Feb. 7, 1928.

1,658,278

L. H. BARDACH ET AL

VIBRATORY TOOTHBRUSH

Filed June 13, 1925

2 Sheets-Sheet 1

Fig. 1

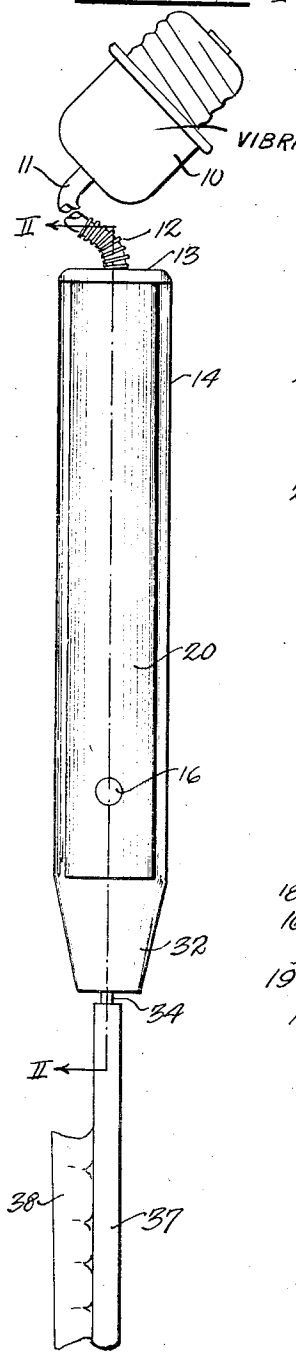


Fig. 2

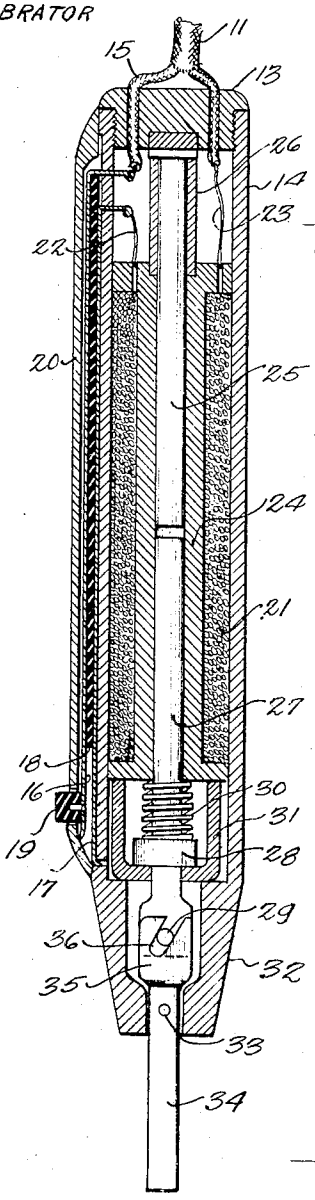


Fig. 4

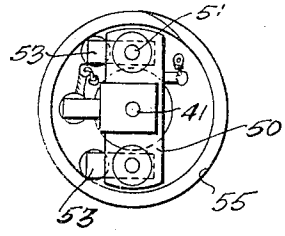


Fig. 5

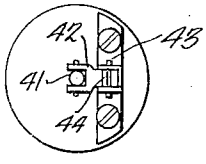
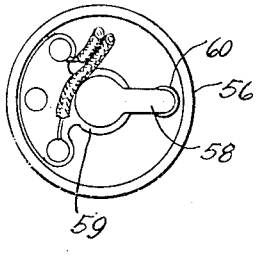


