Dec. 24, 1968 R. J. BLANK ET AL 3,417,971

MIXING AND EJECTION TOOL

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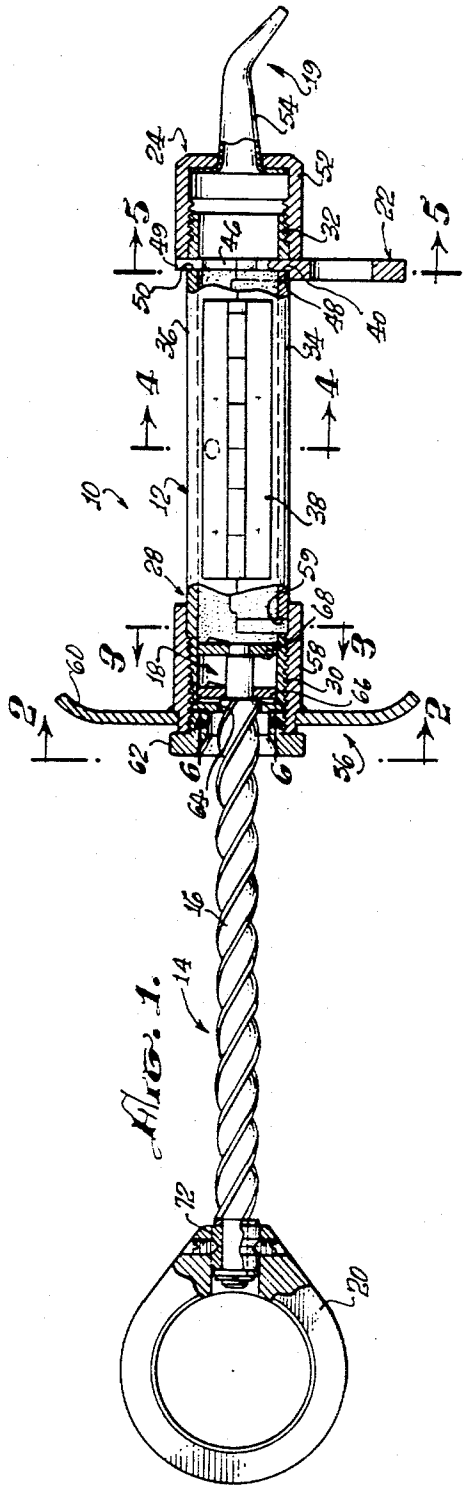


FIG. 1.

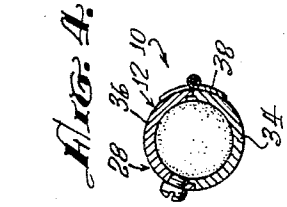


FIG. 4.

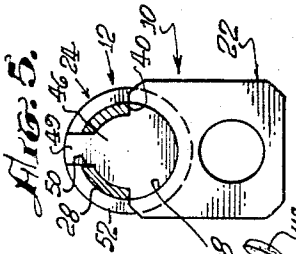


FIG. 5.

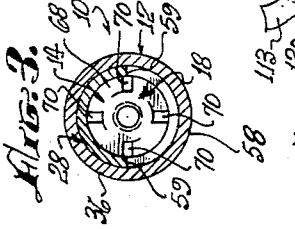


FIG. 3.

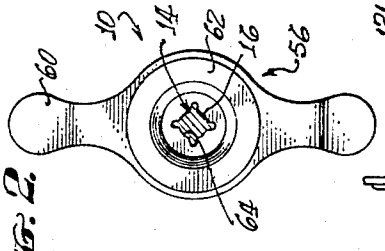


FIG. 2.

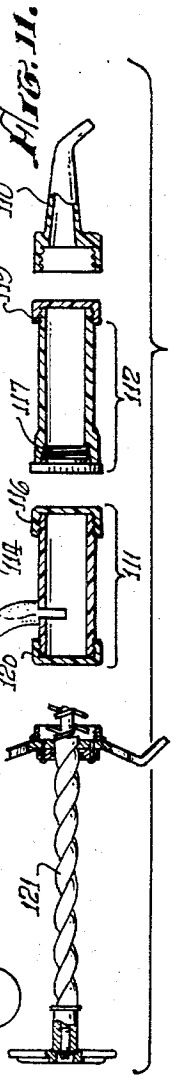


FIG. 11.

