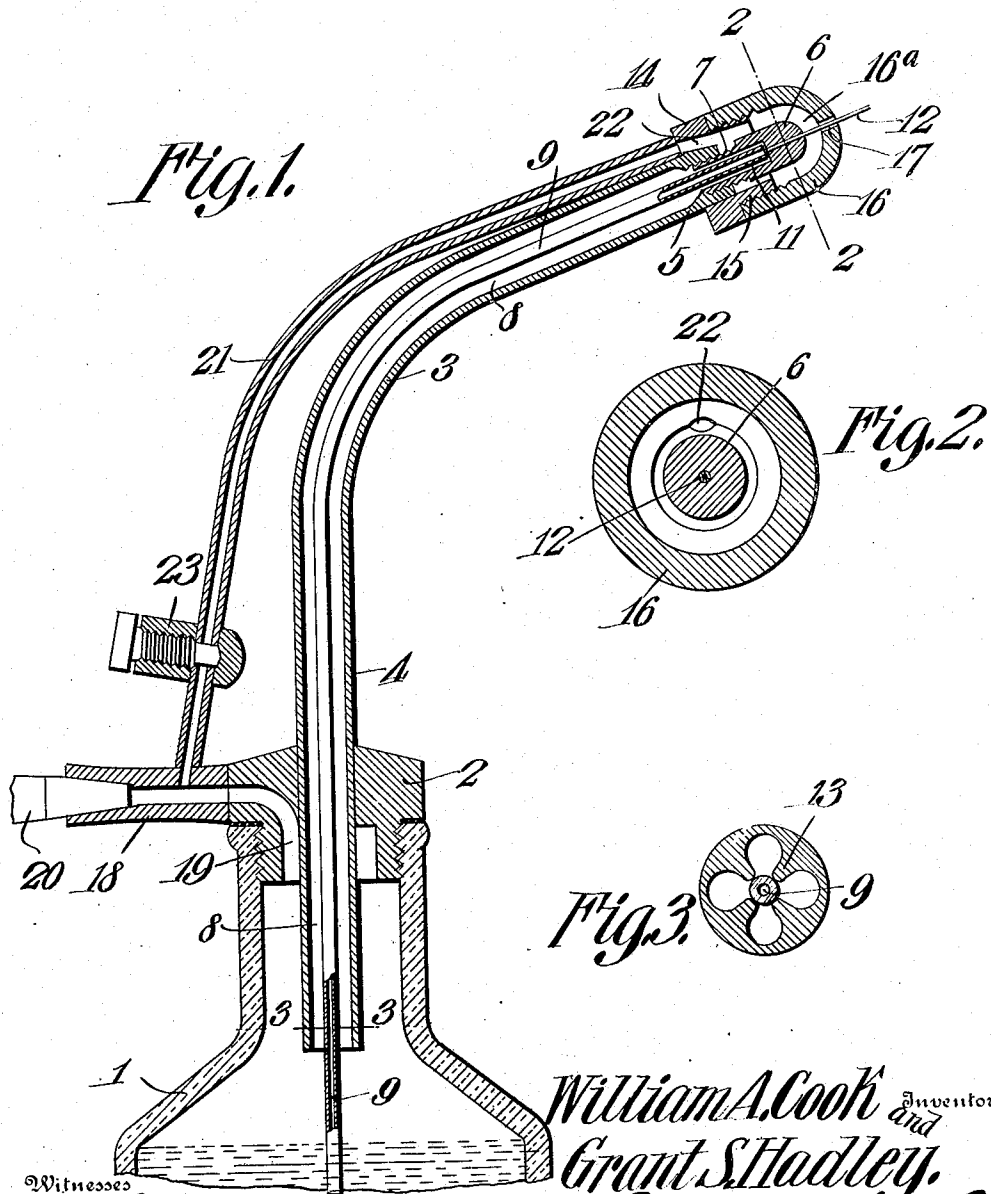


W. A. COOK & G. S. HADLEY.
 ATOMIZING DENTAL OBTUNDER.
 APPLICATION FILED MAY 9, 1908.

Patented Feb. 9, 1909.

911,646.



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UNITED STATES PATENT OFFICE.

