July 31, 1962 F. WEPFER 3,046,584

MECHANICAL TOOTHBRUSH AND THE LIKE

Filed Nov. 2, 1960 2 Sheets-Sheet 1

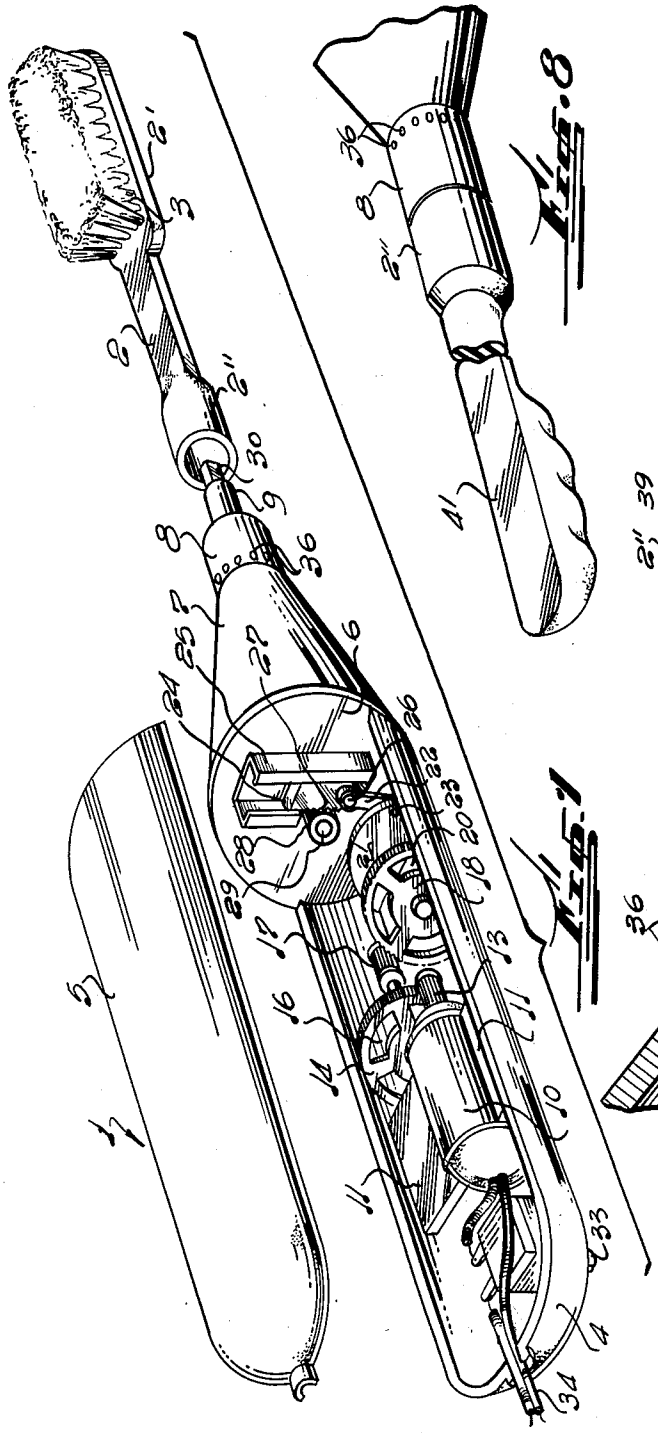


Fig. 1

Fig. 2

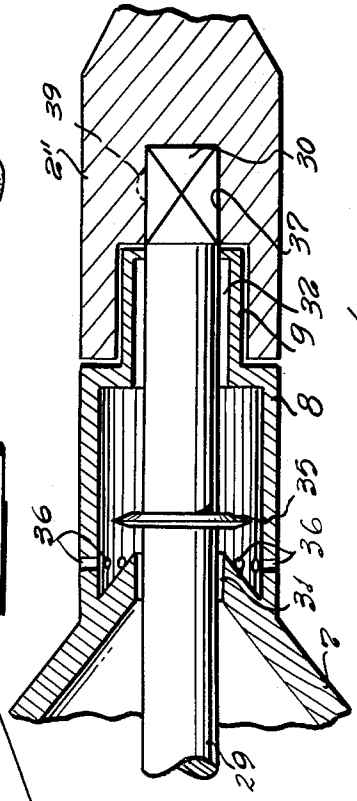


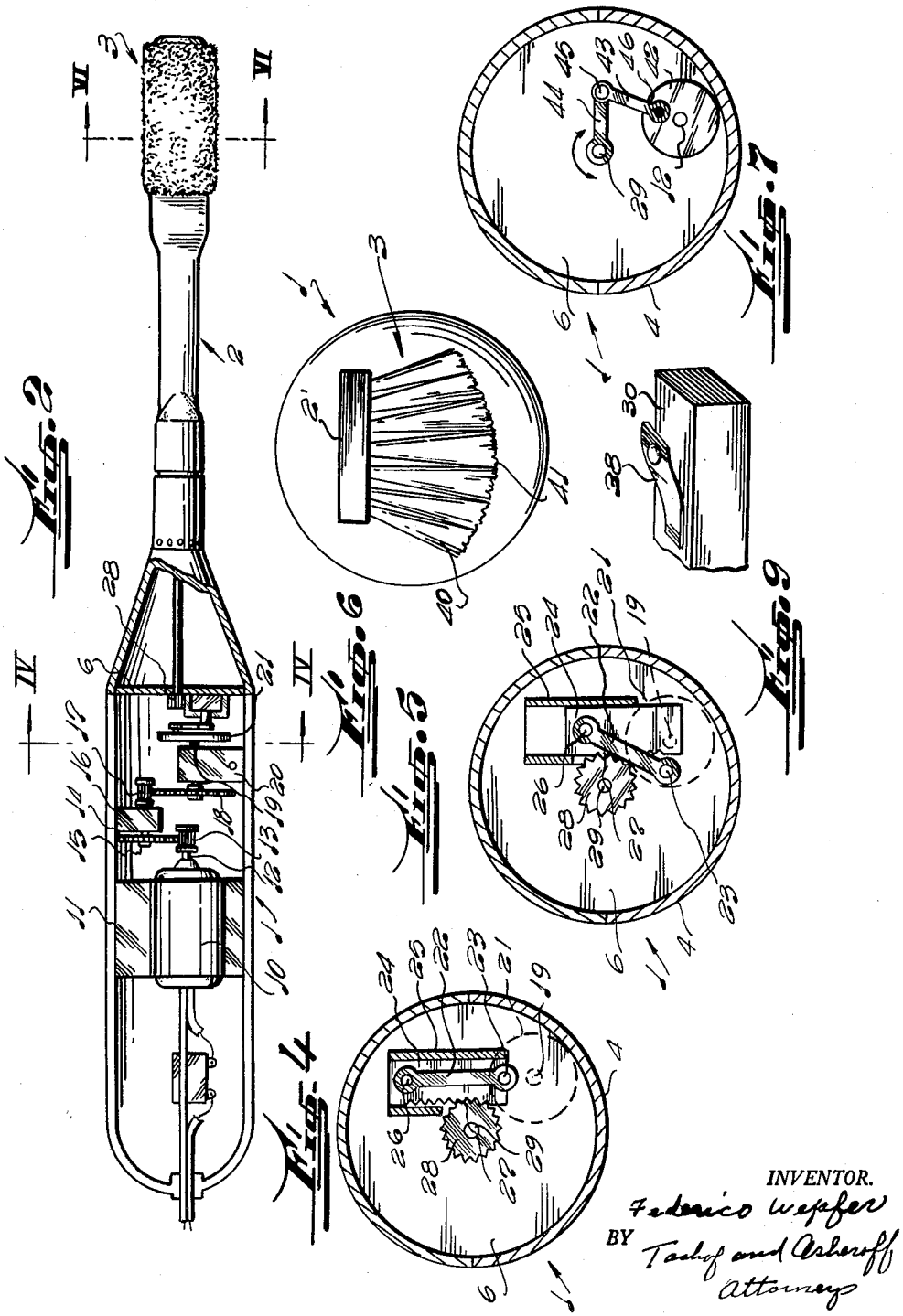
Fig. 3

INVENTOR.
Federico Wepfer
BY Tackof and Cushman
Attorneys

July 31, 1962 F. WEPFER 3,046,584

MECHANICAL TOOTHBRUSH AND THE LIKE

Filed Nov. 2, 1960 2 Sheets-Sheet 2



INVENTOR.
Federico Wepfer
BY Tashof and Ashoff
Attorneys

United States Patent Office 3,046,584 Patented July 31, 1962

3,046,584

MECHANICAL TOOTHBRUSH AND THE LIKE

Federico Wepfer, 2935 Virrey Loreto St., Buenos Aires, Argentina

Filed Nov. 2, 1960, Ser. No. 66,761
6 Claims. (Cl. 15—22)

The present invention refers to a mechanical toothbrush and the like implement such as gum massage brushes and although reference will mainly be made to toothbrushes, it is hereby understood that the expression "toothbrush" does not expressly limit the invention thereto.

The correct cleaning of the teeth requires that the bristles of the conventional toothbrush are moved up and down from the roots to the tips of the teeth and not sidewise along the rows, as is usually done. If the conventional toothbrush is correctly used, after a rather short period of usage the bundles of bristles spray apart rendering the device inoperative, particularly in view of the fact that generally an excessive pressure is applied on the toothbrush. In many cases the excessive pressure may even harm the gum.

