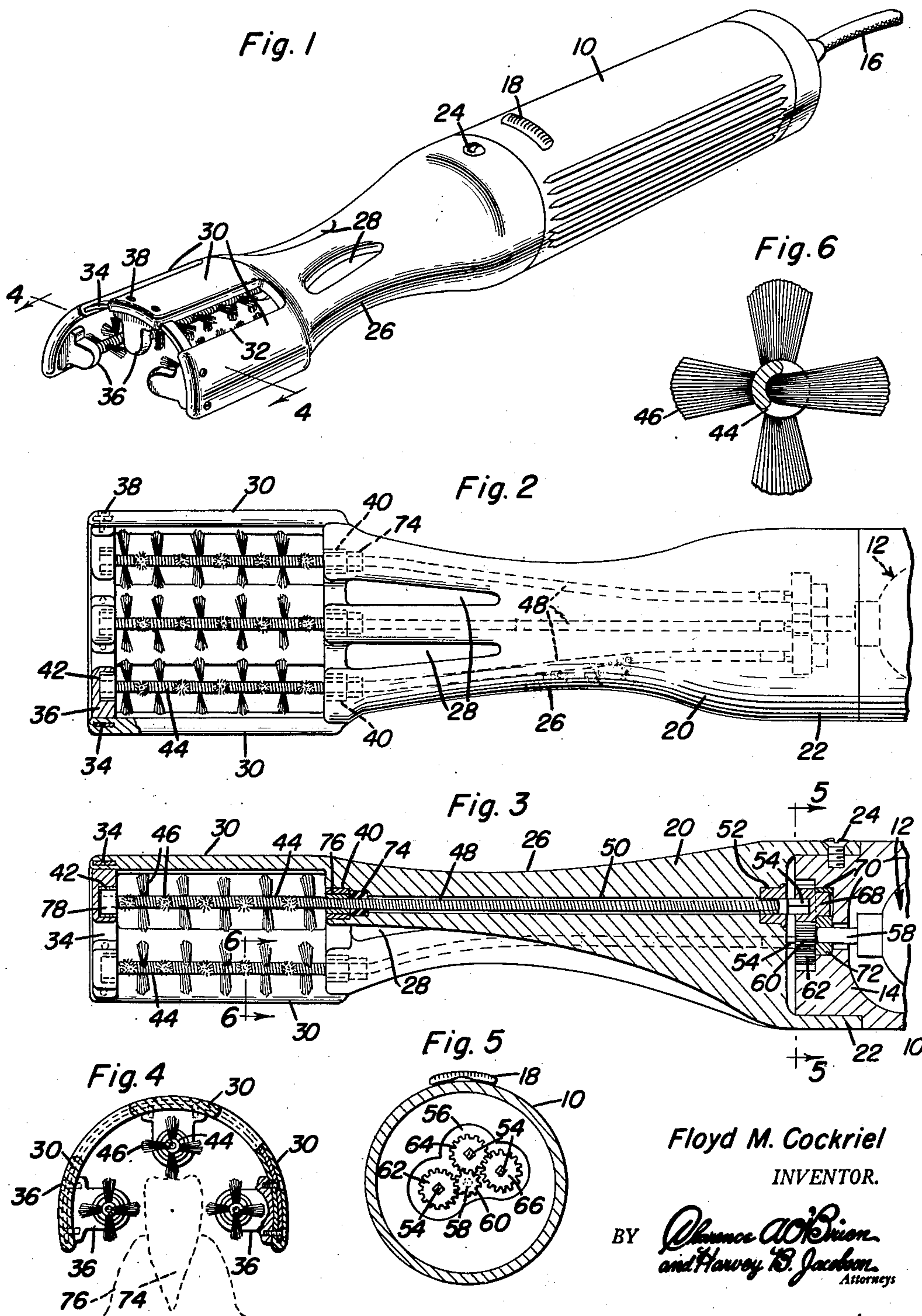


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MECHANICAL TOOTHBRUSH  
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## UNITED STATES PATENT OFFICE

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## MECHANICAL TOOTHBRUSH

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3 Claims. (Cl. 15—23)

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This invention relates generally to toothbrushes, and more particularly to a mechanical toothbrush having rotary brushes.