WILLIAM A. COOK AND GRANT S. HADLEY, OF COLDWATER, MICHIGAN.

ATOMIZING DENTAL OBTUNDER.

No. 911,646.

Specification of Letters Patent.

Patented Feb. 9, 1909.

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To all whom it may concern:

Be it known that we, WILLIAM A. COOK and GRANT S. HADLEY, citizens of the United States, residing at Coldwater, in the county of Branch and State of Michigan, have invented a new and useful Atomizing Dental Obtunder, of which the following is a specification.

This invention relates to that type of devices for producing local anesthesia by projecting on the part in a finely divided state, a rapidly evaporating liquid which, during its change of condition, absorbs heat from the part against which it is projected and lowers the temperature thereof to such a degree that sensation is temporarily lost in said part.

One object of the invention is to improve such devices for obtunding sensitive parts by means of a low temperature rapidly obtained instead of by heat as is commonly used at the present time.

Another object of the invention is directed to a simple, inexpensive and effective apparatus for applying the obtunding preparation to the sensitive part, principally the teeth, so that work thereon may be continued without interruption by the patient due to the pain of the operation.

With these and other objects in view the invention consists of the novel construction, combination and arrangement of parts hereinafter described and claimed and illustrated in the accompanying drawing in which—

Figure 1 is a central vertical sectional view of the improved obtunder; Fig. 2 a cross sectional view to the outlet on the line 2—2 of Fig. 1, and Fig. 3 a similar sectional view of the tubes on the line 3—3 of the same figure.

Like reference numerals are used for the same parts in all the figures.

In the drawing, 1 indicates a receptacle, a bottle for instance, for holding the volatile liquid, into the neck of which is screwed a closure 2 made air tight in any well-known manner. A tube 3 having an intermediate bend of easy curvature terminating in two straight arms 4 and 5 at an obtuse angle to

each other, has one of its tubular arms 4 extended vertically through the closure 2 into the receptacle, the lower end of said tubular arm always remaining above the level of the liquid in the receptacle. The other tubular arm 5 trends upwardly and projects outwardly to any desired or convenient distance. The bore of the tubular arm 5 is interiorly threaded at its end for a head or plug 6 having a threaded neck 7 which screws into said bore.

Within the bore 8 of the tube 3 is placed a smaller tube 9 its lower end reaching to or near the bottom of the receptacle 1 as usual. The outer end of the small tube 9 projects beyond the incasing tube 3 into a longitudinal socket 11, made in the plug 6 of greater diameter than the small tube. The end of the small tube 9 is flat and perpendicular to the axis of said tube as is also the bottom of the socket 11. By turning the plug 6 in opposite directions the distance between the end of the small tube and the bottom of the socket is increased, decreased, or the two parts brought into contact.

Fitted tightly into the plug 6 in the axis of the small tube 9 is a tubule 12 extending from the bottom of the socket 11 through the plug 6 and for some distance beyond the end of the tube, the object of said tubule will be described later.

The small tube 9 as heretofore mentioned, is smaller than the bore 8 of the tube 3, and to sustain said smaller tube in place within said bore the latter is made of cruciform shape, see Fig. 3, the small tube touching the ends of the ribs 13 which extend inwardly in a radial direction between the arms of the cruciform bore 8.

Integral with, or secured to the outer end of the exterior tube 5 is a collar 14 provided with a projecting threaded portion 15 on which a cap 16, having a hemispherical head, is adapted to be screwed. The tubule 12 projects through a small hole 17 in the head, slightly larger than the tubule. Between the plug 6 and the cap 16 is a space 16*.

A short tubular connection 18 projects

laterally from the closure 2 above the mouth of the receptacle 1 and communicates through a channel 19 in the closure with the interior of said receptacle. The bore of the tubular connection 18 is flared at its outer end or it may be threaded for a tightly fitting cock 20 which controls the access of compressed air into the receptacle 1. From the upper side of the tubular connection 18 an independent air pipe 21 extends above the exterior tube 5 to the collar 14 thereon and is tightly secured thereto. An inclined channel 22 extends through the collar 14, communicating at one end with the air pipe 21 and at the other end with the space 16^a between the plug 6 and the cap 16. An air cock 23 on the pipe 21 controls the passage of compressed air to the interior of the cap 16.

