Oct. 14, 1969 J. V. BOONE 3,471,929

DENTAL INSTRUMENT

Filed Oct. 28, 1966

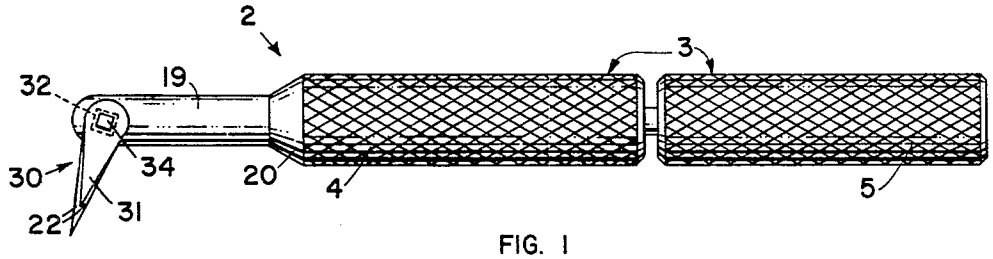



FIG. 1

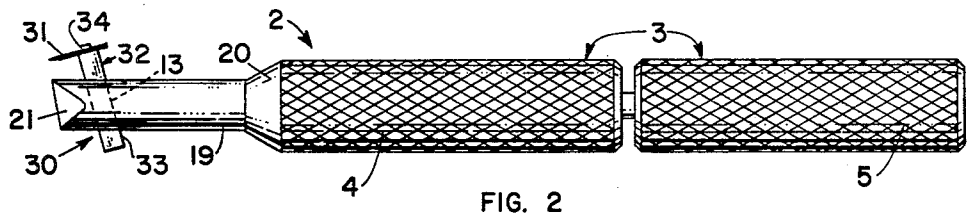



FIG. 2

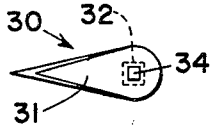



FIG. 3

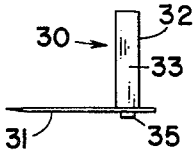



FIG. 4

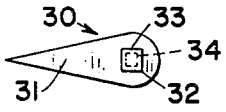



FIG. 5

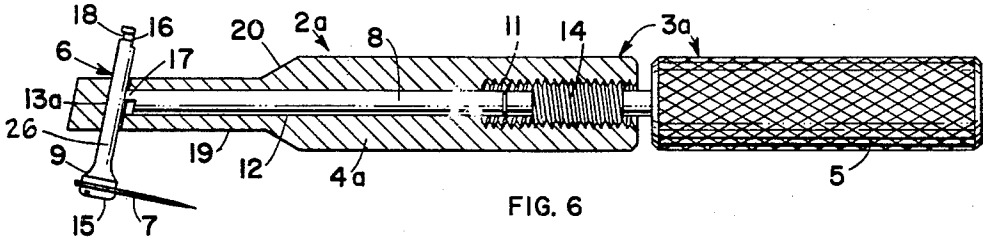



FIG. 6

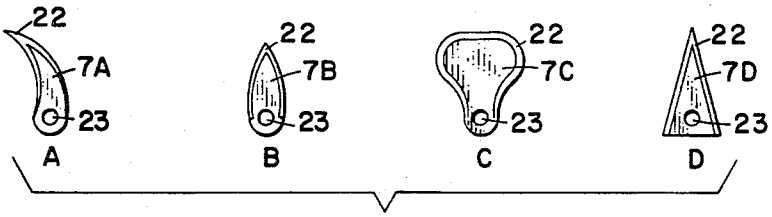



FIG. 7

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# DENTAL INSTRUMENT

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U.S. Cl. 32—40 7 Claims

## ABSTRACT OF THE DISCLOSURE

This specification discloses the invention of a dental instrument in the form of an elongated tool member having a cutting blade that is both adjustable and removable by manipulation of a portion of the elongated member, and which instrument includes a plurality of intricately shaped blades for performing specific dental operations.

This invention relates generally to dental equipment and more specifically to hand held instruments which may be used to perform gum cutting operations as may be required in dental work.

It is a principal object of this invention to provide a dental instrument which may be used for any gum cutting operation likely to be encountered in practice in the dental field.

Another object of this invention is to provide a dental cutting instrument having an adjustable and replaceable blade unit that may be quickly and positively positioned at a desired angle or replaced with the same or dissimilar blade unit.

And yet another object is to provide a cutting instrument including a body, a mandrel, a floating pin and a tightener plug whereby the blade unit is bound to the body only by the quickly releasable pressure between the body and the tightener plug.

A further object is to provide a dental cutting instrument that is adapted to utilize efficient but economical blade units so that any blade need be used only once in practice.

