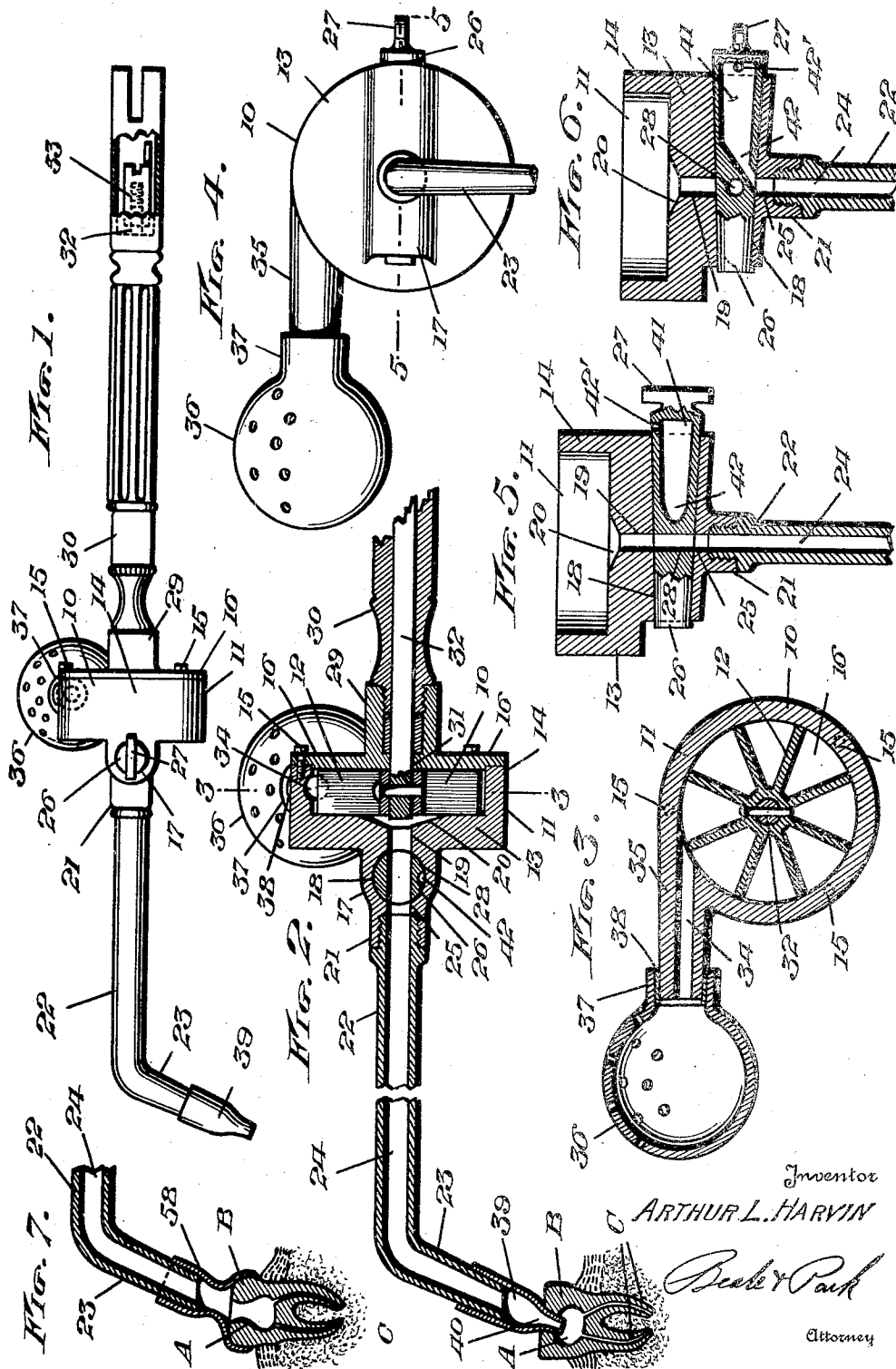


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METHOD AND MEANS FOR TREATING AND FILLING TOOTH CAVITIES AND NERVE CANALS.

