Dec. 27, 1938. J. P. KIRWAN ET AL. 2,141,304

DENTAL VIBRATOR

Filed May 25, 1936

Fig. 1

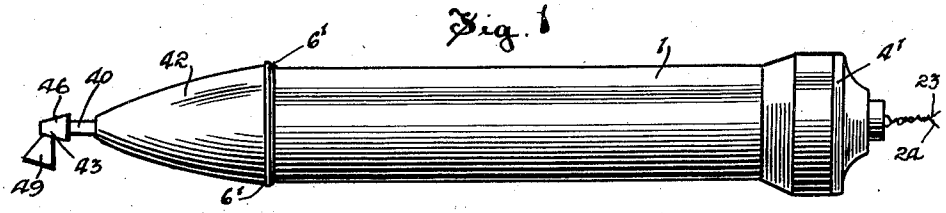




Fig. 11



Fig. 12

Fig. 2

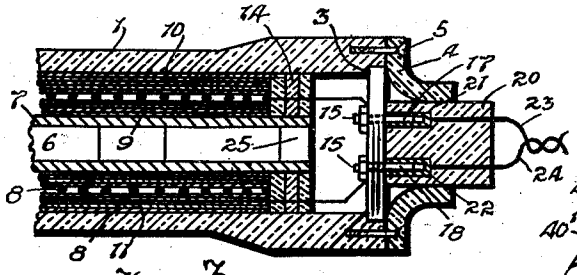


Fig. 3

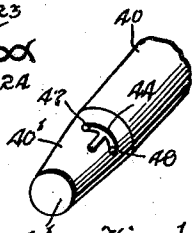


Fig. 10

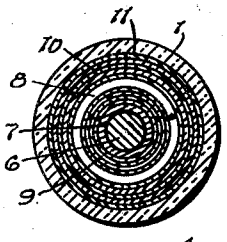


Fig. 4

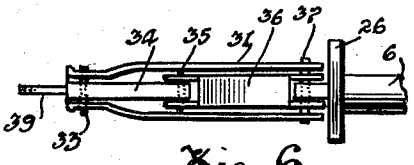


Fig. 6

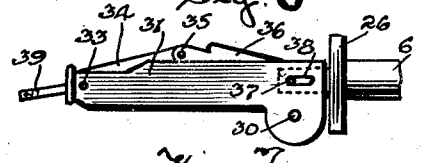


Fig. 7

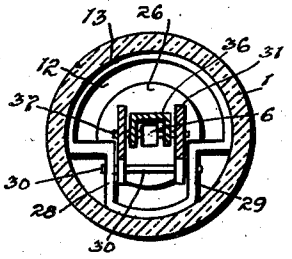


Fig. 5

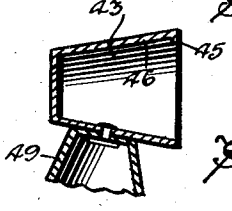


Fig. 8

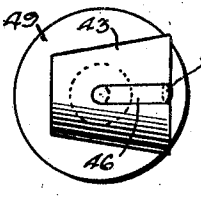


Fig. 9

INVENTORS

J. P. Kirwan,

B. Jackson

BY Harry E. Seidel

ATTORNEY

Patented Dec. 27, 1938 2,141,304

UNITED STATES PATENT OFFICE

2,141,304

DENTAL VIBRATOR

John P. Kirwan and Bernard Jackson, Winnipeg, Manitoba, Canada

Application May 25, 1936, Serial No. 81,577

5 Claims. (Cl. 128—52)

The invention relates to dental vibrators and an object of the invention is to provide an instrument which can be used by the public at large for treating their teeth and gums and particularly to an instrument having a vibrated tool which can be applied on the teeth and gums to clean and polish the teeth and to clean and massage the gums, and which permits also of the application of any desired powder, paste or other medicament.

A further object is to provide an instrument having the tool thereof mounted so that it can be vibrated laterally to provide a very desirable brushing action on the tooth or gum and which is also arranged so that the operator when desired can easily and quickly set the tool to cause an end movement thereof which is of particular benefit where it is desired to clean the space between adjacent teeth.

