

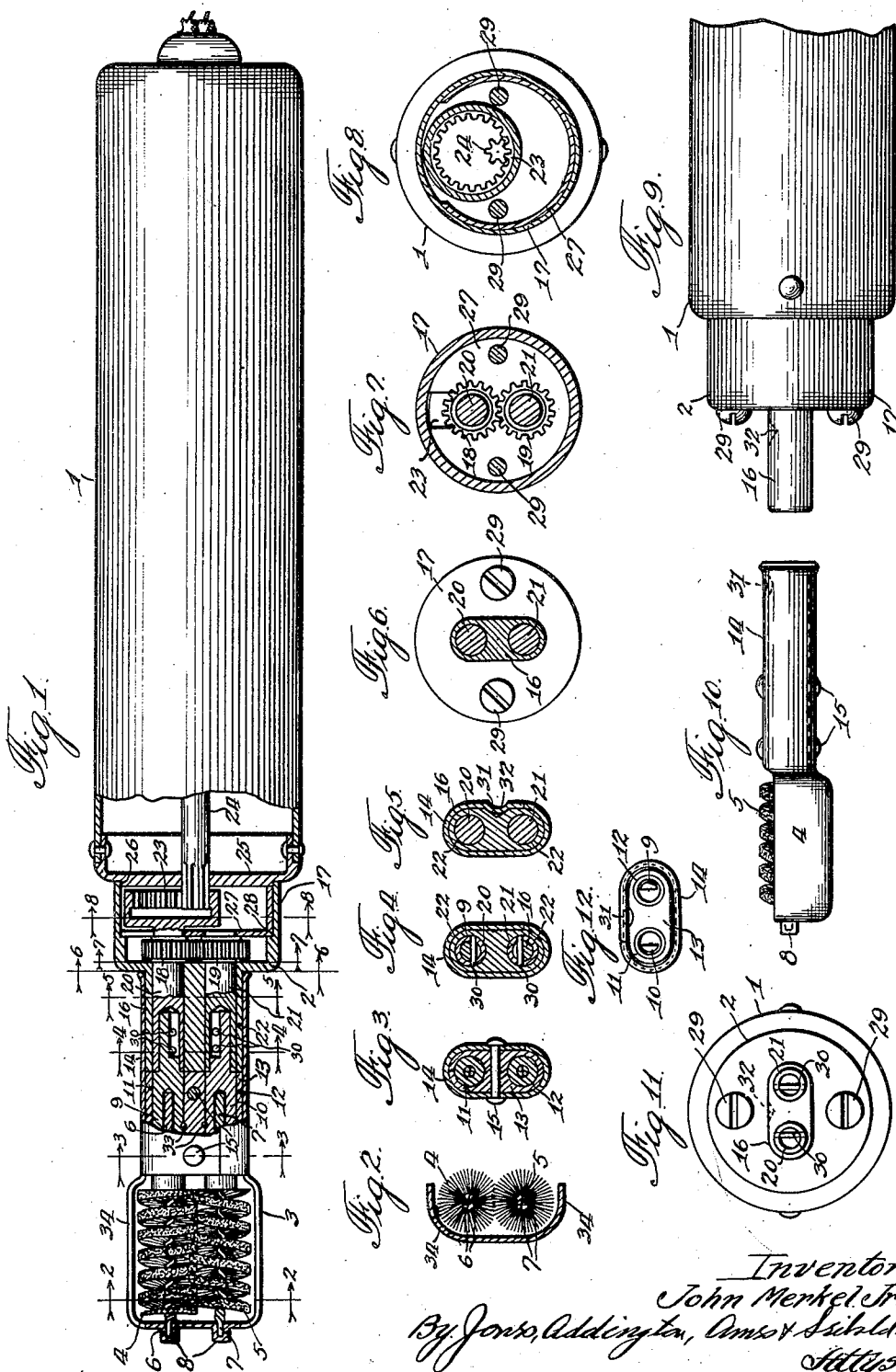
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MOTOR DRIVEN ROTARY TOOTH BRUSH

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## MOTOR DRIVEN ROTARY TOOTH BRUSH

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3 Claims. (Cl. 15—23)

My invention relates to motor driven tooth brushes and more particularly to the type of tooth brush disclosed and claimed in my earlier United States Letters Patent No. 1,500,410, dated July 8, 1924.

The present invention is directed particularly to a structure employing brushes rotating in opposite directions, say of the intermeshing helical type, wherein the driving mechanism is adapted to be motor driven and embodied in a compact unit between the handle and brush assembly and the motor is preferably embodied in the handle.

One of the essential objects of the invention is to provide a structure of this type which is practical in construction, simple and efficient in operation.

