Aug. 19, 1941. H. P. SIEGEL 2,253,143

DENTAL ASPIRATOR

Filed Aug. 3, 1940

Fig.1.

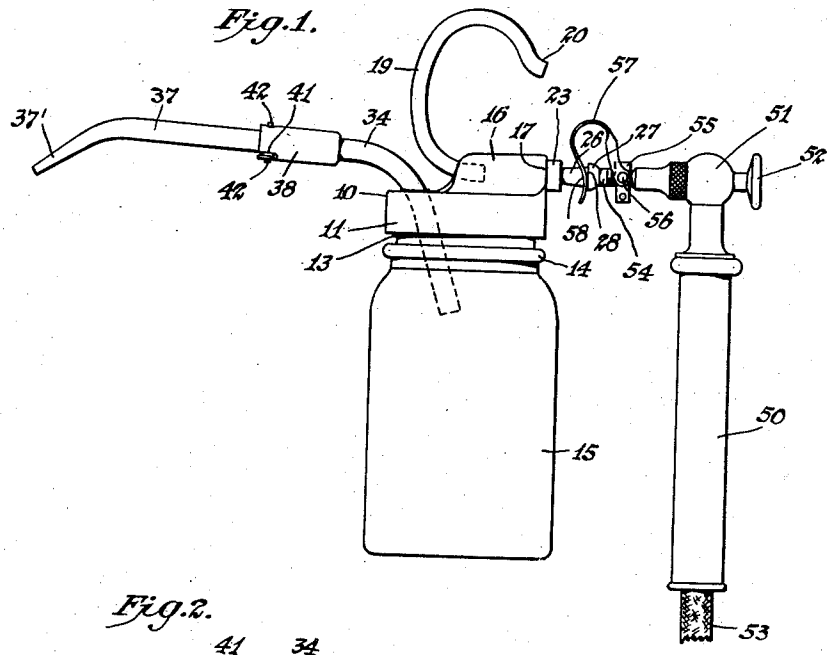


Fig.2.

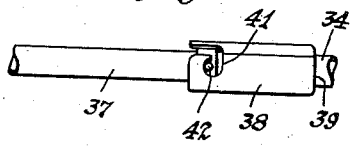


Fig.3.

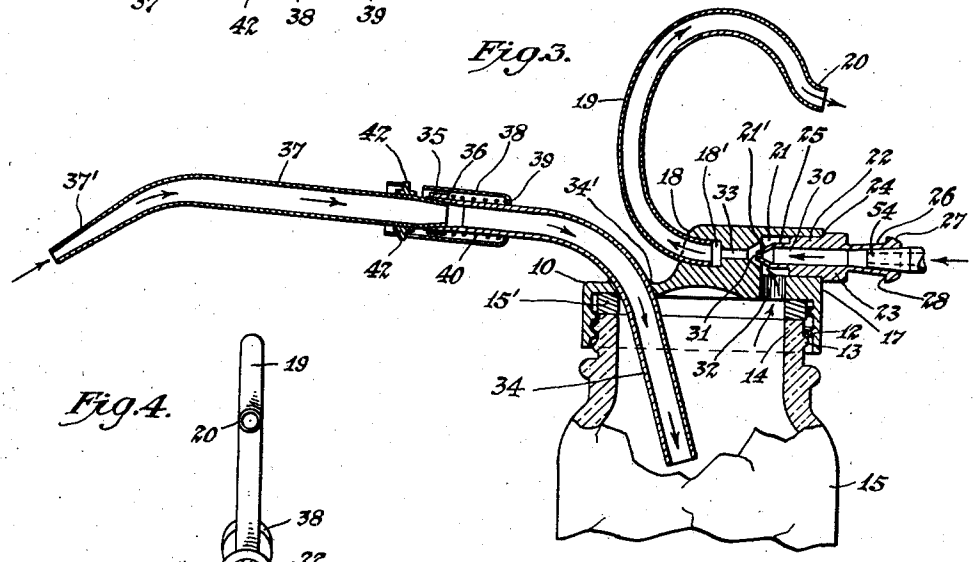


Fig.4.

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DENTAL ASPIRATOR

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1 Claim. (Cl. 32—33)

This invention relates to improvements in dental aspirators and is designed to be used as an instrument for removing and trapping secretions of the mouth, blood and other debris resulting from dental work.

An object of the invention is to provide an aspirator adapted to be readily attached to commonly employed dental equipment known as an air cut-off, and to thereby be capable of manipulation with one hand of a dentist while his other hand is free to handle other instruments.

Another object of the invention is to provide means for detaching the suction nozzle of the aspirator for purposes of sterilization, and for the substitution of nozzles differing in size of apertures therethrough, or in length and shape, and without disturbing the integrity of the necessary tight joint between such nozzles and cooperating parts of the device.

A further object of the invention resides in means for adjusting the angle of presentation of the suction nozzle for greater convenience in reaching certain parts of the mouth of a patient while still maintaining the tight joint.

Other advantageous features and objects of the invention are hereinafter set forth.