A further object is to construct the instrument in a simple inexpensive and durable manner and such that the internal parts are readily accessible for inspection, repair or other purposes.

With the above more important objects in view the invention consists essentially in the arrangement and construction of parts hereinafter described, reference being had to the accompanying drawing, in which:—

Fig. 1 is a side view of the instrument.

Fig. 2 is an enlarged vertical sectional view through the front end of the instrument, certain parts being shown in side elevation.

Fig. 3 is an enlarged vertical sectional view through the rear end of the instrument, certain parts being shown in side elevation.

Fig. 4 is a vertical cross sectional view at 4—4 Fig. 2.

Fig. 5 is a vertical cross sectional view at 5—5 Fig. 2.

Fig. 6 is a plan view of the carrier and associated parts.

Fig. 7 is a side view of the carrier and associated parts.

Fig. 8 is an enlarged longitudinal sectional view through the cap.

Fig. 9 is a plan view of the cap and cup.

Fig. 10 is a perspective view of the front end of the shank.

Fig. 11 is a front view of a further type of tool which may be used.

Fig. 12 is a side view of the tool shown in Fig. 11.

In the drawing like characters of reference indicate corresponding parts in the several figures.

The outer casing 1 of the instrument is made from an insulating material such as Bakelite and has one end terminating in a tapered nose 2 and the other end provided with an internal seat 3 and carrying a cap plate 4 releasably secured to the said end by screws 5.

The casing contains a solenoid which is used to vibrate the tool later referred to. The solenoid embodies the agitator rod or core 6 slidably mounted in the tube 7 and the coil 8 wound around the tube and suitably insulated by inner and outer layers of insulating material 9 and 10 such as sheet mica. An applied outer wrapping 11 holds the insulating material firmly in place.

It will be observed that the front end of the tube carries an out turned flange 12 which supports a short sleeve 13 and that the rear end of the tube has a number of insulating washers 14 forcibly applied thereon. The coil and the insulating material containing the same are positioned between the flange and the washers, and the whole arrangement is such that the solenoid can be readily slid into place within the casing, through the rear end of the casing upon the cap plate being removed.

The ends of the coil are electrically connected to a pair of binding posts 15 carried by a disc 16 of insulating material, which latter is adapted to engage the seat 3 hereinbefore mentioned. It will be here observed that the applied plate holds the disc firmly in place. The posts are extended through the disc to provide a pair of terminals or pins 17 and 18 and these appear through the open centre of the cap plate.

A plug 20 of insulating material is supplied and the plug is provided with a pair of sockets 21 and 22 adapted to slidably receive the pins. Lead wires 23 and 24 are connected to the sockets and can be connected to a suitable source of alternating current supply. Obviously one can readily disconnect the plug by pulling it outwardly to clear the socket from the pins.

The rear end of the tube has a relatively short iron plug 25 frictionally held therein.

The front end of the rod 6 protrudes into the sleeve 13 and has a disc 26 permanently secured thereto and a coiled spring 27 is mounted on the rod between the latter disc and the flange 12.

The front end of the sleeve is pressed inwardly at the sides to provide spaced vertical side walls 28 and 29 which support a cross pin 30. On the pin we mount pivotally the rear end of a carrier 31 which is substantially of channel iron cross section, and has its forward end slidably entering the opening 32 provided in the nose 2.

The front end of the carrier is supplied with a cross pin 33 which pivotally supports a bar 34 and the bar has its rear end pivotally connected at 35 to a link 36 the rear end of which latter is connected pivotally by a pin 37 to the forward end of the rod 6.

The pin 37 has the ends thereof projected and received slidably in a relatively short slot 38 provided in each side wing of the carrier. A pin 39 or finger extends from the front end of the bar 34 and protrudes forwardly through the open centre of the nose.

A shank 40 of hard rubber having a semi-spherical rear end is detachably connected to the forward end of the finger and the end 41 of the shank seats against the front end of the nose. The spring 27 normally holds the pin 37 in the forward ends of the slots 38 and the pivot joint at 35 is accordingly normally buckled upwardly as shown.