With an apparatus constructed as above described and assuming that the receptacle 1 is a bottle, the latter is first partially filled with a suitable volatile liquid and then closed air tight by the closure 2. The cocks 20 and 23 are also shut. The obtunder may now be grasped in the hand and applied to the part to be anesthetized, as for instance, a tooth. On opening the cock 20 compressed air from any convenient source enters the bottle and forces the volatile liquid therein through the small inner tube 9 to its outer end and through the tubule 12 to the tooth to be obtunded. At the same time the liquid enters the inner tube, compressed air passes up the outer tube 5 and into the socket in the plug 6 where it meets the liquid in the space between the end of the inner tube and the bottom of said socket 11 and mixing there, the air and liquid escape together through the tubule 12, the liquid being broken into a very fine spray by the air pressure so that it will volatilize quickly. The change of state from a liquid to a gaseous one requires a relatively large amount of heat which is abstracted, in this case, from the tooth, and so rapidly does the volatilization take place that the temperature of the tooth is lowered in a very short time to such a degree that sensation therein is lost. To further hasten the evaporation of the liquid the cock 23 is opened to admit compressed air into the space 16^a which passes out through the hole 17 around the tubule, envelops the spray and expanding, absorbs heat which tends to volatilize the spray more quickly and further reduce its temperature. The fineness of the spray is regulated by turning the plug 6 which serves as a valve for controlling the quantity of compressed air admitted to the tubule.

What is claimed is:—

1. A dental obtunder comprising two tubes through which liquid and compressed air are separately forced, a combining tube through

which the liquid and air pass into the atmosphere, the former in a finely divided condition or spray, and a second air tube arranged to carry compressed air to the issuing spray and surround the same with an envelop of expanding air.

2. A dental obtunder comprising two tubes with concentric outlets through which liquid and compressed air are separately forced, a combining tube through which the liquid and air pass to the atmosphere as a spray, and a plug carrying said combining tube threaded into the outer end of the air tube, and loosely surrounding the end of the liquid tube for the passage of air, said plug adapted to control the escape of compressed air to the combining tube or to entirely cut off said air.

3. A dental obtunder comprising two tubes with concentric outlets through which liquid and compressed air are separately forced, a plug longitudinally movable in the outer tube having a socket for the liquid of greater diameter than said tube, and a combining tube extending through and beyond said plug in the axis of said liquid tube, said plug adapted to control the quantity of compressed air passing through said combining tube.

4. A dental obtunder comprising two concentric tubes through which liquid and compressed air are separately forced, a plug threaded into the bore of the outer or air tube and having a socket in which the end of the inner or liquid tube loosely fits, and a combining tube extending from the bottom of the socket through and beyond the end of said plug in the axial line of said inner tube, said plug adapted to control the entrance of compressed air into the combining tube.

5. A dental obtunder comprising two tubes with concentric outlets through which liquid and compressed air are separately forced, a combining tube through which the liquid and compressed air pass to the atmosphere as a spray, a plug carrying said combining tube adapted to control the escape of compressed air to the combining tube, a cap inclosing said plug and having a perforation for the passage of the combining tube, and a second air tube discharging compressed air into said cap to escape therefrom to the atmosphere around the combining tube.

6. A dental obtunder comprising two concentrically disposed tubes through which liquid and compressed air are separately forced, the outer or air tube having on its outer end a collar provided with a threaded projection, a plug threaded on its inner end screwed into the outer end of the air tube bore and having a socket for the inner or liquid tube, said plug adapted to control the distance between the end of said inner tube and the bottom of said socket, a combining

tube carried by said plug through which compressed air and fluid escape to the atmosphere, a cap screwed on the projection of said collar and having a perforation for the combining tube to pass through, and a second compressed air tube connecting through a channel in said collar into a chamber between said cap and said head.

In testimony that we claim the foregoing

as our own, we have hereto affixed our signatures in the presence of witnesses. 10

WILLIAM A. COOK.
GRANT S. HADLEY.

Witnesses:

LYMON GREEN,
MARK S. ANDREWS,
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