It has been thought that if the user is able to carry out the conventional incorrect movement along the row of the teeth and at the same time the toothbrush is mechanically driven so as to rotate with a reciprocating movement about the longitudinal axis of the handle, that an almost perfect result is achieved and particularly the different interstices are thoroughly cleaned. In addition, the bristles of the toothbrush of the present invention are substantially radially arranged with regard to the center of rotation, so that the free ends of the bristle define a substantially semicylindrical surface whereby it is assured that during the cleaning action all bristle tips will substantially enter in contact with the surfaces of the teeth to be cleaned.

It may be added that with the toothbrush, according to the present invention, a thorough cleaning of the teeth may be carried out at considerable less time than using the conventional type of toothbrush.

According to the present invention, the handle is divided into a main handle portion having preferably an electric motor for driving with a reciprocating rotary movement a shaft projecting out of said main handle and on which a stem-like connecting member integral with a brush or similar member is removably mounted. Thus, the main handle may be used as a permanent unit and the stem-like connecting member and brush or the like may be replaced by another unit when worn out.

In order to facilitate the comprehension of the present invention reference will now be made by way of example to several specific embodiments in relationship to the accompanying drawings, wherein:

FIG. 1 is an exploded perspective view of the mechanized toothbrush, according to the present invention.

FIG. 2 is a top plan view, partially in section of the toothbrush.

FIG. 3 is a longitudinal section of a detail showing the coupling of the stem-like connecting member with the main handle.

FIG. 4 is a cross section through line IV—IV of FIG. 2, but showing the rack in the uppermost position.

FIG. 5 is a similar view as FIG. 4, and showing the rack in an intermediate position.

FIG. 6 is a cross section through line VI—VI of FIG. 2.

FIG. 7 is a schematic lay-out of another mechanical driving arrangement.

FIG. 8 is a perspective view of a gum massaging implement.

FIG. 9 is a perspective view of a modification of the square coupling end.

As may be appreciated in FIGS. 1 and 2, the toothbrush according to the present invention consists of a main holder 1 and a removable stem-like connecting member 2 integral with a brush 3.