Heretofore saliva ejectors, or other forms of dental equipment utilized for removing secretions of the mouth during the work of preparing cavities in the teeth for filling, have been largely dependent upon connection with running water in order to obtain the desired suction. Such devices are wasteful, and not only too clumsy but impractical for the purpose set forth herein.

This invention is also useful in mouth or nose surgery, or other minor forms of surgical operations where it is similarly desirable to promote better vision by the removal of accumulations of blood in the working area during the operation, and particularly with respect to coagulation tending to seriously interfere with the work of the surgeon. The device is effective with respect to the removal of the apex of a broken root of a tooth, solids in suspension in the saliva, or other forms of debris that may occur, such as bone splinters resulting from an extraction. Furthermore cavities in the teeth under treatment may be conveniently dried and debris removed therefrom without the shock to a patient that frequently happens when a jet of air is directed into a sensitive cavity, and also with less danger of infection.

The invention consists of a special cap for attachment to a glass jar, or other suitable receptacle, having a suction nozzle and an injection nozzle together with an exhaust pipe, all forming component parts of said cap, and symmetrically arranged in transverse alignment so as not to interfere with the line of vision of the operator, the nozzles being positioned diametrically opposite but pointed in a similar direction. The rear end of the injection nozzle extends beyond the periphery of the cap and is adapted to be engaged by and secured to a fitting carried by the air cut-off, and which latter may thus be employed as a handle for manipulating the device.

In the drawing illustrating a suitable embodiment of the invention,

Figure 1 is a side elevation, on a reduced scale, of my improved dental aspirator shown attached to a dental air cut-off fixture.

Figure 2 is a detail plan view of the bayonet slide for attaching the suction nozzle of the device.

Figure 3 is a central vertical section of the device of Figure 1 with the air cut-off shown broken away, and,

Figure 4 is a rear elevation with the jar omitted, and the injection nozzle shown in cross section.

Referring now in detail to the drawing, 10 designates a cap or body member having an annular depending skirt portion 11 which is internally threaded, as at 12, for engagement with external threads 13 of the neck 14 of a jar 15, the latter being preferably made of amber glass, or which may otherwise be made of clear glass with a frosted finish, with a view in either case to hiding from the patient any objectionable exposure of the contents resulting from the use of the device. A gasket 15' beneath the top wall of the member 10 provides for a tight joint between the same and the top of the neck 14 of the jar when the engaging threads are tightened.

The body member 10 is a casting and includes a projection 16 extending upwardly from and partly across the flat top of member 10. The rear wall 17 of the projection 16 is flattened and substantially flush with the outer surface of skirt 11. The forward wall 18 is provided with an opening 18' for the insertion therein of one end of an air exhaust pipe 19, which may be secured in place by solder to obtain an air-tight joint. Pipe 19 is C-shaped, curving upwardly and rearwardly over the projection 16 to provide a suitable hook by means of which the device may be conveniently suspended beneath a dental table when not in use. It will be noted that the open discharge end 20 of the pipe 19 is directed

toward the rear of the device and therefore away from the face of the patient, to permit the inoffensive escape of any unpleasant odors emanating from the contents of the jar.

Projection 16 is bored from the rear wall inwardly, as at 21, for the reception of the shank 22 of an air injection nozzle 23 having a shoulder 24 adapted to engage the rear wall 17, for determining the proper position of the nozzle within the opening 21. Solder is employed to effect a tight joint between engaging surfaces. Forward of the shank 22 the nozzle is reduced in diameter, as at 25, to provide clearance circumferentially thereof within the opening 21. The inner end of the nozzle is tapered to a blunt point. At its other end, and beyond the shoulder 24 there is provided an extension 26 terminating in a head 27 forming a shoulder 28 for a purpose which will presently appear.

The forward end of opening 21 is frusto-conical in shape, as shown at 21', the annular walls thereof being substantially parallel with those of the tapered end of nozzle 23, but spaced therefrom. Nozzle 23 is hollow to provide a passageway 30 the walls of which taper rearwardly through the projection 26 and the head 27. The opposite pointed end of the nozzle is pierced by a relatively small opening 31 communicating with the passageway 30. An opening 32 in the top wall of member 10 provides a port for the passage of air from the jar 15 into opening 21, and through another port 33 leading to the opening 18' and pipe 19, and thence to atmosphere through the open end 20 of pipe 19.

A suction inlet pipe 34 extends through an opening in the top wall of member 10 in alignment with and opposite the forward end of the projection 16, and is secured by solder, as indicated at 34', to prevent any leakage of air into the jar around the pipe. The lower end of pipe 34 projects beyond the bottom of skirt 11 so as to be comparatively remote from the port 32, yet leaving ample clearance above accumulations in the jar 15, and is inclined at an angle to the axis of the jar as shown. Above the top wall of the body member the pipe 34 curves upwardly and forwardly into a plane that is slightly above the horizontal, and terminates in an annulus 35 of greater diameter than the pipe to provide a shoulder 36.

