April 10, 1962 W. H. BRISTOW 3,028,614

ELECTRIC BRUSH

Filed Dec. 31, 1956

Fig. 1.

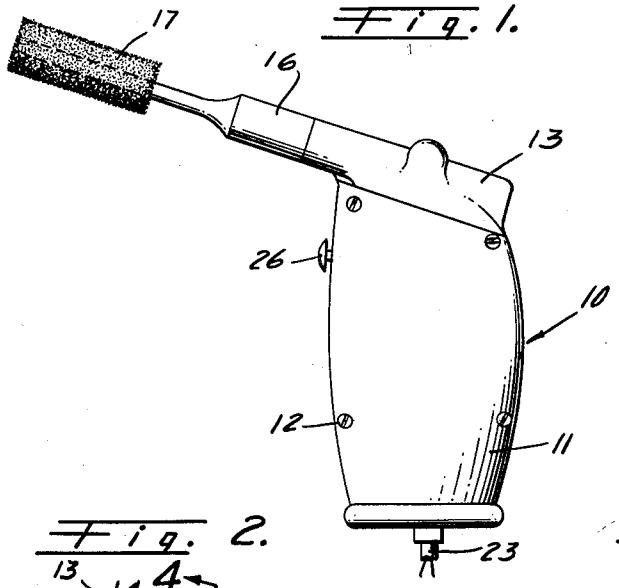


Fig. 2.

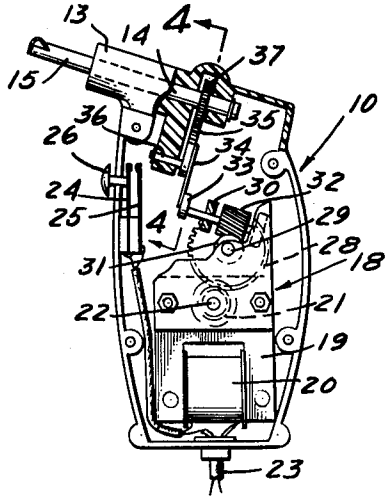


Fig. 3.

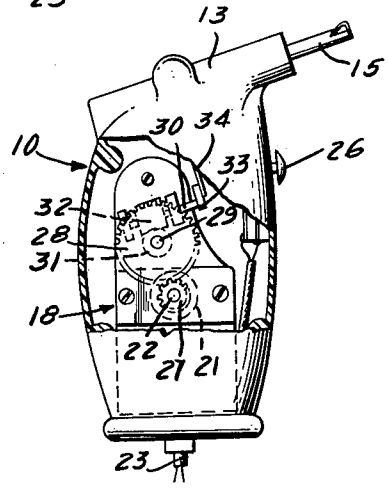
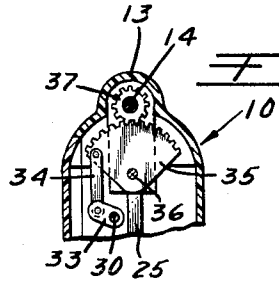


Fig. 4.



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ELECTRIC BRUSH

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The present invention relates generally to an electrically operable brush, and is more specifically concerned with a brush for brushing the teeth, and for massaging and stimulating circulation in the gums during the brushing operation.

Heretofore, motor operated tooth brushes have in general conformed to either of two types, namely, a rotary type brush which operates continuously in one direction, or an oscillatory type brush which is moved in opposite directions.

In the main, conventional arrangements have utilized a brush of conventional bristle arrangement such as utilized in the usual hand manipulated brush in which parallel extending tufts of bristles are mounted in the brush head, the shank of the brush being arranged to be removably attached to a motor operating mechanism which has operated to vibrate or oscillate the toothbrush through a relatively small angle in a manner which more or less simulates a hand operation. Such arrangements have been ineffectual for the reason that the bristles of the brush were merely flexed and remain in a more or less limited position in which the particles of food and other materials in the tooth crevices would not be effectively removed.