The main holder 1 consists of a semicylindrical housing 4 and a semicylindrical cover member 5 (FIG. 1) which when linked together define the rear portion of the main holder 1 which in its front portion is provided with a partition 6.

The main holder 1 further comprises a tapered front portion 7 ending in a cylindrical discharge member 8 having a tubular axial bearing projection 9 (see also FIG. 3).

An electric motor 10 is mounted in a suitable support 11 integral with the semicylindrical housing 4. The electric motor 10 comprises a driving shaft 12 having a pinion 13 meshing with an intermediate gear 14 mounted on an intermediate shaft 15 supported by a bearing 16 integral with the semicylindrical housing 4. The intermediate shaft 15 further supports an intermediate pinion 17 meshing with a second gear 18 mounted on a second shaft 19, rotatably supported in a second bearing 20 again integral with the semicylindrical housing 4. The second shaft 19 further supports a disc 21 to which a connecting rod 22 is pivoted by means of pivot pin 23 (see also FIG. 4). A rack 24 is slidably arranged in a channelled guide 25 (see also FIG. 1) and pivoted by means of a second pivot pin 26 to the other end of the connecting rod 22. The teeth 27 of the rack 24 are directed towards an open side of the channelled guide 25 so as to mesh with a rack pinion 28 mounted on a toothbrush driving shaft 29. The toothbrush driving shaft 29 passes through the partition 6 and the tapered front portion 7 to finally project out of the tubular axial bearing projection 9 in form of a square coupling end 30.

The toothbrush driving shaft 29 is mounted on a pair of bearings 31, 32, of which bearing 31 is arranged in the tip portion of the tapered front portion 7 (FIG. 3), while the bearing 32 is mounted within the tubular axial bearing projection 9.

A switch 33 is interconnected in one of a pair of feeding cables 34 which project out of the rear portion of the main holder 1. The feeding cables 34 are to be connected to an electric current supply source (not shown) which when switch 33 established the connection will feed the electric motor 10.

A discharge disc 35 is mounted on the toothbrush driving shaft 29, within the cylindrical discharge member 8 and in front of a circle of discharge holes 36.

The stem-like connecting member 2 forms in its front portion the back 2' of the bristles defining the brush 3, and in its rear portion a cup-like end 2'' which may be mounted on the tubular axial bearing projection 9 in such a way as to cover the latter and the square coupling end 30 will thus enter a square blind perforation 37, whereby the stem-like connecting member 2 is coupled to the square coupling end 30.

If desired, as shown in FIG. 9, the square coupling end 30 may be provided with a resilient clutching band member 38, in which event the square blind perforation 37 would have to be provided with a suitable depression 39, such as shown in dotted lines in FIG. 3, whereby a better coupling is achieved, as will be readily understood by anybody skilled in the art.

The bristles 40 of the brush 3, as may be appreciated in FIG. 6, are substantially somewhat radially arranged so that the free tips of said bristles 40 define an arc of substantially semicylindrical shape.

As to the operation of the toothbrush according to the present invention, it will be understood that upon rotating

the driving shaft **12**, due to the transmission of the pinions and gears **13**, **14**, **17**, **18**, the disc **21** will likewise rotate and said rotary movement will be transformed into a reciprocating rotary movement by means of the connecting rod **22**, as will be readily appreciated by comparing FIGS. 4 and 5. Thus, the rack **24** will carry out an up and downward movement within the guide 25 and therefore the rack pinion **28** will carry out a reciprocating rotary movement and transmit the latter to the toothbrush driving shaft **29**, whereby the desired movement of the brush **3** is achieved.

Since it might be possible that some water leaks during use through the bearing **32** and may run along the toothbrush driving shaft **29**, the discharge disc **35** will act as a barrier for said water and conduce it towards the periphery of said disc **35**, whereby the water will be deposited on the inner wall of the cylindrical discharge member **8** and gradually discharged through the discharge holes **36**. Thus, it is assured that no water will enter the driving compartment.

