

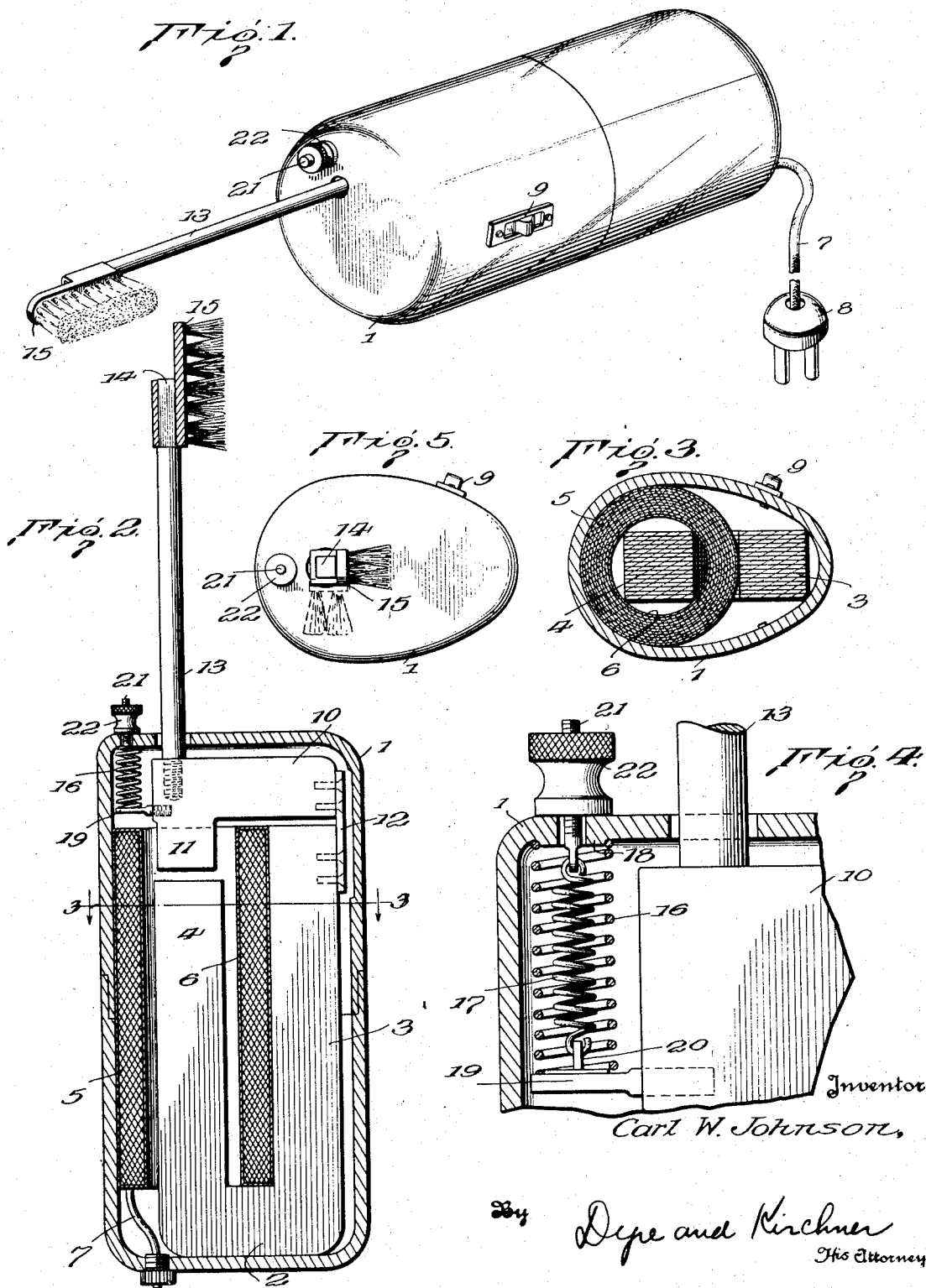
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VIBRATOR

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VIBRATOR

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My invention relates to vibrators, and more particularly to an electrically actuated vibrating instrument especially adapted to the treatment of certain disorders of the gums and teeth.

One object of my invention is to provide a vibrator which will have a minimum of parts and which will be unusually durable, efficient and economical of manufacture.

Another object is to provide an instrument carrying a vibrating element adapted to be placed in contact with the gums or teeth and when energized by an electric current to move, at the choice of the user, through a plane, arcuate path transversely of the gum surface, or to and fro at right angles to said surface.