Fig. 7



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FIG. 3

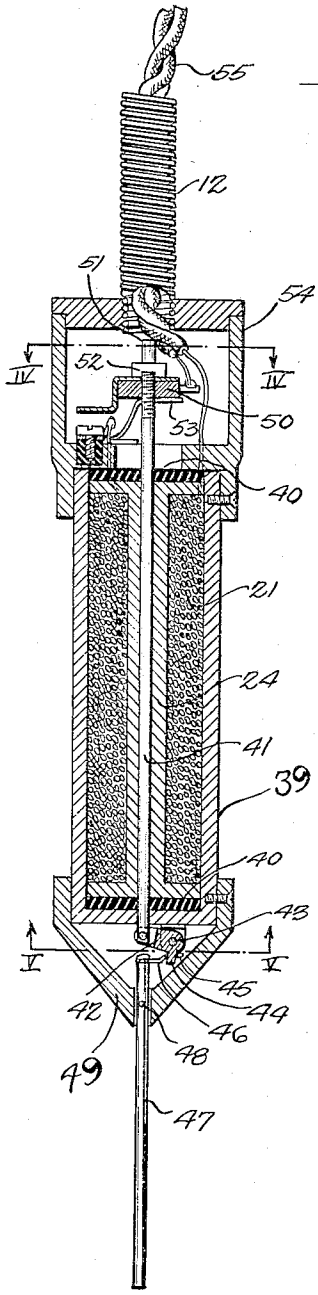
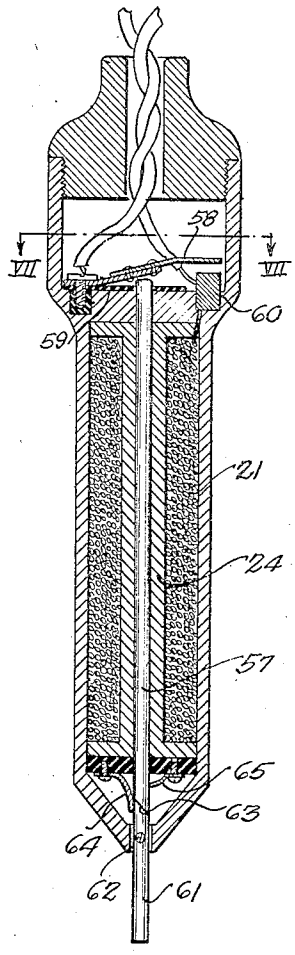


FIG. 6



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Patented Feb. 7, 1928. 1,658,278

UNITED STATES PATENT OFFICE.

LLOYD H. BARDACH AND ARVID G. LARSON, OF CHICAGO, ILLINOIS, ASSIGNORS TO ROBERT H. VAN SANT, OF CHICAGO, ILLINOIS.

VIBRATORY TOOTHBRUSH.

Application filed June 13, 1925. Serial No. 36,834.

This invention relates to an electrically operated mechanism for oscillating individual tooth brushes.

It is an object of this invention to provide an improved tooth brush operating mechanism for household and dental office use adapted to receive any one of a series of individual interchangeable toothbrushes. The proper use of toothbrushes involves an up and down motion of the brush to work into the spaces between the teeth and to accomplish this result the operating mechanism is designed to give a crosswise swinging motion thereto. Such a result could be obtained by adapting the principle of a bell or buzzer mechanism but it has been found that such mechanisms are not sufficiently powerful to reciprocate the brush when under sufficient pressure to properly clean the teeth. To overcome this difficulty we have adapted a solenoid giving a longitudinal motion to a core or rod associated therewith and convert this reciprocating motion into a swinging or oscillating motion of the brush carrying element.

It is a further object of this invention to provide a brush actuating mechanism included in a casing forming the handle thereof whereby a neat and compact hand tool is provided which is efficiently protected against the entrance of water and the like when in use.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a plan view of one form of a device embodying the features of this invention.

Figure 2 is an enlarged section on the line II—II of Figure 1.

Figure 3 is a central section of another form of device embodying the features of this invention.

Figure 4 is a section on the line IV—IV of Fig. 3.

Figure 5 is a section on the line V—V of Figure 3 with the enclosing tip omitted.

Figure 6 is a central section of a third form of the device of this invention.

Figure 7 is a section on the line VII—VII of Fig. 6.

As shown on the drawings:

An interrupter or vibrator type attaching plug 10 is shown adapted to be inserted in an electric outlet or socket adjacent the place of use of the toothbrush. This interrupter type of plug is in common use as with flashing signs, to produce rapid pulsations of current. From the plug 10 an extension cord 11 leads to the end of the various illustrated forms of mechanism, and if desired a coil spring 12 may be positioned to prevent abrupt flexure and consequent abrasion of the cord as it emerges from the cap 13 of the toothbrush handle 14.

In Figure 2, one lead 15 of the cord goes to a switch mechanism comprising parallel strips of metal 16 and 17 separated by an insulator 18 except adjacent the free ends of the strips where a button 19 on the strip 16 is provided for depressing the strip 16 into contact with the lower strip 17. A suitable cover 20 is provided for the strip.

