

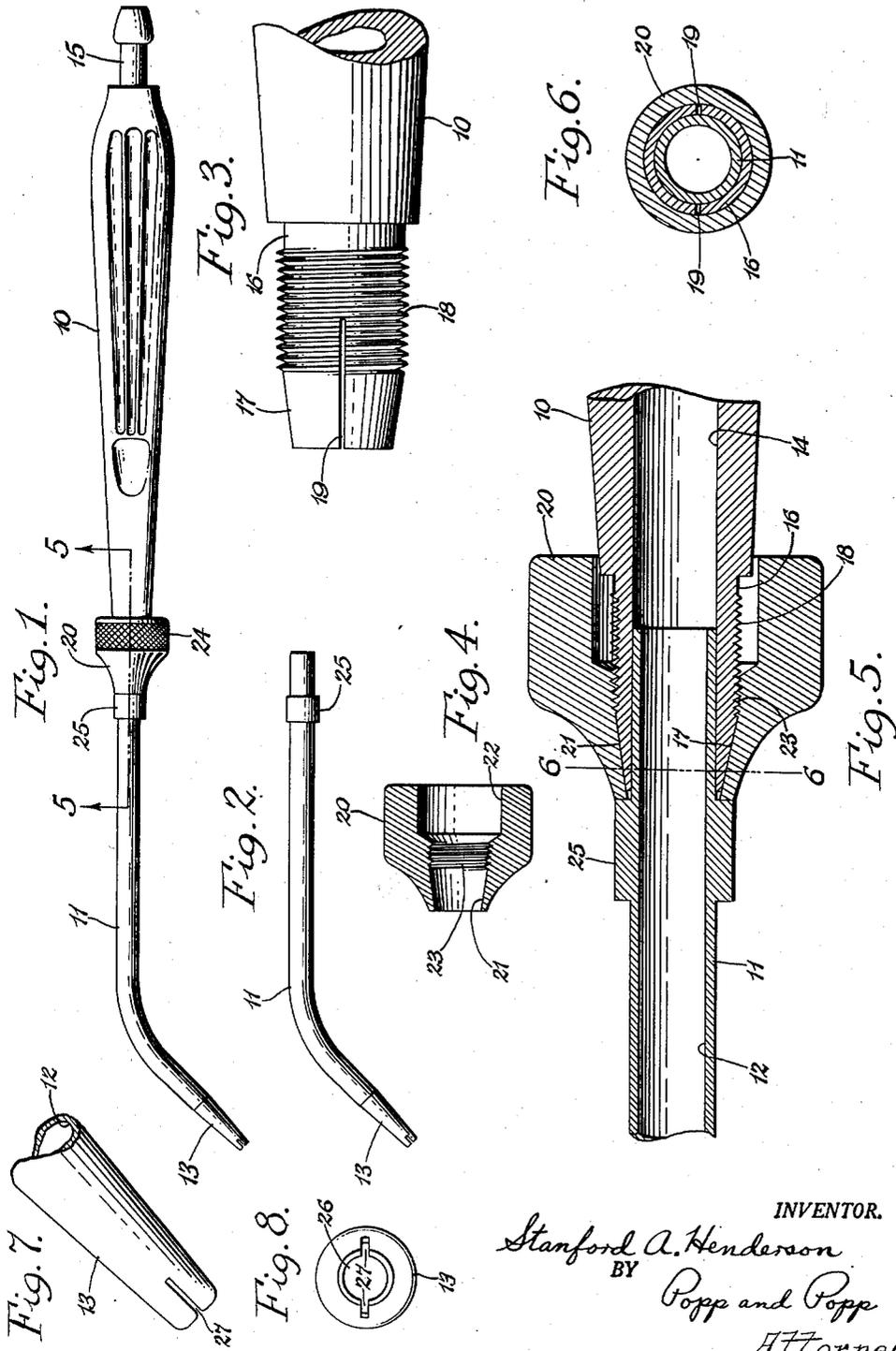
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SURGICAL ASPIRATOR

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SURGICAL ASPIRATOR

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This invention relates to surgical aspirators, and more particularly to improvements in an aspirator for dental surgery.

Generally dental aspirators of the type with which the present invention is concerned include a handle through which a passage extends and a hollow tip or tube removably mounted on one end of the handle. A set of similar tips, each of which is formed with a differently sized opening in its operative end, is generally provided with such a handle so that the tips are interchangeable and the most suitably sized tip can be employed for removal of liquid, semi-solid and solid material, such as blood, saliva, tissue and bone chips from the mouth of the patient.

Heretofore the end of the handle of such an aspirator which received the tip was formed with a female taper into which the correspondingly tapered male end of the tip was inserted. The connection between handle and tip relied upon was therefore one of axially wedging one part into another.