A primary object of this invention is to provide a toothbrush which will thoroughly cleanse the teeth without injury to the gums or teeth, and in an expeditious manner.

Another object of this invention is to provide a toothbrush which is easily cleansed after use, the elements which are brought into contact with the teeth being considerably removed from the motor used to drive the same, so that the danger of short circuiting the motor or damage thereto by water is minimized.

Another object of this invention is to provide a mechanical toothbrush which is extremely safe to use from the point of view of proper shielding of the rotating parts, including the flexible cables used in this invention to connect the rotary brushes with the motor.

Yet another object of this invention is to provide a head which is somewhat resilient and presenting a concavity wherein the rotary brushes are housed in such a manner that the resiliency of the head allows the rotary brushes to move slightly relative to each other during use, the axial members of the brushes themselves being capable of a limited bending, all these features being directed toward greater efficiency and safety in use.

Another object of this invention is to provide a mechanical toothbrush in which rotary toothbrush units are easily removed and replaced when necessary.

Yet another object of this invention is to provide a mechanical toothbrush in which rotary brushes are arranged within a concavity or arch designed so that laterally disposed rotary brushes may contact opposite sides of a row of teeth simultaneously while still another brush or brushes may clean the top portions of the teeth, it being understood that this construction increases the speed with which a complete cleansing operation may be effected.

And a last object to be mentioned specifically is to provide a mechanical toothbrush which is relatively inexpensive and practicable to manufacture, which is simple, comfortable and safe to use by even young children, which is hygienic from every point of view, and which will give generally efficient and durable service.

With these objects definitely in view, this invention resides in certain novel features of construction, combination and arrangement of elements and portions as will be hereinafter de-

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scribed in detail in the specification, particularly pointed out in the appended claims, and illustrated in the accompanying drawings which form a material part of this application, and in which:

Figure 1 is a view in perspective of the assembled toothbrush;

Figure 2 is a lower plan view of the assembled toothbrush, a portion of the motor housing being broken away to conserve space and to allow the toothbrush to be shown on a larger scale;

Figure 3 is a vertical sectional view, taken longitudinally of the structure shown in Figure 2;

Figure 4 is a transverse, vertical sectional view taken substantially on line 4—4 in Figure 1;

Figure 5 is a transverse vertical sectional view taken substantially on the line 5—5 in Figure 3; and

Figure 6 is an enlarged transverse sectional view of a rotary brush, taken on the line 6—6 in Figure 3.

Similar characters of reference designate similar or identical elements and portions throughout the several views and throughout the specification.

Referring now to the drawing in detail, the embodiment illustrated includes a motor housing 10 with a motor, generally indicated diagrammatically at 12. The motor housing 10 has a reduced forward end 14 and electric power lead lines 16 will be of the flexible cable type, and a switch 18 will be mounted on the housing in a convenient location as indicated best in Figure 1.

A neck 20 is provided with a socket portion 22 which fits snugly onto the reduced forward end 14 of the motor housing 10 and is secured thereon by screws 24. The reduced portion 26 of the neck may have indentations or actual apertures extending longitudinally of the reduced portion, to lighten the total weight of the toothbrush while adding a decorative feature. The head of the toothbrush is comprised of a plurality of parallel arms 30, each concavo-convex in cross section and together comprising a head of general concavo-convex shape, the concavity extending longitudinally of the toothbrush and the arms 30 being separated by parallel slots 32. Although the housing, neck and head may be constructed of any suitable material, the material used to construct the head should be somewhat resilient and the provision of the slot 32 will result in making the arms slightly more resilient. A resilient arch 34 or bridge will be secured to and between the outer end portions of the arms 30, by means of screws 38, or the like, and these screws may also be used to secure a plurality of



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bearing plates 36 on the outer end portions of the arms 30.

