July 8, 1924. 1,500,410

J. MERKEL, JR

TOOTHBRUSH

Filed Oct. 17, 1921

FIG. 1

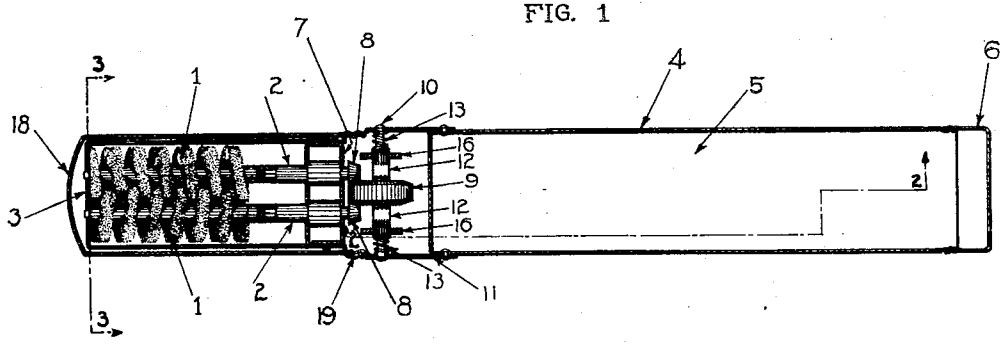


FIG. 2

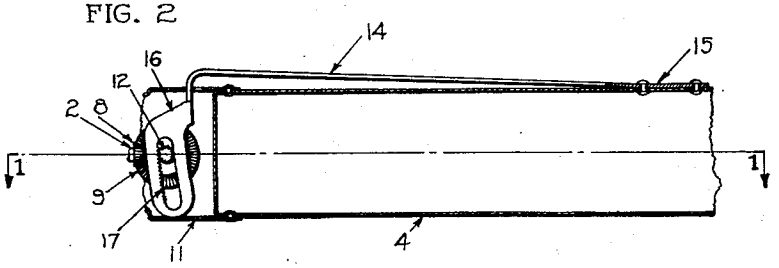


FIG. 5.

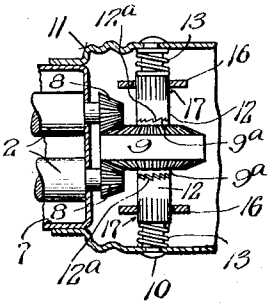


FIG. 4

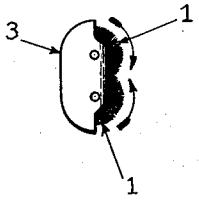
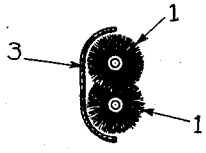


FIG. 3



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN MERKEL, JR., OF EVANSVILLE, INDIANA.

TOOTHBRUSH.

Application filed October 17, 1921. Serial No. 508,332.

To all whom it may concern:

Be it known that I, JOHN MERKEL, Jr., a citizen of the United States, residing at Evansville, in the county of Vanderburg and State of Indiana, have invented new and useful Improvements in Toothbrushes, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to a tooth brush, and it has especial relation to a device of the character designated, wherein the brushes are revolved as said device is used for cleansing the teeth.

One object of my invention, therefore, is to provide a revolving tooth brush wherein the brushes are provided with bristles arranged in helical form about a shaft which is rotated. In my device I provide two of such brushes, and so arrange the bristles that they inter-mesh in such manner that, when the brushes are arranged parallel to one another and rotated in opposite directions, a flat cleansing surface is formed. With such a cleansing surface, and with two brushes revolving in opposite directions, I combine a shield or guard extending over one side of the revolving brushes whereby it is possible for the user to employ only the correct side of the revolving brushes, and further arranged that on the open side of the brush, the bristles shall revolve toward one another. This feature whereby the brushes rotate in opposite directions and towards one another is contributory of what I consider the most beneficial advantage which is derived from the use of a brush embodying my invention.

With the device hereinafter described simultaneous brushing of the upper and lower teeth can be accomplished since the bristles are constrained to always move from the gums towards the crown of the teeth. This last feature is of utmost importance since the movement of the bristles in the other direction will result in a laceration of the gums and the tearing of them away from the teeth. By utilizing my device, on the other hand, the gums are pressed down by the action of the brush and, moreover, both the upper and lower teeth are cleansed in one operation.

