No. 780,146. PATENTED JAN. 17, 1905.

A. A. WILCOX & M. JEWETT.

DENTAL INSTRUMENT.

APPLICATION FILED JUNE 13, 1904.

Fig. 1.

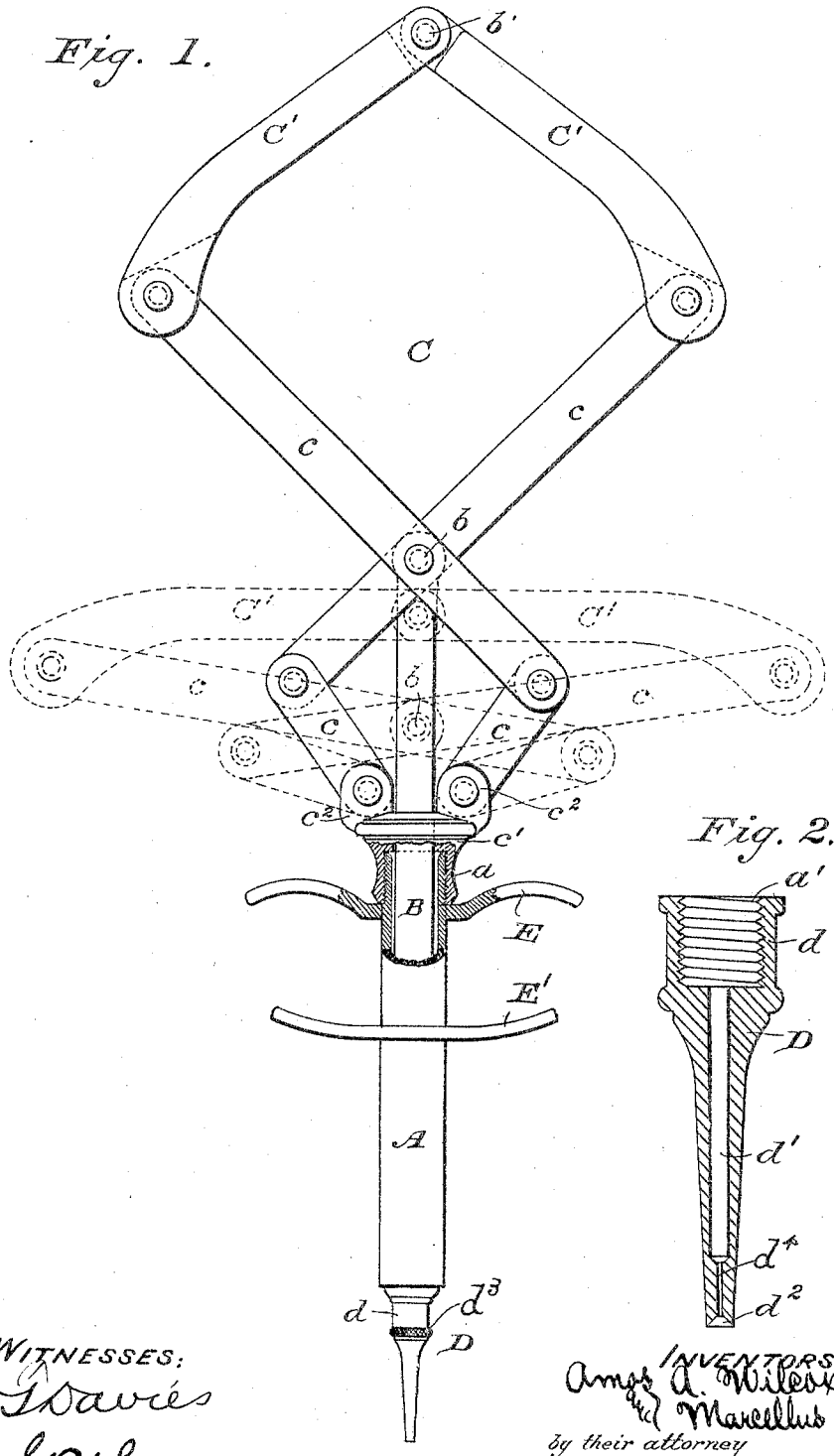

Fig. 2.

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UNITED STATES PATENT OFFICE.

AMOS A. WILCOX AND MARCELLUS JEWETT, OF CLEVELAND, OHIO.

DENTAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 780,146, dated January 17, 1905.

Application filed June 13, 1904. Serial No. 212,234.

To all whom it may concern:

Be it known that we, AMOS A. WILCOX and MARCELLUS JEWETT, citizens of the United States, and residents of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Dental Instruments, of which the following is a specification, the principle of the invention being herein explained and the best mode in which we have contemplated applying that principle, so as to distinguish it from other inventions.

Our invention relates to dental instruments, and particularly to that class of such instruments which is used to inject a quantity of obtundent material into a tooth to produce a temporary anæsthesia thereof.

Said invention consists of means hereinafter fully described, and specifically set forth in the claims.

