from said casing and means operatively connected to said pushbutton within said casing for pressing against the insert to express dental paste from said reservoir.

4. Apparatus as defined in claim 3 wherein said means connected to said pushbutton is a lever arm integral with said casing and resiliently connected to said casing at one end at an end of said slot for pivotal movement in said slot.

5. Apparatus as defined in claim 3 wherein said means connected to said pushbutton is a pressure shoe adapted to bear against said coupling element adjacent said reservoir.

6. A disposable insert for use in a hollow dental handpiece of the contra-angle type wherein said insert takes the form of an elongated flexible element of generally tubular construction that is susceptible of bending to conform to the contra-angle zone of the handpiece and of independent rotation within the handpiece while at the same time serving as a depletable dentifrice reservoir, said tubular element being characterized:

- a. at its leading end by an applicator through which the dentifrice may be dispensed as needed,
- b. at its trailing end by an axially projecting mandrel, and
- c. by means therebetween for rotatably coupling the tubular portion of the insert to the interior of the handpiece.

7. A disposable insert according to claim 6 wherein the tubular portion of the insert is corrugated to enhance its flexibility within the contra-angle zone of the handpiece.

8. A disposable insert according to claim 6 wherein the applicator at the leading end of the insert is formed integrally with the tubular portion of the insert.

9. A disposable insert according to claim 6 wherein the mandrel at the trailing end of the insert is formed integrally with the tubular portion of the insert.

10. A disposable insert according to claim 9 wherein both the applicator and the mandrel are formed integrally with the tubular portion of the insert.