This invention relates to an improvement in tooth brushes and relates more particularly to motor driven rotary brushes.

It has been proposed hitherto to rotate a tooth brush through the agency of motion translated through a shaft actuated by a motor but by reason of the constructions employed, some of this was awkward to handle and failed to give a practical device. One of the disadvantages of other devices resided in the difficulty and inability of the user to brush the teeth free from interference with the holding structure, since the brushes were disposed substantially in line with the power transmitting means as for example the shaft which was used to drive the brushes.

In the present device a structure is provided in which the effective portions of the rotating brushes are extended laterally or offset from the casing or holder making it possible to effectively and conveniently perform the brushing operation particularly when cleaning the back surfaces of the upper and lower incisors. Furthermore, the present invention provides a simple and cheap replaceable brushing unit which may be sold as a separate article. The unit is so constructed that the brushes are mounted in a guard giving the desired protection to the delicate tissues within the mouth but at the same time sufficient brush surface is available for the necessary cleaning operation.

A further feature of the brushing elements mounted in a separable and unitary housing is that each person using the device may have his or her own individual brushing unit, it being a relatively simple matter to apply such units to the device. Furthermore, each unit may be differently colored so that mistakes may not occur in identifying the units.

With the structure employed all the mechanical elements are enclosed and the desired flexibility is provided in the handle such as found in the ordinary tooth brush. For the purpose of giving the most effective and least injurious operation the brushes are rotated in opposite directions so that the surfaces of the teeth are brushed with the bristles moving from the gum to the outer ends of the teeth.

The invention will be more clearly understood by reference to the following description together with the accompanying drawings in which

Fig. 1 is a side elevational view of a motor driven rotary brush and holder constructed in accordance with the present invention, a motor being enclosed in the hand-piece of the holder;

Fig. 2 is a view similar to Fig. 1 but showing the underside of the device with the brushing surfaces exposed.

Fig. 3 is a view of the left hand end of the device shown in Fig. 1;

Fig. 4 is a view taken on line IV—IV in Fig. 1;

Fig. 5 is an enlarged end view of the brush driving gears showing the guard or cover partly broken away;

Fig. 6 is a view taken on line VI—VI in Fig. 5;

Fig. 7 is an enlarged end view of the brush unit.

Fig. 8 is a side view of the brush unit separated from the holder, and

Fig. 9 is a fragmentary view of a modified form of brush in which the motor is separate and motion is transmitted to the brush by means of a flexible cable.

A tooth brush constructed in accordance with the present invention may comprise a holder or handle member of any suitable material such as celluloid, a phenolic condensation product or metal. The casing may be made to include a chamber 11, a tubular portion or neck 12 and an offset portion or head 13. The chamber may consist of sufficient size as to enclose a small motor 13' or may be connected by a flexible cable to a motor conveniently located.

One of the important features of my invention is to provide means for translating motion from the hand grip portion or chamber 11 to the opposite end or offset portion 13.

As shown the tubular portion or neck 12 terminates in a head which projects transversely to the longitudinal axis of the holder. This head is bifurcated in the sense that it has two spaced portions which serve as bearings for spindles 14 and 15. Each of the spindles 14 and 15 is provided with a pinion 16 and 17 respectively and extending from the head. The free or exposed ends of the spindles are each provided with a notch 18 to engage with rotary brushes 18 and 19 in a casing to be later described. Motion is imparted to the pinions 16 and 17 by pinions 21 and 22 each mounted on a stub shaft journaled in the head.

It will be noted in order to attain the opposite directional rotation of the brush driving pinions 16 and 17 it is necessary to have the two pinions 21 and 22. The said pinions 21 and 22 are on opposite sides of the axial line of the holder and a flexible shaft 23 is therefore employed to transmit motion from the motor 13' in the brush handle or from a flexible connection to a suitably supported separate motor. If a separate portable motor is used the holder may be constructed as shown in Fig. 9 and the shaft 23 may have a coupling 26 for connection with flexible cable 25 in a sheath 28. A screw collar 27 may be provided to hold the cable 25 coupled with the shaft 28.