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METHOD AND MEANS FOR TREATING AND FILLING TOOTH CAVITIES AND NERVE CANALS.

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To all whom it may concern:

Be it known that I, ARTHUR L. HARVIN, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Methods and Means for Treating and Filling Tooth Cavities and Nerve Canals; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to dental practice for filling tooth cavities where the nerve canals are involved and removal of the nerve, sterilizing the nerve canals, and filling the canals where required.

Usually, the process of removing a nerve from a root canal, the process of applying the medicament thereto and the process of filling the same are distinct and separate. Ordinarily, for the removal of a nerve, an instrument known as a nerve broach, which is in the form of a fine wire, is introduced into the root canal and is rotated to twist the nerve thereabout, after which the broach is removed, carrying the nerve therewith. The broach is then wrapped with an absorbent, saturated with a suitable medicament and is again introduced into the canal. Then in applying a filling, a broach or similar instrument is dipped into the filling material and introduced into the canal with a small quantity of the filling material adhering thereto. The filling material is deposited within the canal and the broach withdrawn. This operation is repeated until the canal is filled.

These usual processes have marked disadvantages, since it is necessary to introduce an instrument into the root canal with resultant irritation of the tissues and danger of infection from a septic instrument. In applying the medicament, it is difficult to introduce the latter to all surfaces of the canal, and in introducing the filling it is excessively difficult to locate the fillings at the extreme apex of the canal since, as the canal narrows toward its apex, the globule of filling upon the broach contacts with all circumscribing portions of the canal wall,

and, adhering thereto by capillary attraction, forms an air pocket between the filling and the apex of the canal. Such air pockets almost invariably cause subsequent root abscesses.

It is therefore an object of the present invention to produce a method by which a nerve may be removed from the root canal of a tooth, a medicament may be applied to the wall surfaces of the canal and then removed and a filling may be introduced to the canal without the introduction of an instrument into the latter, and without the possibility of leaving an air pocket between the filling and the apex of the canal.

In carrying out my method, I apply suction to the tooth cavity and the root canals, thus withdrawing the nerve from the tooth and creating a vacuum within the tooth cavity and the root canals. I maintain the vacuum thus formed in the cavity and canals and then open to the vacuum a chamber charged with medicament or disinfectant; behind said charge I admit air to said chamber. With the inrush of air to relieve the vacuum said charge (which lies in the passage way of the air) is sucked inward and fills said cavity and canals ahead of the air thus insuring access of the medicament to the innermost recesses of said canal. The medicament is then removed by pump suction and vacuum is again formed as before; then said chamber is charged with a fluent filling, which is likewise by vacuum action sucked into the canals and cavity in advance of the air as before described, thus avoiding the formation of air pockets in the nerve canals.

The accompanying drawings show a form of device I have invented to practice my invention and it is my object to design a dental instrument for carrying out the aforesaid method which may be readily attached to the well known dental engine usually installed for dental practice. I do not confine myself to this form of construction as other devices having equivalent features could be employed in carrying out my invention and I reserve the exclusive right to make such changes as may be found necessary or advisable.

In the accompanying drawings—

Fig. 1 is a side elevation of the complete invention.

Fig. 2 is a simple longitudinal section through the invention showing it applied to a tooth.

Fig. 3 is a vertical section on line 3—3 of Fig. 2.

Fig. 4 is an elevation looking from the nozzle end of the device.

Fig. 5 is a fragmentary horizontal section on line 5—5 of Fig. 4.

Fig. 6 is a view similar to Fig. 5 showing the turn plug in its other position.

Fig. 7 is a detail section illustrating a different form of connector.

Referring by numerals to component parts in the drawings, the present invention includes a centrifugal pump 10, including a casing 11, within which there is mounted the vaned rotor 12.

The casing 11 includes a front end wall 13, which has formed integrally therewith, the circumscribing wall 14, to the otherwise free edge of which there is secured by suitable removable fastening devices 15, an end wall 16 for the pump casing.

Formed upon the outer face of the wall 13, there is a diametrically extending rib 17 provided with a longitudinally extending valve chamber 18, opening through the ends of the rib and having a gradual taper from end to end.