Moreover, in the conventional toothbrushes, the actuating motor was so arranged that the longitudinal axis was substantially parallel and formed an extension to the handle of the brush. Thus, in order to hold the brush in the desired position on the teeth, it became necessary for the user to hold his hand in a strained position, and which was very tiring and uncomfortable.

Having the foregoing in mind, the present invention seeks to overcome the inherent disadvantages of conventional motor driven brushes by providing an arrangement in which the brush shank is connected to a driving shaft which extends at an angle with respect to the longitudinal axis of the casing for the motor such that the user may hold the brush in a convenient unrestrained and untiring position of the hand while performing the brushing operation.

A further object of the herein described invention is to provide a brush in which the bristles extend radially and are arranged throughout the entire brush circumference so as to permit oscillatory movement through a large angle such that the bristles will not merely be flexed, but will be moved to a position where they will be released with a flicking action which is most effective in removing lodged particles between the teeth and in the crevices of the teeth. Thus in such movement, the bristles are alternately fixed in opposite direction and released rather than being merely moved in a small limited area.

A further object of the invention resides in the provision of a novel driving mechanism for oscillating the driving shaft and the brush at comparatively reduced speed through substantially 180°, whereby the above noted flicking action of the bristles may be obtained.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing several embodiments of the invention without placing limitations thereon.

Referring to the accompanying drawings, which are for illustrative purposes only:

FIG. 1 is a side elevational view of electrically operable toothbrush embodying the features of the present invention;

FIG. 2 is a fragmentary similar view with a side cover removed to disclose the cooperative relationship of the parts therein, and being partly in section and having cut away portions to disclose certain details of construction;

FIG. 3 is a view from the opposite side, portions of the casing being cut away to disclose details of the driving mechanism; and

FIG. 4 is an enlarged fragmentary sectional view, taken substantially on line 4—4 of FIG. 2, and showing details of the oscillating driving structure.

Referring now generally to the drawings, for illustrative purposes the electric brush of the present invention is shown in FIG. 1 as comprising generally a casing or housing 10 of plastic or other suitable material, this housing being of generally hollow construction to contain the electric driving mechanism, which will hereinafter be described in detail, and being of such configuration as to be readily and easily gripped by the hand of the user. Access to the interior of the casing is provided by means of a side cover 11 which is removably secured by a plurality of securing screws 12.

At one end of the housing, there is formed an extension 13 within which a drive shaft 14 is supported for rotation about an axis which extends at an angle to the longitudinal axis of the housing (FIG. 2) and so that an outer end 15 of the shaft will be laterally spaced from the adjacent end of the housing. This end of the shaft is adapted to releasably receive in telescoped relation a shank member 16 of a brush head having an elongate brushing portion 17 composed of tufts of radially extending bristles around at least substantially 180° of the shank, and may extend substantially the entire circumference of the shank.

Referring again to FIG. 2, driving power is obtained from a suitable electric motor, as generally indicated by the numeral 18, and which contains a conventional magnetizable frame structure 19, a field winding 20, and a rotatable armature 21 carried by a motor shaft 22 supported for rotation in suitable bearings.

The field winding 20 is energizable from a suitable power source through a connection cord 23, one side of the energizing circuit to the field winding being carried through a pair of normally opened leaf spring contact members 24 and 25 which are arranged to be actuated into circuit closing engagement by means of a push-button 26 supported in the wall of the casing, and so positioned that it may be conveniently manipulated to energize the field winding while gripping the casing 10 during a brushing operation.

The motor shaft drives a small pinion 27 having teeth which mesh with a gear 28 carried by a shaft 29 which drives a jack shaft 30 through a worm 31 meshing with a worm gear 32 so as to drive the jack shaft 30 at reduced speed.