Another object of the invention is to provide a brush assembly of a construction that may be readily adapted to the driving mechanism in detachable relation so that a number of brush assemblies may be used and each easily fitted to the driving mechanism in proper driving relation to secure proper rotation of the brushes.

A further object of the invention is to provide a motor driven tooth brush having an electrically operated motor uniquely disposed in the handle in the manner permitting a compact and simple arrangement of the parts so that the handle may be suitably gripped by the hand of the user and the tooth brushes easily and efficiently applied to the teeth, whereby the cleansing surface will be brought against the teeth to clean the same thoroughly, and the remaining surface covered by a guard to protect the mouth. The brushes are preferably arranged to provide a brushing motion away from the gums toward the tips of the teeth so that the teeth, gums and crevices will be thoroughly cleaned.

Devices of this type, as heretofore constructed, have not been practical chiefly due to their construction and arrangement of parts. The parts of the device herein disclosed are simple, inexpensive and practically arranged so that the unit may be made in a practical manner at a moderate cost and easily used to obtain efficient results.

Other objects and advantages of the invention will be apparent from the following detailed description when taken in connection with the accompanying drawing which forms a part hereof.

In the drawing:

Figure 1 is the view partly in elevation and partly in section of a device embodying my invention.

Fig. 2 is a vertical sectional view of the brush assembly taken on line 2—2 of Figure 1.

Fig. 3 is a similar view of another portion of the brush assembly taken on line 3—3 of Figure 1.

Fig. 4 is a similar view taken on line 4—4 of Figure 1.

Fig. 5 is a similar view through the drive assembly, taken on line 5—5 of Figure 1.

Fig. 6 is a similar view taken on line 6—6 of Figure 1.

Fig. 7 is a similar view showing the gears of the drive assembly taken on line 7—7 of Figure 1.

Fig. 8 is a similar vertical sectional view taken on line 8—8 of Figure 1.

Fig. 9 is an enlarged detailed view of the end of the handle to which the drive assembly is attached.

Fig. 10 is a detailed view of the brush assembly.

Fig. 11 is an end view of the handle showing the drive assembly secured thereto, and

Fig. 12 is an end view of the drive-end of the brush assembly.

Referring now to the drawing,—a device embodying the invention comprises a handle 1 of a design that readily fits the hand of a user, a drive assembly 2 attached to one end of this handle 1, and a detachable brush assembly 3 which may be readily slipped into position upon the drive assembly 2. Brush assembly 3 comprises oppositely rotating brushes 4 and 5, having their bristles mounted in helical formation upon shafts 6 and 7. Each shaft comprises twisted wires which hold the bristles in the usual manner, the outer ends thereof projecting slightly and riding in bearings 8 formed in the outer end of guard 34. The inner ends of the wires forming shafts 6 and 7 extend inwardly a greater distance to be pressed into quills 9 and 10 journaled in bearings 11 and 12, respectively, formed in a bearing block 13. Retainer pins 33 may be provided to retain quills 9 and 10 in proper position in bearings 11 and 12. Guard 34 is extended rearwardly in the form of a skirt 14 which retains the split bearing block 13 therein by means of rivets 15. If skirt 14 is made of sheet metal, or otherwise, it is apparent that it may be pressed into shape to enclose the bearing block 13 so that rivets 15 passing through the center thereof will suitably hold these parts together. Skirt 14 extends beyond the bearing block 13, however, so that it may be slipped over a reduced shank 16, forming part of the drive assembly 2. Reduced shank 16 is an extension of a housing 17 which encases a pair of spur gears 18 and 19, carried upon shafts 20 and 21 respectively. Shafts 20 and 21 are adapted to be journaled in bearings 22 formed in the reduced shank 16.

The drive assembly further includes an internal gear 23 formed upon spur gear 18. A pinion shaft 24 of an electric motor disposed in handle 1 extends through an end cap 25 to engage the teeth of internal gear 23. Cap 25 is provided with an annular shoulder 26 over which the housing 17 is adapted to fit. A cup-shaped member in the form of a gear retainer 27 is fitted in hous-

ing 17 to hold the gears in positions and prevent endwise movement. It will be noted that the interior of housing 17 is cut away at 28 so as to snugly fit the gear retainer 27 into this housing. Bolts 29 passing through the outer face of housing 17 of drive assembly 2 hold the latter in position, these bolts also passing through the gear retainer 27 and entering the end cap 25 of handle 1.