A passage 19 is formed centrally through the wall 13, communicating with the interior of the pump casing and also communicating with the chamber 18. The inner end of this passage 19 is flared as shown at 20.

The rib 17 carries a forwardly extending centrally located integral interiorly threaded nipple 21 which receives the threaded rearward end of a nozzle shank 22, carrying a laterally directed nozzle 23 at its forward end. A continuous passage 24 is formed through the nozzle and the shank 22 and communicates with a passage 25 formed in the nipple 21 and communicating also with the chamber 18, at a point diametrically opposite to the passage 19.

Removably engaged in the chamber 18 there is a rotatable turn plug 26 which is tapered and which is ground into the chamber 18. This turn plug 26 carries a finger piece 27 at its major end, by which it may be turned in the chamber 18, and by which it may be removed from the chamber.

Formed transversely through the turn plug 26 there is a port 28 adapted to register with the passages 19 and 25 for the establishment of continuous passage from the outer end of the nozzle 23 into the pump casing.

Formed upon the outer face of the wall 16 of the pump casing there is an interiorly threaded nipple 29, which receives thereinto

a hollow handle 30, which may consist of a number of assembled sections as illustrated in Figure 2. This handle is similar to the handles of other dental instruments adapted to be driven by a dental engine.

An opening 31 is formed centrally in the wall 16 of the pump casing, and engaged through this opening and continued through the handle there is a pump shaft 32, carrying within the pump casing, the rotor 12. The rearward end of the shaft 32 is provided for engagement with the terminal connection of a dental engine shaft, to be driven thereby. This is indicated at 33 in the drawings.

The pump casing is provided with a tangential discharge passage 34 formed through a cylindrical extension 35 on the circumscribing wall 14, and engaged with the outer end of the extension 35 there is a removable receiving device 36, in the form of a glass bulb formed with a circular neck 37 which receives the extension 35 therewithin. A rubber gasket 38 is engaged between the extension 35 and the neck 37. The upper portion of the bulb 36 is foraminous for the egress of air.

Employed in connection with the structure just set forth, there is a connector, in the form of a tapered sleeve 39, its taper conforming to the nozzle 23, which is also tapered, for the reception of the nozzle within the sleeve. The minor end of the sleeve is reduced to form a neck 40. The neck 40 of the sleeve 39 is adapted to be cemented into a cavity indicated at A in a tooth indicated at B to form an air-tight union, and the fit between the nozzle 23 and the sleeve 39 is such as to prevent the entrance of air therebetween.

With the complete instrument connected with a tooth as just described, the motor is operated and air is exhausted from the tooth, as will be readily understood. Continued operation of the motor results in the application of suction to the tooth cavity and the root canals indicated at C so that the nerve branches within the canal are withdrawn from the tooth, carried through the pump and discharged into the receiver 36, the latter being provided so that the character of matter removed from the tooth may be ascertained. In order that a medicament and subsequently a filling may be introduced to the tooth, the turn plug 26 is provided with a vertical chamber 41 therewithin, this chamber having a discharge port 42' at its inner lower end which opens through the periphery of the plug 26 midway between the ends of the port 28 and in position for registration with the passage 25. An air inlet vent 42 is formed through the plug at the outer upper end of the chamber 41, and communicates with the latter.

It is obvious, from the showing in Figs. 130

5 and 6 that, when the port 28 is in registration with the passages 25 and 19, the port 42 will be closed by the circumscribing wall of the chamber 18, and that when the port 42 is in registration with the passage 19, the port 28 will be out of registration with the passages 25 and 19. Thus, with a medicament or filling within the vertical chamber 41, the pump may be operated to exhaust the air from the tooth cavity establishing a vacuum; plug 26 is then turned to bring port 42 in registration with passage 25 when air entering through port 42' will cause the vacuum to first suck in the contents of chamber 41 and fill the nerve canals and tooth cavity thus excluding the entry of air thereto. I accomplish this important result by positioning the chamber 41 in the air duct line intermediate of said line and the vacuum relief vent, whereby the contents of chamber 41 is first exposed to the vacuum influences and sucked into the nerve canals filling the same. The medicament or the filling in the laterally disposed chamber 41, normally bears directly on port 42 excluding the entrance of air between said port and contents of chamber 41.