I mount the brushes on spindles from which they may be readily detached for the purpose of cleaning the same, when this latter is desired. For further protection, and in view of sanitary considerations, I provide a cap portion which covers the brushes entirely when my device is not in use.

The brushes in my device are, as heretofore indicated, mounted on spindles which are journalled to rotate in a wall of a container or handle portion which latter is so formed that it will receive the cap which is adapted to cover the brushes. Upon this handle portion is mounted a reciprocatory member which is convenient to the hand of the user of the device. This member is preferably of spring character, whereby after being depressed by the user it returns to its initial position and thereby effects reciprocation thereof. The end of this reciprocatory member extends into the interior of a tubular member forming the handle and is there associated with means for rotating the heretofore-mentioned brushes in the proper direction.

Finally I provide the hollow handle portion with a cap in order that a dentifrice may be positioned therein in convenient accessibility to be used with this device.

For a better understanding of my invention reference may be had to the accompanying drawing, in which:

Figure 1 is an elevational sectional view of a device embodying my invention;

Fig. 2 is a fragmentary sectional view taken on the line II—II of Fig. 1;

Fig. 3 is an end elevational, sectional view taken on the line III—III of Fig. 1;

Fig. 4 is an end elevational view; and,

Fig. 5 is an enlarged sectional view of certain portions of the operating mechanism embodied in my improved brush.

Referring now more particularly to the drawing, brushes 1—1 comprise bristles mounted in helical formation on shafts, these shafts being removably mounted at one end on spindles 2—2 and being journaled at the other ends in the upper portion of the resilient end wall of a guard portion or member 3. The latter extends entirely over the backs of both brushes and is moved to also embrace the top and bottom of the brushes as shown in Fig. 3, whereby a substantially planar brushing surface is exposed. The brushes 1—1 extend between the guard mem-

ber 3 and a handle portion 4, said guard also being attached to the handle. The handle comprises a hollow part 5 which is closed by a cap 6 and in which a dentifrice may be positioned, if so desired.

The spindles 2 are journalled in a diaphragm or wall portion 7 at the end of the tubular handle and have bevel gears 8—8 attached to their ends, while the latter gears mesh with a double face gear 9. A shaft 10 is journalled in the walls of the device and has mounted thereupon pinions 12—12, these pinions being held in mesh with the gear 9 by springs 13—13 surrounding the shaft 10. These pinions 12 as well as the gear 9 are free to turn upon the shaft 10, they being mounted loosely thereupon. Moreover, it will be observed that the springs 13 urge the pinions 12 toward the gear 9. The latter is provided with clutch teeth 9^a while the two pinions 12 are provided with clutch teeth 12^a, these last being of such character that upon rotation of the pinions in one direction the teeth are forced into mesh by the spring 13 to cause the rotation of the gear 9.

Secured to the outside of the handle member, and conveniently accessible to the hand of the user of my device is a spring member 14 which is riveted at one end 15 to the handle. The other end of the member 14 extends through a slot in the tubular wall 11, and into the compartment wherein are positioned the various operating gears which turn the brushes. Racks 16—16 are attached to the end of the member 14 and enclose interiorly toothed arcuate slots which surround the pinions 12—12, the teeth being formed on one side only of each of said slots.

As shown in the enlarged sectional view of Figure 5 the teeth 17 are positioned on one side only of the arcuate slots, and further these teeth are oppositely positioned on the two members 16. By referring to said figure it will be observed that the teeth 17 on the upper member 16 are in mesh with the pinion 12, these teeth being on the right hand side of the member 16, as shown. The teeth 17, on the lower member 16, are in mesh with the pinion 12 at the left hand side thereof. It will be apparent therefore that when the member 14 is pushed downwardly the clutch teeth of the lower pinion 12 intermesh with the clutch teeth on the bevel pinion 9 to turn the latter to the left, at the same time the upper pinion 12 moves to the right because the rack teeth on the cooperating member 16 causes the same. The clutch teeth on the upper pinion 12, however, slide over the cooperating teeth of the gear 9 and the movement of said pinion 12, when the member 14 moves downwardly, is not, therefore, effective in causing a rotation of the gear 9. When, however, because of the spring action of the member 14, the racks 16 move upwardly the reverse action takes place. That is, the upper pinion 12 is then forced into mesh and causes the rotation of the gear 9, whereas the clutch teeth of the lower pinion 12 slide over the cooperating clutch teeth on the gear 9, since this latter or lower pinion 12 moves to the right, or in a clockwise direction, when the racks move upwardly. By making use of the above described novel form of cooperating elements I am enabled to impart a most advantageous motion to the brush and to do so with a minimum number of elements. Moreover, the member 14 is arranged in such position that it may be easily manipulated by the hand of the user of the brush in its most natural position in taking hold of the handle member of my device. This is of considerable advantage since, so far as I am aware, those devices of the prior art which make use of moving brushes do not provide an operating member of the described character, that is, one which will impart the necessary rotary motion to oppositely positioned brushes through the simple manipulation of a member such as 14, this manipulation being most aptly described as one of simply tightening and releasing the hold of the user on the handle.