As best shown in FIG. 4, the jack shaft 30 carries a crank arm 33 which is pivotally connected at its outermost end to one end of a link member 34 which forms a connecting rod between the crank arm and a segmental gear 35 supported for oscillatory movement on a pivot 36. The segmental gear has teeth which mesh with the teeth of a pinion 37 carried by one end of the drive shaft 14. By means of the transmission gearing as described above, the continuous high speed of the motor shaft 22 in one direction is translated into a relatively low speed oscillatory movement of the drive shaft 14 through an angle of at least substantially 180° in order to provide the desired brushing action of the bristles so as to produce a flicking action rather than a mere flexing of the bristles as obtained in the prior art devices.

Various modifications may suggest themselves to those skilled in the art without departing from the spirit of my invention, and hence, I do not wish to be restricted to the specific form shown or uses mentioned, except to the extent indicated in the appended claims.

I claim:

1. In a motor driven tooth brush, a housing forming a substantially elongate hand grip, a drive shaft extending transversely to the longitudinal axis of said housing, said drive shaft being journaled in said housing at one end thereof and projecting therefrom with its axis of rotation positioned at an angle to the longitudinal axis of said housing so that the outer end of said shaft is laterally spaced from said housing end, a brush head having an elongate shank adapted to be removably attached to the outer end of said drive shaft, said brush head having bristles extending outwardly from said shank around at least about 180° of said shank, and means within said housing for oscillating said drive shaft and connected brush head about the axis of said shank through an angle of at least substantially 180°.

2. In a motor driven tooth brush, a housing forming a substantially elongate hand grip, a drive shaft extending transversely to the longitudinal axis of said housing, said drive shaft being journaled in said housing at one end thereof and projecting therefrom with its axis of rotation positioned at an angle to the longitudinal axis of said housing so that the outer end of said shaft is laterally spaced from said housing end, a brush head having an elongate shank adapted to be removably attached to the outer end of said drive shaft, said brush head having bristles extending outwardly from said shank around substantially the entire circumference of said shank, and means within said housing for oscillating said drive shaft and connected brush head about the axis of said shank through an angle of at least substantially 180°.

3. In a motor driven tooth brush, a housing forming a substantially elongate hand grip, a drive shaft extending transversely to the longitudinal axis of said housing, said drive shaft being journaled in said housing at one end thereof and projecting therefrom with its axis of rotation positioned at an angle to the longitudinal axis of said housing so that the outer end of said shaft is laterally spaced from said housing end, a brush head having an elongate shank adapted to be removably attached to the outer end of said drive shaft, said brush head having bristles extending outwardly from said shank around at least about 180° of said shank, a pinion gear carried by the innermost end of said drive shaft, motor means within said housing connected in driving relation to a continuously rotatable crank arm, a segmental gear meshing with said pinion gear and mounted for oscillation about an axis in spaced relation to said crank arm, and a connecting rod pivotally coupled to the crank arm and to the segmental gear, whereby to oscillate said drive shaft and connected brush head about the axis of said shank through an angle of at least substantially 180°.

References Cited in the file of this patent

UNITED STATES PATENTS

1,227,412	Fendrich	May 22, 1917
1,243,579	Bates	Oct. 16, 1917
1,355,728	Bennett	Oct. 12, 1920
1,394,636	Murray	Oct. 25, 1921
1,464,776	Rockman	Aug. 14, 1923
1,825,353	Johnson	Sept. 29, 1931
1,862,284	Smulski	June 7, 1932
1,869,991	White et al.	Aug. 2, 1932
2,121,266	Scofield	June 21, 1938
2,129,002	Gold	Sept. 6, 1938
2,158,738	Baker et al.	May 16, 1939
2,196,667	Moseley	Apr. 9, 1940
2,196,786	Wahl	Apr. 9, 1940
2,259,964	Sussman	Oct. 21, 1941
2,448,614	Mirus	Sept. 7, 1948
2,474,899	Hutt	July 5, 1949
2,583,886	Schlegel	Jan. 29, 1952
2,618,797	Grover	Nov. 25, 1952
2,760,092	Galinski	Aug. 21, 1956

FOREIGN PATENTS

991,485	France	Oct. 5, 1951