It may be added, that at least one of the gears or pinion should be made of an electricity insulating material, so that it is assured that no current is conducted towards the square coupling end **30**.

Instead of using a brush **3**, other implements may be provided, such as shown in FIG. 8, wherein a gum massage device **41** is shown, usually made of rubber or resilient plastic material.

Although the driving arrangement just described is the preferred one, it will be obvious that many other types of arrangements could be used. For instance, in FIG. 7 the toothbrush driving shaft **29** is connected to a disc **42** which may be directly driven by the shaft **12** of the electric motor **10** through a crank **43** and connecting rod **44** which are pivoted together by pivot pin **45** and the crank **43** in turn is eccentrically pivoted by pivot pin **46** to the disc **42**.

I claim:

1. Drive means for an electrically operated toothbrush comprising an elongated housing defining a main handle, an electric motor in said housing, a toothbrush shaft projecting out of said housing, a transmission means interconnecting said motor and said shaft for rotationally oscillating said shaft, said housing having a front end portion defining a discharge member, said shaft having a free end projecting through said discharge member, a partition sealingly separating said discharge member from the remainder of said housing, discharge means for discharging liquid from said discharge member, said discharge means being defined by said discharge member having at least one perforation therethrough providing communication between the interior of said discharge member and the exterior thereof, and at least one disc mounted on said toothbrush shaft in said discharge member, said disc being spaced apart and positioned forwardly of said perforation, said free end of said toothbrush shaft being adapted to receive a toothbrush member.

2. Drive means as claimed in claim 1, wherein said housing comprises a tapered front portion including said partition, said tapered front portion terminating in a cylindrical member defining said discharge member, and wherein said discharge means is defined by said discharge member having therethrough a plurality of circumferentially spaced apart perforations, said disc being mounted on said toothbrush shaft in front of said plurality of perforations.

3. Drive means as claimed in claim 2, wherein said tapered front portion ends in a tip portion within said cylindrical discharge member, said tip portion having therein a bearing for said toothbrush shaft, said tip portion projecting beyond the plane defined by said perforations.

4. Drive means as claimed in claim 1, wherein said electric motor includes a drive shaft, and said transmission means comprises a pinion on said driving shaft, an intermediate shaft rotatably supported by said housing having an intermediate gear and an intermediate pinion, said intermediate gear meshing with said first-mentioned pinion, a second shaft rotatably supported by said housing, a second gear and a disc mounted on said second shaft, said second gear meshing with said second-mentioned pinion, means interconnecting said toothbrush shaft and said disc mounted on said second shaft, the last-named means transforming rotary motion into rotary oscillating motion.

5. A drive means as claimed in claim 4, wherein said last-named means includes a connecting rod pivotally connected to said disc on said second shaft, a channeled guide mounted on said partition, a rack slidably arranged in said channeled guide, said connecting rod being pivotally connected to said rack, said rack having teeth, said channeled guide having an open side facing the teeth of said rack, and a rack pinion mounted on said toothbrush shaft and meshing with said teeth of said rack through said open side.

6. Drive means as claimed in claim 4, wherein said last-named means includes a crank pivotally and eccentrically connected to said disc on said second shaft, and a rod pivotally connected to said crank, said rod being journalled to said tooth brush shaft.

References Cited in the file of this patent

UNITED STATES PATENTS

1,869,991	White et al.	Aug. 2, 1932
1,997,352	Van Fleet	Apr. 9, 1935
2,121,233	Horton	June 21, 1938
2,158,738	Baker et al.	May 16, 1939
2,445,819	Bell	July 27, 1948
2,515,342	Glaser	July 18, 1950
2,893,250	Moore	July 7, 1959
2,917,758	Held et al.	Dec. 22, 1959

FOREIGN PATENTS

341,474	Switzerland	Nov. 30, 1959