A further object is to provide an instrument of the type indicated in which the path of travel of the vibrating element may be selectively adjusted between predetermined maximum and minimum limits in a simple and facile manner to suit the individual preference of the user, or the requirements of the gum or tooth condition under treatment.

Another object is to provide a vibrator having simple and efficient means for dampening the amplitude of the oscillations to effectually eliminate noise when in use.

Other and further objects and advantages will sufficiently appear from the description hereinafter of my invention in one preferred form of embodiment, which is shown on the accompanying drawings and which will later be pointed out by the appended claims.

In the accompanying drawings, in which the same reference characters point out the same parts in the several views,

Figure 1 is a perspective view of one embodiment of my present invention;

Fig. 2 is a vertical, central, sectional view thereof;

Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a detail view showing in vertical section the amplitude adjustment and dampening means; and

Fig. 5 is a top plan view showing the adjustable relation of the contact element and its supporting spindle.

Referring to the drawings, the reference numeral 1 designates an outer casing of any suitable material and construction. Mounted within the casing and securely attached thereto is a magnetizable core 2, which is substantially U-shaped in side elevation, one leg 3 being somewhat longer than the other leg 4. I prefer to form this magnet of insulated or non-insulated laminae of soft iron, according to standard practice, but it will be appreciated that the structural details of the core 2 are not essential to my present invention and form no part thereof.

An energizing coil 5 of suitable insulated wire surrounds the short leg 4 of the core, and this coil, as will be noted by reference to Fig. 2, extends upwardly above the pole terminal of the leg 4 to be flush with the pole terminal of the leg 3. As will be understood, this construction makes it desirable to wind the coil wire upon a spool 6 of heavy paper or the like. Lead wires 7 to the coil are carried out of the container and terminate in a suitable plug 8 or the like to effect connection with any standard electric outlet. A thumb switch 9 in series with the wire of coil 5 and mounted in the casing provides convenient means for making and breaking the circuit through the coil while plug 8 remains connected to a source of current.

An armature 10, mainly normal to the legs of the core 2 but carrying a depending vertical leg 11, is pivotally secured to the long leg 3 of the core as by means of the flat spring 12 shown in Fig. 2. It is to be noted that the depending leg 11 of the armature is preferably symmetrical in cross sectional shape with the adjacent end of the short leg 4, but it is essential that the cross sectional dimensions of the leg 11 be somewhat less than those of the leg 4. It will be clear that the construction just described will result in an assembly of magnetizable core and pivotally mounted armature adapted to reciprocate in the well formed at one pole of the core by the projecting coil of surrounding wire. It will also be clear that the spring 12 normally urges the armature to a neutral position of rest, preferably slightly spaced from the pole of the leg 4, as shown to advantage in Fig. 2.

The instrument which I have invented is designed to be energized by alternating current. The periodic directional reversals of this current operate to change with great rapidity the polarity of the core 2, and each polarity change results in either attracting or releasing the armature 10, against the influence of spring 12. I thus secure the desired vibratory motion without employing expensive and delicate circuit breakers and other necessary adjuncts of direct current vibrators.

The armature 10 carries a spindle 13 on its side opposite from the pivotal spring 12, and this spindle projects through a suitable aperture in the casing 1 to terminate in a square shank 14. This shank is received in frictional engagement by complementary sockets provided on a series of interchangeable applicators, one of which is shown in Figs. 1, 2 and 5 as the brush 15. The applicator may be a bristle brush, a rubber massage appliance or the like, the specific character of this part depending upon the preference of the user and the particular purpose of a given use, and is in no way essential to the principle of my present invention.

In order to render the amplitude of vibration of the armature 10, and consequently of the applicator 15, readily adjustable to suit a variety of uses and purposes, I provide the novel mechanism shown in detail in Fig. 4. This consists essentially in a pair of springs 16 and 17. Spring 16 is disposed under compression between a seat 18 formed on the upper inside of the casing 1 and a bearing 19 extending from the armature 10, while spring 17 is preferably contained within the spring 16 and is held normally under tension between an eye 20 in the bearing 19 and a similar eye formed in the lower end of an adjusting screw 21 which projects through the casing 1 and carries the adjusting nut 22.

It will be appreciated that the springs 16 and 17 thus act oppositely to counteract the effects of each other, and the resultant of their influence will be exactly neutralized, when no current is passing through the coil 5, by the flat spring 12. However, rotation of the adjusting nut 22 will result in varying directly the tension of spring 17, and indirectly the compression of spring 16, to dispose the leg 11 of armature 10 at a greater or less distance from the pole of leg 4 of the core 2, with the result that the armature 10 may thus be brought to a greater or less extent within the influence of the core 2. In this way the amplitude of the swing of the armature may be varied from a maximum when spring 17 is under a minimum of tension to a minimum when spring 17 is under a maximum of tension.