The turn plug 26 is readily removable from the chamber 18, as will be seen from the drawings, thus facilitating the sterilization of the instrument, and also permitting the loading of the chamber 41 through the port 42 first with the medicament and subsequently with the fluent filling.

In Fig. 7 there is illustrated a modified form of connector, which consists of a rubber sleeve 58 which is engaged about the tooth, and within which the nozzle 23 is engaged.

I claim:

1. The dental method of removing the nerve and other matter from tooth cavities and nerve canals, treating said cavity and canals to a medicament removing said medicament and finally filling said cavity and canals; which consists in removing by suction the contents of said cavity and canals, then continuing said suction to form a vacuum in said cavity and canals, then exposing to the influence of said vacuum a medicament, then withdrawing said medicament by suction then continuing said suction to form a vacuum in said cavity and canals, and finally exposing to the influence of said vacuum a filling for said cavity and canals.

2. The method of treating teeth where the nerve canals are involved which consists in connecting air tight a duct to an opening in said canals, exhausting air sufficiently to withdraw by suction the contents of said canal and then continuing said suction to form a vacuum in said canals and that portion of said duct adjacent said canals, exposing a medicament located in said duct in-

intermediate of said vacuum and a relief port for said vacuum, then withdrawing said medicament by air suction.

3. A dental instrument formed of a rotary exhaust pump having a nozzle adapted for connection to a tooth cavity or nerve canal, a hollow turn plug for fluent matter forming a part of said nozzle and having an air inlet duct and an air outlet port for said matter located in position to communicate with said nozzle when the plug is in position to interrupt communication between the nozzle and pump and to lie out of communication with the nozzle when the turn plug is in position to establish communication between the nozzle and pump.

4. A dental instrument including a pump, an inlet duct for the pump, means for establishing communication between the passage of the duct and the tooth cavity and a revoluble reservoir positioned in the air duct line intermediate of the pump and outer end of nozzle, said reservoir being adapted to receive fluent matter therein and having an air inlet vent and a fluent discharge port interruptedly connected to said duct. Whereby said matter is forced by air pressure into the tooth cavity and root canals in advance of the air.

5. A dental instrument including a casing, a pump element within the casing and arranged for cooperation with the casing to form an operable pump structure, said casing having a turn plug socket formed therein, a duct communicating with the turn plug socket, said casing having an inlet passage for the pump communicating with the turn plug socket, a turn plug located in the socket and operable to establish and interrupt communication between the duct and the pump inlet passage, said turn plug having a reservoir therewithin and having an outlet communicating with the reservoir and located in position to communicate with the duct when the turn plug is in position to interrupt communication between the duct and pump and to lie out of communication with the duct when the turn plug is in position to establish communication between the duct and pump, said turn plug having a vent communicating with the reservoir and located in position to be closed by the casing when the reservoir outlet is out of communication with the duct and to be exposed when the reservoir outlet is in communication with the duct.

6. In combination, a dental instrument handle carrying a shaft operable by a dental engine, of a pump connected to said handle and operated by said shaft, a pump nozzle adapted for airtight connection to a tooth cavity or nerve canals, an air duct line connecting said nozzle and pump, a chamber in said duct line having a cut-off therefrom and an air inlet, said cut-off and inlet being posi-

tioned relatively to admit therebetween the lodgment of a medicament and filling in said chamber.

7. In a dental instrument for treating
5 tooth cavities and nerve canals the combination of an air duct and a pump casing forming part thereof said casing enclosing a rotary air pump and formed with a tangential discharge passage leading to a removable receiver and means for operating
10 said pump.

8. In a dental instrument of the character described the combination of an air duct, a pump casing having a tangential discharge passage, a foraminous receiver detachably connected to said passage, a handle
15 connected to said casing a shaft mounted in said handle keyed to said motor and adapted to be operated by a dental engine.

In testimony that I claim the foregoing
20 as my own, I affix my signature.

ARTHUR L. HARVIN.