The upper end of pipe 34 is tapered internally to receive the externally tapered rear end of a detachable suction nozzle 37. Means are provided for coupling the nozzle 37 to the pipe 34 under tension so that the engaging tapered surfaces will be effective to form a substantially air-tight joint about which nozzle 37 may be rotated without disturbing the integrity of the joint. For this purpose a bayonet slide 38 is provided, and is mounted loosely on the forward end of pipe 34 over the annulus 35. Pipe 34 passes through an opening in the rear wall 39 of the slide 38, and which rear wall serves as an abutment for one end of a coil spring 40 within the slide 38, that surrounds the adjacent end of pipe 34. Slide 38 is provided with bayonet slots 41 which are diametrically opposed adjacent its forward end, and adapted to engage similarly disposed pins 42 projecting radially from adjacent the rear end of the nozzle 37. It will be understood that the annulus 35 consists of a flat ring that may be soldered to the end of pipe 34 after the slide and spring 40 have been strung thereon. This is easily accomplished by moving the slide a sufficient distance along pipe 34 to uncover its forward end.

It will now be apparent that when the nozzle 37 has been inserted in the end of pipe 34, and slide 38 has been moved forwardly, the pins 42 will enter the bayonet slots 41, and the spring 40 will be compressed between the rear wall 39 and shoulder 36, and upon partial rotation of the slide to the position shown in Figure 2, the parts will so remain until such time as it is desired to remove the nozzle by reversing the described operation.

The forward end 37' of nozzle 37 is bent at an angle of approximately 30 degrees, and is tapered to provide a reduction in diameter at its extremity, and likewise a suitable reduction in the diameter of the opening therethrough.

In Figure 1 there is shown a portion of a dental fixture known as an air cut-off consisting of a hollow cylindrical handle 50 connected to a valve 51 at its upper extremity having a control button 52 adapted to be depressed by the thumb to open the valve and admit air under compression coming from a source of supply through a hose 53, such as a drum, not shown. Leading from valve 51 in a plane at a right angle to the axis of the handle 50, is a nozzle 54 having a tapered end adapted to fit within the tapered end of passageway 30 within the extension 26. Nozzle 54 is threaded for engagement with a nut 55, thus adjustable axially of the nozzle. Pivoted to the nut 55 at 56 is a spring clip 57 of looped formation, and having a bifurcated end 58.

The device of this invention may be readily attached to the dental cut-off by inserting the nozzle 54 in the tapered opening in the end of the extension 26, and then swinging the clip 57 about its pivot 56 in a counterclockwise direction which will bring the bifurcated end 58 of the clip into engagement with the shoulder 28 of the head 27 at opposite sides of extension 26. Thus the engaging parts of the joint are held in position under tension, and a tight union is effected. By swinging the clip 57 in a clockwise direction the elements may be instantly disconnected.

The functioning of the device is as follows:

After the connection has been established with the air cut-off and button 52 is depressed, air under an available compression of from 20 to 40 pounds will pass through the valve 51, nozzle 23, and out through pipe 19, thus creating a suction of air from within the jar 15 through the port 32, as indicated by the arrows in Figure 3. Air thus displaced from the jar 15 will set up a flow of air through the nozzle 37 and pipe 34 in the direction of the arrows, so that any fluids, dust, or other debris within the field of the opening at the tip of the end 37' will be drawn into the jar 15 and trapped therein. Nozzle 23 is capable of setting up a vacuum of 7 to 10 inches in the jar.

It will now be apparent that the handle 50 of the cut-off may be grasped by a dentist, and the aspirator may thus be supported in an upright position for the purpose intended, and because nozzle 37 is rotatable, and in addition has the offset end 37', its angle of presentation to the different parts of the oral cavity may be infinitely varied at the will of the operator while the jar is held in the substantially upright po-

sition necessary to prevent any loss of its contents.

The device may thus be used as an instrument for removing secretions tending to obstruct the vision of the operator, or other substances. The suction nozzle may be removed for sterilization, and the jar may be emptied when required.

The foregoing description is merely illustrative, and not intended as limiting the invention thereto, as various modifications within the scope of the appended claim may be made without departing from the spirit of my invention.

I claim:

An aspirator unit comprising a receptacle and a cap rigidly secured thereto for one-hand operation, the cap having a generally radial projection molded thereon above the top of the cap, a fluid passage axially of said projection, a fluid pressure supply pipe attached to said projection and passage at the outer end thereof, an exhaust pipe leading from said projection and passage at the opposite end thereof, an injector nozzle formed within said projection substantially axially of said passage for creating suction within said receptacle, a short passage through the top of the cap leading into a space around said nozzle, and a suction inlet pipe arranged in the general plane of said supply and exhaust pipes and entering said receptacle through the top of said cap between an edge and the exhaust end of said projection, said suction inlet pipe being substantially rigidly secured to the top of said cap, said fluid pressure supply pipe extending in the general direction of the axis of said receptacle but spaced therefrom an amount sufficient for the fingers to be conveniently placed between said pipe and receptacle, said pipe and its attachment to the receptacle being rigid enough for the pipe to serve as a support for the receptacle.

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