An enclosing shield 42 of tensioned resilient material such as soft rubber is secured to the shank as by cementing and the rear end of the shield is expanded over the nose as shown, the nose being ribbed at 6' to effectively hold the shield against slipping. The purpose of the shield is to prevent moisture of any kind from working back into the interior of the casing and possibly damaging the contained parts and to act also as a means for stabilizing the vibratory movement of the shank.

When the coil is energized, by connecting the lead wires to a suitable source of current, the rod 6 is vibrated violently in the well known manner and this movement is converted by the connections provided into a lateral back and forth swinging movement of the shank.

The shank is utilized to carry tools of various types, for operating on the teeth and gums and it is desirable that the arrangement be such that the various tools can be easily and quickly attached to the shank and also held in either of two selected positions on the shank. To this end we have tapered the front end 40' of the shank and have provided a tapered cup to frictionally engage the same, and have circumferentially slotted the shank at 44 to receive the inturned tip 45 of a spring arm 46 formed by slotting the body of the cap. The slot passes one quarter way around the shank and has its ends terminating in depressions or pockets 47 and 48 adapted to receive the tip 45 of the spring arm.

The tool 49 used is attached to the cap so that when the tip of the arm is in say the depression 47, the tool is in a plane at right angles to the plane in which the shank swings and when the spring arm tip is in the depression 48 the tool is in the latter plane. Accordingly the operator of the instrument can by turning the applied cap, cause the tool to vibrate laterally on the tooth on which it is applied or vibrate in a direction towards or away from the tooth. In one case there is a sweeping action and in the other a hammering action. The two movements so provided for are very desirable for the work of cleaning and polishing the teeth and cleaning and massaging the gums.

We have shown herein only two types of tools one being in the form of the well known rubber cup and the other appearing in the form shown in Figs. 11 and 12. The latter type is especially of value when working between adjacent teeth as it presents a fin which readily enters the space between teeth.

We propose providing caps with tools of various types attached thereto and one can select the particular tool he desires for the work to be done.

While we have entered into a detailed description of the various parts it is to be distinctly understood that they may be materially modified without departing from the spirit of the invention as set forth in the accompanying claims.

What we claim as our invention is:—

1. In combination, a casing, a solenoid contained within the casing and embodying a core adapted to be vibrated endwise upon the solenoid being energized, a pivotally mounted shank contained within the casing and having one end thereof projecting beyond one end of the casing and adapted for tool carrying purposes, connections between the shank and the core effecting the rapid oscillation of the shank in the vibratory movement of the core and a tensioned resilient moistureproof shield extending between the body of the shank and the body of the casing and secured firmly to said body and shank.

2. In a dental vibrator, the combination with a casing having an end opening therein and a laterally vibrated shank projecting from the opening, of a tensioned resilient liquid proof shield enveloping the opening and firmly attached to the casing and the shank and serving to prevent liquid and foreign material penetrating into the casing at the shank and acting to stabilize the vibratory movement of the shank.

3. In a dental vibrator, in combination, a casing containing an operating mechanism, a shank projecting from the casing and laterally vibrated by said mechanism, a tool carried by the forward end of the shank and rotatable thereon to selected working positions and a resilient tensioned liquid proof shield firmly secured to the shank and casing and acting to exclude liquid and foreign material from the interior of the casing and to stabilize the vibratory movement of the shank.

4. A dental vibrator having a pivotally mounted shank which will be vibrated in a single plane, a tool extending laterally from the shank and vibrated by the shank with the longitudinal axis of the tool being in said plane, a turnable mounting for the tool on the shank and rotatable on the shank and about the longitudinal axis of said shank so that said tool axis may be changed to an angular position relative to the single plane and to its former position, and means for vibrating the shank.

5. A dental vibrator having a pivotally mounted shank adapted to be vibrated in a single plane, a cap detachably and turnably mounted to selected positions on the free end of the shank and rotatable about the longitudinal axis of said shank, a combined massaging and hammering dental tool projecting laterally from the cap and vibrated by the shank with the longitudinal axis of the tool being in said plane to provide a hammering action, rotation of the cap causing the tool axis to be moved from the plane of the shank to a position which is at substantially a right angle to the plane in which the shank is vibrated and to its former position to produce a massaging action.

JOHN P. KIRWAN.
BERNARD JACKSON.