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FIG. 6.

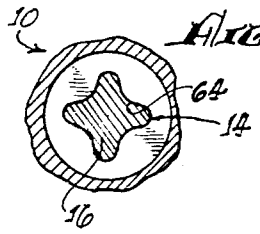


FIG. 7.

FIG. 8.

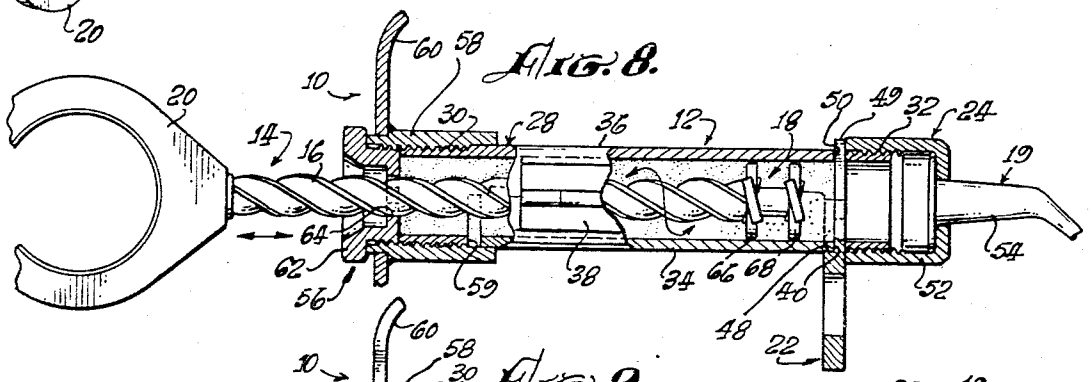


FIG. 9.

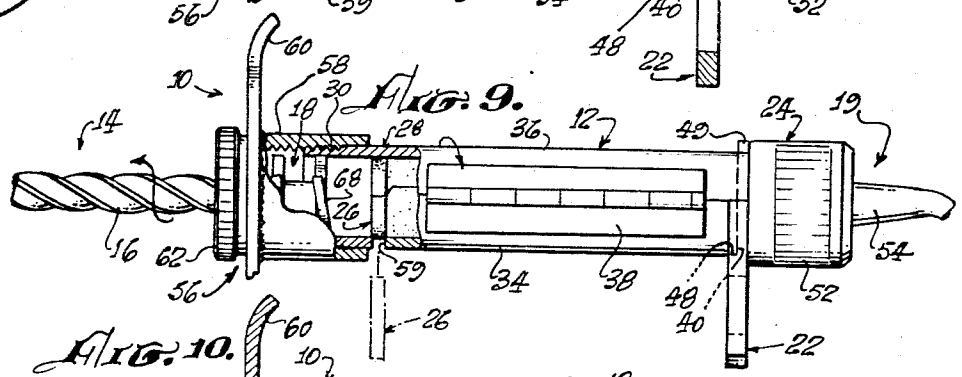
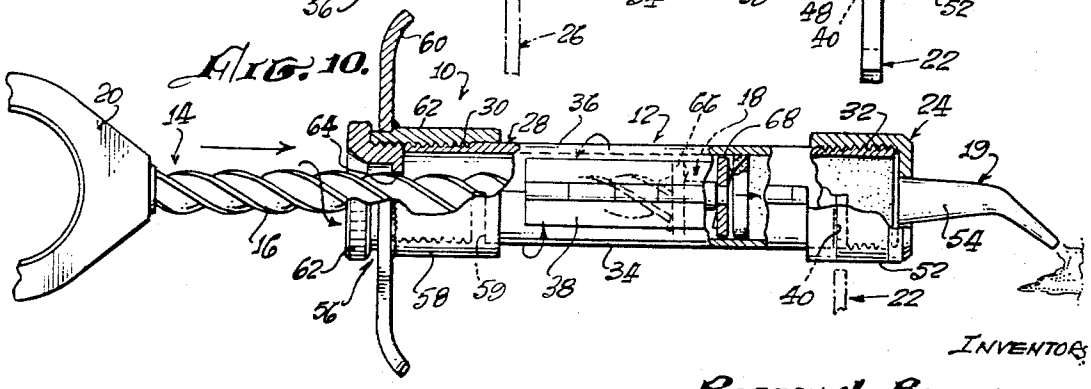


FIG. 10.