A similar number of simple bearings 40 are embedded in that portion of the head adjacent the neck 20, it being understood that the head and neck may be integral, and bearings 42 will be mounted in the bearing plates 36 to mount the axial members 44 of the rotary brushes for rotation about axes parallel to the longitudinal axis of the head. Each axial member 44 carries a plurality of bristles 46 spaced radially and longitudinally of the axial member. As indicated in Figure 6, the axial members 44 may be of spirally wound cable type and the bristles 46 may be inserted and clamped between adjacent windings, as will be clear from an inspection of Figure 6. In a simple and preferred form of this invention, the axial members 44 will be continued through the neck 20, in which a plurality of elongated bores 50 are provided, these bores leading to the socket 22, and the end of the cables 48 will be supported in bearings 52 fixed in the neck 20. These ends of the cables 48, remote from the rotary brushes, have squared terminals 54. A recess 56 is provided in the reduced end portion 14 of the motor housing, and the drive shaft 58 of the motor 12 extends into this recess and carries a drive pinion 60. A set of gears 62, 64 and 66 are operatively mounted within the recess 56 and are each provided with a socket to receive the squared terminal 54 of the corresponding cable 48. The pinion 60 is in direct driving engagement with the gears 62 and 64, while the gear 66 will be driven by the gear 64, so that the gears 62 and 66 will be driven in opposite directions and the corresponding brushes disposed laterally in the head of the toothbrush will be driven in opposite directions. Suitable bearings will be provided for the gears 62, 64 and 66 within the recess 56, it being preferred that each of the gears 62, 64 and 66 be provided with an extending hub portion 68 which will be rotatively engaged in a simple bearing 70 for each of the said gears, these last-mentioned bearing being rigidly mounted within the recess 56, and another bearing 72 will be provided for the drive shaft 58 of the motor.

Special provision is made to prevent water from seeping into the bores 50, the means therefor comprising sealing collars 74, of rubber or like material, secured to the flexible cables 48 and frictionally engaging ends of the bearings 40. It should also be noted that sleeve journals 76 are rigidly secured to the flexible cables within the bearings 40, these sleeve journals being constructed of wear resistant material. Similar sleeve journals 78 are secured to the ends of the cables 48 within the bearings 42.

The operation of this invention will be clearly understood from a consideration of the foregoing description of the mechanical details thereof, taken in connection with the above recited ob-

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jects and the drawings. In recapitulation, the motor 12 will drive the rotary brushes, on the opposite sides of the head, in opposite directions so that both sides of a tooth 74 may be cleaned at the same time, the top of the tooth also being cleaned by the center rotary brush. The slight resiliency of the head, coupled with the easy manipulability of the toothbrush, result in maximum efficiency with maximum comfort in use. It will also be clear that all of the objects recited above are amply achieved by this invention. Further description would appear to be unnecessary.

Having described the invention, what is claimed as new is:

1. A mechanical tooth brush comprising a hollow handle, a head, and a neck joining the handle and the head, said head including a plurality of spaced, parallel, flexible arms secured to and extending longitudinally from the peripheral edge of the end of the neck remote from said handle, said arms forming a longitudinally extending arch, a resilient, arched bridge connecting said arms to one another at their free ends, bearing plates secured to the free ends of said arms and extending radially toward the axis of the arch formed by said arms, the portion of said neck adjacent said arms being recessed and forming a continuation of said arch, said hollow handle constituting a motor housing, a motor in said housing, a plurality of flexible cables each having one of its ends journaled in one of said bearing plates and the other of its ends operatively connected to said motor for rotation, said cables extending through said neck portion, the portion of each of said cables between said bearing plates and said neck constituting a bristle shank.

2. The combination of claim 1 wherein said arms are integral with said neck.

3. The combination of claim 1, the operative connection of said cables to said motor including multiple drive gears driven by said motor, said gears having sockets, said cables having their other ends secured in said sockets.

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