And a primary object of the preferred embodiment of this invention is to provide an integral blade unit comprised of a polygonal mandrel having four, six, or other number of sides for insertion into a similar sided hole in the body of the dental instrument, and a blade that is permanently attached to the mandrel for rapid replacement.

An object of another embodiment of this invention is to provide an instrument of the type described which employs a blade holding mandrel that may be rotated 360° relative to the instrument handle to attain the optimum blade positioning.

And another object of the second embodiment is to provide a cutting instrument as above wherein the attachment between the blade and the mandrel will permit the blade to be rotated 360° relative to the blade holding mandrel.

And a further object is of the second embodiment to provide a dental cutting instrument including generally circular mandrel and a floating press pin each having a cooperating lock means for special uses.

And still a further object of this invention is to provide a plurality of unique cutting blades for special uses in the dental instrument of this invention.

Another object of the principal embodiment of this invention is to provide a mandrel that may be made of plastic and attached directly, permanently and economically to a metal (such as stainless steel) blade.

These and other objects and advantages will be apparent from an examination of the following specifications taken in conjunction with the accompanying drawings, in which:



FIGURE 1 represents a plan view (relative to the preferred position of intended use) of the preferred embodiment of the dental instrument of this invention;

FIGURE 2 is a side elevational view of the instrument of FIGURE 1;

FIGURE 3 is a bottom view of the blade unit detached from the instrument body.

FIGURE 4 is a side view of the blade unit of FIGURE 3.

FIGURE 5 is a top view of the blade unit of FIGURE 3.

FIGURE 6 is a cross sectional view of the instrument of the second embodiment of this invention; and

FIGURE 7 shows a plurality of separate blades (A–D) that may be employed with the instrument of FIGURE 6, or the blade unit of FIG. 3.

Referring now more particularly to the characters of reference in the drawing, it will be observed that the dental instrument of this invention, identified generally at **2** in FIGURES 1 and 2 includes: an elongated body **3** comprised of two principal members, a forward section **4** and a rearward plug section **5**; and a blade unit **30** having a blade **31** therein; and an internally located floating press pin **8**.

The forward section **4** of the body **3** includes a threaded bore **11** which extends to one end of section **4** in one direction and joins a smaller straight bore **12** in the other direction. Bore **12** extends in the said other direction until it intersects a cross bore indicated at **13** near the foremost end of section **4**.

The rearward plug section **5** includes a main portion of the same diameter as the forward section **4** and includes a reduced diameter threaded stud portion **14** adapted to engage the threaded bore **11**.

The blade unit **30** is integrally formed of a polygonal (generally 3–8 sides) mandrel that has an elongated body of relatively small cross section and a blade (usually of stainless steel). The cross section shown in the drawing, FIGURES 2–5, is square, although in actual construction it may be rectangular, multi-sided, fluted or any of a number of configurations. Mandrel **32** has a reduced square head section **34** that is formed to fit into the square opening in blade **31**. Mandrel **32** may be molded to shape while in contact with blade **31**, or an axially extending end of section **34** may be fused to blade **31** by local heat. In either method, a lobe **35** is formed that overlaps the edges of the opening in the blade to permanently join the mandrel and blade.

In operation, the blade unit **30** is installed in opening **13** of the forward section **4** of body **3**, in such a manner that the integrally attached blade **31** will be at the desired position for the surgical work to be performed. Since the entire blade unit **6** is economical and considered disposable, it may be discarded after a single use and replaced with another blade unit **30** having the same or different shape of integral blade therein. During use if it becomes desirable to move the blade unit **30** longitudinally in opening **13**, or change the angle of the blade **31** relative to the body **3**, the rearward plug section **5** may be loosened and blade unit **30** either moved in the opening **13** or removed from opening **13** and reinserted at the new portion, and then section **5** is retightened to firmly resecure the parts together.

Referring now to the second embodiment shown in FIGURES 6 and 7, it will be seen that the general construction is similar to the principal embodiment of FIGURES 1–5. The distinction between the two embodiments lies in the blade unit **6**, which is constructed in three parts, a generally circular mandrel **26**, a separate and

readily detachable blade **7**, and a round head screw **15** that binds the mandrel and blade together.

The mandrel **26** has an elongated body of relatively small cross-section. The cross-section shown in FIGURE **6** is circular, although this mandrel also may be polygonal in cross-section. Mandrel **26** has an enlarged head section **9** that is flat on the exposed side and has a threaded bore to receive screw **15** which has a flat underside, so that the flat surfaces of the mandrel and screw cooperate to bind blade **7** at installation.

FIGURE 7 shows a plurality of different blades, each having a special configuration, for use in the dental instrument of this invention. The blade shown at A may be used for getting at locations where a direct line of site is not available. The blade shown at B is useful where a slight curved blade is needed, and the blade shown at C is used where a greater curvature and the absence of a point is needed. The blade shown at D is a modification of the regular blade **31** of FIGURE 1. These blades may be made of surgical steel or of a grade of stainless steel or other material that will permit a razor like edge **22** to be formed thereon. The blade includes a central opening **23** slightly larger than the diameter of screw **15**.