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United States Patent Office 3,417,971
Patented Dec. 24, 1968

3,417,971

MIXING AND EJECTION TOOL

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Filed Feb. 23, 1967, Ser. No. 618,142
3 Claims. (Cl. 259—37)

ABSTRACT OF THE DISCLOSURE

A dental tool for mixing and ejecting impression paste or similar materials. The tool utilizes a single chamber for mixing material and from which materials are ejected.

This invention relates to a mixing and ejection tool for materials such as impression paste employed in the dental arts. The invention is a single hand-operated tool for both mixing and ejecting impression paste. It employs a single chamber which has a rotatable spiral rod therein that alternately cooperates with a gate that closes off the chamber and a movable disc that enables material to be expelled from the chamber. This tool replaces mixing bowls or pads and spatulas along with ejection tools and other means for depositing the mixed paste.

In the practice of the dental profession, time is of the essence. This is because the patient is often in an uncomfortable position or situation and it is extremely important that this situation be minimized. In addition, the dentist is a highly skilled and trained person whose time is of considerable economic value so that time consuming operations must be minimized if dental services are to be afforded at an economical rate and if dental serives are to be made generally available to the populace. One time consuming operation that presently exists in the dental practice is the preparation, mixing and ejection of impression pastes which are employed incident to the making of bridges, inlays and similar dental appliances. Presently it is the practice to place the various materials to be mixed on a pad or pads and to then take portions of these materials and mix them together with a spatula. The mixing is performed by hand and is a slow, inefficient and messy process. The mixed materials are then funneled, or by other means, inserted into a tool for ejection into the mouth. The placement of these mixed materials into a tool is a difficult manipulative operation as the materials are gummy and do not readily flow from the mixing pad, spatula or funnel. Once the material is in the tool for ejection, then the materials are placed in the patient's mouth at a particular location. It should be noted that the time for this procedure is quite critical as it is desirable that the impression paste have a relatively short set time to facilitate the formation of the desired impression. In some instances the performance of this procedure with such paste requires two persons to be effective. Thus, the dentist and his assistant are often involved in this procedure.

The present invention avoids many of the above problems and is a time saving device which enables a neat and efficient procedure for the mixing and ejection of materials such as impression paste and may take the form of a plastic disposable tool. Briefly, the invention comprises a chamber means for receiving the material to be mixed and ejected; means for mixing the material in the chamber coupled to said chamber means;

and means for ejecting the material in the chamber means coupled to said chamber means.

The above generally described structure will be completely understood with reference to one embodiment of the invention which is illustrated in the drawings wherein:

FIG. 1 is a front view of the tool with portions of the tool in section;

FIG. 2 is a sectional view taken along the lines 2—2 of FIG. 1;

FIG. 3 is a sectional view taken along the lines 3—3 of FIG. 1;

FIG. 4 is a sectional view taken along the lines 4—4 of FIG. 1;

FIG. 5 is a sectional view taken along the lines 5—5 of FIG. 1;

FIG. 6 is a sectional view taken along the lines 6—6 of FIG. 1;

FIG. 7 is an exploded perspective view of the entire tool;

FIGS. 8–10 show the tool in various positions in its mixing and ejection operation; and

FIG. 11 is an alternative embodiment.

Referring to FIG. 1, the mixing and ejection tool **10** comprises a chamber means **12** for receiving material to be mixed and ejected therefrom, a means **14** for mixing material in the chamber coupled to said chamber which includes spiral rod **16**, at least one mixing member **18** at one end thereof, a grip ring means **20** and a gate or closing member **22**. Also included in the tool **10** is a means **19** for ejecting the material in said chamber coupled to said chamber means which comprises in addition to spiral rod **16** and grip ring **20**, an ejection nozzle **24** and a disc **26** (FIG. 7).