A solenoid 21 is connected to the lower switch member 17 at 22 and the other end of the coil is connected to the second lead 23 from the interrupter plug. The solenoid is provided with a hollow core 24 the upper half of which is filled by a non-magnetic member 25 held against the cap 13 by a bushing 26. A bar 27 of magnetic material is reciprocable in the lower half of the solenoid core and terminates in a collar 28 and a rectangular pin carrying tip 29, a spring 30 being positioned between the collar and the core to normally maintain the bar in extended position against the U-shaped stop 31. The nose 32 of the toothbrush handle or case 14 carries a pivot 33 for a projecting member 34 having a yoke 35 with an inclined slot 36 engaging the pin of the tip 29. The member 34 is intended to receive one of a number of interchangeable toothbrushes 37, one for each user of the handle. The toothbrush is positioned on the member 34 with the brush elements 38 in alignment with and parallel to the axis of the pivot pin 33 so that the brush will be reciprocated over the tooth surfaces in an up and down direction to dislodge foreign particles from the spaces between the teeth.

The modifications of Figures 3 to 6 relate

only to different means of applying the magnetic effect of the solenoid and in the conversion of the reciprocating motion into a vibratory motion. In Figures 3 to 5 the solenoid 21 and core 24 remain unchanged, a casing or cup 39 being provided to receive the solenoid with insulating spacers 40 positioned at either end of the core 24. In this modification a rod 41 extends through the core and projects through the bottom of the cup to engage a lever 42 pivoted at 43 and carrying a pin 44 engaging in a slot 45 in a lever 46 fastened to the rod 47 which is pivoted at 48 in the nose piece 49 secured to the end of the cup 39. This linkage serves to convert the reciprocating motion of the rod 41 into an oscillating motion of the rod 47 about the pivot 48, the rod 47 being adapted to receive one of a series of toothbrushes as in the prior form.

Reciprocation of the rod 41 is accomplished by means of a magnetically susceptible bar or keeper 50 secured to the upper end of the rod 41 and sliding on guide pins 51 but insulated therefrom by bushings 52. The bar 50 is normally returned to its outer position by the leaf springs 53, the current impulses from the vibrator plug drawing the bar down and the springs forcing it back upon opening of the circuit. The keeper and associated parts are preferably positioned in a housing 54, the lead-in wires 55 passing through the housing to the solenoid coil.

The modification of Figures 6 and 7 includes a casing 56 inclosing the solenoid 21 and core 24 with a rod 57 extending therethrough. The movement of the rod 57 is produced by the magnetic action of the solenoid on the keeper 58 mounted on the spring 59, a block 60 of material having magnetic permeable characteristics being provided to transmit and concentrate the magnetic effect of the solenoid adjacent the free end of the keeper. Longitudinal movement of the rod 57 is converted into a swinging motion of the rod 61, pivoted in the casing 56 and 62, by means of an angular contact surface 63 between the two rods; downward movement of the rod 56 forcing the contacting end of the rod 61 to the left against the pressure of the spring 64 which returns the rod 61 to the normal aligned position upon breaking the circuit through the solenoid. The rod 57 is guided by the clip 65 which opposes the side thrust set up by the spring 64.

We wish it to be understood that we do not desire to be limited to the exact details of construction shown and described, for obvious modifications within the scope of the claims will occur to a person skilled in the art.

We claim as our invention:

1. A device of the class described, comprising a solenoid, a support therefor, a pulsating current supply therefor, a rod in said solenoid reciprocated by fluctuations of magnetism in said solenoid, a tooth brush carrier oscillatably mounted on said support, means connecting said carrier and rod adapted to convert the reciprocating motion of said rod into an oscillating motion of said carrier.

2. A device of the class described, comprising a casing, a solenoid therein, a rod in said solenoid reciprocated by variations in the current passing through said solenoid, a toothbrush carrier pivoted in said casing, means connecting said rod and carrier adapted to convert the reciprocating motion of said rod into an oscillating motion of the tooth brush carrier about its pivot, and a brush on said carrier.

3. In a device of the class described, an electro-magnetic means, a support therefor, a rod adapted to be reciprocated by fluctuations in the magnetism thereof, a tooth brush carrier oscillatably mounted on said support with a tooth brush mounted thereon, and means connecting said rod and said carrier adapted to convert the reciprocating motion of said rod into an oscillating motion of the brush carrier.

In testimony whereof we have hereunto subscribed our names.

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ARVID G. LARSON.