As is well known to those skilled in dentistry, the dentine or dense calcified substance which forms a large part of the composition of the teeth is not totally impervious to moisture, but will receive and absorb the same if it be forced into the dentine under great pressure. This characteristic of the dentine has been utilized by forcing through the latter into the pulp or nerve of the tooth a solution of cocaine or other fluid obtundent, so as to cause a temporary anæsthesia of the entire tooth structure before operating upon the tooth. To obtain satisfactory results, however, the injecting instrument must be provided with a seat in the dentine that is air and moisture tight in order that air may not obtain access to the cavity that is being treated or other parts of the tooth structure and that the liquid obtundent may not find an exit to the exterior of the tooth around the discharge-orifice of the instrument. Furthermore, to obtain the most effective results the power tending to force the obtundent material through the dentine should be applied to the reservoir containing this obtundent material in a direction substantially parallel with the direction in which the latter is forced from such reservoir, so that the force will not necessarily act at an angle to the axis of the injector, but will act in line therewith, thereby making that component of the force which is effective equal substantially to the whole force used. Our improved device is designed to utilize this permeability of the dentine of the teeth to moisture, at the same time to render effective substantially all the power spent on the device and to prevent loss or escape of the liquid obtundent and will now be described in detail.

The annexed drawings and the following description set forth in detail certain means embodying the invention, such disclosed means constituting but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings, Figure 1 represents a face view of our improved device with parts in broken section, and Fig. 2 represents an enlarged central longitudinal section of the discharge-nipple.

An ordinary barrel A and piston B, working therein, are provided, the latter being fastened at b to a member C, which is preferably composed of a series of rods pivoted together and of the lazy-tongs type. The rods c, composing the lazy-tongs, are provided with suitable pivots b and b', thereby making the member C contractible and expansible, as can be readily seen. The outer pair of rods are made broad and flat, so as to form a member C', which conveniently fits the palm of the hand to allow the lazy-tongs to be pressed together or expanded. The top of the barrel A is exteriorly screw-threaded, as at a, and adapted to screw within an interiorly-threaded cap c', surrounding the piston B and suitably fastened to the lower end of the member C by small lugs c^2, pivotally connected to the lower pair of rods of the lazy-tongs. The piston B slides freely within said cap c' up and down within the barrel when it is operated by the contraction and expansion of the lazy-tongs. Suitable finger-pieces E E' are fastened to the barrel A, by means of which, together with the palm-piece C', a grip can be obtained upon the instrument and the member C contracted or expanded with one hand. It will therefore be seen that the power exerted upon the palm-piece C' will be multiplied, so as to exert a pressure several times as great upon the liquid contained in the barrel A, and such

power is applied in a direction parallel with the direction in which the piston B is operated, so that no force is lost, the component of the total force that is effective being substantially equal to the whole force used. The lower end of the barrel is externally screw-threaded, as at a', and receives a discharge nipple or injector D, which is provided with an enlarged head d and a liquid-orifice d' in line with and a narrowed continuation of the reservoir within the barrel A. A milled ring d^3 enables the easy screwing of the nipple over the screw a'. The nipple D is tapered, and the outer end thereof is cut off square, so as to form said nipple into a frustum having its upper and lower surfaces in parallel planes, said outer end being finished to a very thin wall, so as to provide a circular knife-edge, as plainly shown at d^2, Fig. 2, thereby forming an enlarged concave portion in the liquid-conduit. This enlarged concave portion is the discharge-opening of the nipple, and a restricted portion d^4 is located intermediately of said enlarged portion and the main conduit portion d'. It will readily be noted that this portion d^4 of the liquid-conduit of a reduced cross-sectional area enables the obtundent to be forced from the nipple D with a greater force than it would be if the cross-sectional area of the conduit were as great throughout its whole length as it is in the portions d' and d^2. This knife-edge d^2 is utilized for the purpose of forcing a seat in the dentine of the tooth, as will be hereinafter fully explained.

We are well aware that discharge-nipples having sharp or pointed ends have been used for many purposes; but such pointed ends have been formed by cutting off the outer end of the nipple obliquely, so as to provide a slanting or quill-shaped surface, and the whole length of such quill-shaped portion would necessarily be forced into the flesh or other structure being treated by the medicine in order to prevent the escape of the liquid around the discharge-opening. Such nipples are wholly impracticable in forcing an obtundent through the dentine of the teeth. Our improved nipple has its outer end cut off square or in a plane perpendicular to the axial line of the nipple and then has such outer end finished to a knife-edge, which has been before described, and is wholly different in purpose and structure from the nipples heretofore used.

The operation of our improved device is as follows: A pit is drilled in the enamel of the tooth either in the cavity that is being treated or, if such cavity is in an inaccessible part of the tooth, at some other convenient point, the diameter of this pit being equal to the point of the drill that is being used and the floor of the pit following the form of the needle-point consequently always presenting a concave surface. The circular knife-edge d^2 is fitted closely within this pit and is forced against the dentine, thus cutting for itself a groove or seat in the dentine that is air-tight and allowing none of the liquid obtundent to escape to the exterior of the tooth around the nipple D as it is being forced into and through the dentine by the operation of the member C. Nipples of different sizes, with liquid-orifices of varying diameters and circular knife-edges of varying thicknesses, may be screwed to the barrel A as they are required for individual cases.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the means herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

We therefore particularly point out and distinctly claim as our invention—

1. In a dental instrument, a nipple having a discharge-opening bounded by a circular knife-edge.

2. In a dental instrument, a nipple having a liquid-conduit provided intermediately of its ends with a portion of a reduced cross-sectional area and at its discharge end with an enlarged portion bounded by a knife-edge.

3. In a dental instrument, a reservoir for liquid obtundent; a discharge-nipple attached to said reservoir; a piston operating in said reservoir; lazy-tongs for operating said piston comprising lever-joints pivoted to the latter and to said reservoir and to each other; and outer links pivoted to each other and to said lever-joints respectively.

Signed by us this 11th day of June, 1904.

AMOS A. WILCOX.
MARCELLUS JEWETT.

Attest:
D. T. DAVIES,
G. W. SAYWELL.