More specifically, the chamber **12** includes a tube-like body **28** with a pair of threaded ends **30** and **32**. The body **28** is formed from two sections **34** and **36** (FIG. 4) joined by a hinge member **38** which is secured thereto to enable section **36** to swing open and conveniently receive the material that is to be mixed in the chamber **12**.

Adjacent the threaded end **32** is a slot **40** adapted to receive the gate **22** which closes off the chamber **12** so that material may not pass therefrom. Thus, the gate **22** may be viewed as a means for closing off chamber **12** or for enabling material to be ejected therefrom when it is removed from slot **40** and chamber **12**.

Referring to FIGS. 5 and 7, gate **22** is in the form of a rectangular shaped member with a circular recessed tab **46**. The recessed portion **48** (FIG. 7) abuts a portion of the tubular body **28** and makes contact therewith to form a seal which prevents the leakage of material from the chamber during mixing. The circular tab portion **46** completes the blocking off of chamber **12** and has a tab section **49** which fits into a slot **50** to fix the gate **22** in position. The gate **22** once in position, as shown in FIG. 5, is permanently secured in place by tightening the ejection nozzle **24** on the threaded end **32** to abut gate **22**.

The ejection nozzle **24** includes a threaded fitting **52** and a nozzle member **54** secured thereto. The fitting **52** threadingly engages the threaded end **32** of tube **28** and abuts gate **22** when it is in position. When gate **22** is removed from tube **28** the fitting **52** is adapted to be further threaded over end **32** to close the slots **40** and **50** so that the material within chamber **12** is not expelled therefrom.

At the other end of tube **28** is threaded end **30** which has a slot **59** adjacent thereto and which threadingly receives an end cap **56**. The end cap **56** includes a threaded coupling **58** which is threaded over end **30** and slot **59** and which has secured thereto grip means **60** (FIG. 2) and a threaded insert **62**. The insert **62** threadingly engages the coupling **58** and has an opening **64** contoured to receive the spiral rod **16** so that the spiral rod **16** is rotated as it moves linearly through chamber **12**.

The spiral rod **16** has at least one mixing member **18** secured to its right end (FIG. 1). Preferably the mixing member **18** comprises a pair of blades **66** and **68** which may either be affixed to the end of rod **16** or rotatably mounted thereon. The blades **66** and **68** have a plurality of circumferential notches **70** (FIGS. 3 and 7) with portions intermediate the notches contoured or bent to facilitate mixing. Gripping ring **20** is rotatably mounted by an appropriate bearing structure **72** located at the left end of spiral **16** (FIG. 1). This rotatable mounting of the grip ring means **20** enables the ring to be held in a fixed position while the spiral rod **16** rotates as it is moved linearly through opening **64** in the end cap **56**.

It should be noted with respect to the above structure that the parts may be made of various types of materials such as stainless steel, aluminum, plastic, iron and alloys thereof. In one desirable embodiment all parts are made of plastic and the entire unit is disposable.

With the above structure in mind the operation of the device may now be readily understood by reference to FIGS. 8–10 where the cooperation of the structure at various phases in the operation of the tool are shown. First, the hinged door **36** is opened and the impression paste or other materials to be mixed are inserted in chamber means **12**. The impression paste may comprise a thiokol rubber base material along with a catalyst material. Typically, the material is placed in the chamber **12** by simply squeezing a tube containing a base material and a tube containing a catalyst material. The catalyst may be in liquid form. A typical proportion of materials may be employed up to the door length of base material along with an equal length of catalyst material. The door **36** is then closed. The threaded portion of the ejection nozzle **24** is then loosened and gate **22** is inserted into slots **40** and **50** and secured therein by tightening the ejection nozzle to abut a portion of the gate **22**. End cap **56** is then tightened to seal off slot **59**. This closes off the chamber **12** so that material may not be ejected from the ejection nozzle **24**. With the stop **22** in place and the material in chamber **12**, the grip means **60** is held in one hand and the grip ring means **20** is held in the other hand. Pushing and pulling the grip ring **20** in and out causes the spiral rod **16** to rotate as a result of the rotatable mounting **72** and the spiral or contoured entry **64**. The rotation of the spiral rod **16** which accompanies the push and pull action results in blades **66** and **68** mixing the material within chamber **12** (FIG. 9).