The brushes 18 and 19 may be rotatably supported in a guard or casing 28. This casing may be made of any suitable light weight material such as celluloid, phenolic condensation product or the like with bearings 29 formed to receive the hubs 29' of the brushes 18 and 19. These brushes may be of a diameter and width...
In conformity with the size of the holder and the hubs may be provided with cross pieces 30 for disposition in the notches 20 on the spindles 14, 15 which spindles fit the hubs of the brushes. Extending from the casing or guard 28 are split pins 30 arranged to enter holes 31 in which they may fit sufficiently tight to hold the brush unit on the head of the holder with the spindles in the brush hubs whereby the brushes are rotated. It will thus be apparent that the brushes proper are housed in a separable unit whereby each person using the device may be provided with a unit. In order to readily identify such different units the casing 28 may be made in different colored materials. A convenient hand switch 31' may be provided to start or stop the motor. It will be evident that by reason of the present invention a motor driven tooth brush is provided in which the brushes are easily replaceable at low cost. The brush unit as shown, simply consists of two rotary brushes in a holder of relatively light sheet material or a material which may be readily shaped or molded. Having once purchased the holder the brush units may be replaced at will. The removability of the brush unit makes it possible to more easily clean the device since the unit may be easily detached and rinsed out. It will be understood that the casing holding the gears or pinions may be made substantially water tight by suitable bushings about the spindles. The pinions may, however, be made of non-corrosive steel or of brass so as not to be injured by such moisture as may enter. A tooth brush constructed in accordance with the present invention makes possible a practical and efficient motor driven brush which may be used with the same convenience as the ordinary brush, but which is more effective in operation by reason of the arrangement of brushes which facilitate the brushing operation.

One method of using the device is to place the brushes in the mouth in such manner that the surface of one brush is in contact with the tongue of the patient and the other brush in contact with the edge thereof, and then to progressively brush the teeth by a rocking movement of the brush so that the tongue of the patient is alternately the inner and outer surfaces and edges of the teeth are brushed.

It will be noted by reference to Fig. 1 of the drawings that the handle member 11 is also offset with respect to the tubular portion or neck 12. This arrangement is such that the handle member is symmetrical about the tangent line between the two brushes which lies parallel to the tubular portion 12, thus providing for ease of manipulation as the brushes are rocked from one side of the teeth to the other. Although as illustrated a flexible cable is employed to transmit the power from the small motor 13' it is obvious that a rigid shaft may be employed, the necessary gearing (not shown) being provided in the handle and hand portions to form a connection between the motor shaft and the shaft disposed in the tubular portion or neck 12.

Although a preferred embodiment of the invention is shown and described herein, it is to be understood that modifications may be made therefrom without departing from the spirit and scope of the invention as set forth in the appended claims. What is claimed is:

1. A power driven tooth brush comprising a handle member, a head portion, and a neck connecting said handle member and head portion, said handle member and head portion being offset in the same direction with respect to said neck, a unit housing secured to said head portion, a pair of rotary brushing elements rotatably mounted in said housing having their peripheries tangent to each other, said handle member being symmetrical about the tangent plane between said brushing elements which lies parallel to said neck.

2. A power driven tooth brush comprising a handle member, a head portion, and a neck connecting said handle member and head portion, said handle member and head portion being offset in the same direction with respect to said neck, a unit housing secured to said head portion, a pair of rotary brushing elements rotatably mounted in said housing, said brushing elements being of relatively large diameter with respect to their width and having their peripheries tangent to each other, and means mounted in said head portion for imparting rotary motion to said brushing elements in opposite directions.

3. A power driven tooth brush comprising a handle member, a head portion, and a neck connecting said handle member and head portion, said handle member and head portion being offset in the same direction with respect to said neck, a flexible shaft mounted in said handle member and neck, gearing in said head portion connected to said shaft for imparting rotation imparted thereto, a unit housing secured to said head portion, a pair of rotary brushing elements rotatably mounted in said housing, said gearing being so arranged as to impart rotation in opposite directions to said brushes when said unit housing is secured to said head portion, and means connecting said brushes to said gearing.

4. A rotary motor driven tooth brush comprising a holder, rotary brushes having their peripheries tangent to each other, spindles for said brushes, means for supporting said spindles parallel to and offset with respect to said holder, flexible means in said holder for transmitting rotary motion to said brushes, and means connecting said first mentioned means and spindles for rotating said brushes in opposite directions, said brushes being of greater diameter than their width.

5. A power driven tooth brush comprising a head carrying a pair of cylindrical rotary brushes with their axes parallel to each other and with their peripheries tangent to each other, a handle spaced from the head and having its axis parallel to and between the axes of the brushes, a neck joining the head and the handle and lying at one side of the plane of the brush axes and motor driven means to rotate the brushes.

6. A rotary motor driven tooth brush comprising a head portion, a neck and a handle member, said head having a train of gears, a unit housing partially enclosing a pair of cylindrical rotary brushes with their axes parallel to each other and with their peripheries tangent to each other, said brushes being of greater diameter than their width, spindles connected to said brushes and projecting outside of said housing to engage certain gears of said gear train when the housing is secured from the head and said housing slots therein through which a limited portion of each brush projects, means carried by said head and housing for removable securing the same together, and motor driven means to rotate the brushes.

VERNOR B. BAGNALL.