A blade **31** having the shape of any of the blades **7A–7D** may also be used as an integral part of the blade unit **30** in the embodiment of FIGURES 1 and 2.

In operation, using the second embodiment, the mandrel **26** is usually left installed in the body member **3**, and includes its head screw **15** loosely threaded in place, but without a blade. It is desirable in dental surgery, where a blade is employed for cutting a patient's gums, and where the blade may come in contact with a jaw bone, that the blade be discarded after each use and a fresh blade be used for each patient. So at the start of each use of this instrument, the mandrel head screw **15** will be removed and the desired blade installed on the enlarged head section **9** and screw **15** tightened to hold the blade securely in place. The desired angular position of the mandred is then determined, and plug member **5** is loosened to permit setting the mandrel and then member **5** is retightened. When member **5** is tightened it presses axially against elongated press pin **8** which in turn presses against and binds mandrel **26** against the walls of its bore **13***a*.

In use it is of course very simple and rapid to loosen the plug member **5** and reset the angular position of mandrel **26** and blade **7** as conditions encountered may change during the course of dental surgery. The instrument **2** is usually held by the dentist in the same manner he would hold a pencil, and the blade is usually but not necessarily at the lower end of the mandrel.

Also a locked mandrel position may be employed by sliding the mandrel **26** in its bore **13***a* until the top flat notch **16** is aligned with tip **17** of press pin **8**. The arrangement will insure a positive lock against rotation of mandrel **26** in its bore **13***a*. A positive lock against axial movement of the mandrel **26** may be attained by inserting tip **17** in groove **18**, which may include a flat of a similar nature to flat notch **16**.

Using the preferred embodiment of FIGURES 1 and 2 and the integral blade unit **30**, having a one piece blade and mandrel, it will be seen that an extremely fast and convenient construction is provided to change or replace blades during use.

Body section **5** of both embodiments is knurled throughout its external length, whereas section **4** (or **4***a*) is knurled only to the start of its reduced diameter portion **19** which joins the knurled portion by means of a tapered portion **20**. Portion **19** includes a flat area **21** at its foremost end, and all edges of portion **19** as well as all exposed edges of the entire instrument **2** are beveled or rounded to prevent injury to the patient or to the dentist. The forward section of the body **3***a* of tool **2***a* has been renumbered **4***a* in FIGURE 6 since it is not interchangeable with the forsection **4** of FIGURES 1 and 2. The difference between the items **2**, **2***a*; **3**, **3***a*; **4**, **4***a*; is that the bore **13***a* of the embodiment of FIGURE 6 is circular in cross section to receive the circular mandrel **26**, whereas the bore **13** of the embodiment of FIGURES 1 and 2 is polygonal in cross section.

From the foregoing description it will be readily seen that there has been produced a device which substantially fulfills the objects of the invention as set forth herein. The invention is not limited to the exemplary construction herein shown and described, but may be made in many ways within the spirit of the appended claims.

What is claimed is:

**1.** A dental instrument comprising:

(a) an elongated body having a forward section and a separable rearward section;

(b) a replaceable blade unit adapted to be selectively positioned in one of said sections;

(c) said blade unit including a mandrel and a separate material blade,

(d) said blade projecting transversely outward from said mandrel and having an elongated cutting edge,

(e) said elongated body defining a transverse opening therethrough,

(f) said mandrel extending through said opening and transversely through said body,

(g) said blade unit being adapted to be located and locked at several different functional positions in said transverse opening and relative to the axis of said transverse opening,

(h) and means between said blade unit and said elongated body for locking and positively preventing rotation of said blade unit during use of said dental instrument.

**2.** A dental instrument as in claim **1**, wherein said blade unit is replaceable as a unit in said forward section, and wherein said means for locking and positively preventing rotation includes at least one flat surface on said mandrel.

**3.** A dental instrument as in claim **2**, wherein said mandrel is polygonal in cross section, and wherein a press pin is installed in said elongated body and is adapted to bind against said flat surface and provide said means for locking and positively preventing rotation of said blade unit.

**4.** A dental instrument as in claim **2**, wherein said mandrel and blade form an integral blade unit having an L-shaped configuration.

**5.** A dental instrument as in claim **4**, wherein said mandrel is plastic in composition and is molded to said blade which is metal in composition.

**6.** A dental instrument as in claim **2**, wherein said mandrel and blade are separable pieces and said mandrel includes means for readily replacing said blade at a selected angle in a transverse plane relative to said mandrel.

**7.** A dental instrument as in claim **2**, wherein said mandrel is a member having an enlarged head section for receiving said blade, and wherein said head section defines means including a flat surface to permit said blade to be rotated 360° on said flat surface to a desired location.

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