It should be understood that the teeth 17 are on one side only of the arcuate slot, and that said teeth are oppositely positioned on the two racks. Moreover, the pinions so mesh with the gear 9, through the oppositely sloped clutch teeth, that the latter is constantly driven in one direction by the alternate engagement of the racks with the pinion, the latter being of such character that one pinion rotates the gearing as the member 14 moves downwardly, whereas the other rack rotates its associated pinion as the rack moves upwardly. That is, one pinion 12 drives the gear 9 in the proper direction while the teeth of the other pinion 9 are slipping past. On the opposite stroke of the rack, the last mentioned pinion drives the gear 9 while the teeth of the first-named pinion slip past.

A cap member 18 is adapted to be positioned under the end of the device in order to entirely enclose the brushes, it being observed that this cap is easily detachable by the exertion of a small amount of force, the same being held in position by a corrugated engaging surface at 19. This cap member is perforated to permit the evaporation of moisture when the brushes are covered.

The helical bristles on the brushes are arranged to intermesh when the brush shafts are turned in a particular direction and when the brushes move toward each other, as best shown in Fig. 4. Such inter-meshing of the bristles causes the formation of a substantially planar cleansing surface and inasmuch as I provide a guard 3, as shown,

it is impossible for the user of the device to place the brush against the teeth and have the wrong side of the said brushing surface active. Moreover, when the brushes wear down to such an extent that an active portion of the bristles no longer extends beyond the guard, it is necessary to re-place said brushes. This feature prevents the possibility of the brush shafts ever coming into contact with the teeth.

As I have heretofore pointed out it is essential in a device of this character that the moving bristles always move from the gums toward the crowns of the teeth. This is accomplished in my device by establishing the opposite rotation of the bristles towards each other on the open side of the device. And it will be observed that I obtain such an effective cleansing surface in a very simple and compact manner. Moreover, the brushes, because of their intermeshing relation, operate against the entire tooth surface and it is not necessary that the device itself be moved up and down in order to properly cleanse the teeth. The constant movement of the bristles in one direction only—from the gum towards the crown of the teeth—develops a cleansing action which is obviously more beneficial than can possibly be obtained with a tooth brush of the character now in use, since the gums are smoothed down and the bristles moved only over the proper tooth when the device is in position. Furthermore, the cleansing of the teeth is expedited to a considerable degree since both the upper and lower teeth are brushed in one operation, and moreover are brushed by bristles moving in the proper direction.

I have provided for all sanitary considerations in that the brushes are easily and quickly removed for periodic cleaning of the same, and I have moreover provided that these brushes cannot be returned to operative position in the wrong sequence, since the helical formation of the bristles precludes this latter.

Finally it will be observed that all of the metal portions of the device comprise stampings which are riveted together and the initial cost of my device is therefore reduced to a minimum.

While I have described but one embodiment of my invention, it is obvious that many modifications therein may occur to those skilled in the art, and I desire, therefore, that the same be limited only by the showing of the prior art and by the scope of the appended claims.

What I now claim as new and desire to obtain by Letters Patent of the United States is:

1. In a device of the character described, a pair of oppositely rotating brushes having bristles thereon arranged in helical formation, said brushes being so arranged that said helically arranged bristles on opposed brushes inter-mesh.