The amplitude of vibration of the contact element 15 obviously varies directly with that of the armature 10, and thus by manipula-

tion of the adjusting nut 22 I am enabled to control and regulate the degree of vigor with which the contact element may be caused to vibrate, to accomplish one of the stated objects of my present invention.

It will be clear that any point on the armature 10 will vibrate through a path which is an arc of a circle whose center is the point on spring 12 about which the armature is pivoted. This results in communicating to the shank 14 of spindle 13 a similar, but exaggerated arcuate motion, and this form of motion may be transmitted directly and without change to the contact surface of the element 15 when the latter is mounted with its contact surface parallel to the plane of vibration of the armature 10, as shown in dotted lines in Fig. 5, or it may be converted into a to and fro beating motion when the element 15 is disposed with its contact surface normal to the plane of vibration of the armature 10, as shown in Fig. 2 and in full lines in Fig. 5. It will be clear that this two-fold adaptability is made possible by the peculiar motion initiated in the armature 10, and by the square shank and socket arrangement of the spindle and contact element, the latter arrangement enabling the user to dispose the contact element in any one of four positions ninety degrees apart around the spindle. Two of such positions are clearly shown by Fig. 5. The user of the instrument which I have invented is thus able to selectively employ the same to obtain a transverse arcuate or rubbing motion, or a to and fro or beating motion, as may be desired to suit his individual preference or the type of the disorder being treated.

It is to be understood that various changes and modifications may be made in the embodiment of my invention which I have described herein merely by way of exemplification, and that all such changes and modifications, in so far as they do not depart from the spirit of the invention, are to be considered within the scope and purview of the appended claims.

Having thus described my present invention what I claim and desire to secure by Letters Patent is:

1. A vibrating tooth brush having an armature, means for causing a point on the armature to vibrate through an arcuate path, and an applicator carried by the armature having a contact surface disposed in a plane substantially parallel with the plane of the arcuate path described by vibration of said point.

2. A vibrating tooth brush having an armature pivoted at one point, means for causing a point on the armature spaced from the pivoted point to vibrate through an arcuate path, a spindle carried by the armature at said second point and an applicator carried by the spindle having a contact surface adapted to vibrate through a plane arcuate path parallel to the plane of the path of vibration

of said second point when the armature is vibrated.

3. A vibrating tooth brush having an armature pivoted at one end, means for causing the free end of the armature to vibrate through an arcuate path, and an applicator connected to the armature at a point near its free end having a contact surface adapted to vibrate through a plane arcuate path parallel to the plane of the path of vibration of said free end.

4. A vibrating tooth brush having an armature, means for causing the armature to vibrate through an arcuate path, an element carried by the armature, and an applicator carried by said element including a plurality of bristles the axes of said bristles being substantially normal to the plane of the path of vibration of the armature.

5. A vibrator device having an armature, electromagnetic means for causing said armature to vibrate, spring means connected to the armature and to a non-vibrating portion of the device to maintain the armature normally a constant distance from the electromagnetic means when said electromagnetic means is not energized and to constrain any point on the armature to vibrate through an arcuate path when said electromagnetic means is energized, and an applicator carried by the armature having a contact surface disposed in a plane substantially parallel with the plane of the arcuate path described by said point during vibration.

6. A vibrator device having an electromagnet, an armature disposed adjacent to and within the field of influence of the electromagnet, spring means connected to the armature and to a non-vibrating portion of the device adapted to permit a point on the armature to move toward the electromagnet when the electromagnet is energized, to move said point away from the electromagnet when said electromagnet is not energized, and to constrain said point to move through an arcuate path only, and an applicator carried by the armature having a contact surface disposed in a plane substantially parallel with the plane of the arcuate path described by said point during vibration.

7. A vibrator having a magnetizable core, an armature associated therewith, connecting means carried by the armature having a square shank formed in its free end, and an applicator having a contact surface on one face and a square socket on its opposite face receiving said shank, whereby the applicator may be mounted in different selected relations to the plane of vibration of the armature.

8. A vibrator having a magnetizable core, an armature associated therewith, connecting means carried by the armature having a square shank formed in its free end, and a brush element having a plurality of bristles

on one face and a square socket on its opposite face receiving said shank, whereby the brush element may be mounted in different selected relations to the plane of vibration of the armature.

In testimony whereof I affix my signature.
CARL W. JOHNSON.