- 10 Shafts 20 and 21 of spur gears 18 and 19 are internally cored at their outer ends so that the tips of the quills 9 and 10 enter the same. The tips of quills 9 and 10 are preferably cut away to provide flat faces while the shafts 20 and 21 of the gears have pins inserted therein to lie against such flat faces of the quills. A positive drive of the quills is thereby obtained as well as an assurance of the proper alignment of the quills when they are inserted in the cored ends of shafts 20 and 21, whereby to secure the proper rotation of the brushes in opposite direction.

It will be apparent from this description that the parts may be economically made and compactly arranged. Moreover, a practical driving connection is afforded between the electric motor in the handle 1 and the brushes 4 and 5. No part is of a construction which, when assembled in position, obstructs the convenient use of the tooth brushes when inserted in the mouth for bringing their cleansing surface properly against the gums and teeth.

The brush assembly shown in Figure 10 is adapted to be slipped over the reduced shank 16 of the gear assembly 2. The tips of quills 9 and 10 are conveniently brought into proper engagement with the shafts 20 and 21 of gears 18 and 19 by entering the cored ends thereof, and held in proper driving relation by virtue of the pin arrangement 30. A snap-hump 31 is formed inwardly upon the skirt 14 to engage in a drill spot 32 in the nose end of the drive assembly 2, heretofore called the reduced shank 16 of the drive assembly 2.

More than one tooth brush assembly may be used for each handle unit. These tooth brush assemblies 3 are arranged to slip easily on and off the nose end 16 of the drive assembly 2. It will be noted that each tooth brush assembly comprises parts that are simple and few in number. Moreover, these parts may be easily assembled in a relatively rugged construction that is capable of serving its purpose and of being made at minimum cost. On the other hand, these parts are so constructed that they will efficiently operate without the possibility of excessive wear or of soon becoming inoperative. The construction is practical and characterized essentially by its simplicity and practicability.

Likewise, the drive assembly 2 comprises parts that are simple, free from excessive wear or free from becoming out of order, and efficiently transmit the drive from the electric motor in handle 1 to the brushes 4 and 5. Furthermore, these parts assure a ready attachment of the brush assembly 3 so that the brushes 4 and 5 will be driven in opposite directions and the proper rotary relation of the brushes thereby maintained at all times. The gears are simply arranged and mounted in the housing 17 of the drive assembly 2, requiring only a minimum number of parts and providing a construction that can be simply and inexpensively made, whereby to assure maximum efficient performance.

Moreover, the drive assembly 2 and its parts

permit easy and quick attachment to the head 25 of the handle 1. It provides a driving connection from the motor that cannot quickly become inoperative. The skirt construction 14 of the tooth brush assembly 3 uniquely permits easy and quick attachment or removal of this assembly from the nose end 16 of the drive assembly 2 so that any number of tooth brush assemblies may be used by the members of one family in connection with a single handle unit 1.

Without further elaboration, the foregoing will so fully explain the gist of my invention that others may, by applying current knowledge, readily adopt the same for use under varying conditions of service, without eliminating certain features which may properly be said to constitute the essential items of novelty involved, which items are intended to be defined and secured to me by the following claims:

I claim:

1. In a device of the class described, a pair of oppositely rotating brushes, a handle for said brushes, power driven means for said brushes, said power driven means extending through one end of said handle, spindles for said brushes, a guard extending over all of said brushes excepting their cleansing surfaces, said guard carrying said brushes and said spindles including provisions for journalling said spindles therein as a detachable unitary assembly, and a housing between said handle and said guard, said housing including a driving connection having a pair of intermeshing gears driving said spindles, a pair of shafts carrying said intermeshing gears, an internal gear on one of said shafts, and a pinion meshing with said internal gear, said pinion being driven by said power driven means, and means to detachably connect said shafts with said spindles.

2. In a device of the class described, brushes rotating in opposite directions, power means for driving said brushes, a handle in which said power means may be encased, and a driving connection between said brushes and said power means comprising a housing removably carried by said handle, gear mechanism in said housing, and spindles for said brushes, said spindles being detachably connected to said gear mechanism, a guard device for said brushes provided with a rearwardly extending skirt and having bearings therein for carrying said spindles and said brushes as a removable unitary assembly upon one end of said housing, said housing having a forwardly extending reduced portion provided with bearings therein for said gear mechanism, and means for removably holding said guard skirt upon said reduced portion of said gear housing.

3. In a device of the class described comprising brushes rotating in opposite directions and a guard about and carrying said brushes, power driven means for said brushes and a handle encasing the same, a driving connection and a housing for the same forming a removable intermediate section between said handle and said guard, said driving connection including a gear mechanism having a shaft for each brush, intermeshing gears on said shafts and a driving connection between one of said intermeshing gears and said power means in said handle including a gear ring driving one of said intermeshing gears and a pinion meshing with said gear ring and driven by said power means.

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