2. In a device of the character described, a pair of oppositely rotating brushes having bristles thereon arranged in helical formation, said brushes being so arranged that said helically arranged bristles on opposed brushes inter-mesh to form a substantially flat cleansing surface, and means causing the opposite rotation of said brushes whereby upper and lower teeth are cleansed from the gums towards the crown.

3. In a device of the character described, a plurality of brushes having meshing helically-arranged bristles so arranged as to produce a substantially planar cleansing surface, operating means arranged to be depressed by the hand of the user of said device comprising a spring bar adapted to move up and down and so attached to said device that a reciprocatory motion is imparted thereto when moved in one direction by the user, and gear members connecting said reciprocatory member and said brushes for causing the reciprocatory member to rotate said brushes in opposite directions.

4. In a device of the character described, inter-meshing brushes adapted to be rotated toward each other to form a substantially flat cleansing surface, whereby both the upper and lower teeth are cleansed from the gum to the crown, a support or handle portion for said brushes, a guard member extending over all of said brushes except said cleansing surface, spindles journalled in said handle and to which said brushes are removably attached, and means extending parallel to said handle for driving said spindles to rotate said brushes toward each other on the open side of said guard member.

5. In a device of the character described, inter-meshing helical brushes adapted to inter-mesh to form a substantially flat cleansing surface, a support or handle portion for said brushes, a guard member extending over all of said brushes except said cleansing surface, spindles journalled in said handle and to which said brushes may be attached, a single driving means for said spindles, and reciprocatory means on said handle for actuating said driving means to rotate said brushes toward each other on the open side of said guard member, said means extending along said handle substantially parallel thereto to be grasped by the hand of the user of said device.

6. In a device of the character described, inter-meshing brushes adapted to form a substantially flat cleansing surface, a support or handle portion for said brushes, a guard member extending over all of said brushes except said cleansing surface, pinions to drive said spindles, a single driving

means comprising a double faced gear meshing with said pinions, and reciprocatory means on said handle comprising a spring member having oppositely-toothed racks attached thereto and associated with said gear whereby said driving means is rotated constantly in one direction by the reciprocation of said operating means.

7. In a device of the character described, inter-meshing brushes adapted to form a substantially flat cleansing surface, a support or handle portion for said brushes, a guard member extending over all of said brushes except said cleansing surface, pinions to drive said spindle, a single driving means comprising a double faced gear meshing with said pinions, and reciprocatory means on said handle comprising a spring member having oppositely-toothed racks attached thereto and associated with said gear whereby said driving means is rotated constantly in one direction by reciprocation of said operating means, all of said operating mechanism being positioned within said tubular handle, and said reciprocatory member being attached to the exterior thereof and extending through the handle wall into association with the operating gears.

8. In a device of the character described, intermeshing brushes adapted to be moved toward each other, a support or handle portion for said brushes, pinions to drive said brushes, a double-faced gear in mesh with both of said pinions, reciprocatory means extending along said handle to be operated by the hand of the user, and connecting members adapted to connect said reciprocatory means with said gear whereby a reciprocatory motion of the same drives said gear always in one direction.

9. In a device of the character described, intermeshing brushes adapted to be moved toward each other, a support or handle portion for said brushes, pinions to drive said brushes, a double-faced gear in mesh with both of said pinions, reciprocatory means extending along said handle to be operated by the hand of the user, clutch members on either side of said gear, and means for alternately forcing said members into operating relation with the gear, whereby a reciprocatory motion of the reciprocating means drives said gear always in one direction.

10. In a device of the character described, intermeshing brushes adapted to be moved toward each other, a support or handle portion for said brushes, pinions to drive said brushes, a double-faced gear in mesh with both of said pinions, reciprocatory means extending along said handle to be operated by the hand of the user, clutch members provided with clutch teeth on either side of said gear, said members also having teeth whereby they may be driven, means urging said members into operative relation with said gear, and racks attached to, and operated by, said reciprocatory member, said racks having oppositely positioned teeth thereon which mesh with the last named teeth on said members whereby the latter are rotated, first in a clockwise and then in a counter clockwise direction, said clutch teeth so intermeshing, however, that said gear is driven alternately by said members to eventuate a uni-directional rotation of said gear.

In witness whereof, I have hereunto subscribed by name.

JOHN MERKEL, JUNIOR.

Witnesses:

HENRY J. HELFRICK,

MORRIS C. BIPPOS.