With the mixing complete the gate **22** is removed and the movable disc member **26** is inserted into the chamber. The accomplishment of these steps of the operation may be done in any desirable sequence. With spiral rod **16** withdrawn (FIG. 9), and end cap **56** loosened, disc **26** is inserted in the slot **59**. The slot **59** is then closed by tightening end cap **56**, thus preventing the escape of any material from chamber **12**. The gate **22** may then be removed by loosening ejection nozzle **24**. The ejection nozzle **24** is then tightened to close the slots **40** and **50** (FIG. 10). Alternatively, the gate **22** may first be removed and with the disc **26** being inserted into chamber **12** thereafter. In any event, with the disc **26** in position, the grip ring means **20** may be again pushed forward to deliver the mixed impression paste or other material to the desired point in a patient's mouth. This, of course, takes place after the tool has been located properly in the patient's mouth.

An alternative embodiment is shown in FIG. 11. This embodiment functions as follows:

Capsules **111** and **112** have a premeasured amount of material within them. An adhesive tape **113** is positioned to close the slot in capsule **111**. Closure caps **116** and **117** on capsules **111** and **112**, respectively, are removed and capsule **111** is screwed into and joined with capsule **112**. Next, cap **120** is removed and part **121** is joined thereto by a threaded connection. The unit is now ready for mixing. After mixing is completed, cap **119** is removed and ejector nozzle **110** is screwed into place. The tape **113** is then removed and disc **114** is inserted into the slot. The mixed material can now be ejected. All the parts of this embodiment may be disposable with the exception of part **121** which may be employed for a number of operations.

From the above description it can be seen that a single tool has been provided for the mixing and ejection of material without any messy handling of gummy materials. The utilization of the tool may be carried out by a single person and the procedure completed with approximately a 50 percent time saving. In addition, there is very little impression paste material wasted and neither the patient nor the dentist are required to perform any personal washing or cleaning operations after the procedure. In the event the tool is not disposable, it may readily be cleaned.

Although this invention has been disclosed and illustrated with reference to particular applications the principles involved are susceptible of numerous other applications which will be apparent to persons skilled in the art. For example, in one alternative embodiment the slot **50** and gate **22** may be omitted and the ejection nozzle replaced by a solid threaded end cap which closes off the chamber. Similarly, the slot **40** may be opened and closed by various arrangements such as a rotatable ring fixed by a set screw and movable to an open or closed position. The invention is, therefore, to be limited only as indicated by the scope of the appended claims.

What is claimed is:

1. A dental tool for the mixing and ejection of impression paste or similar materials comprising:

an elongated tube-like chamber having a pair of ends, means for the insertion of materials into said chamber and at least two slots with one located in the vicinity of each of said pair of ends;

an ejection nozzle engaging one end of said chamber for the ejection of material from said chamber and adapted to fit over the slot at said one end;

an end cap for engaging the other end of said chamber and adapted to fit over the other slot at said other end of said chamber, said end cap having an opening adapted to receive a spiral rod;

grip means located on said end cap;

a spiral rod engaging said end cap with one end within said chamber and having mixing blades thereon, said spiral rod adapted to move through said end cap and simultaneously rotate; and

grip ring means rotatably mounted at the other end of said spiral rod outside of said chamber to enable a manual force to be applied to said spiral rod and to rotate said spiral rod and move it through said chamber.

2. The structure recited in claim **1**, wherein a gate means is inserted through said slot at the end of said chamber in the vicinity of the ejection nozzle and in abutting relation to said ejection nozzle, whereby the gate means is secured in said chamber to occlude said chamber to enable mixing to be performed by the said spiral rod.

3. The structure recited in claim **1**, wherein a piston-like disc is inserted through said slot near said end cap and into said chamber to enable material within said chamber to be ejected out of said ejection nozzle.

(References on following page)

5

References Cited

UNITED STATES PATENTS

2,266,186	12/1941	Fischer	259—19
2,274,485	2/1942	Janssen	259—99
3,153,531	10/1964	Cook	259—37 XR

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U.S. Cl. X.R.

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