A dental aspirator of the type in question is frequently used as a lip or mouth retractor incidental to removing material from the mouth of the patient and this places a mechanical stress on the connection between the tip and handle. In such use of the prior aspirator it was not uncommon for the tip to loosen and separate from the handle and fall into the mouth of the patient which was undesirable, of course, or onto the floor resulting in contamination of the tip and requiring its resterilization before being used again. Thus inconvenience and annoying delay attended use of this prior aspirator.

Further the tapering of the tip and handle of such prior aspirator to provide the wedge connection therebetween was such as to produce a constriction in the passage through which passed the material removed from the patient's mouth. Hence when a piece of solid or semi-solid material large enough to pass through the larger part of the passage encountered the restriction it could not pass and the passage would become plugged. This rendered the aspirator inoperative until the passage was unblocked.

Accordingly, an object of the present invention is to provide an aspirator in which the tip is firmly connected to the handle and so maintained during use of the aspirator.

Another object is to provide such an aspirator in which the tip is quickly removable and interchangeable with other tips of similar form.

Another object is to provide such an aspirator which will not plug up in use.

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Another object is to provide such an aspirator which will continue to remove material from a recess even though the operative end of the tip is held against the wall of such recess.

A further object is to provide such an aspirator which is simple in construction, inexpensive to manufacture and capable of standing up with extended usage.

Other objects and advantages will be apparent from the following description and drawings wherein:

Fig. 1 is a side elevational view of an aspirator embodying the present invention.

Fig. 2 is a side elevational view of the tip there-

of.
Fig. 3 is a fragmentary side elevational view, on an enlarged scale, of the tip receiving end of the handle shown in Fig. 1.

Fig. 4 is a central longitudinal sectional view, on a slightly enlarged scale, of the locking nut shown in Fig. 1.

Fig. 5 is a fragmentary central longitudinal sectional view, on an enlarged scale, taken on line 5—5, Fig. 1.

Fig. 6 is a transverse sectional view taken on line 6—6, Fig. 5.

Fig. 7 is a side elevational fragmentary view, on an enlarged scale, of the operative end of the tip shown in Figs. 1 and 2.

Fig. 8 is an end elevational view of the operative end of the tip shown in Fig. 7.

The dental aspirator embodying the present invention is shown as comprising a handle 10 and tip 11. The tip 11 is shown as being an elongated tube circular in cross-section and having a passage 12 extending completely there-through and being bent at one end, the extremity of this bent end being externally and internally tapered to provide a nozzle 13. The tip 11 is illustrative of one of a series of interchangeable tips which are usually provided with this type of aspirator, each tip of such series having a differently sized nozzle opening.

The handle 10 is shown as having the conventional elongated form and exterior contouring and being formed to provide a central axial passage 14 extending completely therethrough. The rear end of the handle is shown as being formed with an axially projecting nipple 15. This nipple 15 is adapted to be connected to a flexible tubing (not shown) connected to a vacuum or suction source (not shown).

An important feature of the present invention resides in the means for firmly yet quickly removably mounting the tip 11 on the handle 10,

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To this end, the front end of the handle 10 is shown as being formed with an outwardly projecting axial integral neck 16, the outer end of which is externally tapered as indicated at 17. Intermediate the tapered end 17 and the main body of the handle 10, the neck 16 is externally threaded to provide a male thread 18. The outer portion of the neck 16 is radially contractable and for this purpose is slit. As shown, a pair of diametrically opposite slits 19—19 extend from the outer extremity of the neck 16 axially thereof into the threaded portion 18.

A nut 20 is arranged on the neck 16. This nut 20 has an opening extending completely there-through. One end portion of this opening is tapered corresponding to the tapered end 17 on the neck 16 as represented by the numeral 21 and the opposite end portion is of enlarged diameter as indicated at 22, the portion of this opening intermediate these tapered and enlarged ends being internally threaded as indicated at 23. The female thread 23 of the nut 20 works on the male thread 18 on the neck 16 so that the tapered end 21 of the nut is engageable with the tapered end 17 on the handle 10 when the nut is moved axially of the neck in one direction. The external shape of the nut 20 may be of any desired form and is shown as being bell shaped at its front end merging into a cylindrical rear end, the periphery of this cylindrical rear end portion being knurled, as indicated at 24, to facilitate manually turning the nut.

The passage 14 which is preferably of uniform diameter throughout extends through the neck 16 of the handle 10. The outside diameter of the attaching end of the tip 11 is approximately the same as the diameter of passage 14 so that the tip can be easily inserted and removed from the neck 16. To limit the depth to which the attaching end of the tip can be inserted into the neck 16, the tip is shown as being formed with an integral protuberance or collar 25 extending radially outwardly from the exterior of the tip and spaced axially of the tip from the extremity thereof.

In the assembled condition of the parts shown in Fig. 5, the attaching end of the tip 11 is arranged in the passage 14 of the handle 10 with the rear shoulder of the collar 25 against the front end face of the nut 20, this nut being arranged on the neck 16. By turning the nut 20 in one direction its surface forming the tapered opening 21 wedges against the tapered end 17 of the neck and thereby clamps or pinches the neck against the tip 11, the slits 19—19 permitting of this radial contraction of the neck. Thus the tip is firmly held on the handle and is not subject to loosening or removal except by loosening the nut 20. It is merely necessary to turn the nut a fraction of a turn in the reverse direction to relieve the pressure of the tapered neck end 17 against the taper 21 so that the tip can be withdrawn from the passage 14. The opposed segmental sections of the neck 16 formed by the slits 19—19 are resilient and constantly seek a position in which they are concentric with the remainder of the neck. Any other size of tip having a similar attaching end can be quickly slid into the passage 14 and held in place by tightening the nut 20.

It will be noted that there are no restrictions in the passages 12 and 14 so that any solid or semi-solid material which enters the nozzle end of the tip 11 does not encounter a constriction in passing from the passage 12 into the passage

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14. Hence the passages 12 and 14 are not likely to become plugged in use.

The operative end of the nozzle 13 of the tip 11 is formed to permit material to enter the passage 12 in the tip when the opening or inlet 26 in the end of the nozzle is closed off. Referring to Figs. 7 and 8, this purpose is accomplished by the provision of a pair of diametrically opposite slits 27, 27 in the operative end of the nozzle 13. Each of these slits 27 is shown as extending axially of the wall of the nozzle and opening to the end face of the nozzle. Thus, if in using the aspirator the nozzle 13 is inserted in a recess in the tissue of the patient's mouth and pressed against the tissue so that the opening or inlet 26 is thereby closed, the material in the recess can be still removed by passing through the slits 27 into the passage 12. It will be understood that any number of slits can be provided in the nozzle 13.

From the foregoing it will be seen that the present invention provides an aspirator having a tip and handle in which simple clamping means are provided for firmly but quickly removably mounting the tip on the handle. Further an unrestricted passage through which the material handled by the aspirator flows is provided by the invention.

I claim:

1. A surgical aspirator, comprising a handle having a neck projecting therefrom and a passage extending axially through said neck, said handle being adapted to connect said passage to a source of vacuum, the outer end of said neck being externally tapered, a portion of said neck adjacent said tapered end being externally threaded, a nut arranged on said neck and having a through opening one portion of which is internally threaded to work on said externally threaded portion and an adjacent portion of which is tapered and engageable with said tapered end, and a tip tubular in cross-section partially arranged in said passage and slidable therein, said neck being slit so as to render said neck radially contractable whereby said neck is clamped against said tip when said nut is moved axially of said neck to wedge said tapered portion against said tapered end.

2. A surgical aspirator, comprising an elongated handle having a neck projecting axially from one end thereof and a passage extending axially through said neck and handle, said handle being adapted to connect said passage to a source of vacuum, the outer end of said neck being externally tapered, a portion of said neck adjacent said tapered end being externally threaded, a nut arranged on said neck and having a through opening an inner portion of which is internally threaded to work on said externally threaded portion and an outer portion of which is tapered corresponding to said tapered end and engageable therewith, and a tip tubular in cross-section removably arranged in said passage and slidable therein, said neck having a slit extending axially thereof whereby said neck is clamped against said tip when said nut is turned so as to move axially of said neck to wedge said tapered portion against said tapered end.

3. A surgical aspirator, comprising an elongated handle having a neck projecting axially from one end thereof and a passage extending axially through said neck and handle, said handle being adapted to connect said passage to a source of vacuum, the outer end of said neck being externally tapered, a portion of said neck

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adjacent said tapered end being externally threaded, a nut arranged on said neck and having a through opening an inner portion of which is internally threaded to work on said externally threaded portion and an outer portion of which is tapered corresponding to said tapered end and engageable therewith, a tip tubular in cross-section removably arranged in said passage and slidable therein, and a protuberance projecting radially outwardly from said tip and engageable with said nut thereby to provide a stop to limit the depth of insertion of said tip into said passage, said neck having a pair of diametrically opposite parallel slits extending axially of said neck from the outer extremity thereof and terminating short of the extremity of the inserted end of said tip whereby said neck is clamped against said tip when said nut is turned so as to move axially of said neck to wedge said tapered portion against said tapered end.

4. A holder for a surgical aspirator tip, comprising an elongated handle having a neck projecting axially from one end thereof and a passage extending axially through said neck and handle, said handle being adapted to connect said passage to a source of vacuum, the outer

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end of said neck being externally tapered, a portion of said neck adjacent said tapered end being externally threaded, said neck having a pair of diametrically opposite parallel slits extending axially of said neck and leading to the outer extremity thereof and a nut arranged for axial movement on said neck and having a through opening an inner portion of which is internally threaded to work on said externally threaded portion and an outer portion of which is tapered corresponding to said tapered end and engageable therewith.

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